off without much difficulty; there was a patch of white membrane upon the inner surface of the right lip and inner surface of the right cheek, the neck was swollen, submaxillary lymphatic glands much enlarged. Bacteriologic examination revealed the Klebs-Löffler bacillus, the guinea pig succumbing to subcutaneous inoculation in seventy-three hours.

The chief points in the present paper may be summarized as follows:

1. True diphtheria, *i. e.*, a disease caused by the Klebs-Löffler bacillus, may occur in the mouth both as a primary and as a secondary manifestation.

2. Pseudo-membranous inflammations, clinically indistinguishable from diphtheria of the mouth, may be produced by other micro-organisms.

3. As far as the cases reported go, we must accord this ability to the streptococcus pyogenes and to the staphylococcus pyogenes aureus.

4. Grave septic states have not been observed in those cases where the disease remained limited to the mouth.

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ACUTE MYRINGITIS.

Presented in the Section on Laryngology and Otolaryngology, at the Forty-eighth Annual Meeting of the American Medical Association, held at Philadelphia, June 1-4, 1897.

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The subject of acute myringitis is usually disposed of in a page or two in most text-books, and one of the most popular modern treatises does not even mention it, yet its widely dissimilar course in different patients, its tendency to produce serious lesions, and its painful character render the disease worthy of most careful study. Acute myringitis differs much in type, each having its own pathology, symptomatology and treatment; it is therefore convenient to divide it into simple, desquamative, hemorrhagic and suppurative varieties.

Simple inflammation of the drum membrane is caused by disease of the external auditory canal, of the Eustachian tube and middle ear, or by direct injury from foreign bodies, irritating fluids, cold water, etc. It is one of the commonest of aural maladies, the ordinary cases of slight earache being usually examples of this disease. The symptoms are usually pain, slight deafness and throbbing tinnitus. Pathologically the condition is one of active hyperemia, with serous infiltration of the layer of the cutis. On inspection the drum shows intense congestion of its upper and central portions, and the malleus may be more or less obscured by swelling. This condition usually promptly subsides under appropriate treatment, or in some cases even spontaneously, or it may progress into the desquamative form.

The symptoms in the latter case are always much

more marked than in the earlier stage, pain is often great and boring in character, and deafness may be nearly complete from combined swelling and mechanical obstruction by the large epithelial masses. The epidermis macerates, becomes loose and is finally shed off in large flakes, occasionally representing the whole outer surface of the drum, and the raw corium is thus exposed; the swelling is marked from both serous and cellular infiltration, and the whole membrane becomes friable and soft. Examination may be impossible until the external canal is cleared of the shed epithelia; when the drum is brought into view the position of the manubrium is recognized only by the red lines of engorged blood vessels, and the whole fundus may have a raw beef-like appearance.

The prognosis is recovery in a few days under properly applied therapeutics, but perforations and permanent thickening are exceedingly apt to occur if the case is neglected, or the acute condition with pain and deafness may continue even for weeks. The amount of desquamated skin thrown off is often surprising, the fundus sometimes being found completely blocked with it every two or three days for a considerable period. This is one of the ways that the large dermoid masses, occasionally found in the external auditory canal, are formed.

Hemorrhagic myringitis Politzer considers a rare disease and the writer has not seen above 20 examples in his last 2000 ear cases. It seems to occur only in ears which have been previously damaged by chronic disease—sclerosis, cicatrices, dense impacted cerumen plugs, etc. The blood vessels appear to give way at one or many weak points, and myringial apoplexies result. The symptoms do not differ from those of the desquamative form, but there appears to be more tendency to constitutional involvement—fever, malaise and weakness—and deafness is more apt to be extreme.

The diagnosis is easy on inspection, the dark purple blebs, varying in size from a No. 8 to a No. 1 shot, standing freely out from the generally congested surface of the drum, or from the canal adjoining. Hemorrhagic myringitis is especially apt to run a somewhat chronic course, successive crops of blebs appearing; even under treatment the duration is apt to extend to at least a fortnight. In one case treated by the writer about eighteen consecutive blood blisters formed and were cut, and the treatment had to be continued for about a month. This case occurred as a sequel of epidemic influenza and chronic aural catarrh, and was characterized by constitutional depression quite out of proportion to the severity of the general disease; the drum finally cleared up completely without any permanent injury to hearing.

Suppurative inflammation of the membrana tympani may occur from septic disease of the middle ear or the external auditory canal, or in rare cases is purely primary, such instances not being very uncommon from sea-bathing. In the primary cases a true abscess occurs between the layers of the drum, which may break outwardly, with or without complete perforation of the membrane. Inspection may show the bulging abscess in addition to intense engorgement, or an ulcer the result of its rupture or perforation may have occurred. The symptoms are generally quite severe, the pain being more like that of general suppurative otitis in character. The prognosis is often more favorable than in either the desquamative or hemorrhagic types, a single treatment often effecting a cure.

The therapeutic management of acute myringitis is most important, as the tendency of the disease to produce permanent lesions can nearly always be obviated by proper care and the pain and discomfort promptly reduced to a minimum. In the simple acute type syringe irrigation with a warm boric or carbolic acid solution has a most happy effect; at least a pint of fluid should be used, great care being taken to cause no pain or traumatic injury. The surplus fluid should be lightly mopped from the canal with a soft cotton tuft, and the meatus loosely plugged with gauze or cotton. If the engorgement is intense and desquamation or suppuration is feared, it is my habit to lightly dust the drum with the calendulated boric acid formula of Sexton; this often appears to give great comfort and seems free from objections.

If the Eustachian tube and the middle ear are involved their treatment is most important. This should consist of sedative sprays applied to the nasopharynx, preceded, if much swelling exists, by the very cautious use of a weak cocain solution.

When engorgement is largely limited to the tube and post-nasal region—an acute Eustachian salpingitis of which the myringitis is a sequel—the cocain solution and also the subsequent wash is best applied by the syringe catheter, the utmost gentleness being used. Inflation of the middle ear by Politzer's or other method has never had any but an unfortunate effect, in my experience, when used in this disease; many cases that would have recovered without any treatment are by it converted into examples of acute middle-otitis, and it is only mentioned here in order to condemn it absolutely in true myringitis.

Desquamative inflammation of the drum is a much more serious affection than the preceding, as actual destruction of tissue has necessarily occurred, and calls for very careful management. It is of the utmost importance to entirely clear the aural fundus of the decomposing irritating masses, as their presence is a fruitful source of further mischief. Syringing should be employed as above suggested, but owing to the insolubility of the epithelial masses, their removal can seldom be perfectly accomplished by this means alone. Burnett's double-pointed screw or the writer's L-shaped hook are the most satisfactory instruments for its removal in trained hands; Sexton's or some similar forceps may be employed by the somewhat less dextrous. After thorough antiseptic irrigation and cleansing, the fundus should be thoroughly dried and very lightly dusted with dermatol or the calendulated boric acid. The nose, throat and Eustachian tubes should also receive appropriate treatment if at fault; even the cases due to local traumatism are benefited by relieving a coexistent nasal or pharyngeal congestion; the naso-laryngeal tract should therefore always be subjected to close scrutiny. Rest within doors and tonic treatment are often indicated in desquamative myringitis, and if the symptoms do not at once subside the patient should receive local treatment daily. Persistent thickening may subsequently call for massage, Eustachian catheterization or judicious applications of iodine ointments to the drum after all the acute symptoms have subsided.

The hemorrhagic form of myringal inflammation has been best treated, in my experience, by freely incising the blebs as they appear, gently syringing out the blood clots and insufflating a boric powder containing from 5 to 10 per cent. of alum, a light

coating only being applied to the fundus. The nasotubal tract always needs attention, and tonic treatment is generally urgently needed, these cases occurring only in persons of poor vitality with weak vasomotor nerves and vulnerable vascular systems. As the disease has a strong tendency to recur, any existent chronic affection of the ear should be removed as thoroughly as possible and the general system brought up to its highest tone. The writer has seen several cases in which glaucoma occurred in patients who were the subjects of recurrent hemorrhagic myringitis, which may perhaps be regarded as corroborative evidence of the general blood vessel weakness.

Suppurative myringitis is more often a primary disease than is sometimes taught, being not very uncommon from various forms of external injury. If the purulent exudation be only superficial, syringing with carbolized solution, lightly drying the fundus and slightly dusting with powdered acetanilid, is often sufficient to at once arrest the attack. If interstitial suppuration has occurred the minute abscess should be opened, but only when the whole middle ear is known to be involved is it necessary to cut completely through the drum. While probably the mucous membrane of the tympanum is always congested in suppurative myringitis, it is quite common for cases to at once subside without any discharge from the middle ear or perforation of the drum, even though the swelling of the latter may have been extreme and the external purulent exudation considerable. In a few cases the irrigation and acetanilid may have to be continued for several days, or in rare cases the whole middle ear may become involved and perforation occur; the latter is, however, a most unusual accident under modern treatment.

The object of the writer in this brief sketch has been to call attention to an apparent want in modern otologic literature, and to further specialize the somewhat too generally treated subject of acute otitis. The classification suggested is believed to be new, and to be founded upon perfectly definite pathologic facts.

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DISCUSSION.

Dr. HERMAN KNAPP—In some cases I have not been sure whether myringitis or middle-ear disease existed. Such are the cases where after sea-bathing there is earache, and on looking into the ear we find that the drumhead is softened and reddened, as is also the adjacent portion of the canal. For treatment I have advised rest for several days, with the result that the redness has disappeared without any other treatment. I think that parasitic myringitis should come under this head. It occurs almost exclusively in the drumhead and is not very frequent. It is remarkable that these cases of parasitic myringitis occur more often among the wealthy than the poor. I have treated these cases successfully by 4 per cent. of salicylic acid in alcohol. If this is put into the ear three times a day the parasite is very soon destroyed. I have used the same solution also in parasitic troubles of the throat.

Dr. HEFFNER—Is there any irritation from the instillations of alcohol?

Dr. KNAPP—As I have used it, it does not produce any irritation, and cures these cases more quickly than any other remedy.

Dr. J. A. STUCKY—I am disappointed in the treatment of these troubles of the membrana tympani with the Politzer bag and syringe. The bag should be used cautiously, if at all. I question the use of large quantities of water in cleaning the canal. It rather increases than diminishes the pain. Patients will endure gentle syringing to the extent of two or three ounces of water very well, but it should not be carried to the point of dizziness or discomfort. I have the best results from keeping the patient in the recumbent position for a day or two. Where this could not be done I have had excellent results by administering salicylate of soda in 0.65 gram doses, every two or three hours, and applying locally 10 per cent. of

cocain and resorcin in aqueous solution. The action of the cocain is intensified and prolonged by the resorcin and rendered more readily absorbed.

Dr. SCHEPPEGRELL—As to parasitic myringitis being more a disease of the wealthy than of the poor, my experience has been to the contrary. In hospital work I find many cases, but in private practice they are very rare.

Dr. FREEMAN—Under what head does Dr. Seiss place these cases of myringitis where there is a form of bleb on the membrane?

Dr. SEISS—Hemorrhagic. As to the pain of syringing, I have a large clinic with eight assistants, and when these cases come in two of these assistants attend to them. These two gentlemen can use a syringe with a quart of solution and give relief to the patients; my other six assistants will make the ears of the patients ache. The way the syringe is handled makes the difference. As to the use of cocain, the general surgeon and the ophthalmologist have decided that even moderate solutions in inflammatory conditions are wrong. To use it in active inflammation has made these cases worse.

ACUTE AND CHRONIC CARIES AND NECROSIS OF THE MASTOID; PACHYMENINGITIS EXTERNA; EPIDURAL ABSCESS.

Presented to the Section on Laryngology and Otology, at the Forty-eighth Annual Meeting of the American Medical Association held at Philadelphia, Pa., June 1-4, 1897.

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Of all the ear diseases, I know none that are, on the one hand, so important and dangerous, and on the other, so gratifying and manageable as the group comprehended in the title of this communication. If left alone they prove fatal in a large percentage of cases; if treated understandingly, they nearly all recover. The grippe has made us familiar with acute mastoid caries. In the first or second week of an attack of acute otitis media there is intense pain in ear and head; tympanic membrane red and bulging; in a few days otorrhea, with or without paracentesis of the drumhead; relief of pain for a few days, then return of it with tenderness and swelling of the mastoid, membrana tympani bulging in upper-posterior part, slight fever, loss of appetite, headache, mental depression; hearing greatly impaired. The further course varies greatly. The discharge may be free for a time, then diminish and disappear together with the other symptoms—natural recovery in the first stage. Or the swelling over the mastoid and the other symptoms become more pronounced, the outer table of the bone is perforated, a post-aural abscess forms, breaks, and the patient gets well—recovery in the second stage.

In the third stage a perforation through the medial table takes place, either outside the skull into the digastric fossa, or into the cranial cavity, more frequently the posterior cranial fossa than the middle. Exceptionally the pus travels through the fenestræ into the inner ear and farther through the internal auditory meatus into the cerebellar cavity. The two varieties are frequently combined and terminate fatally by meningitis and sinus thrombosis, rarely by abscess.

After this brief sketch I will illustrate the chief features of the affection by abstracts of some case histories.

Case 1.—Tympo-mastoiditis from grippe. Acute caries of the mastoid. Extensive operation. Rapid and perfect recovery. End of February, 1896, Mr. G. A. St., a healthy, strong man, was attacked with grippe. In the second week, ear and headache; paracentesis of drumhead; copious otorrhea; relief for a few days. Then symptoms were aggravated; fever; no particular swelling of upper-posterior end of ear

canal; drumhead white, moist, perforated. Mastoid slightly swollen and tender, particularly at the tip and posterior border. Gland over the tip swollen. Temperature 100.2 degrees; pulse 64. Two days later symptoms more pronounced; posterior-upper part of canal slightly bulging.

Operation under ether. Large incision down to bone from tip to above the auricle; periosteum scraped aside; bone over antrum discolored. Chiseling at the antrum pit soon gave vent to thin pus. The interior of the mastoid was one mass of brittle bone, pus and granulation tissue. The outer table and the whole tip removed, laying bare the digastric fossa. The head of the muscle was not infiltrated. The mastoid cavity was most carefully scraped with sharp spoon, until the wall appeared clean and glistening. The inner table was not corroded, the operation being done as early as seven or eight days after the onset of the ear affection. The patient's neck felt stiff for a few days, after that he made a rapid and complete recovery, with hearing as good as before, and with a surprisingly small indrawn scar.

The most remarkable feature in this case is the rapid destruction of the interior of the mastoid and the caries of the whole tip, tables and interior. The total removal of the tip in such cases is the best guarantee of a quick, undisturbed and permanent recovery. If the tip is left, the improvement after the operation is only temporary; relapses with headache and other ominous cerebral symptoms are apt to follow until the tip is removed. This was exemplified by a case I published several years ago, and, I fear, by a recent case which terminated fatally. Its history is as follows:

Case 2.—Acute tympo-mastoiditis. Extensive caries. Recovery delayed until necrosed tip was removed. Well three months, then died of typhoid fever. Frank Steinbrucker, aged 59, contracted a cold, end of March, 1896; ear and headache; paracentesis; otorrhea. First seen May 4, 1896. Upper-posterior part depressed; mastoid tender and swollen.

Operation. Large opening of mastoid, striking pus in a depth of three millimeters, through ivory-like hard bone over antrum. Extensive cavity filled with brittle bone, pus and granulation tissue, which was cleanly removed. Left hospital in twelve days; treated at office, occasionally. Went to business. At the last visit he paid me, about two months after the operation, the remnant of the tip of the mastoid was necrosed, yet still immovable. His family physician extracted it a few days later. Patient felt well for three months; attended over-zealously to his business, and died of what his family physician declared to be a case of typhoid fever. I have no reason to doubt this diagnosis, yet the differential diagnosis between typhoid fever and the intracranial complications of mastoid empyema is not always easy.

Case 3.—Acute tympo-mastoiditis, not operated on. Death from epidural abscess and meningitis. In the *Archives of Otology*, 1895, p. 263, I published a similar case under the title: "A healthy man, of 44 years, had an acute purulent otitis media, after the grippe. Under treatment with paracentesis and topical remedies, rapid improvement, so that he resumed his business (piano-teaching). Relapse of otitis with severe cerebral symptoms; no operation; death. Autopsy: suppuration of mastoid, with perforation into posterior cranial and digastric fossæ; meningitis." Two days before the patient's death, the family physician told me that two weeks previously the patient had had great pain in his left ear and head; was unconscious four days; then dragged his right leg; let fall things held with his right hand, and could not speak. Then there was a complete intermission, during which I saw him. He had had similar attacks, with convulsions, before he contracted his ear trouble, and his father had suffered from the same disease. His younger brother was a drunkard and died a few years previously, and our patient also indulged freely. This family history and the complete intermission might well have clouded the diagnosis, yet I felt so sure of the aural origin of the brain symptoms that I told the physician that I had the greatest misgivings, and that an operation should be done as soon as there was the slightest aggravation of the symptoms. The second night there was a sudden, rapid relapse and the patient died in twenty-four hours. We made an autopsy in the afternoon of the same day. The very instructive, well-preserved specimen of the temporal bone shows a small Bezold perforation and a large perforation of the medial table of the mastoid process, through both of