A very eminent London pathologist suggested that possibly the gangrene in this case started inside the abdomen high up on the omentum, and I suppose he was thinking of the style of cases described in Felix Lejars's excellent book on *Urgent Surgery*, 1909. Under the heading of "Torsion of Pedicles" he describes torsion of the great omentum with or without an irreducible hernia. In my case there was no twisted pedicle of omentum, and so I still contend that the gangrene started with the hernia becoming strangulated, and that the gangrene in these cases is capable of passing along the omentum, past the stricture, to the inside of the abdomen, which is not the case as regards strangulated bowel. I do not find any record of this surgical point in the textbooks.

A CASE OF TETANUS TREATED BY CHLORETONE.

By ROLAND A. HOBBS, M.R.C.S.ENG., L.R.C.P.LOND.,
HOUSE-SURGEON, ROYAL SURREY COUNTY HOSPITAL, GUILDFORD.

With a Note

By ERIC W. SHEAF, M.A., M.B., M.C.CANTAB.,
HONORARY ASSISTANT SURGEON, ROYAL SURREY COUNTY HOSPITAL.

THE treatment of tetanus is so very unsatisfactory that a case such as the one described below, in which the most dreaded symptoms of the disease were checked, is worthy of notice:

J. A., aged 46, a fishmonger, was admitted to this hospital under Dr. Mitchell, to whom I am indebted for permission to publish these notes. Dr. Sheaf also watched the case in consultation with Dr. Mitchell.

A nail projecting from his boot caused an abrasion on the plantar surface of his big toe on January 16th. Rigidity of his jaw developed on January 22nd—six days after the injury—and he was admitted to this hospital on January 25th with all the typical symptoms of tetanus except convulsions. The trismus was so advanced that the teeth could only be separated about $\frac{3}{8}$ in.; there was marked abdominal rigidity and dysphagia, stiffness of the neck muscles, and slight retraction.

He was given 100 c.cm. of antitetanic serum, fomentations to both feet, as there were abrasions on each, and an injection per rectum of olive oil 3ij containing chloretone 30 grains. This was followed by a marked decrease in the rigidity of the jaw; he swallowed much more easily and slept well.

For the next four days his condition remained on the whole satisfactory, although his temperature rose and reached 100.6° F.

During this period the following doses of chloretone were given, all per rectum, with olive oil.

January 26th, 40 grains, and repeated at night.
January 27th, 40 grains, and repeated at night.
January 28th, 120 grains, in three doses.
January 29th, 80 grains, in two doses.
January 30th, 30 grains, early in the morning and repeated.
100 c.cm. of antitetanic serum was injected on January 26th.

The chloretone was given when indicated by an increase in the rigidity.

A marked decrease in the trismus was constantly noticed after every dose of chloretone, the effect being observed at first as early as an hour after the administration of the drug, but later it took about two hours to make any marked difference.

On January 30th the throat was getting very full of mucus, which was improved by injections of atropine sulphate 10 $\frac{1}{2}$ grain.

Towards the evening he became drowsy and passed into a very heavy and semicomatose condition, probably due to the effects of the chloretone combined with the severe constitutional disturbance resulting from the disease itself.

There were no special symptoms of poisoning, but his condition of stupor was somewhat alarming. The temperature now reached its maximum of 102.6° F. With the administration of oxygen and strychnine $\frac{1}{16}$ grain alternating every three hours with caffeine 1 grain hypodermically, and continuous saline per rectum, his condition gradually improved.

He was given another 100 c.cm. of antitetanic serum. The rigidity never became marked again, and beyond an antitoxin rash he had no untoward symptoms, and made a rapid recovery, leaving the hospital for the convalescent home fairly strong, having been in just under six weeks.

The total amount of antitetanic serum and chloretone given was: Serum, 390 c.cm.; chloretone, 420 grains.

To summarize, the points to be specially noted are:

1. The early onset of symptoms and consequent grave prognosis.

2. A marked decrease in the rigidity was noted a definite period after the administration of chloretone, the trismus being relieved in a constant and remarkable manner.

3. The complete absence of convulsions from beginning to end of the illness.

4. The relief of trismus enabled the patient to take ample nourishment throughout and thus maintain his strength.

5. The rapid recovery of the case.

I am firmly convinced that this man's life was saved by chloretone, although the part played by the antitetanic serum must not be disregarded.

NOTE BY DR. SHEAF.

Tetanus kills partly by the direct action of the toxin and partly by the exhausting effects of the convulsions.

By the trismus, and dread that taking food will bring on a convulsion, starvation is added to the horrors of the disease and sleep is prevented by the painful muscular contraction.

In treating the disease there are therefore the following indications:

1. To prevent further absorption of tissue.
2. To neutralize the circulating toxin, for it is at present impossible to affect the toxin which has already combined with the nerve cells.

3. To relax the muscles and prevent the tetanic spasms.

If this last can be accomplished the patient will escape the exhaustion and be able to take food and to sleep. Consequently he will be in the best position to fight the disease.

To this end many drugs have been used with more or less success, and of these magnesium sulphate has recently found most favour.

Dr. C. T. McClintock and Dr. W. H. Hutchings, of Detroit, Michigan, U.S.A., undertook an experimental study of the various drugs used for this purpose, and were convinced that chloretone was the best substance hitherto employed.

Subsequently Dr. Hutchings published 6 cases treated with chloretone, with 4 recoveries.¹

Of the 2 cases that died, one succumbed on the eleventh day of peritonitis, having been free from tetanus symptoms for several days; the other was a very severe case, symptoms appearing four days after injury.

In the next case treatment with chloretone was begun; the convulsions were only partially controlled at first, later complete relaxation was obtained, but he died of circulatory failure.

Dr. Hutchings points out that in animal experiments chloretone poisoning killed by respiratory failure, and that therefore his last case died of tetanus and not of chloretone poisoning. For the same reason I do not think that the serious symptoms on January 30th in our case were due so much to the chloretone as to the disease itself.

These results and the result in the case reported above are very satisfactory. Chloretone has the advantage over the intraspinal injection of magnesium sulphate in its greater safety, and from these cases its therapeutic action seems to be equally satisfactory.

REFERENCE.

¹ *Surgery, Gynaecology, and Obstetrics*, July, 1909.

AN examination of candidates for not fewer than fifteen commissions in the Royal Army Medical Corps will be held on January 25th next and following days. Applications to compete should be made to the Secretary, War Office, London, S.W., not later than January 16th next, on which date the list will be closed. The presence of candidates will be required in London from January 23rd.

ALVARENGA PRIZE.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about 180 dollars, will be made on July 14th, 1911, provided that an essay deemed by the Committee of Award to be worthy of the prize shall have been offered. Essays, which may be upon any subject in medicine, must be typewritten, and must be received by the Secretary of the College on or before May 1st, 1911. The Alvarenga Prize for 1910 has been awarded to Dr. M. Katzenstein, of Berlin, for his essay entitled, *The Formation of an Arterial Collateral Circulation in the Kidney*.