BOOK REVIEWS

Foundations of information theory. By Amiel Feinstein. McGraw-Hill Electrical and Electronic Engineering Series, New York, McGraw-Hill Book Company, Inc., 1958. 10+137 pp. $6.50.

In the event that the mathematical readers of this review have been approached by electrical engineers interested in understanding the Radon-Nikodym theorem, they should not be surprised. The question may have been inspired by attempts to read the volume under review. Interest of electrical engineers in mathematically sophisticated probability theory is reaching the dimensions of a sociological phenomenon in several universities. Registration of electrical engineers in introductory evening graduate courses in probability theory on the order of five times the day enrollment from other university sources in corresponding day courses is not at all uncommon.

For those mathematicians who do not care to abdicate from this rapidly growing area of mathematical training for engineers, it would be well to present a little of the background. The term, information theory, may be best understood by considering the content of the I.R.E. *Transactions on information theory.* This content is characterized by the use of probability and statistics in the problems of communication and control, and for engineering publication is sophisticated in mathematical methods, with material close to parts of the Annals of Mathematical Statistics. Some of the broad categories covered in this publication follow: (1) *Stochastic* (most frequently gaussian) *processes.* The material here is influenced by the pioneering papers of S. O. Rice, *Mathematical analysis of random noise,* Bell System Tech. J. vol. 23 (1944) pp. 282–332; vol. 24 (1945) pp. 46–156 and is available in textbook form (reasonably packaged for the engineering reader) in Davenport and Root, *An introduction to the theory of random signals and noise.* A good deal of this material is treated at a mathematical level not readily accessible to the average engineer in J. L. Doob, *Stochastic processes.*

A typical result of the kind included here is the Kac-Siegert result on the theory of noise in radio receivers with square law detectors. (2) *Prediction and filtering.* This includes developments from Wiener's generalization of regression theory applied to problems of automatic control. This is conveniently packaged for the engineer in the textbook by Laning and Battin. A typical result of interest to engineers is the one by Zadeh and Ragazzini on polynomial signal with finite observation time. Some recent mathematical develop-