trenchant but more technically demanding criticisms.

Sadly, it will be easy for those who take seriously the nontechnical writings of the authors under attack here to read Sokal and Bricmont as every bit as naive, simple-minded, self-important and ridiculous as their victims will surely appear to most readers of PHYSICS TODAY. Instead of narrowing an unfortunate breach between two scholarly communities, this book will broaden it.

The final quarter of the book contains the text of Sokal's famous Trojan horse—the nonsensical paper he published as a hoax in *Social Text*—along with an appreciative exegesis of that parody, and a commentary by Sokal on the broader political implications of these disputes. There is also a 55-page critique of relativism in the philosophy and sociology of science, which it would require another review to comment on. (*Fashionable Nonsense* was originally published in France as *Impostures Intellectuelles* (*Editions Odile Jacob*, 1997).)

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Peace and War: Reminiscences of a Life on the Frontiers of Science

Robert Serber
with Robert P. Crease
Columbia U. P., New York, 1998. 241 pp. $29.95 hc ISBN 0-231-10546-0

The subtitle to Robert Serber's *Peace and War* states accurately what this book is: reminiscences of a life on the frontiers of science. That life was anything but ordinary. Serber, who died in June 1997 at the age of 88, was a major theoretical physicist of this century in the US. His research and insights spurred progress at a number of scientific frontiers and left indelible imprints in such diverse areas as condensed matter, nuclear, accelerator and particle physics. His contributions to the American atomic bomb project, from its beginnings at Berkeley through the Los Alamos days and on to Tinian Island and Hiroshima and Nagasaki, following the Japanese surrender, were major and uniquely fascinating. And the reminiscences recounted in his book have a special charm. Serber, writing perceptively in a laconic and candid style, with the aid of Robert Crease (a science historian who contributes an interesting introduction to this book), leads the reader on a chronological journey through his life of rich and varied experiences and his close associations with many of the major figures of modern physics.

The reader walks away at the end of this book with new insights into the human side of the scientific process; into the trials and tensions of life in the wartime pressure cooker (and behind some of the headlines and romanticized myths) that was Los Alamos; into the first impressions of life, death and survival at ground zero, where the two atomic bombs were dropped; and into the political strains and stresses—and casualties—that occurred as American physicists, returning to peacetime research after World War II became enmeshed in policy disputes.

Serber first met Robert Oppenheimer in 1934, when Serber was 25 and Oppie was 30, at the University of Michigan's famous summer school, and for the next 33 years, until Oppie's death in 1967, the two had a very close personal and professional relationship. This relationship forms one of the major threads running through the book. Out of it, Serber weaves a vivid picture of Oppie that reveals aspects of the personal life and human side of the great teacher and creator, during the 1930s, of the preeminent school of modern theoretical physics in the US. These insights add depth and shadings to the familiar image of this extraordinary physicist, who was the leader and soul of the atomic bomb project at Los Alamos but was publicly persecuted in the post–World War II era of the loyalty oath and the communist scare. Serber also candidly describes his own tribulations during this unfortunate period.

In a series of informative letters written to his wife, Charlotte, and reprinted in the book, Serber tells of his fascinating experiences in the Pacific, as a member of the team sent to Tinian Island for the final assembly of the atom bombs—both the uranium-235 gun assembly, known as "Little Boy," which was dropped over Hiroshima, and the plutonium-239 implosion bomb, known as "Fat Man," destined for Nagasaki. Flying was anything but routine in those times, and military snafus were frequent, including one that had Serber bumped from the second following plane on the bombing mission to Nagasaki, on which he was supposed to have served as photographer, with the result that no photos of that event were taken.

However, he and several colleagues did make it to ground zero at both Hiroshima and Nagasaki shortly after the end of hostilities, to observe and measure the bombs' devastation using their scientists' nuclear knowledge and trained eyes. They arrived at Nagasaki before the first occupation forces and remained in Japan for more than a month, moving around and getting stuck in the usual assortment of mix-ups that characterized those days immediately following the war. His letters from Japan give graphic descriptions of the devastation as well as of some of his technical work, such as determining the altitude of the bomb's flash and the size of the fireball by measuring the shadow and penumbra in a room in the Hiroshima post office that faced the blast one mile from ground zero.

The concluding chapters of this short memoir describe Serber's readjustments to civilian life after World War II. He spent five years as a physics professor at the University of California, Berkeley, before the political schism in American physics on nuclear policy, and the decision to build the H-bomb, drove him east, to Brookhaven National Laboratory and Columbia University. He concludes his memoir with a description of the death of Oppie, his close relationship with Oppie's surviving family and his own retirement years and new family.

Throughout this book, the reader has a feeling of "you are there." The reader becomes a witness to a number of very exciting events in science, because Serber was there as a participant. He describes these events, including their human dimensions, simply and directly, without allowing himself to get in the way. Any physicist with an interest in the years when American physics came of age will enjoy and gain new insights from this charming reminiscence.

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Comets: Creators and Destroyers

David H. Levy
Touchstone (Simon & Schuster), New York, 1998. 256 pp. $12.00 pb ISBN 0-684-85255-1

As an avid sky-watcher, both amateur (when out stargazing and Moon-watching) and professional (while studying comets, their dust, nuclei, and x rays for a living), I found David Levy's *Comets* fascinating and easy to read. Aimed at an audience of educated nonscientists and containing only a single equation (the simple, algebraic Drake equation describing the probability of extraterrestrial civilizations), the book is written from both historical and personal viewpoints.

And what viewpoints! As any student of comets knows, the subject is replete with exciting anecdotes and a long list of characters. The author does an excellent job of putting the ancient events in a temporal context to which the reader can relate, while covering the multitude of events with which comets have been associated in the public mind in the last decade. These events range from the origin of Earth and the creation of its oceans to the death of the dinosaurs and observations of comets by the ancient Chinese and Greeks, the Norman invasion, the cosmologies of Isaac Newton and Edmund Halley, Comet Bennett and the 1973 Yom Kippur War, Comet Shoemaker–Levy 9 and its impact on Jupiter, Comet Hale–Bopp and the Heaven's Gate cult and last year's spate of Hollywood impact–disaster movies.

Levy has been in the thick of these events, having discovered a good number of comets himself and worked closely with others studying minor planets in our Solar System. He describes well what it is like to be a comet hunter (the average hunter spends 400 hours watching the skies before finding a comet) and he invites the readers to go outside and stargaze themselves, following a series of easy steps that he lays out.

The book reads like a series of essays loosely tied together by the overarching theme of cometary impacts on planetary bodies. Discussions include comets and the formation of the planets, a wonderful comparison of Venus, Earth and Mars (and why humans are a very lucky species) and the existence of extraterrestrial life and the need for Jupiters to protect inner, life-bearing planets from impacts. I particularly like his description of what it would be like to live near an impact site. (I remember thinking similar thoughts while being shown through Meteor Crater, Arizona, by Eugene Shoemaker, the father of the study of terrestrial impact features. At the bottom of this approximately 2 km wide and 300 m deep crater, we were invited to look up and around and view the consequences of a 10-megaton explosion; this was very sobering for any contemplation of nuclear war. It occurred to me at the time that, at a relative collision speed of ~50 km/s, the average being at the site would have only enough time to look up and think "Oh—.") Levy points out that while the impact was large, if any people had been living in what is now Flagstaff, Arizona (50 km away) at the time of the impact 50 000 years ago, they would have felt nothing more than strong ground tremors and heard a huge boom.

The one criticism I have of the book is that, while the individual chapters or essays read very well and are informative and thought-provoking, (à la the ruminations of Lewis Thomas on biology), the overall theme of impacts is returned to only in a somewhat haphazard way, making the book more experiential than tutorial I wish Levy had both broadened and refined his focus a bit more. It is clear that he has a lot to say and teach about astronomy as we currently know it, and has clearly used the long hours he has spent hunting comets to think hard about the subject.

I heartily recommend this book to anyone interested in learning about the study of comets and what is being done today to understand them and catalog their dangers to life on Earth. I then recommend that the reader pick up Fred Whipple's *The Mystery of Comets* (Smithsonian, 1980), another wonderful book by a master cometologist, to see how far we have come in the last 20 years of cometary study—and how far we still have to go.

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Basic Calculus: From Archimedes to Newton to its Role in Science

Alexander J. Hahn
Springer-Verlag, New York, 1998. 545 pp. $59.95 hc
ISBN 0-387-94606-3

Alexander J. Hahn's *Basic Calculus* is not a clone of the traditional calculus text. Its development is entirely historical, with many references to and quotes from sources that are, if not original, at least authoritative. Vast numbers of applications, in fields including astronomy, biology, engineering, economics and physics, permeate and surround a solid core of the elements of calculus. A truly modest sampling of topics includes: The potassium–argon clock, OPEC and the price of oil, the Springfield rifle, Hubble's law, the orbit of the Moon, sliding ice cubes, quantitative analysis of lenses, experimenting with *E. coli*, interior ballistics, free fall with air resistance, the internal combustion engine, the sliding chain, fermentation processes, supply and demand in a market and the rocket equation.

The seven chapters of part I ("From Archimedes to Newton") form the mathematical core. The first four of these chapters cover science and mathematics from Pythagoras to Kepler. Calculus first appears in chapters 5 ("The Calculus of Leibniz") and 6 ("The Calculus of Newton"). In chapter 7 ("The *Principia*"), the author takes us through Newton's geometric proof of equal areas in equal times. He then provides a commentary on Newton's proof that seems more resonant to a modern ear. Every serious physics student should dip into the *Principia* at least once. Part II ("Calculus and the Sciences") makes up about 60% of the book and, in its seven chapters, not only stresses applications to the sciences but also introduces new mathematics.

The author, a professor of mathematics at the University of Notre Dame, has used this book in a two-semester calculus sequence "for arts and letters honors students" and a one-semester course of "elementary applications of the calculus for regular arts and letters students and architecture majors." It seems to me that the book is very suitable for such courses. It is perhaps less suitable for a course in which the aim is to learn calculus as a tool and the desire is "to get on with it," without exploring historical byways. Several of its chapters would be appropriate for a course on the history of physics.

There is an abundance of worked examples and an average of about 60 problems at the end of each chapter, many of which could well be borrowed for assignment in an introductory physics course. The author's Web site, http://www.nd.edu/~hahn/ (the URL cited in the book seems to be incorrect) provides excellent support. Here, one can learn much about the mathematicians and physicists whose work the book describes. By judicious clicking one can generate planetary orbits, view a page from the *Conics* of Apollonius or the notebooks of Galileo, study a fascinating gallery of famous curves (from the Astroid to the Witch of Agnesi) or be connected to the US Census Bureau's home page. This is a well-written and interesting book, well suited to its stated purposes.

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Looking for Earths: The Race to Find New Solar Systems

Alan Boss
Wiley, New York, 1998. 256 pp. $27.95 hc ISBN 0-471-18421-7

"There are three topics in your field that we try to keep up with," a *New York Times* reporter told an audience of astronomers recently: "the accelerating universe, dark matter, and, of course, planets of other stars." For astronomers too, extrasolar planets are one of the hottest topics of the 1990s. So it's not surprising that a half-dozen books on the subject have been pub-