

AMERICAN TRYPANOSOMIASIS (CHAGAS' DISEASE) IN THE CARIBBEAN¹

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This article presents a brief review of American trypanosomiasis (Chagas' disease) in the Caribbean, an area generally considered non-endemic for the infection.

Introduction

Chagas' disease is an important public health problem in many parts of Central and South America, and is endemic in nearly all the countries facing the Caribbean basin. Though the infection may produce severe debility, and often death, many cases are asymptomatic. In places where human infection is scarce, the insect vectors may be passing the parasite among wild animals, thus maintaining a sylvatic transmission cycle in which man rarely becomes involved.

Since 1960, reports from the Caribbean islands of Aruba, Curaçao, Trinidad, Jamaica, and from the Central American territory of Belize, have mentioned evidence of *T. cruzi*—including the discovery of the parasite in blood-sucking triatomine bugs and in sylvatic animals. Some of these reports also mention the presence of antibodies against *T. cruzi* in human sera and the discovery of patients with obscure cardiopathies suggestive of

the disease. The purpose of this article, which discusses each of the five areas in turn, is to provide a summary of these findings.

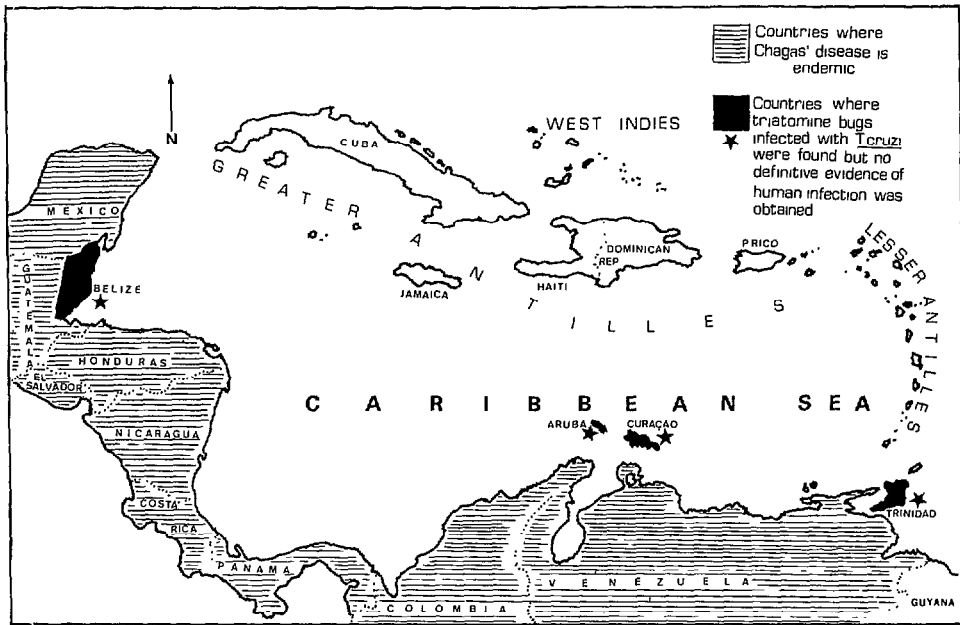
Aruba

Gaikhorst (1) tested 2,232 sera from the population of Aruba by the complement fixation test; all the reactions were negative. He concluded therefore that human infection with *T. cruzi*, if it occurs, occurred only rarely, if at all, on the island. These findings could be explained by the failure of local triatomine bugs to adapt themselves to human habitations, or by lack of virulence to man of local *T. cruzi* strains.

Further investigation on the island was carried out by Van der Kuip (2), who confirmed that a domestic *Triatoma maculata* was present on the island. Of the *T. maculata* collected, 17.0 per cent were found infected with *T. cruzi*. In addition, several species of domestic and sylvatic animals were found serologically positive for *T. cruzi* antibodies, but attempts to isolate trypanosomes from them were rarely successful. It is assumed that these animals most likely constitute the local reservoir of the infection. Chicken pens built of mud and straw were found heavily infested with triatomine bugs.

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A map of the Caribbean showing the various areas described.

Most human dwellings in Aruba are constructed of concrete blocks, with well-plastered walls, and only a small number of bugs have been found in them. For these and other reasons, it is concluded that Chagas' disease is not an important public health problem in Aruba.

Curaçao

Van der Sar and Winke (3) have reported that *T. maculata* is found frequently in Curaçao under sylvatic conditions. Of 130 bugs examined, six were found infected with flagellates. White mice inoculated with feces from the infected bugs developed pseudocysts in the myocardium containing amastigote forms of *T. cruzi*. From a total of 396 human sera tested by the complement fixation test, only a few gave a weakly positive reaction. These data suggest that though human contact with *T. cruzi* may occur,

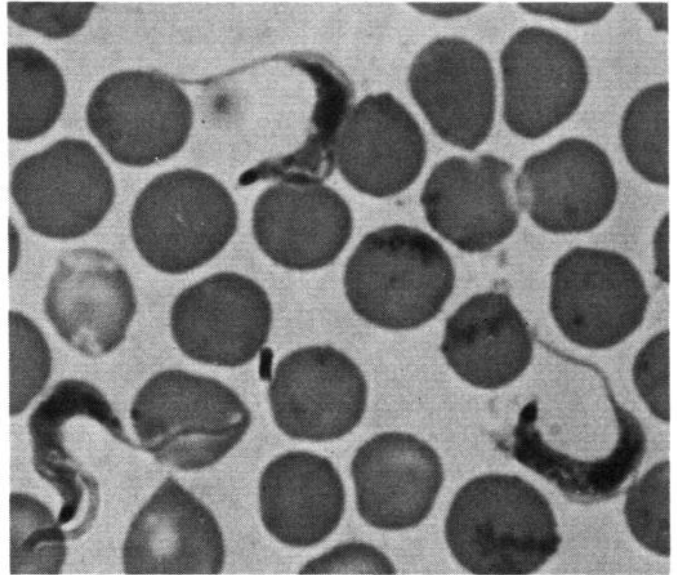
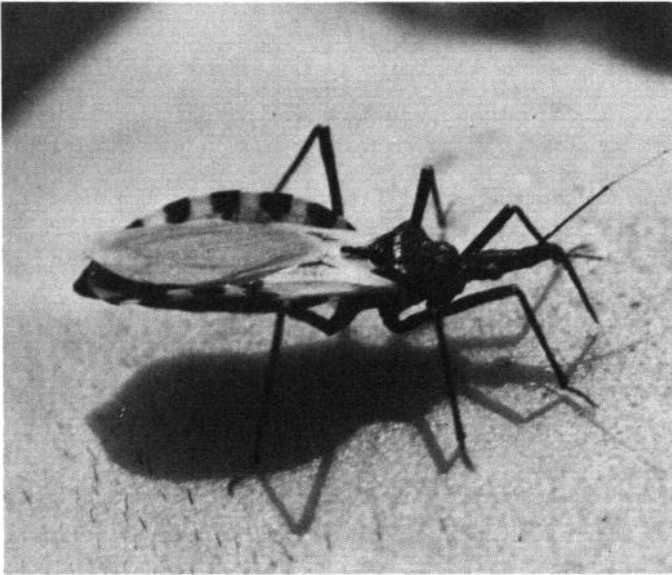
human Chagas' disease on the island is of no epidemiologic importance.

Trinidad

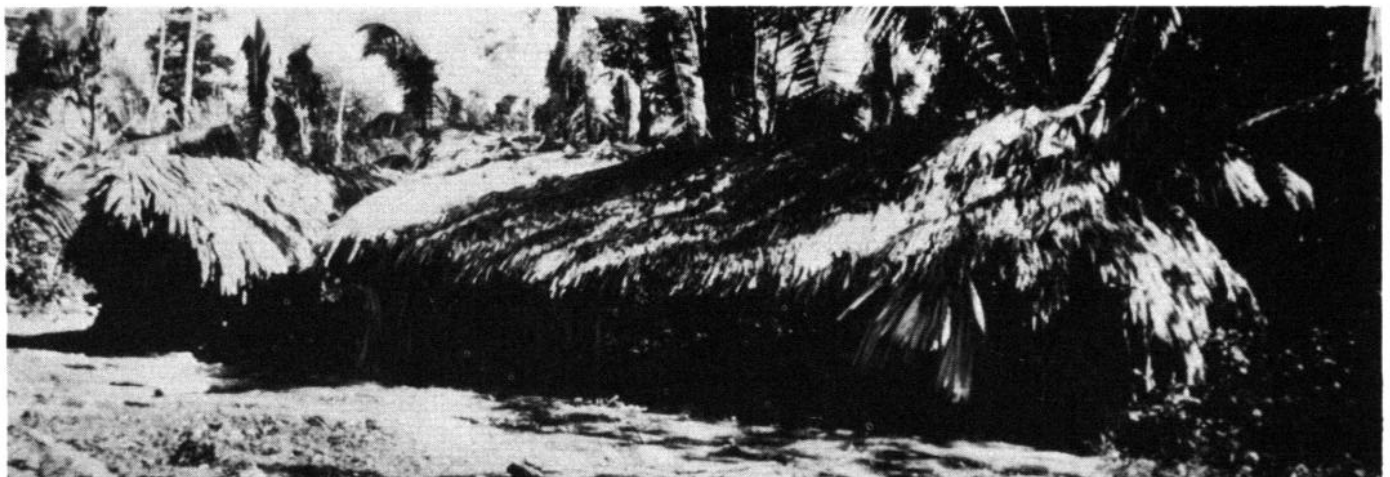
The first (1963) report on the presence of *T. cruzi* in Trinidad was furnished by Downs (4), who isolated the parasite by inoculating serum from a wild-caught rat into white mice. The inoculated animals developed a blood parasitemia with trypansomae which was identified as *T. cruzi* at Tulane University.

The same year Fistein and Sutton (5) drew attention to obscure cardiac disorders frequently seen in general hospitals in Trinidad. Complement fixation test for *T. cruzi* antibodies was carried out on four patients with cardiopathy of unknown origin; three of the sera gave a positive reaction.

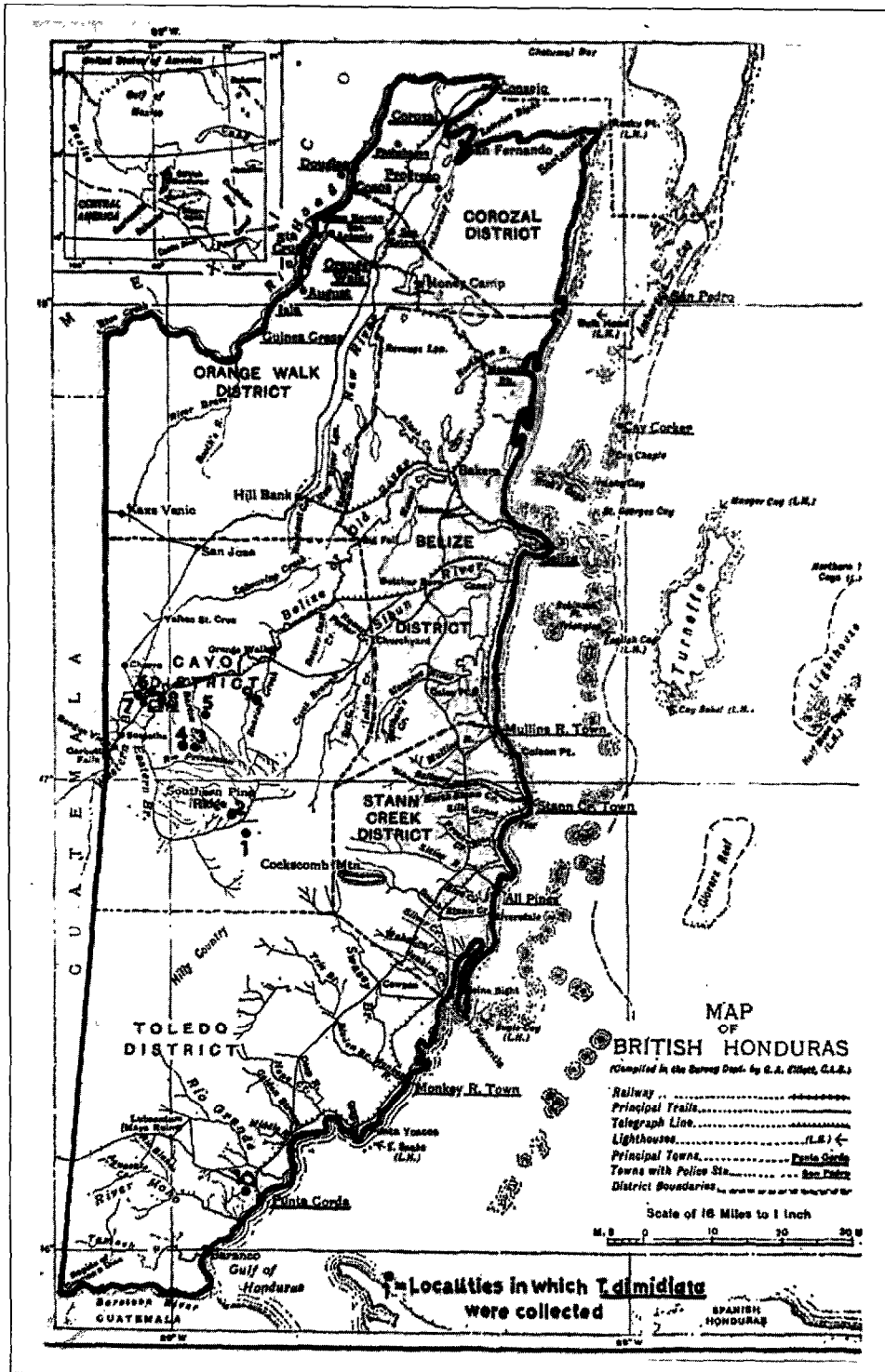
Some time later Fistein (6) collected 79 triatomine bugs near houses of patients



Left: An adult *Triatoma dimidiata*, the only known vector for *Trypanosoma cruzi* in Belize, feeding on a human subject. *Right:* *T. cruzi* in the blood of a mouse infected with feces from wild-caught *T. dimidiata*. *Middle:* A bamboo and mud dwelling typical of those commonly seen in the interior of Belize. *Bottom:* This lumber-camp hut, made of thatch and tree branches in the interior of Belize, provides an ideal shelter for sylvatic triatomine bugs which may infect the unprotected sleeper during the night.



A map of Belize showing the localities where sylvatic *Triatoma dimidiata* have been discovered.



whose sera reacted positive for *T. cruzi* antibodies. A significant number of the bugs (33 of 65 *Panstrongylus geniculatus* and two out of three *Rhodnius pictipes*) were found infected with flagellates of the *T. cruzi* type. Fecal material from 25 of the infected bugs was inoculated into young white mice; 17 of the inocula produced amastigote forms of *T. cruzi* in the myocardium, skeletal muscles, and other organs.

It is of interest that some of the patients with myocarditis or chronic cardiomyopathy had complement-fixing antibodies against *T. cruzi*, and that triatomine bugs known as efficient vectors for the parasite are present on the island and have access to human population. This discovery led Fistein to believe that chagasic myocarditis does occur on the island. He postulates that Chagas' disease in Trinidad is epidemiologically similar to that seen in some countries in Central America where the disease is maintained mainly among sylvatic animals, and where human infection is acquired from adult (winged) bugs which are attracted to lights in houses or which attack people in the forest.

Jamaica

Fistein (7) also drew attention to cases of congestive heart failure and heart enlargement in Jamaica, similar to cases observed in Trinidad. He suggested that some of these cardiopathies might have been caused by infection with *T. cruzi*. Sera were obtained from five such Jamaican cases and tested by the complement fixation test for *T. cruzi* antibodies; two of the sera appeared to react positive. Two species of hematophagous triatomine bugs are known to occur on the island, and it is suggested that a survey should be carried out to determine whether *T. cruzi* occurs in Jamaica and whether it causes lesions of the heart.

Belize

Until 1964 Belize was the only country in Central America from which Chagas' disease had never been mentioned. Indeed, the country was considered climatically unsuitable for blood-sucking triatomine bugs. This belief was disproved when Lainson (8) isolated a trypanosome from a wild coati morphologically identical with *T. cruzi*. Unfortunately, he was not able to classify the flagellate's true identity, as his cultures were destroyed by hurricane Hattie.

Lainson's discovery was followed up by Petana and Coura (9), who established the presence of sylvatic *Triatoma dimidiata* in northern parts of the country close to the border with Guatemala. Later, *T. dimidiata* was found also in the southern parts of Belize, in the Toledo district. From 1,792 bugs captured in both districts, 361 (20.14 per cent) were found infected with *T. cruzi*. The trypanosome strains, isolated from the infected insects and passed on to white mice and rats, were highly virulent, killing the animals in 15 to 28 days after inoculation. During a serologic survey on a segment of population in the El Cayo District a total of 750 sera were obtained, of which 20 (2.7 per cent) reacted positive for *T. cruzi* antibodies (10). The signs and symptoms of pathological heart condition encountered in some of the serologically positive patients could not be considered as specific for Chagas' disease, since such symptoms may also occur in other cardiac disorders. On clinical grounds, therefore, little evidence of human infection with *T. cruzi* was obtained.

Concluding Comments

From the available evidence, Chagas' disease does not appear to be a serious public health problem to the populations in the Caribbean. Nevertheless, if only for reasons

of possible prevention, there appears to be the need to extend the investigation carried out to date in Belize and in Trinidad. Such a scheme should include a large-scale serologic survey of the population, particularly schoolchildren, detailed clinical and electrocardiographic examination of the serologically positive cases, and an extensive search for domestic and sylvatic triatomine bugs and wild animal reservoirs for *T. cruzi*.

From the ecologic point of view, the

spread of the infection may be favored by disturbance in the environment of the vector and wild animal reservoirs. It has been shown in the past that such disturbance brought man into closer contact with the vector, thus increasing the risk of human infection. Though *T. cruzi* must not be considered as a parasite with a specific affinity for man, its presence, together with an efficient insect vector and infected animal reservoir, should always be considered a possible health hazard.

SUMMARY

Chagas' disease (American trypanosomiasis) is endemic in nearly all Central and South American countries facing the Caribbean basin. Since 1960, reports from the islands of Aruba, Curaçao, Jamaica, and Trinidad have confirmed the presence of *Trypanosoma cruzi*, blood-sucking triatomine bugs, and wild ani-

mals infected with the parasite. It was also established that *T. cruzi*, triatomine bugs, infected wild animal reservoirs, and people with a positive serologic test for *T. cruzi* antibodies are to be found in Belize, the last country in Central America once thought to be free of Chagas' disease.

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