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Further Books of Note

Brilliant Blunders: From Darwin to Einstein—Colossal Mistakes by Great Scientists That Changed Our Understanding of Life and the Universe by Mario Livio. Simon & Schuster, 2013. 341 pp. $26 (hardcover). ISBN 978-1439192368.

This book gives accurate and nicely detailed descriptions of the most significant theories and interpretations advanced by Darwin, Einstein, Hoyle, Kelvin, and Pauling. However, the designation of "blunder," brilliant or not, seems unwarranted. What these tales in fact illustrate is how difficult it is to get things completely right the first time when pushing knowledge beyond what's already known.

Darwin's "blunder" supposedly was that he did not recognize the disconnect between his theory of natural selection and the contemporary ideas about transmission of heredity. So what? He generated a plausible theory, which has stood the test of time remarkably well, on the basis of a wealth of empirical data.

Einstein's mistake was his introduction of the cosmological constant to avoid predicting the impossible expansion of the universe. Livio evidently looked into the common belief that Einstein himself pronounced this to be his greatest blunder and found the story to be apocryphal. But, again, substantively this was no blunder, but rather an attempt to square contemporary observations with theory.

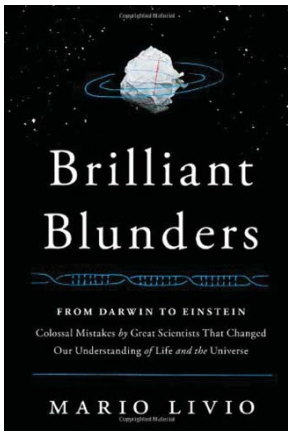
Hoyle's blunder was to stick with steady-state cosmology by contrast to Big-Bang theory, yet eminently qualified astrophysicists continue to find flaws in Big-Bang corollaries and to propose something similar to steady-state theories.

Kelvin's blunder concerned calculations of the age of the Earth, where his estimates fell catastrophically short of the time required by geologists and biologists to explain their evidence. But, once more, Kelvin was only looking for methods based on physics to arrive at an independent estimate, at a time when ideas about formation of the solar system were radically incomplete, and the generation of heat in the Earth from radioactivity had yet to be discovered.

Pauling failed to appreciate the role of hydrogen bonds in the structure of DNA, and he misinterpreted X-ray data to suggest a 3-strand helix rather than a 2-strand one. Again, just an illustration that venturing into the

unknown is likely to bring missteps for even the most accomplished scientist.

I highly recommend the book for its interesting, commendably detailed recounting of the remarkable advances made through the work of these properly honored individuals. However, the notion that they committed blunders, brilliant or not, should be taken merely as a hook on which the author hangs these stories. Perhaps the publishers and their editors conspired to frame the book in this fashion. They are certainly guilty of one definite and incomprehensible annoyance: the lack of captions on the figures.



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Alien Mysteries, Conspiracies, and Cover-Ups by Kevin D. Randle. Detroit: Visible Ink Press, 2013. 340 pp. $19.95. ISBN 978-1578594184.

UFOs and conspiracies go together like movies and popcorn, only repeated in ufology and popular culture alike to the point of dreary banality. Here at last is a new and meaningful twist on this well-worn theme. Kevin Randle, who brings a deep knowledge of UFOs to his prolific writings on the subject, turns his attention to harmful conspiracies grown up within ufology rather than imposed on it from without. He surveys a broad range of hoaxes that have undermined the credibility of UFOs, from complete fabrications like the Dropa disks and the Maury Island incident, to honest mistakes pushed along by uncritical or self-promoting persons, like the 1997 Phoenix Lights. Randle's extensive research into Roswell provides him with excellent credentials to challenge the "alien autopsy" fake, the Aztec crash-site claims, and the MJ-12 documents. He probes many of his cases to a depth that reveals both their factual and forensic shortcomings, so the reader comes away with genuine understanding of why these claims lack credibility.

Superficial readers might dismiss this book as mere debunking, but they are quite wrong. Randle also makes clear that some UFO evidence is

quite strong and government treatment of the subject has been biased and, in many instances, every bit as conspiratorial as ufologists believe. But the real strength and focus of the book is inward. Here a seasoned ufologist warns that the prestige of the field suffers much from self-inflicted wounds, and UFOs stand little chance of attracting the scientific and journalistic attention they deserve while genuine UFOs have to share the stage with so many false, fantastic, and unsupported assertions. Randle has given us a readable and necessary book that everyone interested in the truth about UFOs should take to heart.

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Article of Interest

Insolation-driven 100,000-year glacial cycles and hysteresis of ice-sheet volume by Ayako Abe-Ouchi, Fuyuki Saito, Kenji Kawamura, Maureen E. Raymo, Jun'ichi Okuno, Kunio Takahashi, and Heinz Blatter. *Nature*, *500*, August 8, 2013, pp. 190–193.

One hundred years ago the German meteorologist Alfred Wegener started a scientific revolution that was probably the most important of the 20th century: plate tectonics. In the same year (1912) in Serbia, Milutin Milanković, a civil engineer turned professor of mathematics at the University of Belgrade, published the paper that would forever change the way we look at and attempt to understand climate changes through our understanding of the so-called **Milanković cycles**.

For many years climatologists and geologists could not explain the causes of ice ages on Earth. Various hypotheses were offered, but all failed to explain how ice sheets grew and then melted many times in the geologic past. Milanković's idea was to put the Sun at the center of his theory of ice ages. He proposed three orbital cycles of Earth: **eccentricity** of elliptic orbit (100,000-year cycle), **axial tilt** of rotation axis (**obliquity**) (41,000-year cycle—from 22.1° to 24.5°; presently, the Earth's tilt is 23.5°), and **precession** of equinoxes (23,000-year cycle). Because each cycle works on a different timescale, their combined effects have a variable influence

on the amount of solar energy received by the Earth. In short, Milanković's theory proposes that summer insolation at high northern latitudes (beyond 55°N) drives the glacial–interglacial cycles, and the summer insolation is, in turn, linked to **eccentricity**, **obliquity**, and **precession** cycles.

Along with Wegener's plate tectonics theory, Milanković's theory of ice ages is a monumental contribution to our understanding of how our planet evolved through geologic time. His theory has been confirmed many times. The paper authored by Abe-Ouchi and her collaborators is yet another confirmation of Milanković's theory. While Milanković used only paper and pencil to perform excruciatingly complex computations of spherical geometry, celestial mechanics, and theoretical physics, today's authors use powerful supercomputers and sophisticated software to make Milanković's theory even better.

The main improvement proposed by Abe-Ouchi et al. is that there are two factors that may influence (by way of negative feedbacks) the eccentricity (100,000 year) cycle: the geometry of the North American continent and the long response time of isostatic compensation (i.e. the change in Earth's topographic elevation as a consequence of ice-sheet growth and melting). When ice sheets grow up to 3 km (as during the last glaciation, 20,000 years ago), the land surface subsides about 1 km. Due to subsidence, the top of the ice sheet is lower and starts melting earlier, setting off an interglaciation.

A secondary point made by Abe-Ouchi et al. is that "carbon dioxide is involved, but is not determinative, in the evolution of the 100,000-year glacial cycles." This might be good news for those concerned about anthropogenic CO_2 emissions.

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