

*Lost Land of the Dodo* is a scientific reference work that will long be essential to anyone studying evolution and conservation of insular organisms. Unfortunately, it also serves as a model for how such volumes should not be organized, and it will prove very difficult to use unless eventually made available as a searchable electronic text.

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## CULTURAL EVOLUTION

# Bridging the Big Gap

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Histories are full of gaps. Whether these are apparent (reflecting a lack of data) or real (nothing of import actually occurred) is often an open question. Nevertheless, there is a tendency to develop theories that suggest the latter and thereby explain away our lack of knowledge. For example, the classic historical paradigm of a period of intellectual stasis between the philosophical contributions of the ancient Greeks and their rediscovery in the Middle Ages ignores seminal works of Arab-Muslim scholars (1). But perhaps the most important gap in human history is actually more an abyss—our “prehistory.” It is into this abyss that Daniel Lord Smail, a historian at Harvard University, journeys in hopes of finding links between Stone Age and Modern people.

*On Deep History and the Brain* maps his voyage. In it, Smail shows where we are with respect to understanding humanity’s history, how we got here, and the general direction toward which we should move. He offers two key lines of argument. One illustrates how past and current ways of thinking about human history are based on misguided notions of what counts as history. The second provides a unifying framework for a cultural history that incorporates evolutionary biology and neuroscience.

In essence, “prehistory” refers to the thousands of years before civilization, when history supposedly did not move. Historians came to such an idea through a mixture of ignorance and practicality. Into the 19th century, European historians turned to the Book of Genesis; later scholars, forced to reckon with deep geological time and evolution by natural selection, were more creative. The spirit of their arguments for ignoring deep his-

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tory is reflected in a sentence Smail quotes from the historian Mott Green: “At some point a leap took place, a mutation, an explosion of creative power—the ‘discovery of mind,’ or the ‘birth of self-consciousness’—interposing a barrier between us and our previous brute, merely biological existence” (2). The essential idea is that history in the proper sense began when cultural evolution eclipsed biological evolution. Furthermore, cultural evolution is Lamarckian (directed progress toward a goal) and thus obviates the need to incorporate Darwinian explanations and lessens the importance of our biological history.

The idea that recent history follows an accelerating Lamarckian pattern is pervasive among historians and even endorsed by the late paleontologist Stephen Jay Gould: “Cultural evolution has progressed at rates that Darwinian processes cannot begin to approach.... Human cultural evolution ... is Lamarckian in character” (3). Smail tempers this idea by demonstrating that often apparent directed and accelerated progress is actually an illusion of teleology. First, many cultural paradigms are the result of trial and error or the inadvertent consequence of a sequence of actions. Second, the accelerated nature of cultural evolution does not preclude Darwinian mechanisms (selection based on random events); in fact, the short generation time (sharing an idea with other people multiples it within a short period) creates the illusion of directed progress. Smail concludes that humanity’s deep history has no particular beginning and is driving toward no particular end.

For Smail’s unifying framework, the crux of his synthesis is that culture is made possible by the plasticity of human neurobiology. Civilization—with its attendant agriculture, animal domestication, abandonment of migration, and increasing density of human settlements—Smail holds, did not bring an end to the role of biology in human history. Rather, civilization brought rapid changes in human behaviors and created new neurophysiological ecosystems in which different brain-body states could evolve (molded by different cultures). These brain-body states have their roots in our primate and other vertebrate ancestors. Thus, in essence, any culture represents the dynamic interactions between the brain, body, and environment of humans within a particular group. Smail presents an embodied and situated view of human history.

How do culture and neurophysiology influence each other? One example that Smail elaborates, and that has a direct link to our primate ancestors, is the dominance hierarchy. The social emotions associated with dominance hierarchies (e.g., anger, fear, contempt, and pity) are in large part mediated by the autonomic nervous system and often revealed involuntarily by our facial expressions. These have deep phylogenetic roots. Although the neural responses may not have changed much across time, the means by, and contexts in, which dominance and submission are felt and exploited by people in a society are culturally specific. More generally (and without our being aware of it), emotional and physiological ups and downs are exploited in different ways in different cultures—for pleasure, for inflicting harm, etc.—through different associations. Smail dubs the varying forms of culturally specific instruments that drive brain-body responses “psychotropic mechanisms.” These include mood-altering practices, behaviors and institutions generated by human culture, foods like coffee and chocolate, our interactions with others through social hierarchies or religions, and self-stimulation through novels or roller coasters. Importantly, the exploitation of brain-body states by cultures is not intentional nor does it have a goal.

*On Deep History and the Brain* is a small book with big ideas: that human history is linked in deep time by the physiological mechanisms that we share with our vertebrate ancestors and that the historical “progress” and “acceleration” we detect are in fact directionless series of ongoing culturally specific experiments with psychotropic mechanisms. Smail deftly and impressively pulls together information from the disparate fields of cultural history, evolutionary biology, and neuroscience. His knowledge and sophistication are most evident when he avoids the traps and numerous inadequacies of evolutionary psychology; he cogently adopts a developmental systems-embodied cognition view of behavioral biology for his historical framework. A creative and compelling synthesis of ideas, Smail’s book provides an engaging and invigorating analysis of our history.

### References

1. S. M. Ghazanfar, *Diogenes* **154**, 117 (1991).
2. M. T. Greene, *Natural Knowledge in Preclassical Antiquity* (Johns Hopkins Univ. Press, Baltimore, MD, 1992).
3. S. J. Gould, *The Panda’s Thumb: More Reflections in Natural History* (Norton, New York, 1992).

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### On Deep History and the Brain

by Daniel Lord Smail

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