the main reason for their lack of interest in landing a man on the moon. The average life span of cells in the taste buds of vertebrates is only 200 to 300 hours. The weather satellite Tiros VI, launched September 18, 1962, photographed tropical storms Claudia, Emma, Freda, Gilda, Daisy, Jean, Karen, and Lucy.

One kilowatt-hour of electricity is now being generated from 0.85 pound of coal, on the average. Sexual behavior is primarily dependent upon activity of the central nervous system. A researcher has formulated a mathematical model based on this idea which yields predictions closely supported by experimental data. One somewhat novel sentence: "The fewness of helicopters being used for transportation contributes significantly to their over-all speed."

In all seriousness, however, the McGraw-Hill Encyclopedia is too well known to need favorable comments for its coverage of technical matters. This volume carries on in providing timely supplementary material.—*W. J. Cunningham*

The Speech Chain: The Physics & Biology of Spoken Language by P. B. DENES & E. N. PINSON; 158 pages; $.75 each for 10 to 24 copies; Bell Telephone Laboratories (The Williams & Wilkins, Co., Baltimore, Md., distributor), 1963.

Denes and Pinson have written an excellent elementary textbook that stresses the interdisciplinary character of present-day speech science. It is aimed at advanced high school students, but it can perhaps be used more profitably on the college level. The authors' intimate awareness of, and participation in, recent research is apparent even in the general thoughts offered in the introductory chapter.

The role of linguistics as the discipline that furnishes the theoretical framework for much phonetic research does not emerge clearly, but the authors do convey the notion that there are important linguistic constraints on the perceptual processing of the speech signal. The sections on the anatomy and physiology of speech and hearing are clear and straightforward, omitting nothing essential, but the speech "major" will have to do considerable supplementary reading to gain a knowledge of muscles and their functions.

The authors lucidly present the basic principles of acoustics, with emphasis on those needed for the study of speech. No sophistication in mathematics and physics is assumed on the part of the reader. The concept of resonance, crucial to an understanding of the transmission properties of the vocal tract, is briefly but clearly set forth. The latter part of the book is devoted to a survey of the acoustic characteristics of speech. The authors then go on to describe how the experimental manipulation of both natural speech and synthetic speech is used in the psychoacoustic testing of hypotheses on the acoustic cues to speech intelligibility.

The slimness of the volume and the clarity of the style tend to mislead students into underestimating the contents. Yet, if, upon graduation, the average student of speech therapy or audiology were truly in control of the contents of this little book, he would have far stronger disciplinary underpinnings to his professional training than he typically seems to have today. —*Arthur S. Abramson*

The Language of Nature (An Essay in The Philosophy of Science) by DAVID HAWKINS; 372 pages; $7.50; W. H. Freeman & Co., 1964.

As the reader may have guessed, the language mentioned in the title is mathematics. The first nine chapters, five sevenths of the book, give a rather extensive survey of the structure of principles and axioms in many if not most fields of mathematics and mathematical physics and discuss some of their epistemological significance. This ranges from number theory, set theory, and formal logic over some geometry, kinematics, dynamics, and more modern theoretical physics, to statistical problems: probability theory, statistical thermodynamics, information theory, and the theory of induction. In all of