following with dilatation, and externally opening the larynx in the median line for the complete removal of the superfluous tissue. The latter method is a last resort on account of the probable permanent impairment of the voice. A great variety of dilating instruments has been described, both for intra-laryngeal use from above and for intra-tracheal use from below through a tracheal opening. Several forms of the latter are constructed for attachment to the tracheotomy tube, the dilator projecting upward through the trachea and even through the larynx, according to the site of the lesion. The case here reported presented some very peculiar, and to me, unusual, features:

Immediately after birth the infant had no apparent respiratory difficulty, although a peculiar inspiratory sound similar to the cooing of a dove, was noticed. Labored breathing was not observed until some twelve hours later. Dr. Richard M. Smith was called in consultation on the next day, and after a thorough examination a persistent thymus was most seriously considered. A subsequent roentgen examination of the chest was negative in this respect.

On Tuesday, June 27, when the infant was about 36 hours old, the respiratory difficulty became very alarming; the breathing became progressively more labored, and the respirations more shallow, until the baby was utterly exhausted and cyanotic. Throughout the previous 24 hours, during periods of crying, respirations were much deeper and the cooing sound much more pronounced. At the time of the writer's first examination the baby's physical condition seemed desperate; the pulse was racing at 180, at times being almost uncountable; respirations were shallow, labored, and from 60 to 80 per minute; marked cyanosis was present. Any laryngeal examination or procedure was considered out of the question, and tracheotomy under slight ether anesthesia was at once done. Unfamiliarity with the soft trachea, as yet practically without cartilaginous development, of an infant but little over 36 hours old, added considerable difficulty to this simple operation, the trachea being so soft that great difficulty was found in holding it with sufficient firmness to permit of an incision. Immediately upon insertion of the tube, however, the breathing became deeper and the cyanosis gradually lessened. For the succeeding four days respirations were at times very irregular, varying from 40 and upwards to Cheyne-Stokes; this may have been due in part to exhaustion and insufficient oxygen. No further attempt at diagnosis was considered practicable until such time as the patient's condition would permit of surgical procedure. The subsequent tracheotomy history of the baby was uneventful, as evidenced by the weight table.

After a weekly gain for several weeks of 6-7 ounces, on Oct. 10 the baby, then some 3 1/2 months old, was etherized and the larynx inspected by direct examination, but with some difficulty on account of a great quantity of mucus and a very soft, flabby epiglottis. No abnormality was found above the vocal cords, which were normal in appearance, closure and excursion; but below the glottis no tracheal lumen was seen, there being visible just below the cords what appeared to be a flat diaphragm of normal mucosa corresponding in color

with the false cords. A long pair of round-pointed nasal dressing forceps was now introduced through the larynx, pressing gently into this membrane, and gradually opened in line with the slit of the glottis to about 1/3 inch and the process repeated at a right angle. Considerable bleeding interfered seriously with further examination, but great improvement in breathing was noticed, which obtained for 20 minutes before the tracheal tube was replaced, during which time the wound was kept closed. Respiration now appeared normal, except for the presence of mucus and blood in the trachea and larynx, which fact was taken as definite proof that the obstruction consisted solely in this thin membranous diaphragm.

The tracheotomy tube was now replaced, and it was decided, if possible, to introduce, at the occasions of removal of the tube for cleansing, a pair of thin curved forceps upwards through the tracheal opening to the site of the obstruction, for the purpose of stretching the membrane as before. This was done at intervals of 2-3 days, by Dr. Charles O. Day, the family physician, for nearly three weeks, each dilatation causing a slight bleeding, but no more apparent discomfort to the patient than removal and replacement of the tube. During the absence of the tube on these occasions, great improvement in breathing through the normal channel was noticed. After the last dilatation on Oct. 29, the tracheal tube was not replaced for a half hour, during which time the little patient appeared quite happy, breathing deeply and with perfect freedom. Two days later the tube was permanently omitted, and a dressing applied over the tracheotomy wound. Respiration was apparently perfectly sufficient and normal, excepting the slight sounds caused by mucus in the trachea, to control which minute doses of atropine for about a week's time were necessary.

During this last visit the webbing together of the second and third toes of both feet was brought to my attention. This had so far escaped notice, and the discovery brought out the fact that this condition has been more or less common in the maternal family tree. The incident of the webbed toes was very interesting, for at the time of the tracheotomy, upon being pressed for a possible explanation of the obstruction, my guess was a web across the larynx or trachea, which I likened to the not uncommon condition of webbed toes. My remark, however, at this time of excitement, brought forth no recollection of this family trait.

Medical Progress.

TWELFTH REPORT OF PROGRESS IN ORTHOPAEDIC SURGERY.

BY M. S. DANFORTH, M.D., ROBERT SOUTTER, M.D.,
C. H. BUCHOLZ, M.D., H. C. LOW, M.D.,
R. B. OSGOOD, M.D., BOSTON.

TUBERCULOSIS.

WHITBECK,¹ in reporting the work for ten years at the Sea Breeze Hospital, calls attention to the fact that this is practically the only institution in America where the treatment of surgical tuberculosis can be continuously carried out for any length of time. Since 1904, 262

cases have been treated at this hospital with the most satisfactory results. They have been able to discharge a great percentage of cases cured, and also many of the cases discharged improved have shown continued improvement afterwards. The orthopaedic treatment has been conservative, and the hygienic treatment radical. They have had every advantage of fresh air, salt water, and sunshine. Heliotherapy, they feel, has been a great advantage.

(Ed. Note.—The good work done there emphasizes the need of other institutions of a similar nature.)

Campbell² reports 16 cases of tubercular bone and joint affections in which general heliotherapy has been carried out with much consideration of detail, and in a fairly thorough manner; in fact, he has probably carried out general heliotherapy as well as the conditions permitted. His results have been very satisfactory, and his conclusions agree with those of most other observers in regard to the hastening of the expulsion of sequestra and the early beneficial effects in severe septic conditions, with a rapid healing of the sinuses. He believes that a cure is obtained in a much shorter time by this method. He has tried as much as possible to give up all encumbering apparatus, and has used only a frame or light movable splint, which has allowed a thorough application of heliotherapy.

(Ed. Note.—Each new series of cases carefully treated by this method helps to show its value as an adjunct in the treatment of surgical tuberculosis.)

That thorough orthopaedic treatment of tuberculous deformities of the hip and spine will give very satisfactory results is demonstrated by the work of Gauvain.³ The necessity of a long-continued treatment is shown. He had every advantage of time and of hygiene in his work. Forceful correction was resorted to in certain selected cases, and of course this is justifiable only where the duration of treatment is limited only by the needs of the case and where the hygienic conditions surrounding the patient are excellent. The results in all his cases seem satisfactory.

The changed character of the lesions in certain cases in which, following characteristic tuberculous disease of the bone at an early age, there has been an absence of symptoms for five or ten years and then a recurrence of pain, is shown by Horwitz's⁴ study of three cases. In these cases, after an absence of symptoms for five to ten years, pain associated with activity of the joint began to recur. Joint motions became limited, and there was slight tenderness and some referred pain. The x-ray showed old necrotic bone and some new bone formation. Horwitz advises treatment by manipulation and massage, *i.e.*, quite the opposite of that he recommends in an earlier stage of the disease.

(Ed. Note.—It seems to the editors that a

very careful study of these cases must be made before such treatment as that advised would be justifiable.)

The studies of Paus⁵ reaffirm the necessity of considering tuberculosis as always more than a local affection. In fifty cases with bone or joint tuberculosis, he found by animal inoculation tubercle bacilli in the blood. Multiple foci were very common, especially in the skin, various bones or joints, tendon sheaths, bronchial or other glands, intestines and meninges, and air passages. He considers that a focus once established can never be considered cured unless it is removed, and Silfverskiöld⁶ brings up once more the question of extirpation of a focus in tuberculosis of bone in the early stage. He believes that by opening into the focus and tamponing it with gauze impregnated with some irritating substance, as camphor-naphthol, the tissues will be stimulated to defend themselves against the infection.

(Ed. Note.—This or similar methods have been advocated from time to time, but for the most part have been abandoned after further study by the very men who originally advocated them.)

ARTHRITIS.

The necessity of searching for the focus of infection in cases of arthritis is pointed out once more by McCrae.⁷ His suggestion, that other non-arthritic foci than the original one may cause a continuance of the arthritis, is of value.

RICKETS, ACROMEGALY, ETC.

Schloss,⁸ who is making an extensive series of experiments on 14 infants, has come to the conclusion that there is no benefit from the addition of straight phosphorus to the cod liver oil, hence he has dropped the phosphorus from the treatment of rachitis. Neither calcium alone, nor cod liver oil alone, displayed any special efficacy, but the combination of the two with breast milk gave the most favorable results, both during the treatment and after its suspension. The calcium, in the form of decalcium phosphate or tricalcium phosphate, seems to give the maximum effect.

The report by Kahlmeter⁹ of the case of a man of 45, who died from adenoma of the pituitary body, of ten years' duration, but who had no evidence of acromegaly, indicates that not all tumors of the pituitary body cause acromegaly.

(Ed. Note.—The article does not state, and one may well suppose that the tumor did not involve the part of the pituitary body concerned with the development of acromegaly.)

Wegelin,¹⁰ in Berne, where almost all children are born with some goitre, in studying the cadavers of children still-born or dying soon after birth, has found some abnormal ossification, as, for instance, an absence of the center of ossification at the lower end of the femur. He believes that this abnormal process is due to abnormal functioning of the thyroid, and be-

lieves that, at least where goitre is endemic, thyroid treatment is advisable for disturbances of ossification.

FRACTURES.

Bandit,¹¹ in a very careful article on fractures of the astragalus, reviews the literature and discusses the x-ray appearances. Direct violence is regarded as the cause of the fracture. The author describes the mechanics of the fracture and makes a careful differentiation of the symptoms in cases of fracture of the neck and of the body, with and without displacement. In diagnosing he lays particular stress upon the varus position of the foot. The cases may be treated by: (1) simple reduction; (2) reduction by the open method; (3) reduction by reposition of the fragments; (4) astragalectomy. Wherever possible, after x-ray examination, he prefers the first method, although the other methods have their place in certain cases.

(Ed. Note.—In fractures of the astragalus, the astragalo-calcaneo articulation is very commonly involved, and its functions seriously impaired. As the flexibility of the foot depends upon the normal functioning of this joint more than any other, the maintaining of the proper weight-bearing line in fractures becomes of supreme importance.)

Brickner¹² gives as his method of securing full abduction and extension of the shoulder in cases of fracture of the greater tuberosity of the humerus, the fixation of the hand of the patient to the head of the bed, and the placing of the patient on a reclining rest or pillows, so that he may gradually slide down or the arm may be slowly pulled up. This seems, in his hands, to be a very satisfactory method, judged by the results, but it necessitates remaining in bed in one position.

(Ed. Note.—We have found that plaster casts or some form of splint holding the shoulder in abduction, may be made to fit properly without being very cumbersome, and think that this method offers a more sure and satisfactory way to treat these cases.)

In the treatment of irreducible joint fractures Robinson¹³ shows how, by a simple procedure of fixing the bones by driving in an ordinary wire nail, the intractable fragments can be held in place. In an emergency where bone plates are not available, one must then resort to this method; also, the cases reported show results which suggest that it may be true that there are certain types of fracture near the joint on which it is difficult to use plates, and also not advisable on account of the interference with joint motion, in which this might be the operation of choice. The fixation of fracture with nails of silver or of the ordinary wire type is a simple method, and one which causes very little destruction of bone tissue. The choice depends on the x-ray picture, and the difficulty of correction of the deformity.

A group of four papers by Connell and

Freyer,¹⁴ Hernaman-Johnson,¹⁵ Lane,¹⁶ and Taylor¹⁷ in the *Practitioner*, show very clearly, both by clinical description and excellent x-ray pictures, the development of the bone plate in fracture surgery, and the results are surprisingly satisfactory.

We must realize that many of these cases are infected, and that the bone is often shattered in several places, and the gaining scale in the application of these plates is to be especially commended.

We may consider the conclusions drawn by Lane, at the same time recording certain exceptions that the other authors make. Lane says that it is only on very rare occasions that one should try to fix the bones by the means of plates and screws while the wound is very foul. Taylor does not believe that the use of the plate should be attempted in septic cases. If possible, all plating should be postponed until the septic process has been healed. If, at the time of operation, a hidden focus of sepsis is found, effective drainage must be maintained, and the bone plates used should be long enough to allow the screws to be applied as far as possible away from this area. Often a definite gain in the length of the limb can be obtained, and with this point in view it is not necessary to bring the whole area of the broken ends in apposition, since the interval would often fill up, and the callus can be stimulated by inserting fragments of bone.

In these cases, which are liable to be much earlier ambulatory than those in civil life, it is necessary to use much heavier steel plates; in fact, those used now are three times as heavy as those in use before the war period.

Of course Lane lays special importance on the prevention of stiffness of the joints, relying upon the security of the plates, which are made secure by as many screws as it is possible to insert. He begins motions, especially in the lower limb, as soon as any acute swelling has disappeared. Early attempts at walking with a firmly supporting splint stimulate the deposit of bone at the seat of the fracture.

Various methods of bone graft may be used to bridge over the intervening space between the fragments. Lane does not believe that bone grafts alone offer sufficient fixation, and thinks that the many failures of this method are due to the unsatisfactory grip which the graft may have upon the fragments of the shaft. Bone grafts are a great help in bridging the spaces between bones which are firmly immobilized. Lane does not believe that any number of screws properly applied to hold the bone plate in place produces a harmful rarifying osteitis.

The sepsis, which is a great obstacle in these cases, is often successfully treated by autogenous vaccines. A hemorrhage, which is often great, is best controlled by hemostatic forceps, which may be left in the wound, and ligatures are rarely used.

Sever¹⁸ and Hartwell¹⁹ in their papers upon fractures of the spinal vertebrae, call attention to the frequency of the occurrence of the type of fracture, and the importance of its early recognition and treatment. Sever gives a study of seven cases of fracture of the lumbar vertebrae. To within a short time these cases would probably have passed as severe back strains or hypertrophic changes in the spine. The diagnosis in these cases is often very difficult, but it is of the utmost importance for the successful treatment. They may be caused by direct or indirect violence, and the nerve symptoms due to pressure upon the cord may be present at the beginning, but are most often late or entirely absent; the lesser signs of pain and localized tenderness, often appearing three or four weeks later, are quite important. At this time the diagnosis can be made only from the x-rays. Fixation in a plaster jacket or on a Bradford frame, according to the severity of the case, should be carried out for at least six months. Where there is evidence of injury to the cord a laminectomy should be done with little delay.

Hartwell has studied those cases of fracture of the spine which show none of the characteristic symptoms associated with lesions of the cord. There are often only the moderate signs of back strain at first, and the chief symptom is a persistent localized pain in the back, which grows worse month after month. This steady pain in the back, unaccompanied by any neurological symptoms, should lead one to study the x-ray pictures very carefully, and whether or not there is a history of a fall or severe injury. Localized tenderness over the spinous processes or a disalignment of these processes is the most characteristic symptom. Hartwell does not state whether, in his opinion, the treatment should be by plaster jackets or by a bone graft.

(Ed. Note.—In our experience, a bone graft applied to the spinous processes in those cases which show a persistence of the pain and disability has proved a most satisfactory method of treatment, and has permitted an early return to active life.)

BONE REGENERATION AND TRANSPLANTATION.

Dobrovolskaia's²⁰ experiments with proliferation of bone tissue in the test tube showed that it is possible to obtain an abundant growth *in vitro*, including the endostium, haversian canals, bone cells, etc. The proliferation of osteogenous elements of the cortical substance of the transplanted bone deprived of periosteum gives rise to formation of osteogenous tissue, but this occurs with greater energy when the transplanted bone is not deprived of its periosteum. The newly-formed bone becomes solid only when it grows to blend with the basal-bony tissue. The proliferation and further growth of osteogenous elements are facilitated by the presence of a fibrinous blood clot. The practical conclusion is to guard carefully the smallest frag-

ments, in case of a fracture non-complicated by suppuration, and in case of the latter, to remove them as late as possible in order to give the body a chance to utilize them as construction material.

(Ed. Note.—Clinically, these laboratory findings are most notably confirmed by the results obtained in the very extensive compound comminuted gunshot fractures. Fred T. Murphy, in an unpublished communication, has shown that in those cases in which the fragments have been removed, non-union has been very frequent; whereas, in those in which the minutest fragments were left, speedy union has been obtained almost invariably.)

Tongu²¹ has made experiments on dogs and rabbits to study the effect of the injection of periosteum and bone marrow. The osteoblasts prove most active when an emulsion of periosteum had been injected or transplanted. They were less active when a segment of bone marrow was transplanted, and least active after an injection or transplantation of an emulsion of bone marrow. The newly-formed bone tissue resulting from the transplantation of periosteum and bone marrow was gradually destroyed by the osteoclasts, disappearing completely in time.

Hawley,²² in "A Contribution to the Fate of Bone Grafts," reports six cases in which he has tried a new method of applying a bone graft. The results have been principally interesting because the grafts were applied in a site that could be easily studied by the x-ray. He has used the graft in paralytic deformities of the ankle; in cases of equinus, he has placed it on the posterior surface of the ankle joint in order to lock the plantar flexion. It was generally carried well down into the os calcis. In the calcaneo deformity, the graft has been inlaid in front of the joint in order to check the dorsal flexion. The operation was successful in all six cases, healing with first intention, but the two adults complained of pain for some time.

Functional results in all six cases were failures because the graft did not hold, and there was a dissolution of it in every case. Those parts of the graft inlaid in the bone remained alive and strong, while those parts on the joint line disappeared. Hawley does not try to explain these conditions by anything more than theories. He thinks that these failures show some limitations in the field of bone transplantations.

The results in 40 cases of bone grafting for spinal conditions was shown in a report by Rugh.²³ There was no death. One of the cases was cervical tuberculosis, fifteen dorsal, nineteen lumbar, and three in the sacral region. The presence of abscesses, paralysis or irritability of the cord did not contraindicate an operation. One case with pulmonary tuberculosis showed poor result. In one case there resulted a fracture of the graft; in another case the

graft was lost; and in a third case there was a fracture of the tibia. The average length of time that the patient remained upon the back was 6 weeks, and the average time for wearing a support was 6 months. The result in 26 cases was excellent; 5 cases were improved; 2 were unrelieved; the others have either not been heard from or died from intercurrent disease.

(Ed. Note.—The author's aim evidently has been that expressed by Lange, to put a brace under the skin and to shorten the time of recovery. We feel that the average length of time in which the patient was restricted, either on his back or with a brace, should be longer than the author suggests. In certain cases of active and extensive tuberculous disease they have broken out afresh after bone grafting.)

WAR SURGERY.

Osgood²⁴ presents a paper on "Orthopaedic Work in a War Hospital," which is interesting to us from various points of view. In the first place, it shows the value of an orthopaedic service in a war hospital, a thing that was at first considered to be doubtful. This service in a war has added much not only to the knowledge of orthopaedic surgeons, but it has also shown how useful these principles may be, and has brought this fact to the attention of the general surgeon. The great variety assigned to the orthopaedic surgeon offers proof of the value and the appreciation of their work.

Osgood's article also shows to those who are working all the time in orthopaedic surgery a number of new principles used in splinting these emergency cases, which could be made of practical use in our routine work. It is often that we forget the extent to which the different forms of splints may be developed, and do not avail ourselves of the wire mesh, the perforated metal, or the thin aluminum sheets which are so easily adapted to fit individual cases. His very ingenious and adaptable Thomas splint, made of Shelby tubing, which can be adapted to meet almost all emergencies, is something that we should keep in mind.

The article should be carefully read and the illustrations studied in order to appreciate his adaptations of apparatus to support the shoulder, the hand and the foot, and his descriptions of the use of plaster of Paris, reinforced with metal strips so that large fenestra may be left for the observation of wounds.

The broadening of the scope of orthopaedic surgery is shown by the inclusion of nerve surgery in a paper on War Orthopaedics by Hohman, Lange and Schede.²⁵ In several cases operated upon by Hohman, there was beginning restoration of function five or six weeks after the operation. Lange states that when suture of the nerve does not lead to restoration of function, much may be hoped for from transplantation of tendons. Their paper suggests that the reason of the violent reaction in a joint mobilized under an anesthetic is the hemorrhage

that occurs into the joint, and that this may be avoided by the use of an Esmarch bandage.

The need in certain cases of well-directed, but sometimes radical, surgery in severe gunshot wounds is shown in a paper by Bland-Sutton,²⁶ describing a compound comminuted wound of the upper end of the humerus. The head of the bone was replaced in as nearly its normal position as possible, and the deltoid muscle and the circumflex nerve were repaired as well as possible. The utility of the limb was undoubtedly saved by the operation. It is important that the work should be done before the formation of callus and fibrous tissue has rendered it impossible.

On the other hand, Sehrt²⁷ emphasizes the value of conservative treatment in certain other cases in which he advocated Bier's stasis hyperaemia. He applies the constrictive bandage once for all, and leaves it day in and day out. When the bandage could be applied within 24 up to 60 hours after the injury, the local and general infection was found to be reduced to a minimum, and in many cases the infection was entirely aborted. The author of the paper is very enthusiastic about this method, and says that since it has been applied in his service in treatment of all severe wounds on arms and legs, there has been no case of gas gangrene from the wound on the extremities. The constricting band is applied no tighter than a plaster bandage. The patient must not feel it as painful and the pulse below must always be palpable. The limb swells below, and may even blister, but the wound is left practically untouched so as not to open new outlays for lymph and blood. The wound is merely covered loosely with gauze, not washed or irrigated, and the limb fastened loosely to a splint or placed flat on a pillow. The pain is promptly arrested, but is liable to return if the limb is raised above the horizontal. As soon as possible, on the fourth or sixth day, the patient must make movements inside the loose dressing. The only surgical measure applied was incision under local anesthesia of a gravity abscess, if such developed. The band is left in place for a week or two.

A paper by Linberger²⁸ advocates much the same treatment as that described by Sehrt.

In a paper on the treatment of gunshot wounds of long bones and large vessels, complicated with suppuration, Krotkina²⁹ draws the following conclusions from his experience with the wounded in a large Petrograd hospital: Many gunshot fractures and lesions of the joints heal without any surgical interference. In cases of inflammatory exudates in the joints, Bier's hyperemia treatment must be resorted to, followed, if necessary, by puncture of the joint. Bier's treatment gives good results, even in pyemic states, provided the local process is limited to the joint. When Bier's treatment is used on the knee joint, the popliteal fossa must

be carefully guarded. In case cellulitis sets in, the hyperemia treatment must be preceded by large incisions. If continuous and persistent Bier treatment does not prevent or stop suppuration from the joint, the temperature keeping high, good results are often obtained from partial excision of the joint. In case of malignant edema, the general condition being grave, the earliest possible amputation of the limb is indicated.

The value of conservative treatment in certain "Suppurating War Wounds of the Knee" is emphasized by Ponomareff,³⁰ who decries any attempt to probe or drain the cavity of the knee joint when there is an infectious process in it or such is even suspected. He advocates absolute rest, immobilizing with plaster or splint. If suppuration keeps up, however, he incises and drains the anterior half, following this by incising and draining the posterior half, if this alone does not help. If nothing avails, excision of the joint or amputation of the femur must follow promptly if the infection shows a tendency to spread to adjacent regions.

In two cases of severe suppuration of the leg, Rost³¹ has made a ligature of the femoral vein, and believes that this simple operation has saved the life of the patient in each case. He considers that this operation is particularly indicated in suppurative injuries of the extremities when the patients are for some time in grave conditions and when embolic processes have developed or threaten to develop.

Hardonin³² discusses the etiology and treatment of traumatic talipes equinus, which he says he has seen in hundreds of men as a sequel to wounds of the leg. He is positive that it might have been prevented in 75% of the cases and mitigated in the others. These assertions are sustained by the experience that in certain hospitals this deformity occurs only exceptionally, while in others it is common. Early exercise of the ankle after a wound of the leg is imperative. Even the pressure of the bed clothes, when the men have to stay long in bed, may bring on the deformity, but the usual cause is that the men get up and use the leg too early, stepping on the toes to reduce the pain, and thus fastening the deformity on themselves. Various methods for correcting the established deformity are outlined.

Two cases of this same deformity of talipes equinus following gunshot wounds and sepsis have been treated by Fortunet³³ by cutting off the head of the astragalus, rather than by its removal. He says that the operation is simpler and the results as good.

(Ed. Note.—The editors would suggest that an astragalectomy, with displacement of the foot backwards, might result in a better weight-bearing function than the procedure suggested.)

POLIOMYELITIS.

In a series of lectures, Batten³⁴ brings out many points which are often overlooked in the

treatment of acute cases of poliomyelitis. He considers it an acute specific fever, with an incubation period of 4-12 days, during which time the patient should be isolated; after this time the infectivity is very slight, and in hospitals it is not necessary to place the patient in a separate ward, bed isolation being sufficient to prevent the chance of infection.

Batten believes that, as in typhoid, we can look out for contagion, so in this disease it is essential to pay careful attention to the mucous discharges from the throat and nose. He thinks that it is only through these excreta that the virus may be carried from patient to patient. He considers the use of blood serum from recently recovered cases of poliomyelitis to be of much value in a great many cases, but does not as yet think that we can depend upon it for definite and specific action. He lays special stress upon attention to the early after-treatment, and speaks first of rest. This he thinks is the most important factor. He even says that too early movement may start up a quiescent condition. After three weeks of rest, careful use of the muscles may be allowed. He calls attention to the importance of posture. Many cases are kept immobilized in a splint or other apparatus for months without careful attention being paid to their posture. Muscles which are later expected to resume their normal function should be kept at rest in a position which will prevent any over-stretching or abnormal strain.

Batten uses celluloid splints, accurately fitted to the limb as soon as it is possible to make a cast after the onset of the disease. These splints are carefully made over a plaster cast, which must be formed in a normal position of the limb.

Reëducation is a most important principle of the treatment. In the early stages, badly paralyzed muscles can often be voluntarily put in action while the patient is immersed in a warm bath. When the weight of the limb interferes with voluntary movement, this exercise with the support of the water is of much value. Batten recommends walking exercise in the erect position as the best form for reëducation of the muscles of the trunk. Splints and braces are often necessary, and among other methods of treatment he mentions massage and electricity.

During the last four years, Batten has followed these postural and reëducational lines of treatment in all acute cases, with the result that very few deformities have arisen; those that have been more often noticed were due to the contraction of the flexor muscles of the thigh.

Lovett and Martin³⁵ report a study of the Vermont epidemic made in December, 1914, where 235 cases were examined; 149 only were of less than six months' duration. The cases were classified according to the severity of the paralysis and note was made of the need of braces, minor operations, and muscular exer-

cises. These cases have since been followed up, and although no systematic treatment has been used, great improvement has been found.

The same authors³⁰ have described a method of muscle testing to be used in individual cases of paralysis.

(Ed. Note.—The editors believe this may be of great value. They recognize the difficulty of control with certain muscle groups and in young children.)

In a paper on the Serotherapy of Poliomyelitis, Netter³⁷ reports the results of a series of thirty-two cases in which the patients were treated by means of serum obtained from persons who had had the disease. He regards his results as promising: six rapid and complete cures; three, improvement approximating a complete cure; seven cases of marked improvement; in five others appreciable improvement. Eight of the children died. The injections were made into the spinal canal and were repeated daily for a week. The serum seems to keep its efficiency up to thirty years.

(Ed. Note.—25% of deaths is not less than the average in some of the epidemics, and the recoveries do not seem greater than may be expected under favorable conditions as regards good nursing.)

Gallie³⁸ makes a further report of his operation of tendon fixation, giving the results in 150 cases. Since the first 20 cases were done, three years have elapsed. He describes the operation briefly as consisting of exposing and isolating the tendon, drawing it taut so as to correct the existing deformity, and burying it in the bone in such a way that when healing takes place the deformity cannot recur. Compared with arthrodesis, it should be preferred in some cases because it restricts the motion in one direction only, that of the deformity. He considers that it gives much more success than tendon transplantation and can be used in a greater variety of cases. The method, however, can be combined with both these operations.

In a study of the results of the non-operative treatment of poliomyelitis in the hospital clinic, O'Reilly³⁹ reports rather discouraging findings. However, the unfavorable outcome has been due, he believes, to the fact that the treatment suggested has not been well carried out.

(Ed. Note.—This study serves to show the necessity of constant, if not daily supervision, of the work in the training of weakened muscles.)

In a long experimental study of tendon transplantation, with many illustrations showing the methods and the histological results, L. Mayer⁴⁰ adds much to our knowledge of this subject. It is not possible to review this article satisfactorily, but after reading it, one feels certain that the rules that Mayer makes in regard to tendon operations should be more carefully followed: First, never operate upon any case unless certain that the after-treatment can be thoroughly and conscientiously carried

out under proper directions. The operation may never be considered final with the expectancy that a good result will follow. No matter how careful the technic, adhesions, degenerative changes in the tendon are apt to occur; and these can often be prevented, at least in part, by an early function of the limb. If the operator is satisfied with the physiological fixation of the tendon, exercise can be begun a few days after the operation. The author sometimes implants a silver wire into the muscle at the time of operation so that later electrical stimulation can be obtained more perfectly. In cases where the suture of one tendon to another must be considered ideal fixation, it may be necessary to wait 2-4 weeks before motion is allowed. The transplanted tendon is always barely normal, and it should be strengthened by carefully graded exercise, and often protected by a suitable apparatus, and this exercise, which is so necessary in the after-treatment, must be continued until the transplanted muscle can actually do the work required of it.

In a study of "Implantation of Nerve into the Muscle," Heineke⁴¹ has made experiments on rabbits and can show that functional connection of nerve and muscle is easily obtained already after 1-2 weeks. Faradic reaction begins in several parts of the muscle, and after 4-6 weeks a strong contraction of the whole muscle belly is caused; after 2 months the contraction is practically normal, and the muscle shows no signs of degeneration.

This was also to be noticed when the artificial paralysis had existed for some time, *e.g.*, in a case of 90 days' duration. Five weeks after the implantation, the muscle, which had become degenerated, of yellow color, thin and flaccid, was again of normal color, and could be stimulated in its whole length by the Faradic current. This method, called neurotization by Heineke, does not need any special technic. It is also possible to implant flaps of normal muscles into a paralyzed muscle, and often is found possible when the muscles belong to different nerve zones. Held, a well-known authority in the field of nerve anatomy, has examined the preparations of Heineke, and could find that good connection of the transplanted nerve to the muscles takes place by means of the formation of new end organs, but has not yet been able to decide whether the old nerve sheath had something to do with this process. Further experiments have been made, in that into a normal not paralyzed muscle another motor nerve was implanted, and the effect of the operation was proven after several weeks by a stimulation from the implanted nerve. It was found that it is not possible to implant effectually another nerve into a normal muscle, and Heineke concludes that the implanted nerve can grow in a muscle only by using the old path and nerve sheath.

WEAK FEET.

Grossman⁴² reports on a study of 700 cases

of weak feet studied in children in kindergarten schools. There is nothing especially new in the contribution, but the study serves to bring to our notice the need of proper care of the feet in early childhood, and shows that, along with the teaching of proper posture, it is necessary to give attention to the need of proper shoes and stockings and proper methods in walking.

For severe flat-foot, Arnd⁴³ uses a modification of Muller's operation, consisting in transferring and fixing the tendon of the anterior tibial behind the tuberosity of the scaphoid. The lower end of the tendon is not detached.

VISCEROPTOSIS.

Levy and Kantor⁴⁴ give the results of their study of a series of 1600 private patients complaining of stomach trouble. Of these, 898 had a routine x-ray examination, that is, what is generally spoken of as a bismuth x-ray of the gastro-intestinal tract. A diagnosis of ptosis was made, either from the fluoroscopic or radiographic examination. The authors have grouped as ptotic those stomachs whose low-lying point, "taken with the patient standing after a bismuth meal," reached one inch below the line joining the tops of the iliac crests. In this series gastropptosis occurred 579 times, 64%; and marked gastropptosis in 46%. The proportion of women to men was 6-5, and the condition occurred more often in individuals under 40 years of age.

The authors think that visceroptosis cannot be ascribed to improper garments or other incidental causes, but is more intimately related to the structure of the body, and probably arises from some congenital predisposition. It is not in itself a disease, and the most marked types need not necessarily prevent the affected organs from performing their proper functions.

BACK CONDITIONS.

In a long review of all the various forms of backache, illustrated with many photographs, Marshall⁴⁵ presents many different points of view,—anatomical, physiological, social and economic,—that must be understood for successful management of these cases. He shows a variety of cases and various theoretical conclusions, a study of which may be helpful in understanding some of the types which present all these complications.

Shackleton⁴⁶ considers the condition of severe pain in the back due to a large transverse process on the fifth lumbar vertebra, which may or may not impinge upon the sacrum, as a very important but quite uncommon occurrence. He collected 20 cases in which the results of removal by operation had been fairly good. He reports three cases, two of which had complete relief from pain after the transverse process was removed.

Lyon⁴⁷ writes from the military convalescent home at Spa, Belgium, to describe seven cases

of an inflammatory process in vertebrae during convalescence from typhoid. In only two cases was it severe, with intense pains and swelling of the soft parts and fever. The vertebral affection persisted for two, three, or four months in all, long latent phases alternating with exacerbations. There was very little tendency to suppuration, and the prognosis was favorable, with final complete recovery. He warns that pains in the back during convalescence call for careful examination of the vertebrae. Even mild post-typhoid vertebral affections may be accompanied with great pain, but permanent recovery is the rule.

Schonfeld and Delma⁴⁸ have studied the x-ray pictures of 140 cases in order to find out what may be considered as normal and what as abnormal on the lower part of the sacrum and coccyx and their junction. They have found out that conditions which are spoken of as usual in text-books on anatomy are only occasionally found in plates; for instance, the so-called foramen sacrale quintum, which they found only 5 times among 140 cases.

The sacrum and coccyx are very often grown together, whereas a joint is frequently found between the first and second coccygeal. At times the union between sacrum and coccyx is bony only on the lateral parts, and sometimes only on one side, thus representing some kind of a sacro-caudal transitional vertebra. The connection between the bodies is often in the form of a synchondrosis. It has been pointed out that assimilation on the upper end of the vertebra is usually combined with such on its lower end. This, however, has not been proved by the authors.

SYPHILIS OF BONE.

A study of the disproportionate length of the legs in congenital syphilis is reported by Chable,⁴⁹ who cites Fournier's statement that he found some syphilitic bone affection in 38.7% of 212 cases of inherited syphilis in children over 2. The tibia was the bone affected in 46.6% of the cases. The trouble may be an osteoperiostitis or a gummatous affection. The bone curves and seems to grow thicker, and Chable has encountered two cases in which, after puberty, the bones grew abnormally long, the tibias being 10 cm. longer than the femurs in one case. This excessive growth had begun at the age of 17. In the other case only one leg had grown to excessive length. The distance from the iliac spine to the malleolus was 86 cm. on this side and 83 cm. on the other. The tibia on this side and in one leg in the other patient was of the typical saber shape, with the characteristic thickening and periosteal exostoses. In the older man (22) the bone substance has encroached on the marrow cavity and already shows signs of eburnification at some points. In the other case the bone shows the characteristic softening, the stage of periostitis with hyperos-

tosis being followed by an inflammatory new growth, which likewise encroaches on the marrow cavity. The whole bone is thicker than normal. The pains and functional disturbances from these changes in the leg bone are liable to be misinterpreted, especially as they may not develop until early adult life. Disproportionate length of the leg below the knee should always suggest possible tardy inherited syphilis.

CONGENITAL DEFORMITIES.

The importance of spina bifida in its relation to postural deformities that may develop in the trunk during later life, *i.e.*, its association with irregular formations of the fifth lumbar vertebra, adds much to the interest of the 16 cases reported by Cates.⁵⁰

Of the sixteen cases in which an operation was performed (two had the meningeal sac removed), there were only seven living two years afterwards. Six died in the first three months after the operation. Several of the cases have grown up to be strong, able-bodied workmen.

Cates considers that most of these cases have a low vitality and a generally poor resistance. He does not make mention of the structural deformity of the fifth lumbar vertebra.

In a case of congenital elevation of the scapula, Peckham⁵¹ reports a satisfactory result which he obtained by dividing the trapezius muscle at the lower angle of the scapula and removing a wedge-shaped piece. After all tissues were sutured, the needle was carried across close to the bone and passed through all the deeper tissues, giving a certain amount of fixation. With chromic catgut sutures this lower angle was drawn down closer to the spinous processes. The result, six months later, was quite satisfactory.

MISCELLANEOUS.

It is yet too early to make any definite statement in regard to the pathology of this condition which has been spoken of as Von Perthes' disease. For a long time these cases have been classed as mild tuberculous affections, but the x-ray shows us a very characteristic picture, which seems to be related to a definite clinical entity.

In the 22 cases reported by Taylor and Frieder⁵² there does not seem to be any uniform history of injury, though a mild course which developed in each is characteristic. As they say, the x-ray picture, of course, and the final result are typical. It is a benign affection which needs little treatment, and they consider its cause unknown. Legg, however, shows that in most all his cases there is a definite history of injury, soon followed by a limp with little pain or muscle spasm. The bone destruction is not marked, and the x-ray simply shows a thickening and shortening of the neck of the femur with a destruction or absorption of the epiphy-

sis. Legg argues that the trauma causes an injury to the epiphysis, and that with the disturbance of circulation the bone is either destroyed or changes in its consistency, so that it soon becomes irregular in form. His careful study of a long series of cases bears out all these facts, and it seems probable that we must consider this disease as a trophic condition, usually due to trauma.

(Ed. Note.—The editors believe the careful study of this condition needs to be continued, as undoubtedly some cases still being considered as due to tuberculosis should be included in this group. In this connection it is well to call attention to the fact that this entity, to which the name of Perthes is attached, was first described by Legg of Boston, and later by Calvé of Berck, and that only subsequently did the name of Perthes become associated with it.)

REFERENCES.

- Whitbeck: Amer. Jour. Orth. Surg., March, 1916, p. 119.
- Campbell: Amer. Jour. Orth. Surg., April, 1916.
- Gauvain: British Jour. of Tuberculosis, Jan. and April, 1916.
- Horwitz: Missouri State Med. Association Jour., March, 1916.
- Paus: Norsk Magazin for Lægevidenskaben, lxxvii, No. 5, May, 1916; Abst. J. A. M. A., July 1, 1916.
- Silfverskiöld: Abst. J. A. M. A., July 15, 1916, p. 245.
- McCrae: Penn. Med. Jour., April, 1916; Abst. J. A. M. A., May 20, 1916, p. 1660.
- Schloss: Jour. A. M. A., July 15, 1916, p. 245.
- Kahlmeter: Abst. J. A. M. A., July 15, 1916, p. 245.
- Wegelin: Correspondenz-Blatt f. Schweizer Aerzte, xlvii, No. 20, May 13, 1916; Abst. J. A. M. A., July 1, 1916.
- Bandit: Contributions to the Study of Vertico-Transverse Fractures of the Neck and Body of the Astragalus.
- Brickner: Amer. Jour. of Surgery, March, 1916.
- Robinson: Missouri State Med. Assoc. Jour., February, 1916.
- Connell and Freyer: The Practitioner, March, 1916.
- Herniman-Johnson: The Practitioner, March, 1916.
- Lane: The Practitioner, March, 1916.
- Taylor: The Practitioner, March, 1916.
- Sever: Surg., Gyn. and Obstet., March, 1916.
- Hartwell: Amer. Jour. Orth. Surg., Feb., 1916, p. 82.
- Dobrovol'skaia: Abst. Jour. A. M. A., July 29, 1916, p. 400.
- Tongue: Jour. A. M. A., Feb. 12, 1916, p. 543.
- Hawley: Amer. Jour. Orth. Surg., January, 1916, p. 29.
- Rugh: Amer. Jour. Orth. Surg., February, 1916, p. 71.
- Osgood: BOSTON MEDICAL AND SURGICAL JOURNAL, Jan. 27, 1916, p. 109.
- Hohmann, Lange and Schede: Münch. med. Woch., Feb. 15, and 22, 1916.
- Bland-Sutton: Brit. Jour. of Surg., January, 1916.
- Schri: Jour. A. M. A., April 22, 1916, p. 1360.
- Lüberger: Münch. med. Woch., Feb. 20, 1916.
- Krotkina: Abst., Jour. A. M. A., July 29, 1916, p. 400.
- Ponomareff: Russiky Vrach, xv, No. 21, Abst., Jour. A. M. A., Sept. 9, 1916.
- Rost: Münch. med. Woch., No. 2, Jan. 11, 1916, p. 58.
- Hardonin.
- Fortanet.
- Batten: Lancet, April 15, 1916.
- Lovett and Martin: Vermont Medicine, February, 1916.
- Lovett and Martin: Jour. A. M. A., March, 1916, p. 729.
- Netter: Arch. de méd des enfants, January, 1916, xix, No. 1.
- Gallie: Amer. Jour. Orth. Surg., January, 1916, p. 18.
- O'Reilly: Amer. Jour. Orth. Surg., March, 1916, p. 143.
- Mayer: Surg., Gyn. and Obstet., February, March, April, 1916.
- Heineke: Langsbock Archiv f. klin. Chir., No. 105, p. 517, 1914.
- Grossman: Interstate Med. Jour., May, 1916.
- Arnd: Correspondenz-Blatt f. Schweizer Aerzte, March 4, 1916, p. 308.
- Levy and Kantor: BOSTON MEDICAL AND SURGICAL JOURNAL, April, 13, 1916, p. 534.
- Marshall: BOSTON MEDICAL AND SURGICAL JOURNAL, April 27, 1916, p. 691.
- Shuckleton: Jour. A. M. A., May 20, 1916, p. 1600.
- Lyon: Med. Klinik, Dec. 19, 1915; Abst., Jour. A. M. A., Feb. 12, 1916, p. 541.
- Schonfeld and Delma: Fortschritte der Roentgenstrahlen, xxiii, No. 6, p. 496, 1916.
- Chable: Correspondenz-Blatt f. Schweizer Aerzte, xlvii, No. 24, June 10, 1916; Abst., Jour. A. M. A., July 29, 1916, p. 398.
- Cates: BOSTON MEDICAL AND SURGICAL JOURNAL, March 23, 1916, p. 420.
- Peckham: BOSTON MEDICAL AND SURGICAL JOURNAL, March 2, 1916, p. 315.
- Taylor and Frieder: Surg., Gyn. and Obstet., February and March, 1916.