

Book Review

Jonathan Silverton, ed., *99% Ape: How Evolution Adds Up* (London, Natural History Museum, 2008; Chicago, University of Chicago Press, 2009), 224 pp., £14.99, \$26.00 (paper).

To historians, textbooks can be useful data. Because of their very nature they can act as time capsules for “consensus science” during the period of their publication: cutting-edge science is usually omitted and students are usually only exposed to what is accepted by the majority of the scientific community. This is particularly true of textbooks aimed at secondary-level students. Yet textbooks, due to their pedagogical role, never fully disentangle themselves from the socio-political milieu from which they emerge. A classic example of this is George William Hunter’s *Civic Biology* (1914), which—along with the accepted science of the day—discussed eugenics, the perceived negative implications of “parasitic” families, and the hoped for future improvement of the human race. Textbooks, in short, can be more than just collections of scientific facts and theories; they are also embedded (and can function) within a socio-political matrix. I will return to this issue presently.

The work under review is the textbook for an entry-level Open University (UK) course titled *Darwin and Evolution* and as such is aimed at readers with no previous background in the biological sciences. As such, it offers an entry into the current state of evolutionary biology and sacrifices depth for breadth. Throughout the reader is presented with the evidence for evolution as fact (change over time within populations in both the neontological and paleontological realms) and as pathway (hypotheses about what changes into what through deep time). In addition various mechanisms for evolution are briefly discussed, with pride of place being given to Charles Darwin’s two mechanisms of natural and sexual selection. The examples will be familiar to many readers: Galapagos finches, East African cichlids, Hawaiian picture wing flies, the evolution of the Human Immunodeficiency Virus (HIV) from simian viruses, the transition to land, the evolution of birds and feathered dinosaurs, the evolution of whales, industrial melanism in peppered moths, and of course, human evolution. All are covered relatively briefly using clear text and often stunning illustrations.

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Throughout the work genetic and morphological studies unite to offer explanations of organic diversity. Data from fossils are united with genetic studies (both phylogenetic and within the field of evolutionary developmental biology) to present our current understanding of a particular phenomenon. Often these investigations are put within an historical context. A good example of this is the chapter devoted to Darwin's finches. Beginning with an account of Darwin's own engagement with the group (and after tipping the hat to the pioneering work of David Lack) the chapter discusses the long-term studies of Peter and Rosemary Grant before culminating in a brief discussion of how the proteins calmodulin (CaM) and bone-modulating protein 4 (bmp4) control beak size and shape, illuminating how changes in the activation of genes controlling the production of these proteins could account for aspects of speciation within *Geospiza*. These findings are then integrated into a discussion of the geological and environmental history of the Galapagos archipelago. All of this occurs in eleven pages with twelve figures.

Historians of evolutionary biology are not likely to learn much from this work and its value will be to us as teachers, providing as it does a brief and visually appealing introduction to modern evolutionary biology, one which can be recommended to students with little or no background in the sciences. That said the seven co-authors, all biologists, work hard to include historical information within the individual chapters. The work is richly illustrated with many images that historians will recognize and quotes abound from Darwin's notebooks, *Origin*, and the *Journal of Researches*. Yet Darwin is not the only historical figure one encounters—Thomas Henry Huxley, William Paley, Samuel Wilberforce, and Louis Agassiz are somewhat predictably mentioned. There are however some surprises. The chapter on whale evolution introduces the reader to the relatively little known anatomist, William H. Flower, who in 1883 proposed—based on multiple lines of evidence—that whales evolved from artiodactyls. This idea received little support until the late 1980's when new fossil finds and genetic studies overthrew the prevailing view that whales were related to a carnivorous group known as mesonychids. In time it has become clear that the closest living relative to whales are in fact hippopotami. The book commemorates Flower's bold claim with a full-page picture and an extensive quotation that is worth repeating here (in an abbreviated form):

We may conclude by picturing to ourselves some primitive generalized, marsh-haunting animals with scanty covering of hair like

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the modern hippopotamus, but with broad swimming tails and short limbs, omnivorous in their mode of feeding ... gradually becoming more and more adapted to fill the void place ready for them on the aquatic side of the borderland on which they dwelt, and so by degrees being modified into dolphin-like creatures inhabiting lakes and rivers and ultimately finding their way into the ocean. (p. 93)

As I mentioned above, textbooks function within a socio-political matrix. Here in the United States that matrix is distinguished by the fact that over 50% of the population apparently believes that “the development of life was guided by intelligent design” (Zogby Poll, June 2009) and while traditionally an American problem, such anti-evolutionism has manifested itself in Europe and Australia. Chapter 18 distinguishes the “science of evolution” from the non-science of creationism and rightly identifies the modern Intelligent Design (ID) movement as a manifestation of the latter. Indeed, much of the evidence discussed in *99% Ape* is precisely that dismissed by proponents of ID such as Jonathan Wells as flawed “icons of evolution.” Perusal of this book will show how strong the evidence for evolution (as fact, pathway and mechanism) is. Noting that there are no constitutional barriers, as there are in the US, to the teaching of creationism in British schools, the authors implicitly set their volume as a bulwark against future creationist incursions. For all of us, the book can serve as a primer of forceful examples to use whenever one needs to illustrate the evidence for evolution to a skeptical audience.

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