

shared throughout this volume is a tribute both to the PEAR lab — responsible for the forum which inspired these essays — and to all people, seen and unseen, who care deeply about the future of the planet and what role science plays in our unfolding evolution.

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**Before the Beginning** by Martin Rees. Reading: Addison Wesley, 1997. ix + 291 pp. \$25. ISBN 0-201-15142-1.

**The Inflationary Universe** by Alan Guth, Reading: Addison Wesley, 1997. xiii + 358 pp. \$15 paperback. ISBN 0-201-32840-2.

**The Whole Shebang: A State-of-the-Universe(s) Report** by Timothy Ferris. Simon & Schuster, 1997. 393 pp. \$25 hardcover. ISBN 0-684-81020-4.

Even for books on the abstruse subject of cosmology, publishers' announcements use phrases like "This eagerly-awaited book...." If one reads further, here comes another book on cosmology touted as "This long-awaited volume....," and then another, and another. When one actually sits down to read them, these books all have the same tired old story of everything created instantaneously out of nothing, expanding space, contracting black holes, dark (unobserved) matter, relict radiation from a primeval fireball, *etc.* Is there anything really new here?

Let's start with one of the currently most recognized names in the business, Martin Rees, now Astronomer Royal of England. In his book, *Before the Beginning*, he dispatches alternative theories in a few pages titled "The Losing Battle for a Steady State." Although by now scientists know what he is going to say, the way he says it is actually very revealing.

As one who lived through the days of debate and knew the principle combatants, I can confirm that there was a titanic struggle between the proponents of steady state and the Big Bang. The most prominent advocate of steady state was Fred Hoyle, who founded the legendary Institute for Theoretical Astronomy (IOTA). After a well known, but under-reported political struggle in Cambridge, Hoyle resigned as director and was succeeded by Martin Rees. Rees's characterization in his book was: "Hoyle, the most creative and original astrophysicist of his generation..." If one pauses for a moment on the last three words one is perhaps better prepared for the cursory dismissal of "New Physics" in the few brief pages which follow.

The crucial belief systems are rather neatly summed up when Hoyle proclaims the primacy of observational data. Rees then adopts the stance that "Unless these [anomalous] effects can be nearly all incorporated into a single

theory...," they deserve to be lumped with "extrasensory perception," which he also rejects as bereft of theory. It comes as no surprise that the "single theory" which Rees espouses is the Big Bang that Martin Ryle and his allies in Cambridge managed to make the winning theory. My feeling, as a later participant in the battle, was that the search was not so much for knowledge as for ascendancy.

Of course "anomalous effects" is academic-speak for "observations which contradict current theory." The book incompletely covers the subject and, most important, makes no mention whatsoever of the crucial fact that in 1977, Jayant Narlikar made a more general solution to the Einstein relativistic equations on which the Big Bang theory was founded. This more correct solution incorporates nearly all the "anomalous effects" as well as explaining the standard observations. It also yields the opposite overall picture to that of the Big Bang. So perhaps the rest of Rees's book should be read with the possibility in mind that it could be: "Oops, wrong theory."

Rees actually makes quite a nice listing of the establishment's view of cosmological problems in two to three-page sound bites — if one wants an easily understood review. The orientation of the book, however, is revealed by one perfectly astounding circumstance: there is not one single picture or diagram in all 291 pages! This book is not about observational reality — it is about fitting abstractions of data to old hypotheses.

In his book, *The Inflationary Universe*, Alan Guth promotes one of the same themes that Rees does, *i.e.*, "multiple universes." This seems very curious since any reasonable, operational definition of "universe" includes everything that can be detected now or in the future. "Multiple universes" would seem to be a contradiction in terms, an "oxymoron." Come to think of it, the title of Rees's book, though mystically dramatic, is still another oxymoron.

Of course, Guth's claim to fame is the introduction of the term inflation, which was a faster-than-light invention to rescue the Big Bang. He seems to be unaware that Fred Hoyle's "C" (for creation) field long preceded his inflation. Moreover, Hoyle's field not only gave a reason for the supposed expansion of the galaxies but also allowed the possibility that the creation of the new material could be viewed as the condensation, at particular points, of previously diffused matter within "the" universe.

Aside from the generic conclusion, Guth's book is more concerned with the mathematical details of inflation. Again, the mathematics is based on the conventional assumption that redshift equals recession velocity and equals distance. If the empirical observations were heeded, I believe the mathematics would simplify and transform into a very different physical picture.

Finally, in *The Whole Shebang* by Timothy Ferris, we have a highly polished presentation by an author who is both a professor of journalism, a sometime contributor to *The New Yorker*, and a writer of eight books on astronomy starting with the well-known *Red Limit*. As might be expected, one is treated to a smooth, seductive exposition of contemporary cosmology. Unfortunately for

me, in the end it was the same old story of disproved assumptions and implausible models. I must admit, however, that one can hardly resist the charm of the concluding chapter: "Contrarian Theological Afterword." Timothy Ferris is at his best here, luring the reader on with apt quotations from the famous opposing theories and counter theories, and generally stimulating the hope of fundamental discovery posed against the challenge of the vastness of the unknown.

In summary, it seems to me that a wide spectrum of books are written, starting with those that draw wild conclusions from few or no facts and proceeding through those that draw wild theories from rigorous facts and replicable observations. Although more conventionally accepted, the latter achieve the non-rigor of their interpretations by selection of only those results and measures which support their presumptions while ignoring those which disagree with their story. This is the essence of my criticism of the three books reviewed here. Since, as noted in the introduction, there are so many books which we could spend our time reading, it is perhaps fortunate that there will only be a very few that deal with all of the most important data in a spirit of exploration of empirical relationships.

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**Nuclear Transmutation: The Reality of Cold Fusion** by Tadahiko Mizuno, Hokkaido University, Japan. Translated by Jed Rothwell, Infinite Energy Press, Concord, NH, 150 pp, \$32.95.

Dr. T. Mizuno, a Japanese Academic at an Imperial University, has become well known for his work on what is misleadingly<sup>1</sup> called "Cold Fusion," — *i.e.*, research upon Low Energy Nuclear Reactions, LENR.

The book is a very personal account of Mizuno's struggles to achieve success in this difficult area, totally against the opinions of his Japanese colleagues. He was thereby forced, to a large extent, to buy his own apparatus and equipment.

The book has seven chapters. The first two are preliminary, describing the field. Chapter 3 reports successful work on neutron production resulting in the characteristic energy spectrum which points to the presence of some D + D fusion (the origin of the word cold fusion). The fourth chapter contains a description of the finding of tritium. This gave me much joy because it was I who had suffered at the hands of the journalist, Taubes, who had written in 1990, an article in *Science* accusing me and my co-worker of fraud in respect to our 1989 claims to have produced tritium in the cold.

The fifth chapter concentrates on that part of Mizuno's work whereby he became famous in the field, the detection of anomalous nuclear heat in proton

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<sup>1</sup>Thus, although there is evidence for D+D fusion, many of the observations are best fitted by other types of nuclear reaction.