the bowel. His condition was ascribed to a known indiscretion in diet. He had had no previous illness.

On admission the child looked ill and was very restless. The temperature was 104° F., pulse 160, and respirations 36. The abdomen was freely palpable. A swelling could be felt occupying the right iliac and right hypochondriac regions. It was immovable, very hard, and apparently circumscribed. Although the outline of the mass could not be entirely determined, the tumour appeared to be adherent along its deep surface, while the abdominal wall was freely movable over it. On palpation the whole mass seemed to be smooth, and of the size and shape of a large orange. A provisional diagnosis of sarcoma or of tuberculous glands was made.

The following morning laparotomy was performed. The abdomen was tense. The intestines were nowhere adherent, the ileum and part of the ascending, the transverse, and the descending colon were very red and inflamed, and about 6 in. of the ileum was collapsed, apparently from pressure. There was no further sign which might have indicated a previous intussusception, and acute colitis was evident.

Behind the intestines, and pushing them over to the right and down into the pelvis, a large mass was found situated retroperitoneally along the right side of the bodies of the last four lumbar vertebrae, with the external iliac artery and vein crossing it superficially. The psoas muscle was behind the tumour and it appeared to be flattened. The tumour was immovable, and firmly adherent along its central and posterior surfaces; it was not adherent to the aorta. The condition was thought to be due to a sarcoma arising from the periosteum of the bodies of the vertebrae. A wedge-shaped piece was taken out of the substance of the growth for microscopical examination; a considerable amount of haemorrhage took place from the wound thus formed.

The child died the following day. The tumour was easily removed *post mortem*, it being apparently capsulated and only bound down by connective tissue to the sheath of the psoas muscle. No glandular involvement could be made out, and the kidneys and suprarenals were free from any implication in the tumour growth.

The tumour was kidney-shaped and rather flattened on its deep and central surfaces. Its length was 11 cm., breadth 9 cm., thickness 7 cm., and its weight 226.8 grams. The general appearance of the tumour was very like that of a fibromyoma. On section there was seen to be a very definite fibrous capsule. The substance of the tumour was firm, tough, and resilient. The cut surface was smooth and in some places glistening. White, grey, and yellow fibres could be distinguished in a general felted mass.

Microscopical sections were stained with the usual stains and also for axis cylinders, myelin, Nissl's bodies, fat and glia. It was easy to recognize that the great mass of the tumour was composed of nerve fibres supported in a fibrous tissue stroma. Both medullated and non-medullated nerve fibres were present. Large numbers of ganglion cells, similar to those of normal sympathetic ganglia, were seen in groups scattered throughout the growth. There were also many developmentally early ganglion cells, the so-called sympathoblasts. The growth was non-malignant, and there was no metastasis.

I have to thank my chief, Dr. W. McAlister, for permission to publish this case.

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SIR WILLIAM TURNER, Vice-Chancellor and Principal of the University of Edinburgh, left personal estate in the United Kingdom valued at £71,467, of which £33,730 is in Scotland.

IN the summer term of 1914, the last academic peace term, there were 4,750 foreign students attending the German universities. In the summer term of 1915 this figure had fallen to 1,305, owing, as is alleged, mainly to the expulsion of about 2,600 students from hostile countries. It is, however, claimed that even in 1915 there were 62 Russians, 2 British, 5 Italians, and 1 Belgian students resident in Germany. Among the foreign students were 150 women.

THE THERAPEUTIC VALUE OF HYPOCHLOROUS ACID.

BY

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IN October of last year I communicated to the *BRITISH MEDICAL JOURNAL*¹ some experiments on the neutralizing effects of hypochlorous acid on diphtheria toxin, and drew attention to the resistance the animal body offers to large quantities of the solution used.

During the last nine months various investigators have dealt with the hypochlorites as antiseptics—Lorrain Smith, Murray Drennan, Rettie and Campbell,² Dakin,³ Schütze⁴—and also given the results of treatment by intravenous injection—Lorrain Smith, Ritchie and Rettie,⁵ and Brand and Keith,⁶ in cases of puerperal infections; Fraser and Bates,⁷ in cases of toxæmia consequent to gas gangrene.

In this paper I publish further and more detailed experiments to determine the antitoxic and antiseptic power of hypochlorous acid *in vivo*.

It has been shown by Dakin³ that *in vitro* staphylococci suspended in saline are killed within two hours by sodium hypochlorite, 1 in 500,000, but that when serum is present a concentration of 1 in 1,500 is needed.

It has been thought, therefore, important to prove experimentally (1) which is the highest concentration of HClO tolerated by animals, and (2) what is the lowest concentration producing an antiseptic or antitoxic effect.

Rabbits of about 2 kilos in weight and therefore with approximately 90 c.cm. blood were used. The HClO solution employed was eusol with a hypochlorous acid concentration of 0.5 per cent., physiological saline being used in place of water and CaCl₂ added on account of its antitoxic properties; it is prepared as follows:

To 800 c.cm. physiological saline add 10 grams bleaching powder and 10 grams boric acid, shake vigorously, allow to stand for two or three hours, then filter and add to the filtrate 2 grams of chemically pure calcium chloride. The solution now contains HClO in a strength of between 0.5 and 0.6 per cent.; saline is added until the required concentration of 0.5 per cent. is reached. Owing to its instability the solution must not be used longer than three days after preparation.

While 20 c.cm. of this HClO solution, giving a concentration of about 1 in 1,100 in the blood of the animal, were generally well tolerated, 10 c.cm. proved to be entirely harmless, and the concentration of about 1 in 2,000 that resulted appeared, moreover, to be near the limit of efficiency; 5 c.cm. doses (about 1 in 3,800) seldom led to beneficial results.

Attention may be drawn to the fact that a great number of toxins of bacterial origin are considered to be of an albuminoid nature (Brieger and Fraenkel,⁸ Brieger and Boer,⁹ Etienne Burnet¹⁰); it is possible, therefore, that hypochlorous acid may neutralize toxins by coagulating and eventually precipitating them.

The following tables show the efficacy of 10 c.cm. doses of the HClO solution in certain artificially produced infections and toxæmias.

TABLE I.—Diphtheria Toxin.

Rabbit.	Dose of Toxin Injected Subcutaneously	Quantity of HClO Solution Injected Intravenously.				Results.
		Immediately	After 24 hrs.	After 48 hrs.	After 72 hrs.	
1	10 L.D.	10c.cm.	10c.cm.	—	—	Animals remain healthy.
2	10 L.D.	10c.cm.	10c.cm.	—	—	
3	10 L.D.	10c.cm.	10c.cm.	—	—	
4	10 L.D.	—	10c.cm.	10c.cm.	—	After 5 days paralysis of the legs.
5	10 L.D.	—	10c.cm.	10c.cm.	—	
6	10 L.D.	—	10c.cm.	—	10c.cm.	
Control	10 L.D.	—	—	—	—	Dead after less than 48 hours.

TABLE II.—*Tetanus Toxin.*

Rabbit.	Dose of Toxin Injected Subcutaneously.	Quantity of HClO Solution Injected Intravenously.			Results.
		After 24 hrs.	After 48 hrs.	After 72 hrs.	
1	0.1 c.cm.	10 c.cm.	—	10 c.cm.	Tetanus.
2	0.1 c.cm.	10 c.cm.	10 c.cm.	—	Healthy.
3	0.1 c.cm.	10 c.cm.	10 c.cm.	—	
Control	0.1 c.cm.	—	—	—	Tetanus.
SERIES B.					
4	0.25 c.cm.	10 c.cm.	10 c.cm.	—	After 4 days tetanus; recovered after 10 days.
5	0.25 c.cm.	10 c.cm.	10 c.cm.	—	
6	0.25 c.cm.	10 c.cm.	10 c.cm.	—	
Control	0.25 c.cm.	—	—	—	Dead after 4 days
SERIES C.					
7	0.50 c.cm.	10 c.cm.	10 c.cm.	10 c.cm.	Dead after 7 days.
8	0.50 c.cm.	10 c.cm.	10 c.cm.	10 c.cm.	Dead after 11 days.
9	0.50 c.cm.	10 c.cm.	10 c.cm.	10 c.cm.	Dead after 7 days.
10	0.50 c.cm.	10 c.cm.	10 c.cm.	10 c.cm.	Healthy.
11	0.50 c.cm.	10 c.cm.	10 c.cm.	10 c.cm.	Dead after 8 days.
Control	0.50 c.cm.	—	—	—	Dead after 4 days.

TABLE III.—*Staphylococcus pyogenes aureus.*

Rabbit.	Number of Micro-organisms Injected Intravenously.	Quantity of HClO Solution Injected Intravenously.			Results.
		Immediately.	After 24 hrs.	After 48 hrs.	
1	50 million	10 c.cm.	10 c.cm.	—	Animals remain healthy.
2	50 "	10 c.cm.	—	10 c.cm.	
3	50 "	10 c.cm.	—	10 c.cm.	
Control	50 "	—	—	—	Dead after 48 hrs.
SERIES B.					
4	100 million	10 c.cm.	10 c.cm.	—	Animals remain healthy.
5	100 "	10 c.cm.	10 c.cm.	—	
6	100 "	10 c.cm.	10 c.cm.	—	
7	100 "	10 c.cm.	10 c.cm.	—	
8	100 "	10 c.cm.	10 c.cm.	—	Dead after 10 days. Dead after 24 hrs.
Control	100 "	—	—	—	

TABLE IV.—*Bacillus perfringens.*

Rabbit.	Number of Micro-organisms Injected Subcutaneously.	Quantity of HClO Solution Injected Intravenously.			Results.
		After 24 hrs.	After 48 hrs.	After 72 hrs.	
1	50 million	10 c.cm.	10 c.cm.	—	Animals remain healthy.
2	50 "	10 c.cm.	10 c.cm.	—	
3	50 "	10 c.cm.	10 c.cm.	—	
4	100 "	10 c.cm.	—	10 c.cm.	Dead after 8 days.
5	100 "	10 c.cm.	—	10 c.cm.	Healthy.
6	100 "	10 c.cm.	—	10 c.cm.	Healthy.
Control	100 "	—	—	—	Dead after 48 hrs.

CONCLUSIONS.

It has been found that in rabbits 10 c.cm. intravenous doses of a 0.5 per cent. HClO solution, even when repeated on two or three days in succession, produce no ill effects, that they may delay or prevent the onset of symptoms due to the injection of the animals with diphtheria and tetanus toxins, and with cultures of *Bacillus perfringens* and *Staphylococcus pyogenes aureus*, the rabbits recovering from the infection or remaining healthy.

Hypochlorous acid intravenously administered is therefore to be regarded as of therapeutic value; the antiseptic apparently delays the development of bacteria and destroys their toxins, thus enabling the natural resistance of the animal to assert itself.

It is suggested that this destruction of toxins may be in the nature of a protein coagulation.

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A SIMPLE METHOD FOR THE INTRAVENOUS INJECTION OF EUSOL.

BY

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THE intravenous injection of eusol has been recommended by Lorrain Smith, Ritchie, and Rettie¹ to combat the toxæmia in cases of septic infection. Encouraging results have been recorded,² and the method of treatment has opened up a new field of investigation. The object of this note is to describe a simple method of injecting the solution by means of a syringe and needle. It is preferable to introduce the solution without exposing the vein by incision, as the patient is less disturbed by the simpler procedure, and it may be necessary to repeat the injection several times. It is further of advantage to employ a syringe rather than a funnel and tubing attachment to the needle, as the rate of injection can thereby be more readily controlled.

A 20 c.cm. Record syringe is of suitable size, but the capacity of the syringe is not important. To avoid the necessity of detaching the syringe from the needle, for the purpose of refilling, a simple two-way cannula is employed fitted with a stopcock. The ends of the cannula are moulded to fit easily but firmly on to the syringe at (c) and to the needle at (A). A lateral

Syringe, cannula and needle for intravenous injection of eusol.

opening is placed at (B) and connected by rubber tubing to the flask containing the solution of eusol. By turning the stopcock the syringe can be connected either with the needle, as seen in the diagram, or with the eusol solution by means of the lateral opening. It is best to use a fine needle, as the rate of injection should be slow—usually about 10 c.cm. in one minute. In the case of small veins also a fine needle is more likely to penetrate the wall of the vein successfully. If the needle is slightly bent, as seen in the diagram, there is less chance of puncturing the vein a second time. A superficial vein in front of the elbow is usually available. If there be difficulty in finding a suitable vein, the patient should be kept in a warm atmosphere for some time before the injection. In cases where no vein can be demonstrated, even with a tourniquet, the arm should be placed for a few minutes in a hot-air or hot-water bath.

Before insertion the needle should be attached to the cannula and the cannula to the syringe, so that the entire apparatus is rigid and easily controlled. There should be a few cubic centimetres of saline in the syringe, and after puncturing the vein the plunger should be slightly withdrawn; if the vein has been successfully entered, a stream of blood will be drawn into the syringe. The saline within