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Evolutionary ideologies

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The point I wish to explore in this chapter is scientific authority; who actually gets to speak in Darwin's name, and why it is important that we cast our nets narrowly. Evolution has meant several things to different generations of Darwinians. Most of these versions of Darwinism are recognisable in hindsight as flawed in various ways. Today, as in the past, there are diverse and conflicting Darwinisms, vying for credibility in the marketplace of ideas. The best birthday present we can give Charles Darwin, I will argue, is a clear name.

The main issues

Human microevolution

Recent scholarship has shown that Darwin himself was strongly engaged with the political ideas of his age: as he was reading Lyell on the *Beagle*, the British were outlawing slavery in their colonies. The major evolutionary question of the era was not about dinosaurs or finches or tortoises, but about people (Livingstone, 2008; Desmond and Moore, 2009): were black people and white people the products of a single origin or creative act, or of different ones, of which the Bible only recounts the last?

The first alternative was monogenism, a viewpoint more compatible with the abolition of slavery, but also with Biblical literalism. The second alternative was polygenism, a viewpoint often invoked in scholarly circles in support of slavery, and with two scientific merits. First, it was not supported by a literal reading of the Bible, and thus was more theologically radical; and second, it was more compatible with an ancient earth and the existence of

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people and animals prior to the Garden of Eden, which was what geology, paleontology and archaeology were revealing.

Darwin's great achievement, in this view, was to make the more morally respectable position of abolitionism compatible with the more scientifically respectable position of a premodern world filled with unfamiliar animals, plants and premodern people, long before the Bible. In other words, white people and black people are of the same stock, descended from a single common ancestor, but that ancestor was an ancient, archaic, ape-like person – not Adam.

From the beginning, then, evolutionary biology has been linked to moral and political issues. Of course, we should be reluctant to judge political issues of other eras simplistically, or to revel in our intellectual forebears' seeming political correctness or incorrectness. Nevertheless, having found a position on human origins that was both scientifically and morally respectable, the earliest post-Darwinians declared a rhetorical war against the traditionalists, which needed to be won at any cost. However, faced with the absence of a fossil record with which to document the continuity of human and ape, the earliest evolutionists drew on the pre-Darwinian image of Africans being intermediates between Europeans and apes. Thus, as Thomas Huxley routed Richard Owen on the issue of whether humans have a brain part (the hippocampus minor) that apes lack, part of his argument involved the intermediacy of the African brain (Cosans, 2009). More explicitly, according to Ernst Haeckel, 'We as yet know of no fossil remains of the hypothetical primaeval man … But considering the extraordinary resemblance between the lowest woolly-haired men, and the highest man-like apes, which still exist at the present day, it requires but a slight stretch of the imagination to conceive an intermediate form connecting the two, and to see in it an approximate likeness to the supposed primaeval men, or ape-like men' (Haeckel, 1868/1876, p. 326).

In other words, the first generation of Darwinists were willing to sacrifice the full humanity of the non-European races of the world in order to score rhetorical points against the Biblical traditionalists. They probably did not think about it in quite that way; they were merely integrating the knowledge of the era into their scientific theories, and exploiting the implications, no worse than what any other scientist studying human diversity has ever done (Gould, 1981; Allen, 1983; Haraway, 1989; McKinnon, 2005). This is crucial to understanding the production of scientific facts in the field of human biology: It never occurs in a cultural or political vacuum.

On the origin of inequality

The next generation of Darwinians tackled a different problem, in addition to the genealogy of life: the nature of economic differences, those of lower classes or distant colonies. Why were there wealthy and poor, or exploiters

and exploited? One answer might be that such differences were rooted in historical injustice, and consequently any solution would require seeking justice. Another might be that there is no injustice, for people have what they deserve, and consequently that any attempt to ameliorate wealth disparities would be a subversion of nature. In particular, it would be a subversion of the natural law of 'survival of the fittest', which Darwin himself acknowledged in the fourth edition of *The Origin of Species* to be synonymous with 'natural selection'.

In some hands, such as those of the Yale political scientist William Graham Sumner, evolutionary theory provided a charter for the oppression of the poor by the rich, before the introduction of collective bargaining, child labor laws, or trust-busting.[1] Later generations would call this 'Social Darwinism'. In the hands of turn-of-the-century biologists, however, Darwinism would look even more bizarre. An Oxford paleontologist seems to say that evolution dictates that we should kill the natives and take their stuff: 'It is not priority of occupation, but the power to utilise, which establishes a claim to the land. Hence it is a duty which every race owes to itself, and to the human family as well, to cultivate by every possible means its own strength: … [lest it incur] a penalty which Natural Selection, the stern but beneficent tyrant of the organic world, will assuredly exact, and that speedily, to the full' (Sollas, 1911, p. 521).

In that viewpoint, he was joined by the leading evolutionary geneticist of the age, Karl Pearson. Pearson (1900, p. 369) wrote, 'A capable and stalwart race of white men should replace a dark-skinned tribe which can neither utilise its land for the full benefit of mankind, nor contribute its quota to the common stock of human knowledge.' (This, obviously, before the recognition that indigenous peoples possessed knowledge.) Pearson went on to add that he did not really mean to advocate 'a brutalising destruction of human life', but nevertheless found 'human satisfaction in the replacement of the aborigines throughout America and Australia by white races of far higher civilisation' – however it happened to come about.

Doubtless there was no unanimity, and there were other opinions – we are talking about academics, after all. But how loudly were they voiced? Karl Pearson was an authoritative spokesman for evolution, as was Sollas. Educated policy-makers looking to natural law for guidance (a tradition since Thomas Aquinas) would have had no difficulty discovering what the leading authorities of contemporary Darwinian evolution had to say to them.

Now, why is this history lesson relevant to modern biology?

The evolutionary biology of a century ago seems to tell us either of two things. If, on the one hand, Sollas and Pearson are correct, and the principal application of Darwinism to human affairs is to rationalise, or even to mandate, a programme of genocide against the indigenous peoples of the world, then we

are faced with a moral crisis. Genocide is evil.[2] Indeed, given a choice between genocide and creationism, thoughtful citizens could reasonably choose the latter, if their standards involve valuing morality as a comparable priority to accuracy. On the other hand, if we agree that evolution does *not* imply genocide (as I assume the scholarly community would today, universally), we are faced with a crisis of authority. After all, if the leading spokesmen for evolution a century ago interpreted it in ways that we now judge, with the aid of a century of hindsight, to be unwarranted and evil, then how confident can we ever be of the spins on Darwinism given by the leading authorities in other times?

A more gripping example of the perennial problems affixed to Darwin's name can be seen in the aftermath of the Scopes Trial in 1925. John T. Scopes, on trial for the crime of teaching evolution in Tennessee, was defended by a team of lawyers led by civil libertarian Clarence Darrow. While preparing his defence of Scopes, Darrow took the trouble to read the textbook out of which Scopes was accused of teaching Darwinism. The book has many virtues: discussions of public hygiene, sanitation, a good diet, ecology, and of course, evolution. However, alongside the history of life, Darrow finds the casual presentation of white supremacy, and the solution to America's social problems by restricting immigration and sterilising the poor, lest the gene pool of the US be overwhelmed by alleles for feeblemindedness and incompetence. Thus:

> At the present time there exist upon the earth five races or varieties of man, each very different from the other in instincts, social customs, and, to an extent, in structure … [notably] the highest type of all, the Caucasians, represented by the civilized white inhabitants of Europe and America. (Hunter, 1914, p. 196)

> If such [indigent] people were lower animals, we would probably kill them off to prevent them from spreading. Humanity will not allow this, but we do have the remedy of separating the sexes in asylums or other places and in various ways preventing intermarriage and the possibilities of perpetuating such a low and degenerate race. Remedies of this sort have been tried successfully in Europe and are now meeting with success in this country. (Hunter, 1914, p. 263)

Darrow is not only appalled by such content, but he finds that the book is indeed citing evolutionary authorities accurately, and that evolutionary biologists and geneticists themselves have signally failed to go on record against this representation of evolution. Thus, a successful textbook of genetics, published the same year as the Scopes trial, considers the future of the gene pool and casually explains that 'even under the most favorable surroundings, there would still be a great many individuals who are always on the border line of self-supporting existence and whose contribution to society is so small that the elimination of their stock would be beneficial' (Sinnott and Dunn, 1925, p. 406).

Something is clearly rotten in the state of Darwinism, Darrow concludes.[3] Immediately upon the conclusion of the Scopes Trial, he begins to publish

articles attacking the racism, and the theory and data by which the involuntary sterilisation of the poor seems to be the evolutionary solution to modern social problems. 'Amongst the schemes for remolding society', he writes, 'this is the most senseless and impudent that has ever been put forward by irresponsible fanatics to plague a long-suffering race' (Darrow, 1926, p. 137). In the space of a year, he has evolved from evolutionary biology's greatest hero to its greatest public critic, and the very same scholars whom he had recently likened to Galileo for their views on Devonian fish were now 'irresponsible fanatics' for their views of modern humans, and in particular, for the political implications they were drawing from the application of evolution to politics and society – that is to say, to the lives of other people.[4]

There are many possible lessons to be drawn from the evolutionary biology of the past, but certainly the worst lesson would be, 'That was then; this is now'. That conclusion obscures the invocation of science in every generation for political ends, the misrepresentation of ideologically or politically loaded rhetoric for Darwinism itself, and the consequent obligation on the part of the scholarly community to identify and to repudiate its more odious expressions. It also abstracts the speaker from the public representation of evolution as scientific knowledge, the very domain being contested by the creationists.

This is now

Two papers in an issue of the journal *Science* in 2005 made extraordinary and newsworthy claims: that the distribution of allelic variation for the genes Microcephalin (MCPH1) and Abnormal Spindle-like Microcephaly-associated (ASPM1) differed globally in their frequencies, that this was driven by selection, and that it might account for the cultural advancement of Eurasian civilisations over African (Evans *et al.*, 2005; Mekel-Bobrov *et al.*, 2005).

The principal investigator was a geneticist named Bruce Lahn, and his explanation was framed coyly for the primary literature: 'Although the age of haplogroup D and its geographic distribution across Eurasia roughly coincide with two important events in the cultural evolution of Eurasia – namely, the emergence and spread of domestication from the Middle East [circa]10,000 years ago … and the rapid increase in population associated with the development of cities and written language 5000 to 6000 years ago around the Middle East … the significance of this correlation is not yet clear' (Mekel-Bobrov *et al.*, 2005, p. 1722). It was indeed clarified for the derivative literature, however: 'Dr. Lahn favors the idea that the advantage conferred by the mutation was a bigger and smarter brain' (Regalado, 2006).

Nearly all of the major assumptions of Lahn's reasoning are flawed: that the spread of the alleles was driven by selection for intellect, rather than by drift, or selection for other physiological functions; that the genes have anything to do with the normal variation in human intellectual ability; that the distribution

of human intellectual ability has something meaningful to do with the cultural–historical processes which led to food production, urbanism and writing; or most fundamentally, that there is a cranial defect possessed by non-Eurasians, which genetic research and data could reasonably shed some light on (Balter, 2006; Currat *et al.*, 2006; Woods *et al.*, 2006; Timpson *et al.*, 2007).

It is axiomatic in science studies that *it is usually very easy to find what you are looking for*, and so perhaps unsurprisingly, Lahn indeed found it. A few years later, Lahn published an impassioned plea for unfettered access to the study of human genetic variation, so that human genetic diversity, presumably for the racial intelligence genes that interest him, could be 'celebrated'. And he casually dismissed the scholarship of anthropologists, who have the most experience studying human variation, but who have come to different conclusions than his own (Lahn and Ebenstein, 2009). It is sufficient to note the symmetry with the way that creationists dismiss the scholarship of anthropologists as well, for coming to different conclusions than their own about human origins.

Yet nobody is opposed to the study of intelligence genes. At issue is, what do you think they will explain? If you are looking for them because you think they will explain economic stratification, poverty, and illiteracy rates better than the history of slavery and colonialism will, then you need to confront and acknowledge the political nature of the science you are engaged in, and be prepared to defend it on that basis (Marks, 2009). Every generation has had to face this, because the political stakes are high: given the fact of inequality, one side of the political spectrum sees it as an expression of a history of injustice and seeks to ameliorate it by working for social equality; the other side sees no injustice, merely a low position on a social hierarchy dictated by a low position on an invisible underlying natural or genetic hierarchy. Genetics is irrelevant to the first side, but not to the other. And that side actively recruits, subsidises, or otherwise promotes the work and views of like-minded scientists – for their own interests are advanced by doing so. The subtle distinction between identity (a natural relationship) and equality (a political relationship), which was crucially emphasised for the Civil Rights era by Dobzhansky (1962a,b), needs to be reiterated continually.[5]

James Watson is, of course, the co-discoverer of the structure of DNA, and the first director of the Human Genome Project. He is also a tireless advocate for molecular genetics, known for his provocative soundbites and subsequent apologies. As his erstwhile colleague, the Harvard biologist E.O. Wilson (1994, p. 227), described him: 'Watson, having risen to historic fame at an early age, became the Caligula of biology. He was given license to say anything that came to his mind and expect to be taken seriously … Few dared call him openly to account.'

In 2007, Watson was in the UK, promoting his new book, *Avoid Boring People*. In his zeal not to bore his readers, the Caligula of biology had now

written: 'There is no firm reason to anticipate that the intellectual capacities of peoples geographically separated in their evolution should prove to have evolved identically. Our wanting to reserve equal powers of reason as some universal heritage of humanity will not be enough to make it so' (2007, p. 326). And just to make things absolutely clear, he explained to the (London) *Times* that the intelligence of Africans is just not the same as 'ours', which leaves him 'gloomy about the prospect of Africa' (Hunt-Grubbe, 2007). This afforded Watson a quick segue into promoting the search for 'intelligence genes' – presumably like ASPM1 and MCPH1.

In the ensuing week-long national furore, Watson's book tour was summarily cancelled, as major intellectual venues retracted their invitations – such as the University of Edinburgh, which had invited Watson to give its 'Enlightenment Lecture' but found Watson's views too unenlightened to countenance.[6] In fact, there are good reasons for thinking that intellectual capabilities are fairly evenly distributed across the human species (Boas, 1911; Dobzhansky and Montagu, 1947; Dobzhansky, 1962b; Marks, 1995): notably, the non-operational quality of the concept of 'innate mental abilities' itself; the universal property of human societies to construct their own ecological niches, and to provide effective social and technological buffering from the ordinary selective regimes of nature; our inability to reliably detect any normal variations in cranial form that have functional consequences, in spite of well over a century of looking very hard for them; and the demographic history of our species, which is depauperate in genetic variation, and which appears to have experienced recent periods of great expansion, not causally related to the possession of any obvious genetic novelties.

Were 'politically correct' scholarly institutions trying to suppress open intellectual discourse, and stifling Lahn and Watson? Not really. What Lahn and Watson share, consciously or not, is a vision of history that is not so much historical as genetically fated. It is an old and long-discredited idea, which removes human agency from history: things are as they are by virtue of nature, in this view, and could not be any other way. Thus, gender inequality is seen as an expression of an anthropoid heritage of 'demonic males', rather than as a systematic, economically and politically situated exploitation of women by men (Wrangham and Peterson, 1996). And thus, Jews attain cultural prominence on account of their imaginary genes for intelligence (Cochran *et al.*, 2005), African-Americans attain prominence in basketball on account of their genes for it (Entine, 2000), and Chinese excel at ping-pong for the same reasons (Wade, 2006). However vacuous the science may be, it nevertheless is usually produced (or at least, sanctioned) by impeccably credentialled scientists.

The idea that inequality is natural, and thus things could not possibly be any other way, is also a conservative political and social message, dating back

at least as far as the reactionary nobleman Arthur de Gobineau's 1854 treatise on *The Inequality of Human Races*. The 1994 best-seller, *The Bell Curve*, had that as its central message and was co-authored by a political scientist, after all (Herrnstein and Murray, 1994). The study of human differences is a specialty, and like any scholarly endeavour, there are those who have mastered the body of knowledge, and there are those who are amateurs, in the pejorative sense of the term. Unlike other scholarly endeavours, however, this area is singularly value-laden, and any critical approach to the literature has to build in the source of the ostensible knowledge – for the science of the human condition can be exploited politically like few other domains of scientific knowledge can.

In July 2009, *Science* wrote a news feature on a distinguished 'behavioral geneticist' from the University of Minnesota, Thomas Bouchard, who initiated a large study of identical twins reared apart and is now retiring. In fact, Bouchard is a psychologist, and is a geneticist more by creed than by any other criterion; that is to say, he is a psychologist who deeply believes in the innateness of much of human behaviour. Two things are noteworthy about this corpus of work, however – one mentioned by *Science*, and the other not.

The one mentioned by *Science* is what got Bouchard interested in studying twins reared apart, and stimulated him to develop a major research programme using the twins to establish the innateness of metal and behavioural traits.

> These were the 'Jim twins,' Jim Springer and Jim Lewis, who had been separated at birth and reunited at age 39. Both married women named Linda, divorced, and remarried women named Betty. They named their sons James Allan and James Alan, respectively, and both had dogs named Toy. (Holden, 2009, p. 27)

As Clarence Darrow used to say, that would be interesting, if true. As scientists, we should be able to appreciate the fact that identical twins are the subject of considerable mythologising, and whose amazing stories consequently ought to require high standards of documentation. Taken at face value, there are only a limited number of possibilities to explain the convergences between these identical twins separated at birth. The first possibility is that this is a series of coincidences. Obviously the scientist himself did not regard it as such, and indeed the Minnesota Twin Study quickly became bloated with anecdotal data on pairs of twins, later reunited, and possessing extraordinary similarities of life history and behaviour, of which the Jim twins were simply the starting point (Segal, 2000). The second possibility is that this is an expression of psychic connection. The Minnesota study was careful to dismiss this in their primary publications, but it readily appeared in derivative material on the work. Thus, a 1987 *Newsweek* story quoted Bouchard's protégé:

ESP events: Other mysteries of twin behavior have been harder to unravel – particularly ESP experiences. Psychologists have heard dozens of such stories over the years, mostly from identical twins. The ESP generally revolves around major events: injuries, births, deaths. Nancy Segal, co-director of an ongoing eight-year study of twins at the University of Minnesota, says she doesn't 'doubt the reality of [ESP] events,' since the stories are too numerous to be total fabrications. (Begley, 1987, p. 64)

By that logic, of course, space aliens are indeed revealing themselves to rural Americans, and Elvis is still alive. The third possibility is that this is evidence of genetic control of the most subtle aspects of human behaviour – the name you give your dog, the name of the person you choose to marry. There may certainly be psychologists who believe that the name you give your dog, or the choice to marry someone on account of their name rather than other features, is under genetic control, but I doubt that any geneticists believe it, for they know too much about genetics.

The remaining possibility is also the simplest explanation: this story simply cannot be taken at face value as scientifically meaningful data. It is as much about ESP as it is about DNA. Identical twins without amazing stories do not become famous so readily, and to accept the story of the Jim twins at face value is consequently to strain the famous scientific ideal of 'organized skepticism' past its reasonable limits. And yet it was casually written up in the leading science journal in America without even the merest hint of caution.

It gets worse: Bouchard and the Jim twins had indeed been similarly promoted two decades earlier, in the same venue – again, the leading science periodical in America – and by the same writer (Holden, 1987).

Looking forward

The distinguished science journalist Boyce Rensberger (2009, p. 1056) recently was asked by the journal *Nature* to comment on the changing role of the science journalist. He concluded, 'If science journalists are to regain relevance to society, not only must they master the new media, they must learn enough science to analyse and interpret the findings – including the motives of the funders.' Scientists have long known that their work requires patronage, and that sustained patronage at least minimally entails appreciating the need not to bite the hand feeding you. This is, however, the start of the slippery slope of interest-conflict. Tobacco companies purchased their own science decades ago and pharmaceutical companies do it now.

The problem is, why should it fall to science journalists to point out the effects that a conflict of interest would have on the credibility of the scientific knowledge produced? Should that not be a significant part of scientific knowledge itself? Is there any excuse for a scientist not knowing that *producing*

a favourable scientific result for an interested patron necessarily calls into question the quality of the science that produced the result?

Now, suppose that the patron in question was not in the business of selling toxic and addictive products, but was instead in the business of marketing an idea. Let's say that the idea was toxic and addictive in a different way – namely, to generally affirm the existence of broad natural inequalities, the sort of inequalities that Enlightenment savants such as Thomas Jefferson opposed, when he wrote in the American Declaration of Independence, 'We hold these truths to be self-evident, That all men are created equal …'. Certainly the opponents – the defenders and beneficiaries of hereditary aristocracy, against whom the founding American document was addressed – existed then, and exist now (although hopefully dwindling in number). The question remains, what can science do for them?

The answer, obviously, is that science can provide them with a rationalisation for their political doctrines: the hereditary social hierarchy (which they are atop) exists because of an underlying natural or genetic hierarchy. In other words, they deserve to be where they are. Of course, that underlying hierarchy is invisible to the naked eye, so it requires specialised instruments to be detected – for example, IQ tests or DNA polyacrylamide gels.

It has long been known that IQ has a high heritability; that is to say, that much of the variation in IQ in a study population will correlate with genetic differences. It was the American psychologist Arthur Jensen who in 1969 began to promote the idea that the high heritability of IQ provided an explanation for the average differences between the IQs of a sample of black and a sample of white Americans. Geneticists responded by pointing out the fallacy of invoking a descriptive statistical measure of a single population as a causal explanation for the average difference between two populations (Lewontin, 1970). The psychologist Jensen was perceived as the anachronistic voice of a regressive scientific racism, and as an ignoramus about human genetics.

A quarter of a century later, *The Bell Curve*, co-authored by a Harvard psychologist and a political scientist from a conservative think-tank, attained considerable notoriety for its arguments that largely reiterated Jensen's, and which cited more than 20 of Jensen's papers. However, there was more to it than just Jensen: *The Bell Curve* also cited the work of psychologist Philippe Rushton, and took the odd step of pre-emptively defending his work in an appendix as 'not the work of a crackpot or bigot' and as 'plainly science' (Herrnstein and Murray, 1994, p. 667). What does the work of psychologist Rushton purport to show, then? Rushton (1995) believes that the IQ of indigenous Africans is genetically set at about 70, that is to say, about the level of a mildly retarded European, and that this is the result of natural selection for over-sexuality and under-intellectuality, which is measureable in terms of the size of the brain and penis; that selection has proceeded in the

opposite way for Asians, favoring over-intellectuality and under-sexuality; and that Europeans occupy a spot of happy intermediacy – in IQ, libido and the size of the respectively relevant organs. A biologist reviewed Rushton's work for the British journal *Animal Behaviour* in uncompromising terms: 'Bad science and virulent racial prejudice drip like pus from nearly every page of this despicable book' (Barash, 1995, p. 1132).

Jensen and Rushton are linked through the largesse of a philanthropy called The Pioneer Fund. In 1977, *The New York Times* had noted that its grantees comprised a very exclusive club, composed principally of the most notorious scientific racists of the day (Lichtenstein, 1977). Indeed, its principal beneficiaries over the years have been Philippe Rushton, Arthur Jensen, and Thomas Bouchard (Kenny, 2002; Lombardo, 2002; Tucker, 2002). Rushton himself – pus and all – is now its President, and acknowledges, 'Perhaps the best known of the Pioneer supported studies is the Minnesota Study of Identical Twins Reared Apart … The identical twins turned out to have an extraordinary number of common traits – including eccentricities …' (Rushton, 2002, p. 219). That funding source is what *Science* neglected to mention in both its 1987 and its 2009 features on Bouchard.

Let us return to the Jim twins, then. A psychologist establishes a research programme on a highly mythologised subject, supported initially by a philanthropy that has endowed every scientific racist of note for decades, and is reported in *Science*, with conclusions about behavioral genetics, and without the merest hint of skepticism, twice. However, if the leading scientific periodical in America is incapable of distinguishing between ostensibly scientific research that has some significant bearing on human genetics and ostensibly scientific research that a high-school student should not be dumb enough to take at face value, then we need to face the possibility that compelling the creationists to accept Darwin may not be the biggest problem in public science education.

Here again is what the science journalists apparently need to point out to the science community: *producing a favourable scientific result for an interested patron necessarily calls into question the quality of the science that produced the result*. Moreover, this means that some science indeed needs to be rejected and repudiated – as if the hindsight of history did not already show that clearly enough. And the implication of this point is: *it is no great scandal to reject science*; at issue is simply what your criteria are for doing so. To accept all science as equally valid would be the scandal – it would represent utter credulity, the opposite of a science education. But it is the responsibility of science to tell us what to reject and why, and in the present tense; we do not have the luxury of waiting 80 years to see what scientists of the future think.

What studying the science of evolution shows us is that, because of the respect it commands in the study of nature, Darwinism as applied to people

has regularly been obliged to navigate between a crisis of morality and a crisis of authority. If evolutionary biology supports political evils, like scientific racism, then it is morally compromised. One could reasonably expect to see it repudiated by any thoughtful citizen who has a greater concern for social justice than for whether we came from monkeys. If, on the other hand, evolution does not provide support for scientific racism, but is being actively misrepresented by certain scientists, then the same thoughtful citizen might reasonably be frustrated by the scientific community's reluctance or inability to confer the authority to speak for evolution appropriately. Why, after all, should the responsibility of distinguishing the quacks fall to the public, rather than to the experts?

Conclusions

A relativistic thought-experiment

Let us say that you have a child enrolled in your municipal public education system, and, like any other responsible parent, you take an active interest in the science curriculum being taught. Among the modules that your child brings home, you approve of, or do not really care about, the presentation of certain topics: global warming, the Krebs cycle, the planets (minus Pluto), the evolution of antibiotic-resistant bacteria, covalent bonds, the sex life of the polyp. Then one day, your child comes home with a science module explaining the innate mental inferiority of the African races.

How likely is this? It could easily have happened in 1925. It is hopefully less likely today, but there would certainly be little difficulty for an educator so inclined to select modern scientific publications to document the point: *The Bell Curve*, the works of Philippe Rushton and James Watson. Perhaps the module adds scientific references to reinforce the point: the work of Bruce Lahn on ASPM1 and MCPH1, and the work of Thomas Bouchard on the general innateness of mental similarities and differences.

What would you do? I suspect you would raise hell about it. You would dismiss the work cited as unreliable and biased, and the judgements of the scientists as incompetent, regardless of their credentials. In fact, their credentials might well be superior to your own, and you might have to be prepared to defend your own position from the charge of being anti-intellectual and anti-science. You might not know the technical ins and outs of the work well enough to debate the points successfully with their promoters, but you do know that the work is morally bankrupt and ideologically compromised, and that you do not want your child taught it in school as if it were a set of biological facts – and you would probably work to get it removed from the school's curriculum.

In a more introspective moment, you might reflect on how similar your struggle is to that of your creationist neighbour.

And perhaps, if I have been successful in achieving the goals I set for this chapter, you would now possess a bit greater appreciation for what constitutes relevant knowledge in evaluating truth-claims in the science of human diversity; and you would appreciate the need to defend Darwin's good name from its most insidious enemies, those from within science itself.

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ENDNOTES

1 The intellectual debt owed by Darwin to the foundational capitalist economics of Adam Smith, in particular to Smith's metaphor of the 'invisible hand', was explored by Gould (2002).
2 That, of course, is a modern value judgement. I dare you to disagree with it.
3 Eugenics very explicitly lay at the convergence of evolutionary theory and genetics. The Eugenics Society in England was headed by Darwin's cousin Francis Galton, Darwin's son Francis, and Ronald Fisher, successively. In the United States, its recognised leaders were the geneticist Charles Davenport and the paleontologist Henry Fairfield Osborn.
4 One need only examine the founding 1926 'Advisory Board' of the American Eugenics Society to see how scientifically mainstream the ideas were, and that the judgement of the scientific community was that large groups of people were simply genetically unworthy to breed or to enter the US. The eugenics laws passed in different nations were by no means abuses of science; they were enacted the way the scientists wanted to see them. Consequently, this is a good historical illustration of the difficulty in separating 'pure' science from 'applied' science, and in judging the former retrospectively to be value-neutral and the latter to be subject to a moral code. In the eugenics movement, false facts and a conducive social and political context synergistically gave biologists the opportunity to dictate social policies, to the harm of untold numbers of people. Eugenics declined in America not as a result of any new discoveries, but as a result of political and economic circumstances:

Sinnott and Dunn's textbook deleted the entire chapter extolling eugenics from the second edition of 1932, as the Great Depression seemed to disconnect wealth and good genes, even to geneticists (Marks, 1993).

5 Additionally, the reality of producing phenotypes tends to get lost – such as the complexity of 'environment' in humans and its co-production of the body, epigenetics, etc.

6 I observed this at first hand, as a guest of the ESRC Genomics Forum in Edinburgh, and with a ticket to hear Watson speak.