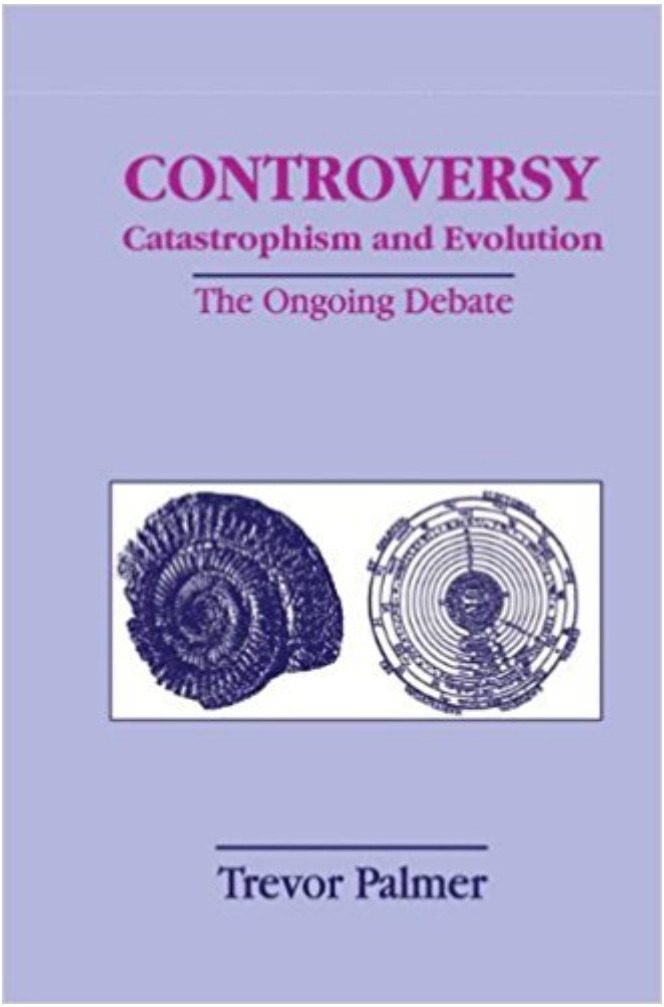
Controversy Catastrophism And Evolution: The Ongoing Debate



Synopsis

In Controversy, Trevor Palmer fully documents how traditional gradualistic views of biological and geographic evolution are giving way to a catastrophism that credits cataclysmic events, such as meteorite impacts, for the rapid bursts and abrupt transitions observed in the fossil record. According to the catastrophists, new species do not evolve gradually; they proliferate following sudden mass extinctions. Placing this major change of perspective within the context of a range of ancient debates, Palmer discusses such topics as the history of the solar system, present-day extraterrestrial threats to earth, hominid evolution, and the fossil record.

Book Information

Hardcover: 452 pages

Publisher: Springer; 1999 edition (February 28, 1999)

Language: English

ISBN-10: 0306457512

ISBN-13: 978-0306457517

Product Dimensions: 6.1 x 1.1 x 9.2 inches

Shipping Weight: 1.8 pounds (View shipping rates and policies)

Average Customer Review: 4.6 out of 5 stars 4 customer reviews

Best Sellers Rank: #5,465,281 in Books (See Top 100 in Books) #98 inÃ Â Books > Science & Math > Biological Sciences > Paleontology > Paleobiology #751 inÃ Â Books > Science & Math > Physics > Gravity #3282 inÃ Â Books > Textbooks > Engineering > Environmental Engineering

Customer Reviews

From the reviews: "Trevor Palmer Ã¢â ¬Â¦ provides in this volume a chronicle of the emergence of catastrophe evidence and thought. He explores planetary science, paleontology, geology, and evolution, with emphasis on human evolution from about 1970 to 1999, but with substantial expeditions into the history of astronomy and evolutionary theory Ã¢â ¬Â¦. it is Ã¢â ¬Â¦ a major contribution to understanding the growth of the present position. Ã¢â ¬Â¦ Palmer thoroughly documents the K-T extinction dispute." (Hiram Caton, Reports of the National Center for Science Education, Vol. 25 (3-4), 2005)

As I prepared a review of this book for a science journal, I checked to sample what others readers say. To my surprise, no readers have recorded their views. So I shall scribble a few words in the hope of drawing attention to this worthy study.Palmer’s controlling idea is that discoveries and

conceptual innovation in the four fields covered point to a new theory of evolution in which natural selection will be reinterpreted or replaced by self-organization theory. The vacant space that the new theory will occupy is the gaping hole currently separating population genetics and molecular biology. He suggests that self-organization theory, a.k.a. non-linear dynamics, a.k.a. chaos theory, is the candidate for linking physico-chemical processes with molecular biology and organism behaviour. (The author, an enzyme biologist, is well positioned to sense this vacant space). The four fields covered are planetary science, geology, paleontology, and evolution theory. The uniting empirical theme is catastrophes of climatic and extra-terrestrial origin. The unifying conceptual theme is provided by the capacity of non-linear dynamics to combine equilibrium behaviour with many kinds of sudden shifts in system dynamics. These shifts are `catastrophes', be they microscopic or galactic.When evolutionary theory took shape, its advocates had no inking of the mathematics of chaos theory. But they were aware of evidence for geophysical and biotic catastrophes, viz, apparent mass extinctions revealed by drastic discontinuities in biota between contiguous geological strata. The evidence was explained away as mere appearance and was replaced by the twin doctrines of Uniformitarianism and Gradualism. Uniformitarianism interpreted the vast changes in the elevation and subsidence as due to very slow processes, like erosion, acting over very long periods. Admittedly catastrophic events (volcanoes and earthquakes) were trivialized as local events with no geophysical implications. Similarly, the hundreds of meteors that illuminate the skies annually were dismissed as inconsequential (when they were acknowledged at all). The planetary system was taken to be the paradigm of orderly uniform process governed by natural laws. This was an erroneous interpretation of Newton's theory. Kepler's discovery of the elliptical orbit of the planets, and the gravitational explanation of their position and orbits implied the possibility of cometary impacts on Earth and other planets. Indeed Newton believed that such impacts had occurred. The first asteroid was discovered in 1801; a century later, about 500 had been discovered and it was known that tons of cosmic dust settle on Earth each year. In 1908 an asteroid explosion over Siberia visited ruin on an area the size of Belgium. This wake-up call was ignored. The Uniformitarian creed began to unravel only in 1980 when Nobel physicist Luis Alvarez proposed that 65 million years ago a ten kilometre diameter asteroid impact caused the K-T boundary mass extinction. Today, many heated words later, we know that there are billions, perhaps trillions, of asteroids and comets in the asteroid belt, the Kuiper Belt, and the Oort Cloud. They constitute the solar system as a cosmic shooting gallery. Not only have they bombarded all the planets and their satellites, but they also bombard one another. Hundreds of meteorites reach the Earth annually. Strikes large enough to produce effects on a global scale occur about every

million years. The lunar surface is exemplary of the density of impacts that the Earth has received. They number in the thousands; some craters are 3200 kilometers diameter. So much for the irenic Newtonian universe. But there is more. Life on Earth is also subject to the effects of coroneal mass ejections, solar flares, tectonic movements, flood basalt volcanoes, super nova explosions, polar reversals, and the Earth's variable declination on its rotational axis, any of which may have catastrophic effects, and some of which have very likely had such effects.The planetary science here adumbrated is largely the product of new data gathering technologies associated with satellite probes and telescopes. It's a whole new world, significantly discontinuous with pre-1970 astronomy. The Uniformitarian conception assumed by Nineteenth Century evolution theory wasn't consistent even with the astronomy of that time, as I have mentioned. Today it is merely quaint, except that it is also a monument to the power and persistence of well-intentioned scientific error. The error meant is not, of course, the failure of earlier generations to know only what posterity would discover, but the claim of dogmatic certainty for theory that was heavily compromised by discordant facts and inconsistency.The locus of this controversy is the `Darwin wars' that erupted when some paleontologists (S.J. Gould, Niles Eldredge, Steven Stanley, David Raup, David Jablonki) blew the whistle on Gradualism, substituting a Punctuated Equilibrium pattern instead. The neo-Darwinian orthodoxy initially opposed the alternative hypothesis as gross error. But then, when mass extinctions were accepted (repugnant to orthodoxy because they imply catastrophic causation), and the sudden origin of many new phyla in short times was confirmed, neo-Darwinians changed their tune: the heretics are now denounced for perpetrating the calumny that Gradualist theory ever denied the punctuation pattern! Protest as they might, nothing in standard theory explains highly variable evolutionary rates, the variation being, at one end, stasis over hundreds of millions of years, and at the other, a profusion of new phyla in short bursts (the Cambrian `big bang' is the classic example). Gradualist theory was formulated in the absence of knowledge of variation and only some glimmerings about what made orthogenesis work. It would thus be a stroke of extraordinary good luck if the proposed mechanism of change, natural selection, turned out to be right. When the Nineteen Century closed, Darwinians were in a frantic chase-fruitless as it turned out-for a slam dunk proof of the evolution of a single species. When the Twentieth Century closed, neo-Darwinians were in damage control to salvage the one and only slam dunk proof of evolution, industrial melanism, from dismissal on the grounds of tampered evidence. The use-by date of natural selection is long over due. Palmer's study assists recognizing that fact, and points the way to new theory.

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