

Evolution in Victorian Britain

Volume I: Evolution Before Darwin

Edited by
Caden C. Testa and Piers J. Hale



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Volume I
Evolution Before Darwin

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SERIES PREFACE

Nineteenth-Century Science, Technology and Medicine: Sources and Documents

This volume is part of the Routledge Historical Resources primary source collection, “Nineteenth-Century Science, Technology and Medicine: Sources and Documents.” This series offers a fresh look at the historical development of science, technology, and medicine through the eyes of subject experts and specialists from around the world. The series provides curated access to significant primary-source documents on these subjects, collating and contextualizing these valuable resources so that they may ground not just scholarly research but undergraduate and graduate research and teaching as well. As well as being published in print and ebook formats, the contents of this and all other volumes in this series will be available through the Routledge Historical Resources database, where they will be presented in a fully integrated and searchable format, together with supplemental secondary sources and images and newly-commissioned scholarly written and video essays.

Our editors have framed their volumes around themes they consider most pertinent to understanding nineteenth-century developments in their chosen field and their significance to broader changes in nineteenth-century British culture and society. Often, the editors have chosen to provide short extracts to illustrate particular points or themes; in other cases, they provide entire essays, book chapters, or periodical articles as appropriate. Each volume is prefaced by an introductory essay in which the editors review their topic and discuss the significance of their sources. They also frame each entry or collection of related entries with explanatory headnotes. Thus, each volume or set of volumes will provide a useful resource of easy-to-navigate, well-contextualized sources curated by an expert eye, which will serve as a useful introduction for those unfamiliar with the field. Since the editors build each volume to represent a unique, deeply considered scholarly perspective on the foundational primary sources for a particular subject, the series should also prove valuable to established scholars, even those with deep experience in the field. Indeed, given the range of topics covered and sources collated in this series, we anticipate that this project will foster an exciting and insightful interdisciplinary perspective on the histories and cultures of nineteenth-century British science, technology, and medicine. We, as general editors, have learned a lot through our engagement with the editors who have contributed to this project, and we believe that wider audiences will do so, too.

Throughout the project, we have asked editors to comment on the state of the existing historiographical debate and to specify where their own work fits in. Some editors have chosen to do this through the provision of recommendations for further reading; others do so through explicit commentary on this topic in their introductory essays and in the headnotes and footnotes of each of the sources they have selected.

The histories of science, technology, and medicine are wide and often disparate fields, even though they are often encountered by students in the context of a single university department. Although they have much in common, scholars of science, technology, and medicine also propose field-specific questions and approaches; these are represented in the project through the disparate interests of the range of scholars contributing to the series. We have also worked to bring the insights of literary scholars as well as historians to the project.

We have made every effort to cover major nineteenth-century themes and topics in the scientific and technological disciplines as well as to give space to specialist topics. Of course, as is inevitably the case in a project of this nature, which must rely on the availability of expert scholars in particular fields, there will remain gaps. We have attempted to address these where we can in the form of introductory essays and video essays in the database. We do believe, though, that the reader and researcher will find that this project presents the major themes, as well as many specialist topics, in detail and with scholarly rigour.

We are very grateful to Routledge for their invitation to take on this project, and we would especially like to thank the commissioning editor, Rachel Douglas, her successor, Laura Pilsworth, and Simon Alexander. Most of all, however, we are grateful to the extensive list of scholars from around the world who have agreed to contribute and who make this series what it is.

Piers J. Hale and Meegan Kennedy

GENERAL INTRODUCTION

The idea that all life, including ourselves, has evolved from other earlier forms has proven to be one of the most controversial in the history of Western thought. It challenged people to reflect on the very question of what it meant to be human and to think deeply about what a common ancestry with other and lower forms might mean for how we think about ourselves not only as biological but also as social, cultural, and moral beings. Most readily associated with the work of Charles Darwin (1809–1882) – both his *On the Origin of Species*, published in 1859,¹ and *Descent of Man*, which was published in 1871² – evolutionary ideas effected such a reframing of the Western sense of self that scholars have long referred to the period that followed the publication of *Origin* as “the Darwinian Revolution” to indicate the extent of this transformation in both science and society.³

As we show in the first of our volumes in *Evolution in Victorian Britain*, though, despite the subsequent emphasis on Darwin and his proposed mechanisms of natural and sexual selection, “transmutation,” or “the developmental hypothesis,” as evolution was often referred to for the first half of the nineteenth century, has a longer history.⁴ Ideas of species development can be found in antiquity, but we can trace the origins of modern evolutionary thought to the Enlightenment and to both the natural history and the political and social philosophy of eighteenth-century Europe. The idea that the development of science and learning might allow humanity not only to attain sufficiency and thus end poverty and inequality, but also to lay the foundations for continual improvement in all things, helped to establish a progressive ideology within which older notions of natural barriers and boundaries were challenged and, in many instances, overthrown. The Enlightenment and its social and political consequences thus provided a new lens through which to ask – and to answer – questions about human nature; about the meaning of sexual, racial, and class differences; and about the implications of a natural origin and development of mankind for religious belief and social organization. As we show here, Enlightenment aspirations for the freedom, equality, and brotherhood of all men had significance across Europe and, following the French Revolution, took on a deeply threatening aspect to those who supported monarchist and other hierarchical forms of government. Indeed, the shadow of the French Revolution hung over British social and scientific debates throughout the nineteenth

century. It is for this reason that we consider works from a number of prominent French thinkers in our collection. Their works were translated and widely read in Britain. In addition, of course, we also include the more significant British Enlightenment and radical thinkers; most notable for our purposes are William Godwin (1756–1836) and Erasmus Darwin (1731–1802). Godwin was arguably Britain’s most famous radical figure; his *Enquiry Concerning Political Justice* was published in 1793,⁵ following on the heels of his wife Mary Wollstonecraft’s (1759–1797) *Vindication of the Rights of Woman* (1792).⁶

THE ‘SPECIES QUESTION’ IN THE NINETEENTH CENTURY

Such political ideas did not evaporate when, by the nineteenth century, the area of focus was narrowed – or perhaps it would be more accurate to say broadened – to address the question of the origin of the new species that were being unearthed from the fossil record as the world’s first industrial nations dug into the earth in search of ores and minerals, or in cutting rail and canal networks across the land. It was this revelation in European science that framed what was called ‘the species question’ as a prominent one in the early years of the nineteenth century. It was, as Darwin noted first in his 1839 account of his voyage on the *Beagle*, but later and more famously in the first pages of *On the Origin of Species*, what the internationally renowned philosopher of science and scientific practitioner Sir John Herschel (1792–1871) had identified as the “mystery of mysteries” in modern science.⁷ The emergence of ‘the species question’ in England in the early years of the nineteenth century thus had its origins in the new science of geology rather than emerging from eighteenth-century natural history. Despite this, though, it was clear that the discovery of new fossil forms asked questions that demanded zoological answers, and in consequence, the term ‘palaeontology’ was coined to describe the study of fossil forms and their implications for our understanding of the connections between what we now call the earth and the life sciences.⁸ The significant debates in this period in the history of geology have been discussed extensively elsewhere, most notably by the historian of science Martin Rudwick.⁹ However, for our purposes, it is relevant to note here just two main aspects of these debates: First, that they raised the question not only of the origin of new species but of what scientific practitioners meant by the word species. Were species ‘real’ in nature, or was it simply a word that naturalists and systematists used to define a group of organisms that were similar in some particular way? Second, these discoveries pressed questions about the tempo and mode of change in Earth’s history. Most notable, at least in the debates as they unfolded in England, were the French geologist and anatomist Georges Cuvier (1769–1832) and the Scottish geologist Charles Lyell (1797–1875). While both men agreed that species were fixed and immutable, they disagreed vehemently over the tempo and mode of change that characterized Earth’s history. Their disagreement was over how to read the rocks and, most fundamentally, over the meaning of the layered strata that geological investigation

revealed. Lyell, in his *Principles of Geology* (1830–1833),¹⁰ followed the Scottish geologist James Hutton (1726–1797) in arguing that earth history had been one of slow and gradual change over many millions of years, while Cuvier, although he admitted that the earth was surely many hundreds of thousands of years old, held back from Lyell’s extravagant claims about the age of the earth, on the basis that he thought that such a hypothesis was both unnecessary and inconsistent with the evidence. Instead, he suggested that the often stark differences between one stratum and the next indicated that there had been frequent major “revolutions.”¹¹ These, he thought, had been caused by great floods which had both caused extinctions and laid down new layers of silt and sediment, often entrapping the remains of those animals now found as fossils. This much, he argued, fit with the geological evidence blanketing the earth. It was the nineteenth-century historian and philosopher of science William Whewell (1794–1866) who coined the terms ‘uniformitarianism’ and ‘catastrophism’ to describe the two schools of thought. These differences regarding belief in gradual and uniform change over time versus more stochastic and saltatory change in Earth’s history had implications for similar debates about the tempo and mode of evolutionary change that lasted well beyond the nineteenth century.

DARWIN, MALTHUS, AND THE POLITICS OF EVOLUTION

There remains debate among historians as to exactly when Charles Darwin came to believe in the mutability of species. It is possible that this was during the years of his medical education in Edinburgh, for as is now widely appreciated, transmutationist ideas were widely discussed and debated in the lecture halls of the Edinburgh anatomy teachers as well as in the pages of the major scientific and philosophical journals published in the city.¹² Darwin met and was clearly influenced by a number of men who had deep sympathies for the French naturalists and transmutationists Jean-Baptiste Lamarck (1744–1829), Étienne Geoffroy Saint-Hilaire (1722–1844), and others whose works were clearly embedded in an evolutionary framework. Further, as a number of historians have shown, for all that the ‘species question’ might have been prompted by fossil finds, in truth, it remained deeply connected to debates about human improvement and the effects that changes in the environment, diet, and climate might have upon human as well as animal species.¹³ Thus, as the study of these debates in Edinburgh shows, the consideration of human natural history was always to the fore, and this inevitably included the question of the nature of human racial variety, as well as the natural historical and geographical relations between them. Enlightenment experiments and dissertations on human and animal breeding only added to the controversial nature of the question.¹⁴ To put it bluntly, evolution was never only about fossils and finches; it was always about us and about what implications it might have for society – questions about sex and race were central, but so too, and especially in England, were questions about class. In this way, we can see that

the Enlightenment ideas and ideals about how best to organize society to ensure human betterment – whether they highlighted *liberté, égalité, and fraternité* or the beheading of aristocrats and monarchs – were always implicit and sometimes explicit in debates about evolution.

It was for this reason that early transmutationist ideas were controversial as much as for the notion that they might undermine belief in a young earth or a religious conception of creation, although in practice, of course, religious conservatism tended to map onto political conservatism.¹⁵ The Francophile and politically radical associations of Erasmus Darwin, Lamarck, and Geoffroy's ideas tainted later expressions of transmutationism. This was so in the case of the anonymously published and deeply evolutionary work *The Vestiges of the Natural History of Creation* (1844).¹⁶ As the historian of science James Secord has shown, the publication and dissemination of this book was a veritable sensation across all sectors of society. In it, the anonymous author, the publisher Robert Chambers (1802–1871), argued that the universe was subject to general laws of progressive development. Even though he tried to frame his evolutionary ideas in the context of a divine law-giver, his work was still read as deeply threatening to conventional morals and politics.¹⁷

Darwin paid close attention to the reception and reviews of *Vestiges* and was mindful to distance his own efforts from those of Chambers, as well as from the earlier radical and Enlightenment thinkers who had tied their ideas of progressive change to a radical political agenda.¹⁸ There has been debate about exactly why Darwin waited so long to publish his theory. Many scholars have argued that he delayed because he was aware of the religious connotations his work would have, and there are some good reasons for accepting this line of argument.¹⁹ Other scholars have noted that Darwin was not the angst-ridden theorist he has often been portrayed to have been. Rather, he was simply busy publishing his geological work and working hard in the time he had to find answers to problems he imagined future readers might have with this developing theory of natural selection.²⁰ Although the parties to this debate see these accounts of Darwin's delay as mutually exclusive, it is, in fact, quite possible that there is truth to both sides of this story, although we might add concern over the political connotations as well as religious concerns.

It was in the context of the political arguments that followed the 1832 reform act and specifically, about the reform of the poor law that Darwin was led to pick up and read *An Essay on the Principle of Population* by the minister and political economist Thomas Robert Malthus (1766–1834). Malthus had originally written his argument against the radical political and social aspirations of Godwin, Nicolas de Condorcet (1743–1794), and others. The fact that there would always be more mouths than resources meant that there would always be inequality and poverty, and thus, the notion of perpetual improvement was contrary to natural laws. People needed to eat, people had an instinct to reproduce, and the population would always expand faster than the ability of society to produce food, and the rest was inevitable.

By the late 1830s, though, liberals were reading Malthus quite differently. Instead of seeing Malthus as making an argument against positive change, they read him as setting up the necessary conditions for social improvement. If one was chaste and worked hard, then each individual could advance their position.²¹ The poor law, which would segregate the poor by sex into workhouses, would ensure that the less moral and less useful members of society no longer increased their numbers.

Darwin read Malthus and noted, as he recalled in his autobiography, “Here, then, I had at last got a theory by which to work.”²² Cutting away the moral restraint that might benefit liberals, Darwin saw that in nature, overpopulation would mean an intense struggle for existence, and then – his original insight – that under these conditions, any organism that had a variation that was in any way beneficial to it would have an advantage, and would likely survive to reproduce. Any individual that had a deleterious variation would just as assuredly succumb. If these variations were to any extent heritable, then the logical conclusion would be that species would change over time, even though it might take many, many generations. As Darwin noted in *Origin*, his theory was “the doctrine of Malthus applied with manifold force to the whole animal and vegetable kingdoms.”²³

A number of Darwin’s contemporaries instantly recognized the political significance of Darwin’s theory. Far from the Francophile radicalism that led to equality and socialism, with Malthusian theory at its heart, Darwin’s work served to naturalize the individualism and competition of liberal capitalism. The comparative anatomist Thomas Henry Huxley (1825–1895) welcomed the publication of *Origin* as “a veritable Whitworth gun in the armoury of liberalism.”²⁴ Karl Marx (1818–1883) famously wrote to his comrade and friend, Friedrich Engels (1820–1895), “It is remarkable how Darwin rediscovered, among the beasts and plants, the society of England with its division of labour, competition, opening up of new markets, ‘inventions,’ and Malthusian ‘struggle for existence.’ It is Hobbes’ *bellum omnium contra omnes*” – Thomas Hobbes’s war of each against all.²⁵ The fact that liberal theologians like Charles Kingsley (1819–1875) also welcomed Darwin’s work did a lot to allay the religious concerns of many of Darwin’s readers.²⁶

DARWINISM AND *DESCENT OF MAN*

1860 was not 1845. The kind of lawful evolutionary ideas framed anonymously in *Vestiges* were published in a Britain that was still politically unstable. The 1832 Reform Act had not opened the floodgates to revolution, as some conservatives had feared, but it had enfranchised and legitimized the growing middle class of capitalists, entrepreneurs, and industrialists.²⁷ By 1860, many of these former radicals were now a part of the establishment themselves, and young liberals were gaining an entry into science and certainly were in the business of writing about it. The ready acceptance of Darwin’s evolutionary ideas among this group is a testament to the extent to which they saw nature in their own guise and welcomed a

work that underpinned their own methods and mode of action. Of course, and as we shall show across this series of source collections, this was not the only way of reading *Origin*, and the moral meaning of Darwin's works was very much open to interpretation. This was even more the case following his 1871 publication of *The Descent of Man and Selection in Relation to Sex*. It was in this book that Darwin ventured into print on the evolution and development of humankind. While by this time, many other authors had written about the implications of evolutionary ideas for humanity, Darwin was, for obvious reasons, the most authoritative voice on the topic. It was in *Descent* that Darwin had given, amongst much else, an evolutionary account of the human mind and morals.²⁸ He had been pressed to address the topic by the defection of his colleague Alfred Russel Wallace (1823–1913) from the belief that natural selection could account for these most important aspects of humankind. And, as Darwin might have imagined, these were precisely the most controversial issues, and they upset the delicate religious compromise he had established by excluding discussion of man from *Origin* and by openly acknowledging the role of “the Creator” from the 1860 second edition onwards.²⁹

By the late 1860s, Darwin had clearly affected a religious compromise. Influential theologians like Charles Kingsley, the American botanist and devout Presbyterian Asa Gray (1810–1888), and the Unitarian Frances Power Cobbe (1822–1904) were not alone in welcoming *Origin* as a scientific theory that gave what they took to be a sound answer to the species question while allowing that a God of law lay behind the unfolding of the laws that pertained to His creation. In *Descent*, though, Darwin gave a natural historical and thoroughly contingent account of the development of the mind and morals. Conscience, morality, ethics: all of these things, if Darwin was right, were simply ideas that had served the good of the community in its struggle for existence but were otherwise quite meaningless. Cobbe and Kingsley each publicly distanced themselves from Darwin's position, Cobbe in her review of *Descent* published in the *Theological Review*, “Darwinism in Morals,” and Kingsley in his 1871 Presidential Address to the Devonshire Association for the Advancement of Science, Literature, and the Arts.³⁰ However, while they rejected Darwin's opinion on this particular point, they did not walk back their long-established support for evolution. Rather, they doubled down on their own theistic interpretations of Darwin's work and of the necessary place of God at the heart of the evolutionary process. This set the ground for a further range of theistic interpretations of evolution that went on in the context of broader debates about the increasingly apparent turn towards scientific naturalism and away from theism within the broader scientific community.³¹ It is clear that although the publication of *Origin of Species* had done away with the old idea of an ever-creating God, it did not undermine the idea of an ever-acting God. These disputes went on, and are worth following in greater detail, in the Metaphysical Society, a debating club established in 1869 to debate exactly these issues. Its members met monthly until it was disbanded in 1880.³²

MALTHUS OR MUTUALISM

Descent of Man was not only read as having theological and metaphysical implications but also as having political import. Whereas, in *Origin*, Darwin had emphasized competition between individuals in a bitter struggle for existence, in *Descent* he emphasized instead the cooperation and mutualism that had allowed one society to best another. It was in this context that he sought to explain the evolution of mankind's social and moral characteristics.³³ It is, therefore, unsurprising that anarchists and socialists read the moral and political meaning of Darwin's work to be quite different from the ways in which the likes of the liberal comparative anatomist Thomas Huxley had read it. Noting that Darwin had acknowledged in *Origin* that he used the term the struggle for existence "in a broad and metaphoric sense" to include the struggle against the environment and reliance of one being upon another, the anarchist Peter Kropotkin (1842–1921) wrote a series of essays in which he sought to reclaim the politics of evolution for anarchist-socialism.³⁴ They were originally published in response to Huxley's essay "The Struggle for Existence: A Programme," in the journal *Nineteenth Century* from 1889 through the 1890s, and were brought together in book form under the title *Mutual Aid. A Factor in Darwinism* in 1902.³⁵ As we show in our third collection of sources, although Kropotkin's *Mutual Aid* was influential, it was far from the only socialist interpretation of evolution.³⁶

EVOLUTION AND THE 'WOMAN QUESTION'

In *Descent*, Darwin elaborated on the theory of sexual selection that he had already outlined briefly in *Origin of Species*.³⁷ It was through sexual selection that Darwin sought to explain the sexual dimorphism that was evident across so many species. Darwin described sexual selection as having two distinct aspects: one was male-male conflict in order to gain access to fertile females, which he called "the law of battle," and the other was the selection of the most attractive males by the females. Darwin called this "female choice." In *Descent*, Darwin suggested that it was through these processes that the human male had become "more courageous, pugnacious, and energetic than women, and has a more inventive genius."³⁸ The human female, by contrast, had become more maternal, physically weaker than man, less intellectually developed, and a more emotional, intuitive, and moral being.³⁹

Further, although female choice continued to play a role in human sexual selection, as Darwin noted in *Descent*, because the male had become "more powerful in body and mind than woman" during the course of the evolution of the human species, he had at quite an early stage "gained the power of selection." Male preference had thus come to play a dominant role in the moulding of the female form and character.⁴⁰ More often than not, husbands and brothers chose whom the single women of their family were to marry. In this respect, Darwin's theory did nothing to challenge or change the conventional bourgeois sexual division of labour.⁴¹

Others wrote more extensively on this topic; among them was the essayist, ardent Darwinian, and psychologist Henry Maudsley (1835–1918). Maudsley wrote on the science of mind and mental development, as well as on mental pathology. He had experience working in asylums for lunatics and the insane but turned quickly to writing.⁴² His works became foundational in the developing field of mental science. They influenced Darwin in the preparation of his 1872 book *The Expression of Emotion in Man and Animals*, but he was also deeply influenced by Darwin in turn. Maudsley adopted Darwin's ideas regarding sexual dimorphism and held a view of women that was quite in accord with those we have already outlined in Darwin's thinking on the matter. If anything, though, Maudsley's writing on women was even more demeaning, and he was challenged on this in public by the physician and suffragist Elizabeth Garret Anderson (1836–1917).⁴³

Indeed, if we look at the writings of advocates of women's rights, whether they were suffragists or socialists of one kind or another, following the publication of *Descent*, it was almost routine for them to appeal to Darwin's theory in one way or another to support their own claims.⁴⁴ In some cases, they accepted his account that it was the relatively recent turn in 'civilized society' to refuse women's choice that had indeed resulted in women's evolution towards biological and, thus, social inferiority. It was thus necessary, they argued, to change the prevailing sexual and social arrangements so that women's true nature might be developed and equality might be achieved.

DARWINISM, COLONIALISM, IMPERIALISM, AND RACE

Darwin appealed to sexual selection not only to account for sexual differences but also the differences between human racial groups. Different groups, he surmised, had developed different standards of beauty, and the selection of mates had resulted in these preferences being carved into the bodies of both the male and the female of each racial group across many generations of selection.⁴⁵

As recent scholarship has shown, although Darwin's family was deeply opposed to slavery and was active in the abolitionist movement, in many ways, Darwin was fairly conventional in his general beliefs about racial differences.⁴⁶ Like many other white, middle-class Europeans, he thought that his own class and culture were better than those of other nations and races. Thus, even though he was committed to a monogenist account of the development of all humans (that is, he believed that all humans shared a common ancestor – a view that was in contrast to the polygenism that predominated in the Anthropological Society of London), he thought that the non-European races were, on the whole, less evolved than those of northern Europe.

Where Darwin had appealed to the competition between tribes and communities to account for the development of human social and moral qualities, others chose to read this as implying that competition and war between racial, ethnic, and national groups was a good thing for the further development of society. As

such, Darwin's name and ideas were often appealed to in ways that sought to justify colonial and imperial endeavours, and to underpin long-held beliefs about white supremacy.⁴⁷

This series of primary source volumes on *Evolution in Nineteenth Century Britain* aims to show just how ubiquitous the ideas and language of evolution became throughout Britain and across the nineteenth century, but we should acknowledge here, too, that they had a much wider influence as well. As we aim to show, however, although scholars have long and quite rightly referred to a "Darwinian Revolution" following the publication and popularization of Charles Darwin's *On the Origin of Species* in November 1859, discussion of "transmutationist" or "developmental" ideas was rife throughout the nineteenth century. Indeed, and as we shall further explore through the first volume in this set *Evolution Before Darwin*, the discussion of evolution before Darwin was much wider than has conventionally been understood.⁴⁸ It has not been unusual, for instance, for histories of this period to acknowledge that Darwin had his forerunners. Buffon (1707–1788), Erasmus Darwin, Jean-Baptiste Lamarck, Herbert Spencer (1820–1903), and the anonymous author of the book *The Vestiges of the Natural History of Creation* are routinely discussed in this light. However, more recently, historians such as Adrian Desmond, James Secord, Paul Elliot, and Pietro Corsi, amongst others, have been working to show that discussion of evolutionary ideas was a much more widespread and popular phenomenon than this list of admittedly significant individuals alone suggests. Indeed, it is fair to say that Darwin's *On the Origin of Species* needs to be viewed merely as Darwin's contribution to an already ongoing and highly controversial social, cultural, and political, as well as scientific, debate. This is an important volume in this series, for rather than just providing an introduction to the discussion of developmental ideas before Darwin, it sets up the social and cultural framework within which and through which people encountered and read Darwin. The idea of transmutation already had a range of political and cultural meanings prior to 1859, and thus, we cannot really understand the debates that followed the publication of *Origin* without recognizing and appreciating this fact.

Our second and subsequent volumes turn more explicitly to Darwin and the publication, reception, and popularization of his work. And we reiterate that following the publication of *Origin*, it really does make sense to talk about a 'Darwinian revolution.' What will become clear is that even though the meaning of Darwinism was and remained very much contested throughout the nineteenth century, Darwin had been successful in capturing the ground from earlier theorists to the extent that his name became synonymous with the very idea of evolution. 'Darwinism' had been born! Further, even though Darwin's theories of natural and sexual selection each remained subject to criticism and question among scientific practitioners, particularly as to whether they were adequate to account for speciation, both natural selection and sexual selection – as well as the idea of a natural and inevitable "struggle for existence" and "progressive development" – came to dominate all aspects of Victorian culture, politics, and society. As a

number of scholars have shown, this was so not only across literature but also in art, architecture, dance, and more.⁴⁹

As readers will expect, in our second volume, *Evolution and Religion in Nineteenth-Century Britain*, we turn first to the perceived theological implications of Darwin's theory of evolution by natural selection.⁵⁰ In our introduction to that collection, we reiterate that we have to keep in mind that readers read and judged the religious implications of Darwin's contribution to the species question in light of their preconceptions of the implications of developmentalism more broadly. What we shall recognize, though, is that one of Darwin's more significant achievements was in managing to convert to his way of thinking a number of prominent and influential liberal theologians, who were able to help smooth the way for a wider acceptance of evolutionary ideas as quite compatible with religious belief in a way that earlier theorists just were not able to do. This cemented a compromise that brought an admittedly revised orthodoxy into line with the latest science at the, by this time, somewhat small cost of the idea of 'special creation.' We will chart the ways in which this compromise was undermined by Darwin's account of the evolution of both the moral sense and moral standards, and the debates that developed from this, in this second volume.

In our third and following volumes, we turn more overtly to the perceived political implications of evolutionary and "Darwinian" ideas. Volume three, *Evolution and Socialism in Nineteenth-Century Britain*, is dedicated to socialist Darwinism.⁵¹ While there have been many studies on social Darwinism and the association that some of Darwin's contemporaries drew between Darwin's individualistic and competitive theory of natural selection and laissez-faire capitalist economics, we want to highlight that there was a wider diversity of political responses. Certainly, Marx and Engels were of the opinion that with *Origin*, Darwin had made a great contribution to their own political perspective, but following the publication of *Descent of Man* in particular, socialists of all shades argued that the theory of evolution gave a natural ground for socialism over capitalism and collectivism over individualism. As we show, however, socialists found that there were as many different ways of reading Darwin's work as there were varieties of socialism. It was not simply the case, though, that people bent Darwin to their own ends – although this is certainly a part of the story; rather, it was frequently the case that in embracing Darwin, socialists often found that they had to alter their political beliefs to fit with the biology they had committed themselves to.

Our fourth volume, *Evolution, Sex, Gender, and the Woman Question in Nineteenth-Century Britain*, expands on this topic to cover the impact that evolutionary ideas had on the discussion of women's place in society.⁵² The "woman question," as it was termed, dominated Victorian political debate in the second half of the nineteenth century. The Industrial Revolution drove many social and demographic changes and the influx of many young women into rapidly expanding cities in search of work and, increasingly, education, political representation, and an active place in society. It was clear that with the formation of new classes, both proletarian and bourgeois, conventional ideas about gender and conventional

gender roles could not stand. Evolutionary ideas about transformation, development, sex, and progress were thus a rich resource for those who sought to make both conservative as well as progressive claims about the place of women in society. As we shall see, not only does this volume include the voices of those who used biological arguments to make the case for female inferiority and thus substantiate existing social and sexual hierarchies, but also a number of prominent voices who argued the contrary. Perhaps predictably, we find the voices of capitalists and socialists, conservatives and reformers, and men and women on both sides of this question. Each appealed to evolutionary arguments to frame and defend their position. Here, we want to emphasize the voices of those, especially of those women, who appealed to Darwin and his ideas to find a political space for their own liberation. These sources are less well known and thus, we see this aspect of this collection in particular as a vital and valuable contribution to existing scholarship.

The fifth volume, *Evolution, Race, and Colonialism in Nineteenth-Century Britain*, engages with the ways in which evolutionary ideas were invoked to describe, categorize, and marshal the concept of race across the nineteenth century, and we see this collection as complementary to other collections in this series that speak specifically to the science of race in nineteenth-century Britain.⁵³ The fact that evolutionism often drew linear – even if sometimes branching – theories of species development meant that it was taken to speak to contemporary concerns and anxieties about the relationship between different racial, national, and ethnic groups of humans. In Britain, in particular, participants in the debates about the morality and legality of slavery in the first half of the century and about the rights and wrongs of imperialism and colonialism in the second routinely appealed to and invoked evolutionary ideas to make their case. Thus, in this volume, we look at Darwin’s views on race, the earlier history of race science from the 1820s through to the 1850s, as well as the ways in which Darwin’s work was later appealed to, appropriated from, and applied to re-create and reinforce biological categories of race from the 1870s onwards.

The nineteenth-century playwright, sometime Fabian socialist, and social commentator George Bernard Shaw (1856–1950) once remarked that what made Darwin so popular and Darwinism so ubiquitous was that “he had the luck to please everybody who had an axe to grind.”⁵⁴ And, as we hope to have shown through these volumes, in a sense, Shaw was right. But beyond merely suggesting that Darwin’s work was open enough to appeal to anyone with a cause, we also hope to have shown that the discourse of development, transmutation, and evolution became so ubiquitous that no one with a social or political agenda could afford not to embrace at least some aspects of Darwin’s work, even when they reframed, muted, or denied others. “Darwin” and “Darwinism” became social and political signifiers that allowed their users (Darwin included) to speak with the authority of nature and natural law. In the context of social, cultural, and political arguments about how we might best live, how we might ensure social progress (and what that might look like, and for whom), and how we might guard against

social degeneration (and what that might mean, and to whom), evolutionary language was at once irresistible and indispensable. By the third quarter of the century, it was certainly the case that both Darwin's name and the broad concept of 'Darwinism' had become an integral and necessary part of British nineteenth-century culture.

Notes

- 1 Charles Darwin, *On the Origin of Species by Means of Natural Selection; or the Preservation of the Favoured Races in the Struggle for Life* (London: John Murray, 1859).
- 2 Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (London: John Murray, 1871).
- 3 Michael Ruse, *The Darwinian Revolution. Science Red in Tooth and Claw* (Chicago: University of Chicago Press, 1977) is perhaps the most classic example.
- 4 Caden Testa and Piers J. Hale, *Evolution Before Darwin* (London: Routledge, 2025).
- 5 William Godwin, *An Enquiry Concerning Political Justice and Its influence on General Virtue and Happiness*, 2 vols. (London: G.G. J & J Robinson, 1793).
- 6 Mary Wollstonecraft, *A Vindication of the Rights of Woman with Strictures on Political and Moral Subjects* (Boston: Peter Edes 1792).
- 7 Charles Darwin, *Journal of Researches into the Natural History and Geology of the Countries Visited During the Voyage of H.M. S. Beagle Round the World, Under the Command of Capt. Fitz Roy, R.N.* (New York: Harper & Brothers, 1846), pp. 145–6; Charles Darwin, *On the Origin of Species by means of Natural Selection, or the preservation of the favoured races in the Struggle for Life*, (London: John Murray, 1859), p. 1.
- 8 Henri Marie Ducrotay de Blainville, "Analyse des principaux travaux dans les sciences physiques, publiés dans l'année 1821," *Journal de physique*, tome XCIV, p. 54. De Blainville coined the term specifically to describe the work of Georges Cuvier in this area of study.
- 9 Martin J.S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005); Martin J.S. Rudwick, *Worlds Before Adam. The Reconstruction of Geohistory in the Age of Reform* (Chicago: University of Chicago Press, 2008).
- 10 Charles Lyell, *Principles of Geology*. 3 vols. (London: John Murray, 1830–33).
- 11 Georges Cuvier, *Essay on The Theory of the Earth* (Edinburgh: William Blackwood, 1827).
- 12 Bill Jenkins, *Evolution Before Darwin: Theories of the Transmutation of Species in Edinburgh, 1804–1834* (Edinburgh: Edinburgh University Press, 2021).
- 13 Bill Jenkins, "Race before Darwin: Variation, adaptation and the natural history of man in post-Enlightenment Edinburgh, 1790–1835" *British Journal for the History of Science*, (2020), 53 (3): 333–350. Evelleen Richards, "The 'Moral Anatomy' of Robert Knox. The Interplay Between Biological and Social Thought in Victorian Scientific Naturalism," *Journal of the History of Biology* (1989), 22, (3): pp. 373–436. B. Ricardo Brown, *Until Darwin. Science, Human Variety, and the Origins of Race* (London: Pickering and Chatto, 2010).
- 14 Caden C. Testa and Piers J. Hale, "Mapping evolutionary ideas in Britain in the first half of the nineteenth century," in Caden C. Testa and Piers J. Hale, (eds.), *Evolution Before Darwin* (London: Routledge, 2025).
- 15 Adrian Desmond, *The Politics of Evolution. Medicine, Morphology, and Reform in Radical London* (Chicago: University of Chicago Press, 1989), pp. 213–20; Piers J.

- Hale, *Political Descent. Malthus, Mutualism and the Politics of Evolution in Victorian England* (Chicago: University of Chicago Press, 2014).
- 16 [Robert Chambers], *The Vestiges of the Natural History of Creation* (London: John Churchill, 1844).
- 17 James Secord, *Victorian Sensation. The Extraordinary Publication, Reception, and Secret Authorship of The Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000).
- 18 Secord, *Victorian Sensation*; Janet Browne, *Charles Darwin. Voyaging. A Biography* (Princeton N.J., Princeton University Press, 1995), pp. 462–65.
- 19 Adrian Desmond and James Moore, *Darwin. The Life of a Tormented Evolutionist* (London & New York: W. W. Norton & Co., 1991).
- 20 Robert J. Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*, Chicago: University of Chicago Press, 1987; John van Wyhe, “Mind the Gap: Did Darwin Avoid Publishing his Theory for Many Years?” *Notes and Records of the Royal Society* (May 2007), 61, (2): pp. 177–205.
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- 22 Nora Barlow, (ed.), *The Autobiography of Charles Darwin 1809–1882* (London: W. W. Norton & Co., 1958), p. 120.
- 23 Darwin, *Origin*, 1859, p. 62–3.
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- 25 Karl Marx and Friedrich Engels, June 18, 1862, in Karl Marx and Friedrich Engels, *Karl Marx and Friedrich Engels: Collected Works*, 50 vols. (New York: International Publishers, 1975–2004), 41:381.
- 26 Piers J. Hale, “Darwin’s Other Bulldog: Charles Kingsley and the Popularisation of Evolution in Victorian Britain,” *Science and Education*, (2012), 21, pp. 977–1013.
- 27 Eric J. Evans, *The Great Reform Act of 1832* (London: Routledge, 1994).
- 28 Piers J. Hale, “Charles Darwin, sexual selection, and the evolution of other-regarding ethics” *British Journal of the History of Science. Themes*, 6, (2021), pp 157–177.
- 29 Darwin, *On the Origin of Species by Means of Natural Selection, or the Preservation of the Favored Races in the Struggle for Life* (London: John Murray, 1860), p. 490.
- 30 Frances Power Cobbe, “Darwinism in Morals,” *Theological Review: A Quarterly Journal of Religious Thought and Life* 8, no.33 (1871), pp. 167–192.
- Charles Kingsley, “President’s Address,” *Report and Transactions of the Devonshire Association for the Advancement of Science, Literature and the Arts* 4, no.1, (1871), p. 383.
- For further commentary see Piers J. Hale, “Darwin, Design, and the Honey Bee. The Morality of the Hive,” *American Bee Journal*, (Oct. 2020), pp. 1103–1107.
- 31 Bernard Lightman, “Darwin and the Popularization of Evolution,” *Notes and Records of the Royal Society* 64 (2010): pp. 5–24.
- 32 For more on the Metaphysical Society see Alan Willard Brown, *The Metaphysical Society. Victorian Minds in Crisis, 1869–1880* (New York: Columbia University Press, 1947); and more recently Catherine Marshall, Bernard Lightman, & Richard England, (eds.), *The Metaphysical Society (1869–1880). Intellectual Life in Mid-Victorian England* (Oxford: Oxford University Press, 2019); also see Caden C. Testa and Piers J. Hale, *Evolution and Religion* (London: Routledge, 2024).
- 33 Darwin, *Descent*, (1871), chapter 3.
- 34 Piers J. Hale, *Political Descent. Malthus, Mutualism, and the Politics of Evolution in Victorian England* (Chicago: University of Chicago Press, 2014), chapter 5.
- 35 Peter Kropotkin, *Mutual Aid. A Factor in Evolution*, (London: Freedom Press, 1902).

- 36 Caden C. Testa and Piers J. Hale, (eds.), *Evolution and Socialism* (London: Routledge, 2025).
- 37 Darwin, *Origin*, 1859, pp. 87–90.
- 38 Darwin, *Descent*, 1871, vol. 2, p. 316.
- 39 Darwin, *Descent*, 1871, vol. 2, pp. 326–9.
- 40 Darwin, *Descent*, 1871, vol.2, p. 371.
- 41 For a thorough study of the social, cultural and scientific development of Darwin's theory of sexual selection see Evelleen Richards, *Darwin and the Making of Sexual Selection* (Chicago: University of Chicago Press, 2017).
- 42 For more on Maudsley see Daniel Pick, *Faces of Degeneration. A European Disorder, c.1848–1918* (Cambridge: Cambridge University Press, 1989); Elaine Showalter, *The Female Malady. Women, Madness and English Culture 1830–1980* (London: Virago, 1987), see chapter 5 especially.
- 43 See Caden C. Testa and Piers J. Hale, *Evolution and the Woman Question* (London: Routledge, 2025).
- 44 See Testa and Hale, *Evolution and the Woman Question*.
- 45 Darwin, *Descent*, 1871, vol.2, pp. 343–354.
- 46 Darwin, *Descent*, 1871, vol. 1., pp. 214–250; Adrian Desmond and James Moore, *Darwin's Sacred Cause: How a Hatreds of Slavery Shaped Darwin's views on Human Evolution* (New York: Houghton Mifflin Harcourt, 2009).
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- 48 Caden C. Testa and Piers J. Hale, *Evolution Before Darwin* (London: Routledge, 2025).
- 49 Bernard Lightman and Bennett Zon, (eds.), *Evolution and Victorian Culture* (Cambridge: Cambridge University Press, 2014).
- 50 Caden C. Testa and Piers J. Hale (eds), *Evolution and Religion in Nineteenth-Century Britain* (London: Routledge, 2025).
- 51 Caden C. Testa and Piers J. Hale (eds.), *Evolution and Socialism in Nineteenth-Century Britain* (London: Routledge, 2025).
- 52 Caden C. Testa and Piers J. Hale (eds.), *Evolution, Sex, Gender, and the Woman Question in Nineteenth-Century Britain* (London: Routledge 2025).
- 53 Caden C. Testa and Piers J. Hale, (eds.), *Evolution, Race, and Colonialism in Nineteenth-Century Britain* (London: Routledge, 2025); see also, for example, the volumes on race in nineteenth-century science edited by B. Ricardo Brown.
- 54 George Bernard Shaw, 'Preface' to *Back to Methuselah: A Metabiological Pentateuch* (London: Constable and Company Ltd., 1921).

INTRODUCTION TO VOLUME I: EVOLUTION BEFORE DARWIN

Mapping Evolutionary Ideas in Britain in the First Half of the Nineteenth Century

The history of the development of evolutionary ideas has focused largely on Charles Darwin for a good reason. His theories of natural and sexual selection, which he developed across both *On the Origin of Species* (1859) and *The Descent of Man* (1871), have become central to modern biology. Historians frequently refer to the period that followed the publication of *Origin* as ‘the Darwinian Revolution’ precisely because Darwin’s evolutionary ideas had a lasting impact not only upon science but on so many other aspects of Western culture and society. Indeed, it has frequently been claimed that the extent of the change that Darwin’s work effected in the dominant Western conception of what it meant to be human is arguably unmatched in the history of Western thought and is akin to the scale of change in worldview brought about by Copernicus.

However, despite this emphasis, historians have long known that Darwin was far from the only person to suggest that life had evolved, and neither was he the first to do so. This fact clearly undermines the view that is commonly held by the wider public that before Darwin published *On the Origin of Species* in 1859, everyone thought that each species existed just as it had been since the Creation. Indeed, in light of what geologists already knew about the earth before 1800, the notion that before Darwin, everyone believed that the earth was only 6,000–10,000 years old (depending on how one counted the various ‘begats’ recorded in *Genesis*) is also untenable. By the early 1800s, geologists were already proposing that the earth must be many hundreds of thousands of years old, if not older, and in the first volume of his three-volume *Principles of Geology* (1830–1833), the Scottish geologist Charles Lyell (1797–1875) revived the uniformitarian and gradualist ideas of his countryman James Hutton (1726–1797) to argue that the age of the earth should be counted in millions and not simply in hundreds of thousands of years.¹ Further, though, and undermining the historical focus on Darwin, the historian of science Peter J. Bowler has long argued that it is not as certain as is often presumed that even after 1859, Darwin’s ideas about the origin of new species were the most influential of the various evolutionary schemes that had already been proposed. It is in light of this that Bowler has claimed that we can better understand the post-*Origin* years in terms of a “non-Darwinian Revolution.” Naturalists did embrace evolution but often remained skeptical of natural selection.²

While not all historians agree with Bowler's "non-Darwinian" terminology, or all he means it to imply, it is certainly the case that elements of pre-Darwinian theories of development persisted long after Darwin published his own work – indeed, aspects of Darwin's own argument contributed to this phenomenon.³ Thus, there is good reason to revisit these earlier theories not just to contextualize Darwin's later achievement – although consideration of these earlier theories and theorists is essential if we are to appreciate the deeply moral and political implications that transmutation was taken to have across the nineteenth century – but also in order to really get an appreciation of the range of developmentalist ideas that were theorized, published, and debated in the decades before Darwin.

It is this last point that we want to emphasize here, for it informs the methodological approach we want to emphasize in this collection and to advocate for among our readers. We read these sources not simply as the publications of significant precursors to Darwin but rather as writers whose texts were not just published but popularized and became popular. In saying this, we recur to the important 1994 article by Roger Cooter and Stephen Pumfrey in which they appealed to their colleagues in the history of science to take the study of the popularization of science seriously and to think too about what it might mean to study science in, and science as, popular culture.⁴ Since the publication of Cooter and Pumfrey's essay, there has been a whole swath of scholars who have turned to the study of science popularization but also to the study of science in and as popular culture, and we read these texts in light of this historiographic approach. We are thus indebted to the decades of work by scholars who have developed these approaches to our discipline. In following their lead, we gain a much richer account of the history of evolution which reveals the depth of the social, political, and cultural importance of evolutionary ideas across this period.

Through this introduction and the headnotes provided for the sources in this collection, we thus seek to put these texts into context. We recognize that they were each written as a contribution to an ongoing debate about the nature of the human condition, and reconstructing this debate – and its social, political, and cultural implications – is a necessary part of making sense of them. Further, such contextualization allows us to see more fully what was at stake for the writers of these selections as well as for those they wrote for, and against. We also recognize that the study of the popularization of the ideas in these texts calls for more than thinking in terms of the mere dissemination of the arguments and ideas contained therein, but rather often in their appropriation, reframing, and rearticulation, often in ways over which the original author had little or no control.

We have divided this work into largely chronological sections, but before proceeding on our broad historical narrative, by way of a preface, we introduce this collection with excerpts from Alfred Lord Tennyson's poem *In Memoriam*. We do so for several reasons. First, Tennyson's poem, which preceded Darwin's *Origin* by almost a decade, was rife with evolutionary ideas. More to the point, though, Tennyson gave voice to the cultural, social, and metaphysical anxieties that came along with a full acceptance of a thoroughly natural history of mankind and the

world we inhabit. The anonymous *Vestiges of the Natural History of Creation* combined with the deep time of Lyell's *Principles of Geology* provided the context in which an evolving nature cared nothing for the individuals, or indeed the species, that came into being and passed away across the long march of geological time. As the historian of science James Secord has suggested, "for thousands of readers, Tennyson's *In Memoriam* offered the most profound integration of the evolutionary narrative into everyday experience,"⁵ and this is something we need to keep in mind as we read the sources provided here. Although the majority of the texts we have provided here are written as non-fiction and framed more as what modern readers might more readily identify as 'science' than as 'literature,' we need to look too for evidence of evolution's impact in wider social, political, and literary culture if we are to grasp the importance that transmutationist or evolutionary ideas had upon Victorian society. Following our preface, we turn our attention to transmutationist ideas in Enlightenment thought and then on to how these ideas were received, interpreted, and often appropriated in Edinburgh in the 1820s, a particularly vibrant time in the intellectual discussion and debate in Scotland's capital city. In our third section, we turn to the articulation of, and debate over, the 'developmental hypothesis' in mid-Victorian England. After the 1832 Reform Act, British politics and society changed significantly, and so too did the debate about transmutation. Finally, in a fourth and shorter section, we include a selection of authors who only later came to notice as having anticipated Darwin. Darwin acknowledged them in the 'historical sketch' that he wrote as a preface to the third and subsequent editions of *Origin*. We close this essay with a further brief commentary on our methodological approach.

EVOLUTIONISM IN THE ENLIGHTENMENT

Although the focus of much of the literature on the history of evolutionary thought has almost always been on Darwin, even the earliest scholarly accounts of this history have sought to contextualise Darwin's work by including at least brief discussion of those who framed earlier evolutionary accounts of life's history. Indeed, the move during the eighteenth-century Enlightenment to champion the almost limitless possibilities of human reason and to pursue an empirical investigation of the natural world led to theories of organic change over half a century before Darwin's work was published. As a number of scholars have pointed out, the contemporary discoveries and theories of mineralogists and geologists regarding a dynamic, rather than a static, earth history seemed to imply the necessity of a dynamic history of life as a matter of logic.⁶ However, as Peter Bowler has argued, the materialist philosophies propounded by Enlightenment thinkers were often constrained by their Cartesian insistence that animals were mere machines, as well as by their rejection of what they supposed to be unsubstantiated and unscientific appeals to supernatural 'vital forces' of generation. Indeed, even when the crucial question of reproduction or 'generation' was considered, it was almost always invoked as the mechanism that perpetuated stability rather than

as a dynamic driving force of biological novelty and change, and Bowler thus contends that their thinking was of quite a different and limited character when compared to later developmentalist thinking.⁷

As we shall see in the works presented here, though, there were thinkers who pressed beyond this framework. The work of the French naturalist Georges Louis Leclerc, the Comte de Buffon (1707–1788), was clearly suggestive of some belief in the natural development of species through adaptation to changed environmental circumstances, for instance. Across the channel in England, the British naturalist, philosopher, and physician Erasmus Darwin (1731–1802) framed reproduction as a driving and productive force of speciation and development. In works such as *The Botanic Garden* (1789; 1791), *Zoonomia; or The Laws of Organic Life* (1794), and *The Temple of Nature* (1803), he developed and laid out his transmutationist theory. He wrote racy poetry about the sex lives of plants in defence of the Linnean system of classification and speculated upon an evolutionary origin and development of life and society.⁸

Other Enlightenment thinkers who invoked the idea of species change did appeal to a vital life force as the motive power that drove natural development, although they were clear in trying to distance their own ideas from discredited earlier vitalist thinking. Here, the German physician, physiologist, and anatomist Johann Friedrich Blumenbach (1752–1840), the French invertebrate specialist and botanist Jean-Baptiste Lamarck (1744–1829), and his colleague the anatomist Étienne Geoffroy Saint-Hilaire (1772–1844) merit our consideration. Blumenbach framed the idea of a “*Bildungstrieb*,” a developmental drive to explain the developmentalism seen in embryology and across the natural world more broadly, whereas Lamarck appealed to a “*sentiment intérieur*” as the animating force of development and adaptation.⁹ Geoffroy supported and expanded Lamarck’s theory but gave emphasis to the divergent development in embryo.

Of the three, Lamarck has generally been given the most attention, especially in the context of the reception of evolutionary or transmutationist ideas in England, for he not only articulated a protracted argument in which he suggested that present-day species had descended from earlier kinds and clearly explained the mechanism by which he believed they had done so, but his work was also widely commented on and popularized in England, a point to which we shall return shortly.¹⁰ Neither Blumenbach nor Geoffroy, though, was without influence.¹¹

Lamarck devised his evolutionary or ‘transmutationist’ theory in the 1790s and brought it together most clearly in his 1809 book *Zoological Philosophy*. His views have frequently been summarized to emphasize his belief in the ‘inheritance of acquired characters’ – the idea that adaptations acquired in an individual organism’s lifetime could then be transmitted to their offspring; however, as scholars have shown, and as we shall indicate here, his ideas were more complicated than this. Indeed, this was very much a secondary element of his understanding of transmutation. Rather, he believed that once organisms had come into being through a spontaneous generation, they were subject to an ‘internal sentiment’ (*sentiment intérieur*) that drove their development from their simple

beginning to an ever-greater complexity. This generally linear development was then subject to direct adaptation resulting from the contingencies of environmental circumstances, and these acquired characteristics might then be inherited by their offspring.¹² As Caden Testa has shown, although historians of evolutionary ideas have often tended to look at Lamarck's theory of development in isolation from his other work and overall aims, his transmutationist ideas, along with his ideas about health, agriculture, and meteorology, were in fact a part of Lamarck's broader contribution to ongoing debates about how best to regenerate the health and prosperity of the French nation.¹³ In the context of these debates, it had been quite common to propose means of biologically improving or perfecting human bodies as a way of enacting various systematic reforms that would address broad social and political problems in France. Such hopes of improving the human species were deeply tied to Enlightenment-era ideas about the progress and perfectibility of humanity, as well as suggestions that biological interventions might provide the answers to the political upheaval France faced throughout the decline of the Old Regime and the revolutionary years. Some of Lamarck's direct intellectual influences, including both Buffon and Condorcet, had also made such suggestions about the relationship between biology and politics, arguing that interventions ranging from encouraging public health and hygiene to selectively 'breeding' human beings would improve the species and ultimately allow for the creation of a better and more enlightened nation.

Other and earlier French philosophes, such as the ardent materialist Julien Offray de La Mettrie (1709–1751) and Pierre Louis Moreau de Maupertuis (1698–1759), also argued for developmentalism of a sort. Maupertuis's 1745 work *Venus physique* was particularly important in this regard, as was his later *Système de la nature* (1751). He not only advanced a theory of embryological development that suggested it as a source of novelty and creative development, but applied his ideas to the origin and development of humans and of the human races. Important here too were the writings of the French philosopher and mathematician Nicolas de Condorcet (1743–1794). Condorcet's *Sketch of a Historical View of the Progress of the Human Spirit* (1795) quickly became one of the most influential works of the French Enlightenment period and underpinned a prevailing faith in human progress as a result of science, learning, and reason. Written in 1794 while Condorcet was in hiding amidst the turmoil of the revolution, this work was published both in England and in France in 1795, achieving wide circulation. Alongside William Godwin's *Inquiry Concerning Political Justice* (1793), it quickly became a major reference point in English political radicalism. Like Condorcet, William Godwin (1756–1836) argued that the application of science and learning to the human condition would ensure progress and end poverty and injustice. It was this optimism that underpinned his faith that humankind could win sufficient resources from nature to ensure that no one went hungry and that mankind could live under social and political conditions of equality – an idea that Godwin's partner, Mary Wollstonecraft (1759–1797), had made clear in her 1792 work *A Vindication of the Rights of Woman* also applied to women.¹⁴

The radical political connections to transmutation and developmentalism need to be stressed because they were not only a central part of the French calls for *liberté, égalité, and fraternité*, but, as the historian of science Adrian Desmond has pointed out, also of the ambitions and rationale of a significant faction of the English political radical movement.¹⁵ Such was the popularity and influence of both Condorcet and Godwin that Thomas Robert Malthus was prompted to put pen to paper to counter their arguments in his 1798 work *An Essay on the Principle of Population*. It was the 6th edition of this book that Darwin famously read in September 1838, and that immediately prompted him to recognize that the incommensurable ratio between population growth and the increase in available resources would lead to a struggle for existence that would have telling consequences for the different varieties of a species. Our concern here, though, is to point out that Malthus's work – and thus Darwin's theory, in which he vociferously acknowledged his debt to Malthus – had its own deeply political associations.¹⁶

EDINBURGH TRANSMUTATIONISTS

Both in his Introduction to *Origin* and even more so following its publication in November 1859, Darwin was keen to distance his own theory of evolution by means of natural selection from earlier ideas and from those of Lamarck in particular. This was a line of argument he maintained in his autobiography, asserting that the works of his grandfather, of Lamarck, and of other theorists had little impact upon his own thinking.¹⁷ Historians have been reluctant to accept Darwin's dismissal of these earlier thinkers quite so readily, however, and for good reason. As we make clear here, the ideas not only of Erasmus Darwin and Lamarck, but also of Lamarck's colleague Étienne Geoffroy Saint-Hilaire and of Blumenbach, were widely circulated and discussed in Edinburgh throughout the 1820s and 30s, exactly when Darwin was in the city studying medicine. Not only was Darwin's mentor, the naturalist and political radical Robert Grant (1793–1874), deeply impressed by Lamarck and Erasmus Darwin's ideas, but so too, it seems, was the geologist Robert Jameson (1774–1854), under whom Darwin also studied.¹⁸ Further, radical, materialist, and developmentalist phrenology was also discussed – and condemned – at the meetings of the Plinian Society, the scientific society at which Darwin read his first research paper.¹⁹ Edinburgh was also home to the anatomist Robert Knox (1791–1862). Knox was the most popular tutor for Edinburgh students seeking classes in anatomy. He had studied extensively in Europe, including with both Georges Cuvier and Geoffroy Saint-Hilaire, and he brought the insights of transcendental anatomy back into his Edinburgh classroom and into his published research. He later spelt out the main thrust of his ideas on this topic in his “Contributions to the Philosophy of Zoology,” which appeared in *The Lancet* in 1855.²⁰ Following Geoffroy, he saw the origins of new species to lie in embryological developments and the adaptation of organisms to a changed climate, alterations in diet, and crossing of varieties. Knox was at one time reckoned to be the most famous transmutationist in Britain, although he later became more widely

known for his involvement in the infamous Burke and Hare murders. Knox, like many of the French Enlightenment thinkers, was interested in the question of the origin and mutability of the human races. He presented papers on this topic from the 1820s in which he argued that all the human races were of a common origin and had descended from the original Caucasian race.²¹ Later, he wrote *The Races of Men* (1850, second revised edition 1862), in which he wrote extensively on the topic, and described what he took to be a biological racial hierarchy.²²

Scholars have long recognized the deeply evolutionary bent of Edinburgh's scientific community. Such ideas were not uncontroversial, of course, as Darwin saw first-hand at the Plinian Society (indicated above). But there were also a number of papers published in the *Edinburgh New Philosophical Journal* in the 1820s that clearly lent support to French evolutionary ideas. For many years, historians thought that the most explicit of these was anonymously authored by Jameson; however, recent research by Pietro Corsi has now established that this was not the case.²³ Rather, the essay in question, "Observations on the Nature and Importance of Geology," which favourably presented Lamarck's transmutationist ideas, was a translation of a report of a recent scientific meeting in France.²⁴ This is suggestive of the extent to which Edinburgh was in touch with debates about anatomy, physiology, and transmutation in Europe as they were unfolding. As Corsi points out, this translation appeared only days after the original French account of the meeting had appeared.²⁵

THE 'DEVELOPMENTAL HYPOTHESIS' IN MID-VICTORIAN ENGLAND

It is a common assertion amongst scholars of English nineteenth-century history that the spectre of the French Revolution hung over English politics and society throughout the century, and transmutationist ideas were intimately associated with Francophile revolutionary politics. This was certainly the case in the 1820s but remained so even after the 1832 Reform Act extended the franchise to male heads of households with a significant income.²⁶ The social historian E. P. Thompson has long since argued that it was the passage of the 1832 Act that was the last stage in the 'making of the English working class,' and although this claim has been much debated, it is certainly clear that it did usher in the political making of the English middle class.²⁷

As James Secord has argued in his study of the anonymous publication and reception of the evolutionary pot-boiler *The Vestiges of the Natural History of Creation*, by the 1840s, writers were framing transmutationist ideas in such a way as to appeal to the political and cultural preferences and prejudices of this newly enfranchised and increasingly hegemonic middle class.²⁸ *Vestiges*, published in 1844 by the London medical publisher John Parker, was the work of the Scottish publisher and editor of *Chambers Journal* Robert Chambers (1802–1871). As Secord has shown, the book made transmutation the talk of the town a decade and a half before *On the Origin of Species* was published. As Secord notes, we

can look to *Vestiges* as an example of the importance of our understanding of the production and reception of printed works in the period we are interested in. The middle years of the nineteenth century not only saw a new industrial middle class gain political representation through the 1832 Reform Act, but as it came to economic prominence, it also established its own unique culture, a middle-class ideology that claimed to be universal and natural. As scholars such as Jürgen Habermas have long noted, the bourgeois public sphere was centred upon the written word and its reading.²⁹ Increasing literacy rates across this expanding social class coincided with and drove developments in print production that saw cheaper paper and new methods for bookbinding, as well as new and faster modes of distribution. The expansion of the rail network brought news, literature, fashions, and ideas from London and the continent to the provincial towns across the nation, and lending libraries originated in this period, as did the middle-class soiree and conversazione – social society gatherings at which the great and the good (and the aspiring) came together, and at which the discussion and demonstration of knowledge and opinion on current literature was the mode of social discourse. As Secord describes, *Vestiges of the Natural History of Creation* was one of the main topics of social debate for more than one season. As we have mentioned, the book was published anonymously, and this fact only enhanced its popularity. The mystery of the identity of the author itself became a major element of discussion of the book. What it also did was ensure that the topic of species change was well debated and extensively popularized across the nation throughout the 1840s. Echoes of Chambers' work found their way into contemporary literature as well as other aspects of Victorian culture. The very idea of progress, which had been so challenging when uttered by French materialist radicals and their English allies, was quickly appropriated to fit with the progressive development of middle-class ambition, industrialization, and the framing of liberal capitalist economics. *Vestiges* was met with an immense amount of criticism from the conservative and religious scientific establishment, some of the most notable of whom – William Whewell and Adam Sedgwick, for instance – had taught Darwin at Cambridge once he had left Edinburgh and the study of medicine behind, and moved south to study with the intent of becoming a country parson. We should bear in mind not only that Darwin, who had begun working out his own evolutionary ideas in the late 1830s after returning from his voyage on H.M.S. *Beagle*, witnessed this response with interest and read reviews of *Vestiges* carefully, but also that all of the history we have described up to this point coloured how Darwin's readers approached his book when he did eventually publish in 1859.

While it would be interesting to include more detailed commentary on those who were critical of *Vestiges*, their arguments, and their motivations – it is notable, for instance, that Thomas Huxley was deeply critical of the book – there is not the space to do so. It would also be useful to give greater consideration to those who were sympathetic to the book. The physiologist William Benjamin Carpenter not only wrote an (anonymous) favourable review of the book but actually had a hand in helping to revise and improve later editions of the text.³⁰ Further, though,

we should also be mindful of the broad impact of the work, not only on middle-class readers, but also among artisans and working men and women. As Roger Cooter and Stephen Pumfrey long ago noted, this makes us have to think about the full range of political and moral meanings that popular science could have.³¹ *Vestiges* made many converts to evolution, and exactly how these readers interpreted, appropriated, and re-conceptualized Chambers' work is a vital part of the social history of the history of science that we need to try to recapture.

Vestiges was not the last major evolutionary work published before *Origin* appeared, though, even if it was immensely popular. Across the mid-1840s and into the 1850s, the young middle-class radical journalist and philosopher Herbert Spencer (1820–1903) put pen to paper to publish his own ideas about the significance of evolution for humankind. Spencer, whose name has subsequently (although not unproblematically) become associated with the philosophy of 'social-Darwinism,' published numerous essays and books on the topic of evolution, or 'the developmental hypothesis.' Spencer understood the mechanism of speciation to be very much akin to that outlined variously by Erasmus Darwin and by Lamarck in particular; he, too, emphasized adaptation to the environment and the subsequent inheritance of these acquired adaptations to circumstance. After 1860, he incorporated Darwin's theory of natural selection into his own work but did so in such a way as not to unsettle his own already-developed ideas. Spencer is very much worth our attention given that, although it was Darwin's name that became synonymous with evolution following the publication of *Origin*, after 1860, Spencer quickly became much more influential, not only in Britain but around the globe. Indeed, the extent of Spencer's international influence in the reception of 'Darwinism' has only relatively recently begun to be appreciated.³²

Spencer was first led to think seriously about the origin of species as a result of his early work as an engineer on the expanding railways that were being cut through the hills and vales of the British countryside throughout this period. He became interested in the fossils that came to light as he worked, and picked up a copy of Charles Lyell's recently published *Principles of Geology*. Lyell's work, as we know, was significant in that he argued that one could best understand Earth's history by accepting the premise that the evidence left to us in the strata of the Earth had been laid down by forces that were consistent with those that we see in operation today – i.e., that natural laws were consistent in their operation. This impressed Spencer not only in terms of its implications for how he read the mineral and fossil evidence he uncovered, but also impressed on him the belief that the whole universe must, of necessity, be subject to uniform, overarching natural laws. In the second volume of *Principles of Geology*, though, Lyell had done his best to reject the transmutationist arguments of Geoffroy and Lamarck and had likely felt the need to do so because his own studies clearly lent themselves to reading earth history as one of progressive development – a belief in the uniformity of law would imply that the fossil record could be read as a record of progressive development. Such conclusions were too troubling for Lyell to entertain because of what he saw as their disturbing theological implications. He therefore resisted the idea that earth

history was progressive, contending instead that it was cyclical (he was subsequently mocked for the implications of his thinking on this topic as suggesting that one day in the future, dinosaurs would return once again to the earth).

Ironically, it was because Lyell did not want his readers to be led towards transmutationist conclusions that he included such a detailed account of Lamarck's argument, and as a result, it became one of the most widely read and fullest accounts of Lamarck's work available to English readers. Spencer was far from alone in developing a 'decided leaning' towards Lamarck's theory as a result of reading Lyell – indeed, Darwin had a similar experience. Further, as the historian Anne Dewitt has recently noted, Lyell's account of Lamarck was embraced and rehashed by freethinkers and published across the atheist press.³³

Reading Lyell was not Spencer's first encounter with the developmental hypothesis, though, for as he noted in his autobiography, he had "during previous years been cognizant of the hypothesis that the human race has been developed from some lower race."³⁴ As the historian Paul Elliott has suggested, this was doubtless a result of the many hours Spencer had spent in the library of the Derby Philosophical Society, which held not only works by Erasmus Darwin but also works by – and which contained accounts of the work of – a number of transmutationist continental anatomists.³⁵ It is also important for us to note that Spencer was interested in transmutation as it applied to humans from the first. This was the case for Darwin, too, of course, but unlike Darwin, Spencer made this central to his writing, where Darwin hedged and delayed engaging with the implications of evolution for humans until he published *Descent of Man* in 1871.³⁶ Even though Darwin's transmutation notebooks reveal that he too was thinking of the implications of evolution for humankind as the central question, in *Origin*, he stated only that in light of his theory, "Light will be thrown on the origin of man and his history," and this in the very last pages of the book.³⁷

It is worth saying a little more about Spencer here because he has so frequently been mischaracterized. Despite some decades of solid scholarship on Spencer, the perception of him as a social Darwinist – in the sense that he took the competition at the heart of Darwin's theory and applied it to society – remains prevalent. This is in large part a result of the immense popular success of Richard Hofstadter's 1944 book *Social Darwinism in American Thought*, which in all sold more than 200,000 copies.³⁸ As we can already see, though, the chronology of Spencer's evolutionism makes this interpretation problematic, and, as we have noted here, even when Spencer did incorporate Darwin's theory of natural selection into his own, it remained very much subordinate to his own very Lamarckian understanding of adaptation to environment. Spencer's evolutionism was certainly very much in service to his political views, but rather than being the simple endorsement of unrestrained capitalist competition that Hofstadter suggests, Spencer believed that natural adaptation needed to be left to its own devices in order to achieve a state of natural and social equilibrium. The competition and struggle central to Darwin's theory was, in Spencer's view, the consequence of maladaptation, rather than the

mechanism that drove adaptation. It was this theory of biological development that underpinned Spencer's anti-statist political radicalism.

Spencer first published his political views in a series of letters published in the radical journal *The Nonconformist* in the early 1840s. He later brought these together and published them as a pamphlet in 1843 under the title *The Proper Sphere of Government*. His first major work was *Social Statics*, published by John Chapman in 1851, and he first spoke out explicitly on his embrace of transmutationist ideas in "The Developmental Hypothesis," published in *The Leader* the following year. Other essays on the "Social Organism" and the book *Principles of Psychology* (1855) followed. Here, he more explicitly applied his ideas of evolutionary development to the human mind and society. Indeed, rather than endeavoring to establish a natural argument for competition, the historian Robert J. Richards has argued that Spencer was, in fact, trying to answer the question of how an ethical and moral society could best be developed.³⁹ As Richards has shown, however, although Spencer's early works, *Social Statics* and *Principles of Psychology*, impressed the small group of intellectuals who surrounded the published John Chapman's *Westminster Review*, it was only after the publication of *Origin* that his work became truly popular and gained a mass audience.⁴⁰

Between 1862 and 1893, Spencer went on to write his massive *A System of Synthetic Philosophy*, a series of works in which he applied his ideas about the implications of his theory of a universal gradual development to biology, sociology, psychology, and ethics. This contributed to his international reputation, and he sold well over a million books during his lifetime. His ideas were popularized and influenced many of his contemporaries around the globe as well as in Britain, not only across the sciences but in politics and literature as well.

It was in the context of the wide and enduring debate about the developmental hypothesis and its implications for humanity, religious belief, and politics that the theologian and mathematician Baden Powell published *Unity of Worlds*. The book was originally published in 1855, and in it, Powell took issue with the standard Christian narrative pertaining to both the age of the earth and the fixity of species. Although Powell maintained that science and theology were quite separate endeavours, it is clear too that he believed that they could and should be consistent. Accepting the basis of Lyell's claims in the first volume of his *Principles of Geology*, he not only concluded that any claim to a young earth must be erroneous but so too, in light of Lyell's arguments about the uniformity of natural law, he controversially rejected the very idea of a miracle as inconsistent with sound theology. In contrast to Lyell on the mutability of species, though, Powell was clearly open to the idea, and he was certainly opposed to the prevailing orthodoxy of the fixity of species. Although in *Unity of Worlds* Powell neither proposed an evolutionary theory of his own nor actively defended any previous transmutationist theory, he did go as far as to suggest the superiority of both Lamarck's and Geoffroy's ideas to those of the French naturalist Frédéric Cuvier, who denied transmutation. The historian Curtis N. Johnson is quite right to say that in the context of the middle 1850s, Baden

Powell's book could only have been read as a positive endorsement of a natural and developmental understanding of earth and life history.⁴¹

A perhaps somewhat controversial inclusion in this collection of those who arrived at evolutionary conclusions before Darwin is Alfred Russel Wallace (1823–1913). Wallace is regarded today as the co-discoverer of evolution by natural selection because he independently came to very similar conclusions to Darwin, and sent an essay outlining his views to Darwin prior to the latter's publication of *Origin*. Darwin was dismayed that he was about to be forestalled after having worked carefully on developing his theory for some twenty years, but the intervention of his friends and colleagues, Lyell and the botanist Joseph Dalton Hooker, resulted in the presentation of Darwin's and Wallace's work together at the Linnean Society of London in 1858. Extracts from Darwin's notes and from a letter he had written to the American naturalist Asa Gray in 1857 were presented alongside Wallace's essay, allowing Darwin to maintain priority. It should be noted here that although this was an arrangement that was undertaken without Wallace's input (he was half a world away at the time), he was later quite happy with it and always referred to natural selection as Darwin's idea.⁴² Wallace's essay "On the Tendency of Varieties to Depart Indefinitely from the Original Type" was preceded by another that had been published in 1855 in the *Annals and Magazine of Natural History*. In this essay, "On the Law Which has Regulated the Introduction of New Species," Wallace discussed the implications of geology for the distribution of species, noting that "the present condition of the organic world is clearly derived by a natural process of gradual extinction and creation of species" and acknowledged that

to discover how the extinct species have from time to time been replaced by new ones down to the very latest geological period, is the most difficult, and at the same time the most interesting problem in the natural history of the earth.⁴³

While Wallace did not go so far as to lay out a clear answer to this problem in this essay, he did state that he hoped his readers would see it as a step in the right direction towards its solution.

The last of the sources we have included in this collection are included almost as an appendix. These authors anticipated Darwin and Wallace's theory of natural selection, but although their contributions were written prior to the publication of *Origin*, they were not widely known until afterwards when either the authors themselves or others brought them to Darwin's attention.

DARWIN'S 'HISTORICAL SKETCH'

It seems likely that Darwin had originally contemplated a historical survey of the treatment of transmutation prior to his own work on the subject as a preface to *Origin*, although he did not include one until the third edition, which was published in April 1861. This was an addition that was clearly prompted by

the numerous authors who wrote to Darwin about their own earlier work or who criticized Darwin for not acknowledging the work of earlier theorists. As historian Curtis N. Johnson pointed out, in this ‘historical sketch,’ Darwin acknowledged some eighteen predecessors; however, in subsequent editions, he expanded this number to thirty-five. Some of these were well-known and widely commented on, and we have covered a few of these already, including Lamarck, Geoffroy, and Baden Powell, for instance. We close out the volume, though, with extracts from the American physician W. C. Wells; the grain merchant, forester, and horticulturalist Patrick Matthew (1790–1874); and the plant breeder and hybridiser William Herbert (1778–1847), who had suggested that it was a distinct likelihood that new species might be produced through hybridization in nature.⁴⁴

CONCLUDING REMARKS: PUTTING TEXTS IN CONTEXT

A primary source collection necessarily brings to the foreground the works of individuals whose work has been considered by historians to be significant in one way or another. And this is the crux. While most historians of evolution would likely agree that the texts included in this volume represent important contributions to the early history of modern evolutionism, it is important for those reading these works to think about why they are important. In early historical works, many of these authors have been framed simply as ‘forerunners’ of Darwin: those who vaguely theorized or speculated, but failed to fully elaborate a system of evolution in a truly scientific manner. This style of ‘Whig’ history is now only rarely to be found among scholars, but it remains prevalent among public readers and specialists outside the field of the history of science. We hope to have made clear that our aim here is different, and we hope to encourage the consideration of these and other sources in the context of their creation and not in the context of events or people that came only afterwards. Thus, a study of Buffon, Lamarck, Erasmus Darwin, Spencer, Chambers, or any of the other evolutionary thinkers needs to proceed with a focus on these individuals and their ideas, and how their ideas were received, interpreted, appropriated, and often reframed, developed, and ultimately acted upon. That is, we must see these texts as a potential entry point into the study of a social and cultural history of science. Thus, for instance, while we do want to ensure that our readers have the opportunity to read often extended extracts from a range of early-nineteenth-century evolutionary theorists, we also want to press readers to go beyond the texts in search of context to recognize that there may be several and even competing contexts to which any particular text is relevant. As Desmond, Secord, Jenkins, Corsi, and Testa have shown, Lamarck can be read in the context of Enlightenment France or in the context of Edinburgh or London. In each place, his texts had (often several) different and often highly contested meanings. So too, as Paul Elliott has shown, the work of Erasmus Darwin was widely popularized and debated in the English midlands, and James Secord has documented the

many and various ways in which *Vestiges of the Natural History of Creation* was read, each highly dependent upon local as well as national politics and culture. We might usefully apply the methods of these scholars to our study of other transmutationist and evolutionary theorists, whether they were established men of science; political radicals, socialist and atheist freethinkers in London or Edinburgh; or genteel ladies who read *Vestiges* by candlelight and thereafter saw the world, and their place in it, quite differently.⁴⁵

Notes

- 1 Charles Lyell, *Principles of Geology* (3 vols.), facsimile reprint, (Chicago: University of Chicago Press, 1990; 1991); Martin J.S. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005); Martin J.S. Rudwick, *Worlds Before Adam. The Reconstruction of Geohistory in the Age of Reform* (Chicago: University of Chicago Press, 2008).
- 2 Peter J. Bowler, *The Non-Darwinian Revolution: Reinterpreting a Historical Myth* (Baltimore: Johns Hopkins University Press, 1988), p. ix.
- 3 Robert J. Richards, *The Meaning of Evolution*; Piers J. Hale, "Rejecting the Myth of the non-Darwinian Revolution,"; Mark Largent, "The So-Called Eclipse of Darwinism," *Transaction of the American Philosophical Society*, n.s., 99, no.1 (2009), pp. 3–21.
- 4 Roger Cooter and Stephen Pumfrey, "Separate Spheres and Public Places. Reflections on the History of Science Popularization and Science in Popular Culture," *History of Science*, vol. 32, Iss. 3, (1994), pp. 237–267,
- 5 James Secord, *Victorian Sensation. The Extraordinary Publication, Reception, and Secret Authorship of The Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000), p. 530.
- 6 Martin J.S. Rudwick, *Worlds Before Adam. The Reconstruction of Geohistory in the Age of Reform* (Chicago: University of Chicago Press, 2008); Peter J. Bowler, *Evolution. The History of an Idea*, (Berkeley: University of California Press, 1989).
- 7 Bowler, *Evolution*, pp. 50–52; 57.
- 8 Janet Browne, "Botany of Gentlemen: Erasmus Darwin and 'The Loves of Plants,'" *Isis* 80, no.4, (1989), pp. 593–621.
- 9 Johann Friedrich Blumenbach, "Über den Bildungstrieb (Nisus formativus) und seinen Einfluß auf die Generation und Reproduction" in *Göttingisches Magazin der Wissenschaften und Litteratur*, vol. 1 (1780), pp. 247–266; Jean-Baptiste Lamarck; *Philosophie Zoologique*, (Paris: Musée d'Histoire Naturelle, 1809).
- 10 Andrés Galera, "The Impact of Lamarck's Theory of Evolution Before Darwin's Theory," *Journal of the History of Biology*, (Feb. 2017), 50 (1): 53–70.
- 11 See Bill Jenkins, "Race before Darwin: Variation, adaptation and the natural history of man in post-Enlightenment Edinburgh, 1790–1835" *British Journal for the History of Science*, (2020), 53 (3): 333–350, on p. 339. Blumenbach, Geoffroy and others were also acknowledged in the work of Robert Knox and James Cowles Prichard, amongst others. See for example, Robert Knox, "Contributions to the Philosophy of Zoology with Special Reference to the Natural History of Man," *The Lancet*, July 14th 1855, pp. 24–26; James Cowles Pritchard, *A Review of the Doctrine of a Vital Principle: As Maintained by Some Writers on Physiology with Observations on the Causes of Physical & Animal Life*, (London: John and Arthur Arch, 1829).
- 12 Biologists are wont to refer to the mechanism of the inheritance of acquired characters as "Lamarckism," in order to contrast it to the "Darwinian" mechanism of natural selection. However, as historians have long pointed out, Darwin also included the

- inheritance of acquired characters as a significant element in the formation of new species. While historians thus generally have a better appreciation for the complexity of both Darwin's and Lamarck's ideas, they also frequently use the label "Lamarckism" and "Lamarckian" in this way. See Piers J. Hale, "Rejecting the Myth of the Non-Darwinian Revolution", *Victorian Review*, vol. 41, no.2, 2015, pp. 13–18. While there has long been an extensive "Darwin Industry" among academic scholars, Lamarck has received much less attention. Among those who have made Lamarck their focus some of the most notable are Pietro Corsi, Snait Gissis, and Caden Testa.
- 13 Caden Camille Testa, "Species Transformation and Social Reform: The Role of the Will in Jean-Baptiste Lamarck's Transformist Theory," *Journal of the History of Biology*, (March 2023), 56 (1):125–151. On Lamarck's meteorology and his efforts to establish a wider scientific discipline dedicated to the topic see Valentine Delrue, "Le spectacle du ciel: nut en schronheid als drijfveren van de meteorologie (1799–1816)," *Jaarboek de Achttiende Eeuw*, (2022), 54 (1), pp. 148–165.
 - 14 Mary Wollstonecraft, *A Vindication of the Rights of Woman with strictures on Political and Moral Subjects* (Boston: Peter Edes 1792).
 - 15 Adrian Desmond, *The Politics of Evolution. Morphology, Medicine, and Reform in Radical London* (Chicago: University of Chicago Press, 1990).
 - 16 As one of us has written elsewhere, the political associations of Malthus's work developed and changed across the first decades of the nineteenth century; see Piers J. Hale, *Political Descent. Malthus, Mutualism, and the Politics of Evolution in Victorian England* (Chicago: University of Chicago Press, 2014).
 - 17 Nora Barlow (ed.), *The Autobiography of Charles Darwin 1809–1882* (London: Norton, 1958), p. 49, p. 153.
 - 18 Bill Jenkins, *Evolution Before Darwin: Theories of the Transmutation of Species in Edinburgh, 1804–1834* (Edinburgh: University of Edinburgh Press, 2021).
 - 19 Adrian Desmond and James Moore, *Darwin. The Life of a Tormented Evolutionist* (London: W. W. Norton, 1991).
 - 20 Robert Knox, "Contributions to the Philosophy of Zoology, with special reference to the Natural History of Man," *The Lancet*, July 14th 1855, pp. 24–6. This essay is reprinted in full in this collection.
 - 21 Robert Knox, "Inquiry into the Origin and Characteristic Difference of the Native Races inhabiting the Extra-Tropical part of Southern Africa," *Memoirs of the Wernerian Natural History Society*, v.5, (Edinburgh: 1824), pp. 206–219.
 - 22 Robert Knox, *The Races of Men. A Fragment*, (Philadelphia, Lea & Blanchard, 1850)
 - 23 Pietro Corsi, "Edinburgh Lamarckians? The Authorship of Three Anonymous Papers (1826–1829)." *Journal of the History of Biology* 54 (2021): 345–374.
 - 24 Both Adrian Desmond in *The Politics of Evolution*, and Bill Jenkins in his *Evolution before Darwin* attributed this paper to Jameson; for Corsi's argument for a revision of this interpretation see Corsi, "Edinburgh Lamarckians?"
 - 25 Pietro Corsi, "Edinburgh Lamarckians? The Authorship of Three Anonymous Papers (1826–1829)." *Journal of the History of Biology* 54 (2021): 345–374.
 - 26 On the significance of the 1832 Reform Act see Eric Evans, *The Great Reform Act of 1832* (London: Routledge 1994).
 - 27 E. P. Thompson, *The Making of the English Working Class*, (London: Penguin, 1963); for just one contrary claim see Patrick Joyce, *Visions of the People. Industrial England and the Question of Class, 1848–1914* (Cambridge: Cambridge University Press, 1994).
 - 28 James Secord, *Victorian Sensation. The Extraordinary Publication, Reception, and Secret Authorship of The Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000).
 - 29 Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry in a Category of Bourgeois Society* (Cambridge: Polity, 1962, trans. 1989).

- 30 Secord, *Victorian Sensation*, p. 143.
- 31 Roger Cooter and Stephen Pumfrey, “Separate Spheres and Public Places: Reflections on the History of Science Popularization and Science in Popular Culture,” *History of Science* xxxii, (1994), pp. 237–267, on 246.
- 32 Bernard Lightman, “The ‘Greatest Living Philosopher’ and the Useful Biologist. How Spencer and Darwin Viewed Each Other’s Contributions to Evolutionary Theory,” in Ian Hesketh (ed.), *Imagining the Darwinian Revolution. Historical Narratives of Evolution from the Nineteenth-Century to the Present*, (Pittsburgh: University of Pittsburgh Press, 2022), pp. 37–57. Bernard Lightman, (ed.), *Global Spencerism. The Communication and Appropriation of a British Evolutionist* (Leiden: Brill, 2015); Greta Jones and Robert A. Peel (eds.), *Herbert Spencer. The Intellectual Legacy* (London: Galton Institute, 2004).
- 33 Anne Dewitt, “Evolution and Political Revolution in Blackwood’s Periodical Poetry,” *Victorian Periodicals Review*, Vol. 56, no.2 (Summer 2023), pp. 158–181, on p. 164. See [William Chilton], “Theory of Regular Gradation XLV,” *Oracle of Reason, September 30, 1843* p. 332–34. As James Secord notes, in *Victorian Sensation*, p. 313, n.33, Lyell’s geology had been appropriated to undermine biblical literalism by other atheist and freethinking writers, such as in Henry Hetherington’s *The Freethinker’s Information for the People*, 1, no.1–2 (1842): pp. 1–16. The series “The Theory of Regular Gradation” also later appropriated the *Vestiges of the Natural History of Creation* to the atheist cause.
- 34 Herbert Spencer, *An Autobiography* 2 vols. (New York: D. Appleton, 1904), vol.1, pp. 200–201.
- 35 Paul A. Elliott, “‘The Derbyshire Darwinians’: The Persistence of Erasmus Darwin’s Influence on a British provincial Library and Scientific Community, c.1780–1850.” In C.U.M. Smith and Robert Arnot (eds.), *The Genius of Erasmus Darwin* (Aldershot: Ashgate, 2005); Paul A. Elliott, “Erasmus Darwin, Herbert Spencer, and the Origins of the Evolutionary Worldview in British Provincial Scientific Culture, 1770–1850,” *ISIS*, 94, no.1 (2003), pp. 1–29.
- 36 See volume two of this series, Caden C. Testa and Piers J. Hale, *Evolution and Religion in Nineteenth Century Britain* (London: Routledge, 2025), for more details on this.
- 37 Darwin, *Origin*, (1859), p. 488.
- 38 Richard Hofstadter, *Social Darwinism in American Thought* (Boston: Beacon Press, 1992).
- 39 Robert J. Richards, *Darwin and the Emergence of Evolutionary Theories of Mind and Behavior*, Chicago: University of Chicago Press, 1987).
- 40 Robert J. Richards, “The Relation of Spencer’s Evolutionary Theory to Darwin’s,” in Greta Jones and Robert A. Peel, (eds.), *Herbert Spencer. The Intellectual Legacy*. (London: The Galton Institute, 2004), pp. 17–36, on p. 19.
- 41 Curtis N. Johnson, *Darwin’s Historical Sketch. An Examination of the ‘Preface’ to the Origin of Species* (Oxford: Oxford University Press, 2020), p. 6. Johnson’s work on the ‘historical sketch’ that Darwin inserted into later editions of the *Origin of Species* explores the importance and influence of Baden Powell’s work at greater length.
- 42 Martin Fichman, *An Elusive Victorian. The Evolution of Alfred Russel Wallace*, (Chicago: University of Chicago Press, 2004).
- 43 Alfred Russel Wallace, “On the Law Which has Regulated the Introduction of New Species” *Annals and Magazine of Natural History*, September 1855, reprinted in A. R. Wallace, *Contributions to the Theory of Natural Selection. A Series of Essays*, (London: Macmillan & Co. 1871), pp. 1–25, on pp. 3, 14.
- 44 Johnson, *Darwin’s Historical Sketch*, p. 83.
- 45 Secord, *Victorian Sensation*, pp. 15–17.

Editorial Headnote

1. Alfred, Lord Tennyson, “In Memoriam A. A. H.” (London: Edward Moxon, 1850), cantos LIV, LV, & LVI

Alfred, Lord Tennyson (1809–1892) wrote this poem lamenting the death of his friend Arthur Hallam, who died at the age of twenty-two in 1833. The poem *In Memoriam A.A.H.* was published in 1850, although Tennyson revised it over the following decade. It reflects not only Tennyson’s grief over the loss of his friend but also a number of pressing metaphysical and theological concerns that were raised by developments in contemporary science. Tennyson not only invoked ideas about evolution that had been widely popularized by the then quite recently published *Vestiges of the Natural History of Creation* (1844), but also reflected on the evident cruelty and carelessness of nature and the demands that this view of life placed on conventional religious belief about a purposeful, beneficent designer.¹ As will be evident from the many readings in this volume,² Tennyson wrote in light not only of *Vestiges* but of developments in geology. The geologist Charles Lyell had argued in his *Principles of Geology* (1830–1833) that the earth was much older than many of his contemporaries in geology had acknowledged (and even they had concluded that the earth was vastly older than a literal reading of “Genesis” would allow), and also that it did not exhibit signs of progression; rather, life on earth was subject to an endless, and apparently purposeless, cyclical development. It was following the publication of *In Memoriam* that Tennyson was appointed poet Laureate, succeeding Wordsworth. As the historian James Secord has noted, “For thousands of readers, Tennyson’s *In Memoriam* offered the most profound integration of the evolutionary narrative into everyday experience.”³

Tennyson remained deeply interested in the relationship between science and religion and the threat that he believed the growth of scientific naturalism posed to orthodox religious belief. As a result, he was instrumental in establishing the Metaphysical Society, a cross-denominational discussion group that included many of the foremost theologians and men of science of that period.⁴

Notes

- 1 For further discussion of Tennyson in this context, see Michael Ruse, *Darwinism as Religion. What Literature Tells Us About Evolution* (Oxford: Oxford University Press, 2017), pp. 33–35.
- 2 Caden C. Testa and Piers J. Hale, *Evolution Before Darwin* (London: Routledge, 2025).
- 3 James Secord, *Victorian Sensation. The Extraordinary Publication, Reception, and Secret Authorship of The Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000), p. 530.

- 4 For more on the Metaphysical Society, see Alan Willard Brown, *The Metaphysical Society. Victorian Minds in Crisis, 1869–1880* (New York: Columbia University Press, 1947); and more recently Catherine Marshall, Bernard Lightman, & Richard England, (eds.), *The Metaphysical Society (1869–1880). Intellectual Life in Mid-Victorian England* (Oxford: Oxford University Press, 2019); also see Caden C. Testa and Piers J. Hale, *Evolution and Religion* (London: Routledge, 2025).

1

“IN MEMORIAM A. A. H.”

Alfred, Lord Tennyson

Source: Alfred, Lord Tennyson, “In Memoriam A. A. H.” (London: Edward Moxon, 1850), cantos LIV, LV, & LVI

LIV

Oh yet we trust that somehow good
Will be the final goal of ill,
To pangs of nature, sins of will,
Defects of doubt, and taints of blood;

That nothing walks with aimless feet;
That not one life shall be destroy'd,
Or cast as rubbish to the void,
When God hath made the pile complete;

That not a worm is cloven in vain;
That not a moth with vain desire
Is shrivell'd in a fruitless fire,
Or but subserves another's gain.

Behold, we know not anything;
I can but trust that good shall fall
At last – far off – at last, to all,
And every winter change to spring.

So runs my dream: but what am I?
An infant crying in the night:
An infant crying for the light:
And with no language but a cry.

LV

The wish, that of the living whole
No life may fail beyond the grave,

Derives it not from what we have
The likest God within the soul?

Are God and Nature then at strife,
That Nature lends such evil dreams?
So careful of the type she seems,
So careless of the single life;

That I, considering everywhere
Her secret meaning in her deeds,
And finding that of fifty seeds
She often brings but one to bear,

I falter where I firmly trod,
And falling with my weight of cares
Upon the great world's altar-stairs
That slope thro' darkness up to God,

I stretch lame hands of faith, and grope,
And gather dust and chaff, and call
To what I feel is Lord of all,
And faintly trust the larger hope.

LVI

'So careful of the type?' but no.
From scarp'd cliff and quarried stone
She cries, 'A thousand types are gone:
I care for nothing, all shall go.

'Thou makest thine appeal to me:
I bring to life, I bring to death:
The spirit does but mean the breath:
I know no more.' And he, shall he,

Man, her last work, who seem'd so fair,
Such splendid purpose in his eyes,
Who roll'd the psalm to wintry skies,
Who built him fanes of fruitless prayer,

Who trusted God was love indeed
And love Creation's final law –
Tho' Nature, red in tooth and claw
With ravine, shriek'd against his creed –

“IN MEMORIAM A. A. H.”

Who loved, who suffer'd countless ills,
Who battled for the True, the Just,
Be blown about the desert dust,
Or seal'd within the iron hills?

No more? A monster then, a dream,
A discord. Dragons of the prime,
That tare each other in their slime,
Were mellow music match'd with him.

O life as futile, then, as frail!
O for thy voice to soothe and bless!
What hope of answer, or redress?
Behind the veil, behind the veil.

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