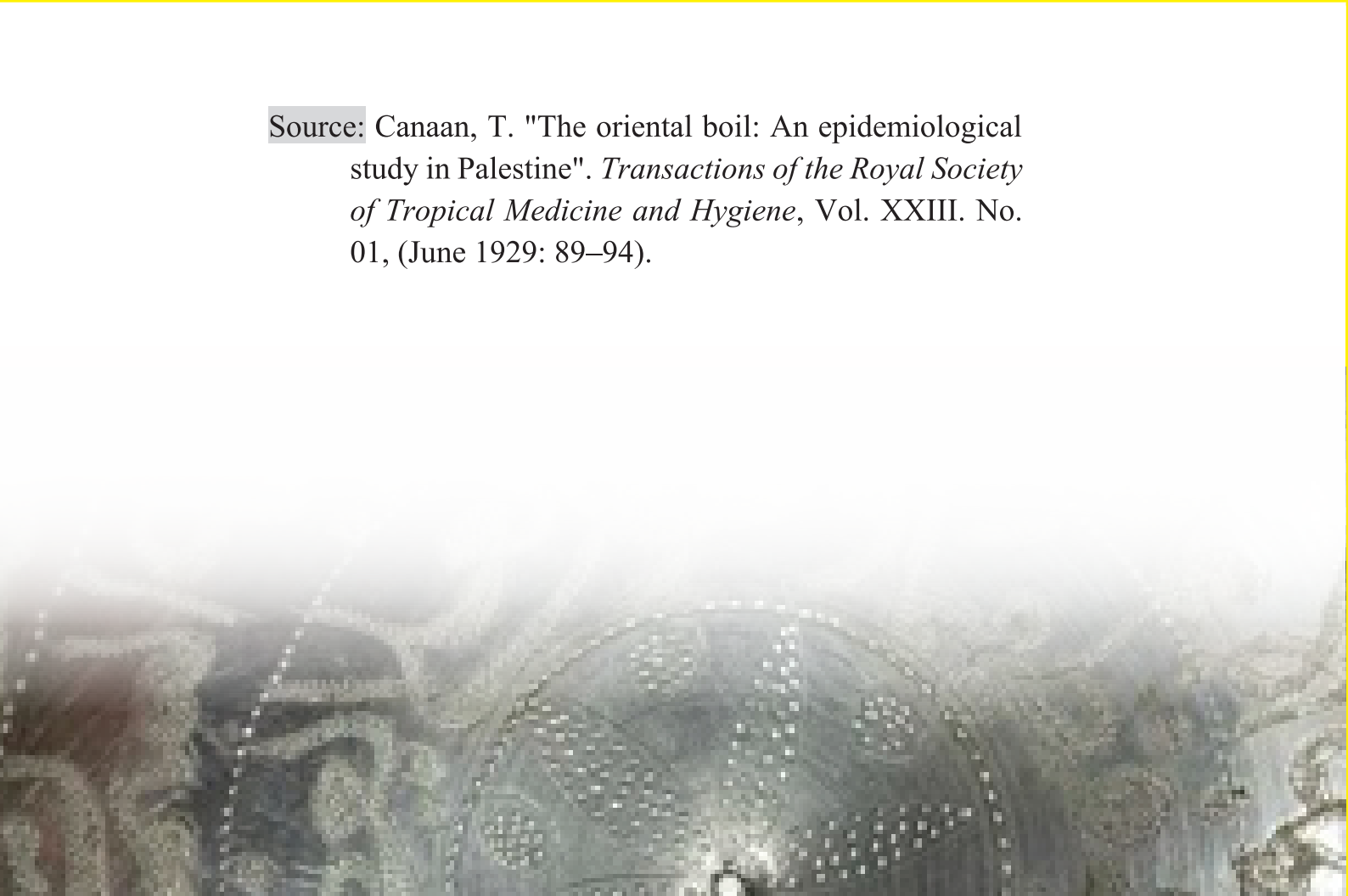


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THE ORIENTAL BOIL :
AN EPIDEMIOLOGICAL STUDY IN PALESTINE.

BY

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Until quite recently it was held that oriental boil occurred only in certain well defined and circumscribed areas in Palestine and Syria, an idea supported by most authorities on tropical diseases. In 1916 I wrote in the *Archiv für Schiffs- und Tropen-Hygiene*, "Jericho seems to be the only place in the whole of Palestine where oriental boil is to be found." I described the geographical and climatic conditions prevailing there and, comparing it with other places, said "It is curious that no oriental boils have been observed in places situated quite near to Jericho, like Wādī el-Kilt, nor in the different Greek Orthodox convents of the Jordan valley." In a paper "Die Orient Beule" read in Aleppo, in 1918, before the German Military Medical Association, I emphasised this point again. "It is very characteristic that this disease is found only in certain definitely circumscribed regions. It is not met with even in places most closely adjacent."

Since the War, however, I have seen (besides several originating in Jericho) the following cases attacked by skin leishmaniasis who had never visited that place.

A woman and her daughter from Bêt Ik̄sa were infected in Ammān where they arrived eight months before the eruption appeared. During this time they had never left this

city. In coming to Ammân they had passed through the Jordan valley in the daytime and did not stay overnight in Jericho.

A case came from Ain Karim ; she assured me that she has never been in Jericho. In the neighbourhood of Ain Karim, between this village and Jerusalem, there is a new Jewish colony, Beth Hakarim, in which DESTROWSKY saw four cases of oriental boil who also had never been in Jericho.

A priest from a convent in Ain Karim who had for the last time been in Jericho three years ago, in Aleppo twenty years ago, and in Egypt thirty-eight years ago, consulted me on the 15th February, 1929. He had three boils on the right and one on the left forearm, and three on the face. One of the latter measured 7 cm. by 4 cm., and was reddish, indurated, not ulcerating, not oozing, and of a varicose character. This eruption resembles those described by me in a former paper. They were also seen by REINHARDT. The two last cases were from Bet Sahur and Bet Djala respectively. They also had never been in Jericho.

In every case diagnosis was based on a typical clinical picture and on microscopic finding of the parasite. Others have had the same experience, and the following have reported cases infected outside Jericho : DESTROVSKY, 18 ; KATZENELLENBOGEN, 6 ; TORRENCE, 1 ; CANAAN, 6 ; KLIGLER, 3.*

In addition to Jericho, primary infection with the Leishman-Donovan bodies is known to have taken place in Palestine at Ain Kari 3 cases, Beth Hakarim 4, Bet Sahur 1, Bet Djala 5, Artuf 11, Mozza 4, Kantara† 3, and Amman 3. I am sure that a more exact investigation would show that there are other centres. The explanation of this phenomenon is no longer difficult, since now we know the most probable source of infection in this skin trouble. It has been shown by several observers that inoculation into the skin of crushed infected sandflies or the flagellates from these causes the disease. It is highly probable that *Phlebotomus papatasi* serves as an intermediate host. Kala-azar, of which a few cases have been described by HITTI in Syria, is also probably transmitted by sandflies.

Sandflies are present nearly universally in Palestine, but until a short time ago Jericho was the only spot recognized as infected with oriental boil. I believe that persons acquiring infection there and returning to their villages have infected sandflies in other localities, for the villages where cutaneous leishmaniasis has been observed are situated *round Jerusalem, and the inhabitants of the Jerusalem district are the most frequent visitors to Jericho.*‡

How is it that many more infected centres have lately been discovered ? Although diagnosis is now made more scientifically, and therefore more correctly, it can hardly be admitted that there were outside Jericho before the war many cases of oriental boil all unrecognized. It is more reasonable to conclude that Jericho is now more often visited, since, owing to the growing

* The cases of KATZENELLENBOGEN and TORRENCE were communicated to me verbally.

† It remains undecided if the cases of Kantara were caused by sandflies infected from Jericho boils or Nile boils. Kantara (East and West) belong politically to Egypt, and not to Palestine. Kantara (East) may be reckoned geographically as belonging to Asia (Palestine).

‡ The distances between the following villages and Jerusalem are (in kilometres) : Ain Karim 7, Beth Hakarim 3, Bet Djala 9, Bet Sahur 9½, Mozza 7.

importance of Transjordan, it is the natural connecting link between the countries east and west of the Jordan.

This theory is supported by the following experience. The priest whose eruptions were described above lived in the same monastery as another priest who was infected in Jericho with leishmaniasis tropica. Three other Fathers of the same order who had acquired this sore in Jericho spent on several occasions, while they still suffered from this affection, some days in the monastery of Ain Karim.

In the case of Artuf, I believe that the explanation given by JOHNSON is correct. He says, "the presence during 1917-18 of a number of cases of leishmaniasis in a military hospital in the neighbourhood of Artuf was responsible for the outbreak of the disease in the latter village." For we are by no means driven to the conclusion of DESTROWSKY that if this be true we have "an incubation period longer than any hitherto recorded." The probability is that the disease was continued by undiscovered and unknown cases either in the Jewish colony or in its neighbourhood.

The disease in Aleppo is so common as to be proverbial amongst the Arabs of Syria and Palestine,* the Jericho boil is unknown to text books, for it is seldom found and has only recently been investigated there.

A point of importance explaining why this infection never appears in Jericho in epidemic form is that only few sandflies are infected. ADLER and THEODOR found an infection index of one per mille of the *P. papatasi* in Jericho, whilst WENYON (1912), working in Aleppo, found 6 per cent. of these insects to be infected with herpetomonas.

I do not think that other causes play an important rôle in infection, for although it has been shown that direct inoculation of the Leishman-Donovan bodies may cause the disease in healthy persons, yet I believe that scratching of a healthy part of the skin with nails infected from a cutaneous leishmania sore of the same person rarely causes a propagation of the disease, since immunity begins probably at the time when the sores are large and cause irritation. As proof of this conclusion the following example may be cited. Five of a family of eleven spent the winter 1914-15 in Jericho. They returned in June to Jerusalem, showing characteristic boils. They lived in Jerusalem with the other six members in two rooms, where the infected slept with the healthy in the same bed, using the same bedding in the presence of a plague of lice and fleas, yet none of the healthy became infected, nor did new eruptions appear on the bodies of the five infected ones.

The life history of the sandfly explains certain facts.

1. The two principal seasons, summer and winter, are more pronounced in Jericho than in any other place in Palestine, the latter season extending over a

* "Shâmî balâ la' âmî milhl Halabî batâ alâmeh"; there is no Damascene who has not had, and no Aleppo man without, a mark.

few months only. From towards the end of December until the middle of April, there are few or no sandflies in Jericho.

In 78·5 per cent. of all patients* for whom exact information could be obtained the eruption made its first appearance in the summer months (July, August, September, and October). In the other 21·5 per cent. it broke out in the autumn and in the early winter. Infection must have taken place mainly during the summer months and to a lesser extent in the autumn. Such observations have been made repeatedly, and show that infection in the winter months is rare. I spend, yearly, several days with my family in the winter months in Jericho, and no one of us has ever been infected. I know scores of families who live for several weeks in Jericho during the rainy season, and they have escaped every infection. A family composed of three members had spent, for four successive years, five to eight weeks of the winter in Jericho; no one was infected. In the fifth year they prolonged their stay until the second week of June and soon afterwards every one of them showed the characteristic eruption. The late Dr. CURADO (Aleppo), wrote in an unpublished thesis on the Aleppo boil "Un fait remarquable est le suivant: Tous les voyageurs qui ont résidé à Alep seulement pendant la saison d'hiver ont été respectés par le bouton."

2. Since the sandfly is essentially a night biting insect, persons who are in Jericho in the daytime only are as a rule not infected.

3. Only exposed parts are affected. The physicians informed me that people who used well-fitting small-meshed netting around their beds escaped infection although they might have lived for years in highly infected places, like Aleppo. These points had led me to conclude in my paper read in Aleppo (1918) that the transmitting insect was probably the sandfly. Experiments have proved the truth of this supposition.

Regarding the incubation period, in three cases who had spent a few days in Jericho once only during that year, the boils appeared after four, five and six weeks respectively; infection must have taken place in this period. But oriental sore papules being at first insignificant, are generally overlooked so that the exact incubation period must be shorter than this. In the inoculation experiments of ADLER and THEODOR the incubation period was generally one month, the shortest periods being seventeen and nineteen days.

Owing to their more delicate skin, children are more liable to this infection than grown-up persons. In Aleppo I found, in thirty-eight families who had 191 children, that 187 of them had been infected in their infancy or early childhood, two of the four non-infected belonging to one family; while of fifty Europeans who had spent at least two successive years in Aleppo (twenty-five of them having lived there much longer) only seven had been attacked.†

* These numbers are true of Aleppo and Jericho.

† SCHEUBE (*Die Krankheiten der warmen Lander*) had the same experience.

Regarding Jericho boil however, I have seen many grown-up persons, who, having stayed during the infectious period in Jericho, were afterwards attacked with cutaneous leishmaniasis.*

The following shows the percentage location of the boil in Aleppo and Jericho :—

	Aleppo.	Jericho.
Face	66	39
Upper Limbs	17	42
Lower Limbs	17	19

The number of boils attacking one and the same person varies greatly. Probably there is in this respect a slight difference between patients infected in Aleppo and those infected in Jericho. In Aleppo an infection with few eruptions predominates; the number of lesions only exceptionally exceeds six to ten. Most Jericho patients show a multiple eruption. In one case I counted fifty-five, and in another (M.K.) the thinly haired scalp was full of small papules, while face and extremities were covered with small and large eruptions. I was told that formerly the multiple form was more prevalent in Aleppo. It is difficult to account for this phenomenon, for there are more patients and a higher percentage of infected sandflies in Aleppo than in Jericho. Perhaps the virulence of the parasites in Jericho at present is, and in Aleppo in past days was, greater than it is at present in Aleppo. Or are the people in Aleppo slowly developing an immunity?

Since every main eruption is probably due to a separate bite it remains to be determined experimentally how many times an infected sandfly can bite and infect. Around a main lesion we may observe very often one or more papules which remain small and insignificant. These are probably due to Leishman-Donovan bodies wandering through the lymphatics from the mother lesion to the neighbouring tissues.

Affections of the mucosa within the mouth caused by these parasites have not been seen by me nor by any other observer in Palestine. In a few cases, exposed parts of the mucosa of the lips have showed sores. It seems that such lesions have been observed only in South America. If cutaneous leishmaniasis is a localized disease transmitted by insects, it is very difficult to explain lesions on the mucous membrane of the mouth, etc. Probably the Brazilian disease with mucous membrane infections is a different one.†

* The above mentioned priest of Ain Karim, lived for several years in Aleppo and did not contract the Oriental boil, but he was infected by the Jericho sore.

† CASTELLANI (referred to by PLEHNE in Mense's *Handbuch der Tropenkrankheiten*).

General symptoms are rare. Even patients with multiple eruptions, of which some were large and suppurating, did not suffer from them. One would expect to meet with severe lymphangitis and adenitis following the badly suppurating open sores, but I have not observed complications of any importance in the Jericho boil. The positive Wassermann reaction and the immunity acquired after this infection point to a systematic reaction of the body against the toxins of the Leishman-Donovan bodies.