selves. Lie groups and algebras do not go beyond O(4) and U(3). There are no applications to particle physics.

The large number of diagrams gives a flavor of the amazingly rich and varied course of lectures that must have formed the nucleus of the book. The wit one has come to expect from Harter's many articles finds its outlet in such items as the "clocktane molecule" (modestly not indexed), the mnemonic wheels for octahedral spin algebra with half-integral angular momenta, and the many nomograms. Axes often have crank handles attached to aid the visualization of rotation and to encourage reader participation. Readers whose ocular decoupling has been honed by Philip Morse and Herman Feshbach's classic *Methods of Theoretical Physics* (McGraw-Hill, 1953) can exercise their skill on the stereograms for generalized Lissajous trajectories.

The abundance of examples and illustrations comes at a price: The book is long. In 1932 B. L. Van der Waerden was able to derive a general expression for an SO(3) Clebsch–Gordan coefficient in a couple of pages. Harter takes more than 100 pages to work his way through the dihedral and octahedral groups before moving on to some special cases of SO(3) and ultimately to the general result.

The book's modern writing style, characteristic of today's ever fatter textbooks, is a reflection of the classroom, where the teacher explains while the audience passively listens. Harter has rethought and reworked his material, often in a brilliantly inventive way, but there is a risk that weak-willed readers may lose their sense of direction and be left dazed and groggy rather than inspired.

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Topics in Ergodic Theory

Ya. G. Sinai
Princeton U. P., Princeton, New Jersey, 1994. 216 pp. $39.50 hc ISBN 0-691-03277-7

The first sentence of Yasha Sinai's *Topics in Ergodic Theory* states that "ergodic theory studies statistical properties of deterministic dynamical systems." The 18 lectures in this book cover that area in the broadest sense. Sinai, now at Princeton University, is the acknowledged leader in the field. His work on K systems began 35 years ago, and he continues to make important contributions. This is a mathematics book rather than a physics book, but because of its obvious relevance to the area called chaos science, it will interest many theoretical physicists.

On the whole, the author avoids abstruse mathematics, so the book will be accessible to physicists. However, the use without comment of basic tools from mathematical probability theory (such as the Borel Cantelli lemma and Doob's theorem) will require many physicist readers to do some background work or else accept a fair amount on faith. The book is filled with clear and nontrivial examples that will be of use even to those who don't hold with the theorem–proof style of much of the book.

The book is divided into five parts. The first, which focuses on John von-Neumann's celebrated theorem classifying ergodic systems having pure-point spectrum, will be of limited interest to physicists, because such spectra correspond to systems that

aren't mixing and so are not very typical. The second part presents the crucial notion of entropy per unit time for dynamical systems, and the next two sections expose many of the ideas that are so basic to recent studies of chaos: Sharkovski's ordering (the set of ideas that includes the one for which, for maps of the interval, the existence of period-three points implies points of every other period), Feigenbaum universality, twist maps and the Aubry–Mather theory, strange attractors and the Lorenz map. The final sections focus on the roles of Gibbs measures and of notions based on a formal analog with thermodynamics in the study of certain kinds of dynamical systems.

No other book that I can think of covers this range of topics with the level of clarity that this book does. The closest works would be the 25-year-old book of Andrew Avez and Vladimir I. Arnold, *Ergodic Problems of Classical Mechanics*, (Benjamin, 1968), Sinai's 1977 book *Introduction to Ergodic Theory* (Princeton, 1977) and the monograph by I. P. Cornfield, S. V. Fomin and Sinai, *Ergodic Theory* (Springer, 1982). In some ways, the current lectures update Sinai's earlier expositions, but they do it in a way that does not require the reader to be familiar with those earlier works. About my only complaint is that I wish the index were a lot longer than two pages. I can't imagine a better choice than this book for someone wanting to come up to speed with modern developments in mathematical ergodic theory.

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NEW BOOKS

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Dynamics of the Standard Model. *Cambridge Monographs on Particle Physics, Nuclear Physics and Cosmology 2.* J. F. Donoghue, E. Golowich, B. R. Holstein. Cambridge U. P., New York, 1994. 558 pp. $39.95 *pb* ISBN 0-521-47652-6

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Particle Physics at the Fermi Scale. *CCAST (World Laboratory) Symposium / Workshop Proceedings, Vol. 10.* Proc. Symp., Beijing, China, May–June, 1993. Y. Pang, J. Qiu, Z. Qiu, eds. Gordon and Breach, Langhorne, Pa., 1994. 492 pp. $108 *hc* ISBN 2-88449-108-2

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Techniques and Concepts of High-Energy Physics VII. *NATO ASI Series B: Physics Vol. 322.* Proc. Inst., St. Croix, US Virgin Islands, July 1992. T. Ferbel, ed. Plenum, New York, 1994. 266 pp. $85.00 *hc* ISBN 0-306-44674-X

Techniques for Nuclear and Particle Physics Experiments: A How-to Approach. Second revised edition. W. R. Leo. Springer-Verlag, New York, 1994