

## BOOK REVIEWS

**Patty's Industrial Hygiene and Toxicology, Fourth Edition, Volume II: Toxicology, Parts A-F. Edited by George D. Clayton and Florence E. Clayton. 1993. John Wiley & Sons, Inc., New York, NY. 5,045 p. Six part set: \$995.00 cloth.**

Because of the widespread concern over the effects of chemicals in the human environment, what could be called the "Environmental Revolution" is now over 25 years old. When one contemplates the relatively recent nature of environmental toxicology as a discipline, Frank Patty can be considered a true pioneer with the publication of the first edition of *Industrial Hygiene and Toxicology* (1948). Now, three years in the making, the fourth and most recent revision of this time-honored publication has been edited by George Clayton and Florence Clayton. Eighteen years ago, these editors assumed their current duties upon the initiation of the third edition of the series. In the preface of the last book in the series, they have declared that this will be their last revision, passing the duty on to the "next generation" of toxicologists.

The fourth edition has been expanded from three to six books and includes the discussion or indexing of over 6,000 chemicals. More than 70 authors and two panels from the Chemical Manufacturer's Association contributed to this revision. This represents probably the largest collection of writings from some of the best-known and respected scientists in the field of toxicology. The revision reflects the ever expanding number of chemicals in use and manufacture. Many new chemicals and their effects have been added to the series, but the editors also have added detailed reviews on the non-chemical stressors of altered barometric pressures in undersea exploration and on physical problems faced by air and space personnel.

The series is long (>5,000 pages and 12" of bookshelf space), and is not meant to be used as a textbook or for casual reading. It should be treated more as an encyclopedic reference work. Because of the nature of the work, it would have been desirable to organize the series by chemical and stressor classes. The editors acknowledge this desire. However, because chapters in the revision were arranged logistically by when they were received by the editors, there is little topical organization to the series. Also because of the temporal organization of the revision, chapters that are common with the earlier editions more often than not appear as a different chapter in the new edition. It therefore becomes somewhat tedious to find a particular topic of interest.

Any weakness in chapter organization is greatly outweighed by the quality of the writing and the information presented in the chapters. Chapters that were included in the earlier edition have not been extensively rewritten, but the reference sections have been greatly updated and expanded. Several chapters have been condensed into single chapters where warranted, and the new chapters added in this edition are excellent choices. Whereas early editions were of interest solely to

the industrial hygienist, the fourth edition should now have widespread appeal to all fields of toxicology. Because of the cost of the series, *Patty's Industrial Hygiene and Toxicology*, Fourth Edition, won't be found on too many personal bookshelves. The series should, however, be considered a standard library reference to be used by students and professionals for years to come.

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**Long-Term Potentiation, Volume II. Edited by Michel Baudry and Joel L. Davis. 1994. MIT Press, Cambridge, MA. 409 p. \$85.00 cloth.**

Long-Term Potentiation, Volume II, is a successful follow-up to the first volume on long-term potentiation (LTP), a neurophysiological phenomenon that has received much attention as a neuronal substrate for learning and memory processes. Based on a meeting held in Gif-sur-Yvette in the fall of 1992, the book provides a spirited debate of several key issues in LTP research. The volume is organized into five main themes, including: "The Role of Nitric Oxide in LTP," "Expression and Maintenance Mechanisms," "Relationships between LTP and LTD (Long-Term Depression)," "Relationships between LTP and Learning and Memory," and "Synaptic Plasticity and Computational Neurobiology."

The editors, Michel Baudry and Joel Davis, have done an excellent job in organizing the book. Rather than providing an exhausting series of chapters describing LTP studies, the editors chose to focus on a few key issues, such as the role of nitric oxide in LTP. Several chapters are devoted to each topic, and each provides a unique perspective on the subject. For the most part, each author presents their own work, but in the context of other work in the field. In addition, the editors have provided a closing chapter for each section that helps clarify the key findings and identify the remaining questions for each major theme. Overall, the presentation of the topics is balanced, leaving the reader with the impression (correct, I believe) that all of the issues have not been resolved.

The four chapters on the role of nitric oxide (NO) in LTP provide a useful introduction to the relatively recent emergence of NO as a retrograde messenger candidate. For example, Daniel Madison and Erin Schuman present compelling evidence for NO involvement in LTP, including an elegant experiment in which slices were bathed in 100  $\mu\text{M}$  L-methyl-arginine (a concentration which blocks LTP). Then, single cells were impaled and L-arginine was allowed to leak into the cell. Following tetanic stimulation, no LTP was found in the field potential, but it was induced in the single L-arginine-filled cell. Despite such impressive data on the side of NO, Baudry, in a summary chapter, presents several equally-compelling arguments against an involvement of NO in LTP. Overall, this approach provides an excellent balance of excitement and objectivity.

The other themes are organized in a similar fashion, and coverage of each topic is generally excellent. Each

chapter is accompanied by several useful figures, and the references should prove more than adequate for investigators who wish to explore a particular topic in more detail. In some cases, detailed methodology is included, which should be helpful for new investigators. The index is adequate, although some may be disappointed to find that their favorite topic is not listed. This is likely a consequence of the editors' efforts to focus on a few key issues in LTP, and does not detract from the overall usefulness of the text.

In summary, Volume II of Long-Term Potentiation represents an important source of relevant and recent information regarding the key issues of research into the mechanisms underlying LTP and its role in learning and memory function. It should be a welcome addition to libraries at institutions with research programs in neurobiology. The field of LTP research is active, and arguments concerning the mechanisms and pre- vs. post-synaptic location of LTP likely will continue for many years to come. Long-Term Potentiation, Volume II, thus will serve as a valuable resource for graduate students and postdoctoral fellows interested in how to approach the study of this interesting neurophysiological phenomenon.

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**Handbook of Endocrine Research Techniques. Edited by Flora de Pablo, Colin G. Scanes, and Bruce D. Weintraub. 1993. Academic Press, Inc., San Diego, CA. 599 p. \$125.00 hardcover.**

The purpose of the book is to provide research scientists with a single source of how traditional and molecular laboratory techniques may be applicable to endocrinological research.

More than sixty authors have contributed to this volume. This handbook has twenty-nine chapters and is divided into four main areas: Hormone Assays, Histological and in Situ Approaches, Techniques for Receptors and Signal Transducers, and Molecular Techniques and Specific Model Systems. The topics of chapters include the traditional radioimmunoassay, flow cytometry, polymerase chain reaction, receptor assays, and the use of transgenic and nonmammalian models in endocrine research.

In addition to the anticipated assays for the presence of hormones and their receptors, many procedures for the study of second messenger systems are presented as well. Protein kinase C, G proteins, phosphatidylinositol, tyrosine kinase, and calcium assays are discussed in detail.

The editors compiled this handbook with the intention of it being useful to both inexperienced and veteran scientists in the field of endocrinology. As a result of this, each chapter includes sections regarding the principles and/or development of the technique, application(s) of the technique to research in the field of endocrinology, a detailed description of the procedure, and advantages/disadvantages of using the particular approach. In addition, the authors include reasons why they prefer a

particular method and troubleshooting tips. Each chapter concludes with an extensive reference list.

The primary focus of the book is the application of these techniques to peptide hormone research. Although the editors mention that many of the assays described in the handbook may be applied to steroid and thyroid hormones, it was quite disappointing to this reviewer that the editors chose not to include techniques that are specific for use in the study of all hormones.

It is the opinion of this reviewer that the editors of this handbook achieved their goal of providing a compilation of experimental methods that can be useful to endocrinology researchers, regardless of their experience in the field. The detailed description of the protocols is most helpful. The introductory material about each technique and the references cited alone make this volume a welcome addition to an undergraduate or experienced researcher's library.

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**Geological and Landscape Conservation: Proceedings of the Malvern International Conference 1993. Edited by Des O'Halloran, Chris Green, Mike Harley, Mick Stanley, and John Knill. 1994. The Geological Society, London, UK. 530 p. \$117.00 cloth.**

Conservation movements usually focus on aspects of the biosphere; however, for those who recognize the need to conserve geological components of the biogeosphere, this collection of conference papers will make an important addition to your library. The conference, held in Malvern, England in 1993, was organized by the Joint Nature Conservation Committee of the UK, the Geological Society of London and the Geologists' Association of the UK. Although this book covers the obvious—preservation of important fossil and mineral localities—it goes far beyond this understanding. The five themes of the conference and the book are: 1) Sustainability, 2) Landscape Conservation, 3) Local Conservation and Community Initiatives, 4) Site Conservation and Public Awareness, and 5) International Convention.

The conference organizers cast a wide net and gathered a variety of papers that ranged from importance of science, to management of sites, to connections with the arts. Participants attended from 40 countries. Papers in this volume describe conservation sites and activities internationally and in the following: Australia, Austria, Bulgaria, Canada, Czech Republic, Estonia, Finland, Germany, Hungary, Iceland, India, Ireland, Lithuania, Malta, New Zealand, Norway, People's Republic of China, Poland, Republic of China, Romania, Scotland, Spain, Switzerland, Turkey, Ukraine, USA, and Wales.

There is an unusual range of items being conserved or worthy of attention under the category of geological/landscape conservation. Included are: alluvium, astroblemes, caves, dinosaur and other paleontological sites, erratics, geologic sections, karst, landscapes (including fjord, waterway and special geomorphic features), peatlands, soils, tectonic structures, and volcanoes. At

some sites conservation of the geological process rather than the landform or material is important.

The reasons for conservation include protection of and access to research and educational features (for geosciences and archaeology), important aesthetic landscapes, and historical/cultural sites. Conflicts in securing protection are recognized as part of the process. For example the extractive industries have the potential of destroying important stratigraphic sites and fossil/mineral/cave localities. On the other hand, educational facilities have arisen because of the recognized importance of a site and the support of industry. Further, much geological information owes its origin to resource development, e.g., geologic sections exposed by roads and quarries. Even hunting preserves (where the landscape is supported by fees) produce landscape conservation. The concept of simultaneous multiple resource use of the land makes sense in many of these efforts to preserve geological landscapes. An "ideal" situation that would demonstrate the concept would be a site that has scenic beauty, extractable geological resources (oil, building stone, fossils, and minerals), an important cultural and historical heritage, and access for education and research. Such a site would be unusual in configuration and cooperation of the players.

Cooperation for conservation on local to international scales is indicated by the sites that have been protected and their classification systems. In the UK, local volunteers have been instrumental in setting up county groups that select and conserve Regionally Important Geological/geomorphological Sites (RIGS). RIGS group members include representatives of wildlife trusts, museums, geological societies, planning agencies, and schools. Guidelines for evaluating RIGS sites cover their educational, research, and historical or aesthetic importance; the program benefits from local involvement, including management. Another mechanism for protection in the UK is the Earth Science Site of Special Scientific Interest (SSSI) program. Selection of these higher-level sites is based on scientific importance in national and international research. At the international level, there are about 30 geological World Heritage Sites. A list of potential additional sites and standardized criteria have been developed by a UNESCO/ICSU task force. The list—known as GILGES (The Global Indicative List of Geological Sites)—contains about 300 sites. An expanded record of potentially important geological sites is being maintained in the IUGS GEOSITES database and it is expected to include thousands of first-class sites, globally. The criteria and mechanisms for geological landscape conservation have improved considerably in the last five years. With a doubling of human population possible in 40 years, the associated pressure on geological resources, and the importance of understanding global environmental change, this development is significant.

It is unfortunate that no one at the conference (including me) really addressed the importance of stabilizing human population as another approach to protecting important geological sites. When one considers the Earth as a system and sustainability as a goal for humanity, this should have been an obvious topic. Were some of us so wrapped up in the details of our own projects that we

just failed to connect population and conservation for this conference? Or had we determined that there was no need to state the obvious?

Another dimension of conservation was provided by two papers on art. Rock sculptures and earthworks have been used to increase landscape awareness by the public and collaboration by local officials. Poetry and "rock music" were also used to gain the attention and interest of the public, who might not otherwise appreciate the importance of the science education and research potential of sites. In the latter case, the example of music played on a lithophone (thin bars of rocks suspended on cords) was cited. This is not unlike a "rock organ" that was discovered recently by our graduate students on a glaciated quarry surface in the Bruce Peninsula. There the students stomped on bore holes of varying depths, size, and water content to produce a tune.

Heightened awareness of the physical environment, the importance of the geosphere in sustainability, and the potential for local involvement all are positives for landscape conservation. The last piece in this volume is a resolution supporting an Earth science conservation convention and the establishment of a task force to examine this need. The volume contains a wealth of information about global action in an area that, until now, has not received appropriate attention. This volume should be a useful reference for academics, planners, industry and community leaders, and environmentalists.

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**Cooperation and Conflict in General Evolutionary Processes. Edited by John. L. Casti and Anders Karlqvist. 1994. John Wiley & Sons, New York, NY. 435 p. \$69.95 cloth.**

In May 1992, the Swedish Council for Planning and Coordination of Research brought together a diverse set of specialists for a conference on cooperation and conflict. The conference resulted in the publication of this book, whose chapters are each authored by a different conference participant(s). An interdisciplinary conference such as this one should have resulted in a cross-fertilization of ideas and significant new insights. Unfortunately, the book offers little evidence of real cross-fertilization as few new insights into conflict, cooperation, or evolution emerge from it.

In the introduction to the book the editors state that "nature's formula" can be written as "adaptation = heredity + variation + selection." One anticipates discussions of the impact that conflict and cooperation can have on this formula. However, relatively little attention is paid to the formula in the chapters that follow. The chapters deal with a broad range of topics, including the evolution of industrial complexes, macromolecular structures, predator-prey systems, narratives, human language and free will, brain processes, and game theory as it relates to language and evolution. However, only chapters 3, 5, and 12 really grapple with the interaction of cooperation and conflict

in evolutionary processes. The other chapters sometimes mention these phenomena but quickly ignore them as they pursue the elaboration of complex mathematical models.

Chapter 3 by John L. Casti employs a game theory approach to analyze the conditions in which cooperation as opposed to conflict should occur among animals. Different variations on the Prisoner's Dilemma game are used in the analysis, but the results of these variations are not clearly explained and virtually no attempt is made to tie the results to empirical observations. Better game theory analyses of the conditions for cooperation exist, especially those of John Maynard Smith, who attended the conference but declined to contribute to the book.

Chapter 5 on the evolution of narratives by N. Katherine Hayles is the most interesting and most provocative chapter in the book. Hayles argues that we can better understand evolution if we understand how narratives evolve. She views Darwin's theory of evolution as a narrative embedded in a larger social context and proceeds to describe how the narrative has changed over time, using Richard Dawkin's *The Selfish Gene* and *The Blind Watchmaker* as examples of more recent evolutionary narratives. The chapter explains how changes in language can shift the focus of narratives and change our conceptual understanding of evolution and the roles that cooperation and conflict play in it. She even argues that the emerging field of cybernetics may change our sense of imagery and individuality to the point of blurring the "bifurcation between competition and cooperation." These are fascinating observations; it is too bad that the rest of the book does not generate the same excitement.

Chapter 12 by Karl Wärneryd again focuses on game theory, employing it as a tool to analyze the evolution of

language. Language is described as a signaling system in which the sender and recipient of signals both benefit; hence, language becomes an ESS (evolutionarily stable strategy). However, Wärneryd acknowledges that language can result in deception when lying occurs. Thus, it is not necessarily a mutually beneficial strategy. Curiously, little is said about how this affects the ESS status of language. Wärneryd concludes by stating, with regard to lying, "It is not immediately obvious how this could be modeled in a convincing manner . . ." That is a disappointing conclusion concerning something that is obviously so important. An alternative approach to analyzing the evolution of language may be needed.

Some interesting insights do emerge in the rest of the book, e.g., the thesis that human free will is a product of our ability to produce and interpret speech (Chapter 6). However, the insights are too often buried in overly long theoretical discussions. Chapter 8 is perhaps most offensive in this regard. It buries interesting observations on the evolution of the brain in more than 100 pages of tedious discussion concerning chaos theory. One quickly gets the impression that the conference participants were more interested in publishing esoteria than in fostering interdisciplinary communication.

Some fault for the shortcomings of the book must lie with the editors, Casti and Karlqvist. Except for a one and a half page introduction, they make no attempt to integrate the diverse views presented by the participants. An opportunity to establish new lines of communication has been lost here; let us hope that another such opportunity can be more successfully exploited in the future.

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