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Scientism and its Challenge to Humanism

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Abstract

Viewed from the perspective of the nineteenth century there is little in the details of contemporary political life that would seem special. Tensions between great powers, ethnic and religious divisions, trade rivalries, economic recessions, currency crises, civil unrest, etc. are all part of the fabric of the modern world. Social life in the West has been marked by the dissolution of families and communities into voluntary and market associations of individuals; but while that was a distinctive feature of the twentieth century and has extended into the twenty-first, it is a continuation of trends well-established in previous times principally through industrialisation and urbanisation.

Keywords

Science, Scientism, Darwin, genetic determinism, Humanism

1. Science and Scientism

Viewed from the perspective of the nineteenth century there is little in the details of contemporary political life that would seem special. Tensions between great powers, ethnic and religious divisions, trade rivalries, economic recessions, currency crises, civil unrest, etc. are all part of the fabric of the modern world. Social life in the West has been marked by the dissolution of families and communities into voluntary and market associations of individuals; but while that was a distinctive feature of the twentieth century and has extended into the twenty-first, it is a continuation of trends well-established in previous times principally through industrialisation and urbanisation.

The issues of pure and applied science are somewhat different. For whatever future advances may serve to diminish the achievements of the present age, it must be clear that the twentieth century was one of remarkable and ever accelerating scientific and technological development, and that the range, extent and forms of this development were largely unimaginable in the nineteenth century.

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Because of this, science has come to enjoy enormous prestige and to be widely viewed as the primary source of concepts and theories sufficient to describe and explain all of reality including human beings. An older Baconian conception of science regarded it as the philosophically unassuming, phenomena identifying, hypothesis-formulating study of the material composition and causal structure of nature. But that has been replaced by a view of science as queen of the philosophies, bearing down upon metaphysics and theology – possibly to press them into new vital forms, but more likely to crush the life out of them. Witness in this connection the opening page of Stephen Hawking's recent book, *The Grand Design*, he writes:

> [H]uman beings are a curious species. We wonder we seek answers. . . . How can we understand the world in which we find ourselves? How does the universe behave? What is the nature of reality? . . . Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics, [and] scientists have become the bearers of the torch of discovery in our quest for knowledge'.[1]

Hawking's concern is with cosmological issues, but if we turn to questions about human nature and moral consciousness it is not hard to find prominent declarations that traditional philosophical approaches have failed and the lead must now be taken by innovative sciences. The following comes from the Introduction to Patricia Churchland's recent book (subtitled) *What Neuroscience Tells Us About Morality*:

> The phenomenon of moral values, hitherto so puzzling, is now less so. Not entirely clear, just less puzzling. By drawing on converging new data from neuroscience, evolutionary biology, experimental psychology and genetics, and *given a philosophical framework consilient with those data* [my emphasis], we can now meaningfully approach the question of where values come from.[2]

Seen in these ways our age is one of scientific thought less in dialogue with, than in judgment upon philosophical, ethical and religious habits of mind. It should be clear that this presents a serious challenge to traditional humanism, in the sense of a perspective that interprets significance and value from the point of view of phenomenologically or reflectively accessible human needs, interests, sensibilities, and practices; in other words, from the viewpoint of lived human

[1] Stephen Hawking (and Leonard Mlodinow) *The Grand Design* (New York: Bantam, 2010) p. 5. I respond to Hawking in 'Philosophy Lives', *First Things*, January 2011.

[2] Patricia S. Churchland, *Braintrust: What Neuroscience tells us about Morality* (Princeton: Princeton University Press, 2011) p. 3.

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experience. For much of the twentieth century the focus of humanistic concern regarding science was the potential of its applications to destroy human life through biochemical and nuclear warfare. More recently, however, the focus of attention has shifted somewhat from the pros and cons of instrumental technology to the potential for science to change the way we think about human beings – and, indeed, to change our very nature by chemical genetic, and surgical interventions.

2. The Challenge of Evolutionary Theories

The first major scientific challenge to traditional ideas of human nature came in 1871 with the publication of Darwin's speculations in *The Descent of Man*. There he applied the evolutionary theory presented in *The Origin of Species* (1859) to the case of human beings, and on that basis was led to write that 'the difference in mind between man and the higher animals, great as it is, certainly is one of degree and not of kind'.[3] Prior to this the prevailing idea which had originated in antiquity with the pre-Socratics and which constituted philosophical orthodoxy through the late-Hellenic, medieval, renaissance and enlightenment periods was of a hierarchy of species with *Homo sapiens* set apart from the rest of nature by its capacity for reason and moral consciousness. Darwin himself observed that 'It may be freely admitted that no animal is self-conscious, if by this term it is implied that he reflects on such points, as whence he comes or whither he will go, or what is life and death, and so forth' but, as indicated by his deliberate contrast between differences of 'degree' and of 'kind', he thought this was ultimately only a *quantitative* rather than a *qualitative* distinction.

The possibility that our moral and spiritual consciousness and our rationality, along with our upright posture and sparsity of body hair, might be the result of natural selection resulting in 'descent with modification' from apes was deeply disturbing to the Victorians. In due course, though, various modes of accommodation between theology and evolution were arrived at, principally by religious parties (re)interpreting their claims in terms that rendered them compatible with scientific explanations of the operations of nature. Some reflective readers, however, saw the threat not only to theological anthropology but to traditional humanist understandings and pointed to particular areas that seemed to resist reduction. An

[3] Charles Darwin, *The Descent of Man: and Selection in Relation to Sex* (Princeton: Princeton University Press, 1981) see Chs 3 and 4: Comparison of the Mental Powers of Man and Lower Animals.

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anonymous reviewer of *The Descent*, writing in the *Edinburgh Review* in 1871 pressed a charge that is still worthy of consideration. He writes:

> Mr Darwin's theory of the growth of the moral sense and of the intellectual faculty is unsupported by any proof; and the very cornerstone of the hypothesis, that the human mind is identical in kind with that of the brutes, is a mere assumption opposed alike to experience and to philosophy. . . . man's intellect and moral sense are now, as they ever were, inscrutable from the point of view offered by natural history, and only to be comprehended from the higher consideration, to which, as a mere naturalist Mr Darwin has not attained.[4]

I shall return to this point, but before doing so I want to consider a general argument for scientific reductionism implied by a famous remark of a major twentieth century disciple of Darwin. The author is the Russian geneticist Theodosius Dobzhansky, and the saying, oft cited by evolutionary biologists, is that "Nothing in biology makes sense except in the light of evolution". This bold dictum formed the title of an article Dobzhansky published in 1973 in the *American Biology Teacher*. There he challenged biblical creationism, opposing it with the idea of 'a process that began some ten billion years ago and is still under way'.[5] Interestingly, however, he also claimed that far from evolution being incompatible with divine creation, it is its method. He did not, however, venture the further thought to which an advocate of theistic arguments from fine-tuning or natural regularity might be attracted, namely that evolution only, or best, makes sense in the light of purposeful design.

Leaving aside the issue of the sufficiency (or otherwise) of material causes, the emergence of life so far as we know it required that the ratios of the relative values of the fundamental physical constants lie within a very narrow range. Had they fallen outside of these then the formation and regular behaviour of elements, compounds, galaxies, stars, and planets would have been impossible and the process of organic evolution could not have occurred. The ratios in question appear arbitrary, i.e. they do not look to exhibit any mathematical or other intrinsic necessity, and so there seems little prospect of interpreting them as consequences of a more fundamental mathematical or cosmological law.[6] On that basis they are either brute and inexplicable, or else explicable in the light of something other than science or mathematics. What other fundamental kind of

[4] 'Darwin *on the Descent of Man*' *The Edinburgh Review*, Vol. 134, July 1871, pp. 195–235, p. 235.

[5] Theodosius Dobzhansky, "Nothing in biology makes sense except in the light of evolution", *American Biology Teacher*, Vol. 33, March 1973, pp. 125–9.

[6] The most recent calculations for these constants are published by the US National Institute of Standards and Technology, see http://physics.nist.gov/cuu/Constants/.

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explanation is there? Familiarly, there is personal explanation in terms of purposeful agency; but since any such personal-cause has to explain the basic structure of nature it cannot itself be part of that structure. Further, since the continuing existence of a law-structured world is no more self-explanatory than is its original occurrence, any such cause has to be sustaining as well as originating. But being the originating and sustaining transcendent cause of natural order is one of the *ex effectus* identifications of God: so the fact of biological evolution appears to lead to the existence of a creator.

One might wonder why Dobzhansky did not consider or even acknowledge the existence of this or related cosmic regularity arguments. Ignorance of, or hostility to, theological speculation can hardly be the answer since he was raised Russian Orthodox, and described himself as religious. Indeed these biographical facts are sometimes merged to suggest that he was a traditional theist, as for example by Stephen Jay Gould who in an article, "Darwinism Defined", described Dobzhansky as "the greatest evolutionist of our time and a lifelong Russian Orthodox"[7] In fact, however, Dobzhansky did not believe in a personal God, or in any transcendent creative source outside of nature. Rather, he seems to have identified creation with evolution itself. Immediately prior to the sentence I quoted earlier he writes: "I am a creationist and an evolutionist. Evolution is God's or Nature's method of creation", and he ends the article by commending Teilhard de Chardin's immanentism, citing a familiar passage from *The Phenomenon of Man*:

> [Evolution] is a general postulate to which all theories, all hypotheses, all systems must henceforth bow and which they must satisfy in order to be thinkable and true. Evolution is a light which illuminates all facts, a trajectory which all lines of thought must follow – this is what evolution is".[8]

The overall impression is of a kind of Spinozistic-cum-Hegelian, spiritualised evolutionism with man representing the emergence of self-awareness. Not only did Dobzhansky favour evolutionary theory as the best account of observed biological diversity and unity, he regarded it as fully comprehensive in cope and in explanatory role. As he wrote elsewhere:

> Evolution comprises all the stages of the development of the universe: the cosmic, biological, and human or cultural developments. Attempts to restrict the concept of evolution to biology are gratuitous. Life is a

[7] Stephen Jay Gould, 'Darwinism Defined: The Difference between Fact and Theory.' *Discover* 8 January 1987, pp. 64–70.

[8] Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper and Row, 1965) p. 215.

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product of the evolution of inorganic nature, and man is a product of the evolution of life.[9]

3. Making Sense, and a Transitive Fallacy

These remarks license a step-wise extension of Dobzhansky's original aphorism: *nothing in religion makes sense except in the light of psychology; nothing in psychology makes sense save in the light of biology; nothing in biology makes sense except in the light of evolution*. Even assuming, for the moment, the truth of the individual clauses, it is not clear that one can simply conclude from their conjunction that nothing in religion makes sense save in the light of evolution. Explanation is not in general a logically transitive relation. What get explained and what explain are features, or aspects, and these may differ from step to step or level to level. That nothing in Mary's behaviour (blushing) made sense save in the light of John's presence; and that nothing in David's behaviour (sweating) made sense save in the light of Mary's presence, do not conjointly imply that nothing in David's behaviour made sense save in the light of John's presence. What does the explaining in each case may be restricted to that case: Mary's infatuation with John, and David's feeling for Mary. One might say that John's presence was *per accidens* a cause of David's sweating, but it is not *per se* an explanation of it. Furthermore, there are contextual assumptions about background facts that form part of the explanation, and not of what is to be explained, and these assumptions may vary in several dimensions reflecting various human interests, meanings and values.

'Making sense in the light of' is an incomplete notion, and relevant specifications drawing upon features of religion, morality, psychology, biology and evolutionary theory may yield no overall explanatory relation between level-specific features of religion and of evolution respectively. Put less abstractly, even were it the case that moral experience or religious practice only made sense when seen psychologically as a form of social bonding, and social bonding only made sense when seen biologically in terms of common species membership, and that in turn only made sense when seen in terms of evolutionary history, it would not follow that the theory of speciation by natural selection makes sense of moral experience and religious practice – let alone 'the only sense' there is to be made of them. In order for that to be so the features in question would have to be of the same sort and appropriately linked, and to presume this would amount to a strong, and unwarranted, form of reductionism. Just to

[9] Theodosius Dobzhansky, 'Changing Man', *Science*, Vol. 155, No. 3761, January 1967, p. 409–15, p. 409.

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press home the point, consider additional clauses to the effect that speciation by natural selection only makes sense in the light of genetics, that in light of biochemistry, and that in light of physics. Anyone inclined to think that it follows therefore that nothing in morality or religion makes sense save in the light of physics needs to revisit the idea of *making sense*.

What then of the truth of the individual clauses. Dobzhansky's main claim was that two marked features of life on earth cannot be made sense of save in the light of evolutionary theory: first, biological diversity, amounting to several million species varying in size, structure, behaviour and habitat; and second, biological relatedness, as evidenced by widespread biological similarities at the level of anatomy and embryology, and the universal encoding of heredity at the biochemical level. Of themselves, these are compatible with a variety of explanations, but let me follow Dobzhansky and accept as their best explanation the assumption of common ancestry, and diversification through variation, heritability and natural selection. What of the further claim that natural evolution comprises human and cultural developments, including ethics and religion?

4. Overlapping Magisteria

In an address to the Pontifical Academy of Sciences in 1996, entitled 'On Evolution', Pope John Paul II reiterated the position affirmed by Pope Pius XII in his 1950 encyclical *Humani Generis* that 'there is no conflict between evolution and the doctrine of faith'[10] and went further in acknowledging the explanatory power of evolutionary science to the extent of saying that 'the theory of evolution is more than a hypothesis'. The positions of the two popes is discussed in detail by Stephen Jay Gould in one of the last books he published: *Rocks of Ages: Science and Religion in the Fullness of Life*.[11] The main theme of this is the presentation and defence of the idea of non-overlapping magisteria ('NOMA') according to which science is seen as explaining the material structure of the world while religion addresses the subject of its (possible) meaning. Gould explains that he had originally assumed that John Paul's statement was 'fully consistent with long-standing Roman Catholic support for NOMA' but on reading *Human Generis* came to see that there is a

[10] John Paul II, 'Message to the Pontifical Academy of Sciences: On Evolution' 22 October 1996.

[11] Stephen Jay Gould, *Rocks of Ages: Science and Religion in the Fullness of Life* (New York, Ballantine, 1999) see pp. 75–82. Following the British publication of *Rocks of Ages* Gould, I, and Hilary Rose discussed the idea of whether or not religion and science are in competition at any point. This was in the BBC series *In Our Time* and the programme can be heard at http://www.bbc.co.uk/programmes/p005479y.

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significant difference between the two Papal documents, and the attitudes animating them:

> Pius had grudgingly admitted evolution as a legitimate hypothesis that he regarded as only tentatively supported and potentially (as he clearly hoped) untrue. John Paul, nearly fifty years later, reaffirms the legitimacy of evolution under the NOMA principle, but then adds that additional data and theory have placed the factuality of evolution beyond reasonable doubt. (p. 82)

The spread of knowledge has made us less innocent than Darwin's contemporaries, and our degree of intellectual pluralism and diversification means we are used to compartmentalising ideas and values. Nonetheless, like the author in the *Edinburgh Review* we too should feel challenged by current scientific enquiry into aspects of human nature, and be aware that the reconciliation Gould recommends may not always be possible. Most theists are committed to the beliefs 1) that the universe is a *work of creation*; 2) that its course is under *Divine governance*; and 3) that human beings are *images of God* in the respect of having a *spiritual* (*non-material*) *aspect* to their nature. Thus they are restricted in what they can consistently believe about human origins and nature. While Pius XII and John Paul II were correct in saying that Christian doctrine is not in conflict with the general outlook of natural evolution, this, together with the latter's acceptance of evolution as a fact, risks creating a false sense of general compatibility; for belief in creation, providence and spiritual nature is at odds with the developed positions advanced by many of the intellectual descendents of Darwin. Pius XII had distinguished between 'the doctrine of evolution, in as far as it inquires into the origin of the human body as coming from pre-existent and living matter' and a general evolutionary account of all aspects of human nature and rejected the latter as incompatible with Christian teaching, and John Paul himself writes that:

> 'theories of evolution which, because of the philosophies which inspire them, regard the spirit either as emerging from the forces of living matter, or as a simple epiphenomenon of that matter, are incompatible with the truth about man. They are therefore unable to serve as the basis for the dignity of the human person'.[12]

While species have evolved and the range of life-forms existing today and in the past is the result of variation and of natural selection, it does not follow that the development of consciousness and the appearance of thinking, deliberating beings, are the product of purely physical process leading to chance variations in replication. The latter reductionism not only goes beyond the empirical evidence

[12] 'On Evolution' op. cit.

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but also includes claims, about all processes being physical, and the course of biological evolution being due to chance, that could not be empirically confirmed since they are really philosophical theses presented under the guise of scientific ones. The issue of the historical emergence of mind is a philosophical one in just the same way as is the issue of the relationship between mental and physical properties. Indeed, it is virtually the same issue seen in diachronic horizontal perspective rather than from a synchronic vertical standpoint.[13] Religious believers should not be intimidated by the assertion that 'science has shown' that we are products of blind chance and entirely physical causes, and personalists should resist the idea that human minds differ from other parts of nature only in the complexity of their physical processes. But each should also set out to challenge the scientistic assumption wherever it is made, and expose its own difficulties. One such is that of explaining thought and moral action as involving nothing other than material processes. Another is that, previously mentioned, of accounting for the natural causal regularities that govern the operations of matter itself.[14]

5. Genetics, Eugenics and Determinism

Beyond the challenge of radical neo-Darwinianism lies that of genetic determinism. Although we now hear a great deal about ethical aspects of genetic research, particularly in relation to reproduction and therapy, genetics also bears upon the issue of the very nature of human beings. First, it raises questions about what it is to be human and whether, for example, if we are aggregations of genes, each determining some phenotypical trait, including mental and behavioral ones, we can possibly be free agents. Second, it introduces possibilities of modifying features and of creating human beings and human/animal hybrids by means of genetic engineering.

Towards the end of his life the geneticist and evolutionary biologist JBS Haldane delivered a talk entitled 'Biological Possibilities for the Human Species in the next Ten thousand Years'.[15] To some extent he was revisiting the themes of his famous essay of forty years earlier 'Daedalus: or Science and the Future' in which he anticipated *in vitro* fertilisation and the development of foetuses in artificial wombs.[16]

[13] For more on this issue see 'Mind over Matter' in Ch 2 of J.J.C. Smart and J.J. Haldane *Atheism and Theism* Second Edition (Oxford: Blackwell, 2003), pp. 96–109.

[14] Again see Smart and Haldane, *Atheism and Theism*, pp. 111–5.

[15] Published in G. Wolstenholme ed. *Man and His Future* (Boston: Little, Brown and Company, 1963).

[16] JBS Haldane, *Daedalus: or Science and the Future* (London: Dutton, 1924). It originated in a talk of the previous year given to the Cambridge 'Heretics'. Haldane's ideas and views on these matters inspired three well-known literary creations in two of

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In 'Biological Possibilities' he is more explicit about how human improvement might be scientifically pursued. It is necessary to quote from several passages (here consolidated) to get a proper sense of what he envisaged, and of his positive attitude towards it. Haldane writes as follows:

> The recognition of human physiological diversity may have enormous consequences. As soon as its genetical basis is understood large-scale negative eugenics will become possible. There may be no need to forbid marriage; few people will wish to marry a spouse with whom they share a recessive gene … we may expect a drastic reduction in the frequency of undesired abnormalities with simple genetical determination by the end of this [20th] century. But we have little notion of how to produce more superior people. Our descendants could of course use men judged superior as stud bulls. … There is, however, another possibility which I at least take seriously. … The production of a clone from cells of persons of attested ability would be a very different matter, and might raise the possibilities of human achievement dramatically. … There are several other possibilities of altering human genetical make-up besides selection. … It may also be possible to synthesize new genes and introduce them into human chromosomes. It will be still easier to duplicate existing genes, thus in some cases perpetuating the advantage of heterozygosity. There is still another possibility. … intranuclear grafting might enable our descendants to incorporate many valuable capacities of other species without losing those which are specifically human. Perhaps even 10,000 years hence this will be a wild project, but techniques progress very rapidly.

As these extracts indicate, notwithstanding his mention of rapid progress, Haldane was remarkably prescient, but he also underestimated the rate at which the science of genetics and the approval of its applications in the sphere of human reproduction would proceed. In *Daedalus* he had written ironically that 'if every physical and chemical invention is a blasphemy, every biological invention is a perversion … [appearing on first hearing] indecent and unnatural'. His own 'enlightened' attitude is clear enough, as is his view of the science religion issue, which contrasts sharply with that of Gould

which he features in fictional guise: first, Aldous Huxley's *Antic Hay* (London: Chatto & Windus, 1923) in which Haldane is portrayed as the physiologist Shearwater; second, Huxley's *Brave New World* whose eugenic society was based on Haldane's *Daedalus* speculations; and third, CS. Lewis's, *Perelandra*, the second in the *Ransom Trilogy*, in which the demonically possessed scientist Professor Weston represents aspects of Haldane, as Lewis saw him. JBS Haldane had his reply in two essays severely critical of Lewis: 'Auld Hornie, FRS' *The Modern Quarterly*, Vol. 1, Autumn, 1946 ['Auld Hornie' is Scots for the Devil, and Haldane was a Fellow of the Royal Society]; and 'More Anti-Lewisite' in *Everything has a History* (London: Allen & Unwin, 1951). Lewis wrote, but never himself published, a response entitled 'A Reply to Professor Haldane' which later appeared (posthumously) in W. Hooper ed., *Of Other Worlds: Essays and Stories* (London: Harvest Books, 1966).

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(as it did with that of his religiously-inclined father the physiologist JS Haldane whom Gould cites approvingly as a committed advocate of the NOMA position).[17] JBS writes:

> Darwin's results are beginning to be appreciated, with alarming effects on certain types of religion ... We may expect, moreover, as time goes on, that a series of shocks of the type of Darwinism will be given to established opinions on all sorts of subjects. One cannot suggest in detail what these shocks will be, but since the opinions on which they will impinge are deep-seated and irrational, they will come upon us and our descendants with the same air of presumption and indecency with which the view that we are descended from monkeys came to our grandfathers.

As he predicted (in *Daedalus*) initial advances in reproductive technology proved morally troublesome, but they did not themselves challenge the idea of human nature. More threatening are the sorts of developments in molecular biology he later contemplated which offer the prospect of controlling physical and psychological attributes by modifying underlying genetic structures. While there is no doubt some tendency to resist change without considering its possible benefit, the momentum of applied life sciences and the prestige and financial rewards attaching to them may also incline practitioners to pursue innovation without considering the question of valuing human life as it is. Haldane's talk of biological invention being first regarded as 'perversion' and 'indecent and unnatural' is part of a rhetorical case for embracing 'transhumanism' and should not distract or inhibit one from asking whether indeed some inventions may not constitute or express a kind of moral perversion and indecency.[18] Here, however, I am less concerned with the practical and ethical aspects of genetic engineering than with the theoretical aspects of this. The evident presupposition of such research is that there are systematic relations between genetic structure and manifest human characteristics: the genotypical determining the phenotypical. Expressed in the commonly favoured style, this is to say that there are (or may be) genes 'for' health, height, intelligence, musicality, sexuality, and so on. Discussion of these matters is apt to be confused. For example, health depends greatly on circumstance and no genetic endowment could eliminate environmental risks. Additionally, it is questionable whether the relation between genes and expressed characteristics is generally deterministic: for having a propensity to some feature does not imply that one will exhibit it. Also very few characteristics and conditions are monogenetically grounded; instead they result from

[17] See Gould, *Rocks of Ages*, Ch 2, section 3: Coda and Segue.

[18] For further discussion see 'Science, Knowledge and Virtue' Ch. 5 of John Haldane, *Practical Philosophy: Ethics, Society and Culture* (Exeter: Imprint Academic, 2009).

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a combination of genetic features plus environmental triggers and reinforcements.[19]

One of the most sensitive areas of genetic research is that of psychology for this bears on our sense of human beings as persons, or to use an older vocabulary as 'souls'. The fact that these matters are sensitive and complex makes the need for understanding and reflection all the more important. One important example is the fallacy of *geneticisation*.

Two perspectives on human beings are relevant in this context. First, that from the microphysical base *up* through various strata to the level of whole functioning intelligent organisms: *persons*. Second, that from the level of personal existence *down* through the sub-personal to the physico-chemical basis. In relation to these it is possible to distinguish two kinds of priority. It *might* be that the behaviour of persons is to be wholly accounted for in terms of the matter out of they are composed, that is to say the material base might be *constitutively prior*. At the same time, however, the proper object of ethical concern is the condition of the whole human being, i.e. the person is *ethically prior*.

If we are concerned with ethical and more broadly human issues, then the relevant order of priority is one favouring persons; and so the proper perspective is that in which the genetic base is viewed through its effects at the personal level. In short, we should be primarily concerned with *people* and not with their genes. Additionally, the current state of philosophical thinking about the nature of things psychological includes a significant strand of anti-reductionism. While most philosophers believe in the material basis of the mind they do not suppose that psychological descriptions and explanations are reducible to those of the physical sciences. Rather they subscribe to the idea that the psychological aspect of human nature has its own structures and principles of operation. As well as being of theoretical interest this conclusion promises to provide an obstacle to scientistic approaches to human psychology and anthropology.

Relatedly, philosophy and the social sciences maintain that personhood is expressed and developed in the context of interaction with others. Thought is intimately connected with language, and this is essentially social. More particularly, the term "I" can only be applied to itself by a being that has the idea of others and the capacity to view himself or herself as an object of attention for others. Given these dependencies the geneticist idea that persons and their psychologies might be reduced to genes is incoherent. *Geneticisation* is an error that can and should be resisted.

[19] See, for example, *Mental Disorders and Genetics: The Ethical Context* (London: Nuffield Council, 1998) available at http://www.nuffieldbioethics.org/mental-disorders.

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All of that said, two points need to be emphasised. First, while it is true that there is a significant anti-reductionist presence in contemporary philosophy this position is under pressure from advocates of extensive scientific eliminativism: that is from those who regard 'psychology', and 'sociology' as at best primitive false theories, analogous to alchemy and demonology, that are in process of being replaced by genuinely explanatory causal theories of neurology and evolutionary psychology. Second, while the anti-reductionists maintain the reality of human consciousness they tend to hold a narrowly constricted conception of its character and significance. Here there is pressing need to broaden the horizons of rationality.

6. The Human Form of Life

Wilhelm Dilthey's observed that "we explain nature but we understand mental life".[20] In writing this he was reacting against the ambition of others, in particular Auguste Comte and John Stuart Mill, to develop a science of man that would formulate general laws of behaviour and explain individual actions as instances of these causal regularities. His opposition to this form of 'scientism' was influenced by Kant and Hegel, who likewise held that there is an important difference between the experimental, quantitative and inductive methods of natural science and the meaning-discerning practices of the humanities. For Dilthey, it is of the nature of human beings to seek for meanings and purposes and to express these in their behaviour, thus constituting the 'life-world' (*lebenswelt*). Accordingly, any study of distinctly human phenomena must be interpretative. By contrast, the domain of the natural sciences is one in which cause and quantity are all, and the comprehension of events is arrived at by discerning the structural properties of things and observing (or inferring) external relations between them.

This contrastive line of thought and its subsequent development within the hermeneutic tradition are familiar, and it can seem to coincide with a theme of contemporary philosophy which is that conscious experience appears inexplicable in terms of neurophysiology and of physical science more generally. It is also evident how a clear and ineliminable duality of physical cause and mental consciousness might serve the interest of those who wish to resist various tendencies to scientistic reductionism about human nature. We need, however, to be attentive to how the line is drawn between the domains of mind and of matter if we are to capture what is truly distinctive of human beings.

[20] Wilhelm Dilthey, 'The Development of Hermeneutics' in H.P. Rickman trans. & ed. *Dilthey Selected Writings* (Cambridge: Cambridge University Press, 1976) pp. 247–63.

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Suppose we ask what can an animal such as a cat or a mouse do? We should have no difficulty with the idea that one cat or mouse may see another, or one another, i.e., be aware of it visually. But if we are to say that an animal can think of the nature of cats or of mice as such, or can think of itself as itself, or as an individual cat or mouse distinct from another that it sees, then we must be willing to attribute intellectual and reflexive abilities to it. Sensory powers are capacities exercised in performances of certain kinds: sight in seeing, taste in tasting, touch in touching, and so on. So, for example, an action that takes as its object the visible features of a thing is by definition an exercise of sight. We have overwhelmingly good evidence that animals possess sensory powers. They modify their behaviour in response to visible audible, and tangible features of their circumstances, and if we want to arrive at an account of the content of the animal's experience then we vary its environment and study the behavioural consequences. What is of prime importance in determining if an individual is sensate is not the phenomenological question of what it is *like* to be it; but rather the behavioural issue of how the individual is related to its environment. We do not need telepathy in order to attribute sensory awareness, for perception shows itself in the eye of the perceiver – *vultus est index animi*. On this basis there can be no serious doubt that cats and mice see other cats and mice.

Why then suppose that they do not think about them also? The correlates of thought are intelligible structures, whatever can be comprehended and analysed in articulated propositions. Intellection is directed towards abstract natures as such. The grounds for saying that this is not something of which animals are capable is that we have no evidence that they do it. Indeed, our best interpretations of their behaviour find no place for the attribution of abstract reflection and moral deliberation.[21] The reason is clear enough, for such abstraction is typically expressed not in action directed towards instances of universal natures but in behaviour in which concepts of such natures are articulated in rationally ordered judgments, and this calls for a logically structured medium such as is provided for by language – not mere signaling but activity with the semantic resources to represent the absent, the general, the possible and the necessary. In the *Descent of Man* Darwin wrote:

> If it could be proved that certain high mental powers, such as the formation of general concepts, self-consciousness, etc., were absolutely peculiar to man, which seems extremely doubtful, it is not improbable that these qualities are merely the incidental results of other

[21] For further discussion see 'Rational and Other Animals' Ch. 9 of John Haldane, *Reasonable Faith* (London: Routledge, 2010).

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> highly-advanced intellectual faculties; and these again mainly the result of the continued use of a perfect language.[22]

Here he shows signs of recognising the uniqueness of intellection and the connection with a semantically structured language but nods towards a difference of degree explanation. This is a gesture rather than an argument, in the words of the anonymous *Edinburgh Review* author, 'the very cornerstone of the hypothesis, that the human mind is identical in kind with that of the brutes, is a mere assumption opposed alike to experience and to philosophy'; and interestingly, perhaps because of the difficulties in showing such differences to be merely quantitative, a century and a half after publication of *The Descent of Man* there is expressed scepticism among psychologists about Darwin's assertions.[23]

For Aristotle and his medieval Christian, Jewish and Islamic followers, the immateriality of intellectual thought is implied by the fact that it is abstract. In aural perception I feel vibrations in my ears deriving from the beating of a distant drum. By contrast, when I think about the ideas of vibration, or of distance, or of matter, these various features are entertained as purely abstract apart from any materially individuating aspects, or in other terms they are engaged with not as enmattered individuals but as immaterial essences. In Aristotle's *De Anima* and in medieval commentaries upon it the ultimate psychological gap is between intellection and every other activity of animals – human and otherwise. In terms of that tradition, to comprehend the nature and activity of any intrinsically intelligent agent calls for a form of *understanding* that is not reducible to scientific explanation by reference to physical laws. Though the latter may well be apt for describing the behaviour of the matter of which living things are made. The distinctive point about abstract thought is that it calls for a unique form of understanding, the contemplation of natures and values, which is the preserve of *mind*.[24]

7. Conclusion

One implication of this is that we should not be content to locate the non-reducibility of human personhood in the area of sensory experience. Making sentience the defining feature of the difference

[22] *Descent*, op. cit.

[23] See, for example, Derek C. Penn, Keith J. Holyoak and Daniel J. Povinelli 'Darwin's mistake: Explaining the discontinuity between human and nonhuman minds', *Behavioural and Brain Sciences*, Vol. 32, April 2008, pp. 109–30.

[24] For further elaboration and argument see John Haldane 'Kenny and Aquinas on the Metaphysics of Mind' in J. Cottingham and P. Hacker (eds) *Mind, Method, and Morality* (Oxford: OUP) pp. 119–139

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between mind and matter has the effect of including all conscious beings on the side of the mental, while failing to provide a criterion of human personhood as such. So far from constituting a basis for humanism this approach tends to undermine the idea of the special nature and dignity of the human being. As the writer in the *Edinburgh Review* recognised, the difference and dignity of human persons lies not in a matter of degree or quantity but in a fundamental distinction of kind or quality, 'a difference inscrutable from the point of view offered by [scientific naturalism], and only to be comprehended from the higher consideration'. Seen in this light the human person also bears a resemblance to the ancient idea of a divine mind as one whose currency of thought is the general rather than the particular. It would be an equal and opposite error to scientism, however, to over-spiritualise the human, for however intellect is related to embodiment it is, in us, certainly embodied. How that may be possible is indeed a mystery but if an explanation is ever to be found (and I do not assume that it will be) then the solution will be a philosophical not a scientific one. In the meantime, humanists, religious and otherwise would do well to look hard and sceptically at the transhumanist promise of genetic enhancement, considering whether it is not an old theological heresy decanted into sci-fi vessels, the heresy of self-perfection by material means. The most effective counter to that false ideal comes not from abstract philosophical, let alone theological argumentation but from pointing to the persistence and ineliminability of the facts with which I began: tensions, divisions, rivalries and unrest, which common sense tells us will always be with us, however negative or positive eugenics might be developed.

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