

## **Book Reviews: 1. *Chaos*. 2. *Deterministic Chaos***

**1. *Chaos*.** Hao Bai-Lin. World Scientific Publishing Co., 1984, 576 pp.

**2. *Deterministic Chaos*.** Heinz Georg Schuster. Physik-Verlag GmbH, 1984, 220 pp.

During the past 10 years the number of investigations into models of non-linear physical behavior has burgeoned. The study of the complicated and, often, seemingly random kinetics encompassed by these models has resulted in a body of literature known as Chaos. Two books recently have appeared which attempt to put this field in order for those who wish to learn about it: "Chaos," by Hao Bai-Lin (World Scientific Publishing Co., 1984) and "Deterministic Chaos," by Heinz Georg Schuster (Physik-Verlag GmbH, 1984).

The first, "Chaos," contains reprints of approximately 40 seminal papers relating to the following topics: the apparent stochastic behavior of nonintegrable classical Hamiltonian systems (KAM theorem); the onset of turbulence; universality and scaling properties of one-dimensional mappings; bifurcations and chaotic behavior in higher dimensions; transitions from quasiperiodicity to Chaos; Liapounov exponents and classifications of phase space topology (e.g., attractors); effects of external noise; and experimental evidence of chaotic behavior. By reading through this compilation, one readily perceives the rapid progress which recently has been achieved in this field. The task is greatly facilitated by a 72 page introduction, written by Dr. Hao, which summarizes the material according to the subject groupings of the reprinted papers. As such, it serves as an excellent introduction to the fascinating subject of the chaotic behavior shown by some nonlinear physical models. An extensive bibliography of books and conference proceedings (40 entries) and papers (approximately 850–900 entries), which covers literature published prior to 1984, also is included. This volume is recommended to those investigators working in peripheral fields who are interested in obtaining a good overview of the subject. It also will serve others who desire ready access to a large number of fundamental papers.

“Deterministic Chaos” affords a more conventional way to learn about this field. This very attractive book, which is based on a series of lectures given by Dr. Schuster, covers approximately the same subject matter as does “Chaos.” However, the material has been further distilled by the author and the book is meant to be used as a text by physics graduate students. It contains numerous line drawings and a set of plates which show experimental evidence of putative chaotic behavior. Also included are colorful examples of computer-generated fractal boundaries of strange attractors. The material is presented in didactic form, but the author implicitly assumes that the reader is familiar with several aspects of non-linear mathematical behavior. Thus, the book probably is useful as a text only if the course instructor is prepared to offer considerable supplemental commentary. Furthermore, the discussion of experimental data is rather cursory. Nonetheless, this engaging book generally should appeal to students and other unacquainted readers who desire a truly interesting education.

Ralph Nossal  
*National Institute of Health*  
*Bethesda, Maryland 20892*