Lenneberg, Eric H. *Biological Foundations of Language*. Malabar, Florida: Robert F. Krieger Publishing Company, 1984, 489 pp, $39.95 (U.S.) (A reprint of the 1967 edition).

In his preface Lenneberg presents the general thesis that this book is an attempt to:

> reinstate the concept of the biological basis of language capacities and to make the specific assumptions so explicit that they may be subjected to empirical tests (Lenneberg, 1967, 1984, viii).

In effect the author produces a book which describes the region where biology and language intersect. The awesome nature of the task is best understood when one reflects upon the immense body of literature in the field of biology alone and the diversity of subject matter to be dealt with by the serious investigator.

The book marshalls evidence from an impressive array of sources. The first six chapters are closely related and might best be described in Lenneberg's own words as 'selected pertinent biological facts of the mechanisms that relate to the use of language' (p.27).

In chapters 1-6, Lenneberg presents the biological foundations with allusions to language and speech. Chapter 1, the conceptual framework deals with 'a vast territory citing embryological, anatomical, physiological and genetic facts pertinent to a great variety of animals.' In chapter 2, he makes a strong argument for the view that the generally common features of man's vocal faculty account for certain universal aspects of human speech and he emphasizes the importance of the human central nervous system. While the evidence for cortical mapping and subcortical and midbrain involvement in language and speech is inconclusive, his initial explorations paved the way for subsequent experiments for resolving what Zangwill (1975) came to call "Lenneberg's question."

Chapter 3 is devoted exclusively to human speech and its production, while chapter 4 deals with language in the context of growth and maturation. The role of 'need' as a basis for learning language or speech is discounted, as is practice. Hence, Lenneberg, in rejecting 'need' as either related to maturation or to the acquisition of language, substitutes the acquiring of language as a consequence of maturity itself.

Chapter 5 presents a brief discussion of the topic of aphasia in which the author disagrees with the view that 'aphasia is a loss of language' and the corollary that the aphasic individual faces a task that is comparable to a child's learning a natural language. For Lenneberg, aphasia is the result of 'lack of availability of language at the right time.'

In chapter 6, Lenneberg discusses topics which might have been (logically) subsumed under an earlier topic. How did language come about? How does it happen to be restricted to man? As the author states, the biological history of language is 'covert'; its evolution is hidden in the series of transformations, structural and functional, that took place in the course of the formation of modern man (pp. 264-265).

In chapters 7-8, language and speech are discussed with allusions to their biological foundations. Some of the same emphases evident in earlier sections carry through: (1) language is a categorizing process, (2) there is a right time for acquiring language, (3) language emerges as an individual becomes skilled in differentiating his 'primitive language,' as he resonates some features of his environment, (4) the deep structure of all natural languages is similar, and (5) there is no evidence that the superficial differences among languages affect the thought process differentially.

In his final chapter, the author summarizes his argument in thirteen postulates: (1) Language is evidence of a cognitive process, much deeper than language itself. (2) The cognitive process is one of establishing increasing numbers of new categories of similarities and differences among physical stimuli and likewise of perceptual processes that are set up by the stimuli. (3) Although some of the universal features of languages may relate to the peripheral, the anatomical, and the physiological characteristics of the species, language can be mastered when the peripheral features are lacking. Thus, language behavior is closely related to central functions. (4) Differences in language in their outward form and underlying structure are limited to the range of individual differences in cognition. (5) Maturation brings cognitive processes to a state of *language readiness*, a realization of what was formerly only potential. Thus, a 'latent language structure' evolves into a 'realized structure'. (7) The development of cognitive processes accompanies an increasing skill in differentiation. Language readiness is a stage in this development. (8) The singular stage of differentiation is of limited duration. It begins around two and declines with cerebral maturation in the early teens. (9) If the biological accompaniments

of latent language structure are universal and replicated in healthy human beings, it follows that these human beings can learn one natural language as easily as another at the time of 'language readiness.' (11) The unfolding of language is a developmental process, not a mirroring of stimuli nor a purposeful behavior. (12) Again, language behavior develops with an increasing capacity for differentiation. The behavior acts upon the oral language of the environment. With language readiness, some crude segments of the environment seem to be copied. These, however, are only convenient outer manifestations of the deeper realization of latent structure. (13) As the close replications account for language universals, so the exceptions (wide individual differences) account for language change. Underlying all the foregoing propositions is an assumption that the human being represents a developmental process and that one segment of this development is a biological accompaniment of language prereadiness, readiness, and postreadiness. These states determine the organism's response to his language environment.

In *Biological Foundations of Language* Lenneberg has provided the reader with a feeling for the biological basis upon which his theory of language development is grounded. In this respect, the book is not light reading, but it is clearly written and Lenneberg's treatment of the subject provides an account which is both informative and interesting in terms of what is known (and is perhaps now well known) about language from other approaches.

History will probably remember Lenneberg best for his synthesis of the biological issues underlying the human capacity for language. In fact, his concern to place the study of cognitive and linguistic development in a firm biological foundation finds a sympathetic audience in Chomsky (Appendix A), who takes Lenneberg's view of innate mechanisms as his starting point. Chomsky's main thesis is that the study of grammar, not the study of language use, is most likely to provide valid insights into the limits that man's genetic endowment imposes on the languages that it is possible for children to master.

Lenneberg's *Biological Foundations of Language* presents the thesis that "man's language capacity is based on specific, biologically determined propensities...." From a historical perspective, it represents a landmark discussion of the biological foundation of conceptual thought as well as language. However, his views appear to be somewhat dated, particularly in light of the shift in interest by psychologists, linguists, sociologists and others, from a concern with function over form. As Bruner (1983), put it, by the 1970s, the study of language acquisition shifted toward a more functional emphasis primarily because the child had to have some knowledge of the "real" world before he could effectively unravel the mysteries of syntax. Indeed, the current emphasis seems to be related to *use* and *function* — to illocutionary force as well as to locutionary form.

Nevertheless, Lenneberg's concern to ground the study of cognitive and linguistic development on a firm biological foundation is a concern shared by anyone who is interested in a serious study of the relationship of language to thought. In many aspects, *Biological Foundations of Language* represents a landmark study of this relationship. And despite the differences in outlook present today, Lenneberg's contribution represents a profound contribution to the study of both language and biology.

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