reaction is of an extremely mild and temporary character. When freely
diluted, a dose of 0'6 to 0'7 gramme may be injected intravenously with­
out risk.

As a routine method, the writer prefers subcutaneous injection, as the
intramuscular injection leads to much necrosis and interference with the
use of the part. After subcutaneous injection, the resultant swelling and
infiltration, being near the surface, can be brought under the influence of
local applications.

Emulsions in oil have been found to be quite as painful as watery
solutions. As regards the repeated small doses of about 0'1 gramme every
four or five days, the writer's experience has been that no special benefit
is derived from this plan. In most cases the writer employs mercurial
treatment along with "606." He gives from three to five injections, each
containing 0'05 gramme of calomel during the three weeks of treatment by
"606."

C. E. P.

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Correspondence.

YELLOW FEVER, BILIOUS REMITTENT, AND REMITTENT
FEVERS IN WEST AFRICA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—I have read with interest Sir Rubert Boyce's article in the
JOURNAL OF THE ROYAL ARMY MEDICAL CORPS. I have also followed, as
they were published, his letters in the British Medical Journal. His
conclusion that yellow fever is endemic in various places on the West
Coast of Africa is, no doubt, true. Surely, however, this has long been
recognised. I know that when I went out to Sierra Leone in February,
1909, yellow fever had been impressed on my mind, from medical litera­
ture referring to the West Coast, as one of the diseases which Europeans
were liable to contract there. I have beside me notes of a lecture
prepared for delivery to the troops on board the ship in which I went out;
in this lecture reference was made to yellow fever as a disease occurring
on the West Coast, and attention was called to the means by which it is
spread, and to the methods of prevention. But exception must be taken
to the further inference by Sir Rubert Boyce, for which he shows no
valid proof, viz., that "a vast number of remittent and bilious remittent
fevers are only mild and common types of yellow fever." The whole of
his articles convey the impression that a very large proportion of the
diseases diagnosed remittent or bilious remittent fever is really yellow
fever. I do not think this is the case.

The great majority of Europeans in Sierra Leone are British soldiers.
Of recent years the diagnosis of malarial fever in European soldiers has
been confirmed by the microscope. From February, 1909, to March, 1910,
with the exception of a few weeks when I was up country, I can vouch
that in all cases of malaria in European soldiers the diagnosis was con­
firmed by the microscope. Now, these were cases infected with malignant
tertian parasites, most of them were typically remittent fevers, and several
what many observers would call bilious remittent fever. All the cases recovered under quinine, mostly given by intra-muscular injection.

These cases, of whom there were many, give a good example of what in a European civilian would be classified as remittent fever.

No doubt the European soldier is well housed, and lives under better sanitary conditions than many civilian business men and traders. But many soldiers certainly contract their fever in the native town or suburbs of Freetown, not in the main barracks. If they thus contract malaria, they are also about as liable as the civilian to get yellow fever. There is no doubt that there are far more stegomyia than *Pyrotophorus costalis* (the common Freetown anopheline) about Sierra Leone.

As regards the fevers of the native inhabitants, both Creoles and the indigenous tribes, it is as difficult as it is in India to say what all these fevers may be, seeing that such a small proportion come under the observation of medical men. A very large number are treated by native fetish men. Certainly a vast number of the natives, especially infants, are infected with malaria. In three up-country stations I found from 85 to 95 per cent. of the children under 3 years of age had parasites in their blood. While in one of the suburbs of Freetown out of thirty children, up to the age of 7, 30 per cent. had malarial parasites in their blood. The infantile mortality is very high. Yellow fever also may quite well be lurking endemically among the infant population in the more crowded and insanitary parts of the native towns, where Europeans are not likely to be bitten by stegomyia at night. (Stegomyia biting by day are said never to be infective, as after their first feed of blood they soon ovulate, and always afterwards bite at night only. After biting an infected person, they do not become capable of infecting healthy people for ten days, before which time they would have ovulated and become nocturnal feeders).

Native adults are probably immune to yellow fever, having had their attack in infancy, and so are incapable of acting as foci of infection for stegomyia (only during the first three days of the fever is man infective). Thus the chance of a European contracting the disease is likely to be small; *Stegomyia calopus*, being a domesticated gnat, is not likely to travel far from the particular locality in which it was bred. Now and again, by some chance, a European may get infected at one of the endemic foci; then he becomes a focus of a small epidemic amongst his non-immunised compatriots with whom he may be living, or who frequent his house. I do not doubt that in some such manner as this yellow fever may be endemic in West Africa just as typhus fever used to be in the slums of some of our large cities. But I think it would be as true to say that vast numbers of the cases diagnosed influenza, measles, or some other fever are really mild cases of typhus, as to say that vast numbers of cases of remittent fever diagnosed by competent medical men are really yellow fever. No doubt a few errors may have occurred, especially in days before the microscope was in fairly general use.
Occasionally at the beginning of a small epidemic outbreak, a mistake may be made in diagnosis. Such a case in point was the fatal case in a civilian in 1909, which Sir R. Boyce quotes in the British Medical Journal of January 28th, 1911.

I did not personally see this case, but in a blood-film (taken after quinine had been administered) I found no malarial parasites, nor was the differential leucocyte count indicative of malaria. The patient referred to had just returned from a visit to an outlying town, where he may have occupied a house in which infective stegomyia were present; his duties probably brought him in contact with many of the poor Creole families. From information I have received from Dr. Barrows, who worked through the epidemic in the spring of 1910, I know there is some doubt about the diagnosis of this case. A blood-film was sent to England for examination, and, as I had found, the result was negative as regards malarial parasites.

Sir R. Boyce seems to think that a high mortality amongst European cases diagnosed as "remittent," "endemical remittent," "malignant remittent," "African fever," &c., in the early periods of last century is proof that they were all cases of yellow fever.

According to the manuscript records at the Military Hospital, Freetown (some of which are very interesting, and would be much better preserved in the library at Millbank than in Freetown), no doubt some of the worst outbreaks of disease were due to yellow fever. But I have no doubt that a large proportion of the mortality was due to malignant tertian malaria untreated by quinine. If quinine were withheld nowadays many of the malarial cases would die.

Two deaths occurred in the garrison in the early part of 1910, one a soldier of the West Indian Regiment, diagnosed, if I remember right, malignant malaria. His cerebral capillaries were absolutely crammed with malarial parasites. The other, a European soldier, died of black-water fever. No malarial parasites were found in his blood, which was very watery—in fact, more like serum than blood. His urine was the colour of porter, and contained methaemoglobin (by spectroscope) and many pigment casts and albumin. He was jaundiced, and had much bilious vomiting and fever. He died, I think, on the fourth day of his illness.

I think the difficulty of diagnosis between such a fulminating case of black-water fever and yellow fever is very great, indeed. It is very possible that certain cases of the one disease may be mistaken for the other, and vice versa.

Sir Rupert Boyce has done service in emphasising the endemic existence of yellow fever in West Africa, but he has gone too far in postulating the probability of wholesale error in diagnosis.

I am, &c.,

J. M. CUTHBERT,
Captain R.A.M.C.