BOOK REVIEWS

Sociality Without Frills

Chimpanzee Culture. RICHARD W. WRANGHAM, W. C. McGREW, FRANS B. M. DE WAAL, and PAUL G. HELTNE, Eds. Published in cooperation with the Chicago Academy of Sciences by Harvard University Press, Cambridge, MA, 1994. xxiv, 424 pp., illus. $39.94 or £29.95.

Edward Tylor, the founder of British anthropology, defined culture in 1871 as that "complex whole which includes knowledge, beliefs, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society." This definition, of course, necessarily excludes all nonhuman species. To open the field a little, in order at least to entertain the possibility that other species might have culture, it is necessary either to devalue the definition, as John Bonner did in his 1980 book *The Evolution of Culture in Animals*, or to invent a new term, as Richard Dawkins did in *The Selfish Gene* (1976) when he coined the term "memes." The editors of this volume have adopted the former approach. Although they do not commit themselves to any specific definition, they appear to favor "socially transmitted adjustable behavior," a phrase first used by Japanese primatologists in the 1950s. It is constrained and responsible but not very inspired.

Even this definition, however, entails methodological difficulties. Any thorough investigation of cultural diversity must first determine the extent to which diversity might also result from genetic, demographic, or ecological factors. Consider, for example, two populations of chimpanzees, one of which uses stones to smash open palm nuts and the other of which does not. The disparity might stem from a difference in cultural traditions. It could also, however, result from ecological differences, such as a lack of stones in the second site or a greater variety of fruiting trees that make it unnecessary for the second population to seek extra calories in palm nuts.

Members of two generations. [From *Chimpanzee Culture*; drawing by Mark Maglio, courtesy of Jane Goodall Institute]

In the first part of the book, devoted to natural populations, therefore, the editors set themselves the rather formidable task of identifying all causes of interpopulation variation in addition to cultural ones. This cautious approach is laudable, but the result is a series of isolated chapters that are largely descriptive rather than evaluative. The chapter on tools is an excellent review of tool use, the one on hunting an excellent review of hunting, and so on. Perhaps we still know too little about chimpanzees to attempt a synthesis, but the book might have been conceptually more interesting if the editors had made more effort to link the chapters and discuss, for example, how grooming relationships and hunting behavior might be related.

Although all chimpanzee populations studied to date use a unique combination of crude tools, the editors admit that "cultural transmission among chimpanzees is, at best, inefficient and possibly absent" (p. 2). This is because there is scant (and in some cases negative) evidence for active imitation or teaching of tool-using techniques. Many cognitive scientists believe that imitation and teaching require the ability to attribute mental states to others. Do chimpanzees consciously model their behavior on that of others, or are they "restricted to private conceptual worlds" (p. 2)? If chimpanzees do differ from humans in being unable to attribute intentions, beliefs, and ignorance to others, they will inevitably lack the full capacity to imitate, to inform, and to teach. They will also lack all but the most rudimentary forms of culture. Having posed this crucial question in the introductory chapter, the editors leave their authors to tackle it as they see fit. Surprisingly, the only chapters that take up the challenge are those dealing with captive animals.

If culture can be defined as socially transmitted behavior, it is essential to study the process by which behavior is acquired. Reviewing the still scanty evidence from both the field and captivity, Tomasello observes that chimpanzees seem to learn a tool's function faster when they are able to observe more skilled demonstrators. Nevertheless, they seldom imitate the demonstrator's precise motor patterns and show no evidence of understanding the demonstrator's goals or intentions. Tomasello concludes that individual learning in chimpanzees is probably often supplemented by social enhancement and emulation, but these alone are not sufficient to create and maintain traditions, rules, and rituals.

Tomasello's chapter raises several issues that are of crucial significance to any discussion of the evolution of culture, though none of them has yet been investigated in any detail. First, how essential is mental-state attribution to definitions of culture? Is it possible to have culture in the absence of imitation or teaching? In his review of tool use in the wild, McGrew argues that much human knowledge is transmitted without explicit imitation or teaching. This is undoubtedly true. In no human culture, however, is imitation or teaching completely absent.

Second, what is it about language training or contact with humans that seems to prepare apes for other cognitive tasks? As Rumbaugh *et al.*'s review points out, language-trained chimpanzees and bonobos often demonstrate impressive problem-solving skills not shown by their untrained peers. Are language-trained chimpanzees no more relevant to questions about the evolution of the mind than circus bears that have been taught to drive cars, or do they provide important hints of cognitive capacities that remain untapped except under human tutelage? The idea that there are unrealized mental capacities in any species is not terribly fashionable among evolutionary biologists, who tend to believe that cognitive skills, like other traits, will only evolve if they serve some function. The question reflects a tension that has existed between empiricists and rationalists since the 17th century, and it needs to be considered.

Equally important, if captive chimpanzees are capable of acquiring many rudiments of human speech, what are they saying to each other under natural conditions? Within the last few years, impressive progress has been made in understanding the function and variability of chimpanzees' long-range calls (reviewed here by Mitani). As Nishida points out in his concluding chapter, how-

ever, we still know virtually nothing about the calls that are most analogous to human speech—close-range vocalizations used in social interactions. Psychologists working with chimpanzees in captivity often assume that their subjects' vocalizations are too simple to be relevant to studies of cognition. This is an assertion born of ignorance. After all, even monkeys (which are thought to be less intelligent than chimpanzees) use their vocalizations to designate features of their environment, to reconcile with opponents, and to facilitate social interactions. It would be very surprising if chimpanzees were not capable of at least this much. If language is crucial to culture, as most definitions would have it be, we will make no progress in understanding chimpanzee cultures until we have some understanding of their natural communication.

Finally, in what way are the cultural and cognitive capacities of chimpanzees different from those of other animals? Of the authors in this book, only Povinelli has attempted to test chimpanzees and monkeys on the same cognitive tasks. The results have suggested some perhaps fundamental differences between the minds of chimpanzees and monkeys. There is as yet little evidence, however, that under natural conditions the social behavior of chimpanzees is qualitatively more complex or variable than that of monkeys (or indeed of other social animals, like elephants). In captivity, species as diverse as parrots and sea lions have been found capable of solving extremely challenging cognitive problems. This book would have benefited from some discussion of these issues.

By letting the data speak for themselves, and by resisting the temptation to formulate any grand hypotheses that might be proved wrong by future research, the editors have compiled a volume rich in new and valuable data. In quite properly treating culture as just another source of diversity, they have also rendered a topic that could be exciting, provocative, and even poetic rather dull. But maybe this is not the editors' fault; maybe the chimpanzees themselves are to blame. Discussions of culture, after all, should focus not just on tools, technologies, and medicinal plants but also on art, song, ritual, and other functionally irrelevant behavior. And in the more than 100 years that have passed since Tylor's anthropocentric definition, none of these characteristics have been found in any animal species, chimpanzees included. Perhaps Tylor was right, and there is no poetry in this book because there is no poetry in chimpanzees. Chimpanzees may have cultural traditions, but, unlike us, they don't have useless ones. They construct rudimentary tools but they don't paint, they don't sing silly songs, and they don't worry about their jewelry. As Clairee Belcher, the doyenne in *Steel Magnolias*, put it so succinctly, the "thing that separates us from the animals is our ability to accessorize."

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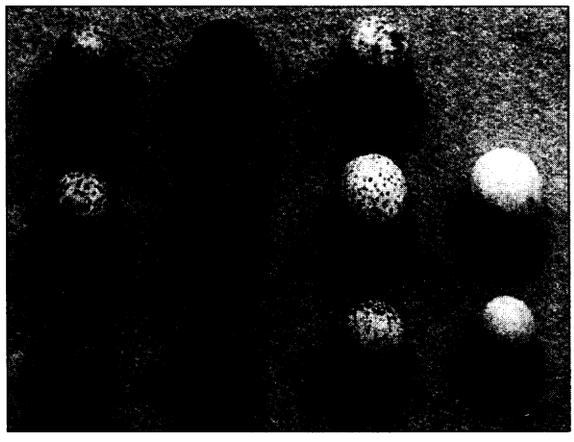
Coevolution Reconsidered

The Coevolutionary Process. JOHN N. THOMPSON. University of Chicago Press, Chicago, 1994. xii, 376 pp., illus. $49 or £39.25; paper, $19.95 or £15.95.

In 1986, after making revisions to a manuscript accepted by the journal *Evolution*, I was asked by the editor to make one additional change—to drop the term "arms race" from the title, since he felt that to label the interaction under study, between a herbivorous insect and its principal host-plant, as such was "premature." I obligingly made the change but was more than a little nonplussed, when the article came out, to see that it was followed in the same issue of the journal by one with a title that began, "Failure of the arms race analogy." But those were the '80s, a time of major disenchantment with the notion that interactions between species could effect evolutionary changes reciprocally, to create cycles of adaptation and counteradaptation epitomized by the arms race analogy. The disenchantment was to some degree well earned by flagrant abuses of the term "coevolution" in the preceding two decades, yet the swing toward conservatism with respect to the phenomenon in the last ten years has been extreme.

John Thompson's new book is a refreshing rejoinder to the naysayers and skeptics of the past decade and a delightfully well-reasoned call to restore the process of coevolution to a place of prominence in ecology. The book begins (part 1) with a historical review of the intellectual foundations of modern coevolutionary theory. Three chapters (part 2) then examine the genetics, phylogeny, and ontogeny of specialization across a broad range of taxa and the relationship of specialization to coevolution, particularly as manifested by phylogenetic diversification. Part 3 consists of five chapters that examine the action of natural selection in different trophic interactions and the ways in which selection imparts geographic structure to specialization. In the final series of five chapters (part 4), Thompson explicitly differentiates his "geographic mosaic" view from more standard views of interactions and provides specific hypotheses to guide future studies. A short epilogue places coevolutionary theory in the broader context of global biodiversity and argues for the preservation of interspecific interactions as well as specific species as goals for the conservationist.



"Mimetic eggs laid by cuckoos (*Cuculus canorus*). Cuckoo populations in Britain have evolved eggs that mimic three of their four major hosts. Top row: cuckoo eggs from red warbler mimics ('gentes'), meadow pipit mimics, and pied wagtail mimics. Middle row: model cuckoo eggs representing each of the three mimetic types plus a fourth representing a redstart egg (a suitable but currently rarely used host in Britain for which a mimetic type occurs in Finland). Bottom row: Eggs of the current favorite British hosts — reed warbler, meadow pipit, pied wagtail, dunnock." Differences in the readiness with which various host species reject the cuckoo eggs laid in their nests may reflect coevolutionary alternation, with time lags producing "a complex pattern of specialization in the parasite populations and a complex distribution of defenses among hosts." [Reprinted in *The Coevolutionary Process* from N. B. Davies and M. de L. Brooke, *J. Anim. Ecol.* **58**, 207 (1989)].

Thompson has integrated an amazingly diverse array of studies to illustrate his points. In a single chapter, sometimes even a single paragraph, he can ask his reader to evaluate phenomena as they relate to taxa as disparate as sea slugs, caterpillars, and bat flies, or aphids, parasitic wasps, and salamanders, or even rabbits, yucca moths, and endophytic fungi. These juxtapositions, though occasionally quite jarring, are always thought-provoking. The prose is fluid and highly readable; the summary of 19th-century efforts that laid the groundwork for today's enterprise borders on thrilling. Mercifully, jargon is kept to a minimum here (although I can't say I'm fond of the term "despecialization").