ABSTRACTS

THE EAR.

Three Million Deafened School Children—Their Detection and Treatment. EDMUND PRINCE FOWLER, M.D., and HARVEY FLETCHER, Ph.D., New York. (*Journ. Amer. Med. Assoc.*, 4th December 1927, Vol. lxxxvii., No. 23, p. 1877.)

The authors estimate from recent surveys that more than three million school children in the United States have hearing defects. Various tests were made of school children in New York, but the most satisfactory findings from the standpoints of accuracy and time-saving were obtained by using a 3-A Audiometer with ear-phones to handle groups of forty children at a time. It was found that from seventy-five to one hundred and fifty children could be tested in an hour. No group test could be used for young children. In doing the test the gramophone was used, first by using a woman's voice twice, and then by using a man's voice twice. The voice was that of a person who seemed to be moving farther and farther away. The children were asked to record the numbers they heard. A check up of the examination of each group was made, and those having ear defects received a careful otological examination, to detect whether or not there was any disease present. Those partially deaf were graded, and some were given front seats in school. More serious cases were provided with special classes in lip-reading, while others were sent to schools for the deaf. ANGUS A. CAMPBELL.

Lesions of the Inner Ear occurring at Birth. Dr THIELEMANN, Bonn. (*Zeitschrift für Laryngologie, Rhinologie, etc.*, Band 15, February 1927, S. 126-134.)

Prolonged and difficult labour occasionally causes hæmorrhagic lesions in the inner ear of the infant (Voss). In this article the author describes some animal experiments, undertaken in order to elucidate the mechanism of these hæmorrhages. By means of suction glasses applied to the heads of newly-born rabbits œdematous swellings are produced which closely resemble the *caput succedaneum* of the newly-born infant.

Some of the animals were killed at once, others were put back into the litter, and after an interval of two to three months histological preparations of the labyrinth were made. There are six microphotographs and two coloured plates which all clearly show hæmorrhages into the cochlea, or late effects of these.

The explanation of these blood effusions is found in the venous circulation of the interior of the skull. The experimental suction—or

the prolonged pressure ring on the infant's head—causes an arrest or slowing of the blood flow in the veins, chiefly in the superior longitudinal sinus which lies just under the open anterior fontanelle. A back-pressure occurs in the lateral, the superior and inferior petrosal sinuses, and ultimately also in the veins draining the inner ear which practically all open into the inferior petrosal sinus. When this back-pressure is severe and prolonged, hæmorrhages may occur. It also explains why hæmorrhages under these conditions are very seldom seen in the middle ears, as the venous drainage here is chiefly outwards towards the pterygoid plexus and towards the venous plexus around the internal carotid artery. J. A. KEEN.

The Clinical Significance of Pulse Alterations in the Course of Complicated and Uncomplicated Aural Diseases. Privatdocent Dr TH. NÜHSMANN, Halle. (*Archiv für Ohren-, Nasen-, und Kehlkopfheilkunde*, September 1926, Bd. 115, Heft 4.)

Nühsmann records a pulse rate of 100 on the 37° C. line of his temperature charts, a pulse of 80 on the 36° C. line and so on, adding or deducting twenty beats for each degree. Thus in health the pulse curve lies below and parallel to the temperature curve. A divergence of the two curves due to the onset of intracranial complications is obvious at a glance. The pressure of the cerebrospinal fluid is entered in figures in a space below at each lumbar or occipital puncture. The advantages of this system are illustrated by ten charts with brief clinical notes.

He discusses at length the relative rôles of toxic irritation of the vagus centre and increased intracranial pressure in slowing the pulse, summarises certain experiments made by American and Continental workers bearing on the production of the so-called "Cerebral" pulse (Hirndruckpuls), and states his own views as to the mechanisms concerned. A bibliography is appended.

WM. OLIVER LODGE.

A Clinical and Experimental Study of the Pathogenesis and Treatment of Tinnitus. GEORG KEREKES, Budapest. (*Beiträge z. Anatomie, Physiologie und Therapie des Ohres, der Nase und des Halses*, 1925, Bd. xxii., pp. 241-68.)

In this important paper Dr Kerekes suggests a reasonable hypothesis for the mechanism of tinnitus.

He defines tinnitus as "an acoustic perception caused by a condition of irritation of the end-organ or tract, and evoked by stimuli, specific or non-specific, arising within the body." Thus tinnitus may be due to one or both of two factors, increased irritability and

lowering of the threshold of stimulation within the tract, or abnormal irritants without. Such irritants he describes as "specific" or "non-specific," and it is with them that his work is principally concerned.

(*Note.*—In the original Dr Kerekes uses "adequat" and "inadequat." In a letter to me he very courteously explains the significance which he attaches to these words. I venture to translate them as "specific" and "non-specific" in terms of Weber's law.—F. W. W.-T.).

The specific stimuli, vascular and muscle sounds, are inaudible under normal conditions, just as Purkinje's figures are normally invisible; they become audible, and so cause tinnitus when interference from without is abolished, for instance, in a noise-insulated room, or when the conditions of sound transmission in the ear are modified; such modifications may be due to alteration in resonance, *e.g.* when the cellular system is obliterated in mastoid disease, to alterations in the conducting mechanism, such as ankylosis of the ossicles, or to alterations in the character or tone of the sounds themselves.

The non-specific stimuli which directly affect the nerve elements of the tract, are classified as follows:—

(1) Mechanical—tumour, meningeal adhesions.
(2) Toxic—quinine, lead, salicylates.
(3) Disease of the acoustic end-organ—labyrinthitis.
(4) Specific nerve changes. Syphilis, disseminated sclerosis, disorders of internal secretion, uricæmia.
(5) Circulatory (trophic) changes:—
    (*a*) Of the blood tissue — defective oxygenation, blood diseases, leukæmia, the anæmias.
    (*b*) Of the circulation—
        i. General arterial change.
        ii. Local change—either organic change in the vessel wall or spasm of the vessel.
(6) Reflex irritation.

Such a classification is useful, but it cannot be applied arbitrarily; the overlap is too great. It may be taken, roughly, that in diseases of the transmitting mechanism the tinnitus will be due principally to the specific stimuli, in nerve deafness to the non-specific. But apparently, in similar diseased conditions, the tinnitus is sometimes present, sometimes absent; in widely dissimilar conditions of disease identical sounds are heard; and in similar conditions of disease widely dissimilar sounds may be present. On such grounds Kerekes suggests that there is usually a second factor at work, and this factor he suggests is a reflex, and a reflex that has an effect on the circulation. Reflex tinnitus produced by lesions of the trigeminal has been described;

is there any other sensory nerve which can produce such an effect? In a patient with tinnitus, who had a large perforation of the membrana tympani, Kerekes found he could always produce the tinnitus by light pressure on a sharply-delimited area on the supero-posterior portion of the promontory. This "point of irritation" was found in a number of patients; tinnitus was abolished by painting with cocaine, but was unaffected by adrenalin. From this he deduces that the abolition of tinnitus was due to interference with a nerve, probably a portion of a reflex arc, and not to ischæmia. As the point of irritation corresponds with the point where the nervus tympanicus of the glossopharyngeal forms an anastomosis with the tympano-carotic rami of the sympathetic, and as no central connection between the nervus glossopharyngeus and the acusticus has been made out, Kerekes suggests that here we are dealing with a reflex arc affecting the circulatory supply. Further, he suggests that such stimulation causes an ischæmic paræsthesia, and that here, as elsewhere, the end-organ affected responds to stimulus by the production of its own disordered sensation. He then gives details of a series of experiments on the blood-pressure during stimulation or anæsthesia of the promontory. His results are interesting and suggestive, but, as he points out, the variations in blood-pressure are small and the margin of experimental error is considerable; also, the actual response obtained varied greatly, and the number of patients who gave reliable results was small (only fifteen). A far larger number, and more constant variations, would be necessary to establish his thesis. The best results of treatment were obtained with sodium nitrite administered over long periods. In many cases the improvement in the tinnitus was associated with improved hearing. Dr Kerekes has made a valuable contribution to our subject; it is to be hoped that the work will be continued over a larger number of cases. F. W. WATKYN-THOMAS.

The Influence of Vision on Vestibular Rotation Nystagmus and After-Nystagmus. J. OHM, Ophthalmologist, Bottrop. (*Zeitschrift für Hals-, Nasen-, und Ohrenheilkunde*, Bd. xvi., Heft 4, p. 521.)

The rotation nystagmus induced in the light is to some extent optical rather than "aural." By means of the nystagmograph working on the closed eyes, the movements may be registered in the dark as well as in the light. In the light the nystagmus during rotation is more pendular than the typical "after-nystagmus." The post-rotational nystagmus arrives at its fullest development and longest duration in the dark, whereas in the light it is quickly extinguished by the action of seeing. The fact of optical nystagmus, being more marked in the dark (poor light) than in a bright light, has some bearing on the development of miners' nystagmus. JAMES DUNDAS-GRANT.

Abstracts

THE LARYNX

The Movements of the Larynx, their Physiology and Pathology. J. WELEMINSKY (Vienna). (*Zeitschrift für Hals-, Nasen-, und Ohrenheilkunde*, Bd. xvi., Heft 3, p. 374.)

The development of the various muscles from their original form as merely sphincters is briefly sketched. In regard to closure of the glottis attention is drawn to the forward movement of the apices of the arytenoids to meet the epiglottis. In the process of swallowing importance is attached to the suction-action of the gullet. The cricothyroid muscle is allowed a share in the closure of the glottis in phonation. The mechanism of the falsetto voice is deduced to a considerable extent from a study of the movements of the cartilages by external palpation. The whole larynx is raised and the cricoid cartilage drawn closer up to the thyroid. The thyroid tilts somewhat forward without the hyoid bone accompanying it. The cricoid is drawn back firmly against the vertebræ so that if during falsetto production we press backwards on the cricoid no change in tone takes place, whereas during chest production such pressure would cause a rise in pitch or a change into falsetto. If pachydermia affects the cartilaginous part of the glottis the outward movement of the cord may be limited, and a stage may be reached when the muscular process of the arytenoid cartilage does not get behind the centre of rotation on the convex surface of the joint. The posticus will then be at such a disadvantage that it may fail to produce abduction, and a more or less complete immobility of the cord may result. What we recognise as "paresis of the internal tensors" is due to a "combined insufficiency of the internal tensors and the cricothyroid." Persistent falsetto-prolonged break (mutation) is essentially a paresis or "insufficiency" of the internal tensors. Paresis of both cricothyroids may be compensated for by the other auxiliary muscles and a useful voice be present. Unilateral paralysis produces a vertical rotation of the thyroid cartilage towards the sound side. Weleminsky has observed defective action of the cricothyroids in his cases of stammering. In paralysis of the recurrent nerve he attributes the median position of the cord mainly to the action of the cricothyroids, though the fibres of the "stylo-pharyngeus" which are inserted into the arytenoid cartilage may take a share. The attainment of the cadaveric position is favoured by the action of the elastic tissues (of the crico-arytenoid joint). Weleminsky confirms the accuracy of the "Rosenbach-Semon" law while offering supplementary explanations. There are many other points of interest in this elaborate paper, but those which present most novelty have been selected. JAMES DUNDAS-GRANT.

The Larynx

The Question of Myopathic Laryngeal Paralysis and of the Rosenbach-Semon Law. K. W. CLAUBERG (Berlin-Schöneberg). (*Zeitschrift für Hals-, Nasen-, und Ohrenheilkunde*, Bd. xvi., Heft 2, p. 299.)

Clauberg revives the view that owing to its higher functional activity the posterior crico-arytenoid muscle requires an extra amount of blood and is, therefore, specially likely to attract toxic material. He examined with the microscope specimens from the various muscles of the cadaver and found the muscles of the larynx, particularly the posterior crico-arytenoids, were those which showed cloudy swelling and fatty degeneration. This condition was often present although there might have been no clinical signs of its existence. He considers this as a support and explanation of Semon's Law, which is a special case of a general biological one. JAMES DUNDAS-GRANT.

The Surgical Treatment of Paralysis of the Vocal Cord and of Paralysis of the Diaphragm. LIONEL COLLEDGE, M.B., B.Ch. Camb., F.R.C.S.; and Sir CHAS. BALLANCE, K.C.M.G., M.S., F.R.C.S. (*Brit. Med. Journ.*, 26th March and 2nd April 1927.)

A series of experiments performed on the monkey and the dog show that anastomosis of the recurrent laryngeal nerve with the phrenic nerve — either end-to-end or end-to-side — is successful in restoring movements of abduction and adduction of the cord.

It was found that after six or eight weeks the inner border of the cord became straight and tense, in fact tension was more marked than in the normal cord. Four months after the first end-to-end anastomosis was carried out both cords were moving equally in quiet respiration: six months after operation the previously paralysed cord moved more strongly than the other, and at the end of the seventh month there was excessive, almost violent movement as compared with the vocal cord on the normal side. This is explained by the stronger nerve current passing through the phrenic nerve which has normally to innervate one half of the muscle of the diaphragm.

Several methods were adopted in these experiments; in some cases the root of the phrenic nerve from the third cervical nerve, or the root from the fourth cervical was united side-to-end with the recurrent laryngeal; in others the same roots were united end-to-end with the recurrent laryngeal; in others the divided recurrent laryngeal was united end-to-end to the proximal segment of the divided main trunk of the phrenic, and in yet another series the divided recurrent laryngeal was anastomosed end-to-side to a small lateral incision made in the side of the main trunk of the phrenic.

The writers think that the last-named method is the operation of choice, if there is sufficient length of recurrent laryngeal nerve to bring

across the carotid sheath to the side of the phrenic nerve without tension. If, however, the available length of recurrent laryngeal nerve is not sufficient, then the phrenic nerve must be divided and its proximal end brought across to meet the recurrent laryngeal.

A partial or complete paralysis of the corresponding half of the diaphragm follows, but in a few weeks the paralysis passes off. The most rapid recovery of the diaphragmatic muscle occurred when the distal cut-end of the phrenic nerve was anastomosed to the proximal cut-end of the descendens noni nerve. The authors remark on this rather unexpected result, as they had in previous experiments failed to get any return of function in the vocal cord by anastomosing the cut laryngeal nerve to the descendens noni. In the series in which end-to-side recurrent laryngeal-phrenic anastomosis was performed, some cases showed arrest or delay of complete recovery either in the vocal cord or the diaphragm, or in both. It appeared that the nerve was overtaxed by the pursuit of the double objective.

One of the authors has performed the operation on a woman who suffered from paralysis of both vocal cords after removal of a thyroid tumour. An end-to-side recurrent laryngeal-phrenic anastomosis was effected. Five months after the anastomosis on the right side, and four months after the operation on the left side, both cords were showing slight abduction excursions in tranquil respiration, and the paralysis of both halves of the diaphragm had disappeared. In previous experiments on animals the writers had noted that increased movement of the cords was obtained by partial asphyxiation of the animal.

This observation is being utilised in the case of the patient referred to who is being re-educated by exercises in holding the breath. She is also having a galvanic current passed across the larynx for ten minutes once or twice daily. Altogether twenty experiments have been performed in which the recurrent laryngeal nerve has been anastomosed to the phrenic nerve or its roots, and details are given of the results of each. There is also given an interesting description of the authors' method of filming the cords. T. Ritchie Rodger.

PERORAL ENDOSCOPY.

(Cases of Foreign Bodies.)

Complete Upper Tooth-Plate removed from the Œsophagus. G. S. McReynolds and M. D. Temple. (*Journ. Amer. Med. Assoc.*, 7th August 1926, Vol. lxxxvii., No. 6, p. 407.)

A man, aged 65, was syphilitic and alcoholic. He had a severe choking spell in a restaurant, was unable to eat, and went home. He had no pain, but complained of difficulty in swallowing, breathing, and talking. He was seen by his physician, who failed to make the

diagnosis. Thirty-three days later, after losing 30 lb., he was seen by the author, and at the time of the examination denied the possibility of a foreign body. Examination with a laryngeal mirror disclosed something white extending across the hypopharynx. X-Rays showed a full-sized upper tooth-plate. This was removed through a Jackson's laryngoscope with alligator forceps; it measured $2\frac{1}{2}$ inches each way. ANGUS A. CAMPBELL.

Contribution to the Study of Foreign Bodies impacted in the Respiratory Tract. B. WISKOVSKY. (*Archives Internationales de Laryngologie*, November 1926.)

This paper concerns twenty cases of foreign bodies which had sojourned in the respiratory tract for periods varying between twelve hours and twenty-four days.

Of these patients, seven were under 2 years, eight between 2 and 11 years, and five were adults.

A short clinical account is given, upon which are based the author's remarks.

He considers the pulmonary signs of emphysema and moist râles, which often accompany the impaction of a foreign body in the air passages, to be due to a reflex and not to an inflammatory cause.

The author discusses the etiology of post-bronchoscopic stenosis, originating shortly after bronchoscopy, and states that it is not due, in all cases, to the presence of subglottic œdema, but to subglottic fibrinous laryngitis. He discusses the indications for tracheotomy and intubation in this variety of acute stenosis. MICHAEL VLASTO.

A Contribution to the Question of Foreign Bodies in the Lung. P. HORNUNG. (*Münch. Med. Wochenschrift.*, Nr. 21, Jahr. 73, S. 867.)

The case-history is given of a boy, aged 9 years, whose father had died of pulmonary tuberculosis. The tuberculin reaction was always positive; the case was for five years considered to be one of pulmonary tuberculosis and kept in a sanatorium, though tubercle bacilli were never found in the sputum. The physical signs and symptoms favoured this diagnosis, as also did the Röntgen examination, which showed a broadened hilus, several chalk deposits as large as a pea in each lung and a primary focus in the right inferior field.

Finally the boy coughed up a small screw (7 mm. × 9 mm.), after which his cough and expectoration ceased and his general condition measurably improved. The writer deducts that the existence of the foreign body did not apparently raise the susceptibility of this boy to pulmonary tuberculosis. J. B. HORGAN.

Abstracts

THE ŒSOPHAGUS.

The Treatment of Cancer of the Œsophagus. ("Section of Surgery," *Proc. Roy. Soc. Med.*, 3rd November 1926.)

In opening the discussion, Mr F. J. Steward dealt first with the palliative, and afterwards with the curative treatment. He reviewed his personal experience of the palliative treatment from the year 1896 onwards.

In the early days of his practice, treatment by means of Symonds' tubes was the rule, but gradually tubes were abandoned in favour of gastrostomy, and for several years now no tube of any kind had been used and gastrostomy was always advised.

Early gastrostomy was the only means of ensuring that death will not take place from starvation.

With regard to curative measures—radium and surgical extirpation —radium had been used largely now for the last eighteen years, and the results were disappointing. There were still some factors which we did not understand, and the future of radium treatment depended for better results upon earlier diagnosis, more exact knowledge of the extent of the disease, and more powerful dosage.

In dealing with surgical excision, the operation on the cervical part of the œsophagus, it was hoped that modern improved methods would decrease the mortality, which in twenty-five cases reported by Von Acker in 1908 was 56 per cent.

Finally, the operation on the mediastinal portion of the tube had been practised. Many cases have now been operated on in recent years, but very few have survived more than a few days. The cases of Torek, Lilienthal, and Eggers, described in detail, were the only three cases to survive the operation. Torek and Eggers used a trans-pleural route, whilst Lilienthal did a multi-stage extra-pleural operation.

Steward described three cases in which he explored the mediastinal growth with a view to removal, and his method closely followed that of Lilienthal. Unfortunately, all three cases ended fatally. Clinical investigations were confirmed both at operation and at the post-mortem.

As the technique improves, better results may be looked for, an opinion based on five considerations which are given.

Mr H. S. Souttar differed regarding the operability of these cases, and favoured treatment by means of the tubes which he has devised. He did not believe that 5 per cent. of the cases which came to the surgeon were operable, and he questioned if removal of the growth as a routine treatment could be justified, even if a few cases were entirely successful. He considered that to be able to make the patient swallow comfortably until the end of his life was all that it was possible to do in many cases.

Miscellaneous

Mr A. Lawrence Abel attributed great importance to dealing with the teeth. He advocated local anæsthesia in gastrostomies, described two accurate methods of measuring the length of a carcinomatous or other stricture in the œsophagus, told of his failures with Souttar's tubes, and made a strong plea for further attempts at the radical cure of the condition.

Mr T. B. Layton thought there was room for both methods of treatment, and agreed that the patients in all cases should be made edentulous. He described what was in his experience the best method of removing the teeth, and ended by saying that there should be more co-operation between the specialist and the surgeon in deciding what was to be done in these cases. G. B. BRAND.

MISCELLANEOUS.

Observations on Salivary Secretion and Associated Clinical Findings. R. A. BARLOW, M.S., Jackson Clinic, Madison, Wis. (*Annals of Otology, Rhinology, and Laryngology*, December 1926.)

Cases of "canker sores," burning tongue, sore mouth are often sent to the laryngologist with a view to operative treatment, removal of tonsils, etc. The results of such treatment are always unsatisfactory. In other cases the conditions may give rise to a marked phobia relative to cancer.

It has been commonly accepted that acid saliva is an etiological factor in such cases, and alkaline mouth washes, sprays, and gargles have been given accordingly but without success. After carrying out a careful chemical analysis of the saliva in cases of stomatitis it was found that the acid-content is not definitely altered at all. There is certainly no increase in the acidity. The author next studied the acidity of the gastric secretion in those cases, and found the secretions were bordering on a low acid-scale though not showing true hypochlorhydria.

These conditions should therefore be looked on as oral manifestations of some general disturbance, an imbalance of the nervous mechanism, the sympathetic system playing such an important rôle in regulating both the salivary and the gastric glands.

It seemed therefore not unreasonable to state that the sore mouth may have its causative factor in a relatively high acid-content of the saliva as compared with the decreased acidity of the gastric secretion.

In view of the above findings patients with stomatitis, burning tongue, canker sores were given hydrochloric acid (diluted) 10 drops to a dram, three times a day in water, with gratifying results.

NICOL RANKIN.