

Learning and brain lesions make up the final topics, and this portion of the book is slighted in this review because of the complexity of the area. Competitive theories are assessed, and clever experiments analyzed, so that reading this part of the book demands complete attention that goes beyond the average interest, so this part is clearly for the dedicated neurobiologist.

We come out then, as the quatrain goes, by the same door where in we went. This book is the only complete physiology of an octopus and, when properly supplemented, conveys a sense of understanding of much of this special physiology.

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Dimensional Analysis in the Biomedical Sciences. Bernard Schepartz. Charles C. Thomas, Springfield, 1980. 172 pp., illus., index \$19.75.

This book is intended for students and research workers in biology and medicine. It reviews a branch of engineering physics which biomedical engineers have used with considerable profit during the post World War II era. The style is clear and forthright, the book is well manufactured and there are two useful appendices. One appendix is a list of symbols and the other is a collection of dimensional formulas. In the bibliography, the author seems to have made a sincere effort to mention the relevant English-Language publications. One notes the absence of titles in any other language. The index is entirely satisfactory.

The book is built around a set of fifty problems ranging from studies of the swimming of spermatozoa to the physics of coughing. There is even a discussion of the running of dinosaurs! The first chapter introduces the concept of dimensional analysis by reviewing Warburg's analysis of oxygen diffusion in tissue slices. Given the external O_2 concentration and internal consumption rate how thin must a slice be, so that all parts get O_2 ? Rather than solving the differential equation, one examines how the primary physical units of mass, length and time enter into the problem. It is first shown dimensionally that the limiting tissue thickness depends not only on concentration and consumption-rate but on a measure of the ability of the gas to traverse the tissue - the diffusion coefficient. By inspection one immediately sees that it is the *square* of the limiting thickness which is proportional to the concentration times D and inversely proportional to the consumption rate.

One may recognize that a well-trained physicist has developed his physical intuition by working many hundreds or perhaps thousands of physics problems and that dimensional analysis applied to simple models plays a valuable role in this process. Physical intuition can often be useful in biomedical science. Nevertheless, there are times when a pragmatic engineer can simplify a problem to death. Careful reading of the author's discussion following the solution of each problem will help the reader to avoid this trap.

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Insect Neurophysiological Techniques. Thomas A. Miller, Ed. Springer-Verlag, New York, 1979. 303 pp., illus., index, \$25.80.

This book is the first volume of the new Springer Series in Experimental Entomology. The goals of the series are to "1) report new developments in methodology, 2) to reveal sources of groups who have dealt with and solved particular entomological problems, and 3) to describe experiments which might be applicable for use in biology laboratory courses."

The first topic in this volume is the basic equipment needed for neurophysiology experiments including electrodes, instruments, tools and materials. The next section deals with many of the materials and methods used to observe and measure activity of unrestrained insects. Part three is concerned with devices for recording nerve and neuromuscular activity simultaneously with the study of behaviors such as walking or flying in free-moving and tethered preparations. The concluding section deals with special techniques for the study of many different dissected preparations such as nerve, nerve-muscle, heart and digestive tract.

Throughout the book, an abundance of useful information is presented on the selection of materials and their sources. Experimental procedures are outlined clearly. Many of the experimental paradigms are diagrammed schematically. In addition there are many helpful illustrations and relevant circuit diagrams which apparently have not been published before. Too often, texts discussing techniques are written so the reader must have experience with a procedure in order to understand the description of it. The author avoids this problem by writing clearly and by paying attention to common technical problems one is likely to encounter in an experiment. Some of the described procedures clearly are not for the student laboratory or for the novice. Usually, forewarning is provided. For example, on page 92, the author cautions about the technical difficulties involved in the use of capacitance shifts in a tuned resonant circuit for monitoring activity. Although published in 1979, most of the references date prior to 1976. This may produce an occasional problem. For example, the RCA 5734 mechanical transducer is cited in a few places, but is no longer manufactured. Inevitable difficulties such as this should pose no serious problem since most suppliers will provide help in securing substitutes.

The book is weak in the treatment of the practical consideration of cost. Although quality and utility of different techniques and associated equipment are compared, the question of relative expense of alternate choices is slighted. Hidden costs such as exotic types of chart paper, instrument maintenance and repair are important and sometimes neglected considerations when equipping a new laboratory.

This volume will prove useful for people already established in the field wishing to broaden their range of techniques, as well as for the novice setting up an insect laboratory for the first time. Many of the described procedures and techniques should prove useful to the teacher wishing to demonstrate neurophysiological and behavioral concepts. Hopefully, teachers of physiology will find in this book relatively simple and inexpensive preparations for demonstrating fundamental principles of modern neurophysiology.

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