discharged, but the temperature had not fallen and the condition was associated with repeated vomiting, whilst on the day of admission a rigor lasting about half an hour had occurred.

On re-examination the left ear was normal, but the right tympanic membrane was injected, obscuring landmarks, and the fundus occupied with pulsating secretion.

*29th April* 1930—As the condition was not improving, an operation on the right mastoid was undertaken when the antrum was found filled with pus under pressure. The sinus was also exposed and the wall discovered to be thickened and covered with granulations.

Puncture of the sinus showed normal bleeding.

The condition remained satisfactory till the 2nd of June, when the temperature again rose, and on re-examination of the wound the bulb was found occupied with pulsating pus.

In connection with this, there was a sudden profuse bleeding from the bulb controlled by packing.

*10th June*—After an apparently satisfactory convalescence, the temperature again suddenly rose. With ligature of the jugular vein the child recovered uneventfully.

# ABSTRACTS

## EAR.

*The Variations in the Sinuses of the Posterior Cranial Fossa, especially the Occipital Sinus.* ANTON PFEIFFER (Würzburg). (*Zeitschrift für Hals- Nasen- und Ohrenheilkunde*, Band xxv., Part 5, p. 503.)

Fifty preparations were examined, and in only twenty-one were there well-developed occipital sinuses, bilateral in only one of them and single in the other twenty. In the bilateral case both were extremely small. In eleven of the unpaired the sinus was in the middle line of the falx, in six it was on the right and in three on the left of it. In general it may be said that in 50 per cent. of cases the occipital sinus was of no clinical importance, but in the remainder it might act as a life-saving collateral mode of venous circulation or, on the other hand, as a channel for the passage of infectious material, as in a unique case of Professor Marx, in which thrombosis of this little sinus led to a fatal meningitis.

With regard to the arrangement of the confluent sinuses at the torcular, the following types were found:—(1) The classical torcular, 20 per cent.; (2) the "island" type in which the longitudinal and

the straight divide into two very unequal limbs, 20 per cent.; and (3) those in which the longitudinal opens into one, and the straight into the other lateral sinus communicating only by a window or a small canal. The longitudinal was continued into the right lateral in 18 per cent. and into the left in 8 per cent. With few exceptions the author's results went to confirm those of Henrici and Kikuchi (*Zeits. für Ohrenheilkunde*, 1903, Vol. xlii., p. 351).

JAMES DUNDAS-GRANT.

*The Exact Determination of Acuity of Hearing; Theoretical Considerations; and Practical Problems.* C. E. BENJAMINS (Gröningen). (*Internat. Zentralblatt für Ohrenheilkunde und Rhino-Laryngologie*, July 1930.)

The real test of useful hearing is the appreciation of speech sounds. The great difficulty is to devise a method by which such sounds can be produced under conditions of measured and accurate control of their intensity. Professor Benjamins uses the high grade telephone of Dr Sell, of Siemensstadt. The patient to be tested is placed in a sound-proof cabinet. The voice of the examiner is transmitted to him over the telephone, the ear pieces of which are provided with rubber sponge pads to obviate bone conduction. For patients who are unused to the telephone, the sounds are transmitted by a graduated loud speaker. The loudness of speech can be controlled and measured in either case by means of a variable resistance introduced into the telephone circuit. The resistance is increased until the test words become inaudible, and then decreased until they are again just heard. The hearing capacity of the patient for the particular sound employed is measured by the reciprocal of the resistance required for minimal audibility. The patient repeats the test sounds heard by him into a second telephone connected by a separate circuit with the examiner, who can then tell whether they have been properly heard.

When vowel sounds are used for testing, the audibility of the different vowels varies widely in different subjects and in different forms of deafness. This is due to the different pitch of the "formants," or predominating partial tones, characteristic of the various vowels.

The author has also investigated the "index vocalis," *i.e.*, the ratio of intensity of whispered and spoken sounds of minimal audibility. He finds that the "index" is not constant for any given subject, as it varies with the different vowel and consonantal sounds. In pathological conditions the factors determining the index become further complicated. Up to the present the determination of the index has not yielded any useful results.

G. WILKINSON.

# Ear

*Pneumatisation of the Mastoid and Streptococcus Mucosus Infection.* H. RICHTER. (*Zentralblatt für Ohren. u.s.w., Heilkunde,* 1929, Band xxii., Heft 1, quoted in *Internat. Zentralblatt für Ohrenheilkunde und Rhino-Laryngologie,* May 1930.)

Richter analysed eighty-six cases of mastoiditis due to streptococcus mucosus infection occurring in the Erlanger Clinique during the last six years. Only cases in which skiagrams were available were included in his survey. Pneumatisation was good in 58 per cent. and definitely subnormal in 39 per cent. No special liability to these infections could be inferred for either class of case. In the forty-nine cases in which complications occurred the incidence was fairly distributed between the two classes, except for meningitis, which occurred five times in the well pneumatised and only once in the more acellular subjects.

G. WILKINSON.

*The Minimum Tone Range necessary for the Understanding of Speech.* KREIDEWOLF (Berlin). (*Internat. Zentralblatt für Ohrenheilkunde und Rhino-Laryngologie,* August 1930.)

This question is not merely of great scientific interest, but also of practical importance to those engaged in the teaching of the deaf. Bezold stated that the minimum tone range over which the hearing must extend, if speech is to be understood, is the "sixth" $b^1$ to $g^2$. K. looks on this pronouncement as entirely arbitrary and misleading. He quotes Stumpf's book *Die Sprachlaute* (1926) to the effect that if such an arbitrary range as a sixth were to be chosen, that from $e^2$ to $c^3$ is more important than Bezold's sixth, though actually, for anything approaching the full understanding of speech, a range of from $c^1$ to $c^5$ is required. Modern methods of analysis of the partials contained in speech sounds, and their relative importance in characterising the various vowels and consonants, point to the same conclusion. In his own considerable experience K. found that Bezold's rule has no real validity. He quotes two cases, one in which Bezold's sixth was absent but in which the subject understood speech, and another in which the sixth with two tones below and three tones above was retained, but the understanding of speech could not be acquired.

G. WILKINSON.

*The Pneumatisation of the Mastoid Cells.* M. SCHWARZ. (*Archiv. für Ohren., u.s.w., Heilkunde,* Band cxxiii., Heft 3-4, and *Internat. Zentralblatt für Ohrenheilkunde und Rhino-Laryngologie.*)

The supposed increased density of the mastoid following inflammatory affections was disproved by Mouret (also by A. H. Cheatle). Wittmaack proved the connection between growth of mucous membrane

and pneumatisation. In the presence of a sound and resistant mucous membrane good pneumatisation is found, with a tendency to spontaneous resolution of inflammatory infections. The functional activity of the mucous membrane is an inherited characteristic. The same thing holds good for the nasal accessory sinuses. In order to establish the existence of this inherited property S. investigated by means of skiagrams the mastoid processes and also the nasal sinuses of 94 pairs of twins (59 homogenous and 35 heterogenous) and three triplets. The subjects were five to thirty years old. In the homogenous group the same general pattern of pneumatisation was found in both members of 39 pairs, or 61 per cent. No such agreement was found in the heterogenous group. Where good pneumatisation was present, indicating a "strong" mucous membrane, the histories of the subjects showed resistance to catarrhal inflammations, whilst with a "weak" mucous membrane and poor or absent pneumatisation, there was a susceptibility to catarrhs. He also found a tendency to abnormalities of structure in the membrana tympani in the "weak" group. G. WILKINSON.

*Case of Acute Mastoiditis caused by* Ascaris lumbricoides. G. ISHIKAWA (Osaka). (*Oto-Rhino-Laryngologia*, Vol. iii., No. 2, p. 916.)

A man, aged 32, complained of right-sided otorrhœa and otalgia, which had come on without any obvious cause. The otalgia gradually increased and was finally accompanied by a feeling of giddiness, pale infiltration of the right tympanic membrane and a pulsatile outflow of pus through a small perforation. When the right mastoid was opened a plentiful collection of pus was found in the antrum. On the third day after the operation at the first dressing a dead *Ascaris lumbricoides*, 9.5 cm. in length, was found in the external meatus. After its removal the fever quickly subsided. The writer is of the opinion that the larva during its cycle of development had got loose in the body of the host and had found its way through the Eustachian tube into the tympanum and suddenly set up the disease. JAMES DUNDAS-GRANT.

*Carcinoma and Cholesteatoma of the Ear.* H. MARX (Würzburg). (*Zeitschrift für Hals-, Nasen- und Ohrenheilkunde*, Band xxvi., Heft 2, p. 133.)

In the case of a woman, aged 61, whose right external auditory meatus was filled with a carcinomatous mass, a vertical section through both fenestræ showed cholesteatoma in the tympanic cavity with commencing carcinoma developing from the matrix. This grew into the bone and destroyed it to a considerable extent. In the anterior part there was simple cholesteatoma, but posteriorly at the level of the

descending portion of the facial nerve there was exclusively typical pavement epithelial carcinoma with numerous cancroid pearls. On the left the membrane was absent and the cavity was lined with epidermis and filled with regular cholesteatoma mass. The labyrinth had undergone osseous obliteration. The author has, so far, not come across any report of a direct transition from cholesteatoma to carcinoma.

JAMES DUNDAS-GRANT.

*Osteogenesis Imperfecta Congenita of the Capsule of the Labyrinth.* MORITZ WEBER (San Francisco). (*Zeitschrift für Hals-, Nasen- und Ohrenheilkunde*, Band xxv., Heft 4, p. 345.)

Weber has defined this condition of bone as a generalised fœtal maldevelopment of the bone-forming system with a "shifting to the left" (Links-vershietung) of the bone-picture. In a case with this defect the labyrinth capsule was examined. The endosteal capsule was merely a thin layer of pathologically changed fibrous bone. The enchondral capsule was represented by a medullary space. There was no lamellated bone. The periosteal capsule consisted of a scaffolding of pathological fibrous bone and was thicker than the enchondral capsule. The osseous changes in the capsule of the labyrinth have this in common: a generalised fœtal retardation of development and non-differentiation of the bone-forming system with relative leftward shifting of the bone-picture. JAMES DUNDAS-GRANT.

*Some Other Observations on Ewald's Law, and on the Plane of the Nystagmus obtained by Compression and Aspiration of the Contents of the Anterior and Posterior Semicircular Canals in the Rabbit.* P. DE JUAN (Madrid). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

In a preceding work the writer had pointed out that Ewald's law (*i.e.* the ampullipetal current is double the intensity of that of the ampullifugal current) is only partly fulfilled, and only in a determined position of the head in space. The experiments which the writer carried out had for their object the solution of the two following points:—

(1) To compare the intensity of the currents and displacements provoked by the aspiration and compression of the contents of the anterior and posterior vertical semicircular canals according to the different positions of the head in space.

(2) To determine the plane of the nystagmus which is produced by the compression and aspiration of the contents of the anterior and posterior semicircular canals.

The technique and also the protocols of his experiments will be published shortly in *Les Trav. du Lab. de Rech. Biol.*, and he concludes the present article with a tabulation of his conclusions.

H. V. FORSTER.

*The Utriculo-Endolymphatic Valve.* GORDON WILSON (Chicago). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

SUMMARY.

Bast, apparently for the first time, described the utricular fold, having observed it in a human embryo. Our description records its post-natal occurrence in man, and recently Dr R. D. Russell, engaged in post-graduate study in the author's department, has discovered the structure in adult rabbits.

In the series of sections herein described, no epithelial structure is more striking in appearance than the utricular fold, or "utriculo-endolymphatic valve." It is so arresting that one inclines toward Bast's opinion that any morphological feature "so definite as this valve-like structure should have a definite function." Since, presumably, the usual movement of endolymph must be slow, it may be conjectured that such a mechanism may come into service, under conditions of sudden pressure-change, to prevent abrupt fluid changes in the utriculus.

The "valve" in our series is a much stouter structure than the thin epithelial vesicle against which it lies, and there is, it seems, no substantial wall present to complete the valvular mechanism—unless it be assumed that the perilymph serves as a liquid support for the utricular wall. We have at present no suggestions to offer regarding the possible function of the fold. AUTHOR'S ABSTRACT.

*The Action of Compression and Ligature of the Great Vessels of the Neck on the Vestibular Reactions.* G. PORTMANN (Bordeaux). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

Experiments in the human subject were carried out by compressing the vertebral arteries and also the common carotids, but no useful conclusions could be drawn, and it was necessary to make use of animals.

Four dogs were used.

In the first one the common carotid was tied, in the second the two vertebrals, in the third the two vertebrals were tied at their entrances into the canal formed by the transverse processes of the cervical vertebræ.

In the fourth the left vertebral artery was tied with temporary ligature of the right vertebral and the common carotid of the same side.

The experiments are described in detail, but rotation tests do not appear to have revealed any appreciable modification in nystagmus thus produced in the animals, and he concludes, "It appears consequently that, unlike modifications of sympathetic origin, the mechanical modification of the intracranial circulation, in the dog at least, can be without effect on the vestibular reactivity."

H. V. FORSTER.

*Some Experimental Observations on the Otolith Nystagmus in Pigeons.* A. THORNVAL (Copenhagen). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

The writer wishes to find out whether it is possible to produce experimentally a nystagmus movement of the head which may be supposed to originate from the otolith apparatus.

This article deals with twenty-four experiments on pigeons. After stopping up the semicircular canals and afterwards opening the bony canals between the stopped-up part and the distal extremity of the two vertical canals near the vestibule, one was able at the same time to provoke a movement of the head of the pigeon by increasing a little (it did not matter if it were done slowly or quickly) the air pressure in the cavity operated upon. This movement had the character of a nystagmus movement with the slow phase forward and to the operated side, that is to say in the plane of the anterior vertical semicircular canal of the operated side, the rapid phase going in the opposite direction.

The diminution of the air pressure in the operated cavity did not produce any effect. Variations in the position of the head and of the body of the pigeon had no effect. After several modifications of the operation, particularly after the extirpation of the posterior vertical canal with the ampulla, and of all the membranous canals with their ampullæ, one is entitled to believe that the nystagmoid movement is the effect of an endolymphatic movement directed probably towards the utricle—and one need not explain it as an effect exercised on the ampullæ, if one has regard to its direction and to the writer's previous experiments.

The writer also carried out under similar circumstances experiments with the caloric reaction—injecting cold salt water into the operation cavity, which confirmed the previous experiments.

H. V. FORSTER.

*On Non-Experimental Labyrinthitis in Animals.* EELCO HUIZINGA (Gröningen). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

Labyrinthitis in animals can be of importance from several points of view—in the first place one can study minutely the symptoms which the animal has shown during life, and it is possible to kill the

animals at a certain stage at which a microscopical examination of the labyrinths may enrich our knowledge.

Microscopical analysis of this kind of labyrinthitis in animals has made considerably clearer our knowledge of the analogous morbid process in the human being. It is above all the study of experimental labyrinthitis in animals which has contributed to this. Cases of spontaneous labyrinthitis have the advantage over those obtained experimentally in that the inconvenience of artificial infection is omitted. Cases of spontaneous labyrinthitis which have been described are chiefly in rabbits and guinea-pigs used in laboratories.

In the literature few cases are known where microscopical examination has been carried out—such examinations, however, have been published by Neumann, Mayer, Yoschii, Marx, Grunberg and Kelemen, and brief descriptions of these are given. The classification of different forms of labyrinthitis furnished by Wittmaack is to a great extent the result of experimental labyrinthitis carried out on animals. The perforation into the labyrinth found in animals is nearly always through the round window—in man both windows have more or less the same importance, at least in the cases mentioned by Zange. In cases described in animals the oval window is of secondary importance; this has been demonstrated by Steurer in his experimental researches. The writer goes on to describe in detail cases of spontaneous labyrinthitis in rabbits, also an example of this in a pigeon and in a fowl. Photographic illustrations are given. H. V. FORSTER.

*The Structure and Function of the Labyrinth of Petromyzon.* H. M. DE BURLET and C. VERSTEEGH. (*Acta Oto-Laryngologica*, Supplement xiii.)

In 1844 Ecker showed that a considerable part of the interior of the labyrinth of Petromyzon (the Lamprey) is lined by ciliated epithelium. This observation appeared to throw doubt upon all our accepted ideas of the mechanism of the labyrinth of vertebrates, the endolymph of which is supposed to be set in motion, and so to stimulate the special sense organs, only as a result of changes in position of the head or movements of the stapes or columella.

In order to find some solution of this difficulty, the authors made a detailed study of the anatomy and physiology of the labyrinth of *Petromyzon fluviatilis*. Other varieties of Lamprey were also examined and showed no essential differences.

Over three-quarters of the present paper deals with the anatomy, which was studied by means of serial sections and models built up therefrom.

The labyrinth possesses only two vertical semicircular canals united directly with one another by a crus commune, the lateral or

horizontal canal being entirely absent. Each of the two canals has an ampulla with an area of specialised sensory epithelium, and there are similar sensory areas in the lagena, the sacculus, the utriculus and the macula neglecta.

A characteristic feature is that all these sensory areas are continuous with one another with the exception of those of the ampullæ.

Communicating freely with the interior of the utriculus and the crus commune are two large cavities lined with ciliated epithelium. They are of an elongated oval form and are placed obliquely to one another, their long axes cutting one another at an acute angle open above.

The endolymph currents in these cavities were studied by observing, through small artificial openings in their walls, the movements of fine carbon particles introduced for the purpose. It was found that in each of the cavities there were two circular currents, an upper and a lower, completely separate and of opposite direction to one another. It appeared also that although, as already mentioned, these cilia-lined cavities communicate freely with the rest of the labyrinth, the endolymph currents produced by the cilia were entirely confined to the cavities themselves, the endolymph of the semicircular canals and the utriculus remaining completely at rest. If this is correct, it is clear that the labyrinth of Petromyzon does not, as might seem probable at first sight, differ in principle from that of other vertebrates. The meaning and function of the cilia-lined cavities still, however, remain obscure. They may possibly have some relationship with the cilia-lined statocysts found in some invertebrates.

In the second part of the paper the authors give experimental proof that the labyrinth of the lamprey both serves as a balancing mechanism and gives the characteristic labyrinth reflexes. An important point is that although there is no horizontal canal, definite horizontal turning reactions are obtained. This anomalous result may be compared with a similar one in the rabbit, recorded by de Kleyn and Versteegh in the *Journal of Laryngology and Otology* (October 1927), in which with only two functioning canals, a horizontal, a rotatory and a vertical post-rotatory nystagmus were all obtainable. THOMAS GUTHRIE.

*Remarks on the Surgical Treatment of Otosclerosis.* J. DUERTO (Barcelona). *Revista Española y Americana de Laringologia*, June 1930, p. 241.)

Dr Duerto describes a visit to the clinic of Dr Sourdille at Nantes, where he saw operations by the technique already well known and described elsewhere, and saw also patients who had undergone the

operation for the relief of deafness and tinnitus. Dr Duerto expresses his admiration of the skill and care devoted to the technique of these operations, of which the principle was originally suggested by Passow. He believes that the immediate results in improving the hearing and diminishing the tinnitus of otosclerosis are favourable, but he gives the warning that time, by showing whether or no the immediate results are maintained, will have the last word ("la ultima palabra") on the subject.

He does not make any comparison of this elaborate operation in two stages with the operation of Hautant for vertigo, which consists merely in opening the convexity of the external semicircular canal by a simple mastoid operation without touching the tympanum at all, except to contrast the difficulty of the operation of Sourdille with the simplicity of the other. These cautious and unprejudiced remarks by an independent observer of the actual operations and patients are important while the method is still on trial. L. COLLEDGE.

*A Study of the Function of the Labyrinthine Windows.* A. BONAIN (Brest). (*Archives Internationales de Laryngologie*, July, August.)

It is generally believed at the present time, that the function of the vestibular apparatus is only concerned with the sense of equilibration and has nothing to do with the sense of hearing. Comparative anatomy shows us that the first sense organ to appear in the internal ear, the otocyst, is associated with the function of equilibration. Moreover, the membrane which protects the otocyst is homologous with the oval window of the higher vertebrates, and the protective cover of the primitive membrane is homologous with the foot-piece of the stapes. This protective membrane with its protective cover can only be regarded as protective structures of the primitive organ of the static labyrinth, whose function is of capital importance to the animal in its struggle to survive. They could not possibly be designed as transmitters of sound when no receptive mechanism is present.

As we travel up the scale, and the organ of hearing makes its appearance, the protection of the otocyst is modified and perfected.

In the reptiles for instance, where no middle ear exists, an additional ossicle, the "columella," is developed on the "operculum," and through the medium of the temporal muscles can act on the perilymph and modify the intensity of the waves of sound. Higher up the scale a middle ear is developed together with the Eustachian tube and the round window giving direct access to the cochlea.

In certain cetaceans the middle ear is separated from the outside world by the cranial bones, and we find that the round window is considerably enlarged in order to deal with the greater resistance to the path of the sound vibrations.

From the above facts the author infers that the oval window, the tympanic membrane and the ossicular chain are designed only for the protection of the labyrinthine structures, and that the function of sound transmission is subserved by the round window.

Clinical and experimental support for his argument is obtained from the facts that (1) the transmission of sound through the fenestra ovalis is useless and sometimes dangerous; (2) perception of sound is adequate even when the foot-piece of the stapes is fixed in the oval window and when the tympanic membrane and ossicles are absent; (3) deafness is profound when the round window is obstructed experimentally or by a pathological process. M. VLASTO.

*Ocular Strabismus and the Absence of Auditory Strabismus.* RAFAEL MENDOZA (Mexico). (*Revista Española y Americana de Laringologia*, June 1930, p. 251.)

The author notes how it comes about that hypermetropia calls for an abnormally great effort of accommodation, and the corresponding convergence produces strabismus which puts one or other eye out of action, otherwise the patient would not see with either eye.

The two ears normally receive the same impulse of accommodation, and when there is a disorder of accommodation in one of them the impulse which this one receives must be either greater or less than it should be. But this impulse, more or less abnormal, is received by the sound ear, and the patient fails to hear with either ear, because in the ears there is no auditory strabismus which would preserve the hearing of one ear as ocular strabismus preserves the vision of one eye.

This absence of auditory strabismus explains the following phenomena:—

1. If a patient with damage to both ears occludes one of them he hears better than with both.
2. If treatment improves the hearing of the ear which began to fail in a deaf person, the hearing in the other ear also improves.
3. In a deaf person it can happen that by stimulating one ear with one sound, the other ear can hear another sound better.
4. In order that paracusis of Willis may be present, the deafness in the two ears must be unequal.

If a deaf ear needs a greater or less degree of accommodation than normal, this abnormal impulse is transmitted also to the sound ear and the patient finds himself unable to hear with either ear, unless he occludes one or other altogether, preferably the damaged ear. Thus is explained why some deaf persons prefer to keep one of the ears

blocked, especially during general conversation when the ears need sudden changes of accommodation according to the different tones of voice.

In the paracusis of Willis certain loud sounds deafen one ear and stimulate the other; then the other hears the voice. But if the sound is not loud there is no deafening, and moreover it is necessary that the hearing acuity should be unequal so that the stimulation on one side is not equal to that in the other. These observations only apply when there are no powerful adhesions in the tympanum and when the internal ear is intact.

The practical conclusion is that on examination of the ears separately a patient may not be so deaf as he seemed, and the ears should be examined together as well as separately. On the other hand a patient may be found to be more deaf than might be expected, and this is not necessarily due to the embarrassment of a consultation, but because the patient is not accustomed to listening with the ears separately. Oculists have estimated, and perhaps even overestimated, ocular accommodation, while aurists have neglected auditory accommodation. Dr Mendoza thinks that accommodation in the ear is even more important than in the eye. L. COLLEDGE.

## NOSE AND ACCESSORY SINUSES.

*The Relation between Optic Nerve Paralyses and Nasal Sinusitis.* A. DE KLEYN (Utrecht). "Proceedings of the Collegium Oto-Laryngologicum," 1929. (*Internat. Zentralbatt für Ohrenheilkunde und Rhino-Laryngologie*, June 1930.)

Rhinologists may almost be said to be divided into two camps on the question of the frequency with which optic neuritis is attributable to nasal sinus infections. There can be no doubt as to the frequent concurrence of eye lesions and sinus infections, or the close anatomical association of the posterior sinuses and the optic nerve. On the other hand sinus infections are extremely common, and the number of cases which are associated with optic neuritis form a small fraction of the total incidence of these infections, and there is no close correspondence between the severity of the infections and the liability to involvement of the optic nerve. Histological evidence bearing on the spread of infection from the sinuses to the nerve is scanty, as the opportunities for obtaining post-mortem material are few. These considerations impelled de Kleyn to resolve fully to investigate histologically all cases in which the opportunity occurred of procuring material.

# Nose and Accessory Sinuses

CASE 1.—Pansinusitis with secondary panophthalmitis. Cellular infiltration was traced from the mucosa of the sphenoidal sinus, through the bony wall, to the sheath of the optic nerve, which was penetrated at one point round a vessel, which had led to cellulitis of the optic nerve itself.

CASE 2.—Very acute septic infection of one sphenoidal sinus, and concurrent phlegmon of the face. The mucous membrane lining the sinus was greatly swollen, and the veins in the bony walls thrombosed. The sheath of the optic nerve showed slight œdema, though the nerve itself appeared normal on microscopic examination. The only eye symptom was central scotoma for white and colours.

CASE 3.—Endothelioma growing within the sphenoid sinus and spreading to the dura, where it was in contact with the optic nerve in several places. A large central scotoma of the retina on the same side. Microscopically, the optic nerve was normal.

Case 1 demonstrates the possibility of direct septic infection of the optic nerve from the posterior nasal sinuses. The damage to the nerve would be irreparable in the event of the patient recovering from the general infection. In Cases 2 and 3 we have an axial neuritis, probably due to toxic absorption into the substance of the nerve, and affecting chiefly the more vulnerable central fibres. In most cases this would be a recoverable lesion.

Although this investigation demonstrates the actual occurrence of the two forms of optic neuritis generally assumed to be secondary to sinus infections, all cases were of extreme severity, and it would not be legitimate to infer from them that any degree of infection of the sinuses, even the slightest, is capable of producing similar eye lesions.

G. WILKINSON.

*Thrombosis and Embolic Pulmonary Infarct after Submucous Resection of the Nasal Septum.* GEORGE KELEMEN (Buda-Pest). (*Zeitschrift für Hals-, Nasen-, und Ohrenheilkunde*, Band xxvi., Heft 2, p. 139.)

The patient, aged 39, underwent the operation, and the tampon with Mikulicz's Ointment was removed at the end of forty-eight hours. Healing appeared to be perfect. After two days the patient got up and felt pain in the left leg followed by swelling. Pain in the right side of the chest was in turn followed by the signs of embolic infarct in the lower lobe of the lung. Recovery gradually supervened. This is related as a unique instance of thrombosis and embolism following submucous resection of the septum. The author comments on the increasing frequency of embolism after surgical operations in general,

but does not know whether this increase has been observed also after operations on the nose. He asks for consideration of the conditions which respectively favour or hinder coagulation of the blood.

JAMES DUNDAS-GRANT.

*A Physico-Chemical Study of the Blood Serum in Cases of Colloidoclastic Rhinitis.* V. FAIREN (Zaragoza). (*Acta Oto-Laryngologica*, Vol. xiv., Fasc. 1-2.)

It has been satisfactorily proved that the phenomenon of anaphylaxis is the result of a disturbed colloidal equilibrium.

The work of Lumière, of Kopacyuski and of Rocasolano brings one to the conclusion that the essential cause of such shock is a process of coagulation.

In rhinology one frequently sees manifestations of shock in nasal symptoms, but it is erroneous to imagine that the only manifestation in anaphylactic rhinitis is an augmentation of nasal secretion.

It is merely a manifestation of this augmentation, a general disturbance for which the secretory area of the trigeminus is a sensitive indicator.

Such cases are by no means seen only when foreign protein comes into direct contact with the nasal mucosa.

A case of vasomotor rhinitis is described in which the nasal phenomena only followed ingestion of ripe strawberries.

A description of the blood findings are given before and after the attack. The blood count, surface tension, electric conductivity, PH. of the blood, alkaline $CO_2$ reserve in the lungs are examined, and it is shown that the disturbance of equilibrium of the stability of the serum is "parallel to what takes place in all coagulation processes."

H. V. FORSTER.

*A New Method of applying a Tampon to the Nose.* F. FERNANDEZ ARRATIA. (*Revista Española y Americana de Laringologia.* June 1930, p. 254.)

The author reviews the various methods of packing the nose for the control of severe epistaxis and mentions their disadvantages, of which the chief is the resulting septic infection with the risk of extension to the middle ear.

He recommends the following rapid and simple method. A thread is tied to the end of a strip of gauze about 3 inches wide and 18 inches long. Threads are then tied to it along the whole length about 4 inches apart. The threads are numbered by tying the corresponding number of knots in each. A sound is passed through the nose and made to project through the mouth so that the threads can be attached

to its tip, while the gauze is kept on the stretch. The sound with the threads is withdrawn through the nose until the gauze appears at the nostril. Then traction is made on the thread which carries one knot, then on the next, and so on in succession until the nasal cavity has been packed completely from behind forwards as firmly as may be desired. In this way the whole passage is packed with an even pressure, and in addition the first part of the gauze which sweeps the nasal fossa clean comes to the front and the part at the back near the opening of the Eustachian tube remains free from blood clots. When the packing is in place the threads are cut short and for removal it is only necessary to make gentle traction on the gauze through the nostril.

The advantages are that no special instruments are required, it is so simple that any medical man can apply it, there is no space left where blood can collect, and there is no danger of infection, so that the appliance can be left in position for several days. L. COLLEDGE.

*On the Blood-Borne Sense of Smell: Über das intravenöse (hämatogene) Riechen.* By MARCEL BEDNÁR and OTTO LANGFELDER (*Monatsschrift für Ohrenheilkunde und Laryngo-Rhinologie*, October 1930).

Prompted by the fact that very little investigation has been carried out in this direction, and that only in connection with the intravenous injection of salvarsan (which he considers does not possess a sufficiently characteristic odour), the author undertook an experimental research, using certain compounds of camphor and turpentine, which apparently were easily recognisable as such by the patients whom he tested.

The "material" consisted of 20 patients, of whom 14 were regarded as having a normal sense of smell; two were cases of ozæna with absolute loss of smell; one case of temporary anosmia as the result of influenza; one case of acute rhinitis and two cases of anosmia associated with ethmoidal polypi.

The experiments were controlled by packing the interior of the nose with gauze soaked in liquid paraffin, which it was found in normal people prevented the sense of smell until the packing was removed; they included the testing of the latent period between the intravenous injection and the recognition of the odour and the determination, amongst other things, of the value of an intact healthy nasal mucous membrane and of the effect of fatigue. The results of his research are summarised as follows:—

(1) Certain substances after intravenous injection produce a typical sense of smell.

(2) The average latent period in normal persons between injection into the median vein and the recognition of the odour is six seconds.

(3) With paralysis of the olfactory nerves or atrophy of the mucous membrane causing anosmia there is also no sense of smell with such blood-borne test substances. On the other hand, when anosmia is due to obstruction, the blood-borne sense of smell is unimpaired.

(4) The blood-borne sense of smell is dependent on the stimulation of the olfactory nerve endings. ALEX. R. TWEEDIE.

## LARYNX.

*Observations on the Diagnosis and Treatment of Malignant Neoplasm of the Larynx.* T. DELLA VEDORA. (*Bollettino delle Malattie dell'Orecchio, della Gola e del Naso*, October 1930.)

The author bases his argument on the work of Hicguet of Brussels. He says that cancer of the larynx can and should be diagnosed in a very early stage. The general practitioner should be able to diagnose a neoplasm of the larynx from the signs and symptoms. The laryngologist should practise biopsy and then no time is lost in observing the case. In cases of difficulty laryngostomy should be performed for diagnostic purposes and portions removed by biopsy.

He considers that laryngostomy and excision should be the treatment of election, but this must be regarded as a very delicate operation, and the after-treatment is of the greatest importance.

The author is of the opinion that radium treatment is unsuccessful and prefers surgical measures.

The author thinks also that recurrence should be treated on surgical lines. Laryngectomy should be reserved for advanced cases and recurrences. F. C. ORMEROD.

## PHARYNX.

*Deep Cervical Infection following Tonsillectomy.* S. L. SHAPIRO. (*Archives of Oto-Laryngology*, June 1930, Vol. xi., No. 6.)

Thirty cases of deep cervical infection following tonsillectomy, including three fatalities, are reported in this paper, and eighty cases are reviewed from the literature.

In 94 per cent. of all the cases reported the operation had been performed under local anæsthesia. The most important factor in the ætiology is the injection of infected solution into the parapharyngeal space.

Two clinical varieties are noted: a phlegmonous type, which includes a large majority of all the cases analysed, and a vascular infection which manifests itself in the form of septicæmia, thrombosis, or embolism.

# Œsophagus and Endoscopy

The phlegmonous form of deep cervical infection following tonsillectomy is characterised by a symptom-complex consisting of trismus, fever, and swelling of the neck on the affected side. A large number of grave additional complications have been recorded.

The treatment should aim at localising the infection before an attempt is made to drain the abscess. The incision of choice is through the tonsillar fossa, but external operation is indicated under certain conditions. DOUGLAS GUTHRIE.

*Palato-graphic Examination in Disturbance of Function of the Soft Palate after Adenotomy.* M. OYAMADA (Fukuoka). (*Oto-Rhino-Laryngologia*, Vol. iii., No. 9, p. 771.)

Daito has found by means of palato-graphy that the function of the soft palate is affected to a certain extent after adenotomy, even if the voice appears quite normal. After a few days the normal conditions return. The paper is illustrated by palato-graphic tracings. JAMES DUNDAS-GRANT.

## ŒSOPHAGUS AND ENDOSCOPY.

*Stenosis of the Œsophagus associated with Kyphosis of the Thoracic Vertebral Column of Traumatic Origin.* WALTHER STUPKA. (*Zeitschrift f. Laryngologie, Rhinologie, etc.*, October 1930, Band xx., pp. 35-48.)

Man aged 56, who complained of dysphagia of three weeks' duration. The examination with the œsophagoscope revealed a spasm at the entrance of the œsophagus which was easily overcome, but lower down at the level of the 6th to 7th thoracic vertebræ there was an impassable stricture. Above this stenosis the œsophagus was somewhat dilated and there were changes in the mucous membrane which caused the author to suspect carcinoma. Further investigation showed that the stricture allowed soft bougies and bismuth in fairly liquid form to pass freely, as the actual lumen of the œsophagus was not diminished. The stenosis must therefore be called a *relative* one, and in this case it was due to a kink or bend in the œsophagus which appeared to be fixed to the vertebral column.

The dysphagia which brought the patient to the hospital was due to a reflex spasm affecting the entrance of the œsophagus. It was not due to the kink in the thoracic segment, although the changes in the œsophagus at that level indicated some delay in the passage of solid food particles.

The etiology in this case is extremely interesting. At the age of 22 the patient had a severe fall from a ladder, injuring his back and

head. He was laid up for two weeks, but no injury to the spine was diagnosed. In the course of three months he developed a marked kyphosis which had remained unchanged up to date.

The X-ray showed three much deformed thoracic vertebræ with a sharp-angled kyphosis, the bend being reproduced in the œsophagus. The original injury undoubtedly caused a fracture of the body of at least one thoracic vertebra and presumably an extravasation of blood into the mediastinum. Later this effusion became organised and transformed into scar tissue, fixing the œsophagus at that level and involving it in the deformity of the spinal column which developed later.

There is a good illustration of the X-ray appearances, several very clear diagrams and many references. J. A. KEEN.

## MISCELLANEOUS.

*Percaine as a Local Anæsthetic.* J. FEUZ (Lausanne) *Schweiz, Medicin. Wochenschrift*, 1929, Nr. 46, p. 1160. A. RITTER, *ibid.*, Nr. 27, p. 706. H. v. SEEMEN (Munich), *Internat. Zentralblatt f. Ohrenheil. u. Rhino-Laryngol.*, March 1930. E. EICHOFF (Munster), *ibid.* A. CHRIST (Bâle), *ibid.*, May 1930. L. RUEDI (Zurich), *ibid.* KLESTADT (Breslau), *ibid.*

The reports which continue to appear in the journals on percaine are, on the whole, favourable. All agree as to its extraordinary potency as a local anæsthetic. Experiments on rabbits show that anæsthesia of the cornea can be induced by solutions twelve times more dilute than correspondingly active solutions of cocaine. For surface application in oto-laryngology 1 to 2 per cent. solutions are used. Klestadt states that this solution is less toxic than a 10 per cent. cocaine solution. Christ draws attention to its utility in painful ulcerations of the mouth, bladder, rectum, etc., in the form of lotions, ointments, and suppositories. No unpleasant effects following its surface application have been reported.

With the exception of Eichoff, the reporters quoted are all agreed as to its rapid action, and the long duration of its anæsthetic effect. It has one disadvantage as a surface application to the mucous membrane of the nose as compared with cocaine, viz., slight vaso-dilatation, or at all events, absence of vaso-constriction. It is thus less convenient for routine examinations in which it is desired to dilate the cavities to the fullest extent in order to obtain a complete view. It is suggested that the addition of a small quantity of adrenalin obviates this difficulty, but this has the disadvantage of sometimes provoking very severe and protracted spasmodic sneezing and rhinorrhœa. Possibly the substitution of ephedrine for adrenalin would avoid this unpleasantness.

# Miscellaneous

For infiltration anæsthesia percaine possesses many advantages. Solutions are unaltered by boiling for half an hour, so they can be thoroughly sterilised. They do not devitalise tissues, and the subsequent healing of the wound is not retarded. The long duration of the anæsthesia minimises post-operative pain.

For infiltration 1/2000 to 1/1000 solution is used. Seemen has given as much as 350 c.c. of the 1/2000 solution, and 200 c.c. of the 1/1000 for single infiltrations without ill effect. It is usual to add 10 to 20 drops of 1/1000 adrenalin solution to each 100 c.c. of the infiltrate (0.65 to 1.3 per cent. of 1/1000 adrenalin).

Feuz found that in some cases the 1/2000 solution did not give entirely satisfactory anæsthesia, whilst 1/1000 was completely effective. Seemen has used 1/1000 to 1/400 for blocking the nerves, and 1/2000 for infiltration. Feuz lays stress on the danger of injecting the solution direct into the blood stream by puncture of a vein. Special care should be used in infiltrating vascular areas. The piston of the syringe should be withdrawn slightly before each injection, and if blood appears in the syringe the position of the needle should be altered.

It is not to be expected that the use of so powerful a drug should be entirely without risk. Feuz reports three cases (out of 400) in which alarming symptoms occurred. In the first 1/1000 solution was used to infiltrate the floor of the mouth, preparatory to introducing radium needles in a case of cancer of the tongue. A 10 per cent. solution of cocaine had previously been applied to the ulcerated surface. It is not certain that the symptoms might not have been due to the cocaine, or to the combined toxic effect of the two drugs. These consisted of mental excitement, clonic spasms of the face and limbs, loss of consciousness, slowing of the pulse, and stoppage of the breathing. The patient was brought round by stimulants, and artificial respiration. In the second case the alarming symptoms only lasted two minutes, but the patient remained drowsy for several hours. The third case was one of partial removal of the thyroid in a patient with symptoms of hyperthyroidism: a 1/1000 solution was used. The symptoms, which were similar to those in the other cases, came on suddenly at the commencement of the operation. The patient remained unconscious for an hour and a half. Over-distension of the tissues, due to excessive pressure in making the injection, is suggested as an explanation.

One fatal case has been recorded by Eichoff. The patient was twenty-one years old. Preparatory to a plastic operation on the cheek he had 100 c.c. of 1/2000 percaine in the face, and 130 c.c. of 1/1000 in the shoulder region. Fifteen minutes later acute toxic symptoms developed, clonic spasms, cyanosis, unconsciousness, and stoppage

of breathing. He died twenty minutes later. Appearances somewhat suggestive of status lymphaticus were found at the post-mortem examination, but it is doubtful whether they were sufficient to explain the fatal result.

On the other hand, A. Ritter reports 309 cases without the occurrence of any toxic symptoms whatever. 1/2000 solution was used. In some of the cases anæsthesia was incomplete. 212 of the 309 cases had pantopon or morphia in addition to the percaine, and in thirteen light general anæsthesia was employed.

Percaine appears to be the most effective of all the local anæsthetics which have been introduced up to the present. It would seem also to be reasonably safe, if proper care is taken in its administration.

(The writer greatly regrets that in his abstract "Percaine" in the November number of the *Journal* (p. 826) the concentration of percaine for infiltration solutions was stated in percentages instead of per thousands.) G. WILKINSON.

## REVIEW OF BOOK

*Technique Chirurgicale Oto-Rhino Laryngologique.* Par E. J. MOURE, G. LIEBAULT et G. CANUYT. Gaston Doin & Cie. Price 70 francs.

This volume (the 4th) completes this important surgical work. In dealing with operations on the larynx and œsophagus it gives, like the others preceding it, essentially practical details from the personal point of view of the authors. Each operation is fully described and a minute account of the technique that the authors employ and in which they are experienced is given. Naturally with Professor Moure's name at the head of it, the surgical treatment is that we are accustomed to associate with the Bordeaux school which he founded, and which he and his assistants and pupils have extended and popularised.

One of the most interesting sections of the book is, perhaps, that which deals with stenoses of the larynx and their treatment. After a description of the ordinary treatment by means of bougies and so forth, there is a most detailed description of tracheo-laryngostomy for those stenoses that are not amenable to simpler methods. This section is admirably illustrated and shows the methods that are used to keep the tracheo-laryngeal gutter patent during the healing and epithelisation of the cavity. In some cases where after healing the gutter is not thought to be sufficiently wide, intra-laryngeal dilatation with rubber tubes is described and illustrated. At the end of the section closure of the healed fistula by plastic operation is figured.