hawks that are long-distance migrants tend to be adapted for gliding (although the birds fail to achieve his simulated migratory speeds).

The potential of behavioral ecology as an approach is not realized here, in part because of a lack of basic data on hawk migration but in part because the salient features of the discipline are not applied. Mathematical models that would allow evaluation of alternative strategies are not presented, and no currency is proposed in which to evaluate cost-benefit ratios. Kerlinger also expends energy attacking his critics (the acknowledgement section contains a list of agencies that declined to fund his research) that would have better been spent on more numerous and more sophisticated simulations.

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From Crystals to Earth

Rheology of Solids and of the Earth. SHUNICHIRO KARATO and MITSUHIRO TORIUMI, Eds. Oxford University Press, New York, 1989. viii, 440 pp., illus. $98. Translated from the Japanese edition (Tokyo, 1986). Based on a symposium, Tokyo, 1985.

For at least 15 years, it has been recognized by earth scientists and materials scientists alike that the plastic deformation of crystalline solids, whether metals or minerals, proceeds by the same physical mechanisms and that both communities would profit by exchanging information and problems. Structural geologists and geophysicists have hoped that a better understanding of the microscopic deformation mechanisms would help them understand problems at the scale of mountains or even of the earth's mantle, and this hope is reflected in the ambitious and somewhat awkward title of the present book.

Rheology of Solids and the Earth is based on the symposium "Plastic Flow and Microstructural Developments in Solids: From Crystals to Earth" held in Tokyo in 1985. The book contains contributions from distinguished Japanese materials and earth scientists, with some international flavor given by the addition of a paper by Mervyn Paterson.

The first two parts of the book, which deal with defects and plastic deformation in metals and oxides and in minerals, are of uneven interest. The very short overview of high-temperature creep by such an eminent specialist as S. Takeuchi must have been useful to the participants but says nothing that cannot be found in any textbook of materials science. Many papers would be more appropriately published in specialized journals. However, four stand apart as complete and useful reviews: those on self-diffusion in oxides (K. Ando), creep of oxides and spinel ferrites (Y. Okamoto), plastic deformation of olivine (S. Karato), and water-weakening in quartz (M. Paterson). Paterson's paper is an especially up-to-date and beautifully balanced overview of recent work and controversies.

The third part, Deformation Microstructures, is more homogeneous and deals mostly with textures and preferred orientations by deformation and recrystallization in metals and minerals. A. Fujimura's paper dealing with the preferred orientation of mantle minerals is especially interesting in that it includes information based on experimental deformation of the high-pressure phases of olivine: modified spinel and spinel.

The fourth and last part, Flow in the Earth, purports to deal with the application of "materials science studies of mineral and rock deformation to the problems of earth science." Of the five papers in this section, two describe microstructures of rocks from various Japanese metamorphic belts (M. Toriumi) and shear zones (H. Takagi); they are good structural geology papers, but I fail to see where materials science comes in. The other three papers deal with the application of dislocation and grain-size piezometers to periodotite nodules (K. Matsumoto and M. Toriumi), seismic anisotropy (S. Karato), and experimental shear zones in halite (T. Shimamoto).

Meetings bringing together earth scientists and materials scientists have done much to further a new approach to structural geology, tectonics, and geodynamics in recent years. But with respect to the editors' hope that "this book will serve as a useful guide to this newly growing area of interdisciplinary science," my feeling is that it comes a bit late for that and not quite in the proper shape.

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Books Received

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Aging Brain and Dementia. New Trends in Diagnosis and Therapy. Leontino Battistin and Franz Gerstenbrand, Eds. Wiley-Liss, New York, 1990. xxvi, 648 pp., illus. $140. Neurology and Neurobiology, vol. 54. From a symposium, Padua, Italy, Sept. 1988.

Alternative Approaches to Lithic Analysis. Donald O. Henry and George H. Odell, Eds. American Anthropological Association, Washington, DC, 1989. xii, 256 pp., illus. Paper, $13.50; to AAA members, $10. Archeological Papers of the American Anthropological Association, no. 1. Based on a conference, Tulsa, OK.

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