serted between the crura. In 6 of the cases, which had not been dizzy before, vertigo, more or less severe, followed the operation, persisting for more than a month in 3 of them, in 1 for nearly a year, and in but 3 out of the 21 cases was there improvement in hearing, except temporarily.*

As an example of the feasibility of operation upon the middle ear through the exploratory tympanotomy opening, the following case, that of a woman fifty-five years of age, in whom the operation included the removal not only of the stapes, but also of the incus, may be cited. At the time of operation, there was marked decrease in hearing in both ears in consequence of chronic, non-suppurative disease of long standing, and in the right ear neither Politzer's acoumeter, nor the tuning-fork, nor the upper portion of the scale of the Galton's whistle was heard. Subsequently to the injection of a two-per-cent. solution of cocaine through the Eustachian catheter, the crescentic, peripheral cut in the right drumhead was made with but one application of cocaine solution to the edges of the cut and with but little discomfort to the patient. Tests of hearing at the end of the first stage of the operation showed no improvement either by aerial or by bone conduction, and served to confirm the diagnosis of fixation of the stapes in consequence of the long-continued thickening process in the middle ear. Careful tactile examination of the accessible portions of the inner tympanic wall, especially in the neighborhood of the fenestral niche, by means of a probe, showed lack of sensitiveness to touch, with the exception, perhaps, of a slight pricking sensation; if, however, the probe came accidentally or intentionally into contact with the cut edges of the drumhead, especially upon the superior posterior margin, there was a sense of discomfort, which amounted to pain as the effect of the cocaine passed off, which it apparently did before the more important part of the operation was concluded; care was therefore taken in subsequent manipulation to avoid touching the edges of the opening. Under these conditions the operation, including tenotomy of the stapedius muscle, disarticulation and removal of the stapes, was continued and completed without pain. The division of the tendon caused to the patient the sensation of a dull thud, and in dividing the articulation between the incus and stapes the grating sound made by the knife was similarly heard. The ankylosis at this point was very firm, and disarticulation was effected with such difficulty that at its completion the incus dropped not only outward, but also slightly downward, in such a manner as to show that it was separated from the malleus also; its removal, therefore, seemed advisable, and this was easily done by means of the blunt hook and forceps, the only pain caused being incident to the passage of the body of the incus through the opening in the drumhead. The stapes was now plainly in view, and as no improvement in hearing had thus far been effected, this bone also was extracted, by means of a blunt hook passed between the crura from above, and came away with a sensation, to the patient, of a loud report, but without causing either pain or vertigo; the pulse, which had been 80, rose to 100 and became weaker, but returned to its former rate and volume within two minutes. Subsequently to the operation there was no other discomfort than that naturally incident to having the head held for a long time in a constrained position, and in this respect, as well as in the conditions of the operation itself, the result was a satisfactory one, although the hearing was not materially improved.

In a man twenty-nine years of age the hearing in both ears had become impaired, and in the left ear gravely affected, as the result of a chronic non-suppurative disease of the middle ear. The Politzer acoumeter was heard only when held so close to the ear that the hammer was on a line with the posterior border of the concha; the tuning-fork (512 v. s.) was heard aerially $\frac{8}{8}$, and by bone conduction $\frac{2}{8}$; Politzer's forks, Nos. 1 and 2, were not heard aerially, nor was a Galton's whistle, ranging from 6,000 v. s. to 12,000 v. s.

After the first stage the operation was painless, except when the shaft of the instrument touched the cut edges of the drumhead, but it was accompanied by the auditory sensations incident to tenotomy and disarticulation.

Efforts at mobilization showed the stapes to be firmly fixed, and in an attempt at circumcision by means of a fine paracentesis needle, the knife met with bony resistance on the superior and posterior borders of the niche, and gentle traction, made with a blunt hook, resulted in the coming away of the head and both crura of the stapes broken off close to the foot plate. There was no sense of suction on this extraction, no vertigo, no change in pulse, and no special sensations to the patient, except a snapping noise which was presumably heard at the moment of fracture. Investigation of the fenestral niche by means of a probe showed the base plate to be apparently fixed by bony union, especially to the posterior and superior niche walls; subsequent examination of the crura showed them to be distinctly atrophied, as is the case in long-continued ankylosis of the base plate of the stapes. The whole operation, including the tests of hearing made during its progress, lasted but twelve minutes and was without pain to the patient, who was, however, it should be said, a well man of an equable temperament. Five days after the operation, during which interval there had been neither pain nor other discomfort, the hearing test gave the same result for Politzer's acoumeter and for duration of the tuning-fork aerially; but the hearing was improved in the following respects: Galton's whistle, previously not heard at all, was now heard throughout its whole register; the tuning-forks, Nos. 1 and 2, were heard plainly, as was also the voice in a low tone, close to the ear; a loud voice, however, even if one or more feet distant, was heard only confusedly.

Clarence John Blake.

EAR DISEASES: SYPHILITIC AFFECTIONS.—I. Acquired Syphilis — Auricle. — *Primary syphilitic chancres* have been but very seldom seen on the auricle and the adjacent parts. Desprès[1] found among twelve hundred syphilitic patients one with a chancre (soft) on the auricle. Pellizzari[2] reports having seen a primary sore on the lobule, and thinks that it was caused by the use of a towel which the son of this patient had previously used in cleaning a sore on his penis. Hermet[3] saw a chancre on the lobule of a woman's ear, which resulted from a kiss by her infected husband. The same author[4] saw also, in the clinic of Dr. Fournier in Paris, a phagedenic hard chancre on the lobe and the posterior part of the lower third of the auricle, caused by the bite from an infected individual. A similar case, due to a bite, has been observed also by Hutchinson.[5] Hulot[6] saw a chancre on the base of the tragus, the origin of which was problematical. Zucker[7] has described at length the history of a case of chancre on the outer surface of the tragus. A chancre on the mastoid process in a man, due to the kiss of a prostitute, has been observed by Mracek,[8] and another in the same place in a child, caused by infection from the nurse, has been described by Hulot.[6] Finally, Lincke,[9] speaking of otitis syphilitica externa, says that it attacks sometimes the auricle, at other times the external canal, or it may attack both parts simultaneously, and that it manifests itself usually in the form of a chancre.

As far as can be seen from the description of the cases here cited, the chancres presented the usual appearance; the lymphatic glands in the vicinity were enlarged and indurated. In Zucker's case the tragus was of a livid red color, of twice the normal thickness, and on its anterior surface was a pigmented radiating cicatrix. The

* In a case of destruction of the drumhead and loss of the malleus and incus incident to suppurative disease in childhood, there had been no cicatrization. The mucous membrane of the tympanum was clear, dry, and transparent; the stapes was plainly visible in the niche, but without attachment of the stapedius muscle. For hearing purposes this ear (the right) was practically useless. Removal of the stapes, which came away easily with a slight sense of suction, was followed by an outflow of fluid and immediate increase of hearing (the voice being heard twenty feet) and a severe vertigo; the hearing and vertigo lasted ten days, and then both disappeared.

entire parotid region was involved in the process; it was greatly swollen, felt as hard as a board, but was not at all painful. There was no secretion from the external canal, and the hearing was but slightly diminished in acuteness. In this case the diagnosis of primary syphilitic infection was facilitated by the recent appearance, on the surface of each hand, of three or four small, round, slightly scaly efflorescences. The genitals were intact, and the inguinal glands were not swollen. A course of inunctions produced a perfect and rapid cure.

A primary sore on the auricle may be mistaken for cancer, from which it differs, however, in that it presents a clean surface and secretes but little. The nearest lymphatic glands usually enlarge with the development of induration in the primary sore.

Secondary and Tertiary Forms.—Manifestations of constitutional syphilis are not very rarely observed in the auricle. Squamous, pustular, and papular eruptions, usually in connection with the same affection on the integument of adjacent parts, but sometimes limited to the auricle and external canal, have been seen by many writers. According to Gruber,[10] papular eruptions are most frequently seated at the point of insertion of the auricle, while exanthematous eruptions appear mostly on the other parts of the auricle. Broad condylomata have been often seen by Desprès on the lobule, and usually in the hole for the earring. Wilde,[11] as far as I know, is the only author who maintains that syphilitic ulceration is by no means uncommon, and that rupia is frequently seated on the external ear.

Tubercular syphilides* and gummata of the auricle have been observed by Zeissl,[13] Burnett,[14] Buck,[15] Field,[16] Hessler,[17] Pelletan,[17] Sexton,[18] Pierce,[19] Ravogli,[20] Woakes,[21] Barklay,[22] Bumstead and Taylor,[23] McBride,[24] and Packard.[65] In all of the cases reported, the affections appeared in the so-called tertiary stage of syphilis. In almost all only one ear was affected, and in the majority of the cases no other symptom of syphilis was present at the time the patient came under observation. The seat of the tubercle or gumma was in the anterior part of the auricle in all the cases, except Burnett's, in which it occupied the posterior surface. A case with symmetrical patches of lupus erythematosus in the concha of each ear, probably syphilitic, was seen by Hutchinson (*loc. cit.*, p. 348). According to Zeissl, the auricle may be the seat of both the dry (non-ulcerating) and the ulcerating forms of gummata, and the latter frequently shows a tendency to the lupoid character in this situation (Fournier). In Burnett's case, which is about the only one recorded in which the disease was seen in its earliest stages, there first appeared a circumscribed infiltrated lump on the posterior surface of the auricle, and this gradually extended until it had diffused itself throughout the tissue of the pinna. It was slightly elevated above the general surface of the auricle, of a deep reddish color, painless, and was not attended with itching; it was inclined to run a slow course. In the space of a month or six weeks the infiltration had diffused itself throughout the greater part of the auricle, and somewhat over the mastoid portion. The thickening and deformity of the auricle had become considerable, the groove behind the auricle was obliterated, and the appendages assumed a firm, thick feeling. This condition lasted for some weeks, then softening and ulceration ensued, the latter beginning in some natural groove or depression. The ulcer thus formed by the breaking down of the gumma may assume any shape, and if not properly treated soon increases in size and depth. The floor of the ulcer is usually ragged and covered with dirty grayish matter which cannot be readily removed. The discharge from the ulcer is often excessively offensive. In several of the reported cases, necrosis of parts of the auricular cartilage and exfoliation of the sequestra occurred, and in Field's case two-thirds of the auricle was destroyed. As a rule, comparatively little deformity seems to result from this affection, sometimes even when the infiltration is extensive and the ulcer large and deep; very often an indelible, depressed white scar is in after-years the only evidence remaining of the gumma. In Barklay's case, in which the cartilage of the concha, tragus, and canal was exfoliated, the general outline of the ear remained normal. The first abnormality to strike the attention was the peculiar deformity of the concha, the upper and lower limits of which were preserved, while the tragus and meatus were absent. The beginning of the helix above was at an oval pit in the concha, and the intertragal notch below was a circular pit. There was a shining, bulging, yellowish spot—resembling somewhat a sebaceous cyst—right over the site of the normal meatus, upon a strong band of cicatricial tissue, extending downward and backward from a spot above and in front of the site of the normal tragus, which band completely closed the meatus. Except a slight tightening of the skin, a seeming loss of subcutaneous tissue on the anterior side, and a slight drawing outward and forward of the auricle, it was otherwise apparently normal. Above and anterior to the site of the normal tragus, and near that of the temporo-maxillary articulation, was a stellate cicatrix.

Packard's case[65] was that of a negro twenty-five years of age. A painful swelling, fluctuating on pressure, developed in the upper portion of the auricle twelve years after the primary sore. There was no history of injury. Under treatment the auricle attained its normal condition, except for the presence of some hardening and thickening of the cartilage, in a month.

The *diagnosis* of the diseases under consideration, as well as of those which I shall treat farther on, must rest largely on the previous history of the case. If syphilitic infection is denied, and necrosis of, or gummata on, the bones are absent, careful search should be made for scars and marks left by secondary affection of the skin and mucous membranes. An ulcerated tubercle may possibly be confounded with lupus vulgaris and scrofulous ulcer. In both of the last-named affections there is, however, very frequently considerable redness and œdema of the skin around the ulcer, while the syphilitic ulcer is, in most instances, sharply bounded by healthy-looking skin. Lupus vulgaris begins, moreover, usually before puberty; its course is much more chronic, and there is but little discharge from the ulcer.

From an ulcerating epithelioma* the syphilitic ulcer

* The tubercular syphilide is a solid rounded nodule of the skin and subcutaneous cellular tissue, and is coppery or purple-brown in color; commonly several tubercles are collected in a group. The tubercle is liable to ulcerate, and its course is slow. Sometimes creeping ulceration attacks a tubercle. When this takes place, little tubercles develop at the margin of the first deposit and merge into each other. The original tubercle soon ulcerates; a scab is formed, under which the ulcer creeps, healing where the tubercle first began to melt away, and spreading by the destruction of the tubercles at the margin of the ulcer. The course of the affection is indefinite, unless controlled by treatment. Ulcerated tubercles always leave indelible white scars. Gummy tumors form solid nodules beneath the skin. Presently the skin becomes absorbed over the tumor, and, bluish-red in color, breaks down in slow ulceration. Sometimes the mass is absorbed before ulceration is reached (Hill and Cooper[12]).

* *Differential Diagnosis between Ulcer, Tubercle, and Cancer.*—Hutchinson (*loc. cit.*, p. 511), speaking of the differential diagnosis between cancer and syphilis, says: "I am most anxious to insist on its extreme difficulty. The surgeon who trusts to rules, or who ventures to rely with confidence on his own powers of observation as regards minute differences of appearance between cancerous and syphilitic ulcers, will often make serious mistakes. Cancerous processes may be simulated by syphilis in the closest possible manner. As a general rule, it may be said that we distinguish between a cancerous ulcer and one that is syphilitic by observing that in the former a process of growth precedes that of ulceration, whereas in syphilis it is at best only one of chronic inflammation. Without doubt this is a most important distinction. In syphilis the edges of an ulcer may be greatly indurated and its base may be firm, but there are seldom any sprouting masses on the surface, or any well-defined margins to the induration, such as we encounter in cancer. Exceptions, however, occur even to this statement, and now and then even a syphilitic sore may be covered with bossy masses of firm granulation structure which closely resemble epithelioma. I possess more than one drawing in which the ordinary features of rodent ulcer, its clean surface, and its sinuous, rolled edge of induration, were so exactly imitated by tertiary syphilitic sores that we had to appeal to treatment for diagnosis. I have not attached much importance, for diagnostic purposes, between syphilis and cancer, on the presence or absence of implication of lymphatic glands. Nothing can be more illusory than to teach that enlargement of the lymphatic glands is one of the *features* by which cancer can be distinguished from other local disease. There is no doubt, however, that in any case which comes under observation late, and with enlargement of the