Mr. LIVINGSTONE (in reply) said he agreed that it was the method, rather than the thyroxine, which should be investigated. The results which he had obtained did not, he thought, justify controls being used at all. He did not know how to use controls effectively. He had a solution containing thyroxine, and a similar kind of solution without that drug, but he did not think even this was satisfactory. He thought that puncture of the drum should be carried out in a series of cases; all controls must be over a long period. He did not feel optimistic as to ultimate or remote results.

# ABSTRACTS

## EAR

*On the question of Inheritance in Otosclerosis.* M. WEBER. (*Hals- u.s.w. Arzt*, 1936, xxvii, 1-42.)

*The Zeitschrift für Laryngologie*, etc., now called *Der Hals- Nasen- und Ohrenarzt*, contains a new feature "Erbblätter", intended for articles devoted to the study of heredity problems in our speciality. The sub-title of Dr. Weber's important first article in this section is "The theory of the homozygote dominance of stapes ankylosis."

The problem of inheritance in otosclerosis is particularly difficult. There is the fact that the diagnosis of otosclerosis during life is never anything but a tentative diagnosis. Further, the finding of an otosclerotic focus in a temporal bone is very often accidental. e.g., among a collection of ear specimens in Leipzig (Professor Lange's) there were 56 instances of otosclerosis. In not a single one of these patients had a diagnosis of otosclerosis been made during life. However, 15 out of the 56 were persons who had died at the Leipzig Clinic, mostly from complications of middle-ear suppuration and their clinical histories are given. Among them were 4 instances of stapes ankylosis. The family histories as regards deafness were negative in all the 15 cases. The tympanic membranes, as recorded in the case histories, had shown various changes, and some cases showed radical mastoid cavities. The reddish tinge, said to be characteristic of otosclerosis, had not been observed once.

The laws governing inheritance of defects are discussed in a general manner and subsequently as applied to otosclerosis. In this disease there is an inherited tendency towards the development of a particular defect in the bony capsule of the labyrinth.

# Abstracts

Stapes ankylosis which determines deafness occurs only in a small proportion of the cases. Otosclerosis can only be recognized with certainty in a *histological* preparation and the inheritance of the defect cannot be solved with clinical material alone. Previously reported family trees based on a clinical diagnosis of otosclerosis are mostly useless. We do not know yet whether deafness is only caused by ankylosis of the stapes or whether it can also be caused by foci of otosclerosis lying away from the oval window.

The 56 cases of otosclerosis were accidental findings from a collection of 500 temporal bones. Otosclerotic foci are therefore relatively frequent. For this reason it is probable that otosclerosis is transmitted as a *dominant* factor, rather than as a recessive one. In the terminology of inheritance one speaks of heterozygote when the defect is inherited either from the father's or from the mother's side; homozygote when both parents have carried the predisposition. When a disease factor is a dominant one and the patient is a homozygote, the disease shows itself in a particularly severe form. The author believes that patients with stapes ankylosis are very likely homozygotes with a dominant defect.

J. A. KEEN.

*Reparative Processes in the Membrana Tympani.* W. D. STINSON. (*Archives of Otolaryngology*, xxiv, 5, November, 1936.)

Why, enquires the writer, does a minute perforation of the tympanic membrane sometimes persist unclosed for years, while after a radical mastoid operation an epidermal layer may grow from a remaining vestige and completely close off the tympanum? He relates a series of cases in which he observed the gradual migration from the centre of the tympanic membrane to the periphery of a small foreign body, a clot, a small perforation and a traumatic perforation. In all cases the migration was in the direction of the posterior edge of the membrane. In Shrapnell's membrane, however, there is no such definite current, and a dot of Indian ink on the membrana flaccida is broken into particles which move out radially.

This regular method of proliferation of the epidermis of the membrana tympani explains why a drum which has been repeatedly incised may ultimately present a normal appearance and show no scar.

Those observations may account for the failure of anterior or "tubal" perforations to close and would appear to contradict the accepted view that cholesteatoma in the posterior quadrant or attic is caused by an in-growth of epidermis from the wall of the canal.

DOUGLAS GUTHRIE.

# Ear

*Is there Localization in the Cochlea for Low Tones? Is impaired Hearing for the tones below* 1,000 *d.v. ever due to a Cochlear or Inner Ear Lesion? If so, where is the lesion located and how is it recognized clinically?* (Symposium before the American Otological Society, Toronto.) *Annals. of O.R.L.*, 1935, xliv, 737.

(Part I.)

DISCUSSION FROM THE POINT OF VIEW OF STUDIES ON HUMAN TEMPORAL BONES.

By STACY R. GUILD.

A description of several cases in which the hearing tests were carried out prior to death and the temporal bone examined *post mortem*, was given. Unfortunately the value of several of these is lessened by the fact that in the clinical examination the opposite ear was not "masked", but, "while not clear cut, the evidence from this group of five cases indicates that even a considerable amount of nerve atrophy, when limited to the upper middle and the apical turns, does not have much effect on the acuity of hearing for low tones; certainly the evidence does not favour the theory that there are sharply localized areas in the human cochlea for the several low tones."

A series of cases operated on by Dr. Dandy are quoted. These had had an intracranial section of the VIIIth nerve with the object of severing the vestibular part in which the auditory part was also cut. "For all patients with a post-operative change . . . it is the upper limit which is reduced, never the lower limit and never is there a gap of the tonal range."

THE ABSENCE OF THE ORGAN OF CORTI: AN AUDIOMETRIC AND HISTOLOGIC STUDY.

By C. C. BUNCH and DOROTHY WOLFF.

Six cases are quoted in which histological examination revealed little or no evidence of the presence of the organ of Corti but considerable hearing was present. Experiments were done in these cases to ascertain the possibility of this being a *post mortem* change, but there was no evidence in support of this.

These findings are in agreement with several previous records.

(Part II.)

DISCUSSION FROM THE POINT OF VIEW OF ANIMAL EXPERIMENTATION.

*Para.* 1. By E. G. WEVER, C. W. BRAY and G. P. HORTON.

A series of animals were subjected to an intense tone for a considerable number of hours—the tones being 1,000, 1,500, 2,000 and 3,000 d.v. The results when tested by the method formerly

described by these authors, showed a great deficiency in hearing as compared with a group of controls but the loss of hearing extended over the complete range. It is thought by the authors, that sound of this intensity affects the whole ear though 100 d.v. and more stimulate the whole cochlear apparatus rather than any particular part.

*Para.* 2. By H. DAVIS, M. H. LURIE and M. S. STEVENS.

Animals were tested by the Wever and Bray methods and the effects of drilling through the cochlear wall at different levels was tested. The conclusion was reached that " high tones are localized near the basal end of the cochlea ; 2,000 d.v. in the middle and the low tones . . . are bunched quite closely towards the helicotrema—more closely than has previously been supposed."

*Para.* 3. WALTER HUGHSON, EVA THOMPSON and E. H. WITTING.

The cochlea of cats was exposed and drill holes made into it but not piercing the wall. A galvano-cautery was then placed in the hole thus made and the underlying end organs scorched. Their conclusion is as follows : No evidence obtained from the procedure described above indicated localization of low frequencies to the apex of the cochlea. Though the apex is doubtless necessary for optimum experimental or clinical perception of tones, any intact portion of the end organ may serve as the receptor of stimulus of low frequency applied to the ear.

*Para.* 4. By T. H. BAST and J. A. E. EYSTER.

The authors carried out a series of experiments on guinea pigs, using the Wever and Bray method. In each case a subsequent histological examination was made. Their conclusions were as follows :—

(*a*) Low frequencies were best picked up towards the apex of the cochlea, higher frequencies towards the base.

(*b*) Removal of portions of the cochlea from the apex to the base gave a progressive reduction of perception of low tones, whilst the high tones were relatively unaffected. Low tone perception was still possible if the intensity was increased when only the basal coil was left.

(*c*) Normal transmission curves were possible when the organ of Corti was atrophied in all but a small part of the basal coil.

The general impression from the experiments was that low tone perception was possible in any part of the cochlea but the maximum reception was from the apical coil.

*Para.* 5. By E. A. CULLER.

Using the Wever and Bray method the cochlea of guinea pigs was exposed and a very sharp electrode placed at varying points on the capsule. A pure tone of minimal intensity was used. Localization of the maximal intensity of each tone could be fixed

with only 10 per cent. error. The indication was that localization of low tones was in the apex of the cochlea and high tones in the base.

*Para.* 6. By EDWARD MCCRADY, JUNR.

The investigator approached the problem from the standpoint of embryology. The opossum at birth is very immature, the development of the inner ear being roughly equal to the human embryo at six weeks (20 mm.). The cochlear duct has only reached $1\frac{1}{2}$ turns and the organ of Corti is entirely undeveloped. On the twelfth day the scala has commenced to form in the second half of the first turn. At sixteen days the cochlear duct has covered the $2\frac{1}{2}$ turns characteristic of the adult and the scalae have extended throughout the first turn and into the second. The organ of Corti at this stage is most advanced in the second half of the first coil.

It had previously been found that notes caused a jump reflex at birth in most animals and this experiment was now tried on the nursing opossum, using various notes from 254 d.v. to 269 d.v. On the fiftieth day a response was obtained at 1,305 d.v. and during the succeeding five days responses were obtained up and down the scale to the limits of the experiments.

On various days the young opossums were killed and the cochlea examined histologically. It was found that on the fiftieth day the organ of Corti was fully developed in the second half of the basal coil only and that during the succeeding five days, it progressed towards the base and apex.

The writer concludes that from his experiments there is evidence of specific areas of reception of different notes and that the organ of Corti is essential to hearing.

[Authors' Abstracts.]

*Changes in the X-ray appearance of the Petrous Pyramid.* L. KRAUS. (*Arch. Ohr-, u.s.w. Heilk.*, 1936, cxlii, 15-27.)

An X-ray photograph may show a "defect" of the petrous pyramid, or even a complete absence of the petrous tip, although at a subsequent *post mortem* examination one finds apparently normal conditions. In the case of tumours and inflammatory processes near the base of the skull it is now recognized that the petrous pyramid can show a varying calcium content at different times.

The author describes four cases which illustrate and amplify these observations on the bony structure of the petrous bone. Two were instances of tumours of the nasopharynx involving the base of the skull; one case of tumour in the cerebello-pontine angle and the fourth, a case of tuberculous otitis media after a radical mastoid operation where the patient died from an aggravation of the lung process. In the first case a carcinoma of the nasopharynx

had infiltrated the base of the skull and the X-ray showed an extensive " defect " of the lower part of the left petrous bone, but with an *intact upper margin* ; also an " absence " of the extreme petrous tip on the right side. Histologically the " defective " regions were shown to be infiltrated by tumour cells with destruction of the bony tissue (illustrations in text).

In the second case of nasopharyngeal tumour the petrous bone on one side appeared to be almost completely absent, except for a thin line of bone marking the upper margin. The *posterior wall* of the petrous pyramid has the strongest bone structure and is therefore the important part from an X-ray point of view. When the posterior wall is destroyed the petrous pyramid may appear to be absent on an X-ray photograph. For the same reason it is generally easy to see an enlargement of the internal auditory meatus, as was proved in the author's third case. The X-ray findings in the fourth case indicated an extensive destruction of the petrous bone including the whole bony labyrinth.

J. A. KEEN

## NOSE AND ACCESSORY SINUSES

*On the relationship between the Nasal Mucous Membrane and the Vestibular Apparatus of the Ear.* A. T. BONDARENKO. (*Hals-, u.s.w. Arzt*, 1936, xxvii, 289-308).

Various agents which act on the circulation in the vessels of the nasal mucosa, also influence the circulation of the vestibular portion of the inner ear. The author demonstrates this relationship by a series of experiments. In a first group of experiments a small amount of adrenalin was injected into the mucous membrane of the inferior turbinate in ten patients suffering from serous labyrinthitis with spontaneous nystagmus. In many cases, before spontaneous nystagmus can be seen, the eyes have to deviate sideways to a greater or lesser extent and this angle is measured by Bárány' " Winkelmesser ". Within two minutes of the injection the " angle " is increased with a maximum effect 16 minutes after the injection.

From these experiments the author concludes that the labyrinth circulation is affected in the same way as the circulation of the nasal mucosa, viz., a contraction of the vessels with diminished excitability.

A second group of experiments was made in rabbits by inserting cotton wool plugs with ether into the nose. The cooling effect on the nasal mucous membrane resulted in a diminished excitability of the vestibular apparatus, as shown by the rotation tests.

In a third group of experiments the effect of blowing cold air into the nose was tried in 40 patients with minor affections of the

ear. The cold air was blown on to the inferior turbinate bone or on to the mucous membrane of the septum. With very few exceptions the functional activity of the labyrinth was influenced. In some of the cases there was an increase in the rotary nystagmus, in others a diminution. The effect was specially marked in the cases where the cooling was applied to the mucous membrane of the septum.

J. A. KEEN.

*The Architecture of the Blood Vascular Networks in the Erectile and Secretory Lining of the Nasal Passages.* P. F. SWINDLE. (Milwaukee.) (*Annals of O.R.L.*, xliv, 913, 1935.)

The inferior turbinals of two animals, the reindeer and the Walaroo kangaroo were used for this investigation, the former because of its exceptionally vascular nature, the latter because it was relatively avascular. The vessels were first of all injected with Indian ink, later with cannibar, and the resulting specimens examined by direct and transmitted light and by X-rays.

It was found that the arteries of the nasal passage formed a single network which could, however, be divided into two parts: Firstly, a series of arteries very inflatable and histologically very similar to veins of the same size. These vein-like arteries anastomosed with each other, but none of them branched into terminal arteries or connected with the capillary system. The second type consists of relatively slender arteries with the typical characteristics of these structures, branched into smaller arteries and finally connected with the capillaries. In no specimen were there any direct arterio-venous anastomoses.

Upon inflating the vein-like arteries with a liquid these arteries compressed the veins passing underneath, trapping the liquid therein into a series of irregular dilatations, and when this happened the fluid contained in the perivascular tissue was driven into the nasal passages as a viscous discharge.

GILROY GLASS.

*An investigation of the Nasal Nerves.* ST. ERNYEI. (*Arch. Ohr-, u.s.w. Heilk.*, cxlii, 97-105, 1936.)

The nerves concerned are the olfactory, trigeminal, sympathetic and nervus terminalis. Their finer distribution and connections in the nasal mucous membrane have not yet been fully worked out and the author therefore undertook the present histological study, using white rats, guinea pigs and cats.

The olfactory nerve was found to contain only *non-medullated* fibres and there were no communications anywhere between the olfactory nerve fibres and the *medullated* fibres of the trigeminal

nerve. A small group of ganglion cells was seen in the olfactory region amongst the olfactory nerve fibres.

The anterior and posterior ethmoidal nerves and the sphenopalatine nerve contained both medullated and non-medullated fibres, while the palatine nerves had only medullated fibres. The non-medullated fibres of the sympathetic were found among the various branches of the trigeminal or in separate bundles in the immediate vicinity of the vessels or glands.

The nervus terminalis was not found in any of the animals which were examined. The vomero-nasal organ is supplied by olfactory nerve fibres, as well as trigeminal and sympathetic.

J. A. KEEN.

*Twenty years' experience of Ozæna.* K. AMERSBACH. (*Arch. Ohr-, u.s.w. Heilk.*, cxlii, 106-18, 1936.)

The author gives his views on the pathology and treatment of ozæna, based on twenty years' experience. During this time he treated some 400 cases and most of them were followed up for long periods. The *genuine* forms of atrophic rhinitis must be clearly distinguished from the secondary forms, e.g. in tertiary syphilis, and after severe trauma of the nose. The theory that ozæna is caused by chronic sinus suppuration has lost support. Such forms of atrophic rhinitis must also be grouped among the secondary forms. Atrophic rhinitis is often associated with a sclerosis of the face bones and a poor development of the accessory sinuses. This change in the bones is not secondary to ozæna, but is due to an interference with free pneumatization; a function of the mucous membrane. There is a constitutional inferiority (Minderwertigkeit) of the mucous membrane which is the cause of both atrophic rhinitis and of the poorly developed sinuses. The pathology is explained in the same way as that of the sclerosed mastoid in chronic middle-ear suppuration. The term " sclerosing ozæna " is therefore a misnomer.

The various theories which attribute ozæna to endocrine influences, or which have linked the ætiology with certain chemical states of the blood, such as cholesterin deficiency, alteration of the calcium level, etc., have not withstood subsequent critical analysis. Specific infection theories (Perez, Abel-Löwenberg) are also being gradually abandoned and with it vaccine therapy.

Lautenschläger's operation for ozæna consists in mobilizing the lateral nasal wall and pushing it towards the septum. The good results are entirely due to the extensive formation of granulations and the temporary increase in the circulation of the part, associated with the operative trauma. The more the outer wall is broken up during the operation, the better the result. The relief from symptoms is only temporary and when the patients are seen again

in after years their symptoms have usually returned. The same arguments, in the author's opinion, apply to the various implantation proceedings. A wide nasal cavity *per se* is not a causative factor in atrophic rhinitis. Many persons have wide noses with a normal mucosa.

In Wittmaack's operation for atrophic rhinitis one makes a fistula of the parotid duct into the maxillary sinus. In patients with ozæna the maxillary sinuses are often abnormally small and the operation cannot be carried out. The dribbling of saliva from the nose during eating is very disagreeable. Also, there is a risk of parotid infection, or the parotid gland may cease to function. A fistula often forms again into the mouth cavity and thus defeats the object of the operation. For these various reasons Wittmaack's operation has now been given up.

J. A. KEEN.

## LARYNX

*The effect of Nerve Section on the development and extension of Inflammation of the Upper Respiratory Tract.* E. MILSTEIN and P. POUGATCH. (*Les Annales d'Oto-Laryngologie,* October, 1936.)

The beneficial effect of anæsthesia of the affected area in cases of inflammation has been recognized by clinicians for a considerable time. In a preceding article the authors described experiments on animals in which they showed that laryngeal tuberculosis could not be produced after laryngeal nerve section, in spite of the fact that the lungs were the seat of an advanced pulmonary infection. The present article is a further attempt to investigate the matter. In these experiments, the nerves sectioned were the superior and inferior laryngeal either together or separately and on one side only. The fact that the nervous anastomosis is sometimes well defined tends to vitiate observations. Experiments were carried out on dogs: after nerve section, the dog was poisoned with "luisite"; another dog also poisoned with intact nerves was used as a control. After a period of time, the dogs were killed and the upper respiratory tracts were examined histologically. The object of the experiment being to find out the manner—if any—in which nerve section influenced the process of inflammation and recovery of the upper respiratory tract. These results are given in detail. They may be briefly summed up as follows: (1) "Luisite" produces an inflammation of the upper respiratory tract. (2) Inflammation is more marked in animals who had been operated upon than in control animals. (3) There was a less severe degree of inflammation on the side of the respiratory tract on which the nerves had been sectioned than on the other. (4) Section of the sensory

nerves is unfavourable to inflammatory repair. (5) The effect of section of the motor supply was not established. (6) Simultaneous section of sensory and motor distribution aggravated the process of inflammation.

M. VLASTO.

*Cancer of the Epiglottis: Total Extirpation of the Epiglottis by the Laryngofissure Route.* GABRIEL TUCKER. (Philadelphia.) (*Annals of O.R.L.*, xliv, 933, 1935.)

The case of a male, aged 67, with malignant disease of the under surface of the epiglottis extending down to the ventricular band was admitted to hospital for operative treatment. Biopsy proved the growth to be squamous-celled carcinoma.

Preliminary tracheotomy under local anæsthesia was carried out and later a radical operation was undertaken. A mid-line incision was made from the hyoid bone to a point just above the tracheotomy fistula, exposing the larynx which was opened as for laryngofissure. The mucosa was dissected up from the interior surface of the epiglottis, and that structure removed along with the ventricular band on either side. The flap of the mucosa from the epiglottis was then pulled downwards over the denuded area of the hyoid bone where the base of the epiglottis had been attached and the wound was then closed.

A feeding tube was passed into the œsophagus and all fluids given by that route for the first seven days after operation, at the end of which time the patient had no further trouble in swallowing and left hospital at the end of another week, the tracheotomy tube having been removed.

Although the author had not seen the patient after the operation he is reported by another laryngologist as being free from recurrence and having a normal voice at the end of $3\frac{1}{2}$ years.

GILROY GLASS.

## MISCELLANEOUS

*A case of Mikulicz's disease.* PAUL ABOULKER. (*Annales d'Oto-Laryngologie*, September, 1936.)

This case is reported in very great detail. Every conceivable clinical and pathological examination was carried out, and the author's conclusions which are backed by a report on a biopsy of the parotid gland, are entitled to respect. According to him, Mikulicz's disease is a cirrhosis of the lachrymo-salivary system. It is a dystrophy of unknown cause not unlike certain hepatic cirrhoses the origin of which cannot be accurately determined. Prognosis in these cases is not bad. But treatment must be prompt

and thorough. The most satisfactory form of treatment is radiotherapy. By this means, the lympho-conjunctival neo-formation is absorbed and allows that part of the gland which is still alive its liberty of function.

M. VLASTO.

*A case of Hæmolytic Streptococcal Meningitis cured by Lumbar Puncture and Intrathecal Anti-streptococcal Serum.* H. BAHNTJE BRAUNSCHWEIG. (*Münch. Med. Wochenschrift*, December 4th, 1936.)

A thirteen-year-old patient had typical scarlet fever at the beginning of May, 1936. She was admitted to hospital on May 23rd with signs of meningitis and bilateral mastoiditis. During 5 days 300 c.cm. of cerebrospinal fluid were drawn off and 10 c.cm. of anti-streptococcal serum were injected. The case recovered.

G. H. BATEMAN.

*Streptococcus Hæmolyticus Bacteræmia with special reference to Oto-laryngological conditions.* JOSEPH L. GOLDMAN and GREGORY SCHWARTZMAN. (New York.) (*Annals of O.R.L.*, xliv, 970, 1935.)

In this study 168 cases of streptococcus hæmolyticus bacteræmias were described and classified according to the portal of entry of the organism.

Of the 168 patients, 91 died—a mortality rate of 54 per cent. A mortality rate ranging from 60 to 100 per cent. was encountered in the following groups: gynæcological infections, articular and osseous infections, miscellaneous non-bacterial conditions associated with streptococcus hæmolyticus, surgical post-operative infections, pulmonary infections and acute otitis media with meningitis. In contrast to these, the mortality rate of the cases of secondary erysipelas was 20 per cent., upper respiratory infections 34 per cent., peripheral infections 36 per cent., lateral sinus thrombosis 37 per cent., and primary erysipelas 50 per cent.

Ninety-one per cent. of the cases in which the primary foci were located in the respiratory tract (pulmonary infections, upper respiratory infections, acute otitis media with meningitis) occurred in the winter and spring months. The remaining conditions manifested no particular seasonal influence.

Upper respiratory infections, lateral sinus thrombosis and osseous and articular infections showed a tendency to occur during the early years of life. The other conditions evidenced no predilection for a special age. In the group of peripheral infections the mortality during the middle years of life was considerably higher than during the earlier years of life (75 per cent. as compared to 25 per cent.).

# Abstracts

The enrichments of the blood culture media and the blood culture methods employed were largely responsible for the high incidence of these positive streptococcus hæmolyticus blood cultures, especially when limited to fluid media.

The quantitative estimation of the number of hæmolytic streptococci in the blood stream (i.e., growth of the bacteria in both solid and fluid media alone) had both diagnostic and prognostic significance.

The conspicuous groups illustrating the diagnostic value of these blood cultures were the cases of lateral sinus thrombosis, upper respiratory infections and peripheral infections. In the cases of lateral sinus thrombosis, 50 per cent. of the pre-operative blood cultures showed growth in fluid media only, and growth appeared in but one fluid medium in 21 per cent. of these cultures. In the cases of upper respiratory infections and peripheral infections, bacterial growth was restricted to fluid media in 61 per cent. and 45 per cent., respectively, of all cultures.

The prognostic import of these blood culture results is demonstrated by the fact that the groups with relatively low mortality presented a high percentage of positive blood cultures in fluid media only, while the groups with relatively high mortality had a high percentage of positive blood cultures in both solid and fluid media. It is significant that all the gynæcological and associated non-bacterial cases showing growth in fluid media only recovered.

Of special interest among the cases of upper respiratory infection was the group which developed long bone metastases. The infection in these cases (ten) manifested a predilection for young children, a tendency towards complete recovery (90 per cent.), and a small number of organisms in the blood stream in a majority of the cases (fluid media only 60 per cent.).

The data embodied in this paper disclose that in contrast to non-hæmolytic streptococci (Alpha and Gamma), the finding of streptococcus hæmolyticus (Beta) in the blood stream, even in extremely small numbers, was of important clinical significance for diagnosis, prognosis, and indication for surgical interference.

[Author's Summary.]