Glock has summarized the data on pentoses. She has included a number of helpful metabolic "maps." The difficult work in the field of purine and pyrimidine biosynthesis has been covered by Peter Reichard. The reader is aided considerably in understanding the means by which assignments of the metabolic origin of the atoms of these compounds were made through the inclusion of numerous charts of the degradation methods employed. The next chapter by Fritz Schlenk covers not only the biosynthetic pathways for nucleosides and nucleotides but includes a discussion of the hydrolases as well. The literature is reviewed critically and the important point of the biological origin of the enzymatic preparations is consistently noted.

Brown and Roll have written a superb chapter in which the biochemical literature on the biosynthesis of the nucleic acids is organized on a framework of the biological aspects of these compounds. The detailed numerical data have been pulled together into a single table. These authors are to be commended for the cohesive narrative style in which they review and discuss this involved and rapidly developing area. In the succeeding chapter, Smellie has reviewed the more physiological aspects of nucleic acid metabolism and catabolism. The catabolism of the nitrogenous portions of the nucleic acids is covered in more detail in this chapter than it is in other places in the volume. The literature on the incorporation of phosphorus-32 is usefully summarized in three carefully prepared tables.

The final two chapters are indeed a fitting conclusion to the two volumes. In the first of these, the biological activities of DNA are discussed in an elegant manner by Rollin Hotchkiss. Nowhere have I read a more concise summary of this aspect of DNA than that which concludes this chapter. Brachet wrote the final chapter; he reviews the rapidly growing body of evidence for the role of pentose nucleic acid in protein synthesis, morphogenesis, and plant viruses. Many pieces of evidence are pulled together to evaluate each of the principal hypotheses on these topics. A lengthy addendum brings the reader up to the exciting present.

The documentation of the chapters in this volume is impressive, both with regard to the recency and number of references. One-half to three-quarters of the references are dated 1950 or later. Many references are from 1954. There are from 100 to 300 references per chapter. Relatively few errors were found. There is considerable overlap of subject matter between a number of the chapters, with resultant overlap in references. Few cross references by page are employed.

This volume alone represents a unique work in its field. The two volumes together form an indispensable reference unit; but they are more than that, for they carry the added value of critical consideration and discussion by many leaders in this important field.

JESSE F. SCOTT
Massachusetts General Hospital

Principles of Animal Virology. F. M. Burnet. Academic Press, New York, 1955. x + 486 pp. $10.

Burnet's book is certain to be read by a wide group of people who will seek to be informed about those aspects of the subject in which they have interest, but not highly specialized knowledge. I do not believe that they will be disappointed or misled. The book is a very ambitious one in that it seeks to interpret a tremendous range of experimental observations. Burnet is well fitted for this task, for he is a lucid, finished writer with laboratory background, and he has previously carried out some successful smaller operations of this general character. As might be expected, the most stimulating chapters deal with subjects in which the author had vital personal experiences. This applies particularly to those concerned with immune mechanisms, virus variation, and epidemiology. These will provide fascinating reading to those unfamiliar with this field; in addition, they will also be of interest to anyone who attempts to follow the forming outlines in this jigsaw puzzle.

Specialists are bound to carp about points of interpretation relative to their own subjects but probably should not be taken too seriously. However, Burnet is no tyro in the field of poliomyelitis (which is my major interest), so it seems fair to criticize him here. I found the topics chosen for presentation germane but their development occasionally cloudy. For example, it is quite permissible to call attention to the difficulties of understanding poliomyelitis as a disease caused by an exclusively neurotropic virus, but to say that axonal transmission of this virus is a "hypothesis" blurs the subsequent discussion, since it indicates a lack of clear understanding of the many observations on this subject. There were times, also, when I sighed over the omission of some reference to work which to me has seemed important in the development of thinking in this field. One, in particular, was the failure, in the table that details *the* important animal passage experiments, to mention the adaptation of poliomyelitis virus to rodents by Armstrong in 1939. This discovery furnished a technique that during the succeeding 10 years made it possible to lay the groundwork for current successes in immunization with inactivated vaccines.

These criticisms need not imply serious faults in the book, but they indicate rather that one should not expect everything. Omissions are inevitable and one great asset of single authorship is a kind of continuity which is missing from the symposium-type books now so numerous in this field. I found that nearly every chapter gave me a good idea. This, I think, achieves the primary aim of the book—to stimulate. The bibliography is also reasonably extensive and should be an invitation to those who would go further.

HOWARD A. HOWE
Johns Hopkins University

Stuttering in Children and Adults. Thirty years of research at the University of Iowa. Wendell Johnson, Ed., assisted by Ralph R. Leutenegger. Univ. of Minnesota Press, Minneapolis, 1955. xviii + 472 pp. $5.

For a long time there has been a need in the field of speech pathology for a book devoted entirely to researches in the age-old problem of stuttering. Stutterers constitute one of the largest groups of handicapped people in the world. It is estimated that there are 15 million persons who stutter.

This new book contains 43 papers that have resulted from the research program at the State University of Iowa during the last 30 years. Many heretofore unpublished studies are also included.

A great deal of the work centers on the onset of stuttering in children and proposes the theory that the defect begins with the parent rather than with the child. The authors advance the view that stuttering is what the talker does in trying to keep from stuttering again. In other words, Johnson believes that stuttering is a conditioned response resulting from an anxiety to avoid stuttering.

Many of the studies reviewed in this volume deal with interpersonal relationships between personality and stuttering, conditions affecting the severity, variations in the amount of stuttering, and approaches to stuttering therapy.

Part VII is a review of several studies that were formerly available only at the University of Iowa library.

The styling of the volume is excellent. Proper credit and appreciation are given to all the graduate students whose academic labors are so well documented.

I am of the opinion that the total research picture of the Iowa Speech Pathology Laboratories, in order to be complete, should include detailed accounts of