

The challenge of the new millennium

**HOLMES ROLSTON III ASKS WHETHER REASONED
 BEHAVIOUR IS POSSIBLE IN THE MIDST OF
 SELF-SEEKING IDEOLOGIES AND ANCIENT APPETITES**

The biological sciences have developed dramatically in the past half century, raising concerns about their implications for human nature and behaviour, and for those who make decisions about governing science. I worry that half-truths, if taken for the whole, can be both misleading and dangerous. Fortunately, scientists are also good at being their own critics and we can often enlist other scientists to counter the overblown claims of reductionist scientists. But then we have to decide which scientists to trust.

We are told that we are full of selfish genes. "We are survival machines – robot vehicles blindly programmed to preserve the selfish molecules known as genes." Richard Dawkins claims

this "has become textbook orthodoxy". Edward O Wilson proposes to "biologicize" ethics. "The genes hold culture on a leash". Michael Ruse joins Wilson: "Ethics ... is an illusion fobbed off on us by our genes to get us to cooperate." Bluntly put, ethics results in fertility; that is its deepest explanation.

Ethicists worry that biologists are labelling genes with a word borrowed from the cultural phenomenon of morality. Even biologists have more than one way of framing this behaviour. Organisms are quite interrelated, living in communities, ecosystems, with myriad co-actions, cooperations, interdependencies. Genes are spread around; that is the only way they can be conserved. Fitness is not measured by

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an individual's own survival, long life or welfare. Fitness is measured by what any individual can contribute to the next generation in its environment, fitness in the flow of life to pass life on. Survival of the fittest turns out to be survival of the better senders of whatever is of adaptive value in self into others in the next generation.

Biologists have found as many ways in which natural selection favours cooperation as it does competition. In his book *SuperCooperators*, Martin Nowak, who calls himself a mathematical biologist, claims: "Competition does not tell the whole story of biology. Something profound is missing. Creatures of every persuasion and level of complexity cooperate to live This is the bright side of biology. Cooperation is the master architect of evolution." We prefer to have those governing science seeking cooperation, not operating from their selfish genes.

A parallel concern is our genetic destiny. "Now we know, in large measure, our fate is in our genes." That comes with great authority from one of the discoverers of the genetic code, James Watson. Frances Crick, the other discoverer, adds: "Eventually one may hope to have the whole of biology 'explained' in terms of the level below it, and so on right down to the atomic level." This puts the focus on the molecular details of the coding.

But many geneticists demur. J Craig Venter and over 200 co-authors, completing the Celera Genomics sequencing of the human genetic code, caution: genetic "determinism, the idea that all characteristics of the person are 'hardwired' by the genome" and accompanying "reductionism"

"are two fallacies to be avoided". Do not take a half-truth for the whole.

Subsequently, there has proved to be much more tension than Watson and Crick realised in reducing genetic information to nothing but physics and chemistry, with DNA completely understood by discovering which molecule goes where with what bonding states. As they were already suggesting, one must understand the coding, what the information coded does, its significance. The novelty is that matter-energy enters into proactive information states about directed use in vital biochemistries, absent in the merely physico-chemical processes. This continues in neurochemistry. Tracing molecular movements in whatever fine detail imaginable, it would be difficult to comprehend what is taking place at a synapse without some concept of signals passing across the synapse.

Genes figure increasingly into our self-understanding, but mixedly. We do want heritage, something that roots genetics in, with and under us. But we do not want either ourselves or our politicians to be genetically determined.

Other problematic genetic legacies are called our Pleistocene appetites. Our evolutionary past did not give us many biological controls on our desires for goods that were in short supply. We love sex; we want children; these urges kept us reproducing in ancient times, when most infants died. Now it pushes overpopulation. We love sweets and fats, of which in Pleistocene times humans could seldom get enough. But now we overeat and grow fat. Generally, that is a model for the whole overconsumption problem.

There are few biological controls on our desires to reproduce and amass goods, to consume; for most people it has always been a struggle to get enough (indeed for most it still is). When we can consume, we love it, and over-consume. Consumer capitalism transmutes a once-healthy pattern of desires into avarice. With escalating opportunities for consumption, driven by markets in search of profits in overpopulating

Ethics is an illusion

populations, we need more self-discipline than comes naturally. Our self-interested tendencies overshoot; we love ourselves (egoism) and find it difficult to know when and how to say enough.

But when the economists, philosophers, theologians get into the conversation, these ancient appetites can still seem more positive than negative. For all of human history, we have been pushing back limits. Especially in the West, we have lived with a deep-seated belief that life will get better, that one should hope for abundance, more people living a prosperous life, and work towards obtaining it. Economists call such behaviour “rational”; humans will maximise their capacity to exploit their resources. Moral persons will also maximise human satisfactions, at least those that support the good life, which must include food, clothing and shelter, but also an abundance, more and more goods and services that more and more people want. Such growth is always desirable.

In the West we have built that into our concept of human rights: a right to self-development, to self-realisation, to reproduction. Such an egalitarian ethic scales everybody up and drives an unsustainable world. When everybody seeks

their own good, there is escalating consumption. When everybody seeks everybody else’s good, there is, again, escalating consumption.

Humans are not well equipped to deal with the sorts of global-level problems we now face. The classical institutions – family, village, tribe, nation, agriculture, industry, law, medicine, even school and church – have shorter horizons. Far-off descendants and distant races do not have much “biological hold” on us. Across the era of human evolution, little in our behaviour affected those remote from us in time or in space, and natural selection shaped only our conduct toward those closer. Global threats require us to act in massive concert, of which we might be incapable. If so, humans may bear within themselves the seeds of their own destruction. More scientifically put: our genes, once enabling our adaptive fit, will in the next millennium prove maladaptive and destroy us.

Maybe these Pleistocene appetites inhabit a monkey’s mind. Charles Darwin worried: “With me the horrid doubt always arises whether the convictions of man’s mind, which has developed from the mind of the lower animals, are of any value or at all trustworthy. Would any one trust in the convictions of a monkey’s mind, if there are any convictions in such a mind?” In body structures such as blood or liver, humans and chimpanzees are 95–8 per cent identical in their genomic DNA sequences and the resulting proteins. So biologists may claim: “DNA evidence provides an objective non-anthropocentric view of the place of humans in evolution. We humans appear as only slightly remodeled chimpanzee-like apes”, as do Derek E Wildman and his colleagues in the *Proceedings of the National Academy of Sciences, USA*.

But humans have over three times the brain size of chimps, so that a 3 per cent difference in protein structures makes 300 per cent bigger brains. Cognitively, we are not 3 per cent but 300 per cent different. When you compare Einstein with a chimp, it does not appear that Einstein is only slightly remodelled; nor do we wonder whether an atomic bomb built with his theory that $E=mc^2$ is a slightly remodelled ant-fishing stick. Darwin misses the historical development between monkeys and men; the query fails because it reduces man's mind to a monkey's mind and then distrusts it. Darwin stumbles into the genetic fallacy. Nothing is gained by supposing that humans cannot now make rational judgements about human behaviour, evaluating ideas about governing science, because monkeys before them could not. The difference lies in what is called "a theory of mind". Humans can pass ideas from mind to mind, and chimps cannot

not enough, at least, to form a cumulative transmissible culture.

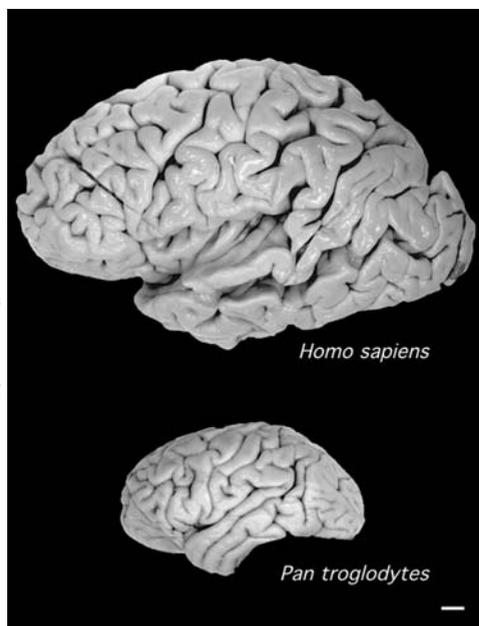
An information explosion gets pinpointed in humans, an event otherwise unknown, but undoubtedly present in us. Chimps do not attempt to construct persuasive arguments. I am not a chimp because I do. You are not either, because you are thinking about my

Capitalism transmutes healthy desires into avarice

arguments. Such arguments require language with its advanced conceptual and symbolic powers enabling abstraction, analysis, evaluation, present in humans but unprecedented in animals. Michael Gazzaniga, a neuroscientist, speaks of "the explosion in human brain size": "We are hugely different ... the differences are light years apart."

One might expect that the organs of knowing will have a biased focus on the native-range habitat. Yet in the human form of life, even if mind conveys survival benefits, mind explodes the theory, since the scientific mind in both theory and practice so evidently transcends the necessity to produce offspring and to live in the native ranges that humans inhabit. Trust any creature's mind in the niche in which it is adapted to survive. But the human niche is culture as well as nature, and there we may have to tell a different story – about scientists finding black holes, or decoding their own genome. Governing science turns around what the ideals promoted by a culture are. If the self-seeking biologists are right, the ideals, sooner or later, tacitly if not explicitly, are the most offspring in the next

Comparison of a Human and a Chimpanzee Brain, scale bar = 1 cm (Todd Preuss, Yerkes Primate Research Center) [CC-BY-2.5], via Wikimedia Commons



An egalitarian ethic scales everybody up and drives an unsustainable world

generation, which accompanies a quest for self-serving power. Their critics insist on recognising various other ideals – self-actualising, justice, fairness, honesty, universal life, redeeming lives – that are not at first sight adaptive for maximising offspring. Those who govern science need more than a monkey's mind.

Monkeys cannot do neuroscience. Humans can, and next we meet a bottom-up, top-down concern. Neuroscience went molecular (acetylcholine in synaptic junctions, voltage gated potassium channels triggering synapsing) to discover that what is really of interest is how these synaptic connections are configured by the information stored there, enabling function in the inhabited world. Our ideas and our practices configure and reconfigure our own sponsoring brain structures. Genes make the kind of human brains possible that facilitate an open mind. But when that happens, these processes can also work the other way around.

What began as a “bottom-up” process becomes a “top-down” process. In “top down” causation, an emergent phenomenon reshapes and controls its precedents. In *Cortex and Mind: Unifying Cognition*, Joaquín M Fuster, a neuroscientist, finds that in human brains there is an “emergent property” that is “most difficult to define”: “Top-down network building predominates. Imagination, creativity, and intuition are some of the cognitive attributes of those emergent high-level representations.” Minds employ and reshape their brains to facilitate their chosen ideologies and lifestyles.

Michael Merzenich, another neuroscientist, reports (in a box essay in a widely-used text) his increasing appreciation of “what is the most remarkable quality of our brain: its capacity to develop and to specialize its own processing machinery, to shape its own abilities, and to enable, through hard brainwork, its own achievements.” In the vocabulary of neuroscience, we have “mutable maps” or “neuroplasticity”. For example, with the decision to play a violin well, and resolute practice, string musicians alter the synaptic connections and thereby the structural configuration of their brains to facilitate fingering the strings with one arm and drawing the bow with the other. With the decision to become a taxi driver in London, and experience driving about the city, drivers likewise alter their brain structures, devoting more space to navigation-related skills than non-taxi drivers. The human brain is as open as it is wired up. Our minds shape our brains. That is, we hope, going on not only in the minds of scientists, but in the minds of those who govern science.

Still, we may be told that humans will inevitably act in self-interest, the best we can do is enlighten it. We might get past that with Good Samaritans and saints here and there on an individual basis. But the most we can do at global scales, even national scales, is to seek collective enlightened human self-interests enlarged into ever-widening communities in which they participate. Humans cannot, even ought not, be regulated beyond their larger self-interests, but we can and must stretch out the shorter-scale biological concerns.



Affenskat by Paul Meyerheim (1883), via Wikimedia Commons

Humans are attracted to appeals to a better life, to quality of life. If environmental ethics can persuade large numbers of persons that an environment with biodiversity is a better world in which to live, then some progress is possible. This will use an appeal to still more enlightened self-interest or, perhaps better, to a more comprehensive concept of human welfare, entwined with ecosystem health. That will get us clear air, water, soil conservation, national parks, some wildlife reserves and bird sanctuaries.

We may prove able to work out some incentive structures – the Montreal Protocol, or CITES, the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Humans have proved capable of advanced skills never dreamed of in our ancient past: flying jet planes, building the internet, decoding their own genome, and designating world biosphere reserves. It would be tragic if we let our left-over Pleistocene appetites become an alibi for continuing our excesses. *Homo sapiens* can and ought to be wiser than that.

But always continuing is the challenge that at the same time that we enlighten self-interest, we also find that self-interest escalates in its power to exploit. We do need to figure human brokenness into governing science. *Science*, a leading journal, has descriptive science but regularly has advocacy for a more forceful presence of science in setting national policy. In a recent issue, prominent scientists speak to what they call

Our ideas re-configure our brain structures

“Navigating the Anthropocene: Improving Earth System Governance”. They propose improving such governance by creating a high-level United Nations Sustainable Development Council. They do not propose geographical representation, the usual policy, but rather giving special predominance to the largest economies – the Group of 20 – because these countries have more power to act. So scientists are advocating more power for the top economies, in the belief that such a development council will better address such critical issues as climate change and sustainable development.

Do we have good reason to think that the Group of 20, given more power to act, will not act self-servingly? Allen Greenspan, former Federal Reserve Chairman, testifying before the House of Representatives Committee on Government Oversight and Reform, October, 2008, stated: “I made a mistake in presuming that the self-interests of organizations, specifically banks and others, were such that they were best capable of protecting their own shareholders and their equity in the firms.” The world financial crisis resulted from such thinking. He testified that he

was in “shocked disbelief” to see how self-interest corrupted what might seem like the best of our corporate institutions.

Greenspan must be acquainted with the experience of Joseph E Stiglitz, Nobel laureate, who became increasingly ethically concerned when he found that decisions were but “thinly veiling special interests”. “I was chief economist at the World Bank from 1996 until last November,

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during the gravest global economic crisis in a half-century. I saw how the IMF, in tandem with the US Treasury Department, responded. And I was appalled.” For such concern he was pressured into resigning and his contract with the World Bank was terminated. Those who govern ethically need now and forever in the future to remember Lord Acton: “Power tends to corrupt and absolute power corrupts absolutely.”

This reconnects us with the worries we had earlier about those Pleistocene appetites driving humans, rich and poor, ever to want more, more, more.

So in the end we question whether reasoned governing behaviour is possible in the midst of self-seeking ideologies. The more optimistic of the humanists will insist that biological reduction of human’s powers to enlightened self-interest fails to recognise the novel, non-biological dimensions of human culture. Humans, in their cumulative transmissible cultures, have formed theories of science, of ethics, of politics. Cultural options can operate without modifying the genetics. In computer imagery, the same

“hardware” (biology) supports diverse programs of “software” (culture). Biologists may reply that the hardware does limit what sorts of software can run on it – Wilson’s culture on a biological leash, those Pleistocene genes. Critics counter that the metaphor overlooks how the infant brain is synaptically unfinished and is to a considerable extent “wired up” during the child’s education into its culture. The evolved brain allows many sets of mind. One does not have to have Plato’s genes to be a Platonist, Darwin’s genes to be a Darwinian, or Jesus’s genes to be a Christian. The system of inheritance of ideas is independent of the system of inheritance of genes. Humans can argue their ideologies.

How individuals behave in fact is often determined by their learning experiences, by social trends. Blacks were slaves in the southern United States and freed in 1863. Though long segregated, in the second half of the twentieth century they became quite integrated into American life. The great-grandchildren of slaves became legislators, mayors, college presidents, military generals. The critical difference lies in the historically emergent ethical conviction that slavery is wrong and freedom is right: that blacks are, in morally relevant respects, to be given equal opportunities and responsibilities.

These new-found convictions have little to do with selfish genes or instinctive adaptive mechanisms. Persons with essentially the same genetic makeup are being converted from one ethic to the other. The biological theory does not explain this cultural development. Marshall Sahlins, concludes: “Biology, while it is an absolutely necessary condition for culture, is equally and absolutely insufficient: it is completely unable to specify the cultural properties of human

We are entering the Anthropocene, when humans will manage the planet

behaviour or their variations from one human group to another.” Biology determines some outcomes but underdetermines many others. One cannot look to self-interests, enlarged with the powers of science or in escalating markets to produce or protect the multiple values that citizens enjoy, since many of the values sought here are not, or not simply, scientific or economic ones.

Democracy, though more admired than is capitalism, is no more perfect. The humans who gather to do business together are the same humans who gather to form government. If human nature is sometimes flawed, these flaws will as soon turn up in government as in business. We have largely thought that democracy is the form of government best able to combine individual freedoms and mutual cooperation with checks on these flaws in human nature. With its more comprehensive sense of the public good, with all the citizens cross-checking each other, democracy can put checks on the abuses of technological power or the drives that make unregulated markets inhumane. A tough question is whether democracy can discipline itself enough to be rational.

One thing that democracy can produce is debate, discussion about values (though, alas, it does not always do so). We are more likely to uncover and conserve all of the values at stake when issues have been well debated. There will be trade-offs, my good against yours, and hence the sense of justice arises (each his or her due), or fairness (equitable outcomes for each), or of

greatest good for greatest number. Often it may be hard to reach more than a truce between parties pressing their self-interests, enlarged as these may be into reciprocating groups. But in such disputes issues of justice and fairness will arise. Those who press such self-interest publicly will have to learn how to argue fairness and justice for their own sake, and perhaps will learn to feel the force of any unfairness and unjust allegations should these be used against them.

Further, there is considerable satisfaction both in being fairly and justly treated and in realising that you keep your end of the bargain, even at some cost. The result – though persons act in their generic self-interest – is to pull the focus of concern off self-centre and bring into focus others in the community of persons. The defence of one’s own values gets mixed, willy-nilly, with the defence of the values of others. Values must be recognised as widely dispersed, extensively proliferated. Such government may enlighten self-interest, it also transcends it.

We are entering, many say, the Anthropocene Epoch, when humans will manage the planet. On global scales, this will demand better science, better economics, better ethics, and better government than humans have yet managed to produce. This is the challenge of the new millennium.

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FRANK JACKSON INTERVIEW
HOLMES ROLSTON III ON SCIENCE
EVIL ACHIEVEMENTS
FAITH IN THE CLASSROOM

**Is it ever
reasonable
to agree to
disagree?**

