

The authors of this book have essayed to bridge this gap in the sense of providing a vigorous pure mathematical text combining and interweaving the abstract and concrete approaches. As such it should prove particularly useful to readers interested in applications who also wish to become familiar with the more abstract axiomatic approach. This is not to say that the book makes easy reading, for the unusually large number of unfamiliar symbols and definitions introduced at an early stage makes great demands on the readers concentration. However, the large number of examples and exercises with which the text is interlarded serves to alleviate the more formal aspects of the text.

The first half of the book deals with standard topics of vector spaces, linear transformations, linear equations, determinants, equivalence relations and canonical forms, vector functions, and orthogonal and unitary equivalence. Apart from the usual subject matter, there is an interesting discussion of Hermite matrices in relation to the solution of systems of linear equations. The book then goes on to deeper problems of algebra, including the structure of polynomial rings, the equivalence of matrices over a ring, and the similarity of matrices, the latter chapter including the Cayley-Hamilton theorem. The final chapter deals with linear inequalities, with special reference to game theory and linear programming, and is cast in an easily applicable form. The book concludes with appendices on mathematical induction and relations and mappings, and a brief bibliography. Anyone interested in both pure and applied aspects of matrix theory and prepared to master an initially overcomplicated notation will find the book a valuable addition to his library.

**Proceedings of the Symposium on the Physics of Fission** (Chalk River, May 1956). AECL No. 329. Edited by G. C. Hanna, J. C. D. Milton, W. T. Sharp, N. M. Stevens, E. A. Taylor. 414 pp. Atomic Energy of Canada Ltd., Chalk River, Ont., Canada, 1956. Paperbound \$5.00. *Reviewed by E. Richard Cohen, Atomic International.*

The discovery of fission in 1938 stimulated no small amount of activity in physics. However, it has only been within the last five years that much of this work has been able to emerge from behind the cloak of secrecy. The Moscow Conference in July 1955 and the Geneva Conference in August 1955 on the Peaceful Uses of Atomic Energy represented the first large-scale declassification, and since then a large amount of material has appeared in the open literature.

The symposium reported here was held primarily to educate the personnel at the Chalk River (Ontario) Laboratory and to provide a coherent and unified survey of the state of knowledge of the physics of fission. The papers (twenty in all) are reviews of the field rather than presentations of original research. They are divided into five sections: Background, The Probability of Fission, The Results of Fission, Theoretical View-

point, and Concluding Remarks. Each paper is accompanied by an extensive reference list as well as a condensation of the discussion which followed the paper as transcribed from notes taken by the editors.

An unfortunate reminder that all is not yet well with the world is the note in the preface that "Certain classified information presented at the Symposium is issued as a supplementary report."

**Solid State Physics.** By Adrianus J. Dekker. 540 pp. Prentice-Hall, Inc., Englewood Cliffs, N. J., 1957. \$9.00. *Reviewed by Robert T. Beyer, Brown University.*

One of the enduring problems of science is the reduction of research articles, first to review monographs, then to graduate texts, and then, if the field is a sufficiently broad one, to texts that can be used in undergraduate work. Professor Dekker's book carries through this latter stage for the field of solid-state physics.

As soon as the field is selected for writing a book, the problem of the point of view must be resolved. The standard approach in texts dealing with the solid state has been to regard the ideal crystal as the fundamental unit of examination. Only after all problems have been analyzed to their limit in this approximation does the author then append a study of imperfections. However, the pioneering work of Burgers, Frank, Read, Shockley, and others on dislocations and lattice imperfections generally, has suggested a new approach—that the concept of imperfections should be introduced early in a solid-state text, and that applications of such ideas should run concurrently with idealized treatments. This Professor Dekker has done with considerable success.

Much of the material treated in any solid-state text is by this time routine. Outstanding in this book are the considerable treatments of ionic crystals, the excellent summary of the band theory of solids, and the coverage of phenomena in secondary emission, which is much more extensive than is usual in solid-state studies.

The number of literature references is impressive—more than 500 research articles and monographs being cited. While the references are international in scope, it is an interesting commentary on our lack of knowledge of Soviet physics that the reviewer could find only one reference to Soviet work later than 1937—that to Zavoisky's discovery of electron spin resonance in 1945—although the Russian effort in solid-state research must be roughly comparable in magnitude to our own. The use of the literature references would have been facilitated by a name index.

Other than superconductivity (a deliberate omission) no field of solid state appears to have been slighted. Of course, every reviewer can find a few points in which he would have preferred a different handling of the problem. Thus, this reviewer was surprised to find no discussion of Cole-Cole diagrams in the treatment of dielectric phenomena in alternating electric fields, while

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the treatment of various atomic and nuclear resonance phenomena comes at the very end of the text and is on the brief side. Nevertheless, viewed as a whole, the text is an excellent one and a valuable addition to instructional literature.

**The Life and Death of Cells.** By Joseph G. Hoffman. 301 pp. Hanover House Books, Garden City, N. Y., 1957. \$4.50. *Reviewed by P. Morrison, Cornell University.*

There are three clear levels of unity in the wonderful pattern that is life: the biochemical, studying protein polymers common in most living forms, and their interlinked sequences of catalyzed reactions; the evolutionary, where the atomic unit is the whole organism, and statistical change the rise and fall of species; and the cellular. "The cell is the physical unit of life," writes the biophysicist author of this straightforward and detailed popular account of cytology as a physicist sees it.

There is not yet the depth of unity in general cytology to match what the biochemists have found, nor the results of the geneticists. The cell is almost everywhere, but it is marvelously diverse. Dr. Hoffman does not shrink before that diversity. He describes for us the forms of cells and tissues, their motions and changes. He looks at their grouping into an organism, their division and growth. He discusses errors, and naturally enough the deadly puzzle of cancer. Four of the freshest chapters end the book: an account of fibrous polymers, of the models of death and growth as the outcome of sequences of randomly varying steps, a look at the possibilities of specific chemical forces (of London type) between biological molecules, and a chapter on death, which merges into a discussion of the polymer code of the nucleic acids.

The exposition is always clear, and often illuminating. The tablespoonful of human eggs, which would span the life of our species back to the true Adam, and the ton of germ cells, which would carry genealogy back to the first living form, are unforgettable. The discussion is nontechnical at every point, but the over-all impression is not that of the simplicity of the world, but of the bewildering detailed diversity of the cell and what it does. That no cell of the body—except perhaps those of the cornea—lies more than a few cell-diameters from a tube carrying fluid is a clear statement of a geometry so complex that it may silence an expert on screw dislocations or on high-order Feynman graphs. None of this daunts Dr. Hoffman, who tells it all in an affable and winning way.

This is a first-rate popularization of a complex subject. It is not an easy book, though it is easy page by page. The credit which the author merits for his clarity, optimism, and width of knowledge, stands in contrast to the demerits of his publishers, who have allowed this work to come out without even one single halftone, line cut, graph, or table. It is a pity that we could not be brought closer to the world of the cytologist by see-

ing some of the things he has seen, and that we cannot find summarized or graphed any of the many relationships and differences Dr. Hoffman has discussed. The value of the text for readers from the most casual to the most devoted would have grown greatly with a mere dozen or so added pages of photos and figures. The editing is weak as well, but there is a satisfactory index.

## Books Received

**SERVICING COLOR TV.** By Robert G. Middleton. 224 pp. Gernsback Library, Inc., New York, 1957. Clothbound \$4.60; paperbound \$2.90.

**THE SCIENCE OF ENGINEERING MATERIALS.** Edited by J. E. Goldman. 528 pp. John Wiley & Sons, Inc., New York, 1957. \$12.00.

**PHYSICS (4th Revised Edition).** By Erich Hausmann and Edgar P. Slack. 722 pp. D. Van Nostrand Co., Inc., Princeton, N. J., 1957. \$8.00.

**ACOUSTICS FOR THE ARCHITECT.** By Harold Burris-Meyer, Lewis S. Goodfriend. 126 pp. Reinhold Publishing Corp., New York, 1957. \$10.00.

**CORROSION AND WEAR HANDBOOK FOR WATER COOLED REACTORS.** Edited by D. J. DePaul. Sponsored by US Atomic Energy Comm. 293 pp. TID 7006. US Govt. Printing Office, Washington, D. C., 1957. Paperbound.

**THE MOLECULAR THEORY OF SOLUTIONS.** By I. Prigogine. 448 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1957. \$13.25.

**H. A. LORENTZ: Impressions of his Life and Work.** Edited by G. L. de Haas-Lorentz. 172 pp. (North-Holland, Holland) Interscience Publishers, Inc., New York, 1957. \$3.00.

**MICROWAVE MEASUREMENTS.** By Edward L. Ginzton. 515 pp. McGraw-Hill Book Co., Inc., New York, 1957. \$12.00.

**EINFÜHRUNG IN DIE MAXWELLISCHE THEORIE, ELEKTRONENTHEORIE, RELATIVITÄTSTHEORIE.** Vol. 1 of Theorie der Elektrizität (16th Revised Edition). By Richard Becker. Revised by F. Sauter. 302 pp. B. G. Teubner Verlagsgesellschaft, Stuttgart, Germany, 1957. DM 29.00.

**TIME SAVING TIPS FOR THE DRAFTSMAN AND THE ENGINEER.** 34 pp. Frederick Post Co., Chicago, Ill., 1957. Paperbound. No charge.

**THE UNITED KINGDOM CONTRIBUTION TO THE INTERNATIONAL GEOPHYSICAL YEAR 1957-58.** 72 pp. The Royal Society, London, England, 1957. 10s.

**PHYSICS FOR SCIENCE AND ENGINEERING.** By Robert L. Weber, Marsh W. White, Kenneth V. Manning. 618 pp. McGraw-Hill Book Co., Inc., New York, 1957. \$8.00.

**GUIDED WEAPONS.** By Eric Burgess. 255 pp. The Macmillan Co., New York, 1957. \$5.00.

**X-RAY ATTENUATION COEFFICIENTS FROM 10 KEV TO 100 MEV.** By Gladys White Grodstein. 54 pp. NBS Circular 583. US Govt. Printing Office, Washington, D. C., 1957. Paperbound \$3.35.

**CHEMISORPTION: Proceedings of Symp. (U. College of N. Staffordshire, Keele, Staffordshire, England, July 1956).** Edited by W. E. Garner. 277 pp. (Butterworths, England) Academic Press Inc., New York, 1957. \$9.00.

**MYSTERIES OF SCIENCE: A Study of the Limitations of the Scientific Method.** By John Rowland. 214 pp. Philosophical Library, Inc., New York, 1957. \$6.00.