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Editor-in-Chief, OTTO GLASSER, PH.D., Head, Dept. of Biophysics, The Cleveland Clinic Foundation. Vol. 1: 1744 pages; 1382 illus; \$20.00; Vol. 2: 1227 pages; 978 illus; \$25.00; Vol. 3: approx. 750 pages; 595 illus; price to be announced. Special price for all volumes purchased as a set, \$55.00.

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linear operations on the functions in question, all the more so since only finite samples are practically available. As a result, a number of techniques have been developed to obtain this information from various quadratic forms, of which the two most common are the autocovariance function and the power spectrum (the latter being the Fourier transform of the former).

The present book, actually a collection of several journal articles, treats in some detail the problems connected with the analysis of power spectra of finite samples (the practical case, mainly from the point of view of the communications engineer and statistician) though much of the analysis is applicable to broader classes of problems. The power spectrum method is by far the most potent way of treating these problems both because it is so amenable to illuminating physical interpretation and because of its relatively simple mathematical characteristics when subjected to simple filtering or statistical operations.

The presentation is divided between a general discussion (Part I), an appendix devoted to relevant aspects of Fourier techniques, and details of the various derivations (Part II). A good deal of time is devoted to the effects of various "lag windows" and their spectral counterparts for the analysis of records of finite length, which is, after all, the only practical way of estimating the actual spectra, and the authors have not skipped any relevant details. There are also sections on the duration requirements and the digital computer requirements.

A number of the Fourier applications and calculations will be of interest to readers not greatly concerned with the important practical necessities, and on the other hand many of the calculations given seem immediately applicable to practical problems. This reviewer found the statistical illusions rather delphic in character, and suspects that this aspect of the treatment will be inaccessible to many nonstatisticians; there is, however, enough else to prove useful to them.

Soviet Space Science (2nd Revised Ed.). By Ari Shternfeld. Translated from Russian by Technical Documents Liaison Office, Wright Patterson AFB. 361 pp. Basic Books, Inc., New York, 1959. \$6.00. Reviewed by H. Mendlowitz, National Bureau of Standards.

ALTHOUGH the book is entitled *Soviet Space Science*, the author also discusses the efforts of other countries in the field of astronautics. The book is addressed to the nonspecialist in space science, but the specialist will also probably find the book interesting.

The author starts with an introduction to the basic notions of kinematics and dynamics. He then discusses the engineering aspects of building and launching of rockets and satellites, communication with the earth, and the technological problems of return to the earth. There is a chapter devoted to the problems of putting a man in cosmic space, and there are discussions of

Because reactor design parameters require efficient neutron transport calculations, mathematicians at the Bettis Atomic Power Laboratory considered extracting information from the adjoint Monte Carlo problem in which neutron trajectories are essentially reversed in time. Thus by using the duality theory to satisfy neutron flux and importance function, sampling models were modified in a systematic manner thereby optimizing computing efficiency.

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Mr. M. J. Downey, Dept. B-33, Bettis Atomic Power Laboratory, Westinghouse Electric Corporation, P. O. Box 1526, Pittsburgh 30, Pennsylvania.

$$\varphi(\underline{r}, \underline{E}) = \iint K(\underline{r}, \underline{E}; \underline{r}', \underline{E}') \varphi(\underline{r}', \underline{E}') d\underline{r}' d\underline{E}' + S(\underline{r}, \underline{E})$$

$$\iint \Sigma(\underline{r}, \underline{E}) \varphi(\underline{r}, \underline{E}) d\underline{r} d\underline{E} = \iint S(\underline{r}, \underline{E}) \eta(\underline{r}, \underline{E}) d\underline{r} d\underline{E}$$

$$\eta(\underline{r}, \underline{E}) = \iint K(\underline{r}', \underline{E}'; \underline{r}, \underline{E}) \eta(\underline{r}', \underline{E}') d\underline{r}' d\underline{E}' + \Sigma(\underline{r}, \underline{E})$$



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the applications of satellites for peaceful and military purposes.

The author illustrates many of the technical problems and concepts with a great deal of numerical data. I wonder, however, if the nonscientific reader is interested in all the data that the author places before him. On the other hand, the nonspecialist in space science with a scientific background might find this aspect very interesting. Sections of the book must by necessity be pedagogic in nature and other parts are more or less progress reports. Some readers will find the balance between these two aspects of the book to be according to their liking and others not so. This depends very much upon the background which the reader brings to the book. Surprisingly there is very little propaganda in the book, and the places where there is some are quite transparent.

There are some places where this reviewer might question some of the wisdom of certain details in the proposed scientific applications of satellites. For example, the suggested utilization of a sodium-coated mirror for a reflecting telescope on a satellite (why not aluminium?—it reflects down into the vacuum ultraviolet). But in general his science is sound.

Over all, the book is well written and the translation is free, for the most part, from awkward constructions. The technical production of the book is good, but there are a few obvious proofreading errors. There is one bad error in the labeling of a diagram, but it is so obvious that it should not bother the reader.

I feel that anyone interested in learning about the efforts in space science both in Soviet Russia and elsewhere (up to the launchings of the first sputniks) would profit greatly from reading this book.

The Structure of Metals: A Modern Conception. Lectures by G. V. Raynor, J. A. Catterall, A. G. Quarrell, J. Nutting. 118 pp. (Inst. of Metallurgists) Interscience Publishers, Inc., New York, 1959. \$4.00. Reviewed by David Turnbull, General Electric Research Laboratory.

IN this book are published the 1958 lectures of a refresher course for metallurgists arranged annually by the British Institution of Metallurgists. The purpose of these courses is to survey the current state of knowledge of some aspect of metallurgy.

Though the book is called *The Structure of Metals* the coverage is limited essentially to electronic and dislocation structures. There are four papers entitled and authored as follows: (1) The Electronic Structures of Metals by G. V. Raynor, (2) Experimental Aspects of the Electron Theory of Metals by J. A. Catterall, (3) Dislocations in Metals by A. G. Quarrell, and (4) Seeing Dislocations by J. Nutting.

The papers by Raynor and Quarrell for the most part follow quite closely the patterns of the corresponding treatments in elementary texts on metal physics. The papers of Catterall and Nutting give useful summaries of some of the important new experimental develop-