THE HEARING CAPACITY OF DEAF MUTES*.

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Translated by

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In a series of examinations, with my special accordion, of eighty pupils of the Hebrew Institute for the Deaf and Dumb in Vienna, the answers of seventy-two were proven reliable in that they could distinguish with certainty between a simple blast of air and musical tones, as produced by the accordion.

Of these seventy-two deaf mutes, thirty were of congenital origin and forty-two acquired deafness. Of the seventy-two cases, fifty-four heard all of the tones of the harmonium, ranging from contra A to F^{IV} with both ears.

A comparative test of both ears elicited these results: in nineteen cases the amount of hearing was the same in both ears; in eleven cases, hearing better in right ear; in twenty-three cases, better hearing in left ear: in one case the low and middle tones were heard better with the right ear, and the deep tones with the left ear. This confirms my previous experience that in deaf mutes the hearing faculty is better developed in the left ear.

Of the remaining eighteen cases, three heard all of the tones with one ear (complete deafness in two of these cases in the other ear; in the third case, partial deafness in other ear); fourteen cases indicated partial deafness, one case exhibited complete bilateral deafness.

The results of these tests in seventy-two cases of deaf-mutism confirms my previous observations, that complete deafness occurs rarely, even in deaf mutes, viz: in seventy-two cases where both ears were tested, only in one case (both ears) and in two cases (one ear) was total deafness demonstrable; in one hundred and forty-four tested ears, therefore, only three of total deafness. More frequently a partial deafness exists. Thus in one hundred and forty-four cases, thirty were found, viz: five cases failed to hear deep tones, eleven could not hear high tones, eight could appreciate neither deep nor high tones; in three cases there was a loss of hearing for certain single tones, the other tones of the scale being heard. This failure to appreciate certain single tones was variable from

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time to time, so that tones previously heard were not again perceived, and tones not heard before were appreciated at another sitting.

A comparison of the results of my observations concerning deaf mutes with those of Bezold¹ show marked differences.

Thus Bezold found in a series of tests of one hundred and fifty ears: total deafness in forty-eight cases; slight sound perception in one hundred and eight. In not one of his cases, therefore, could all the tests and tones be appreciated. On the other hand, my own investigations were as follows: In one hundred and forty-four ears, total deafness in three; partial deafness in thirty; hearing perception for accordion tones ranging from contra A to F^{IV} (a range of nearly 6 octaves) in eleven cases.

There is also a decided difference in the amount of hearing defect in the reported series of our cases. The test tables accompanying Bezold's report indicate more marked and more numerous hearing defects than in the series of cases recorded by me.

The considerable disparity in the results obtained in these observations is, perhaps, not due to any marked functional differences in the ears of our respective patients, but rather to the difference existing between Bezold's and my method of testing the hearing capacity.

In testing, Bezold uses a tone-scale (Tonreihe) comprising tuning-forks (contra C to A^{II}), reed pipes, and the Galton whistle for the higher tones.

In my brochure, "Aural Gymnastics in the Training of the Deaf" (Vienna, 1895, p. 20 and p. 40, Urban & Schwarzenberg, publishers), I emphasize the fact that the weak sounds of the tuning forks are not perceived with the first tests, but that a continued application results in a gradual appreciation of sound, capable of considerable improvement by diligent practice.

I also maintained in my previous communications that tuning-forks and delicate sounds from other sources frequently fail to elicit any sound perception, so that the large class of deaf-mutes tested in this manner, would consequently be recorded as "absolutely deaf." This same class of deaf-mutes, tested with loud vocal tones, give evidence of sound perception and by systematic training with the voice develop an unmistakable hearing capacity.

On the strength of these observations, I have excluded tuning-forks and all similar testing mediums of delicate sound, even in my earliest endeavors in this direction in 1893 and 1894, as I considered them entirely inadequate in this class of cases. I have sub-

1. Das Hörvermögen der Taubstummten, Wiesbaden, 1896, S. 54.

stituted the powerful tones of the accordion. For this purpose I had a large-sized accordion constructed, arranged to produce the single tones of the musical scale from contra F to F^{IV}, a range of 6 octaves. Each tone can be separately produced in varying intensity and prolonged at will.

The great volume of tone which can be produced by this accordion has thus often many advantages over those of the tuning-fork, reed, etc.

Frequently it is necessary to maintain a prolonged tone of the test-note to excite sound-perception; sometimes this perception is excited only after accentuation of the tone. In numerous instances even I have recorded an absence of perception for a certain tone at one sitting, and a definite appreciation of this same tone at a subsequent testing, and vice versa.

Thus the delicacy of these tests can be appreciated, and the necessity of several tests to verify results is apparent.

If such difficulties present themselves when testing with the very intense and penetrating tones produced by my special accordion, they are of course manifoldly greater when weaker testing instruments, such as tuning-forks and reeds, are employed.

Thus it can be easily understood that the same deaf mute, subjected to a series of tests with test-instruments of widely differing intensity of tone, will indicate a great disparity in sound-perception.

I have repeatedly verified the above by comparatively testing a number of deaf mutes, first with the testing system employed by Bezold and then with my special accordion, and have obtained the most marked difference in results, viz: with the Bezold system the indications were those of complete deafness for the entire musical scale, while with the intense accordion tones they were definitely appreciated.

I am convinced that in even many cases thus accorded negative, decidedly more favorable results could have been obtained if louder and more intense testing tones could be employed, and also that many tones, not appreciated at the first sitting, would be definitely heard at successive trials; and that such tones admit of perception only after considerable stimulation of a latent and sluggish sense of audition. This fact is of considerable practical importance, as it demonstrates the difficulty of differentiating complete deafness from an auditory apparatus, capable of being stimulated by patient and energetic measures, and that failure to elicit an auditory perception in the first trials does not justify us in pronouncing such cases as "absolutely deaf."

If a careful test convinces us that there is hearing perception in a given case, even though it be of slightest degree, there is every possibility of developing a considerable hearing faculty. The progress made with the systematic aural gymnastic training, as practiced in the Oberdöbling Institute for the Deaf and the Hebrew School for Deaf Mutes in Vienna, and the Sisters of St. Joseph School for the Deaf in St. Louis, is illustrative of the results which can be obtained by patient and careful work in this direction.

A number of instances are recorded in these schools, where the first tests gave negative results, and only after repeated sittings could any perception of sound be determined. Some of these pupils, after patient training by the systematic aural exercises, developed a surprising degree of hearing. One young deaf mute made such excellent progress in the course of one year that he could accurately hear entire sentences, spoken in a loud voice at close range.

I also wish to protest against the use of the weak-testing tones of the Bezold "Tonreihe," as they are of little practical importance in determining sound-perception in deaf mutes.

In cases pronounced "absolutely deaf" by these tests, I have cultivated a sound-perception for the speaking voice capable of remarkable development. This is conclusive evidence of the comparative value of the two systems of sound-testing here referred to.

Motor Excitation in Deaf-Mutes on Whom Acoustic Exercises Are Practiced—GELLÉ—*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, April 23, 1898.

As the sense of hearing is awakened in deaf-mute children, on whom acoustic exercises are practiced, a profound change takes place in their manner. They become noisy, agitated, sometimes turbulent and restless, and will cry and gesticulate. All the faculties of the child, such as the memory, power of repetition and expression, and efforts at articulation are benefited by the acoustic exercises. This explains the rapid progress made by young children (three to seven years old).

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