a firm than to teach the methods of a long established business to a professional programmer. This book covers almost everything about programming and computers, needed by such personnel, except, of course, the specifications of the particular system installed in their office. As in a previous book on programming by McCracken, a hypothetical computer, DATAC, incorporating features of the various business computers on the market, is described and used in the text rather than any existing computer. This is a disadvantage; as I indicated above, one learning to program for a computer should run several programs on that computer. However, there is a good chance that, in view of the excellence of this book, DATAC simulators will be written for various existing computers. This will enable one to run problems written in the DATAC code on a particular computer.

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Ascidiacea. *Discovery Reports*, vol. 30. R. H. Millar. Cambridge University Press, London, 1960. 160 pp. Illus. 70s.

This monograph is based on 2500 specimens representing 78 identifiable species, principally from the Falkland Islands and the Patagonian shelf, but also from other subantarctic islands and some material from New Zealand as well. There are 13 new species.

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Science Study Series. *Horns, Strings, and Harmony*. Arthur H. Benade. 263 pp. Illus. $0.95. *The Restless Atom*. Alfred Romer. 192 pp. Illus. $0.95. Doubleday, Garden City, N.Y., 1960. (Available to secondary school students and teachers from Wesleyan University Press, Columbus, Ohio.)

These most recent volumes of the "Science Study Series" maintain the high standards set in its previous books. The series is being published by the Physical Science Study Committee as one part of its program for improving high school physics education. The books are intended to be read profitably by young students and by laymen. Amazingly enough, they seem to be successful on both levels.

The new books are well written. This does not necessarily mean that they are easy; each book will demand careful, hard reading from the nonprofessional reader. However, if he is sufficiently interested in the subject or if his intellectual curiosity is great enough, his work will be well rewarded.

Horns, Strings, and Harmony was written by Arthur H. Benade (Case Institute of Technology). Benade's main field of research is in nuclear physics, but he continues an old Case tradition by studying the physics of music.

Following an introduction that is partly autobiographical, Benade presents some of the physics necessary for understanding musical vibrators. He then discusses how the structure of the human ear determines our hearing of music. The various types of musical instruments examined range from strings to brasses to woodwinds. The final chapter applies the information found in the earlier sections by giving instructions for constructing simple trumpets and woodwinds.

Benade's book communicates well his love for both music and physics. Not only is the reader reminded of the compatibility of music and physics, but he sees how the study of either subject can provide some valuable understanding of the other.

Alfred Romer (St. Lawrence University) wrote *The Restless Atom*. It is a clearly written, exciting account of the revolution which occurred in physics between the 1890's and the 1910's.

Romer does not attempt to give a complete history of atomic physics; he stops after indicating the first successes of Rutherford and Bohr. Relativity and quantum mechanics are hardly mentioned. Nevertheless, Romer gives the reader a good appreciation for modern understanding of the atom. He accomplishes this by telling his limited story well.

He starts his story with a brief description of Röntgen's discovery of x-rays, backtracks to describe the understanding of the elements current before Röntgen's work, and then proceeds to describe the rapid developments which followed. Romer recounts the work of Becquerel, the Curies, the young Rutherford, Crookes, Soddy, and Bohr, among others. He presents the problems that confused them, their groping for answers, and the gradual creation of a workable picture of the atom.

The Restless Atom leaves the reader eager to learn more about the development of quantum mechanics, and it gives him a good background for such study.

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Moisture in Textiles. J. W. S. Hearle and R. H. Peters, Eds. Textile Book Publishers (Interscience), New York; Butterworths, London, 1960. ix + 203 pp. Illus. $6.50.

Although moisture in textiles has been a topic of fundamental importance for many years, not all aspects of the problem have been properly appreciated by students and recent research workers. This book, based on a series of lectures given at the Manchester College of Science and Technology, provides some help in a convenient, compact form. The authors of the various chapters are well known authorities, each an expert in the field he discusses.

In the first chapter, P. S. H. Henry discusses humidity: how it varies seasonally, diurnally, indoors, and out-of-doors; how it is affected by the presence of people, furniture, and windows. A brief chapter by J. W. S. Hearle describes the structures of the principal textile fibers in use today. These two introductory chapters lay the foundation for the remainder of the book.

In an excellent chapter on sorption isotherms, A. R. Urquhart summarizes research on moisture regain and explains in nontechnical language the principal theories proposed to account for the phenomena observed. The next paper, by W. H. Rees, is an interesting and lucid discussion of the heat of absorption; the latter part of this chapter explains the thermostatic action of hygroscopic textile materials when used for clothing.

In the next two chapters, G. King reviews the various theories of moisture absorption. J. Crank follows with three chapters on the rate-of-change of moisture content, simultaneous diffusion of heat and moisture, and diffusion of moisture in fiber-forming substances. Hearle follows with a chapter on moisture and electrical properties. R. Meredith has contributed two chapters on the physical properties of textile fabrics. Hearle, in the final chapter, discusses fibers and liquid water.

The book is aimed at the level of the advanced undergraduate student, except for the two chapters by King, which require a good understanding of chemical thermodynamics. Each of the chapters provides a list of references to technical literature and thus serves as a starting point for further study. On the whole, the book provides an interesting, concise review that can be read with profit by students and research workers.

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Introduction to the Theory of Quantized Fields. N. N. Bogoliubov and D. V. Shirkov. Authorized English edition, revised and enlarged by the authors. Translated from the Russian by G. M. Volkoff. Interscience, New York, 1959. xvi + 720 pp. Illus. $17.

This book demonstrates that the effects of the Iron Curtain were not wholly evil. The rapid development of quantum field theory during the years 1945–1953 was carried out almost exclusively by Western and Japanese scientists. The work was done in a hurry, in a confused and disorderly way, as is usual in any rapidly expanding field of science. The men chiefly concerned in the work were too much preoccupied with the next unsolved problem to write a coherent account of what they had already done. The Russians, compelled by force of circumstances to stand outside the battleground, had time to consider and reflect, to organize the new ideas into a balanced and scholarly exposition. As a result, the Russians have produced the two best textbooks on field theory published during the last 10 years, the first, *Quantum Electrodynamics* (by Akhiezer and Berestetskii), and now the book under review.

The emphasis throughout this book is on mathematical precision. For the first time the details of quantum electrodynamics, renormalization, and the subtraction of divergences are presented in a style free of mathematical sloppiness. This means that the customary procedures for obtaining finite results from perturbation theory are rigorously justified, while the attempts to calculate explicitly with infinite quantities are shown to be meaningless. The limits within which the standard methods of field theory are valid have thus been precisely defined.

This is not a textbook for beginners in field theory. For beginners the book by Akhiezer and Berestetskii would be much more suitable. In this book Bogoliubov and Shirkov pay very little attention to the applications of the theory, and they do not discuss any approximation methods other than perturbation theory. The book is addressed to the expert, especially to the mathematically trained person who wishes to understand the basic principles of field theory without following the devious path along which the subject developed historically.

The first eight chapters of the book form a coherent whole, and they describe rather completely the state of field theory as it existed in 1956 before the "dispersion theory approach" became fashionable. Since the ninth and last chapter deals with the subject of dispersion relations which was developing rapidly at that time, it is on a different level. Bogoliubov's proof of dispersion relations has been added as a mathematical appendix to the English addition; it arrived just too late to be included in the Russian edition of the book. Thus, the ninth chapter is inevitably less satisfactory than the rest of the book. The detachment in space and time, which gave the first eight chapters their scholarly and unhurried style, is noticeably absent here.

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New Books

Mathematics, Physical Sciences, and Engineering

Ashford, Theodore Askounes. *From Atoms to Stars.* An introduction to the physical sciences. Holt, Rinehart and Winston, New York, 1960. 654 pp. $8.50.

Atkin, R. H. *Classical Dynamics.* Wiley, New York, 1959. 281 pp. $5.75.

Bauer, Edward L. *A Statistical Manual for Chemists.* Academic Press, New York, 1960. 166 pp. $4.75.

Bentley, K. W. *The Natural Pigments.* vol. 4 of *Chemistry of Natural Products.* Interscience, New York, 1960. 313 pp. $5.

Berl, Walter G., Ed. *Physical Methods in Chemical Analysis.* vol. 1. Academic Press. New York, ed. 2, 1960. 700 pp. $19.

Boucher, H. *Organisation et fonctionnement des machines arithmetiques.* Masson, Paris, 1960. 435 pp. NF. 70.

Brand, J. C. D., and J. C. Speakman. *Molecular Structure.* The physical approach. Arnold, London; St. Martin's Press, New York, 1960. 308 pp. $8.

Branley, Franklyn. *The Moon.* Earth's natural satellite. Crowell, New York, 1960. 114 pp. $3.50 (juvenile book).

Cable, J. Wesley. *Vacuum Processes in Metalworking.* Reinhold, New York; Chapman and Hall, London, 1960. 208 pp. $5.50.

Chapman, Alan J. *Heat Transfer.* Macmillan, New York, 1960. 464 pp. $9.

Chase, Grafton D. *Principles of Radioisotope Methodology.* Burgess, Minneapolis, 1959. 294 pp. $6.

Christiansen, G. S., and Paul H. Garrett. *Structure and Change.* An introduction to the science of matter. Freeman, San Francisco, 1960. 623 pp. $8.75.

Clauss, Francis J., Ed. *Surface Effects on Spacecraft Materials.* Wiley, New York, 1960. 419 pp. $11.50. Transactions of the first symposium on the requirements of materials for temperature-control surfaces of spacecraft and the behavior of material surfaces in space.

Daniels, Farrington, Ed. *Photochemistry in the Liquid and Solid States.* Wiley, New York, 1960. 180 pp. $6. Based on some of the papers presented at a symposium held in September 1957. These papers discuss photochemical reactions, photosensitized reactions, fluorescence, kinetic considerations, triplet state, reactions involving chlorophyll, and photoreactions in solids.

Elliott, John F., and Molly Gleiser. *Thermochemistry for Steelmaking.* vol. 1. Addison-Wesley, Reading, Mass., 1960. 304 pp. $10.50. First volume in a series that is planned to collate, consolidate, and summarize the available data pertinent to the physical chemistry of steelmaking. The work was carried out at Massachusetts Institute of Technology and was supported by the American Iron and Steel Institute.

Feigelson, E. M., *et al. Calculation of the Brightness of Light in the Case of Anisotropic Scattering.* Translated from the Russian. Consultants Bureau, New York, 1960. 104 pp. Transactions of the Institute of Atmospheric Physics, No. 1, 1958.

Foust, Alan S., *et al. Principles of Unit Operations.* Wiley, New York, 1960. 588 pp. $15. The preliminary draft of this book has been used for more than 2 years as a text for junior students at Lehigh University.

Goldfarb, Nathan. *An Introduction to Longitudinal Statistical Analysis.* The method of repeated observations from a fixed sample. Free Press, Glencoe, Ill., 1960. 233 pp. $5.

Gould, David F. *Phenolic Resins.* Reinhold, New York; Chapman and Hall, London, 1959. 220 pp. $5.75.

Haaser, Norman B., Joseph P. LaSalle, and Joseph A. Sullivan. *Introduction to Analysis.* vol. 1. Ginn, Boston, 1960. 733 pp. $8.50.

Handbook of Filtration. Eaton-Dikeman, Mt. Holly Springs, Pa., 1960. 125 pp.

Harris Lawson P. *Hydromagnetic Channel Flows.* Technology Press and Wiley, New York, 1960. 96 pp. $2.75.

Harrison, Thomas R. *Radiation Pyrometry and Its Underlying Principles of Radiant Heat Transfer.* Wiley, New York, 1960. 246 pp. $12.

Hille, Einar. *Analytic Function Theory.* vol. 1. Ginn, Boston, Mass., 1960. 319 pp. $6.50.

Jones, James B., and George A. Hawkins. *Engineering Thermodynamics.* An introductory textbook. Wiley, New York, 1960. 742 pp. $8.50.