Darwin, Evolution and God: The Present Debates
Transcript

Date: Tuesday, 23 February 2016 - 1:00PM
Location: Barnard's Inn Hall
One of the most vigorous debates within modern Christian thought concerns the implications of Darwinism for religious belief. This important discussion focusses on a number of areas, one of which we considered in the previous lecture – the idea that God created the world. We then considered some aspects of this doctrine, especially its relation to modern understandings of cosmology. As I indicated at the end of that lecture, the most obvious topic to consider next is Darwinism, the subject of this lecture.

It is a debate that is by no means limited to Christianity, as is evident from the generally hostile reaction towards Darwinism within the Islamic world. So what is Darwinism? While the term is often used to refer specifically to the views set out by Charles Darwin in his *Origin of Species*, it is more widely used to refer to the theories that emerged from Darwin's work, as they have been developed and modified. Although terms such as the “neo-Darwinian synthesis” are often used to distinguish the present state of evolutionary theory from the earlier forms proposed by Darwin himself, I shall follow the widespread convention of using the word "Darwinism" to define a family of theories.

In brief, Darwinism can be defined in terms of its core constructs – the "minimal theory that evolution is guided in adaptively non-random directions by the non-random survival of small random hereditary changes" (Richard Dawkins). This is often taken to be sufficient to distinguish it from the rival evolutionary paradigm associated with Jean-Baptiste de Lamarck (1744-1829), who proposed the theory that changes that are acquired during the lifetime of an organism are passed on to its offspring. The idea that phenotypic changes can be passed on to the genotype is now widely discredited as a mechanism for explaining biological evolution. It is, of course, important to note that a number of debates are under way within contemporary Darwinism. Stephen Jay Gould's notion of "punctuated equilibrium", although clearly consistent with a broad construal of Darwinism, has met considerable resistance from those committed to more continuous modes of evolutionary development. Gould's critics argue that he placed too much emphasis on drift and historical contingency, and neglected the themes that adaptationists regard as significant in selectionist theories.

Discussions of the issues raised for religion in general, and Christianity in particular, by Darwinism focus on two general areas. The first is broadly historical, and focuses on the religious response to Darwin's *Origin of Species* (1859) and *Descent of Man* (1871). The second is more thematic in its approach, aiming to identify the religious issues that arise from Darwinism, and assessing their significance. We shall consider both aspects of the question in this lecture.

**The Historical Background**

Darwin's radical theory of natural selection can be seen as the culmination of a long process of reflection on the origins of species. Among the studies which prepared the way for Darwin's theory, particular attention should be paid to Charles Lyell's *Principles of Geology* (1830). The prevailing popular understanding of the history of the earth from its creation took the form of a series of catastrophic changes. Lyell argued for what he called "uniformitarianism" (a term which was coined by James Hutton in 1795), in which the same forces which can now be observed at work within the natural world are argued to have been active over huge expanses of time in the past. Darwin's theory of evolution works on a related assumption: that forces which lead to the development of new breeds of plants or animals in the present operate over very long periods of time in the past.

The publication of Charles Darwin's *Origin of Species* (1859) is rightly regarded as a landmark in nineteenth-century science. On December 27, 1831, H.M.S. Beagle set out from the southern English port of Plymouth on a voyage that lasted almost five years. Its mission was to complete a survey of the southern coasts of South America, and afterwards to circumnavigate the globe. The small ship's naturalist was Charles Darwin (1809-82). During the voyage, Darwin noted some aspects of the plant and animal life of South America, particularly the Galapagos Islands and Tierra del Fuego, which seemed to him to require explanation, yet which were not satisfactorily accounted for by existing theories. The opening words of *Origin of Species* set out the riddle that he was determined to solve:

When on board H.M.S. Beagle as naturalist, I was much struck with certain facts in the distribution of the organic beings inhabiting South America, and in the geological relations of the present to the past inhabitants of that continent. These facts, as will be seen in the latter chapters of this volume, seemed to throw some light on the origin of species – that mystery of mysteries, as it has been called by one of our greatest philosophers.

One popular account of the origin of species, widely supported by the religious and academic establishment of the early nineteenth century, held that God had somehow created everything more or less as we now see it. The success of the view owed much to the influence of William Paley (1743-1805), archdeacon of Carlisle, who compared God to one of the mechanical geniuses of the Industrial Revolution. God had directly created the world...
in all its intricacy. Paley accepted the viewpoint of his age – namely, that God had constructed (Paley prefers the word "contrived") the world in its finished form, as we now know it. The idea of any kind of development seemed impossible to him. Did a watchmaker leave his work unfinished? Certainly not!

Paley argued that the present organization of the world, both physical and biological, could be seen as a compelling witness to the wisdom of a creator god. Paley's *Natural Theology; or Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature* (1802) had a profound influence on popular English religious thought in the first half of the nineteenth century, and is known to have been read by Darwin. Paley was deeply impressed by Newton's discovery of the regularity of nature, which allowed the universe to be thought of as a complex mechanism, operating according to regular and understandable principles. Nature consists of a series of biological structures which are to be thought of as being "contrived" – that is, constructed with a clear purpose in mind. Paley used his famous analogy of the watch on a heath to emphasise that contrivance necessarily presupposed a designer and constructor. "Every indication of contrivance, every manifestation of design, which existed in the watch, exists in the works of nature". Indeed, Paley argues, the difference is that nature shows an even greater degree of contrivance than the watch. Paley is at his best when he deals with the description of mechanical systems within nature, such as the immensely complex structure of the human eye and heart. Yet Paley's argument depended on a static worldview, and simply could not cope with the dynamic worldview underlying Darwinism.

Darwin knew of Paley's views, and initially found them persuasive. However, his observations on the *Beagle* raised some questions. On his return, Darwin set out to develop a more satisfying explanation of his own observations and those of others. Although Darwin appears to have hit on the basic idea of evolution through natural selection by 1842, he was not ready to publish. Such a radical theory would require massive observational evidence to be marshalled in its support.

Four features of the natural world seemed to Darwin to require particularly close attention, in the light of problems and shortcomings with existing explanations.

1. The forms of certain living creatures seemed to be adapted to their specific needs. Paley's theory proposed that these creatures were individually designed by God with those needs in mind. Darwin increasingly regarded this as a clumsy explanation.

2. Some species were known to have died out altogether – to have become extinct. This fact had been known before Darwin, and was often explained on the basis of "catastrophe" theories, such as a "universal flood," as suggested by the biblical account of Noah.

3. Darwin's research voyage on the *Beagle* had persuaded him of the uneven geographical distribution of life forms throughout the world. In particular, Darwin was impressed by the peculiarities of island populations.

4. Many creatures possess "rudimentary structures" (sometimes referred to as "vestigial structures", which have no apparent or predictable function – such as the nipples of male mammals, the rudiments of a pelvis and hind limbs in snakes, and wings on many flightless birds. How might these be explained on the basis of Paley's theory, which stressed the importance of the individual design of species? Why should God design redundancies?

These aspects of the natural order could all be explained on the basis of Paley's theory. Yet the explanations offered seemed cumbersome and strained. What was originally a relatively neat and elegant theory began to crumble under the weight of accumulated difficulties and tensions. There had to be a better explanation. Darwin offered a wealth of evidence in support of the idea of biological evolution, and proposed a mechanism by which it might work – *natural selection*.

The *Origin of Species* sets out with great care why the idea of "natural selection" is the best mechanism to explain how the evolution of species took place, and how it is to be understood. The key point is that natural selection is proposed as nature's analogue to the process of "artificial selection" in stockbreeding. Darwin was familiar with these issues, especially as they related to the breeding of pigeons. The first chapter of the *Origin of Species* therefore considers "variation under domestication" – that is, the way in which domestic plants and animals are bred by agriculturists. Darwin notes how selective breeding allows farmers to create animals or plants with particularly desirable traits. Variations develop in successive generations through this process of breeding, and these can be exploited to bring about inherited characteristics which are regarded as being of particular value by the breeder. In the second chapter, Darwin introduces the key notions of the "struggle for survival" and "natural selection" to account for what may be observed in both the fossil records and the present natural world.

Darwin then argues that this process of "domestic selection" or "artificial selection" offers a model for a mechanism for what happens in nature. "Variation under domestication" is presented as an analogue of "variation under nature." A process of "natural selection" is argued to occur within the natural order which is analogous to a well-known process, familiar to English stockbreeders and horticulturists: "As man can produce and certainly has produced a great result by his methodical and unconscious means of selection, what may not nature effect?"
In the end, Darwin's theory had many weaknesses and loose ends. For example, it required that speciation should take place; yet the evidence for this was conspicuously absent. Darwin himself devoted a large section of *The Origin of Species* to detailing difficulties with his theory, noting in particular the "imperfection of the geological record", which gave little indication of the existence of intermediate species, and the "extreme perfection and complication" of certain individual organs, such as the eye. Nevertheless, he was convinced that these were difficulties which could be tolerated on account of the clear explanatory superiority of his approach. Yet even though Darwin did not believe that he had adequately dealt with all the problems which required resolution, he was confident that his explanation was the best available:

A crowd of difficulties will have occurred to the reader. Some of them are so grave that to this day I can never reflect on them without being staggered; but, to the best of my judgement, the greater number are only apparent, and those that are real are not, I think, fatal to my theory.

Darwin's theories, as set out in the *Origin of Species* (1859) and the *Descent of Man* (1871), hold that all species – including humanity – result from a long and complex process of biological evolution. The religious implications of this will be clear. Traditional Christian thought regarded humanity as being set apart from the rest of nature, created as the height of God's creation, and alone endowed with the "image of God." Darwin's theory suggested that human nature emerged gradually, over a long period of time, and that no fundamental biological distinction could be drawn between human beings and animals in terms of their origins and development.

Since Darwin's time, there have been many developments which have led to modification and development of his ideas. These include the clarification of the mechanism of inheritance of acquired traits by Gregor Mendel (1822-84), the discovery of the gene by Thomas Hunt Morgan in 1926, and the clarification of the critical role of DNA in the transmission of genetic data, particularly through the establishment of its "double helix" structure by James Watson and Francis Crick. On the basis of their research, Crick proposed what he called the "Central Dogma" of a neo-Darwinian view of evolution – namely, that DNA replicates, acting as a template for RNA, which in turn acts as a template for proteins. The long and complex DNA molecule contains the genetic information necessary for transmission "encoded" using the four nucleotide bases adenine (A), guanine (G), thymine (T) and cytosine (C) arranged in sequences of "base pairs".

Today, the term "Darwinism" is generally used to mean the general approach to biological evolution set out in Darwin's canonical works, as developed and extended through clarification of the molecular basis of inheritance.

So what religious issues are raised by Darwinism? It will be evident from the historical account just presented that Darwin's account of the origin of species raises serious problems for a static understanding of the biological order. Paley's most noted critic in recent years is Richard Dawkins. In his *Blind Watchmaker* (1987), Dawkins relentlessly points out the failings of Paley's viewpoint, and the explanatory superiority of Darwin's approach, especially as it has been modified through the neo-Darwinian synthesis. Dawkins argues that Paley's approach is based on a static view of the world, rendered obsolete by Darwin's theory. Dawkins himself is eloquent and generous in his account of Paley's achievement, noting with appreciation his "beautiful and reverent descriptions of the dissected machinery of life." Without in any way belittling the wonder of the biological "watches" that so fascinated and impressed Paley, Dawkins argued that his case for God – though made with "passionate sincerity" and "informed by the best biological scholarship of his day" – is "gloriously and utterly wrong." The "only watchmaker in nature is the blind forces of physics." For Dawkins, Paley is typical of his age; his ideas are entirely understandable, given his historical location prior to Darwin. But nobody, Dawkins argues, could share these ideas now. Paley is obsolete.

This, then, is perhaps one of the most obvious religious issues raised by the rise of Darwinism – the undermining of an argument for the existence of God which had played a major role in British religious thought, both popular and academic, for more than a century. Of course, the argument could easily be restated in more appropriate forms – a development which took place during the second half of the nineteenth century, when many Christian writers stressed that evolution could be seen as the means by which God providentially directed what was now understood as an extended process, rather than a single event.

**Darwinism as a universal theory**

A significant debate, which emerged as important shortly after Darwin's death, was whether Darwinism was a domain-specific theory, limited to biology, or a universal theory capable of explaining many aspects of human cultural and intellectual development. Darwin himself was cautious on this matter, although there are points at which he seems to imply that there are parallels between biological and cultural evolution. Darwin's theory of natural selection began to transform the manner in which the matter of doctrinal development was conceptualized. If one could speak of evolution within the biological world, could not the same – or at least an analogous – process be discerned within the world of ideas? Darwinism rapidly began its subtle and pervasive transformation from a tool of biological explanation to a more general view of reality. Nineteenth century cultural evolutionists – such as Sir Edward B. Tylor – were committed to a "doctrine of progress", in which the human situation was confidently predicted to improve through the constant replacement of inferior beliefs by those which were considered to be superior.

Richard Dawkins, perhaps the most celebrated populariser of Darwinian orthodoxy and aggressive advocate of "universal Darwinism", insists that, at least in two respects, humans do not conform to the mechanisms that
shape the biosphere. In the first place, human beings have developed culture – something that he asserts has no direct counterpart within other evolved species. Secondly, and perhaps more significantly, Dawkins proposes an important – indeed, a decisive – distinction between humanity and every other living product of genetic mutation and natural selection. *We alone are able to resist our genes.* Where E. O. Wilson and others had insisted that human beings came within the scope of the methods of socio-biology or evolutionary psychology, Dawkins excludes them from its purview as a matter of principle.

Such a "universal Darwinism" has met with considerable theological resistance. The idea that every aspect of human life and thought can be accounted for by such a reductionist approach is seen as eliminating the distinctiveness and integrity of human reasoning. This naturally leads into a consideration of one of the most significant areas of tension between Darwinism and traditional religious views – the place of humanity within the natural order.

**Darwinism and the nature of humanity**

Traditional Christian theology regarded humanity as the height of God's creation, distinguished from the remainder of the created order by being created in the image of God. On this traditional reading of things, humanity to be located within the created order as a whole, yet stands above it on account of its unique relationship to God, articulated in the notion of the *imago Dei*. Yet Darwin's *Origin of Species* posed an implicit, and *The Descent of Man* an explicit, challenge to this view. Humanity had emerged, over a vast period of time, from within the natural order.

If there was one aspect of his own theory of evolution which left Charles Darwin feeling unsettled, it was its implications for the status and identity of the human race. In every edition of the *Origin of Species*, Darwin consistently stated that his proposed mechanism of natural selection did not entail any fixed or universal law of progressive development. Furthermore, he explicitly rejected Lamarck's theory that evolution demonstrated an "innate and inevitable tendency towards perfection." The inevitable conclusion must therefore be that human beings (now understood to be participants within, rather than merely observers of, the evolutionary process) cannot in any sense be said to be either the "goal" or the "apex" of evolution.

This was not an easy conclusion for Darwin himself, nor for his age as a whole. The conclusion to Darwin's *Descent of Man* speaks of humanity in exalted terms, while insisting upon its "lowly" biological origins:

> Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale; and the fact of his having thus risen, instead of having been aboriginally placed there, may give him hope for a still higher destiny in the distant future. But we are not here concerned with hopes or fears, only with the truth as far as our reason permits us to discover it; and I have given the evidence to the best of my ability. We must, however, acknowledge, as it seems to me, that man with all his noble qualities... still bears in his bodily frame the indelible stamp of his lowly origin.

Most Darwinists would insist that it is a corollary of an evolutionary worldview that we must recognize that we are animals, part of the evolutionary process. Darwinism thus critiques the absolutist assumptions concerning the place of humanity within nature that lies behind "speciesism" – a term introduced by Richard Ryder, and given wider currency by Peter Singer, currently of Princeton University. This has raised considerable difficulties beyond the realm of traditional religion, in that many political and ethical theories are predicated on the assumption of the privileged status of humanity within nature, whether this is justified on religious or secular grounds.

The question of the status of humanity is controversial within Darwinism itself. Evolutionary psychology has tended to emphasise how human habits, values, beliefs and norms can be ascribed to essentially Darwinian processes. Others, including Richard Dawkins, have argued that humanity possesses the capacity to resist its genes. Understanding the evolutionary process is thus a means to prevent humanity from being shaped by its pressures. As Dawkins famously put it: "We have the power to defy the selfish genes of our birth... We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of the selfish replicators."

**Darwinism and the redundancy of God**

The traditional Christian understandings of the notion of "creation" prevalent within popular religious culture attributed the creation of the world, including humanity, to direct, special divine action. This notion of the special creation of each and every species underlies William Paley's celebrated *Natural Theology* (1802). Darwin, however, found this notion of special creation problematic on several grounds. What of vestigial or rudimentary organs? And what of the uneven geographical distribution of species? Darwinism holds that the origin of species is to be attributed to extended natural process of variation and selection, in which no divine intervention is required or presupposed.

For some, this implies that Darwinism is atheistic, on two counts. First, that it does not require divine action in order for it to take place; second, that the random nature of variation is inconsistent with the idea of divine creation and providence, which are linked with the ideas of design, purpose and intentionality. Richard Dawkins is an excellent example of a Darwinian who argues that God has been rendered utterly superfluous by the theory of evolution. Many conservative Protestant writers agree, arguing that the role attributed to random events is
inconsistent with the biblical material. Creationist writers often consider this one of the most important elements of their critique of Darwinism.

However, the force of this point is open to question. B. B. Warfield, perhaps one of the most influential conservative Protestant theologians of the late nineteenth century, pointed out that evolution could easily be understood as a seemingly random process, which was nevertheless divinely superintended. God's providence was directing the evolutionary process towards its intended goals. More recently, other writers have proposed alternative mechanisms by which the divine superintendence of the evolutionary process could be conceptualised - for example, Arthur Peacocke's notion of "top-down causality".

Yet the most widely proposed mechanism which Christian writers have proposed to account for God's involvement in the evolutionary process is the classic notion of secondary causality, particularly as this was developed by Thomas Aquinas in the thirteenth century. For Aquinas, God's causality operates in a number of ways. While God must be considered capable of doing certain things directly, God delegates causal efficacy to the created order. Aquinas understands this notion of secondary causality to be an extension of, not an alternative to, the primary causality of God. Events within the created order can exist in complex causal relationships, without in any way denying their ultimate dependency upon God as final cause. The created order thus demonstrates causal relationships which can be investigated by the natural sciences. Those causal relationships can be investigated and correlated - for example, in the form of the "laws of nature" - without in any way implying, still less necessitating, an atheist worldview. God creates a world with its own ordering and processes.

Yet while Darwin's theory of evolution did not lead to the elimination of God, it highlighted a particular difficulty for Christian theology: how could the goodness of God be maintained, in the light of the wastefulness of the evolutionary process? Surely there was a more efficient, more humane way of achieving these goals? Darwin himself felt the force of this point. Paley's argument emphasised the wisdom of God in creation. But what, Darwin wondered, of God's goodness? How could the brutality, pain and sheer waste of nature be reconciled with the idea of a benevolent God? In his "Sketch of 1842", Darwin found himself pondering how such things as "creeping parasites" and other creatures that lay their eggs in the bowels or flesh of other animals can be justified within Paley's scheme. How could God's goodness be reconciled with such less pleasant aspects of the created order?

There are indeed several important passages in Darwin's writings that can be interpreted to mean that Darwin ceased to believe in an orthodox Christian conception of God on account of his views on evolution. The problem is that there are other passages which variously point to Darwin maintaining a religious belief, or to his losing his faith for reasons quite other than evolutionary concerns. However, a note of caution must be injected: on the basis of the published evidence at our disposal, it is clear that Darwin himself was far from consistent in the matter of his religious views. It would therefore be extremely unwise to draw any confident conclusions on these issues.

These points have been addressed by a number of writers, particularly the American Catholic theologian John Haught. Recognizing the pain and apparent wastefulness of evolution, Haught argues that we must not limit our reflections to the apparent design of the present natural order, but also look forward to its transformation. "Instead of focusing only on the fact of living design, which can be accounted for scientifically in terms of the Darwinian recipe, a revived natural theology will focus on nature's openness to the future." Haught deploys a thoroughly Trinitarian view of God in using the image of a "self-emptying God" who "participates fully in the world's struggle and pain". In some way, we can think of evolution as being transformed by the notion of "an incarnate God who suffers along with creation." For Haught, this affirms that "the agony of living beings is not undergone in isolation from the divine eternity, but is taken up everlastingely and redemptively into the very "life-story" of God."

A Challenge to traditional Interpretations of the Book of Genesis?

Darwin's evolutionary theories impacted on a religious question which was particularly significant for Christians and Jews - the interpretation of the early chapters of the book of Genesis, which speak of the creation of the world and humanity. Some popular Christian writers of the seventeenth century interpreted this text as implying that God created the world and human beings about six thousand years ago - one famous suggestion being 4004 BC. In fact, the biblical narratives give no chronology for the act of creation; this figure depends on some very speculative mathematics and creative interpretations of the biblical texts. By the middle of the eighteenth century, geological data had made it clear that the earth was much older than a few thousand years.

In some ways, the problem was that some Christians of the Victorian age were reading the Bible naively, as if it
were a science textbook, failing to realize the complexity of its language, the theological intentions of its authors, or the literary conventions of its context. Early Christian writers of the fourth and fifth centuries were much more sensitive to this complexity, reading Genesis as a literary text with a theological message to convey. Core elements of that theological message included the idea that there is one Creator God who made all things that exist; that the material creation is "good", not evil; and that human beings have a special place in this creation, including a responsibility to care for the created order.

Despite the fact that sermons were one of the most important means of exploring the interface of science and religion during the Victorian age, few preachers engaged Darwin or his ideas seriously. Indeed, many popular English preachers of the early nineteenth century treated Genesis in a crudely literal manner, seeing it as using straightforward descriptive prose to convey a factual scientific message about the chronology of the world.

This tendency developed further within American Protestant fundamentalism, which holds to a literal reading of the Genesis text. Fundamentalists argue that the best weapon against what they regard as "bad" science is "good science" – that is, science based on a literal and factual reading of Genesis. This view, which involves reading the Bible as a scientific textbook rather than as a religious text, has now come to be known as "Creationism".

For Augustine, the natural meaning of the Genesis creation accounts is that God brought everything into existence in a single moment of creation. Yet the created order is not static, in that God endowed it with the capacity to develop. Augustine uses the image of a dormant seed to help his readers grasp this point. God creates seeds, which will grow and develop at the right time. Using more technical language, Augustine asks his readers to think of created order as containing divinely embedded causalities which emerge or evolve at a later stage. Yet Augustine has no time for any notion of random or arbitrary changes within creation. The development of God's creation is always subject to God's sovereign providence. The God who planted the seeds at the moment of creation also governs and directs the time and place of their growth and development.

Now this isn't a theory of biological evolution, as we would now understand the term. Neither Augustine nor any of his contemporaries had access to the geological or biological information that would have opened up this issue for them. They were not anti-evolution; the idea just never occurred to them, because there was no evidence available to them to open up this line of thought. Yet Augustine's approach can be developed, easily and naturally, to respond to this new insight. And many would argue that, if British theologians of the nineteenth century had had a better knowledge of their intellectual heritage, their response to the challenge of Darwinism would have been more interesting, constructive, and productive.

Eugenics and Evolution

Darwin's theory of evolution was adopted by those with progressive political agendas, particularly the improvement of the human race. It is not difficult to understand Darwin's appeal to social progressives of the late Victorian age. If Darwin allows us to understand the mechanism of evolution, might we be able to use that understanding to improve the quality of humanity? Or at least to prevent certain defective human beings from being born? Now these are contentious issues! Yet we must consider how Darwin's insights were applied by his successors, whether rightly or wrongly.

The first major attempt to apply Darwinian insights to safeguarding the human future was the "eugenics" movement, which emerged in the first half of the twentieth century. The scientific basic of this movement was unassailable. Sir Francis Galton (1822-1911), a cousin of Charles Darwin, had noted the implications of Darwin's theory of natural selection, and influenced a significant passage in the Descent of Man which laid the foundation for eugenics. Darwin noted that "with savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health." Civilized societies, however, inhibit this "process of elimination" through medical and social care, thus enabling "the weak members of civilised societies" to
"propagate their kind." Darwin saw this as "injurious" to the future of the human race:

No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man. It is surprising how soon a want of care, or care wrongly directed, leads to the degeneration of a domestic race; but excepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed.

Darwin's implicit support for the notion of selective breeding for humans, paralleling the best practices of stockbreeders, was one of many factors which led to eugenics becoming increasingly influential within Victorian culture. Since the process of genetic transmission in evolution was now understood, why should it not be applied to ensure the future of the human race? Galton argued that breeding should be limited to those possessing "eugenic value" – qualities which seem remarkably close to the virtues and values of Victorian England. Galton's proposals included the suggestion that extra credit should be given for "family merit" in competitive examinations for the civil services or other professional posts if the candidate had superior breeding potential, as judged by the success of family members in their chosen professions. He also recommended that the requirement for celibacy for Fellows at Oxford and Cambridge Universities should be abolished, since these intelligent males could be expected to have superior offspring, and thus ought to be encouraged to breed.

It soon became clear that there was a darker side to this. Galton's science quickly became the victim of politics and prejudice. Normative judgements about "eugenic value" soon extended to race and social class. Certain undesirable social groups were prohibited from reproducing. Although this problem was especially pronounced in the case of Adolf Hitler's racial policies of the 1930s, many progressive thinkers of that period – both in Great Britain and the United States – argued for the forcible sterilization of individuals or social groups deemed to have limited eugenic value. While these could arguably be given some scientific justification, the chief difficulty was that eugenic value was all too often defined in terms of class, race or creed. In effect, self-appointed social "in-groups" sought to prevent "out-groups" from reproducing.

Now there is much more that needs to be said about the issues that we have explored so briefly in this lecture! But I have tried to give you a sense of some of the issues that arise in this discussion. Now I suspect that many of you will have been intrigued by my brief comments on eugenics towards the end of this lecture and feel that they need further discussion. So in the next lecture, we are going to open up the whole question of religion, morality and meaning, and reflect more on some of the ethical issues that arise from the sciences, and how we can engage such questions.