use of data from tables at the back of the book. Problems in nuclear physics require use of halftones showing cloud-chamber and bubble-chamber tracks and tracks in nuclear emulsions. Many of the problems are written interestingly and some include bits of history and biography. Such names as Delil', Stoletov, Avenarius, Mendeleev and Cerenkov appear along with Knudsen, Langmuir, Kelvin, Millikan, Laue and Maxwell. The evolution of ideas is sometimes indicated. Problem 125 contrasts Newton's and Laplace's viewpoints in calculating the speed of sound in air. In several problems the Thomson atom is contrasted with the Bohr model.

The notation is generally acceptable, but one might have made better choices than these: linear expansivity β, volume expansivity α, temperature coefficient of resistivity κ, water equivalent of a thermometer k, specific heat q. Also, while problems refer clearly to necessary plates and data tables, it is not so easy for one who has become interested in a plate or table to identify it and find the relevant problems. This could be improved by giving informative titles to halftones 1–11 and to tables 2, 3, 5.

The level and interest of the questions can be best illustrated by a few samples.

"1. A box containing thermometers of the Florentine Academy (1660) with 50° scales was found by chance in Florence in 1829. It was found that 50° Florence (Fl) corresponded to 44°R and 0°Fl = −15°R. Find an expression for converting degrees of the Florentine scale to degrees centigrade (°C)."

"112. A heater is switched on in a room for a certain time. The air temperature in the room rises from T_1 to T_2, whilst the pressure remains the same and equal to the outside pressure. Regarding air as an ideal gas, find the amount of heat that goes into increasing the internal energy of the air in the room."

"404. Close artificial Earth's satellites move with velocities of the order $V = 8$ km sec^{-1}. Could a hydrogen (H), nitrogen (N) or oxygen (O) atom, elastically reflected from a satellite, ionise an atom of the same type in the atmosphere? The ionisation potentials are respectively 13.60, 14.47, 15.56 eV."

"663. By using the Mössbauer effect, it is possible to measure the gravitational frequency shift. Use has been made for this purpose of the γ rays emitted by an excited Fe^{57} nucleus (energy of the γ rays $E_{12} = 14.4$ keV, line width $\Gamma = 3\times10^{-13}\ E_{12} \approx 4\times10^{-9}$ eV). For what height difference between the receiver (absorber) and source is the γ line displaced 1 percent of the line width (a change in the absorption of the γ rays can already be noticed here?")

This is an especially attractive book for use as a supplementary text in a course where the main text may offer few illustrative problems for the use of the student.

Tools for theoreticians

FUNCTIONAL ANALYSIS. By Kosaku Yosida. 458 pp. (Springer-Verlag, Berlin) Academic Press, New York, 1965. $16.50

by J. G. Taylor

Research in physics requires constantly sharper tools, both in theoretical and experimental physics. The tools in theoretical physics are those provided by mathematics. Although such tools do not assure success in our understanding of the physical world they are, without doubt, very helpful in achieving such success. Furthermore, there are certain unsolved and fundamental problems concerning the elementary particles, such as arise in local quantum field theory, which cannot even be stated without considerable mathematical sophistication. In such a situation it is necessary that the research worker keep abreast of modern mathematical developments and that the student catch up with them.

Does this book help to do this in functional analysis? Yes it does. It does it by means of its content, and also by means of its handling of this content. The content is given by the chapter headings: 0, Preliminaries; 1, Seminorms; 2, Applications of the Baire-Hausdorff Theorem; 3, The Ortho-

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gonal Projection and F. Riesz's Representation Theorem; 4, The Hahn-Banach Theorem; 5, Strong Convergence and Weak Convergence; 6, Fourier Transform and Differential Equations; 7, Dual Operators; 8, Resolvent and Spectrum; 9, Analytical Theory of Semi-Groups; 10, Compact Operators; 11, Normed Rings and Spectral Representations; 12, Other Representation Theorems in Linear Spaces; 13, Ergodic Theory and Diffusion Theory; 14, The Integration of Equation of Evolution. The subject matter is developed almost ab initio, though in a concentrated manner, so that each of the above topics is thoroughly discussed. There are also useful references at the end of each chapter to a very satisfactory bibliography given at the end of the book, which is extremely up to date.

A further good feature of the book is the large number of examples used in illustrating theorems; these examples are mainly of commonly met function spaces, etc.

A criticism that must be made is that there is not enough emphasis on the generality of certain results, and one does not get an overall picture of the modern developments of functional analysis (particularly in the theory of locally convex spaces); to be balanced against this is the very large number of more detailed results that can be obtained by methods mainly of use in normed spaces.

Thus the book is something of a recipe book. I have no hesitation in recommending it as a balance to the loftier abstractions of Nicolas Bourbaki.

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Random sampling

THE MONTE CARLO METHOD: The Method of Statistical Trials. Yu. A. Schreider, ed. Trans. from Russian by G. J. Tee. 381 pp. Pergamon Press, Oxford, 1966. $12.50

by Alan G. Henney

It is the intention of the authors to expound the basic features of the Monte Carlo method, to give an adequate account of the techniques used, and to exhibit typical examples to illustrate the principal fields of application.

The result is a book designed for a wide circle of readers, ranging from those who are interested in the fundamental applications of the method, to those who are concerned with comparatively limited problems connected with the peculiarities of simulating physical processes. Techniques are described for generating and transforming random and pseudo-random numbers, computing multidimensional integrals, and simulating complex systems of control and operations research. Several chapters are devoted to applications associated with neutron physics and radio technology. There is also a section dealing with the design of specialized computers for performing Monte Carlo computations.

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The reviewer is a staff member at the Naval Ordnance Laboratory.

Engineering MHD

A TEXTBOOK OF MAGNETOHYDRODYNAMICS. By J. A. Shercliff. 265 pp. Pergamon Press, Oxford. 1965. Paper $3.95

by J. Gillis

The author's declared purpose was to provide a textbook for advanced undergraduate and graduate students, with the emphasis on physical understanding rather than on mathematical technique. This aim would seem to have been realized, and the result is an extremely useful little volume.

The science of magnetohydrodynamics (provided that frequencies are low and displacement current is negligible) is actually pre-Maxwellian; indeed Ritchie's pump, which worked in 1832, was essentially an MHD instrument. However the present great interest in the subject has its origins in the post World War II period and can be traced to three causes; the realization that nearly all of the matter of the universe is in a state to which MHD equations apply, the stability problems of magnetic confinement of a hot plasma, and the usefulness of MHD devices in reactor technology.

A curious feature of the present state of the science is the huge lead of theory over experiment. It is to be