



Ethics and Animals. Based on the Conference "The Moral Foundations of Public Policy: Ethics and Animals," Held on the Campus of Virginia Polytechnic Institute and State University, May 24-27, 1979.

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SCIENTIFIC REASONING AND EPISTEMIC ATTITUDES.

By László Hársing; translated by Balázs Dajka. *Akadémiai Kiadó, Budapest*. \$8.00. 147 p.; ill.; no index. 1982.

Hársing distinguishes ordinary reasoning from idealized scientific reasoning by noting various devices of abstraction used to purify reasoning in science. He identifies scientific reasoning with the posing of hypotheses that are "confronted with reality, only through the mediation of other knowledge" (p. 22)—such "background knowledge *k* is relative since it reflects the historical state of development of a given science." But as "the logical foundation for the evaluation of hypotheses . . . on a given level of cognition it can be considered as absolute" (p. 29).

The truth of a hypothesis is relative to the background knowledge—this relative truth value being its *plausibility*—and leads to *plausible inferences*. These inferences are grounded in a comparative probabilistic logic. Hársing lays out rules for the relative valuation of hypotheses, distinguishes diverse cognitive approaches, and argues for the inverse relation between the quantity of information content and degree of probability (relative truth value) of a hypothesis. He uses these notions to define the epistemic utility of new knowledge or cognitive gain, and the expected epistemic utility of a hypothesis relative to given background knowledge. He then specifies the rules of acceptance of a hypothesis and their application "to different situations of reasoning," called *reasoning strategies*. Finally, he argues that his analysis of scientific reasoning and epistemic attitudes is more satisfactory than rival treatments of this question.

Throughout, Hársing emphasizes the temporal dimension involved in scientific activity, and specifies the importance of the distinction between the synchronic and diachronic approaches within the structure of the logic he adopts. He further notes the importance of the social, psychological, and other peripheral aspects affecting scientific reasoning as he seeks to formulate and include in his logical structure the total situation affecting man's actions.

He takes account of much of the current literature in the field, mentioning such contributors as Carnap, Bunge, Chomsky, Hintikka, Kuhn, Popper, Putnam, Rescher, and Russell, but yet the presentation passes lightly over most of this and slurs points made sharply by earlier thinkers as Hársing fits what he can into his own scheme.

There is indeed quite a respectable philosophic literature on the topic of scientific reasoning and epistemic attitudes, in which the formalism of probability analysis is applied to the specifications

and comparisons of hypotheses and the knowledge upon which they are supported.

Thinkers in this area, including Hársing, claim to be practical in applying logic and mathematics to the problems of empirical science. Whatever the intrinsic value of such endeavors, many philosophers of science treat such idealizations as far removed from the actual practices in which scientists engage when they formulate and use diverse, overlapping, sometimes conflicting, sometimes divergent hypotheses in their daily thinking and inquiring.

Unless the readers of *The Quarterly Review of Biology* have an interest in the formalism for its own sake, this book has doubtful value for them as empirical scientists.

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ETHICS AND ANIMALS. *Based on the conference "The Moral Foundations of Public Policy: Ethics and Animals," held on the campus of Virginia Polytechnic Institute and State University, May 24-27, 1979. Contemporary Issues in Biomedicine, Ethics, and Society.*

Edited by Harlan B. Miller and William H. Williams. *Humana Press, Clifton (New Jersey)*.

\$39.50. xii + 400 p.; ill.; subject index. 1983.

This book, based on a symposium held in 1979, has taken a long time to appear in print. In most cases this does not matter too much, because ethical arguments do not date in the same way as scientific research. Sometimes, however, it does matter; a paper on "Apes and language research" by Duane Rumbaugh and Sue Savage-Rumbaugh has a brief note at the end advising readers to check more recent publications for reports of further progress. This obviously reduces the value of that particular chapter.

The volume contains a mix of philosophical and factual papers. The philosophers discuss the ethics of our treatment of animals, paying particular attention to such questions as whether animals have rights, and whether it is wrong to kill them unnecessarily. The contributors are not limited to the 'pro-animal' side; there are arguments in favor of giving priority to one's own species, and against attributing rights to animals. Hence the book would serve well as an introduction to both sides of the issue. The reader has to put up with a certain amount of repetition, however, as some papers traverse similar ground.

While any ethical debates about the status of animals are clearly relevant to the issue of animal experimentation, there are three papers of special interest to workers in this area. Deborah Mayo criticizes selected areas of animal experimenta-

tion on the grounds that the work is irrelevant to anything of human or even general scientific interest; she then argues that other experiments are invalid for a variety of reasons, which include the difficulty of cross-species comparisons and the fact that the animals were in artificial and stressful environments prior to or during the experiment. Gavan Daws gives a detailed account of a Hawaiian court case that resulted from the liberation—or theft, depending on how you look at it—of two dolphins from the Hawaii Institute of Marine Biology. As Daws brings out in his engrossing account, the case raised a crucial issue concerning what makes an animal a piece of property, in contrast to a person or other entity with rights of its own. The court, however, would not accept argument on this issue. In the final essay, Henry Spira gives a brief account of the campaign he has led against animal experimentation, particularly against the Draize eye test and the LD 50 test. This campaign led to contributions of over \$2,500,000 from cosmetics companies for the development of alternatives to animal testing. Spira gives a frank account of the philosophical basis, strategies and tactics of such a campaign.

There is much else in the book, including some ethical perspectives on ecological questions. All in all this is a mixed but definitely worthwhile volume.

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THE SECULAR ARK. *Studies in the History of Biogeography.*

By Janet Browne. Yale University Press, New Haven (Connecticut). \$27.50. x + 273 p.; ill.; index. 1983.

Janet Browne notes in the conclusion of *The Secular Ark* that biogeography is a highly diffuse scientific discipline with no strong social or conceptual boundaries that set it apart from the subjects from which it emerged: geology, botany and zoology. It is highly appropriate that Browne's delightful book is written in a style that will permit scholars from many different fields to read it with pleasure and profit. Although modestly subtitled *Studies in the History of Biogeography* the book outlines the history of the central ideas in biogeography from the seventeenth to the nineteenth century, i.e., from the time when the story of Noah's ark was taken literally to the period when the theory of evolution set out the conceptual framework on which modern biogeography is constructed.

Browne shows how naturalists of the eighteenth century replaced their understanding of the distribution of plants and animals in terms of a dis-

persal from Mt. Ararat with the alternative view that the world is divided into distinct floras and faunas. Later naturalists extended this perspective and attempted to construct either a science of patterns (a topographical natural history) or a science of processes (a consecutive history of the earth and its fossils). Her account of how naturalists attempted to synthesize these descriptive and historical approaches, and her discussion of the various solutions to central empirical problems provide valuable insights into the work of some of the most interesting naturalists of the century (Forbes, Darwin, Wallace), as well as an original inquiry into the usually overlooked contribution of botany to the development of Darwin's theory of evolution.

PAUL LAWRENCE FARBER, *General Science, Oregon State University, Corvallis, Oregon*



GENERAL BIOLOGY

NAKED EMPERORS: ESSAYS OF A TABOO-STALKER.

By Garrett Hardin. William Kaufmann, Los Altos (California). \$15.00 (hardcover); \$8.95 (paper). vi + 281 p.; ill.; index of names. 1982.

In thirty refreshing essays Garrett Hardin challenges the conventional wisdom on population growth, on "scientific" creationism, on attitudes toward sociobiology, abortion, eugenics, the values of "waste" in genetic systems, the evolution of the computer as the modern slave, altruism as a biotic and social force, on the subversive science of Paul Sears, on the limits of global solutions, property rights, and a dozen other contemporary topics.

The essays are the product of one of biology's best scholars. Hardin has read much; he has also thought and written much, and has drawn with precision on a lifetime of scholarship. He is here a geneticist, struggling to see through the fogs of politics and profit to find some hard core of universal truth to guide new beginnings. He finds them well enough, but few are simple, hard, shinningly immutable, or easily adapted as political slogans. Most fall back on the geneticist's touchstone of self-preservation, modified by the enlightenment available now. Hardin is a delightfully rich source of fresh thinking on old topics and this book is a revealing and important new step toward a synthesis.

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