Book Reviews

Mathematical Thinking in the Social Sciences. Paul F. Lazarsfeld, Ed. Free Press, Glencoe, Ill., 1954. 444 pp. $10.

This is an era of rapid interplay between theory and method in sociology and social psychology. There is a search for empirical categories that can be utilized within general theoretical schemes, and a decreasingly slavish reliance upon statistical techniques borrowed from other disciplines. Thus, Lazarsfeld has performed a timely service by stimulating and assembling in this volume a variety of challenging, readable papers which apply mathematics to psychological and social questions *per se.*

Much of the book's specific content relates to the study of the individual human being and his attitudes. It includes such long-awaited materials as Lazarsfeld's own conceptual introduction to latent structure analysis and Louis Guttman's announcement of a psychological theory to match his previously published mathematical theory of principal components. T. W. Anderson applies stochastic analysis to the prediction of future attitudes. Jacob Marschak, in a general discussion of probability, deals with subjective probability, a concept that seems to come close to that of attitude. Herbert A. Simon, in a brilliant exposition, compares models of rational behavior, as these have been developed in economics especially, with models that set limits to rationality and incorporate such notions as motivation and learning. Guttman in a second paper introduces, and illustrates from mental testing, a new radex theory of factor analysis. Portions of the book also relate to the study of the group, as distinct from the individual: notably, in Simon's mathematical translation of certain of George Homans' theoretical postulates; Nicolas Rashevsky's enunciation of models for imitation and social status distribution; and James S. Coleman's lucid commentary on the Rashevsky models.

Apart from its specific content, the volume illustrates the general role which may be played by mathematical thinking in the social sciences. First, it provides numerous instances of the use of mathematics to derive additional propositions from initial theoretical postulates—propositions that might not have been reached through the more cumbersome language of words. Second, certain of the models—those involving status, for example—may perhaps seem to be oversimplifications, poor representations of empirical reality. If so, this should point up the challenge of mathematics to the substantive theorist to clarify his concepts to examine his assumptions, and to communicate with greater precision. Third, the book suggests the relative ease of comparing and integrating theories from diverse fields once these theories have been translated into the basic language of mathematics. Marschak, for instance, demonstrates from economics that groups cannot always be effectively treated as mere aggregates of their individual members, a principle that might well be heeded in developing further sociological group models. Finally, the interplay between models and data, the *sine qua non* of useful mathematical application, is dramatized in Guttman's engrossing account of the way he fitted together the many solutions to an equation and the several components of an attitude.

The volume represents, of course, an early stage of development. Much research remains to be done before the proximity between many of these models and their empirical counterparts can be determined. Many computational problems must be solved before some of the necessary operations can be performed by the average social scientist. Yet the book points in a direction that should at once quiet the pangs of some who have bemoaned the "emptiness" of earlier quantitative approaches and focus the efforts of others who have long been looking to mathematics for greater precision of conceptualization and measurement and fresh insights into the complex relationships among the variables of social science.

MATILDA WHITE RILEY
Department of Sociology, Rutgers University

Active Networks. Vincent C. Rideout. Prentice-Hall, New York, 1954. xvi + 485 pp. Illus. $10.65.

Most physical objects are passive in the sense used in the expression "passive networks." These are electric circuits consisting of resistances, capacitances, and inductances, containing no energy sources, and characterized by having a small "response" to a small "stimulus" (except for relatively rare unstable configurations), and in which transient disturbances ultimately die out. If a component capable of amplification—for instance, a vacuum tube and associated power supply—is added to such a network, transients need not die out; large response (output) can be obtained with a small stimulus (signal); the network is "active." Many active physical systems can be devised—electric, mechanical, chemical, their combinations, and others. The great variety of behavior possible in such systems and their comparative "irritability" make them, rather than passive systems, what one would choose in constructing physical analogies for vital behavior.

The tube circuits of the communication and controls engineer seem to be the portion of this field that has been most highly developed. This book gives an excellent introduction to a large variety of electronic circuits, makes no demands on the reader's mathematical knowledge beyond the elements of differential and integral calculus, is well organized, and is well written. Each of its 15 chapters has a bibliography of textbooks and original journal articles, several hundred carefully chosen references in all, help-