frequently is found in chicken coops, where it feeds on chicken blood.

In the contaminated areas where we worked, we never found a bug-free hut among the rural population. New houses, built in remote spots far from other dwellings, are very quickly invaded by *Conorhinus*, despite the difficulty of infestation from another home.

In areas where the “barbeiro” is present, recently settled small towns are quickly infested. A case in point is Lassance, a village that came into being with the arrival of the railroad. In the first two years after it was established, infested houses were few and far between. Today, four years later, *Conorhinus* is found in almost every house of Lassance, and schizotrypanosis is rampant.

The bug bites only at night. In the dark, when the lights have been turned off, it leaves its hiding place and crawls down the walls in search of man. Adults can reach beds and mosquito nets in short flights. During the day, *Conorhinids* do not leave their hiding places. However, if a person leans for some time against a wall, he is sometimes bitten, as happened in our presence to a companion on an excursion to an infested house. We report this as a warning against prolonged contact with the walls of suspect houses.

The bug’s bite is almost painless and leaves no betraying mark at the site, nor is it followed by any inflammation whatever. I watched children sleeping undisturbed while about 20 nymphs and adults of *Conorhinus* sucked blood from their bodies.

*Conorhinus megistus* transmits the disease as a larva, as a nymph, and as a winged insect. A young larva is no larger than a bed bug and can be carried along in laundry, luggage, etc. This fact is very important for prophylaxis, and may account for the appearance of sporadic cases in homes where “barbeiros” are not present. We should also state the possibility of the disease being transported by larvae to other parts of the country when frequent communication has been established with infested regions.

Commentary: The lucid reasoning of Carlos Chagas

Alvaro Moncayo

When Carlos Chagas was requested by Oswaldo Cruz in 1907 to investigate and control an outbreak of malaria in Lassance, Minas Gerais, he could not have imagined that this field of research was the beginning of one of the most notable examples of medical discoveries.

In fact, when reading his scientific reports written in a clear and elegant style, the reader perceives that the observations and precise conclusions are the fruit of a lucid reasoning.

At the age of 28, Chagas was a young doctor working as an assistant researcher at the Instituto Sorotérapico de Manguinhos, founded by the Baron de Pedro Afonso in 1900 and directed by Oswaldo Cruz since 1902. Chagas was studying in primates a flagellate parasite isolated from triatomine insects from the State of Minas Gerais. He named this parasite *Trypanosoma minasense*.³

In Lassance, he observed that these same triatomine insects were present in cracks of the mud walls of the rural dwellings whose inhabitants complained that at night they were bitten in the face by the insects known locally as ‘barbeiros’ (‘barbers’).

In addition, he also observed that a medical condition in that region was frequent in children. The clinical picture showed episodic fever, severe anaemia, palpable oedema, spleen enlargement and swollen lymph nodes. Most cases had a benign progression after a few weeks but a proportion of them developed severe cardiac lesions.

The complete description of this clinical picture was made in a 2-year-old girl, Berenice, from whose blood Chagas isolated the same parasites that he inoculated in laboratory animals. He later described the different phases of the biological cycle of the parasite and in the scientific report quoted above, he named it *Trypanosoma cruzi* in honour of Dr Oswaldo Cruz.
The cardiac alterations—the most serious chronic lesions of the disease—had already been observed by Chagas who described them as follows: ‘The symptoms that most deeply impressed me in the patients of that region, particularly in those who lived in houses infested with the triatomine insects, were the cardiac rhythm alterations in the form of extra systoles’.

The link between the causal agent, the insect vector and the clinical picture was complete!

These notable discoveries were carried out by Chagas in 20 months, living in a car of the central Brazilian rail road where he had installed his house and his field laboratory in Lassance.

At the age of 33, Carlos Chagas had completed his discoveries and published the scientific articles that gave him world recognition and a deserved high place in medical history.

In an unparalleled sequence, Chagas discovered the etiological agent, the insect that transmits the parasite and the disease that bears his name. He reported his observations in a paper published in the first issue of the Memorias do Instituto Oswaldo Cruz in 1909 as mentioned above.

After the publication of this classic article, the world paid homage to Carlos Chagas who was elected as the Director of the Instituto de Manguinhos, Director of the National Public Health Department and Member of the National Academy of Medicine of Brazil. He was also elected as Corresponding Member of other National Academies in the South American continent, such as those of Argentina and Colombia, among others.

In 1910, Carlos Chagas delivered a famous lecture at the National Academy of Medicine in Rio de Janeiro where he summarized his research work as follows: ‘As you can see, the study of this disease shows the curious fact that we started by the previous detailed knowledge of the biology of the causal agent to arrive later at the demonstration of its role in the aetiology of a human disease. On the contrary, in the aetiological discovery of other diseases, the starting point is the description of the clinical symptoms and the epidemiological circumstances and from there we arrive at the isolation of the suspected causal microbe’.

Further on in the same conference he stated the importance of the control of the transmission of the disease through public health programmes of insecticide spraying and improvement of rural housing. He said: ‘Could we find public health procedures to alleviate this situation? I am convinced that this is both a humane and a state problem and that the scientifically well oriented statesman who launches such a public programme with successful results will win the recognition of my compatriots and the future generations of Minas Gerais’.

The advances made in high quality research on Chagas disease since 1909, the date of the first communication, have been outstanding and must be credited to the scientists working in Brazil, Argentina, Venezuela, Colombia and in other Latin American countries. They have disclosed many of the biological, medical and social aspects of the disease.

The publications indexed in international data bases such as the National Library of Medicine, Washington, DC show that in 56 years, from 1949 to 2005, a total of 8976 articles have been published on different aspects of this disease that are distributed as follows:

Of the indexed articles 97% deal with basic research on T. cruzi (7408 articles or 83%) or on two of the most important vectors of the parasite: Triatoma infestans (665 articles or 7%) and Rhodnius prolixus (617 articles or 7%). The above contrasts with 286 articles or 3% published on treatment of the disease while no studies are indexed on control of transmission.

However, the success in control of transmission has been a landmark of public health in the continent, thanks to the political and financial engagement of the Ministries of Health of Uruguay, Chile and Brazil where the interruption of vectorial transmission has been achieved through public programmes of insecticide spraying and improvement of the rural dwellings.

The interruption of the transmission of Chagas disease in the above countries and the marked advances in others such as Argentina, Paraguay and Venezuela have lead to a decrease in incidence and mortality of the disease on the continent. In 1990, it was estimated that 700 000 new cases appeared annually in Latin America while in 2006 this figure dropped to 41 000, a decrease of 94%. Similarly, in 1990 the annual deaths due to the disease totalled 45 000 and in 2006 they decreased to 12 500, a reduction of 73%.

In less than one century, Chagas disease has been discovered, studied and controlled in most of the endemic areas in Latin America. An extraordinary success in the history of medical research and public health!

References