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An Audio-Oscillator Technique in the Study of Beating Intertones

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device, developed in connection with this study, which photographs a graphic representation of breath pressure changes at the mouth. The subjects sing into a closely fitting face mask from which two rubber tubes lead to the two recording devices. The complete set-up was calibrated by having a sound wave and a wave of pressure start into the mask simultaneously. Several records were taken to insure that they were arriving at their respective recording instruments simultaneously. The device was constructed so that changes in frequency and breath pressure actuate points of light, causing the records to be graphically recorded on Eastman sensitized paper.

The conclusions, while tentative, seem to indicate that (a) not all vibratos have an intensity fluctuation, (b) not all trained singers sing with a diaphragmatic vibrato, and (c) most vibratos present a periodic fluctuation of wave form, or timbre, in addition to the frequency changes.

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AN AUDIO-OSCILLATOR TECHNIQUE IN THE STUDY OF BEATING INTERTONES

INGVALD B. HAUGE

In a previous study of the beating complex by the writer two electrically driven tuning forks having frequencies of 256 d.v. and 244 d.v. respectively were used as the source of the tones. The intensities of the two tones could be valued independently from maximum to minimum by means of rheostats. The sound was conducted to the observer in a sound proof room by means of rubber tubes. When the two primary tones had equal intensities two beating intertones were heard. The pitch of one was near the upper primary while the pitch of the other was near the lower primary.

Some limitations of the above technique are: The beat frequency can be varied only a limited amount by weighting the prongs of one fork. To investigate higher or lower frequency ranges additional pairs of forks are required. The tuning fork does not respond quickly to a change in the current supplied. The frequency of the forks cannot be changed while they are vibrating.

The audio-oscillator technique has none of the above mentioned limitations. An audio-oscillator produces a comparatively pure tone. The frequency can be varied throughout the range of audible tones. Intensity changes can be effected without changing the frequency.

It offers the means of investigating the following problems: Is there a fixed ratio of the frequencies of the two primaries at which two beating intertones are heard? Under what conditions are two beating intertones heard when two primary tones are sounding? What are the maximum and minimum beat frequencies at which two intertones are heard throughout the range of audibility?

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SOME ASPECTS OF THE PROBLEM OF FATIGUE

CHRISTIAN A. RUCKMICK

In general fatigue is introspectively describable in terms of kinaesthetic relaxation and low attentive ebb of ideas with an affective aspect of indifference, sometimes bordering on mild pleasantness. Galvanic responses taken by both the Hathaway apparatus and a highly sensitive D'Arsonval galvanometer show marked individual differences with a general tendency toward lower bodily resistance under fatigue. Two types of fatigue are distinguished: cognitive fatigue and bodily or physical fatigue. Under some experimental conditions both types may be combined. The galvanometric response varies with each type. Muscular fatigue, due probably to continued residual twitchings and tremblings, tends to show increased response, while cognitive fatigue usually shows diminished response. The technique and results are given in detail.

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THE EXPERIMENTAL PSYCHOLOGY OF THE PRESCHOOL CHILD (*Illustrated*)

BETH L. WELLMAN

Since the establishment of the first preschool psychological laboratory in 1921, the Iowa Child Welfare Research Station has been conducting, as one part of the program in the mental development of young children, a series of experiments that have been repeated, extended and amplified from year to year. These experiments have been planned to afford detailed analyses of performance and the evaluation of psychological processes rather than test standards or the clinical diagnosis of a particular child.