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HEARING AIDS AND AUDIOMETERS: REPORT OF THE COMMITTEE ON ELECTRO-ACOUSTICS

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The Committee on Electro-Acoustics was formed in 1944 and set out to solve two practical problems which would go far to help the welfare of the many deaf persons in Britain today. One task was to design a single type of electrical hearing aid which would be small, light, reasonably cheap, suitable for mass production, and capable of giving good results for speech intelligibility for the majority of deaf persons. The other task was to determine the most satisfactory specifications for pure-tone audiometers for use in early diagnosis and accurate assessment of different types of deafness.

The need for a mass-produced hearing aid has been debated, but it was obvious that something had to be done to bring down the high cost of aids made by reputable firms, and to force out of existence the many unethical firms selling greatly advertised but very inefficient instruments. The high cost of good aids has been due to the inability, in this country, of any firm being able to sponsor a big enough initial cost to ensure mass production of efficient individual parts, in particular the miniature valves. The Government have been criticized for the decision to produce a new hearing aid and not to use the existing products of the industry itself. In Parliament the answers have been that this was done deliberately to avoid any further commercial exploitation, and that the contracts placed were based on tenders made in an open field.

This M.R.C. Report has been awaited with tremendous interest by all concerned with deafness. Any impatience for the issuing of it was unjustified when it is realized how much work has been done by the well balanced "team" of otologists and telephone engineers. The Committee must be warmly congratulated for the careful way in which the experiments and investigations were planned and executed, and for the concise form of the report. Nearly all the apprehensions of the "unenlightened" are dispelled: there is a proper warning that the aid is not likely to help those suffering from severe nerve deafness, and too high hopes should not be entertained for this group, which amounts to about 10% of the whole number. Other aids, of commercial origin, will be necessary to supplement the official ones in the endeavour to help these special cases. The report deals with the findings of a social survey (based on work by Beasley in the U.S.A.) and analyses the social degrees of disablement from deafness.

The report deals in great detail with the technical ways in which tests were made on groups of deaf persons, and issues an enormous amount of information on the construction and performance of hearing aids. The final specimen models were given careful clinical trials. They embody many points of various existing aids, with

nothing of a revolutionary nature. The criteria for the performance of the aids has been that of intelligibility of speech in common everyday surroundings. The optimum overall acoustic amplification has been carefully assessed, and the best frequency response and power output have been arranged to suit the majority of deaf persons. Variable tone controls are considered unsuitable. Careful tests appear to prove the justification of having only two standard settings of amplification (with the gain control adjusted to maximum sensitivity): the high frequency in one type being set higher than in the other by a convenient pre-set in a deafness clinic. Patients thus have to fit one of only two types of aid, which on the surface sounds unscientific, but electro-acoustically is correct. It does mean, however, that elaborate pure-tone audiometry is not essential for instrument prescription, which is a fact that has been well known for some time. Speech tests are the "yard stick" for hearing-aid fitting. One-piece units are impractical owing to the disproportionately high cost of miniature batteries, and therefore two-piece units of convenient size have been designed. Flat, light-weight, ear-cap type receivers of British make are advocated as well as the more popular insert type of American make, owing to the present difficulty of obtaining suitable British components for the latter. It has apparently proved necessary to use American valves (although a statement in Parliament on Oct. 30, 1947, by the Minister of Health, reports that the valves are British-made). Considerable freedom is left to manufacturers in their development of design to attain the performance described, but replacements are facilitated by the demand for closely specified component parts.

The arrangements for the issuing of the aids and their servicing is not dealt with in this report.

The second part of the report deals with the production of a reliable, standardized, and well-calibrated pure-tone audiometer. This plan fulfils the need for improving the methods for more accurate measurement of deafness for diagnostic and prognostic reasons. The following desirable characteristics are advocated: adequate upper-tone limit, accuracy of frequency scale, accuracy of attenuator steps, purity of wave form, absence of mains hum, and accuracy of threshold calibration. Until the actual articles are available for general inspection, trial, and use, it is inopportune to make any criticisms, but one is told that the specimen audiometers compare very favourably indeed with the latest types of expensive American commercial ones. It is, however, allowable to express the hope that provision is being made for such features as calibrated speech audiometry, gramophone-record input, malingering control, and group-testing facilities. As the Committee state that a further report will be issued at a later date, it is certain that this present one is only a forerunner of others, and many problems will be dealt with in a like efficient manner.

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