

having been confirmed by previous observations it was decided, in working out the malarial incidence in the two companies, to include only those reporting sick a fortnight after entering camp to a fortnight after leaving it. The result of the experiment was as follows :—

A Company 47 per cent infected with malaria.

B Company 49 per cent infected with malaria.

The diagnosis was in every case verified microscopically, the parasite found being the benign tertian variety in almost every instance.

When one takes into consideration the greater difficulty of finding the parasites in the blood of a patient who has been taking quinine, one realizes from the above figures what a scant protection the drug gave to the men of A Company.

That this failure was not due to any deterioration or staleness in the quinine used was proved by the fact that, in therapeutic doses, the same stock solution speedily removed the parasites from the blood of patients in hospital.

Experience afterwards proved that to keep men free from malaria whilst under canvas it is essential to select camp sites that are elevated and windswept, and as remote as possible from native villages.

With regard to barrack infection, many officers must have been struck with the fact that occupants of one or two rooms will show a malarial case incidence out of all proportion to the other inhabitants of the barracks. This I believe to be due to a few infected mosquitoes becoming domesticated in these rooms, roosting under the beds during the day and infecting a fresh victim every night. I have obtained most gratifying results in these cases by thoroughly fumigating the rooms with sulphur.

### A CASE OF POISONING BY QUININE.

*(Communicated by the Director, Medical Services in India.)*

THE following case is of sufficient interest, if only from its rarity, to warrant record. The facts are as follows :—

Private M. D., 2nd Cameron Highlanders, was brought to the Station Hospital, Bangalore, at 11.45 a.m. on March 4, 1912, in a comatose condition. The history of the man was that he was employed in the regimental mineral water factory. Not feeling very well, he told a comrade that he thought he had a "touch of fever," and then proceeded to actually swallow two fluid ounces of "essence of quinine," a reagent used in the factory for flavouring an aerated drink known as a tonic water. The so-called essence of quinine is known to contain 120 gr. of quinine sulphate to the ounce. Therefore, he consumed not less than 200, but apparently 240 gr. of quinine. After taking the "essence" he laid down; later a comrade went to see how he was, whereupon the

patient rose up, staggered round the room, and said that he could hear nothing. A stretcher was sent for and the man promptly taken to hospital.

On admission to the hospital, approximately one and a-half hours after taking the essence, he was in a comatose state, the breathing stertorous, the pulse barely perceptible, pupils equal but widely dilated, no corneal reflex, and the body cold and clammy. Ether and strychnine were given hypodermically and hot water bottles applied to the extremities. The patient rapidly became worse and markedly cyanosed. Artificial respiration was at once commenced and continued for three-quarters of an hour. In spite of all efforts he died just an hour after admission. No autopsy was made.

This case is of interest, apart from its rarity, in that it conforms to the accepted lethal dose of quinine, which is put at from 220 to 240 gr. It is particularly unfortunate that no autopsy was made, as it leaves unsettled the possible escharotic or other irritative action of the "essence" on the upper parts of the digestive tract. The record too is unsatisfactory as it gives no information as to whether the respiratory or cardiac action ceased first, neither is there any record as to whether the post-mortem production of heat in the cadaver was at all diminished. The sequence of pathological events in this case are easy to follow in the light of Binz's well-known work on quinine. If we suppose that quinine produces an effect upon the protoplasm of cells composing the tissues of the body similar to what it has upon leucocytes, we can appreciate how it must lessen oxidation in the tissues and have also an action on the tissues themselves, and especially a contractile effect on the protoplasm of the cells in the brain and spinal cord. The actual cause of death in this and other cases of the kind would appear to be exaggerated and acute cell asphyxia, this interference with oxidation involving not only the general tissues, but also those of the higher nerve centres, particularly the respiratory centre, the failure of which to be able to respond, is the true cause of death.

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