others mentioned) was heard from vertex and teeth. The tuning-fork C[4] was not heard at all. The shrill whistle of a distant factory was heard. Their own voices the patients could scarcely hear. In other cases of total or nearly total deafness of both ears, in which also only the large tuning-fork C was heard, the writer found sometimes a preponderance of bone conduction over aërial in one ear, while the other ear gave an opposite result. Gradenigo (*op. cit.*), who used tuning-forks of the same size and make as the writer, obtained similar results from his experiments. The examination of children with tuning-forks is, however, in most cases, very unsatisfactory in its results, as many of them are apathetic and indifferent, and can rarely be induced to produce, by singing, the tone of the fork, and one is, therefore, never certain whether they hear the fork or simply feel its vibrations.

The objective examination of the ear may reveal a perfectly normal condition of the drum membrane, the tympanic cavity, and the Eustachian tube, or evidence of present or past disease of these structures. Acute catarrh of the middle ear will be found present in an inconsiderable number of cases, and changes in the drum membrane, evidently the remains of bygone disease, in many others. Symmetrically placed areas of redness (localized periostetitis) on the posterior and upper wall, in close proximity to the drum membrane, in both external canals, were observed in a well-marked case of this disease by Buck (Transactions of American Otological Society, 1889, p. 62). Disease of the naso-pharynx is as often present as it is not. Perforating ulcers of the hard and soft palate, caries and necrosis of the naso-cranial bones, and ulceration of the larynx will be found in a small percentage of the cases.

The diagnosis of the peculiar ear affection under notice presents no difficulty if, in addition to the aural symptoms previously described, other symptoms of syphilis hereditaria tarda are present or have preceded the ear trouble. In addition to the eye diseases already mentioned, these patients often suffer from chronic inflammation of the knees or other large joints. The knees are often very much enlarged and locomotion may be painful, but there is rarely spontaneous pain. The disease usually passes off in the course of a few weeks, leaving the joints apparently in as good a condition as they were before the attack. Nodes on the long bones are also not infrequently present. With regard to the peculiarities of the teeth, Hutchinson says: "If the upper central incisors are dwarfed, too short, and too narrow, and if they display a central cleft in their free edge, then the diagnosis of syphilis is almost certain. If the cleft is present and the dwarfing absent, or if the peculiar form of dwarfing is present without any conspicuous cleft, the diagnosis may still be made with much confidence." Perforating ulcers of the hard and soft palates, deep ulcers of the pharynx, caries and necrosis of the naso-cranial bones, and laryngitis are less often seen than the other affections above mentioned. The patients, moreover, often have withered and old-man-like features, a peculiar square form of the forehead, prominent frontal eminences, a sunken nose, and scars about the angles of the mouth.

With regard to this disease Hinton[34] remarks that he knows of no other affection, except fever, which in a person under twenty years of age brings on a deafness so rapid and complete, and Hutchinson says that it may be broadly stated that if a child or young person, without either earache or otorrhœa, becomes quickly and completely deaf, the patient is almost certainly syphilitic. The writer has, however, recently met with two cases, both in vigorous boys, without the slightest sign of syphilis, in whom nearly total deafness was very rapidly developed while they were in excellent health. No disease of the middle ear could be discovered, and no febrile disturbance preceded or accompanied the onset of the deafness. Examination failed to reveal intracranial disease at the time, and none has developed since. The parents of these boys absolutely denied having had syphilis. Other otologists have doubtless met with similar cases, and have, like the writer, come to the conclusion that hereditary syphilis of the ear cannot be diagnosed from the symptoms presented by the ear affection alone.

From the ordinary catarrhal inflammation of the middle ear (from which syphilitic children are no more exempt than others) the disease here described can be readily distinguished by the clinical history and the results of the local treatment.

In the absence of post-mortem examinations of the organs of hearing of typical cases of this disease, the writers on this subject are divided in the opinion as to the seat of the lesion. Hutchinson thinks it tolerably certain that the internal ear or the nervous apparatus is the seat of the affection, but as to the exact site and the nature of the morbid process he is still in doubt, and most English writers are of the same opinion. Politzer and Schwartze do not hesitate to speak of the disease as inherited syphilis of the labyrinth, and Gradenigo calls it a syphilitic otitis interna. The view that both the conducting and the nervous apparatus are liable to be involved in this disease is held by Hinton and others, and Roosa has come to the conclusion that the disease is one chiefly of the peripheral and not of the central part of the organ of hearing. The view expressed by the writer in another place,[64] that disease of the nuclei of the auditory nerves might be the cause of the deafness, he has now abandoned, and a larger experience and further study of the disease leave but little doubt in his mind that the labyrinth is involved in all cases, and that in many, both it and the middle ear are the seat of the morbid process. The apparently normal state of the accessible parts of the middle ear found in acute cases, together with the total deafness for the voice with which the disease ends, must be regarded as strong evidence that the auditory nerve is the part affected, and the absence of other signs of cerebral disturbance makes it positively certain that its terminal apparatuses are chiefly affected. The results of tuning-fork tests cannot be utilized, as we have seen, in the settlement of the question as to the seat of the disease. That in many cases evidences of disease of the middle ear are not wanting is generally admitted, but they are rarely sufficiently marked to account for the profound deafness. The usual treatment for the middle-ear affection of children, moreover, is rarely followed by improvement in the hearing, even in the cases in which, under it, the objective signs of the disease disappear.

The purulent inflammation of the middle ear, with perforation of the drum membrane, which developed in several of the writer's cases years after the attack which destroyed the hearing, may have been due as well to a gradual increase in the inflammation of the lining membrane of the middle ear as to an extension of a purulent inflammation from the inner ear to the tympanic cavity.

Treatment is generally regarded as of no avail in any except very recent cases. Hutchinson thinks it more than justifiable, having regard to the terrible results in prospect, *in early* stages of ear disease of this type from inherited taint to confine the child to bed and induce ptyalism quickly. Knapp has reported a case in which a cure occurred under the use of mercury; but the writer, who adopted Hutchinson's advice in a number of cases, has been unable to arrest the progress of the disease in a single one. The iodide of potassium has been given in such cases by the writer for many years, and sometimes with apparent benefit, which, however, was generally transient. Buck saw marked improvement follow the administration of this remedy in gradually increasing doses (gr. v. to gr. xxxviij. three times a day). If middle-ear disease is present, it should be treated by inflation and other means, and even in cases presenting no marked evidence of a middle-ear affection it is best to give the patient the benefit of the doubt and treat him locally as well. Pritchard advises repeated blistering behind the ear for several months in all cases, and as it can do no harm it may be worth while to try it. Hinton has seen striking improvement follow in a severe case from scruple doses of hydrochlorate of ammonia, and has seen good effects produced by the injection of iodine vapor into the

tympanum in less marked cases. Favorable hygienic surroundings and a sufficiency of good food are, of course, to be desired in the treatment of all cases of ear disease, but, if the writer may judge from his personal experience, they have little or no influence on the course of this disease.

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EAR DISEASES: TRAUMATIC AFFECTIONS.—For the sake of orderliness and convenience it is proposed to discuss the subject of injuries to the different parts of the organ of hearing under the following heads: Traumatism of the Auricle, Traumatism of the External Auditory Canal, Traumatic Perforations of the Membrana Tympani, Gunshot Wounds of the Ear, and Fractures at the Base of the Skull involving the Petrous Portion of the Temporal Bone.

Traumatism of the Auricle.—The exposed position of the auricle renders it particularly liable to various forms of injury. The importance of these injuries depends entirely upon the extent of the deformity. Superficial bruises and light forms of contusion generally fade away rapidly without leaving any disfigurement. Perichondritis, ulceration, or gangrene rarely follows the lighter injuries, but if the cartilage has been weakened by previous disease the tendency to ulceration is thereby much increased. Ulceration of the cartilage frequently results in auricular deformity. Fracture of the cartilage is not infrequently seen when the violence has been very severe. Incised wounds, even when there has been more or less loss of tissue, usually terminate favorably. Union occurs by first intention if the edges of the wound are brought together by interrupted sutures under strict antiseptic precautions. Piercing the lobe of the ear is a practice liable to cause violent inflammation, gangrene, and possibly tetanus. The dragging of heavy earrings is apt to produce a condition known as cleft ear, which is easily corrected by a plastic operation. Where the lobe is torn or cut, the edges of the wound should be brought together and sutured. The absolute loss of the auricle from any cause does not appear to affect the hearing power to any appreciable degree unless, as a result of replacing the severed member, atresia of the auditory canal develops during the process of healing. Should replacement be impossible, an auricle made of papier-maché will be found a very serviceable substitute.

Traumatic hæmatoma auris, or othæmatoma, is caused by the severer forms of injury and is more frequently seen on the left auricle than on the right, seldom on both. It is characterized in most cases by an effusion of blood between the perichondrium and cartilage, but should the violence be slight the effusion may be limited to the layers of the cartilage, or it may be simply subcutaneous. The tumor is a circumscribed swelling of a bluish-red color and appears most frequently in the fossæ triangularis and scaphoidea. It is rarely fluctuating and is hard or soft to the touch. Considerable pain and a feeling of fulness and heat are usually experienced during its development. The entire auricle is but seldom involved. Perfect absorption of the sanguinolent fluid will insure a normal restitution of the part, but imperfect absorption will, on the other hand, lead to organization of the fluid with cicatricial thickening, contraction, and atrophy, producing a shrivelled mass so well known to pugilists —the shrunken or cauliflower ear. The lighter forms of traumatism of the auricle rarely require any treatment. In hæmatoma the treatment should be expectant, and if the tumor is painless it is better not to interfere at all. Massage and fomentations tend to increase the effusion rather than favor its absorption. Evacuation of the swelling by aspiration is advised only when positive signs of pus are present, or after local treatment fails to relieve the pain. The application of ice, or ice water by means of the Leiter coil, or the use of Goulard's solution tends to reduce the violence of the inflammation and pain. Incision and packing the cavity with gauze are to be resorted to only when other means fail to effect a cure.

As a result of personal encounters, the practice of biting the auricle is not infrequently seen in foreign countries and among our foreign population. Various degrees of mutilation, from incised wounds to total amputation,