

INVENTION

New Aid For Deaf Transmits Sound Through Bones or Teeth

Device, Serving Purpose Similar to Loud Speaker in Radio Set, Permits Afflicted Persons to Enjoy Music

A NEW device that brings radio and phonograph music to the deaf, not by way of the outer and middle ear passages but through their teeth or the bones of their heads, was demonstrated before the National Academy of Sciences, by Dr. Frederick Bedell, physicist of Cornell University.

Dr. Bedell describes his apparatus as a "deaf speaker," because it serves a purpose similar to the loud speaker in a radio set. The deaf speaker, however, does not broadcast sound, but carries it directly to the person who holds the receiving part of the apparatus between his teeth or pressed against cheek bone or forehead. To other persons in the same room, the apparatus is silent, which Dr. Bedell regards as one of the notable advantages of the device.

Defective Middle Ear

The theory upon which the physicist worked out his new speaker was that the majority of persons with defective hearing have a defective middle ear. His aim was to bridge that middle ear and bring the sound waves to the inner ear by some other channel.

By means of bone conduction this can be done. But it is not enough, Dr. Bedell found in his experiments, to transmit vibrations of the same frequency as the actual sound waves themselves to the inner ear of the listener. In order for him to hear through the bones, the vibrations must be adjusted to a suitable loudness, and force, and frequency. This adjustment is substantially what takes place in the normal middle ear. Dr. Bedell's deaf speaker achieves the adjustment by stepping up the force of the sound waves and making the amplitude or size of the waves smaller.

Since some persons are deaf to high tones and others fail to hear lower tones, the deaf speaker is provided with a means of fitting the type of tone to the listener's particular problem.

Dr. Bedell displayed two kinds of receiving instruments, or applicators, which he has developed. One kind is held between the teeth, and looks like a

long tube. The tip, made of thin wood, is removable, so that more than one person may use the same machine without using the same mouthpiece. The other receiver, a face applicator, is a flat disk to be held against cheek bone or forehead.

False teeth, the physicist said, are no hindrance to hearing with the mouth applicator. The disk type of applicator makes it possible for the listener, by means of a microphone, to hear his own voice. This is an advantage to the hard of hearing who rarely are able to know how their own voices sound.

The apparatus can be used with a microphone for teaching the deaf, Dr. Bedell reported to the Academy meeting. The box containing the apparatus is portable, but is not small enough to be carried on the person for general use.

"Nearly 15,000,000 people because of defects in hearing are completely debarred or partly debarred from enjoying benefits of radio programs and phonograph music," the physicist stated. "The need therefore is evident for a deaf speaker which will give audition to the

deaf similar to the audition given by a loud speaker to those having normal hearing."

That bone conduction can be used to carry sound waves to the inner ear has been recognized, but has not been widely applied in devising aids for the deaf.

It has long been known that, if a piece of cardboard is held before the mouth and one end of the board is caught under the upper teeth, curving the board, it is possible to hear conversation with the ears stopped. Greater volume of sound is necessary for bone conduction than for hearing through air passages of the ear.

Persons using a telephone often use bone conduction without thinking of it when they press the receiver tightly against the ear. The bone in front of the ear thus aids in catching the sound.

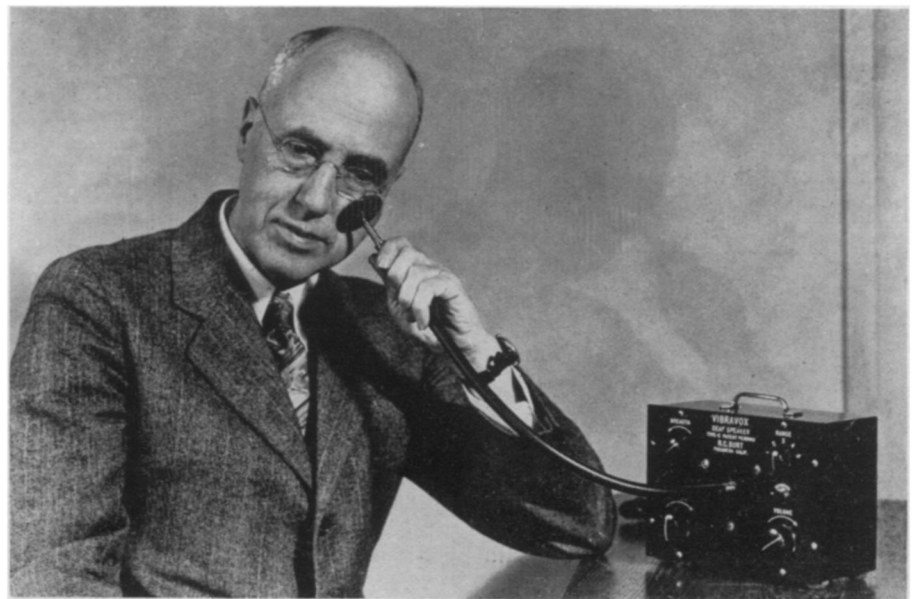
It is possible to hear music on a phonograph record by holding a long needle between the teeth and placing the needle in the grooves of the revolving record. This shows the principle of bone conduction although it is not a very practical working device.

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PHYSIOLOGY

Racial Factor Involved In Rate of Metabolism

THE RATE at which certain vital energy interchanges go on in the human body varies with different races, it appears from the report of Dr. Francis G. Benedict of the Carnegie Institution of Washington's Nutrition Laboratory



HEARING IN SILENCE

Dr. Frederick Bedell, physicist of Cornell University, using the face applicator which he demonstrated before the National Academy of Sciences.