

## BOOK REVIEWS

**Some Features of Organization in Nature: A Contribution to Unified Science.** Robert E. Bass. 1991. Adamson Printing Company, Inc., Toledo, OH. 58 p. \$14.00 paper.

Factual notes of a science teacher educated before World War II have been republished in a second edition. The collection of information is irregular and totally innocent of electronics and genetics. Nevertheless, some connections between chemical and biological systems are sketched, and the original insights are documented and correctly attributed.

The most insightful threads through this short text (36 pages of commentary, plus 16 pages of references) are the observations on the fortuitous and limited windows of physical properties that permit the interaction of physical, chemical, biological, and geological systems on the surface of the earth—the grand coincidences. The narrow range of body temperature required for human life to exist is one example; the relatively high specific heat of water and the plenitude of ocean is another; the high heat conductivity of water along with the circulatory blood system is a third example that is necessary for the efficient distribution of heat through the human body.

The argument of the essay is devoid of both theories and developments in electronics, communications, and computers—developments that have shaped the post World War II scientific horizons. This comment implies that a sequel is needed to relate the newer knowledge to the human physiological systems. Dr. Bass has made a creditable presentation of the interfaces of some of the physiological systems using classical chemistry and physics and properties of the environment, especially water, to underline the narrow limits within which organic species evolved. Work in biotechnology and microbiology using concepts such as repressors, activators, and thresholds are addressing some of the hierarchical issues as subsystems are aggregated. A scholar trained in these new paradigms, of genetic engineering and molecular biology, is needed to expand the argument.

Bertalanffy and Boulding have made careful statements that define the outlines of systems theory. The essential idea of a system is that the set of elements that comprise the system have relational characteristics and, therefore, properties that are different from the summation of the characteristics of the elements outside the system. This idea of systems separates the philosophy of reductionist science from the philosophy of positive purposive behavior: for example, the behavior of an organism as a goal-seeking entity. Of course, many examples in the non-living realm also exhibit the interactions among elements that characterize a system. Professor Bass's little book generally restricts comment to the interrelationships within human physiological systems, such as the circulatory system and the digestive subsystem. He makes no effort to connect the subsystems into higher level systems, or to argue verbally for the placement of human physiological subsystems into an overarching philosophical construct.

Human subsystems will be aggregated into larger

system constructs using concepts from information theory and cybernetics that depend on sending and feedback circuits for control. Systems applications as diverse as maintaining homeostasis in the organism or maintaining a flight heading in an airliner are amenable to explanation. The current understanding of purposive behavior also requires other post World War II mathematical models such as neural networks and parallel processing.

It is not fair to criticize an author for failure to include a purview outside the scope of inquiry. Nevertheless, a determination to stay within the carefully described physiological subsystems, and simply to republish the original edition limits the value of the treatise. The essay is primarily a check list. There are no bold hypotheses or reckless assertions. This is the work of a life-long educator reciting information. Medical students will find the text of value in the sense of an outline for review.

No effort has been made by the author to point out isomorphism among systems. The systems commented upon have been drawn from diverse scientific fields, and have not been integrated into a general systems perspective or a coherent world view. The result is a collection of comments on organizational features, as the title promises.

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**The Tyrannosaurus Prescription: And One Hundred Other Essays.** Isaac Asimov. 1989. Prometheus Books, Buffalo, NY. 323 p. \$21.95 cloth.

(Editor's Note: The world lost a great proponent for the popularization of science with the death of Isaac Asimov in early April at the age of 72. Dr. Asimov was a prolific writer, having published over 460 books at the time of his death. While the majority of those were in the realm(s) of science fact and science fiction, others considered the history of science, the Bible, Gilbert & Sullivan, and Shakespeare. He was an excellent essayist, having maintained an unbroken streak of 399 monthly science fact essays in the magazine *Fantasy and Science Fiction*. It is a collection of such essays which comprises *The Tyrannosaurus Prescription*, reviewed below. It is unlikely that Isaac Asimov will be replaced as a communicator of science.)

This book by Isaac Asimov is a collection of his essays written for various publications over the past forty years. The essays are each in the 1200-word range and cover many subjects into which, as Dr. Asimov stated in his introduction, "people [can] dip almost at random when they have some minutes to spare." As for the title of the book—Dr. Asimov explains it as "whimsy."

There are seven sections in the book offering ideas about the following subjects: The Future, Space, Science, Sciquest, Foreword by Isaac Asimov, Science Fiction, and Personal.

The first section, "The Future," delves into the author's personal ideas about the future, but Dr. Asimov does not make "predictions." Rather, he describes *possibilities*. These possibilities are based on the assumption that

human civilization will not destroy itself “under the weight of a harrowing population increase and fatal shortages of food and energy.” Indeed, Asimov’s apparent concern about overpopulation and the future existence of *H. sapiens* is mentioned several times in the book. Despite his concern, Asimov does not “preach” and, in fact, says that he does not try to force any of his ideas on anyone because of the possibility that they “may be completely wrong.”

Like “The Future,” “Space” has many references to anticipated developments in space exploration, but also describes many astronomical phenomena currently being investigated by scientists. Any non-astronomer who followed closely the Voyager expedition would enjoy this section.

The next section, “Science,” also describes and, to some extent, explains astronomical conditions and earth-bound problems, both past and present, facing humans, some of which are in today’s news (i.e., ozone depletion and natural disasters such as recent earthquakes and volcanic eruptions). Not only does this section peek into the future of scientific research, but several chapters describe ancient happenings such as the earth’s prehistoric periods and life forms.

“Sciquest,” the favorite section of the reviewer, describes the search for scientific answers, the great names in science, exciting breakthroughs, and accidental discoveries. All “non-science” people should read this section. Sometimes lay people need reminders of the way science is done and what scientists and their research have done for humanity.

“Foreword by Isaac Asimov” is a close second favorite section. Just as the title implies, the section contains a collection of forewords that Asimov authored during his long writing career. To really appreciate this section the reader may need to be an inveterate Asimov fan, as is this reviewer.

The six chapters in “Science Fiction” detail the history and possible future of science fiction writing, including a chapter about the people Dr. Asimov rates as “all-time greats” (it is interesting to note that he did not include himself). This section was least enjoyable, probably because of its placement in the book. It should have been read first—before reading the other sections that were more interesting.

Finally, Isaac Asimov provides a section that allows the reader to somehow feel a kinship with him as he describes his personal life with his wife Janet (to whom this book is dedicated). He mentions his wife often throughout the book and in other essays and columns he has contributed in other works. As most Asimov fans know, Dr. Asimov was a biochemist by training, and in this section he describes his transition from active scientist to science (fact and fiction) writer.

The essays in this book do not report on recent scientific findings with detailed descriptions of research procedures. Instead, they are, as is so much of Isaac Asimov’s writing, plain English guides to various fields in and out of science which can be of interest to people who have hope for the future of Planet Earth and who have an abiding curiosity about the workings and complexities (past, present, and future) of their world.

This is a great book to read when you have time for entertaining reading. Keep the book under the seat of

your car, and when you find yourself with idle moments at your next dental appointment, or while waiting for your offspring to emerge from band practice (play practice, skating lessons, etc., etc.), just reach for *The Tyrannosaurus Prescription*—and treat yourself to one of Isaac Asimov’s essays.

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**Biodegradable: Detergents and the Environment.**  
**William McGucken. 1991. Texas A&M University Press,**  
**College Station, TX. 104 p. \$38.50 hardcover.**

Solutions to environmental issues appear easy: stop cutting down the rain forests, stop using CFCs in air conditioners, and stop putting so much CO<sub>2</sub> in the atmosphere. People always ask why, when scientists discover the negative impact of man-made environmental hazards, solutions are not immediately found and implemented by the political decision makers, manufacturers, and ecologists? In this book, McGucken produces an excellent case study—the introduction of synthetic detergents to the American household—that clearly describes the complexities of addressing one environmental concern.

McGucken’s intent is to lead the reader to a wider understanding of the social control of technology. As he states in the book, it cannot be expected that one case study could yield any permanent conclusions, but this one can be used to explore tentative general observations concerning these processes. McGucken cleverly chooses a scenario that is relevant to everyday living, an environmental concern that holds wide-spread public interest, and one that industry attempts to regulate without government interference. The problem is a wise choice since it proves to hold a more aesthetic environmental concern than one that is life threatening; hence, it allows the reader to become intellectually involved, not emotionally.

The problem is the introduction of synthetic detergents—operationally defined as a cleaning agent other than soap—to American households following World War II. Soap is an efficient cleaning agent when used with warm, soft, alkaline water. In hard water, calcium and magnesium must react with soap to effect cleaning; however, this causes an unappealing scum. Synthetic detergents work well in hard water and do not produce a scum. They also produce abundant suds. With a bit of encouragement from advertisements, housewives have been convinced that increased sudsing power increases cleansing power. These products have proven their amazing ability to produce suds, not only in kitchen sinks, but also in sewage treatment plants, rivers, and streams.

Synthetic detergents quickly replaced soap in American households, resulting in increased profits to manufacturers. At the same time when the public was purchasing the products, manufacturers were confronted with public pressure to eliminate the sudsing ‘problem’ outside the household. The ingredient that caused the problem was identified, alkyl benzene sulfonate (ABS); however, this was also the ingredient that made the product so profitable

to manufacturers. To eliminate the offender would also eliminate the abundant suds that sold the product.

Although the suds proved to be more of an aesthetic problem than a danger, the high visibility made the probability of water contamination by harmful chemicals a reality to the general public. If a harmless chemical could make it through the sewage treatment system, harmful chemicals also could. This reality led to government, industry, and private environmental groups facing the task of establishing a structure to deal with this problem as well as to set a precedent for other issues.

McGucken provides the reader with an even-handed description of the processes that entail solving such a problem and the interaction between the main players—environmentalists, political policy makers, the general public, and manufacturers. He gives descriptions, without harsh judgment, of the interpretation the interested parties hold, and of the processes by which they choose to solve the issue. This analytical approach allows the reader to get “just the facts.” Each player’s part is reviewed meticulously, with a clear understanding of the issues each faces.

To prepare the reader for the social issues, McGucken first gives an historical accounting of the introduction of synthetic detergents and their benefits over soap. He continues by giving a detailed outline of the chemical make-up and description of the molecular structure of the non-biodegradable offenders. He then wades through the cumbersome bureaucracy that industry, science, and government developed in identifying the problem, assigning accountability, and eventually finding a replacement for ABS. Also included is a cross-cultural comparison of how German and British counterparts handled similar situations in Europe.

The technical aspects of this book could most likely be read and understood by readers with a minimum background in biology or chemistry. The objectivity with which the book is written makes it a useful tool for students, scientists, and concerned citizens to examine, without prejudice, the complex issues that are webbed in what could be construed as an easy environmental problem when compared to others. The unbiased reporting most likely will doom its appearance on popular best-seller lists. However, it should make it to the top of the best-seller lists for readers who are seeking a scholarly explanation why solving environmental issues is neither fast nor simple.

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**Phylogeny, Ecology, and Behavior: A Research Program in Comparative Biology.** Daniel R. Brooks and Deborah A. McLennan. 1991. The University of Chicago Press, Chicago, IL. 434 p. \$21.00 paper.

With the term biodiversity at the forefront of academic, conservation and, occasionally, political circles, this book is a timely treatment to help explain the diversity of life on planet Earth. Brooks and McLennan have presented in a most lucid manner arguments demonstrating the importance and the rewards of integrating phylogenetic, behavioral, biogeographic, and ecological processes as a means to understand diversity.

The book is divided into three basic sections, the first presenting major concepts and background terminology (an excellent overview; e.g., homoplasy, plesiomorphic character, autapomorphy, transformation series, principle of parsimony). The second part addresses primarily two major evolutionary processes, speciation and adaptation, with emphasis on diversity as a major manifestation of these processes. The third section of the book treats ecological interactions, with cospeciation and coadaptation being the major “players” in their discussions of the evolutionary assemblage of multispecies ecological associations. These sections are advanced by rigorous integration of phylogenetic hypotheses, and the authors clearly demonstrate that reliable appraisals of the relationships of organisms can provide useful tools for tracing evolution.

This is a very refreshing book for the seasoned phylogeneticist as well as for the fledgling ecologist. The authors have used a wide variety of examples from different biological systems (e.g., birds from temperate and tropical settings, numerous fishes from many different habitats, parasitic helminths on freshwater stingrays, butterfly taxa, composit plants, colubrid snakes, at least 20 anuran families, and various tropical plants as well as gall midges of birches). Maps, tables, cladograms, and phylogenetic trees are numerous and facilitate understanding of the text. The authors present summaries of various sections of the book and introduce and provide answers to a variety of valuable questions. The book is well edited (only few errors noted) and has an extensive reference section followed by author, subject, and taxonomic indices. This well organized, clearly written, and innovative book is highly recommended to all students of ethology, ecology, and evolutionary biology.

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