tle by a supercontinent assembled at about 1.8 billion years ago should be considered. R. C. Newton and E. C. Hansen, in a welcome marriage of experimental petrology, field geology, and comparative tectonics, conclude that 1.0- to 2.7-billion-year-old charnokitic granulites are best explained as products of continental collisions. The section on mineral deposits contains papers on tectonic controls (F. J. Sawkins), massive sulfide deposits (G. H. Gale), stratiform lead-zinc deposits (I. B. Lambert), sedimentary iron formations (M. M. Kimberley), and uranium deposits (F. F. Langford). Three rewarding papers make up the section on life and the oceans: a poetical overview by P. Cloud, a status report on the puzzling oxygen isotope data for Proterozoic sediments by E. C. Perry and S. N. Ahmad, and an informative summary of Proterozoic plankton by G. Vidal and A. H. Knoll. Two of the four papers on glaciation do not directly concern the Proterozoic, but one of them, by J. C. Crowell, concludes with the apt warning that globally dispersed Late Proterozoic glacial deposits are probably diachronous and that paleomagnetic evidence for low latitudes may result from rapid continental drift, possibly related to the breakup of a Late Proterozoic supercontinent.

In sum, Memoir 160 will be of interest to Great Lakes geologists and those wishing to follow progress in a "classic" field area. Memoir 161, although it contains some good material, lacks sufficient originality and foresight to impress as a research document and lacks the coherence and focus desirable in a textbook.

P. F. HOFFMAN
Precambrian Geology Division, Geological Survey of Canada, Ottawa, Ontario K1A 0E4

Self-Revelations

A Slot Machine, a Broken Test Tube. An Autobiography. S. E. LURIA. Harper and Row, New York, 1984. x, 229 pp. $17.95. Alfred P. Sloan Foundation Series.

Among literary art forms, I suspect the autobiography is the most difficult to write. The novelist is free to create as vivid and memorable a personality as his or her imagination and talent will allow. A biography can describe, dissect, and analyze the anatomy of a life. However, an autobiography presents the reader not only with the story of a life but with the autobiographer as storyteller as well. I have found most autobiographies unsatisfying. Too often the story is not whole; the author seems intent on justifying some aspect of his or her life, or, in the case of many scientists, deals only with the science and leaves the scientist as person seemingly narrowly restricted, uninteresting, and unrevealed.

Salvador Luria, in the introduction of his autobiography, *A Slot Machine, a Broken Test Tube*, informs the reader that he is aware of this problem. In Luria's view, "An autobiography is valuable if it shares with the reader even those budding insights of which the writer is still uncertain. In fact, it ought to reveal the effort of self-creation through self exploration." In a word, the autobiographer should be immanent in the story. Given this objective (with which I agree), Luria has written a successful, and unusual, autobiography.

Luria, together with Max Delbruck and Alfred Hershey, was a founder of "the phage group" in the 1940's. Their research and, more important, their intellectual influence contributed greatly to the emergence of molecular genetics, a methodology, a paradigm really, that is now invading virtually every biological nook and cranny.

I was a latecomer to the phage group, and though I was close to Delbruck I do not know Luria, although I have met him on many occasions. Thus I approached his autobiography with interest and innocence. I left it with a sense of coming to know him in the same way I grow to know my close personal friends. Indeed, the form of the book itself resembles a developing friendship.

At first rather distant and guarded, Luria recounts the major events of his life. A lower-middle-class Jew who grew up in Fascist Italy, he became a physician, but his dissatisfaction with the practice of medicine turned him to research. The rise of anti-Semitism in Italy before World War II led him to leave Italy for Paris. Before the advancing German armies, he fled Paris on a bicycle. In the south of France, he managed to obtain a visa, ending up in the United States, one of the numerous Jewish scientists rescued from the clutches of Fascism who contributed to the postwar development of American science.

In a more personal vein, Luria then describes what he perceives to be his most satisfying scientific accomplishments. I found especially fascinating his account of the role of metaphor (a slot machine) and serendipity (a broken test tube) in shaping his major discoveries, the mode of mutant formation in bacterial populations and the phenomenon of host-induced modification. The former discovery marked the beginnings of bacterial genetics, the latter led to the discovery of restriction enzymes and thus to genetic engineering.

The second half of the book increasingly reveals the "inner Luria"—his attitudes and opinions about science and the academic life, the importance of politics and political action to his life, his conscious efforts to expand his appreciation and understanding of the arts. In the last chapter he describes his long ordeal with bouts of depression and his bitterness with what he experienced as the ineffectuality of psychotherapy.

Luria writes well, and with wry humor. His personal approach allows the reader to learn, without judgment, of his opinions and attitudes about science, politics, philosophy, and art. They are presented as aspects of a man, a man whose formative years occurred in a time and place of great social evil. He reveals himself as a discerning immigrant who actively and consciously embraced many of the American ideals. Yet he is an avowed existentialist and socialist. This book helped me to appreciate how these philosophies could allow one who lived through that bitter time to grasp the present and, through the efforts of self-creation, move toward wholeness and affirmation.

R. S. EDGAR
Thimann Laboratories, University of California, Santa Cruz 95064

Pioneering Space Research

Origins of Magnetospheric Physics. JAMES A. VAN ALLEN. Smithsonian Institution Press, Washington, D.C., 1983. 144 pp., illus. $19.95.

The last three decades have witnessed dramatic advances in our knowledge of physical phenomena throughout the universe. Especially significant has been the radical transformation of physical understanding—and, indeed, the dramatic extension of concepts—in the geophysical sciences. From global plate tectonics, with its vast implications regarding the structure of the earth (and other planets), to the earth's radiation belts, which would not exist if there were no geophysical magnetic dynamo, many basic ideas have undergone complete revolutions. The discovery of the radiation belts at once linked concepts of plasma physics to those of terrestrial geophysics; the linkage is now found in many other aspects of the solar system, as in the case