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David Toomey. *Weird Life: The Search for Life That Is Very, Very Different from Our Own*. Advance Copy. New York: W. W. Norton & Company, 2013, 288 pages.
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Truth, as the saying goes, is often stranger than fiction, and nowhere is this concept better illustrated than in the study of biology itself. From apex predators to parasites, living things display a near-infinite diversity and ability to adapt to almost any environment. Indeed, the resilience of life has only been reinforced in recent decades with the discovery of extremophiles: organisms that thrive in conditions too hot, cold, toxic, or barren for most other creatures to survive. From chemosynthetic worms at the bottom of the ocean to bacteria that thrive in salt-saturated, boiling water to spores that can survive the irradiated vacuum of space, life as we know it can flourish in the most unexpected places.

What is truly amazing is that all of these organisms originated from a single genetic source: LUCA, the last universal common ancestor, a tiny single-celled creature from 3.5 billion years ago. Familiar life, all descended from this single common background, is strange enough — but some scientists believe that it may not be the only form of life in the universe. If non-LUCA life exists somewhere, how weird might that be?

David Toomey's *Weird Life* is a solid introduction to a field of study also referred to as alternative biology or unfamiliar life. Each chapter is devoted to exploring key questions in the field, including how life should be defined, how it might have come into being, and where life might exist within and outside of our solar system. Theories on extraterrestrial intelligence are also addressed, as well as concepts in quantum mechanics and even the influence of science fiction on the study of weird life.

Toomey incorporates elements of zoology, chemistry, physics, astronomy, and even philosophy and theology in his investigation of alternative biology. This deliberately diverse source material is one of the book's greatest strengths: *Weird Life's* interdisciplinary nature makes it one of few books that could genuinely appeal to almost anyone. Wildlife scientists, software programmers, historians, and writers of science fiction will all find sections relevant to their miscellaneous interests. It is a rare book that can capture the attention of both experts and novices in any given subject, but *Weird Life* might just accomplish that challenge. A reader with limited scientific training and no prior knowledge of topics in alternative biology will be able to comfortably follow the discussion, but seasoned scientists will not be bored either.

Readers already familiar with case studies in weird life will be delighted to find that the book is not at all a rehashing of headlines in popular science. Stories about extremophiles, for instance, that have already entered popular knowledge, such as the deep sea life mentioned briefly in most high school biology courses, are explored in great depth and supplemented by engaging dialogue with experts. Much of the book is built around cutting-edge research and incorporates some of the newest and most revolutionary findings in a range of disciplines from astrophysics to molecular biology, and the

numerous notes and cross-references will provide intrigued individuals with a wealth of future readings to investigate.

Those more interested in the fact-based than fanciful elements of weird life may be leery of the chapters on science fiction and physics so theoretical they seem like fantasy, but any concerns about the academic nature of the text are unfounded. To skeptics, alternative biology can easily slide into the realm of a *Syfy* channel special, but Toomey makes no tenuous claims and in fact draws attention to the very uncertainty engendered by his subject matter. He freely admits that almost everything in the book is theoretical, but that doesn't stop him from getting excited about his subject matter. It's a sentiment mirrored by many of the specialists featured in the book. There is no concrete evidence of weird life yet, most experts are quick to say — but if there was, how cool would that be?

Overall, this is a smart, well-organized, and highly approachable book. Toomey's playful style is a joy to read, striking a balance between technical terminology and high readability ideal in popular science writing. While there are a couple of particularly florid metaphors and groan-worthy puns throughout the book, they simply reinforce that the author is having fun, and his enthusiasm is nothing if not contagious. When dealing with a topic as complex, multi-faceted, and delightfully bizarre as life itself, you really couldn't ask for more.

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