The second cause for diversity lies in the question whether to do these operations in local or general anesthesia.

Probably the best answer to this inquiry, to date, is contained in the discussion, by Grunert, of Seldon Spencer's monograph on local anesthesia in hammer and anvil extractions. The substance of his remarks was that it had long been known that in strong-willed men it was possible to extract both bones without the use of any anesthetic, and that while it was possible in some cases to work with a local one, the vast majority required a general narcosis, and a pretty deep one.

This voiced the opinion of the majority of otologists, and among them the staff of the Politzer clinic. The result was a return to general narcosis in endotympanic work.

As a result of this, many cases in which simple extraction of the ossicles might have been sufficient to stop the suppuration, had there been an efficient local anesthetic, went to radical operation because the patient did not wish to be subjected to a second narcosis and operation in case of failure of the conservative procedure.

This was the situation when Neumann's method came upon the scene. Through it the otologist realized Utopia. For not only was it possible to extract the ossicles, but a perfect, deep and lasting anesthesia of all parts of the external and middle ear was brought about, making it possible to work with certainty, at leisure and under a direct vision, unobstructed by blood.

This necessarily altered the indications for endotympanic work, as it was now possible to cut the tensor tympani muscle, to do ossiculectomy, to remove the lateral attic wall and to curette the attic and antrum, the patient all the time being at perfect ease and comfort.

Back from the past was brought the Stacke operation, obsolete and dangerous, to have its good intentions reincarnated by Neumann.

As this paper has to do with the anesthesia only, and not with indications and methods, the writer refers you to an article entitled "Technik und Indikationen der Hammer-Ambos-extraktion" by H. Neumann.²

The injection fluid has been already described, and, as on the mastoid, the injection is subperiosteal. To make the anesthesia perfect, the fluid must lift the lining from the upper and posterior walls. To do this, the needle is inserted into the cartilaginous canal about $\frac{1}{2}$ cm. external to the beginning of the bony canal, and from here pushed inward under the periosteum of the bony canal. The place for insertion is determined by raising and lowering the auricle, when a little groove can be made out corresponding to the junction.

Another mark is the lusterless color of the cartilaginous, in contradistinction to the shiny surface of the bone canal. A fraction of a cm. will completely anesthetize the middle ear for operation when injected into the upper posterior wall. In the radical operation an injection is made into all four walls. The fluid is heated to body temperature and injected with steady

pressure. The operation can be begun in ten minutes. The only contra-indication is when the periosteum has already been lifted off by disease, as here, again, absorption would not be sufficient. On the other hand, a partial or total defect of the tympanic membrane makes no difference to success.

To understand the working of the fluid a glimpse at the anatomy of the canal is necessary. The skin of the medial end of the bony canal is continued directly into the dermal coat of the pars flaccida of the tympanic membrane. As Shrapnell's has very little membrana propria of its own, and its mucosa is a direct continuation of the mucous lining of the middle ear, it follows that any fluid injected under the skin and periosteum of the canal must force its way onward and behind the mucous lining of the middle ear. Besides this, the fluid is carried onward by vessels perforating the lateral attic wall, going to Prussak's space, and the cavities of the external attic; last and finally, through connective tissue trabeculae where the os tympanicum is united with temporal and mastoid bones.

Direct contact of cocaine with the mucous linings causes the anesthesia. The anesthesia of the tympanic membrane is brought about by the action on nerves of the *Troelsche'sche streife*.

SUMMARY.

1. Neumann's anesthesia fulfills all the requirements of Heidenhain and stands forth as one of the great advances of modern otology.
2. It has no design on the ether or chloroform market and desires only to be on the most friendly terms with both relatives.
3. In mastoid work, when a general narcosis is contra-indicated, it needs no defense.
4. It seeks to limit the radical exenteration to those cases in which there is a strong presumption of mastoid or brain involvement.
5. It promises to do away with the chiselling out of a healthy mastoid to arrive at a chronic ear.
6. It claims the intra-tympanic field as its own.³

TUBERCULOSIS OF THE SHOULDER IN CHILDREN.

BY JAMES WARREN SEVER, M.D.,

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TUBERCULOSIS of the shoulder-joint is a rather rare condition, especially in children. Since 1869 there have been but 17 cases recorded at the

³ On the tenth of February, 1910, by invitation of Dr. E. A. Crockett, the writer demonstrated this method at the Massachusetts Charitable Eye and Ear Infirmary, and has permission to report the result.

The patient, a woman about forty years of age, was admitted for the purpose of ossiculectomy. The injection was made according to the rules given above, with customary wait of ten minutes. Dr. Crockett then proceeded with the operation, which was absolutely painless and bloodless. A chance remark made the patient laugh and it was necessary to suspend work until she was sobered down. Dr. Crockett says: "A wonderful discovery; the finest demonstration I have ever seen." Dr. George Loring Tobey: "No more ether for me in these cases." *Et alii idem*. The writer has an invitation from Dr. George A. Leland, of the Boston City Hospital, to demonstrate the method on the first suitable case. A syringe for this work is in the process of making by the firm of Codman & Shurtleff, of Boston. It is, in fact, Neumann's syringe; in form, it will be slightly modified. The modification, suggested by Mr. Given, of that firm, has to do with the jointage, and seems to be a practical suggestion.

² Arch. Ohrenh., vol. lxxiv, 1905-6, p. 167.

Children's Hospital. Of all the large joints it is the most infrequently attacked, these 17 cases having occurred out of a total of 7,474 cases of tuberculous joint disease. Young, of Philadelphia, reports 7 cases out of 5,680 tuberculous joints at University of Pennsylvania; Townsend, 21 cases out of 3,244; Whitman, 38 cases out of 1,833 tuberculous joints exclusive of tuberculous spines.

Occurrence.—Tuberculosis of the shoulder-joint may occur in children who have other tuberculous foci in other joints, or in the lungs. In this series there were 5 cases associated with other foci as follows, and usually subsequent to the other infection: Shoulder with hip, 1; shoulder with elbow, 2; shoulder with wrist and ankle, 1; shoulder with tuberculous spine, 1.

It is said by some authorities to occur rarely before ten years of age and to be commonly associated with phthisis; also, to follow an injury such as a blow or a fall on the shoulder, and 6 of this series had such a history of trauma. Two cases also had a tuberculous family history, which in children is of great importance.

In this series there were 13 boys and 4 girls. The average duration of the disease when reporting to the hospital was 9.7 months.

Mode of infection.—Tuberculosis in the long bones, such as the humerus, usually starts in the epiphyses, generally in the marrow, and rarely in the cartilage or cortical bone. The focus extends towards the joint cartilage and perforates that into the joint, which process is followed by a general infection of the joint. Trauma predisposes to infection, but a serious trauma seems to summon such quantities of defensive agents to the injured area that tuberculous infection rarely results, while a slight trauma, on the other hand, often offers favorable conditions for the development of the tuberculous process.

Susceptibility is at its height in childhood, and with poor heredity influences, predisposition and poor environment there may easily follow an infection. There are two methods which seem probable for the entrance of the bacillus into the system, namely, ingestion and inhalation, the throat, tonsils and adenoids being favorable channels.

Surgical tuberculosis is usually of the bovine type, probably comes from milk, and is the type which usually affects the bones, glands, peritoneum, ear and genito-urinary tract.

The onset in the shoulder is usually insidious, due to the slow growth of the diseased area. After the joint is infected, a pannus extends over the synovial membrane, spreading by an inflammatory process and prone to suppuration.

Symptoms.—The onset is generally slow. Many cases at first are confused with chronic rheumatism, and the appropriate treatment consequently delayed. There may be local temperature as well as some slight constitutional reaction. Tenderness is an early symptom, usually over the anterior aspect of the joint, followed by a change in the contour of the joint due to atrophy of the muscles of the shoulder girdle and swelling of the joint. Impairment of motion is an early

symptom, especially in rotation and abduction, due to reflex spasm of the muscles about the shoulder.

Reflex spasm is a most important sign. It appears early, as a rule, and is most marked in the deltoid. It is easy of demonstration by attempted abduction of the arm. Atrophy is usually a sign and may be rapid and extreme, even involving the pectorals.

There may also be some glandular enlargement in the axilla. If the disease goes on to abscess formation it may point in the region of the coracoid process, in the axilla, or even make its way down the arm along the shaft of the bone, and appear on the surface anywhere in its upper third or half.

Pain may be the first symptom, but is usually noted at first only when joint motion is attempted. It may be worse at night than during the day. It may extend to the elbow, following the course of the musculo-spiral nerve.

There are two distinct types of tuberculous disease of the shoulder, namely, *caries sicca* and *caries carnososa*.

Caries sicca is a type of disease which is more slow in its action and generally destroys the head of the humerus and the joint without abscess formation. The joint, instead of being swollen, is often diminished in size, from the bone destruction and constriction of the capsule. There is not so much tenderness, nor are the acute symptoms marked, but there is the usual loss of motion and, finally, ankylosis. These cases have at times been mistaken for an infantile paralysis involving the shoulder group of muscles.

In *caries carnososa*, however, the condition is more acute and the tuberculous process extends from the joint into the medullary cavity of the bone. The medullary tissue is replaced by fleshy granulations, through which the tubercles are disseminated. This type is often acute and leads frequently to abscess, formation of abscess cavities in the bone and formation of sequestra. The tuberculous process may be either primarily synovial or may begin in the epiphysis. When it begins in the marrow of the epiphysis the disease works towards the joint, breaking through the cartilage or spreading out under it, lifting it up and invading the joint finally at the periphery. Certain portions of the joint may be spared by the development of adhesions. Following this joint invasion the synovial membrane is attacked and the rest of the joint involved.

In the synovial type the synovial membrane is thickened and filled with tubercles. The extension then follows around the edges of the cartilages and then later bone involvement. The type may exist for considerable time without extension to bone.

Diagnosis.—The diagnosis is usually easily made and there is very little else that can be confused with this condition. Swelling of the joint, atrophy of the shoulder muscles, pain, local heat, limitation of motion especially in abduction and reflex spasm are cardinal symptoms. The x-ray is of great value. One of the first things noticed

following a tuberculous infection of bone is the atrophy of the shaft of that bone. This may occur before the focus can be made out; when the focus is more fully developed it may be seen as an area of increased radiability. Osteomyelitis is usually of much more acute onset, with marked local and constitutional symptoms.

Articular rheumatism usually involves several joints and is of more rapid onset. There is swelling, but not atrophy. There is also muscle spasm, but not as marked as in tuberculosis, and there are no bone changes, such as abscess formation or atrophy.

Treatment. — The essential thing is rest. The arm is to be flexed at the elbow and held by a sling and circular bandage or a velpeau. The weight of the arm in most cases furnishes sufficient traction. When abscesses form they must be opened and any necrotic bone curetted and the cavity packed. When abscesses recur and the bone destruction is extensive, the head of the bone must be resected. It is well to bear in mind that as the growth of the humerus is largely from the upper epiphysis, any resection of the head of the humerus or interference with the epiphysis before eighteen years of age will result in a considerable loss of growth of that bone. It is, however, always best to remove any diseased tissue and endeavor to get a movable joint. An arm slightly shorter than the other, but movable, is better than a stiff one.

After operation sinuses occasionally persist for long periods of time. The general treatment is of great importance as in all tubercular conditions.

The results of treatment vary considerably according to the type and severity of the disease. The loss of function also varies according as to whether the disease was synovial or bony. Abduction is most affected, then flexion and extension, and then adduction and rotation. Partial ankylosis is usually fibrous, while total ankylosis is usually bony. As a rule, the fixing of the head of the humerus to the glenoid cavity of the scapula limits the ability to raise the arm from the side about one third to one quarter of the normal. When the patient can get the hand to the head to dress and feed himself, the disability is not serious and is little felt. The duration varies from two to three years in favorable cases and longer in the unfavorable ones. Relapses in cured cases are rare.

CASES AND RESULTS.

CASE I. Boy, seven. July 29, 1890. Duration, three months. Fall, right shoulder. At that time the arm was held stiff at the side, with atrophy of the shoulder muscles. Below and outside of the coracoid there was an abscess which was opened on Aug. 27, 1890.

The sinus at site of abscess closed by March, 1891. On Jan. 17, 1910, the condition was as follows: Marked atrophy of shoulder; no motion in joint, which evidently has been destroyed with the upper end of the humerus; considerable shortening of upper arm. Can abduct arm about 10° from body by including the scapula in the movement. He is now a mail clerk, but has been a teamster and used to lifting heavy weights, such as

sugar barrels. He has no symptom referable to the shoulder.

This is evidently a case where the destruction began outside the joint, followed by extension into it and subsequent total destruction.

CASE II. Boy, nine. Right shoulder and right ankle affected. Oct. 19, 1898. Duration not known. Shoulder showed considerable atrophy of muscle. There was no motion in rotation, but the arm could be abducted 15°. The arm was supported and by June 28, 1899, there was complete ankylosis. When seen on Jan. 17, 1910, there was still atrophy of shoulder group of muscles. There was slight motion in abduction, rotation and forward and backward. The whole arm was slightly atrophied and smaller than the left. The boy uses it freely, however, plays ball and is able to work in a wholesale dry goods house.

The ankle shows good motion with slight bony thickening about the malleoli and slight shortening of the foot. He has no symptoms from the ankle.

This case illustrates the probable synovial type with arrest of extension to bone. The motion in the joint is evidently limited by fibrous adhesions.

CASE III. Boy, eight. Right arm. April 21, 1888. Duration, six weeks. Fall. Shows marked swelling about joint, with fluctuation over coracoid process. All motions limited. Bandage for two months.

In hospital June 4, 1888. The head of the humerus was found necrotic and resected through the anatomical neck. When last seen, in October, 1888, still had sinuses from the wound and there was no motion. He died later, Jan. 4, 1889, of general tuberculosis. He had one sister die of tuberculosis and one sister developed a tuberculous ankle.

CASE IV. Nov. 22, 1886. Girl, nine. Right arm. Fall, three years before coming to hospital. Joint stiff, right arm atrophied and all motions gone. There was a sinus present which had been discharging some time. Under ether the sinus was curetted and the arm forcibly manipulated without any gain. I have not been able to trace the case further.

CASE V. Jan. 16, 1897. Girl, age two. Duration, five months, apparently secondary to cervical glands. Right shoulder.

There is considerable bony thickening about the shoulder. No motion; considerable spasm. Sinus over anterior part of joint.

Six months later under rest treatment the sinus had closed. There was no pain or tenderness, and there were a few degrees of motion in all directions. A year later the condition was about the same.

CASE IX. Jan. 31, 1891. Boy, age six. Right shoulder. Duration, one year following a strain. There was marked atrophy about the shoulder, with a tender ankylosed joint and an enlarged head of humerus.

In March, 1891, under ether, the arm was forcibly manipulated and again in October, 1891. Following these procedures the arm was massaged and exercised to keep and gain on any motion, without any great success. When last seen in March, 1892, there was no improvement.

CASE X. April 25, 1897. Boy, age two. Right shoulder. Duration, five months. Examination shows marked fullness about joint, with an abscess pointing in posterior axillary line. Very slight motion and marked thickening of upper end of humerus, especially about anterior aspect of joint. At operation in May, 1897, the head of the humerus was found necrotic, and a portion removed by curette. Two sinuses persisted until the following August, when there was an exacerbation. A further curetting of the head of the humerus was done and the greater part of the bone removed.

Two years later, in September, 1899, examination showed considerable thickening about the joint, very few degrees of motion, about 10° of abduction, atrophy of muscles and shortening of shaft of humerus. He was still wearing a sling and bandage.

CASE XI. Jan. 4, 1898. Boy, age two and one-half. Right shoulder. Duration, one year. Shows considerable thickening about head of humerus. All motions limited. Muscle atrophy; rotation about two thirds normal. Abduction not possible without scapula moving. He was treated by a sling and a circular bandage. Three months later an abscess developed, which was opened under ether. The joint was found involved. At this time the arm could be raised 45° in abduction and there was slight anterior and posterior motion. The sinus closed by October, 1898, and in March, 1900, there was nearly normal motion in the joint with slight bony thickening.

CASE XIII. Jan. 21, 1905. Boy, age two and a half. Right arm. Duration, eight months, following a fall which was followed by pain and limitation of motion. Later an abscess developed which was opened and curetted. In March, 1905, he began to complain of pain in the right hip.

In April, 1905, he had increased pain and limitation of motion, with considerable thickening about head of humerus. A partial excision of the head of the humerus was done.

In the following August the head of the humerus was again curetted. At this time the motion was limited to 45° in rotation and no abduction.

In September, 1905, the motion in the shoulder was to within 15° to 20° of horizontal. Rotation was fairly free. Forward and backward motion and adduction was limited. At this time his hip was acute and he was being treated by a splint for that condition.

In this series there were 11 cases which developed abscesses which required operations. There were 8 cases which needed one operation, 5 which had two, 1 which had three, and 5 cases came to resection, partial or complete, of the head of the humerus. As is natural, these cases which required frequent operations had the greatest amount of bone destruction and came to excision of the head of the bone.

The results are not encouraging, even with the best treatment. An ankylosed joint is usually the ultimate result. Where the case involved much bone and cartilage, ankylosis always occurs, but when the type is synovial there may become motion. Eleven cases showed no motion in the joint. Four of these had had resection of the head of the humerus, 1 case had a moderate amount of motion following resection, and 6 cases that had not had resection showed motion varying from a very slight amount to about one half normal.

THE HOSPITAL DIETITIAN.*

BY WILLIAM F. BOOR, M.D., PH.D., BOSTON.

THE great importance of a carefully chosen diet for the sick is being gradually recognized by the medical profession at large. In the treatment of diseases such as diabetes, typhoid fever and diseases of the kidneys, diet is now the most im-

portant factor, while in many other pathological conditions, like heart disease, diseases of the gastro-intestinal tract and diseases of infancy, treatment by diet alone rather than by drugs is asserting itself more and more. But food prescriptions lie outside of the apothecary's scope. To fill them properly, and to do a hundred other things which progress in the study of food and nutrition has made necessary, falls to the lot of the new profession, dietetics.

Few of us, I think, realize just what the manifold duties of a hospital dietitian are, and fewer still appreciate the responsibilities and the difficulties of such a position. During the past year the total expense of the Massachusetts General Hospital was something under \$400,000; over \$100,000 of this was for food. The fact alone, therefore, that the dietitian of an institution like the Massachusetts General Hospital is responsible for the proper expenditure of one third the entire sum expended annually by the institution is most significant.

The task of the dietitian is arduous and it calls for very unusual qualities on the part of the individual. She must be economical, and yet she must not allow her economy to lower the standards of the hospital. She must be an executive of energetic and self-reliant character, since she has a definite, unequivocal position to maintain. If she wishes to retain capable employees — and most of you, I think, will realize what it means to deal with domestics — she must be patient, tactful and just. All these qualities, however, will not suffice to insure success if our candidate is not progressive as well; the dietitian of a leading hospital must keep in touch with any and all advancement which is made in her field of work, and she must develop ideas of her own in order that her institution may remain in the van. Since it is one of her duties to give the nurses their entire course in dietetics, she must needs be a person of excellent education and training in the fundamental sciences of physiology, chemistry and biology. Needless to say, she must be a good teacher; it is one thing to understand and ably to apply the theories concerning the values of food from a caloric, nutritive and digestive standpoint, to prepare the diets, to assume the care and management of the diet kitchen, and quite another matter to teach all this to nurses in the course of three short months. No wonder it is, therefore, that few only of the candidates are successful.

Much, however, can be done to remedy the present state of affairs. If young women would revert to the old order of things and improve the home opportunity to learn some of the elements of domestic science rather than to depend entirely upon the training schools, which they enter at a comparatively advanced age, a great deal would be gained. Then, too, study at the training school, although it is, of course, invaluable, is not complete; it is mainly theoretical. The many and varied problems of hospital dietetics cannot be anticipated by the training school, and there being no books on this subject, a course of prac-

* Read on the occasion of the first meeting of the Section for Dietitians of the American Home Economics Association at the Massachusetts General Hospital, Dec. 31, 1909.