Vision and Value Series

The many contributors to these richly illustrated volumes—**Structure in Art and in Science** (197 pp.); **Education of Vision** (240 pp.); and **The Nature and Art of Motion** (207 pp.)*—are scientists, artists, engineers, and linguists. The editor, Gyorgy Kepes, is professor of visual design at Massachusetts Institute of Technology. The contributions are essays, approximately 13 in each of the three books, that treat in broad perspective "visual formulations of our awareness of contemporary problems." The improvement of interdisciplinary understanding and communication is the goal toward which these essays are oriented. The larger problems of our times, says the editor, demand wider perspective, and the visual sense promises to support, on a common base, an appreciation of the structure and the flux of man's relations with his environment.

Each volume has a looseness of organization that permits it to be self-contained and at the same time overlap with others of the series. This is realistically defended as an aid to communication, since readers will be more at home with the language of certain of the essays than with that in others. *Science* readers will find contributions by artists and architects wordy and vague. We must realize that this is, at least in part, attributable to our unfamiliarity with connotations that are peculiar to the specialties. The excellent illustrations help, but not always sufficiently, and since color is not used some of the meanings are lost.

It is perhaps quite significant that the majority of the essayists are European, though not overwhelmingly so. From three to six contributors to each volume are American-born. Kepes, born in Hungary in 1906, came to the Institute of Design in Chicago in 1937 after working as a design artist for 6 years in Berlin and London. He sees modern technology too often violating the unifying forces and structural organization of nature. In the introduction to *Education and Vision* he writes, "If the primal sanities of nature can be absorbed through his [man's] vision, if man is led to see them, he can reproduce them in the world he shapes for himself." He speaks of our dishonest environment and the reciprocal relations between it and our impoverished visual sensibilities. One to three psychologists contribute to each of the volumes. With some differences in relative emphasis, Richard Held, James J. Gibson, and Hans Wallach document the general proposition that seeing effectively cannot be identified with simple projections of light rays upon the retina and faithful transmission of the resulting information through the central nervous system. Interactional and transactional organizing processes are as much a part of seeing the world as are such processes integral in the nature of that world under study by physicists.

Psychologists will quickly recognize the differences between the psychophysics of Gibson and the stress on organismic processes by Held and by Wallach. From the perspective of these three volumes, the reader can appreciate these differences as supplementary rather than as contradictory. Visual direction, the perception of slant and distance, and the integration of these into awareness (discrimination) of movement are neither piecemeal in any adequate physical equation nor purely external (or internal) from the biological-psychological viewpoint. Europeans have been quicker to see this and more insistent upon our dealing with it than American experimentalists. But now the experiments are paying off. The essays cannot do justice to the empirical base that research of the past 30 years has provided. Bibliographic documentation in these essays is fair to good and will guide some readers to the evidence.

This series is not a plea for achieving unity at the expense of diversity. It is rather excellent support for an increase in each. Physicist Gerald Holton, in describing the history of man's ability to describe and predict motion, points out that each stage "represented a stripping away of anthropomorphic and other subjective associations from the definition of motion."

Although the volumes suffer from repetitiousness, both within and between the separate covers, one also reads them with the strongly increasing impression that much has been left out. One doubts that the essayists understand each other. While many participated in ongoing seminars held at Massachusetts Institute of Technology during the past decade and a half, they have only now and then referred to each other's contributions. Perhaps the students who attended could fill in the gaps better than the experts themselves. Solving puzzles can be an exciting experience. The reader of these volumes has such in store for him, because Kepes is quite accurate in saying, "The essays have in common their implicit acceptance of the complementary unities inherent in their respective areas."

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Cloud Physics

Elements of Cloud Physics. Horace Robert Byers. University of Chicago Press, Chicago, 1965. x + 191 pp. Illus. $7.50.

The study of clouds in the atmosphere can be divided, unfortunately perhaps, into two fields that overlap relatively little—the macrophysics of cloud development, air motion, and mixing, on the one hand, and the microphysics of condensation and freezing and the behavior of populations of water droplets and ice crystals, on the other. One day a book will be written which effectively links together these two fields and every point, as happens in nature. At present, it seems, our understanding of processes in the atmosphere is too incomplete to make this possible.

The present book, despite a final chapter on cloud dynamics, is devoted almost entirely to microphysical questions. In discussing these the emphasis

* The books, published by George Braziller, New York, 1965, are $12.50 each.