Brilliant Blunders: From Darwin to Einstein—Colossal Mistakes by Great Scientists That Changed Our Understanding of Life and the Universe FREE

Donald Simanek

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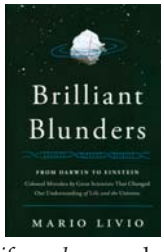
Noteworthy errors viewed in hindsight

Brilliant Blunders
From Darwin to Einstein—Colossal Mistakes by Great Scientists That Changed Our Understanding of Life and the Universe

Mario Livio
Simon and Schuster, New York, 2013.
$26.00 (352 pp.).
ISBN 978-1-4391-9236-8

Reviewed by Donald Simanek

Typical textbooks and popular science books often sweep historical mistakes of science under the rug. Only successes are mentioned, which gives the misleading impression that scientific progress results from the work of a few geniuses with uncanny insights.



At last we have a book specifically devoted to scientific mistakes: *Brilliant Blunders: From Darwin to Einstein—Colossal Mistakes by Great Scientists That Changed Our Understanding of Life and the Universe*. Its author, astrophysicist Mario Livio, chooses only five from the many available classic "blunders": mistakes made by Charles Darwin, William Thomson (Lord Kelvin), Linus Pauling, Fred Hoyle, and Albert Einstein.

Livio's title and subtitle are worth pondering. Are the mistakes he writes about truly "brilliant"? Isn't "colossal" a bit over the top? Are they even "blunders," or are they justifiable and well-motivated ideas that just happened to turn out wrong? Concentrating on five examples gives Livio the opportunity to explore them and their scientific importance in detail. His extensive, 21-page bibliography is evidence of his thorough research.

The reader might assume that Pauling's mistake was his advocacy of vitamin C as a remedy for the common cold. That isn't mentioned here. It is an earlier mistake—his triple helix DNA model—that qualifies as a major blooper. Livio retells the history of James Watson, Francis Crick, and the double helix. I had the feeling I was rereading Watson's *The Double Helix* and wondering how Pauling would figure into Livio's account.

The account of Kelvin's calculation of Earth's age corrected the impression I had long held about why his estimate was wrong. I thought that he knew nothing of the contribution of radioactive materials in Earth's crust to the thermodynamic cooling problem. Livio concludes that the main reason his calculation was so far off was Kelvin's willful neglect of the possibility of convective currents within Earth's mantle. Many other books mislead by treating that subject too superficially.

Darwin's mistake was his failure to recognize that his assumed mechanism for heredity (blending of inheritable traits) was at odds with his hypothesis of natural selection. It appears that he had not read or heard of Gregor Mendel's experiments—work that had languished for three decades in an obscure journal.

Hoyle's defense of his steady-state universe, even after contrary evidence had convinced others to abandon it, was a case of a common human failing. We place special weight on our own original ideas and may defend our intellectual brainchildren even in the face of overwhelming evidence and arguments against them.

Livio corrects another common historical misconception. Despite going to great lengths, he found no document or account of Einstein ever calling the cosmological constant "his biggest blunder." The quote appears to have been invented by George Gamow. Yet it has become widely circulated as a genuine Einstein quote. The introduction of the constant itself seems not to have been a serious mistake at all.

One strength of Livio's book is its argument that, despite the title, scientific mistakes are seldom blunders at all. They are complex manifestations of human psychology in the context of the prevailing scientific knowledge of the time. Livio concludes each essay with speculations about the mistakes from the perspective of our present knowledge of how the brain works. Some readers may consider those ruminations pop psychology. In any case, skipping them won't diminish the value of the rest of the book.

Livio often tells you more than you thought you wanted to know: the background, the context, the subtle nuances, and the aftermath. His is not a book for the casual reader looking for a pleasant and entertaining diversion from serious work. When Livio tells a story, he leaves no pebble unturned. He habitually puts asides in the text, resulting in lengthy and complex sentences with parenthetical insertions. There are 271 numbered endnotes, but no reference numbers appear in the text. And every so often there's a "Huh?" sentence that forces you to reread it to unravel its meaning.

Such quibbles shouldn't deter a serious reader from savoring the book's episodes from the recent history of science. For someone who wants the whole story, Livio's book is a page turner.

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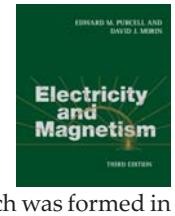
Electricity and Magnetism

Edward M. Purcell and David J. Morin
Cambridge U. Press, New York, 2013.
$80.00 (853 pp.).
ISBN 978-1-107-01402-2

The third edition of *Electricity and Magnetism* by Edward Mills Purcell and David Morin is a welcome update to the original (McGraw-Hill, 1963) and second-edition (McGraw-Hill, 1985) texts by Purcell. The previous editions were a product of a series known as the Berkeley Physics Course. The series was influenced by MIT's Physical Science Study Committee, which was formed in 1956, shortly before *Sputnik* was sent into space. The satellite's passages, their times published by the Boston newspapers, were watched from the rooftops at MIT. The *Sputnik* affair shook up the US scientific establishment and led policymakers and academics to take a new look at science education in the US.



Prior to the 1960s, students at MIT and elsewhere were brought up on MIT professor Nathaniel Frank's terse *Introduction to Electricity and Optics* (McGraw-Hill, 1940). The first in the less terse and widely adopted *Physics* textbooks by David Halliday and Robert Resnick