Introduction

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If *Evolution and Victorian Culture* teaches us anything it is that neither collectively nor individually do the words 'evolution', 'Victorian' and 'culture' mean any one thing. Even the word 'and' is unhelpfully vague. Are we studying evolution 'and' Victorian culture, or evolution 'in' Victorian culture? Are we studying the influence of evolution upon Victorian culture, or Victorian culture's influence upon evolution – is the relationship unilinear or is it reciprocal, or both? How long did it last? How did it change, and why? What caused it to change, and what change did it bring to contemporary science, Victorian culture and the contemporary science of Victorian culture? How have evolution and Victorian culture changed our perceptions today? And can we really ever 'know' the Victorians, if we can barely define the meaning and relationship they ascribe to evolution and culture? Conscious of its limitations, *Evolution and Victorian Culture* is a first attempt to answer these important questions through a set of eleven conceptually linked chapters, each devoted to one aspect of Victorian culture.

Evolution, from the Latin 'evolvere', means 'rolling out', and in its earliest English incarnations in the seventeenth century it defines a process of unrolling something that already exists. In 1667, for example, Henry More believes that 'the whole evolution of times and ages from everlasting to everlasting is … represented to God at once'.[1] During the eighteenth century evolution began acquiring its more modern, developmental meaning, so in 1745 John Turberville Needham could claim that nature is 'ever exerting its Fecundity in a successive Evolution of organized Bodies'.[2] This reflects common usage describing an embryo's development – how a fertilized egg transforms into a new organism – not the transmutation of species.[3] The French naturalist Jean-Baptiste Lamarck advanced a tantalizingly pre-Darwinian theory of developmental evolution that emphasized the transmutation of species in his *Philosophie Zoologique* (1809). Lamarck used the word 'transmutation' to describe a theory that was based on

the inter-relationship of two evolutionary principles, the inheritance of acquired characteristics and progression from simplicity to complexity. The inheritance of acquired characteristics describes how characteristics become inherited if replicated over successive generations (e.g. the giraffe stretching its neck to reach for food); and progression from simplicity to complexity expresses the biologically inherent tendency towards development. In 1844, Robert Chambers's anonymously published *Vestiges of the Natural History of Creation,* a huge best-seller, presented a progressive, and cosmic, version of evolution that was fiercely attacked by most scientists. In the *Vestiges* Chambers writes: 'The whole train of animated beings, from the simplest and oldest up to the highest and most recent, are, then, to be regarded as a series of *advances of the principle of development*, which have depended upon external physical circumstances, to which the resulting animals are appropriate.'[4] To Chambers, the theory of development, or developmentalism as it was later called, narrates an evolutionary pathway culminating in the apex of human life.

Conceiving of evolution as moving from simplicity to complexity resonated with the ancient idea of the Great Chain of Being. Descended from Plato and Aristotle, the Great Chain connected earth to heaven in a seamless progression from minerals to plants, animals, humans, angels and God. In the radically anthropocentric atmosphere of the Enlightenment, however, man often usurped God's position at the top of the Great Chain, and among many Victorian evolutionists the Great Chain, topped and tailed by God and minerals, continued to assure his supremacy. In the third edition of *Elements of Geology* (1851) the eminent geologist Charles Lyell uses the Great Chain as a metaphor to describe elements absent from the layers of a geological column, and in the process unwittingly initiates the mythic evolutionary quest for the 'missing link': 'A break in the chain implying no doubt many missing links in the series of geological monuments which we may some day be able to supply'.[5] By postulating a present absence, Lyell's metaphor also loosened confidence in the previously fixed developmental strata of the Great Chain of Being, and, as an expression of developmentalism, the Great Chain fed other evolution conceptions, especially those related to embryology. Recapitulation intensified the developmentalism inherent in the Great Chain by adding a temporal, diachronic dimension to a roughly synchronic concept. Thus, according to J. F. Meckel: 'The development of the individual organism obeys the same laws as the development of the whole animal series; that is to say, the higher animal in its gradual development essentially passes through the permanent organic stages that lie below it.'[6] Schelling describes this as

'dynamic evolution': shaped by environmental factors 'nature would come more completely to realize in the varieties of individuals the full concept of the species'.[7]

Recapitulation achieves iconic status in Ernst Haeckel's vastly popular, if hotly debated, *Generelle Morphologie des Organismen* (1866), declaiming that '*Ontogenesis is a brief and rapid recapitulation of phylogenesis*'.[8] For Haeckel, as other recapitulationists, an individual human foetus passes in its development through *all* stages of human evolution, from protozoa to invertebrates, vertebrates and ultimately mammals. In other words, during gestation the foetus of a more developed animal displays the individual adult form of lower animals. Recapitulation entered the Victorian psyche through Herbert Spencer. *Principles of Sociology* (1876) is just one of his many books to epitomize the mid-Victorian recapitulationary mindset: 'In the general course of organic evolution from low types to high, there have been passed through by insensible modifications all the stages above described; but now, in the individual evolution of an organism of high type, these stages are greatly abridged, and an organ is produced by a comparatively direct process.'[9] Like so many neo-Lamarckians, Spencer also venerates the widely held teleological belief that all organisms progress from the simple to the complex, or the homogeneous to the heterogeneous: 'The investigations of Wolff, Goethe, and Von Baer have established the truth that the series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure.'[10] Uniquely, Spencer weaves these evolutionary strands together into a systematic structuring of all organic and non-organic knowledge, which he called a synthetic philosophy:

> Now, we propose in the first place to show, that this law of organic progress is the law of all progress. Whether it be in the development of the Earth, in the development of Life upon its surface, the development of Society, of Government, of Manufactures, of Commerce, of Language, Literature, Science, Art, this same evolution of the simple into the complex, through a process of continuous differentiation, holds throughout. From the earliest traceable cosmical changes down to the latest results of civilization, we shall find that the transformation of the homogeneous into the heterogeneous, is that in which Progress essentially consists.[11]

As many essays in this volume prove, Spencer's hold on the Victorian evolutionary imagination cannot be overestimated; indeed it was Spencer, not Darwin, who coined history's most well-known evolutionary phrase. 'Survival of the fittest' comes from *Principles of Biology* (1864),[12] and was

later adopted by Darwin in *The Variation of Animals and Plants under Domestication* (1868), *On the Origin of Species* (fifth edition, 1869), *The Descent of Man* (1871) and a number of subsequent publications. A reciprocal adaptation is the equally common, if misappropriated, Victorian phrase 'Social Darwinism'. Closely linked with Spencer's synthetic philosophy, Social Darwinism applies Darwinian evolutionary principles to society. At its best – as an intellectual exercise – Social Darwinism tried to theorize overarching, analogical relationships between social and biological growth, but at its worst – as the reality of socio-political policy – it was used flagrantly to justify and rationalize extermination of people drifting from evolutionarily fitness. Spencer is painfully resolute in his laissez-faire approach to survival:

> Blind to the fact that under the natural order of things, society is constantly excreting its unhealthy, imbecile, slow, vacillating, faithless members, these unthinking, though well-meaning, men advocate an interference which not only stops the purifying process but even increases the vitiation – absolutely encourages the multiplication of the reckless and incompetent by offering them an unfailing provision, and *dis*courages the multiplication of the competent and provident by heightening the prospective difficulty of maintaining a family.[13]

Spencer and Darwin's seemingly amenable exchange of ideas belies severe underlying structural antagonisms. Although renowned for coining the term 'survival of the fittest', Spencer actually places survival on a conceptually sliding scale from survival of the fittest to survival of the better. Each is capable of producing increasingly contradictory results:

> very often that which, humanly speaking, is inferiority, causes the survival. Superiority, whether in size, strength, activity, or sagacity, is, other things equal, at the cost of diminished fertility … where the life led by a species does not demand these higher attributes, the species profits by decrease of them, and accompanying increase of fertility… Survival of the better does not cover these cases, though survival of the fittest does.[14]

Darwin adopted the vocabulary of survival to help clarify and distinguish it from the salient evolutionary phrase 'natural selection': 'as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress toward perfection'.[15] For Darwin nature 'creatively directed development in an altruistic and progressive way'.[16] Despite his recognition that the struggle for existence did not always lead to the production of a more advanced organism, Spencer remained a lifelong teleologist, confirmed in his belief that all nature

progresses ineluctably towards a more perfect future. Darwin, despite his evolutionary optimism, remained convinced that the beauty of evolution – of adaptation to environment and the reproduction of favourable characteristics in offspring – lay in its complete and total lack of any predetermined design. Unsurprisingly, the irrepressibly confident world of imperial Britain failed to sympathize with Darwin's beautiful, yet aimless, materialistic vision, preferring instead the teleological securities of Spencer's resonant theoretical witness.

One of the debates that raised the temperature of the Victorian anthropological hothouse directly concerned the origin of man's place in nature. Monogenism postulated the common, unified descent of all men as portrayed in the Bible; polygenism produced different species by recording descent from multiple, unrelated sources. Both held sway in the teeming partisanship of Victorian Britain – monogenism for obvious theological reasons; polygenism to defend racial difference and secure anthropological superiority. Despite their differences, however, both monogenism and polygenism apotheosized white European (implicitly British) man, ensuring that civilized, advanced and developed Victorian Man would triumph over the world's Great Chain of Being. Securely tethered to their opposite position at the bottom of the Chain were grim, modern primitives, missing links, living Wild Men, fossilized remnants of degenerated people, or just savages unsullied by exposure to civilizing influences. Victorian anthropologists studied these incontestably primal figures by comparing them to early man, using a method known as the comparative method of anthropology. Its most ardent exponent, E. B. Tylor, developed a theory of 'survivals', arguing that the 'antiquarian relics'[17] of the past contain clues to our developmental present: 'the savage state in some measure represents an early condition of mankind, out of which the higher culture has gradually been developed or evolved'.[18]

As an extension of 'survival of the fittest', 'survivals' became a defining feature in the terminological lexicon of Victorian culture, not least for its evolutionary implications in Tylor's comparative method. Tylor not only codified anthropological praxis, but was arguably one of the first to define culture within explicitly evolutionary parameters:

> Culture or Civilization, taken in its wide, ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society. The condition of culture among the various societies of mankind, in so far as it is capable of being investigated on general principles, is a subject apt for the study of laws of human thought and action. On the one hand, the

> uniformity which so largely pervades civilization may be ascribed, in great measure, to the uniform action of uniform causes; while on the other hand its various grades may be regarded as stages of development or evolution, each the outcome of previous history, and about to do its proper part in shaping the history of the future.[19]

Insofar as Tylor defines culture as synonymous with civilization he shares in a then long-standing anthropological tradition. As his definition suggests, that buoyant scientific tradition treated culture as inextricably linked to civilization, often using the words with entirely interchangeable meanings. George Stocking may complain that Tylor compromises the concept 'by its equation with "civilization"',[20] but that equation was commonplace in Victorian Britain, especially among evolutionary anthropologists who considered their research to be the 'science of culture'. Pitt Rivers' famous essay 'The Evolution of Culture' (1875) in the eponymous volume typifies the work of such men. Published soon after *Primitive Culture* (1871), 'The Evolution of Culture' does not define culture so much as the science practised to study it. In true Comtean (and Spencerian) fashion, the science of culture passes through three predetermined stages: 'These three stages then, the empirical or practical, the classificatory or comparative, and the evolutionary, are applicable to the development of all the inductive sciences.'[21] It is significant that the evolutionary stage represents an evolutionary apogee, because in the unilinear thinking of Victorian anthropology the rise of evolution was itself a marker of advanced civilization. Forward-looking historians like Stocking tend to focus their deprecation on the earlier part of Tylor's definition of culture, but his equation of culture and civilization needs to be re-read in the context of Victorian evolutionary self-awareness. As a barometer of civilization evolution was the culture of science, and the science of culture was evolution.

As an apex of civilization, however, the Victorian science of culture really succeeded in defining only itself; as a meaningful term 'culture' remained elusive. Raymond Williams rightly describes it as 'one of the two or three most complicated words in the English language',[22] not least for its frustrating entanglement with civilization. Eager to distinguish the study of culture *as* civilization from the study of culture *through* civilization, Victorians also reflect idealist tendencies almost completely lacking in the materialistically formulated anthropological conventions of the time. In *Culture and Anarchy* (1869), for instance, Matthew Arnold claims that

> there is of culture another view, in which not solely the scientific passion, the sheer desire to see things as they are, natural and proper in an intelligent being, appears as the ground of it. There is a view in which all the love of our neighbour, the impulses towards action, help, and beneficence, the desire for removing human error, clearing human confusion, and diminishing human misery, the noble aspiration to leave the world better and happier than we found it, – motives eminently such as are called social, – come in as part of the grounds of culture, and the main and pre-eminent part. Culture is then properly described not as having its origin in curiosity, but as having its origin in the love of perfection; it is a *study of perfection*. It moves by the force, not merely or primarily of the scientific passion for pure knowledge, but also of the moral and social passion for doing good.[23]

Although Arnold postures against science, his language reflects scientific awareness, and like Pitt Rivers he defaults to defining culture as a process of understanding rather than defining culture in and of itself. Culture, he argues, has 'its origin in the love of perfection; it is the *study of perfection*', and it moves by 'force'. But what exactly is the nature of that force? Why does it emanate from a social imperative to do good? And how does it produce and define culture? *Culture and Anarchy* may speak the language of Victorian humanism, but it never completely disdains the sciences. Neither does science ever dismiss the arts. In 'Science and Culture' (1880) Thomas Huxley concedes the importance of literature in the context of a balanced education: 'I am the last person to question the importance of genuine literary education, or to suppose that intellectual culture can be complete without it';[24] in 'Literature and Science' (1882) Arnold admits 'that a genuine humanism is scientific'.[25]

In a Victorian culture immersed in evolutionary thought, the culture of science and the culture of the humanities were complementary rather than oppositional.[26] And in many ways it is precisely the nature of their complementarity which makes their relationship identifiably Victorian. Emblematically, the same period that produced Huxley's 'Evolution of Theology' (1886) produced Lyman Abbott's *Theology of an Evolutionist* (1897). The Victorians conceived of almost everything in terms of something else which represented it. In the starry semiological universe of Victorian culture evolution was not merely a scientific theory. It was a symbol of humanity's progress, and as Spencer points out man's progress is marked by the ability to make increasingly complex – if seemingly antithetical – connections: 'It is undeniable that intelligence ascends from those simple perceptions in which consciousness is occupied in localizing and classifying sensations, to perceptions more and more compound, to

simple reasoning, to reasoning more and more complex and abstract.'[27] Synthetic philosophy exemplifies the intellectual project of Victorian culture because it recapitulates recapitulation; synthetic philosophy is the ontogenic form to recapitulation's phylogenic content. If synthetic philosophy represents anything cultural it is the indomitably Victorian aspiration to link unity and diversity, the individual and the whole, form and content – to understand the universe in its magisterial sublimity, and to appreciate our single human place within it.

Evolution and Victorian Culture proves that the same spirit of interconnectedness marking synthetic philosophy continues to this very day, updated with new terminology. Interdisciplinarity is the fashionable evolutionary descendant of the fashionable synthetic programme of Victorian culture. Like the intractable word 'culture', 'interdisciplinary' is terminologically squidgy. Yet, according to Joe Moran, its source of strength lies precisely in indeterminacy. Moran urges us to embrace the confusion: 'there are potentially as many forms of interdisciplinarity as there are disciplines … I take interdisciplinarity to mean any form of dialogue between two or more disciplines: the level, type, purpose and effect of this interaction remain to be examined.'[28] Compare this definition with Spencer's notion of integration, here describing science but equally applicable to the whole of the natural world, society and language: 'Science … has become highly integrated not only in the sense that each division is made up of mutually dependent propositions, but in the sense that the several divisions are mutually dependent – cannot carry on their respective investigations without aid from one another.'[29]

Interdisciplinarity makes *Evolution and Victorian Culture* very Victorian; what makes it modern is evolution. The influence of evolution has been studied exhaustively from the nineteenth century onwards, but until recently that influence revolved mainly around Darwin and the effects of Darwinian scientific culture, including classic books like Eiseley's *Darwin's Century* (1959), Himmelfarb's *Darwin and the Darwinian Revolution* (1959), Ruse's *Darwinian Revolution* (1979), Oldroyd's *Darwinian Impacts* (1980) and Young's *Darwin's Metaphor* (1985). Peter Bowler's work begins to release evolution from its conceptually Darwinian shackles with *Evolution: The History of an Idea* (1983/current edition 2009), *The Eclipse of Darwinism* (1983), *The Non-Darwinian Revolution* (1988) and *The Invention of Progress* (1989), among others. *The Non-Darwinian Revolution* is significant as one of the first attempts to recalibrate the nature of Darwin's influence on Victorian culture. But while Bowler's contribution is significant in the history of Victorian science, his and other non-Darwinian theories

have never been adequately tested in the larger plurality of Victorian cultural activity. *Evolution and Victorian Culture* is the first book to do this.

Evolution and Victorian Culture contains eleven chapters on the relationship between evolution and various forms of culture in nineteenth-century Britain. Each chapter offers projections for future research as well as an overview of previous scholarship on the topic. The notes to the overviews, in addition to the notes throughout the chapters, should provide all of the information needed for readers to become acquainted with the most important scholarship on evolution and Victorian culture. The sequence of chapters follows a tree-like pattern, closely connecting essays linked in culture. The first two chapters focus on poetry and the novel, two forms of literature. In his chapter 'Evolution and Victorian fiction' Schmitt contends that Victorian fiction was heavily conditioned by evolutionary theory. Many writers in the second half of the century came to believe that evolution constituted the law of things as they are, and this belief transformed their view of human nature, the social environment, and the theory and practice of fiction itself. Schmitt focuses on the evolutionary significance of language. Darwinian theory raised questions for both novelists and scientists about the suitability of the current lexicon to capture the dynamic reality now revealed by evolution. In 'Poetry', John Holmes argues that the full impact of evolution on the forms and imaginative worlds of Victorian poetry has rarely been acknowledged. Long before the publication of Darwin's *Origin of Species* in 1859, some poets, such as Tennyson and Clough, were actively engaged with evolutionary themes. But after the *Origin* it was impossible for poets to ignore the existential implications of evolution for an understanding of nature and the place of humanity within it. Some reacted by denying the validity of all evolutionary theory; others portrayed evolution as the unfolding of God's creative plan, rejecting Darwin's theory; still others endowed nature with the creative impulses previously attributed to God; while others accepted the brutality of nature and did without a divine being.

Chapters on photography, cinema and painting all consider the relationship between evolution and visual forms of culture. In 'Between specimen and imagination: photography in the age of evolution', Edwards explores the vast network of photographic images interpreted through the use of an evolutionary perspective. She points out that evolutionary theory and photography became culturally pervasive at the same time. Photographs offered the possibility of concretizing evolution in a visual image. Edwards examines evolutionary themes in three crucial areas of photography: anthropological visualizations of the human race, pictures

of cultural behaviour, and the domestic and popular use of photography. Taken together, these three examples demonstrate the range and connectedness of photographs that were read from an evolutionary perspective. In 'Early cinema and evolution', Gaycken emphasizes the role of non-fiction films in the long history of cinematic engagements with picturing evolutionary processes. He examines depictions of human-like primates and human prehistory as well as the emphasis on animal combat and protean transformation in natural history films. Gaycken argues that filmmakers took advantage of novel representational techniques to help make evolution accessible to audiences. High-speed cinematic effects were used to simulate the vastness of the evolutionary process, allowing for a visualization of time scales beyond human perception. In sum, cinema provided a novel resource for thinking about evolution. In her 'Evolution and Victorian art', Larson demonstrates that artists who produced representations of evolutionary ideas after the middle of the nineteenth century often turned to conventions created in the Romantic period or even earlier. Victorian evolutionary art was deeply rooted in previous traditions of envisioning nature, the history of the earth, and human development. Larson refuses to present a linear narrative where science directly influences painting and sculpture. She insists that we appreciate the ongoing dialogical relationship between art and science. Conventions for depicting evolution were the result of collaborations between artists, geographers, geologists, botanists and anthropologists.

Chapters on the performing arts – theatre, dance, and music – follow the chapters on the visual arts. In her '"I'm Evolving!": Varieties of evolution on the Victorian stage', Shepherd-Barr argues that Victorian theatre was deeply engaged with evolutionary theory, and in hugely diverse and often unexpected ways. Playwrights tackled such evolutionary themes as deep time, anomalies in nature, human origins and gender essentialism. Far from being a mere reflection of evolutionary theory, theatre of the period often takes the form of a reaction *against* Darwin and an embrace of non-Darwinian evolution. This is no story of benign assimilation: dramatists and theatre practitioners who dealt with evolution were often suspicious, doubting and hostile to it even while deeply drawn to the new insights and possibilities it offered. Shaw, for example, adopts a Bergsonian-influenced, teleological 'Creative Evolution' that puts a new twist on the theory of natural selection. In her chapter 'Dance and evolutionary thought in late Victorian discourse', Buckland contends that evolution did not begin to shape views on dance until the end of the century. She discusses two formative histories, Edward Scott's *Dancing in All Ages*