Book Reviews

Intention and Mechanism

Purposive Explanation in Psychology. MARGARET A. BODEN. Harvard University Press, Cambridge, Mass., 1972. xii, 408 pp. $13.50.

This book is an exploration and (attempted) reconciliation of purposive and mechanistic orientations in psychology. The conflict between these two pictures of man—man as a conscious agent, striving after goals, and man as a purely physical system the states of which succeed each other according to causal laws—is an ancient one. However, it has taken on new urgency in recent times; developments in neurophysiology in the last hundred years have given some promise of filling out the details in the physicalist program and rendering it more than speculation. At the present moment the issue can be usefully viewed in the following way: On the one hand it seems obvious from our common experience that human beings have conscious desires, hopes, aspirations, beliefs, thoughts, and perceptions; and that (often) they act as they do because they believe that what they are doing has some chance of attaining what they want or avoiding something to which they are averse. On the other hand developments in physiology and psychology have encouraged us to think of a human being as a purely physical mechanism that can, in principle, be completely described and explained in physicochemical terms. From this latter point of view a piece of behavior like getting out of bed can be completely explained in physical terms, more specifically by reference to neural processes in the brain, neural impulses sent from the brain to muscles, and so on. There is no room in this picture for desires, beliefs, conscious perceptions, or felt anxieties. Thus we are confronted with a dilemma. Do we have to choose between the scientific and the commonsense framework? Or is there some way in which they can be integrated?

In this book Boden takes the latter tack. Her position may be viewed as a sort of "double language" account. On the one hand, she insists on the irreducible distinctness of purposive and mechanistic explanations of behavior. The one is not "semantically reducible" to the other. In explaining Jones's getting out of bed by saying that he believed someone was walking around the house and he wanted to see whether the door was locked, we are not talking about neural impulses and muscular contractions. That is not the sort of thing we mean. The "language" of purposive explanation is different from the language of physics and chemistry in being "intentional," that is, in identifying states (like desires and beliefs) in terms of their "intentional" objects. We specify a given belief as, for example, the belief that someone is walking around the house; and that is the belief it is, even if no one is in fact walking around the house. Traditional psychological concepts, like the concept of belief, differ from any physical concepts in picking out states (of persons) by reference to objects that may or may not exist.

On the other hand, Boden denies that the purposive account identifies any causal factors or forces over and above the physical forces involved in the body; its explanatory efficacy does not stem from the invocation of any immaterial agency or "realm of being." She wants to agree with the physicalist that the body (including the nervous system) with its physical workings is all that is involved. But then how is there any room left for the purposive explanation? According to Boden, purposive explanations play an essential role just because an intentional "language" is required to bring out some of the features of complex physical organizations such as we have in human beings. The physical organization and physical operations of human beings are such that their behavior is guided by internal "models" or "representations" of their goals, their environment, and even of themselves and (some of) their own operations. These "models," as well as the operations they direct, are purely physical in character. The models are, most likely, organizations of neural activity in the brain. However, to describe the way in which they are used as models we must go beyond a description of their physical dimensions, and use the intentional language of belief that ——, perception that ——, and so on. So in giving a purposive explanation of the man's behavior in terms of his desires, beliefs, fears, and so on, we are perforce using a language different from that used in any purely physical description, but what we are referring to is certain features and operations of a purely physical system. Thus, although purposive explanations are not "semantically reducible" to mechanistic ones, they are "empirically reducible," in the sense that it is the operations of the physical mechanism that provide the causal basis for the goal-orientations specified in the purposive explanation.

Boden is far from being the first to put forward a position of this sort, nor does she significantly differ from her predecessors in the number of loose ends left dangling (to take one example, she leaves it unclear how it is that intentional states like beliefs can be said to be nothing over and above neurophysiological states if, as she cheerfully admits, it is probably impossible to establish any one-to-one correlations between beliefs of a certain kind and a certain kind of neural organization). The originality of the book lies primarily in the fact that her position is presented in the form of a detailed exposition of William McDougall's psychological theory, together with suggestions as to how various elements of it might receive a computer simulation. She chose McDougall, hardly a modish figure, for this purpose because (i) he stresses the centrality of purpose in human life, (ii) he is sensitive to the complexities of human personality and motivation, (iii) he takes a strongly antireductionist (even "empirically" reductionist) position. If one can take so "mentalistic," so purposive, and so richly articulated a psychology as that of McDougall, and give reason to think that various features of the structure and functions postulated therein can be simulated in a purely mechanistic system like a digital computer, this will lend aid and support to the author's general position, at least to the extent of indicating that "intentional" states and

purpose *can* be exhibited by a physical mechanism. In pursuit of this goal Boden gives detailed and illuminating expositions of McDougall's views on purpose, instinct, sentiments, emotions, temperament, the organization of behavior by the self-image and "master sentiment of self-regard," and various other topics. In the case of each she offers stimulating suggestions for computer simulation. The book is also generously larded with references, by way of parallel and contrast, to the views of many other psychologists and philosophers. The author may not have succeeded in reviving McDougall as a major force in contemporary psychology (nor indeed was it her purpose to do so), but she has succeeded in providing a fresh context, and some fresh perspectives, for the age-old controversy between mechanism and purpose.

WILLIAM P. ALSTON
Douglass College,
Rutgers University,
New Brunswick, New Jersey

Hominids and Their Relatives

The Functional and Evolutionary Biology of Primates. Papers from a symposium, Burg Wartenstein, Austria, July 1970. RUSSELL TUTTLE, Ed. Aldine-Atherton, Chicago, 1972. xii, 488 pp. + plates. $15.

One of the most widely known contributions of the Wenner-Gren Foundation, and often an important one, to the field of anthropology has been the support and stimulus given to a series of conferences on current anthropological topics from which valuable books have been derived. The system works in this way: a conference organizer is invited to attract participants, who submit drafts of their contributions for private circulation which are then debated by the participants and modified, prior to publication, in the light of the discussion. In effect, the academic wash is put through the machine in private, in contrast to the treatment meted out to those who brave the *Current Anthropology* technique. The conference from which the volume under review stems was held at a castle in Austria, according to Tuttle in an "enriched environment," whatever that means in human ecological terms.

The think-tank situation has a lot to offer in interactions among those who participate and in the topics that are under discussion; but inherent in the use of the system are several questions that must be raised. Clearly, whoever acts as convenor, whom he selects to participate and what is to be discussed are crucial to the success of the conference and therefore to the published volume that results. Scientific elitism of this kind can succeed only in the presence of an elite whose areas of expertise are so closely related that in the process of debate the refinement can operate effectively. It is not for a reviewer to comment on the choice of the participants, but it seems open to question that a conference as broadly based as that covered by the title of this book can produce debate of the quality that has been reported in some earlier publications of this series. The decision to exclude the transcript of discussions from publication is disappointing, for the reader is denied the pleasure of following the arguments that led to new conclusions, and more particularly those that led nowhere.

The papers are grouped into five sections, on fossil primates, on skull structure, on brain and endocasts, on limb morphology, and on behavior, any one of which is worthy of a conference on its own account.

In the fossil primate section Szalay gives a useful review of the earliest primates, with a personal flavor, and Simons and Pilbeam review the current state of hominoid paleontology and explore the global prospects for new excavations. In the same section Tobias provides an updated catalog of early man in sub-Saharan Africa and touches on sexual dimorphism, posing again the question of its relevance in australopithecine studies.

The section on skull morphology exemplifies the broad approach in that it contains a most stimulating and provocative essay by Cartmill questioning the arboreal explanation of primate skull features. Much of his evidence is negative, in that it exemplifies other arboreal mammals that are without the primate specializations usually said to be due to tree life, but his case is closely argued and of great interest. Howells's new analysis of modern human cranial dimensions shows that interpopulation differences involve the same morphological pattern as individual variation within populations.

Stephan, Radinsky, and Holloway all wrestle with an intractable field of research. The study of cranial endocasts seems like an assault on Everest, necessary because this material exists to be conquered, even though it appears biologically almost unassailable.

The postcranial morphology section is uneven, the matters included ranging from a simple investigation of the vertebral anatomy of primates to the world of Fourier optics, lasers, stressed plastic cut-outs, and "multivariate morphometric" analyses, all exemplified by the remark, "This is comparative anatomy at the flick of a switch" (Oxnard, p. 345). Perhaps the peak of the distribution is the meticulous work reported by Tuttle on catarrhine hand muscles.

The section on behavior is rounded off by an amusing and informative piece on mathematical modeling by Cohen. His astringent style and realistic approach to research revived your reviewer and restored his faith in behaviorists.

This is a book for specialists, each of whom will find something of importance. It is a volume of loosely grouped papers and not the outcome of a concerted scientific attack on a specific problem with the big guns deployed. If the emphasis was intended to be on "research strategies," the outcome was results; but then results are far more interesting anyway.

M. H. DAY
Department of Anatomy,
St. Thomas's Hospital Medical School,
London, England

Problems in vitro

Invertebrate Tissue Culture. Vol. 1. C. VAGO, Ed. Academic Press, New York, 1971. xiv, 442 pp., illus. $25.

Choose almost any review on invertebrate (or insect) tissue culture written during the past 15 years and the first paragraph will contain a sentence stating how unexpectedly difficult it has been to obtain actively proliferating cells in vitro. After reading J. L. Vaughn's introductory chapter on culture media one might justifiably wonder that we have had any success at all.

Optimally, a culture medium should provide the nutritional and physical factors to insure that the metabolism of the cells in vitro closely approaches that of their counterparts in vivo. One means of determining such factors is simple empirical testing; another is quantitative analyses. That the latter means has been woefully neglected is made apparent in Vaughn's review: ". . . very little investigation of the anion requirements of invertebrate cells *in vitro*"; ". . . few studies . . . on the amino acids requirements"; ". . . use of carbohydrates . . . has been investigated only