TICK FEVER IN PALESTINE.

BY

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SPIROCHAETOSIS conveyed by ticks has been recognized in Africa since 1904 owing to the researches of Ross, Dutton, and others, who incriminated the tick *Ornithodoros moubata*; similarly, Miana fever in Persia was found by Balfour to be a form of relapsing fever transmitted by *Argas persicus*. I do not think that the relapsing fever which occurs in Palestine has previously been traced to infection by ticks, and the following notes may therefore have some interest.

The advanced troops on that front were infested with lice owing to the rapid advance after the fall of Gaza in November, 1917, and to the impossibility of getting transport for the numerous Thresh disinfectors which had been left behind. Relapsing fever was, in consequence, very rife, and, although rather outside the scope of this note, it may here be mentioned that its clinical characters did not by any means bear out the textbook description.

The parasite measured about 8μ in length, and had a great tendency to form loops, thus conforming to the *Spirillum recurrentis* rather than the longer *S. duttoni* of Africa. The initial fever lasted almost invariably seven days, but the subsequent paroxysms were very irregular in their duration and occurrence; frequently a second or third rise of temperature would only last one or two days, and there were instances of apyretic intervals lasting a month, while three or four relapses were fairly common. In its course the fever thus resembled a hybrid of the European and African varieties. Amongst the white troops the parasite was usually very difficult to find; many fields under the microscope had to be searched, and not infrequently recourse had to be made to the "thick drop" method; in the imported Egyptian Labour Corps, which suffered very badly, the parasite was usually demonstrable in large numbers. The severity of the symptoms did not seem to bear any relation to the number of spirochaetes in the blood. In the worst cases severe epistaxis was a troublesome and alarming complication, but amongst several hundred cases I only saw one death—namely, in a Maori who collapsed directly after his first crisis; although the paroxysm had been unusually mild.

On March 20th, 1918, eight men of the — Suffolks were admitted to hospital suffering from relapsing fever; as it was very unusual to get so many patients from one source at a time, inquiries were made, and it was found that they all belonged to one company of about 250 men, stationed for several days at Ras-el-Ain Castle (mentioned in Acts xxiii, 32, as Antipatris), which was then one of our advanced posts. They further gave the interesting information that they had been bitten by some animals "like sheep-ticks, oval in shape and having several legs, which crawled slowly and sucked blood, becoming red." One man had watched two or three feed on his arm, and had then squashed them. Another had shaken several from beneath his trousers in the morning; these were seen to crawl slowly away by several witnesses. They declared they were not lice, with which they were well acquainted, and, finally, they unhesitatingly identified *Argas persicus* from pictures of ticks. The diary of the movements of these men is instructive. They were bathed and their clothes fumigated at Mulebbis on March 10th, 1918. They went to Ras-el-Ain Castle on March 12th, where they remained four days and three nights. They returned to Mulebbis on March 15th, and were bathed and fumigated a second time on March 16th. The initial symptoms appeared on March 19th and 20th.

Four of the patients had shared the same bivouac, the pegs of which were fastened to the outer wall of the castle; a ditch or drain ran under the wall and traversed the floor of the tent. One man occupied the tent next door, and the remaining three slept in an outhouse within the castle walls. Spirochaetes indistinguishable from the parasite met hitherto were found in the blood of all the patients; the clinical symptoms were distinctly modified in comparison with the louse-infected cases, for the men were quite cheerful throughout the paroxysm, and looked at papers on each day of the illness—a very different picture from the ordinary individual, who lay like a log, with eyes suffused, intense headache and backache,

hacking cough due to congestion of the bases of the lungs, and complete anorexia. The temperature charts of these tick-infected men were very atypical: several showed a maximum of 102° to 103° , four had a crisis on the fourth day, three reached normal on the fifth day, and one came down by lysis.

The — Suffolks had been relieved by the — Norfolks on March 15th, and a watch was kept for cases of relapsing fever amongst the latter. Six appeared on March 23rd, giving the same history of having been bathed and fumigated before going to the castle, and of having been bitten whilst there by "tick-like insects." By that time a report had been sent to the A.D.M.S., who caused the bivouacs to be shifted thirty yards from the walls, and it is significant that, though troops continuously occupied this spot for the next five months, no further ticks were seen and no other cases of relapsing fever occurred. It will be noticed that the incubation period of the second series of cases was the same as that of the Suffolks—namely, seven or eight days.

Analysis of Patients Admitted to Hospital.

The following is a tabulation of the cases admitted from all companies of the Suffolk and Norfolk Regiments between February 20th and April 12th, 1918 (eight weeks):

	Suffolks.	Norfolks.
Surgical ...	10	0
Medical ...	17	18
Relapsing fever ...	8	6

(a) Relapsing fever was rigidly excluded from all the medical cases by repeated examination of their blood.

(b) No case of relapsing fever occurred in either regiment, except during the period covered by their stay at the castle.

(c) No case of relapsing fever occurred in those companies of the two regiments which did not visit the castle.

The Tick.

Unfortunately it was very difficult to get to the castle owing to its exposed position, but by the kindness of the A.D.M.S. I was enabled to make two or three visits for the purpose of obtaining specimens of the ticks. Scratching and scraping in the interstices of the ancient walls proved of no avail; a puppy was tied up to the walls for several nights but only secured a *Rhipicephalus*. Two fowls were next immured against the wall, and a specimen of *Argas* was obtained the next morning; by mischance the birds were left in the sun and died of heatstroke. They were replaced by another fowl, on whom next morning six hexapod larval forms of *Argas persicus* were found and identified by Dr. Woodcock of the 4th Military Laboratory, whose report on the first specimen is as follows:

One specimen only of the tick has been submitted for identification and examination. This was a young female ("nymph") belonging to the genus *Argas*, most probably *A. persicus*, but as the specimen was not adult the species could not be absolutely determined. The tick contained traces of digested blood, but no evidence of the presence of spirochaetes could be found.

A transfer to India put an end to my investigation. Another tick-infested spot was discovered later in three small caves a few miles from the castle. These caves became part of our front line after an engagement in May, and were used by stretcher-bearers of the — Field Ambulance as shelter during the subsequent shelling; a crop of cases of relapsing fever suddenly occurred about that period and were all traced to the caves, whose occupants had been bitten by ticks; no member of the field ambulance who had not been in the caves developed spirochaetosis.

ERYTHEMA NODOSUM AND TUBERCULOSIS.

BY

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APART from the mere coincidental occurrence of erythema nodosum and tuberculosis, the condition has been recorded following an injection of tuberculin, and under other circumstances in tuberculous patients. I have also noticed erythema nodosum in tuberculosis when for some reason a chronic condition becomes more acute, or at the time when symptoms of tuberculosis first become noticeable in a patient under observation as a contact.

CASE I.

Miss H., a girl clerk, aged 20, developed a cough about February, 1916, but continued at work, and during the summer her cough improved. Early in 1917 the cough returned, with