point but present the necessary formula without further ado." Similarly, the definitions are not always very precise, as the author recognizes: "It is not our intention to confuse the reader with a series of definitions. That would be the usual textbook approach."

The result is a book that is very easy to read, but unfortunately this ease is partly obtained by glossing over the subtle and difficult points, especially in the calculus. The author realizes this to some degree, for he writes (page 175), "The expert in pure mathematics will probably hold up his hands in horror at our exposition. We believe however that it is better to have a rough idea than no idea at all. In any case our method was good enough to satisfy the mathematicians of the seventeenth century and any enthusiastic reader who wishes can pursue the subject further in a more comprehensive book of higher mathematics." How true! But the mathematician, whether he is in pure or applied mathematics, may be excused for balking at the antiquated treatment of the calculus or at such statements as (page 57): "Zero is not in itself a number though it is often treated as if it were; it separates the positive from the negative numbers."

It is a pity that the mathematics is not more accurate and up to date because there can be no question of the author's skill at exposition. His writing is lucid and entertaining, and it seems certain that many people in no position to recognize the inadequacies will find in the book just the thing they had been looking for in mathematics—an easy style, a constant encouragement to continue, and an absence of problems or exercises.

IVAN NIVEN
University of Oregon

Essays in Linguistics. Viking Fund Publications in Anthropology, No. 24. Joseph Greenberg. Wenner-Gren Foundation for Anthropological Research, New York, 1957 (order from University of Chicago Press). 108 pp. $3.

This collection of essays will further the increasing awareness of the significance of so fundamental a trait as language to any general science of human behavior.

The first two essays, on "Language as a Sign System" (pages 1–17) and "The Definition of Linguistic Units" (pages 18–34), are the most immediately relevant to general linguistic methodology. Of particular interest is the discussion of the nature of the grammatical analysis of natural languages and of how, given samples of expressions in the system, the linguist attempts to produce an infinite number of additional expressions which belong to the same system. By definition, an infinite number of expressions cannot be listed and, consequently, can only be generated by some set of rules. Current research in syntactic analysis is aimed at clarifying the techniques for deriving such rules and for identifying the units to which the rules apply. In this connection, most linguists will not agree with Greenberg's segmentation of forms like *man* into /m-n/ and /-æ-/ for the singular; rather they would prefer the analysis to reveal the similarity of the singulars *man* and *pan*; Greenberg's suggestion projects onto the singular forms the differences which are apparent in the corresponding plurals, *men* and *pans*. And, indeed, this is Greenberg's purpose: to make explicit the premises on which linguistic analysis is based and to develop the consequences of a rigorous adherence to those premises.

The essays on "Genetic Relationship among Languages" (pages 35–45) and "The Problem of Linguistic Subgroupings" (pages 46–55) contribute to a clarification of the assumptions of historical and comparative linguistics. It has sometimes been maintained that the comparative method involves a fundamental circularity—namely, that one cannot establish phonetic laws without cognates but that one cannot establish cognates without phonetic laws. Greenberg indicates four causes of sound-meaning similarities which may be observed between languages. Of these, two are nonhistorical—chance and symbolism, the latter being Greenberg's cover term for the occasional nonarbitrary connection between sound and meaning as exemplified by onomatopoetic forms and by some nursery words like those for "mother" and "father." "The remaining two—genetic relationship and borrowing—involve historic processes. The two basic methodologic processes then become the elimination of chance and symbolism leading to hypotheses of historic connections and the segregation of those instances in which borrowing is an adequate explanation from those on which genetic relationship must be posited" (page 37). Essentially, the circularity disappears with the establishment of other-than-chance resemblances.

The remaining four essays include a number of original and fruitful notions on such topics as language and evolutionary theory, genetic and nongenetic classifications, function, efficiency and redundancy in language, linguistic universals, and so forth.

The essays in this volume are independent of one another and are in no way intended as a systematic over-all treatment of linguistics. Nevertheless they seem to share two features: a desire to explore the relationship between linguistics and other disciplines—particularly logic, mathematics, anthropology, and psychology—and, in the process, to apply some of the more rigorous techniques developed in these areas to the scientific study of language. The result is a stimulating book, revealing a variety of approaches for the analysis of linguistic phenomena.

SOL SAPORTA
Indiana University

Meat Hygiene. WHO Monograph Series No. 33. World Health Organization, Geneva, 1957 (order from Columbia University Press, New York). 511 pp. Illus. $10.

In this book on meat hygiene, the World Health Organization has compiled papers prepared by 16 of the world's foremost authorities on the subject. The book is interesting, instructive, and beautifully illustrated.

Three of the papers are scientific treatises: those by C. E. Dolman, of the University of British Columbia, on meat-borne diseases; by H. Drieux (Ecole Nationale Veterinaire, Alfort, France), on tuberculosis; and by G. Schmid (University of Berne, Switzerland), on parasites.

The highly authenticated and well-documented papers of Dolman and Drieux highlight the monograph. In his "Epidemiology of Meat-Borne Diseases," Dolman organizes the material in a way that permits a full, convincing and logical presentation. He brings together the many ramifications of the subject of meat-borne diseases in a way that enables the reader to understand the relationship between the many probabilities that tend to confuse the student and even the meat-hygiene practitioner.

Drieux's paper on tuberculosis is a masterpiece. What is remarkable about his paper is that he has taken a subject that many would regard as having been pretty well exhausted by an array of authors and has given it fresh treatment from the meat hygienist's point of view. His paper serves two purposes—the first, of course, to inform the reader fully on the subject matter and the second—which seems to me to be more important—to inform meat hygienists that the science of disease evaluation in terms of fitness for food of an animal carcass is a fascinating and exacting one.

M. M. Kaplan (World Health Organization, Geneva) has a paper on meat-hygiene problems in tropical areas. His account of what might be described as primitive conditions as he sees them from the point of view of a public health official shows how the official's problem is complicated by merging of hygienic, eco-