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## Introduction

**I**N RECENT CENTURIES, the rate of human advance has been remarkable, and the pace of change shows no sign of slowing. Technological innovation constantly presents us with new discoveries, each apparently set to revolutionize our lives. Progress defines us; the achievements of our ancestors pale in comparison. But has all this progress led to an improvement in the quality of our lives, or does relentless change only present us with a tougher set of challenges and new anxieties to be overcome? Despite our achievements, are we really happier than our ancestors a hundred or a thousand years ago? How can we be sure if our drive for innovation has been of general benefit to humankind?

Need the material advantages conferred by a century of great advance necessarily have been applied so selectively among and within human populations? Why have certain groups, peoples and nations benefited so immensely while millions remain no better off than their forebears? Would this improvement have been possible in a form which was less selective and more embracing of all humankind, or is it only the selfish drive of ambitious individuals striving for their own material betterment that has enabled a fortunate minority to develop so rapidly in recent generations? If this is true, then what hope for the quarter of the world's people who still live in abject poverty, or the half that have access to the economy but no security within it; or even those lucky enough to have been born in the 'developed' nations, but where so many are troubled by the anxieties which spring from the gradual realization that the world they were brought up to believe was certain and secure is, in reality, anything but? Humankind faces many great, apparently insoluble problems: none has a simple solution and none has a solution in isolation from the others. All of them are a consequence of our failure honestly to appraise the motives and consequences of our relentless drive for progress.

Progress is a difficult concept to tie down. Archaeological evidence from the earliest societies suggests that humans have long been concerned with managing their communities so as to promote improvement on what has gone before. As a concrete idea, however, progress only came to prominence with the *Enlightenment* philosophers of the eighteenth century. Today it occupies a pre-eminent place in people's minds, but it is a concept about which we are strangely ambiguous: as often as

we berate ourselves for not doing enough to improve society, we have nothing but praise for modernity. This confusion results from the absence of criteria against which to judge progress. Such criteria would enable us objectively to assess claims for progress, and also to make conscious decisions about future priorities. We need an explicit definition, one which provides clear benchmarks for the measurement of progress, and which is underscored by clear and recognizable moral values.

In the context of this book, progress has several elements: first, the creation of conditions in which growing numbers of people have access to economic opportunities sufficient to provide for their basic needs. Second, the improvement of life expectancy among those groups where it is lowest. Third, the provision of improved economic security for the poorest members of all societies, including the rich countries. Fourth, the achievement of these objectives through means which do not compromise the capacity of the planet to provide for future generations. Fifth, that whatever changes to social and economic arrangements are implemented in order to meet these objectives, they do not threaten the freedom and liberty of individuals. Finally, revised social arrangements should allow everyone to draw a measure of self-worth and creative satisfaction from their working lives and leisure time. The ultimate objective of progress is a reduction in the number of human beings whose lives are blighted by physical and emotional suffering, and lack of opportunity. To be concise, *progress*, in the context of this enquiry, is movement towards a more equitable, inclusive and sustainable global social order.

Philosophers, anthropologists, sociologists, economists, biologists and others regularly make claims for and against the possibility of progress. Occasionally, their ideas have a direct and rapid impact on society, but few thinkers any longer dare to attempt the broad sweep that the subject demands. Academic specialists tend to direct their attention at only one part of a very large picture, applying the criteria of one natural science or another, or focusing on a certain culture, or a particular time. Some writers have recognized the need for a broad approach and have successfully attempted to synthesize theory and evidence from diverse quarters, but few have been ambitious enough to attempt an integration of knowledge from all relevant disciplines, or been able to package the result in a format which is intelligible to ordinary people.

Problems of social organization and economic inclusion appear exempt from the demands of time for progress. If pioneers in physics, medicine and engineering had allowed their efforts to line the shelves of libraries, rather than become an integral part of our evolving society, we would still be waiting for the industrial revolution, and would not expect to live past fifty. But since the time of Socrates, ideas that could form the basis for fundamental changes in the way we organize our societies, and

have a tangible impact on the quality of life for many people, have remained just ideas. Occasionally they enter a wider public consciousness, or elements are selected and applied in isolation, but they remain at the margins while we view developments driven by technology in pursuit of enhanced material benefits for a minority as evidence that we are constantly reinventing, improving and conforming to the ideal of progress. This book aims to explain the continuing gap between our hopes for humankind and the largely unchanging reality of existence for most people, and to seek solutions to the apparently timeless problems of suffering and social exclusion.

Just as our collective problems cannot be solved in isolation, neither can the solutions promised by different disciplines be applied without reference to one another. The following chapters draw from diverse sources in order to build an argument for the possibility of progress which addresses all potential criticisms and objections. Chapter 1 examines the history of ideas of progress and their entanglement with evolutionary science, to determine precisely what constraints human biology places on the possibility of progress. Chapter 2 broadens the debate to look at cultural evolution, how it differs from biological evolution, and the historical development of the mechanisms by which we provide for our needs through the economy. Chapter 3 asserts the unity of humankind in terms of our shared basic needs: if we are essentially all the same, are we not under a duty to organize the economy in ways that recognize the equal interests of all people? As a reminder of the pressing need for change, Chapter 4 examines the extent of misery and suffering in the world, and connects the hardship of the many with the comfort of the few. Chapter 5 seeks a philosophical basis for social change: unless we know why it is right to pursue progress, our efforts will be found wanting. Chapters 6 and 7 focus on the individual in society: what shapes us and makes us, and how the manner in which we are trained for life renders us powerless and accepting of the status quo. Chapter 8 looks at moral development in the individual, and uncovers evidence for an advanced level of moral awareness to which all humans naturally aspire. Chapter 9 investigates the ideas of classical economics, and unearths a long disregarded, but indisputable, explanation for our ongoing failure to build a more inclusive society. Chapter 10 applies this discovery to the challenge of reconciling the apparently opposing values of individual freedom and social justice through changes to economic arrangements which promise equity and sustainability. Finally, Chapter 11 assesses the arguments made in the book against the political and economic landscape of today's world, and considers the means by which a process of transformative social change might begin, and the likely implications of such change for our individual lives.

Many books have highlighted the miserable condition of humankind and the precarious state of our planet, but too many of these testaments fail to identify root causes, or to investigate the means by which we might stop the rot. This book attempts to discover what it is about humans as biological organisms, cultural players and economic agents which gives rise to our social problems, what we therefore need to change about ourselves, and how change in individuals might translate into wider social change.

If it is allowed a nurturing environment in which to develop, the human mind possesses a remarkable ability to absorb and assimilate information and evidence through observation and experience, to reflect on these, and to make considerable progress towards determining reality from unreality; to get some way towards knowing the truth. Widespread application of this capacity could set us on a course towards solving many of the problems we face. At present, for reasons we shall examine, not everyone, and not anyone all of the time, is able to engage this capacity consistently.

The means by which knowledge and understanding permeate the individual and collective consciousness, and the mechanisms by which such revelation is internalised and becomes motivation to action, are central to this enquiry. While I hope that what follows will prove interesting and stimulating, it is intended to make you think; to take the material here provided and do something with it: agree wholeheartedly, disagree vehemently, argue with colleagues, debate with friends, find common ground with lovers, but above all to think, to engage with and reflect on the most profound and challenging questions of our time. The only real obstacles to engaging with the issues considered here lie within each of us. Most of us are quite capable of deciding whether or not to join the debate, and whether to do so with an open mind.

Without a degree of certainty, a rootedness of belief, life would be very hard to negotiate. Once we begin to question anything, we can easily end up questioning everything. It is quite understandable that we seek some guarantees before we can give up firmly held beliefs and convictions. This book provides no such guarantees; what it offers instead is an insecurity bypass, a vision of what might be, and an indication of the likely rewards for taking the biggest risk of all. For we have a choice, either to take the passive risk: to sit tight and see what happens; or to take the active risk, the one that gives us a degree of control: we can embrace both the validity and the possibility of building a world in which human beings live cooperatively and equitably. Although it may take generations, we can begin by accepting that it is a realizable and worthwhile project, one which might ultimately produce a society which we would all choose over our current, rather troubled, world.

## Science and Humankind

IT WAS OUR ANCESTORS' realization that the human mind is capable of understanding the forces of nature, and the human will capable of action to harness and exploit these forces, that set us on the path of progress. After millions of years as nature's subjects, human beings learned to take control. We became problem-solvers; we had discovered science. Our evolving scientific understanding has been the engine of human advance for ten thousand years, but latterly, as we have begun to apply scientific method to the study of human relations, it has proved a less than reliable guide. We have allowed our perceptions of the prospects for human society to be influenced by quasi-scientific claims for the limits to progress for which there is little evidence.

The principal gift of science to humankind has been certainty. Certainty makes life much more manageable for people. It is not surprising, then, that many social thinkers have turned to science in search of explanations for, and solutions to, the problems of human society. If properly conducted and applied, science can enable an idea, theory or claim about the world to be tested to the satisfaction of all but the most marginal sceptics. The best science is that which stands the test of time and survives the development of more sophisticated tools for evaluation. In physics and chemistry, even where bad science evades detection there are few consequences. While developments in genetic engineering may alter this assumption, if you misinterpret the mechanisms that drive the natural world, you will not have much impact upon it. As a rule, bad science will either fail to stand up to the test of observable evidence over time, or someone will offer an alternative which displaces the earlier theory. In the natural world, the only real cost of a bad theory, however long it survives as the dominant view, is to the reputations of its originator and proponents.

The quest for greater understanding of human social relations is not scientific in the sense that astronomy and molecular biology are. When speculative scientific method is applied to matters of society and economy, ill-conceived ideas are often taken up by people eager for evidence to support a pre-existing view of the world. Subjective notions about the

way the world is, or should be, are then portrayed as having a sound basis in science. It is impossible to create laboratory conditions in which to test theories of human social relations, and unethical to conduct such experiments on people and societies in the real world. This should confine the contribution of science to one of theory only, but the history of the twentieth century suggests we are reluctant to accept this.

As we shall discover, when properly applied, scientific method can help us to appreciate the underlying causes of social and economic problems. It can help clear some of the obstacles to progress by improving our understanding of what it is about human nature and our historical cultural development that constrains progress. It can even give indications as to how we might create conditions more favourable to progress. But, just as when we identify certain problems within society, we do so by reference to values – we make an assessment of how we would like the world to be on the basis of what we think important and valuable, and what we think possible – so those same values must underpin any effort to apply science in the pursuit of progress. We shall investigate the philosophical basis for values compatible with our definition of progress in Chapter 5, for without a rational and informed value base, science-motivated attempts at shaping social advance will bring no progress whatsoever.

Efforts to establish a scientific basis for human behaviour and social relations have long been linked to arguments over the nature and possibility of progress. If we could prove through science that all humans possess an innate and invariable propensity for competitive attitudes and selfish behaviour then we might conclude that there is little point intervening and let nature run its course. Conversely, if science revealed that we were essentially altruistic beings whose cooperative nature had been corrupted by an identifiable cultural source that we could control, then we might see our way to a more equitable society. In either case, and in respect of any other scenario that science might reveal, we would have a blueprint for the future, some indication as to the likelihood of progress and the nature and extent of our role in promoting it.

While scientific method can help us along the path to progress, it will not provide any definitive prescription of possibilities and limitations. Terms such as social or political science should therefore be understood as the application of scientific method to the study of social or political relations. They are necessarily different from the physical sciences. By treating them as pure sciences, we assume that one day there will be nothing we cannot explain and predict with scientific confidence. This desire for simple, unarguable explanations for the world and its ways constitutes a massive threat to the integrity of human enquiry. While science has provided us with almost limitless potential for technological

progress, the extent of our commitment to it compromises our ability to mediate its consequences. Science certainly enables us to work with nature on more equal terms, but in the social sphere it offers little in the way of indications towards progress.

Only if we articulate a clear moral basis for the application of scientific method to problems of social relations will the cause of progress be helped. Thus far, the general thrust of science-based attempts at improving our understanding of the social world has been to place strict limits on the possibility of progress: first, through an unfounded assertion that social injustice and economic inequity are the inevitable outcomes of a 'natural' unfolding which we cannot control, and latterly through the reckless misapplication of what we have learned about our evolution and the science of genes. This chapter aims to dispel the myth that the prospects for human society are necessarily constrained by our evolutionary heritage. We begin with a brief excursion through the history of social science, where we find its origins inexorably entwined with early biology.

*Evolution* is a word ubiquitously associated with science, but, before Charles Darwin claimed it for biology, it found common use among social thinkers. The ultimate gift of the word from philosophy to science is not simply a matter of historical record. The timing of the publication of Darwin's *On the Origin of Species* in 1859 ensured that subsequent debate about progress and the development of society would never escape the shadow of biology. The impact of the confluence of two spheres of thought around a single word cannot be overstated. We will return to Darwin, for we must accurately plot the boundary between biological and social evolution, and determine any overlap between the two. But first let us turn to the world of ideas in the decades before Darwin's birth.

In the mid-eighteenth century there was Europe-wide political upheaval. In England and The Netherlands a transition of power from the aristocracy to the commercial middle class was almost complete. France and Scotland lagged behind, and it was concern over how best to promote the political interests of the middle classes in these countries that gave birth to the philosophy of *The Enlightenment*. Before this sea change in ideas, philosophical thought had been limited by the absence of any concrete concept of progress or direction in social affairs. This precluded the possibility of either optimism or pessimism about the future; the question simply did not arise. Although, two thousand years earlier, Greek philosophers had speculated on how we should best live our lives and organize our societies, it was only two hundred and fifty years ago, with the publication of Montesquieu's *De L'esprit de Lois*, that

modern humans began seriously to consider the possibility of alternatives to prevailing structures of social organization and political control. Up to that point, the idea of social change was usually associated with degeneration and collapse.

The ideas of the Enlightenment philosophers were original and radical, revolving around the doctrine of *psychic unity*, which suggested that there were no essential differences between groups or races of humans. Nor were there any biological constraints on any group or individual attaining *perfection*. Groups denied contact with others would, it was thought, devise similar solutions to similar problems; and the very observable differences between cultures were explained by the widely varying environments in which isolated cultures had developed. People were essentially good, and possessed a natural tendency to cooperate with others. It was only the unwelcome intervention of certain social forces which made people greedy and selfish. These ideas were summed up in a belief that progress was the defining property of human history and that it occurred continuously.

This new and optimistic view of humankind represented a major change in a world of thought that had previously been dominated by the less hopeful reading bequeathed by Thomas Hobbes in his *Leviathan* more than a century earlier. Hobbes had suggested that conflict and the resultant suffering were the inescapable destiny of humankind. Enlightenment ideas quickly spread, and had considerable impact. Both the French and American revolutions were influenced by the new thinking, and although marginalized in the first half of the nineteenth century, the Enlightenment seed had been sown. Never again would the idea of progress be absent from speculations about the origins of humankind, or the future of human society.

As early as 1693 the German philosopher Gottfried Leibniz anticipated the evolution of species in the sense that we now understand it. During the eighteenth century, Montesquieu and Darwin's grandfather, Erasmus, pursued the idea. But it was the French naturalist Jean-Baptiste Lamarck who first suggested that all species were the product of a uniform process of evolution. Lamarck believed that new species emerged spontaneously to embark on a process of evolution towards perfection. He is most commonly associated with the idea that characteristics and behaviours acquired by an organism during its lifetime are passed on through the reproductive process to successive generations: *Lamarckism* is now defined as 'a theory of evolution based on the inheritance of acquired characteristics'. Lamarck was not the originator of this belief however, it was a widely held assumption which survived well into the twentieth century, but his original contributions were crucial to the development

of evolutionary biology. He was the first formally to advance the idea of an evolutionary transition of species over time, basing his belief on geologists' claims that the earth was far more ancient than most thinkers of the time allowed. Two hundred years ago, when Lamarck was struggling with evolution, anyone suggesting the world was much older than six thousand years or so, as the Bible implied, got very short shrift. By imagining a much older world, he was able to visualize a process of evolution slow enough not to conflict with the observable evidence of little change in the appearance or behaviour of species over time.

Lamarck's ideas met a frosty reception with the thinking middle classes of early nineteenth-century Europe. They were far too radical for a world still unready to discard divine explanations of human origins and a Christian moral basis for the prevailing social order. In Britain, that order, which had seen a shift in power and prestige to a growing but still small middle class, was under threat from the consequences of rapid industrialization and the movement of huge numbers from countryside to city. Just as the Enlightenment was invoked to protect the middle classes from an aristocracy unwilling to let go the reins of power, so a new maxim was required to justify and protect the comfort of the new ruling class against a backdrop of exploitation and poverty among the industrial working class. This was duly supplied by the philosopher Herbert Spencer, who did more than anyone to entangle the concepts of biological and social evolution.

The mid-nineteenth century in which Spencer lived and worked was a period of immense social change. Considerable wealth was accruing to the successful entrepreneurs of the new industrial age, but the plight of the majority, many of whom were faring worse than their pre-industrial forebears, was giving cause for concern. Politicians struggled to reconcile the obvious benefits of industrialization with its unforeseen social consequences. A successful economy meant allowing individuals the freedom to apply their entrepreneurial zeal in the pursuit of profit as an end in itself. Providing for the material needs of those who saw little benefit from industrialization belonged to a separate realm of collective welfare, to be funded by philanthropists and ultimately coordinated by the state.

Spencer's vision was of a grand evolutionary design. By way of a single process, plants and animals, then humans and ultimately the developing structures of civilized society were all the result of a seamless evolutionary process which took simple organisms and produced ever more complex species and social institutions. Spencer was motivated by a desire to reconcile advances in science with the moral teachings of Christianity, and he supported Adam Smith's *laissez-faire* approach to economic management which he considered essential to the unfettered course of evolution. He was convinced that the free market would grant access to

the economy to all those excluded by the apparatus of state which acted principally in the interests of the established professional middle classes.

For Spencer, the emerging *entrepreneurial* middle class was key: once freed from the shackles of state intervention, he believed, these new entrepreneurs would better provide not only for themselves but for all they were able to employ. He advocated *laissez-faire*, individual freedom and the protection of property rights because he believed this was the surest route to a more equitable and inclusive social order. But Spencer was happy to suspend moral criteria along the way. He explicitly accepted the consequences of such arrangements: that some would be left to die. He opposed compulsory education as unhelpful meddling in the process of evolutionary improvement, and argued against colonial expansion on the grounds that it represented unwarranted interference in the development of other societies. He had a strong distaste for any action coordinated by the state, although it cannot have escaped him that, in securing colonies, the interests of both state and private enterprise were well served.

It was Spencer, not Darwin, who coined the phrase 'survival of the fittest' to describe a finite process which justified short-term suffering and loss of life in the pursuit of an 'equilibrium' society in which hardship would disappear and the needs of all be met. He thus provided a conscience-salving justification for the dreadful and very visible social consequences of industrialization. In the process he helped sell the idea of evolution to a previously reluctant middle class, further preparing the intellectual landscape for the publication of Darwin's theory of biological evolution in 1859.

Today Darwin is everywhere; no thinker is so revered and no reputation so secure as his. To criticize Darwin is to lay oneself open to accusations of intellectual naivety and even treachery. The reaction of Darwin's supporters to those who dare criticize him is akin to fundamentalist zeal. Darwinism has become the faith upon which not only the whole edifice of evolutionary biology rests, but upon which the prospects for human society are founded. There is a fine line between rational belief in sound scientific theories, and Darwin's are pretty sound, and an ideological belief in the same theory which is not circumscribed by a thorough understanding of its limits and how it can legitimately be applied in the pursuit of further knowledge. At his peak, Darwin was acutely aware of the boundaries of science, but towards the end of his life he found it impossible to resist the temptation to apply his theories more widely and controversially, reviving a trend for pseudo-philosophical speculation disguised as science which would come to characterize much of twentieth-century social thought.

A few mavericks have dared to question Darwin's contribution and to ask how much of his thought was truly original. He was certainly not the discoverer of the fact of evolution. Lamarck had proposed the evolution of species from primitive to more complex organisms while Darwin was still at school. Soren Lovtrup, in his analysis of the comparative contributions of Darwin and Lamarck, argues persuasively for Lamarck as the originator.<sup>1</sup> He is now largely discredited because he acquiesced in the notion that variation in species depended upon the heritability of acquired characteristics. Little mention is made of the fact that Darwin, always unsure of his own theories, supported the inheritance of acquired characteristics until his death.

In biology, according to the theory of natural selection, evolution occurs through the selection, in nature, of variations in the information stored in genes, the chemical units within biological cells which hold design specifications for species and ensure that established designs are passed on from generation to generation. But the mechanism by which genetic information is replicated during reproduction is sometimes subject to error: mistakes are made which lead to the substitution of slightly altered genes for the originals. Over the course of a few generations, such changes will have no discernible impact, but over many hundreds or thousands of generations, they will. This is because variations in genes are selected for, or against, depending on their impact on the *fitness* of the organism. Some accidental modifications to genes leave an organism with greater fitness and are selected for. These randomly mutated genes survive and multiply throughout the species group. Others reduce fitness and are selected out of the evolutionary process.

Fitness has two elements: the ability of the organism to survive to reproductive maturity, and its ability to reproduce successfully and so pass on its genetic inheritance to the next generation. The direction of evolution is influenced by both these aspects of the evolutionary process, which are called *natural* selection and *sexual* selection. Their interaction adds another variable to an already complex process.

External factors play a major role in setting the criteria for fitness: climate, environment, space and availability of food all interact with these accidental design changes to determine the order of selection. It is quite possible, especially in species which reproduce quickly, that the same genetic variation may be selected for during a cool summer but against during a warm one. This example begins to give an idea of just how uncertain the process of biological evolution is. However, whilst the mutation of genes is quite random and accidental, the process by which they are selected for and against is not. Only if it improves the fitness of an organism will an altered gene survive. It should be noted that Darwin himself had no conception of the mechanism by which variation entered

the reproductive process; he knew nothing of genes. This description of his theory is embellished by a century of further thought and research.

Is natural selection sufficient a force to drive the entire evolutionary process? Darwin was unsure: not only did he fall back on Lamarckism, but he allowed the possibility of *macromutations*, major changes in organisms over a single generation. Alfred Wallace, who is credited with Darwin as the co-formulator of the theory, rejected Lamarckism all along, arguing for natural selection as the sole mechanism of evolution until 1869, when he concluded that it was not sufficient a force to have accounted for *human* evolution, and instead sought solace in eastern mysticism.

In contrast to Darwin's status today, the fiftieth anniversary of the publication of the *Origin* in 1909 saw natural selection universally opposed. Much of this early opposition was philosophical in nature, largely motivated by a reluctance to accept its implied lack of design. But the scientific arguments over the mechanics of evolution are of more interest, for they continue today. The debate provides a fascinating example of how poorly informed protagonists weighed down by preconceived ideas, guarding vested interests and assuming entrenched positions, can derail the process of human intellectual endeavour. Most damagingly, analogies have continually been drawn between the process of natural selection in biological species and the processes of social and cultural advance. Such analogies would have little merit if there was clear evidence that natural selection was the sole and exclusive mechanism for biological evolution; but, as John Maynard Smith, leading geneticist and proponent of natural selection, was happy to admit, even in biology natural selection remains a hypothesis.<sup>2</sup> While it certainly does occur in nature, evidence for additional mechanisms, ones that may play a more important role, may still emerge. Nonetheless, our attempts to understand developments in human social relations are under constant assault by analogy with an incomplete and possibly unprovable explanation for biological evolution.

Let us be clear: neither the fact of evolution, nor its tendency over time towards greater complexity, are in question. But, in addition to lingering doubts over its mechanisms, further concern centres on the issue of whether all species derive from a single ancestor. There are two main arguments for *common descent*. First, the intrinsic logic of Darwin's theory: on his five-year voyage around the world on *HMS Beagle*, he collected evidence that species evolve in a branching manner. Where species had become isolated it was possible to see how evolution had followed a particular path in one place and another elsewhere. Branch-like diagrams can be constructed to represent this process of *isolated speciation*. The human mind then only has to extrapolate these branch

segments into one enormous and complete tree to determine a single origin for all species over all time.

The second piece of evidence for common descent is the fact that every living species has genetic material in common – but is this proof? We can be reasonably certain that, if common descent is a fact, then all species will share genetic material, but the reverse is not necessarily true. Consider a more recent theory, one that is rarely aired and not heavily featured in academic texts: that of Sir Fred Hoyle and Professor Chandra Wickramasinghe.<sup>3</sup> They point out that certain organic particles have been identified in dust clouds floating in space, and that these particles are not so different to those that form the building blocks of life on earth. Suppose these particles periodically find their way to earth, where, if encountering favourable conditions, they give rise to life. This may have happened many times in the history of our planet. It may have happened just once, but in many different places. It might mean that humans and chimpanzees share one common ancestor, but that snails and slugs share a different one. Both common ancestors may share a common origin in the space-borne particles in which the genetic markers common to all species are found. This would go some way to explaining the amazing diversity of life on earth. I do not know whether this explanation is more or less likely than the conventional theory of a single original life form emerging from a primordial soup of chemicals, but neither would I be persuaded by anyone who insists on the truth of either theory in the absence of conclusive evidence.

Biologists agree that the rate of evolutionary change in humankind is very slow. Over the last ten thousand years, only negligible changes in our biological construction have occurred. Social evolution, by contrast, can be very fast, and this is one of the reasons why analogies between the two are tenuous and unhelpful. This brings us back to Herbert Spencer, whose preoccupation was *social* evolution, but whose time was the time of Darwin.

Darwin drew from Spencer's view of the social world to illustrate his theories of the biological world, but he had done some rigorous science first, and knew its limitations. Spencer clearly did not; today he is a largely discredited theoretician. He survived Darwin by twenty years, dying in 1903, a sad and dispirited figure. The economic depression of the late nineteenth century revealed to Spencer immense problems which appeared to defy the power of *laissez-faire* to put society to rights. But the abject failure of his theories caused few to doubt Spencer, and in the early twentieth century his ideas were taken up with great enthusiasm. The impact of *social Darwinism*, as the popular interpretation of his philosophy came to be known, endures to this day.

Spencer himself never conceived of a social movement; there was no plan for social Darwinism. Some definitions are therefore useful. For John Greene, social Darwinism is the view 'that competition between individuals, tribes, nations and races has been an important, if not the chief, engine of progress in human history'.<sup>4</sup> For Howard Kaye it is 'the misapplication of the theories of natural selection and the struggle for existence to human society as a powerful and cruel apology for brutal exploitation both within and between societies'.<sup>5</sup>

Social Darwinism, although not yet so named, was the dominant idea in social thought in the mid-nineteenth century. Darwin's theories lent scientific credence to a Spencerian world view in which nature determined the direction of human social affairs. At the time of the publication of *On the Origin of Species*, Darwin was adamant that evolution had nothing to do with progress, and went out of his way to distance his theory from notions of moral value. According to Tim Megarry, 'Social Darwinism was little more than a rag-bag of contemporary preoccupations made into a pseudo-science by a misalliance of social observation with biological analogy'.<sup>6</sup> Mary Midgely argues that social Darwinism was adopted by people whose conscience was stirred by the plight of those who were victims rather than benefactors of nineteenth-century industrialization.<sup>7</sup> The new creed offered the possibility of enormous suffering and deprivation as a transient stage, representing the inevitable course of social evolution towards a perfect future.

Midgely makes the point that, in the analogy from biology to society, the meaning of competition is changed completely. In nature, two organisms vying for survival in a particular environmental niche are, in a sense, competing, but they have no choice in the matter and are in no way conscious of their actions. It is not possible for one of them to adopt a pragmatic approach and scuttle off to the next available niche. The competition between individuals at the core of social Darwinism consists of consciously directed behaviour which, often in the full knowledge of the protagonist, will lead to others being harmed. Social Darwinism excuses moral selectivism in the name of perceived collective progress. This may have been the way of things for much of human history, but it had never previously been articulated so convincingly, backed up with scientific 'proof', or disguised as an ultimate good.

Social Darwinism found its own niche in the United States in the 1870s when, in the words of Howard Kaye, social conditions represented 'a vast human caricature of the Darwinian struggle for existence and the survival of the fittest'.<sup>8</sup> Settler history comprised of pushing back the frontier, exterminating the indigenous population, and bloody disputes between the colonizers themselves. In two hundred years, American republicanism had defeated nature, marginalized an entire race, and

emerged victor over competing colonial powers; a perfect environment, then, in which Spencer's philosophy could flourish.

William Graham Sumner encountered social Darwinism when Spencer's *Study of Sociology* was serialized in a monthly magazine. Sumner was already enthused by the Protestant work ethic and the pessimistic political economy of Thomas Malthus and David Ricardo; his immersion in Spencer completed his political philosophy. He wrote, travelled and lectured widely and with considerable impact on the emerging industrial economy of the time.

Sumner pulled no punches in his synthesis of the economic, political and natural worlds, arguing that 'democratic representation in the extreme was inappropriate given genetic differences in mental and moral sensitivities because intrinsically less capable voters will insist on having a voice in matters they are intrinsically incompetent to judge'.<sup>9</sup> He refuted, utterly, the spirit of Thomas Jefferson, and people listened to him. To this day, western, and increasingly global, political economy evokes Sumner and Spencer far more than it does the values of the *Declaration of Independence*. Lester Ward, who was the chief critic of Sumner and social Darwinism in the United States, suggested it was little more than a fresh dressing for the *laissez-faire* political economy of Smith, Ricardo and Malthus and that it had little do with Darwin.<sup>10</sup> But there is a difference between believing that general economic improvement will result from the free operation of market forces, and arguing, as Sumner did, that relentless competition between humans is not only a force for good but a prerequisite to a harmonious social order.

The contradictions of social Darwinism were visibly in evidence on the ground. John D. Rockefeller, founder of Standard Oil, and one of the greatest of American entrepreneurs, is often characterized as the leading exponent of the creed among business people. A close examination of his record, however, reveals a more interesting story. Rockefeller certainly believed in free markets and competition as vital to economic advance, and he explained business gains and losses as the consequence of natural laws. But the commercial world he encountered in the late 1870s was one of competition-fuelled chaos. Rockefeller quickly recognized the waste and inefficiency of prevailing arrangements and set out to bring stability and long-term solvency to the oil industry. This he did by acting the arch social Darwinist, by using every means possible to consolidate and extend his power and run all competitors out of town. He could see the obvious failings of open competition in the oil industry, and was fully aware of the dangers of monopoly, but he soon realized that the only way to sort out the oil business was to enforce a virtual monopoly. Not only did Rockefeller succeed in his project and provide an enduring model for large-scale enterprise, he also amassed an immense

personal fortune which, in most undarwinian fashion, he promptly gave away.

From early in his career Rockefeller made it clear that beyond financing a suitably comfortable lifestyle as reward for his efforts, the rest of his wealth, which he saw as a by-product of his success in rationalising the oil industry, would be given away. He spent his retirement managing a charitable trust which dispersed \$550 million to those in need – the very people whom Spencer and Sumner argued should be left to their fate.

Although social Darwinism suited a rapidly industrializing American society, once the full impact of industrialization and urbanization became clear and began to impinge on the quality of life of the emerging middle class – just as it had in Europe a century earlier – as an *economic* creed, social Darwinism fell quickly from favour. Whereas Britain had embraced it to explain and justify the horrors overtaking society, so America ditched it as the palpable cause of many new and intractable social problems. But Spencer's legacy survived its rejection by business and economics, with a change of direction away from competitive individualism towards a more insidious collectivized version through which Darwin was used to explain perceived differences between national, racial and ethnic groups. Darwin must share some of the responsibility for this turn of events. While discussing human evolution in *The Descent of Man*, he acknowledged that evolution had left no trace of any meaningful physiological differences between human groups, but went on to say, 'the intellectual and moral or social faculties must, of course, be excepted from this remark'.<sup>11</sup> Carl Degler argues convincingly that it is Darwin rather than Spencer who is responsible for the racist version of social Darwinism that grew rapidly in influence, especially in America.<sup>12</sup>

The 1900s brought a change in the pattern of migration to the United States, with many poorer people from southern and eastern Europe following in the wake of the earlier north Europeans. For many in the establishment, already fearful that industrialization was upsetting the established social order, the arrival of millions of individuals with little to invest, either in capital or skills, spelled disaster. And so Darwin was hoisted once again, this time in support of the arguments of those who demanded a more selective immigration policy.

As more was learned about the mechanisms of biological inheritance, those inclined to use Darwin as justification for dividing humans into groups on grounds of biology gained influence. Darwin's cousin, Francis Galton, coined the term *eugenics* in 1883, arguing that a better race of humans could be created through artificially controlled breeding programmes, echoing Darwin himself, who had earlier argued that weaker

members of society should be encouraged to refrain from reproduction for the sake of improving the race.

Eugenics and social Darwinism were similarly influential, but they were quite different in nature. Social Darwinism was an argument and justification for the inevitability of a social situation which many found unbearably cruel and unjust. Eugenics was an attempt to attack the perceived cause of this injustice – genetic variation – by breeding a superior race of human beings. The United States, still struggling to come to terms with the fall-out of rapid industrialization, embraced the idea. By 1930, thirty states had laws sanctioning the sterilization of criminals and the mentally ill, whose contribution to the gene pool was deemed detrimental. Several European nations followed this lead, including Germany in 1933, *before* the Nazis came to power. There can be little doubt, however, that the eugenics movement played a role in Hitler's plan for the extermination of the 'lesser' races.

The phenomenon of social Darwinism is unmatched in its influence on the course of twentieth-century history. It took ten short years after 1859 for, as John Greene said, 'the idea of progress through competitive struggle to be elevated from the status of a principle of political economy to that of a law governing biological and social evolution'.<sup>13</sup> We have yet to rescind this law, but we could. Tim Megarry, following Thomas Huxley, suggests that, if we chose to, we could use our understanding of evolution to 'repudiate the gladiatorial theory of existence and the fanatical individualism of social evolutionary theory: society depends not on imitating nature but on ending its impositions'.<sup>14</sup>

Back in the scientific world, the *Evolutionary Synthesis* of the 1930s and 1940s amounted to a final reckoning on all the arguments over natural selection that had raged since Darwin's death. The synthesis comprised a number of works by leading evolutionists, notably Ernst Mayr, Theodosius Dobzhansky, George Simpson and Julian Huxley. They set out to move the debate forward by at least agreeing on the basics. Examination of the detail of their work reveals how incomplete the understanding of evolutionary mechanisms remained, and remains to this day. But the larger purpose was served and not for another thirty years was natural selection questioned as the principal mechanism of evolutionary change, by which time the theory had become virtually unassailable.

The period following 1945 held out the possibility of genuine social progress. Crucial to a short-lived revival of Enlightenment values, and a clear reaction to the horrors of Nazism, was the rapid emergence of a consensus that biology was of no value as a guide to ethics or social policy. In 1953, our understanding was enhanced by the discovery, by

Francis Crick and James Watson, of the chemical structure of DNA, the material from which genes are made. Unfortunately Crick, like many other great discoverers, was unable to confine himself to science. In 1964 he claimed that knowledge of DNA finally made eugenics a viable tool in the planning of human social affairs. Howard Kaye's discussion of this period summarizes the view of Crick and his followers as 'acknowledging the role of cultural evolution, but viewing mind and culture as regrettable rather than liberating, causing self-delusion, psychic pain and social instability by violating our true biological nature.'<sup>15</sup> As Kaye describes the opposing camps of the time, there were, on the one hand, the *biological humanists*, represented by Julian Huxley and Jacob Bronowski, on a 'value salvage project' to find a biological basis for the noble values of the ancient Greeks and Enlightenment thought. They argued that 'a Lamarckian process of cultural or psycho-social evolution has relegated biological evolution to a vastly inferior position'.<sup>16</sup> On the other side were Crick and his *philosophical biologists*, setting out to reduce philosophical thought in its historical entirety to basic laws of nature.

Nonetheless, the social and political world, anxious to be seen as having learned the lessons of the holocaust and two world wars, was able to resist arguments for a biological basis for human social affairs until the publication, in 1975, of Edward O. Wilson's *Sociobiology – The New Synthesis*.

Wilson has defined sociobiology as 'the systematic study of the biological basis of all forms of social behaviour in all forms of organisms, including man'.<sup>17</sup> The discipline originated in laboratory experiments on non-human organisms, generally less complex ones such as insects, which revealed evidence that the interaction between organisms – their 'social' behaviour – was heavily influenced by genes, and that certain social behaviours could be selected for through artificial breeding strategies. Wilson's book is a detailed exposition of this research and is generally acknowledged as an exceptionally rigorous piece of science. But he devoted his final chapter to the idea that, this gene-behaviour link having been established for fruit flies, it could be extended to humans. He further suggested that, ultimately, all human social behaviour could be explained in terms of our genetic constitution as shaped by evolution. He argued that our efforts should therefore be directed at unearthing the genetic roots of human behaviour, assuming that all behavioural traits were adaptive responses to changes in environmental conditions that were favoured by natural selection, rather than relying on traditional means of investigating human behaviour as pursued by the social sciences.

Critics of sociobiology assert that its mission is simply too ambitious to be realizable. To map comprehensively the nature and relation of links

between biological, individual psychological and socio-cultural influences on individual and collective human social behaviour is impossible, and not necessarily useful. Whilst not as pernicious as the beliefs underlying social Darwinism and the eugenics movement, in the minds of many, the idea of a predictive model for human behaviour derived from an established natural science could easily be misapplied. Perhaps unsurprisingly, Wilson has steadily revised down his ambition for sociobiology in his subsequent writing.

Many sociobiologists were originally motivated by concerns over the growing separation of human biology from culture. They saw cultural evolution as creating a modern world for which human nature, the product of a much slower process of biological evolution, is quite unprepared. Sociobiology aimed to address this problem by determining precisely what kind of social structures the natural design of human beings equipped them for, so we could then set about constructing an appropriate social environment. This does seem ambitious: if the process of biological evolution is to be trusted as the indicator of the proper path of our species' development, why did it let us off the evolutionary leash? If we evolved the ability to make conscious contributions to shaping the future through culture, can it really be argued that something went wrong with the evolutionary process? Evolution just happens; it has no purpose or direction beyond that of creating more life. We are perfectly entitled to choose to reject the outcome and work to change it, and such a project would certainly be helped by improved understanding of our evolutionary heritage, but that is quite different from suggesting that solutions to contemporary problems are to be found by returning humankind to the 'natural course' of evolution, whatever that might be.

Sociobiology suggests that human nature is the result of natural selection acting on our species over an exceptionally long period when neither the environment, nor human interaction with it, changed very much. There is strong archaeological evidence to suggest that for about two million years, until only twelve thousand years ago, all humans, and our pre-human ancestors, pursued a hunter-gatherer existence. Sociobiology contends that our biological constitution was designed for a hunter-gatherer lifestyle quite different from the world which most of us now inhabit. The world of the hunter-gatherer is termed our 'environment of evolutionary adaptation'. It is true that we differ little from our hunter-gatherer ancestors in respect of our genes, but this does not make it impossible for us successfully to conduct our affairs in today's world. Our genes might not have changed, but they did not stop us from creating the modern world; what is to say it is not the correct outcome of the evolutionary process? Wilson himself admits that 'the cultural change involved

in the appearance of civilization cannot be regarded as a result of any significant genetic change'.<sup>18</sup>

Sociobiologists have taken a particular interest in the topic of ethics, eager to find an explanation in biology for acts of altruism which fail to support the notion that only behaviours that guarantee personal survival and reproductive success will evolve. To this end, they modified the definition of fitness in the evolutionary sense, coining the term *inclusive fitness*. Fitness was no longer just about surviving to produce as many offspring as possible, rather it was about getting as many of your genes into the next generation as possible. As any organism shares a proportion of its genes with its siblings, cousins, nephews and nieces, its inclusive fitness will be enhanced not only by its own reproductive success but also by that of its close relatives. Altruistic behaviour therefore emerged, or so the argument goes, as a means to maximising inclusive fitness.

It is certainly true that genes are shared; some of my genes are making generational progress through my sister's children. It is also true that many humans show a preference for the well-being of their close relations over that of others. But there is no evidence that consideration of reproductive strategies for best propelling ones genes through time has ever played any role in the conduct of human social affairs, nor those of other species. There is, however, contrary evidence of the wholly unfit outcomes of regular episodes of sibling rivalry, fratricide and infanticide which do not support the theory of inclusive fitness as the source of altruistic behaviour at all. Sociobiologists have taken up the challenge of explaining many such theory-denting phenomena in terms of their preferred model, but other theorists have done the same, coming up with equally plausible explanations for social phenomena based on non-biological theories of social change, ones which do not imply that human beings are ruled by their genes, or by their evolutionary history. Over the last 25 years, there have been hundreds of pieces of research conducted to establish a basis in evolutionary history for various facets of contemporary human social life, many of which sound exceptionally plausible to an audience always grateful for concrete explanations of phenomena which do not always make sense. But none of these theories is, or can be, proven. As the anthropologist Marvin Harris argued, if we really want to understand the complexities of contemporary human society, we should be focusing our efforts on identifying the forces which have shaped human culture over the last ten thousand years, during which time, by the sociobiologists' own admission, our genes have barely altered, rather than investigating that element of our culture into which our genetic inheritance has had some input.<sup>19</sup>

The inclusive fitness argument is further compromised by too narrow a definition of altruism. For a sociobiologist, an altruistic act is one that

ensures the progress of genes through generations. To a philosopher, or anyone who enjoys the prospect of mutual cooperation with others, an altruistic act is something quite different: it is about doing favours for people; occasionally putting the interests of others ahead of your own. Sociobiologists may argue that gene-free acts of altruism are simply an unanticipated evolutionary side-effect, but altruistic behaviour is now a fixture in the behavioural vocabulary of people of all cultures; it is liberated from any biological origin, and it is the most conscious form of human action. If we want to assess our true collective moral potential we should be investigating why humans exhibit such an enormous range of moral behaviours, from heinous crimes of genocide to unimaginable acts of self-sacrificing altruism. All sociobiology can tell us is that human genes permit as wide a range of behaviours as we are able to conceive of.

Much of the debate around sociobiology has centred on whether the discipline constitutes an attempt at a scientific defence of the social and economic status quo. If contemporary human society is the outcome of an inescapable evolutionary heritage, then our current situation, characterized by differing equality of opportunity and outcomes between genders and across racial groups and social classes, is unalterable: culture has no influence. Most serious sociobiologists do not take this line. In fact, a great deal of sociobiology-inspired research has been to identify universal traits among humans, rather than genetic causes of difference. The best sociobiology, rather than trying to justify class, gender and race divisions, attempts to illuminate the unity of humankind, and admits that the differences between people and groups are largely a result of non-biological interventions, that is to say the product of culture. Whether we need sociobiology to reveal these human universals is another question. As John Maynard Smith pointed out, if they exist, they will emerge via the observations of anthropologists and sociologists.<sup>20</sup>

Sociobiology has so far failed to provide any concrete examples of human behavioural traits which are immune to intervention by culture or reason. Clearly we exist under physiological constraints: we cannot jump more than a few feet in the air, for example, nor can we outrun a cheetah; but when it comes to behaviour, there is nothing among the collection of traits that sociobiology puts down to our evolutionary inheritance that we can not overcome through conscious choice. We need consider only one example to strike at the very heart of the argument: the fact that many individuals consciously decide to abstain from sexual, and therefore reproductive, activity. Furthermore, in seeking sterilization, or by using contraception, many others decide to deny their genes any possibility of generational progress. Examples abound of

individual human beings deciding not to conform to behavioural norms and beginning, through culture, to define new ones.

If we are able to act, through reason and conscious will, against the dictates of our biological heritage, then, even if contemporary social ills such as racism and ethnic conflict can be partially explained in terms of our evolutionary origins, there is nothing to say they are inevitable. Whatever evolutionary origins can be identified for such attitudes, it is clearly their interaction with cultural advance that has brought out the worst in our innate behavioural armoury. It is the conscious acts of human beings, rather than nature, which determines cultural change. If this argument is rarely heard, it is because of a general but unfounded belief that, in biological evolution, *behaviours* which improve fitness are selected for. Whilst some behavioural traits have certainly been influenced by our evolutionary heritage, specific behaviours are not selected for or against, and no serious biologist or sociobiologist claims that they are.

The usefulness of sociobiology depends entirely on the proportion of behavioural traits attributable to biological evolution. It is reasonable to assume a watershed: a point at which culture began to play the dominant role in human decision-making processes, and when our ancestors' development ceased to be driven solely by biology. Marvin Harris suggests that this may have occurred as long ago as five million years.<sup>21</sup> If so, he was right to argue that we should be looking to historical cultural explanations for our evolutionary development rather than biological ones. The problem that anthropologists and sociobiologists share is that conclusive scientific proof for their various hypotheses is unlikely ever to be forthcoming.

Perhaps to escape the shadow of so much criticism, sociobiology has now recast itself in popular form as *evolutionary psychology*. Popular science, as is to be expected, is less rigorous in its evaluation of new ideas than formal science. Not surprisingly, books about evolutionary psychology aimed at the lay person have been very successful. Despite the best efforts of serious writers not to make unrealistic claims for the new science, the message that permeates popular culture is that scientists have discovered that much contemporary human behaviour derives from our evolution and that we largely remain prisoners of our genes. Not only does this make us feel better about the horrors of war and genocide, especially in respect of so-called tribal conflicts that blight so many less-developed countries – the populations of which we mistakenly assume to be genetically closer to our barbarian ancestors – it also provides excuses for personal and individual behaviour about which we are not especially proud.

Evolutionary psychology has taken up sociobiology's interest in the evolutionary basis of mating and partner-selection strategies, and offers

conclusions which are easily extended to justify unequal power relations between the genders, and even 'explain' acts of violence by men against women.

These criticisms should not be taken as an argument that sociobiology should be rejected out of hand. The discipline has clearly made a contribution to scientific understanding that is of value. As Georg Breuer argues, we need to be able to explain and understand social behaviour in terms that do not deny or contradict our best understanding of evolution.<sup>22</sup> But, as he also asserts, there is no value in reducing all of human social life down to biological components. Further, there is a role for sociobiology in piecing together the history of evolution as applied to human society in much the same way as anthropology has provided us with a historical view of sociology.

If sociobiology had set itself more moderate goals and used more moderate language, and if sociobiologists had been more consistent and less speculative in their statements, we would surely be closer to an accurate understanding of the role of evolution in human social behaviour. Science is at its best when it takes a small piece of observable reality and tries to explain it. Ideas emerge which can be systematically discounted until one remains which defies attempts to disprove it. It can then be tentatively extended to explain other related or similar phenomena. Sociobiology started from the premise that an explanation for all human social behaviour was available in biology, and set out to construct it. The project was doomed by its own ambition.

A rejection of the scope and ambition of human sociobiology does not constitute an attack on all social science based on genetics. The discipline of *behavioural genetics* stands in contrast to sociobiology in two notable regards. First, it takes as its subject matter observable differences in the behaviour of individual human beings. It acknowledges that differences among individuals are likely to be influenced by genetic factors, that is to say by biological heredity, *and* by environmental factors, the nature and type of social and cultural inputs to which the individual is exposed throughout life. In order to determine the extent of genetic influence, behavioural geneticists take as their subjects twins, both fraternal and identical, and siblings in adoptive families. By working with subjects about which the relative genetic inputs are known, it is possible to ascertain the extent to which genetic and environmental factors influence outcomes. They work closely with molecular geneticists in the hope of isolating genes or groups of genes that can be associated with particular behavioural traits. Behavioural genetics has enabled great advances in knowledge about, for example, the genetic basis for schizophrenia, and the relative influence of genes and environment on the development of general cognitive abilities in individuals.

Refreshingly, the texts on behavioural genetics are littered with reminders that a genetic basis for some aspect of human behaviour is neither an argument for the rightness of that trait nor its inevitability. They also point out that success in determining the degree of genetic relevance for a certain trait is the best argument for environmental influence: where genetic influences for behavioural traits have been identified, none is much greater than 50 per cent. They further stress that those traits where there is a significant genetic influence are rarely the result of a single gene, arguing that, where multiple genes combine to determine behavioural traits, behavioural genetics can only be partial in its explanatory and predictive potential. Practitioners of behavioural genetics appear to recognize the boundaries of their discipline. It is of little interest to them precisely how or why evolution left us with the genes we now possess. They focus on the genetic design of contemporary humans and what that means for the concerns we face today. They approach their task with a degree of value neutrality to which all scientists should aspire, and they fulfil the vital role of providing social science with pointers as to what consideration we should give biological factors based on current evidence.

Thankfully behavioural geneticists are more typical of scientists than some sociobiologists. It is not surprising that some scientists have difficulty remaining within bounds: they are usually ambitious, highly motivated individuals, eager to leave their mark. It is unfortunate that populist declarations stamp themselves on the public memory far more readily than does good science. Perhaps basic training for scientists should include classes on social and intellectual responsibility. As Georg Breuer suggests, scientists are largely responsible for the intellectual and popular world of ideas that their arguments create; they therefore have a duty of care.<sup>23</sup> History is littered with examples of the misapplication of semi-formed scientific theories in support of one ideology or another, and scientists must recognize their contribution. No one who volunteers an opinion, especially if he or she is recognized as an expert in a particular field, can hide behind a defence that science has its own value and cannot be responsible for any unanticipated outcomes which its ideas might inspire.

What contribution does this analysis of the history of evolutionary thought make to our enquiry? Is there any link between biological evolution and social and cultural advance? Does the fact of our biological evolution necessarily place constraints on our collective capacity to make progress towards a more equitable, inclusive and sustainable global society?

To describe evolution in terms of survival of the fittest as Darwin, after Spencer, chose to do, implies an element of value. It suggests that

the process consciously selects fitter organisms for survival while others are permitted to fall by the wayside. It therefore implies that the process of evolution has a preconceived idea of what constitutes fitness, which it does not. As Tim Megarry describes it: 'Evolution by natural selection means constant undirected adaptation to an environment that is itself changing. It is nonsensical to claim that evolution produces superior fitness or complexity, it is simply a continual adjustment of the organism to its ecological niche.'<sup>24</sup> Nonetheless, Ernst Mayr did not exaggerate when he said, 'Every modern discussion of man's future, the population explosion, the struggle for existence, the purpose of man and the universe, and man's place in nature rests in Darwin.'<sup>25</sup> This is undoubtedly true today, but only because we make it so. We must reject Mayr's assertion and start thinking beyond the supposed constraints of our evolutionary heritage. Until we do, our ambition will be needlessly restricted.

It should be clear by now that evolution in biological species is quite different from evolution in culture and society. Indeed, the only advantage to be gained from drawing analogies between the two is to make obvious how great the differences are. This is not to suggest that we can make ambitious plans for transforming our world without reference to our evolutionary heritage, only that, over the last two centuries, the scope of our ambition has been unnecessarily limited by a tendency to overstate the constraints imposed by evolution. This unfoundedly pessimistic view of our prospects has most often been promoted by those whose privileged position in society it has helped to sustain.

We must conclude that the implications of the fact of evolution, and its supposed mechanisms, for the possibility of human social progress are neutral. Evolution is a prerequisite to progress in as much as it endowed the human species with consciousness and the capacity to conceive of progress. While we must be aware of the role of evolution in shaping the instinctual drives which influence the behaviours of all humans, our biological evolution places no insurmountable limits on the possibility of progress. Our genes may not give us much help in this project, but evolution's legacy in our capacity for reasoned reflection, and our ability, as individuals, to embrace behaviours which have little or nothing to do with evolution, most certainly will.

The principal reason biological evolution fails to explain, predict or determine the direction of human social advance is the fact of our consciousness. Evolution is an undirected process lacking in purpose beyond the survival of species to reproduce. Humans alone have developed the capacity for conscious awareness and for understanding the evolutionary process which made us. The evolution of species, including our own, happened without any consciousness on the part of its subjects. But our

continuing evolution, biological and social, can no longer occur without our conscious involvement, for as long as we think about anything we do, as long as we take decisions in respect of the options presented us in our daily lives, we are actively directing the future course of our evolution.

Spencer's dream of a single process of evolution operating under universal laws is just a dream, one best left in the nineteenth century. That is not to say that our biological origins have no impact on the future direction of society, nor that our knowledge of them cannot guide us in mediating that future. There is no doubt that developments in human culture began to alter the direction of biological evolution long before we discovered its science, just a century and a half ago. If we can identify this bio-cultural watershed, the point at which culture began to outrun biology as the principal force in human advance, then we would learn a great deal more, both of the true constraints of our biological inheritance and the potential for progress through cultural innovation.

It is time to move on. We have seen that science and scientific method provide us with great opportunities, but can all too quickly become slaves to ideology. About evolution, the body of evidence points to a gradual process over many millions of years, but there are still huge gaps in our knowledge, and question marks hang over natural selection as its principal mechanism. The beauty of natural selection lies in its value neutrality, which is not to argue that our apparently purposeless evolutionary history condemns us to a future of meaningless existence – far from it. The sooner we take full responsibility for creating our own meaning in life, the sooner we will realize that the human mind and the culture it creates have always been the exclusive source of meaning. Without doubt, aspects of our future are prescribed by our evolution; but far from placing constraints on human potential, our recently acquired and still growing understanding of our evolutionary origins gives us greater power than we ever thought possible over our collective destiny. It is history itself, rather than the history of evolution, or even the history of ideas, that is likely to give us a more complete guide to the possibility of progress, and it is to our earliest history that we must now turn.