

# BOOK REVIEWS

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YOUR INNER FISH, A JOURNEY INTO THE 3.5-BILLION-YEAR HISTORY OF THE HUMAN BODY. Neil Shubin. 2008. Pantheon Books, New York. ISBN -13: 978-0-375-42447-2. 230 p. \$24.00.—*Your Inner Fish* is a book that many readers of *Copeia* will enjoy, and a book many of us probably wish we had written. Many of its themes, which are meant to inspire and educate the laymen, are well known to us: the origin of the middle ear bones, the transition to land, the discovery of Hox genes. However, despite our best hopes few among us are as qualified as Neil Shubin to discuss the origins of human anatomy as it relates to our fishy ancestry. Dr. Shubin can legitimately say he is a paleontologist, developmental biologist, and comparative anatomist; he is well versed in mammalogy, herpetology, and ichthyology. He has published widely on these subjects, and many of his publications are among the most important in those fields. Dr. Shubin's interpretations of the origin of our human anatomy are born out of his understanding of these disciplines, and his book benefits from his interweaving of his own history with the history of our unique human anatomy.

The book is not without flaws, and it perhaps misses on some of its promise by focusing on too many well-known examples. Dr. Shubin writes in a clear voice that is well suited for the laymen (the intended target audience), but readers of *Copeia* might find some examples oversimplified. You may grit your teeth at the repeated reference to the well know chordates *Amphioxus* and *Haikouella* as “worms.” Generally the author avoids the greater details in explaining, for instance, the homology of teeth, glands, hairs, and feathers, but this book is not the place for that. For the details, see the primary literature diligently referenced at the back of the text, or textbooks like the excellent *Functional Anatomy of the Vertebrates* by Liem et al. (2001).

If the book suffers from a major flaw, it is in the interpretation of phylogenetic history. Dr. Shubin, like many paleontologists, still has a tendency to illustrate the history of life in the style of the *scala natura* with higher taxa begetting other higher taxa. Why these diagrams persist rather than the phylogenetic trees most scientist use to describe the history of life is a mystery. The novice science reader might interpret these diagrams as saying that fish,

amphibians, reptiles, and other mammals are sequentially “less evolved” than humans. This erroneous view would be reinforced by illustrations like the “pattern at the zoo” (p. 9) that shows lowly fish then amphibians up to humans in a chain-of-being which “mirrors how fossils are laid out in the rocks of the world.” This is clearly a gross oversimplification: there are many “lower vertebrate” fossils in recent strata because these organisms did not stop evolving despite the rise of other taxa. We also never really find out what Dr. Shubin means by “fish”. Phylogenetically speaking all vertebrates (including us) could be called “fish;” if not, we render “fish” paraphyletic. Dr. Shubin's “fish” lie elsewhere: Lampreys and hagfish are “primitive fish,” *Ichthyostega* is a wholly fleshed out amphibian, and sharks are periodically treated separately from “fish.”

Despite some flaws and oversimplifications the manuscript is excellent and well written. Even the seasoned comparative anatomists among us undoubtedly would still learn new things about anatomy. These may include the description of the flawed route of the sperm cord over and through the pelvis or the explanation of how hangovers and hiccups could be explained by reflexes we still share with our aquatic cousins. A few more of these examples would have been nice but all in all the text does its job of introducing the subject of the evolution of human anatomy. Too many people still see humans as the pinnacle of evolution. This book will do a lot of good in dispelling the idea that humans are the perfect combination of all things that came before us. The naïve laymen will learn that many of our anatomical possessions are unchanged and that these features would be considered irrational if a divine designer had created them.

## LITERATURE CITED

Liem, K. L., W. E. Bemis, W. F. Walker, Jr., and L. Grande. 2001. *Functional Anatomy of the Vertebrates: An Evolutionary Perspective*. Third edition. Harcourt College Publishers, Philadelphia.

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