

after the operation, the patient could hear voices, and still, after one year, heard them some inches from the ear. The wound remained open.

ON THE CONDUCTION OF SOUND THROUGH THE BONES OF THE HEAD AS A MEANS OF DIAGNOSIS OF THE SEAT OF EAR-DISEASE.

Read in the Section of Ophthalmology and Otology at the Annual Meeting of the British Medical Association in Cardiff.

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As you well know, there are two means used for this examination of the ear. The first is a very old, common, and convenient one: the watch; in Germany especially recommended by the late Erhard, who said: "If there be only an affection of the conducting apparatus, the watch will be distinctly heard, and the conducting power through the bones of the head is preserved." The contrary would show that the nerve was affected, and the prognosis bad.

How erroneous this theory is, though represented even to this day, you may easily conceive from the simple fact that even only ear-wax obstructing the external meatus is sufficient to weaken this so-called bone-conduction, as I found in several cases so long as twenty years ago. The reason of this is that this conduction of sound depends not only on the bony and the other solid parts of the head, but also on the healthy state of the external and middle ear.

Modern aural surgery uses the tuning-fork, and conducts especially deep tones (*c*, *c'*) by placing this instrument on the vertex. The theory, especially represented by Politzer as a dogma, says: If in a case of an one-sided affection, or where one ear is more affected than the other, the tuning fork be more distinctly heard on the only affected or more affected side, there may be a disease of the external parts, and the acoustic nerve may remain sound. If the tone be more heard on the healthy side, there may be a nervous affection.

You will soon perceive that this other theory is also incorrect. It rests for a basis on the general fact that, in a well known affection of the external parts of the ear, for instance, if there be inspissated ear-wax in one ear, the patient does not hear the tuning-fork well near the auricle; but the same instrument, when placed on the head, is heard much more strongly in this obstructed side than on the healthy side, and the patient may even think that he hears its tone only on the affected ear. Mach and Politzer have explained this fact by supposing that the sound is more harshly heard because it cannot escape on account of the wax.

I will not tire you by my own theory, which rests upon the pathological resonance of the air-filled parts of the external and middle ear. I will only say that any conclusion drawn from this in other cases where there is no visible affection of the ear, is by no means a correct one, as can easily be proved by clinical observations. There are not rarely cases where the same deep tone (*c*) is normally heard through the air, and at the same time, also, through the head, more strongly on the only affected side. I have made this observation even in cases where there was found, by clinical examination, an undoubted lesion of the labyrinth following fracture of the petrous bone. Also, by anatomical investigation, I showed, several years ago, that, in cases where the tuning-fork is heard better on the affected side, there will be by no means always a healthy internal ear. The most astonishing proof, and one which I never expected to find, is the following case. But, before proceeding, allow me to say some introductory words. You are well aware that the pathological resonance I mentioned a few minutes ago is most frequent in cases of purulent inflammation of the middle ear, with perforation of the drum-head. In these cases, also, I took no notice of the strengthening of the sound on the affected side as a means of diagnosis, because of the above-mentioned reasons. I said, in a work published fifteen years ago, that the best use of this symptom may be made by the physician in cases where inflammation of the ear is followed by disease of the brain or by pyæmia, because I had never hitherto seen a patient die from their effects. But since the opening of my clinic in Berlin, I have observed a case of a poor woman who died of pyæmia, after one-sided chronic purulent inflammation of the middle ear. She was incapable of hearing on the affected side, the other being in a normal state. But for several days we observed that through the head the patient, who was conscious to the last, not only heard the sound more distinctly with the affected ear, but could repeat the tone by singing it, and this even six hours before her death. On

making a *post mortem* examination, I found the internal ear in a condition which did not correspond with the observation made during the life of the patient. You remember that the sound of the tuning-fork was heard alone through the bones of the head. And now I found nearly the whole middle and internal ear destroyed by caries; there was no drum-membrane, no ossicles; the whole labyrinth being filled with purulent matter and granulations, and the only healthy part being the trunk of the acoustic nerve. The cochlea especially was found to be in a curious condition, the whole bony cavity being filled with pus and granulating cells, without any normal structure; and of the lamina spiralis ossea there remained only a fragment similar to a hook.

For the explanation of this curious dilemma, we can only have recourse to the trunk of the acoustic nerve, which was found in the normal state. By placing the tuning-fork on the head, all parts of it are set in vibration, and for this reason also the trunk of the acoustic nerve; which, therefore, will respond to the mechanical irritation only by a quantitative sensation, its end-apparatus being destroyed. This explanation would be sufficient, if it were not for the remarkable fact, that the patient was able to repeat the tone which she seemed to hear only in the affected ear. After due reflection, I came to the simple conclusion that the patient might have had, on the affected side, a stronger but indistinct sensation of sound through the resonance at the bony cavities, which were enlarged and filled with purulent matter, and that she only borrowed the real tone repeated by her from the other healthy side.

And now, as a practical conclusion, you will easily see that the whole theory of the conduction of sound through the head cannot be of any importance, either *quoad sensum* or *quoad vitam*.

Mr. CRESSWELL BABER (Brighton), in remarking upon Professor Lucae's paper, admitted the want of definite knowledge on the subject, but thought that the tuning-fork should not be rejected, as it was of value in certain cases. He also drew attention to the effect of pressure of the finger on the orifice of the meatus in preventing the tuning-fork from being heard more loudly on that side, when applied to the median line of the head.

Dr. POST (Beirut) had suffered serious impairment of the hearing in the left side eighteen years ago, from large doses of quinine, for fever, in Syria, and hearing was only medium in the right ear. Yet he heard the tuning-fork in the left ear, on whichever side the fork was applied.

ANTISEPTIC PRECAUTIONS DURING CATARACT AND OTHER OPERATIONS ON THE EYE, BY MEANS OF MR. MAYO ROBSON'S DRY EUCALYPTUS-SPRAY, AND DRY DRESSINGS.

Read in the Section of Ophthalmology and Otology at the Annual Meeting of the British Medical Association in Cardiff.

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The object of this paper is to bring before ophthalmic surgeons the utility of Mr. Mayo Robson's dry eucalyptus-spray (which will be shown in action, and explained), whilst operating for the various forms of cataract. It occurred to me to use this antiseptic atmosphere so as to secure the cataract a complete antiseptic operation. Previously to its use, it was not a rare occurrence to lose an uncomplicated cataract with the partial antiseptic precautions. Since its use, the twenty-five cases, as follows—seven congenital cataracts, fifteen senile, and six traumatic cataracts—have, with one exception, in a senile cataract, of acute glaucoma (which required an iridectomy, and afterwards got fair sight), done perfectly well.

Previously to operating, the eyes and surrounding parts are washed inside and out with carbolic lotion, 1 in 80. The instruments are washed in the same lotion, and, during the operation, the eucalyptus-air plays on the eye, and does not cease until a circular pad, consisting of a thin layer of absorbent wool, is placed next the eye; then a slightly thicker layer of salicylic silk (Mr. McGill's); over this, another layer of absorbent wool; and above and without all, a thin layer of black cotton-wool. This pad is retained on the eye, if all be going well, for seven to ten days. It is seldom that it requires earlier removal; in which case, the corneal section will be fairly well united.

My conclusions with regard to this treatment are these. 1. It pro-