**EVOLUTION**


During the infamous Kansas Science Education Standards controversy I learned that evolution, more than any other topic in science, clarifies the nature of science and its fundamental differences with other valid methods of human understanding. Most of our struggle, as science educators, centered on helping policy makers and their constituents understand the limitations of science and the self-imposed restriction to seek natural explanations for natural phenomena—all the while showing respect and empathy for dissenting views. Evolutionary theory was always at the core of these discussions. At the time, I was aware that WGBH/NOVA was working on a new Evolution Public Television Series. I eagerly awaited the debut of the series and the release of its companion volume: Evolution, The Triumph of an Idea by Carl Zimmer. My hope was that it would help to inform policy makers and the citizens of the state about the scientific understanding of evolutionary theory as well as the social controversy surrounding the theory. Fortunately our controversy was resolved, in our favor, through democratic processes but without a doubt this series, and particularly Zimmer's volume, would have been a great help.

What sets Zimmer's work apart from the multitude of other titles on the topic is his ability to emphasize the history and science of evolution while placing it firmly within a modern social context. He accomplishes this with a blend of the best of a journalistic style that is direct and clear in meaning with the eloquence of an exceptional storyteller. The book is organized into four sections: (1) a history of the development of modern evolutionary theory; (2) Earth's history and the history of life; (3) evolutionary interactions between organisms; and (4) humanity and evolution. This work, along with the video series and other resources development, provide exceptional resources for teachers designing instructional units on evolution.

The first section of the book contains two chapters that present a condensed account of Darwin's life and work. Zimmer has captured much of the essential aspects of Darwin's scientific and personal life. What is particularly effective is that Zimmer always presents Darwin in the context of Darwin, the person. I think that Zimmer's treatment of Darwin's struggles with his wife's concerns about his work will particularly resonate with biology educators. Also in this section is good coverage of the discovery of the immensity of geologic time and its implications. High school biology teachers will find the chapter covering the modern synthesis to be valuable as they design lessons that connect genetics and evolution. This section also has a number of modern examples of speciation and natural selection.

Part two of the book provides coverage of our modern understanding of the history of life on earth. Critics of evolution often target this area of the science. Zimmer has provided a number of great examples of the latest discoveries direct from the headlines. A number of my colleagues have pointed out an important advantage of attending a teacher's college for teacher preparation—discipline content is usually presented in the context of teaching. Zimmer's book has a similar advantage. Critics of evolution use and re-use the same arguments and criticisms. For example, critics often point to the "Cambrian Explosion" as evidence that somehow discredits evolution since gradual natural selection can't possibly explain it. Zimmer has done a good job of directly covering the Cambrian explosion along with the modern evidence from developmental biology, molecular biology and newly discovered metazoan embryo fossils—all the while addressing the criticism. Teachers will find that most of the questions that students have about evolution are addressed in a similar manner throughout this book.

Part three helps to clarify explanations for the complex interactions of organisms on
this planet. This is the meat and bones of how evolution impacts our daily lives. This is where the explanatory power of evolutionary theory is revealed. Zimmer has picked a number of fine examples to feature and he tells a compelling story. The material on disease and its interaction with populations is particularly timely since September 11.

Part four may be the most important for the classroom biology teacher. Seldom have I found such a cogent discussion of human evolution along with the enigma of human cultural evolution. Zimmer has done a good job of distilling much of the modern discussion. The final chapter of the book meets head-on the challenge of covering the conflict that some find with trying to reconcile their religious beliefs with modern science. Taking a page from Darwin, Zimmer treats this emotional subject with compassion and the respect it is due. He does this by exploring modern controversy contrasted to Darwin’s own struggles of faith. It is an exceptional treatment.

Overall, I would have liked to see more coverage of the importance of modeling to evolutionary theory. Mathematical models inform much of our understanding of the complexities of the evolutionary process. Also, deeper coverage of the development of cladistic analysis could have been useful to the biology educator. These points have more, though, to do with biology education and less to do with the understanding of evolution.

Over the years I have generally found companion volumes to public television series to be long on image but short on substance. My measure has been the companion volume’s value as a resource for my students or for myself as I prepared instructional plans. By such measure the printed volumes seldom matched the effectiveness of the television series. Such is not the case for Evolution, the Triumph of an Idea by Carl Zimmer. This book is not just a great resource; it is a great read. Every biology teacher, but especially new biology teachers, should have a copy of this book in their library.

Brad Williamson
Olathe, KS 66061

CETACEAE


Uncle Jacques persuaded Ann Collet to follow her heart, and when a school chem personally introduced her to a dolphin, she knew instantly where her heart would take her. This introduction triggered a lifelong adoration of whales, dolphins and seals. Each chapter is a fascinating story deftly interwoven with an intriguing explanation of the marine mammals' physiology, anatomy and behavior. Tales of how Collet was lured into the study of these animals are followed by descriptions of her own personal experiences with the animals and of the realities embedded in what might appear to be a form of exotic research.

As founder and director for the Center of Research on Marine Mammals, Collet extends her enthusiasm for the mammals to groups of teenage 'sailor-reporters' who accompany her on voyages of Fleur de Lampaun. What could be factually presented in a textbook takes on an excited turn when seen through the eyes of Collet; the textual content takes on an exciting aspect for her students and other researchers. The reader also learns delightful bits of sea mammal lore in a most engaging manner.

Once, when Collet and her students were swimming, they encountered a sperm whale with her calf. Collet sensed danger when the mother opened her mouth, showing her teeth. She reasoned that the mother whale must have recognized the innocence of her young friends, and when safely back on boat, she seized the opportunity to talk about whale teeth and to explain why, unlike adults, the guileless young are not feared. Through her descriptions, cetacean evolution reads like an extraordinary adventure. Later she cautions her students and the reader that whatever is learned from one group of dolphins will not be observed again with the next group. All attempts to classify them according to irrefutable laws of behavior have failed.

As a young woman, Collet’s dissertation research upset the accepted views of when dolphins begin to bear young. From her studies, the experts learned why dolphin populations grow more slowly than previously thought. Work with the Stranding Network provided Collet many opportunities to witness the horror of seeing hundreds of dead cetaceans washed onto land, the result of modern fishing techniques with pelagic trawls. She does not attempt to hide her disgust for human negligence and stupidity. Collet concludes her story with the apprehensive comment that while her function is primarily to convey the wonder in the beauty and richness of our planet by telling stories about whales and dolphins, if we want to be able to tell more stories tomorrow, it is urgent to open our eyes today.

Dr. Catherine Carter
Georgia Perimeter College
Decatur, GA 30030

ENTOMOLOGY