as he had done on the previous occasions, and I drew off cerebro-spinal fluid. As the fluid came away the pulse gradually became weaker; when 12 c.cm. had come away the pulse was imperceptible at the wrist; we then stopped, and injected 8 c.cm. of the antitoxin. As this was done the pulse again appeared at the wrist. The remainder of the phial of serum was injected subcutaneously. He did not sleep at all that night, and on the morning of January 17th the nurse gave him an injection of pituitary extract, as his condition became very bad. We found him later quite unconscious, with scarcely perceptible pulse, 150 to the minute, and the head still more retracted. The anterior chamber of the left eye now contained thick, curdy-looking pus. He was again injected with half a million of his autogenous vaccine. The evening of the same day he was again seen by Dr. Dighton, who found him extraordinarily improved; he was able to take food by the mouth, was rational, and looked as if he was now really going to recover. At 4 o'clock the next morning, January 18th, he took a sudden turn for the worse, became cyanosed, the pulse failed, and he died the same morning.

The only comment I have to make on the case is that we were disappointed with the antimeningococcic serum, which, as far as we could judge, produced no clinical improvement. On the two occasions on which the vaccine was given a notable improvement followed. The sterilization of the vaccine was effected by heating to 58° C. for thirty minutes.

PRELIMINARY NOTE ON TWO CASES TREATED BY RIB TRANSPLANTATION.

BY

W. I. DE C. WHEELER, M.D., F.R.C.S.IRE.,
SURGEON, MERCER'S HOSPITAL, DUBLIN.

Two recent cases of transplantation of bone have impressed on me the usefulness of portion of a rib as a transplant instead of the anterior crest of the tibia, which is more usually employed.

Congenital Dislocation of the Hip.

In this case the child, aged 4, was treated unsuccessfully by Lorenz's method. The following operation was performed on March 5th, 1914, through Kocher's posterior incision. The upper and posterior rim of the acetabulum was freely exposed, and the bone in this region freshened by light touches of a gouge and chisel. A finger-length of one of the upper ribs was removed in a position where the curve seemed suitable for re-enforcing and deepening the posterior portion of the acetabulum. Before reduction of the dislocation three single sutures of fine aluminium bronze wire were passed through the bone in the required position with a strong fully curved needle. The head of the bone was then levered into place and the rib fixed with its centre at the point where the head of the bone appeared to escape most easily from the socket.

Skiagrams taken at frequent intervals showed, first, the rib in good position; afterwards it almost disappeared, and later still a well-defined shadow marked the position of the transplant.

The head of the bone, judging by the skiagrams, did not appear in the best position, and the joint was again exposed through Murphy's "goblet" incision eight months after the first operation. The head was found, after rotation of the leg inwards, to be in normal relation to the acetabulum, and the latter showed an excellent formation of new bone deepening the socket considerably at the site of introduction of the rib. The shape and size of the new bone corresponded in a large measure to the original transplant.

Modification of the Albee Operation for Spinal Caries.

In this case the child, aged 5 years, was operated upon on January 19th for ever-increasing kyphosis in the mid-dorsal region of the spine. She had been treated without success since May, 1914. Absolute rest with extension on a Whitman's splint and subsequently with a spinal jacket did not arrest the progress of the disease. Skiagrams showed active caries in three vertebrae.

An incision was made slightly to one side of the spines of the vertebrae and carried well above and below the

disease. The laminae and transverse processes were cleared of the soft tissues and the exposed bone freshened with Jones's arthrodesis gouge. The articulations of the adjacent ribs were freely exposed. A superficial horizontal incision approximately at right angles to the vertical incision was carried forwards in the direction of the ribs. The erector spinae muscle and dense aponeurosis was carefully preserved and pulled backwards. The rib was divided with bone forceps just outside the articulation and was easily separated forwards under the muscle to the required length and removed. The curve of the rib suited admirably the kyphotic curve of the spine. The rib was laid on the freshened bone and held firmly in position by interrupted sutures of catgut through the divided soft parts. The fragments of bone detached during the freshening of the vertebrae were carefully preserved and placed deeply in the wound.

The application of the graft alongside of the spinous processes after Jones's method, instead of the original plan of splitting the spinous processes to receive it, and the procuring of the transplant from the operation area with very little addition to the original incision, made the operation simple and rapid.

The size and shape of the graft, as in the first-mentioned case, was admirable.

In both cases, in trying to save the periosteum of the rib, the pleura was injured, but at the time of operation it was obvious that this was avoidable; and in neither case did the patient suffer any ill effects from the development of transient pneumothorax.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

SUGGESTED FORM OF TREATMENT FOR TETANUS.*

THE bacillus of tetanus produces toxins which affect the nervous system. No doubt the toxin becomes incorporated with the nerve centres—it passes to the nerve centres, not by way of the lymphatics of the nerve, but through the plasma of the nerve fibres. I can well imagine why the treatment of tetanus with antitoxic serum so frequently fails to cure. Flexner states that *Trypanosoma gambiense* can be suppressed by drugs in the blood and lymph vessels without being destroyed in the central nervous organs, and the virus of poliomyelitis prevented from developing through intraspinal injections of an immune serum that is without effect when introduced into the blood. I may add that when I was working on pellagra in Columbia, S.C., I gave monkeys subdural injections of a bacillus which I found in the nodes of patients who suffered from pellagra; in twelve hours I made a lumbar puncture and inoculated ascitic real broth tubes with the cerebro-spinal fluid which was withdrawn. In twenty-four hours I had a vigorous growth of the same bacillus.

The treatment by antitetanus serum is a general treatment, but what we require is a local treatment to come into contact with the local infection of the nervous centres of the brain and cord. We certainly have not had brilliant results in treating syphilis of the nervous system by injecting salvarsan into a vein—in other words, by general treatment—and it is dangerous to inject salvarsan directly into a subarachnoid space. Swift and Elliott† were the first to employ the serum of salvarsan-treated patients for intraspinal injection, and many brilliant results have been met with by this generalized local form of treatment. As Flexner remarks, it is known, for example, that the cerebro-spinal liquid produces a means of direct and immediate contact with the structural tissues of the brain; whatever chemical is introduced into this liquid will immediately find its way to the supporting elements—the nerve cells and fibres of the cortex.

Why not treat tetanus by the same method as syphilitic diseases of the nerve centres? The cases are parallel. We recognize the fact that the toxin or toxins of the tetanus bacillus are incorporated with the nerve centres and fibres. We know that general treatment with anti-

* Abridged.

† New York Medical Journal, 1912, 10, 10653.