On deafness and its curative treatment : with chapters on certain special diseases of the ear, and an analysis of 1,000 cases of ear and nose affections. / By Litton Forbes.

ON DEAFNESS

AND

ITS CURATIVE TREATMENT:

WITH CHAPTERS ON

CERTAIN SPECIAL DISEASES OF THE EAR,

AND AN ANALYSIS OF 1,000 CASES OF EAR AND NOSE AFFECTIONS.

BY

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Seventh Edition, Revised and Enlarged.

HENRY RENSHAW,

356, STRAND, LONDON.

1890.

PREFACE TO THE SEVENTH EDITION.

In this Edition the whole work has been carefully revised and in part re-written. The second portion, treating exclusively of Diseases of the Nose, is now published separately.

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Bond Street, W.

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CHAPTER I.

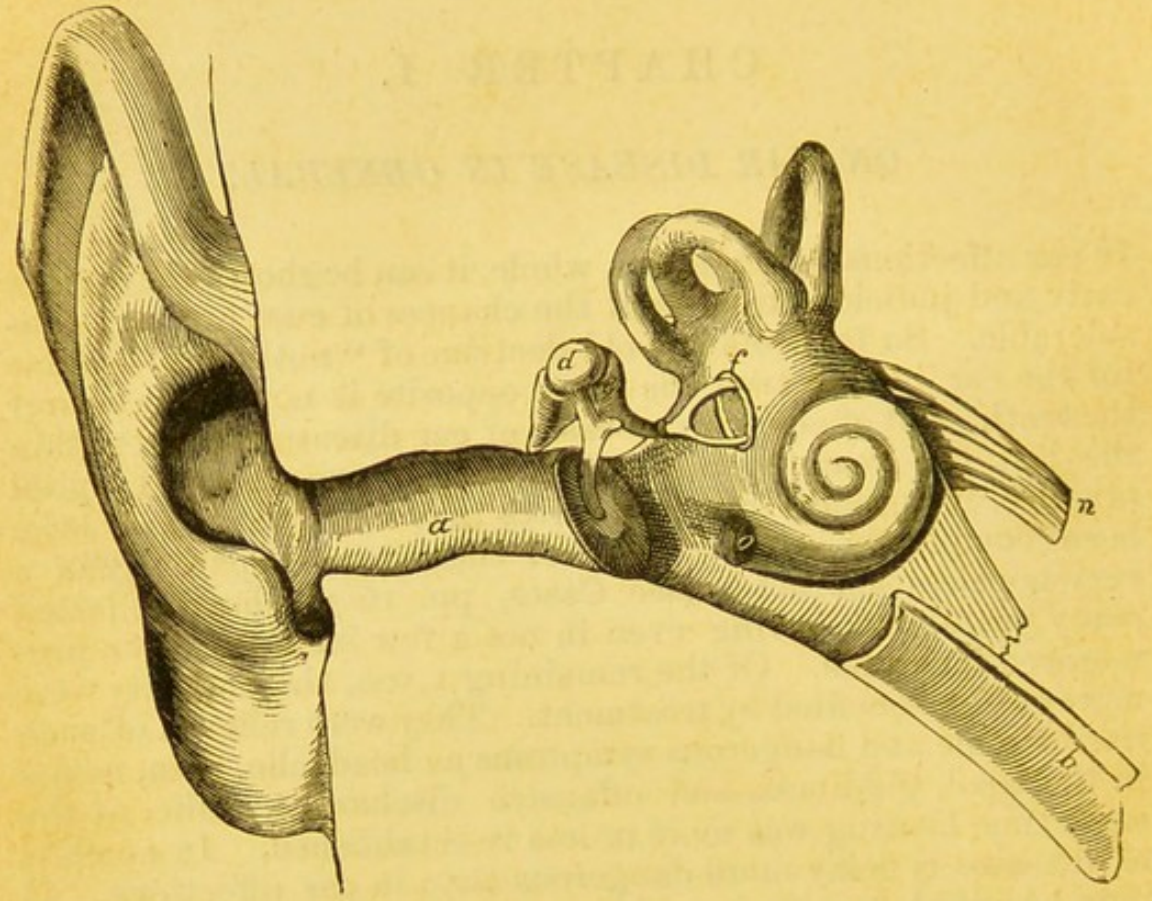
ON EAR DISEASE IN GENERAL.

If ear affections be taken as a whole, it can be shown that under early and judicious treatment the chances of cure are very considerable. So far from the old doctrine of "nothing to be done for the ear" being true, the exact opposite is now much nearer the truth. Out of some 9,500 cases of ear disease treated within the last ten years by the author, both in private and hospital practice, it appears from his notes that more than 8,000 have been completely cured. Some of these were apparently of a very hopeless character (see Cases, pp. 16-36), having lasted many years, and having even in not a few instances been pronounced incurable. Of the remaining 1,500, the majority were more or less benefited by treatment. They were relieved of such troublesome and dangerous symptoms as headache, pain, noises in the head, giddiness, and offensive discharges, while at the same time hearing was more or less re-established. In no class of diseases is delay more dangerous than in ear affections. It may be added, too, that no class of patients are less inclined to give treatment a fair and sufficient trial. Many ear affections are curable only after months of treatment, patiently and perseveringly carried out. It is scarcely reasonable to expect that a disease which has endured for years can be cured in a few weeks or days. There must, as a rule, be some relation between the length of time during which the malady has existed and the duration of treatment. But this is exactly what the majority of ear patients either forget or fail to realize.

Of all diseases which affect the ear, those attacking that portion of the organ known as the "middle ear" (see Fig. 1) are by far the most common. In fact, "middle ear diseases" may be said to constitute at least two-thirds of all affections which the aurist is called on to treat. There are, of course, many other affections of the ear, some of which are peculiar to the "outer ear," and some to the "internal." In others, again, although the ear as a whole may not be diseased, it may nevertheless

"sympathize" or suffer along with some general derangement of the bodily health. This is especially liable to occur in those cases in which the throat and nose, from some cause, such as an attack of measles, or scarlatina, or a chronic catarrh, are in a

FIG. 1.



a Meatus externus, or passage into ear.
b Eustachian tube.
d Head of the malleus resting in the regular cavity of *e*.
e The body of the incus.
f The stapes.

This engraving represents a magnified view of the parts. The tympanum or middle ear is laid open, and the connection between the small bones, stapes, malleus and incus, and the membrane of the drum is shown; the Eustachian tube is seen leading from the middle ear to the throat; the semi-circular canals represent the position of the "inner" ear.

diseased condition. In such cases, as also in those in which the poisons of gout, rheumatism, or syphilis are present in the blood, hearing becomes affected secondarily, that is, as a consequence of the general affection. In these cases the ear, if neglected, becomes diseased, and requires for its cure both local and constitutional treatment.

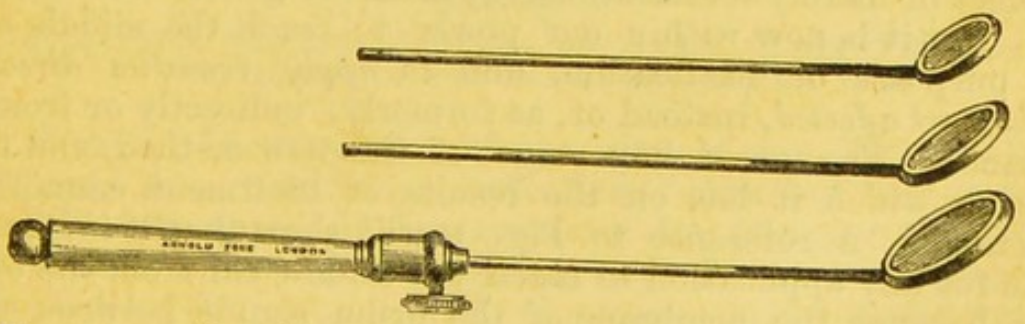
CHAPTER II.

The Middle Ear—Its anatomical connections—Difficulty of applying remedies directly to it—Treatment by direct Medication—Treatment of Closure of the Eustachian tube—Description of an improved form of Inhaler, and the method of using it.

Within the limits of this small work, a systematic and complete account of all diseases to which the ear is liable would be manifestly impossible. It is not the author's intention, therefore, to give a complete treatise on all ear affections, with their appropriate remedies, but rather to call the attention of the medical profession to a plan of treatment which he has found by experience to be remarkably successful in a certain class of cases. These cases may be grouped generally under the name of affections of the "middle ear," in contradistinction to those of the "outer ear," the "meatus," the "drum membrane," and the "inner ear."

The middle ear, or "tympanum," is that portion of the organ of hearing which lies immediately on the inner side of the "drum membrane" (see Fig. 1, p. 8), or, as it is sometimes, though improperly called, the "drum." The "middle ear" is connected with the throat, into which it opens directly by a canal, called the "Eustachian tube." This passage leading from the cavity of the ear enters the throat just behind the back of the nose, and immediately above the tonsils, where its trumpet-shaped mouth can be felt with the finger, and seen with a proper rhinoscopic mirror (see Fig. 2).

Fig. 2.



The connection thus existing between the throat, the nose, and the "middle ear" sufficiently explains the well-known fact that affections of the throat and nose, such as enlarged tonsils, a cold, ozæna, polypus, &c., will produce deafness,

noises in the head, discharges, pain, and other symptoms referred to the ear. Such a result is often seen in children after scarlatina, measles, fevers, and other exhausting illnesses, as also in growing lads and girls, whose general health from some cause or another is impaired.

Within the middle ear lies a chain of exceedingly small bones called the ossicles (see Fig. 1, p. 8). One of these ossicles, known as the "malleus" or "hammer bone," is attached to the drum membrane, while another is connected indirectly with the "inner ear." This latter portion of the organ lies within the head, in close proximity to the brain. It is to the "inner ear" that the auditory nerve, or nerve of hearing, is immediately distributed. Hence when, as sometimes happens, these small bones are destroyed by disease and pass out of the ear, hearing is necessarily very much impaired, though not absolutely destroyed.

The middle ear is in relation with the outer world by the drum membrane, which forms its external boundary, with the throat and nose by the Eustachian tube, with the internal ear by the ossicles, and with the brain by the nerve of hearing, in its distribution within the inner ear. It is further supplied by branches of another nerve, which supplies wholly, or in part, the face, teeth, and tongue, and sends branches to the stomach and heart, a fact which serves to explain the occasional dependence of earache, deafness, noises in the head, and other symptoms, on decayed teeth, neuralgia, indigestion, &c.

As already remarked, very great advances have been made within the last few years in the recognition and treatment of affections of the ear. This is more particularly true as regards affections of the deeper seated portions of the organ. The middle ear, for example, is liable to a number of affections, which at one time were inaccessible to any treatment except indirect or merely constitutional by means of general medicines, &c. But it is now within our power to reach the middle ear for purposes of medication, and *to apply remedies directly to the part affected*, instead of, as formerly, indirectly or from a distance. The great importance of this new method, and the bearing which it has on the results of treatment, cannot be overrated. A reference to Fig. 1 will show that it is impossible for any application to reach the middle ear from the outside, because the membrane of the drum stands between the outer and middle ears, and effectually guards the entrance of the latter. The middle ear can, however, be *reached directly from the throat* through the Eustachian tube (Fig. 1), and air, or fluid in a minute state of subdivision, or medicated

vapours, can thus be introduced within its cavity. This method of treatment, when properly carried out, is free from pain, danger, or any inconvenience whatever. It has in the author's practice yielded most satisfactory results. It is based on the fact, well known to every physiologist, that when the Eustachian tube is in a healthy and open condition, air may be forced by what is called the "Valsalva method" directly into the middle ear from the lungs. By means of the author's improved form of inhaler (see Fig. 5, p. 13), not only air, but medicated sprays and various vapours, such as those of iodine, chloroform, chloride of ammonium, benzoin, and many others, can be introduced exactly where they are wanted, and that is at the *actual seat of the disease*.

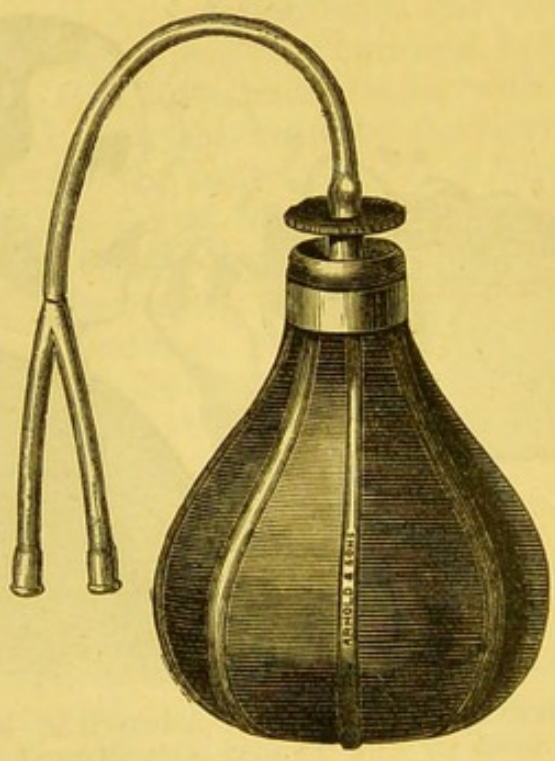
FIG. 3.

INHALER FOR NASCENT CHLORIDE OF AMMONIUM, IN TREATMENT OF AFFECTIONS OF THE THROAT AND MIDDLE EAR.

Hitherto, the treatment of the class of ear diseases already referred to as "middle ear affections" has not been in a very satisfactory state. It has consisted for the most part of constitutional remedies, of syringing, and of a vain dropping in of fluids from the outside, which of course, except in the few rare cases of extensive perforation of the drum membrane, could never, on account of the existence of the membrane itself, reach the interior of the ear. But treatment by "direct medication" is essentially different. It consists of two stages. In cases where the Eustachian tube has been blocked up by chronic

inflammation or other cause, the first stage of treatment consists in opening up the tube by catheterisation, or by bougies of *Laminaria*, as recommended by Kramer, or, if possible, by insufflation with a Politzer bag (see Fig. 4). In compassing this object, whatever means be adopted, too much gentleness and patience on the part of the surgeon cannot be used. To cause pain to a patient is, as a rule, the sign of a heavy and uneducated hand in the operator. The second part of the treatment of such cases is equally, if not more important. It consists in *the direct application of the remedy employed to the diseased* part. The remedies used will of course vary in each individual case, but, as a rule, the author has found that when exhibited in the form either of spray or vapour, they are at once most grateful to the patient, and most efficacious in their action.

Fig. 4.



Improved Form of Politzer Bag.

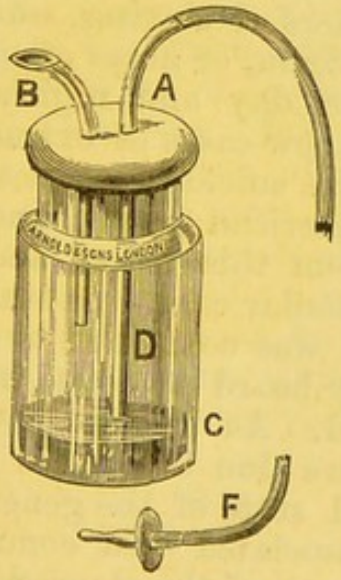
To facilitate this method of treatment, the author has recently introduced to the notice of the profession, as already stated, an improved form of inhaler (see p. 13, Fig. 5). It is simpler and safer than most of those at present in use. By its means a variety of remedies may be applied not only to the middle ear, but also to the outer ear, throat, back of the nose, mouth, and pharynx. These parts are, as is well known, very subject to catarrh, to granulations, to follicular inflammation, and to other morbid conditions, which not merely affect the

hearing, but likewise destroy the purity of the breath, interfere with pronunciation and the sense of smell, and, if allowed to go on unchecked, with the health and well-being of the whole body.

For such a condition of things, which is very common in young persons of both sexes, the safest, and indeed only efficacious mode of treatment, is that by *direct medication*. This may be carried out by the patient at his own home. It is safe and sure in its action, requires little skill, and causes no pain or inconvenience. In conjunction with proper constitutional measures, it is the only really efficacious method of dealing with that large class of cases already referred to as "affections of the middle ear." Such cases are characterized by *deafness* more or less well-marked, by *pain* in and around the ear, which is at times severe, and often worse at night, by *noises* in the head, by a *sense of stuffiness* in the ear and nose, and very frequently by *offensive breath, loss of appetite, and a generally impaired state of health*. Such a train of symptoms are often seen in children after measles, scarlatina, fevers, and other exhausting maladies.

The author's inhaler consists essentially of a closed (Wolff's) bottle, connected with the external air by two tubes A and B, which pass into the receiver through two air-tight openings. The mouth of the pipe A is covered by fluid C, and the other B is free in the interior of the inhaler D. The whole may be encased in flannel to retain heat.

FIG. 5.



INSTRUCTIONS FOR USE.

Half fill the inhaler with boiling water cautiously. Add a teaspoonful of the solution (inhalant). Inhale the vapour by the mouth; close the nostrils with the fingers, and gently force the vapour towards the ears by blowing whilst the mouth and nose are closed. When inhaling for chest or throat affections, close the mouth and exhale through the nostrils.

In the case of children, early and prompt treatment is urgently called for, because with them the ear is still enlarging and developing. Deafness in a child often means *dumbness*, and is always a serious check to education and study. Experience has shown that the best, and indeed only serviceable treatment for such cases is *direct medication applied at the very seat of the disease itself*. In those few cases in which such treatment fails to do good, it at least does no harm. This is more than can be said for "syringing," "drops," "injections," and some other plans of treatment which have been too long in vogue.

CHAPTER III.

Of Tinnitus Aurium, or Noises in the Ears, and the Value of Electricity in certain Forms of Deafness.

THERE is perhaps no more distressing symptom connected with disease of the ear than what is known as *Tinnitus Aurium*, or "noises in the ears." These noises may vary a good deal in intensity, or at times disappear altogether, soon, however, to return. Sometimes they are loud, sometimes low. Some persons hear a sound of bells continuously ringing, others of rushing waters, others of singing, whistling, buzzing, blowing, or the rush of steam, or notes of music. In many cases these sounds continue day and night. Writers on aural disease mention not a few cases of extraordinary depression of spirits, ending even in suicide, produced by these continual noises. Roosa, an American writer, knew of a musician who committed suicide from this cause, and Kramer, a German writer, mentions a similar case. Sauvage records an instance in which a musician was compelled to give up his profession, because he continually heard a second inharmonious note with every note he played. As to the cause of these noises, in many cases they are due to certain diseased conditions of the ear, or to a bad state of the general health. They are often, for instance, associated with commencing disease of the brain, with derangements of the stomach, heart, or womb, with hysteria, chlorosis, poverty of blood (anæmia), or a cold; with closure of the Eustachian tube, with the presence of wax in the ear, with a diseased condition of the drum membrane and middle ear, with nervous deafness, and with syphilis, gout, or rheumatism, affecting the internal ear or labyrinth.

In many of these cases, once the cause has been discovered, the "tinnitus" or noises, can be removed. The author has frequently given permanent relief in such cases, when other means had failed, by a combination of local and constitutional treatment, and in cases where disease of the middle ear has existed, by remedies directly applied to the part. For this purpose the vapour of chloroform or benzoin, administered in small quantities, has been found extremely useful. Again, the judicious employment of the air-douche (see Fig. 4) and the Eustachian catheter will often be found of benefit. The main difficulty in most of these cases is to detect the cause of the tinnitus, and this can, of course, only be done after a very careful and systematic examination of the external and middle ears, and, when necessary, of the heart, kidneys, and other organs.

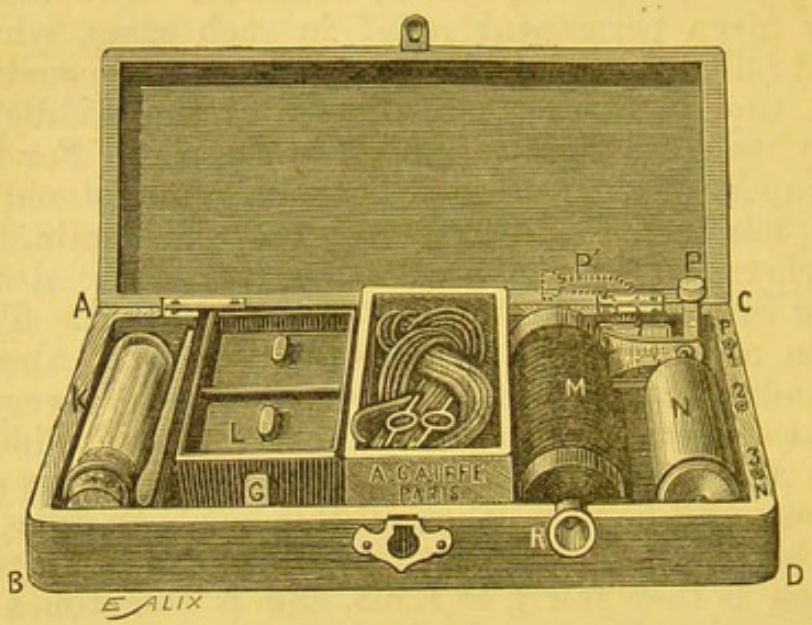
But it may still happen, when all this has been done, that no cause can be detected sufficient to account for the symptoms. The surgeon is then fairly at fault, and is sometimes obliged to tell his patient he can do nothing more for him. These are very distressing cases, and are often met with both in private and hospital practice. Patients so afflicted have gone from one specialist to another, trying various plans of treatment, and gaining but little permanent benefit. In several such cases (see Cases, pp. 16-30) the author has succeeded in effecting a cure by means of electricity, in others by means of a safe and simple operation.* As regards electricity, the secret of success exists in the manner in which the remedy is applied. Electricity may fail in one form and succeed in another. In chronic and obstinate cases of noises in the head, ordinary galvanism is of little or no use. It is, indeed, often worse than useless, for it only irritates the already too sensitive nerve fibres. Again, the electricity must often be applied *directly* to the part affected, which is frequently either the drum membrane or the middle or inner ears. To apply it properly, a special instrument is necessary, which can be inserted into the passage leading to the drum membrane, while at the same time it is connected with a suitable battery. Such an instrument is shown in

Fig. 6.

Improved Rheophore for Applying Electricity to the Drum Membrane.

* *See* page 30.

Fig. 7.



Electric Battery, for Self Use.

The induction and constant currents are here combined.

An electrical current sent through the head or body cannot have the same efficacy as when applied directly to the diseased part, that is, to the deeper structures of the ear itself. This method of treatment of "tinnitus" has hitherto scarcely received sufficient attention. In the author's hands it has certainly given good results in cases where other methods of treatment had failed.

CHAPTER IV.

ILLUSTRATIVE CASES.

Case 1.

Catarrh of the Middle Ear, with Deafness and Noises in the Head during 10 *years, cured by Electricity.*

Mr. G. R. consulted the author in 1882 for deafness, giddiness, profuse discharge from one ear, and noises in the head of ten years' duration. The patient considered that his affection was due to having bathed recklessly in cold weather. Treatment

by direct medication, chiefly by means of warm inhalations, improved the hearing, and checked the discharge, but failed to remove the noises. These the patient described as at times like a railway whistle, at others resembling the sound of air blown into a bottle. The noises were constantly present, and by the annoyance they caused had seriously affected Mr. R.'s health and spirits. After the first application of the battery the noises became decidedly lessened. The current was applied directly to the drum membrane, and caused little pain or other unpleasant symptom. A fortnight later, the noises ceased at times altogether, and no longer kept the patient awake at night. Three weeks later, they had disappeared during the day also; but for the sake of additional security treatment was continued once a week for three weeks longer. In the result, the case was completely cured, nor has there been any return of the "tinnitus" within a period of six months, when the patient was last heard from.

Case 2.

Deafness and Noises in the ears of 22 years' duration cured by Electricity.

Mrs. S., a middle-aged lady, consulted the author for a constant noise in the head, which she compared to the "roaring of the sea," and which had not ceased in her case for twenty-two years. She was so deaf as to be unable to hear loud conversation, or a watch when pressed against either ear. The tuning-fork was heard but indifferently through the head on the left side, showing that the auditory nerve was to some extent affected. The outer ears and drum membranes were healthy. She had tried innumerable remedies for both the deafness and the noises, but had not derived any real benefit. Her case was just one of those in which electricity is frequently beneficial. That treatment was therefore applied once a week, the current being conducted as deeply as possible within the ears. After a few applications hearing became improved, and along with this improvement there was a decided diminution of the noises. Eventually the noise ceased altogether in the right ear, though it still continued, but considerably lessened, in the left. After three months' perseverance the patient was finally cured of the tinnitus in both ears, while hearing was so much improved that she was able to join in general conversation.

This is a very satisfactory result, not only because of the

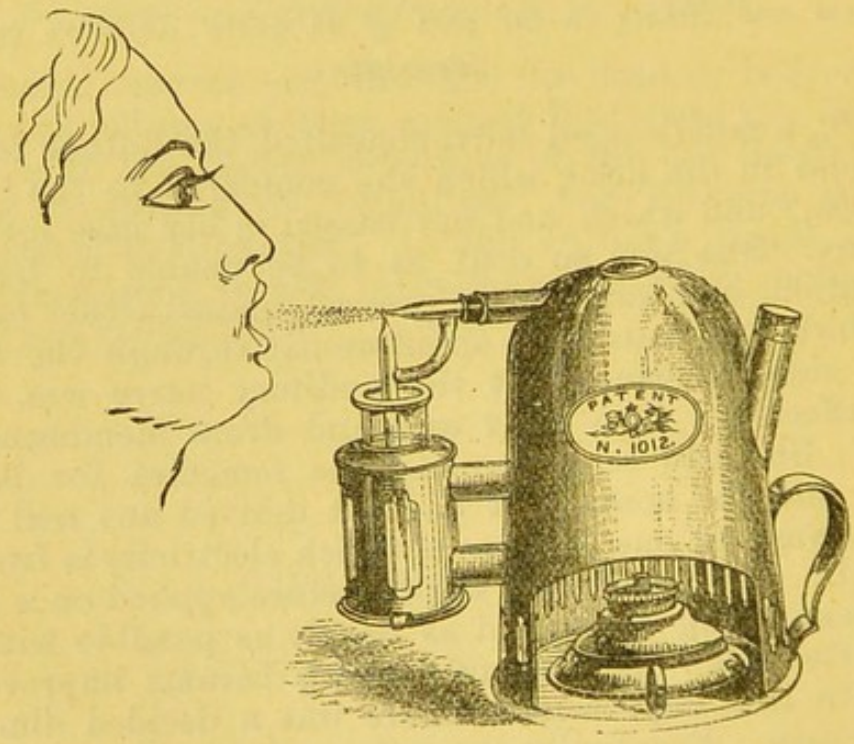
length of time during which the symptoms had lasted, but also because it resembled in many of its features those cases of "nervous deafness," which are often pronounced incurable. No case of deafness, however, should be pronounced absolutely incurable until every method of treatment has had a fair and patient trial.

Case 3.

Deafness, Dryness in the Throat, together with constant Headaches and Noise in the Ears, due to a former attack of Erysipelas.

Mr. C. W., a commercial traveller, aged 38, consulted the author for difficulty in hearing, constant headaches and noise in the ears. While on a visit to Ireland two years ago he was attacked with acute erysipelas, which spread over the face and a certain distance down the throat. Previously to this attack hearing had been good in both ears. After the disappearance of the erysipelas he observed a gradually in-

Fig. 8.



Method of Inhaling Steam, or Medicated Vapours, which can be forced by the "Valsalva Method" from the Mouth to the Middle Ear.

creasing difficulty in hearing conversation, a tickling and dryness in the throat, and suffered in addition from "noises" and giddiness. On examining the external ear, the meatus (see Fig. 1 *a*) was found to be thickened and

swollen. The drum membrane, examined by reflected light, appeared of a dull leaden colour, and the middle ear when auscultated with the otoscope returned a harsh and dry sound. Treatment in the form of syringing and various drops had already been tried ineffectually, and the patient was becoming more deaf each day. The dullness of hearing in this case was evidently due to abnormal dryness of the drum membrane and middle ear, the result of the old attack of erysipelas. Inhalation of medicated vapour was recommended for the middle ear, together with some stimulating and astringent applications to the throat. Constitutional remedies in the form of a mineral tonic, and a liberal diet, were also prescribed. Under this treatment Mr. C. W. rapidly improved. The noises disappeared, hearing returned in full measure, and after a month's treatment the case was completely cured.

Case 4.

Case of Wax in both Ears, producing Deafness and Noises in the Ears.

Mr. J. S., aged 22, consulted the author for deafness, singing and buzzing in the ears, and an unpleasant sensation of "stuffiness," as he described it, in ears, throat, and nose. He had sought advice from several surgeons, and had attended for some months two institutions devoted specially to diseases of the ear. He had, however, obtained no relief, and began to despair of being cured, when he was recommended to try the author's treatment. On examining him, I found that hearing in both ears was reduced to bare recognition of the tick of a watch when pressed against them. The tuning-fork, however, was heard well on both sides when applied to the head, showing that the nerve of hearing was still healthy. On introducing the speculum, and using a powerful light, it was evident that there was an accumulation of wax in both ears which was pressing on the delicate membrane of the drum. This wax, from the length of time it had remained in the ear, had become as hard and black as a piece of coal, and most effectually closed up the passages. In fact, any sounds which the patient heard, he heard not through his ears, but through the bones of the head. Considering the length of time during which the wax had been there, it was deemed advisable to soften it by applications of glycerine and ether before attempting to remove it. At the second visit the wax, thus softened, was successfully removed by careful syringing, when a quantity as large as a good-sized filbert nut was withdrawn. In a moment the worst symptoms were relieved, the hearing distance increased about tenfold,

while the noises which had vexed the patient day and night for nine months ceased as if by magic, and all feeling of "stuffiness" disappeared. Unfortunately, however, the length of time during which the wax had been pressing on the drum of the ear had caused thickening and ulceration. This condition eventually yielded to suitable remedies, and at the present moment the patient hears as well as he ever did.

This case is interesting, first of all, as showing how even skilful observers may occasionally fail to detect the presence of wax when deeply seated; and secondly, as showing how wax, if not removed, will, by its continued pressure, cause thickening, ulceration, and even destruction of the drum membrane. Once this has been perforated, the middle ear becomes exposed to the air (see Fig. 1), the ossicles are destroyed, an offensive discharge is set up, and a high degree of deafness results in consequence.

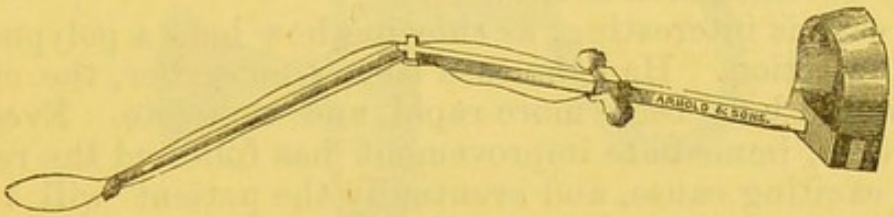
Case 5.

Supposed Nervous and Incurable Deafness, together with Pain, Giddiness, and Head Symptoms, due to Pressure of a Hardened Layer of Wax on the Membrane of the Drum. Removal and Cure.

Mrs. C. F., aged 50, consulted the author for almost complete deafness in the right ear, together with headaches, giddiness and noises in the head. She had consulted several physician and aural specialists, who, after trying various remedies, had pronounced the case "incurable." There was in this lady's family a well-marked history of deafness, which in such cases is always a bad, though by no means necessarily a hopeless feature. Mrs. C. F. stated that she first noticed her right ear to be affected some years before, since which period the deafness had steadily increased in both ears, until, at the time of her visit, she could scarcely hear the tick of my watch, which a healthy ear can distinguish at a distance of two paces. It was necessary to speak in a loud voice, and close to her. She complained very bitterly of singing and other noises in the head, with dizziness, and occasional headaches, together with severe pain in and around the ear. This pain extended round the temple, and downwards towards the jaw, and was accompanied by attacks of giddiness. To relieve this leeches, blisters, and other severe remedies had been tried in vain. On carefully testing her hearing power, I found that it had fallen to bare recognition of the watch when pressed against the meatus. With the tuning-fork, however, when placed on the top of the head, Mrs. C. F. heard best

on the right, that is, on the deafer side of the two. This showed at once that the *nerve of hearing* was not hopelessly affected, and therefore that in all probability the case was *not* one of nervous or incurable deafness. Moreover, on examining with the otoscope (Fig. 9), I found that air entered freely into the middle ear through the Eustachian tube, showing that the passage from the throat to the middle ear was open, and in a fairly healthy condition. There were no symptoms of catarrh, or other disease, and no history of any constitutional affection. I asserted therefore with some confidence that the cause of the patient's deafness would be found in all probability in the condition of the drum membrane. On examining this very carefully in a strong light, I noticed a thin dark substance spread over it, while the usual "light

Fig. 9.



Wire Polypus Snare.

cone" present in every healthy ear was absent. This layerof wax, for such it was, was quite sufficient to account for all the patient's symptoms. It was removed, not without difficulty, by careful syringing, and came away in one piece like a scale. Immediate relief followed, while the hearing distance for the watch increased from mere contact to three feet. All the other disagreeable symptoms subsided one by one, and after a few days' treatment, Mrs. C. F. left London perfectly cured.

The above case is interesting, as showing how very small a quantity of wax pressing on the delicate membrane of the ear may give rise to long-continued deafness, and other distressing symptoms.

Case 6.

Polypus of the Ear mistaken for Granulations, and causing Noises in the Head, Giddiness, Profuse Discharge, during a Period of Four Years, with Impaired General Health. Removal and Cure.

Mr. A. S., residing in Warwick Street, Pimlico, consulted the author in 1882, on account of noises, deafness, giddiness, and a discharge from the left ear. In the history of his case, written by himself, the patient states that he has been deaf in

his left ear, and has suffered from noises and a discharge in it, for over four years. Some months before his visit, the right ear became affected, and as he was rapidly losing his hearing on both sides, he determined to seek special advice. He consulted the Author in June, 1882, who, after careful examination, detected the presence of a small polypus. This was at once removed by a wire snare without pain or difficulty. The patient writes subsequently—"Since the operation the ear has been very much better; for instance, before the operation if I had held up a watch to that ear, I could not have heard the slightest sound, whereas by doing so now I can hear the ticking distinctly. One disagreeable thing in connection with the polypus was that whenever I stooped or held down my head, I always became giddy as if about to stagger and fall. Since the operation these symptoms have altogether disappeared. Since I have been under treatment my right ear has also become much better."

This case is interesting, as showing how long a polypus may escape detection. Had the case been seen earlier, the cure no doubt would have been more rapid and complete. Even as it is, however, immediate improvement has followed the removal of the exciting cause, and eventually the patient will recover under continuous treatment. There is, it may be added, as a rule, neither pain nor danger in the removal of polypi, but when they are deeply seated there is often considerable difficulty in seizing or catching hold of them. Not unfrequently also, in long-continued disease of the middle ear or drum membrane, numerous granulations or "proud flesh" spring up, and have sometimes been mistaken for true polypi. They arise, however, from a different cause, and require different treatment.

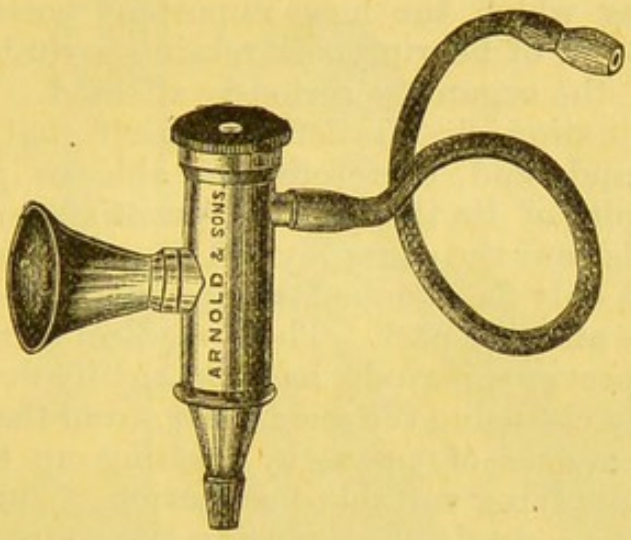
Case 7.

Case of Restored Hearing after Thirty Years of Deafness—Catarrhal Inflammation of the Middle Ear, with Retained Secretion, treated by the Air-douche, and by the Author's System of Direct Medication by Inhalation.

Mrs. W., aged 58, consulted the author in 1882, for continued deafness, which had lasted with occasional short periods of improvement or remission for thirty years. There was in her case a family history of gout, a not unfrequent cause of deafness and noises in the ears. The patient stated she was always worse in damp, foggy weather, and when she had "a cold." She had at various periods suffered from discharges from

the ears, singing noises, giddiness, and sore throat. Her general health was feeble, and she was depressed by a constant dread of becoming, as she expressed it, "stone deaf." On examination, I found she could barely hear the watch when pressed against her ear, although the tuning-fork showed that the nerve of hearing was healthy. On examining the right ear with the speculum, the drum membrane was found to be somewhat immovable, and covered in one portion with small

Fig. 10.



Pneumatic Ear Speculum for Testing the Mobility of the Drum Membrane.

white deposits. On the left side the external passage, or meatus, was partially blocked with mucous crusts, the remains of former attacks of inflammation. On examining with the otoscope, and inflating the middle ear, the peculiar hissing sound was heard which is always characteristic of a hole or "perforation" in the drum membrane. At the same moment a quantity of stringy mucus was discharged through this perforation. The hearing distance for the watch at once increased to several inches on that side. Mrs. W. had been treated for many years for deafness, without receiving any benefit whatever, and this sudden and unexpected improvement inspired her with confidence in the author's method of treatment. The Eustachian catheter was passed at regular intervals of a week, and spray applied by this means directly to the middle ear. In the intervals she practised inhalation twice a day, morning and evening. On inspecting the drum membrane at each weekly visit a continual and steady improvement became

manifest. The giddiness, noises, and deafness gradually yielded, until after four months of treatment all these symptoms had ceased. Towards the close of treatment the watch, a low ticking one, could be heard at a distance of four feet instead of only when pressed against the ear. A whisper had by this time become as audible as a loud roar had been previously. The improvement thus secured was not lost. Mrs. W. continued the treatment by inhalation diligently for some time, and now does not consider herself, nor do her friends consider her, "at all deaf."

This is an extremely interesting case, as showing the length of time during which the most important portion of the ear, namely, the nerve of hearing, will retain its vitality, even when other parts of the organ are seriously affected. The author by careful examination first satisfied himself that the auditory nerve was sound, and therefore was able to pronounce the deafness, in spite of its thirty years' duration, to be capable of relief. In this case the cause lay in the condition of the middle ear, and could only be reached by applying remedial measures directly to the affected part. Those medical men who had seen the case at previous periods had too hastily declared it to be incurable. By cleansing the middle ear, from the throat, of the accumulated mucus of years, by opening up the Eustachian tube, and by applying suitable medication, a cure was effected without pain or a single check during the course of recovery.

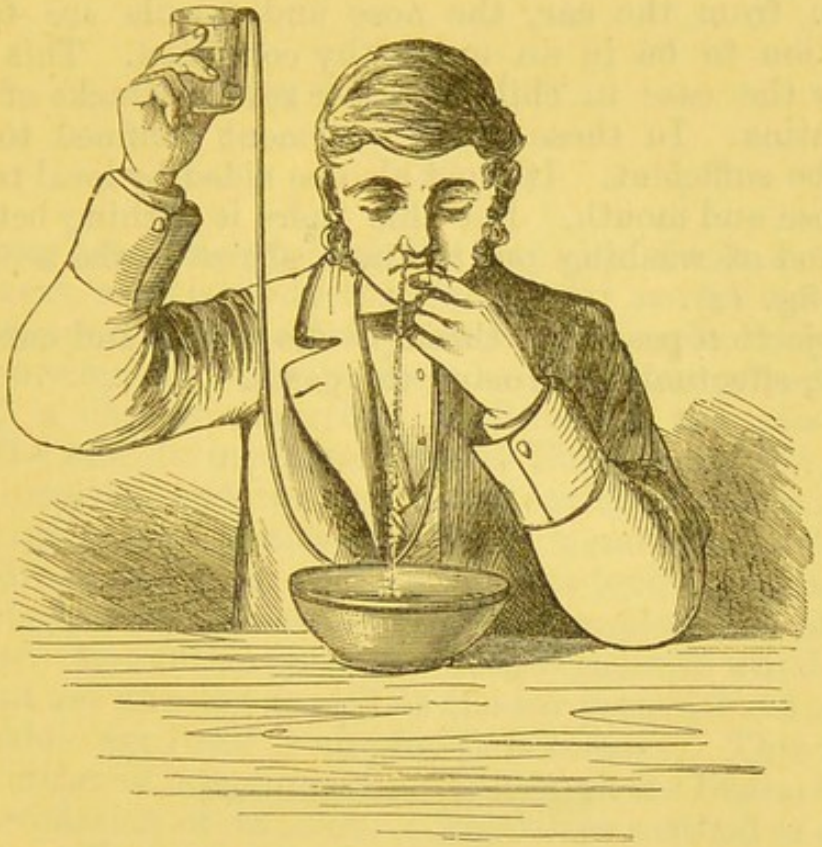
Case 8.

Deafness of Twelve Years' Duration, due to Obstruction of the Passage from the Ear to the Throat (Eustachian tube). Treatment by Direct Medication. Cure.

The patient Mr. G. R., aged 17, consulted the author for dullness of hearing, which he states he has had since the age of seven years, and which he attributes to a severe cold. His deafness is always worse in damp, chilly weather, and when he has "a cold." He snores in sleep and keeps his mouth habitually open, owing to a difficulty of breathing through the nose. On examination, the watch was heard only at three inches, instead of at as many feet, but the tuning-fork applied to the head was heard with equal distinctness in both ears. The patient complained of "fulness in the ears, and of humming noises," with occasionally a slight discharge, but no pain. The throat easily became sore from cold or other irritation, and the tonsils were enlarged and covered with thick

mucus. Innumerable "ear drops" and other reputed specifics, had been tried in vain, and both the patient himself and his friends considered his case as practically hopeless. On inspection with reflected light, the drums of both ears were seen to be drawn in, and to exhibit an unhealthy "ground glass" appearance. It was evident from these signs that the middle ear on each side was cut off from the throat by some obstruction, and that if only this obstruction could be removed the

FIG. 11.



METHOD OF WASHING OUT BACK OF NOSE AND NOSTRILS.

hearing faculty would be much improved. A catheter was therefore introduced into the Eustachian tube, and by means of Politzer's elastic air-bag (see Fig. 4) the middle ear was thoroughly inflated. The patient at once expressed himself as feeling better. He described his sensations as though "a gun had gone off in his ear." Hearing distance for the watch immediately rose to over three feet, and ordinary conversation became audible. A few applications of the air-douche and inhaler completely restored hearing. It was necessary, however, to remove the cause of the affection as thoroughly as possible, in order to prevent a relapse. Treatment was there-

fore continued for some weeks. The throat and middle ear and nose were twice a week thoroughly cleansed with medicated spray, and the patient instructed in the method of carrying on this treatment himself by means of the author's inhaler and the nasal douche (fig. 12). He returned home eventually cured, and writes that when any of his former throat or ear symptoms threaten to come back, he can at once cut them short by the proper remedies, which in his case he himself applies.

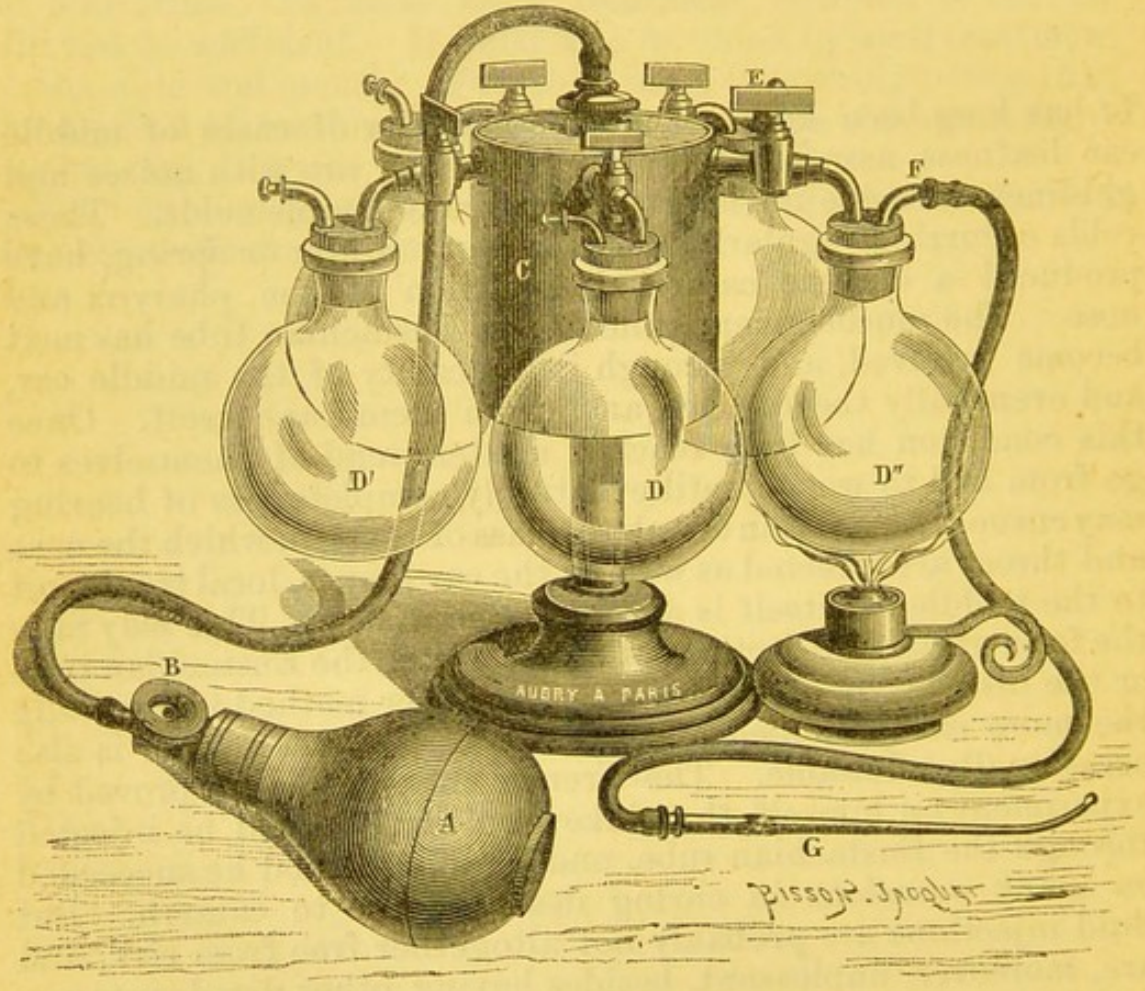
This case is interesting, as shewing the intimate connection between the back portions of the nose or " posterior nostrils," the throat and the ear. As a rule, in most cases of obstinate discharge from the ear, the nose and tonsils are found on examination to be in an unhealthy condition. This is more especially the case in children after severe attacks of measles or scarlatina. In these cases treatment confined to the ear will not be sufficient. It must also be aided by local treatment to the nose and mouth. For this there is nothing better than the method of washing out the nose shewn in the accompanying cut (fig. 12).

The injection passes in through one nostril and out through the other, effectually cleansing the parts.

INJECTIONS AND INSUFFLATIONS INTO THE MIDDLE EAR.

It has long been known that the majority of cases of middle ear deafness, associated as they frequently are with noises and giddiness, are due in the first instance to simple colds. These colds occurring regularly, perhaps every winter or spring, have produced a chronic catarrhal condition of the pharynx and nose. The mucous membrane of the Eustachian tube has next become involved, and through it the cavity of the middle ear, and eventually the ossicles and drum membrane itself. Once this condition has been reached matters tend of themselves to go from bad to worse, until eventually complete loss of hearing may ensue. As a rule in the above class of cases, in which the nose and throat are affected as well as the ear proper, local treatment to the middle ear itself is absolutely necessary. This may take the form either of injections of fluid through the Eustachian tube or the insufflation of vapours. The latter method is generally the more easily applied and efficacious; but the former is also occasionally advisable. The French surgeon Guyot proved by experiment on himself that lukewarm water could be injected through the Eustachian tube, and by this method he succeeded on many occasions in curing deafness due to catarrh. But fluid injections are probably not altogether free from risk, and are, moreover, unpleasant, besides having other disadvantages, which have caused them to be abandoned almost entirely in modern aural practice. It has been found, however, that they can be replaced by insufflations of warm medicated air, that is, air mixed with the vapours of certain volatile or aromatic substances, such as chloroform, iodine, pine oil, compound tincture of benzoin, &c., &c. This method of treatment has

now become of extreme importance in all catarrhal affections of the nose and ear. In the former, especially in cases of ozæna, it can be made to act not only as a means of cure but also as a temporary disinfectant. Thus in those distressing cases of impure or even fetid breath, due to various conditions of the nasal mucous membrane, the parts can be as it were purified, and a most unpleasant and characteristic symptom at once removed. In ear cases the mechanical advantages of the use of Politzer's bag are secured, and at the same time the seat of the disease is actually reached by the medicaments used. A special instrument is, however, required, and though several have been invented, the best is, no doubt, that of Dr. Miot, of Paris.



Miot's Apparatus for Insufflation.

It consists essentially of a spherical air-chamber, to the upper portion of which is attached an indiarubber tube. This is provided with proper valves, and is terminated at its free extremity by a bellows, which can be worked either with the

hand or foot. To this central chamber are attached five globes furnished with stop-cocks. Each of these globes can be heated by a spirit-lamp; while an extra one can be used if desired, to produce chloride of ammonium vapour in a nascent state. Each globe is filled with the substance, the vapour of which it is desired to use. Heat is then applied, the stop-cock is turned, and the vapour passes into a central reservoir. Thence by means of the bellows it is blown through a Eustachian catheter into the middle ear. The vapours of two or more globes can be mingled in the central chamber, and in this way a considerable therapeutic advantage is obtained. A continuous hot air or vapour bath can thus be applied for as long as may be desired to the interior of the ear.

ON THE OPERATION OF PERFORATION OF THE DRUM MEMBRANE.*

"The indications generally accepted for the operation of my-
"ringodectomy, or perforation of the drum membrane, are: (1.)
"a collection of fluid, purulent or otherwise, in the tympanic
"cavity, whether the symptoms be acute or not; (2.) oblitera-
"tion of the Eustachian tube; (3.) sclerosis of the middle ear,
"with thickening, dryness, and rigidity; (4.) adhesions of the
"membrana tympani to neighbouring parts; (5.) tinnitus
"dependent on abnormal tension of the tensor tympani and
"ossicles.

"As regards the first of these conditions—that is the pre-
"sence of purulent matter in the middle ear—little doubt can
"be entertained as to the propriety of the operation. There is
"a general consensus of opinion among all specialists, that the
"sooner such collections in the tympanum can be evacuated
"the better. As Von Tröltsch well remarks, there is no cavity
"in the body of the same size which is surrounded by such
"important structures. Thus its inferior wall is in more or
"less close relationship with the jugular vein, and the pneu-
"mogastric, glosso-pharyngeal, hypoglossal, and spinal accessory
"nerves. Its superior wall, which is often imperfect (Hyrtl,
"*Comptes Rendus de Vienne*, 1850), is covered by the meninges;
"while its internal wall, formed in part by the vestibule and
"the cochlea, lies in dangerous proximity to the facial nerve
"and the internal carotid. Its posterior extremity abuts on
"the mastoid cells. The mere consideration of these common-
"places of anatomy will be sufficient to demonstrate the
"necessity of giving early issue to purulent matter within the

* Extracts from a paper read before the British Medical Association, August, 1883. To be had *in extenso* direct from Mr. Henry Renshaw, 356, Strand, price 1s.

" middle ear. Neglect of this practical point has, without " doubt, often resulted fatally, especially in the case of " young children. There is reason, indeed, to believe " that deaths from this cause in very early life are far " more common than is generally supposed. Philipeaux " has collected nine cases in which a fatal termination " occurred, without perforation of the membrana tympani " having taken place. Indeed, as results are collated, " it will probably be found that a large number of cases " of brain disease, especially in children, have had their origin " in acute inflammation of the middle ear.

" But the most interesting and important application of the " operation is in the treatment of certain forms of chronic " catarrh. This affection has hitherto been a sort of oppro- " brium to aural surgery. Subtle in its onset, and slow and " insidious in its development, it too often defies every remedy. " It consists of a group of symptoms well known to aurists, a " group which it will be convenient to speak of under the " generic term sclerosis. In this affection, as the rigidity of " the parts involved increases, the power of accommodation " becomes impaired, until finally complete deafness supervenes. " Noises in the head is a symptom which nearly always accom- " panies sclerosis. The noises are sometimes described as " ' hissing ' and sometimes as ' throbbing ' sounds, the ' throbs ' " being isochronous with the pulse. The morbid changes do " not at first appear to cause much loss of hearing, but later on " deafness makes itself painfully felt.

" It has been proposed to perforate the membrane in the " above class of cases, in order to permit the sonorous waves to " impinge more directly on the fenestra. Where the morbid " process has not spread to the articulation and the fenestra, the " operation immediately improves audition. I have performed " it in several cases, often with permanent benefit. The noise " has, as a rule, been almost immediately relieved. In some " cases, however, patients have complained of an increase of " deafness. Sclerosis may be associated with retraction of the " tensor tympani. As the result of prolonged obstruction in " the Eustachian tube, or of changes in the mucous membrane " of the middle ear, the drum membrane becomes highly con- " cave. Atmospheric pressure, by destroying the elastic tension " of the drum-head, neutralizes the antagonistic action of the " tensor tympani muscle. This latter, therefore, contracts on " itself, and if the obstruction be of long standing, the shorten- " ing becomes permanent. Mere inspection will serve to show " some of the results of this pathological condition. But

" behind these manifest changes there lie others more deeply " placed. The chain of ossicles has become denser, and " now exerts an abnormal pressure through the stapes on " the endolymph and perilymph. The function of audition is " thereby seriously compromised, and deafness, associated with " noises and giddiness, is often the result. Moreover, the " congestion of the internal ear thus induced may eventuate in " paresis of the auditory nerve from pressure. It is impor- " tant, practically, to differentiate this pathological condition " from nervous deafness, properly so called. With a " view of removing the tinnitus and deafness due to this " pressure, Frank and Weber have divided the tensor tympani, " and Grüber has perforated the drum. The latter operation " is the more simple of the two, and may, therefore, be tried " first.

" The first to suggest artificial perforation of the membrana " tympani as a cure for tinnitus or noises in the head was Sir " William Wilde, of Dublin. It was suggested to him by obser- " vation of the well-known fact that, in chronic perforation, " tinnitus is rarely present. The operation has been tried as a " means of treatment in obstinate cases, and has often given " good results. I have performed it many times in obstinate " cases without ever inducing any bad symptoms. Where failure " has occurred it may have been due to inexact appreciation of " the conditions demanding the operation. Noises may be " merely a common symptom in a large number of distinct " affections. Thus, they may occur as a symptom of morbid " changes in progress in the brain or spinal cord; of anæmia; " of the action of certain drugs, as quinine; of sympathetic " action due to irritation of the fifth pair; of compression of the " endolymph; of womb or bladder disturbance, &c. That " peculiar form of tinnitus which is capable of amelioration by " perforation depends, probably, on pathological changes hav- " ing their seat in the middle ear. They may be enumerated as " (1) an abnormal state of the meatus or tympanum; (2) an " accumulation of matters, solid or liquid, in the tympanum; (3) " abnormal tension of the membrana tympani; which, in turn, " may be due to retraction of the tensor tympani, obliteration of " the Eustachian tube, or anchylosis of the ossicles.

" The results of some years of special practice have induced " the author to arrive at the following conclusions as to the " indications, method of performing, and curative value of the " operation of perforation of the drum membrane.

" It is indicated in all cases of fluid collections, whether of a " purulent or muco-purulent character, within the tympanic

"cavity; in thickening and abnormal tension of the drum "membrane; and in retraction of the tensor tympani muscle. "It is useful, also, in certain cases of closure of the Eustachian "tube, and in many forms of tinnitus.

"The simplest and best method of performing the operation "is by incision with a curved bladed knife, fitted into a proper "handle. The incision may be a bold one, involving the whole "diameter of the membrane. Puncture is rarely sufficient. "The incision may be repeated at intervals, if required.

"The operation, if performed with ordinary care, is perfectly "free from danger, and causes but little pain; indeed none, if "cocaine be used. The good results which it so often gives "justify its performance in all of the cases above mentioned."

ANALYSIS OF SIX HUNDRED CASES.

The following cases are selected from the author's Case Book, and occurred, with a few exceptions, in private practice during the past year. The cases now given belong to a class of ear affections which, as every surgeon knows, are frequently associated with an unhealthy condition of the *nose* and *throat*. Deafness may be present in a greater or less degree, and when present is generally associated with noises and giddiness. The author's method of treatment in these confessedly difficult, obscure, and sometimes almost hopeless cases, was laid fully before the medical profession in a paper read last year at a meeting of the West London Medico-Chirurgical Society. A series of cases was then brought forward in which permanent improvement had followed systematic treatment. The cases now given include those mentioned on that occasion, together with some fresh ones. As regards the treatment of noises in the head, which in some instances are not associated with deafness, much good may often be effected, in the author's experience, when other means have failed, by the simple and almost painless operation of division of the drum membrane. On this subject he would refer to a paper read by him before the British Medical Association at Liverpool in 1883, and subsequently reprinted from the "British Medical Journal," of October 27, 1883, entitled, "The Indications for and Therapeutic Value of Artificial Perforation" (Smith, Elder & Co., London). (*See* pp. 30-33.)

Mrs. C., aged 40 (C. B. 24), consulted the author for troublesome discharge from the left ear, which had continued for three months. During this time she had had several attacks of severe pain, with throbbing, always worse at night, and with "singing" and "whistling" noises. On examination, the drum membrane was found to be thickened and rigid. It

was divided across so as to allow a free exit for the discharge from the middle ear. Treatment commenced on February 3rd, when the hearing distance in the left ear was only three inches. An artificial drum was inserted, and on February 9th all the symptoms were much improved. On February 24th, the date of the last visit, the discharge and noises had ceased, and the hearing distance for the watch had increased to two feet.

Mr. A. W., aged 20 (C. B. 33), has been deaf on and off since he can remember. He complains that his throat and nose are constantly more or less "stuffed up," and that the noises in the head and the occasional giddiness are very trying and incapacitate him from work. On examination, the Eustachian tubes were found to be blocked, and the throat and nose chronically inflamed. Hearing distance for watch in the right ear was one inch, and in the left three inches. Special treatment was commenced on March 22nd. On April 1st the hearing distance had risen in the right to three feet, in the left to four feet six inches. On May 6th all symptoms complained of had been removed, and hearing distance for watch had become in right ear fifteen feet, in left ear fifteen feet.

Mr. J. H., aged 34 (C. B. 44), was sent to the author by Dr. B. on March 29th. Case similar in its leading symptoms to the preceding. Watch could be heard on either side only when pressed against the ear. The patient was manager to a large business firm, and was threatened with loss of employment. He had consulted several aurists without benefit. Treatment was commenced March 29th; on April 5th the hearing distance for the watch had risen in right ear to eight inches, in left ear to eighteen inches; on April 19th it was in the right ear two feet, in the left four feet. The patient at this date was considered cured, as he could hear conversation with ease, and as all his other symptoms had disappeared.

Mr. T. R., aged 50 (C. B. 53), engineer at large works, has complained of deafness gradually increasing for ten months past. Hears much better in a noise, as when machinery is working close to him. Hears watch only at four inches. Treatment carried on during two months, when hearing had improved in each ear to six feet, and conversation could be readily followed.

Mr. E. T., aged 38 (C. B. 70), has been getting gradually deafer for some years past. There has never been any discharge from either ear, but noises have been more or less constantly present in the head, together with giddiness. His general health

is much impaired by worry, due to the fact that he can no longer attend to business. He sleeps badly, is very nervous, has lost appetite, and suffers from habitual constipation. The case is one of middle-ear deafness combined with extreme nervousness. Watch can be heard in either ear at the distance of one inch only. Treatment commenced April 24th. After two weeks the hearing distance had improved to five inches, and ordinary conversation could be followed. On May 8th the hearing distance had more than doubled. He feels less nervous. The noises are still heard, but only at intervals, and not, as heretofore, continuously. On May 15th the giddiness and noises were much less; hears the natural voice; general health very much better. July 5th—All noise and giddiness gone, hears conversation well, and intends to return to business. Recommended to spend a month at seaside before commencing work.

Mr. G. H., aged 40 (C. B. 71), has suffered from noises in the left ear for the last three years; these noises he considers to have been caused by a cold caught while rowing. He describes the noises as of two kinds, one, "a buzzing," such as may be heard when a shell is held to the ear; the other as a "throbbing" or "beating," which seems to follow the beats of the heart. The watch on either side can be heard at five feet. After treatment had been carried on for one week, twice a day, the first noise had disappeared, and the hearing distance for the watch had increased in the right ear to ten feet, in the left to seven feet. On May 20th the second noise ceased, and treatment was discontinued.

Mr. S., aged 34 (C. B. 74), consulted the author for deafness which had been gradually increasing during some years, for noises in the head, and for a feeling of general discomfort in the throat. At the date of the first visit, May 13th, the watch could be heard in either ear only two inches off. On examination the drum membrane was found to be hard and dry; the secretion of wax was deficient. Inflation through the nose by Politzer's method improved hearing temporarily. Treatment was commenced April 13th; on May 6th, general symptoms much improved; hearing distance had risen in right ear to six inches, in left to twelve; on May 20th, date of last visit, all noise had ceased and hearing had risen in both sides to four feet.

Mr. A. C. H., aged 30 (C. B. 82), had suffered from childhood from deafness and constant irritation of throat and back of

nose. Spits much phlegm, occasionally tinged with blood in the morning. He attributes his symptoms to an attack of croup in early life. His tonsils had been removed without material benefit. On May 6th treatment commenced: hearing distance with the watch was in left ear one foot, right ear two inches. On May 13th, throat much improved; hearing distance, left ear three feet, right ear eighteen inches. On May 20th, date of last visit, hearing had become in left ear five feet, in right six and a half feet.

Mr. W. H., aged 30 (C. B. 88), musician, consulted the author May 13th, 1884. He had suffered from partial deafness for between five and six years, and had tried various remedies. He complained of inability to distinguish one musical note from another, the sounds "ran one into the other," and were more or less muffled by a hissing noise, which varied at times in intensity, but was always perceptible. Mr. H. complained also of a husky sensation in the throat, and a feeling as if the nose and ears were blocked up. Hearing had been slowly but certainly growing worse for some months past. At the first visit the hearing distance with the watch was in the right ear three inches, in the left five inches. Special treatment was directed to removing the unhealthy condition of the nose, throat, and middle ear. Four days after commencing treatment hearing distance for the watch had risen in the left ear to nine inches, in the right to four; a fortnight later, May 24th, it had increased in the left to four feet, in the right to four and a half feet. The power of distinguishing various notes with certainty had much improved, and all noise had ceased. About this time the patient accepted an important professional engagement, and left London, feeling, as he said, "quite well."

Mr. C. (C. B. 117), age 45, consulted the author for noises in the ears of a peculiarly distressing character. Sometimes they resembled "steam being blown off," at another time the "roar of the sea," at another a "shrill whistle." He attributed his condition to neglected cold. The watch could be heard when pressed against the right ear, but could not be heard in the left. His case had been pronounced "hopeless." Special treatment, together with electricity, was commenced and persevered in by the patient steadily for nearly five months, from May till September, with the result that at the last visit, September 22nd, the noises had entirely disappeared, while the watch could be heard on the left side at a distance of eight feet, on the right at five feet. No trace of deafness or other symptoms remained. Mr. C. has been heard from subsequently,

and there has not been for the last year any return of his affection.

Miss E. G., aged 24 (C. B. 93), had been deaf from childhood. She complained chiefly of noises, and inability to hear conversation. She heard better in a noise, as for example when travelling in a train or omnibus. The drums of both ears were thickened, and the throat and nose in an unhealthy condition. Hearing distance for the watch was—right ear six inches, left ear four inches. She had attended various special hospitals in London, having been treated in one for three months, in another for nine, without any benefit. In Miss G.'s case, owing to the length of time during which the symptoms had lasted, and the actual destruction of the parts which had taken place, it was scarcely probable that any treatment could effect very much. Miss G. was anxious chiefly to be cured of the noises, which never ceased night or day, and were most distressing. Treatment commenced May 3rd; the hearing distance at this date was for the watch on the right side six inches, on the left four inches. Treatment was continued till November 12th, when Miss G. left town; the noises had by that date almost disappeared, and the hearing distance in either ear had risen to eight inches. Treatment was recommenced in January following, and by the 21st, the hearing distance had risen to fifteen inches in the right and twelve in the left. The noises had ceased entirely, and the patient could now take part in general conversation. She expressed herself as very well satisfied with the general result, which was better than she had ventured to hope for.

Mrs. A., aged 68 (C. B. 97), suffered much from general weakness and nervousness, together with noises in the head, and at times absolute deafness. She had been told that she had nervous deafness, and was "incurable." On May 22nd, 1884, the date of first visit, the watch could be heard only when pressed against either ear. Direct medication was applied, and the drum membrane perforated. On June 3rd the watch could be heard well in either ear at the distance of three feet. Mrs. A. was directed to continue general and local treatment herself for some time longer, and was discharged on June 15th, cured.

Mr. E. T. (C. B. 100), consulted the author, May, 1884, for deafness, noises, and giddiness, which had been present since January of the same year. His throat and nose were in an irritable condition, smell was impaired, and the power of hear-

ing readily and distinctly ordinary conversation was quite lost. The tuning-fork could be heard through the head, but the watch only when pressed against either ear. Treatment was commenced May 24th. On June 28th the hearing distance in either ear had risen to thirty inches. By July 12th the power of hearing in the right ear was four feet; in the left, three and a half feet; all noises had ceased, and conversation could be readily followed.

Mr. J. T., aged 24 (C. B. 103), had suffered from deafness, giddiness, noises in the head, with at times an offensive discharge from either ear for "at least fifteen years." He "had never heard well since he could remember; had lost some of the small bones of the ear, was aware that both drums were practically destroyed, and having tried various methods of treatment had almost given up all hopes of ever being better." The case was a most unpromising one. The hearing distance for the watch was on the right side four inches; on the left, ten inches. Treatment was commenced May 24th. On June 7th the noises and discharge were better, and the hearing distance had risen in the right to eight inches, in the left to twelve inches. The patient at this date unfortunately caught a severe cold, had a relapse, and his symptoms became aggravated. Treatment was resumed as soon as possible, and by July 12th the discharge had ceased, as also the giddiness and noises, except occasionally in the mornings. By September 27th all his old symptoms had disappeared, and the patient could hear the watch at two feet; in other words, could follow ordinary conversation. Considering the destruction which had already taken place in the middle ear, it was scarcely to be expected that much more could be done. Accordingly, Mr. T. was recommended to cease further treatment, at least for some time. He was seen subsequently, on October 25th, at which date the improvement was still fully maintained.

Miss O. (C. B. 111) consulted the author in May, 1883, for deafness, with intense pain in the ear, and a "noise like water falling." The watch was heard in the right ear at twelve inches, in the left ear at eighteen inches. Treatment was commenced May 23rd; by July 12th all symptoms had disappeared, and the hearing distance for the watch in either ear had risen to twelve feet. In July, 1884, the patient, whose hearing had remained well through the winter, was seized in spring with a recurrence of the symptoms of the previous year, together with loss of hearing and rupture of the drum. Treatment again

brought back, by August 1st, hearing power for the watch to twelve feet in either ear. Miss O. was again seen in April, 1885. She had continued well during the winter, having treated herself at intervals as directed. Hearing distance for watch in both ears was in April, 1885, fifteen feet.

Miss S., aged 37 (C. B. 145), has been deaf for last six months, and has suffered much from noises in the head, worse at certain times, and when worried. Throat and nose healthy. Hearing distance for the watch on the right side three inches, on the left only on contact. Treatment commenced July 1st, and ended August 2nd. At latter date all unpleasant symptoms had disappeared, and the hearing distance for the watch had become on the right side five feet; on the left, ten inches.

Miss M. (C. B. 153) has suffered for some years past from deafness, giddiness, and noise. The nose is frequently stopped up, and the breath offensive. The patient cannot breathe easily with the mouth shut. On examination, on October 8th, the right drum was found to be perforated. The watch was heard in either ear only at six inches. Treatment, both local and constitutional, was ordered twice a week; on November 19th, the patient considered herself cured, as all symptoms had then disappeared; the hearing distance for the watch had risen in right ear to five inches; in left to three and a half feet. Miss M. was seen at intervals until the March following, but there had been no return of the deafness or noises.

Miss D. (C. B. 104) consulted the author, May 25th, 1884, for painful swelling and irritation of the ear passages. Had had erysipelas, and had suffered at intervals during five years. The drums were thickened and dull, and the meatus of both ears tender, red, and swollen. Hearing distance for watch on either side four feet. Constitutional and local remedies were directed to be used. By June 19th the hearing distance had increased to fifteen feet. The condition of the parts, which had been a constant source of trouble for years past, was so far cured that this spring (1885) there had been no return of the painful swellings from which Miss D. had constantly suffered.

Mr. W. M., aged 40 (C. B. 171), consulted the author on July 24th, 1883, for deafness and profuse discharge from both ears. Noises were at times troublesome, and the throat and

nose blocked up and liable to cold. The watch could not be heard except when pressed against the head. Treatment, which the patient could not carry on very regularly, was directed chiefly to the throat and middle ear. By September 25th the watch could be heard in the left ear at six inches, in the right at two feet. Mr. M. continued treatment twice a week until December 13th, when his hearing power had increased on the right side to ten feet, on the left to two and a half feet. The noises and unpleasant sensations in throat and nose had quite disappeared.

Annie O., aged 5 years (C. B. 232), complained of deafness and noises; tonsils were much enlarged, nose stopped up, profuse discharge from both ears. Patient is a very delicate and undersized child. Hearing distance for watch in right ear eighteen inches, in left two feet. Treatment was commenced on October 27th, and was continued till March 10th, by which date all symptoms had disappeared; the hearing distance for the watch had risen in both ears to twelve feet. The general health also improved rapidly as the throat and nose became in a more healthy condition.

Miss C. H., aged 31 (C. B. 233), suffered from "middle ear deafness, off and on for two years," with noises and general sense of discomfort in nose and ears. Seen on September 30th, when the hearing distance for the watch was on the right side four inches, on the left five feet. On October 14th, hearing distance in both ears for watch twelve feet; throat and nose symptoms much better.

Miss E. K., aged 19 (C. B. 236), had been under treatment at a well-known London special hospital for four years, with scarcely any benefit. Watch could be heard in right and left ears only at four inches; there was a profuse discharge from left ear. Throat and nose irritable and blocked up. On examination a polypus was discovered and removed from the left ear. Systematic treatment of throat and nose was commenced on October 8th. At this date it was found that the left drum membrane had been partially destroyed, and that the case as a whole presented a very unfavourable aspect. Treatment was steadily pursued for three months, and on January 1st the hearing distance for the watch had risen in the right ear to two and a half feet, in the left to four feet. This patient was seen subsequently some months afterwards, and the improvement was still maintained. The case is interesting (1) for the length of time during which the symptoms had lasted, and

(2) for the benefit ultimately derived from the treatment adopted.

Mr. K., aged 27 (C. B. 265), had suffered from deafness, noises, and occasional discharge from the right ear for some years past. Has been gradually getting worse, and is very anxious about his condition; watch heard at first visit, October 28th, in right ear at distance of four inches, in left at six inches. Treatment commenced on that date. On October 31st, the hearing distance had risen in the right ear to ten inches, in the left to six; by December 16th, it had risen in the right to three and a half feet, in the left to two and a half. On March 3rd, the date of the last visit, the watch could be heard in the right ear at eight feet, in the left at five feet. Recommended to call at intervals and renew treatment, should any symptoms of a relapse show themselves.

Mrs. S., aged 46 (C. B. 296), had suffered for some weeks from deafness and constant discharge from the nose, with noises in the head. The Eustachian tubes were closed. The watch on right side could be heard only when pressed against the ear, on left side it could be heard at three feet. On December 15, treatment was commenced and a small polypus removed from the nose. On February 9th, Mrs. S. considered herself cured; the watch could be heard in right ear at four feet, in left at six feet. The noises in the ears and discharge from the nose had also ceased.

Mr. J. W. M. (C. B. 307), aged 30, middle ear and throat deafness for last two years, noises very troublesome. Treatment commenced December 5th, at which date Mr. M. could hear the watch in either ear at a distance of only eighteen inches. By February 2nd the noise had disappeared and the hearing power for the watch had risen to three and a half feet in either ear. On March 8th Mr. M. was directed to cease further treatment; all throat and ear symptoms had by that date disappeared, while the hearing distance had risen for the right ear to five feet, for the left to four feet.

Mrs. W., aged 40 (C.B. 311), consulted the author in January, 1885, for deafness, giddiness, and severe pain in the right ear. There was no discharge present, but a constant sense of weight and pressure in the ear and head; general health was much depressed, and the patient was nervous and anxious, as she feared something was "growing in the ear." The watch could not be heard except when pressed against the ear. On examination,

the right ear was found to be filled with a parasitic growth, which completely blocked the passage and pressed backwards on the drum membrane. This growth was painful when touched, and hard and immovable. It was gradually softened and broken up by means of suitable applications and finally removed. Hearing distance at once rose to five feet. The patient was seen subsequently three months afterwards, when she still continued well.

Mr. E. F. (C. B. 344) was seen first on January 8th, 1884. He had suffered for several years from pain behind each ear, from noises in the head and irritation in the nose and throat. The tonsils were chronically enlarged and the nose blocked up. On examination the drum of the right ear was found to be perforated. Hearing distance in right ear four inches, in left fourteen inches. Treatment of throat, ear, and nose was commenced January 10th. On the 15th the watch could be heard in the right ear at twelve inches, in the left at thirty. On January 22nd watch was heard it the right ear at twelve inches, in the left at six feet. On this date the discharge was much better, the noises had disappeared, and the patient could breathe comfortably with the mouth closed. Treatment was continued until February 26th, when the distance at which the watch could be heard had risen in the right ear to eighteen inches, in the left to seven feet. The improvement continued until March 11th, when the hearing distance for the watch in the right ear had become three feet. At this date Mr. F. went to the seaside and caught a severe cold, which caused a return of some of his former symptoms. Treatment was resumed once more, and on June 3rd finally suspended, all troublesome symptoms having disappeared and the hearing power in both ears having become natural.

SPECIAL DISEASES OF THE EAR.

SYPHILITIC DEAFNESS.

When syphilis attacks the ear it appears under three very distinct forms, neither having any necessary relation to the other, except in common origin. Thus, syphilitic deafness may be either inherited, in which case it will be associated with certain well-known conditions of the eyes and teeth; or it may be catarrhal, and due to simple propagation of the disease from the throat through the Eustachian tube; or, finally, it may be associated with tertiary lesions, and be essentially nervous in character. These latter cases are the most severe, and, fortunately, also the least frequently met with. As to the frequency of the disease in general, it may be said that the ear is directly attacked but seldom. Defroes, in 1,200 cases of syphilis, noted only five with symptoms in the external ear, and Bruck an equal number in 4,000, while Raviglie only one case of specific external otitis in 844 patients.

The inherited form of syphilitic deafness is undoubtedly one of the most insidious and hopeless, and also the commonest. It attacks the ear occasionally in early childhood, and then is a very frequent cause of deaf-mutism. This arises from the fact that in such cases the hearing power is sometimes lost at a very early age, and before a child has learned to speak. Such, however, is happily not always the case. With many the hearing is not lost till the period of youth, or at ages varying from fifteen to twenty. It is lost with some in a few weeks, while with others the deafness may increase gradually for months or years, and never become absolute at any time. In these cases there is generally not much difficulty in discovering the cause of the symptoms, for as a rule defective sight due to interstitial keratitis, together with the peculiar physiognomy and teeth of inherited syphilis, are also present.

In adults, syphilis occasionally attacks the outer ear in the form of condylomata and warts. At a variable time after the primary infection, small dry patches make their appearance, increase in size and discharge a thin serous or purulent matter.

The papules are first seen near the meatus, and then spread to the drum membrane. Their presence is often associated with pain in moving the jaws, with deafness, and with noises. In some of these cases the symptoms are due probably to direct propagation of the inflammation from the throat through the Eustachian tube. The mucous membrane of the drum may be affected, and perforation of the drum membrane with purulent discharge follow. Both ears are generally affected. Deafness in these cases is essentially catarrhal, and must be carefully distinguished from the nervous deafness associated with tertiary lesions. It is more or less benign in character, and readily susceptible of cure by appropriate treatment commenced sufficiently early. Occasionally, however, both the nervous and catarrhal form may co-exist in the same individual, as I have often had occasion to notice in hospital practice. Thus, while the catarrhal form of inflammation, whether of syphilitic origin or not, may be present, there will be superadded an element of nervous deafness due altogether to syphilis, and quite distinct from the former. Treatment may favourably affect the former but not the latter. Hence, in such cases it is necessary to note how much is due to specific disease, and how much to catarrh.

Syphilis attacking the inner ear or labyrinth is undoubtedly a most formidable affection. It may shew itself comparatively early, but is more generally associated with the so-called tertiary symptoms. It has been known, however, to attack the inner ear within four years of the primary affection, causing sudden and absolute deafness in one ear, with violent headache, loss of sensibility and power of movement in the side of the body. In another case it was associated with giddiness and inability to stand, so that the patient practically lost all control over his movements.

The specific symptoms are not always produced in both ears, nor is the deafness necessarily sudden or absolute. If, however, in any case of suspected syphilis, after the complete disappearance of all symptoms, violent headaches have come on suddenly, with giddiness, noises in the head, and a high degree of deafness, and if this is associated with loss of power to hear the tuning fork through the bones of the head, the symptoms are almost certainly due to syphilis.

The actual lesions in syphilitic deafness have not been very satisfactorily made out. In one case Furber found after death hyperæmia of the mucous membrane of the drum, with apparent thickening of the membranous labyrinth. In another, where seven years had elapsed from the primary infection, and which had been characterized by sudden deafness with noises and

giddiness, Moos discovered periostitis of the vestibule and infiltration of the labyrinth, but no changes in the auditory passage or middle ear.

Prognosis and Treatment.—The prognosis in cases of deafness from inherited syphilis is most unfavourable, indeed they are practically incurable. Deafness, however, occurring in the course of acquired syphilis, especially if it assumes the catarrhal form, is readily amenable to treatment, and frequently passes off, leaving little or no permanent damage to the auditory structures.

Treatment, however, must be energetic, and be carried on for several months. Nor must it be limited to merely constitutional and anti-syphilitic measures. The ear must be treated locally by air douches, injections, and, if necessary, electricity. In this way it is often possible to obtain a cure, either of one or both ears. In the tertiary stage the prognosis is less hopeful. The nerve in these cases is often hopelessly destroyed, and the deafness, therefore, permanent and absolute. In some cases, however, the process of destruction may not have proceeded so far, and an effort should then be made to arrest it, and save at least what remains of hearing power. The most hopeful treatment is that by electricity in the form of continuous currents, with constant attention to the general health. Mercury is seldom of any use in these advanced cases.

Case I.—*Inherited syphilis causing almost absolute deafness, and associated with a catarrhal condition of the middle ear. Improvement.*

Miss P., aged 18, consulted me at the Hospital in 1889. She had become deaf very rapidly within the last few months, but had never had very good hearing as a child. The teeth presented the familiar notched appearance, and her eyes were inflamed and sight weak. The pupils under atropine did not dilate regularly. Her mother gave a distinct history of inherited disease. She had had several miscarriages, and also secondary symptoms. Miss P. herself had had fair general health until about the age of 16. On examination with the watch and tuning fork, it was found that hearing in each ear was much reduced. She could, however, be made to understand very loud conversation. There were no noises in the head or giddiness. On examination, the drum membrane was found to be perforated, and there was at times a considerable discharge of matter. The throat was also red and sore, and the tonsils enlarged. The Eustachian tubes were open. Treatment consisted in restoring, as far as possible, the general health and arresting the catarrhal

process. This was effected by the air douches, inhalations, and astringent applications. The result was so far satisfactory that the hearing improved considerably as the catarrhal symptoms disappeared. A residue of deafness, however, remained which incapacitated the patient for any employment, and would, no doubt, be permanent and might increase further.

The above is an example of a class of case very common among the poorer residents of London. These patients, with scarcely an exception, present the familiar aspect of inherited syphilis, and have generally suffered from an inflammatory affection of the eyes. The deafness will frequently come on in a few weeks, and is characterized by its completeness, as well as the rapidity of its onset. Should it be associated with catarrhal symptoms or impaired general health, treatment may effect some improvement. In many cases, however, the nerve would appear to be absolutely destroyed.

Case II.—*Syphilitic deafness in an adult of recent occurrence. Cure.*

Mr. S., aged 26, consulted me for deafness of about three weeks' duration. He had had specific disease, associated with sore throat and other secondary symptoms some months previously. The deafness came on about the same time. It commenced in the left ear and gradually extended to the right. There were loud ringing noises in both ears, but no pain or giddiness.

On examination the watch could not be heard on contact in either ear, but the tuning fork was audible when placed on the forehead. The external meatus in both ears was healthy, the Eustachian tubes open, but the membranes were slightly opaque and drier than natural. The throat and tonsils were red and inflamed. Specific treatment was vigorously used for about three months. At first there was not much improvement, but hearing gradually returned, the noises lessened, and eventually all symptoms disappeared.

The above case, if left much longer, would probably have become one of absolute and incurable deafness, such as is constantly met with associated with the tertiary or latest stages of the affection. Early treatment in all cases of deafness due to syphilis is of great importance, as it is probable that the early stages alone can be influenced by specific treatment. But if the case be seen sufficiently soon, and if treatment be persevered in, very satisfactory results may be looked for. Some months must frequently elapse before any marked improvement takes place.

GOUTY DEAFNESS.

Gouty inflammation of various portions of the auditory apparatus, as is now well known, is by no means of rare occurrence. Deposits of urate of soda, the specific product of the gouty poison in the outer portion of the ears, is often one of the most characteristic symptoms of the affection. Such deposits are by no means rare. Among seventeen patients suffering from gout, associated with deposits of urate of soda (chalk stones), in nine they existed on the ear and in the vicinity of the joints; in seven, on the ear alone. Of all the cases where they existed in other parts of the body, in only one were the ears free from them. (Garrod.) This, however, is not an invariable rule. Sometimes the ears present no trace of gout, while there may be abundant evidence of its presence elsewhere, possibly in a latent or "suppressed" form.

Gouty deposits on the outer portion of the ear generally take the form of small pearly-looking excrescences, situated on the helix. They may be soft if of recent formation, but if old, are generally hard and firmly attached to the cartilage beneath. Garrod remarks that the ears of women suffering from gout seldom exhibit these deposits. On the other hand, I have frequently noticed in women the peculiar congestion and redness, especially of the lobule, so characteristic of a gouty constitution. It is seldom that gout appears first of all in the ears, though instances are on record in which patients have noticed deposits in their ears a year or more before any manifestation had occurred in the joints or elsewhere. Much more common is pain, heat, and more or less acute congestion of the auricle, just before an attack of gout. Dr. Graves mentions the case of a gentleman whose ears were the seat of severe pain lasting only a few hours, and ushering in an attack. Sometimes cases occur in which the irritation of the ears proves very troublesome, and prevents the patient resting comfortably. Gouty eczema is a common form of skin affection which attacks the external ear, and especially the auditory meatus. It is characterized by itchiness, heat, and

the exudation of serum, which dries and forms scabs. The irritation may at times become very distressing, while the dry flakes of skin are unsightly.

The above manifestations of gout are, however, external to the ear proper, and have but little influence on the hearing powers. The case is much more serious when the deposits are situated on the drum membrane or the joints of the ossicles. In this position they interfere very materially with the conduction of sound, and cause both deafness and persistent noises. On examination with the speculum it is sometimes possible to see gouty deposits on the drum membrane. They appear as white opaque patches situated in the immediate vicinity of the handle of the malleus. The whole membrane is often thickened, and may be concave, with a dull lustreless appearance, and absence of the light cone. Beyond the drum membrane actual inspection is of course impossible. But it is reasonable to believe that what takes place in the larger joints of the fingers and toes, takes place also in the ears. Thus it is probable that the stapes becomes immovable, and that the vibration of the drum membrane, and the movements of the ossicles generally, are interfered with. The first stage in the morbid process is effusion. This is followed by inflammation, with subsequent deposition of gouty matter. In many of these cases the symptoms appear to be entirely due to thickening and immobility of the parts. In other words it is chiefly the conducting portion of the hearing apparatus which is at fault. In not a few cases, however, there is evidence that the nerve of hearing is affected, probably in its sheath. When this happens, to failure of conductive power there is superadded an element of nervous deafness.

Treatment in all the above cases should be both local and general. The latter must be essentially constitutional, and will consist in carefully regulated diet, with abstinence as far as possible from stimulants, more especially malt liquors and effervescent wines. At the same time, more harm than good may be done by cutting off all wine or alcohol from patients who have been accustomed for years to these aids to digestion. In such cases a moderate indulgence is not only advisable but even necessary. The diet should consist chiefly of game and fish in preference to meat, and be regulated on strictly anti-gouty principles.

As regards local treatment the air douche and warm inhalations of eucalyptus or menthol are generally necessary in order to open up the Eustachian tubes and clear the passage of mucus. Gouty patients generally complain of noises in the

head, and a sense of weight and congestion. These symptoms may be relieved by small doses of colchicum, with hydrobromic acid. I have also often succeeded in giving relief by means of dry cupping behind each ear. Where there are symptoms of nervous deafness electrical currents at intervals of every second day may be used with advantage. The following cases will illustrate the forms in which gouty deafness sometimes appears.

CASE I.—*Gouty deafness associated with noises.*

Mr. S. consulted me in 1889, complaining of noises and difficulty of hearing general conversation. He could hear one person speaking directly to him but not several. He suffered also from a sense of dulness, and confusion in his head. He had had several attacks of gout during the last five years, but had always lived a regular life, and for his age (67) looked young. He complained much of a peculiar sensation of weight in the ears, accompanied by a low humming sound. On examination the external ear was large and congested, and had the peculiar aspect so often seen in gouty persons. The surface of the meatus was healthy, but the drum membrane was grey and dull, and mottled with white spots, which were apparently deposits of gouty origin. He was placed on constitutional treatment, and small doses of hydrobromic acid with arsenic and colchicum administered twice a day. He was allowed either claret or hock at meals, with a reduced quantity of meat and abundance of fish and vegetables. For the noises dry cupping behind each ear was found of much benefit. The result of this treatment was the gradual cessation of all distressing symptoms in the ears, with a marked improvement in hearing power.

CASE II.—*Gouty deposits impeding the movement of the ossicles.*

The Rev. Mr. C., aged 40, has been gradually becoming deaf for the last eight years. There is a distinct history of gout in both his mother and father's family, but no hereditary history of deafness. He has never suffered any pain in the ears, or tinnitus, does not hear better in a noise, is worse if he has a cold, and also after a hearty meal or any stimulants. He hears the watch in right ear at eight inches, in the left at nine, and the tuning fork well in both. Examination shews that the membrana tympani is not concave, but somewhat dull and apparently thickened. The left auditory passage contains flakes of detached skin, and is abnormally dry, and deficient in wax. The Eustachian tube on the left side can be inflated, but not on

the right. During inflation the malleus is not seen to move, and is apparently tightly fixed. In this case perforation of the drum membrane was suggested, but not accepted. Treatment was continued for some weeks, careful attention being paid to diet. A marked improvement followed in hearing power, but the condition of immobility of the ossicles will probably be always persistent.

CASE III.—*Affection of the auditory nerve due to gout.*

Miss P., aged 60, had suffered for last five years with a noise in the right ear like falling water, and with a similar but louder sound in the left. At times these sounds altered in character, becoming more shrill. Simultaneously with the development of these symptoms the hearing has been gradually failing. No cause can be suggested, but the patient has suffered severely from pains in the head, affecting only one side at a time. These return at intervals, and when they are present the deafness and noises are worse. There are symptoms of gout in the hands and on the skin, and there is also a strong family history. The watch can be heard at four inches in the right ear, in the left on contact only; the tuning fork is badly heard, and louder on the better side. The drum membranes are apparently healthy and the Eustachian tubes open. Inflation causes some improvement in hearing power and also lessens the noises. The case was diagnosed to be one of gout affecting the auditory nerves. Treatment by dieting, inhalation, and electricity was carried on for two months, after which a very marked improvement had taken place, both in the hearing power and the general health.

NERVOUS DEAFNESS.

Until within comparatively recent times, the term "nervous deafness" was used by aurists very loosely. It was made to include many cases in which the symptoms were really dependent on affections of the middle, or external ear. These in their course, occasioned various diseased conditions, such as anchylosis and immobility of the small bones, a hardening of the tympanic mucous membrane, and more or less complete obstruction of the fenestræ. Any one of such conditions would be capable of reducing hearing power and of interfering with the functions of the auditory nerve, but could not properly be classed as "nervous." Modern writers now limit that term exclusively to affections of the labyrinth, or inner ear. Hence, nervous deafness means that form of the affection in which the nerve of hearing is either impaired functionally or organically. Under this heading large numbers of cases may be grouped, in which the symptoms much resemble each other, though the causes which produced them may be very various. Thus, nervous deafness may follow injuries of the head or ear, apoplexy, paralysis, sunstroke; or may be due to or associated with gout, rheumatism, scarlatina, intermittent fever, hysteria; or may be dependent, indirectly, on disorders of the digestive organs, mental shock, the abuse of quinine, excessive mental excitement, or physical debility.

In any of these cases so long as the nerve tissue is not actually destroyed, there is good hope of either partial or complete recovery.

It becomes, therefore, a matter of great importance to recognise true nervous deafness, and to distinguish it from other forms. Careful examination will generally be sufficient to show whether there is present any diseased condition of the outer ear, drum membrane, throat, uvula, tonsils, and Eustachian tubes. The rhinoscope and the catheter will show the conditions of the post nasal spaces, or the permeability of the tube. Should the evidence be negative as to the presence of any diseased conditions, a thorough examination of the condition of the inner ear and auditory nerve must be undertaken. In this inquiry the first important point is the (1) history of the case. This will shew whether deafness came on after fever, diphtheria, child-bearing, residence in tropical countries, etc. The (2) second point is whether the patient hears better in a noise, as

when travelling in a railway carriage, or much worse when fatigued, excited, or listening attentively; or whether he hears some sounds strikingly better than others; as for instance, hearing the voice fairly well, but being comparatively deaf for the watch. (3) Whether the patient is very (that is almost absolutely) deaf; if so this would exclude minor affections of the conducting parts. (4) Certain tests can be applied by means of a tuning fork. Thus, if a tuning fork be applied to the head its vibration should be heard loudest in the ear which is most deaf for outside sounds. If this is found to be so then nervous deafness may be excluded. If, however, the tuning fork be heard best on the best side for the watch, this circumstance is suspicious, but by no means absolutely confirmatory of nerve disease. Important information may also be obtained by closing the ear with the finger, while the tuning fork is placed on the head. If the portions of the ear which conduct the sound are healthy, then the sound will appear louder; if they are not, no effect will be produced.

As a rule, purely nervous deafness is an unfavourable condition. But very many cases can be improved by rational, and, above all, continuous treatment, carried out with patience and perseverance. Moreover, nerve deafness may arise from many different causes, so that no one method of treatment is applicable to all cases. Each case must be dealt with on its own merits, and until treatment has had a fair trial, it is impossible to pronounce any case to be absolutely hopeless. Under the heading "Nervous Deafness," I have grouped some typical cases which have come under my own observation within the last few years, adding the treatment which in each case was found most effective.

Case I.—*Deafness after confinement, associated with noises, but no giddiness.*

Lady X. consulted me in 1889, complaining of constant noises and defective hearing. General health had been good for last ten years, and was so at the time of her visit. No lesion or unhealthy condition could be discovered in any part of the outer or middle ear. Hearing for the watch was in the right ear one inch, in the left on contact. The noises were excessively annoying, and did not cease day or night. They and the deafness suddenly appeared after her last confinement ten years previously, in which she had suffered much, and have not since materially altered, either for better or worse. Treatment was commenced in June, and consisted in full doses of strychnine and arsenic internally, electricity three times a week, and dry

cupping daily behind each ear. This was continued for six weeks. The noises were considerably lessened, and the hearing distance increased by about one inch in each ear.

CASE II.—*Similar case, with cure.*

Mrs. B. was sent to me early in 1890 by Doctor L. Her age was 29, she had been confined about 10 months previously, and had lost the child six weeks after birth. Her general health was evidently weak, and her nervous system severely shaken. She complained chiefly of deafness, and in a limited degree, of noises and giddiness. The watch could be heard best on the right side at the distance of about one inch, on the left at half an inch. The tuning fork was heard best in the best ear, but not well over any portion of the head. Treatment consisted in arsenic, strychnine, and hydrobromic acid internally, with the use of electricity, and as there appeared some obstruction in the Eustachian tubes, occasional inhalations. Under this treatment the improvement became marked. The noises gradually disappeared, and hearing returned sufficiently for all practical purposes. After three months' treatment it had risen to 16 inches for the watch.

CASE III.—*Nervous deafness due apparently to overwork.*

Mr. F., aged 58, consulted me in 1890, suffering from mental depression, loud noises in the ears, occasional giddiness, and very marked deafness. The patient was secretary to a company in the City, and his work was of a very arduous and exciting nature. He had been in India for many years, and had taken quinine in large quantities, but until recently had had fair health and hearing. At the time of his visit the watch could not be heard in the right ear, and at only half an inch in the left; the tuning fork was badly heard. He was much tormented with noises which were at times of a buzzing, humming character, at others loud and sharp. He could hear a single speaker at about two feet if speaking loud and distinctly, but could not hear mixed conversation. Treatment by nerve tonics and electricity was commenced in February. By the end of March the improvement, both in the hearing and general health, was very marked. Hearing distance for the watch had increased to four inches, while the noises, and general confusion of thought and inability for work, had become much less. Mr. F. was recommended to take a holiday, if possible by the seaside, and continue treatment by himself on the lines laid down. I have heard from him at intervals, and the improvement is not only steadily maintained, but apparently increasing.

CASE IV.—*Noises and deafness after rheumatic fever.*

Miss B., aged 36, consulted me in 1887. Ten years previously she had had an attack of rheumatic fever, from which she recovered but slowly. It was followed by dulness of hearing in the right ear, and was accompanied by a constant blowing or buzzing sound, and pulsation extending over each side of the head. The watch could not be heard in the left, and only at 13 inches in the right ear. No actual appearance of disease could be found in either ear, and the case was diagnosed to be one of paresis of the auditory nerve. Treatment consisted in strong counter irritation behind each ear, and electricity. This was continued for two months, with the result that the noises gradually lessened, hearing for the watch rose to one inch, while conversation became fairly audible.

CASE V.—*Deafness following on Scarlatina.*

Deafness following scarlatina is well known to be not only of frequent occurrence but also of a very serious character. Much depends on the length of time which has elapsed since the attack, and the actual amount of damage done to the organ of hearing. The following case shews that some improvement will often follow treatment. At any rate in all these cases nothing can be worse than leaving a patient to hopeless deafness. Miss C., aged 26, consulted me in 1889. She had been deaf for sixteen years, after a severe attack of scarlet fever. She suffered little from noises or giddiness, and her general health was good. The watch could not be heard in either ear, but the tuning fork could be felt (probably not heard) when applied to the head or teeth. The case was evidently one of partial paralysis of the nerve. Treatment consisted chiefly in counter irritation behind the ears, and electricity three times a week. After four months a very marked improvement had taken place. The watch shewed only an improvement of two inches, but this was much more evident for conversation. The result was considered satisfactory by the patient, and was sufficient to shew that the case was not absolutely hopeless. Probably many more such cases could be very considerably improved by steady and continuous treatment carried on for months.

But patients are apt to lose hope, and accept a result which they consider probably as inevitable. There is too great a tendency even among medical men to pronounce such cases as beyond the reach of art. As a matter of fact, I believe there are exceedingly few of such cases which are not capable of some amelioration by rational and persistent treatment.

THE VALUE AND LIMITS OF ELECTRICITY IN EAR DISEASES.

The application of electricity as a means of treatment in certain forms of deafness is not new. It was tried at the commencement of this century, at a time when the discoveries of Volta and Galvani were attracting much attention among physiologists. The earlier experimenters, however, were ignorant of the principles which should guide the application of therapeutic electricity. They possessed only the rudest appliances, and, moreover, made no attempts to distinguish cases hopelessly incurable from those capable of improvement. As a natural result disappointment and finally abandonment of the method followed. The value of electricity in ear disease was ignored or denied, or it was tacitly left to charlatans, some of whose cures, however, were sufficiently remarkable to have attracted attention.

In 1868 and 1869, Dr. Brenner, of St. Petersburg, published a remarkable work on electro-therapeutics. In it he laid down clearly the principles which underlie the therapeutic use of electricity, described the methods by which it should be applied, and defined the cases in which it was likely to be of value. His writings stimulated further research, and, though his views met with opposition, they have eventually obtained acceptance from the majority of aurists. His facts are now generally admitted to be true, and his methods within certain limits are recognised to possess real value. An aurist of European celebrity, Prof. Moos, of Heidelberg (Archives of Ophthalmology and Otology, Vol. I. No. 2), has recently published a case of nervous deafness completely cured by galvanic currents.

The researches of Brenner may be briefly stated to be as follows:—Whenever in a healthy ear the negative pole is applied to the auditory passage, and the positive pole to another portion of the body, a ringing sound is heard; this sound continues during the passage of the current, and ceases when this latter is cut off. But if the positive pole be placed in the ear, and the negative elsewhere on the body, no regular sounds follow,

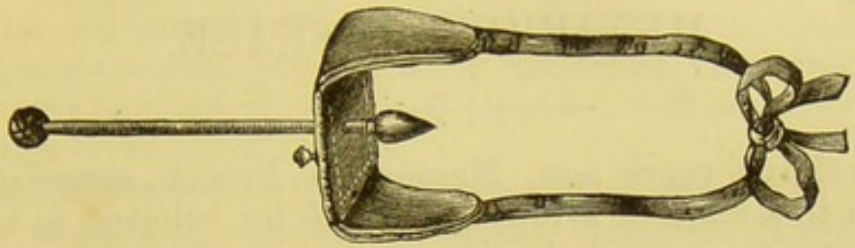
though there may be a slight noise heard at the moment of opening the current. The loudness of the sounds depend on the strength of the current. The sounds also vary with age, being better marked in young persons. Besides the sounds there is frequently also a pricking or smarting sensation, and muscular contractions of the eyelids, brows, and muscles over the temples. There may be also luminous sensations and slight giddiness, with movements of swallowing, and a metallic taste and irritation of the tongue on one side. This is due to excitation of the chorda tympani nerve. The above reactions take place in a healthy ear, and any departure from them must be considered a sign of disease.

In an ear no longer healthy, the electrical reactions depend a good deal on the actual condition in which the middle ear and auditory nerve are. In cases of hyperæsthesia of the nerve, according to Brenner, the characteristic sound may be produced by a very small number of elements, and will last for a certain time with the negative pole in the ear; or also at the moment of closure of the current with the positive pole in the ear. These unusual phenomena are generally found to co-exist with noises in the head, and to occur in cases of middle ear disease in which the nerve has become unduly sensitive.

I have myself used Brenner's system for many years, and, while differing from some of his conclusions, believe that the author has nevertheless added materially to our knowledge of the principles of treatment to be carried out in cases of nerve deafness. The curative powers of electricity are undoubted. I consider it chiefly applicable in cases (1) of chronic catarrh of the middle ear; (2) in cases of syphilitic deafness; (3) in hysterical affections of the ear; (4) in cases of persistent noises; (5) in so-called "nervous" deafness, where some vitality still remains in the nerve.

The manner in which the electricity is employed is extremely important as regards the success of the treatment. Electricity may fail in one form, or be indeed worse than useless, while it may succeed when applied in another. The physiological and therapeutic influence of induced, continuous, and interrupted currents are widely different. In chronic and obstinate cases of noises, for instance, irritation of the nerve may only make matters worse. Moreover, the electricity must be applied to the part affected. A current sent through the head or body cannot have the same efficacy as when applied directly to the diseased part, that is, the deeper structures of the ear. To facilitate the application I have devised a special form of rheophore for self use. This is fastened round the head and connected with a

proper battery. The screw, with olive-shaped ending attached, passes into the auditory meatus. By simply turning it the patient himself can apply the current to any part of the passage, or even to the drum membrane. In the latter case a very weak current only should be used.



MENIÈRE'S DISEASE.

About thirty years ago, Menière, a French surgeon, called attention to a train of symptoms which he believed to be associated with disease of the internal ear. The affection was characterized by symptoms analogous to those observed in congestion of the brain. Menière himself believed these to be dependent on effusion of blood or serum into the semi-circular canals. Further research, however, has not supported this opinion. It is probable that injury to the auditory nerve itself, or certain parts of the brain, may cause the symptoms, but our knowledge on this point is not yet very accurate.

Symptoms.—Menière's disease generally shows itself suddenly and with little warning. It comes on without fever or constitutional disturbance in a person otherwise healthy, or possibly suffering from some form of ear disease, or from slight deafness or noises. The predominant symptoms are giddiness, noises, deafness, and sickness of the stomach. Consciousness is seldom lost, but sufferers from the affection frequently stagger or fall. They rise feeling fatigued, and so giddy as to stand upright with difficulty. There is often an involuntary tendency to turn towards the affected side, say from right to left, or *vice versâ*, but not towards the healthy one. These symptoms are not accompanied by muscular contraction or paralysis. In only one case did Menière himself observe spasmodic contraction of the facial muscles with incomplete paralysis on the same side as the affected ear. Visual disturbances are not infrequent. Vertical objects may appear in a horizontal plane, and *vice versâ*. Some patients find a great difficulty in writing immediately or for some days after the attacks. It has been noticed that the handwriting gradually alters in character, becoming tremulous like that of an old person. The dominant symptoms of Menière's disease are deafness, noises, attacks of giddiness, with tendency to stagger and fall, sickness in the stomach, and above all *progressive* deafness. It is this last symptom which stands out above all the others as peculiar to the disease and imparts to it its pathological entity.

Progress and Duration.—The various symptoms just noticed do not all last equally long. Thenausea may continue for hours or days, but seldom beyond one week. The giddiness and tendency to fall generally are of longer duration. They cease for a time, but return with great facility under the stimulus of any excitement, worry, or mental emotions. The noises and deafness continue longest, and have a tendency to grow steadily worse. It has been remarked that the loss of hearing may be either on one or both sides, and is chiefly for certain groups or kinds of sounds.

The subjective noises tend in the majority of cases to diminish and may disappear completely as the deafness increases, but even in cases of complete deafness they may return. In one recorded case, that of a syphilitic patient, the whole train of symptoms of Menière's disease returned after an interval of four years, during which they had been in complete abeyance.

It is seldom that only one attack is experienced. Sooner or later the symptoms reappear with more or less intensity, and are associated with disturbances of digestion and obstinate constipation.

Diagnosis.—Giddiness, loss of power of balancing the body, and impaired hearing are not peculiar to Menière's disease, nor are they of themselves, and taken alone, sufficient to enable us to diagnose effusion into the semi-circular canals. Other affections of the external and middle ear may induce indirectly similar symptoms by modifying intralabyrinthine pressure. There may not be any lesion of the inner ear itself. It is not uncommon, for example, to see all alarming symptoms disappear after the removal of wax, the opening up of the Eustachian tubes, the removal of a polypus, or in sclerosis of the middle ear after perforation. Before definitely concluding as to the presence of Menière's disease it is well to make certain that there are no departures from health in those portions of the ear which are accessible to examination.

When a person loses consciousness and falls without any warning symptoms, it is right to suspect the presence of some affection of the nervous centres. The falling may be due to congestion, or threatened apoplexy, but in this case there would be intellectual impairment, with more or less loss of consciousness. This does not occur in Menière's disease. In cerebral congestion the noises are of short duration; deafness when present is slight, and soon passes off, but in labyrinthine affections the noises are loud, continue for a long time, or constantly, while the deafness is absolute and persistent.

In the giddiness due to stomach derangements, the symptoms of which are very similar to Menière's disease, disturbances of digestion are present. The giddiness occurs only during fasting, and ceases on digestion of food, and moreover is amenable to treatment. The accompanying noises are transient and hearing is not lost or even reduced.

Etiology.—Primarily or secondarily, Menière's disease may be induced by cold, by sunstroke, by syphilis or gout (Toynbee), or may follow child-bearing or certain zymotic diseases. It has also been met with in the course of inflammation of the middle ear and after fracture of the petrous portion of the temporal bone.

Prognosis.—Menière's disease very seriously reduces the hearing power, and may sometimes destroy it absolutely. This indeed is the great point of difference between Menière's disease and other affections of the ear in which the symptoms are almost identical. After a first attack, a certain amount of hearing power may be lost, and more at subsequent intervals. The deafness, in fact, is progressive. Frequent returns of the noises and giddiness induce great mental depression, and tend to impair the general health.

Treatment.—In the first attack, when the effusion may be supposed to be recent, efforts should be made to induce absorption. With this object, the earliest treatment should be vigorously anti-phlogistic. Leeches or cupping should be applied to the mastoid process, cold compresses to the head, and sinapisms to the legs. Purgatives are also useful. These measures, together with the horizontal position, will generally cause the symptoms to disappear, at least temporarily. Treatment subsequently should consist in hypodermic injections of pilocarpine and iodide of potassium internally. Injections of the same into the middle ear have also been recommended. Blisters, moxæ, and continuous currents of electricity should also be given a fair and extended trial. Bromide of potassium in doses of from 30 to 90 grains daily will calm the noises and giddiness. Very large doses of quinine (15 grains to 20, *Charcot*), though useful for the giddiness, frequently make the noises and deafness worse. Levi prefers hydrobromic acid which is equally efficacious, and may be administered in smaller doses. This drug has a power apparently of lessening noises and giddiness, but without affecting the stomach. The quinine treatment appears to act by relieving cerebral congestion and lessening the reflex actions of the nerve centres. Its effects

are only produced after a certain interval of time, and it must therefore be persevered in even should no benefits follow immediately.

Charcot prescribes quinine to be taken during eight days, and then to be stopped during fourteen, and recommenced if necessary, with progressively increasing doses. Hydrobromic acid may be given for six days consecutively with an interval of four days, and then prescribed again. This has given me, in several cases, satisfactory results within four or five weeks. Along with the above medicines iodide of potassium may be tried, but only in one case did I consider any benefit to be derived from it. In conjunction with the above remedies I have found that blisters or dry cupping behind the ear, over the mastoid process, are often useful. Electricity should also be used at intervals.

It should not be forgotten that cases of Menière's disease vary much in the severity of their symptoms and the amount of deafness they leave. Many cases are amenable to treatment to a considerable extent, hence no efforts should be spared to secure even a slight amelioration. Time is an important element, and whatever treatment be adopted no rapid or striking improvement can be expected. A gradual departure of all symptoms, together with an appreciable increase of hearing up to a certain point, is as much as can be hoped for.

WAX IN THE EAR.

In health every ear contains a certain amount of cerumen or ear wax, which varies both in colour and consistency in various individuals. It is at times almost fluid, at others dry, hard, and pliable; sometimes dark brown, or again a pale yellow. If, however, either through unhealthy activity of the glands the wax be secreted in too large amounts, or if the normal amount be retained within the meatus, an obstruction follows. This obstruction increases slowly, but surely. It may remain only partial, until some accident either displaces the mass or causes it to swell and increase in volume.

Both ears are generally blocked simultaneously. If the stoppage occurs in one only, there is sometimes a deficiency of wax in the other. Individuals with active skin secretion are especially liable to these accumulations. In elderly persons the weakness of the walls of the ear passage or its excessive curvature, or undue narrowing, or the presence of much hair within it, increase the tendency to retention of wax. The secretion of wax is often excessive in patients suffering from chronic catarrh of the middle ear, and in those subject to boils and certain forms of skin disease or eczema.

Symptoms.—So long as the plug of wax does not completely fill the meatus, it gives rise to no unpleasant symptoms, but as soon as there ceases to be a free space between the wax and the walls of the passage, deafness becomes very marked, and is accompanied with loud noises and possibly giddiness, sickness of the stomach, and a tendency to fall. These latter symptoms are due to pressure on the endolymph, through the drum membrane, and have more than once given rise to suspicion of some serious affection of the inner ear (Menière's disease) or brain itself.

The presence of wax may be suspected when deafness and noises suddenly come on after a patient has freely perspired or bathed in the sea, or if the dulness of hearing increases or diminishes on moving the external ear or jaw. But examination with the speculum will alone give certain information. If on looking into the meatus neither the long process of the malleus nor the luminous triangle can be seen, but instead, a

dull or dark mass, this must be wax. On touching it with a probe the sensation is conveyed of a hard body, and the probe perhaps sinks into it without causing the patient any pain.

Prognosis.—A plug of wax may remain for years without causing any serious damage; atrophy of the walls of the passage and of the drum membrane may, however, supervene though they are fortunately of rare occurrence. The deafness, noises, giddiness, and other symptoms produced by pressure, generally disappear on removal of the plug.

Treatment.—Syringing with warm water is undoubtedly the safest and speediest plan of removing wax. When the mass is soft and not very adherent a few injections of warm water are generally sufficient. The water should be fairly warm, the nozzle of the syringe directed upwards, and very little force used. The entrance of the syringe will be aided if the meatus is rendered straighter by drawing up the external ear. If the mass of wax is very hard, it should first be softened by the use of drops containing equal parts of water and glycerine, with some bicarbonate of soda. This much facilitates extraction. It is often well to warn patients that during the use of the above drops all their symptoms may be aggravated. As soon as the plug has been removed, there is generally an immediate and marked improvement. In some cases, however, the deafness may continue owing to lesions of the drum membrane, middle or internal ear, or Eustachian tube. After syringing, the ear should be carefully dried, and, if the patient is going out of doors, be plugged with wadding. The hearing power is, as a rule, not fully recovered for some hours after syringing.

In cases in which the accumulation of wax is due to excessive secretion by the ceruminous glands, a fresh formation of wax, with blocking up of the ear, takes place more or less quickly. In such cases the external passage should be washed with a one per cent. solution of sulphate of zinc or nitrate of silver, so as to diminish undue activity. Syringing sometimes brings on faintness or even alarming symptoms of syncope. These always pass off without danger, but may cause some anxiety for the moment.

Case of Wax pressing on the drum membrane and associated with symptoms of Menière's disease.

Mr. C., aged 50, had suffered from noises and deafness, together with severe giddiness, for three years. The attacks of giddiness commenced suddenly, and without apparent cause. One day in the country, the patient staggered and fell, but did

not lose consciousness. After a short interval he was able to rise, but felt weak and dazed and scarcely able to walk. The following day he felt better, but the humming in the ears was constant, and was associated with a whistling sound. The giddiness and falling attacks returned at intervals, so much so that the patient could not trust himself to walk alone. His spirits and health became affected. At night when lying down the giddiness still continued, the room and bed and articles of furniture appearing to revolve round him. The deafness increased steadily, and he was moreover troubled with dyspepsia and frequent attacks of vomiting. He had not consulted any aurist, but had been treated entirely for the head symptoms, which the patient considered to have no connection with his deafness. On examination the left ear was found plugged with hard grey wax, which was removed with difficulty, and had evidently been there a long time. Hearing at once returned, and the left ear became better than the right. The giddiness and sickness three days after had apparently ceased, though the noises continued, but much moderated. Further examination showed that the drum membrane was thickened and concave, while the long process of the malleus was unduly prominent. These lesions were evidently the result of long-continued pressure on the drum membrane by the wax. Anchylosis of the ossicles had probably followed, and produced intralabyrinthine pressure, simulating disease of the nerve. The symptoms were actually those of Menière's disease, but the cause apparently was a plug of hard wax in the external meatus.

ON TINNITUS, OR NOISES IN THE HEAD.

The name "Tinnitus" has been given to those sonorous vibrations which are heard within the head, but which have no real existence. They are, in fact, "subjective" sounds or auditory spectra, produced by the organ of hearing itself. Of these noises the majority are probably due to irritation in some form or other of the auditory nerve. There are others which appear to the sufferers themselves to follow or harmonise with the beats of the heart. These are due to the movements of the blood in the neighbouring arteries of the middle ear, more especially the internal carotid. The pulsations of the heart are imperceptible to the healthy ear, but are heard with painful distinctness either when the conducting portions of the ear are blocked, or when the sensibility of the auditory nerve has become intensified.

In certain affections of the heart and great vessels, or the arteries of the brain and neck, patients are conscious of a peculiar rhythmical sound. This becomes particularly loud and clear in cases where the middle ear is diseased, while the inner is healthy. In persons suffering from general weakness a steady singing noise is complained of, due probably to movements of the blood in the internal jugular vein.

Crackling sounds, which are not uncommon in cases of hardening and drying, or atrophy, of the drum membrane, are due probably to spasmodic contractions of the tensor tympani muscle. Others, however, consider them to depend on sudden opening of the Eustachian tubes. A few individuals can produce subjective noises at will. These are heard as "rustling" sounds, and are due to movements of the drum membrane. Excessive or long-continued doses of quinine will also frequently produce "humming" and "buzzing" sounds.

A plug of wax in the external meatus is a common cause of noises. These are due to pressure on the drum membrane, which is propagated to the inner ear, causing irritation of the nerve endings. In some cases, however, it cannot be shewn that any pressure exists, the plug of wax not extending so far back as the membrane. When such is the case it is probable

that the noises are due to the movements of the blood strengthened by obstruction in the auditory passage. It has also been suggested that they may depend on congestion of the deeper parts of the ear, due to pressure, not on the drum membrane but on the walls of the auditory passage.

Any inflammation of the skin, such as a furuncle, or boil, or those eruptions of a gouty or eczematous character, of which the external ear is so often the seat, will give rise to noises. In these cases they may depend either on congestion of the deeper portions of the organ, or on pressure, or more rarely on reflex irritation of the auditory nerve. The contact of any foreign body with the drum membrane or Eustachian tube gives rise to noises. Turnbull, an American writer, mentions a case in which a beard of barley passed into the tube, causing intense noises, inflammation, purulent discharge, and eventually perforation of the drum membrane. Complete recovery followed the expulsion of the foreign body. A somewhat similar case is mentioned by Fleischmann, in which a patient complained for years of continuous noises and a peculiar sensation in the throat. On examination after death a grain of barley was found projecting from the end of the Eustachian tube. According to Kramer, inflammation of the drum membrane itself causes a buzzing noise. Other aurists, however, consider these as due to muscular contraction, and to vibration or oscillation of the drum membrane on itself. Wilde believed that they might depend on actual increase of the sounds in the neighbouring blood vessels caused by want of mobility in the membrane and excessive arterial tension.

Noises associated with disease of the inner ear are generally due to augmented pressure within the middle ear. This pressure may be due to exudations, to retraction of the tensor tympani muscle, to membranous adhesions, to depression of the drum membrane owing to closure of the Eustachian tubes, or to changes in either of the fenestræ. It is important to note that noises in the head are seldom associated with perforation of the drum membrane or with a discharge from the ear. Cold in the head is often associated with temporary tinnitus, which after a time may become permanent from repeated attacks. This is always an unfavourable sign.

Little is known with certainty as to the causes of noises where no disease of the outer or middle ear exists. The most diverse conditions of the labyrinth, but more especially increase of pressure in the fluid which it contains, will apparently produce them. They are found associated with congestion of the brain, with anæmia, and in cases where the nerve of hearing

is pressed upon by a tumour. They may also be produced artificially by electric currents. Reflex irritation at a distance will also often give rise to them, and thus at times they are associated with toothache, acute glaucoma, or sudden chills.

Noises in the head are, as a rule, accompanied by deafness. This latter may appear at the same time, or may come on later, but more usually the noises continue after the hearing has improved. In a few cases hearing is not affected. The intensity of the noises has no definite relation to the degree of deafness, which indeed may be absolute without the presence of any noises. In other cases the noises often diminish in proportion as the deafness increases, and disappear when the latter has become complete. This condition is generally associated with paralysis of the auditory nerve. A return of the noises in such cases must be considered a favourable sign, as it shows an increase of nervous sensibility.

Noises may be either intermittent or continuous, simple or multiple. Continuous noises are not unfrequently supposed to be intermittent, being interrupted or masked by external ones. Some patients are unable to describe the character of the noises they suffer from; others compare them to the sounds they are accustomed to hear in ordinary life, such as water boiling, the whistle of a locomotive, the rushing of steam, bells, the noise heard in a shell, the rolling of carriages, the singing of birds, or even music.

Noises, due to affections of the labyrinth, may increase or diminish under the influence of ill-defined causes. They are not, however, so liable to variation as noises depending on affections of the middle ear. Loud noises coming on very suddenly are generally due to some lesion of the inner ear or brain. In exceptional cases they may arise from rapid and severe hæmorrhage. The sonorous noises complained of by the insane are due to central irritation of the auditory nerves. Hallucinations, such as cries, voices, observed in patients who have not hitherto shown any signs of mental derangement, are often the precursors of some form of insanity. Sometimes, however, they are due merely to an affection of the external or middle ear, and are amenable to treatment. Noises, of whatever kind, are very distressing to patients. They render them nervous and unsettled, disturb rest, interfere with work, and may even occasion madness or suicide. Agreeable noises are unfortunately but rare. Troeltsch gives a case in which the patient heard with pleasure birds singing, and Levi mentions the case of a young girl who heard operatic airs. Atmospheric conditions and the surroundings of patients exercise a considerable

influence on the intensity of the noises. In some wet weather, in others the electrical conditions of the atmosphere, in others moral or mental emotions, and in others generally whatever may determine an increased flow of blood to the head will intensify them. Not infrequently loud noises, external to the patient, by drowning the subjective ones, give a certain amount of relief.

In children noises are generally less frequent and loud than in older or adult persons. The elasticity of their organs counterbalance to a certain extent the effects of pressure within the labyrinth. When noises are first heard patients often imagine that they are really external, but the steady continuation of the same sound gradually undeceives them.

The ear is the most common seat of noises, but they may be apparently located also at the top or back of the head, or over the brow. Sometimes only one ear is affected; in others the noises are present on both sides, but in varying degrees.

Prognosis.—Continuous noises are generally more difficult to cure than intermittent ones. When a noise which has been intermittent becomes continuous it may be said to be an unfavourable symptom. Multiple noises are less amenable to treatment than a single distinct sound, such as humming or buzzing, and are more frequently of nervous origin.

Treatment.—This will mainly depend upon the causes, if they can be discovered, to which the noises are due. If due to congestion of the head, they can often be relieved by purgatives, or by small doses of digitalis or aconite or by dry cupping over the mastoid process. Those due to anæmia must be treated by ferruginous tonics, while those dependent upon acute or chronic affections of the middle ear will cease as soon as the cause is removed.

Insufflations of medicated vapour, where catarrh of the middle ear is present, and nasal douches in cases of naso-pharyngeal catarrh, will generally diminish the noises, but may not appreciably improve the hearing. In many cases, on the other hand, hearing improves, but the noises remain stationary. In the treatment of such cases of tinnitus, as well as in those due to a primary affection of the middle ear, a number of remedies have been suggested and tried. Internally tincture of arnica, hydrochlorate of ammonia, quinine, arsenic, strychnine, hydrobromic acid, ergotine, aconite acid, bromide of potassium, have been advocated by various writers with very varying success. In my own practice I depend chiefly on hydrobromic acid in combination with nux vomica and arsenic.

This combination appears to act well in cases associated with nervous weakness and a low tone of the system. Chloroform and sulphuric ether have been recommended by continental aurists to be used as insufflations into the middle ear. Injections of warm water and glycerine, with solutions of hyoscyamus, morphia, atropine, and strychnine have found their respective advocates. Another method of treatment suggested has been by hypodermic injections containing morphia, atropine, or strychnine, together with blisters behind the ear and back of the neck. Moxæ, electricity, and aspiration of air from the auditory meatus have also been tried, together with pressure or massage over the mastoid region and behind the ear, and have in some cases given good results.

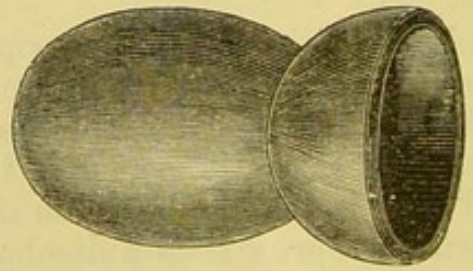
Levi, a French writer with whom I agree, considers that bromide of potassium and electric currents are, on the whole, the most generally useful. Bromide of potassium calms the condition of general nervousness which is so often developed in conjunction with the noises. It will sensibly reduce these latter, or cause them to cease altogether. I have found it best to administer the drug in large doses of from 60 to 80 grains for a week, at intervals of from two or three days, and to continue this for a month or six weeks. In some cases, after successful treatment, the noises may return temporarily owing to some disturbance in the general health, but a renewal of treatment will be sufficient to check them.

With most persons continuous electric currents produce remarkable and almost instantaneous results. These continue for several hours after the first application, and subsequent applications serve to increase the effects. In patients suffering from multiple noises, one or more will disappear completely under electrical treatment. The electricity should be applied every day or every second day for the space of five or six minutes. It should be carried well into the ear, and be used of moderate strength, but not sufficiently strong to cause pain or actual discomfort.

The comparatively slight and painless operation of division of the drum membrane will often give unlooked-for relief. The operation itself is perfectly free from danger, and even in case it fails, leaves no bad results. It has long been a matter of observation that ears in which the drum membrane has been perforated, or in which there exists a discharge of matter, are generally free from noises. Hence it has been suggested to produce inflammation of the middle ear artificially. In two cases lately under my care this had actually been done, but though the discharge was copious the noises were not sensibly

reduced. Possibly the artificially induced discharge does not continue sufficiently long to produce much effect. I have several times, however, had good results from a slight incision into the drum membrane, and as this is perfectly safe it should always be tried, with, of course, the patient's consent. Weber, Liel and others have divided the tensor tympani muscle, behind the drum membrane, and claim to have had brilliant results in several cases. The operation, however, is a much more formidable one than mere division of the membrana tympani and should not be lightly undertaken.

As to general measures, persons suffering from obstinate tinnitus should be very careful in the matter of diet. They should avoid all foods likely to cause indigestion, or to stimulate any latent gout which may be present. Severe mental or bodily work should not be undertaken, but on the contrary, the nervous and vascular systems should be kept as. quiet and free from excitement as possible. In many cases noises are rendered worse by stimulants, and as a general rule they should be avoided. On the other hand, in anæmic persons with weak digestion and low vitality, they are decidedly beneficial. Smoking is probably more useful than hurtful, but tea and coffee, more especially the latter, should be indulged in sparingly. In some few cases the noises continue at night, and interfere with sleep. This is fortunately seldom the case, but where it occurs, sleeping or at least soothing draughts are necessary. In two cases under my care recently, one that of an elderly lady, the other that of a comparatively young person, wakefulness caused by noises in the head was a marked and very distressing symptom. I succeeded in relieving the sleeplessness by large doses of bromide of potassium half-an hour before bedtime. In addition to this the patients were directed to take food, and use a warm foot bath just before lying down, with a view of emptying the cerebral vessels, and lessening the flow of blood to the brain.



Apparatus for Dry Cupping.

The following cases will illustrate the treatment of tinnitus by electricity, and the success which often attends it.

Case 1.—Mrs. M., aged 40, has suffered from noises of a constant and severe character for the last two years. No cause can be discovered, as, with the exception of slight dulness in the appearance of the membrane, the ears are healthy. Hearing is good, and there is no giddiness. She has two distinct noises—one of a "blowing" character, the other "singing." The battery was applied for about five minutes the first visit. Two days after the application was again repeated, with the result that one noise almost entirely ceased, the other was diminished. This treatment was carried out regularly three times a week during five weeks. At the end of that time the noises were no longer troublesome, and, in comparison with what they were before, had practically disappeared.

Case 2.—Mr. G., aged 26, consulted me in January, 1890. He has been deaf for about 10 years, and suffers constantly from noises in the head, especially at nights. He hears the watch three inches on the right side, and four on the left, and the tuning fork best on the latter. There was evidently partial closure of the Eustachian tubes, and a catarrhal condition of the middle ear. Ordinary treatment by Politzer's bag, etc., was applied, and improved the hearing, but had no effect on the noises. Electricity was now given daily for ten days. The noises had ceased by that time, and have not since returned.

Case 3.—Miss A., aged 76, was sent to me from the north of England, suffering from moderate deafness, but severe and continuous noises in the head. These noises varied in character, being sometimes shrill, at others dull and humming or buzzing. Treatment consisted in the combined use of the Eustachian catheter, inhalations, and electricity. The latter had a very marked influence on the noises. After each application, they changed in character and became less loud. Treatment was continued daily for six weeks. The noises gradually ceased, or came on only at rare intervals, and were so much mitigated in character as to be scarcely perceptible.

THROAT DEAFNESS.

Many cases of impaired hearing which eventually develop into middle ear deafness and become chronic have commenced in the throat or nose. The mucous membrane lining these latter is continuous with that lining the Eustachian tube, and covering the interior of the middle ear. The same membrane also lines the posterior portion of the drum head, which again is connected through the handle of the malleus with the small bones (ossicles), and by them with the inner ear. Hence the importance of throat and nose affections in the causation of deafness can scarcely be exaggerated. In a large number of the cases ordinarily met with in practice, more especially of catarrhal deafness, there is little doubt but that the affection is directly or indirectly connected with some form of inflammation of the membrane lining the throat, nose or Eustachian tube.

The most frequent cause of this condition is an ordinary cold. Colds repeated with more or less frequency each winter and spring at length set up chronic inflammation, and permanently alter the nutrition of the mucous membrane. Continental aurists have drawn attention to the greater frequency of middle ear disease in England than in European countries, and have attributed this to the above cause. After a succession of colds one generally comes at length more severe and continuous than any which preceded it. It is not readily got rid of, and is associated from the commencement with a certain amount of deafness and discomfort in the ears, and perhaps with noises. The catarrh may after a time apparently cease, but the deafness and sense of oppression remain, and tend to increase steadily. The explanation is not difficult. The Eustachian tube is not hollow like an ordinary tube, but is really a passage, the walls of which are in contact with each and are open only at short intervals. One of its chief functions is to permit the entrance of air from the throat to the drum, which is separated and shut off from the outside air by the drum membrane. When the Eustachian tube is patent the atmospheric air presses

equally on both sides of the drum membrane. If, however, the tube be not open more or less of a vacuum is formed between the membrane and the throat, and the colder external air pressing upon it with increased force tends to drive it inwards. Hence in time the drum membrane becomes concave, and eventually, by a slow process of inflammation, thickened. The movements of the small bones which carry the sonorous vibrations to the inner ear, are necessarily interfered with. Irritation produces altered nutrition, with catarrhal symptoms and excessive secretion of mucus. Sometimes, however, and this especially after middle life, the morbid process extends one degree further. The catarrh ceases, and in its place *sclerosis*, or a hardening and drying process supervenes. The vitality of the parts then becomes destroyed. The mucous membrane atrophies and shrinks, while the drum membrane itself becomes thin and dry, and useless as a vibrating medium. In these latter cases the deafness is generally of high degree, and is associated with continuous noises and possibly giddiness.

In acute inflammation the throat appears red from congestion of the superficial blood vessels, while there may also be a thick mucous discharge. In the chronic form there is, on the contrary, excessive dryness and even a glazed appearance of the pharynx. Large masses of tough tenacious mucus may be seen clinging to it, which can only be removed with difficulty. Patients complain that this mucus appears to drop from the back of the nose into the throat. They always feel "stuffed up," and very frequently suffer in addition from impaired taste and smell. A not uncommon feature of such cases, especially in children, is enlargement of the tonsils. This depends on effusion of lymph into the cells of which the glands are composed. In the adult, this lymph may become organized and firm; in children it is usually re-absorbed, but may become permanently organized. The presence of enlarged tonsils sets up a definite series of symptoms, such as hindrance to breathing, snoring in sleep, alteration of the voice, obstruction through the nose, partial closure of the Eustachian tube and deafness. This latter is due to thickening of the mucous membrane in the immediate vicinity of the tonsils. This condition of thickening is directly propagated along the Eustachian tube to the middle ear. Hence, an explanation of the well-known fact that deafness often follows scarlatina, measles, diphtheria, and other diseases in which the part primarily affected has been the throat.

Fortunately, however, much can be done in all cases of throat deafness by early treatment. Where the tonsils are

enlarged, they should be reduced by means of astringent sprays, and constitutional remedies. It is very seldom necessary to remove them by operation. If not much diseased, and if their enlargement occasions only slight inconvenience, they are better left alone. The operation of removal is perhaps sometimes performed when less severe measures and more patience would have brought about the desired results. In practice, indeed, I find it very seldom necessary or advisable to remove the tonsils either in young or adult persons. In regard to these glands, two facts should always be borne in mind, one is that as life advances they tend to disappear of themselves; another is that their removal by cutting has often been associated with severe and dangerous bleeding. This last accident fortunately occurs but seldom, still there is always a risk that it may occur, and even be attended by fatal consequences. Hence, if time be no particular object, it is always better to allow the tonsils gradually to become absorbed, or, should removal be absolutely necessary, to use some strong caustic, such as London paste, which consists of equal parts of caustic soda and lime.

The treatment of chronic catarrh of the throat or nose which has invaded the Eustachian tubes and middle ear must be both constitutional and local. The former indication can be carried out by tonics, cod liver oil, good diet, change of air, and generally by measures directed to improve the general health. Local treatment is, however, equally important, and consists in the use of nasal douches, sprays to the throat, the air douche, or inhalations to the middle ear. The Eustachian catheter should frequently be passed, and, if deemed necessary, alkaline injections used through it to the middle ear. To clear the throat from the masses of mucus which frequently encumber it, sprays of boracic acid and carbonate of soda are useful. It is often, however, necessary to remove the mucus with a brush, and then apply some strong astringents to the denuded surface. For self use nothing is so beneficial and grateful as constant and regular inhalations. These should be lukewarm, and may consist of eucalyptus, menthol, Tinct. Benzoini Co., or camphor. The warm air should be forced into the Eustachian tube twice a day for several weeks. This method, in combination with local treatment to the throat, will seldom fail to secure good results. I have not much faith in inhalations of chloride of ammonium, which have frequently appeared to irritate, and seldom to do any good. A warm and bland inhalant is more likely to be permanently beneficial. The inhalations should not be forced into the ear violently, for fear

of causing headache and giddiness afterwards. A certain amount of skill is required to inhale properly, but this patients soon acquire. To facilitate self-treatment I have devised a simple form of inhalant which fulfils all necessary requirements (*see* page 13).

The diseases of the nose most frequently associated with deafness are post-nasal catarrh, polypi, adenoid growths in the pharynx and behind the nostrils, and a generally thickened and swollen condition of the nasal mucous membrane. This latter condition is often associated with a discharge from the nose, and possibly attacks of violent and continuous sneezing.

Post-nasal catarrh is an extremely common affection in this country, and also in the United States of America. It is characterized by a most uncomfortable feeling in the throat, causing an irresistible desire to clear it, which is often ineffectual. On inspection, tenacious masses of dried mucus may be seen clinging to the posterior nostrils. So tenacious are these that nothing short of pulling them off is sufficient to dislodge them, sprays or syringing being in severe cases quite useless. Polypi in the nose and pharynx are a not uncommon cause of deafness. They interfere with the organ of hearing chiefly by the mechanical obstruction they raise to the entrance of air into the Eustachian tubes.

Adenoid growths behind the nose are most frequently met with in children. They surround the posterior nostrils, occupy the space behind the soft palate and interfere both with breathing and articulation. In children they cause a peculiar pronunciation of certain consonants, and an altered and harsher tone of voice. Loud snoring and troubled breathing during sleep is associated with their presence, and also reduced hearing power. The deafness is mechanical, and generally ceases after removal of the growths.