

which was distended, the left heart being empty and contracted; there was a decolourised clot filling the superior longitudinal sinus. The organs were otherwise healthy. The bones were soft and porous, and the ends of the ribs were enlarged.

*Remarks by Mr. E. A. T. STEELE.*—The above case appears to me to have been an advanced type of scurvy-rickets, the most noticeable points in the diagnosis being the history, the long-continued farinaceous diet, and the swelling of the wrists and ankles in the neighbourhood of the epiphyses of the tibiae and radii. The complication of pemphigus is unusual and difficult to explain. Dr. Sansom has reported<sup>1</sup> a case of purpura hæmorrhagica associated with acute pemphigus, but this was in a girl aged twelve years and was a sequence of influenza.

## THE AUCKLAND HOSPITAL, NEW ZEALAND.

TWO CONSECUTIVE CASES OF TETANUS TREATED WITH  
TETANUS ANTITOXIN AND CHLORAL HYDRATE;  
RECOVERY.

(Under the care of Mr. ARTHUR MARSACK.)

ALTHOUGH the value of tetanus antitoxin is very generally acknowledged, yet it cannot be said that we are at present fully possessed of exact indications either as to the quantity to be administered or as to the cases in which it is likely to be really beneficial. In many cases, and those not necessarily very severe, but little benefit seems to follow its employment, while in others the improvement is striking and enduring. Under these circumstances it is highly desirable that all those cases of tetanus should be put on record in which the antitoxin has been thoroughly tried. The following two cases are noteworthy in that chloral was extensively used as an adjuvant, and the value of this drug in symptomatic treatment by controlling the spasms is often very marked. For the notes of these cases we are indebted to Dr. J. C. Pabst, assistant medical officer.

CASE 1.—A lad, aged fifteen years, was admitted to the hospital on the afternoon of Aug. 13th, 1896. He was able to give the following history. On Aug. 1st, whilst walking barefooted, he trod on a piece of glass and cut his right foot. He continued to limp about, and a few days later squeezed some "matter" out of the wound, after which it rapidly healed. On the 5th during a game of football he had a severe fall, but was well enough to continue the game. Next day he went to school, but returned early as he did not feel well. For the next two days he was able to walk about, but did not feel well, and noticed especially a pain in the right hip. On the 9th he noticed that he continually bit his tongue, but though he still had pain in the hip he did not go to bed. There was no change till the morning of the 11th, when he felt too ill to get up; he "felt stiff" in places, especially in the neck, jaw, and legs. In the evening he got up, but shortly afterwards his body becoming "stiff all over" several times, he went back to bed, and passed a very restless night. On the evening of the 12th he was seen by Mr. Marsack, who found him with marked trismus, profuse sweating, and severe clonic spasms. He prescribed belladonna and a purgative, and ordered his removal to the hospital, which was done next day. On admission his temperature was 102.2° F., the pulse 120 and feeble, and the respirations were 22. The tongue was slightly coated and dryish; it was protruded with difficulty. He was mentally clear and very cheerful. There was profuse sweating. There was trismus, the incisor teeth being separated only to the extent of half an inch. Marked risus sardonicus was present. The pupils were equal, a little dilated (belladonna), and reacted sluggishly to light. He lay on his back with his knees slightly flexed. The abdomen felt like a board and the muscles at the back of the neck were very rigid. There was opisthotonos, so that the hand could be easily placed between the back and the bed. The muscles of the thighs and legs were rigid, but those of the upper extremities were quite flaccid. He could flex and extend both arms and legs. There was apparently no loss of power and no loss of sensation. The cutaneous reflexes were greatly exaggerated. The patellar reflexes could not be made out owing to the rigidity of the limbs. He was able to swallow. The heart's action was rapid. The lungs were normal. He complained

chiefly of pain in the right hip. On the sole of the right foot there was a small scar in which a small splinter was buried; this latter was immediately removed. The urine was turbid, acid, of specific gravity 1030, and showed a large deposit of urates, but no albumin. The examination was frequently interrupted by short severe spasms. Five grains of calomel were immediately given, and at 3 P.M. one gramme of antitoxin (the dried form from the British Institute of Preventive Medicine) was injected into the subcutaneous tissue of the upper abdomen on the right side. During the next five hours the number of spasms, which had been thirty-six, steadily lessened, until from 7 to 8 P.M. there were only seventeen to the hour. At 8 P.M. another gramme of antitoxin was injected into the left upper abdomen. The lump raised by the first injection had not entirely disappeared, and pressure on the spot caused pain and gave rise to a spasm. At 11 P.M. the patient seemed very drowsy, but his sleep was disturbed every few minutes by a severe spasm. At 12 midnight the spasms still continued, and the prospects of a good sleep appeared bad; he was given a tablespoonful of the chloral mixture, and one gramme of antitoxin was also injected. During the next two hours the number of spasms became reduced to nine and seven respectively; however, as his sleep was still much disturbed the dose of chloral mixture was repeated at 2 A.M. on the 14th. Between 5 and 7 A.M. there were no spasms at all. At 10 A.M. the physical condition of the abdomen, neck, and face was precisely the same as on admission. At 12 noon one gramme of antitoxin was injected, and until 4 P.M. the spasms gradually increased in number and severity. There was considerable difficulty in swallowing. During the night he was delirious and tried to get out of bed. On the 15th, at 9 A.M., he was given two doses of chloral mixture and a suppository containing a quarter of a grain of morphine. His tongue was very sore from his biting it. The respiration was very laboured and noisy, especially during sleep. He was continually bathed in sweat. The trismus, risus sardonicus, and board-like abdomen remain unaltered. At 8 P.M. the question of continuing the use of antitoxin or not was discussed. It was decided to continue, for although no apparent beneficial effect could be detected, neither could it be said that the case was aggravated by its use. One gramme was therefore injected. At 12 P.M. another gramme of antitoxin was injected. The patient slept well during the night after a dose of chloral. At 9 A.M. on the 16th the bowels were well opened by five grains of calomel. Three of the points of injection were very red and tender. At 12 noon one gramme of antitoxin was injected (last dose). From this time till 9 P.M. the patient became much worse, the spasms being so numerous and the opisthotonos so marked that the chloral mixture was given, improvement immediately following. The antitoxin was now discontinued, as it was felt that the bad symptoms which followed so quickly upon the last dose might in some way be due to it. During the next two days the patient's condition remained practically unaltered. The trismus, sardonic grin, and rigidity of the muscles of the abdomen and legs were quite well marked. Chloral was pushed at night so as to secure sound sleep, and discontinued during the day, a dose, however, being given whenever the spasms became so frequent as to cause great distress, and the result was uniformly satisfactory. On the 19th there was an urticarial rash on the chest, abdomen, and back. Four of the points of injection looked angry and the glands in the right axilla were tender; however, as the temperature was not above 99° they were not opened. The body was covered with sudamina. On the afternoon of the 20th the pain in the right hip suddenly increased in severity, so much so that a quarter of a grain of morphine suppository did not give relief and had to be repeated. On the 21st, at 12 noon, as the bowels had not been open for nearly forty-eight hours, an enema was given, a scanty motion resulting. Immediately afterwards the patient was seized with a severe spasm in which the respiratory muscles were involved, the cyanosis being marked. Similar but less severe fits occurred frequently during the afternoon, and his temperature rose to 102.6°. Five grains of calomel were given, and five minims of tincture of digitalis were added to the chloral mixture. The patient passed a very bad night; he was delirious, and had numerous severe spasms. Another morphia suppository (one quarter of a grain) was given. During the next three days the patient appeared to be better, although the tonic rigidity persisted. On the 25th, from 9 P.M. to midnight, there were ninety-nine spasms. Two doses of chloral mixture were given, and the spasms rapidly

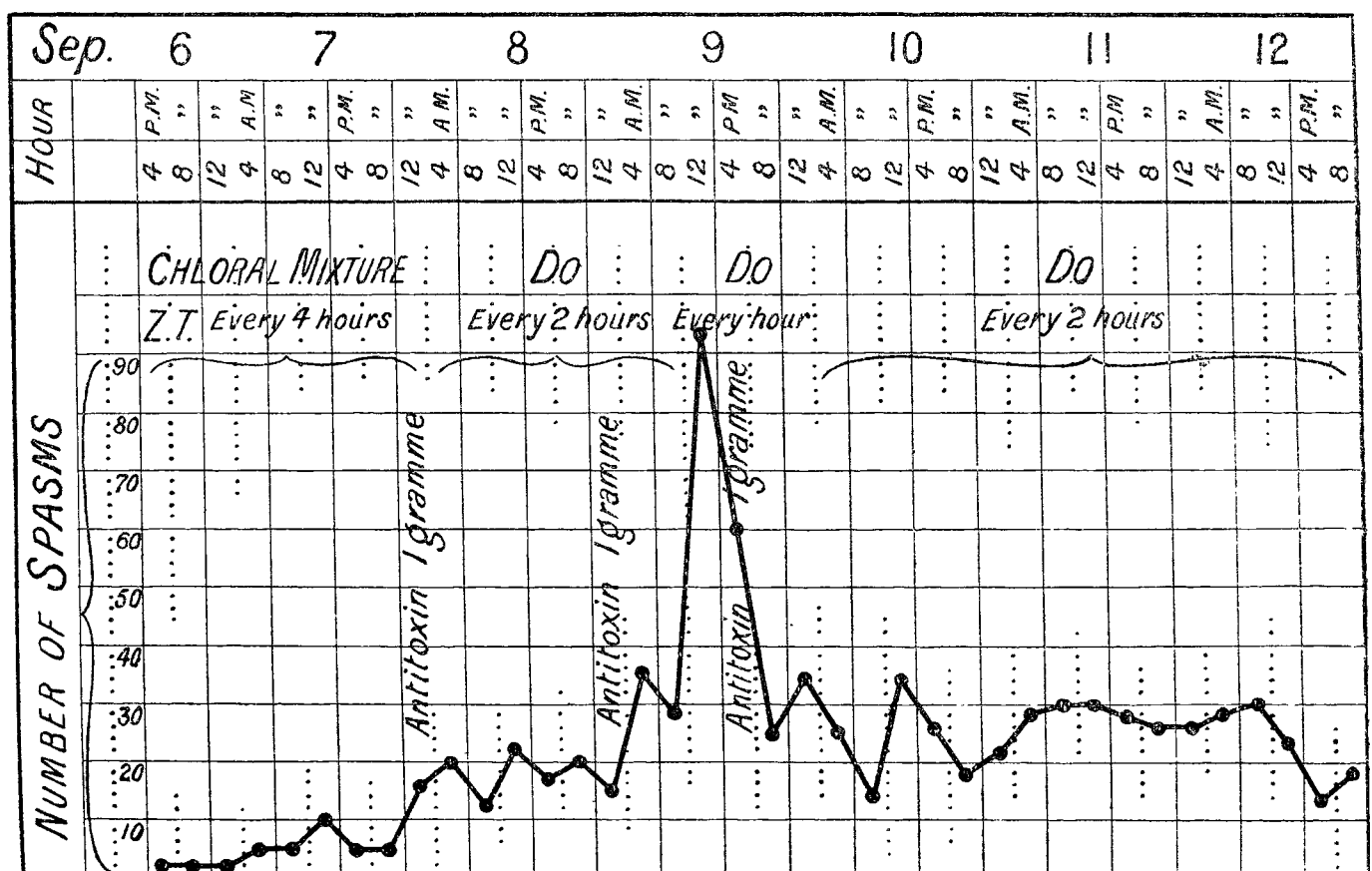
<sup>1</sup> Report of a meeting of the Clinical Society, THE LANCET, June 2nd, 1894, p. 1375.

subsided. All medicine was discontinued for four days, only one dose of the chloral mixture being given daily. The patient was allowed solid food on the 29th. On the 31st there was still a little trismus, and the muscles of the abdomen and neck were rigid, though less so than formerly. The lumps formed at the point of injection were much smaller and showed no signs of inflammation. The urticarial rash and sudamina had entirely disappeared. On this date the patient was removed to the general ward as a convalescent. Up to this stage of the case the temperature and pulse had been taken every four hours and the urine measured and tested daily. The temperature during the first week averaged 100°, only once touching 101°. The pulse varied directly with the temperature and ranged usually between 100 and 110. No relation could be detected between the use of the antitoxin and the condition of the muscles or between it and the temperature and pulse. The quantity of urine was fairly constant and averaged fifty ounces daily; there was never any albumin. The patient took his food well, averaging six pints of fluid daily. On Sept. 5th he was able to walk about the ward, and on the 11th he was discharged.

CASE 2.—A boy, aged four years, was admitted to the hospital on Sept. 6th, 1896, at 2 P.M. His mother dated the illness from Sept. 3rd, though she noticed that for a week previously to this he had not taken his food so well and appeared to have a "cold." However, on the date mentioned he was seized with severe "screaming fits," during which he clenched his teeth and bit his tongue. In the intervals he was unable to open his mouth widely and sweated profusely. The "fits" increasing in frequency and severity he was on Sept. 6th taken to Mr. Lewis, one of the honorary surgeons of the hospital, who recommended the patient's immediate removal to the hospital. On admission the patient was found to be a well-nourished and very intelligent child, but he refused to protrude the tongue for fear of having it bitten. His temperature was 98° F., the pulse 96, and the respirations were 32. He was sweating profusely. There was slight risus sardonicus. He could only separate the incisor teeth to the extent of one-third of an inch. There was slight rigidity of the muscles at the back of the neck, but the sterno-mastoids were unaffected. The abdomen was quite lax and there was no rigidity of the extremities. The cutaneous reflexes were exaggerated, but the patellar reflexes were absent. There was very little difficulty in swallowing. The heart and lungs were normal. The pupils were equal and reacted to light. The urine was acid, of specific

gravity 1032, and contained neither sugar nor albumin. The patient was immediately placed in a warm bath, after which he was given a powder containing ten grains of calomel and five grains of compound scammony powder, also a drachm of the chloral mixture, the latter to be repeated every four hours. So far the case differed little from one of simple trismus, and although a minute examination was made no sign of a wound could be found. During the night the patient slept for six hours; and at 9 A.M. on the 7th his physical condition was unaltered; the nurse reported nine spasms. On the 8th, at 1 A.M., one gramme of antitoxin (British Institute of Preventive Medicine) was injected, as there was no longer any doubt about the condition; the abdomen was board-like, the muscles of the neck were very rigid, the risus sardonicus was much more marked, and at frequent intervals there were severe clonic spasms which threw the body into a condition of opisthotonos. A powder containing three grains of santonin and five grains of compound scammony powder was given, to be followed by a drachm of castor oil, repeated if necessary. The dose of the chloral mixture was doubled. At 9 A.M. it was noted that there had been sixty-nine spasms in the twenty-four hours. At 11 P.M. one gramme of antitoxin was injected. By 9 A.M. on the 9th the patient's condition was much worse, he lay practically on his head and heels, and the slightest touch precipitated a spasm. The bowels had been opened thoroughly and one motion contained a round worm. At 4 P.M. one gramme of antitoxin was injected. By 9 A.M. on the 10th the patient had had 252 spasms, the majority being very mild. The condition of tonic rigidity of the body remained unaltered. The increase in the number of spasms followed rapidly the last dose of antitoxin. During the next three days the patient improved; the spasms were less frequent and less severe, and the rigidity of the muscles of the abdomen and neck was less marked, though the trismus and risus sardonicus appeared to be unaltered. On Sept. 14th there was an urticarial rash on the abdomen. By the 16th the rash had almost disappeared, but two of the lumps raised by the injection were very discoloured and tender. On the 21st the patient was removed to the general ward as a convalescent. During the whole illness the temperature was very little above normal; the urine, though tested daily, never gave evidence of albumin. The patient was always able to take his food. On the 1st he was discharged. He was able to walk, though the abdomen was still a little rigid.

## CASE II - CHART SHEWING SPASMS.



*Remarks by Dr. PABST.*—The foregoing cases complete a list of eleven cases of tetanus treated at this hospital during the past two years. Of the other nine cases (all of which passed through my hands as house physician) seven died and two recovered completely. In five of the cases the patients died within forty-eight hours after the onset of tetanic symptoms. These five cases were definitely traumatic; by this I mean that at the time they came under observation there was an unhealthy wound to be seen. These cases were treated with chloral hydrate, eserine, and morphine, combined with local treatment by the application of carbolic acid to the wound. In two other cases one patient died on the fifth and the other on the sixth day after the first symptoms appeared. Both these cases were indefinitely traumatic—one following a “gumboil” and the other a scratch on the foot; they were treated with chloral hydrate and eserine. The remaining two patients who recovered were both treated with chloral hydrate and bromide of potassium. One was definitely traumatic, following twelve days after a wound of the knee caused by a fall upon a piece of glass; the other was apparently idiopathic, as there was neither history nor trace of any wound. These eleven cases as regards their acuteness fall naturally into two groups:—1. The five rapidly fatal cases which may be taken as examples of acute traumatic tetanus, their severity depending not so much upon the shortness of the incubation period (the most rapidly fatal case of all having an incubation period of twelve days), but upon the rapidity with which the spasms followed one another, and so exhausted the patient. 2. The six sub-acute (fairly severe) cases in which the symptoms after first showing themselves developed slowly. To this group belong the two cases treated with antitoxin and chloral. They were therefore not of the severest type, and it will be noted that both cases had shown symptoms for three days before admission—a period in which the cases belonging to Group 1 had all ended fatally. Still, it would seem that sometimes after the first signs there is a period of quiescence, after which the symptoms reappear with increased severity; this would appear to be what occurred in Case 2, where for the first twenty-four hours after admission there was little else than trismus, after which the symptoms assumed the severest type. Having indicated the type of case (an essential point), it only remains to try to form a correct estimate of the value of the remedies used to bring about the successful result. A difficulty arises in that there are undoubtedly two factors—antitoxin and the chloral mixture. The effect of the chloral mixture had been studied in the two patients mentioned who recovered under its use; it lessened the number and severity of the spasms, and when pushed procured sleep. When given with the antitoxin its beneficial action was quite as apparent; after giving it improvement was expected; if none occurred the dose was increased gradually, and always with the required result. With regard to the antitoxin no improvement at all could be detected after its use; there was nothing comparable to the improvement seen to follow an adequate dose of diphtheria antitoxin in a case of diphtheria. On the other hand, in both cases the injection of the antitoxin was sometimes (not always) followed by aggravation of all the symptoms. Still, the duration of the two cases treated with antitoxin and chloral was much shorter than those two treated with chloral alone, the general prostration was less, the stage of convalescence was shortened, whilst the acute stage was about the same length. In this respect there is some resemblance to diphtheria in which a case sufficiently bad to be treated with antitoxin often convalesces more rapidly than a case which has been so mild as not to require antitoxin. This shortening of the course of the disease was to my mind the most marked feature in both cases and must be ascribed to the antitoxin. On the whole, though both these cases might possibly have recovered under chloral alone, I believe that the antitoxin was of value probably in the way of preventing the rapid development of severe symptoms; that it shortened the course of the case I feel certain. Some other points require notice. In using the antitoxin the directions issued with it were carefully followed. A rather turbid fluid was the result, and the lump raised by its injection served as a source of peripheral irritation. For this reason a more potent antitoxin would be an improvement and is more called for than in the case of diphtheria. The urticarial rash was probably a direct result of the antitoxin, but not so the sweating, which was equally profuse on admission, and, moreover, was a marked symptom in the fatal cases in which the patients did not have antitoxin. I have come to

the conclusion (1) that moderately severe cases may recover under the use of chloral and bromides; (2) that although cases have recovered under tetanus antitoxin alone, its use should not preclude the adoption of measures to meet the urgent symptoms which are almost constantly present, and that in this respect the treatment should resemble that of diphtheria, where the successful issue of a case in which the antitoxin has been used so often depends upon the prompt way in which every symptomatic indication is met; and (3) that the treatment which offers the best prospects of success is that in which tetanus antitoxin is combined with chloral and bromides.

## Medical Societies.

### ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

#### *Hernia Cerebri.—Non-tuberculous Posterior Basic Meningitis.*

A MEETING of this society was held on April 13th, the President, Dr. HOWSHIP DICKINSON, being in the chair.

Mr. LAW FORD KNAGGS read a paper on a case of Compound Depressed Fracture of the Skull, followed by Cerebral Abscess and Hernia Cerebri, together with a consideration of the subject of hernia cerebri based on 100 collected cases. The patient, a man, was operated on for compound depressed fracture of the left parietal bone on Sept. 11th, 1894. Though the membranes and the brain were injured, and the wound subsequently suppurated, healing took place in due time, and he became an out-patient on Nov. 28th. He was re-admitted in February with some cerebral symptoms and a protrusion of the soft parts over the bony aperture. On Feb. 4th he was unexpectedly found at the point of death, and the swelling was explored and then opened with a pen-knife by Mr. Thompson, the resident surgical officer. An ounce of pus was evacuated from a cerebral abscess, and the patient brought round by artificial respiration. Hernia cerebri and paresis of the right arm and leg at once developed. The former grew as large as a hen's egg in a fortnight, remained stationary for three weeks, and then shrank, and by July 7th had disappeared. He left the hospital on Aug. 3rd well, except for some remaining weakness of the forearm muscles and a hesitation in his speech; and a year later his condition remained unaltered, except that he had a fit every eight weeks. He was working as a labourer. In discussing the subject of hernia cerebri the intracranial conditions which produce it were described—viz.: (1) increased tension; (2) a softened or diffident state of a portion of the cerebral substance; and (3) inflammation of the brain substance, which leads to an increase in bulk, to its softening, and when prolonged to its replacement by granulation tissue, and finally by cicatrix. The inflammation also impairs, suspends, or even destroys the functions of the centres implicated. The duration and size of the hernia are influenced by the extent of the inflammation. The causes are traumatism and sepsis, either separate or in combination. If sepsis be avoided the inflammatory effusion is gradually absorbed and the protrusion will certainly dwindle and disappear after it has reached its maximum. The time required varies from a few days to several months, and depends on the amount of brain involved and the absence or presence of any continued irritation. The results of septic infection are abscess, meningitis, and diffuse inflammation, and abscess is the only one that is not always fatal. Hæmorrhage and abscess may be associated with hernia cerebri, and attention was drawn to the importance of gravity in certain cases and to the sudden but transient enlargement of the tumour, which may result from trivial causes, either local or general, such as probing the wound or an attack of tonsillitis. The prognosis was stated to be good if sepsis were avoided, and it was to be borne in mind that septic infection might be a result, not only of the original injury or consequent operation, but of interference. The results of treatment by pressure, by caustics, and by various operative procedures, as well as of those left to nature, were then fully considered, and the conclusion arrived at that most of the recoveries were due to natural processes, and that most of the successful cases would probably have recovered if left alone. Three more might have recovered