

essayistic stance of many books written by Anglo-Saxon evolutionists). With such a broad scope, it is unavoidable that one finds some odd choice of examples. For example, for the origin of the genetic code, Lane discusses the primordial codonic assignment of amino acids to dinucleotides according to a mechanism proposed by Morowitz and his colleagues (namely, that such dinucleotides catalyzed the conversion of amino acid precursors to cognate amino acids), for which there is no evidence at the moment, while the exciting findings by Yarus (that RNA molecules experimentally selected to bind acids are characterized by a statistical predominance of anticodons in their binding sites) receives a mere footnote. Or, regarding the cell nucleus, he discussed its origin of as a response to the invasion of the early host cell genome by introns, which is probably putting the cart before the horse, since before the advent of eukaryotic sex and linear chromosomes with many replicons there would have been not much chance for the spread of introns in the first place. Perhaps the least revealing chapter is on consciousness, which is hardly surprising, because it is one of the major outstanding problems in science and, incidentally, farthest away from the expertise of the biochemist author.

Finally, I return to the problem of the origin of language that is omitted (among other candidate inventions) from Lane's list. Now, it is true that language rests on cultural evolution (and, conversely, that cultural evolution in our species rests mainly on language), but this rest is only partial: the other pillar is genetic evolution. Cultural evolution is not restricted to humans (songbirds pass on songs as memes, chimps have many cultural items in the different—social and technical—domains of life), so in this sense it is a product of biological evolution. In humans, language functions as a biologically co-determined, novel inheritance system with practically unlimited hereditary potential. Our capacity for language rests on genes. It is iconic, because some regard it the hardest problem of science. And, undoubtedly, it has changed the world.

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ON THE ORIGIN OF STORIES: EVOLUTION, COGNITION, AND FICTION.

By Brian Boyd. *Belknap Press, Cambridge (Massachusetts): Harvard University Press.* \$35.00 (hardcover); \$19.95 (paper). xiii + 540 p.; ill.; index. ISBN: 978-0-674-03357-3 (hc); 978-0-674-05711-1 (pb). 2009.

This volume is a bold attempt to use evolutionary perspectives to help explain the origin, persistence, and structure of fiction. These ex-

plorations lead Boyd to propose a new paradigm for the interpretation of fiction, *evocriticism*, which he recommends should replace what he sees as the dominant paradigm, critical theory. The author suggests that art is cognitive play—an adaptation derived from our obsession with finding patterns in our environment and our inherent disposition to hone our neuromuscular system. Fiction, specifically, is meaningful art derived from our compulsion to engage in cognitive play and our ability to represent the world to one another through language. Since play requires the sharing of attention, some aspects of a story are meant simply to gain our attention and are not otherwise meaningful. Boyd's book is organized into two autonomous parts: an overview of evolutionary theory that forms the basis for his argument that fiction is an adaptation; and interpretive case studies (from Homer and Dr. Seuss) that illustrate how an evolutionary framework can lead to unique and often superior interpretations.

The author attempts to unify under an evolutionary banner the analysis of art, literature, and religion. In this endeavor he is at play in the same arena as others espousing a "Darwinian worldview," such as Richard Dawkins, Daniel Dennett, and Sam Harris. From the perspective of modern evolutionary theory, however, his argument is lacking in nuance. Boyd paints too broadly with a single evolutionary paintbrush, and often confounds adaptationist origins with current functions. In particular, it is unfortunate that he does not discuss in depth the interaction between biology and culture, a place where contemporary biology might well be more allied with his project. Although the primary audience of *On the Origin of Stories* is not the evolutionary biologist but the literary critic, in order for his account to satisfy the scientist, a deeper engagement with the evolutionary literature would be necessary.

The second half of the book, which shows how to practice evocriticism, does not require the main conclusion of the first half (fiction is an adaptation), but instead merely requires that humans are the products of adaptive evolution. Boyd thus could have profitably begun with the second half of the book, showing how a reflection upon ourselves as evolved beings can have a profound implication for how we can understand the features of texts. He could have then used the rest of the book to carry his evolutionary vision forward to push his argument that fiction is an adaptation. Structured this way, readers would have seen the payoff sooner and may have been more tolerant of the questionable use of evolutionary theory in the first half.

The author suggests that the scientific method (understood here as the testing of hypotheses) may be applicable to literary criticism. Although evolutionary theory certainly generates testable hypotheses, we are skeptical that the kind of hypotheses generated through evocriticism could be readily tested. It is hard to see, for example, how one could test whether the red stain on the white dress in *Cat in the Hat* is there to capture our attention merely because primates, like us, are innately drawn to the color red, or whether it is (or is also) a Freudian reference to menses. Furthermore, it is not clear to what extent hypothesis testing should be a goal, or source of legitimation, for literary criticism.

As a manifesto, however, the book is valuable: *On the Origins of Stories* is a call to scientists and scholars in the humanities to contribute to a fledgling research project that has the potential to bridge these different areas of human endeavor. Boyd has succeeded in making a case for literary criticism done through the lens of our evolutionary past. We applaud his insistence on generating literary explanations that centrally refer to our shared biological humanity.

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INNOVATION IN CULTURAL SYSTEMS: CONTRIBUTIONS FROM EVOLUTIONARY ANTHROPOLOGY. *Vienna Series in Theoretical Biology.*

Edited by Michael J. O'Brien and Stephen J. Shennan. Cambridge (Massachusetts): MIT Press. \$40.00. xi + 284 p.; ill.; index. ISBN: 978-0-262-01333-8. 2010.

As the editors point out in their introduction to this volume, "innovation" in human societies would seemingly have a straightforward and intuitive meaning: the appearance of "something new and different" (p. 3). However, they also note a distinction between true "innovations" as those cultural properties that arise *and* persist, and those that merely appear but do not flourish ("inventions"). As such, to study "innovation" is to study the engine and workings of culture change.

In tackling this topic, O'Brien and Shennan have drawn on scholars working in a wide range of fields: anthropology, archeology, biology, philosophy, and psychology. The book begins with a general introduction by the editors, describing how innovation has been approached scholastically over the last century, particularly in anthropology and archeology. They note that many key areas have been inadequately addressed, yet also note that given

recent advances in the study of cultural transmission processes, this may begin to change.

The remainder of chapters help point the way to deal with some of these outstanding issues, both theoretically and methodologically. They are grouped into three sections. The Biological Substrate contains five papers that consider innovation conceptually and comparatively against the wider backdrop of behavioral change in nonhuman animals. Cultural Inheritance includes six papers that focus on the computer-aided simulation of innovation and transmission of innovations. Such studies are shedding new light on how factors such as demography and stochasticity come to influence innovation. Patterns in the Anthropological Record consist of three papers that examine the materiality of innovation in specific archeological and anthropological contexts.

Graduate students of the various disciplines from which the contributors of this volume are drawn will, of course, be essential engines in future studies of cultural innovation. However, tackling such a broad topic can often seem overwhelming. They could do worse than to consider carefully the issues raised here, and identify specific questions to which empirical and analytical perspectives may be brought to bear. They will find pointers to both within the pages of this volume, which looks set not merely to be novel, but innovative in regard to its field of focus.

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EVOLUTION OF ISLAND MAMMALS: ADAPTATION AND EXTINCTION OF PLACENTAL MAMMALS ON ISLANDS.

By Alexandra van der Geer, George Lyras, John de Vos, and Michael Dermitzakis. Hoboken (New Jersey): Wiley-Blackwell. \$99.95. xi + 479 + 26 pl.; ill.; index. ISBN: 978-1-4051-9009-1. 2010.

Although there is no discipline named "island paleontology," perhaps there should be, with this text as its empirical bible for the mammalian part of the record. This volume is devoted to the placental mammals that have lived on the world's islands, species which, in most cases, are known to us today only as fossils. Van der Geer et al. have done a thorough job of providing an up-to-date overview of what is now known about the diversity, adaptations, biogeographical histories, and ultimate extinction of these quite remarkable creatures: elephants the size of large dogs, lemurs that hung from branches like sloths, rodents the size of ponies, and many other examples of adaptation in action.

The book has three sections. Beyond the Mainland briefly treats what makes an island an island