

mals, with higher centers of gravity, the antigravity control is more dynamic, hence postural muscles are all of the fast type.

Among the papers from outside the U.S.S.R., several are of particular interest. Burřs, Bureřov, and Křivnek, from Prague, describe the release of potassium from cortical cells as the basis for spreading depression. Grundfest discusses the evolution of sense cells as a transition from transducing mechanisms to electrogenic neurones. Pantin clearly separates the fast and slow systems of contractile response in sea anemones. A brief but scholarly historical essay on concepts concerning the evolution of the brain is given by Magoun.

This volume makes available to Western physiologists some important work previously published only in Russian. Many of the chapters are provocative and informative. The quality is extremely uneven, and the title of the volume is not appropriate.

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Transistor Devices

Principles of Electron Tubes: Including Grid-Controlled Tubes, Microwave Tubes, and Gas Tubes. J. W. Gewartowski and H. A. Watson. Van Nostrand, Princeton, N.J., 1965. xvi + 655 pp. Illus. \$18.50.

The decade of the 1960's may go down in the history of science and technology as the one in which training in transistor devices *completely* displaced that on the use of electron tubes. The collection of tales is growing about the young engineers who design intricate control equipment, up to the point where an electron tube becomes necessary, and then bog down completely. Gewartowski and Watson's book may well turn this tide. Here is a book that presents, between its covers, the fundamental principles of electron tubes with the technological developments, covering the full range from diodes and triodes, through picture tubes, klystrons, magnetrons, traveling wave tubes, and gas discharge devices, to an ultimate chapter on gaseous lasers. Not infrequently in universities the inside of the electron tube is described

in one course and circuits and the uses of the tubes in another course; the courses may even be taught in different departments. Occasionally, students have time for only one of the courses, a situation that leaves them in an oddly incomplete position professionally. Gewartowski and Watson acknowledge this to be the rule rather than the exception. The book is written for the use of engineers and physicists at approximately the first-year graduate level.

The problem of rigor and completeness within the bound of 600 pages is squarely faced and met. Electron sources and electron optics are first treated. The reader is left satisfied with his comprehension of the subject—that is, he knows that the treatment is usable and that greater complexities lurk very near. The subject of "radio tubes" is handled by treating the fundamentals and illustrating them with one example each of a triode, a tetrode, and a pentode. The ground is laid immediately for klystrons and other microwave tubes by raising the question at the outset of the electron transit time compared with the signal period. The famous teaser that has been stumbled over by generations of students—"what is the current induced in an external metallic circuit while an electron is traversing a diode space?"—is clearly formulated and solved, and its importance in practice is subsequently emphasized. The use of equivalent circuits is presented and extensively used. A smooth transition from lumped circuit constants to microwave procedures is made, and a quite thorough treatment of elements of microwave equipment and analysis is presented.

Approximately one-third of the book (the middle section) deals with klystrons, traveling wave tubes, and magnetrons. The treatment, as is customary in this book, covers the principles and designs of tubes *and* a discussion of uses of the tubes. The final chapters deal with gas discharges and devices.

In general, the problems presented are exercises in application of principles, with only a few purely numerical ones.

Regardless of whether authors, editors, or publishers deserve the credit, it should be noted that the style, format, and language are remarkably good.

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Boring's Selected Papers

History, Psychology, and Science. Selected papers of Edwin G. Boring. Robert I. Watson and Donald T. Campbell, Eds. Wiley, New York, 1963. xii + 372 pp. \$8.95.

The pen of E. G. Boring has been one of the truly phenomenal instruments of our time. Skillfully directed toward all manner of public psychological questions and problems—the psychology of science, systematics, psychological history and historiography, critique of the communication process, psychophysics and psychophysiology, persistent vexations of epistemological roots (not to mention a solid set of laboratory investigations and even ventures into psychopathology)—it has been of enormous influence in shaping the psychological thought of this generation and will be in shaping that of the next. The *omnium gatherum* by 1961 was reckoned as 505 publications!

If the present book were being put together in the early days of the republic, it would have carried some such title as "The Science of Science; being a selection of some of the essays of Edwin Garrigues Boring on scientific topics not hitherto assembled in one place, though for the most part already published in scholarly journals, and eschewing all writings dealing with such matters already contained in Professor Boring's justly popular *History of Experimental Psychology, Sensation and Perception in the History of Experimental Psychology, The Physical Dimensions of Consciousness*, and, with one notable exception, his recently expanded autobiography, *Psychologist at Large*."

The one exception is "Human nature *versus* sensation: William James and the psychology of the present," a paper originally printed in 1942 in *American Journal of Psychology* at a time when preoccupation was less with "microscopic psychology," as James derisively called it, than with new aptitude tests and formulae for correction of restricted range. The James paper is a great paper, a masterful effort to point up the differences between the Jimmian psychology and the modern positivistic approach, and fully merits the reiteration provided by *Psychologist at Large* and the present volume.

The contribution selected for keynote position and one eminently deserving