the frequency of micturition was still more than natural during the night. She was seen in May 1873, and was very much improved, there being very little irritation now.

Possibly this may be nothing new to some present; but as it seems to be a very effectual mode of dealing with these troublesome little growths, I thought it not unworthy of the attention of the Society, as I am convinced it is not generally known, and it deserves a more extended trial.

The cases I have selected are only a few of those in which I have employed it; in many instances, the patients have attended some few times and then ceased to do so; it is, therefore, fair to conclude that they were relieved from their sufferings, otherwise they would have again presented themselves.

CASE OF TRAUMATIC TETANUS SUCCESSFULLY TREATED BY CALABAR BEAN.

By JOHN CUNNINGHAM, M.B., Campbelltown.

As the uses of the Calabar bean in the treatment of tetanus are at present engaging the attention of some of the members of our profession, I may be pardoned for giving the following notes of an interesting case which lately occurred in my practice.

Alexander C., aged 7, was on a visit to his grandfather, when he met with an accident on July 31st last. When I went to see him, I found a lacerated wound of the left foot. The tissues covering the great toe and first and second metatarsal bones were bruised, as was also the union between these bones, almost as far as their tarsal articulations. I cleaned the wound, and dressed it with a weak watery solution of carbolic acid. The injury proceeded, without an adverse symptom, towards recovery, until August 11th, when his friends told me that he had caught a cold in being carried from one room to the other. The patient complained that his throat was sore. There was nothing abnormal to be found about the throat; and I ordered that it should be kept warm, and that the patient must not be removed from his bedroom.

August 11th, 8 P.M. The patient could not open his mouth sufficiently wide. The muscles on the back of the neck were stiffer than normal. The patient was fretful and peevish, and refused food. As I had no confidence in the ability of those attending to carry out my instructions, I telegraphed for the little boy's mother to come with all speed. I left a mixture of bromide of potassium and hydrate of chloral. On the patient refusing it, the friends said "there is no use in tormenting him".

August 12th. I saw the patient in the forenoon and evening. He was very much worse; he took neither food nor medicine.

August 13th, 11 A.M. The patient's mother had come, and was determined that my directions would be strictly carried out. I left a bottle containing a grain of fresh extract of Calabar bean to an ounce of water, and a small graduated measure. I ordered twenty drops (*i.e.*, 1-24th of a grain) to be given every hour and a-half, unless symptoms of faintness should supervene, also sherry wine, milk, and chicken soup frequently.

August 13th, 8 P.M. He was much worse. The jaws were completely closed. The whole body was rigid. Clonic spasms occurred every fifteen or twenty minutes, and were almost immediately preceded by severe pain at the sternum. After every such attack, there were profuse perspiration and rapid pulse. The patient always cried to be lifted when he felt the clonic spasms coming. He lay in his mother's arms in a state of opisthotonos until the spasm relaxed. I ordered twenty-five drops of the medicine to be taken every hour.

August 14th, forenoon. The patient was slightly worse. He had taken wine, milk and soup abundantly. In the evening, he was slightly worse. Thirty drops were given every hour.

August 15th, forenoon. The symptoms were gradually becoming worse. I ordered thirty drops to be taken every hour. In the evening there was slight improvement. The clonic spasms did not occur every three or four minutes as this forenoon. A little sleep had been got, during which "he looked", the mother said, "as if nothing ailed him".

August 16th. There was slight relaxation of the masseters in the forenoon. In the afternoon there was no improvement. I ordered thirty-five drops every hour.

August 17th. There was no improvement. Forty drops of the mixture were given every hour.

August 18th. The clonic spasms of the body were not so severe; the tendons of the ham-strings were like bands of iron (the forearms and fingers had remained free throughout). He had had a short but refreshing sleep during the day.

August 19th. Improvement was not marked. Fifty drops were given every hour. In the evening, as he had had no motion from the bowels for two days, a simple turpentine enema was given. The bowels had

been perfectly regular previously, and I attributed the necessity for the enema to the use of brandy instead of sherry wine for the past few days, owing to the patient's desire.

August 20th. From this date the improvement was rapid and permanent. Day by day the relaxation increased, the spasms became fewer and less violent, the pulse lower, and the perspiration less. The dose was reduced by degrees (the effect of the reduction being noticed) to fifty drops every hour and a half on August 23rd, the same dose every two hours on the next day, and so on. The symptoms gradually diminished in severity, until I considered the patient so far recovered as to permit his removal home on September 2nd. At that date, he could stand with a little assistance. I have since heard that he is quite well.

It would be illogical to deduce that a cure resulted in this case from the medicine employed; but so many cases have been successfully treated within these few years by means of the Calabar bean, that I think it should be preferred in the treatment of this dangerous malady to any of those empirical remedies formerly recommended. If the Calabar bean exercised any beneficial influence in this case, I think that it was by means of constantly increasing doses as long as the symptoms shewed no abatement in severity. Large quantities of warmed milk, wine, and soups were, I have no doubt, powerful adjuvants.

I may mention, as adverse to the theory of the entozoic origin of all cases of tetanus, that the stools were carefully watched for worms, but none were found, and that not a single symptom of their presence was present before the accident occurred or during the convalescence.

ACUTE TETANUS ENDING IN COMPLETE RECOVERY.

By CHARLES D. ALLEN, M.B., Glenarm.

ON June 11th, 1872, I was called to see a boy, aged 11, who had met with an accident in a flax-scutching mill, his left hand having been caught between two cogged-wheels, which crushed and lacerated to a great extent the fingers and palmar surface of the hand. I found it necessary at once to amputate the second, third and fourth fingers, the former at the first phalangeal, and the latter two at the metacarpophalangeal articulation. On visiting the boy each day, I found all going on most satisfactorily.

On the seventeenth day after the operation, the wound was nearly healed. On the eighteenth evening (June 29th), the child's father came in haste to say his son was very ill, had rested badly the previous night, refused his food, and all that day had been unwilling to leave his bed, although hitherto he had been going about enjoying perfect health and strength; indeed, he was a peculiarly robust lad. He now complained of severe pain and stiffness along the back and side of the neck, and experienced slight difficulty in opening and shutting his mouth; and before I left the house that evening, his jaws were firmly clenched upon a piece of wood inserted by myself to guard against the complete closure of the teeth. The patient apparently had caught no cold, nor was he exposed in any way that could account for these symptoms—they appear to have been the result directly of the injury. The wound at this time was healthy looking, and had almost completely cicatrised. These tetanic warnings came on late on the evening of June 29th, and the following morning, at ten o'clock, he was violently affected with general tetanus; the trismus was excessive, and opisthotonos very marked. The pulse now was 120; temperature, 100.2 deg.; respirations, 30. The face had the tetanic grin, and the abdominal and flexor muscles of the lower extremities were most violently affected under spasm. The treatment noted below was at once commenced, and with apparent utility. There was no intermission of the tonic contractions, and every ten or fifteen minutes these were increased by fits of painful spasmodic action of entire frame, the face assuming a terrific aspect and the jaws almost breaking the wedge of wood. The most trivial noise or movement in the room brought about a renewal of the worst symptoms, the approach of them being indicated by the boy crying out in fear. The body during the severest moments rested on the back of the head, the elbows, and the heels. He made it to be understood that he must be lifted out of bed and brought to the door for air. On these occasions, the dyspnoea was great, and the lividity of countenance showed that the struggle for breath was intense. Night and day this was the routine. I could not persuade the boy to remain in bed.

On July 2nd, the symptoms became aggravated. The pulse rose to 140; temperature, 103.2 deg.; respirations, 40. Abundant perspiration broke out over the entire body, and the urine passed two or three times involuntarily. On July 3rd, the pulse came down to 134; temperature, 102 deg.; respirations, 34.

For some days, things remained in much the same fearful condition,

it being still necessary to hurry him to the door—the same noise bringing on a fit. All this time the bowels acted very sluggishly, but the urine was passed generally regularly. The intelligence throughout was perfectly good, and he took his food well, which consisted entirely of milk and brandy—sometimes drinking two quarts of fresh milk in the twenty-four hours. He appeared always better for an hour or so after food. The brandy, which at one time was given pretty freely, was quite tolerated.

It was not till July 14th that there appeared for the first time a change for the better. From this day there was gradual improvement, chiefly indicated by a longer interval between fits of spasms. On July 22nd, he sat up. On the 23rd, he walked across the room with the aid of his mother. On the 24th, the wedge was taken away; he was induced only with the greatest difficulty to allow this to be done. He now took solid food, and each succeeding day gained strength and advanced to convalescence rapidly. The treatment throughout was muriate of morphia, with tincture of cannabis Indica.

On the evening of June 29th, when the first symptoms appeared, a draught with solution of muriate of morphia and tincture of cannabis Indica (a drachm of each) was administered. This was repeated every second hour; and the wound was dressed with a bread and water poultice, with half-an-ounce of opium in it. Next morning, his mother said he had got ease after each dose. For two or three days these draughts were pretty regularly given. Having waited myself on more than one occasion after medicine was given, I did perceive relief—there appeared some slight indication of sleep, and the fits that came soon after were less violent and painful. After a few days, when he became extremely ill and his parents lost all hope, it was with the greatest difficulty that I got the medicine given. I always found on my visiting the following day that there had been much neglect. On the fourth day, two drachms of each of the above drugs were given; and this was adhered to, as well as could be done, for nearly three days. Each day got over was in itself most material to the hope of final recovery. I did not further increase the doses, as I feared the stomach might refuse food. The bowels were kept open by enemata.

There are many points of interest in this case. The child, though young, appeared to tolerate the morphia and cannabis Indica without the semblance of any physiological effect. The illness was very prolonged, from the 29th June till 14th July, with very few remissions from the violent spasms under which he laboured. The digestive powers remained intact, and the appetite was good throughout, and, contrary to all expectation, the boy recovered.

The case must be looked upon as acute; the almost uninterrupted and violent spasmodic state of the whole frame, accompanied by the most intense agony, both mental and bodily, prevent us from even considering a subacute attack. It is difficult to know what value to put upon the morphia or cannabis Indica. I believe that some good was gained, for I watched the effects on several occasions. I considered a combination of these remedies safer than larger doses of either alone; but I look upon the liberal supply of nourishment taken as the one great and happy feature, and of more use than we are justified in assigning to any drug. Throughout, the lad drank with avidity, and the urine was passed in regular quantities. The left side was the most violently contracted under spasm. The pulse was very irregular during the fits. It was interesting to note that no advance in the healing of the wound was gained during the period of tetanus. The boy has since regained his natural strength and robustness, although for some considerable time he had a markedly contracted look about the neck and shoulders—the latter were drawn much forward and upward. The numbers noted with reference to temperature, respiration, and pulse refer to periods intervening between the fits.

Query: Would amputation on the evening of June 29th have been advisable?

THE CAUSES OF THE CONTAGION OF TYPHOID FEVER.

By M. K. ROBINSON, M.R.C.S.,
Medical Officer of Health for East Kent.

It is generally admitted that enteric fever is a communicable disease, and that its specific virus is cast off along with the feces by the bowels. Concerning the physical characters of the poison, however, ignorance has yet to be pleaded. The microzymes or particles are so minute and subtle as to defy our present powers of penetration into the mystery of their existence; and this cannot be wondered at, supposing their size to be but one-twenty-thousandth of an inch in diameter, and that they do not differ in their power of transmitting light from the media in which

they are suspended. Dr. Burdon Sanderson has adduced considerable evidence in proof of contagion being neither soluble in watery fluids nor yet capable of assuming the form of vapour without losing its properties, and thus has shewn, that this indiffusibility and particulate character offer a ready explanation of the escape at one time, and affection at another, of those exposed to the incidence of contagious particles under similar circumstances, dilution in fluid matter or distribution through the atmosphere not diminishing the potency of the particles, but rendering their chance of impinging on a given surface more or less probable, according to the extent of such dilution or distribution.

Cast off from the diseased body, enteric virus finds its way into cess-pools and sewers. The etiology of enteric fever has been so intimately associated with sewer-gases and sewage-polluted water, that some have inferred that the disease may arise, *de novo*, from the products of faecal fermentation. Leaving, however, the question of spontaneous generation, exertion of disease-force through dead matter or living cells, in the hands of those who are devoting their special talents and attention to those recondite questions, I will proceed to the consideration of the vehicles by which the poison of enteric fever is conveyed. Three such vehicles or "carriers" have, from time to time, been recognised, viz., air, water, and milk. Innumerable instances of sewage-polluted air have been noticed in connection with outbursts of enteric fever. Dr. Murchison, in his valuable monograph, recites remarkable instances of this mode of conveyance (notably the Croydon and Windsor outbreaks); of which examples he remarks "that the poison appeared to be conveyed in the volatile emanations from drains, cesspools, etc. During the time I held the post of medical officer of health for Leeds, about five thousand cases of enteric fever (*i.e.*, including sickness and death) came under observation; and of these seventy-five per cent. occurred in houses where either the house-drainage was defective, or otherwise those attacked dwelt in an atmosphere intensely charged with faecal matter. The water supplied to the fever-stricken houses was identical with that consumed by the healthy inhabitants, and the prominent non-sanitary difference of circumstances in the two classes (affected and exempt) was the atmospheric impurity attending the condition of the former.

That water is another vehicle by which the poison is often conveyed has been clearly demonstrated. I have seen many examples of such conveyance. One striking instance I well remember, where about sixteen persons were attacked, who preferred to draw their water from an open well, instead of availing themselves, like their neighbours, of the public service; into the well a drain overflowed, which communicated with a house where the first case (an imported one) occurred in the village.

But, perhaps, the most interesting carrier, because the one to which public attention has been most prominently directed of late, is that of milk. Dr. Michael Taylor of Penrith recorded, in 1858, an outbreak of enteric fever in that town, which he traced to fever-poisoned milk. He accounted for the conveyance of the virus to the milk in one of two ways: first, either by deposit from the hands of the woman who performed the double duty of nursing the sick and milking; or, second, by absorption of the poison during the exposure of the milk in an atmosphere of fever-miasms. The addition of foul water to the milk, either by accident or design, Dr. Taylor considered impossible, as the only available supply was derived from the public service of pure water from Ullswater.

Dr. Ballard, in an admirable essay, described a localised outbreak of enteric fever at Islington, in the year 1870, which he had traced to the use of milk polluted, through the agency of water, by enteric dejecta.

During the summer and autumn of last year, it fell to my lot to be engaged in the investigation of two epidemics of enteric fever associated with milk-conveyance. One of these has been specially reported on by Dr. Ballard; and his deduction was that, as in the Islington outbreak, water acted as the conductor to the milk. In the second example, reported by myself, the coincidence of communication between the infected farm whence the supply of milk was drawn and the fever cases was strikingly manifest, the fever marking with unerring certainty the trail of the milk-purveyor. In streets where only one, two, three, or four houses were invaded, these were the only houses in the same streets supplied by the milkman in question. Altogether eighty persons, who obtained their milk from the infected source, where six cases of fever had occurred, contracted the disease, fourteen of whom died. The water-supply of the infected farm (which was the source of the milk in question) was derived from a spring having its origin and delivery, not only removed away from, but above the level of the ground on which the house and outbuildings were situated; consequently, pollution of the water by percolation or gravitation from the sewage of the premises was physically impossible. The water itself yielded no evidence of pollution, and the milk, from its reputed character and other evidence, was totally unsuspected of dilution? How, then, did the milk become con-