On the pathology and treatment of the deafness attendant upon old age. Illustrated by dissections and cases / [Joseph Toynbee].

With the Author's Compliments

ON THE

PATHOLOGY AND TREATMENT

OF THE

DEAFNESS ATTENDANT UPON OLD AGE.

ILLUSTRATED BY DISSECTIONS AND CASES.

BY

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ON THE

PATHOLOGY AND TREATMENT OF THE DEAFNESS ATTENDANT UPON OLD AGE.

THE majority of medical men seem to have arrived at the conclusion, that the distressing affection to which attention is about to be directed, depends upon a gradual and natural decay of the powers of the organ of hearing; and that it must in consequence be endured as a disease entirely beyond human control. The grounds usually assigned for arriving at this conclusion are, that as other organs of the body are found to lose their power as life advances, it is only natural to anticipate that the ear should form no exception to that rule. Not content, however, with this view, it appeared to me desirable to ascertain what was the peculiar pathological condition attendant upon this diminished power of hearing, in order to arrive at some definite information on the subject. With this object in view, and with the persuasion that an accurate knowledge of disease must not only precede its successful treatment, but would also be of service in relieving the minds of sufferers from the continued discomfort resulting upon unsuccessful trials after relief; I have neglected no opportunity of investigating the pathology of this special form of deafness, and I now offer to the profession the results of my dissections and cases.

Before entering upon the pathological appearances discovered, it may be well to draw attention to the fact, that when we consider the great number of elderly persons who hear well, in comparison with those whose hearing is materially affected, the frequency of this disease in old age is not so great as may perhaps generally be supposed. The results of my experience tend to show, that this decline of the power of hearing in old age, is dependent upon the influences to which aged persons are frequently subjected; namely, the prolonged stay in warm and close rooms, the avoidance of the open air, the cessation from bodily exertion, the want of attention to diet, and to the healthy performance of the functions of the skin; and that it does not depend upon the decline of nervous power, or upon an atrophy of the tissues which compose the organ of hearing. On the contrary, an extensive field of *post mortem* investigation has demonstrated, that the *most frequent* pathological condition found in cases of senile

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deafness, is a considerable increase in the substance of the mucous membrane lining the tympanic cavities; and that the evidences of atrophy of the tissues are very rare. The pathological condition *second* in frequency in these cases, is a thickening of the *membrana tympani;* and the *third* consists in the presence of bands of adhesions, which connect together various parts contained in the tympanic cavity and these contents to the walls of the tympanum. The examination during life of elderly patients suffering from deafness, quite agrees with the results of the pathological researches. Thus, while the external surface of the membrana tympani remains smooth and shining, its substance is seen to be whiter than natural; upon attempting a forcible expiration with closed nostrils, air is heard by the otoscope[1] to enter the tympanic cavity, but it produces an unnatural sound: the hearing is generally worse during an attack of cold, and in dull weather.

Case I.—*A Lady, æt. eighty-seven, Deaf for Six Years previous to her Death; Bands of Adhesion in the Cavity of the Tympanum.*

Mrs L. died in Dec. 1848, at the age of eighty-seven, from a gradual decline of the vital powers. Until the age of fifty, had no symptoms of derangement of the ears, but about that period she was in the habit of taking "cephalic snuff," which she thought produced a buzzing sensation in the ears; the latter symptoms disappeared immediately that its use was relinquished. At that period there was no sign of deafness, but about the age of eighty-five she first perceived that the sense of hearing was becoming blunted. From that time, deafness gradually but very slowly made progress, attended now and then by noises in the ears. The deafness was temporarily increased by a cold, but when she recovered the usual amount of hearing remained. During the last year of her life the disease did not make much progress, but the patient was obliged to use a speaking-trumpet in conversation; it was observed that the sense of hearing was more acute during the last few days of her life. For the last nine or ten years this lady took very little exercise; was in the house, and sat in a warm room the greater part of the day. She suffered also from a chronic inflammation of the mucous membrane of the eyelids, lacrymal sac, and nasal ducts. It is important to observe, that this lady had two sisters, one of whom died at the age of ninety, and was nearly, to the time of her death, a very active person, she was slightly deaf; the other sister, still living, aged eighty-nine, who has been confined to her room for some years, is extremely deaf.

Dissection I.—Right Ear. *The External Meatus* was dry, and did not contain any cerumen.

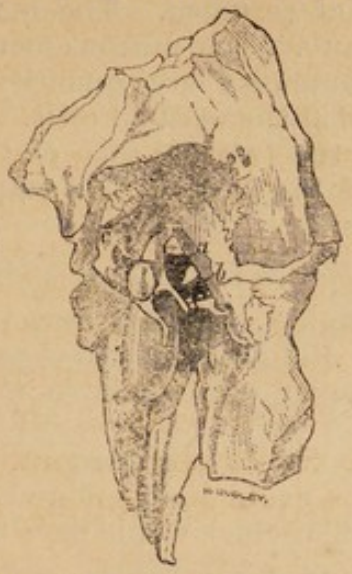
Membrana Tympani. The fibrous layer is white and slightly thickened; it is more concave and tense than natural.

Tympanic Cavity. The mucous membrane appears to be healthy and not thicker than natural, but there are bands of adhesion which connect together the ossicula, and the ossicula to the wall of the tympanum. These adhesions may be divided into two distinct sets; one is placed between the incus and the inner wall of the tympanum and the stapes; the other connects the head of the malleus and the body of the incus to the external wall of the tympanum. The first-named set consists of two portions, one of these measuring half a line from above downwards, and three-quarters of a line from without inwards; con-

[1] An elastic tube twenty inches in length, each extremity having fixed upon it a piece of ivory or ebony: one orifice is introduced into the ear of the surgeon, and the other into that of the patient, while the latter attempts to make a forcible expiration with closed mouth and nostrils.

nects the anterior part of the long process of the incus to that part of the inner wall of the tympanum which is posterior to the fenestra ovalis (see Fig. 1).

Fig. 1.



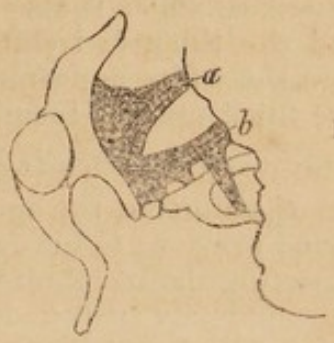


Fig. 2.

Fig. 1. Dissection of an ear taken from a deaf lady, who died at the age of eighty-seven. a, *A band of adhesion connecting the posterior part of the long process of the incus to the inner wall of the tympanum.* b, *A second band connecting the anterior part of the same process of the incus to the stapes and tympanum.* c, *Two bands connecting the head of the malleus and the body of the incus to the outer wall of the tympanum.—Fig. 2. A magnified view of the bands* a *and* b, *which connect together the incus, stapes, and inner wall of the membrana tympani.*

This band is connected by several small ones to the superior surface of the stapes, and also to a fine membrane which extends between the two crura of the latter bone. These small bands are seen in Fig. 2, and they are so firm and tightly stretched between the stapes and the larger band, and between the incus and the inner wall of the tympanum before mentioned, as to keep the stapes more fixed than natural. There are also adhesions between the upper surface of the crura of the stapes, and the margin of the *fossa fenestræ ovalis*. The other part of this band extends from the posterior part of the long process of the incus to the inner wall of the tympanum, posterior to that just described; this band is also firm and tense. The second set of adhesions passes from the head of the malleus and body of the incus directly outwards, connecting them to the osseous walls of the tympanum superior, and posterior to the attachment of the membrana tympani. It is interesting to consider what effect these bands must have had upon the ossicula and membrana tympani during life. Those which surround the stapes, and connect it to the *fossa fenestræ ovalis*, must have had the effect of impeding the movements of the stapes; and those which connect the long process of the incus to the inner wall of the tympanum, by pulling that process inwards, would probably have been the means of pressing the stapes (attached to its lower extremity) towards the vestibular cavity. The effect of the adhesions between the bodies of the malleus and incus and the outer wall of the tympanum, seems to have been to draw those extremities outward, and in consequence their inferior extremities inwards; this action upon the malleus is apparent, and may account for the greater concavity of the membrana tympani, which is carried inwards with the long process of the malleus, and is very tense. The base of the stapes is apparently fixed more firmly than natural to the margin of the fenestra ovalis. The membrane of the fenestra rotunda is in a natural state. The membranous labyrinth is healthy; there is rather more black pigment than usual in the cochlea of the left ear; in other respects it is like the right ear, and presents adhesions connecting the ossicula.

DISSECTION II.—*The Mucous Membrane of the Tympanum very thick; Mucus in Tympanic Cavity.*

Mr S. T. died at the age of eighty-seven from the effects of an accident; he had been deaf, especially in the left ear, for a considerable period previous to his death.

Right Ear. The meatus externus is distended with cerumen; the other parts of the ear are healthy.

Left Ear. The meatus externus is full of cerumen. The membrana tympani is smooth on its surface, but very white. The mucous membrane of the tympanum is very thick, and the cavity contains a large quantity of dense and tenacious white mucus, which is also found in the mastoid cells. The presence of this fluid, and the thickened state of the internal coat of the membrana tympani, explain the white appearance of the latter. The stapes is entirely concealed by the thick mucous membrane.

DISSECTION III.—*Bands of Adhesion in the Tympanum.*

Mr B. C. died of asthma at the age of eighty. He had been very deaf for a considerable period previous to his death. Both ears presented numerous bands of adhesion connecting the membrana tympani with the inner wall of the tympanum, and by completely surrounding the ossicula the membrana tympani is nearly concealed. The Eustachian tube is healthy throughout.

In this case only a small quantity of air could have entered the tympanic cavity, and upon its ingress only a slight puff or crack would have been produced.

DISSECTION IV.—*Mucous Membrane of Tympanum very thick.*

Mr J. R. at seventy-three died of consumption, and had been deaf for a considerable period previous to his death.

In each ear the mucous membrane lining the tympanic cavity was so thick as to conceal the stapes, and to form so thick an investment for the other ossicula as to prevent their natural form being recognized.

DISSECTION V.—*Disease of the Membrana Tympani, Mucous Membrane of Tympanum and Bone.*

Mrs L. E. died of apoplexy at the age of ninety-four; she had been deaf for several years in both ears.

Right Ear. The membrana tympani is entirely gone, but a thick and soft portion of it lies in contact with, and adheres to the promontory. The malleus has been removed by disease; but the incus remains attached to the stapes, which latter bone is entirely concealed by the extremely thick mucous membrane. The lining membrane of the mastoid cells is also very thick; and the upper osseous wall of the tympanum is diseased and soft.

Left Ear. The membrana tympani is thick and opaque, especially at its posterior part. Its upper surface is firmly adherent to the inner wall of the tympanum and the stapes; the latter being entirely concealed by adhesions. The upper osseous wall of the tympanum is in several places carious, presenting large orifices, which allow the dura mater to be in contact with the thick mucous membrane of the tympanum and mastoid cells. One of these orifices measures three lines in length and two in breadth. The posterior part of the pars petrosa presents a large exostosis. The labyrinthine humours are very small in quantity, and the membranous labyrinth is much atrophied. The base of the stapes projects into the cavity of the vestibule.

DISSECTION VI.—*Membrana Tympani very concave; Adhesions in Tympanic Cavity.*

Mrs F. O. died of gangrene at the age of sixty-two. She had been deaf for some time, especially in the left ear.

Right Ear. The membrana tympani is unusually concave, and in consequence its internal surface, about the central part, is not more than a quarter of a line from the promontory. The membrane is also, in parts, rather opaque, especially at its circumference; its internal layer is white and slightly thickened. The mucous membrane of the tympanic cavity is rather thicker and more vascular than is natural, and it is very tough. A firm band of adhesion connects the cervix of the malleus to the long process of the incus, and another membranous band of adhesion connects the anterior surface of the long process of the incus with the promontory and with the stapes, which latter bone it completely envelopes. The tensor tympani muscle is of diminished size.

Left Ear. Although the surface of the *membrana tympani* is smooth, it is very white around the line of attachment of the malleus; the blood-vessels are enlarged, and they are much distended with blood. The *membrana tympani* is much more concave than natural. The *cavitas tympani* is three parts filled with a thick, tenacious, white mucus, which is partly the cause of the white appearance of the membrana tympani, though the inner layer of the latter membrane, being opaque and white, aids in producing this effect. The mucous membrane lining the tympanum is thick and very vascular, and that portion of it which covers the body of the incus is red, the vessels being completely distended with blood. The upper wall of the tympanum is very thin and translucent; the blood-vessels contained in it are distended with blood, and connect the vessels of the mucous lining of the tympanum with those of the *dura mater;* the latter membrane being more vascular than natural. The *tensor tympani muscle* is atrophied, and tension of the membrana tympani is not produced by pulling it. The concavity of the membrana tympani seems to have been produced by a gradual contraction of the tensor tympani muscle.

Dissection VII.—*Mucous Membrane of Tympanum thick; Adhesions in the Tympanic Cavity; Labyrinth diseased.*

Mrs L. B. died of consumption at the age of eighty. In each ear the membrana tympani is somewhat thickened, and membranous bands of adhesion connect the incus and the stapes with the walls of the tympanum. The vestibule is full of a rather turbid fluid, and the membranous labyrinth is thicker than natural.

Dissection VIII.—*Membrana Tympani opaque; Mucous Membrane of Tympanum thick.*

Mr S. D. died of inflammation of the bowels at the age of seventy-four. He was slightly deaf for a short time previous to his death.

Right Ear. The membrana tympani is rather opaque and thick about its central part.

Left Ear. The membrana tympani and the mucous membrane of the tympanum are thickened.

Dissection IX.—*Membrana Tympani white; Mucous Membrane of Tympanum thick; Carotid Canal partially closed.*

Mrs D. E. died with dropsy at the age of sixty-nine. She had been deaf for some time previous to her death.

Right Ear. The membrana tympani is white, and there is a quantity of thick mucus in the cavity of the tympanum, the mucous lining of which is also white.

Left Ear. The membrana tympani is thicker than natural. The mucous membrane lining the tympanic cavity is thick, and the latter is full of mucus. The canal for the carotid artery is partially closed by an enlargement of its osseous walls, and the *dura mater* over the petrous bone is thick.

Dissection X.—*Membrana Tympani white; Mucous Membrane of Tympanum very thick.*

Mrs E. B. died at the age of sixty-eight; she had for some time been deaf in the right ear.

Right Ear. The membrana tympani is white, and the mucous membrane of the tympanic cavity is so thick as to bury the stapes, and nearly wholly conceal it.

Dissection XI.—*Collection of Cerumen.*

Mrs L. R. died of asthma at the age of seventy; she had been deaf for several months in both ears. The only pathological condition discovered was a collection of cerumen in the external tube of each ear.

Dissection XII.—*An Orifice in the Membrana Tympani; Ulceration of the External Meatus.*

Mr M. S. died at the age of seventy; he had been deaf in the right ear for a considerable period previous to his death.

Right Ear. The membrana tympani presents a large orifice, which is evidently the result of ulceration. There is also ulceration of the membranous lining of the external tube. The mucous membrane of the tympanum is healthy.

DISSECTION XIII.—*Mucous Membrane lining the Tympanum very thick; Bands of Adhesion in the Tympanic Cavity; Membrana Tympani concave.*

Mrs N. O. died at the age of ninety; she had been deaf in the left ear many years previous to her death.

Right Ear. The mucous lining of the tympanic cavity is thick, and the stapes is concealed by adhesions.

Left Ear. The membrana tympani is so much drawn inwards as to be nearly in contact with the promontory; where it looks towards the external meatus, it is so concave that a pea would lie in it. The tympanic cavity is full of bands of adhesion, which encircle the ossicula and connect them with the internal wall; the cavity of the vestibule appears to contain less fluid than natural.

DISSECTION XIV.—*Orifice in Membrana Tympani; Mucous Membrane of Tympanum thick.*

Mrs D. S. died of fever at the age of seventy-three. She stated that so long as she could remember she had been troubled with a discharge from the right ear; she had become deaf in the left ear only at a recent period.

Right Ear.—The membrana tympani presents a large orifice at its central part; the remaining portion is thick and white. The mucous membrane lining the tympanic cavity is very thick, and is concealed by purulent matter. The stapes is adherent more firmly than natural to the circumference of the fenestra ovalis.

Left Ear.—The membrana tympani is thick, opaque, and softer than natural. The mucous membrane of the tympanum is thick, and the cavity contains mucus.

DISSECTION XV.—*Membrana Tympani white and thick; Mucous Membrane of Tympanum thick; Stapes anchylosed to Fenestra Ovalis.*

Mrs G. C. died from gangrene senilis at the age of seventy-nine; she had been deaf for several years; the disease commenced by a succession of attacks of earach.

Right Ear. The membrana tympani is white, and thicker than ordinary parchment, to which it bears a great likeness. The mucous membrane of the tympanic cavity is thick, and the base of the stapes is firmly anchylosed to the circumference of the fenestra ovalis.

Left Ear in the same state.

DISSECTION XVI.—*Membrana Tympani opaque and adherent to Promontory; Mucous Membrane of Tympanum thick.*

Mr R. D., æt. sixty-five, died of dropsy. He had been deaf for some time previous to his death.

Right Ear. The membrana tympani is rather opaque; and it is connected to the stapes by membranous bands.

Left Ear. The meatus externus is full of cerumen mixed with epithelium. The membrana tympani is white, thick, and drawn inwards so as to be very concave, and its internal surface is in contact with the promontory, to which it is attached by firm adhesions. The cavity of the tympanum is nearly obliterated by the approximation of the membrana tympani to the inner wall of the tympanum. The stapes is entirely concealed; the tendon of the tensor tympani muscle is completely enveloped by the thick membrane, and the substance of the muscle is much atrophied. The incus has been removed by absorption, and part of the malleus has also disappeared. The upper wall of the tympanum

is very thin, the bone is brittle, and the dura mater separates from the bone with greater facility than natural.

DISSECTION XVII.—*Membrana Tympani soft and concave; Mucous Membrane of Tympanum thick; Petrous Bone diseased.*

Mrs F. B. died from pneumonia at the age of seventy. She had been deaf in the right ear for some time previous to her death.

Right Ear. The external meatus is filled with a dark-coloured thick pus, which seems to have been secreted by the external surface of the membrana tympani. The membrana tympani is very soft, and so concave that its inner surface is in contact with the inner wall of the tympanic cavity and the stapes, to both of which it is firmly adherent. The malleus is but slightly connected to the membrana tympani; the long process of the incus and its orbicular process have been wholly absorbed. The mucous membrane of the tympanum is very thick. The upper bony wall of the tympanum is thick and diseased, showing the effects upon it of chronic inflammation of the mucous membrane lining its inferior surface. From its cranial surface a small rough exostosis projects, to which the dura mater is very firmly adherent. The posterior surface of the petrous bone also shows symptoms of chronic inflammation. The mastoid cells contain a large quantity of dark-coloured mucus.

Left Ear. The membrana tympani has commenced to undergo calcareous degeneration.

In the following case it could not be ascertained whether the patient was deaf during life, but there can be very little doubt that she was so; the particulars of the dissection are so interesting, that I think it right to insert them at length.

DISSECTION XVIII.—*Adhesions in Tympanic Cavity; Stapes more firmly adherent than natural to the Fenestra Ovalis.*

Mrs E. N. died of phthisis at the age of sixty-five.

Right Ear. A transparent band of adhesion connects the membrana tympani posteriorly with the long process of the incus; and the base and crura of the stapes are joined by numerous firm bands to the circumference of the *fossa fenestræ ovalis.*

Left Ear. The inner surface of the membrana tympani is connected with the long process of the incus and with the head of the stapes, by transparent but firm bands of adhesion, which nearly conceal the stapes, and firmly bind it to the promontory. The membrane surrounding the articulation of the incus and the stapes is so thick and tough, that the two bones required for their separation considerable force. Besides the adhesions connecting the stapes to the promontory, the membrane connecting the base of the stapes to the fenestra ovalis is much more firm than natural; so that, in endeavouring to separate the stapes by means of the forceps, the crura were fractured, and the base of the bone remained firmly adherent to the fenestra ovalis.

In addition to the dissections, the particulars of which have just been related, I have made others of the ears of fifty-one persons, who were more than seventy years of age at the time of death. Of these one hundred and two ears, *sixty-two* were in a diseased, and *forty* in a healthy state. As these dissections are included among the 915 which form the groundwork of a paper [1] now before the Medico-Chirurgical Society of London, I can in this place merely state, that the principal pathological condition presented by them was a thickening of the mucous membrane lining the tympanic cavity.

[1] Pathological Researches into the Diseases of the Ear.

Treatment.

It being now established by dissection that the most frequent pathological condition in the ears of elderly deaf persons consists of a thickened state of the mucous membrane, the presence of bands of adhesion, and a thickened condition of the membrana tympani—any one of which circumstances is sufficient to prevent the passage of sonorous undulations from the membrana tympani to the expansions of the auditory nerve—it is highly important to inquire whether any remedial measures can be suggested which will tend to diminish these diseased conditions, and consequently improve the power of hearing. Practical experience induces me to believe, that not only may the thick membrana tympani be relieved, but the thickened mucous membrane be so reduced, and in some cases the bands of adhesion so far relaxed, that their presence will offer scarcely any impediment to the function of hearing.

The local application most suitable for this purpose which I have tried is that of a solution of argenti nitras, of a strength varying from half a drachm to two drachms of the salt to an ounce of distilled water. Proceeding from the exterior orifice of the meatus externus, the passage may be touched to an extent varying from one-half to two-thirds of its length every third or fourth day. In some cases the membrana tympani also may be washed with a solution of argenti nitras, of six grains to the ounce. Where the noises are loud, and the symptoms indicate much congestion in the ear, leeches should be applied immediately *below*, not *behind*, the ears; and, where there is irritation of the external tube, an ointment, composed of half a drachm of pulvis cantharidis added to an ounce of simple ointment, and applied behind and below the ear, either daily or every other day, will be found beneficial.

The administration of alterative doses of pilula hydrargyri, hydrargyrum cum creta, or the hydrargyri bichloridum, is very useful; but it must be always recollected that these doses ought to be so proportioned, that neither debility nor any other unpleasant symptom shall be produced; in other words, so gentle should be the alterative, that no sensation should suggest to the patients that they are under a course of medicine.

In addition to the medicines recommended, patients should be cautioned to avoid warm close rooms, and sitting very near the fire; no wine should be taken unless diluted with water; daily exercise, and where possible on foot, should be taken in the open air; together with a warm bath every week or ten days. This course of treatment has been productive of the greatest advantage in several cases of deafness of a most unpromising character. All the cases which I shall now proceed to cite, are those of patients who considered old age to be the cause of their failure of hearing, and some of them were older in constitution than the mere statement of their years would indicate.

Case II.—R. B., Esq., aged eighty, in tolerable health, consulted me on the 29th March 1844, on account of deafness in both ears. He stated that, three years before, the power of hearing began gradually to decline in the right ear, and had continued to do so up to the time of consultation, that, about six months previously, the left ear had been similarly affected, and that his deafness had so much increased as to disable him from hearing the voice without the aid of a speaking-trumpet. He was unable to assign any cause for the deafness. Upon examination, the membrana tympani in each ear was observed to be dull and opalescent, and although, by aid of the otoscope, the air was heard to pass into the tympanic cavities, yet it did so with a bubbling crackling sound, indicating obstruction. Two grains of *pilula hydrargyri* were ordered to be taken every night, and a stimulating liniment to be applied around and below the ears. This plan having been persevered in for about three weeks, and some slight improvement experienced, the patient was directed to take one grain of *hydrargyrum cum creta* daily; and at the end of two months this gentleman recovered his hearing, and gave up the use of the speaking-trumpet.

Case III.—J. P., Esq.; aged sixty-four, consulted me in July 1845. During the last four or five years the right ear has been growing deaf, and the deafness is now so far advanced as to render the ear useless to him. Has been suffering from a cold for a few days, during which there has been a sensation of singing and of vibration in the head and ears, accompanied with deafness. In each ear there was a large collection of wax, on the removal of which the symptoms somewhat abated. The membrana tympani of both ears was white. Air passed freely into the tympanic cavities. The fifteenth of a grain of *hydrargyri bichloridum* thrice a-day was prescribed, and counter irritation around the ears. In the course of six weeks the patient had perfectly recovered.

Case IV.—Lady R., aged sixty-two, consulted me in Dec. 1848, for a deafness which had come on during the preceding month, and gradually increased, till, by the time I saw her, it was requisite to speak loud and close to the ears. The deafness had been first perceived after a cold, and was accelerated by an attack of influenza. The feeling in the right ear was that of a veil hanging over it. In each ear the *membrana tympani* was white, and air passed freely into the tympanic cavities. The treatment pursued consisted in the application of a solution of *argenti nitras* to the outer half of the external meatus; beginning with the strength of a drachm of the salt to an ounce of distilled water, afterwards increasing it to double that strength, and occasionally applying the *argenti nitras* in the solid form. This course of proceeding, coupled with the administration of alterative doses of *pilula hydrargyri*, effected so great an improvement, that in two months this lady had no difficulty in hearing in ordinary society.

Case V.—Mrs A. T., aged sixty-seven, consulted me in April 1845. She stated, that when eight years of age she fell down on the *left ear*, and had been deaf of that ear ever since. About four years ago, loud internal noises disturbed the right ear, and increased to so distressing a degree, that this lady felt as if she were continually travelling in a carriage over gravel; at times a loud explosion would be heard, succeeded by acute pain. She can scarcely hear her own voice, and is obliged to make use of a trumpet in society. The ears seem to her stopped up with pegs. She attributes this deafness to a close attendance upon the sick room of her husband during a long illness.

Right Ear. Membrana tympani concave, and evidently nearer to the promontory than is natural, and the membrane is so white that the malleus is not distinguishable.

Left Ear. Membrana tympani has been entirely removed by ulceration.

Treatment.—In the first place, leeches were placed immediately below the ear; tincture of iodine was applied to the external meatus of the right ear; and three grains of *pilula hydrargyri* were given every night.

June 3.—Feels much better; has less confusion in the head, and more confidence in herself.

June 15.—The noises are so much diminished, that she is no longer troubled by them; is feeling stronger and better, and the hearing is improved.

Case VI.—Mrs T., aged seventy, applied to me in May 1845. Has been deaf for the last two or three years, especially in the *right ear*. The deafness came on with a feeling of pulsation, and was increased by travelling on a railway. There is a constant singing in the right ear.

Right Ear. Hearing distance[1] half an inch. External meatus slightly tumified. *Membrana tympani* white like parchment.

Left Ear. Hearing distance one inch. Membrana tympani quite white.

I had not an opportunity of watching the progress of this case, but it is introduced here to show the common condition of the membrana tympani in senile deafness.

Case VII.—J. C., Esq., aged sixty-four, consulted me in November 1844. His father became deaf at the age of fifty, and he has a sister deaf. About a year ago, he found that he was deaf in the left ear; might have been deaf a longer time; but at the period mentioned, a singing commenced in the left ear which has continued without intermission ever since. Occasionally it is much diminished. The noise and deafness are both worse during a cold. The right ear is not so bad as the left. When he closes the right ear he cannot hear any sound naturally.

Right Ear. Membrana tympani opaque; the handle of the malleus is only just discernible. When air is forced, the otoscope enables air to be heard entering the tympanum in a series of small puffs. After the air has been forced into the tympanum, a cracking sensation is experienced. Hearing distance two inches.

Left Ear. Membrana tympani white; handle of malleus not discernible; air enters the tympanum in a short puff. Hearing distance, absolute contact.

I prescribed for this gentleman two grains of the *pilula hydrargyri*, to be taken every night, and tincture of iodine was applied behind the ears. In the course of three months I saw him again, and found the hearing decidedly improved; the noises also had much diminished.

Case VIII.—Mrs R. N., aged sixty-four, consulted me August 2, 1844. For the preceding four or five months deafness had been coming on, and had lately so much increased, that she finds it difficult to hear any conversation. Has for several years been subject to occasional dulness of hearing. The present deafness was apparently produced by an attack of cold, which left a sensation of fulness in both ears. The membrana tympani of each ear is quite white.

Treatment.—One-twentieth of a grain of *hydrargyri bichloridum*, in conjunction with *vinum ferri*, was administered three times a-day. The dose of bichloride was subsequently increased to one-sixteenth of a grain, and a solution of *argenti nitras*, half a-drachm of the salt to an ounce of distilled water, was applied to the outer half of the external meatus. In the course of three months this patient recovered her hearing, and has remained quite well ever since.

In the above paper I have only adverted to the more frequent causes of deafness in elderly persons. There are other cases in which the stapes becomes more or less firmly anchylosed to the margin of the fenestra ovalis, and in which little or no relief can be anticipated; these cases, however, as far as my experience enables me to judge, are comparatively rare.

12, Argyle Place, St James', London.

February, 1849.

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[1] I have used a watch for several years which is heard distinctly at a distance of three feet by a healthy ear: with this watch I have always calculated the hearing distance.