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VOLUME OF
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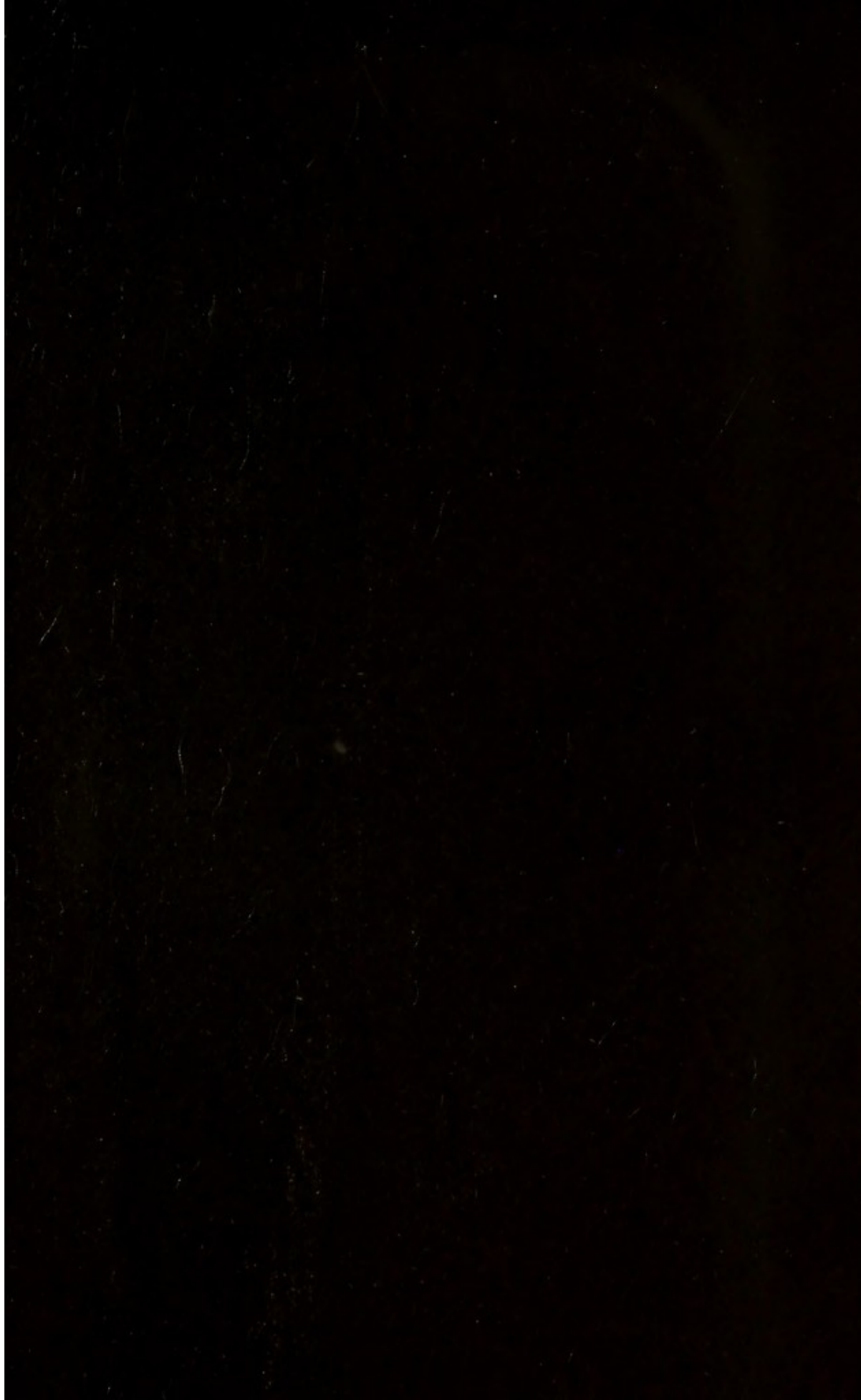
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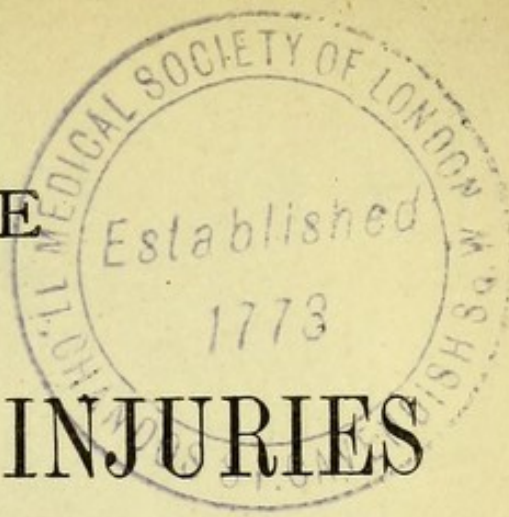
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With the Author's Empts

EPITOME OF DISEASES AND
INJURIES OF THE EAR

THE HISTORY OF THE
REIGN OF CHARLES THE FIRST

EPITOME
OF
DISEASES AND INJURIES
OF THE
EAR



WITH A CHAPTER ON
NASO-PHARYNGEAL DISEASES CAUSING DEAFNESS

BY

W. R. H. STEWART, F.R.C.S.
L.R.C.P. EDIN., ETC.

Aural Surgeon to the Great Northern Central Hospital;
Surgeon to the London Throat Hospital; Surgeon
to the Throat and Ear Department, Establish-
ment for Invalid Ladies, Harley Street.

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PREFACE.

FREQUENTLY asked by practitioners and students for some work of reference on Ear Diseases small enough to carry in the pocket, the Author hopes that this little work, which epitomises the chief features of Aural Surgery, will meet the want.

Its small size will enable the student to use it both in ward work at the hospital and as a refresher to the memory before examination, and the busy practitioner will find it a ready reference in his daily work.

It should be distinctly understood that this book is in no way intended to take the place of the larger works on Ear Disease.

W. R. H. STEWART.

41 DEVONSHIRE STREET,
PORTLAND PLACE, W.
Oct. 1st, 1888.

MEMORANDUM

The following information was obtained from the records of the Department of Health and Human Services, Office of the Assistant Secretary for Health, regarding the activities of the National Health Council during the period from January 1, 1960, to December 31, 1960.

The National Health Council is a non-profit organization which was established in 1955. Its primary purpose is to coordinate and support the activities of the various health-related organizations in the United States. The Council has a broad membership, including representatives from the Federal Government, State and local health departments, and the private sector.

During the period covered by this memorandum, the Council has been actively engaged in a variety of health-related activities. These activities include the following:

- 1. The Council has been instrumental in the development and implementation of the National Health Goals and Objectives, which were established in 1960.
- 2. The Council has been actively involved in the promotion of health education and health promotion programs.
- 3. The Council has been instrumental in the development and implementation of the National Health Survey, which is a major source of information on the health status of the American people.
- 4. The Council has been actively engaged in the coordination and support of the activities of the various health-related organizations in the United States.

The Council's activities during the period covered by this memorandum have been highly successful. The Council has been instrumental in the development and implementation of many important health-related programs and activities. The Council's efforts have resulted in a significant improvement in the health status of the American people.

W. R. H. [Signature]

Assistant Secretary for Health

Department of Health and Human Services

Washington, D. C.

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EPITOME OF DISEASES
AND
INJURIES OF THE EAR.

CHAPTER I.

ANATOMY OF THE EAR.

Divided into :—External, Middle, Internal.

The **External Ear**.—Composed of the pinna or auricle and the external auditory meatus.

The **Auricle**.—A trumpet-shaped expansion on the side of the head.

Consists of :—

The **CONCHA**.—A depression surrounding the opening of the external auditory meatus.

The **TRAGUS**.—A prominence in front of the concha projecting backwards over the external auditory meatus.

The **ANTI-TRAGUS**.—A prominence ; more posterior and separated from the former by the notch.

The **LOBULE**.—Pendulous portion below the anti-tragus.

The **ANTI-HELIX**.—A curved ridge starting from the anti-tragus and surrounding the concha.

The **FOSSA OF THE HELIX**.—The depression between the anti-helix and the helix.

The **HELIX**.—The thin margin which surrounds the pinna, starting from just above the tragus and losing itself in the lobule.

Structure.—Is attached to the side of the head by muscles, skin, &c.; is composed of yellow fibro-cartilage enclosed in a delicate skin continuous with that of the meatus. The lobule contains no cartilage.

Blood Supply.—The posterior auricular artery, from the external carotid.

The anterior auricular artery, from the temporal.

Small branch, from the occipital.

Nerve Supply.—The great auricular, from the cervical plexus.

The posterior auricular, from the facial.

The auricular temporal, from the third division of the fifth.

The **External Auditory Meatus**.—A canal leading from the bottom of the concha to the membrana tympani.

Direction.—First upwards and inwards, then downwards and inwards.

Length.—About one inch—the external or cartilaginous part being one-third of an inch, the internal or bony portion two-thirds of an inch.

The floor is slightly longer than the roof on account of the position of the membrana tympani. The middle portion is the narrowest.

Structure.—Partly cartilage, partly bone, covered with a very fine and delicate skin, which is continuous with that covering the auricle, and which is also stretched over the membrana tympani forming the external layer of that structure. Hairs guard the entrance; the glands, deep in the cartilaginous portion, secrete a wax which moistens the integuments. Superficial glands are sebaceous.

Blood Supply.—Branch of the internal maxillary artery.

Nerve Supply.—Auricular branch of the pneumogastric and the auriculo-temporal.

The **Membrana Tympani.**—*Situation.*—The partition between the external and middle ear, is inserted in a groove at the end of the external meatus, at an oblique angle, downwards and forwards, thus bringing the posterior and superior parts nearest to the surface.

Colour.—A delicate pearly grey, highly polished.

Shape.—Nearly circular, slightly concave externally and convex internally.

Structure.—Three layers. An *external* or *dermoid*, a fine skin continuous with that of the external meatus. A *middle* or *fibrous*, consisting of external radiating fibres attached to the handle of the malleus, and internal circular fibres, which form a dense ligamentous ring. This layer is attached to a ridge of bone, deficient above, and across this notch is stretched the external and internal layers only, the middle being absent; this part is called the *membrana flaccida* or *Shrapnell's membrane*. An *internal* or *mucous*, continuous with the mucous lining of the tympanum.

Short process of the Malleus is near the upper border.

The *Handle* projects downwards and backwards from the short process to a point somewhat below the middle line of the membrane.

Shining Spot.—A triangular reflexion of light, base downwards, extending downwards and forwards from the lower end of the handle.

Posterior Fold of Membrane.—A ridge extending backwards from the short process of the malleus.

Anterior Fold of Membrane.—A ridge extending forwards from the short process of the malleus.

Blood Supply.—External layer—*deep auricular branch of the internal maxillary.*

Internal layer—*tympanic vessels.*

Nerve Supply.—External layer—a branch of the fifth.

Internal layer—*tympanic plexus.*

The **Middle Ear.**—Composed of the tympanum, its contents, and the various passages leading from it.

The **Tympanum.**—*Shape and Situation.*—A small irregular six-sided cavity in the substance of the temporal bone.

Size.—The *antero-posterior* measurement, the longest is from a quarter to half an inch. *Depth* from within out, from one to two lines.

Contents.—The chain of ossicles, their ligaments and muscles. The chorda tympani nerve.

Communications.—The Eustachian tube in front communicating with the outer air. The mastoid cells.

The *Walls.*—THE ROOF.—A thin layer of bone separating the cavity from the contents of the cranium.

THE FLOOR.—A thin layer of bone separating the cavity from the jugular vein.

The **EXTERNAL**.—A ring of bone and the membrana tympani.

The **INTERNAL**.—Irregular ; in it are :—

The *Fenestra Ovalis*.—An ovoid opening, near the upper and posterior part, which leads into the vestibule, closed by the lining membrane and the base of the stapes.

The *Aqueductus Fallopii*.—A ridge of bone containing the facial nerve, situated just above the fenestra ovalis.

The *Promontory*.—A smooth bony projection containing the first turn of the cochlea, situated below the fenestra ovalis ; grooved for the passage of the tympanic nerves.

The *Fenestra Rotunda*.—A round opening below and behind the promontory, leads to the scala tympani of the cochlea, closed by a membrane—the membrana tympani secunda.

The **ANTERIOR**.—A thin layer of bone separating the cavity from the carotid artery ; on the inner side is an opening into the Eustachian tube.

The **POSTERIOR**.—Separates the cavity from the mastoid cells ; near the roof there is an opening leading into the cells.

The *Mucous Membrane* is delicate and intimately connected with the bone, it covers the ossicles. The portion forming the internal

layer of the membrana tympani is *squamous*, the remainder *ciliated*.

The *Contents*.—THE OSSICLES.—A chain of small bones crossing the tympanum—three in number, consisting of, from without in—The Malleus, The Incus, The Stapes.

The *Malleus* consists of a handle or manubrium, a central portion and two processes.

The *manubrium* or *handle* runs downwards and backwards to below the middle of the membrana tympani, to which it is firmly attached in its whole length.

The *short process*.—A low conical eminence situated at the root of the handle, projecting outwards and attached to the membrana tympani.

The *long process* runs from the junction of the handle and central portion downwards and forwards into the Glasserian fissure.

The *central portion* articulates by a smooth depression (*the head*) with the next bone—the incus.

The *incus*, situated behind the malleus, consists of a body and two processes.

The *body* articulates with the malleus.

The *short process* runs backwards to the posterior wall of the tympanum to which it is connected by ligamentous fibres.

The *long process* is directed downwards and articulates with the stapes.

The *Stapes*, shaped like a stirrup, consists of a head, neck, base, two crura.

The *head* articulates with the long process of the incus.

The *neck* receives the insertion of the stapedius muscle.

The *base*.—An oval plate of bone is attached to the margin of the fenestra ovalis.

The *cruræ* diverge from the neck and are attached to the outer surface of the base, near its extremities, the anterior being the shorter and straighter.

The **LIGAMENTS**.—The ossicles are held together and in position by ligaments.

The Malleus, by the *anterior, superior, and external*.

The Incus, by the *posterior and capsular*.

The Stapes, by the *capsular and annular*.

The **MUSCLES**.—Two in number; the tensor tympani and the stapedius.

The *Tensor Tympani*.—Arising from the cartilaginous end of the Eustachian tube and adjoining bony wall, is inserted into the inner part of the handle of the malleus.

The *Stapedius*.—Arising from the hollow of the pyramid, is inserted into the neck of the stapes, posteriorly.

The CHORDA TYMPANI runs through the tympanum at a level of the upper margins of the tympanic membrane passing, in its course, between the malleus and incus.

Blood Supply.—The internal carotid, middle meningeal stylo-mastoid, ascending pharyngeal.

Nerve Supply.—The tympanic plexus; composed of Jacobson's nerve of the glosso-pharyngeal; carotid plexus of the sympathetic; branch of the great superficial petrosal; small superficial petrosal of the otic ganglion.

The *Communication.* — THE EUSTACHIAN TUBE runs from the cavity of the tympanum forwards, inwards, and downwards to the pharynx, where it ends in a trumpet-shaped opening situated behind the inferior meatus of the nose, above the palate level.

Structure.—Partly bone, partly cartilage and membrane. The latter portion is cartilaginous in its internal, superior and partly external aspect; the remainder being membranous—it is lined with a ciliated mucous membrane, There are numerous glands towards the pharynx.

Length.—About an inch and a half—the osseous portion about half an inch, the cartilaginous and membranous about one inch.

Muscles.—Three in number; the tensor palati, the levator palati, and the salpingo-pharyngeus.

The *Tensor Palati*.—Arises (among other points of origin) from the tip of the free edge of the cartilage of the tube, and passing round the hamular process, is inserted into the palate.

The *Levator Palati* lies below the tube, and on contracting, pushes up and widens it.

The *Salpingo-Pharyngeus* connects the posterior wall of the cartilaginous part of the tube to the pharynx, and renders the canal more pervious.

The *Blood Supply*. — Internal maxillary, ascending pharyngeal, internal carotid.

The *Nerve Supply*. — Glosso-pharyngeal, branch of the second division of the fifth, internal pterygoid, facial (Vidian), spinal accessory.

The MASTOID PROCESS.—Situated behind the external meatus and tympanum, and is immediately under the lateral sinus.

Structure.—Dense bony shell containing air spaces, separated from each other by thin bony plates; one big cell placed horizontally is called the antrum; communicates with the tympanum and the other smaller cells, which

are placed vertically; it is lined with a squamous mucous membrane.

Blood Supply.—Stylo-Mastoid.

Nerve Supply.—Tympanic plexus.

The **Internal Ear** consists of an osseous and membranous labyrinth divided into three parts:—*The Cochlea, Vestibule, Semi-circular Canals.* It is situated in the petrous portion of the temporal bone, and has three openings. The *fenestræ ovalis and rotunda* for communication with the tympanum, and the *internal auditory canal* for the nerve. The *membranous labyrinth*, which contains a fluid—the *endo-lymph*, is situated within the osseous, and is surrounded by fluid—the *peri-lymph*.

The COCHLEA.—Shaped something like a snail shell, has its base towards the internal auditory meatus.

Size.—Length, quarter of an inch; base at its broadest, quarter of an inch.

Composed of:—A central column—the *modiolus*, around which winds a tapering spiral canal one and a half inches long. This canal is partially divided by the osseous spiral lamina projecting into it from the modiolus. From the osseous lamina—a membrane—the basilar membrane, projects so as completely to divide the passage into two—the *scala vestibuli* and

the *scala tympani*, one communicating with the vestibule, the other cut off from the tympanum, at the fenestra rotunda, by a membrane only. The two passages join at the apex by means of a small opening—the *helicotrema*.

The SCALA VESTIBULI is divided by the *membrane of Reissner*; this additional space, which terminates at its apex and base by blind extremities, is called the *canal of the cochlea*.

The MEMBRANOUS COCHLEA consists of a tube lined with epithelium containing endolymph and surrounded by a space containing peri-lymph.

From the upper plate of the lamina spiralis the *membrane of Corti* is stretched, and between this and the basilar membrane is the *organ of Corti*, consisting of epithelial cells and rods in communication with the cochlea filaments of the auditory nerve. The *rods of Corti* stand upon the inner and outer margin of the basilar membrane and form a canal by their heads meeting above. Ciliated rows of cells stand on the basillar membrane, and rows of air-cells on both sides of the rods of Corti.

The VESTIBULE.—*Shape and Size*.—Irregular shape, about one-fifth of an inch in diameter.

The *Walls*.—The OUTER WALL contains the fenestra ovalis.

The INNER WALL contains a small pit pierced with holes to transmit the branches of the auditory nerve—the *fovea hemispherica* and the small opening of the aqueductus vestibuli.

The ROOF contains a depression—the *fovea hemielliptica* opening into the semicircular canals and the scala vestibuli.

The MEMBRANOUS VESTIBULE consists of two sacs—the *Utricule* and the *Saccule*, and their connections with the semicircular canals and cochlea.

The *Utricule*.—The larger and posterior sac occupies the fovea hemielliptica. Several branches of the auditory nerve enter it here and are in close connection with some calcareous particles—the *otoliths*, within. The sac communicates with the semicircular canals.

The *Saccule*.—The smaller and anterior occupies the fovea hemispherica, and is close to the opening of the scala vestibuli; branches of the auditory nerve enter here and are in close connection with otoliths in the sac. It communicates directly with the cochlea.

The SEMICIRCULAR CANALS. — Three osseous canals, with a membranous lining, something like horse-shoes in shape, with dilated

ends—the *ampullæ*. Situated above and behind the vestibule, and arranged at different angles.

The SUPERIOR, the highest of the tubes, is *vertical* and *transverse*.

The POSTERIOR, the longest of the tubes, is *vertical* and *longitudinal*.

The EXTERNAL, the *shortest* of the tubes, is *horizontal*.

Openings.—Five, into the vestibule.

The *external* tube has two separate openings.

The *superior* and *posterior*, each have one separate and one common opening.

The MEMBRANOUS LINING.—Lines the bony canals and is attached along its convex portion.

The AUDITORY NERVE enters the ear through the internal auditory meatus and divides into two branches, one for the cochlea and one for the vestibuli.

The COCHLEA PORTION pierces the foramina in the modiolus, and spreads out on the lamina spiralis, and terminates in connection with the cells of the organ of Corti.

The VESTIBULAR PORTION is distributed in filaments in the saccule and utricle, branches going to the *ampullæ* of the semi-circular canals.

CHAPTER II.

PHYSIOLOGY OF THE EAR.

The organ of hearing is made up of two distinct portions.

The *Sound Conducting*.—Composed of delicate structures whose duty it is to convey the sound vibrations.

The *Sound Receiving*.—A complex nervous system.

The waves of sound are conducted to the membrana tympani by the external auditory meatus and striking the membrane, set the chain of ossicles acting, producing undulations of the labyrinthine fluids and disturbance of the auditory nerves and filaments. The basilar membrane increases in breadth from base to apex, and the vibrations of its different parts are supposed to cause the various notes, those at the base causing the high, and those at the apex the low notes.

THE EUSTACHIAN TUBES balance the equilibrium of air on the two sides of the membrana tympani, and together with the MASTOID CELLS allow the escape of superfluous sonorous vibrations. They also act as drains to the tympanic cavities.

CHAPTER III.

EXAMINATION OF PATIENT.

Instruments required :—

Strong artificial light.

Frontal Mirror.

Aural Specula (*various sizes*).

Pneumatic Speculum (*Siegle's*).

Posterior Rhinoscopic Mirror (*Zaufel's*).

Laryngeal Mirror.

Nasal Speculum (*Woakes' modification of Thudichum's*).

Tongue Depressor.

Watch and Tuning Fork (*various tones*).

Otoscope or Auscultation Tube.

Politzer's Bag.

Eustachian Catheters (*various sizes*).

Ear Syringe.

Ring Forceps (*Hinton's*).

Fine Rectangular Forceps.

Fine Canaliculus Probe.

Cotton-wool Holder.

Jarvis's Snare.

Blake's Snare.

Insufflator.

Cocaine Spray.

Laryngeal Brushes.

Previous History and Present State.—

Enquire into:—The length of attack; mode of commencement; manner and rate of progress; general health; occupation; situation of dwelling; family history; whether the disease is unilateral or bilateral; pain, and its character; discharge, and its character; noises in the head, and their nature; giddiness; if sounds are heard at times better than at others; what sounds, high or low, are heard best.

Hearing Distance.—Ascertain exactly by the Watch and Conversation.

WATCH.—Gradually approach it to the ear after closing the opposite one.

CONVERSATION.—1. By various modulations of the voice, while ascertaining the patient's history.

2. Standing behind the patient (to prevent lip-reading), gradually approach him, at the same time speaking in a whisper.

3. Go through the same process, speaking in your ordinary tone of voice.

4. Do the same, speaking loudly.

Condition of Auditory Nerve.—Place a vibrating tuning fork on forehead or teeth, in the middle line. In the normal condition it is heard with equal intensity in both ears. If heard better in the affected ear, the sound

conducting apparatus of the external or middle ear is at fault.

If heard better in the good ear, the sound perceiving apparatus of the internal ear is usually at fault, but this may also be due (*Buck*) to immobility of the foot-plate of the stapes, or the secondary membrana tympani, or to a marked increase in the tension of the fluid contents of the labyrinth.

This test is also liable to error in old people on account of the change in the conducting power of the bone.

Rinne's Test.—Apply a vibrating tuning fork to the surface over the mastoid process; as soon as the sound has completely died away, transfer it rapidly to the air opposite to but not touching, the orifice of the meatus. If the sound again is heard, the air conduction is better than the bone conduction and the hearing normal. When, on the contrary, the sound of the tuning fork is inaudible after its transference from the mastoid process to the air, the bone conduction is then said to predominate over the air conduction.

To Examine the Aural Apparatus.—Before proceeding, I would here impress upon the reader the *absolute necessity* of avoiding *all force* when examining or operating on the ear,

as damage may be done and confidence lost by the patient.

It should be borne in mind that patients sometimes faint when the speculum is inserted.

Position.—Sit facing the patient, reflect the light (situated on the patient's left) by the frontal mirror well on the patient's ear, getting a correct focus. The operator, having once placed his head in the best position for examining the ear, should not move it to get a more satisfactory illumination, but should shift the frontal mirror.

The AURICLE.—Examine for any obstruction, to the orifice of the external auditory meatus or the sound receiving portion.

The EXTERNAL MEATUS.—Remember its direction, and draw the auricle a little backwards, upwards, and outwards, to straighten it, and gently and quickly insert the speculum. Remove any obstruction, such as wax, pus, hairs, fungi, &c., by the aid of the syringe, ring forceps, or cotton wool holder. Examine for any swelling, inflammation, discharge, &c.

Appearance of a Normal Membrana Tympani—A pearly semi-transparent highly polished membrane. Slightly retracted at a point a little below the centre. Near the

upper margin is a slight prominence, the short process of the malleus, from which, backwards and forwards, run two indistinct lines; the anterior and posterior folds. Extending downwards and backwards from the short process to the point of retraction is seen the handle of the malleus. From this passing downwards and forwards to the margin, is a triangular reflection of light, the apex upwards. When the membrane is unduly retracted, the short process and handle of the malleus, and the two folds become very prominent, and the shining spot is either altered, or altogether absent.

The MEMBRANA TYMPANI is usually divided for description into anterior, posterior, superior and inferior parts.

Remember that it is inserted obliquely and that the posterior and superior parts are nearer to the eye than the anterior and inferior.

Note the general appearance; colour; injection; opacity; transparency; mobility; any deposit; old cicatrices; perforations, polypi, or granulation tissue; appearances of the handle of the malleus; prominence of the short process, handle and folds; alteration in the shining spot, &c. If there is an offensive discharge, examine carefully with a fine probe for any carious or necrosed bone.

To ascertain Mobility.—1. By the *Pneumatic Speculum*.—A vulcanite speculum with glass at the outer end and screw ear pieces of different sizes. Branching off at right angles is an india-rubber tube to which either a bag or a mouth-piece is attached and by which the membrana tympani can be made to work, its movements watched, and any adhesions discovered.

2. By *Valsalvan Process*.—The patient is directed to hold the nose, shut the mouth and make a forcible expiration, air will then be driven through the Eustachian tube into the tympanum. By keeping the mouth and nose still closed and swallowing, the air will be drawn back again and the tympanum emptied.

3. By *Politzer's Method*.—One end of the auscultation tube is placed in the patient's ear, the other in the operators. The patient is directed to hold some water in the mouth. The nose-piece of a Politzer's bag is then inserted into one nostril, the other being closed by the index-finger and thumb. The patient is told to swallow the water, and at the end of the second stage of swallowing, when the nasal cavity and upper part of the pharynx is closed by the soft palate and tongue, the bag is compressed, and air forced into the tym-

panum. Directing the patient to close the mouth and inflate the cheeks while the bag is compressed, will usually answer the purpose of swallowing the water.

Too much force must not be used, as it is possible to rupture some of the vessels in the membrane or even the membrane itself, it may also bring on an attack of syncope. It is always wise to ascertain the state of the heart before recommending either Politzer or Valsalvan. In young children whistling or crying answer almost the same purpose as swallowing, but it is not quite so effective, the act of swallowing separating the lips of the pharyngeal orifice of the Eustachian tube. If the operator is slightly deaf himself, it may be advisable to use a bin-aural auscultation tube, one tube fitting into each ear of the operator, or discarding the tube altogether judge, from the appearance of the membrane and the sensations of the patient, whether the inflation has been successfully effected.

4. *By the Eustachian Catheter.*—Where the tubes are non-pervious, the use of Politzer's method through the Eustachian catheter is necessary; this is not possible in young children and in some conditions of the nasal fossæ.

How to pass the Eustachian Catheter.—

Two or three ways are recommended, the student had better try them all and continue to use the one he finds the most easy.

1. Direct the patient to close the mouth, depress the upper lip, and pass the catheter along the floor of the nose until it touches the posterior wall of the pharynx, rotate inwards and withdraw until the septum is felt, then rotate outwards with the point downwards to the opposite side, until the ring points to the outer canthus of the eye, and it will generally be found to have entered the Eustachian tube.

2. After passing the instrument to the posterior wall of the pharynx, rotate it outwards at once until the ring points to the outer canthus of the eye; the point is then in the fossa of Rosenmuller, press gently the outer end of the instrument to the middle line, withdraw it until the beak is felt to glide over the prominent edge of the Eustachian orifice.

3. Another method is not to turn the instrument when it has reached the posterior wall of the pharynx, but to pull it forward until the soft palate is reached, then push slightly backwards and turn outwards.

Be careful not to tear the tubal lining as emphysema may follow. If emphysema has

been caused, the swelling should at once be incised, this, in want of a better instrument, can easily be done with the fingernail.

A vulcanite catheter slightly heated over a lamp can be bent to any angle to suit a particular case. If the catheter can be passed without touching the posterior wall of the pharynx so much the better as it will then not cause any irritation.

To inflate or inject fluid into the tympanum, a Politzer's bag having a tube attached should be hung on a button of the coat. The catheter is then passed and firmly held in its place with the left hand, the fluid to be injected is then placed in the catheter with a pipette or hypodermic syringe, the tube from the bag inserted, and the bag compressed with the right hand.

Sounds heard by the Otoscope.—1. If the passage is free and there are no adhesions, a *full clear* note is heard as the air strikes the drumhead.

2. If there is any narrowing or adhesions, a *feeble and distant thud* is heard.

3. If there is fluid in the cavity of the tympanum, there is a *moist gurgling* or *bubbling* sound.

4. If there is a perforation, a *whistling* sound is heard close in the operator's ear.

Examine the Fauces, Tonsils, &c., for colour; ulceration; inflammation; any paresis; alteration in shape; old cicatrices; swelling; enlargement of tonsils, &c.

Examine the Nasal Cavities (anterior and posterior).—ANTERIOR RHINOSCOPY.—Incline the head slightly backwards, introduce the speculum and use slight upward traction, throw a good light into the cavity, search thoroughly the region of the turbinate bones for any signs of swelling or polypi. The seat of such swelling and the point of attachment of polypi should be carefully explored with a fine probe for any signs of necrosis, &c. The septum should be inspected for any deflection or outgrowth, and the nature of any discharge enquired into.

POSTERIOR RHINOSCOPY.—The patient is directed to breathe gently through the nose. The tongue is depressed with a spatula. The mirror is passed behind the soft palate, as close as possible to the wall of the pharynx without touching it, first on one side of the uvula and then the other. The posterior nasal fossa, the roof of the pharynx, the septum and turbinate bones, and the openings of

the Eustachian tubes are to be carefully examined.

It may be necessary sometimes to use a uvula, hook, or twitch.

Digital Examination.—With young children, it is usually necessary to employ digital examination. Take the head in your left arm, the left hand being used to depress the lower jaw and prevent the patient closing his teeth on your finger, pass the fore-finger of the right hand gently and quickly behind the soft palate and thoroughly search the posterior nares and naso-pharynx.

A metal shield is sometimes used for the finger.

Anæsthetic.—In case where, on account of irritability, it is impossible to make a proper examination, the use of a local anæsthetic, "*Solution of Cocaine, 20 per cent.*," is necessary.

CHAPTER IV.

DISEASES AND INJURIES OF THE EXTERNAL
EAR.

Divided into :—I. Diseases and injuries of the auricle.

2. Diseases and injuries of the external auditory meatus.

I. **Diseases and Injuries of the auricle.**—

MALFORMATIONS.—Occlusion of the meatus from a doubling up of the auricle.

Deficient or excessive growth.

Entire absence.

Increase in number (children have been born with two or more auricles on either side).

Arrested development leaving a branchial fistula.

Treatment.—Surgical interference according to requirement.

Anæsthetic.—Gas and ether.

DERMOID CYSTS occur usually in the line of the first pre-oral cleft, caused by the nipping in of a fold of dermoid tissue.

Treatment.—Removal.

Anæsthetic.—Gas and ether.

WARTS sometimes grow on the auricle.

Treatment.—The daily application of *salicy-*

late collodion. Ligature with application of *acid nitrate of mercury* to the base.

CHALK STONES are generally found in the upper portion of the helix.

Treatment.—Non-interference unless they produce inconvenience, when removal may be necessary.

CYSTS.—Small cysts sometimes form in the lobule, and are liable to become inflamed.

Treatment.—Removal of the cyst-wall.

OTHÆMATOMA.—An effusion of blood between the cartilage and perichondrium, degeneration and softening of the cartilage occur, an attempt at repair then takes place with the formation of delicate vascular granulations, rupture of these is followed by extravasations, resulting in the formation of the tumour.

Divided into traumatic and idiopathic.

TRAUMATIC.—The result of direct violence such as a blow.

IDIOPATHIC (or insane ear).—This occurs usually in the insane, more especially in those diseases connected with epilepsy.

Symptoms.—Rapid growth with little or no pain; tense-shining reddish-blue colour, varying in size, situated on the anterior surface of the auricle, sometimes confined to one spot, at others occupying the whole auricle, with the

exception of the lobule, which is never involved; contains serum which solidifies and shrinks, causing deformity; suppuration may occur, followed by rupture of the sac.

Prognosis.—Bad.

Treatment.—Evaporating lotions; vesication; puncture of tumour and aspiration; evacuating contents and applying pressure; ice; iodine; lead lotion; methodical massage (*Meyer*). After aspiration the injection of a small quantity of iodine, which may be left in for about five minutes and then withdrawn, sometimes does good.

MALIGNANT DISEASES.—Epithelioma, sarcoma.

Treatment.—Amputation, *partial* — in the early stages. *Complete*—in the late stages.

FIBROUS TUMOUR.—Semi-malignant, varying in size from a pea to a hen's egg, produced by wearing ear-rings.

Treatment.—Excision.

KELOID GROWTHS.—Semi-malignant, produced by wearing ear-rings.

Treatment.—Excision.

Anæsthetic.—For all these cases, gas and ether.

PERICHONDritis. — *Causes.* — Degenerative changes of the cartilaginous framework; blow; burn; frost bite; &c.

Symptoms.—Red, sometimes almost black, tense swelling, containing a yellowish-pink fluid or dark blood; more or less thickening of the parts; ulceration.

Prognosis.—In simple cases favourable. Where there is much ulceration the deformity may be considerable.

Treatment.—Incision and evacuation of the fluid, pressure. The ulceration should be touched with the solid nitrate of silver. Cod-liver oil, tonics, and a good generous diet.

ANGEIOMATA sometimes occur; they present the same features as in other parts of the body.

Treatment.—Galvano-cautery in *one* sitting if *small*; if large in size, a small portion is best done at a time. Hæmorrhage may occur, and it may be necessary to tie the carotid or the vessels supplying the tumours.

INJURIES, such as tears, cuts, &c., heal readily when carefully cleaned and adapted, plenty of sutures being used.

SKIN DISEASES.—*Eczema*, acute or chronic, is of the same nature as that found in the other parts of the body. It usually occurs behind the ear in fat children, and in the anæmic and debilitated. In the skin around the meatus it is due to an acrid discharge from the meatus, to lack of cleanliness and improper diet.

The constitutional causes, such as gout, rheumatism, &c., are the same as in other regions.

Symptoms vary from simple redness and slight infiltration of the skin, to a continuous mass of scabs and ulceration; there is more or less irritation.

Prognosis.—Favourable.

Treatment.—Remove all exciting causes by perfect cleanliness; abstinence from all alcoholic liquors; attend to diet, fresh air, open bowels; attend to constitutional causes, giving arsenic, colchicum, iron, iodide of potassium, and cod liver oil as required. Soak the scabs and crusts away with weak carbolised oil. Use bran water for washing the parts, and apply one of the following lotions or ointments:—

Plumbi Acet., Hydrarg. Subchlor. āā gr. x., Lanoline, ℥j.

Ung. Plumbi.

Pulv. Calamin. ℥ij., Pulv. Tinct. Oxidi, ℥ij., Glycerin. pur., ℥ij., Liq. Carbonis Detergen., ℥ss., Aquam ad ℥viij.

Liq. Plumbi Subacet., ℥j., to two table-spoonfuls of new milk.

The lotions or ointments sometimes require frequent changing. Cimolite powder used

after the lotions is very soothing. All ulcerated points should be touched with solid nitrate of silver.

Erysipelas.—Swelling, redness, burning sensation, same appearance as in other parts of the body.

Treatment.—Large doses of perchloride of iron, port wine. Warm carbolic lotions, should be gently syringed into the ear and the surface painted with flexible collodion.

Erythema.—Swelling and redness as in other parts.

Treatment.—Lotion of—Soda Bicarb., ℥j., Glycerin. pur., ℥jss., Elder Flower Water to ℥vj. An aperient. Quinine.

Frost Bite.—In slight cases.

Symptoms.—A red-purplish and somewhat swollen appearance. In actual freezing, it has a whitish look, and after prolonged exposure to freezing the auricle becomes quite brittle.

Prognosis.—In favourable cases the auricle gradually assumes its natural colour, but may leave some permanent redness behind.

In bad cases, the inflammation that sets in may be followed by gangrene.

Treatment.—In simple cases, rubbing gently with snow and a spirit lotion will be all that is necessary.

In severe cases, amputation of the gangrenous portions.

The best method of thawing a frozen ear:— Rub gently with snow first, then cold water, and when circulation is established use tepid water. This is to be done in a cold room (*Buck*).

Herpes.—Same character as in other regions.

Treatment.—Some simple ointment, vaseline, &c.

Herpes Zoster.—Same as elsewhere.

Treatment.—Some simple ointment; quinine internally.

Icthyosis.—Generally congenital.

Symptoms.—Dry crusts on a hard scaly black skin.

Treatment.—Relief may be obtained by applications of glycerine and bran baths; alternative, amputation.

Lupus.—*Symptoms*.—Rough reddish patches, with nodules which may or may not soon break down.

Treatment.—Careful and repeated cauterisation or scarification. Iron, quinine, arsenic, and cod-liver oil internally.

Pruritus.—Usually occurs in elderly people and persons suffering from defective circulation.

Treatment.—Soothing lotions or ointments ; arsenic internally.

Syphilis. Symptoms.—Secondary eruptions at the junction of the lobule and auricle ; squamous on auricle ; sloughing of auricles ; condylomata round the orifice of the meatus ; gummata.

Primary chancres have been known to occur.

Treatment.—Iodide of potassium, mercury and other anti-syphilitic treatment ; black wash or bichloride lotion. Ung. hydrarg. to condylomata.

2. Diseases and Injuries of the External Auditory Meatus.

CONGENITAL ABSENCE OF.—Unilateral ; usually accompanied by malformation of the auricle.

Treatment.—When the other ear is perfect, do not think of surgical interference, even if the auditory nerve, as tried by the tuning fork, is all right, as the middle ear may also be imperfect.

CERUMEN may be deficient or in excess, soft and oily, or dry and crumbling, often mixed with hair and epidermic scales.

Absence of.—This occurs frequently in persons suffering from a catarrhal inflammation of the middle ear, in gouty and rheumatic

constitutions, and is most common in old people.

May be due to a morbid condition of the trophic nerves (Politzer).

Treatment.—Glycerine, lanoline, or alkaline lotions.

Excess of, with impaction.—Due to a narrow orifice; imperfect cleanliness, especially after the free use of soap; taking cold from sitting in draughts, &c.; use of towel ends and ear-picks. Cotton-wool sometimes forms the nucleus of the mass, it having been inserted at some previous time and forgotten.

Symptoms.—Complete deafness on the affected side, sudden or gradual; sometimes tinnitus, usually of a rushing character, numbness, giddiness, and pain.

A dark-looking mass in the meatus.

Prognosis.—Generally good, but wax long impacted may cause a perforation of the drum-head; a thickened condition of the epithelial layers, or undue pressure through the chain of ossicles upon the labyrinthine contents.

Treatment.—Careful syringing with warm water to which a small quantity of sodæ bicarb. has been added. The syringe should be used very gently, the stream of water being directed along the roof. If the plug is obstinate

a few drops of a solution of sodæ bicarb. and glycerine, or a weak solution of liq. potassæ, will soften the wax and enable the syringe to do its work. The plug occasionally swells when fluid is applied, causing some discomfort. *All instrumental interference by those not skilled in the use of aural instruments should be most strictly avoided.* To those who are accustomed to use them, a small scoop, the aural probe, and fine angular forceps, will materially assist the removal of an obstinate plug. If from the previous history you are led to suspect a perforation of the drum-head. A sharp application of Politzer's bag will sometimes assist to dislodge the mass.

IMPACTION OF EPITHELIAL SCALES usually occurs in old people and is frequently mixed with cerumen and hairs.

Symptoms and treatment are the same as in the case of a plug of cerumen. After removal the walls are generally red and scaly.

FOREIGN BODIES frequently lodge in the meatus.

Symptoms.—Pain; swelling; hæmorrhage; deafness; tinnitus; discharge; occasional epileptiform seizures; vomiting and coughing. All these symptoms may occur; on the other hand, the substance may stop in the ear for a

long time without causing any inconvenience or damage. There is usually a history of a foreign body having entered the ear.

Prognosis.—Guarded. Depends on the nature of the foreign body; length of time in the ear; what previous attempts have been made to remove it.

When first introduced they are generally close to the orifice, and are easily got rid of.

Treatment.—If they have been in some time—Remove all swelling and inflammation, this is as a rule readily effected, and the acute pain relieved by leeching in front of the tragus; make a thorough examination with the speculum to be sure there is a foreign body to remove. Carefully syringe the ear, directing the stream along the roof of the meatus; if necessary, place the patient on the affected side, and syringe from below, an anæsthetic (gas and ether preferred) being given if required.

Do not use any other method until this has been tried over and over again; unskilled instrumental interference may push the substance further in, and may cause fatal results. In the case of a dried bean or pea, instruments had better be used, as the water will cause the substance to swell if not at first dislodged.

The following methods for removal have been suggested and tried.

The agglutinative.—Attach a piece of calico or coarse substance to the foreign body with glue and then remove with forceps.

A bent probe, scoop, or a fine wire noose may be passed behind the obstruction, or it may be removed by aural forceps, the alligator forceps being most useful.

Cutting through the posterior wall at the back of the auricle.

I think it is better not to employ cocaine where the operator is not accustomed to aural instruments, the pain caused being an indication not to go too far.

Foreign bodies such as pins, cotton-wool, &c., have been forced into the tympanum and passed into the Eustachian tube. Repeated efforts at swallowing may sometimes dislodge them.

INSECTS sometimes get into the external auditory meatus, and small fish have been known to enter during bathing.

Symptoms.—Irritation; deafness; tinnitus; giddiness; faintness; nausea may be present. When there are maggots, little white moving bodies are seen.

Treatment.—Syringing with warm water,

after warm weak carbolised oil has been poured into the ear and allowed to soak. The vapour of chloroform will kill the maggots from the larvæ of flies; they can then either be syringed out or removed with fine rectangular forceps.

VEGETABLE FUNGI.—The aspergillus is the most common.

Cause.—Some chronic unhealthy affections of the meatus; dried up discharge; rancid oily matters in the ear; damp dwellings; damp beds, &c.

Symptoms.—Sensation of fulness in the ear; deafness; tinnitus; dull heavy pain; irritation; giddiness, with sometimes a slight serous discharge. The meatus is generally blocked, and thin whitish coatings like wet newspaper sprinkled with coal-dust, cover the membrane and meatus. This when removed leaves an injected surface, it is reproduced in a few hours. Where the drum-head is perforated, it may be found in the cavity of the tympanum.

Treatment.—Absolute cleanliness. Syringe with warm water, and use as a lotion:—a saturated solution of boracic acid in alcohol; equal parts of alcohol and glycerine; solution of bichloride of mercury, 1 in 1000; or hyposulphite of soda, gr. iij. ad ʒj.

BOILS.—*Causes.*—Colds from draughts; ear-picking; collection of cerumen and irritating discharges; constitutional debility. Patients suffering from boils in the external auditory meatus seldom get them elsewhere.

Symptoms.—Ear feels full and heavy, some deafness and tinnitus, great pain gradually developing and increasing at night, and with movements of the jaw and auricle; a circumscribed excessively tender swelling is seen in the meatus.

Prognosis.—Favourable, though recurrence is very liable in different sites in the meatus.

Treatment.—Find out the most tender spot with a probe and incise it deeply, cutting from within outwards, and apply powdered boracic acid. Leeches in front of the tragus and counter-irritation over the mastoid; hot poppy fomentations and syringings. A concentrated alcoholic solution of boracic acid. Medicated gelatine and opium bougies (Grüber), or a few drops of warmed laudanum. Poultices should not as a rule be used, but a small conical shaped linseed poultice introduced into the meatus according to Roosa does good sometimes.

Give iron and quinine, cod-liver oil, arsenic, or sulphide of calcium. The bowels should

be kept open with salines; regular habits and avoidance of late hours enforced.

ABSCESS.—A circumscribed inflammation of the meatus.

Symptoms.—Much the same as those of boils. Acute pain increased by movements of the jaw and auricle, deafness and tinnitus. Sometimes the whole external ear becomes swollen and tender to the touch.

Prognosis.—Favourable, though very liable to recur.

Treatment.—Early and free incision down to the periosteum, and hot poppy fomentations; leeches in front of the tragus, and mastoid counter-irritation. The general treatment is much the same as that for boils.

In applying leeches be careful always to stop the meatus with cotton-wool to prevent either blood or the leeches themselves from entering.

Anæsthetic.—Cocaine, 20 per cent., when incision is required.

ACUTE DIFFUSED INFLAMMATION OF THE MEATUS.—*Causes.*—Colds from draughts; ear-picking; sea-bathing; foreign bodies; impacted cerumen; vegetable fungi; the exanthemata; constitutional causes, such as gout, syphilis, &c.; direct violence.

Symptoms.—Deafness, throbbing tinnitus, pain increased by movements of the jaw and auricle, itching sensation, fever, swelling to occlusion of the meatus, redness, extreme tenderness, some slight sero-sanguineous discharge, and perforation of the drumhead may take place.

Prognosis.—Guarded, owing to possible implication of the middle ear and perhaps the meninges.

Treatment.—Hot poppy fomentations, anti-septic warm douches, a warm solution of cocaine, 10 per cent., leeches in front of tragus, and mastoid counter-irritation. If the pain continues search for a tender spot with a probe, and then cut down to the periosteum. If suppuration has become established, astringent washes should be used two or three times a day, then carefully dry and blow in finely powdered boracic acid. Give salines, pay attention to diet, and strict abstension from alcoholic liquors must be enforced.

CHRONIC DIFFUSE INFLAMMATION usually follows an acute attack.

Symptoms.—Deafness from narrowing of the passage, and collection of pus and epidermic scales; slight discharge; ulceration. Membrana tympani is reddened, the epidermic layer

thickened, and there is occasionally a perforation and granulations.

Treatment.—Mild astringent lotions, such as:—Sol. of Boracic Acid, gr. x. ad ℥j., Zinci Sulph., and Acid. Carbolic, āā gr. v. ad ℥j. Finely powdered boracic acid. Solid nitrate of silver should be applied to the ulcerations. Where there are granulations they should be touched with solid nitrate of silver or chromic acid, and pure alcohol instilled. For general treatment:—Tonics. Cod-liver oil. Fresh air. Regular habits.

ECZEMA.—Usually of a dry desquamative character, but may be moist.

Causes.—Constitutional, such as gout, indigestion, &c., or an irritating discharge in debilitated anæmic children or old people.

Symptoms.—Deafness and tinnitus caused by the filling up of the meatus with epithelial scales and muco-purulent discharge. In old people the meatus is generally dry, causing a considerable amount of itching and irritation.

Prognosis.—Decidedly unfavourable in the dry variety of old gouty people.

In children, favourable.

Treatment.—Soak the scales and scabs well with carbolised oil or glycerine until most are removed, and then treat in the same way as

in eczema of the auricle, observing perfect cleanliness. Attend to diet, and treat the constitutional cause from which it arises with arsenic, cod-liver oil, colchicum, iodide of potassium, &c., as required.

ERYSIPELAS.—*Symptoms.*—Swelling, redness, narrowing of the passage and consequent deafness.

Prognosis.—Guarded, but generally favourable.

Treatment.—No special treatment beyond that usual in erysipelas.

COMPLETE CLOSURE OF MEATUS may occur from inflammation, either by a membranous septum or by dense bone.

Treatment.—Removal of the membranous septum. For treatment of the osseous obstruction, see “Exostosis.”

Anæsthetic.—Cocaine, 20 per cent. locally.

OTORRHAGIA.—Hæmorrhage from the external meatus is a common symptom of various diseases and injuries, such as fracture of the base of the skull, rupture of the drumhead, small-pox, yellow fever, suppressed menses polypi, &c.

Treatment.—Treat the cause.

EAR COUGH.—Patient has a fit of coughing, more or less violent, on the introduction of a

speculum or foreign body into the meatus, due to irritation of a twig of the auriculo-temporal branch of the fifth cranial nerve, and so the floor of the fourth ventricle.

Treatment.—If bad enough to prevent the insertion of the speculum try cocaine.

SEBACEOUS TUMOURS.—Produce absorption of the bone without pain, causing great dilatation, and might set up brain mischief.

Symptoms.—Deafness from blocking the meatus.

Treatment.—Removal, being careful to take away the whole of the sac.

Anæsthetic.—Gas and ether.

POLYPI AND GRANULATION TISSUE sometimes spring from the walls of the meatus. Their symptoms and treatment will be more fully described in the chapter on aural polypi.

SYPHILIS.—*Symptoms.*—Ulceration and condylomata. Gummata are rare.

Treatment.—Cauterisation, mercury, and iodide of potassium; black wash as a lotion.

MALIGNANT DISEASE.—Epithelioma has been known to appear primarily in the external meatus, but it is usually secondary, due to extension from neighbouring parts, the cavity of the tympanum, &c. It may appear first as an eczema, soon proceeding to destructive ulceration, or as a small painful nodule.

Treatment.—Where possible, removal. The use of a sharp spoon and caustics may do some good.

Anæsthetic.—Gas and ether.

Osseous Tumours.

HYPEROSTOSIS.—A thickening of the osseous walls of the meatus.

Causes.—Inflammation; syphilis; gout, &c.

Symptoms.—Narrowing of the meatus causing deafness and tinnitus, and penning up of secretions in the auditory canal or tympanum.

Prognosis.—Guarded.

Treatment.—The introduction of small ivory bougies. If these do not relieve the symptoms, a chisel or the dental drill must be employed, of course the greatest care and caution must be taken in using these instruments.

Anæsthetic.—Gas and ether.

EXOSTOSIS.—Differ little from exostoses in other parts of the body. They may be divided into spongy, ivory, and an intermediate variety. Are usually found arising at the junction of the cartilaginous and osseous portion of the canal.

THE SPONGY.—Pedunculated, single, usually arising from the middle ear as the result of inflammation.

Symptoms.—Deafness from blocking the

meatus; tinnitus; rapid growth; sometimes it is preceded by a polypus, and there is usually a quantity of offensive pus.

Treatment.—Removal by snare.

Anæsthetic.—Cocaine 20 per cent. locally.

INTERMEDIATE.—Partakes of some of the characters of both the ivory and spongy varieties, is generally multiple and has a broadish base.

Treatment.—Removal by the snare, chisel, or drill; Bonnafont's dilators; sea tangle; or sponge tents.

Anæsthetic.—Cocaine 20 per cent. locally. Gas and ether if necessary.

THE IVORY.—Resembles ivory in consistence, is more common in men than women.

Causes.—Gout; rheumatism; chronic inflammation from sea-bathing, or discharge of pus.

Symptoms.—Deafness from blocking the meatus; tinnitus; penning up of pus in the meatus or tympanic cavity; a tumour with a broad base arising from the posterior wall and close to the orifice of the meatus; of slow growth and covered with a smooth white skin; may be single or multiple.

Treatment.—Counter-irritation; electricity; sea tangle and sponge tents have all been

tried. The most effectual treatment is drilling with the American dental drill. A steel guard being carefully placed behind the tumour, and the operation conducted slowly and with great care (Field). Dilute nitric acid injected into the tumour when partially penetrated will sometimes act as an absorbent (Pritchard).

Injuries.—Fractures through the osseous portion, generally complicated by fissure of the upper and inner tympanic walls, the mastoid process, or the petrous portion of the temporal bone.

In fracture of the lower jaw a portion may be driven through the meatus.

CHAPTER V.

DISEASES AND INJURIES OF THE MIDDLE EAR.

Collapse and Obstruction of the Eustachian Tube.—*Causes.*—Cold; rheumatism; sea-bathing; exanthemata; mental shocks; scrofula; general debility; thickening and relaxation of the mucous membrane of the fauces; enlarged tonsils; hypertrophied inferior turbinated bones; closure by membranous adhesions; by mucus; stricture of the osseous walls of the tube; paresis of the tubal muscles.

Symptoms.—Stuffy feeling in the ear during a cold; deafness; tinnitus at times; swollen faucial mucous membrane; granular pharyngeal mucous membrane; swollen condition of the pharyngeal orifice of the Eustachian tube; enlarged tonsils; enlarged turbinates.

The drumhead is dull, white, and retracted, the handle of the malleus and the anterior and posterior folds being very prominent. There is no response, or else a very slight one, on inflation by Politzer. The shining spot is altered in appearance or disappears entirely.

Prognosis.—Guarded, unless seen early it

soon becomes chronic, producing troublesome deafness and tinnitus, and may lead to suppurative inflammation of the tympanic cavity with perforation of the membrana tympani. The accumulated mucus frequently hardens in the tympanum, causing adhesions and ankylosis of the ossicles.

Treatment.—Inflations by Politzer and Valsalvan*, frequent at first, gradually getting less. Iodine Vapour (Tinct. Iodi. Æther Acet. āā ℥xx.) by Valsalvan. Alkaline nose-wash (Biborate of Soda, gr. xii., Boracic Acid, gr. v. to the ounce of water), or a solution of common salt; wash out the tympanum, through the Eustachian catheter into a solution of Pot. Iod. or a saline wash; astringent applications to fauces. Galvanism to tubal muscles through the Eustachian catheter. Tonics; general bracing of the system; a mixture of Iodide of Potassium from gr. iii. to gr. v., and Tincture of Nux Vomica from ℥x. to ℥xv. to water ℥i. For a narrowing of the Eustachian tube, due to chronic catarrh, passing Eustachian bougies often does great good.

Inflammation of the Middle Ear may be

* The Valsalvan process should not be resorted to except under frequent medical supervision, or undue relaxation may result.

divided into:—1. *Acute* and *Acute Suppurative*.
2. *Chronic* and *Chronic Suppurative*.

ACUTE.—Most frequent in children. Both ears are sometimes equally affected, but as a rule the inflammation is more active on one side than the other.

Causes.—Cold, exanthemata, sea-bathing, inhalation of sewer gas, collapse of Eustachian tube, collection of irritating fluid in the tympanum.

Symptoms.—Deafness; tinnitus; tuning fork heard best in the affected ear; pain, varying with the amount of inflammation, deep in the ear and radiating over the side of the head, increased by swallowing, coughing, or sneezing; tenderness in the external meatus and over the mastoid; sensation of fulness and weight in the ear; neuralgia; flushed face and hot skin; quick pulse; rise of temperature, &c.; throat and naso-pharynx often inflamed; hollow sound of one's own voice; sometimes a sensation of numbness on the side of the head. Very young children become restless, crying out now and again with pain, the hand is put up to the ear and they refuse to lie on the affected side; the nose seems stopped from affection of the naso-pharynx and throat. The drumhead is of a pink or

reddish colour, with injected vessels and dull appearance; sometimes it bulges, at others it is retracted from obstruction to the Eustachian tubes.

Prognosis.—Generally favourable; may run on to suppuration, or a thickening of the tympanic mucous membrane, hardening of the mucus with adhesions, ankylosis of the ossicles, &c.

Treatment.—Inflation by Politzer's bag to remove any collection of mucus. Hot poppy fomentations to the external meatus. Leeching in front of the tragus and counter-irritation over the mastoid. Vapor Benzoin. by Valsalvan process. Warm nose wash of Biborate of Soda, gr. x., Boracic Acid, gr. v., Water, ℥j. Throat and naso-pharynx painted with a Solution of Chloride of Zinc, gr. xxx. ad ℥j, or Argent. Nitrate, ℥ss. or ℥j. ad ℥j. As the case is improving, finely powdered boracic acid may be blown into the meatus, and the tympanic cavity washed out through the Eustachian catheter with a warm alkaline solution. Saline purges; diaphoretics; non-stimulating diet; no alcohol or tobacco. Change of air to a warm dry place protected from strong winds. A warm hop pillow does sometimes a great deal of good in soothing the pain, &c. Para-

centesis of the membrane and blowing out the mucus through the opening may be tried if it cannot be got rid of any other way.

Otitis Hæmorrhagica is described by Roosa. During an attack of acute inflammation violent pain is complained of, and a feeling experienced as if something had given way, and there is hæmorrhage through a perforated membrane.

Myringitis.—In an acute attack of middle ear inflammation the membrane may be alone affected.

Cause.—Cold from draughts, &c., or direct violence.

Symptoms.—Deafness, fulness, and throbbing tinnitus; deep-seated pain, especially on moving the jaw. Hæmorrhage and perforation may occur. The drumhead slightly injected at first goes on to general redness; some bulging; vesicles sometimes form on the surface.

Prognosis.—Generally favourable.

Treatment.—Hot poppy fomentations; leeching in front of the tragus; counter-irritation over the mastoid. Eustachian tubes kept patent with Politzer. Vapor Benzoin by Valsalvan method. Warm alkaline nose wash. Throat and naso-pharynx, if affected, painted

with a Solution of Chloride of Zinc, gr. xxx. ad ℥j.

Finely powdered boracic acid to be blown into the meatus; warm drops of Acetate of Lead, gr. ij., and Tincture of Opium, ℥v., to Water, ℥j. or Sol. Cocaine, 10 per cent. Bromides to relieve the tinnitus. Quinine, &c.

Acute Suppurative Inflammation. —

Causes.—Cold draughts; exanthemata; blows; sea bathing; typhoid; diphtheria; extension of inflammation from throat and naso-pharynx. Sunstroke is said to cause it, but it is rare. Usually follows a simple acute attack of inflammation.

Symptoms.—Deafness, fulness, and throbbing tinnitus; vertigo; deep-seated pains; blockage of the Eustachian tubes; perforation of the drumhead, which occurs at various times according to the severity of the attack, with discharge. The membrana tympani, before perforation, is a bright-red or deep-pink colour, and bulges.

Prognosis.—In simple forms—favourable. The acute inflammation having subsided, a perforation in a healthy membrane readily heals, if it is not too large.

In the more severe forms, and in cases that have been neglected, the inflammatory con-

dition and discharge may become chronic, and then any of the complications of chronic suppurative inflammation may occur, or the brain may be more rapidly attacked from the spread of acute inflammation, and death quickly follow.

Treatment.—Hot poppy fomentations, or dry heat from a rubber bag filled with hot water and covered with flannel, or a hot hop pillow. Leeching in front of the tragus. Counter-irritation over mastoid. Evacuation of the pus through the Eustachian tube by Politzer's inflation; if this fails paracentesis of the drum-head should be resorted to in the posterior and inferior segment, the bulging generally showing there, and the tympanum washed out with warm water. Instillation of Cocaine, 20 per cent. solution, will relieve pain. Incision over the mastoid and opening the cells may be necessary. When improving gently syringe with warm water and blow in finely powdered boracic acid, or apply sulphate of zinc, gr. v. ad ℥j., Plumbi Acetat., gr. ij. ad ℥j.; Acid. Boracis, gr. x., Alcohol ad ℥j. Give bromides to relieve pain and tinnitus; salines; diaphoretics, &c.

Cretaceous Deposits in the Membrana Tympani.—Usually composed of phosphate of lime.

Causes.—Long-standing inflammatory diseases, especially in gouty subjects.

Symptoms.—Deafness may be slight or very great; severe tinnitus and vertigo may be present. The membrana tympani has white patches upon it, either crescentic or irregularly radiating in form; they are usually unilateral.

Prognosis.—Hearing may improve, and the tinnitus cease after an operation.

Treatment.—Either incision of the membrane, or excision of the diseased portion.

Anæsthetic.—Cocaine 20 per cent. locally.

Serous Inflammation.—An excessive secretion in the middle ear may be of a serous character.

Symptoms.—More or less deafness, varying according to the amount of serous fluid and the position of the patient. Pain seldom present. Sound of own voice becomes distressing. Movement of the fluid in the tympanum is felt by the patient when he changes his position. The drumhead is generally bulging and a yellowish fluid is seen through, which changes its position on movement.

Prognosis.—Guarded; very liable to recur.

Treatment.—Inflation by Politzer's bag. Vapor iodine by Politzer or Valsalvan; emptying the tympanum by closing the mouth and

nose and swallowing ; washing out tympanum with an iodide of potassium wash through the catheter. Gargles to the throat. Attention to general health.

If there is much bulging and the tympanum cannot be emptied, paracentesis must be performed ; this may have to be repeated several times before a cure is effected.

Chronic Inflammation.—*Causes.*—Follows an acute attack ; extension of inflammation from the throat and naso-pharynx ; collapsed Eustachian tubes ; or it may be due to a more or less slow inflammatory process going on in the Eustachian tubes and tympanic cavity. The atrophic condition of the drumhead is generally due to the closure of the Eustachian tubes, the constant pressure on the outer surface thinning the membrane.

Symptoms.—Deafness ; tinnitus and vertigo, gradually increasing ; little or no pain ; chronic affection of the throat and naso-pharynx with dryness and discomfort, and sometimes a sense of fulness aggravated by atmospheric dampness.

Children often become absent in manner, breathe heavily, snore, have enlarged tonsils and adenoid growths in the naso-pharynx. Where there is collapse of the Eustachian tube

or an obstruction caused by a swollen condition of the mucous lining, fluid often collects in the tympanum.

The drumhead loses its transparency, is generally concave, of a dull whitish colour, with patchy opacities; calcareous deposits may appear. It may maintain one position during inflation caused by adhesion, ankylosis of the ossicles, obstruction to their movements by a collection of mucous or a swollen condition of the mucous membrane. Atrophic patches may occur, they usually appear thinner than the surrounding membrane. They sometimes look dark, at others are so transparent that the parts behind can be distinctly seen. The diagnosis of these patches can be easily confirmed by the pneumatic speculum.

DRY CATARRH.—There is a form of dry catarrh which occurs principally in middle life from syphilis, gout, or rheumatism, &c. The stapes is usually most affected, becoming fixed from adhesions, &c. The Eustachian tubes are patent, and the naso-pharynx and the drumhead are normal in appearance, the deafness is gradually progressive with some tinnitus and vertigo.

Prognosis.—Decidedly unfavourable. In the majority of cases there is no improvement, but

under appropriate treatment no further loss of hearing may take place. In those very deaf cases that sometimes hear better when there is a noise the prognosis is bad.

Treatment.—Politzer two or three times a week. Valsalvan inhalation of the vapour of chloride of ammonium, or vapour iodine, especially in the dry form. In cases of collapse of the tubes where the vapour cannot be blown up, or where the hot vapour produces a relaxation of the throat, a stimulating lotion such as Zinci Sulph. gr. v. ad ℥i., an alkaline wash, or Pot. Iod. gr. ii. ad ℥i. should be used through an Eustachian catheter. Astringent applications to the throat and naso-pharynx, such as Zinc. Chlorid. gr. xxx. ad ℥i., or Ferri Perchlor. ℥i. ad ℥i., gargles of alum, or boracic acid. Enlarged tonsils should be excised, and adenoid vegetations removed. Paracentesis is necessary where exudations of mucous behind the drumhead cannot otherwise be got rid of.

Warm nasal douches; tonics; vin. ferri; symp. ferri iodid.; cod-liver oil. Small doses of hydrarg. perchlor.; iodide of potassium; nux vomica; chloride of ammonium are all useful. Bromides in hysterical patients; hydrobromic acid and the bromides for tinnitus; salicylate of soda in rheumatic conditions.

Paracentesis of the Membrana Tympani.

—Use a spear-headed, double-edged myringotom as small as convenient, cut into the posterior and inferior quarter, be careful not to go too deep, as facial paralysis and inflammation of the brain might occur. Avoid all damage to the ossicles, more especially the incus, its attachments being very slight.

Tenotomy of the tensor tympani.—This operation has been recommended where the retracted drumhead does not yield readily to inflation. Also section of the anterior ligaments of the malleus, and destruction of adhesions either by a rectangular knife or Woakes pneumatic tractor.

Chronic suppurative inflammation.—

Causes.—Follows an acute attack; an exanthem; blow; cold; sea bathing; inhalation of sewer gas. It occurs in patients, more especially children, of a strumous or phthisical constitution where there is no history of a previous acute attack.

Symptoms.—Deafness; tinnitus; vertigo; a discharge more or less constant and offensive varying from a pale and watery consistence, which may be tinged with blood, to a thick and creamy one. Pain sometimes severe, in other cases, especially those occurring in

strumous or phthisical children, there is none. Tenderness over the mastoid region and in front of the tragus, often an eczematous rash and ulceration of the lobule from the continuous irritating discharge. Epileptiform attacks may occur, and loss of taste through the involvement of the chorda tympani. Facial paralysis.

The colour of the membrana tympani ranges from a pale pink to a deep red. There may be signs of old cicatrices and deposits of cretaceous matter; a perforation varying from a pin's head to complete destruction of the membrane. The mucous membrane of the tympanum may become swollen and œdematous resembling a polypus. Carious or necrosed bone can be demonstrated by means of a probe. The objects in the internal wall of the tympanum are sometimes distinctly visible. The whole of the ossicles are at times discharged.

Prognosis.—Guarded as in the event of the perforation not healing, the hearing power may remain permanently impaired, and even if healed the suppurative process may have so damaged the tympanum and its contents as to cause permanent deafness.

Neglect of a chronic suppuration may cause

serious complications and fatal consequences.

Treatment.—Extreme cleanliness. Wash out the ear from four to six times a day with a warm weak antiseptic lotion; after washing, the ear should be dried as much as possible with cotton wool. The Eustachian tubes should be kept clear by Politzer or Valsalvan. Wash out the tympanic cavity with a warm alkaline solution—use astringent drops, such as Boracic Acid gr. x. ad ℥j.; Acetate of Lead gr. ii. ad ℥j.; Zinc. Sulph. and Acid. Carbol. āā gr. v. ad ℥j.; Boracic Acid gr. x. to ℥j. of Alcohol. Finely powdered boracic acid or powdered iodoform. Solution of sulphurous acid 1 in 8 if there is any carious bone; should this strength cause pain and smarting, dilute with water as necessary. An ointment of powdered root of the *Hydrastis Canadensis* gr. x. to ℥j. of Lanolin.

The swollen mucous membrane of the tympanum should be touched with a solution of Nitrate of Silver gr. ii. to ℥j., or a saturated solution of chromic acid. When there is much pain, leeching in front of the tragus and counter-irritation over the mastoid will generally relieve it.

The treatment of eczema of the lobule has

been already referred to. One kind of application should never be continued for any length of time.

Tonics; cod-liver oil; iodide of potassium, in combination with strychnine or tartarated iron; fresh air; change of climate if possible.

Perforation of the Membrana Tympani.

Causes.—Direct violence, such as falling; hair pin driven through; forcible and unnecessary syringing; blows on the head; foreign bodies in the ear; diving; violent sneezing or coughing; whooping cough; atmospheric pressure; concussion; boiling water; irritating applications, urine, &c.; an acute or chronic suppurative inflammation.

Rupture of the membrana tympani from violence, such as a box on the ears, would form good grounds for an action in a court of law.

The membrane may be ruptured at any point, no particular situation being preferred.

Prognosis.—Good, if the perforation is small and clean cut.

Bad, if large with irregular edges, and when a great amount of suppuration has been going on—although provided the stapes is left in position and is not fixed, even if the rest of the ossicles are destroyed a certain amount of hearing remains.

Symptoms.—On examination with a speculum the hole is, generally, readily discovered, though it may be so small and situated in the anterior portion of the membrane that it cannot always be seen. By using the auscultation tube the characteristic rush of air through the perforation will be heard.

Treatment.—Cleanliness. Wash out the tympanum, Eustachian tubes, and meatus, with a warm alkaline solution. Insufflations of boracic acid or iodoform powder, or instillation of concentrated solutions of such. Touch the edges with nitrate of silver fused on the end of a probe. If the perforation be round and small, slight incision at either end may do good.

Artificial Membranes.—If large, and the ossicles remain intact, an artificial membrane may be used after all inflammation and discharge has ceased; it should never be worn too long at a time, and should be discontinued if it causes any discomfort, and on going to bed. Half an hour at a time is quite long enough to start with, gradually increasing until it can be worn all day.

YEARSLEY'S, made of absorbent cotton wool, with a fine silk attached, are I think the best, as they are less likely to cause irritation

than the more elaborate ones. If there should be a slight discharge left moisten the wool with some astringent lotion.

THE WICK.—A modification of Yearsley's, consists of a wick-shaped piece of cotton wool, moistened with some slight astringent, and pushed down the membrane.

TOYNBEE'S is an india-rubber disc on a silver wire.

GRUBER'S.—India-rubber or linen discs attached to a silk thread.

FIELD'S.—Composed of two discs—Toynbee's india-rubber and a second disc of flannel, the intervening space filled with cotton wool.

BLAKE, of Boston, uses sized paper placed over the perforation.

MICHAEL suggested a fluid artificial membrane instilling first medicated glycerine and then collodion, which forms a membranous covering retaining the glycerine in position.

The artificial membrane should be carefully inserted and gently pressed in various directions until the right spot for the pressure is found.

Progressive Deafness.—A form of deafness occurring generally in anæmic and debilitated patients, especially in those getting on in age.

Symptoms.—Deafness which comes on gra-

dually and slowly increases until the patient becomes quite deaf. The membrana tympani is normal and the Eustachian tubes are patent; there is usually some slight congestion of the fauces. Patients often say they hear better in a noise.

Prognosis.—Bad.

Treatment.—Attend to general health as no particular treatment does much good.

Malignant Diseases.—Generally, either epithelioma or sarcoma usually attacks patients suffering from chronic suppurative middle ear inflammation, the otorrhœa being followed by granulations and fungoid masses, which bleed freely when removed and rapidly recur.

The glands are affected and the facial nerve is often implicated.

When the middle ear is attacked, either primarily or secondarily, it is difficult to diagnose from caries; the best way is to remove a portion of the growth and put it under the microscope.

CHAPTER VI.

SEQUELÆ OF CHRONIC SUPPURATIVE INFLAMMATION OF THE MIDDLE EAR.

NEGLECT of a chronic suppuration of the middle ear may cause the sufferer not only to become a nuisance to himself and those about him owing to the offensive discharge, but he may be liable to the following serious consequences.

Ulceration of the lobule.—*Cause.*—Pouring out of an irritating discharge from the meatus.

Symptoms.—Vary from a slight superficial ulceration to more or less entire destruction.

Treatment.—Cleanliness and some antiseptic lotion such as a weak solution of carbolic or boracic acid. Surgical interference if necessary. In a severe case, where the lobule was completely divided, by paring the edges and bringing the parts together, I was able to form a very respectable lobule.

Adhesions and Cicatrices.—The edges of a perforation may adhere to the walls of the tympanum, and cicatricial bands be thrown

across the cavity. These should be divided and cut away where possible.

Aural Polypi.—*Nature and Structure.*—May be either MUCOUS, FIBROUS, or MYXOMATOUS.

The pathological basis of most polypi is a delicate stroma holding in its meshes small round cells which may become elongated and form fibres. The stroma may degenerate into branching myxomatous cells.

The MUCOUS is soft, glistening, and round. Very vascular. This is the most common form.

The FIBROUS firm, elongated, red, not so vascular as the mucous. Next in order of frequency.

The MYXOMATOUS very rare.

Situation.—Upper and inner wall of the tympanum; the membrana tympani; the walls of the external meatus. Polypi growing from the tympanum or the membrane are much more vascular than those of the meatus.

Size.—Vary from a pin's head to one filling up the external meatus, and protruding from it.

They may be multiple and bilateral; very liable to recur.

Prognosis.—Guarded.—The hearing power may be much improved.

Symptoms.—A moveable tumour whose base is easily diagnosed by means of a probe; it is sometimes obscured by pus, or a swollen condition of the walls of the meatus.

Treatment.—Removal by Blake's modification of Wildes snare, or Hinton's ring forceps; Toynebee's lever forceps; Colin's écraseurs; ring knife, &c.

The base should be touched with caustic, such as: nitrate of silver; chromic acid; perchloride of iron, &c. I prefer the chromic acid. Free syringing after operating to bring away any loose portions. The use of hot water to stop hæmorrhage if necessary. It may not be possible to take the whole away at one sitting, and the operation may have to be repeated three or four times. Always operate or otherwise head symptoms might set in from retained pus, &c.

Insufflation of finely powdered boracic acid, or the instillation of boracic acid gr. x., sp. rect. ad ℥i., are the best applications for the patient to use after removal.

Great perseverance and attention is absolutely necessary to perfect a cure. The injection of a few drops of the liq. ferri perchlor., or pure alcohol into the growth has been recommended, when removal has been objected to.

Anæsthetic.—Cocaine 20 per cent.

Granulation tissue.—*Causes.*—Much discharge, and when formed, the granulations themselves are very instrumental in keeping up that discharge. Very abundant where there is carious bone.

Symptoms.—Soft, round, red, growths, varying in size from a pin's head to a pea. Very vascular, bleeding freely when touched.

Treatment.—Frequently disappear without any special treatment, or merely the insufflation of boracic acid. As a rule they require some caustic, as nitrate of silver; chromic acid; or iron. Puncturing the granulations with a fine needle, before applying the caustic, is very useful. The instillation of rectified spirit or the insufflation of gallic acid is best for the patient to use at home. It may be necessary to scrape with a sharp spoon.

Where there is carious bone, its removal or absorption by a sulphurous acid lotion (1 in 8) is necessary.

Osseous Tumours.—(*Vide p. 46*).

Mastoid Disease.—Divided into superficial and deep. In the former the periosteal covering, and in the latter the interior of the bone are the parts affected.

Causes.—May occur during an attack of

acute inflammation, but it is more frequent in chronic cases from cold; retention of pus in the mastoid cells; direct blow.

Symptoms.—In the SUPERFICIAL VARIETY.—Violent pain; great tenderness; redness and swelling behind the ear coming on quickly, the auricle standing straight out from the head, and the swelling sometimes extending down the neck; rigors; increase of temperature; quick pulse. The swelling has sometimes an erysipelatous look; after incision bare bone is generally felt. A fistulous opening into the mastoid cells may exist.

In this variety the pus escapes to the surface through the upper part of the osseous portion of the external meatus which is here incomplete.

In the DEEP VARIETY.—Pain deep-seated and severe in character; some tenderness on firm pressure; swelling and redness behind the ear slight. Pus escapes either by the tympanum, or through the mastoid process. The mastoid cells have been known to become solidified owing to the inflammatory products within ossifying.

Prognosis.—Very guarded. The thin walls which partition off the important structures lying around being liable at any time to become involved.

Treatment.—In the SUPERFICIAL VARIETY.—Free leeching over mastoid; application of ice-bag, and keeping the tympanic cavity, Eustachian tube and meatus free by warm douches may do good, but the best treatment is free and immediate incision down to the mastoid, entering the knife at a point about half an inch behind the auricle and on a level with the external meatus; cut from below upwards and deep enough to divide the periosteum, evacuating any pus that may be collected.

Bare bone is usually felt with the probe and must be freely exposed, and an opening may have been made into the mastoid cells. The wound must always be kept open until all pus and dead bone has come away. Free syringing with carbolised lotions and other antiseptic precautions must be observed. If the pain after the incision becomes acute, leeches in front of the tragus are necessary.

In the DEEP VARIETY.—Hot fomentations, leeching, and a free escape for the pus, incising the membrane if necessary. Eustachian tube and tympanic cavity to be washed with warm douches; saline purges and opium. If these fail and there are symptoms of brain mischief coming on, open the mastoid cell.

To open the Mastoid Cells.—INDICATIONS FOR OPERATING.

1. Purulent inflammation with persistent pain unsubdued by other means.

2. Accumulation of pus in the mastoid process, even when the parts over the mastoids are not swollen or infiltrated, where there is no means of escape by the external meatus, &c.

3. In cases where we have to fear circumscribed osseous abscess.

4. As a vital indication, if any suppuration combined with inflammation of the mastoid process in which vertigo and headaches are developed during the course of the affection (Politzer).

Method of Operating.— Make either a curved incision about two inches in length down to the bone, or a small flap incision. Stop all hæmorrhage; peel off the periosteum; open the cells with Hinton's trephine, mallet and chisel, or a sharp spoon. Care must be taken to avoid the venous sinuses. The wound must be kept open and drained until the mastoid process is in a healthy condition. All accumulated secretions to be removed by anti-septic syringing. Be careful to explain the seriousness of the operation and its risks, to both patient and friends before operating.

Anæsthetic.—Gas and ether.

Caries of the Temporal Bone.—Any portion of the bone may be first attacked. According to Gruber the following is the order of frequency :—

1. The mastoid process, most common.
2. Roof of the tympanic cavity.
3. Posterior wall of the external meatus.
4. Plate of bone separating the mastoid cells from the lateral sinus.
5. Floor of the tympanum and posterior wall of the carotid canal.
6. Petrous portion containing labyrinth.

Symptoms.—Where the mischief is deep-seated there is often great pain, but it is not always present. When the tympanic walls are affected there is usually an abundance of granulation tissue thrown out. In all cases where the discharge is watery and offensive, there is grave suspicion of caries. It generally occurs where chronic suppuration exists, the patient being debilitated by an exhausting illness or some constitutional taint. The probe, where possible, is the best method of diagnosis, but in deep-seated disease the tuning fork is most useful.

Treatment.—Warm antiseptic washes; removal of all carious bone, or absorption by a

sulphurous acid lotion 1 in 8. Where a fistulous opening from the mastoid cells exists behind the ear, enlarge it, and syringe through the ear. Opiates to relieve pain and general constitutional treatment.

In cases of necrosis, Pritchard recommends a decalcifying solution, viz., Acid. Nit. Fort. ʒij., Aquæ vijss., mix and add Glycerin. Acid. Carbol. ʒss. To be used with a glass syringe with twice the quantity of warm water.

Meningitis and Cerebral Abscess.

Symptoms.—Rigors; headache; increased temperature, with great variations; photophobia; optic neuritis; fainting; vomiting; loss of consciousness; delirium; albumen in the urine, &c.; but in some cases the symptoms are very insidious, an increase of pain being quickly followed by paralysis, coma, and death. In cerebellar abscess these symptoms may occur only a few hours before death.

Treatment.—Ordinary treatment for these diseases. Keep a free vent and thoroughly wash out with a warm antiseptic lotion.

Trephining the mastoid may be necessary. Where the situation of the abscess can be indicated, trephining over that point should be resorted to.

Erosion of Blood-vessels.—Carries of the

temporal bone may lead to erosion of the internal carotid artery or the jugular veins, with of course a fatal termination.

Facial Paralysis.—Uncomplicated facial paralysis with ear disease is usually due to the extension of bone-disease from the tympanic cavity, in the direction of the bony canal which surrounds the portio dura in the course through the tympanum. Where there is caries with profuse suppuration, recovery is not likely to take place.

Hemiplegia may occur from a clot formed by an eroded meningeal artery.

Treatment.—Counter-irritation behind the ear, and iodide of potassium internally may do some good when pushed far enough.

Pyæmia.—Pus may find its way into the lateral sinus or jugular vein through the lower portion of the tympanum or the mastoid veins.

Symptoms.—The usual pyæmic symptoms, such as rigors, sweating, high and variable temperature, &c.

Treatment.—That usual to pyæmia—fresh air, &c.

Metastatic Abscesses in Lung, Liver, &c.

Disease of the petrous portion of the bone produces embolisms which are washed into the smaller pulmonary arteries and plug them ;

sometimes they pass on and lodge in the liver and other organs.

Epilepsy.—*Symptoms.*—Ordinary epileptiform convulsions.

Treatment.—Bromide of potassium.

Albuminuria.—This may follow chronic suppuration of the middle ear.

Insanity.—May be due to an accumulation of pus in the mastoid cells.

CHAPTER VII.

DISEASES OF THE INTERNAL EAR.

DISEASES of the internal ear are usually of a secondary nature, and arise from constitutional causes, such as fevers; syphilis; inflammation of the meninges; a general lowering of the nervous system. From caries of the temporal bone; blows on the head causing effusion into the labyrinth, or partial destruction of its component parts. In many cases there is no trace of injury or diseases of the drumhead.

The tuning fork is the best means of diagnosis.

Nervous Deafness.—*Causes.*—Dyspepsia; emotion; general depression; nervous shock from blows; want of activity of the nerves and nerve centres.

Symptoms.—Deafness and tinnitus, cannot hear tuning fork or loud noise.

Prognosis.—Bad.

Treatment.—Constitutional.

Disease of the Auditory Nerve.—If the auditory nerve in the lower portion of the cochlea is diseased, the perception for high

notes will be abolished. If the upper part, the low notes will be affected.

Symptoms.—Deafness ; giddiness ; tinnitus ; fainting ; vomiting.

According to Roosa, if the patient has deafness, tinnitus, and no vertigo, the disease is limited to the cochlea portion alone.

Treatment.—In the early stage: leeches ; salines ; purgatives ; counter-irritation over mastoid ; bromide of potassium combined with nux vomica may do some good ; cod-liver oil.

In chronic cases no treatment is of any good.

Inflammation of the Labyrinth following Middle Ear Disease occurs from either an acute or chronic attack of inflammation of the tympanic cavity.

Symptoms.—Marked tinnitus and vertigo ; nausea and vomiting ; deafness ; a deficiency in hearing the tuning fork conducted through the cranial bones ; power of modulating the voice gone.

Prognosis.—Bad.

Treatment.—Complete rest ; mastoid counter-irritation ; leeching in front of the tragus ; large dose of hydrobromic acid.

Artillery Men and Boiler Makers are liable to chronic inflammation of the internal

ear, coming on gradually, and in those cases where a middle ear inflammation or collapse of the Eustachian tubes exist, this is much more likely to occur.

Symptoms.—General deafness and tinnitus, no vertigo.

Treatment.—Prevention, by using cotton wool.

Syphilis, Hereditary.—Deafness due to this cause usually makes its appearance between 10 and 25 years of age, or later; and is generally preceded or accompanied by chronic keratitis.

Symptoms.—Deafness with or without vertigo according as the whole labyrinth or only the cochlea is involved; comes on rapidly accompanied by tinnitus and is sometimes bilateral; the meatus is usually clear; the drumhead white and roughened and looks dry; the tuning fork is heard imperfectly or not at all.

Prognosis.—Bad. When taken early children might recover under appropriate treatment.

Treatment.—Anti-syphilitic; counter-irritation over the mastoid; chloride of ammonium, gr. xx.

Politzer recommends pilocarpine injections.

Syphilis, Acquired.—Tertiary syphilis sometimes attacks the internal ear.

Symptoms.—Those of inflammation of the internal ear combined with a syphilitic history.

Treatment.—Anti-syphilitic; iodide of potassium and mercurials.

Cerebral Tumours.—Usually either fibrous, sarcomatous, or syphilitic gummata, may affect the auditory nerve.

Symptoms.—Pain and throbbing in the head; deafness; tinnitus; periodical attacks of vertigo, falling down at times; fainting; vomiting; optic neuritis; paralysis, &c. Destruction of the auditory nerve is usually preceded by tinnitus.

Treatment.—No treatment of any avail except in cases of a gummata where active anti-syphilitic does good.

Aural Vertigo.—Caused by pressure of the air through a perforation; by pressure on the membrana tympani; from violent syringing; wax or a foreign body; by an inflammatory condition of the external ear. According to Weber Liel this is not true aural vertigo, but is produced by pressure on the stapes.

TRUE AURAL VERTIGO.—*Causes.*—Occurs usually in debilitated, overworked, anæmic

persons, suffering from dyspepsia; from growths or collections of pus or mucous in the cavity of the tympanum; venous congestion in the sinuses; increase of labyrinthine pressure; organic mischief in the semi-circular canal; vascular and nervous change in the labyrinth; effusion and secondary formation in the labyrinth; drugs such as quinine and salicine.

Woakes says:—The cervical ganglia of the sympathetic play an important part in producing vertigo, especially the inferior cervical ganglion, and the result of functional disturbance in any of the correlated area presided over by the ganglion, is vertigo.

Symptoms.—Attacks of giddiness come on suddenly and vary from slight dizziness to actual vertigo, the patient falling with loss of consciousness. Patient may stagger to one side in walking or appear to sink backwards into space. Objects revolve in a definite plane when patient is standing still. They are usually preceded by deafness and tinnitus.

Cold sweats, nausea, and vomiting.

Prognosis.—Good, if the ear mischief producing the symptoms is curable.

Bad, if the contrary.

Treatment.—First find out cause. In cases of pressure from growths or collections of pus

or mucous, &c., removal of the cause will remove the vertigo.

For diminished vascular tension.

Diet: early hours and regular exercise; stoppage of all work, and if possible a sea voyage. Such drugs as quinine, digitalis, iron with either arsenic and strychnine, bromide of potassium, hydrobromic acid may do some good.

When due to drugs leave them off.

For effusions and recent secondary formations intra-tympanic or intra-labyrinthine.

To do any good the treatment must be early. Iodide of potassium, vapor iodi by Valsalvan process, iodine baths, and mercurials if there is any suspicion of syphilis.

For abnormal vascular tension subcutaneous injections of pilocarpine 3 to 6 drops of a two per cent. solution; counter-irritation to mastoid, and leeching.

Meniere's Disease.—POLITZER limits this disease to the sudden apoplectiform attacks of deafness in which the symptoms of aural vertigo are present.

ROOSA limits it to hæmorrhage into the semi-circular canals.

Causes.—In the majority of cases no sufficient cause can be assigned. Constitutional

disease, such as debility, gout, syphilis, and injuries, predispose to its development.

Symptoms.—Sudden deafness, tinnitus, nausea, vertigo, and inability to walk straight, with a sensation of rotatory movement round a vertical axis.

The attacks at the beginning are of brief duration, separated by long intervals, becoming more frequent as the disease progresses, and may finally end in an habitual vertiginous state.

Blind-folding during the more chronic stages will increase the vertigo.

The tuning fork is not heard.

Prognosis.—Bad ; the hearing power being generally completely lost. If taken early the symptoms may be arrested, the hearing power remaining as it is ; but there is always a strong tendency to relapse.

Treatment.—*IN THE EARLY STAGES.*—Rest in the horizontal position ; counter-irritation over the mastoid ; bromide of potassium, with or without ergot ; Chloride of Ammonia gr. x. ; Tinct. Nuc. Vom. ℥xii. ; Aquam ad ℥j. ; Valerian or Salicylate of Soda, gr. xv., may do some good.

IN THE LATER STAGES.—Leeches over mastoid for the relief of the tinnitus and

vertigo. Iodide of potassium; quinine with caution; bromide of potassium and hydrobromic acid; nitrite of amyl; nitro-glycerine. Politzer recommends the subcutaneous injection of pilocarpine, 3 to 10 drops of a two per cent. solution as a dose, to be abandoned after fourteen days if there is no result; otherwise, to be continued daily until a decided improvement is manifest. Galvanism.

Tinnitus Aurium.—Is a symptom, not a disease, characterised by noises in the ears of varying kind and intensity; it may be very slight, but is often of a most distressing nature, driving the patient to suicide or insanity. There is a tendency to progressive deafness in those cases of chronic affection of the middle ear that are accompanied by tinnitus.

Causes.—*External Ear.*—Blocking of the external auditory meatus with cerumen, foreign body, or some inflammatory condition.

Middle Ear.—Obstruction to the Eustachian tubes. Pressure on the membrana tympani. Rigidity or collapse of the drumhead. Ankylosis of the ossicles, especially fixture of the stapes. Abnormal conditions of the tympanic muscles.

Internal Ear.—Abnormal pressure on the nervous expansion in the labyrinth.

Osseous.—Disease of the osseous structures of the temporal bones.

Nervous.—Cerebral and nervous diseases. Cerebro-spinal disease, which may affect the hearing powers. Reflex disturbances. Sudden shocks, such as fright, grief, &c.

Vascular.—Heart disease; aneurism; atheromatous degeneration of the vessels; relaxed arterial walls; abnormal vascular tension, such as, anæmia from sudden hæmorrhage or chlorosis; hyperæmia, as in Bright's disease; a watery state of the blood.

Drugs.—Nitro-glycerine; quinine; salicine; tobacco.

Diseases.—Syphilis; gout; hysteria; chronic alcoholism; too frequent sexual intercourse.

Climate.—The effects of climate.

Symptoms.—The peculiar character of tinnitus is very varied, from the soft murmur of the sea shell to rushing of steam, or heavy hammering, &c. The noise is generally likened to the sound with which the patient is most familiar, or the sound of the sea-shell. The louder and more defined the noise the more likely to be due to internal ear mischief. It often disappears in the daytime.

A snapping sound heard by the bystanders, as well as the patient is due generally to the

sudden drawing away of the anterior from the posterior walls of the Eustachian tubes from the spasmodic action of the muscles.

A drumming sound is produced by closure of the Eustachian tubes.

A rushing sound is produced by venous circulation due to congestion of the middle and internal ear.

Ringling of bells, rushing of water, and the murmur of the sea shell, generally indicates some sort of pressure.

Fluid in the tympanum may produce a splashing or bubbling sound.

Prognosis.—GOOD in removable causes, such as impaction of cerumen, foreign bodies, &c., provided they have not been left too long.

Bad, when the tuning fork on forehead is slightly or not at all heard, and closure of the external auditory meatus makes no difference. Little or no alteration in the appearance of the drumhead. Ankylosis of ossicles, with adhesions, the tinnitus gradually increasing. There is no evidence of effusion into the middle ear. Collapse of the Eustachian tubes. Musical and rushing water sounds are bad according to M. Jones.

Treatment.—Removal of cerumen and any foreign body, relieving any inflammatory con-

ditions of the external meatus, and any pressure on the drumhead. Politzer and Valsalva to inflate the Eustachian tubes and tympanic cavity, either with plain air or the vapour of iodine, or chloride of ammonium. Incision of the drumhead. Washing out the tympanic cavity with an alkaline or iodine wash. Traction on the membrana tympani with a pneumatic speculum or tractor.

McKeown recommends painting a relaxed membrane with collodion.

Section of the tensor tympani has been recommended, but is not much in favour.

Faradisation and galvanism are not of much use except to stimulate the tubal muscles, and at times it aggravates instead of improves the tinnitus. The electrode may be applied in either of the following ways:— (1) Over the mastoid. (2) The meatus filled with a solution of salt, and the electrode dipped into this. (3) The electrode applied direct to the drumhead. (4) A fine electrode inserted into the Eustachian tubes.

Hydrobromic acid in doses of 25 to 30 minims, especially in abnormal vascular conditions; chloride of ammonium; bromide of potassium; hydrobromic ether; ergot; caffeine; strychnine; digitalis; arsenic; iron;

quinine ; jaborandi ; iodide of potassium combined with nux vomica, have all been recommended, and may do good where indicated. Podophyllin and calomel followed by salines. Blood-letting may be advisable in some cases of increased tension.

Glycerine and laudanum applied warm to the meatus. The injection of chloroform vapour and blowing in the drumhead may cause the noise to cease for a time, but it usually quickly returns.

Where possible a change of climate with a sea-voyage, enforced rest, and cheerful society.

If there is any gouty tendency, the waters of Royat, La Bourboule, Kissengen, &c., may be tried.

Mercurials should be given in syphilitic cases.

Autophony, or hearing one's own voice, is a symptom in some diseases of the ear, such as :—

Loss of tension in the drumhead.

A very patent condition of the Eustachian tubes.

Displacement of the ossicles.

It depends a good deal on the conductive mechanism not conveying the ordinary sounds in the usual manner, but allowing sounds to be heard which are not normally audible.

Malignant Disease.—Of a secondary nature, and when this involves the labyrinth, the vibrations of the tuning fork are not heard.

Rheumatic condition of the auditory nerve.—A few cases are recorded in which there is sudden deafness after exposure to cold in one ear, the other being untouched. There was no change noticed in the drum-head, the tuning fork was not heard. Iodide of potassium internally, and counter-irritation over the mastoid quickly relieved the symptoms.

Double Hearing.—This condition in which sound is heard in a different pitch in one ear to the other, usually occurs in musicians, and exists very often as a symptom of pressure upon the labyrinth from disease of the middle ear, or possibly from independent disease of the labyrinth (*Roosa*).

CHAPTER VIII.

DISEASES AND INJURIES WHICH MAY AFFECT
THE EAR.

Anæmia. — There is generally tinnitus; alteration in tension and shape of the drum-head; want of tone in the muscles affecting the Eustachian tubes.

Bright's Disease. — There is increased vascular tension and hæmorrhage into the tympanum which either becomes absorbed or leads to suppuration.

Diphtheria. — May involve the external, middle, or internal ear; there is usually very great pain, and the formation of false membrane; acute inflammation of the middle ear very commonly accompanies diphtheria; deafness may come on from diphtheritic paralysis.

Epidemic Cerebro-spinal Meningitis. — Permanent deafness is a very common sequel to this disease, inflammatory changes being set up in the lining membrane of the vestibule. Semi-circular canals and the auditory nerve may be affected.

ROOSA says:—There is congestion and purulent infiltration of the labyrinth and compression of the auditory nerve. The labyrinth being the part most affected.

VON TRÖLTSCH says:—Tinnitus is common at the commencement of the attack, there is ear-ache and auditory hallucinations.

ZIEMSEN says:—Deafness is generally bilateral, comes on at any stage—most commonly the third day. Acute suppuration of the middle ear is not uncommon.

Gout and Rheumatism may produce exostosis of the meatus; irritation of the meatus; cretaceous deposits in the membrana tympani; ankylosis of the ossicles; deposits in the auricle; a gradual thickening of the mucous membrane of the Eustachian tubes and cavity of the tympanum.

Heart Disease.—Causes tinnitus from a disturbance of tension.

Inter-cranial Tumours.—Deafness and tinnitus accompany a great many cases of cerebellar, pons, or middle lobe tumours.

Leucæmia.—Deafness comes on suddenly, is bilateral, well marked vertigo, tinnitus and ocular migraine. It generally ends fatally.

Locomotor Ataxy.—

ERB says:—There is atrophy of the auditory nerve in some cases.

POMEROY says :—Progressive deafness is common in locomotor ataxy.

Malaria.—Causes intermittent aural neuralgia.

Measles.—Middle ear inflammation with sometimes chronic suppuration of the tympanum. The Eustachian tubes may be the only part involved. Probably due to the spread of an inflammatory condition of the mucous membrane of the naso-pharynx. In treating, extreme cleanliness should be employed, and the drumhead incised on the first sign of bulging.

Mumps.—Cause marked deafness, and the labyrinth is at times incurably injured. Vertigo is often complained of.

Menstrual Disturbances.—May cause intermittent congestive attacks and tinnitus from menorrhagia, &c.; some cerebral disturbance.

Neuralgia of the Ear is generally a reflex pain.

Naso-pharyngeal Inflammation.—Deafness arising from this cause see Chapter IX.

Pregnancy and Parturition.—POMEROY says :—The labyrinth may be affected by anæmia or nervous shock.

Pre-existing deafness may become worse.

Relapsing Fever.—Acute inflammation of

the tympanum which Luchan says is direct and not from extension from the throat.

Scarlet fever.—Ear disease is one of the most common complications of scarlet fever, and generally occurs immediately after the cessation of the rash and during desquamation. It takes the form of suppurative inflammation of the middle ear, and there is a perforation of one or both drumheads.

Small-pox.—WENDT says that pustules are met with in the cartilaginous portion of the external meatus, most frequently near the orifice. There is sometimes middle ear catarrh with serous exudation and pus.

Syphilis.—Gummatous deposits may occur in the auricle; ulceration and condylomata in the external meatus; acute inflammation of the middle ear; closure of the Eustachian tubes from cicatrisation of a pharyngeal ulcer, or swelling of the mucous membrane; gummata and periostitis of the internal ear. According to Hinton, deafness from lesion of the terminal portion of the auditory nerve from hereditary syphilis.

Tuberculosis.—Suppuration of the tympanum in phthisical patients occurs without pain, and causes rapid destruction of the tissues. The petrous portion of the temporal bone is liable to be attacked.

Typhoid.—Deafness from affections of the Eustachian tubes and middle ear; labyrinthine disease; central nervous disturbance, usually secondary to the tympanic mischief. The deafness is common during the acute stage of the fever varying with the amount of nervous prostration, it most commonly passes off with convalescence, but some cases remain permanent.

Typhus.—Deafness from affections of the Eustachian tubes; acute inflammation of the middle ear; disease of the labyrinth and auditory nerve; a cured otorrhœa will return; usually begins about the end of the first week (Field).

Whooping Cough is a common cause of acute ear disease, and of rupture of the membrana tympani during paroxysms of cough.

Injuries and blows, &c.—Produce rupture of the external meatus; rupture of the membrana tympani; hæmorrhage into the middle ear; lesions of the nervous mechanism; useless and forcible syringing will produce ear mischief.

Certain occupations such as artillery men, boiler makers, &c., predispose to deafness.

Climate.—A residence in a hot climate sometimes causes most distressing tinnitus, and often middle ear inflammation.

Bathing, especially in sea-water is a frequent cause of inflammation of the tympanum exostosis, &c., caused either by the shock from diving, or from sea-water and its contents taken in at the mouth and nose, getting into the tympanic cavity by the Eustachian tubes.

Foreign bodies in the ear may produce mischief, not only *per se*, but from unskilled and forcible attempts to remove them.

Uncleanliness from collections of wax, irritating discharges, &c.

Hereditary Deafness.—Usually skips one generation, appearing in the next.

Certain Drugs.—Quinine and salicine, produce tinnitus and deafness. These symptoms generally pass off when the drug is discontinued, though permanent deafness may remain after a prolonged use of the drugs.

Old Age.—Some people get deaf sooner than others. The deafness is due both to middle and internal ear changes; the cavity of the tympanum; the labyrinth; the auditory nerve, and the nerve centre itself being affected. The lumen of the external meatus is often blocked by the condyle of the lower jaw thrown back in cases where the teeth are lost.

Obesity.—May cause deafness from pressure.

CHAPTER IX.

DISEASES OF THE NOSE AND NASO-PHARYNX
CAUSING DEAFNESS.

Nasal Catarrh.—Acute and chronic.

ACUTE.—*Causes.*—Cold; season of the year; nervous and rheumatic temperament; change of clothing; bodily fatigue; inhaling irritating gases, dust, powders, &c.

Symptoms.—At first slight shivering; general malaise; sneezing; watery discharges; fulness of head and frontal headache; increased secretion of tears; swollen and red eyelids; some deafness and tinnitus when the Eustachian tubes are involved; the uvula, fauces, and Schneiderian membrane are red and swollen. The smell and taste are lost or impaired. The nose then becomes stopped with a mucopurulent secretion, and the symptoms gradually subside.

The attack generally lasts from a few days to a fortnight or more, occasionally alternating from one side to the other.

Treatment.—Hot foot bath; warm drinks on retiring to rest; camphor inhalations; carbolised smelling salts; inhalation of hot vapor benzoin; nasal injection of boracic acid, or cocaine spray 4 per cent.; a Turkish bath. Anti-febrile mixture, such as quinine, tincture of aconite in one minim doses, Dover's powder gr. x., saline aperients. Iodide of potassium in one-grain doses every hour.

Cause of Deafness.—The Eustachian tubes becoming involved.

CHRONIC. — *Causes.* — Recurrent acute attacks; temperament, polypi, and adenoid growths; syphilis; scrofula, &c.

Symptoms.—Constant discharge of varying consistency; sense of fulness; chronic redness and swelling of the Schneiderian membrane; sometimes denuded spots on the septum.

Treatment.—Use an alkaline spray to wash away the secretions, and then some astringent lotion, such as boracic acid, Zinc. Sulph. gr. x. ad ʒj., Acid. Tannici gr. v.-xv. ad ʒj, either by hand spray, nasal douche or sniffing. Powders, such as bismuth, quinine, and iodoform; salicylic acid and boracic acid; bismuth and alum; cocaine spray, 4 per cent.

When possible, I think sniffing is superior

to spraying, and spraying to the insufflation of powders.

Cause of Deafness.—The Eustachian tubes becoming involved.

Post-Nasal Catarrh.—Two forms:—The Moist; The Dry.

THE MOIST.—*Symptoms.*—The mucous membrane of the posterior wall and vault of the pharynx is swollen and covered with a thick tenacious mucus, grey or yellow in colour. The pharyngeal tonsil and the openings of the Eustachian tube are swollen together with the uvula and pillars of the fauces, and the mucous membrane covering the middle turbinate bones. There is comparatively little discomfort.

Treatment.—Astringent applications to pharynx and fauces. An alkaline nose-wash to be frequently used.

THE DRY.—*Symptoms.*—In this form there is great discomfort. The throat feels stiff and sore, with a good deal of pain and irritability at times. Smell and taste are sometimes lost. There is continuous coughing and hawking to get rid of the mucus. The voice has a peculiar harshness of character. The mucous membrane of the pharynx is dry, shining, atrophied, and covered with a thin yellowish-brown

or black mucus and large hardened crusts. The turbinated region looks shrunken, atrophied, and covered with crusts. There is a peculiar disagreeable odour.

Treatment.—Carefully remove all crusts and secretions with the nasal douche, and then use some astringent application; carbolic lozenges will moisten the throat; iodoform wool should be worn in the nose after an application. Woakes recommends a spray of Eucalyptus, sandal wood, or Scotch pine, in combination with adepsine oil 1 in 100, ℥ss. to ℥j. to be sprayed into the nose twice daily. Tonics, cod-liver oil, fresh air, and free ventilation.

Cause of Deafness.—Implication of the Eustachian tubes, collapse and obstruction to the tubes.

Hypertrophic Nasal Catarrh.—Hypertrophy of the mucous membrane covering the turbinate bones. The bones themselves may become enlarged.

Cause.—Recurrent catarrh.

Symptoms.—Swelling and redness, the swollen parts more or less covered with a thick tenacious mucus which obstructs the passage and sometimes reaches across to the septum. The smell and taste are usually more or less affected, and there is some degree of deafness and tinnitus.

Treatment.—Application of chromic acid (saturated solution), galvano-cautery, scarification, or removal of the hypertrophied portion by the snare. Use a nose wash of biborate of soda and boracic acid, and insert a small plug of iodoform wool after the application of a cauterising agent.

Anæsthetic.—Cocaine locally.

Cause of Deafness.—Blocking of the nasal passages causing an obstruction to the free entrance of air through the Eustachian tubes.

Nasal Polypus.—Grows as a rule from one of the turbinated bones.

Cause.—Chronic catarrh; injury; a necrosis of the turbinates.

Symptoms.—Stiffness and inability to breathe through one or both nostrils. On examination a smooth globular glistening pedunculated growth is seen, painless to the touch, and may be multiple or single, unilateral or bilateral.

Treatment.—Removal by snare or galvano-cautery; a saturated solution of chromic acid to be applied to the pedicle several times after removal. An alkaline nasal wash to be used. If the polypus should return after this, a thin plate of bone from the spot from which it grows, should be sliced off by either Woakes's nasal plough or curved scissors.

Anæsthetic.—Cocaine locally; but where a piece of bone has to be removed—chloroform.

Cause of Deafness.—Nasal polypus does not as a rule cause deafness unless the inferior nasal meatus is invaded.

Exostoses.—*Situation.*—Usually the inferior turbinate bones; more rarely the septum.

Symptoms.—Stiffness of the nose; swelling and redness of the mucous membrane covering the growth; hard substance felt with a probe. The growth may involve the whole turbinate bone or only a small portion.

Treatment.—Removal by strong curved blunt-pointed shears or Woakes's nasal plough. If on the septum it may be sufficient to drill the growth and then cut away enough room for breathing with a fine saw.

Anæsthetic.—Cocaine locally. Chloroform if necessary.

Cause of Deafness.—Blockage of the air-passage.

Enchondromata.—Usually grow from the septal cartilage.

Symptoms.—A tumour springing from the cartilage of the septum of which it seems part. It causes deformity and there is a stiffness of the nose.

Treatment.—Destroy the growth by galvano-

cautery or remove it with curved shears, gouge, saw, &c.

Anæsthetic.—Cocaine locally, or chloroform.

Cause of Deafness.—Blockage of the nasal passages.

Deviation of the Septum.—Usually associated with abnormal conditions, the result of injury, tumours, &c. The septum is rarely found perfectly straight.

Symptoms.—A swelling of the septum with a corresponding hollowing of the other side.

Treatment.—If any is necessary, forcible straightening with Adam's septum forceps, then the application of Adam's septum clamp. It may be necessary to punch a hole in the obstructing portion.

Anæsthetic.—Chloroform.

Cause of Deafness.—Obstruction to the nasal passage.

Dislocation of the Septum.—This sometimes happens from violence or the pressure of a tumour.

Symptoms.—Obstruction to respiration; deformity; extensive deviation.

Treatment.—Remove the cause and straighten the deviation.

Anæsthetic.—Chloroform.

Cause of Deafness.—Obstruction to the nasal passages.

Foreign Bodies in the Nares.— These cause deafness from obstructing the air-passages.

Closure of Nostrils.—*Cause.*—Congenital malformations. Disease, such as syphilis, small-pox, &c. Accident. A thickened band sometimes stretches across from the inferior turbinate bone to the septum, partially blocking the canal.

Treatment.—Incision; kept open and dilated with oiled lint and sponge tents. In case of a band cut across with galvano-cautery.

Anæsthetic.—Chloroform. Cocaine locally, in case of a band.

Cause of Deafness.—The blocking of the air-passages.

Growths in the Naso-Pharynx.

Situation.—Congregated in the vault, or scattered about the naso-pharynx. They may be few, or completely fill up the naso-pharynx.

Size.—Vary from a pea to large masses, hanging down and partially visible below the palate.

Cause.—Chronic nasal catarrh; may be congenital; hereditary. A damp dwelling and atmosphere is conducive to the growth.

Symptoms.—Those due to the interference of respiration and hearing, such as nasal

speech; interference with nasal respiration; breathing with the mouth open; snoring at night; alteration in the form of the chest-wall; peculiar look and sometimes gait; sense of smell and taste blunted or obliterated; deafness; tinnitus; chronic middle ear inflammation from pressure on the Eustachian opening, and irritation of the mucous membrane. The growths bleed freely on palpation.

Prognosis.—Good, if the growths have not been left too long, and operative measures are used.

Treatment.—Removal by Woakes's modification of Loewenberg's forceps.

Roughened finger nail if the growths are few, small and soft.

Galvano-cautery. Application of caustics, chromic acid or arg. nit. fused on a probe, or by Loewenberg's caustic holder.

Constitutional treatment:—Cod-liver oil, syrup of the iodide of iron, &c.

Try and correct the habit of breathing with the mouth open.

Anæsthetic.—Chloroform.

Cause of Deafness.—Occlusion of the pharyngeal openings of the Eustachian tubes.

Hypertrophy of the Pharyngeal Tonsil.—Occurs in early life and may be complicated

with hypertrophied faucial tonsils and growths in the naso-pharynx.

Symptoms. — Deafness and tinnitus from pressure on the openings of the Eustachian tubes; obstruction to nasal respiration. Digital and posterior rhinoscopic examination reveals a soft round mass at the vault of the pharynx, which obstructs part of the posterior nares and presses on the openings of the Eustachian tubes.

Prognosis.—Good, provided too much mischief has not been set up in the middle ear.

Treatment.—Removal by Woakes's modification of Loewenberg forceps, snare, or galvano-cautery.

Anæsthetic.—Chloroform.

Cause of Deafness.—Pressure on the Eustachian tubes.

Enlarged Faucial Tonsils.—Chronic hypertrophy of the tonsil sometimes affects the hearing by causing an obstruction to the Eustachian tubes from chronic thickening of their mucous membrane, or from pressure on the openings.

Treatment.—Amputation with Mackenzie's tonsil guillotine. Burning with London paste; the powder should be mixed with a little water to the consistency of cream and carefully applied, a small quantity at a time, the patient

to freely wash out the mouth with cold water. The mass may also be slowly burnt away with the galvano-cautery.

Anæsthetic.—Cocaine locally 20 per cent.

CHAPTER X.

AIDS TO HEARING.

IN order to have the instrument most suitable to a given case, it is better to try all, and take the one which gives the best result.

The use of the ear trumpet is to collect waves of sound into the external ear, and to improve resonance.

The best reflectors of sound are METALS, GLASS, PORCELAIN.

Those most commonly used are SILVER-PLATED METALS, ALUMINIUM, JAPANNED IRON, EBONITE.

Certain materials may be objected to on account of their INTRINSIC NOTES, WEIGHT, FRAGILITY.

The hand placed behind the ear increases the auditory capacity, especially for high pitched notes.

An ordinary conversation tube supplied with a very large mouth-piece and placed on a stand in front of the reader's lips, is very useful for reading aloud.

The OTOPHONE.—Increases the receptive capacity of the auricle for sounds by projecting it forward.

Teeth Conductors.—THE AUDIPHONE.—Fan made of vulcanite and held between the teeth.

The DENTAPHONE.—Consists of a small vulcanite clip connected with a circular vulcanite box by a string.

The TONOMITTOR.—Made of ash-wood with a resonating bar attached (Cassell's).

Bone Conductors.—ROD OSTEOPHONE — Transmits sounds directly from the skull of the speaker, to that of the deaf person.

ACOUSTIC TRUMPET.—Resembles a stethoscope (Kœnig).

Sound Reflectors.—A small horn-shaped vulcanite tube, the small end inserted into the meatus, the mouth directed backwards towards the concha (Politzer).

The simplest forms are:—A hollow cone truncated obliquely, a few holes in the side to stop confusing sounds (Williams).

The aural tubes made by Creswick from cardboard.

Binaural instruments are generally the most satisfactory.

CHAPTER XI.

SIMULATED DEAFNESS, LIFE INSURANCE, &c.

MALINGERING is generally unilateral.

Modes of Detection.—Stop the good ear with cotton wool, and afterwards apply the tuning fork to the head or teeth. The patient will generally state that he does not hear a sound, ignorant of the fact that an obstructed meatus intensifies vibration carried on through the bones (Moss).

If one ear is perfect, even after it has been stopped with cotton wool, a word will be heard if shouted close to the patient; he will often deny his ability to hear a sound (McBride).

Binaural stethoscope so arranged that each branch can be hermetically closed at will. Being unaware of this fact the patient will be unable to tell what he ought to hear (Coggin).

When bilateral it is much more difficult to detect.

Make the suspected individual repeat again and again the history of his case, discrepancies will sure to arise; or give him an anæsthetic and take him unawares when he is returning to consciousness (Politzer).

Life Insurance.—Chronic affections of the ear are not in themselves dangerous to life.

Patients sometimes suffer from otorrhœa without knowing it, the discharge being so slight.

Where perforations of the drumhead remain permanent after a chronic suppuration has subsided, there is always the danger of a return of the discharge.

A chronic discharge without perforation is very suspicious, and should require a large premium.

A large exostosis should require a very large premium, on account of the danger arising from pent up discharge.

Chronic otorrhœa with a perforated drumhead should be either refused or a high premium charged, on account of the dangers elsewhere described among the sequelæ of neglected otorrhœa.

If the former is combined with pain, granulation tissue, or polypus, the applicant should be rejected, as there is almost sure to be some bone disease.

Any signs of bone disease should make rejection necessary.

Auditory vertigo and severe tinnitus, especially in those exposed to any extra amount of danger from falling without warning should pay a large premium or be rejected.

CHAPTER XII.

DEAF-MUTISM.

Deaf-Mutism may be divided into congenital and acquired, and is said to be more frequent in males than in females.

Causes.—Consanguineous marriages; hereditary; scrofula. Constitutional taint in the parents, such as syphilis, alcoholism, over-suckling. Cerebral affections. Deafness acquired before learning to speak, or in those who have lost the power of speech. From middle ear inflammation, produced by the exanthemata, especially scarlet fever and typhus. Inflammation of the internal ear. Throat, nose, and naso-pharyngeal affections. Injuries, &c. Congenital malformations.

Test of Deafness in a Young Child.—If a sharp loud noise is suddenly made behind the head, the child, if it hears, will turn its head in that direction; and a vibrating tuning fork placed on the forehead will generally produce some signs of hearing.

Time to commence Treatment. — The earlier the better.

If with mutism there are objective signs of ear disease, these should be attended to, and the child taught to speak as soon as possible.

Deafness occurring up to six years old; there is generally dumbness also, after that speech is usually retained.

Management of Deaf Mutes.—Kindness combined with firmness. The knowledge of right from wrong taught. Attention paid to drill. Cultivation of the sense of sight and touch, and the power to hear certain words should be increased. They should be encouraged to articulate and copy sounds. They should have cheerful companionship, and above all, should be removed from home influences to an institution under skilled teachers, where lip-reading is taught.

Methods of Teaching.—GERMAN.—Pure lip-reading.

FRENCH.—Artificial finger alphabet.

OLD ENGLISH.—Combined lips and signs.

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