

## BOOK REVIEWS

David E. Longnecker, M.D., Editor

**Consciousness, Awareness and Pain in General Anaesthesia.**  
EDITED BY M. ROSEN, JN LUNN. London, Butterworths, 1987.  
Pages: 195. Price: \$34.95.

Evolving from a conference held in Cardiff in 1986, this small volume summarizes much of what is known, and not known, about perception during anesthesia. The issue is an important one during an era in which the specific blockade of both the autonomic nervous system and neuromuscular function can deprive the anesthesiologist of the means to assess the possibility of awareness during anesthesia. In analyzing this problem, the editors present a compendium of clinical cases, studies, suggestions, philosophical and legal discussions, and monitoring techniques. As often happens when there is such wide-ranging presentation, this leads to a choppy volume in which individual chapters read well, but the transition from chapter to chapter is awkward. Even more disconcerting is the plethora of neologisms offered to replace the oxymoron of "awareness during anesthesia," a problem which might have been addressed by more aggressive editing.

The chapters examining monitoring techniques run the gamut, including esophageal motility and EMG, as well as the evoked potential and a variety of EEG processing techniques. These are presented well, but are likely to intimidate many who are unfamiliar with the myriad of EEG processing techniques and, thus, unable to integrate the various pieces of the picture presented in different chapters. In contrast, the picture of the patient suffering through a horrifyingly painful episode of intraoperative awareness is clearly and forcefully presented, both in citations of published case reports and an appendix of responses to a newspaper advertisement. It is this clinical material that conveys the force of the problem and makes this book interesting reading for anyone who administers general anesthesia.

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**Macintosh Mushin & Epstein—Physics for the Anaesthetist.** BY  
WILLIAM W. MUSHIN AND PETER L. JONES. London, Blackwell  
Scientific Publications, 4th edition, 1987. Pages: 648. Price: \$76.50.

The anesthesiologist uses a wider variety of technology routinely than any other medical specialist. Although the significance and impact of technology is continually changing, the fundamental scientific principles of the basic chemical, physical, and thermodynamic laws remain unchanged. It, therefore, behooves every anesthetist to clearly understand the scientific principles of the fundamentals of the technology we continually use.

Although numerous books and monographs discussing "physics for the anesthetist" have been written, it is the opinion of this reviewer that no single book has either the legacy or a clearer presentation of the topic than does this one. Although, as stated in the preface, Macintosh's and Epstein's participation in the writing of the book was extremely limited, its value as a basic text establishing a background for the technological principles of the delivery of anesthesia remains unchanged.

The book is organized into 25 chapters. The first nine chapters discuss a few of the basic principles and concepts ranging from fundamental dimensions through the structure of matter, heat, gases, and the thermodynamic processes of vaporization and humidification. The middle eight chapters of the book are devoted to the principles and

applications of transport phenomena, particularly those involved in fluid flow and mass diffusion. The next three chapters deal with the topics of electricity, electronics, and electromagnetic radiation. The remaining chapters appear to be provided for completeness, and include such topics as combustion, physical data, and a mathematical review.

One of the difficulties with writing this type of book is how to simplify the technical material. It must be appropriately balanced so that a nontechnical reader can appreciate and understand the concepts, and, yet, the technical reader does not become bored. Furthermore, the simplification can not be done to the point that the final material presented is technically correct but in only limited applications. In the simplification process, it is easy to oversimplify and omit what some knowledgeable readers would consider essential information.

In general, the authors of this book have carefully and successfully walked that "fine line." I found each chapter well written and containing numerous pictures and illustrations that greatly aid the reader in understanding the material being discussed. Although the material presented has been simplified, the text contained enough technical information to make it appropriately accurate and complete. Throughout the book, the authors used numerous examples from the practice of anesthesiology to demonstrate applications of the principles under consideration.

Even though the book is well written, this reviewer feels that several significant points should have been included. First, although implied, there is either no direct reference to or discussion of the Laws of The Conservation of Mass, Momentum, and Energy. It is from these laws of conservation that the principles of transport phenomena involved in fluid flow, heat, and mass transfer are derived. By including these concepts, reference and discussion of Bernoulli's principle would have been a simple matter rather than the more difficult approach utilized by the authors in the discussion of fluid mechanics and dynamics as presented in Chapters 11, 12, and 13.

This reviewer would also have liked to have seen analog comparisons between Newton's Law of Viscosity, Fourier's Law of Heat Conduction, Fick's Law of Diffusion, and Ohm's Law of Electricity. I feel this would help the reader appreciate how these fundamentals are analogous and closely related, rather than separate independent entities.

Finally, for the sake of completion, two minor points should have been made. First, the authors should have included reference to Raoult's Law in the discussion dealing with liquids and vapors in Chapter 5. Secondly, although implied, the authors should have made clear that, for Hagen-Poiseuille flow, the fluid must appear to be incompressible.

The comments that this reviewer has made should not distract one from the significance of the book, nor from the manner in which the material is presented. I highly recommend the book to every individual who practices and studies anesthesiology. This includes anesthesiologists, CRNAs, residents, students, engineers, and anyone with an interest in the physical principles that are *fundamental* to anesthesiology. The book can be used as either a beginning text or as a reference for the knowledgeable individual.

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