

PHYSICS—PHYSIOLOGY

Voice of Adolescent Boys Drops or Rises an Octave

Acoustical Society of America Hears Reports on Human Voice and How to Amplify It for Audiences

THE VOICE breaks of adolescent boys that commonly put a high-pitched squeak into the otherwise low but immature adult voice are now being studied, it was reported to the meeting of the Acoustical Society of America at Iowa City by Grant Fairbanks of the State University of Iowa.

With scientific apparatus it is found that almost as many voice breaks occur at 10 years of age as at the age of 14. Very frequently the voice will break downward although upward breaks are more frequent. The average break represents a change of pitch of 8 tones, or one octave.

Other studies at the University described by Mr. Fairbanks showed that trained actors can simulate the emotion of contempt with a pitch range of 10.5 tones. Anger was simulated with a range of 10.3 and required a very rapid change of pitch.

The highest average pitch and the greatest range of tone (11.2) was required to express fear. Grief needed only a tonal range of 9 and indifference had the lowest range of all, only 7.8 tones.

Photograph Vocal Cords

WITH high speed motion picture photography Dr. John C. Steinberg of the Bell Telephone Laboratories showed movies of the vibrations in the

human vocal cords taken at the rate of 4,000 pictures a second.

When projected at the normal speed of only 16 a second speed reduction ratio of the pictures was 250 to one so that when the cords were vibrating 250 times a second (essentially the tone of middle C—256) the cords in the movie vibrated only once a second.

For low-pitched sounds the cords appeared relaxed completely. As the tension in the vocal cords increased the pitch went up.

These vibrations of the cords, emphasized Dr. Steinberg, do not possess the distinguishing characteristics of different speech sounds. The latter characteristics are produced by the passage of the sound waves through the throat, nose and mouth cavities.

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Amplifiers Aid Theater

THE USE of microphones, amplifiers and other acoustical apparatus is now bringing to the theater the whole gamut of sounds which the human ear can hear, Harold Burriss-Meyer of Stevens Institute of Technology told the meeting.

While formerly it was possible to have complete control only over the lighting of the stage, and the actors had not only to interpret their parts but to overcome bad architectural acoustics, it is now pos-

sible to achieve added dramatic value through sounds.

"It is possible to use sound," explained Mr. Burriss-Meyer, "as an arbitrary independent means for stimulating predictable involuntary audience reaction; to engender by auditory means that emotional flux which will make it easy for the audience to suspend disbelief, to laugh at, weep for, or believe in something which would have seemed absurd when first the curtain went up."

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MINING

Japan Plans Exploitation Of Iron and Coal Deposits

JAPAN plans the exploitation of immense iron ore and coal deposits in Manchukuo, in the still wild and inaccessible Tungpientao district near the Korean boundary. The deposits of high-grade iron ore are estimated at 100,000,000 metric tons.

The Tungpientao Development Company has a project which calls for the production, by the end of 1941, of 1,300,000 metric tons of iron ore, 1,300,000 metric tons of coal, and the construction of an iron and steel works with a capacity of 500,000 tons of pig iron and 100,000 tons of steel. A railroad into the district is now under construction.

John S. Stewart, discussing the project (*Far Eastern Survey*, Oct. 25), remarks:

"Whether the Japanese plan of a new heavy industry zone in a hitherto undeveloped area will be realized, depends, of course, on several vital factors. The steps outlined above merely break the ice. Assuming that the discoveries can be substantiated by later findings, the real test will come in raising the capital and equipment to get under way on a large scale."

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