

eters of diffusion and drift types. The high-frequency behavior of transistors is the subject of chapter 5, where the alpha-cutoff frequency is explained from the frequency-dependent transistor parameters. A simplified rf equivalent circuit is given and the power gain is computed. Chapter 6 is more theoretical, dealing with the physical model of the band structure in semiconductor physics. The seventh chapter, on high current densities, discusses the interdependence of parameters and typical high-current effects, such as avalanche multiplication, recombination and thermal effects. In the next chapter transient phenomena are dealt with. In chapter 9 the authors discuss surface-recombination effects, field-effect transistors, metal-semiconductor contacts, point contacts and compound transistors, both theoretically and by using very illustrative drawings. The scope of the material discussed in the preceding chapters is extended in chapter 10 by a compendium of additional phenomena, such as transit-time effects, parametric amplification, photo effects, laser diodes, thermoelectricity and the Hall effect. Four-layer devices, tunnel diodes and integrated circuits are the subject of discussion in the eleventh chapter. In the last section combinations of metals, semiconductors and insulators, that is, some newer devices still under research, are described. Metal-base transistors and metal-gate transistors are examples of such devices.

Quadrupole parameters in different notations, methods for combining two quadrupoles, equivalent circuits, a table of the error function and its properties, remarks on Fermi-Dirac statistics and a table of physical constants are given as appendices. The book also contains problems for each chapter, a list of references and an index.

As an effort to combine solid-state physics and electronics, the book can be considered very successful. It is well written and illustrated, and it shows a well balanced combination of theoretical explanations and outlook to practice. It can be recommended both as a reference and as a textbook, even if the material given is more than what can be covered in a semester course. It does not assume that the reader has a prior

acquaintance with semiconductors; the introduction into solid-state theory is gradual. Even a reader with quite a good knowledge of transistor theory can gain from reading the book.

Green light traps

LIGHT: PHYSICAL AND BIOLOGICAL ACTION. By H. H. Siliger and W. D. McElroy. 417 pp. Academic Press, New York, 1965. Price \$12.00

by Robert L. Weber

"The whole of nature is a trillion, trillion chemical machines, squirming, twisting, swimming, crawling, floating, flying, and sometimes walking—in the image of Man. What a spectacle is that vast proliferation of green light-traps. . . ."

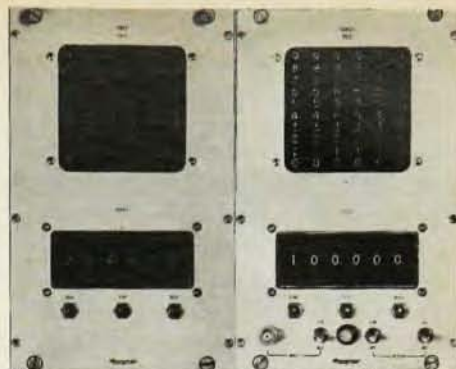
So begins this monograph prepared under the direction of the American Institute of Biological Sciences for the Division of Technical Information of the US Atomic Energy Commission. Although the writing is less pedestrian than in some monographs, it is informative and quantitative. In the first dozen pages the reader reviews evidence for the nature of light and the terminology of photometry. He is ready to face the difficulties inherent in photometric units in biology.

The first two chapters deal with material familiar to physicists: measurement and characterization of light, excitation of molecules by light. Using the molecular mechanism approach to the absorption of light, the remaining two-thirds of the book deals with chemiluminescence, present knowledge of the biochemistry of bioluminescent reactions and colors of emitted light, and finally a chapter summarizing all of the effects of light in biological systems.

Data are up to date, references extensive. The text is nicely organized and should be welcome to all who are studying problems in photobiology, where the processes initiated by light are quantum phenomena but may experience enzymatic amplification.

* * *

The reviewer is a professor of physics at The Pennsylvania State University.



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