

per unit mass, β is the logarithmic coefficient of thermal expansion, and ρ_0 is the density. Maximum radiation occurs at $\theta = 0$. [This work was supported by the U. S. Office of Naval Research.]

Q13. Experiments on a Laser-Excited Array. T. G. MUIR, *Applied Research Laboratories, The University of Texas at Austin, Austin, Texas 78712.*—The generation of highly directive sound through thermodynamic expansion of media illuminated by modulated laser light has recently been proposed by Westervelt and Larson [J. Acoust. Soc. Amer. 53, 384(A) (1973)], and paper Q12, 85th Meeting Acoust. Soc. Amer.]. Measurements on the field of a thermoacoustic array so created are reported in the present paper. A pulsed ruby laser operating in the conventional mode was fired into an absorptive copper sulfate solution. The noiselike light burst was found to

generate a sound burst perpendicular to the optical path with a directivity as predicted by the Westervelt-Larson theory. Data on the conversion efficiency and on other critical parameters of the experiment are discussed and interpreted with respect to theory. [This work was supported by the U. S. Navy Office of Naval Research.]

Q14. Wide-Band Response of the Parametric Acoustic Array. K. G. FOOTE, *Brown University, Providence, Rhode Island.*—Westervelt's theory of the parametric acoustic array [J. Acoust. Soc. Amer. 35, 535-537 (1963)] is generalized to continuum sources of arbitrary spectral composition. A general expression for the angular distribution of difference frequency radiation is derived, in the random phase approximation, and evaluated for the case of a delimited band of white noise in a medium of constant attenuation.

WEDNESDAY, 11 APRIL 1973

BAY STATE ROOM, 2:00 P.M.

Session R. Speech Communication II: Speech Perception and Intelligibility

RICHARD C. BERRY, *Chairman*

Boston University, Boston, Massachusetts 02215

Contributed Papers (7 minutes, variable discussion time)

R1. Decision Processes in Speech Discrimination as Revealed by Confidence Ratings. DAVID L. GLANZMAN AND D. B. PISONI, *Department of Psychology, Indiana University, Bloomington, Indiana 47401.*—Standard speech discrimination tests require the listener to make a decision about a given sequence of stimuli. For example, with the ABX test the listener is required to determine whether the third stimulus is most like the first or most like the second. This test along with several other forced-choice procedures has the excellent property that the E need not specify the dimension along which the stimuli differ, e.g., select the stimulus with the higher pitch. The typical measure of the listener's performance is the percentage of stimuli correctly discriminated. However, in recent attempts to examine the processes underlying the identification and discrimination of speech sounds, it has become apparent that the listener's task, i.e., providing just a single response, may not accurately reflect all the information that the listener may have available to him about the stimuli. For example, sometimes a listener may be quite certain that his response was correct whereas other times the listener may be very uncertain about his response. In this study we examined how listeners assign confidence ratings to discrimination judgments for a set of synthetic stop consonants and a set of steady-state vowels. The confidence ratings obtained with both ABX and 4IAX discrimination procedures carry additional information about the stimulus properties of consonants and vowels and provide some insight into the decision processes employed in the discrimination of these two classes of speech sounds.

R2. Effect of Practice on Intelligibility of Masked Speech. JERRY V. TOBIAS, *Civil Aeromedical Institute, Federal Aviation Administration, Oklahoma City, Oklahoma 73125.*—Anecdotal evidence often is used to illustrate how people who live or work in noise can hear and understand signals that are inaudible or unintelligible to others. Following a procedure previously used to test the ability to learn to understand *distorted* speech, learning curves were generated for six untrained lis-

teners. The speech materials were imbedded in enough white noise that well-trained listeners averaged 80% intelligibility. In their first minute of listening to this masked speech, the experimental subjects' scores ranged from 5% to 29%. After approximately 25 minutes, subjects reached plateaus ranging from 48% to 90% intelligibility; the plateau value was correlated with the score from the first minute of listening. The learning curves show a somewhat shallower slope than that for distorted signals. One unexpected but interesting piece of information that derives from these data is that speech-reception thresholds for masked signals are not necessarily similar from listener to listener. This finding is particularly pertinent in the development of valid audiometric tests for those who work in noise.

R3. Attentional Control in Speech Perception. R. M. SHIFFRIN, D. B. PISONI, AND K. CASTANEDA-MENDEZ, *Department of Psychology, Indiana University, Bloomington, Indiana 47401.*—Does the ability to identify speech stimuli entering an ear depend on the number of ears being monitored simultaneously for these stimuli? Two tests of this question were carried out to examine the operation of attentional control during auditory perceptual processing. Condition 1 involved simultaneous monitoring of both ears for the presence on one of four consonant-vowel syllables. Condition 2 involved successive monitoring of the ears in a known order, 500 msec apart, for the same stimuli. In the simultaneous condition, O must split his attention among both ears. In the successive condition, O can give all his attention to each ear in turn. Thus, models proposing limitations of capacity and attentional control during perceptual processing predict an advantage for successive presentation. Experiment I presented only one of the four target stimuli on any trial. Experiment II always presented, in addition, a non-confusable syllable on the non-target ear. In both cases the near equality of performance in the simultaneous and successive conditions suggests that only minimal attentional control could have been present.