July 30th. Condition about the same. At 7 P.M. 2.25 grammes of antitoxin were injected, but were not followed by the small doses.

July 31st. Patient's condition decidedly better. Spasms and pain confined chiefly to the right leg. Cough is still very troublesome, owing to the difficulty in ejecting the mucus. Although the injured finger was quite healed, it was considered safer to amputate it. Patient was anaesthetised with chloroform, and had to be placed very deeply under its influence before the rigidity of the muscles began to disappear. In the trunk and abdomen the rigidity never completely disappeared. While under the anaesthetic, another dose of antitoxin (2.25 grammes) was injected.

August 1st. Patient had a much better night, and the temperature began to fall rapidly. From 10.30 A.M. to 9.30 P.M. he had no painful spasms; cough still very troublesome.

August 2nd. Improvement continued until 2 P.M. but then he became very restless; more muscular rigidity and an increase in the painful spasms; considerable headache.

August 3rd. Patient's condition slightly worse; had a very bad night, chiefly owing to the troublesome cough; very few spasms. No antitoxin was given as the stock was exhausted, and no more could be obtained until August 7th.

August 4th to 6th. Patient much better; cough less troublesome; no spasms; sleeping well. Temperature between 99° and 100°.

August 7th. Patient in about the same condition excepting that occasionally there were a few spasms. Between 11 A.M. and 3 P.M. there were several painful spasms, and at 7 P.M. 2.25 grammes of antitoxin were injected. Between 8 P.M. and 10 P.M. there were severe spasms.

August 8th. Good sleep obtained; had two spasms at 6 A.M.; perspiring freely; patient complains of throat feeling sore and swollen; muscles of legs and trunk still rigid; mouth can be opened about 1 inch.

August 9th to August 16th. The tetanic symptoms gradually improved; the temperature varied between 99° and 103°, and soreness of throat still felt. So far as examination of the throat was possible, nothing abnormal could be seen.

August 17th to August 24th. Patient's general condition good; temperature still high occasionally (102° F.).

August 25th to September 4th. Steady improvement maintained; all signs of tetanus have disappeared. Patient rapidly gaining strength and taking food well.

REMARKS.—1. As regards the diagnosis, there is not the slightest ground for doubting that the patient was suffering from tetanus. On July 27th—that is, on the fifth day after the onset of the disease, when the antitoxin was first administered, the symptoms were of considerable severity, and were rapidly becoming worse.

2. As regards the severity of the case, there is considerable difficulty in the present instance in determining its degree. In cases of tetanus generally it is very difficult, in the early period of the disease, to say whether the case is likely to end fatally or not; and in trying the effect of any new remedy it is most important to determine, if possible, the degree of severity of the case. Some look upon the length of the incubation period as forming a very good guide. The shorter the period of incubation the more severe the symptoms are likely to be. In the present case the duration of the incubation period is by no means certain. It is quite possible that the bacillus gained entrance into the tissues, not at the time of the first injury, but subsequently while the patient was working, digging potatoes, etc. The rapidity with which the symptoms develop after their first appearance and their intensity seem to be fairly safe guides. My colleague, Mr. Jeremiah McCarthy, however, in his article in *Heath's Dictionary of Surgery*, states that "no correct inference can be formed from the apparent mildness of the symptoms. The writer had under his charge three cases of tetanus in the year 1884, which all ended fatally, although the symptoms in each case were not severe." In the present case the rapidity with which the symptoms developed was not great, three or four days elapsing between the onset and the presence of well-marked opisthotonos. On the fifth day, however, the symptoms were decidedly severe. The inability to open the jaw was complete, and the painful spasms affected nearly the whole body. Before the commencement of the treatment by antitoxin the temperature

remained about 100° F., and such a moderate degree of fever is said to indicate a favourable prognosis. After the fifth day the temperature began to rise, but was never more than 103.2° F. From these considerations it will be evident that no accurate or even approximate prognosis concerning the termination of the case could have been made before the fifth day—that is, before the antitoxin was administered. Looking at the statistics of the termination of cases of tetanus, we find that the chances are greatly against recovery. Thus, Gowers states that "in traumatic tetanus the mortality is nearly 90 per cent., and seems to be rather greater in women than in men." Taking the cases admitted into the London Hospital during the last sixteen years, I find that the mortality is almost exactly 80 per cent.

3. Whether the administration of the antitoxin had any share in the favourable termination it is impossible to say. The objection that is usually brought forward when recovery of a disease during the administration of a new remedy takes place—namely, that the patient would have got well without the remedy—applies with considerable force in this case. The value of any remedy cannot, so far as I can see, be determined by a single successful case, or even by two or three successful cases. Considering the overwhelming evidence in favour of the value of antitoxin in the treatment of tetanus induced experimentally in lower animals, it is only right to give such a remedy a fair trial in the case of man, and my chief reason for publishing this single instance is to give additional support to the view that the remedy is, to say the least, a perfectly harmless one. The maximum dose recommended by Professor Tizzoni is 4.5 grammes, but as my patient was only 16 years old, and as the symptoms were not of alarming intensity, I started with half this quantity, that is, 2.25 grammes, and repeated a quarter of this amount, that is, 0.5625 gramme every six hours. Altogether the patient was given 15.75 grammes of the antitoxin. So far as I could ascertain the drug had no effect, either immediately or for some hours afterwards, on the pulse, respiration, or consciousness; in other words, the drug seemed to have no "physiological action." Whether the drug had any influence upon the disease I am, as I have said before, unable to say. It is true that there was a marked improvement in the symptoms about eight hours after the first dose, and that this improvement did not continue. I could trace no definite relationship between the administration of the subsequent doses and amelioration in the symptoms. Although more than two dozen injections were given, there were no signs of inflammatory reaction in the region of the punctures. I may add that with the exception of one small hypodermic injection of morphine and occasional doses (gr. 10) of chloral hydrate and pot. bromide, no drug, other than the antitoxin, was administered. The drug is an expensive one, costing £1 per gramme; it is prepared according to the directions of Professor Tizzoni, of Bologna, and is imported into this country by Messrs. Allen and Hanburys. I desire to express my thanks to the members of the House Committee of the London Hospital for the promptness with which they consented to the administration of so expensive a remedy.

A CASE OF TRAUMATIC TETANUS WHICH RECOVERED UNDER ANTITOXIN INJECTIONS.

By HERBERT L. EVANS, M.B., C.M. EDIN.,
Goring-on-Thames, near Reading.

THE following brief notes may be interesting to your readers.

W. S. (a boy, aged 13 years and 11 months) of this village fell on Friday, June 8th, cutting his right knee on the road, and leaving some of the road dust embedded in the wound. He was away from home at the time but returned to his father on June 26th.

On July 16th he began to experience "stiffness in the back and pain between the shoulders." On the following day the pains were worse, and there was some difficulty in mastication.

On July 22nd the pains were worse and more frequent; the "head was quite drawn back." He cried loudly during the

spasms, and was obliged to kneel so as to rest his head against some object.

When seen on July 23rd he complained of pain between the shoulders, which had not been relieved by rubbing; he had a difficulty in sitting up and turning to the light; he felt sick but had not been so; he could not open the teeth one inch, and the jaws closed on attempting to protrude the tongue; the bowels were opened by calomel, the abdomen thereafter being far less tense. The same evening the patient was put under chloroform, and the supposed focus of infection scraped and kept under a compress of solution of perchloride of mercury. The wound was freely excised, a light wet dressing being put on; chloral and bromides were given. Slight improvement seemed to have taken place by next day, but on July 25th his condition was worse. Plugs of cotton wool were placed in the ears, as sounds caused spasms. Opisthotonos was well marked.

During July 26th spasms occurred about every quarter of an hour. Chloroform was given and twelve mxx injections of Tizzoni's tetanus antitoxin were introduced under the skin of the abdomen and inside of the thighs with antiseptic precautions. The injections were made soon after 7 P.M., the temperature being then 99.8°; by 9 P.M. it had fallen to 98.4°. He was ordered nepenthe mviij, acid. hydrobrom. dil. mxx, every four hours if in pain.

On July 27th the temperature was 98°. He had had three spasms, but less severe; he could open his mouth better and the head was less drawn back.

Up till July 30th the spasms since the injection had caused little trouble. He seemed bright and hopeful. Towards mid-day slight spasms, "little niggling pains," were said to occur every five minutes, but he had not been kept sufficiently quiet.

Three injections of a fresh solution were made under cocaine in each arm, the temperature apparently falling to 96.6°. From this time he had no return of the spasms, and general improvement took place. His appetite was enormous. The tongue was protruded with greater ease; the tendons at the back of the knee were less tense; the head could be slightly raised from the pillow. He asked to be allowed to get up and walk.

The improvement continued, but with a view to hastening the cure two more injections of a strong solution were given on August 9th. On August 11th the patient got up and walked downstairs, and on August 12th he was taken out in a Bath chair.

The mouth could be opened, apparently to its full extent, on August 15th; voice and mastication were normal; the knee-jerk was now normal; a few days after the first injection this was found to be absent.

The injection used was Tizzoni's tetanus antitoxin, supplied with great promptness by Messrs. Allen and Hanburys. A hypodermic syringe by Arnold of a very simple type was employed. The dried serum proved very difficult to dissolve in cold distilled water, and the solution was far weaker than that advised. In all, not more than half the total quantity supplied—4½ grammes—was used.

The chief subjects for discussion at the French Medical Congress to be opened at Lyons on October 25th will be the Etiology of Diabetes, the Clinical Value of the Chemical Examination of the Gastric Contents, and Aphasia. The President of the Congress will be M. Gailleton, Professor in the Medical Faculty of Lyons and Mayor of the city.

A MOVEMENT is on foot at Chesterfield for the establishment of a medical hospital for the town and neighbourhood. The present institution is devoted to surgical cases. The idea appears to be to have a separate hospital—perhaps as a cottage hospital—but the advantages of consolidating rather than multiplying such charities, especially in a small town or district, are very great. At the least, a separate institution would mean additional expense in management.

THE next meeting of the International Congress of Hydro-balneotherapy will be held at Ostend in 1895. The questions proposed for discussion are (1) the Treatment of Pulmonary Phthisis at the Seaside; (2) the *Technique* of Marine Therapeutics.

SIXTY-SECOND ANNUAL MEETING

OF THE

BRITISH MEDICAL ASSOCIATION.

Held in BRISTOL July 31st, and August 1st, 2nd, 3rd.

PROCEEDINGS OF SECTIONS.

SECTION OF OPHTHALMOLOGY.

F. R. Cross, M.B., President.

A DISCUSSION ON
THE RELATION OF SOME OCCUPATIONS TO
EYESIGHT.

I.—SIMEON SNELL, F.R.C.S.Ed.,

Ophthalmic Surgeon to the Sheffield General Infirmary.

MR. SNELL observed that the subject of occupations as they bore upon eyesight was a most interesting and important one, but was far too wide for complete treatment in a single paper. He could only refer to some of the occupations into which he had made investigations.

TOXIC AMBLYOPIAS.

Bisulphide of carbon was used in rubber works as a penetrating solvent in the process called curing or vulcanising. From his recent investigations it appeared that the bisulphide was less employed now than formerly, and less likely to be used in the future, the sulphur being now mixed with the rubber and the vulcanising effected by heat. Dinitro-benzol as used in making explosives was a subject he had only recently treated exhaustively in an article in the *BRITISH MEDICAL JOURNAL*. Tobacco was hardly to be considered as belonging to the occupation group of disorders, because, though such a frequent cause of optic nerve failure, there was no evidence of the workers at tobacco works being injured by the powder; rather, on the other hand, there was evidence to the effect that these *employés* did not suffer injuriously. Iodoform, recently recognised as occasioning optic nerve failure, did not, as far as was known, affect the workers at the factories where it was made. Lead in the many occupations in which it was used in different forms was mentioned as a cause of optic neuritis, either direct or secondary to brain or kidney disease. Allusion was made to the Sheffield file cutters as sufferers from lead poisoning and eye troubles.

EFFECT OF INTENSE LIGHT AND HEAT.

The various occupations in which men were exposed to intense light and excessive heat received attention. The alleged frequency of cataract among glass blowers was mentioned, and it was stated that if, as was supposed, the withdrawal of moisture by the sweating and the heat to which the men were exposed were the causes, then the metal workers to be referred to later on should also be specially liable to lens lesions, which, however, did not appear to be the case. The brightness of the surface worked upon was mentioned, and the employment of "burnishing" of silver or electro goods as pursued in Sheffield trades was given as a frequent cause of retinal hyperæsthesia in the females who generally were employed at this work. The exposure to heat and intense light was seen chiefly in the large works in which iron was made and converted into steel. The men exposed to these heats sweated a great deal, and consequently often wore little clothing above the waists. The temperatures to be mentioned could be best grasped by recollecting that the temperature of an ordinary well-lighted fire in a grate was about 500° F. Up to a temperature of about 2,000° F. a man could look at the furnace with comparative ease, but before it got to 3,000° F. he could only do so with using coloured spectacles. The different processes seen in some of the large armour-plate works were described. With cast iron the heat would be about 1,800° to 2,000° F., and molten steel 2,700° to 2,800° F., and the gases in the furnace would make this about 200° or 300° higher; the heat of the Bessemer process was 3,000° to 3,200°, but only one man was required to watch this