liquid core, it will be necessary to write a successor to Lambeck in far less than two decades. Given the hoped-for time scale and the magnificent achievement evident in his first effort, one can only add the hope that Lambeck himself will take on the task.

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Solar Phenomena

Solar and Interplanetary Dynamics. Papers from a symposium, Cambridge, Mass., Aug. 1979. M. DRYER and E. TANDBERG-HANSSEN, Eds. Reidel, Boston, 1980 (distributor, Kluwer Boston, Hingham, Mass.). xx, 558 pp., illus. Cloth, $66; paper, $28.95. International Astronomical Union Symposium No. 91.

The study of the solar corona was revolutionized during the decade of the 1960's by in situ spacecraft observations of the coronal gas in the vicinity of 1 astronomical unit. Even the earliest spacecraft data revealed that the solar corona is not static but expands supersonically into interplanetary space. Observations of this "solar wind" confirmed the basic theoretical predictions made by E. N. Parker in the late 1950's, but it soon became apparent that the simple kinematic picture of Parker required modification. The observations revealed that the solar wind was highly structured over some six orders of magnitude of spatial scales, from a few hundred kilometers to a large fraction of an astronomical unit. Moreover, the solar wind was found to be highly variable in time, with temporal scales ranging from a few seconds to many months, and to even longer time scales associated with the solar cycle.

A similar revolution occurred in solar physics during the decade of the 1970's with the launching of sophisticated solar telescopes into space, most notably in the Skylab program. As a result of studies during this period it is now realized that the lower solar atmosphere is itself highly structured and dynamic. The structuring of the solar atmosphere occurs over a wide range of spatial scales, from a few hundred kilometers to about a solar radius. It has become apparent that the structuring is strongly controlled by the solar magnetic field, with the solar atmosphere being organized into loop-like structures that appear to follow magnetic field lines. Prominent exceptions to this rule are the "coronal holes," which have been shown to correspond to magnetic field lines that open out into the solar wind and contribute to some of the spatial and temporal structure of the wind. Moreover, the modern data reveal the lower solar atmosphere to be ever in a state of change and agitation on a wide variety of time scales.

As a result of these discoveries, the solar physics community has abandoned its quasi-static one-dimensional view of the solar atmosphere and solar wind. The solar physicist is now presented with a fascinating laboratory for exploring a great variety of nonlinear dynamic phenomena in a flowing plasma in the presence of gravity and a highly structured magnetic field. In addition, direct observations of the response of the solar wind to changes in the lower layers of the solar atmosphere demonstrated in a graphic way how closely the behavior of the solar wind is coupled to the underlying solar atmosphere. As a result, solar wind physics and solar physics have largely merged into one discipline.

This volume of proceedings consists of 12 invited review papers, 69 short contributed papers, and a brief summary by M. Kuperus. The overall approach is to consider what is known about the dynamic response of the solar atmosphere and solar wind to various changes occurring at some lower layer. A wide variety of phenomena are examined: spicules, surges, solar flares, coronal and chromospheric heating, filaments and prominences, solar wind streams, coronal and interplanetary shock waves, and related phenomena. However, two topics are recurring themes throughout the book. The first is the quasi-static response of the chromospheric, coronal, and interplanetary magnetic field structures to the dynamo activity in the subphotospheric solar layers. This topic is treated in several review papers; "Evolution of coronal and interplanetary magnetic fields" by R. Levine is particularly instructive. The second theme is the physical nature of the so-called "coronal transient"—a large-scale eruption of coronal mass (and perhaps magnetic field) into the solar wind. This topic is treated in several review papers; "MHD aspects of coronal transients" by U. Anzer stands out as a model of a critical review of the field. There are also several invited papers dealing with prospects for future developments.

The contributed papers are of varying quality. The editors have, however, restricted them to a nearly ideal length of two to three pages; more information is provided than in an abstract, but they do not substitute for publication in a properly refereed journal.

The one objection I have to the volume is its division into eight primary sections. I have been able to find very little correspondence between the section titles and the contents of the sections and recommend that the reader ignore the section divisions and peruse the entire table of contents for papers that may be of interest to him or her. (An index is also provided.) I also recommend that the paper by Kuperus be read first as an introduction to the volume.

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Bridges Past and Future

Long-Span Bridges. O. H. Ammann Centennial Conference, New York, Nov. 1979. EDWARD COHEN and BLAIR BIRDSELL, Eds. New York Academy of Sciences, New York, 1980. viii, 282 pp., illus. Cloth or paper, $54. *Annals of the New York Academy of Sciences*, vol. 352.

For many years, the United States was the leader in the design and construction of long-span bridges. However, after World War II, countries such as Germany, England, and Japan soon caught up. Appropriately, an international conference on long-span bridges was held in November 1979 in New York City to share ideas on the subject. The meeting commemorated the 100th anniversary of the birth of Othmar Hermann Ammann, a Swiss-born bridge engineer who practiced his profession in the United States and was the designer of the famed Verrazano suspension bridge across New York Harbor. Out of this conference came the present book. Although much of the information found in it is available elsewhere, the book does bring together in one package a considerable amount of useful material on long-span bridges.

Because of the wide range of subjects