The resulting data are presented and the degree of correlation between the cues is compared with that of data obtained from the human. [Supported in part by the National Science Foundation.]

10:45

C8. Cues for Auditory Localization in the Rat. F. FLAMMINO AND B. M. CLOPTON, *Department of Psychology, University of California, Santa Barbara, California 93106.*—Rats were trained to indicate the direction of a sound source under two conditions. The first task was set in an anechoic chamber with free-field stimuli. Tone bursts from 1 to 10 kHz were used. The relationship of mean correct responses to stimulus frequency was similar to those obtained with humans performing in localization studies. The rats showed a decrement in performance in the region of 5 kHz, suggesting that they utilize interaural time cues for stimulus frequencies below 5 kHz and interaural intensity differences above about 6 kHz. In the second condition, time and intensity cues could be varied independently at each ear. The rats were able to lateralize the source when the stimulus at one ear led by 80 μsec (phase-shift equivalent) at 3 and 4 kHz. They were unable to do so at 5 and 7 kHz. The results indicate that despite their small head size rats are able to use both time and intensity cues in localizing the source of sounds. [Supported in part by NINDS Grant NS09551 and a General Research Grant, U.C. Academic Senate.]

11:00

C9. Detection of Signals of Unpredictable Frequency with Simultaneous Contralateral Cue. C. DOUGLAS CREELMAN, *Department of Psychology, University of Toronto, Toronto, Canada M5S 1A1.*—Thresholds were found and tracked for each of an ensemble of signal frequencies using the PEST adaptive testing procedure under three different conditions, for three observers. On each trial, the signal was in one of two time intervals, and was presented at the current best estimate of threshold for that frequency. The most interesting situation was where the signal frequency on each trials was selected at random from the ensemble, while during both intervals within the trial the chosen signal was presented to the contralateral ear without noise, in phase and equal in amplitude with the chosen signal. This is the MDCC paradigm (monaural detection with contralateral cue), which has been extensively investigated by M. M. Taylor and his co-workers. Other conditions involved presentation of the same frequency each of a long run of trials, with and without the contralateral cue. These results confirm those of Taylor and Forbes [J. Acoust. Soc. Am. 46, 1519–1526 (1969)] in showing lower frequencies aided by the contralateral cue more than higher frequencies, with considerable individual differences both in the magnitude of the threshold improvement and in the frequencies over which the MDCC paradigm is helpful. The contralateral cue was helpful to observers in overcoming the loss due to frequency uncertainty only in the case of those frequencies for which the observer was able to use the cue to lower his threshold with fixed-frequency detection. A contralateral cue is not necessarily successful in specifying the signal to be listened for when frequency is unpredictable. Some members of the ensemble continue to show the 3–5 dB effect of uncertainty, and these frequencies are those for which MDCC is not helpful to simple detection. [Supported by the Canadian National Research Council.]

11:15

C10. A Forced-Choice Procedure for Measurement of Combination Tones. G. W. JENKINS, P. M. ZUREK, AND B. LESHOWITZ, *Department of Psychology, Arizona State University, Tempe, Arizona 85281.*—A three-alternative forced-choice procedure was employed to measure monaurally the phase and amplitude of the cubic combination tone, $2f_1 - f_2$. To measure phase, two primaries f_1 and f_2 were presented simultaneously with a third tone at frequency $2f_1 - f_2$. The third tone had phase θ in two intervals and phase $\theta + 180°$ in the third interval. A plot of percent correct discrimination as a function of θ was used to determine the phase of the combination tone. The phase of the combination tone was calculated to be $\pm 90°$ from the value of θ which resulted in minimum discrimination. A "mirroring" technique was then employed to determine the amplitude of the combination tone. In the odd interval a cancellation tone was added 180° out of phase from the combination tone. Percent correct discrimination was measured as a function of the level of the cancellation tone. It was assumed the minimum in the function occurred at a level 6 dB greater than the combination tone. The results obtained from various objective and adjustment procedures will be compared. [This research was supported by an NIH grant.]

11:30

C11. Identification of the Temporal Order of Three Tones: Effect of an Added Tone. PIERRE L. DIVENYI AND IRA J. HIRSH, *Central Institute for the Deaf, St. Louis, Missouri 63110.*—Experienced and musically trained monaural listeners had to identify the order of three 20-msec tones whose frequency covered a $\frac{1}{3}$-octave range (891, 1000, 1118 Hz) and which were followed by a fourth tone of variable frequency. The listeners were instructed to ignore this added tone. Overall identification performance was relatively unaffected when the frequency of this tone was far from the range of pattern frequencies, and was most affected when the frequency of the added tone was slightly (up to $\frac{1}{3}$ octave) higher than the highest frequency in the pattern. When the added tone and one of the three pattern tones had the same frequency, the patterns in which the first tone coincided with the added tone became less identifiable. Results of another experiment showed that lengthening of the added tone actually improved identification of the three-tone permutations.

11:45

C12. Discrimination and Labeling of Noise–Buzz Sequences with Varying Noise-Lead Times. J. D. MILLER, R. E. PASTORE,* C. C. WIER, W. J. KELLY, AND R. J. DOOLING, *Central Institute for the Deaf, St. Louis, Missouri 63110.*—The onset of a noise (0.9–2.1 kHz, 55 dB SPL) preceded that of a buzz (100 Hz, 0.5–3.0 kHz, 70 dB SPL, 500 msec) by −10 to 80 msec and both terminated simultaneously. Eight adults discriminated among noise-lead times in an oddity task. In separate sessions, they labeled singly presented stimuli with two responses of their choice such as "short noise" and "long noise" or "no noise" and "noise." The results are highly similar to those reported for the phoneme boundary between voiced and voiceless synthetic plosive consonants. Discrimination was optimal across a 16-msec noise-lead time boundary and labeling shifted abruptly at the same noise-lead time. The results can probably be accounted for in terms of judgment of temporal order or the difference limen for duration of the leading part (noise-alone) of the stimulus.

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