

key members of the anti-slavery movement.

The authors claim that Darwin partly chose to highlight the common descent of man from apes to show that all races were equal as a rebuttal to those who insisted black people were a different, and inferior, species from those with white skin.

Desmond and Moore say Darwin attempted early on to show his theory of sexual selection, where traits seen as desirable but which give no competitive advantage to a species are passed down through generations, was responsible for differences in appearance between races of both animals and humans. But, they argue, Darwin shied away from these topics in *On the Origin of Species* because it was too controversial. Nonetheless, they argue that “human evolution wasn’t the last piece in the evolution jigsaw; it was the first.”

“From the very outset Darwin concerned himself with the unity of humankind. This notion of ‘brotherhood’ grounded his evolutionary enterprise. It was there in the first musings in 1837,” they write.

“Always retiring, often unwell, Darwin never threw himself into abolitionist rallies and petitions (as his relatives did). While activists proclaimed a ‘crusade’ against slavery, he subverted it with science. Where slave masters bestialized blacks, Darwin’s starting point was the abolitionist belief in blood kinship, a ‘common descent’.”

“Rather than seeing ‘the facts’ force evolution on Darwin, we find a moral passion firing his evolutionary work. He was quite unlike the modern ‘disinterested’ scientist,” the authors say.

“Reading the greatest one-origin-for-all-the-races work, by the anti-slavery advocate James Cowles Prichard, *Researches into the Physical History of Mankind*, Darwin scribbled, “How like my Book all this will be.””

Desmond and Moore believe they have uncovered the passion driving Darwin. “The real problem is that no one understands Darwin’s core project, the nucleus of his most inflammatory research. No one has appreciated the source of that moral fire that fuelled his strange, out-of-character obsession with

human origins. Understand that and Darwin can be radically reassessed.”

The discovery and recovery of Darwin’s letters is still something of a rolling revolution. “Even as we write new ones are turning up — not least, from the son of the most famous ‘immediatist’ abolitionist in the world, the American William Lloyd Garrison.”

It confirms what we had come to suspect, they write, that Darwin was an admirer of the most uncompromising, non-violent Christian leader in the anti-slavery movement. Garrison was, in Darwin’s words, “a man to be for ever revered”. Darwin was overjoyed on hearing that the blistering anti-slavery passage in his *Beagle* journal had been read to the elderly Garrison, whose son reported to Darwin how it shed “a new and welcome light on your character as a philanthropist”, they write.

To think, Darwin replied, that a man “whom I honour from the bottom of my soul, should have heard and approved of the few words which I wrote many years ago on Slavery”.

Although the slave trade had been outlawed in Britain two years before Darwin’s birth, merchants and sea captains were willing to flout the law. And other countries — despite pressure from Britain and harassment from its Navy — remained engaged. But the big desire in Darwin’s youth was the end of slavery itself.

The West Indies cane fields were still worked by black slaves, even if planters could not import more. In the century to 1810, about 1.75 million people had been abducted from Africa and sold in the British colonies. Some 750,000 were alive when slavery was abolished in the 1830s. “These broken black bodies under the lash had been destined to serve the sugar tooth of the nation — until the nation, with its lobbies and activists, finally balked,” they write. “Darwin’s young world, then, was buoyed by this huge humanitarian upswelling in the country — the whole family... were swept along.”

The enormity of the crime in the eyes of the Darwins and the Wedgwood cousins was understandable: the African slave abductions had resulted in probably the largest forced migration of humans in history. And the newly emerging correspondence “shows how much there is still to be learned about Darwin”.

Q & A

Tetsuro Matsuzawa

Tetsuro Matsuzawa is a professor of Kyoto University, Japan, and, since 2006, director of the Primate Research Institute (KUPRI). He is known for his research on the chimpanzee mind both in the laboratory and in the wild. His laboratory work consists of the Ai-project, which focuses on language-like skills, number-concepts, and memory ability in chimpanzees. The project is named after Matsuzawa’s main research partner: a female chimpanzee named Ai. Launched in 1978, the Ai-project is one of the longest running laboratory research projects. Matsuzawa has also studied tool use among the wild chimpanzees of Bossou, Guinea, West Africa since 1986. The Bossou chimpanzee community has been followed by KUPRI researchers for more than three decades. Bossou chimpanzees are well known for their use of a pair of mobile stones as hammer and anvil to crack open oil-palm nuts. Matsuzawa has been attempting to synthesize his field and laboratory work in order to understand the nature of chimpanzees, our evolutionary neighbors. He has received several prizes during his career to date, including the Prince Chichibu Memorial Science Award, the Jane Goodall Award, and Japan’s prestigious Medal with Purple Ribbon. The following two books published by Springer are recommended: Primate Origins of Human Cognition and Behavior, and Cognitive Development in Chimpanzees.

Why did you become interested in chimpanzees?

My major at undergraduate level was philosophy. I wanted to know about various aspects of the world: biology, chemistry, history, language, and so on. I could not focus on a single discipline. I thought that philosophy would somehow contain all these subjects. However, students of philosophy were obliged to learn German, French, Latin, and Greek in the first two years of their studies because all the important books were written in those languages. I became bored with looking at black patterns printed on white pages. I preferred

climbing mountains, where I could directly contact nature. For four years, I spent about 120 days a year climbing mountains and became a member of the Academic Alpine Club of Kyoto (AACK) team. In 1973, we first climbed the West peak of Kangchenjunga, the third highest mountain in the world. During my mountaineering days, I gradually came to recognize what the question that really interested me was.

Many disciplines try to understand various aspects of the world. However, the world is perceived through our sensory organs. My question concerned the constraints of the human way of thinking: how do we perceive the world? I decided to leave philosophy and became instead an experimental psychologist, analyzing human binocular perception. Then, I recognized that it was not in fact the eyes but the two hemispheres of brain that really saw this world, so I shifted to neuroscience, examining brain activity in rats in graduate school. This career helped me to get a position, in 1976, as assistant professor at KUPRI at the age of 26. I now wanted to know how nonhuman primates see the world — a unique window into the evolutionary basis of the human mind. A year later, KUPRI launched its own ape-language-like project. The first chimpanzee, Ai, arrived in November 1977. From then on, every single day was unique and memorable for me. I was amazed by each new finding and experience through my daily interactions with Ai. In that sense, it was she who guided me to various questions about the chimpanzee mind.

Why and how did you start the field work of wild chimpanzees? My first scientific paper on the Ai-project appeared in *Nature* in 1985. It reported that Ai had learned to use Arabic numerals to represent numbers. She had also learned letters corresponding to 10 different color terms: color classification by the chimpanzee is very similar to that in humans. Having gone some way to understanding chimpanzee perception, I decided to take a sabbatical leave, which I spent at the University of Pennsylvania. David Premack was my mentor there. He is a well-known psychologist who coined the term 'theory of mind' — understanding the minds of others. While based on the East-coast of the USA, I took a trip to West

Africa to visit Bossou where one of my KUPRI colleagues, Yukimaru Sugiyama, had begun his survey of wild chimpanzees. I was motivated by a simple question: how is chimpanzee intelligence employed in the natural habitat? Compared to climbing in the Himalayas, a trip to Africa was easy for me.

Why did you start combining field work and laboratory work? After my initial experience of fieldwork in Africa, I was invited to the first conference that brought together chimpanzee researchers from all over the world, 'Understanding chimpanzees', held in Chicago in 1986. The meeting aimed to celebrate the publication of the landmark book *The Chimpanzees of Gombe* by Jane Goodall. She became another mentor of mine. With help from interactions with Premack and also Goodall, I looked for my own intellectual niche. The simple answer was an attempt to synthesize my two mentors' approaches, in order to understand the chimpanzee as a whole.

What came out of combining two different approaches? In Africa, I was fascinated by observing various aspects of chimpanzee life, especially their sophisticated way of making and using tools. I focused on the stone tool because it is the most complex form of tool use ever observed among wild chimpanzees. It is also related to lithic technology, which played a fundamental part in hominid evolution. Thanks to my background as a laboratory researcher, I decided to develop a 'field experiment'. I provided stones and nuts in a clearing in Bossou forest and waited for the arrival of chimpanzees to this 'outdoor laboratory'. It worked. The field experiment dramatically increased our opportunities for observing and video-recording chimpanzees' use of stone tools for nut-cracking.

My colleagues and I have continued recording stone tool use and the use of leaves for drinking water at Bossou's outdoor laboratory ever since. Twenty-three years' worth of annual long-term research has provided interesting findings, such as: individuals' hand preference when using hammers; a critical period for learning to nut-crack at around 3 to 5 years of age; the role of 'education by master-apprenticeship' and

observational learning; episodes of deception; cultural variation in neighboring communities; and clues to how immigrant females are responsible for cultural propagation between communities. I often observed hard pounding of tools resulting in an anvil stone being broken into two halves. Later, the broken half would be used as a hammer. This kind of utilization of unintentional stone knapping might have been the first step toward Oldwan-type hominid lithic technology.

My experience in the field, in return, had a strong influence upon my laboratory studies. I became sensitive to the environmental enrichment of captive chimpanzees. We built 15-metre high climbing frames in our outdoor compound at KUPRI, planted trees, and introduced a small stream. I also learned the importance of the mother-infant bond among wild chimpanzees. This led us to 'participation observation' studies in the laboratory, in which we tested the cognitive development of infant chimpanzees raised by their biological mothers. This research method represents a clear contrast to previous research in captivity, where infants were often isolated from their mothers and were instead being reared by humans.

What is your most important finding in recent years? We published an article on chimpanzee memory in December 2007 in *Current Biology*, reporting that the working memory of young chimpanzees is better than that of human adults. The task was to memorize Arabic numerals and their positions, briefly presented on a computer monitor. Visit YouTube and search for 'chimpanzee memory' — you will find many of our video clips and see that the chimpanzees' performance is truly astonishing!

What is the significance of your finding? This is the clearest evidence that chimpanzees can outperform humans in a cognitive task. Many people still hold a kind of naïve belief that humans are superior to nonhuman animals in all intellectual domains. This is not true. Each species has developed its own unique way of adapting to the environment. It is time to say farewell to the

human–animal dichotomy. Humans are a species within the animal kingdom. The study of the chimpanzee mind might provide a good bridge connecting humans to the rest of the organisms with whom we share this planet.

What would you like to do in future? I have learned a lot from chimpanzees. I feel that it is now my turn to work for them. Over the years, I have come to realise that the laboratory study of nonhuman animals should be accompanied by considerations of animal welfare, while field studies should go hand in hand with wildlife conservation. We are facing problems both in Japan and in Africa. There are 348 chimpanzees in Japan at present. Among them, 72 are ex-biomedical research subjects. At the end of 2006, a collaborative effort completely put a stop to the use of chimpanzees for invasive biomedical research in Japan. While this is good news, it also means that we must now find a way to continue caring for these chimpanzees. To solve the problem, we created the first chimpanzee sanctuary in Japan. We also founded the Wildlife Research Center of Kyoto University in 2008 to look after the endangered species, including the sanctuary chimpanzees, in collaboration with zoos and aquariums.

In Africa, the size of the Bossou chimpanzee community has dropped to 13 individuals following a flu-like epidemic in 2003. We have already started the 'Green corridor' project — a scheme of planting trees in the savanna that separates the Bossou community from the neighboring communities of Mont Nimba, a World Natural Heritage site. Mont Nimba itself is facing a serious threat from iron ore mining. Throughout Africa, chimpanzee lives are being threatened by deforestation, poaching and bushmeat trade, and contagious disease: all direct results of human activity. It is not easy to find the ultimate solution for a harmonious coexistence between humans and other organisms. I want to keep things simple — to make my own efforts based on my place in the world. Step by step, every single day can make a change.

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Birthday presence

The Royal Society, the UK's national academy of science, has acquired a mansion to celebrate 350 years since its foundation next year. Chicheley Hall, 80 kilometres north of its London headquarters, will be home to an expanded programme of meetings currently held in central London.

The house has been bought for £6.5 million with help from the Kavli Foundation, which will be contributing further funds to help convert the house and outbuildings to a conference centre.

"The Kavli Royal Society Centre will gather some of the world's greatest scientific minds," says Stephen Cox, executive secretary at the Royal Society. "In bringing these people together in a

residential atmosphere we hope to create the sort of intense thinking and activity that gave rise to major breakthroughs such as the decoding of the human genome."

The house was built between 1719 and 1723 for the Chester family but has passed through many owners since and stands on the site of an earlier Jacobean house. In the last century it was bought by the second Earl Beatty, whose father was a naval commander and First Sea Lord. The house displayed a Jacobean Room, containing fragments of the original 16th century house. The Kavli Foundation will use the centre as its European home, hosting a programme of its own events there.

Nigel Williams



New life: The Grade 1 listed Chicheley Hall has been bought by the Royal Society and Kavli Foundation as a new base for residential conferences outside London. (Photo: Royal Society.)