

## XI.

*Further Observations on the effects which take place from the Destruction of the Membrana Tympani of the Ear ; with an account of an operation for the removal of a particular species of Deafness. By Mr Astley Cooper.— See Philosophical Transactions of the Royal Society of London for 1801. 4to. London. 1801.*

SINCE the publication of the former paper, Mr Cooper has examined more than twenty cases of a similar defect in the membrana tympani, which have all corroborated the opinions therein mentioned. The membrana tympani may be injured by suppuration, or external violence. In some persons it may be easily seen, and, if the ear be free from wax, it has a bright tendinous appearance, and an aperture in it appears as a dark spot.

spot. If there be an aperture, air also, upon blowing the nose with violence, will be forced with a whistling noise through the ear; the smoke of tobacco may be driven from the mouth through the ear, or water may be injected from the ear into the throat. The effect produced upon the sense of hearing varies according to circumstances. If the aperture be small only, leaving the malleus with its natural attachment, no difference in the power of the organ is perceptible. If the whole of the membrane be destroyed, and three out of four of the small bones of the tympanum be removed, an almost total deafness ensues; but the ear, after a time, begins to recover its powers, and, in the end, regains them, with an inconsiderable degree of imperfection only. When the membrane of one ear only is destroyed, a greater degree of deafness occurs than when it is destroyed in both.

These facts and observations induced Mr Cooper to try an operation in one species of deafness, which has, in several instances, proved successful. The deafness alluded to is, that which arises from an obstruction of the Eustachian tube, and the operation consists in puncturing the membrana tympani.

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When the Eustachian tube is obstructed, the air confined in the tympanum being unable to yield, the membrana tympani must cease to vibrate; and thus, sound being no longer conveyed to the interior parts of the organ, a permanent deafness must ensue.

A closure of the Eustachian tube may be produced by a common cold affecting the parts contiguous to the orifices of the tube; by ulcers of the fauces; by an extravasation of blood in the cavity of the tympanum; and by a stricture of the tube. Deafness from all these causes, Mr Cooper thinks, may be remedied by puncturing the membrana tympani, as an aperture in it does not injure the ear, and a very small aperture is sufficient to admit a free passage of air to and from the tympanum.

Opportunities soon occurred of trying the effects of this operation.

CASE I. — A woman of about thirty-six years of age was so deaf, that it was with difficulty she could be made to hear. Her deafness came on in 1793, and arose from the tonsil glands becoming enlarged by a cold she caught

caught in the winter of that year. Mr Cooper punctured the membrane of the left ear, being that in which the hearing was most defective. Immediately she could hear what was said to her, without any particular exertion on the part of the speaker; and, in about half an hour, she was capable of hearing every thing that was said in the ordinary tone of conversation.

CASE 2.—Ann Daley was admitted into Guy's Hospital, on the 21st January 1801. She was so deaf, that unless words were spoken close to her ear, she could not hear them; nor could she hear the beating of a watch, unless it were pressed against her head. She had been thus far deprived of hearing for the space of six weeks, and the deafness had been occasioned by ulceration of the fauces. On the 25th, the membrane of the left ear was punctured, and with that ear she could instantly hear the beating of the watch at the distance of several feet.

On the 28th, the operation was repeated on the right ear with equal success; so that her hearing was perfectly restored.

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CASE 3.—Mr J. Round, aged seventeen, had laboured from his birth under such a degree of deafness as would have incapacitated him from engaging in business. He had been born with an imperfect state of the fauces, and the Eustachian tubes had no openings into the throat. The auditory nerves, however, were perfect; for he could distinctly hear the beating of a watch, if held between the teeth, or against the side of the head, and he never had perceived any buzzing noise in his ears. Immediately on perforating the membrana tympani, the confusion produced by the number of new sounds which immediately struck his ear, made him sink upon a chair almost in a fainting state. From this state he recovered in about two minutes; and finding that his hearing was completely restored upon the one side, he wished the operation to be performed upon the other, which was immediately done, with the same happy result, and without his experiencing the same confused sensations as before. Near two months after the operation, Mr Cooper heard from him, and he had suffered no relapse, or any inconvenience from the operation, and his hearing continued perfect.

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CASE 4.—A person was sent to Mr Cooper, in January last, who had received a blow upon his head, which had occasioned symptoms of concussion of the brain, and was attended with a discharge of blood from each ear. From the effects which the blow had upon the brain, he speedily recovered; but the deafness which had immediately followed from the accident, continued. The meatus was cleared from the blood it contained, without any relief to the patient, and as Mr Cooper expected that a quantity of blood was lodged in the tympanum, which prevented the vibration of the membrane, he punctured the membrane some days afterwards. On withdrawing the instrument, some dark-coloured blood appeared upon its point; and whenever the ear was examined afterwards, there was the same appearance of blood mixed with the wax, which continued to discharge for about ten days after the operation; during which period, the hearing was gradually restored. Mr Cooper has known cases of permanent deafness from this cause, and in these, he thinks, that the blood effused has become organized, and continued to fill the tympanum.

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The operation consists in passing into the ear a canula of the size of a common probe, in which a trocar is concealed; the canula is to rest upon the membrana tympani, and the trocar is then to be thrust through the membrane. The trocar should be so adjusted as not to pass more than one-eighth of an inch beyond the canula, to prevent its reaching the opposite side of the cavity of the tympanum, which however can produce no serious harm. The aperture should be made in the interior and inferior part of the membrane under the manubrium of the malleus, which must not be injured in the operation, and it is therefore necessary that the operator be acquainted with its exact situation. Though the membrana tympani be vascular, the vessels are so small that they bleed but little; and therefore, if much blood be discharged, the operation cannot have been properly performed. In an ear otherwise healthy, the pain is very slight and momentary, and no inconvenience of any kind succeeds the operation.

As this operation will not afford relief in any cases of deafness, except such as arise from a closed Eustachian tube, it becomes of  
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the greatest consequence to know whether the tube be closed or open.

It may be supposed to be closed when the beating of a watch held between the teeth, or pressed against the side of the head, is heard; when, in blowing the nose violently, no swelling in the ear is felt; when the deafness was immediately preceded by a complaint in the throat; and when the patient is most troubled with a noise resembling the roaring of the sea, or the ringing of distant bells.

No relief can be expected when the deafness depends upon insensibility of the nerve, or upon an alteration in the contents of the labyrinth.

The observations contained in this very interesting paper, certainly authorise us to be sanguine in our hopes, that this operation will be the means of restoring to many individuals, the advantages of colloquial intercourse, while, at the same time, they point out, in a remarkable manner, the importance of pathological inquiries, both to the theoretical and practical branches of the healing art.