which I am not an enthusiast; the question of notification as to when, if at all, it is called for in the absence of infectivity; the question as to when a focus may be said to be healed, that is soundly healed or reasonably free, if ever, from all question of relapse, recrudescence, lighting up or flaring up; when medical supervision can, if ever, be relaxed, and to what extent, and a good many other questions, including the problem of notification.

I will content myself, in conclusion, by saying that I agree with the view that in a suspected early case, whether physical signs be detected or not, and in the absence of positive X-ray findings, I would on the symptoms alone make a positive provisional diagnosis and *act* as if the matter were absolutely, one might even say, mathematically certain, but this, I need hardly add, would not imply in my judgment a need for immediate or speedy "notification."

TINNITUS.

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HISTORICAL.

The word "tinnitus" is derived from the Latin "tinnitus" and corresponds with the French "tinnire."

The word "tinnitus" means "a sensation of ringing in the ears."

Medical writers in 1693 recognized tinnitus as a definite symptom of disease.

Classification.—Tinnitus may be divided into (I) Subjective tinnitus; (II) Objective (Entotic) tinnitus.

(I) SUBJECTIVE TINNITUS.

Significance.—This always denotes a lesion in some portion or portions of the auditory nerve.

Frequency.—Politzer states that nearly two-thirds of all persons suffering with aural lesions are victims of tinnitus. Children rarely complain of tinnitus.

Pathological Classification.—(i) due to primarily diseased aural states, in which the disease originates in the ear itself; (ii) due to secondarily diseased aural states in which the disease originates in some organ belonging to another system in the body.

GENERAL ÆTIOLOGY.

Shambaugh's Theory as to the Origin of Tinnitus.

He states that the character of tinnitus is generally that of an "indefinite" sound, composed of a great complexity of tones, and with no definite pitch.

One well-known cause of tinnitus is pressure applied to the conducting apparatus.

This pushes the foot-plate of the stapes into the foramen ovale, and so there results an increase in the intra-labyrinthine pressure, which alteration in tension causes disturbance of the membrana tectoria.

This latter structure appears to have the same specific gravity as the endolymph under normal circumstances, and it has been shown to be so constituted anatomically that it is capable of responding to the most delicate impulses passing through the endolymph.

Now the hairs of the hair-cells normally penetrate into the lower surface of the membrana tectoria and therefore, any disturbance of this latter will alter the physiological relationships between the hairs and the membrana. Shambaugh considers that such an alteration may result in stimulation of these hair-cells; thus all instead of only certain of these cells, would become stimulated, and so bring about this "indefinite" tinnitus.

When, by severe hæmorrhage, administration of drugs, &c., a sudden increase or decrease in blood-pressure results in tinnitus.

this is explained by the above theory; so is the tinnitus in Menière's disease, and that following a sudden noise.

When a permanent disturbance in hearing is produced by injury, such as the noise of a shrill whistle, or explosion, &c., it can be readily accounted for by a partial severance of the physiological relations between the membrana tectoria and the hair-cells, so that the hairs from a greater or smaller number of these cells project free in the endolymph, and do not come into contact with the membrana tectoria, thus being unable to receive the stimuli from impulses passing through the endolymph.

Also in cases where a permanent tinnitus results from such injury this may be due to the same partial severance.

It is instructive to note that the pitch of tinnitus is often approximately that of the sound, (such as a whistle), that originally produced the injury.

Helmholtz' Theory.

This observer believes that it is the basilar membrane and not the membrana tectoria, that forms the resonator of the perception-apparatus.

For the sake of clarity the particular ætiology of a clinical aural lesion is discussed under that heading, but there are certain general ætiological factors that influence the onset and course of tinnitus, and these may now be described as follows:—

(a) Factors likely to originate tinnitus.

Sudden explosion.

Sudden increase of blood-pressure; or gradual increase, as in arteriosclerosis.

Sudden, severe, decrease of blood-pressure, as is seen with a profuse hæmorrhage.

Many acute infections, especially those involving the upper respiratory regions.

(b) Factors likely to aggravate tinnitus.

Mental exhaustion; especially when associated with hysteria; neurasthenia, excessive grief, persistent sleeplessness; it must be remembered, however, that too much sleep may also be an aggravator.

Menstruation; pregnancy, parturition.

Muscular exhaustion such as follows excessive talking, coughing, sneezing, chewing or movements of the head.

Indigestion and other allied abdominal lesions, "Pulsating" tinnitus is common after too heavy and injudicious a meal.

Cachexia.

Alcohol.

Tobacco.

Drugs such as quinine, salicylates, &c. Sudden hæmorrhage into the labyrinth (see under Ménière's disease).

Electrical currents of varying intensities (see under General Treatment).

Climatic factors (see under Tympanic catarrh).

(c) Factors likely to mitigate tinnitus.

Improvement in general health, mentally and physically, (with special reference to the upper respiratory region) associated with

Freedom from excessive anxiety and worries leading to

Contentment.

Climatic factors (see under tympanic catarrh).

(d) Factors likely to influence the increase or decrease of tinnitus.

Circulatory changes, as in certain cardiac lesions, as in compression of the carotid artery, as in compression of the vertebral artery.

Reflex factors, such as stimulation of branches of cranial nerves 5 or 7 by pressure over the mastoid, or by rubbing the skin in the region of the ear, or by stroking in front of the pinna, even shaving may cause musical tones to be heard; or by a

lesion of the 5th cranial nerve as evidenced by neuralgia, hemicrania, &c.

Objective noises such as that of traffic machinery, high or low tuning forks.

Artificial rarefaction or condensation of the air in the external meatus, as may be obtained with a Siegle's speculum and inflating bellows; or by closing the external meatus with the finger.

In some cases of tinnitus, associated with deafness, the former may either increase or decrease concomitantly with the increase of the latter; or, again, the tinnitus may actually increase after the deafness has become practically complete.

GENERAL SYMPTOMATOLOGY.

Tinnitus may be :—

Single or multiple in character.

Uni- or bilateral. If bilateral the character of the tinnitus may be different on the two sides.

Intermittent or constant, the periods of quiescence, in the former, varying very greatly, even in the same patient; whilst in some cases the tinnitus, originally intermittent, may gradually become constant.

Slight or intense, the degrees varying enormously; depending upon the ætiology and neighbouring influences; whilst the intensity may be so severe that it becomes past endurance, and patient seeks relief in suicide.

Variable in pitch, passing through all grades from low to high, in the same patient, under differing conditions.

Much more noticeable when lying down to sleep, but many cases also complain of severe tinnitus on waking.

By far the greater number of patients localize their tinnitus in the ear itself, but, and especially is this the case with very intense and paroxysmal types, some victims hear it in the

homolateral temporal region, or even complain of its radiating into the frontal, vertical and occipital areas of the skull. It is only in rare cases that tinnitus appears to project outwards.

The following is a list of the more common characters of tinnitus, as described by patients :—

Roaring, as of the sea or of a train.

Buzzing, as of a telephone, &c.

Hissing, especially of steam.

Pulsating, being synchronous with the pulse.

Humming.

Ringling, as of bells, &c.

Rushing, as of wind, &c.

Whistling.

Whizzing.

Seething.

Cracking, crackling, creaking.

Popping.

Thunder.

Calls of animals, such as chirp of cricket, warble of birds, barking of dogs, croaking of frogs.

Sounds of separate musical instruments, such as violin, trumpet.

Sounds of a medley of musical instruments.

Human voices, even entire sentences (see under Hallucinating tinnitus).

Sudden explosions, such as from a pistol shot, blow of a hammer.

Of these I should place the first nine varieties as the commonest.

It should be noted that a severe attack of tinnitus is often the first warning of approaching deafness.

ROUTINE EXAMINATION OF ALL CASES.

For many years it has seemed to me that the routine examination of patients suffering with tinnitus, amongst other symptoms, is not always thorough enough, and that by this omission the results of treatment are correspondingly disappointing. Thus, it is

Equilibration...Rombergism...
 spontaneous
 nystagmus...
 electrical tests
 caloric tests ... } if specially
 rotary tests ... } indicated
 past-pointing

Face...toxic
 swelling
 tenderness

Right...Left

Neck...Adenitis
 Transillumination—thus

Explanation of figs. :—1. Right frontal sinus.
 2. Left frontal sinus.
 3. Right maxillary sinus.
 4. Left maxillary sinus.

The letters suggested for use in these four spaces are :—
 C = clear. D = dim. O = opaque.

Radiography of all nasal sinuses and skull
 (if specially indicated).

Wassermann reaction (if specially indicated).

At first sight this may seem rather a formidable task for General Practice but, as a matter of fact, when once the routine has become a habit, and especially if sheets of paper with all these headings already printed on them be used, such cases do not take long to examine in the vast majority of instances, whilst the advantages, both to patient and doctor are invaluable . . . for the following reasons :—

(a) There is very little risk of any important points being missed that might help to elucidate the problem.

(b) The patient feels increased confidence in his doctor for his careful and thorough examination, and this confidence is a

necessary preliminary to successful treatment.

(c) There remains a permanent detailed record for future reference and comparison. Such notes would be invaluable in a Court of Law.

No one who has studied the difficult problem of tinnitus can feel satisfied with present results, and must not therefore be content with anything but the most persevering efforts at discovering its correct ætiology and treatment.

THE MORE IMPORTANT CLINICAL AURAL LESIONS ASSOCIATED WITH TINNITUS.

(I) *Acute Tympanic Catarrh—Exudative Catarrh.*

Ætiology—

Acute nasal and naso pharyngeal catarrh.

Acute Eustachian catarrh—the common “cold.”

Influenza (in this disease the tympanic catarrh frequently progresses to suppuration).

Hunter Todd suggests that the tinnitus in this lesion may be due to hyperæmia of the labyrinth.

Symptomatology—

Deafness is pronounced.

Pain is present in the form of a “blocked-up” feeling in the affected ear, or ears.

Discharge is not present.

Tinnitus is present and is generally continuous. It is usually of a “crackling, snapping or clicking” character, being intensified when masticating and swallowing, as it is largely the result of muscular contraction, viz., of those muscles that act upon the Eustachian tube (levator palati, tensor palati and salpingopharyngeus), and partly due to the movements of the temporary adhesions and strictures in the Eustachian tube, set up by the catarrhal process (to these movements is due the “clicking” character).

Course—

This aural lesion generally resolves spontaneously, and as suddenly as it originated, the Eustachian tube becoming patent once more, leading to restored hearing and cessation of tinnitus. But for those cases that do not clear up so readily the following treatment is advised :

Treatment—

- (a) To relieve the excessive nasal catarrh and consequent obstruction :—

Nasal douche, b.d., either of normal saline or of some bland alkaline mixture.

Inhalation of menthol. This mixture contains 5 gr. of menthol in a drachm of S.V.M., and of this one teaspoonful is added to a pint of water, half boiling and half cold.

Nasal spray of (i) chloretone inhalant ; or (ii) menthol, 10 gr. in liq. paraffin, 1 oz.

- (b) To relieve tinnitus and restore hearing :—

Eustachian catheterization (see under General Treatment).

(2) *Chronic Tympanic Catarrh.*

- (a) Exudative type (with a bulging tympanic membrane).

Ætiology—

Commoner in children than in adults.

Infected tonsils and adenoid excess in the nasopharynx.

Symptomatology—

Deafness is present.

Pain is intermittent and slight.

Tinnitus is occasionally present, but is not a marked feature.

Treatment—

Tonsillectomy and adenoidectomy, then Eustachian catheterization.

- (B) Adhesive type (with retracted, lustreless and sluggish tympanic membrane).

Ætiology—

Oft-recurring exudative tympanic catarrh due to :—

Chronic infections of the nasal passages and pharynx that result in the so-called "colds" that are especially prevalent in cold, damp climates.

Certain occupations, such as hot-house labour, &c.

Unhealthy hygiene at home.

Excessive indulgence in tobacco or alcohol.

Certain constitutional lesions, such as :

The lymphatic diathesis, tuberculosis, syphilis, chronic rheumatism, chronic nephritis, anæmia, marasmus, pregnancy and the puerperium, heredity.

Politzer gives post-diphtheritic paralysis of the facial nerve, that results in paralysis, fatty degeneration and atrophy of the muscles attached to the soft palate and Eustachian tube, so that the tympanic cavity cannot be efficiently ventilated.

Roget states that adhesion of the Eustachian tube to the posterior pharyngeal wall is a frequent cause.

Symptomatology—

Deafness present.

Pain not a marked feature.

Discharge *nil*.

Tinnitus present, generally intermittent, in by far the great majority of cases. This may be the first or the only symptom and is generally more noticeable at night, and when it is continuous the labyrinth is very probably also involved.

This tinnitus varies in character, it is generally described as being deep-seated.

When, as in some of these cases, after Eustachian catheterization or rarefaction of the air in the external meatus, the tinnitus ceases, or becomes much diminished, this is probably due to a diminution of the intra-labyrinthine

pressure, previously raised by the adhesions, themselves now acted on by the catheterization.

Vertigo often present but not severe as a rule.

Treatment—

Render nasal passages, sinuses, pharynx and mouth healthy.

Inflation of air into the tympanic cavity.

This may be carried out by : (a) Valsalva's method ; (b) Politzerization ; (c) Eustachian catheterization (see under General Treatment).

Rarefaction of the air in the external meatus.

The following drugs are recommended :—

- (i) Acid hydrobrom. dil. 10 to 30 min., gradually increasing the dose up to 1 drm., in a large amount of water, b.d. Personally, I have rarely found any real benefit from this drug, whilst it has often seemed to set up much gastric disturbance.
- (ii) Luminol, 1 to 5 gr. o.n.
- (iii) Sodium bromide, 5 to 30 gr.
- (iv) I have found the following mixture to give relief in some cases :—

℞ Ammon. bromid.	10 gr.
Potass. iod.	5 gr.
Liq. arsenicalis	2 to 3 ℥
Tinct. nuc. vom.	5 ℥
Spir. ammon. aromat.	20 ℥
Tinct. card. co.	20 ℥
Aq. chlorof.	ad 1 3 t.d.s.

- (v) Collosol iodine.

(3) *Acute Tympanic Suppuration.*

Ætiology—(see under Acute Tympanic Catarrh).

Acute specific fevers, especially measles and scarlet fever.

Any acute inflammatory lesion in the upper respiratory tract.

Influenza.

Predisposing factors are chronic, nasal, and pharyngeal lesions.

Symptomatology—

Very similar to that of acute tympanic catarrh, but the symptoms are much more severe, the tinnitus being continuous and often "pulsating" in character whilst there is increased general toxæmia.

Treatment—

Early myringotomy ; this generally relieves the tinnitus, but does not, as a rule, eliminate it altogether.

Guttæ mercurochrome, 2 per cent., or some similar preparation.

Antiphlogistine over the mastoid.

If the condition does not improve in a few days, or if it becomes worse, and especially with signs of increasing toxæmia, then mastoid drainage should be carried out without delay, as follows :—

Stage I : Mastoid drainage, with removal of all diseased cells, good visualization of the dura mater of the middle fossa and of the lateral sinus, and establishment of a free antro-tympanic communication. The wound is then left entirely open and treated with the dressing of choice.

Stage II : Generally performed seven to ten days later. The edges of the wound are freshened, undercut and sutured.

Tonsillectomy, by dissection, if the tonsils be diseased, as they are in a very large proportion of these cases.

Adenoidectomy if indicated.

In my experience this two-stage method gives far better results, as regards healing, cessation of suppuration, hearing, and abolition of tinnitus, whilst there is a much shorter convalescence, with perfect restoration to health in the vast majority of cases.

(4) *Chronic Tympanico-mastoid Suppuration.*

Ætiology—

Non-resolution of an acute tympanic suppuration.

Nasal and pharyngeal lesions.

When the tinnitus in these cases is continuous, one or more of the following conditions may be present, and should be looked for.

Very chronic intra-tympanic adhesions.

Intra-labyrinthine syphilis.

Neurasthenia. Hysteria.

Anæmia. Cachexia.

Symptomatology—

Deafness present.

Pain, if present, is generally over some portion of the mastoid.

Discharge present.

Tinnitus present, generally intermittent, unless it be of very long standing, whilst it varies very greatly in character. Tinnitus occurs much less frequently here than in chronic tympanic catarrh, the reason being that the membranous perforation present tends to equalize the intra-tympanic pressure with that of the atmosphere; nor is the labyrinth so frequently involved.

Vertigo very variable, both in its presence and intensity.

Time, for more than one month.

Onset originally sudden, but this is frequently forgotten because of its chronicity.

Treatment—

Every case must be carefully considered on its own particular merits, but it seems to me that the vast majority need operation. That, I think, should be carried out on the same principles as in cases of acute suppuration; the main difference being that, in the chronic cases, a special meatal flap requires fashioning.

Prognosis—

Continuous, persistent tinnitus argues an unfavourable outlook for the hearing, and for its own cessation, and suggests labyrinthine involvement.

(5) *Ménière's Disease. Apoplectic Type.*

Definition—

Sudden hæmorrhage, or effusion into the vestibular labyrinth.

Ætiology—

Politzer gives the following causes :—

Intense heat, especially long exposures to the sun.

Rheumatic influences.

Influenza.

Lues.

Metals.

Tabes dorsalis.

Leukæmia.

Nephritis.

Pernicious anæmia.

Symptomatology—

Deafness complete, or nearly so.

Tinnitus severe and generally of a "buzzing and hissing" character.

Vertigo severe with staggering, or actual falling, and loss of senses.

Onset very sudden.

There is pallor and sweating with nausea, or actual vomiting.

May be uni-, or bilateral.

Course—

As regards the tinnitus, this gradually tends to diminish, but, and even though the hearing be entirely lost, it may persist unabated throughout the rest of the patient's life.

Prognosis—

Unfavourable.

Treatment—

(a) Immediate—

Patient must lie on his back with the head raised slightly.

Absolute mental and physical rest.

Cold compresses to head.

Alcoholic embrocations over the mastoid

Sinapisms on to the nape.

Frequent sponging of the body.

Mild purgatives.

Careful diet—no tea or coffee.

No alcohol.

(b) Later—

Potass. iodid., 5 gr. to 20 gr. daily.

Quinine, 5 gr. to 20 gr. daily, but the effect of this drug must be carefully watched as it may actually increase the symptoms.

Isopral.
Bromides.
Collosol iodine might be tried.
Subcutaneous injections of a 2 per cent. solution of pilocarpine, 4 min. to 10 min. daily.

- (c) Later still—
Aural galvanic electricity—using weak currents.

(6) *Ménière's Syndrome.*

- (I) *Labyrinthine Hyperæmia—Acute Congestive Labyrinthitis.*

Ætiology—

Acute specific fevers. Influenza.
Acute tympanico-mastoid suppuration of severe virulence.
Angio-neurotic congestion of cranial vessels.
Congestion of the head associated with: goitre, cardiac lesions, pulmonary lesions.
Basal cerebral tumours.
Thrombi in the petrous blood-vessels.
Thrombi in the internal jugular vein.
Certain drugs, such as amyl nitrite, &c.

Symptomatology—

Deafness—present but slight and temporary.
Pain—described by the patient as a "fullness" in the ear.
Tinnitus present.
Vertigo severe, with nausea.
Patients also complain of a tightness in the head.

Treatment—

Causative.
As in Ménière's disease (which see).
Leeches over mastoid.
Cupping over the nape.

(II) *Labyrinthine Anæmia.*

Ætiology—

Generally a part of a constitutional anæmia.
Sequelæ of a severe hæmorrhage.
Osteomyelitis of another part of the body.

Impaired circulation of the internal auditory artery, brought about by: aneurysms of the basilar artery, dural or brain neoplasms, emboli, atheroma.
Angiospasm, due to a lesion of the sympathetic nerve (very rare).

Symptomatology—

Deafness, severe.
Tinnitus, severe.
Vertigo, severe, with fainting attacks and vomiting, and comparable to seasickness.

Treatment—

Causative.
Inhalation of amyl nitrite.

- (7) *Suppurative Labyrinthitis.*—Acute – Chronic.

Ætiology (see under Tympanico - Mastoid Suppuration)—

Extension from the above.

Symptomatology—

Tinnitus is, at first, one of the most prominent symptoms, but this soon becomes subservient to the chief symptom, vertigo.

Treatment—

Labyrinthine drainage.

Prognosis—

Grave risk of intra-cranial infection.

It should always be remembered that cochlear and vestibular labyrinthitis may occur without tinnitus.

(8) *Otosclerosis.*

Ætiology—

This is obscure, but the following causes have been suggested—

Heredity—

Faulty uric acid diathesis.

Syphilis (otosclerosis is frequently associated with ozæna).

Puerperium.

Rickets, &c., in young persons.

Symptomatology—

Deafness present.

Paracusis present.

Pain in the form of hyperæsthesia acustica.

Discharge may or may not be present.

Tinnitus, the most frequent and troublesome symptom, especially when it be localized in the cranium. It is generally continuous and is more intense than in any other aural lesion. It becomes more and more intense concomitantly with increase of deafness and may continue, without diminution, even after the latter has become complete; though sometimes the tinnitus ceases at this stage. It may be high or low in pitch.

Vertigo present.

The condition is generally bilateral, the two sides not being necessarily concomitant. This persistent and intense tinnitus may eventually produce very serious results on the general health, so that a severe type of neurasthenia is produced.

Treatment—

Very unsatisfactory.

Causative.

Eustachian catheterization merely gives temporary relief, and that not always, and is of no real value.

Pneumo-massage (electric), via the external meatus, relieves the tinnitus in the early stages.

Sodium iodide.

Potass. iodide.

Collosol iodine.

Salvarsan injections in syphilitic cases, combined with the use of the following ointment applied over the mastoid.

Rx	Potass. iodid....	..	...	...	2.0
	Iodine	...	...	...	0.2
	Lanoline	...	...	...	} aa 15.0
	Vaseline	...	...	...	

(9) Toxic Tinnitus.

There is a type of tinnitus that appears to have received little attention up to the present, and that I suggest shall be classified as "toxic," in that it is either completely eliminated or greatly reduced by removal of an obvious toxic focus.

Ætiology—

Hunter Tod mentions this type and suggests the following causative areas of focal sepsis—Intestinal, Dental, Tonsillar.

In my own experience I have been greatly encouraged, in dealing with several cases of troublesome tinnitus, by their being cured through dental treatment and tonsillectomy. No Eustachian catheterization was indicated or would have been of any use.

I conclude that in these cases there is a toxic neuritis affecting the auditory nerve, and so the organ of Corti.

(10) Neurasthenic Tinnitus.

Ætiology—

Exhaustion of the central nervous system, especially in cases where there is focal sepsis, that so often acts as a powerful predisposing factor.

Severe sound concussion, thus:—

Incessant gun-fire.

Unceasing noise of the streets in our great cities.

Symptomatology—

Deafness, nil.

Pain may be present.

Tinnitus present. This is the most frequent aural symptom; it varies greatly in character, being often of the "roaring" type.

Vertigo, slight.

There may be hypersensitiveness to light, and similar lesions of other nerves.

Treatment—

Causative.

Prognosis—

Uncertain.

The tinnitus may either persist indefinitely, or eventually disappear; it may precede an otosclerosis, or an intra-cranial lesion.

Recurrence is likely, even after moderate fatigue, such as prolonged talking or listening.

(II) *Lesions of the Brain—Insanity.*

Here the type most commonly present is that known as Hallucinating tinnitus.

When this arises from a cortical lesion it may be due to, or aggravated by a concomitant aural lesion; but, *vice versa*, it may be diminished, or even dissipated by the cure of that aural lesion. It is instructive to note that pathological changes in the external middle or internal ear have frequently been found in these cases.

Tinnitus in the form of musical melodies, that are persistently repeated and so become intolerable, may occur with a healthy mentality, and may, in some cases, be dissipated by the cure of an aural lesion.

Tinnitus in the guise of entire sentences and human voices suggests a much more unfavourable prognosis, and may be the forerunner of serious mental disease.

It must be remembered that, very rarely, hallucinating tinnitus may be produced by cerumen or a foreign body in the external meatus.

General Treatment—

Causative.

Render all the upper respiratory region healthy.

Remove cerumen and any foreign body from the external meatus.

Remove all debris, epithelial and otherwise, from the external meatus.

Remove polypoid granulations and actual polypi from the external meatus; but this manœuvre is not without serious risks because, and especially is this so in very chronic cases, the polyp may be attached to the inner tympanic wall, or to the facial canal, and its removal may be followed by acute labyrinthitis and meningitis, or by facial paralysis. There is no doubt that by far the most satisfactory course is to perform mastoid drainage.

Eustachian catheterization. This is best performed by lubricating the sterilized catheter (No. 3 is the average size

for adults) with a mixture such as chloretone inhalant, before passing it. Cocainization of the nasal passages is sometimes necessary and, when this be so, the following solution is strongly recommended, viz. :—

R	Cocaine hydrochlor.	...	...	3
	1 in 1,000 adrenalin hydrochlor.	...	...	5
	2 per cent. solution of potass.	...	...	
	sulphat.	...	...	25
	0.5 per cent. solution of acid	...	...	
	carbol.	...	...	ad 100

By this solution the 3 per cent. cocaine provides a 20 per cent. anæsthetic value, whilst the adrenalin prevents general absorption; it will be seen, therefore, that this is a very safe solution, seeing how small is the dose of cocaine.

Having placed the catheter in position, and blown air through it into the tube, one of the following solutions may be thereby injected, preferably by means of an electric pump, that gives a regular and well-controlled stream, viz. :—

(a)	Iodum resublimat	...	...	2 gr.
	Menthol	...	...	5 gr.
	Camphor	...	...	3 gr.
	Ol. sassafras	...	...	3 m.
	Ol. eucalypti	...	...	3 m.
	Liq. paraffin	...	ad	1 oz.

This is vaporized by means of a special apparatus.

Vaporized	(b)	Sulphuric ether	
	(c)	Acetic ether	
	(d)	Chloroform	
	(e)	Ether sulphuricus	} aa
		Ether chloricus	
	(f)	Ethyl iodide	
	(g)	Spir. ætheris nitrosi	
	(h)	Pilocarpine Hydrochloride, 1 per cent. solution.	Dose 8 to 12 m.
	(i)	Sodii bicarbonas, 1 in 20 solution.	Dose 10 m.

Valsalva's method.

Politzerization.

Rarefaction of the air in the external meatus.

Electric oto-pneumo-massage.

Vibratory massage over mastoid and auricle.

Diathermy over mastoid.

Electricity. Galvanism.

This may be applied in the following ways :—

- (a) Internal method. Insert one electrode into the external meatus, that has been previously filled with saline.
Objection—meatitis is sometimes produced.
- (b) External method. Place a moistened electrode against the lobule, or the margin of the external meatus.
- (c) Eustachian method. The electrode is passed through a catheter into the Eustachian tube.

Counter-irritation and vesication over the mastoid, by emplastrum cantharidis, or sinapis.

Rubbing in of alcoholic embrocations, such as :—

Spir. aromatici } āā. Dose, 20 min.
Spir. sinapis }

Narcotic embrocations.

Leeches over the mastoid.

Medicated and iodide baths.

Internal medication—

Sodium bromide.

Luminal.

Isopral.

Acid. hydrobrom. dil.

Collosol iodine, or the French tincture of iodine.

Syr. ferri iodide.

Potass. iodide.

Syr. hydriodici.

A mixture containing tinct. digitalis, or tinct. strophanthus. This is useful in cases of "pulsating" tinnitus.

A mixture containing liq. strychnin. This is useful in cases of labyrinthitis.

Mineral purgatives. This is useful with certain cases of intestinal derangement.

Very little alcohol or tobacco should be allowed.

Operative—

Tonsillectomy and adenoidectomy.

Compression of the vertebral arteries.

Ablation of the labyrinth.

Section of the auditory nerve.

Dietetic—

Carefully regulated and digestible diet.

Thus, very little red meat should be allowed in cases of hyperpiesia.

Climatic—

Sometimes a change of climate, especially to a more elevated resort, is beneficial.

General routine—

A regular, well-ordered existence, without excessive fatigue, mental or physical; avoidance of loud noises should be especially insisted upon.

General Prognosis—

This depends upon the ætiology, duration, &c.

The more continuous the tinnitus, the worse the outlook.

The more favourable cases are those associated with—

Meatal and auricular lesions.

Acute tympanic infections.

Chronic exudative tympanic catarrh.

Intermittent type of tinnitus.

The less favourable cases are those associated with—

Chronic adhesive tympanic catarrh.

Otosclerosis.

Lesions of the central nervous system.

Continuous type of tinnitus, especially when of the "pulsating" variety.

(II) OBJECTIVE—ENTOTIC—TINNITUS.

Types.

(i) Vascular, the commonest.

"Blowing" in character.

(ii) Muscular—

(a) "Mucous" or "rattling" tinnitus.

"Ticking" or "humming" tinnitus.

"Snapping" tinnitus.

These are due to the voluntary, or involuntary contractions of the intrinsic muscles of the ear.

"Cracking" tinnitus.

Due to the contraction, or chronic spasm of the muscles of the Eustachian tube acting on its cartilagino-membranous portion.

Ætiology—

Dilatation of the tympanic arteries.

Changes of pressure in the internal carotid artery in its course through its bony canal.

Transmission to the ear in such conditions as—

Valvular cardiac disease.

Goitre.

Aneurysms of the arteries of the head, especially the arterio-venous and cirroid types.

Dilatation of those vessels of the head that supply the ear; this type, "blowing" tinnitus, can be heard by auscultation all over the head.

Treatment—Causative—

Ligation of the carotid artery may be tried in certain selected cases, but there is grave risk to the structures of the brain.

REFERENCES.

- MURRAY. "A New English Dictionary," 1926.
 POLITZER and BALLIN. "Diseases of the Ears."
 TOD. "Diseases of the Ear."
 BALLENGER. "Diseases of the Ears."
 PHILLIPS. "Diseases of the Ears."

POST-GRADUATE NEWS.

SEVERAL Special Courses have been arranged by the Fellowship of Medicine to take place after the Easter vacation.

From April 13 to April 18 a course in Gastro-enterology will be held at the Prince of Wales's General Hospital (Tottenham) in association with the North Middlesex Hospital. Instruction will be given from 10.30 a.m. to 5.30 p.m, throughout the week,

with the exception of Saturday, when the morning only will be occupied. Fee £4 4s.

An afternoon and evening course will be held at the London Lock Hospital, Dean Street, from April 13 to May 9. Fee £2 2s.

An all-day course in Diseases of Chest will be held at the Brompton Hospital from April 20 to April 25. Instruction will be given in all the various departments of the Hospital. Fee £3 3s.

A comprehensive course in Psychological Medicine will be given at the Maudsley Hospital from April 21 to May 30, consisting of lectures on Psychoneuroses, Crime and Insanity, Clinical Laboratory Methods, &c., and demonstrations on Clinical Psychiatry, Clinical Neurology, Clinical Laboratory Methods, &c. There are various forms of clinical instruction at the Hospital, which will be open to those taking the course. Fee £5 5s.

An intensive course in Ear, Nose and Throat Diseases will be held at the Central London Throat, Nose and Ear Hospital from April 27 to May 23. This course consists of a clinical course, a Peroral class, Pathology class and an Operative Surgery class. Early application is desirable for the last three named, as they are strictly limited. Fees £5 5s., £6 6s., £5 5s. and £7 7s. respectively.

From April 27 to May 9, a morning course in Diseases of Children will be given by the Staff at the Hospital for Sick Children. Instruction will be given in all departments of the hospital. Fee £5 5s.

An afternoon course under the direction of Dr. Eric Pritchard will be held at the Infants Hospital from April 27 to May 9. This course is of especial interest to those engaged at infant welfare centres and can be fitted in by those taking the morning course at the Hospital for Sick Children. Interesting visits are made to other centres away from the hospital. Fee £3 3s.