111. Lilly, John C., Henry M. Truby, Alice M. Miller, and Frank Grissman 1967. "Acoustic Implications of Interspecies Communication." Miami. Communications Research Institute. J. Acous. Soc. of Amer. Vol. 42: P. 1164. I10 (Abstract.)

Reprinted from

THE JOURNAL
OF THE
ACOUSTICAL SOCIETY OF AMERICA

Volume 42 Number 5

NOVEMBER 1967

I10. Acoustic Implications of Interspecies Communication. JOHN C. LILLY, HENRY M. TRUBY, ALICE M. MILLER (nonmember), AND FRANK GRISSMAN (nonmember), *Communication Research Institute, Coconut Grove, Florida.*—When, in interspecies exchange of information, the dominant modes of the communication are vocal and acoustic, some of the physical limitations imposed upon the communication are shown by the hearing curves and the acoustic energy output curves. Additional limitations are shown in the difference frequency limen curves and in certain time-pattern perception limitations. One such communication system is the interlock or feedback between a single individual *Homo sapiens* (Hs) and a single individual *Tursiops truncatus* (Tt). The speech output of Hs was measured with a high-frequency microphone; detectable amounts of energy were found above the generally accepted speech band, up to the order of 60 kc. This high-frequency energy is detectable by Tt as is shown by its hearing curve from 400 Hz to 160 kHz. The usually accepted limits for Hs–Hs transmissions for 100% intelligibility are from approximately 100 Hz–10 kHz. The Hs–Hs feedback control thus is limited to approximately 10 kHz; i.e., energy above this limit is not controlled nor used by Hs. In the Hs–Tt transmission, this energy functions as an adequate stimulus to Tt. Thus, to Hs this high-frequency energy is unknown noise but can be mistaken by Tt for signals. Further consideration of the physical limitations on Hs–Tt vocal exchanges are considered with a feedback diagram and quantitative calculations based on the hearing curves and the sonic–ultrasonic output of Hs and Tt. Thus, in treating another species with a different hearing curve and a different sonic energy output, it is imperative to have quantitative physical measures in order to find channels that are adequately open both ways between the different species. Such considerations determine necessary acoustical and electrical transforms of the outputs and inputs from and to each member of the different species. [Work supported in part by AFOSR and NIH, NINDB.]