It is but fair to state, however, that I have known patients to hear better after I had removed the mallet and anvil, either through the external canal, or incidentally to an operation on the mastoid process. Neither do I deny that there are certain cases that may be benefited by this operation, but I insist that the utmost patient care must be observed in selecting them, for carelessness is fatal to the welfare of the patient, our piece of mind and the good of our art.

DR. FULTON, of St. Paul, referred to the lessened use of the catheter in his hands.

DR. WURDEMANN—in closing the discussion. The difference between the use of high and low pressures has been sufficiently well pointed out in the body of my paper, but I can not but help again calling attention to the dangers attendant upon the high pressure apparatus in hands less skilled than those of our friend, Dr. Bishop. I do not think that we may do away with the Eustachian catheter and esteem it as yet one of our most useful instruments. The method of treatment advocated in my essay is supposed to be done by the catheter. If we use metal instruments and sterilize by boiling there is no danger from septic infection and for specific cases surely we can afford to have separate instruments.

In regard to the vapors used, one must decide whether the membranes need stimulating or antiseptic treatment, just as in nasal catarrh. Select the remedy accordingly.

SURGICAL TREATMENT OF CHRONIC OTORRHEA.

Read in the Section on Laryngology and Otology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY CHARLES HENRY BURNETT, A.M., M.D.

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Surgical treatment of chronic purulent otitis media consists in the excision of necrotic tissue from the tympanic cavity. Instillation, insufflation or mopping of medicaments upon the diseased parts in the drum cavity in many cases result in a cure, but there are many instances in which all these forms signally fail after a long and fair trial. In these unyielding cases it will be found that one or more of the auditory bonelets are necrosed, and in some instances that the tympanic wall in apposition to the necrosed bonelets is itself carious. Manifestly in such cases the plain surgical indication is to excise the diseased bonelets or their remnants, in order to remove septic material from the drum cavity. This improves the drainage of this space, promotes a free application of antiseptics to the tympanum and favors the healing of its muco-periosteal lining. Under such treatment, in most cases, *after the operation* the diseased mucous membrane heals and carious spots in the tympanic walls are covered over without resort to curetting.

There are some forms of chronic purulent otitis media, in which excision of the remnants of the membrana and ossicles, is especially indicated. These are the so-called attic suppurations, in which necrosis of one or more ossicles is always present, and in which the sole perforation is in the membrana flaccida. Unless the necrotic tissue is excised there can be no permanent cure in such cases.

The operation of excision in chronic suppurative otitis media, is like the removal of a polypus in similar conditions. It is the *first* step in the antiseptic treatment of the ear. In many instances, not until the operation has it been possible to thoroughly ap-

ply antiseptics to the ear nor to maintain antiseptic conditions in the suppurating space.

The length of time which may elapse between the operation of excision and the cessation of the chronic discharge of pus from the drum cavity varies greatly. The quickest permanent cessation in the writer's practice occurred in eight weeks, in an attic suppuration of six years' duration. In another attic case, permanent cessation occurred at the end of two and one half years. In some cases it has not occurred after the lapse of even three years. But after the operation of excision, a chronic purulent otitis media has a better chance of being healed than before the operation. It also runs less chance of extending to the brain cavity or causing pyemia than it did before the drum cavity was freed from septic matter, and better drained by the removal of carious bonelets and obstructive synechiæ. The patient to be operated upon must be under the influence of a general anesthetic, preferably of ether. Cocainization of the membrana and drum cavity does not produce sufficient anesthesia, and furthermore the risks of cocain poisoning are very great when this drug is applied to the drum cavity.

After etherization has been accomplished the ear may be thoroughly and safely illuminated by a six-volt electric lamp held on the operator's forehead, and supplied by a small portable battery. Now a thorough exploration of the drum cavity may be made by means of probes of various curves, for the first time, especially in children, where before anesthesia, the sensibility of the parts forbade such exploration. All carious ossicles excepting the stapes, must be removed from the drum cavity. The stapes is rarely found to be carious anywhere excepting in its head. In no case should more than this of this bone be removed, as the removal of its foot-plate in a case of chronic suppuration opens the way for the entrance of pus into the labyrinth and cranial cavity. All diseased membrane should be excised, especially from the region of the attic, and if polypi are discovered by such excision, as they often are, they are to be carefully removed. Then the seat of the operation should be gently mopped with a solution of bichlorid of mercury, 1 to 6000, and the ear left open, so as to promote the escape of oozing blood or pus. The ear after this must be treated like any other suppurating ear, by means of antiseptics until the entire cessation of the discharge. The improved drainage and the more direct treatment of the suppurating cavity now give hope of a cure, unattainable without excision of necrotic tissue.

It has been urged against excision of the remnants of the membrana and carious ossicles in chronic purulent otitis media, that it is sometimes followed by facial paralysis. When this unfortunate sequel of the operation occurs, it will be found that curetting the cavity of the drum has been done. I have performed seventy-five intra-tympanic operations of late, but curetting has been applied in *no* instance and I have not had a case of facial paralysis to mar the result. I rest content with excision of diseased ossicles and membrana and the removal of polypi. If carious spots are detected on the tympanic walls I know they will soon be covered in by the healing of the ulcerated muco-periosteum, under antiseptic treatment, after the removal of carious and septic matter.

The hearing usually improves as the discharge

diminishes. Sometimes it is improved greatly and immediately by the operation, as the removal of diseased bonelets, synechial bands and infiltrated membrana admits sound directly to the oval window.

The operation of excision in suppurative otitis media furthermore greatly diminishes and in many cases entirely removes the risks of cerebral and general infection.

If the tympanic cavity has become practically the outward opening of a sinus, clearing it of septic and obstructive matter at least favors drainage from deeper parts, and ought to be done before resort to cranial operations. If the suppurative disease is limited to the tympanum then the excision of carious tissue practically removes the disease which is threatening to produce brain-abscess, sinus-thrombosis and pyemia, and mastoid and cranial operations are not necessary and never may be. *Were excision of necrotic tissue from the drum cavity more frequently and promptly performed there would be less need of mastoid and deeper cranial operations.*

DISCUSSION.

DR. WURDEMANN, of Milwaukee—I am pleased with the moderate tone with which the author has dealt with his topic, and especially with his present conservative views in regard to the selection of cases for operation, as he has been known heretofore as one of the most ardent exponents of radical aural procedures.

While my experience (I have done more than fifty of these operations) is not quite as great as Dr. Burnett's (he having done about a third more than I), it is quite sufficient to substantiate the statements made in the author's paper. Such operations for chronic suppurative otitis media should be done only on those cases that have resisted antiseptic treatment for a sufficient length of time to warrant the assumption that they are incurable by simple means. Despite the fact that considerable literature has appeared in recent years, all observers agreeing upon the necessity for operative procedures, the public generally has not been educated up to this point and even some of the profession are opposed to it. They are those who either have not tried it or who have scored failures in the first attempt. The operation done through the canal is in no sense an easy undertaking. General anesthesia is necessary and the canal and middle ear becomes filled with blood, rendering inspection difficult, so that often the greater part of the operation has to be done by the sense of touch. It is almost needless to warn those who are not properly versed in the anatomy of this small locality (and its dangerous surroundings) from attempting the operation.

LARYNGEAL TUBERCLE TREATED BY TUBERCULIN.

Read in the Section on Laryngology and Otology, at the Forty-fifth Annual Meeting of the American Medical Association, held at San Francisco, June 5-8, 1894.

BY A. J. ERWIN, M.D.
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At the Detroit meeting of this Association, I read before the Section on Laryngology a paper on the tuberculin treatment of laryngeal tubercle, in which I gave the history of seven cases treated in 1891. Three of the patients were still living. This paper is a continuance of that report. All have since died, but the results of the treatment seem to me to be of enough importance to deserve mention. I will briefly recapitulate the history of the three cases then living, in connection with their sequelæ:

Wm. Beiterbucher, age 20 years; Lowdonville, Ohio. Cough,

fever, and night sweats began in January, 1891; had several hemorrhages in April. Consumption hereditary on each side. Examined April 23, 1891, reduced twenty pounds. Pulse 132, respiration 30, temperature 102. Cough frequent; some expectoration containing bacilli; râles and obstruction in apex of left lung. A deep ulcer on inner surface of the left arytenoid about five millimeters in diameter, also a tubercle on the first tracheal ring. I treated him with tuberculin exclusively from April 23 to August 15, making in all fifty-four injections of one-twentieth to 1 minim each. The tubercle in the trachea and the râles had disappeared by May 20, but the ulcer did not entirely close until about August 1. Two months later, cough and expectoration had ceased and he had gained twenty pounds in weight. About April 1, 1892, a catarrhal attack seemed to start afresh symptoms of tuberculosis, especially of the heart, which soon showed valvular infiltration and insufficiency, and consequent engorgement of the lungs, finally broncho-pneumonia, and death three months later, but without any return of the disease of the larynx, and with but little if any increase of tubercles in the lungs. The tuberculin treatment was not repeated.

Case 2.—Mrs. George McMullen, age 25 years, Mansfield, Ohio. Cough, fever and night sweats began in December, 1890; had two hemorrhages. Consumption hereditary on each side. Examined May 13, 1891; had lost over twenty pounds in weight. Pulse 92, temperature 100, respiration 22; râles throughout left lung, free expectoration containing bacilli. The left arytenoid was a little thickened but not ulcerated. I gave her thirty-two injections of tuberculin one-twentieth to 1 minim each, between May 14 and July 21. By June 1 the entire anterior surface of the left arytenoid had ulcerated; by June 15 the fever and night sweats had ceased. When dismissed, July 21, the arytenoid thickening had disappeared and the ulcer was about one-third of its former diameter, her appetite and digestion were restored and she had gained five pounds in weight. The cough and expectoration continued with but little abatement, but her general health had considerably improved. In March of 1892 she had a return of fever and night sweats with increased cough, probably of a catarrhal character, but did not return to me for examination until July 1, when I found her free of fever. Cough and expectoration about as at date of dismissal a year before. Weight and general health not changed. The ulcer of the larynx had entirely healed, leaving a little contraction of the left fold as the only evidence of former disease. The tuberculin treatment was not repeated, she varied but little in health until February, 1893, from which date the lung disease advanced rapidly and she died in April following without any reappearance of laryngeal disease.

Case 3.—Mrs. Albert Vaughn, age 28, Mansfield, Ohio. Cough, fever, night sweats and indigestion began July, 1890. Father and sisters died of consumption. Examination May 7, 1891. Weight reduced twenty-six pounds. Pulse 130, respiration 30, temperature 103. Obstruction and râles in apices of lungs. Left arytenoid twice as thick as the right; a deep ulcer about seven millimeters in diameter on its interior surface, from which pain extends to the ear; cough frequent, some expectoration containing bacilli. Began injections of tuberculin May 8, which were continued for one month daily one-tenth to 2 minims each, and for some months afterward at irregular intervals; by July 1, the fever, expectoration, obstruction and râles had disappeared; by September 1 the thickening had left the arytenoid but the ulcer did not entirely heal until about November 1. It left the cartilage considerably deformed but not irritable. She passed the winter without fever or cough of any consequence, with a good appetite and digestion, and a gain in weight of fifteen pounds. In March, 1892, she had an attack of the grip, during which râles re-appeared in the apex of the right lung, followed by some infiltration of the previously diseased arytenoid and a degree or two of fever. She returned to the tuberculin injections of 1 minim twice a week. Within three weeks the laryngeal thickening disappeared entirely without ulceration, and the fever, râles, and cough ceased a week or two later. In September, 1892, there was a little fever with cough and râles, but no thickening of the larynx, which was relieved again by three weeks' treatment with the tuberculin. In January, 1893, without any recurrence of fever, râles, expectoration or laryngeal irritation, cough and prostration began to follow slight exercise. Examination showed the heart to be weak and irritable with very dull valve sounds. These symptoms gradually increased and were followed by frequent attacks of that form of congestion of the lungs which we recognize as due to heart disease. At first