A theory that's hard to digest

The Hunting Apes: Meat Eating and the Origins of Human Behavior

by Craig Stanford

Princeton University Press: 1999. 245 pp.

\$24.95, £14.95 (pbk)

Christophe Boesch

The quest to understand what makes us human and how we became so is one of the most controversial and fascinating scientific adventures. Many scientific disciplines, including anthropology, psychology, biology and philosophy, join in this debate. The fossils of our ancestors have made it clear how closely related they were to chimpanzees. Two particularly striking differences, however, became apparent quite early in evolution: an upright walking gait and a big brain. Since most of us think that there must be more to being human than walking upright, the quest to understand human uniqueness has centred around our ancestors' development of an enlarged brain.

Craig Stanford uses some observations of wild chimpanzees to suggest a new approach to this question. Classically, anthropologists have relied on fossil bones and the artefacts associated with them. This approach gives us limited information about our ancestors' behaviour, forcing us to make inferences. Others have used knowledge of contemporary hunter-gatherer communities to make such inferences, based on the assumption that we had a similar lifestyle for most of our history. However, our ancestors were morphologically very different from modern humans. Thus, an additional source of comparison is the information we have on chimpanzees, to which our ancestors were physically similar. Stanford's attempt to add some of our growing knowledge on chimpanzees to this debate is to be welcomed.

Jane Goodall began her pioneering work on the chimpanzees in the Gombe Stream National Park, Tanzania, some 39 years ago. Her observations of the Gombe chim-

panzees using and making tools and hunting small monkeys for meat profoundly changed our view of the human-chimpanzee differences. Throughout the book, Stanford takes chimpanzee behaviour to be Gombe chimpanzee behaviour, but this produces a distorted image of what chimpanzees really are.

As Michael Tomasello and I have suggested, we should speak of different chimpanzee cultures from both biological and psychological points of view. William McGrew has shown that the tool-using habits of chimpanzee populations differ greatly; the more populations we study, the more diverse these sets of behaviour become. Similarly, many authors have shown that hunting and many other aspects of social behaviour differ strikingly between chimpanzee populations.

Chimpanzees in the Tai forest, Ivory Coast, search actively for prey, hunt in groups and coordinate their actions for most hunts, but chimpanzees at Bossou in Guinea in West Africa hunt rarely and solitarily by 'collecting' passing prey. Chimpanzees at the Mahale Mountains, Tanzania, like those at Gombe, hunt quite frequently, but rarely coordinate their actions. The diversity of chimpanzee cultures contrasts with what has been seen in other animals, but is reminiscent of humans. Whatever aspects of chimpanzee behaviour we look at, we see important differences between populations which do not reflect genetic, or sometimes ecological, differences.

The 'Man the Hunter' theory of human evolution, proposed in the early 1960s, that Stanford seeks to resuscitate, has been much criticized for ignoring women. The chimpanzees of Gombe differ from other populations, such as the Tai chimpanzees, by having females with low sociality and seemingly limited choice in their reproductive strategy. In the Tai forest, female chimpanzees are highly social, play a decisive role in many aspects of social life and make their own choice of male partners. The differences between chimpanzee cultures make us realize the flexible but important role of females in both chimpanzee and human evolution.

In addition, I don't expect that just one activity — namely hunting — could explain the evolution of humans. Humans and chim-

panzees are different from other species in many ways, and it seems reasonable to expect that other activities, such as the use and the making of tools and the use of complex social strategies, would influence our evolution. Females are prime tool users in most chimpanzee populations, and the increasing knowledge of tool use in chimpanzees reveals how complex it can be. The role in our history of females in this domain is undeniable.

What made our ancestors develop such a big brain? Stanford proposes that it was the machiavellian demands of meat-sharing: not hunting itself, and not making and using tools. However, we are left puzzled as to what about meat-sharing is so demanding that it produces the modern human mind. Large brains could mean large memories or sophisticated cognitive abilities. The skills that required such an enlargement of the brain are not stated, and we can only speculate about them. Many authors have tried to define our cognitive uniqueness, and the responses propose that it lies in the domain of abilities to understand complex causal relations about external objects, or in our ability to understand the minds of others. Meat-sharing, which in humans is often viewed as tolerated theft, is not really a convincing candidate as the driving force behind higher cognitive abilities. "What makes us human?" and "How did we become so?" remain among the most exciting questions to be studied, and many more books will have to be written to find convincing clues. □

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Courting success for the future

Eco-pragmatism: Making Sensible Environmental Decisions in an Uncertain World

by Daniel A. Farber

Chicago University Press: 1999. 216 pp.

\$23, £18.50

Calestous Juma

The intensity of public debate in Europe on the risks to human health and the environment posed by genetically modified crops illustrates the widening gap between public concern about environmental issues and the capacity of regulatory and judicial institutions to deal with such challenges.

There is a general crisis of confidence, and environmental concerns are becoming a prominent part of national political platforms in many countries: the public wants a fundamental reform to the way government institutions handle environmental issues. But institutional changes have been slow, and in many countries reforms have run

Share and share alike: were the demands of meat-sharing behind the evolution of the big human brain?

counter to environmental aspirations. Environmentalism is no longer a fringe activity confined to a small group of activists challenging the status quo, but a growing movement that is influencing court decisions. Indeed, this influence extends to laws and national constitutions around the world. Underlying these reforms are efforts to manage risk and uncertainty in a complex world.

The 1990s have witnessed attempts to integrate environmental considerations into institutional behaviour at national and international levels. International environmental conferences and treaties are regularly used to set the agenda for national action. But if we are to achieve this successfully, we must integrate environmental concerns into the functioning of our judicial systems.

In many cases, the judicial system has been called upon to decide between seemingly competing economic and ecological perspectives. Much of the emerging research suggests there is a false dichotomy between environment and economy. Eco-pragmatism adds to this research by seeking to establish a middle road between "tree-huggers" who support environmental conservation as a primary public-policy goal and "bean counters" who argue for the strict application of cost-benefit analysis.

Daniel Farber's is therefore a timely and well-argued contribution to the understanding of how judicial systems can maintain the balance between competing environmental and economic claims. It does more than that: it puts forward a framework for using judicial pragmatism to integrate environmental considerations into economic activities.

Farber uses the case of the Reserve Mining Co. versus the United States government to show how a pragmatic approach makes it possible to promote environmental conservation while taking into account economic considerations. In this case, the court had to decide whether to rule that a mining company should spend US\$250 million on removing a possibly carcinogenic chemical from a city's drinking water.

Arguing that "sanctity of human life is of too great value", the judge ordered the immediate shut-down of Reserve Mining. An appeal court ruled that the evidence "does not support a finding of substantial danger", and the discharges posed only a "possible medical danger". The matter then turned to how to identify a feasible land-disposal method.

The book shows how the courts translated the environmental standards embedded in American culture into decisions that promoted conservation while applying cost-benefit analysis. It is a compelling account of how the judicial system dealt with a complex case under conditions of uncertainty and growing scientific knowledge. Generalizing from this account, Farber proposes an approach of cost-benefit analysis and feasi-

bility analysis designed to reflect environmental considerations.

Farber admits that "there are limits to how far Americans are willing to go to achieve environmental goals". This lack of willingness itself requires explanation because of its implications for relations between the United States and the rest of the world. Many argue for approaches governed by caution. Given the current sweep of globalization, a dialogue between different value systems is essential. One of the key interna-

tional goals today is to reconcile pragmatism with the precautionary approaches that dominate European cultures.

A pragmatic approach should lead to an ecological renaissance and contribute to our understanding of how our existing cultures (and the institutional arrangements that come with them) influence our approach to environmental issues. □

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Hoffman's Erdős is number one

Paul Hoffman's book *The Man Who Loved Only Numbers* was announced as this year's winner of the Rhône-Poulenc Prize for Science Books at a dinner at London's Science Museum last week. Hoffman was one of six finalists:

The Man Who Loved Only Numbers: The Story of Paul Erdős and the Search for Mathematical Truth

by Paul Hoffman

Fourth Estate, £7.99, \$12.95 (pbk)

"... Hoffman is very good at discussing the sort of problems that intrigued Erdős, which makes *The Man Who Loved Only Numbers* an excellent introductory book for anyone interested in number theory. As a subject, however, Erdős is difficult. He led a very determinedly undramatic life and Hoffman is forced to fill up many pages with unrelated detail and stories about mathematicians. This upsets the flow of the biography, but frequently adds to the book's interest... *The Man Who Loved Only Numbers* is a fascinating, affectionate biography, but the title is untrue: Erdős loved many things besides numbers, including children (whom he called epsilons, after the mathematical symbol for a very small quantity) and especially his mother, who accompanied him on many of his early travels." Alexander Masters, *Nature* 394, 535-536 (1998).

A Beautiful Mind

by Sylvia Nasar

Faber, £17.99

This book will be reviewed in *Nature* in July.

How the Mind Works

by Steven Pinker

Norton/Penguin, \$17, £9.99 (pbk)

"... Pinker has a gift for exposition, for witty analogies, for apposite quotation from his vast knowledge of culture, high and low. And he knows when to skip the details of difficult technicalities. He uses all these skills in his latest book. It is erudite, light in touch, but long... The most controversial aspect of Pinker's package is his defence of evolutionary psychology... Pinker's evolutionary psychology is useful heuristic for generating hypotheses, but not a refutable theory." P. N. Johnson-Laird, *Nature* 389, 557-558 (1997).

Consilience: The Unity of Knowledge

by E. O. Wilson

Knopf, \$26

"... Its first thesis is that the humanities, sociology, religion, ethics, art appreciation and almost everything else outside the current remit of science that has not found its analytical roots in evolutionary biology will soon do so. Its second thesis is that, once we understand how we came to be, we shall be constrained in determining where to go. Wilson makes a formidable argument for consilience — unifying on the basis of a common theoretical framework — of those near-disciplines that have no rational structure... Wilson is a kind man, but he has no problems producing withering denunciations where they are called for. His description of our ecological plight, and his heartfelt plea for understanding and urgent action, are written with such authority, clarity and passion that I have read nothing to touch them." Paul H. Harvey, *Nature* 392, 451-452 (1998).

One Renegade Cell: The Quest for the Origins of Cancer

by Robert Weinberg

Weidenfeld & Nicolson, £12.99

Robert Weinberg's brisk trot through the scientific efforts to understand cancer joins the recent spate of books in which experts write a history of their own field. It is amazing science, but the tired metaphors and unwieldy gene names will not make it easy reading for lay-readers even if it is all terribly relevant to them — as Weinberg points out, about 40 per cent of the population of the United States will develop cancer at some stage in their lives. Nor does the ultimately unsettling subject matter recommend the book as one to read in bed. — Harriet Coles

Mapping the Mind

by Rita Carter

Weidenfeld & Nicolson, £25

See page 652 for a review.