

What is the Most Evolved Thing About Humans?

Harriet Feldman

Five Cambridge academics from five disciplines respond...

Professor Robert Foley, Director of the Leverhulme Centre for Human Evolutionary Science

The term ‘more evolved’ is problematic. As an evolutionary scientist I try to understand organisms in terms of how well adapted they are to their environments – so something that is highly evolved and very adaptive in one animal could be maladaptive in another. That said, some features are more ‘derived’ than others—they have appeared more recently. Upright walking differentiates us from the apes, but appeared 4–5 million years ago. More recent developments include a precise hand grip, loss of body hair and prehensile toes and the shrinking of the face. What has allowed humans to dominate the planet, however, is the size of their brains and their capacity to model the world internally. Current theory suggests the development of our brains was to cope with the highly complex social groups which became advantageous in the precise (and apparently rare) conditions in which humans evolved—it is easy to forget just how rare gregariousness is in species other than primates. This ‘neurological modelling’ of the world underlies language, essential for development of a complex society, agriculture, arts, politics, and technology. Technology is arguably our most adaptive feature; how many of us could survive anywhere in the world without a cutting edge, or a fire?

Dr Paul White, Darwin Correspondence Project

I will start with the caveat that Darwin’s theory technically does away with the notion of ‘higher’ and ‘lower’ organisms, and of evolution as progress. Darwin, however, still seemed to hold these views: he occasionally describes Europeans as a ‘superior’ race, and ‘primitive’ peoples as closer to animals, the implication being that there is a hierarchy of species. For Darwin, the pinnacle of human evolution, the latest stage, was ‘moral instinct’. Many animals show selflessness towards their children, others still altruism to members of their group or pack. It is only humans, though, who show selfless behaviour towards all members of their own species, and often treat other species with kindness to our own detriment. To Darwin, this was the highest moral sense, and the equitable treatment of animals was something he was obviously passionate about. He supported animal rights cases brought to him as a local Justice of the Peace and was involved in the campaign of anti-vivisection legislation which formed the basis of British animal experimenting legislation for over 100 years.

Dr David Summers, Head of the Department of Genetics

The most evolved thing in the world is certainly bacterial reproduction. Unlike humans, who only have access to the genetic information in other humans, bacteria can exchange DNA with any member of any species of bacteria, vastly increasing their gene pool. We are only now beginning



to understand how complex and well controlled this process is. Bacteria can exchange important genes as complete units, the gene being neatly and precisely cut out, copied and posted then reinserted by another bacterium, with no random chopping up which would lead to wastage. In addition, bacteria have enormous population sizes and can take 99.99% losses and still recover overnight, making them amazingly efficient evolvers. What makes them so astonishing is that they have gained control over their own evolution, so that it is no longer left to chance but ruthlessly exploited for the survival of their genes.

Compared to bacteria, humans are rare, homogenous and slow. However, our brains do make us special. Many of the things we can do with them—designing computer games, writing poetry and even thinking of God—are not the things they evolved to do at all. Most features evolve to a selective pressure, whereas many aspects of modern human culture could be described as ‘adopted’ rather than ‘adapted’. I am always depressed by the Dawkins camp, who argue that we are puppets of our neural evolution. Selfishness and tit-for-tat altruism may well be hard-wired into our brains, but surely the point of having such a complex one is that we are able to transcend them?

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Professor Simon Blackburn, Professor of Philosophy

I am not very happy about the question, given that every creature alive today has had the same time to evolve from pre-Cambrian ancestors. In that sense our exquisite cognitive faculties are no more evolved than the crocodile's snout. Nevertheless I suppose those are the faculties of which we are most proud, partly because we are much more conscious of them than of any adaptations at a molecular level. In Victorian times resistance to Darwin often concentrated on our developed moral sense, as if above all else that could not have been a product of the teeming, purposeless war of all against all that Darwin made the source of all our features. But that idea is not much in favour now, since our capacities for sympathy, together with the need for cooperation with others, provide ample soil in which tendencies for self-restraint, just dealing, and such things as respect for property and promises evolve. It is regrettable in this regard that prominent contemporary writings on biology have talked heroically of mankind "rebellious against selfish genes" in order to behave decently. This description of what we do is only really available to an unscientific dualist, bent on adding a divine spark to our natural makeup.

Other cognitive functions are arguably more mysterious. Why do we care about truth, when myth and legend serve just as well? How were some of us adapted to be so good at mathematics or physics, or painting or music? A popular suggestion is that they attract mates, but that leaves open why we find those characteristics attractive in the first place.

Dr Roger Carpenter, Reader in Oculomotor Physiology, Department of Physiology, Development and Neuroscience

Well of course the conventional thing is to be frightfully impressed by the human brain, and especially the fact that it has a ridiculous amount of that messy neocortex, burgeoning out into bulges and folds and making our brains look like walnuts. But how useful is it, really? The effects of evolution are not necessarily beneficial, and in some dramatic cases—the peacock's tail, the stag's antlers—can be downright silly. I suspect that the cortex we are so proud of may be similar, and is actually better viewed as a tumour-like excrescence, its size being selected for because by generating wit and art and music, it makes its owner attractive to the opposite sex. In purely biological terms, we're not much more skilled by having all that cortex. A blackbird flying into a tree, and landing with precision on a twig, is about as good as it gets. Our brain is a few thousand times more massive than the blackbird's: are we a thousand times better at that kind of precise, elegant, movement? I think not. We're pretty good at holding and manipulating things, though, so I think I'd go for the hand rather than the brain. Not many creatures can play the piano. But given how nicely they sing, I bet if God had given blackbirds hands, they would be the Paderewskis of the animal kingdom. ■

Harriet Feldman is a third year studying Medicine at Gonville & Caius College.

The Darwin Correspondence Project

Rachana R. Narayanan

In 2009, the 200th anniversary of Darwin's birth, few people are busier than the Darwin Correspondence Project. They are currently being inundated with requests for their expertise in developing special radio and television programmes on Charles Darwin and his life. The Project, started in the 1970s by Frederick Burkhardt with the help of Cambridge zoologist Sydney Smith, is in possession of the single largest collection of Darwin's letters alongside his personal library and journals.

Letters were Darwin's primary means of communication and to date the project has located 14,500 letters exchanged between Darwin and nearly 2000 correspondents around the world. There are letters discussing his ideas with colleagues and also personal messages to his wife and children. The project has painstakingly carried out the colossal task of tracking the letters, transcribing them into an electronic format and putting them in chronological order. This is no mean achievement, especially considering that letters are continuing to be discovered and, very unhelpfully, do not often contain the date or the addressee. Dating the letters relies on their content and also on material changes—such as alterations in the letterhead and stationery over time.

Conversations and debates held between Darwin and his correspondents (including some of his critics) have revealed glimpses of his domestic and business life. His letters and manuscripts have shed light on the emotional side of science—his enthusiasm, disappointments, his belief in his theory, his amicability and openness to criticism, and his humility.

The efforts of the project are designed to leave an accurate, lasting and accessible body of work. Each letter has been stringently proof-read and supplemented with factual, background information that refrains from making interpretations of the content. An online database of the letters has been created, volumes of the collection have been published, select conversations have been dramatised and more recently, a teaching resource has been developed for school pupils and university students. The project hopes that the richness and variety of the letters will keep Darwin's work and world accessible to the general public.

The project is based at the University Library in Cambridge and also the US. See the website www.darwinproject.ac.uk for more information.

I wish to thank Dr. Paul White for talking to me about the project and the letters. ■

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