

Book Review: *Studies in Statistical Mechanics*

Studies in Statistical Mechanics, Vol. VII. Edited by E. W. Montroll and J. L. Lebowitz. North-Holland, New York, 1979, 350 pp.

Five chapters by ten authors make up this survey of fluctuation phenomena. The chapters are all on different aspects of the subject, they are all written in different styles, and they probably will all appeal to different sets of readers. It is useful to have this material collected in one volume.

Chapter I, by M. Kac and J. Logan, is an account of the "Rockefeller" view of fluctuation phenomena. As is so often the case in this series, it is not entirely up to date, being based mostly on a course of lectures given in 1974. The topics covered range from the old and familiar Ehrenfest dog-flea model to the fluctuating Boltzmann equation. The emphasis is on careful mathematics applied to simple models.

Chapter II, by E. W. Montroll and B. J. West, has the odd title "On an Enriched Collection of Stochastic Processes." It contains treatments of many problems connected with random walks, some familiar from earlier Montroll reviews and some quite new. Of particular interest is the very clear discussion of the continuous time random walk, using pausing time distributions. But there is probably something for everyone here. And where else can one learn about the connection between Brownian motion, smallpox, and King George III of England?

Chapter III, by R. Zallen, is an excellent, readable survey of "stochastic geometry." The main topics are random close-packed systems (peas in a pot), continuous random networks, and percolation. This is a fine place for beginning students to learn about these topics.

Chapter IV, by H. Metiu, K. Kitahara, and J. Ross, is to a considerable extent a rehash of their earlier published articles on the kinetics of phase transitions, although some related topics are discussed. It is a hard road to travel, and the going is made tougher by many potholes in the form of misprints. (The master equation is written in different places with three of the four possible sign combinations in \pm gain \pm loss).

The book ends with Chapter V, by O. Penrose and J. L. Lebowitz. This

is an excellent review of some aspects of the theory of metastability, a subject to which the authors have made notable contributions. It is well organized, clearly written, and thought provoking.

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