Thesis

On Otorrhoea

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A most excellent thesis - well written, well arranged, practical - sound - safe.
The subject of the present thesis is Otosclerosis,
is nature, cause, progress, and treatment. The dis-
ease is such a very common one, common to a degree
which is but imperfectly realized by us, while its con-
sequences are so serious, and its treatment so much
neglected that I have deemed it well worthy of dis-
cussion in this paper.

Why Otosclerosis should be so much overlooked,
and neglected, it is not hard to discover. It is a dis-
ease which, originating for the most part in child-
hood, or in early youth, is in many cases capable of
delivery, generally at the period of puberty, or shortly
thereafter, when the system, attaining its full develop-
ment, acquires new functions, and puts forth new
force and vigour. Its continuance is not attended
with pain, nor with any outward visible deformity,
nor even necessarily with marked defect in the sense
of hearing. The inconvenience it gives rise to, is com-
paratively slight, and so patients are content to go on
year after year, adopting perhaps at intervals some rec-
ommended treatment which too often proves abortive but
at last giving up such intermittent curative attempts in despair, content to submit to their malady with all its deprivations and annoyances. But while such is the case, the affection is by no means so trifling as we might be led from this to suppose. A person may have stood for years, even for a long life time, may enjoy good health, and discharge neatly the duties of his occupation, yet from exposure to cold, from an attack of fever, or even from a blow, intense inflammatory action is exceedingly liable to be excited in the part which is affected and thereby most readily susceptible to any such influences, and the most disastrous consequences may result. Moreover, the perpetual annoyance the presence of such a disease entails upon the patient, the awkwardness the consequent deafness, even though slight, necessarily impairs, and its very loathsomeness demand that something should be done for the relief, or cure of the disorder. More a bitter acquaintance with the bar and its various diseases, more general, multitudes might be spared great pain, trouble, and anxiety thus brought upon them, and a most interesting branch of the profession be saved from the deceit, and rapacity of the charlatan, and quack.

Diseases of the ear were not wholly overlooked by the ancients, but they were regarded as mere
symptoms of constitutional affections. Celsus was the first who gave them a place as independent diseases, and who practiced ocular inspection of the ear. The treatment in his time, and for long ages after, consisted chiefly in strong stimulating applications, made up of a great variety of drugs of a powerful nature. A new impulse was however given to the study of the ear by public dissections, made in 1315 by Mundini de Luski, and about the end of the 15th century, its anatomy was still more minutely investigated by some celebrated anatomists, whose names are still applied to the subject of their discovery. But not till the 17th century were the principles of surgery brought to bear upon the disorders of the ear. About the end of this century, Dr. Verney, a Frenchman, classified aurial affections according to the structures involved, and his work being translated into English in the beginning of the 18th century, attention was for the first time directed in this country to diseases of the ear. Tracing the history later we find Béjot, a French postmaster of Versailles, who was himself afflicted with deafness. Preparing in 1724 the introduction of a catheter by the mouth into the Eustachian tube, to remove obstructions by injection. He blazed an English army surgeon introduced it through the nose, and invented an instrument for crawling
light into the external meatus. Little else was done and endless nostrums, acoustic drops, and the like were still in vogue. In 1870 Sir Astley Cooper directed attention to the effects of destruction of the membrana tympani, and, very shortly after, proposed the operation of perforation in cases of obstructed eustachian tube. Starzl and others improved the operation, and the instrument employed. Surgeons had not as yet interfered much with diseases of the ear, and at the beginning of the present century only the more outward inflammatory affections were treated by leeches, counter-irritation, and the like. The labour was more particularly of Staud in France, of Kramer in Prussia, and in this country of Sanders and Buchanan, and still more recently by Williams, Trenchard, and others, the pathology and treatment of various diseases on a more satisfactory basis, though much yet remains to be done by observation and research, for this important class of affections.

It is not the purpose of this paper to treat of all the affections pertaining to the ear, but merely of those principally concerned in Otorrhoea. By the term Otorrhoea is meant, literally, a running from the ear—the occurrence of some unhealthy discharge, without special reference to its nature, for such discharges vary greatly in character. They vary also as to their causes, and their reach
deed of origin. They may for instance be muco- or serous, mucopurulent, purulent, or sanguineous; they may originate from injury, from exposure to cold, or from some febrile attack, and they may have their site, either externally, or internally. What then is the understood by otosclerosis, i.e., adopting the wide signification of the term, the presence of some mineral discharge, however originating, connected with the organ of hearing directly, and most generally having its outlet at the external auditory meatus. The outlet however, is not always by the external meatus, since the discharge may find its way by the Eustachian tube to the pharynx, or may even penetrate the mastoid process. Hence a rapid glance may be taken of the structures which are principally, and primarily involved in the affection.

Placing these from without inwards, there is, first, the external auditory canal, which is about one inch and a quarter in length, and pursues an irregular curved course inwards. It is formed of bone and cartilage, with a strong fibrous membrane connecting them. The bony part is somewhat longer and narrower than the cartilaginous. It is covered throughout with skin prolonged from the pinna. This becomes gradually thinner as it extends inwards, and over the membrana tympani, and adheres very closely to the periosteum in the bony part of the canal. At the external orifice the skin is studded with fine white hairs, and numerous sebaceous follicles, and is closely
connected to the subjacent cartilage. In this part succeeds a glandular portion, containing the cerumenous glands, which secrete the ear wax. This is about three-eighths of an inch long, and the hairs and sebaceous follicles here become fewer, while the dermal lining gets finer. The ear wax surrounds the passage in the form of a ring, and the part is frequently the seat of polypi. The bony part consists next white, smooth, dry, and shining, and its dermal membrane intimately connected with the periosteum, and therefore the seat of great pain when attacked by inflammation. Limiting the external meatus internally is the membrana tympani. It is circular in shape, and tightly fixed in a groove of the bone. It is formed of three structures, a mucous membrane on its internal surface, skin externally, while between, it is made up of fibrous and elastic tissues with blood vessels, and nerves. In its healthy state it has a tenuous appearance. When an aperture exists in it, this looks like a dark spot. The existence of inflammation gives it a dark brown aspect, while numerous red vessels are seen coming in every direction. Internal to the membrana tympani is the tympanum—a cavity contained within the temporal bone. It is irregular in form, narrow from without inwards, but extending for half an inch from below upwards, and from before backwards. The roof is formed
by a thin plate of the petrous portion of the temporal bone on its upper surface. The floor is narrow, from the approximation of the outer and inner walls. The outer wall is formed by the Membrana tympanica, and the contiguous bone, while the inner is an irregular surface, having near its upper part an oval opening—the fenestra ovalis, and below and behind this an irregular aperture—the fenestra rotunda. The fenestra rotunda is closed by a thin membrane, and into the fenestra ovalis fits the base of the stapes which, with the incus, and malleus, forms a chain of bones connecting the Membrana tympanica with the inner sensory part of the ear. The anterior portion of the tympanicum ends in two canals, the lodgement of a small muscle the tensor tympani which is inserted into the malleus, and the other, lower and larger than the first, being the auditory portion of the Eustachian tube. Professor the tympanicum leads chiefly into the mastoid cells. It is lined throughout by a thin vascular membrane which adheres very closely to its walls. This mucous membrane is continuous with that of the Pharynx through the Eustachian tube, and like it, is ciliated. It invests more or less the bones, muscles, and nerves which exist in the cavity, and is prolonged backwards to line the mastoid cells. It secretes a slightly viscid yellowish fluid.

This quick glance at the structures chiefly concerned in Stethoscopes shows us, that the Membrana tympani di-
vides the appendages to the labyrinth into two parts, an. inner, the tympanum, and an outer, the external meatus. The affection which proceeds from inflammation of the inner is said to be internal, while that arising from a similar affection of the latter is said to be external. These two kinds of affection are, however, not so held as invariably distinct. They may become blended with each other. Thus, an external affection in some fresh inflammatory accession may spread inwards, and involve the tympanum, while an internal affection by perforating the membrane tympani may extend itself outwards, or may strike disease in the external meatus from mere sympathtic action. Moreover, the membrane tympani itself occasionally becomes the seat of disease, being either independently affected, or suffering from the presence of a contiguous disorder, which spreads and involves it also.

The mode of subdividing affection by tracing the division of the structures involved is the one we shall adopt. Some have adopted classification of the disease founded on the nature of the discharge. The discharge from various causes is however liable to vary, and it is better to combine a consideration of the exact cause along with the nature of the discharge.

Affection may be considered, first, as it arises from a diseased state of the tympanum and mastoid cells,
secondly, as dependent on a disordered condition of the
membrana tympani, and, thirdly, as proceeding from the ex-
ternal meatus.

Internal Otosrhea is that form of otosrhea which pro-
ceeds from the tympanum, and mastoid cells. Here it is
the lining membrane of the tympanum which is most fre-
quently involved, the discharge being secreted from the muc-
ous surface of that cavity, with, or without ulceration of the
part. The disease may be either acute, or chronic, and both
forms supervene upon internal otitis.

Internal Otitis is known by the severe pain in the ear,
and this is felt the deep seated. There is also a sense of weight
with roaring. Noise cannot be endured by the patient, no can
be readily bear a close examination of the part. The pain may
extend from the tympanum to the head itself, accompanied with
more or less throbbing and causing emaciation. A high state
of irritative fever is also induced. The disease is most com-
mon in those who are of a weak and arophous constitution.
and may be excited by exposure to cold, an attack of any
of the febrile, or serous fevers, more especially scarlatina, or it
may arise without any manifest exciting cause, being trace-
able. To account for its frequent occurrence as a sequel
of scarlet fever, Dr. Waterman conceives that the inflamma-
tion which affects the throat in that disorder, and which often
constitutes all its danger, creeps along the pharyngeal tube
into the interior of the ear. Such symptoms of an acute inflammatory attack may simply resolve. They are much more likely however to usher in suppuration, and when the matter which has formed is discharged, the patient generally feels great and immediate relief. The pain subsides, the head symptoms are mitigated, and the fever disappears. The discharge may then gradually dry up, changing from purulent to mucopurulent, and from this to matter of a still milder character, until ultimately it disappears. On the other hand, it may continue permanently—constituting a chronic internal abscess which may persist for many years, or even for the whole lifetime of the patient, causing him comparatively little disturbance; it may be, yet not unattended with the utmost unpleasantness, with loss to a more or less degree of hearing, and with danger to life itself.

A tympanum inflamed so as to become the seat of a mucous or purulent discharge, how does such discharge find exit? The my communication between the tympanum and the external air in the normal condition of the parts, is by the Eustachian tube. Hence it often happens, that the discharge does find an outlet in this way. But very often again, the lining membrane of the tube, sympathising with the morbid condition of the tympanum, becomes itself inflamed and
thickened, and co effects a thorough occlusion. Such thickening may frequently arise in cases of ordinary catarrh at the extremity of the tube, causing the deafness so often met with in these instances from obstruction to the free passage of air into the tympanic cavity. Much more likely is thickening of the mucous membrane, and occlusion of the tube, the similarly induced higher up, in a part which is narrower, and in close proximity to an inflammatory affection of the tympanum so severe as to lead to suppuration. The viscous mucous secretion from the membrane also helps to close up the tube. Though therefore the discharge may, and does occasionally find an outlet through the Eustachian tube into the pharynx, yet this is not its most common exit, as from the construction of the parts we might have been led to suppose.

Restrained from passing down the Eustachian tube, and confined within the cavity of the tympanum, it naturally pressure against the membrana tympani. There it acts in the manner of an abscess when point ing. Absorption of some part, most frequently the upper, takes place, and, ultimately, by disintegration to a more or less extent, an aperture is formed, and the discharge escapes by the external auditory meatus. If the in flammation has been of a violent character, the
greater part, or even the whole of the membrane may be destroyed. The small bones in such a case lose their supports, more particularly the malleus and incus, and these may be extended along with the discharge. The hearing is thereby considerably impaired, but as long as the stapes remains fixed in the fenestra ovalis it is not absolutely destroyed. The discharge, having thus found outlet by an aperture through the membrane, may gradually diminish and disappear, and if the opening made in the membrane is not too large, this may also heal over, leaving a dense firm cicatrix which interferes but slightly with the integrity of the patient's hearing.

It occasionally happens, however, that the membrane is so strong and tense that it resists the pressure made upon it. The inflammation in such a case continues and spreads. The pent-up matter, acting as a foreign body, irritates the parts, and gives increased stimulus to the disorder, and the result of this fresh experiment is to cause the inflammation to attack the surrounding vesicular tissue, and so spread inwards to the membranes, and substance of the brain. This is a very serious, and most frequently fatal complication, and leads us now to consider the tension of disease of the tympanum,
and of the ear generally, to the brain and its membranes.

The subject has naturally attracted a good deal of attention and discussion. Kramer, Stand, Zygier, Abercrombie, Paton, Williams, and others have written on the subject, and have brought forward many well-recorded and authenticated instances, proving that such an extension is exceedingly liable to take place, and even almost of constant occurrence. Such extension, it must be understood, may arise either from simple spreading of the inflammatory disorder from continuity of tissue in debilitated constitutions, as well as from the presence of conformed matter. Zygier, who has devoted much attention to the connection between affections of the ear and brain, designates as the reason for this great liability to extension, the intimate connection which subsists between the dermis of the meatus, or the mucous membrane of the tympanum, and the periostium and bone, and the communication of the blood vessels ramifying through them. Affections of the external meatus and mastoid cells, he holds, produce disease in the lateral sinuses, and cerebellum, because of the thinness of the layer of bone forming the outer third of the posterior wall of the meatus, which separates the cavity of the meatus from that of the sulcus of the lateral sinus and which is
often is thin as the translucent. Moreover, the
plate of bone separating the inner two thirds of the
meatus from the mastoid cells is also very thin, and
even sometimes perforated, and as the lateral sinus lie
in a sulcus on the posterior wall of the mastoid cells,
it follows that oticopleur, originating in the external
meatus, or in the mastoid cells (which however is
rare) must be very apt to proceed to disintegration
of the intervening bony plates, and so be prolonged to
the brain. In the same manner, he maintains that
"affections of the tympanic cavity produce disease in
the cerebrum," from causing various destruction of the
thin bony plate forming the upper wall of the tympan-
ium, and that affections of the vestibule and cochlea,
originating from the tympanum, produce disease in
the medulla oblongata, owing to the direct com-
munication established between these two cavities
and the cranium by the auditory nerve.

The extension of the disease, into the brain
is not necessarily direct and continuous extension.
Most generally it is so— the affection involving first
the periosteum, then the bone, then the lining mem-
brane of the brain, and lastly the brain itself. Cases
are however on record, where abscesses were formed
in the brain, consequent on disease accompanied with
discharge from the meatus, and yet no trace of un-
roundness found in the bone. A considerable quantity 
of healthy cerebral substance may even intervene be-
 tween the two affected parts. Such cases have been cited 
as supporting the notion that there is but little liability 
to the extension of disease of the ear to the brain, and that 
the cerebral affections originate altogether independently 
of the aural affections, or even primarily constitute the 
producing cause of them. But the fact that such 
abscesses and other similar affections of the brain are 
usually preceded by discharges of long standing effectually 
disproves all such opinions. The explanation of the 
cases in question is rather to be found in the envel-
oumance of the disease by the veins, which as we have 
been connect the lining membrane of the ear with the 
cerebral tissue, and the sympathy which must nec-
ecessarily exist between the brain, and the structures 
of the ear, when the latter are in an inflammatory, 
and consequently irritable condition.

Nothing can be more insidious than the ori-
gin and progress of such cerebral complications. There 
may be little or no pain accompanying the progress 
of the malady, and the discharge may continue sim-
ilar to what it had been previously. Occasionally 
however, the patient will complain of pain in the
ear affecting the head, and leading to languor and giddiness. The presence of caries in the bones is said to give a stain to a silver probe, but this is necessarily a very unsafe guide in diagnosis. If an accurate examination be made, in many cases there will be detected a slight tenderness, and an unnatural cerebral sensibility on percussing the affected side. But the cerebral symptoms only become decidedly well marked when the acute stage has supervened. This may happen from an attack of cold, from fever, or exposure in any way, or just from the onward progress of the disease, without any well marked exciting cause being traceable. The acute inflammation now set up, causes a sudden cessation of the discharge, which in a case of long standing is always to be regarded as an unfavourable sign. As the result of this fresh inflammatory attack new structures are involved, and the general health likewise suffers. But as long as there is free to the matter which forms, there is comparatively little danger. When there is not sufficient room for it escape, the upper wall as we have seen is most liable to become affected. Sometimes the upper wall resists while the inner yields, the brain thus being involved through the labyrinth, and the cribiform plate of bone through which the auditory nerve leaves the cavity of the cranium. This however is not
so common as we might have expected, considering the compressing delicate septa which separate the tympanum from the cochlea and vestibule— at the pons,

tra, petrous, and geniculate canals. The structures of these parts would seem in these cases to undergo a pro-
tective thickening.

But my own the brain become affected through the upper and inner walls of the tympanum; but the disease may likewise be communicated through the mastoid cells. These cells, lined with a similar membrane, are liable to disorders similar to those of the tympanum, and may be denuded in a like manner, as by cold, measles, scarlet fever. They may be affected either by themselves, or in conjunction with the tympanum—the disease having spread from that cavity. The disease advances from these cells to the brain from the same cause as in the case of the tympanum—the retention of the purune-

data which has formed within them. That each extremity of the disease is due to the want of a free

outlet for the discharge, is fully borne out by a case re-
corded by Jazebbe, in which the mastoid cells of both ears became affected after scarlet fever. In each ear

the lower half of the membrana tympanica was de-

stroyed, but in the organ of which the bone became
diseased, the lower margin of the remnant of the mem-

Brana tympani fell inward towards the promontory, to which it became attached, and by this means the escape of matter from the mastoid cells was prevented, while in the other ear the lower margin of the membrane remained free, and the discharge freely escaped. The view is further borne out by the comparatively slight manifestation of cerebral complication, when the discharge finds a free escape externally. In very early childhood, before the mastoid process has become fully developed, that part of the bone which is continuous posteriorly with the upper wall of the tympanum, as being then the weakest, is the part which most readily gives way, and affects the cerebrum—while in later life the mastoid process having become developed, and that of the bone which are liable to become involved. In the whole however, affection of the mastoid cells are rare, and more frequent in childhood than in adult life.

When therefore the brain becomes affected in affection of the ear—the disease is most generally communicated through the upper wall of the tympanum, and when the brain has become involved the prognosis is always very bad. Recorded cases of recovery are but few in number, and these must be regarded as of a doubtful nature. Still such cases are not the
hopelessly abandoned. At this point, Dr. Watson, citing a case from Abercrombie, well remarks—"We know that inflammation of the dura mater may be received from by what happens in certain injuries of the head; and the following would seem the an instance of recovery, when the source of the mischief was situated in the ear. A young lady, after the usual symptoms in the head, lay for three or four days in a state of perfect coma, and her condition was thought utterly hopeless. Her medical attendants continued to visit her as a matter of form, and one day they were abruptly surprised to find her sitting up, and free from complaint; a copious discharge of mucus had taken place from the ear, with immediate relief; and she continued in good health. We cannot be sure in such a case that the matter came from the brain, but the symptoms made that supposition exceedingly probable. The case shows clearly one of two things, either that pus may thus escape from the skull, and the patient get well; or that pus shut up in the cavity of the tympanum, or in the mastoid cells, may produce the urgent symptoms that are known to result from cerebro-spinal pressure."

It is further observed, that though affections of the ear are liable to extend inwards and implicate the brain—such a tendency being generally called retroversion, or the operation of some exciting cause to which the
patient has been exposed — yet many persons pass through life without any such tendency ever having been manifested. We have instances of otosclerosis continuing for ten, twenty, forty years, and even to the end of a long life without any such symptoms becoming developed. The danger is naturally lessened in proportion as the patient takes care to avoid all exposure of the affected organ, maintains strict cleanliness of the part by frequent washing with tepid water, and supports the vigor of the constitution by strict diet and regimen. We have seen that the danger arises from accumulation of matter either finding no exit, or finding a very imperfect one. Such danger occurs also from the formation of impregnated masses of pus, which check the outward passage of the discharge. This is very apt to take place when no attention is paid to the part, and hence the propriety, and even necessity, for keeping the external auditory passage free, and clean. With such precautions, the tendency to internal extension may be very greatly mitigated, but cannot be wholly overcome, until the affection itself from which such tendency springs has been subdued by the proper remedial measures.

The treatment of internal Otosclerosis must now be considered. The discharge, as we have seen, may result from acute internal otitis, and our treatment in
such cases should be directed towards obtaining, if possible, resolution without the formation of any secretion, and when a discharge has formed, to provide for its free escape and for its assentment. With the view of securing resolution, the patient should be kept in the utmost quiet, the head being well propped up when in bed to diminish the extension of the blood vessels as much as possible. In fact the patient finding such a position the easiest will be found in very many cases instinctively to assume it. The diet should be of the simplest kind, avoiding everything in the shape of stimulants. Bechey also, should be applied behind the ear, or cupping had recourse to, either there or at the base of the neck. Calomel and opium are to be added if the delicate structure of the organs is still found the in danger. Attention must in all cases be paid to the state of the system generally, and aperients and emetics exhibited as the stomach and bowels demand. Warm fomentations are of use in soothing and relieving the part. With such treatment, specially maintaining the strict absence of all noise now so irritating to the patient, we may succeed in staying the further progress of the disease.

Very often however the inflammation does not resolve, but goes on to suppuration. The pain increases, matter forms and collects in the tympanum, distending
that cavity, and intensifying all the inflammatory symp-
toms. Should the matter succeed in forcing through the
membrane tympani the patient gets great and immediate
relief after the bursting sensation which is thus produced
in the ear. But should the membrane slowly resist the
pressure, while the local and general distresses become in-
tensified, an aperture will require to be made in it, which
is done by simply incising its lower half. The confined
matter escapes, and continuing the general plan of treat-
ment we have indicated above, with the frequent use of
the syringe to preserve an open passage for the free discharge
of all the matter, the inflammation quickly abates, the
discharge lessens and at last ceases, the aperture in the
membrane quickly closes, and the integrity of the hearing is
restored.

The discharge, on the other hand, may persist from
continued inflammation of the mucous membrane consti-
tuting chronic internal state. This may arise at first
from the irritation produced by the imperfect and
partial discharge of the matter which has collected in
the tympanic cavity. The aperture may not permit of its
free escape through the membrane; matter may be also
retained in certain of the mastoid cells, owing to the
peculiar disposition of these structures to the tympanum,
forming as they do recesses continued backward from
it, or thick viscous masses of matter may remain, clogging up the cavity, and maintaining the irritation of the parts. Again, suppurative inflammation, having once occurred in a part, is very liable to continue in constitutions impaired by sarcopenia, or otherwise debilitated, and it is in the sarcoplonia especially that we meet with cases of chronic stomatosis. The disease in the majority of cases is not merely local, but constitutional, and hence, with the view of effecting a cure, our measures must be directed as well to the general system as to the organ more particularly involved.

Whatever tends to improve the general health must tend also to effect an improvement in the local disorder. Hence all healthful exercises and employments, agreeable nutritious food, pure air, warm clothing, the liberal use of the bath, whether of sea or fresh water, regular hours, and temperate habits, a cheerful and well-regulated mind - these, with whatever else is fitted to cherish and promote our physical well-being, are the specially recommended, and if need be enforced. Tonic medicines are also to be employed, of a mild nature, and such as may be deemed best adapted to the symptoms manifested. Above all, any dyspeptic tendencies which may appear are to be studiously counteracted.
In the local treatment, we must guard against doing either too much, or too little. A chronic disease of this kind, affecting an organ so delicately constructed as the ear, and an organ in such close contact with structures of the most vital consequence, is neither to be rashly over-muddled with, nor left to run its own course unchecked. Time, patience, and perseverance are all needed in the treatment of an affection so much out of the easy reach of our appliances as this is. In the first place, the part must, as in the other case we have treated, be kept thoroughly clean by the constant and regular employment of the syringe and tepid water. The syringes used should be large and strong, so as to inject the water with efficient volume and force. In addition to thus cleansing the part—astringent, metallic lotions are the injected, and these rather mild than strong in character. When strong astringent washes are used, there is danger of their acting as irritants, and exciting acute inflammation, which in such circumstances is very liable to become serious. The presence of the acute inflammation when severe is accompanied with a stoppage of the discharge, and hence the popular prejudice against doing anything to stop an otorrhoea. This cessation however is to be regarded as the effect, and not as the cause of the inflammation. When there is pain in the head, or a
tendency to central excitement, we must be especially careful in the employment of astringents. The astringents most beneficial are sulphate of zinc, sulphate of copper, nitrate of silver, and acetate of lead. Of strength proportioned to circumstances. A succession of diasters should also be employed — applied either over the back of the ear, or on the nape of the neck, unless this is contraindicated by the presence of swollen glands. With the aid of such combined local and constitutional treatment as we have here indicated, perseveringly continued, we may hope for a satisfactory and permanent cure.

Stenosis, besides arising from acute or chronic inflammation of the tympanum, may result also from the presence of polypi, or malignant disease in the cavity.

The polypi met with are usually red and vascular, soft, spongy, and liable to bleed. At other times they are pale, hard, and insensible. Here is first an inflammatory swelling of a part of the membrane affected. This goes on increasing, and elevating, until a fleshy excrescence is formed, which is attached by a root, and termed a polypus. They are most commonly associated with a discharge which has continued for some time, and from the pressure exercised by them give rise to pain, and such cerebral symptoms as
Vertigo. In form they are generally globular, and pedunculated. Kramer mentions two kinds, the soft and vascular with narrow roots which are easily removed, and the hard with large thick roots which are difficult to remove. They are most generally seated at that portion of the tube which contains the seromucous glands—at other times they may be almost hidden within the tympanum.

As to treatment, they should be grasped with a pair of scissors adapted to the meatus, and then snipped off. If this cannot be readily done they should be grasped and pulled away with the forceps. The root should then be touched with nitrate of silver, and lotions of sulphate of zinc, or acetate of lead applied. Kramer says he has always succeeded best in removing them with cutting instruments.

Malignant disease in the ear is of infrequent occurrence. Such tumours of a malignant type are occasionally to be met with in the tympanum. They are to be distinguished from polypi, by having a rough ulcerated surface, instead of the smooth aspect characteristic of the latter. There is also more or less swelling of the parts involved. They not infrequently perforate the Membrana tympani, and appearing in the external auditory meatus, they have been mistaken for polypi, and treated as such, with of course the very worst results. The tendency
of this disease is not so much its rapid progress towards the brain, but its involvement of the surrounding osseous structures, and an extension rather to the external aspect, where it may burst and assume the appearance of a fungus hematomata. The progress of the disease is very rapid. It gives rise to foul discharges of mingled pus and blood, and like most other cancerous affections is not amenable to treatment.

Atrophia must must be considered as its connected with, and dependent on, a disordered condition of the membrana tympani.

The membrana tympani is liable to a variety of affections. In the first place, it may be congenitally deficient, or even wholly wanting. Persons with such malformed membranes can blow air, or a thin volume of smoke through them at will. The membrane may also be prerenoturally thick, tense, and strong. A case is on record in which it was converted into bone. In all these instances the hearing is more or less interfered with. Like the other structures of the ear, it is liable also to inflammation which may be either acute or chronic in its nature. But it is very seldom that we find it independently affected. When it is inflamed, the pain is of a tickling character annoying to the patient, but not so severe as in the case of internal otitis, and referred by him to the inner part of
the external meatus. An accurate diagnosis, however, is not to be made from mere symptoms, but from an examination with the speculum. The membrane will then be found to have lost its diaphanous character, and become thicker, and of a dull brown colour. Small circumscribed abscesses may also be seen between its layers. When the inflammation is chronic, and connected with disease in the external meatus, its inner surface may have a flabby aspect—having become transformed into a purulent, or mucous-purulent secreting surface.

This membrane is also liable to sudden rupture from loud and unexpected reports—as frequently happens in the Army and Navy. In such cases there is a slight effusion of blood from the ear. Kramer very extensively denies that such rupture can take place, having never in his extensive practice seen an instance of it. But one reason why he may not have seen it, may be, that the membrane very rapidly heals after such a wound, so that in a day or two there will be no trace of the injury done. The membrane is also liable to be injured by the incautious use of instruments, and Sir Astley Cooper mentions a case in which the membrane was actually ruptured by a bone on the ear. Still such cases are rare, and when we do find the membrane affected, it turns out in the great majority of cases to be a complication.
some other disorder.

When the membrane gives way in cases of internal
strictures, it does so generally at the upper half and never the
sudden
margin than the centre, whereas in excision of the membrane
it is the lower half which is torn. The ulceration may be-
gan makes rapid progress, if unchecked by proper remed-
dial means. If the discharge is but temporary, the mem-
brane, provided it has not been already too much destroyed,
will gradually heal over, and as great is this tenacity of
heal that when properly perforated, as in cases of obstructed
Eustachian tube relieve distress, it is with the ut-
most difficulty kept from closing. A simple means of
diagnosing an imperfect membrane according to Williams
is to place the finger gently on the meatus when if perfect
a low rumbling noise will be heard. The rumbling noise
is never heard when the membrane is absorbed.

In treatment, if the inflammation is severe, leeches,
emollient poultices, and the antiphlogistic diet should
be employed. The may here also use blisters, or tinctur-
emetic rubbed over the mastoid. When it is needful
to puncture the membrane a sharp pointed probe
or bistoury will be found an effectual instrument,
but this operation is not to be too readily performed.

When the disease is of a chronic nature, the tym-
panum should be inflated with air, to ascertain
if the membrane is still entire. Its sensibility is also to be ascertained by the probe. If treated in an early stage it will yield to treatment, but Nature only in a very few cases effects a cure when the disease is left to itself. The part should be kept clean, and a solution of the acetate of lead applied, of strength varying from 1 to 10 qrs to the ounce of water. The other metallic astringent lotions are also useful, as is blistersing behind the ear.

A simple and seemingly very effective method of achieving the deafness caused by perforation of the membrane was discovered by Mr. Tansley, and originally communicated by him to the "Lancet" for 1848. It consists in merely introducing into the meatus a small piece of cotton moistened with water, as far as the membrane, and accurately fitting it into the hole. It answers the maintenance in cases with and without discharge, and gives several instances in which it has proved thoroughly successful. One objection it has: it is liable to irritate the part, and hence its use must be occasionally interrupted. It may also be added that trifling as the operation may appear, in incautious, or unskillful hands it is attended with danger, and further, that it is a difficult process for the patient to apply it properly—requiring as it does much practice.
We now come to treat of external ototitis. This affection, like the others we have been considering, may be either acute or chronic in its nature. Acute inflammation of the external meatus is characterized by symptoms of violent pain, with redness of the part, and a sensation of stinging up to the ear. The constitution generally is not so much involved as in internal otitis. The symptoms vary somewhat, according as the glandular, cellular, or peristomal tissues are involved — an accurate discrimination being made only on careful examination of the part. When the inflammation becomes chronic, the secretion of wax permanently ceases, the dermis desquamates, and the lining membrane becomes converted into a perpetual secreting surface.

The affection causing the ototitis may result from a febrile attack, as scarletina or measles, or from the spreading invades of erysipelas or other cutaneous diseases. The injection of irritating lotions will also cause it as will likewise the presence of foreign bodies, and piles or other tumours. Subcutaneous glands may also discharge matter through the meatus by a fistulous opening. Here gives the case of a discharge arising from disease of the parotid gland, and a case is even on record of part of the brain passing through the meatus. The chemical injuries may occasion ototitis — as improper springing
As again the affection may be purely sympathetic in its character, the primary disease existing in the tympanum, mastoid cells, or Eustachian tube. It has been found in connection with nasal polyps, and with diseases of the spinal column.

To determine accurately the source and cause of the discharge, the history must not only be carefully inquired into, but the meatus itself minutely scrutinised with the aid of the speculum. The speculum which appears to us the best is that in the form of a simple conical silver tube, adapted to the size of the meatus. Dilatation being impossible owing to the bony walls of the canal, such a tube will serve to straighten the outer cartilaginous portion, which is all that is needed.

In treating acute external otitis, we must have recourse to the ordinary antiphlogistic remedies—sulphur, warm fomentation, poulticing, and cathartics. When matter has formed its evacuation is promoted, and the part healed with the aid of some mild astringent. With such treatment the otitis may be very generally subdued, even though the pain and constitutional disturbance attending it have been violent.

As to chronic external otitis, a great deal of prejudice exists in the minds of some with regard to stopping a chronic discharge. It very often happens
indeed that a discharge which has continued from early youth departs at puberty or shortly after, and because this is the case, it has been deemed advisable to leave such cases almost wholly to nature. But we have already seen the dangerous tendency there is to implicate the neighbouring menses and cervical tissues, and this is a most weighty reason for our interference. No doubt fatal cerebral complications have been in their early stage characterized by the sudden stoppage of a chronic discharge from the ears. Such stoppage was not the cause, but merely symptomatic of acute inflammation having involved the part in such cases, and no more goes to prove the necessity or advantage of non-interference here, than it does in any other disease.

The treatment of the chronic form is both constitutional and local. As the disease recurs chiefly in the weak and corpulent, we must endeavour fully to restore the tone of the system by the aid of such tonics as cod-liver oil, syrup of the iodide of iron, tincture of the murichol of iron and quinine, but more especially by giving good nutritions diet, by warm clothing, fresh air, exercise, and the daily use of the bath. Such treatment is simple enough, and adopted and perseveringly carried through, would with the young more especially be in many cases, an effectual cure—the otoscopy ceasing as the constitution becomes fully
developed. The fact of its being so simple, however, seems to be regarded as reason sufficient for its being almost entirely neglected.

Not always will the constitutional treatment be sufficient, even in favourable cases, and recourse must be had therefore to local measures. If, on examination, the abscesses are found to arise from the presence of a foreign body in the meatus, this must be removed—the instrument employed varying according to the nature of the impacted substance. Sometimes it will be readily removed by the Kemp, at other times a bent probe will answer better. If, however, the abscesses be idiopathic in its nature, the utmost cleanliness must in the first instance be enforced, and daily practiced. Then metallic lotions, with frittering behind the ear, as employed in other aural disorders, is recommended. It is safer, and more effective to paint the meatus with the solution, than to infuse it into the ear. Occasionally, an issue in the arm or elsewhere may be made, as a precautionary measure against any danger that may be suspects to arise from a too sudden stoppage of the discharge. In some, general plan of treatment is indicated when the bones are affected, but the prognosis here is unfavourable. If episcula of bone form in the meatus, they should be removed. It must always
be remembered also, that in treating diseases of the ear, the utmost perseverance is necessary, there being especially liable to continue on account of the fragile character of the auditory meatus.

We have thus very imperfectly considered a disease which possesses alike great interest, and practical importance. The want of experience, and of the facilities for personally examining cases of otitis media, which, being looked upon as comparatively trivial, has not very much attention paid to it in our hospitals and dispensaries, necessarily renders this paper crude and faulty. Still the remarks that have been made will suffice to show the necessity there is for greater attention being paid to this branch of surgery, and the vast importance as a safeguard of life, of treating early and scientifically the diseases of an organ so delicate and valuable as the ear.