

Design for an Ideal Hearing Aid

Harvard University research workers have devised a hearing aid that will work for all deaf or hard-of-hearing people. "Regardless of the nature of their particular defects, most patients hear best with an instrument which amplifies all frequencies uniformly, or with moderate emphasis of the higher frequencies," the researchers reported in "Hearing Aids: An Experimental Study in Design Objectives," published by the Harvard University Press.

In his preface to the report Dr. S. Smith Stevens, director of the laboratory, points out that "the net result of the study is a questioning of the dogma that hearing aids, like eyeglasses, must be fitted to individual ears."

"Hearing Aids" reports on the work done late in the war and in the early post-war months. This earlier work included such problems as how to cut down noise in airplanes and so reduce fatigue on long bomber and fighter missions and how to build telephones that could be used at high altitudes and in intense noise. Out of this work came Harvard's hearing aid study.

Questions About Hearing

It turns out that many good hearing aids are on the market and that among the better ones there is little to choose, but none brings speech to the defective ear with the clarity and crispness required under conditions of noise and stress. Questions arose: How differently do the various kinds of deafness limit hearing-aid design? How loud are the loudest sounds the human ear can tolerate? What is the effect of amplitude distortion on the intelligibility of speech? How does frequency distortion affect the intelligibility of what the listener hears?

A master hearing aid was con-

structed which allowed the experimenters to select by simple switch-throwing any one of several patterns of frequency or pitch response and the suitable limits of acoustic output. "MHA," as it was known in the laboratory, provided a choice of five simple frequency or pitch characteristics.

With the master hearing aid and eighteen deaf or hard-of-hearing persons who served as "guinea pigs," exhaustive experiments were made. Several hours a day for three months "the talkers" read off scientifically constructed word lists and "the listeners" wrote down what they heard. After tens of thousands of words had been read and heard under all varying conditions and the resulting data studied, it was found that hearing aids, unlike glasses, needed not be fitted.

Specifications Listed

The group next drew up specifications for the ideal hearing aid.

"When instruments are produced to these specifications, the problem of individual selection or 'fitting' will almost disappear," the group comments. Deaf or hard-of-hearing patients need only a well-fitting acoustically sealed ear-piece which is comfortable and which can be semi-permanently adjusted.

Dr. Stevens predicts that hearing aids to come will have midget batteries, bean-sized amplifying tubes and an earphone so small that it will not be visible from the front when worn. Also on the way for those who find it necessary "to be wired for sound" is an earphone in each ear so that the direction from which a sound has come can be noted, something which is necessary when several persons are talking at once.

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