

# Richey (S. O.)

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## A CASE OF REPRODUCTION OF THE MEMBRANA TYMPANI.

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MEDICUS.



JANUARY 23, 1879, I examined the ears of Doctor S—, aged 37 years, and with his permission I report his case from my notes:—

Thirty-five years ago he had scarlatina, and as a complication, acute inflammation of the left middle ear. Chronic suppuration of the left tympanum followed and has continued to this time.

Upon inspection the left external meatus is found to be red and inflamed from the presence of irritative pus: the middle ear is the seat of profuse granulation, and contains a polypus large enough to two-thirds fill it, extending into the meatus externus one-third of the length of the canal (see Fig. 1). The membrane of the drum is entirely gone with the exception of a sickle-shaped segment 0.5 mm. wide, and about 2 mm. in length in the periphery of the posterior inferior quadrant.

The head of the incus and the short process of the malleus may be seen adherent to the upper wall of the tympanum. The connection between the incus and stapes is broken, and the manubrium mallei has been lost by ulceration. The Eustachian tube is free. H. D. S. A. =  $\frac{17 \text{ cm.}}{\text{watch} = 3.5 \text{ m.}}$

The right Eustachian tube is so closed that no air can be forced through it; the right membrana tympani is thickened, opaque, dry, and adherent to the inner tympanic wall in the neighbourhood of the promontory.

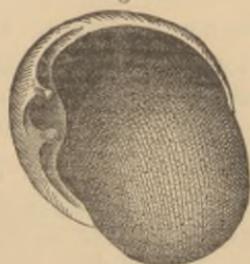
In the post-superior quadrant of this membrane is a bulging resembling a tumour: the external meatus is dry and desquamating.

$$\text{H. D. D. A.} = \frac{5 \text{ cm.}}{\text{watch} = 3.5 \text{ m.}}$$

Feb. 28. The right ear has been treated by iodized air forced through the catheter, and the hearing has increased to  $\frac{32 \text{ cm.}}{\text{watch} = 3.5 \text{ m.}}$ . The same gain is not noted as tested by the voice. (This is the greatest degree of improvement I have been able to obtain in the right ear.)

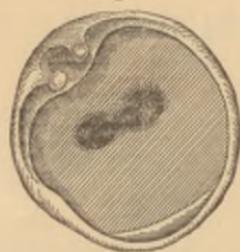
After removal of the polypus, the left middle ear was cleansed and treated with a solution of nitrate of silver,  $\mathfrak{zj}$  to  $\mathfrak{f}\mathfrak{zj}$  of water. The middle ear has been washed out each day with an alkaline solution forced through the Eustachian tube and the middle ear, and the nitrate of silver

Fig. 1.



solution applied. No improvement in the hearing power of this ear has been made, but the granulations being all destroyed, restoration of three-fourths of the membrane has been obtained. An hour-glass perforation, representing one-fourth of membrana tympani, remains, situated just anterior to a vertical line dividing the membrane in halves. The perforation slants in its long diameter from below upwards and from before backwards at an angle of  $65^{\circ}$  (see Fig. 2).

Fig. 2.



*March 1.* The middle of the hour-glass perforation has closed, leaving two pin-head holes, one at each end of the former perforation, distant from each other about one-third of the vertical diameter of the membrane.

*8th.* Air can still be forced through the membrane, but the point of escape can not be seen. Since

*March 1st* this ear has not been treated with nitrate of silver, but iodized air and warm water have been constantly forced into it through the Eustachian tube.

*20th.* The membrane is entirely closed, and no pressure of air or water to which the middle ear can safely be subjected will force a passage through it. The patient can inflate the tympanum, perceptibly forcing outwards the new membrane. H. D. S. A. =  $\frac{.5m. (21 \text{ inches})}{\text{watch} = 3.5 m.}$

*June 17.* The left meatus externus begins to give some evidence of the presence of cerumen.

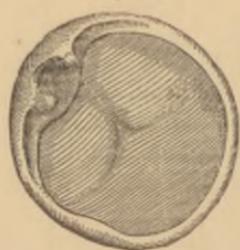
*Sept. 15.* No change in the appearance of membrane—

$$\text{H. D. S. A.} = \frac{.85 m.}{\text{watch} = 3.5 m.}$$

The new membrane is peculiar in appearance, giving reflexes from several points of its surface, and is very flexible. (See Fig. 3.)

In my former cases, except one, the new membrane became adherent to the promontory, or to some other point interior to the attachment of the

Fig. 3.



original membrane. To avoid this, frequent and persistent inflation has been resorted to, resulting in an irregular bulging of the membrane, which, posteriorly, is attached normally, while anteriorly it is situated within the position of the old membrane. Nearly in the position and in the direction of the former hour-glass perforation is an irregular depressed line, which looks like a line of adhesion, but upon inflation it moves outwards with the membrane.

If the middle ear be inflated, this new membrane becomes as hyperæmic as a healthy membrana tympani under like circumstances. The distribution of the bloodvessels does not seem to be so regular as in the normal membrane, though the general direction of the vessels is towards the centre.

As stated above, the hearing distance of the left ear reached 34 inches, tested by a watch which may be heard at least twelve feet distant, and which, at our first interview, was heard by this ear seven inches away.

The suppuration has lasted since childhood, and the *right* ear being good until later in life, the patient depended upon it for practical purposes, and ignored the sounds received by the left ear; just as in strabismus, images are neglected by one eye until from want of exercise it becomes amblyopic. The patient now with the left ear easily recognizes single, distinct tones, such as the tick of a watch, but mixed sounds are not so well analyzed by it, as by the right ear, although its power of audition is three times as great. Thus he depends upon the right, or educated ear in auscultation, while the left is useless to him for this purpose.

Such is the history of a case, which is the sixth in which I have obtained similar results. In the other five, the *whole* membrane was destroyed. The two first were not reported at all, as I kept no notes of them. The third case (to which I called the attention of the Chicago Medical Society, and a report of which was published in the *Chicago Medical Journal and Examiner*, April, 1878) was one from which I removed a necrosed cochlea, and a sequestrum from the mastoid cells. The history of two others in which both membranæ tympani were reproduced was read before the Illinois State Medical Society, May 1878, and published in the "Transactions" for that year.

In only one case since my first success have I failed to obtain the result desired: this patient had before been treated with nitrate of silver, but the treatment had not been carried far enough, and was attended by subsequent loss of the renewed tissue. Thus, of seven cases of destroyed membrana tympani, in six it has been restored with decided improvement of hearing.

The treatment in each has been the same, and would seem to demand for the subject further consideration. In none of these had the suppuration lasted less than 2 years: in two it had existed for 20 years, and in the last for 35 years. The advantage of the new membrane, even though the hearing be not improved, need not be dwelt upon.

In treating these cases, it must be remembered that the middle ear is the seat of the disease which caused the destruction of the membrane, and is the part to be treated. It has been suggested by some writers<sup>1</sup> on the subject of perforation of the membrana tympani that the *edges* of the perforation be treated with nitrate of silver, but my experience does not justify this course. Any such application to the edges of the membranal tissue seems to retard rather than advance its formation.

The surgeon should force the pus from the middle ear into the external meatus, using the catheter, if possible, every day. He can by this means keep open the Eustachian tube, by forcing out the pus prevent its reaching the stomach, and, at the same time, avoid the dizziness and vertigo which are often caused by thorough syringing.

The patient should, in the mean time, be advised to syringe the ear with

<sup>1</sup> Wilde (*Dis. of Ear*, p. 294), and others.

warm water frequently enough to insure cleanliness, and to make use of some astringent lotion. For the purpose of stimulating the middle ear, and destroying any granulations which may be present, nitrate of silver, in saturated solution, applied, by means of a cotton-holder, to the lining mucous membrane, has been attended with best results in my hands. Wilde preferred nitrate of silver, and some writers since his time have expressed the same preference. Weak solutions seem to accomplish little, though they cause tolerance if used for a time, and subsequently the stronger solutions do not appear to answer so well as if used from the beginning.

The first application of nitrate of silver ( $\frac{3}{j}$  to  $\frac{f3}{j}$ ) solution usually causes severe pain for several hours, and the excitement must be prevented from getting beyond control. Its subsequent use rarely gives much annoyance to the patient, as it seems to change the nature of the surface to which it is applied. It may be necessary in some instances to use solutions of less strength than that named.

In my former cases the reparation of tissue began in the upper and anterior segment, and extended downwards and backwards, the last of unrenewed tissue being in the posterior inferior quadrant. In the case of Dr. S. the new membrane seemed to grow nearly equally fast from all sides: perhaps, a little more rapidly from the direction of the shred of membrane left by the destructive suppuration.

Early in the process of repair the membrane grows rapidly, when it once begins, but when the opening becomes small progress is tedious, for whatever stimulates the middle ear is apt to increase the suppuration, and this, in turn, keeps open the small apertures in the membrane. In any event, the treatment must restore the middle ear cavity to comparative health, or the result will hardly be satisfactory.

Nearly all writers on the subject agree in regard to the great power of reproduction in the membrane. Hinton<sup>1</sup> says, that "there seems to be no destruction of the membrane so extensive as entirely to put aside possibility of repair;" but he expresses the opinion that "perforations of the membrane occurring with discharge from the tympanum may be of any extent, except that they are *never absolutely complete*." I have seen instances in which not a shred of membrane was left: its ligamentous attachment to the meatus, alone, remaining to indicate that a membrane had been there. Other observers have seen this same condition. Mr. Hinton uses the word *repair* instead of reproduction, and reports one case of *repair of half* the membrane after three years' treatment; and another, in which *nearly* the whole membrane was restored after its destruction: it, however, remained perforate.

<sup>1</sup> Aural Surgery, pp. 173-178.

Troeltsch,<sup>1</sup> in this connection, states that "the perforation is generally the reason that a chronic otitis with otorrhœa often remains permanent—a radical cure not being possible." The perforation can be blamed for this, only because it exposes the middle ear to the cold air; for if the middle ear cavity be restored to a healthy condition, the suppuration will cease, and the perforation will generally close.

Roosa<sup>2</sup> obtained a new membrane after ten months' treatment. The inflammation was acute when the case came under his care, and the patient was less than 12 years of age. He claims that there was *entire* destruction of the membrane in this instance. A case is reported by Spencer,<sup>3</sup> of St. Louis, but the details are very meagre. He claims entire loss, with subsequent reproduction of the membrane ten years later. Moos<sup>4</sup> reported two cases in which the membrane was destroyed *even up to its periphery*, and in both was closed by cicatricial tissue. In the cases reported by the writer of this paper the new tissue does not seem to be cicatricial, but resembles a true membranal formation.

In the case of Dr. S. the membrane may have been restored by proliferation as there was a minute shred left, but in the one from which I removed the cochlea, nothing remained of the ossicles, or the old membrane, and yet the new membrane resembled the normal membrana tympani.

I desire to express my obligations to Dr. J. H. Thompson for the drawings from which the cuts accompanying this paper were made.

<sup>1</sup> On the Ear, p. 184.

<sup>2</sup> Treatise on Dis. of the Ear, p. 359, 4th ed.

<sup>3</sup> Transactions of American Otological Society, 1871.

<sup>4</sup> Klinik der Ohrenkrankheiten, p. 133.





