AGAINST HUMAN NATURE

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Are human cultural differences superimposed upon a universal human nature? The appeal to an essentialist concept of human nature is a defensive reaction the legacy of racist science left by Darwin's argument in *The Descent of Man*. Humans are made to appear different in degree from their evolutionary antecedents by attributing the movement of history to a process of culture that differs in kind from the biological process of evolution. The specifications of evolved human nature are supposed to lie in the genes. However human capacities are not genetically specified but emerge within processes ontogenetic development. Moreover the circumstances of development are continually shaped through human activity. There is consequently no human nature that has escaped the current of history.

1. Introduction

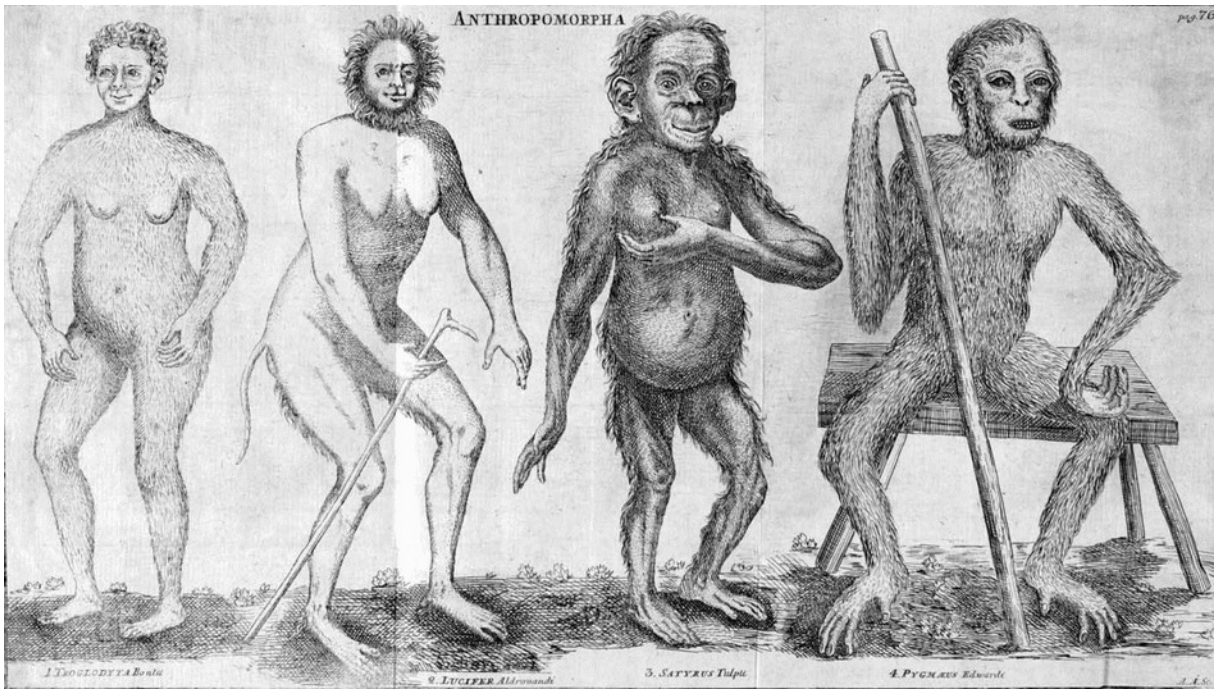
There is a fundamental contradiction at the heart of current evolutionary thinking. Natural science, including the science of evolutionary biology, has developed in the West as an inquiry into the objective properties of physical entities. Thus the applicability of evolutionary biology to humans depends upon our accepting that they, too, are objects of nature. Yet *they are us*, and were we but objects, how could we know ourselves for what we are? Paradoxically, if organisms are living entities, then to know ourselves as organisms we must be *more* that organisms. We must be both objects inside the world of nature and subjects outside of it at one and the same time. Thus even as science insists that the human is just another biological species, the very institution of science – and its claims to deliver an authoritative account of how nature really works – rests on the idea that humans have been raised by a process of culture or civilisation, without parallel in the history of life, onto a level of being over and above the purely biophysical. This is why science continues to appeal to a notion of essential humanity in the name of a theory – of variation under natural selection – that denies its very existence. To resolve the contradiction we need nothing less than a new way of thinking about human evolution: one that enables us to understand the evolutionary process from within, recognising that we ourselves are no more able to watch from the sidelines than are creatures of any other kind, and that like them, we participate with the whole of our being in the continuum of organic life. And the first step in establishing this way of thinking is to revisit the hoary old question of human nature. That will be my task here.

2. A tail of human beings

People differ the world over, and the study of these differences has always been the special province of anthropology. But is difference superimposed upon a baseline of characteristics that all human beings have in common? Is there such a thing as a universal human nature? You may think it obvious that human nature exists; I am going to suggest that it does not. This may seem an odd conclusion to reach; after all, we surely recognise another human being when we see one. People may differ a lot, but not so much that we nowadays have any practical difficulty in drawing the line between humans and non-humans. But less than three centuries ago, matters were much less certain. So let us start by going back to that time – a time when people in Europe were not yet aware of the full range of human variation.

By the early eighteenth century, European traders and explorers were beginning to reach regions of the globe they had never visited before, such as parts of Africa and the East Indies.

Reports were coming back, not only of strange and exotic tribes but also of creatures that, though hairy all over and sometimes even sporting tails, and though apparently lacking the gift of language, nevertheless bore a closer resemblance to human beings than anything previously encountered. Were these creatures, then, human or not? Reproduced below is a picture, dating from 1760, which was drawn on the basis of information derived from such reports. The picture has an interesting history. It comes from a treatise by the great Swedish naturalist Carolus Linnaeus. It was Linnaeus, of course, who was responsible for creating the system for classifying plants and animals, by genus and species, which is still in general use today. And it was he, too, who took the bold and momentous step – considered outrageous by many of his contemporaries – of placing human beings within the same overall scheme of classification, under the genus *Homo*, alongside all other members of the animal kingdom. This is not to say that Linnaeus thought that man was a 'mere animal', for indeed he was to be distinguished in a way quite different from that in which other animals are distinguished from each other. I shall return to this point in a moment. For the present let us look more closely at this picture. Actually drawn by one of Linnaeus's pupils, by the name of Hoppius, it bears the title *Anthropomorpha* (literally 'human forms'), and shows four characters by the names of Troglodytes, Lucifer, Satyrus and Pygmaeus. The question that confronted Linnaeus and his contemporaries was this: which of these, if any, were human, or could be grouped under the genus *Homo*?



'Anthropomorpha', from C. E. Hoppius, *Amoenitates academicae* (Linné), Erlangae 1760. Lucifer is the second figure from the left.

One of those who read Linnaeus's account was the Scottish judge James Burnet, otherwise known as Lord Monboddo. A scholar of considerable repute, Monboddo published between 1773 and 1792 a massive six-volume work, entitled *On the origin and progress of language*, and in the very first volume he referred to our picture. He was particularly concerned with Lucifer, the one with a tail. Could a human being, Monboddo wondered, possibly have a tail? Anticipating that his readers would find such a thing incredible, he reminded them that they should not be bound by their own, fixed ideas of what humans were like. Just because they had never met humans with tails did not mean that such could not exist. If some humans have white skins and others black, is it not just as possible that some have tails whereas others do not? It is no good merely saying 'humans aren't like that', Monboddo argued, for that would be to impose our own preconceived notions about what kind of thing a human being is. It is in the nature of all animal kinds, he thought, that they are not uniform and immutable but geographically and historically variable, and in this the human should be no exception. Having carefully weighed up the evidence, Monboddo came to the conclusion that Lucifer was indeed a human being (Reynolds 1981: 40-2).

Of course in hindsight we know that Monboddo was wrong. We can now recognise the figures in the picture as rather fanciful depictions of the great apes, though since even apes lack tails, Lucifer seems to be a kind of hybrid between an ape and a monkey. Could it not be, nevertheless that Monboddo was wrong for the right reasons? My argument will be that Monboddo's warnings against projecting a Eurocentric construction of human nature upon the infinitely contoured and ever-changing terrain of human variation are as relevant to us today as they were in his time. We continue to seek some universal and changeless bedrock for our common humanity, but it terms that overtly celebrate the values and ideals of modernity. What is all the more remarkable is that we do so in the name of a biology remodelled on the Darwinian idea that the characteristics of species evolve through a process of variation under natural selection, even though – as we shall see shortly – this biology teaches us that for *no* species does there exist an essence of its kind. To find the reasons why we are so compulsively driven to search for the essence of humanity, we have to dig deeper into our own tradition of thought, a tradition that is far older than Darwin and that continues to influence present-day thinking to an extent that we are rarely prepared to acknowledge. So to pick up the story, let me return to Linnaeus, and to the problems he was having in his attempts to fit the genus he had christened *Homo* within his overall system of classification.

3. The ascent of reason

Remember that at the time Linnaeus was writing, in the middle of the eighteenth century, information about apes consisted largely of travellers' tales, not all of them entirely trustworthy. With the limited factual evidence available to him, Linnaeus found it rather difficult to discover any anatomical features that would reliably separate humans from apes. The distinction, he surmised was of a different order, to be grasped by introspection rather than observation: *Nosce te ipsum*, 'know for yourself'. Do you ask how a human being differs from an ape? The answer, says Linnaeus, lies in the very fact that you ask the question. It is not one that apes ask of themselves. Apes and humans may look alike, but only humans are able to reflect upon the kind of beings they are. This, thought Linnaeus, is because they have been endowed, by their Creator, not only with a functioning body but also with the gift of intellect or reason, that is with a *mind*, thanks to which humankind is equipped to exercise control and domination over the rest of nature. There are no scientists among the apes.

Like every other major European thinker of that period, Linnaeus firmly believed that every species had come into existence for all time through an act of divine creation. And he thought that for every species there was an essential form, a basic architecture or ground-plan, to which all individuals of the species conformed to greater or lesser degree. It is often to this kind of basic architecture that we refer when we speak of the 'nature' of a thing, or class of things. Thus each species was supposed to have its particular nature, regardless of idiosyncratic differences among the individuals that make it up. And in this the human was held to be no exception. The notion of human nature has its roots in this ancient way of thinking. Philosophers call it 'essentialism': that is, the doctrine that for every class of things there exists a fixed, essential form or constitution.

Now modern biology has – at least in theory – rejected essentialism, along with the idea of the divine creation of species. In the history of science, the figure who is generally credited with having brought about this revolution in thinking was, of course, Charles Darwin. In his epoch-making work *The Origin of Species*, published in 1859, Darwin had argued that every species is just a collection of individuals, each minutely different from every other. As the variations that underlie these differences are transmitted to offspring, those that are favourable to the reproduction of their carriers, under prevailing environmental conditions, accumulate along certain lines of descent, while those that are less favourable gradually disappear. This is what Darwin called natural selection. Through natural selection, species continually evolve. One line of descent may split up into two or more diverging lines, yielding several distinct species (as, for

example, the lines leading to chimpanzees and humans). The vast majority of lines, however, have ultimately come to the dead end of extinction.

Ever since Darwin, the basis for biological classification into species, genera and so on has been *genealogical*. That is to say, individuals are grouped into the same class on the grounds not of their formal approximation to a basic template or design, but of their descent from a common ancestor. It is characteristic of living things, as distinct – say – from inorganic crystals, that each one is unique, differing, albeit minutely, from each and every other along manifold axes of variation (Medawar 1957). Grains of salt all have the same molecular composition, of sodium chloride, and in this respect comprise what is technically called a 'natural kind' – a class of objects united by the fact that they all have some essential attribute in common. But barring identical twins and natural or artificial clones, no living organism, in its genetic constitution, is quite the same as any other. Individuals of a species may share a family resemblance, but there is no single thing common to all of them. Were it not for this intrinsic variability, natural selection could not occur. There is no formal, species-specific ground-plan hovering in the background, immune from time and change.

Now if this is true of species in general, then it must be true of the human species in particular. Accordingly, what connects us as members of a single species (*Homo sapiens*) is not our possession of a common nature, but our descent from a single ancestral population. In *The Origin of Species*, however Darwin had virtually nothing to say about human evolution. Indeed, he had nothing really to say about evolution at all, for the word appears only once in the entire book – in the very last sentence! Instead, he spoke of 'descent with modification'. Only subsequently, largely as a result of a colossal mistake perpetrated by the philosopher Herbert Spencer and compounded by generations of biologists ever since, was the concept of evolution substituted for that of descent with modification (Ingold 1998: 80-1). Throughout the *Origin*, Darwin pictures himself as a spectator, watching the panorama of nature unfold before his eyes. And it was in this original sense of unfolding that he testified to a process of evolution. "There is grandeur in this view of life", Darwin wrote in the closing sentence of his book – in the realisation that "while this planet has gone cycling on according to the fixed laws of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved" (Darwin 1872: 403).

But this is not a view of life available to non-human animals. They are condemned to live more or less *within* the world of nature, whereas Darwin could write as though he himself were *above* it, and could look at it in the manner of a spectacle. Yet Darwin was a human being. How was it, then, that human beings – or at least the more civilised among them –

could reach such an exalted or transcendent position vis-à-vis the rest of nature? It was in a later book, *The Descent of Man*, published in 1871, that Darwin set out to answer this question. Where *The Origin of Species* was, as it were, a view from the summit, *The Descent of Man* was an account of the climb (Ingold 1986: 49). But it was a very different kind of book from *The Origin.* In an idiom shot through with the moral attitudes of his day, Darwin here attempted to establish a single scale, running all the way from the most primitive of animals to the most advanced of humans, along which could be charted the rise of reason or intellect, and its gradual triumph over the shackles of instinct. Where Darwin differed from many (but by no means all) of his predecessors was in both attributing powers of reasoning to subhuman animals and recognising the powerful sway of instinct even on the behaviour of human beings. The beginnings of reason, he argued, could be found far down in the scale of nature, but only with the emergence of humanity did it begin to gain the upper hand.

In short for Darwin and his many followers, the evolution of species *in* nature was also an evolution *out* of it, in so far as it progressively liberated the mind from the promptings of innate disposition. Ever since, science has cleaved strongly to the view that humans differ from other animals in degree rather than kind. Darwin, it is said, finally showed us that the idea of an absolute Rubicon separating the human species from the rest of the animal kingdom is a myth. He did not, however, dispense with the dichotomy between reason and nature, or between intelligence and instinct; rather his whole argument was couched in terms of it. Recall that for Linnaeus it was man's possession of the faculty of reason that allowed him to rise above, and exercise dominion over, the world of nature. Darwin concurred: "Of the high importance of the intellectual faculties there can be no doubt, for man mainly owes to them his predominant position in the world" (1874: 196). His point, however, was simply that the possession of reason – or the lack of it – is not an all or nothing affair distinguishing all humans from all non-humans. In evolutionary terms, Darwin thought, reason advanced by a gradual, if accelerating ascent, and not by a quantum leap. "We must admit", he observed, "that there is a much wider interval in mental power between one of the lowest fishes … and one of the higher apes, than between an ape and a man; yet this interval is filled by numberless gradations" (1874: 99).

4. The scientist and the savage

Now the idea that no radical break separates the human species from the rest of the animal kingdom is in fact an ancient one, going back to the classical doctrine that all creatures can be placed on a single scale of nature, or what was called the 'Great Chain of Being', connecting the

lowest to the highest forms of life in an unbroken sequence (Lovejoy 1936). Every step along the chain was conceived as a gradual one or, as the saying went, 'nature never makes leaps'. Initially the idea was that each species was immutably fixed in place, from the moment of Creation, at a particular position on the chain, such that not a single position remained unfilled. It was the French naturalist and originator of the term 'biology', Jean Baptiste Lamarck, writing in the early decades of nineteenth century, who set the chain in motion. He thought of it as a kind of escalator, on which organisms are continually working their way up the scale of nature, while new ones arise at the bottom to make their way up in their turn. Thus the monkey was on its way to becoming an ape; the ape on its way to becoming a human. Darwin, in his theory of evolution by natural selection, replaced the image of the single chain with that of a branching tree, but the idea of gradual change remained (Ingold 1986: 5-9). According to the view of the evolution of our species that you will find in any modern textbook, our ancestors became human by degrees, over countless generations. An unbroken sequence of forms is supposed to link the apes of some five million years ago, from which both human beings and chimpanzees are descended, through the earliest hominid creatures of two million years ago, to people like you and me – certified humans of the species *Homo sapiens*.

As an account of human biological evolution that may be all very well, but what about human history? Theorists of the Enlightenment tended to think of human history as the story of man's rise from primitive savagery to modern science and civilisation, and the idea that human reason would rise and eventually triumph over the brute forces of nature was the centrepiece of their philosophy. Yet they were also committed to the doctrine that all human beings, in all places and times, share a common set of basic intellectual capacities, and in that sense may be considered equal. This doctrine was known as that of the 'psychic unity of mankind'. Differences in levels of civilisation were attributed to the unequal *development* of these common capacities. It was as though allegedly primitive peoples were at an earlier stage in the pursuit of a core curriculum common to humankind as a whole. In short, for these eighteenth century thinkers, human beings differed in *degree* from other creatures with regard to their anatomical form, but nevertheless were distinguished in *kind* from the rest of the animal kingdom insofar as they had been endowed with minds – that is with the capacities of reason, imagination and language – which could undergo their own historical development within the framework of a constant bodily form (Bock 1980: 169; Ingold 1986: 58).

The immediate impact of Darwin's theory of human evolution, as set out in *The Descent of Man*, was to subvert this distinction. The scientist and the savage, Darwin insisted, are separated not by the differential development of intellectual capacities common to both, but by a

difference of capacity comparable to that which separates the savage from the ape. "Differences of this kind between the highest men of the highest races and the lowest savages, are connected by the finest gradations" (Darwin 1874: 99). And these differences were, in turn, a function of the gradual improvement of a bodily organ, the brain (*ibid*: 81-2). Throughout human history, the advance of civilisation was supposed to march hand-in-hand with the evolution of the brain, and with it of the intellectual and moral faculties, through a process of natural selection in which "tribes have supplanted other tribes" – as even now "civilised nations are everywhere supplanting barbarous nations" – the victorious groups always including the larger proportion of "well-endowed men" (*ibid*: 197). In this process the hapless savage, cast in the role of the vanquished in the struggle for existence, was sooner or later destined for extinction.

Darwin's commitment, in *The Descent of Man*, to an imperialist doctrine of progress according to which the morally and intellectually well-endowed are bound to supplant their inferiors, not only ran counter to the whole argument of *The Origin of Species*, but was also deeply racist. Whereas in the *Origin* Darwin had shown that the mechanism of natural selection always operates in such a way as to make species better adapted to their particular environmental conditions of life, in the *Descent* he argued that it would inevitably bring about absolute advance along a single, universal scale – from the lowest of animals to the highest of men (1874: 194) – regardless of environmental conditions, leading from instinct to intelligence, and reaching its ultimate conclusion in modern European civilisation. And in bringing the rise of science and civilisation within the compass of the same evolutionary process that had made humans out of apes, and apes out of creatures lower in the scale, Darwin was forced to attribute what he saw as the ascendancy of reason to hereditary endowment. For the theory to work, there had to be significant differences in such endowment between 'tribes' or 'nations' – or between what we might today call populations.

Conversely however, if there were no such differences then the theory could not work, as Alfred Russell Wallace, the co-discoverer of natural selection, found to his cost. Having the advantage of a much greater familiarity and sympathy with the ways of 'primitive' people than Darwin ever had, Wallace was most impressed by the wealth and diversity of their cultural achievements. These achievements, he felt sure, were the work of superior brains. But how could natural selection have produced brains apparently capable of so much more than was actually required under the simple conditions of primitive life? "Natural selection", Wallace wrote, "could only have endowed savage man with a brain a little superior to that of an ape, whereas he actually possesses one very little inferior to that of a philosopher" (1870: 356). His notorious conclusion, to Darwin's dismay, was that only a Creator would come to think of preparing the

savage for civilisation in advance of his achieving it. For this apparent capitulation to creationism, subsequent generations of evolutionists would unfairly banish Wallace to the sidelines of the history of their science.

For in his estimation of the intellectual capacities of so-called 'savages', Wallace was right and Darwin was wrong. The term 'savage' was generally applied by nineteenth century anthropologists and their predecessors to people who lived by hunting and gathering. We now recognise that the brains of hunter-gatherers are just as good, and just as capable of handling complex and sophisticated ideas, as the brains of Western scientists and philosophers. Nevertheless racist notions about the innate mental superiority of White European colonisers over indigenous peoples were remarkably persistent in biological anthropology. We should not forget that the idea of eugenics – that is, of bringing about an overall improvement in human capacities through a deliberate policy of breeding – enjoyed a certain respectability in scientific circles right up until the time of the Second World War. It was the War, and above all the atrocities of the Holocaust, that finally laid that idea to rest. What was self-evident to Darwin and most of his contemporaries – namely that human populations differed in their innate intellectual capacities on a scale from the primitive to the civilised – is no longer acceptable today. Darwin's view that the difference between the savage and the civilised man was one of brain-power has given way in mainstream science to a strong moral and ethical commitment to the idea that *all* humans – past, present and future – are equally endowed, at least so far as their moral and intellectual faculties are concerned. "All human beings", as Article 1 of the Universal Declaration of Human Rights states, "are endowed with reason and conscience".

5. Human nature and history

But this left the Darwinians with a problem on their hands. How was the doctrine of evolutionary continuity to be reconciled with the new-found commitment to universal human rights? If all humans are alike in their possession of reason and moral conscience – if, in other words, all humans are the kinds of beings who, according to Western juridical precepts, can exercise rights and responsibilities – then they must differ in kind from all other beings which cannot. And somewhere along the line, our ancestors must have made a breakthrough from one condition to the other, from nature to humanity.

Faced with this problem, there was only one way for modern science to go – that is, back to the eighteenth century. Indeed the majority of contemporary commentators on human evolution appear to be vigorously, if unwittingly, reproducing the eighteenth century paradigm in all its essentials. One process, of evolution, leads from our ape-like ancestors to human beings

that are recognisably of the same kind as ourselves; another process, of culture or history, leads from humanity's primitive past to modern science and civilisation. Taken together, these two axes of change – the one evolutionary, the other historical – establish by their intersection a unique point of origin, without precedent in the evolution of life, at which our ancestors are deemed to have crossed the threshold of true humanity and to have embarked on the course of history. And standing at the threshold, at the point of origin when history diverges from evolution, and culture from biology, is the figure of the primitive hunter-gatherer, today's equivalent of the eighteenth century's savage.

It is a remarkable fact that whenever scientists are concerned to stress the evolutionary continuity between apes and humans, the humans are almost always portrayed as ancient hunter-gatherers (or if contemporary hunter-gatherers are taken as examples, they are commonly regarded as cultural fossils, frozen in time at the starting point of history). According to a now widely accepted scenario, it was under conditions of life as hunter-gatherers, hundreds of thousands of years ago in the era that geologists and palaeontologists call the Pleistocene, that the biological and psychological capacities evolved – language, symbolic intelligence, bipedalism, toolmaking, male-female pair-bonding, and so on – that are supposed to have made us human. Once established they have remained with us, as a legacy from our evolutionary past. Thus every one of us is said to carry, as a fundamental part of our biopsychological make-up, a set of capacities and dispositions that originally arose as adaptations to the requirements of hunting and gathering in Pleistocene environments. As the distinguished archaeologist J. Desmond Clark put it, in a lecture delivered in 1990, "the behavioural complexes of ancestral hunters lie deep within the psycho-social patterning of the nervous system of *all* humans and, when better understood, these can help to show how we came to be what we are today" (Clark 1990: 13). The doctrine of psychic unity, it seems, was right after all, or as John Tooby and Leda Cosmides declare in their manifesto for the brave new science of evolutionary psychology, "the psychic unity of mankind is genuine and not just an ideological fiction" (1992: 79). This unity, they believe, lies in the "evolved architecture of the human mind", in other words in human nature.

Following this line of argument, so far as their evolved capacities are concerned there should be little or nothing to distinguish today's scientists and engineers from the hunter-gatherers of 50,000 or even 100,000 years ago. What makes them different, apparently, is a separate process of history, or what many have taken to calling cultural (as opposed to biological) evolution. But the movement of culture is said to have left our basic biological constitution virtually unaffected, hardly changed from what it was in the Stone Age. "History",

state David and Ann James Premack, "is a sequence of changes through which a species passes while remaining biologically stable" – and only humans have it (Premack and Premack 1994: 350-1). Yet this very distinction implies that at some point in the past, history must have 'lifted off' from a baseline of evolved human capabilities. Short of supposing some kind of unfathomable quantum leap or – with Wallace – invoking the miraculous intervention of a Creator, there seems to be no alternative but to imagine a historical trajectory that rises inexorably from a point of emergence, gathering pace as it does so, leaving the biological constitution of the organism, confined to the slow lane of evolutionary change, far behind.

Indeed this kind of picture, first elaborated in a celebrated paper by the anthropologist Alfred Kroeber and published in 1917 under the title of *The Superorganic* (Kroeber 1952), has been invoked on countless occasions ever since. But it raises a host of awkward questions. If human history has a point of origin, what could it mean to have been living close to that point, or even at the crucial moment of transition itself? Were such people semi-cultural, gearing up for history? How can one conceivably distinguish those actions and events that carried forward the movement of human history from those that set it in motion in the first place? Indeed it is hard not to see, in the image of our hunter-gatherer ancestors looking out upon the dawn of history, the reflection of a decidedly modern political rhetoric. And it has set prehistorians on a frantic and much publicised search for the time and place of emergence of what are euphemistically called 'anatomically modern humans' – that is, people who were *biologically* indistinguishable from ourselves even though *culturally* still at the starting block. Their appearance is said to mark nothing less than the 'human revolution': a revolution, however, that seems mysteriously to have lasted several times longer than the new era it was supposed to have inaugurated (Mellars and Stringer 1989).

So after all that, the paradox remains. Short of reverting to the racially stratified scenario of Darwin, with its populations of more or less well-endowed men, the only way in which humans can be made to appear different in degree, not kind, from their evolutionary antecedents is by attributing the movement of history to a process of culture that differs in kind, not degree, from the process of biological evolution! The division between nature and reason is still there, but is now shifted onto that between the exotic hunter-gatherer and the Western scientist, the former epitomising a view of humanity in the state of nature, the latter epitomising the triumph of human reason *over* nature. Even today, there are scholars – many of whom would call themselves scientists – who assert that through the study of hunter-gatherers, whether ancient or modern, we should gain a window on evolved human nature which is obscured, in the study of societies of other kinds, through the subsequent accretions of culture and history (Clark 1990).

Where, then, does this human nature lie? How come that these capacities with which we are all supposed to be innately endowed have been faithfully handed down, over tens of thousands of years, apparently immune to the vagaries of history? For most contemporary students of human evolution the answer is simple: because they are in the genes.

6. Genes and development

Now this response merely evades the issue, and is really no answer at all. Let me explain why. Genes consist of sections of an immensely long molecule called DNA, which is found in the nucleus of every cell in the body. Of this genetic material, about 80 per cent – so-called 'junk DNA' – is entirely inconsequential. The genes comprising the remaining 20 per cent, however, play a crucial role in regulating the manufacture of proteins, which are the principal materials from which organisms are made. What these genes do not do, however, is contain a programme or blueprint for building an organism of a certain kind. The notion of the genetic blueprint is fundamentally misleading, for the simple reason that organisms are not built like machines, on the basis of pre-existing design specifications. Rather they *grow*, a process technically known as ontogenetic development. This applies as well to human beings as to organisms of any other species. Thus you cannot simply point to the DNA in the cell nucleus and say: 'There is a capacity for such-and-such'. It is make-believe to think that lengths of DNA can turn themselves into 'innate capacities', whether of body or mind, before this process has even got underway. Whatever capacities people might have, in the form of skills, motivations, dispositions and sensibilities, they are generated in the course of development. And at whatever stage in the life-cycle we may choose to identify a particular capacity – even at birth – a history of development already lies behind it (Dent 1990: 694).

More importantly, people do not live their lives in a vacuum but in a world where they are surrounded by other people, objects and places, together making up what is usually known as the environment. Growing up in an environment largely shaped through the activities of their predecessors, human beings play their part, through their intentional activities, in fashioning the conditions of development for their successors. This is what we call history. It is my contention that there is no human nature lurking inside us that has somehow escaped the current of history. Of course we all carry our complement of genes, but these do not set us up with a constitution all in place, ready to interact with the outside world. All sensible biologists have long recognised that the dichotomy between nature and nurture is obsolete. But it is not enough to say, instead, that we are products of nature *and* nurture, as though these were separate things – genes on the one hand, environment on the other – that then interact to form

the organism. For genes do *not* interact with the environment (Keller 2001). As Daniel Lehrman pointed out many years ago, the interactions from which the development of an organism proceeds are not between genes and environment but between *organism* and environment, and the organism is not a constant but the continually changing embodiment of a whole history of previous interactions that have shaped its life course to that point (Lehrman 1953: 345). Nor is the environment a constant for it, too, exists only in relation to the organisms that inhabit it, and embodies a history of interactions with them.

If genes interact with anything, it is with other constituents of the cell, which interacts with other cells in the organism, which interacts with other organisms in the world. It is out of this multilayered process that the capacities of living beings emerge. In other words, these capacities are products of the whole *developmental system* comprised by the genome in the cells of the organism in its environment (Lewontin 1983; Oyama 1985). There is no good reason why we should home in on the genes, as the locus of the nature of the organism, rather than any other of the myriad components of the system (Griffiths and Gray 1994). The fact that we nevertheless continue to do this, apparently with the full backing and authority of science, is due to a fundamental misunderstanding about the nature of information. This point is so crucial that it calls for a brief digression.

7. The imaginary genotype

Strictly speaking, as we have seen, the gene is simply a particular segment of the DNA molecule. However evolutionary biologists frequently refer to the gene in another sense, as carrying information that encodes a particular trait or character. This is the so-called 'Mendelian gene' (Dunbar 1994: 762). Taken together these Mendelian genes add up to a kind of character specification for the organism as a whole, technically known as its *genotype*. How came it, then, that lengths of DNA in the genome came to be identified, under the same concept of the gene, with information coding for particular traits making up the genotype? In the commonly understood, vernacular sense, information refers to the semantic content of messages transmitted from senders to recipients. It is the meaning attached by the sender to the message, intended for its recipient. But it was not by extension from this vernacular usage that the concept of information entered biology. Rather, its source lay in the theory of information as it had been developed in the 1940s by Norbert Wiener, John von Neumann and Claude Shannon. In the specialised sense employed by information theorists, 'information' has no semantic value whatever; it does not *mean* anything. Information, for them, meant simply those differences, in the input to a system, that make a difference in terms of outcome.

This point was entirely lost on the molecular biologists who, having realised that the DNA molecule could be regarded as a form of digital information in the technical, information-theoretic sense, immediately jumped to the conclusion that it therefore qualified as a *code* with a specific semantic content. The point was not lost, however, on the information theorists themselves, who repeatedly warned against the conflation of the technical sense of information with its vernacular counterpart and looked on in dismay as the scriptural metaphors of message, language, text and so forth became entrenched in a biology that had become seemingly intoxicated with the idea of DNA as a 'book of life'. Since then, and especially with all the hype surrounding the human genome project, these metaphors have become more prevalent than ever, and the original confusion upon which they rest has virtually disappeared from view (Kay 1998).

In truth, the DNA of the genome does not encode anything: there is no 'message'. Placed within a cellular context, DNA undergoes a process of replication, but it is an illusion to suppose that the replication of this genetic material is tantamount to a replication of a character specification for the organism. The only 'reading' of the DNA is the process of ontogenetic development itself, whose outcome is the manifest form of the organism – otherwise known as its *phenotype*. Or to put it another way, the genome can be regarded as a carrier of coded information only if the outcome of the developmental process is presupposed. What, then becomes of the genotype? Where is it? Does it exist at all?

By definition, and as opposed to the phenotype, the traits comprising the genotype are assumed to be wholly independent of developmental context, and to be already in place at the point of inauguration of a new life-cycle. But how have they come to be placed there? Not, evidently, by the mechanism of genetic replication. What has happened, it seems, is that in their effort to prove that the properties of organisms have evolved by natural selection biologists have sought to redescribe the characteristics of these organisms in a way that factors out all variation ostensibly due to environmental experience. That is, they have sought to produce, for each, an abstract, context-independent specification. This abstraction is then 'read in' to the genome – as if it had a concrete presence in there – so that development itself can be seen as a 'reading off', under particular environmental conditions, of a pre-existing specification. The circularity of this argument needs no further elaboration, and is one reason, of course, why it has proved so hard to refute.

Nothing better illustrates this tendency to transpose, into living organisms, a set of abstract specifications derived from our external observation of them, than the fate of the concept of biology itself. Referring initially to the procedures involved in the scientific study

of organic forms, 'biology' has come to be seen as a set of directives – literally a *bio-logos* – supposedly residing in the organisms themselves, and orchestrating their construction. For any particular organism this bio-logos is, of course, its genotype. Herein lies the explanation for the commonplace, though highly misleading identification of 'biology' with genetics. The very notion of biology has come to stand in for the belief that at the heart of every organism there lies an essential specification – a nature – that is fixed from the start and that remains unchanged throughout its lifetime. To be sure, this specification is taken to be open-ended, affording scope for the developmental outcome to be conditioned by environmental circumstances. But understood in this sense – as components of a conditional specification – the genes are, as I have shown, entirely fictitious.

Now what applies to organisms in general must surely apply in particular to those organisms we call 'human'. The human genotype, in short, is a fabrication of the modern scientific imagination. This does not mean, of course, that a human being can be anything you please. But it *does* mean that there is no way of describing what human beings *are* independently of the manifold historical and environmental circumstances in which they *become* – in which they grow up and live out their lives. As we all know, these are extremely variable. But what are the implications of this view for our understanding of culture and history?

8. From walking to cello-playing

In order to answer this question, perhaps it will help first to spell out what I take to be a rather orthodox view of the relation between human nature and culture. According to this view there are two kinds of inheritance in human populations, which run in parallel. One is said to be 'biological', the other 'cultural'. Biological inheritance works through the transmission of genetic information encoded in the DNA; cultural inheritance is more or less independent of genetic transmission, and takes place through a process of learning. The first provides us with the essentials of human nature; the second adds on a superorganic or 'non-biological' component. Consider a couple of apparently uncontroversial examples. I can walk and I can play the cello. Bipedal locomotion is generally regarded as a species attribute of *Homo sapiens*, an integral part of our evolved human nature. Cello playing, by contrast, is surely a cultural skill with a very specific background in the European musical tradition.

But human beings are not born walking, nor do they all walk in the same way. There is, as the anthropologist Marcel Mauss observed in his famous essay of 1938 on *Techniques of the Body*, no *natural* way of walking (Mauss 1979: 102). In Japan, at least traditionally, it was conventional to walk 'from the knees', in what looks to us like a rather shuffling gait, but one

that actually makes very good sense when your footwear is sandals, and when you have to walk on very steep terrain, as is common in the Japanese countryside, especially when carrying heavy loads slung from either end of a long, supple pole balanced across one shoulder. To Europeans, however, this looks most ungainly. They are taught from an early age of the virtues of upright posture, and baby walkers are used to get your child standing up at as early an age as possible (as a device, the baby walker is not new, but has been around for centuries). We are taught to walk from the hips, and not from the knees, while keeping the legs as straight as possible. And our carrying devices, from rucksacks to suitcases, are designed with this posture in mind (Kawada n.d.).

Are these inflections of walking non-genetic or superorganic supplements added on to a universal capacity for bipedal locomotion that has already been imparted to the human body by the genes? Surely not. For walking is not a compound of pre-existing and add-on components, but a skill that is gradually acquired mainly but not exclusively in the first few years of life, and incorporated into the *modus operandi* of the human organism through practice and training within an environment that includes skilled caregivers, along with a variety of supporting objects and a certain terrain (Ingold 2000: 375). It is, in that respect, the outcome of a process of development. And because people encounter different developmental circumstances, they walk in different ways. As Esther Thelen and her colleagues have shown, in a series of studies of infant motor development, there is no "essence of walking that can be isolated from the real-time performance of the action itself" (Thelen 1995: 83). But is it any different with my ability to play the cello? This, too, is a bodily skill, likewise established through practice. Of course I had a teacher, and we may say colloquially that my teacher passed on his skills to me. What he did not do, however, was *transmit* them to me, as advocates of the orthodox view would say, by *non-genetic means*. That is, he did not send me abstract, decontextualised messages, encoded in symbolic media, specifying rules of play which I had then to execute in my performance. Rather he would place my hands around the bow, and my fingers on the fingerboard, so that I could experience for myself the relation between the movement of my right arm and the vibrations of the strings, and between the muscular tensions in the left hand and the resulting intervals of pitch. My ability to play the cello was not transmitted to me any more than was my ability to walk. Rather, I grew into it.

Indeed the metaphor of transmission, whether attributed to genes or culture, is deeply flawed. For the growth of practical knowledge in the life history of a person is a result not of information transmission but of guided rediscovery. By this I mean that in each successive generation, novices learn through being placed in situations in which, faced with certain tasks,

they are *shown* what to do and what to look or listen out for, under the tutelage of more experienced hands. In this process, what each generation contributes to the next are not rules and representations for the production of appropriate behaviour, but rather the specific circumstances under which successors, growing up in a social world, can develop their own skills and dispositions, and their powers of awareness and response (Ingold 2001: 141-2).

Now the implications of this view are rather radical. If, as I have suggested, those specific ways of acting, perceiving and knowing that we have been accustomed to call cultural are enfolded, in the course of ontogenetic development, into the constitution of the human organism, then they are equally facts of biology. A skill like playing the cello, being a property of the organism established through practical experience in an environment, is every bit as 'biological' as is walking on two feet. Cultural differences, in short, are not *added on* to a substrate of biological universals; rather they *are* themselves biological. Not long ago, such a conclusion would have been inconceivable. In 1930, no less an authority than Franz Boas, the founding father of American anthropology, had declared that "any attempt to explain cultural form on a purely biological basis is doomed to failure" (Boas 1940: 165). Thenceforth, the absolute independence of cultural variation from biological constraint became a fundamental tenet of disciplinary integrity, one of the few things on which virtually all social and cultural anthropologists were agreed. Indeed it has served us well in our efforts to resist some of the more extreme forms of determinism, for example in debates about the alleged hereditary basis of intelligence, or about the influence of sex on gender. But it is now high time to put this tenet in question. To return to the example of a culturally specific skill like playing the cello: as a property of the organism, the outcome of a process of development, is this not fully admissible as a biological characteristic? Despite Boas's strictures, there is nothing wrong with accounting for this or any other aspect of cultural form on a "purely biological basis", so long as the biology in question is of development, not genetics.

9. Biology is not genetics

Evidently, the source of the problem is not the conflation of the cultural with the biological, but the reduction of the biological to the genetic. And this reduction, I contend, still lies largely unchallenged at the heart of modern evolutionary theory in its current, neo-Darwinian incarnation. True, most evolutionary biologists are quick to deny all charges of genetic reductionism. *Of course*, they will say, the human organism, like any other, is the outcome of a developmental process. But in the same breath they will attribute this development to a *complex interaction* of 'biological' and 'cultural' factors, operating in a given environment. And if you ask

how biological and cultural factors are distinguished, they will say that the former are genetically transmitted, whereas the latter are transmitted by such non-genetic means as imitation or social learning. Thus, despite their initial denials, biology is tied to genes after all, as indeed the logic of neo-Darwinism requires. The implied essentialisation of biology as a constant of human being, and of culture as its variable and interactive complement, is not just clumsily imprecise. It is the single major stumbling block that up to now has prevented us from moving towards an understanding of our human selves, and of our place in the living world, that does not endlessly recycle the polarities, paradoxes and prejudices of modern thought.

Let me stress that my objections are not to the science of genetics, but to the way in which this science has been commandeered in the interests of an evolutionary psychobiology that is intent on harnessing the gene to an essentialised conception of human nature. Thanks to a huge investment of resources and effort into genetic research, we now know an enormous amount about the genome and how it works. The more we learn about it, however, the less likely it seems that it could do the work that evolutionary theory requires of it. How can a genome that is structurally fluid, given to getting itself tied in knots, susceptible to incorporating bits of DNA from any of the millions of other organisms that inhabit the body at one time or another, and that consists largely of 'junk', possibly provide the foundation for a stable architecture in the form of a more or less immutable set of character specifications?

My contention is that the forms and capacities of all organisms, human beings included, are not prefigured in any kind of specification, genetic or cultural, but are emergent properties of developmental systems. We can understand their stability across generations only by investigating the properties of dynamic self-organisation of such systems. That we know so little about these properties is no reflection of their real importance. It is, however, a reflection of the widespread notion – above all among those with influence or control over the funding of research – that developmental processes are no more than the 'writing out', or realisation, of pre-established genetic potentials. To put it bluntly, the importance we ascribe to genes is a function of the amount we know about them; the amount we know about genes is a function of research funding, and the amount of research funding is a function of the importance ascribed to genes. It is not easy to break out of this vicious circle, especially when the wheels are turning with the momentum, and oiled with the finance, that they are today. Astronomical sums have been spent on the human genome project, to sequence the genes of an idealised human being – a kind of 'universal person' (Brown 1991) – who never existed in the past and will never exist in the future.

Darwin, as I have already pointed out, categorically rejected the idea that any species, least of all the human, could be characterised by some unchanging essence. But it is precisely the belief in such an essence – a belief that long antedates the rise of modern evolutionary theory – that continues to dominate our ideas of scientific progress. Despite all the hype, the outcomes of the human genome project have not changed in the least the way we think about ourselves; for built into the project is a way of thinking that has already been around for centuries, and which its results merely serve to perpetuate. And the reason for its persistence is simple: it is deeply embedded within the institution of science itself.

10. Back to the future

I would like to conclude by returning to the theme of human nature. The search for absolute, defining attributes of common humanity does indeed seem a hopeless endeavour, since whatever attribute you choose, there will be bound to some creature born of man and woman in which it is lacking (Hull 1984: 35). Remember that for modern biology, reconstructed along Darwinian lines, the criterion for species membership is genealogical. Basically, this means that you are a human being if your parents are. If it is human nature to walk on two feet, what of the congenitally crippled? Is he not human? If it is human nature to communicate by means of language, what of the child who is deaf and dumb? Is she not human? If it is human nature to join in forms of social life based on a mutual awareness of self and other, what of those individuals who suffer from autism? Are they not human?

The argument can be turned around the other way as well. Whatever attribute you choose, there is a possibility that some creature of non-human ancestry may turn out to possess it – if not now, then at some time in the future. The way a species evolves is not predictable in advance. It is perfectly possible that the descendants of chimpanzees, a million years hence (perhaps once humans have already managed to make themselves extinct), will have developed a fully linguistic capability and be walking on two feet. They have already been shown to be capable of such things up to a point, as well as of other things once thought distinctively human, like making tools. Would they then have become human? In genealogical terms this is not possible, yet if it is human nature to walk and talk, then these chimpanzees of the future would have to count as human too.

I have shown that the contemporary appeal to universal human nature, in the name of evolutionary biology, is a defensive reaction to the legacy of racist science left by Darwin's account of the evolution of the moral and intellectual faculties in *The Descent of Man*. But it is an appeal fraught with contradictions. While insisting on the continuity of the evolutionary

process, it also reinstates the twin distinctions between biology and culture, and between evolution and history, setting an upper limit to the world of nature that humans alone appear to have breached. More than that, it asserts that human nature is fixed and universal while attributing its evolution to a theory – of variation under natural selection – that only works because the individuals of a species are endlessly variable. That is why evolutionists find themselves in the curious position of having to admit that whereas in the non-human world, biology is the source of all variability and difference, in the human world it is what makes everyone the same!

Moreover, the racism that modern biology claims to have left behind is never far beneath the surface. The potentially explosive combination of genealogical categorisation and essentialist thinking is still there. Far from dispensing with the concept of race, science has settled on the idea that all extant humans comprise a single race or sub-species, *Homo sapiens sapiens*. According to the currently favoured out-of-Africa hypothesis this race, of so-called 'modern humans', dispersed from its African cradle and eventually colonised the world. It is striking how accurately this hypothesis mirrors the story of global colonial conquest by White Europeans so much favoured by Darwin and his contemporaries. The story may have been turned upside down, but the structure is the same: one dominant race, equipped with superior intelligence, supersedes the rest. And it is scarcely surprising that versions of Afrocentrism, for example, that seek to tell the same story but in a way that emphasises the *differences* between Africans and Whites, tend to assume an explicitly raciological form.

For it is indeed the case that while affirming human unity under the rubric of a single sub-species, we do so in terms that celebrate the historical triumph of modern civilisation. It is not hard to recognise, in the suite of capacities with which all humans are said to be innately endowed, the central values and aspirations of our own society, and of our own time. Thus we are inclined to project an idealised image of our present selves onto our prehistoric forbears, crediting them with the capacities to do everything we can do and have ever done in the past, such that the whole of history appears as a naturally preordained ascent towards the pinnacle of achieved modernity. The schizochronic attribution of modernity to humans at both ends of history is no accident, for it is built into the logic of the comparative method by which people of other cultures are likened to earlier versions of ourselves (Fabian 1983). Accordingly, where *we* can do things that *they* cannot, this is attributed to the greater development, in ourselves, of universal human capacities. But where *they* can do things that *we* cannot, this is put down to the particularity of their cultural tradition. This kind or reasoning rests on just the kind of double standards that have long served to reinforce the modern West's sense of its own

superiority over ‘the rest’, and its sense of history as the progressive fulfilment of its own, markedly ethnocentric vision of human potentials.

11. Conclusion

I have argued that there is no standard or universal form of the human being, underlying the variations that are so apparent to all of us. In their dispositions and their capacities, and to some extent even in their morphology, the humans of today are different not only from one another, but also from their prehistoric predecessors. This is because these characteristics are not fixed genetically, but emerge within processes of development, and because the circumstances of development today, cumulatively shaped through previous human activity, are very different from those of the past. In this sense the story of human evolution is still going on, even in the course of our everyday lives. But it is not a story of upward movement, along a scale from lower to higher, nor is it one of breakthrough to a superior level of being, over and above the organic. It makes absolutely no sense to claim, as is so often done, that humans have ‘transcended biology’. We have not reached above our biology, and we never will. There never was any mighty moment in the past when the upper limits of nature were breached and our ancestors emerged onto the stage of culture, for the very idea of a division between nature and culture is, as I have shown, a modernist conceit.

It is, in my view, a great mistake to populate the past with people like ourselves, equipped with all the underlying capacities or potentials to do everything we do today. Indeed the very notion of human origins – the idea that at some point in evolution these capacities became established, awaiting their historical fulfilment – is part of an elaborate ideological justification for the present order of things, and as such just one aspect of the intense presentism of modern thought. It is high time we recognised that our humanity, far from having been set for all time as an evolutionary legacy from our hunter-gatherer past, is something that we have continually to work at, and for which we alone must bear the responsibility.

Note

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