

to operation in but three cases and recovery has been very rare. The circumscribed form which frequently accompanies middle ear disease has been operated upon a number of times with excellent results. Kummell himself has had three cases of circumscribed purulent meningitis following middle ear disease which he operated upon through a large opening in the skull. All of these recovered. But in a number of cases similarly treated death ensued in spite of operation. He has carried out a similar method in a number of cases of tubercular meningitis without any recoveries, but the operation has had a favorable influence on the severe headaches and temperature. He also operated upon two cases of purulent meningitis, one following a fracture at the base of the skull and the other an ascending meningitis following an operation on the spinal canal. In the former case the lumbar puncture showed thick pus under great pressure. The patient was a man thirty-three years of age, and was admitted to the hospital ten days after the injury, deeply comatose and almost pulseless. A trephine opening was made through the skull over both parietal bones and strips of gauze inserted deeply towards the base of the skull. He improved gradually from day to day. Lumbar puncture on the third day showed only slightly turbid fluid. On the sixth day it was quite clear. There was transient aphasia and agraphia. The patient was discharged from the hospital after four weeks, fully recovered and able to work. In the second case following the operation on the spinal canal there was improvement in the symptoms, the coma and pain disappearing, but the patient died a little later.—*Proceedings of the German Surgical Congress, 1905.*

III. Intraneural Injections of Antitoxin in the Treatment of Tetanus. PROFESSOR KÜSTER (of Marburg) reported a case of local tetanus with injection of antitoxin into the nerves and recovery. Gumprecht was the first to call attention that the tetanus toxins reached the central nervous system through the

peripheral nerves, and Meyer and Ransom have found that one can block these nerves, and in that way protect the spinal cord. Kiister had occasion to prove the correctness of this theory on a thirty-seven-year-old employee of the von Behring Institute. This patient had sustained a cut of the right hand on the palm while carrying a beaker containing virulent tetanus bacilli, the beaker breaking, and the fluid entering the cut. The wound was washed with tetanus antitoxin and a subcutaneous injection given. Beginning with the seventh day after the receipt of the injury, the patient had very painful muscular spasms in the right arm, followed by a similar condition in the muscles of the neck, jaw, and œsophagus. Kiister exposed the axillary nerves and injected the antitoxin of tetanus into the median, ulnar, and musculo-spiral nerves until they began to show considerable swelling. He carried out the same procedure on the cervical nerves above the clavicle. The very next day the spasms entirely disappeared and never returned, but a very painful and long-continued myositis developed within a few days, which Kiister did not ascribe to the injection. A perfect recovery ensued. He does not believe that the appearance of symptoms which indicate the involvement of the spinal cord are contraindications to its application, for the reason that the system can take care of all the toxins that have been absorbed, provided that the nerves are blocked so that no more can enter the system.

HENTLE, of Graz, in the discussion reported a case of tetanus which he had treated in a similar manner in September, 1901. The patient was admitted to the hospital on the third day after the appearance of symptoms. The wound was excised and tetanus antitoxin was injected into the wound and into the three principal nerves of the arm. At first there was considerable improvement, but after a lapse of six days the patient suddenly became worse and died within a few hours. He believes that the injections should be repeated a number of times.

BRAUN, of Gottingen, did not consider that the applications were of any benefit when the tetanic symptoms had become gen-

eralized. If the disease had existed ten days, one should not expect any results from the injections.

Kocura, of Bern, reported one case in which recovery followed the use of the injection. He was very favorably impressed with the method, but did not believe that we ought to expect too much. The antitoxin was in all probability only able to utilize the toxins in the peripheral nerves into which it was injected.

Kiister, in closing the discussion, said that we should limit the use of the method to the first days after the appearance of the symptoms, and advised using it as early as possible.—*Proceedings of the German Surgical Congress, 1905.*

IV. Present Status of Spinal Anæsthesia. By PROFESSOR AUGUST BIER (of Bonn). The old method of spinal anæsthesia with pure cocaine was not a competitor of general anæsthesia on account of its dangers and its unpleasant after-effects. The older substitutes of cocaine did not relieve this condition. A change has taken place, first, through the addition of suprarenal preparations, the best of which are paranephrin and suprarenin. These limit the dangers of cocaine considerably, but unfortunately they do not obviate the disagreeable accompanying and after-effects which cocaine causes, such as headache, backache, and vomiting. Second, stovain has been substituted for cocaine. It was first discovered by the French chemist, Fournier. Compared with cocaine, it has very insignificant after-effects. Bier considers stovain the best agent to use at the present time for spinal anæsthesia, but advises that it should always be used in connection with adrenal preparations.

The great advantage of spinal anæsthesia is that it is excellently borne by weak persons and those who have endured a good deal of suffering, as well as by the aged. Formerly, it was impossible to secure the necessary anæsthesia after the introduction of the anæsthetic agent through lumbar puncture in about 6 to 10 per cent. of the cases. This can be reduced almost to nothing through painstaking technique.