my recent experiences at all events tend to show that the Mauser bullet is not so "harmless," "humane" or "merciful" a projectile as some suppose it to be. But, for the present, the cases noted above illustrate my contention sufficiently well.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, March 3rd, 1900.

NOTES ON GASTRO-ENTERITIS, DYSENTERY, AND ENTERIC FEVER.

[FROM THE IMPERIAL YEOMANRY BASE HOSPITAL, DEELFONTEIN, SOUTH AFRICA.]

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THE diseases most prevalent during the present campaign, if we can judge from the experience of the Imperial Yeomanry Base Hospital, are gastro-enteritis, dysentery, and enteric fever.

PREVALENCE OF INTESTINAL DISEASES.

Almost everyone after arriving on the veld is attacked with gastro-enteritis; for instance, nearly the whole of our medical staff, nursing sisters, and detachments have at one time or another suffered, whilst the prevalence of enteric fever and dysentery is shown by the fact that of the first 650 medical cases admitted here 289 were cases of enteric fever and 158 of dysentery.

The primary lesion in these three diseases is situated in the alimentary canal, and they are without doubt caused by the ingestion of micro-organisms or their products with the food. We know that the bacillus of enteric fever is capable of multiplying in the soil, and it is probable that the same holds good for the micro-organisms causing gastro-enteritis and dysentery.

Flies and Dust.

In military camps it is difficult to prevent infection of the soil with the excreta, and particles of the infected soil or of the excreta themselves can readily gain access to the food by means of flies and dust. The flies are innumerable, and get into every article of food, and after a dust storm everything is covered with a thick layer of dust.

Water.

In addition to these modes of conveyance of infection the drinking water is frequently to blame, coming, as it does, from polluted rivers and surface springs. On the march it is not easy to boil the drinking water, or to prevent flies and dust getting into the food; nevertheless, one cannot help feeling that, if greater precautions were taken, the incidence of disease would be greatly diminished.

GASTRO-ENTERITIS.

The chief symptom of the gastro-enteritis met with here is acute diarrhoea, which is usually painless, but is sometimes attended with colic. In some cases, in addition to diarrhoea, there is severe vomiting. As a rule the temperature is not raised, but it may reach 103° F., though this is never maintained for longer than a day at the most. The majority of cases recover in a couple of days, but diarrhoea may persist for a week or two. The best treatment is a dose of castor oil and laudanum, the diet being restricted to milk. Although more than one attack may occur in the same person, immunity is ultimately established.

Exposure to chill is undoubtedly a predisposing cause, and the wearing of a cholera belt affords some protection. One can easily imagine that vasomotor changes in the intestine may favour infection with microbes or absorption of toxins. In some outbreaks—as, for instance, at Modder River, where the disease was so common as to go by the name of "Modders"—the materies morbi was probably conveyed by the drinking water. The water was badly contaminated, and so turbid that some people actually attributed the disease to the mechanical irritation of the particles of mud. In our own cases the water was not to blame, for two reasons. One patient was attacked between five and six hours after arrival, not having partaken of any water, while an adjoining camp supplied with the same water was not affected.

On the other hand, there was reason to believe that the fresh meat which we received from Capetown was responsible for, at any rate, some of our cases. One of our company who had never partaken of meat was not attacked, while detachments of soldiers some distance from us were exempt as long as they were eating "bully" beef, but were at once attacked when they were supplied with meat from the same source as ourselves.

DYSENTERY.

The dysentery met with here is not very fatal. We have had only 2 deaths out of 158 cases. These cases exhibit the usual symptoms of tenesmus with passage of blood and mucus. Up to the present we have had no case of hepatic abscess. I have examined the stools of a number of cases microscopically, using a warm stage, but have failed to discover amœbæ. In both the fatal cases typical dysenteric ulceration of the large intestine and peritonitis from perforation of the bowel were found.

During the acute stages—that is to say, when there is passage of blood or mucus—the symptoms usually yield readily to treatment with ipecacuanha or with magnesium sulphate.

Ipecacuanha is given in the following way: The patient is kept without food for a few hours. A small dose of laudanum or chlorodyne is then given, and this is followed within an hour by a dose of 30 grs. of powdered ipecacuanha. The patient is kept quite quiet in bed, and is told to endeavour not to vomit. The same dose of ipecacuanha is repeated in four hours.

Magnesium sulphate is administered in 5j doses every hour until the motions become faecal. After the acute symptoms have subsided the diarrhoea generally yields to treatment with opium and bismuth.

The following short notes illustrate the value of these modes of treatment:

CASE I. *Ipecacuanha*.—Private D., admitted April 7th, under the care of Dr. Handson, had been ill a fortnight with dysentery. The bowels acted at first about twenty times a day, and blood and slime were passed. On April 8th the bowels acted ten times, and there was blood in the motions. He was treated with ipecacuanha. On April 9th the bowels acted four times, and the stools contained no blood. On April 10th the bowels acted three times and on April 11th twice, and there was no blood. On April 16th the motions were becoming formed, and on April 20th he was discharged well.

CASE II. *Magnesium Sulphate*.—Private J. W., admitted on May 10th, under Dr. Elliott, had had two attacks of dysentery since landing in South Africa, and was admitted when his second attack had lasted a little over a month. The motions were frequent, contained blood and mucus, and were accompanied by abdominal pain and tenesmus. On May 10th the bowels acted seven times, and on May 11th ten times. On May 12th magnesium sulphate was begun in doses of 5j. Six consecutive hourly doses were given, followed by two others at intervals of two hours. This was followed by a bismuth and opium mixture. On May 13th the bowels acted five times on May 14th twice, and on May 15th once. The patient stated that after the first dose the abdominal pain and "working" ceased, and in twenty-four hours there was neither blood nor mucus in the stools. There was no recurrence of the dysentery.

As a rule, no sequelæ have arisen after dysentery, but in the following case cerebral embolism occurred:

CASE III. *Dysentery, Cerebral Embolism*.—Gunner G., admitted March 26th under the care of Dr. Handson, had been ill six weeks with dysentery, with passage of blood and slime. On admission he was convalescent, but there was still some diarrhoea and passage of blood. This yielded to treatment with bismuth and opium. On April and his temperature rose to 100.6° F., and continued at about this level till April 12th, when it rose to 103° F. On this day the liver was observed to be slightly enlarged and tender. An intermittent temperature, varying between 103° and 98° F., continued till the night of April 25th, when it suddenly rose to 105.8°, but fell within an hour to 97° F. He became collapsed, with feeble pulse, recovering on administration of brandy. Later, he grew restless, shaking his head from side to side, and for a time became semi-unconscious. On the morning of April 26th his temperature was normal, and he was very drowsy. Well-marked paresis was present in the right arm and leg, with slight blurring of the optic discs. From this time he gradually recovered, and there was no subsequent rise of temperature. At the present time (May 21st) he is walking about, but still has some loss of power in the right arm and leg.

ENTERIC FEVER.

The cases of enteric fever run a similar course to those at home. There is the same eruption, pyrexia, enlargement of the spleen, etc. The following short notes will serve as an example:

CASE IV.—Driver S., aged 23, admitted under the care of Dr. Elliott on March 26th, had had an attack of dysentery lasting ten days, from which he was convalescent on admission. The temperature was raised on admission, and after four days the diagnosis of enteric fever was made. The patient passed through a very severe attack, the chief symptoms of which were diarrhoea, active delirium, nervous prostration, and cardiac failure. The highest temperature was 105° F. There were copious spots, the spleen

was enlarged, and the abdomen markedly distended. The temperature reached the normal line on the thirtieth day.

The *post-mortem* appearances are also similar, as the following short notes of necropsies performed by Drs. FitzHugh and Handson demonstrate:

CASE V.—Trooper A. B., diagnosed as appendicitis followed by enterica. *Necropsy*: Typhoid ulceration of lower part of ileum. Appendix large, and surrounding area matted with adhesions. Some muco-pus in lumen of appendix. Spleen large and soft.

CASE VI.—Private H. B., diagnosed as enterica with perforation. *Necropsy*: Typhoid ulceration of ileum, towards the lower part of which was a large perforated ulcer. General suppurative peritonitis.

CASE VII.—Private G. W., diagnosed as enterica with broncho-pneumonia. *Necropsy*: Typhoid ulceration of ileum; broncho-pneumonia at both bases.

CASE VIII.—Private G. K., diagnosed as enteric. *Necropsy*: Typhoid ulceration of ileum; large spleen.

CASE IX. Private A. W., diagnosed as enteric, with suppurative parotitis. *Necropsy*: Typhoid ulceration of ileum; large soft spleen; pus in both parotids.

CASE X. Private E. T., diagnosed as enteric; hæmorrhages. *Necropsy*: Typhoid ulceration of ileum and cæcum; large quantity of dark blood in the intestines; towards the lower part of ileum a large ulcer, at the base of which was adherent clot; large soft spleen.

CASE XI. Corporal A. B., diagnosed as traumatic suppurative arthritis of knee followed by enteric. *Necropsy*: Typhoid ulceration of ileum; large spleen; suppurative arthritis of knee.

CASE XII. Private J. A., diagnosed as enteric, with pneumonia. *Necropsy*: Typhoid ulceration of ileum; broncho-pneumonia at both bases; large spleen.

Widal's Reaction.

In conjunction with Mr. Owen Richards I have also obtained in many cases typical clumping with a typhoid bacillus brought from England, and kindly given me by Dr. Eyre, of Charing Cross Hospital; for instance, in Case XI. In Case IV above quoted (Driver S.) a typical reaction was given with a dilution of 1 in 20.

Value of Inoculation.

It is, perhaps, premature to give an opinion with regard to the value of inoculation; but, as far as I can judge, it does not have a marked effect in mitigating the attacks. Two of our patients who died of enteric had been inoculated.

Dysentery followed by Enteric.

Several of our patients have suffered from dysentery and enteric fever, the latter immediately following the former.

"SIMPLE CONTINUED FEVER."

Many cases are sent to us with a diagnosis of "simple continued fever." Most of these are cases of enteric fever; nevertheless, now and then a case is met with in which the only symptoms are pyrexia and *malaise*, and which do not come into the category of any known diseases. It is possible that some of these are cases of influenza. The following is an example:

CASE XIII. *History*.—Private L., aged 20, admitted on May 1st under the care of Dr. Handson, had been ill for seven days. During this time he had had bad abdominal pain followed by diarrhoea; the stools were yellow. The temperature had been taken now and again, and had been found to range between 102° and subnormal.

Condition on Admission.—The tongue was furred, brown, and dry; the temperature was 101.6°. He had no headache; the abdomen was not distended; he had no abdominal pains or tenderness; the spleen could not be felt; there were no spots and no cough.

May 4th. The temperature was still raised in the morning but usually lower at night. It varied between 103° and 98.4° F. The bowels were somewhat constipated, the motions dark and hard.

May 6th. The tongue was still furred, white, but was now quite moist. Still there were no spots, the spleen was not palpable, and the abdomen not distended. The patient said he felt quite well, the bowels were still rather confined, and the temperature had been lower for the last few days.

May 12th. The temperature was normal and he felt quite well, and on May 21st it was noted that the temperature had remained normal. He had been on milk diet all along.

This patient never had any pain while in the hospital, and the only evidence of his illness were the furred tongue and the pyrexia. His blood was tested on May 9th but no clumping was observed.

ABSENCE OF MALARIA.

Dr. Saunders informs me that malaria is not infrequently diagnosed as arising in the Karroo, but that he has never met with a case in his own practice. We have had cases of malaria here in which the malaria parasites were present in the blood, but in all these cases the patients had previously suffered from malaria in India or elsewhere. We have, however, not met with a case of malaria arising in South Africa.

A RECENT OBSERVATION ON FILARIA NOCTURNA IN CULEX: PROBABLE MODE OF INFECTION OF MAN.

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[WITH COLOURED PLATE.]

WHILE working during the last three months in the London School of Tropical Medicine under Dr. Manson on a series of filarated mosquitos (*Culex ciliaris*) forwarded to the latter by Dr. Bancroft, of Australia, I have been able to add some facts to our knowledge of the life-history of *Filaria nocturna*, facts which have special reference to the probable mode in which the human subject is infected by this parasite. They give also, if only indirectly, strong support to the inoculation theory of malaria, and add an additional argument, if such be required, for pushing forward the schemes now on foot for the protection of the human body from mosquito bite.

As is now well known, the filaria embryo, after being swallowed by certain species of mosquito, undergoes a metamorphosis in the thoracic muscles of these insects. In the stomach (Fig. 1) it casts its sheath. It then quits the stomach and enters the thoracic muscles (Fig. 2), in which it passes through various changes (Figs 3 and 4). These result in the acquisition of vastly increased size, a mouth and alimentary canal, and a peculiar trilobed caudal appendage (Fig. 7). Until Bancroft's recent observations it was supposed that the filaria on the death of the mosquito—an event which was generally believed to occur in the water on which the insect had laid her eggs for the first and last time—quitted the body of its defunct intermediary host, entered the water, and through this medium obtained access to the alimentary canal, and ultimately the lymphatic system of man. The principal reasons for this supposition were:

(a) That mosquitos confined in vessels after they had fed on human blood deposited their eggs about the end of a week and almost immediately thereafter died, and

(b) That the developed filaria on the completion of its evolution in the mosquito exhibited remarkable activity when placed in water, and a capacity for living in this medium for, at all events, several hours—an activity and capacity suggesting that water is its natural habitat at this stage of its life.

Ross, and subsequently Bancroft and others, have now shown that the female mosquito if fed can go on living and laying for many weeks after the meal on human blood and after depositing her first batch of eggs, provided she is supplied with nutriment, whether in the form of animal or of vegetable juices. It is manifest, therefore, that any filariae she may contain must find some other means for quitting the body of their intermediary insect host, and of getting access to the tissues of the definitive human host. Bancroft made two suggestions—(a) that the filaria might be swallowed by man while still in the mosquito—a somewhat improbable as well as unnatural event; (b) that it might be stimulated to re-enter the oesophagus of a mosquito when the latter came to feed again on a human subject, and so creep along the proboscis by the natural channel and thus into human tissues. How near suggestion b is to the truth the following observations show:

To study the anatomy of the mosquito in reference to any possible migrations of the worms, sections of filarated mosquitos were cut after embedding in celloidin and stained. In serial sections of infected insects, killed at various times both before and after the final stage of the metamorphosis, it was found that the young filariae, after reaching their highest stage of development in the insect, instead of lying passively in the thoracic muscles, leave that tissue, and, in the vast majority of instances, travel forward in the direction of the head of the mosquito, and pass into the loose cellular tissue which abounds in the prothorax in the neighbourhood of the salivary glands. Although the large majority of the filariae take up this position very constantly, an occasional straggler is seen in the tissues between the thorax and abdomen, or in the abdomen itself even as far back as the Malpighian tubes, or in the neighbourhood of the ovisacs. The situations last named are distinctly unusual. If we disregard these exceptional stragglers it will be found that the worms, after a short stay in the prothorax, pass along the neck, enter the lower