

book of interest. Only time will tell how progressive an impact this book itself will have on the philosophy of science.

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Physiology and Anatomy

ANIMAL PHYSIOLOGY: ADAPTATION AND ENVIRONMENT

by Knut Schmidt-Nielsen. 2nd ed., 1978. Cambridge University Press (30 East 57th Street, New York 10022). 560 p. \$18.95.

The usual topics of food getting, digestion, respiration, transport, locomotion, excretion and response in animals are discussed in this textbook of animal physiology. However, though the topics are familiar, the approach is novel. Most physiology texts are adequate presentations of the processes of life, but this text relates the life processes to the stresses imposed by the environment and shows how animals respond to these changes.

The author's use of simplified language, crisp style, comparative descriptions of animal structure and function plus liberal use of graphics heightens interest and brings into sharp focus the relationship between structure and function as related to environmental stress.

Intended as an elementary textbook, the information is presented in a manner that requires a minimal background in biology. However, more specialized and advanced materials are included for the inquiring student.

Although directed toward the beginner, the author's frequent use of formula requiring a fundamental understanding of chemistry and physics, may tend to thwart rather than foster the interest of students searching for a field of study.

The text is excellent for first-level courses at the university, college, and junior college and would be ideal as a source book for advanced secondary students.

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Related Fields

THE SCIENTIFIC IMAGINATION

by Gerald Holton. 1978. Cambridge University Press (32 East 57th Street, New York 10022). 382 p. \$27.50 hardback; \$7.95 softback.

This is a scholarly book and certainly not directed toward the casual reader. It

is basically a sequel to the author's previous book *Thematic Origins of Scientific Thought: Kepler to Einstein*. The style of the book tends to be somewhat ponderous, and each chapter is copiously annotated. Indeed, fully 15% of the total pages are devoted to notes.

The first of the book's three sections is devoted to the premise that a scientist often develops a presupposition that comprises a primary guideline in his/her work. Several general themes are discussed and then a detailed case study of the Millikan-Ehrenhaft controversy as to the magnitude of electronic charge is presented.

The second part, entitled "Studies in Recent Science," provides an excellent case study of Fermi and his research group. At this point, the book's title and the succeeding chapters appear to part ways. What is presented next is a discussion of a governmental report published to determine the plausibility of forming predictors of the validity and state of scientific research in the United States. The final chapter of this section deals with the psychology of the scientist, his/her sensitivity towards society, and society's view of scientific work.

The third section deals with the public understanding of science. The first chapter is a critique of Lewis Mumford's writings on science, technology, and society. Next follows a discussion of Frank Manuel's Isaac Newton, Ronald Clark's biography of Einstein, and finally a short discussion of the Project Physics Curriculum.

Judging from the book's title, I expected and eagerly looked forward to an in-depth analysis and discussion of scientific imagination, i.e., creativity, but in this respect was disappointed. However, for the professional in the areas of philosophy and history of science, the work provides both interesting and provocative reading.

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METHODS FOR EVALUATING PLANT FUNGICIDES, NEMATOCIDES, AND BACTERICIDES

by Eldon I. Zehr, ed. 1978. The American Phytopathological Society (3340 Pilot Knob Road, St. Paul, Minnesota 55121). 147 p. \$14.

This attractively bound book consists of a collection of forty-six papers written by plant pathologists and nematologists from the United States and abroad. These papers are arranged into four major sections: Preliminary considera-

tions, Laboratory and greenhouse procedures, Field test procedures, and Nematicide test procedures. A literature cited section and/or a bibliography is contained in all but seven of the papers. There is also a potentially valuable index.

The book is intended as a reference for those investigating new chemicals as plant disease and nematode control agents. I found it to be much more than that. This is a valuable book for the student of experimental design. Many of the procedures can be adapted to a variety of biological experiments. I was particularly impressed with the paper on "The use of statistics in planning, data analysis, and interpretation of fungicide and nematocide (*sic*) tests." It is most clearly and beautifully presented, complete with a useful flowchart of decisions and operational aspects of experimentation. Although this is a multi-author volume, the papers are uniformly well written in a thorough, clear, and straightforward manner.

I am not a plant pathologist nor a nematologist, yet I find this an excellent book and recommend it highly.

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Social and Ethical Issues

ON THE FIFTH DAY: ANIMAL RIGHTS AND HUMAN ETHICS

by Richard Knowles Morris and Michael W. Fox (eds.). 1978. Acropolis Books, Ltd. (2400 - 17th Street, N.W., Washington, D.C. 20009). 240 p. \$12.50.

This collection of essays by scientists, philosophers, and theologians explores the relationships between human beings and other animals. The Humane Society of the United States sponsored this book as another means of broadcasting the need for a reduction in animal suffering. It is an effort to reach students, educators, and theologians and engage them actively in the prevention of cruelty to animals.

These essays try to find answers to the following kinds of questions: Why be humane to animals? Is the mark of civilized person humane attitudes? Do animals have rights? Are people spiritually and psychologically affected by cruelty to animals? How can greater compassion for humans and other animals be fostered? What do history, philosophy, religion, and ecology tell us in searching for new ethics toward other living things?

R.S. Brumbaugh reviews humanity's historical attitudes toward animals. Against such a background, R.K. Morris reveals our modern views of animals in science, philosophy, and religion. J. Feinberg and C. Montagu and M.W. Fox deal with the biology of other animals. In doing so they reveal some of the misconceptions which act as contaminants in our thinking about non-human animals. R. Caras demands an end to the many abuses of animals in a strong appeal to reason. Our anthropocentric code of ethics fosters abuses says, J.B. Cobb, Jr. as he reviews our beliefs. C. Hartshorne and A. Freeman Lee reveal the changes that are possible with a change in human values. How attitudes toward other animals arise in humans brings the analysis of F.S.C. Northrop and a "biospiritual" ethics to shape human attitudes and actions is presented by M.W. Fox.

These essays are meant to contribute to a new humane ethics and an effort to bring about a true reverence for life. Because the topics are history, philosophy, arguments, and doctrines, this book of essays will find a limited audience of college students and the scholarly. The titles of the twelve essays are: "Of Man, Animals and Morals: A Brief History"; "Man and Animals: Some Contemporary Problems"; "Human Duties and Animals Rights"; "Thinking and Being with Beasts"; "Is Man Innately Aggressive?"; "Man and Nature: Biological Perspectives"; "Are We Right in Demanding an End to Animal Cruelty?"; "Beyond Anthropocentrism in Ethics and Religion"; "Foundations for a Humane Ethics"; "Naturalistic Realism and Animate Compassion"; "A Game For All Seasons"; and "What Future for Man and Earth?"

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MATTERS OF LIFE AND DEATH: CRISES IN BIO-MEDICAL ETHICS

by John Thomas, ed. 1978. Samuel Stevens, Publisher, Limited (554 Spadina Crescent, Toronto, Canada M5S 2J9) or (P.O. Box 3899, Sarasota, Florida 33578). 378 p. \$14.95 hardback; \$8.95 softback.

In recent years bio-medical ethics has become among the most actively debated topics within the profession and among the general populace. This book is a collection of articles addressing themes that have been perennial major problems in the field of medical ethics. The articles were chosen by the author for their readability and their relevance in hope that they would be of value to the

intellectual layperson as well as to serious undergraduate and graduate students. The first chapter provides a definition of medical ethics. Subsequent chapters examine Abortion and Fetal Research, Death, Dying and Euthanasia, Eugenics and Genetics, Experimentation with Human Subjects, Drugs and Psychosurgery, and Patient's Rights. The material selected by the author is very readable, and it is obvious that an attempt was made to display the diversity of opinion that exists on the many topics examined. In fact, the breadth of thought expressed is perhaps the author's major contribution, as it is this which makes this book extremely useful for busy biology teachers who are discovering that their students are being bombarded with treatment of these issues in the popular media and want to discuss the issues in class.

Biology teachers will find this economical treatment most valuable. It is highly recommended.

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BIOETHICS: A TEXTBOOK OF ISSUES

by George H. Kieffer. 1979. Addison-Wesley Publishing Company, Inc. (Reading, Massachusetts 01867). 454 p. 14.95.

CONTEMPORARY ISSUES IN BIOETHICS

by Tom L. Beauchamp and LeRoy Walters, eds. 1978. Wadsworth Publishing Company, Inc. (10 Davis Drive, Belmont, California 94002). 612 p. \$15.95.

Introducing social issues into the curriculum is scarcely new, and many of such concerns have exceeded Methuselah's 969 years. What is different, and much more worthwhile, is that the issues are being analyzed with respect to fundamental moral precepts, ethical actions, and values choices, in turn synthesized into the secondary and collegiate curriculum, and derivatively into textbooks. One of the arenas in which this is occurring with considerable rapidity is bioethics, whether defined more narrowly as relating to biomedical fields, or more broadly to the life sciences and science itself. The rapidity and extent of scientific and technological developments, particularly in the post-World War II period, have exacerbated the already existing considerable moral perplexities regarding genetic screening, euthanasia, and other health-related issues including those of patient-professional relation-

ships. Burgeoning populations increasingly facing circumscribed food supplies and unequal distribution of those supplies and the increased exploitation of all natural resources coupled with often ill-considered land use added yet further dimension and depth to contemporary ethical concerns.

Not unlike many other exciting intellectual areas of discourse today, bioethics is a strikingly multidisciplinary field. It brings together life scientists, the health care community, theologians, and philosophers along with anthropologists, political scientists, and just about everyone else save Sanskrit scholars. In a relatively short time, the field has made substantial progress in defining its purview and parameters but seems remote as yet from fully integrating such diverse disciplines into a field of inquiry replete with its own paradigms, constructs, and the like. Perhaps it will always be so given the very nature of its presently defined concerns and its fundamental dependence on strictly disciplinary developments. No matter, since the import is not whether compartmentalization occurs but that fluidity of interchange be sustained.

These two volumes, both excellent, make unique but different contributions to this emerging field of inquiry. They are much alike in some respects, and markedly different in others. Much common ground is covered; both are eclectic, and the highlight is the thinking of a wide diversity of scholars on various aspects of the central issues. The primary structural difference is the use of primary source material in anthology fashion by Beauchamp and Walters as contrasted with a partial digestion of much of the same material by Kieffer in a one person *tour de force*.

Beauchamp and Walters have included 87 contemporary essays selected for clarity of conception and ethical reflection, teachability, and significance for the current controversies in bioethics. The essays are arranged in debate-like format, opposing views being juxtaposed. Each of the six sections (Moral and Conceptual Foundations, Professional-Patient Relationships, Life and Death, Allocation, Human Experimentation, Biomedical and Behavioral Technologies) begins with an overview establishing the context and setting forth the major arguments. The selection and juxtaposition of articles is decidedly on target: an intelligent reader, regardless of training in the life or medical sciences, can quite easily apprehend the technical and scientific foundations needed to appreciate the particular ethical issues involved and to distinguish those issues clearly.