FOUR PROCEDURES FOR ABOVE-THRESHOLD MEASUREMENTS WHICH BECAME KNOWN ESPECIALLY IN GERMANY

Hans Kietz

For many years specialists have been trying to find a practicable above-threshold method. There are already several proposals, but none of the proposed solutions has found general approval. In the following, 3 procedures are described which have found a certain significance in Germany. Then as a fourth method a procedure is described which being new might become a valuable supplement of the other three measuring methods.

1. Langenbeck's noise audiometry. A "Langenbeck noise" of 80 db is applied to the ear to be tested, and the intensity of the single test tones of an audiometer is measured which is required that said test tone can just be discriminated from the noise. With ATLAS Audiometers these differential limens of the testtones are precisely on the 80 db line.

2. Corti-Test according to Zangemeister. The "Langenbeck noise" is increased in 10 db steps starting from zero and the corresponding differential

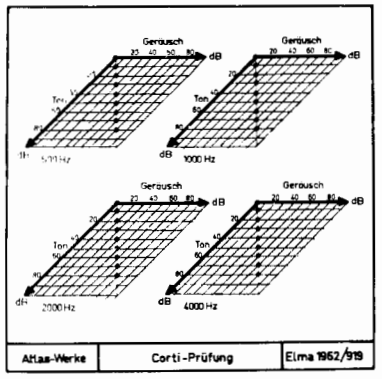

Fig. 1.

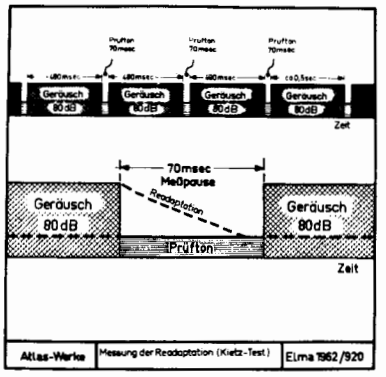

Fig. 2.

Fig. 1: Corti-test of persons with normal hearing. The test was limited to the test tones 500, 1000, 2000 and 4000 cps. On account of the oblique diagram form, the measuring values of a person with normal hearing lie on a vertical line.

Fig. 2: Measurement of readaptation time. The noise as preliminary exposure comprises gaps of 70 msec. duration. The test tone as continuous tone at the hearing threshold can only be effective within the gap and at the end of the gap.

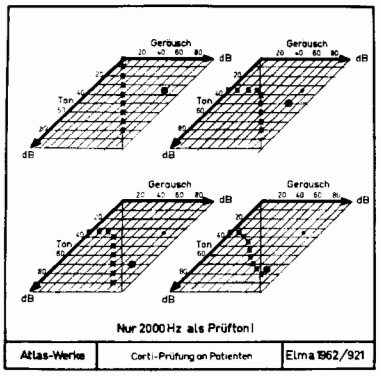

Fig. 3.

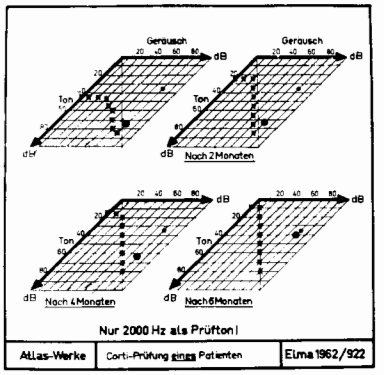

Fig. 4.

Fig. 3: Only the results with test tone of 2000 cps are shown. At the top left side the result of a person with normal hearing. The other 3 diagrams were obtained from 3 patients with quite different kinds of hearing anomalies. Top right side for example shows the middel ear deafness. All 3 patients show a deafness of 40 db for 2000 cps.

Fig. 4: Another example in which measuring procedure was done during the reconvalescence time of a patient. The example shows only the result for a 2000 cps test tone.

threshold of the testtone is determined for each of these noise levels. In general the measurement is limited to the testtones of 500, 1000, 2000 and 4000 cps. For the display of the measuring values it is practical to choose a diagram as shown in figure 1.

3. A procedure known in Germany as "Kietz-Test". A "Langenbeck noise" of 80 db is interrupted rhythmically (see fig. 2) and the threshold value of the testtone in the "noise gap" is determined. Figures 3 and 4 show examples of these procedures (Corti-Test and Kietz-Test).

The Kietz-Test gives information as to how quickly the examined ear returns to resting position after previous sound exposure; in other words, this test measures the facility of the ear to utilize a gap of certain duration in a noise. It is the measurement of the readaptation time.

4. In a new procedure it is investigated how the ear can utilize a gap within the frequency range of a noise for hearing. It is a measurement of local adaptation. If for example the testtone is 2000 cps, within a broad-band "Langenbeck noise" the frequency band from 1500 up to 2500 cps is suppressed as far as possible. This noise is given as continuous noise and the threshold values of all test tones are determined. The result is called gap audiogram. Figure 5 shows several examples.

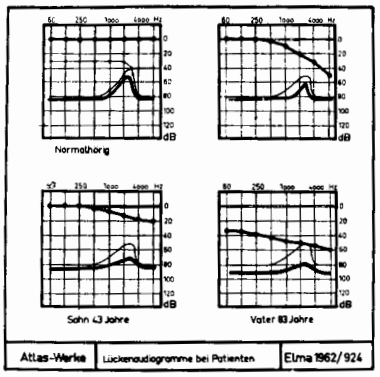

Fig. 5.

Fig. 5: Top left side the "gap audiogram" of a person with normal hearing. The thick line on top shows the normal air cu .e; the thick line below the gap audiogram.
The other 3 diagrams show the measuring results at 3 patients, whereby the gap audiogram was only recorded for the 2000 cps test tone. In each diagram the thick line above is the well-known air curve of the tone audiogram. The thin line serves as comparison with the gap audiogram in cases of normal hearing. The lower thick line is the patient's gap audiogram.

QUATRE METHODES DE MESURE SUPRALIMINAIRE INTRODUITES EN ALLEMAGNE

Les spécialistes de l'acoustique sont à la recherche d'une méthode de mesure supraliminaire. Dans le texte ci-dessus, sont décrites 3 méthodes de mesure de ce genre qui sont été introduites ces derniers temps en Allemagne. Ces dernières sont:

1) Audiométrie dans le bruit selon Langenbeck
2) Test de Corti selon Zangemeister
3) Mesure de la réadaptation (connue en Allemagne sous le nom de test de Kietz).

Ensuite, un nouveau procédé de mesure a été décrit dans lequel on produit intentionnellement une lacune nette dans un bruit à large bande de fréquence. Si par exemple, le ton de mesure est de 2000 Hz, on réduit le plus possible la gamme de fréquence comprise entre 1500 et 2500 Hz. Ce bruit avec lacune est alors appliqué comme bruit permanent à l'oreille à examiner et l'on détermine les seuils auditifs de tous les tons de l'audiomètre. Le résultat est alors appelé "Audiogramme de lacune". On obtient parfois des différences appréciables entre une audiogramme de lacune d'une personne sourde et un audiogramme de lacune d'une personne à ouïe normale.

H. Kietz, Ph. D.,
Atlas Werke,
Bremen,
W.-Germany.