The first seven chapters of the book are devoted to an introduction to the methodology involved in the study of the paleoecology of the function of extinct organisms, population structure, and community ecology. Also present are three helpful introductory chapters explaining some principles of evolution, genetics, and ecology and giving a good introduction to marine science. They are of generally high quality, though I found the explication of population growth and selection coefficients somewhat unclear and much of it unnecessary for the discussions that followed. The discussions of paleoecology are well balanced between introductory principles and extensive, if somewhat selective, use of examples chosen from the literature. One thing lacking is a presentation of the elegant multivariate techniques (factor analysis, Markov chains) that have been developed in recent years to reconstruct properties of ancient environments, as opposed to their use in the classification of communities and provinces.

Perhaps the most effective contribution of the book is Valentine's attempt to unify the history of the biosphere and to decompose it into an organized structure that may be studied at different scales of time, space, and taxonomy. This approach can only have a salutary effect upon present and future students of paleoecology. The book is at once a textbook and a treatise on the principles of the study of the history of life. These two purposes occasionally work against each other but generally result in a stimulating and interesting presentation. Valentine certainly justifies his statement, "The fossil record deserves to be taken very seriously."

JEFFREY LEVINTON
Department of Earth and Space Science, State University of New York, Stony Brook

How People Move

How Man Moves. Kinesiological Studies and Methods. SVEN CARLSÖÖ. Translated from the Swedish edition (Stockholm, 1972) by William P. Michael. Heinemann, London, 1973 (U.S. distributor, Crane, Russak, New York). viii, 198 pp., illus. $10.75.

Scandinavians have long maintained an interest in the scientific investigation of exercise, sports, gymnastics, and other movements. Sven Carlsöö has continued this tradition. The English translation and expansion of his book *Människans rörelser* should be read by all interested in just what occurs in our muscles and joints when we sit still or move about.

After an all-too-brief introduction to the development and organization of movement, a clear account is given of the sophisticated application of strain gauges in dynamometers, force plates, and accelerometers to measure what happens outside the body. What goes on inside, and in particular which muscle does what and when and how effectively, is described from experiments with surface and internally injected electrodes which together with the appropriate electronics can detect and display the electrical activity as single motor units become recruited until the firing of all the fibers occurs in maximal activity. Although, surprisingly, which muscles are actively engaged when a person is walking normally has not been fully established, the rise and fall of the activities of 60 of them (30 on each side) are described in fascinating detail. To swing one arm upward uses 18 muscles, but a golf swing requires 46, all working together in (one hopes) an exquisitely coordinated fashion.

All sorts of interesting things can be found in this remarkable book. For instance, there are quantitative studies of the chance of slipping on different surfaces and the angle of the step that can prevent this. Most people know by experience that, in general, very tiny steps are safest, but this book records careful measurements under many conditions. There are even studies of the most efficient way to lift bread in a factory. Under the words "How Man Moves" on p. 166 is a picture of a working woman, and whereas on p. 90 the line drawing of the figure at a typewriter is clearly a male, the evidence given on p. 179 was obtained from women. This shows that in high-speed typing the nervous system cannot optimize properly, so that when using an electric typewriter rapidly, the finger muscles perform approximately 100 times more work than is necessary.

Clearly in this book, as on many other occasions, to quote the old saying, "man" embraces "woman." But why leave this to the imagination in a book on How People Move?

R. E. DAVIES
Department of Animal Biology, University of Pennsylvania, Philadelphia

Behavior

Habituation. HARMAN V. S. PEEKE and MICHAEL J. HERZ, Eds. Academic Press, New York, 1973. Two volumes. Vol. 1, Behavioral Studies. xii, 290 pp., illus. $15. Vol. 2, Physiological Substrates. xii, 216 pp., illus. $22.50.

These volumes reflect the considerable attention habituation has recently attracted from scientists of varying backgrounds, including ethologists, psychologists, and neurophysiologists. Habituation has been most simply defined as a waning of the response elicited by a repeated or constant stimulus, with the proviso usually added that this waning not be the result of altered properties of sensory receptors or effectors (such as adaptation, damage, or fatigue). Because it is stimulus-specific, persists over time, and is mediated by the central nervous system, habituation is often considered a primitive form of learning. Frequently, the rationale given for studying habituation is that the results may be applicable to more complex forms of learning not as amenable to detailed analysis.

Peeke and Herz have collected articles that represent quite well the interdisciplinary nature of research on habituation. The topics include the relation of habituation to conditioning, habituation at different phyletic levels both in the laboratory and in natural settings, and mechanisms of habituation in intact animals as well as in "model systems" such as the feline spinal cord. The range of subjects is such that even those whose primary research interest is in some aspect of habituation will find much that is new to them. Of particular interest in this regard is the chapter by Pakula and Sokolov, which describes a great deal of work, generally unavailable in English, on neuronal mechanisms of habituation in gastropods.

Two features of these volumes, however, may significantly detract from their potential usefulness, particularly for the nonspecialist. First, many of the chapters, which from their titles might be expected to be general surveys, are instead detailed descriptions of previously published experiments performed in the authors' laboratories. Such chapters may be interesting to the specialist, but they often present a biased view to the general reader. One of the several exceptions is Graham's scholarly review of habituation of responses mediated by the autonomic nervous system.