

Muller's period piece

Antoni Hoffman

Nemesis: The Death Star. By Richard Muller. Weidenfeld & Nicolson, New York:1988. Pp.193. \$17.95. To be published in Britain next year by William Heinemann.

ON ITS jacket this book bears the legend *The Story of a Scientific Revolution*. The revolution Richard Muller aims to describe refers, of course, to the idea that periodic catastrophes are brought upon life on Earth by comet showers thrown towards the inner planets by an unseen solar companion, Nemesis. And the readers are told that here they will find *the*, rather than *a*, story of this idea because Muller is the inventor (though not yet discoverer) of Nemesis, and one of the collaborators of Luis Alvarez who proposed the impact hypothesis to explain the mass extinction at the end of the Cretaceous — the hypothesis that made it possible (though by no means easy) to think of Nemesis.

The development of the Nemesis hypothesis is indeed a fascinating intellectual adventure, clearly showing the power of trespassing across the established borders between scientific disciplines. Undoubtedly, a geologist or palaeontologist might be able to break with his subject's tradition and explain mass extinctions by periodic comet showers, but he would not be able to develop a plausible astronomical theory; yet, without such a theory, be it one involving Nemesis or Planet X or perhaps something else yet to be proposed, the explanation would not even be remotely acceptable to specialists. But how does a successful physicist become interested in problems of the history of life on Earth? How does he get around his lack of expertise and even basic understanding of geology and palaeontology? How does a new idea originate, become published and publicized, develop into a research programme? It is indeed exciting to have a first-hand account of the process.

As a storyteller, Muller is excellent. His book vividly describes the ways in which science is done. It portrays all of the main players in the game of the end-Cretaceous impact and Nemesis hypotheses as real characters, for whom Muller has sympathy or dislike. It shows how many false and even ridiculous solutions to a problem are considered and evaluated before the plausible ones are hit upon. It points to the importance of maintaining both scepticism and enthusiasm while working on the frontiers of research. And it emphasizes the crucial role of informal contacts, ties of friendship, mutual confidence, and even

gossip and hearsay in the progress of science — for this is the context in which new ideas originate and, well before they are formally published, undergo evaluation and modification, stimulate further studies and generate research funds. When summarized in such general terms, this sounds nothing special. The interest is in the detail, however, as in the story of Muller learning from David Raup what rival astrophysical articles on periodic mass extinctions Raup is receiving as a referee for *Nature*.

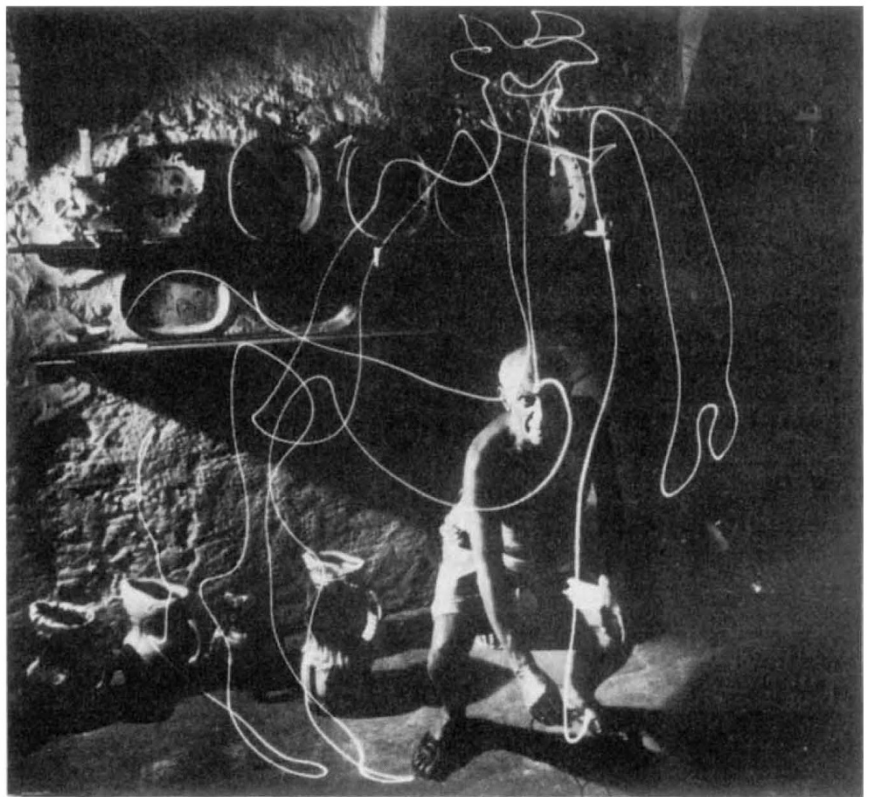
On top of all this, Muller's book is a very good read. Perhaps even too good, for it is easy to miss its clear intention to convince rather than to describe. Never mind the many minor, though annoying, mistakes (for example, Thomas Kuhn is an eminent physicist and philosopher not a 'writer'; coccoliths are remains of algae not animals; and the textbook *Principles of Paleontology* is co-written by Raup and Steven Stanley, who thus share the responsibility for the assertion that "the causes of mass extinction are not simple"). More importantly, Muller presents an extremely one-sided argument and his description of his opponents sometimes descends to caricature. In his view, William Clemens, whom he condescendingly calls "the local dinosaur expert", just "dug in his heels" when proved wrong on the geology of dinosaur-bearing strata in Montana. Muller does not entertain the

possibility that the alleged proof might be wrong, as may in fact be the case, depending on one's interpretation of subsequent sedimentological studies.

Similarly, Muller tells how Charles Officer claimed that mineral microspherules are not restricted to the Cretaceous-Tertiary boundary clay in Italy, and how this claim was ridiculed by Walter Alvarez who found modern insect eggs posing as microspherules at rock surfaces of the section concerned. It does not even occur to Muller that alongside Recent contaminants other microspherules may also abound in the section, as has indeed been demonstrated in Italy as well as in Spain and Denmark. Muller notes that the Nemesis hypothesis depends on the postulated periodicity of extinction, but he fails to mention the counter-arguments to the concept of periodicity, as if there were no statistical problems whatsoever.

Nemesis is certainly fun to read. But those who would like to examine the facts and arrive at their own judgement of events should instead turn to David Raup's *The Nemesis Affair*. Raup's book is written for the same broad readership and from the same partisan position, but it offers a more balanced view and more expert treatment of the pros and cons for Nemesis. □

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Light work — Picasso's creation of an image of a bull, captured with time-exposure photography. This example of modern abstract symbolism is compared with examples reaching back 300,000 years in Roger Lewin's *In the Age of Mankind*. The book is a large-format, illustrated account of the age and complexity of human ancestry, and takes in the background and significance of many recent discoveries in anthropology. Publisher is Smithsonian Institution Press, price is \$35.