the brain so much as to affect the behavior. Perhaps the flavor left by Bohr's more adventurous musings on quantum theory and complementarity is best conveyed by a joke he used to tell on himself:

> The first talk was brilliant, clear and simple. I understood every word. The second was even better, deep and subtle. I didn't understand much, but the rabbi understood all of it. The third was by far the finest, a great and unforgettable experience. I understood nothing and the rabbi didn't understand much either.

Beginning in the mid- and late 1930s, when he was close to 50, Bohr had a sort of physicist's rebirth. He developed a new metaphor for atomic nuclei, based on an analogy to liquid drops, that has proved remarkably fruitful. Using ideas of this kind, he was able immediately to seize upon the discovery of nuclear fission by Hahn, Strassman, and Meitner in 1939 and to provide in very short order the foundations for a semiquantitative understanding of its features, such as which nuclei were the most likely to fission, how much energy would be necessary to make fission likely, the likely decay products, and so forth. This work was epitomized in a truly remarkable paper written with John Wheeler, wherein several concepts (semiclassical quantization of extended objects, use of Morse theory arguments in physics, instantons) that would only be fully appreciated decades later appear in germinal form. The more dramatic immediate impact of this work, of course, was in the development of nuclear weapons and nuclear power. Bohr attempted, with complete lack of success, to influence the political fallout from these developments, a tragicomic story that is recounted both in Pais's book and, with different emphases, in Richard Rhodes's *The Making of the Atomic Bomb*.

Coming back to the issue raised at the top of this discussion, I think this recounting suggests why in the ordinary course of their training most physicists, let alone others, may get an insufficient appreciation of Bohr's contribution. It is because his most characteristic work was in provisional theories, often of a semi-phenomenological character, whose technical content has been largely superseded. Even in the area of interpretation of quantum mechanics, where his ideas are still very much alive, it seems most unlikely that a doctrine of limitation and renunciation, however revolutionary and constructive in its time, can satisfy ambitious minds or endure indefinitely. Like the rest it will be digested and transformed and in its new form no longer bear Bohr's distinctive mark or name explicitly. Yet, as his contemporaries realized, no one will have contributed more to the finished product. Pais's book, by telling the story as it happened, helps capture a rich and intrinsically interesting intellectual style and preserve its achievements.

The preceding discussion has emphasized the intellectual side of Bohr. However, it would be wrong to fail to mention the impression one gets, both from Pais's book and from the lovely collection of reminiscences *Niels Bohr: His Life and Work as Seen by His Friends and Colleagues* (S. Rozental, Ed.; Elsevier, 1985), of the rootedness and inner harmony of his life and personality. He was apparently regarded with deep affection by all who knew him well. Pais's book contains many warm anecdotes and amusing stories, and some outright jokes, that help make it entertaining as well as edifying.

A fascinating man, Bohr; and a fascinating book, this, which should help do justice to his memory.

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An Advocate from the Past

Women in Science. With an Introductory Chapter on Woman's Long Struggle for Things of the Mind. H. J. MOZANS. University of Notre Dame Press, Notre Dame, IN, 1991. xxiv, 452 pp. Paper, $14.95. Reprint, 1913 ed.

Originally published in 1913, *Woman in Science* echoes both the problematics and the opportunities confronting well-educated and ambitious "new women" of the early 20th century. Its unlikely author, a Jesuit professor of science at the University of Notre Dame, was determined to demonstrate that women had a capacity for all intellectual activity, and most particularly for science. His method was to provide an extraordinary catalogue of exceptional women who had—or should have—won prizes, advanced degrees, and accolades from ancient times to the 20th century.

John Augustine Zahm, writing under the anagrammatic pseudonym H. J. Mozans, often lectured on scientific topics to popular audiences. His account of women scientists mixes quotations from well-known sources, anecdotes, and wry humor into a detailed account of women's contributions in the major scientific fields, including medicine, archeology, and technology. He also describes the "many and diverse obstacles" that opposed women's advancement in education and thus in science. His capacity for using French, German, Italian, and English sources makes the account unusually broad-based and leads him to conclude, for example, that the Golden Age of Greece provided no golden opportunities for women whereas the so-called Dark Ages permitted many women in Italy unprecedented access to university education in science and medicine. At some points he virtually catalogues women scientists at work, including physicians in the Middle Ages, women mathematicians in early modern Italy, and women natural scientists in the 19th century. At other times, his detailed sketch of intrepid women like Octavie Coudreau, who explored and wrote six volumes about the Amazon River, highlights the ways in which family connections and extraordinary courage and conviction, as well as scientific talent, let them join the ranks of exceptional scientists.

Zahm's observations are comparative, provocative, and often preliminary. He never hesitates, however, to draw his own independent conclusions even as he calls Voltaire flippant and cocksure for the *philosophe's* dismissal of women's intellectual capacity. Zahm's own moral intention and didacticism lead him toward an alternative enthusiasm and a somewhat romantic notion of what women could and should be doing as scientists. Thus women in medicine are inevitably compassionate and charitable, while most who studied astronomy never forgot their earthly duties. He gives disproportionate attention to women involved in religious orders, overcompensating perhaps for the tendency of others to ignore the intellectual life afforded to women in convents and religious orders. In general, Zahm follows John Stuart Mill's argument that it is the circumstances of women, particularly their access to education, that accounts for the achievement (or lack of achievement) by women.

There are aspects of the book that grate on current sensibilities. One is Zahm's presumption in using the singular "woman" in his title and throughout the book. Few scholars today would be comfortable identifying a generic woman; no simple stereotype exists in either history or science. Much of Zahm's historical narrative is couched in terms of women in a world of men, but there is virtually no discussion about the ways in which the scientific enterprise is encoded with masculine values that in themselves may inhibit women's participation.

Zahm's "exaggerated optimism," as Cynthia Russett points out in her preface to this edition, allows him to envision significant possibilities and major contributions by women in the 20th century. Zahm's volume answers his own rhetorical query: Given the accomplishments of so many women, at so many times and in so many places, how can one doubt their capacity for original work in

science? He could not, nor can we, readily explain why troubles have persisted, positive precedents have been overturned, and access to scientific institutions has fluctuated so dramatically from ancient times to the present.

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Activity Measurement in Psychology and Medicine. Warren W. Tryon. Plenum, New York, 1991. xx, 247 pp., illus. $39.50. Applied Clinical Psychology.

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Advances in the Understanding and Treatment of Asthma. Priscilla J. Piper and Robert D. Krell, Eds. New York Academy of Sciences, New York, 1991. xii, 462 pp., illus. $135. Annals of the New York Academy of Sciences, vol. 629. From a conference, London, Oct. 1990.

Basin and Range Extensional Tectonics Near the Latitude of Las Vegas, Nevada. Brian P. Wernicke, Ed. Geological Society of America, Boulder, CO, 1991. xii, 511 pp., illus., + plates + maps. $115. GSA Memoir 176.

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The Triumph of the Embryo. Lewis Wolpert. Illustrations drawn by Debra Skinner. Oxford University Press, New York, 1991. x, 211 pp. $22.95.