of dissidence, apart from Jack Steinberger's reference to refusal to sign a loyalty oath and the editors' comment on the unpopularity of the government decision on the 12.5 GeV zero-gradient synchrotron and allusion to "other Cold War decisions that alienated some physicists from the government." There should be scope for historical study of such themes.

In the face of history, there appears also a widespread desire to remedy past wrongs, to acknowledge unquoted sources, recall the role of little-recognized innovators such as Hartmutt Kallmann, or acknowledge the contribution of humbler colleagues, as Alvarez does in the case of the discoverers of the strange resonances. When acknowledgment is not forthcoming, there are those who make their own claims, either by implication or directly, like Oreste Piccioni and E. C. G. Sudarshan.

The historians have paid considerable attention to the encouragement of phenomenological theory at the cost of axiomatic quantum field theory but little to the age-old contrast between experimenters and theoreticians. Abdus Salam, quoting Oppenheimer, refers to the experimenter's "desire to spite the theorist." The '50s was a period in which the experimenter was still dominant. Not only did the richness of the data pouring out of the machines keep the theorists calculating busily, unexpected discoveries obliged them to think hard too. There is much nostalgia in the experimenters' contributions for this aspect of the good old days.

The clarification of these various tensions is in part due to the editors' careful contrapositioning of texts and in part is to be found by an attentive reader in odd phrases. It is perhaps in the apparently minor details that the richness of this volume as a source book for the history of particle physics lies.

CONSTANCE DILWORTH
Physics Institute,
University of Milan,
20133 Milan, Italy

Lost Heroes

Women of Science. Righting the Record. G. KASS-SIMON and PATRICIA FARNES, Eds. Indiana University Press, Bloomington, 1990. xvii, 398 pp. $39.95.

There now exists a considerable amount of published material on women in science, and to make a substantial contribution to this field a new book must integrate its material with the new scholarship, provide an expanded reference source, or offer a unique approach to the subject. This collection of essays recounting the contributions of women to ten different scientific disciplines takes an approach that is problematic in several respects. Kass-Simon writes that "since the method of evaluating a scientist's work has traditionally been by peer review, it . . . seemed essential that such an investigation be carried out by trained women scientists," and for the most part these essays were written by practitioners of the disciplines. Kass-Simon further reports that a major aim of the volume was to search for "the lost and buried women heroes of science." Yet an expert in a discipline is not necessarily qualified to write its history, and with the perspective that "in one sense history is the recounting of heroes' deeds," such a search may be too much concerned with assigning proprietorship over an idea or apparatus at the expense of historical context. Perhaps part of the problem lies with the appropriateness of the essay format for the purpose of calling attention to "forgotten women." Such information might have been better presented in a reference-book format.

The volume also seems to suffer from a lack of editorial direction. The editors do not address the question of criteria for inclusion, and the contributors use their own implicit criteria. The lack of an operational definition of science is especially apparent in Martha Moore Trescott's chapter on engineering and Farnes's on medicine.

The scope of the essays also varies. Some authors deliberately limit their coverage, others consider a broad sweep of time and geography, and some provide a combination of the broad and the narrow. Kass-Simon, for example, in dealing with developmental biology, genetics, and physiology stresses 19th- and 20th-century Americans but in her consideration of natural history goes back to the contributions of Hildegard of Bingen. Some authors consider living scientists and others include some oral history. For example, Cynthia Irwin-Williams (archeology) interviewed three living American archeologists, although she does not integrate the interviews into the rest of her essay. The question of how to deal with well-known material is a problem in the essay on physics by L. M. Jones, who rehashes biographical material on Marie Curie without adding any new information. However, by selecting women who have contributed to a variety of aspects of physics Jones supports her contention that there is no such thing as "women's physics."

At a more specific level, defects such as crediting Antony van Leeuwenhoek with the *invention* of the microscope, ignoring Leibniz's contribution to the invention of the calculus, and substituting question marks for easy-to-locate death dates should not have occurred.

The essays by Michele L. Aldrich on geology, Pamela Mack on astronomy, Judy Green and Jeanne LaDuke on mathematics, and Jane Miller on chemistry do a good job of organizing and integrating materials. The authors clearly are aware of current literature and have set their subjects in a social and institutional context. Their essays reflect their understanding of historical problems. Maureen Julian's essay on crystallography is an especially valuable source for the names of women crystallographers and their connections with parent laboratories. Irwin-Williams makes a convincing case in her discussion of the "expedition mentality" as one reason for the exclusion of women in archeology.

In spite of obvious problems, the volume serves a valid purpose. Some new research is included (although in most cases still undigested), names of persons warranting future research are provided, and some (but not all by any means) of the essays integrate their material with recent scholarship.

MARILYN BAILEY OGILVIE
Department of History of Science,
University of Oklahoma,
Norman, OK 73019

Reprints of Books Previously Reviewed

American Genesis. A Century of Invention and Technological Enthusiasm, 1870–1970. Thomas P. Hughes, Penguin, New York, 1990. Paper, $10.95. *Reviewed* **244**, 830 (1989).

The Analysis of Starlight. One Hundred and Fifty Years of Astronomical Spectroscopy. J. B. Hearnshaw. Cambridge University Press, New York, 1990. Paper, $34.50. *Reviewed* **237**, 783 (1987).

Reminiscences About a Great Physicist. Paul Adrien Maurice Dirac. Behram N. Kursunoglu and Eugene P. Wigner, Eds. Cambridge University Press, New York, 1990. Paper, $27.95. *Reviewed* **241**, 1239 (1988).

Studying Animal Behavior. Autobiographies of the Founders. Donald A. Dewsbury, Ed. University of Chicago Press, Chicago, 1989. Paper, $19.95. (Originally entitled *Leaders in the Study of Animal Behavior: Autobiographical Perspectives*) *Reviewed* **235**, 598 (1987).

Books Received

Aspects of Internalization. Roy Schafer. International Universities Press, Madison, CT, 1990. xxiv, 254 pp. Paper, $19.95. Reprint, 1968 ed.

Atomic Rivals. Bertrand Goldschmidt. Rutgers University Press, New Brunswick, NJ, 1990. xviii, 372 pp., + plates. $39.95. Translated from the French edition (1987) by George M. Temmer.

Attitudes. D. W. Rajecki. 2nd ed. Sinauer, Sunderland, MA, 1990. xii, 522 pp., illus. Paper, $24.95.

Between Science and Technology. Andries Sarlemijn and Peter Kroes, Eds. North-Holland (Elsevier), New York, 1990. viii, 214 pp., illus. $48.75. North-Holland Delta Series. From a conference, Eindhoven, The Netherlands, June 1989.

Biochemistry of Breast Cyst Fluid. Correlation with Breast Cancer Risk. Alberto Angeli *et al.*, Eds. New York Academy of Sciences, New York, 1990. viii, 296 pp., illus. Paper, $74. Annals of the New York Academy of Sciences, vol. 586. From a workshop, New York, Dec. 1988.

Divergent/Passive Margin Basins. J. D. Edwards and P. A. Santogrossi, Eds. American Association of