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**THE TREATMENT OF CHRONIC PURULENT
INFLAMMATION OF THE MIDDLE EAR.**

BY

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THE TREATMENT OF CHRONIC PURULENT INFLAMMATION OF THE MIDDLE EAR.¹

BY JAMES ERSKINE, M.A., M.B.,

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THE most common disease of the ear which presents itself to the general practitioner for treatment is what is called otorrhœa, or a "running ear." As a rule it has existed for years, and has received almost no treatment at all. By the time a doctor is asked to look at it, the discharge has become fœtid, blood has been noticed in it, the patient having become dull of hearing. A popular prejudice against treatment of otorrhœa—as disastrous as it is erroneous—is to a very large extent the cause of neglecting or delaying attention to such cases. Some people even give as a reason for neglect that they are afraid to go to doctors about their ears lest they be made worse than they are. Moreover, a discharge from the ear is regarded by the laity as rather a salutary indication, for they have heard of cases where it stopped, and the patient died of disease of the brain. Besides, a person suffering from purulent discharge from his ear is led to think that the presence of a considerable quantity of matter in his ear is desirable, because he notices that he hears better when there is some purulent fluid present, than when there is none or almost none. The surgeon is commonly told that a patient heard pretty well until the discharge from the ear ceased entirely, and it is even regretted that such a happy state of matters has been brought about in the course of nature. The layman's view of the subject is not altogether without foundation, erroneous as it is. We can easily see how he has taken it up. He has seen an acute case of inflammation of the tympanum, and he has heard of or felt the excruciating pain which is suffered till the drumhead is ruptured, and great relief takes place simultaneously with discharge of matter from the ear. The appearance of the matter is welcomed, and it would be held a very objectionable procedure to attempt to stop it. This discharge may gradually

¹A paper read at the Glasgow Southern Medical Society, 5th May, 1887.

disappear, or it may continue, and the disease may assume a chronic form ; but in the latter case it does not generally cause much inconvenience or attract much notice. It is allowed to go on for months or years ; the patient at last notices that he is deafer at times in the affected ear, and that this is the case when his ear is almost dry, or quite dry, so far as he knows. The explanation of the periods of good hearing along with a certain amount of fluid is, that the latter acts as a sort of artificial tympanic membrane, and aids in the conduction of sound. By the time the disease has become quite chronic, the membrane is largely destroyed along with the malleus, in whole or in part, or with the incus in addition. Whether these remain or not, the fluid present conducts the sound to the stapes still remaining in the fenestra ovalis. A similar result may be obtained by the use of various artificial tympanic membranes. But after destruction of the drumhead and the tympanic bones, the discharge ceases altogether, and the affected parts in his tympanum are quite healed—but he has become very deaf. How is this ? he asks ; and the only answer he can reach to afford himself an explanation is that the discharge has been stopped. On examining such an ear we find that the membranes and ossicles are destroyed, or what remains of the drum head is cicatrised to the inner wall of the tympanic cavity at certain parts, or the remaining ossicles are anchylosed and bound down by connective tissue formations. The stapes may be absent altogether, and the niche of the fenestra ovalis be easily seen. Hence it is that the patient is so deaf ; the disease has exhausted itself. When cases of this kind pass into capable surgical hands, before reaching such a termination, and when appropriate treatment is adopted to heal the remaining parts, and is successfully carried out, the patient becomes deafer, and the surgeon is sometimes blamed. The artificial membrane may be found useful, but the most guarded prognosis should be given in every such case. The dread of stopping the discharge from an ear is intensified in the popular mind by the knowledge or report of some case where a fatal result has followed such an occurrence.

The disease of the middle ear through time invades the roof of the tympanum and the mastoid antrum and cells. Septic material lodges therein, and gradually destroys the osseous structures in which it lies, encroaching more and

more upon the brain and its coverings, and also upon the large neighbouring blood vessels. Very little or perhaps no purulent discharge is noticed at the external meatus for a time, and rigors, increased temperature, and alarming head symptoms may set in, showing that the patient is suffering perhaps from mastoid abscess, but likely from cerebral abscess, purulent meningitis, or septic phlebitis, and consequent thrombosis of the sinuses of the brain. The sequel to such symptoms is generally death, and hence the lay mind is impressed with the necessity of keeping up the flow of purulent matter from the ear, because, as is sometimes expressed, if it does not come out by the ear it will go inwards to the brain, and kill the patient. Medical practitioners themselves, particularly those of the old school, are not altogether free from responsibility in the matter of establishing the erroneous notion in the peoples' mind—that a discharging ear should be left alone. Doctors are sometimes reported to have informed the parents or guardians of a child suffering from otorrhœa, that it would get better as the child grew older, and that it would be a dangerous thing to stop the discharge of the matter. Without looking into the meatus at all, they are said to give such prognosis and caution. Sometimes an astringent lotion is prescribed, which in some cases, with due and careful examination, and cleansing under illumination, may be a proper prescription. Condy's fluid, or a weak solution of carbolic acid or other antiseptic may be ordered, which alone would bring about a cure of the case, used *secundum artem*. But we shall return to this part of the treatment in the sequel.

Only within recent years has the treatment of this most common and most important disease of the ear received at the hands of the profession anything approaching to the care it demands. It may be averred, that in this department of surgery we are just emerging from the empirical or "dark ages" of the art, for practitioners are only now ceasing to grope in the darkness, when they have been pressed into this corner of their work. Cases of ear disease and of deafness were set down to an accumulation of wax, or something of a similar nature, lying in the external meatus, and the first thing that occurred to the ordinary as well as the professional mind was to remove it by means of the syringe. If a patient felt dull in his ear he might go to a doctor, who, as he expected, syringed it, and after the operation he was

quite pleased to abide by the result, because it was thought there was nothing else for it. Often cases present themselves where there could have been no reason whatever for resorting to syringing, and yet that operation had been performed. In giving the history of his case the patient often reports that he had consulted a doctor who syringed the ear, but that the operation had not been followed by any improvement in the hearing. The syringe is a very useful instrument, especially in treating chronic purulent inflammation of the middle ear, but in the various diseases of that organ it must be used with great discrimination and care, and only in the accurate knowledge of the condition of the parts under treatment.

For each and all of the popular nostrums for diseases of the ear, and the properly dispensed lotions or powders prescribed by members of the profession, something might be said to justify their use in certain conditions and properly applied, but not a single one of them can be used with safety and benefit so long as the actual state of the part has not been accurately ascertained. Therefore, before adopting any particular course of treatment of a case of chronic purulent otitis media, we must first examine it carefully.

With regard to the diagnosis of this disease, the history and appearances are quite definite and sufficient for that purpose. Scarlet fever, measles, typhoid fever, diphtheria, tonsillitis, chronic nasal and pharyngeal catarrh, and scrofula are among the commonest causes of the affection. Injury in a small number of cases is set down by the patient as the origin of the disease, and very often in the case of children the mischief is attributed to a box on the ear from the schoolmaster; but on this point, both from my own convictions in the matter, and in the interest of the teacher, I am in the habit of expressing myself as very sceptical. I saw one case where severe injury had resulted in the tympanum from a blow on the ear, and it had been occasioned by the baton of a policeman.

The duration of this disease varies greatly. An otitis media with a purulent discharge may go on for years and not occasion much destruction of the parts involved. The nature of the disease from which the otitis has resulted is one cause of this variation. Scarlet fever, for example, or diphtheria, soon produces great destruction of the membrana tympani and adjacent parts, while in measles

the process of destruction is not nearly so active. Of course the constitution of the patient affects the progress of the disease. The position of the perforation in the tympanic membrane influences materially the after course of the suppuration: if it is in the lower part of the membrane, and is extensive enough to allow the discharge of pus through it, less mischief is likely to happen than if it occurred towards the roof of the tympanum. Perforations in Shrapnell's membrane are very productive of chronic discharge on account of the way in which the pus becomes confined in the meshwork of connective tissue which is placed between the anterior surface of the head of the malleus on the one hand, and the anterior part of the roof of the tympanum, along with the inner surface of the upper part of the drum-head on the other hand. The state of the parts affected also depends on the treatment carried out, or on its neglect.

The first thing to be done for a case of purulent otorrhoea is to cleanse it carefully from the discharge lying in the external meatus. This is best done by injections of tepid water, plain or medicated, by means of a small india-rubber ball syringe. The ordinary disinfectants, permanganate of potash, carbolic acid, salicylic acid, corrosive sublimate, or preferably boracic acid, may be used in solution for the purpose. This operation must be performed gently, because at first we do not know exactly the state of the external and middle ear. Besides, it should be performed under illumination, the point of the syringe being inserted a short distance into the external meatus. With a syringe whose point is composed of india-rubber, no pain is inflicted in the event of it being brought in contact with the parts which may be very irritable. If an ivory or metal pointed syringe is used, its point should be covered with india-rubber, especially if handled by any one unaccustomed to perform the operation. After syringing, the meatus should be mopped out or dried by means of pledgets of cotton-wool inserted by little forceps, or on a cotton holder, of which there are various kinds. A view may then be obtained of the meatus, and possibly of the remains of the tympanic membrane and of the inner wall of the tympanum. The presence of polypi is to be noted, and also of granulations, large or small, solitary or abundant. The soft covering of the external meatus may be so swollen and eroded that stenosis is well marked, and the parts cannot be seen with any definition.

By the aid of the probe, which must be used very cautiously and only under good illumination, some valuable information can be obtained. We can thereby ascertain from what part of the structures a polypus may have grown and its pedicle can be accurately defined. The probe is also useful to break up and remove inspissated steatomatous material confined behind polypi or among granulations, acting as an irritant and promoting their growth. This material may be also found in the tympanic cavity behind the remains of the membrane, and often it accumulates in the mastoid antrum and the mastoid cells. It is easily removed with the probe when within reach, dislocating it with that instrument, or brushing it off with cotton on the holder. Little instruments shaped like Volkmann's spoons may be employed for the same purpose.

To clear the tympanic cavity, or even the mastoid cavity, of purulent or steatomatous contents, Hartmann's little tympanic metal tube is very useful. It can be inserted beyond the obstruction and a current of water passed through it, which washes out the irritating fluid or material as it passes outwards. The results obtained in this way are quite astonishing. After the tube has been used several times the irritation is allayed and granulations begin to disappear. It can be passed through a perforation in the tympanic membrane, and if the perforation be large enough to give exit to the water the tympanum can be effectually cleansed. For perforations in Shrapnell's membrane Hartmann's tube is specially to be commended. It is for that very obstinate affection of the middle ear he specially insists upon its use. At present I am treating a case by its means, where there has been long continued discharge from the middle ear for years. The posterior half of the drum-head behind the malleus is destroyed completely. What remains is firmly adherent to the inner wall of the tympanum. No appearance is seen of the incus or stapes in this case, and the prominence at the entrance to the mastoid antrum, to which the incu-tympanic joint is attached has been eaten away by caries, and the opening into the mastoid is widened. Some months ago this patient suffered from an acute exacerbation of the inflammation in the tympanic and mastoid cavities, with great swelling of the soft parts in the external meatus, producing almost complete stenosis. He complained of severe headache and of giddiness: his temperature

rose, and he was very restless. There was no swelling externally, and there was scarcely any pain on pressure over the mastoid process. After incising the walls of the meatus, I introduced the tympanic tube, and passed a current of tepid water through it, and succeeded in removing a quantity of foul smelling steatomatous material. The patient was instructed to instil a tepid solution of boracic acid into his ear at frequent intervals, and in the course of twenty-four hours the swelling had greatly diminished. He was also ordered to syringe the ear gently with the same solution. While doing so a large piece of this curdy inspissated matter came away, which he brought to me, thinking it was a bit of bone. I could then manage to insert the tympanic tube right into the mastoid antrum, and affect the removal of more steatomatous stuff. After operating for some time in this way every twenty-four hours, the patient using the syringe and a very weak solution of Condy's fluid, the parts began to heal. I have also found Hartmann's tympanic tube very useful in cases of double perforation of the tympanic membrane. It can be passed through the one perforation, and the current, with the purulent discharge, returns through the other.

To dilate the meatus when its walls are swollen and inflamed is rather difficult. The presence of any foreign body is apt to cause irritation. If the patient were continually under our view, the insertion of dry cotton wool pledgets as tents, would be sufficient if removed often enough, the parts being previously carefully cleansed and dried. In a case of chronic otitis externa with a discharge of a sero purulent character, I succeeded by this method after trying various other plans, such as tangle tents, lead, vulcanite. The walls of both external meatuses when first seen were so swollen that only a thin probe could be admitted, but after persevering with treatment for some months, and finally adopting tents of cotton wool, at first smeared with a little iodoform ointment (20 grains of iodoform to an ounce of vaseline), and afterwards dry and impregnated with finely powdered boracic acid, the calibre of the canal in each ear was restored and the patient heard perfectly well, the tympanic membranes being quite intact, in spite of the long-continued inflammation external to them.

The greatest care must be taken with an ear which is inflamed and irritable. The best thing for it is the appli-

cation of ear-baths of tepid water with boracic acid dissolved in it. In this way the swelling of the parts is reduced and a view into the meatus can be obtained. Depletion of the parts by means of leeches placed in front of the auricle will be found beneficial for the same purpose. Leeching is highly to be commended in acute inflammation of the middle ear, two or three being placed in front and behind the auricle. I regard blistering as a barbarity. I have never had recourse to it in any case whatever. The benefit can be more surely and less painfully obtained by bleeding. But such treatment is seldom necessary in chronic purulent inflammation of the middle ear, except when acute exacerbations occur.

The walls of the meatus sometimes require to be incised when it is found that they are so swollen as to prevent the exit of pus. Various lancets are made for this purpose, which can be applied to any wall of the meatus. It is sometimes found necessary to enlarge a perforation in the membrana tympani to give better egress to the discharge. It might also be found advisable to make a second opening in the membrane, which is performed by the paracentesis knife. This knife is of course mostly used in perforating the drum-head for evacuating secretion from the tympanum in case of acute inflammation of that cavity. By means of the probe we can make out carious spots either in the osseous walls of the external meatus, or of the tympanic cavity. These may be treated by removing all obstructions when a small sequestrum may form and come out with the discharge, or they may be scraped away by means of the curette.

Polypi require immediate attention. The snare is the only thing for them—either the old-fashioned one of Wilde or the modern modification of Blake. It is wonderful, however, how they shrivel up after the irritating discharge in which they grow is removed. But it is well to eradicate polypi at once, in order to promote good drainage and obtain a view of the parts. With a good light thrown into the meatus by means of a mirror fixed over the brow reflecting a light from behind and at the side of the patient, the loop of wire is passed over the free surface of the polypus, and pressed down towards its pedicle or base. After being accurately placed in position, the loop of wire is withdrawn and the polypus is partly cut and partly torn off. The

bleeding is seldom very great, and in every case it can be controlled by introducing a tent of cotton firmly into the meatus. When the bleeding has ceased or has greatly abated, the ear may be syringed gently with tepid water and carefully dried. A view may then be obtained of the stump or remains of the polypus, and also of the meatus and tympanum, provided no more growths are present. Very often a number of polypi are formed, and they must be removed one after the other at one or more sittings.

When the swelling and bleeding have disappeared an astringent lotion should be used. The best and most frequently used for the purpose is rectified spirit of wine. It should be employed at first largely diluted, equal parts of it and water being used. By instilling the strong spirit at first irritation is caused, hence it is best to increase the strength of the lotion gradually. It should be used twice daily, being instilled slightly tepid. Of course syringing must also be continued so long as any discharge is present, a mild antiseptic solution being used in that way. If the stump of the polypus remains of any appreciable size, some caustic should be applied to it. Chromic acid applied on cotton wool fixed on the cotton holder is very valuable for that purpose. But it can only be properly and safely done under good illumination through an aural vulcanite speculum. The same application is very efficacious in treating granulations or carious spots. Solid nitrate of silver fused on the end of a probe is commonly used with benefit. To remove a small polypus, deeply situated in the meatus or in the tympanic cavity, is sometimes a very difficult operation, the manipulation being complicated in such a case by the necessity of working the snare passed through the aural speculum. This difficulty can only be overcome by practice and experience. In a number of cases the completeness of cure after removal of a polypus is very remarkable. I have had a few exceptional cases, in which, after using the snare, removing the growth, and cleansing and drying the meatus, I have insufflated boracic acid at the same sitting, and the patient has returned in two days with the parts quite healed and dry.

The following case of chronic purulent discharge from the right ear of two years' duration may be described as illustrating the success of the ordinary treatment of polypi, by means of the snare and the spirit lotion. The

polypus in this case completely filled the inner half of the external meatus. On inspecting it with the mirror and speculum, it presented the appearance of the inner wall of the tympanum, but on using the probe the polypus could clearly be made out. It could easily be demonstrated that it was growing from the anterior superior part of the meatus or tympanic cavity, probably from Shrapnell's space. The snare was easily passed over its free part, and pressed upward and forward, and thus the growth was removed, the stump remaining hanging through a perforation in the membrana flaccida. In the course of two days the pedicle was removed through the speculum, and the spirit lotion was used undiluted, with the result that the part healed up completely in about a week. The rest of the tympanic membrane was intact with the exception of being somewhat soddened by contact with the purulent discharge, and also with the growth lying upon it. The handle of the malleus and also the short process soon manifested themselves, and the normal lustre of the membrane reappeared. The patient's hearing was greatly improved: she could only hear the watch at first when it was pressed on the ear or placed on the mastoid, and she could not hear the voice by it at all. She was afterwards able to hear a watch (heard by a normal ear at sixty inches) at a distance of about twenty inches from the ear, and could easily hear the ordinary conversational pitch of voice. The cure in this case is very remarkable, as the disease affected that part of the middle ear—Shrapnell's membrane—which is most obstinate to treat.

With regard to the treatment of an ordinary case of purulent discharge from the ear, it should be clearly understood that *cleanliness is the great desideratum*. It is not merely an astringent that is wanted. Unfortunately, on account of the crude notions hitherto held, it is considered that a strong agent of that character can alone effect a cure, hence, alum, sulphate of zinc, sulphate of copper, acetate of lead, tannic acid, rectified spirit, have been in common use in the treatment of such cases. The last-mentioned is mostly employed now-a-days, but even it is still dropped into tympana containing very irritable granulations, to the great agony of the patient. Cases which would readily heal if kept daily under the surgeon's eye for a short time, have the spirit lotion given them, and return in a week or two worse than ever. It is very seldom that the aural surgeon gets his patient's treat-

ment properly carried out at the hands of parents and guardians. If he prescribes a lotion to be dropped into the ear several times a day, he may have that direction carried out to a nicety, not a drop more or less than he ordered being used on every occasion. But the cleansing is not and cannot be done properly by people themselves. At Anderson's College Dispensary, it is perfectly aggravating to find that the poor people do not cleanse their suppurating ears in the way I try to impress upon them as absolutely necessary, but this neglect is perhaps more owing to their poverty than their carelessness. Give them ointment or powder or a lotion, they will smear the external ear, blow the powder over it, or drop the lotion into it—all atop of the matter in the meatus.

The aural surgeon should see his patient with otitis media purulenta at least every second day during the earliest period of treatment, and carry out the treatment with his own hands. He can easily judge from the appearance of the parts what treatment is best. Tepid syringing with a solution of boracic acid should be discontinued after the parts are clean and healthy-looking, and a dry treatment adopted. If the discharge is foetid, a solution of carbolic acid 1 to 100 may be used. Corrosive sublimate in the proportion of 1 to 2,000—10,000 may also be used as an instillation and for syringing.

It is necessary to insist on the adoption of Politzer's method for driving any accumulation of secretion into the external meatus by injection through the Eustachian tube. Secretion sometimes lies behind a part of the remains of the tympanic membrane, and cannot therefore be reached from the external meatus. By Politzerising it can be blown into the meatus and then removed by a tampon of cotton wool. This operation should be adopted in almost every case when cleansing the tympanum of fluid. Professor Lucae, of Berlin, has had an instrument made for driving exudation in the tympanum through the Eustachian tube into the nasopharynx. He calls it the "Meatus air douche," and it consists of an india-rubber bag furnished with an olive-shaped nozzle, which is inserted into the meatus, and is used after cleansing the external meatus as thoroughly as possible. In the case of children especially, this manner of removing the secretion is said to be very effective, but it sometimes produces giddiness. For the purpose of expelling fluid in the

tympanum through a perforation, Valsalva's method is in the majority of cases perfectly successful, and it has the advantage of being performed by the patient while the ear is under inspection by the surgeon.

The dry method of treating chronic purulent inflammation of the middle ear is only of limited application. It can only be used when the discharge is not copious, and when the boracic acid powder can be brought to lie directly upon the surface of the part affected. The cleansing may be effectually performed by the dry method of removing the discharge by means of tampons of cotton wool either introduced by the forceps or on a holder. The introduction of the tampons must be repeated until they show no trace of exudation. Boracic acid is found to be the best powder for use in the method of treatment. After drying the meatus carefully and using the air douche, this powder is insufflated by means of a powder blower, of which there are various kinds. As much is used as fills about the inner third of the meatus, and the orifice is closed with antiseptic cotton wool. The application should be repeated so long as the cotton is moistened with the discharge. Packing the meatus with boracic acid powder is a dangerous procedure and need never be resorted to. It is apt to cake and confine any purulent accumulation behind it. If the meatus and tympanum are properly cleansed and dried the insufflation of powder is quite sufficient. A good way of absorbing a small amount of secretion is to insert a tampon of cotton wool impregnated with boracic powder well into the meatus, and to change it frequently if necessary.

In examining the external meatus in a case of purulent otitis media a sequestrum may be felt with the probe. If large its removal can only be effected with difficulty. Every means should be taken to allay the swelling and irritability of the parts, in order to allow of its withdrawal by the forceps. It may be found advisable to crush it with the forceps if it be carious and friable, or it may be removed whole by detaching the auricle posteriorly from the auditory canal and extracting it through the opening made in that way. Large sequestra most frequently form in the mastoid process, and are associated with abscesses or sinuses. By cutting down upon them, therefore, from the outer surface of the bone, they can be reached and removed.

It is impossible to treat here of all the complications of

otitis media purulenta: a number of them have been referred to in the course of the paper. Periostitis, abscess, and caries or necrosis of the mastoid call for treatment according to ordinary surgical principles. Periostitis over the mastoid is most radically dealt with by Wilde's incision made down to the bone. This incision is generally directed to be made about one-third of an inch behind the attachment of the auricle and parallel with it. Politzer advises that the incision should be made where the infiltration is greatest, and where examination suggests an accumulation of pus in the deeper parts. When there are no surer signs of pus under the periosteum he makes the incision close to the place of attachment of the auricle, in order to use it in case Wilde's incision should be unsuccessful for the operation of opening the mastoid antrum. There need be no hesitation in incising an abscess over the mastoid process, for it is sometimes found communicating with the mastoid antrum. The operation of trephining the mastoid process is performed for the purpose of removing purulent material which has been pent up in the interior of the bone, and also for the removal of sequestra or carious bone. By its means a communication may be effected between the tympanic cavity and the external opening over the mastoid process through the antrum mastoideum. Through the channel formed in that way it is possible to wash out the middle ear and the mastoid antrum and cells, and to remove any stagnating and putrid secretion contained therein. By this means the development of serious affections of the brain and sinuses may be prevented.

Extirpation of the malleus is practised for the cure of disease in Shrapnell's membrane, and is attended with success, the hearing in many cases being improved. Everything that acts as an obstruction to the free discharge of pus in chronic otitis media should be as early and as effectually removed as possible. The tympanic membrane itself may form such an obstruction. It may have been noted that the perforations in that membrane were small in the cases of cerebral abscesses recently operated upon, and reported in the medical journals. The complete removal of the membrana tympani in cases of otitis media purulenta is an operation calling for immediate adoption. The preservation of a limited power of hearing is of little consequence com-

pared with the prevention of complications which are likely to prove fatal.

I can only refer briefly to the subject of employing artificial tympanic membranes. It is sufficiently interesting and important for treatment by itself. They should be used when the parts are healed, or almost healed. Often they are of much therapeutic advantage, because they sometimes aid in the process of healing. The most commonly used is Yearsley's membrane, consisting of a pledget of cotton wool soaked in an antiseptic solution, such as a saturated solution of boracic acid. It can be best applied by the patient himself, by means of small forceps, for he knows when it is in that position in which the hearing is most improved. It supports the remains of the membrane and ossicles, and acts as a conductor of sound. The improvement of hearing it effects is often very remarkable. The other artificial membranes used are Toynbee's, Hinton's, Gruber's, Blake's, Lucae's, Delstanche's, Hartmann's—examples of which are shown (specimens of instruments also exhibited).

Speaking to general practitioners, I have made the above remarks as practical as possible. Of course I assume that constitutional treatment is carried out simultaneously with local treatment of the ear, and also that due attention is paid to the nose and nasopharynx.



