

many of the readers and justify the writing of the book. On the other hand, some of the applications of x rays are not covered at all, for example scattering by gases, measurement of stresses. The usefulness of the book could be improved very much by a detailed subject index. There are many instructive problems, some of them difficult and time consuming to solve, at the ends of the chapters; they appear to result from the author's teaching at Northwestern University.

* * *

Martin E. Straumanis is professor of metallurgy and research professor of materials at the Graduate Center for Materials Research, University of Missouri at Rolla.

Practical math for use

MATHEMATICAL METHODS IN THE PHYSICAL SCIENCES. By Mary L. Boas. 778 pp. Wiley, New York, 1966. \$11.95

by Jacques E. Romain

Reviewing this book was a rather lengthy task as the reviewer was so engrossed in his reading that he had a recurring tendency to forget he was reviewing and keep reading for his own pleasure. Boas's students (she is presently teaching at DePaul University in Chicago) are lucky fellows: Not everyone enjoys such a vivid and practical introduction to applied mathematics. It is a good fortune for present-day students (and instructors) all over the country, and abroad as well, that the result of the author's teaching experience and unique ability for lively, attractive and to-the-point presentation are now available in book form.

The book, which is intended for students with one year of calculus, does not claim to study every field in detail. It is not written for abstract mathematicians even though it would be a good idea for pure-math students to have a look at it and become quickly aware of the practical use of what they are taught. The purpose is to enable the reader to develop a basic competence in the areas that will be relevant to his later physical work, essentially by giving careful definitions, stating the necessary theorems and the simpler relations (many without proof), and by stressing the use and usefulness of the

methods, the particular techniques and their limitations.

The reader who has digested this book will not know everything of the theory and rarer details of any of the topics covered. But he will know principal available techniques for dealing with physical problems, with a clear notion of what these techniques can and cannot do; he will be supplied with examples of applications and shortcuts and will be cautioned against pitfalls, and he will know where to find more on the subject if necessary. The book is particularly well suited to self-study, thanks to the numerous stimulating examples that are worked out to illustrate possibilities and difficulties and to the impressive collection of problems, a good many of which have numerical answers given in an appendix.

The topics covered are infinite series, complex numbers and functions, determinants and matrices, partial differentiation and multiple integrals, vector and tensor analysis, Fourier series, differential equations, calculus of variations, special functions, integral transforms (Laplace and Fourier), probability and essentials of elementary statistics.

* * *

The reviewer formerly taught mechanics, theoretical physics and applied mathematics. Presently he is a scientific adviser in the same fields.

Modern infrared

INFRARED INSTRUMENTATION AND TECHNIQUES. By A. E. Martin. 180 pp. American Elsevier, New York, 1966. \$12.00

by Stanley S. Ballard

All workers in laboratory phases of infrared instrumentation will find this book of great value, and so will those who are involved with the so-called field applications of infrared technology. Martin is head of the infrared department of the Grubb-Parsons firm in England and is in a most knowledgeable position to write on the subject of instruments for the infrared spectral region.

The major part of the book is devoted to succinct descriptions of modern infrared spectrometers and spectrophotometers. It appears that this



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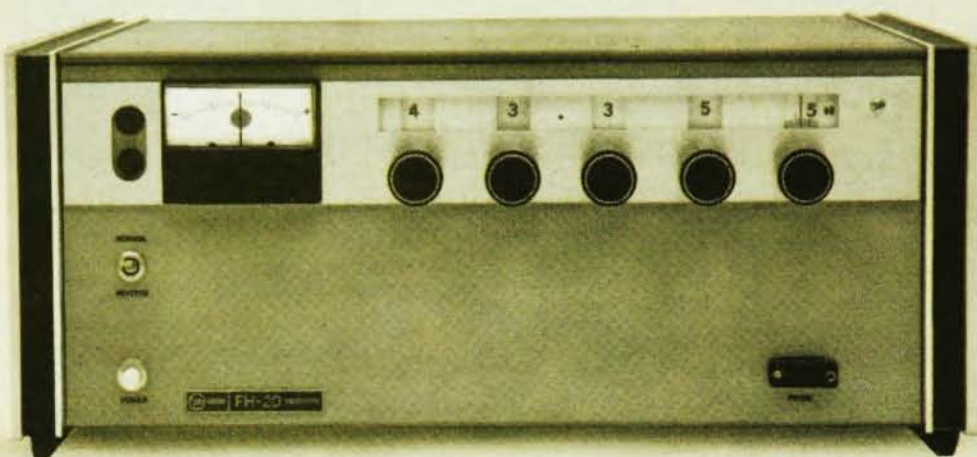
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field, which was dominated by American scientists and engineers only 10-15 years ago, has now been successfully invaded by British manufacturers. Thus substantial coverage is given to the three or four British firms where such instruments are produced as well as to the equal number of well known American firms.

The book is strictly modern in that it discusses theory and applications of interferometric spectrometers and also such recently introduced analytical methods as attenuated total reflection (ATR), often called frustrated total reflection (FTR) in this country. Persons not familiar with the use of either interferometer-spectrometers or these new reflection techniques will

Static and understanding

NOISE AND ITS EFFECT ON COMMUNICATION. By Nelson M. Blachman. 205 pp. McGraw-Hill, New York, 1966. \$13.50

by Sanford E. Gerber

In this book Blachman has attempted to bring together in a single volume a number of related topics that apparently had not been so collected previously. The book is divided into three parts as follows: part 1, Statistical Properties of Noise and Random Signals; part 2, Demodulation, Detection, and Other Non-Linearities and part 3, Information Theory.

In the preface of the book, Blachman suggests that it is a text for "a full year's course." He fails, however, to suggest what the subject matter of that course might be. He further fails to indicate who should take such a course. For example, I found part 1 extremely difficult to understand, while parts 2 and 3 much less so. One wonders if the combination of topics is such as to preclude any given individual from using this book as one text in one course. The author does suggest that parts of the book can serve as text material for parts of one course.

In general, it is a good book and one worth having as reference. It fails, in part, both as a reference and text in two ways: In far too many instances the author has failed to define symbols used in equations, and in many other instances he uses equations that are

find excellent introductions to them herein.

There is a long chapter on accessories for infrared spectrometers and spectrophotometers and one on sample preparation that will be useful to laboratory scientists and technicians.

The book is well written and well printed and is illustrated with numerous well executed line drawings. It will provide the reader with a wealth of specific practical information as well as the needed theoretical backup.

* * *

The reviewer, chairman of the Department of Physics and Astronomy at the University of Florida, is a long-time worker in spectroscopy and infrared instrumentation.

found elsewhere but changes their symbols. For example, although his discussion of signal detection is rather good, he has used symbols different from those conventionally used to express likelihood ratios.

This review gives me an opportunity I have long awaited to make a general complaint about books of this kind. I do not mean to be unfair to Blachman. He is neither more nor less guilty than other authors on related topics. My complaint has to do with the repeated and incorrect use of such phrases as "We suppose that . . .," "It is seen that . . ." and "It follows that . . ." I am always bothered by gnawing questions, such as, "To whom is it obvious?" "Who is doing the supposing?" I find that I chronically fail to so suppose and that it frequently is not obvious, no matter how casual my observation. I must commend Blachman, however, for not using the phrase, "It is obvious even to the casual observer that . . ." I consider this an enormously poor excuse for failing to explain what one is doing.

I would recommend this book for the sophisticated reader, but I question its value as a textbook for any but the most advanced and specialized student.

* * *

Sanford E. Gerber was formerly in the Communications Division of Hughes Aircraft and is now on the faculty of the University of California at Santa Barbara.

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