

Implication of *Phlebotomus* Sand Flies as Vectors of Bartonellosis and Leishmaniasis as Early as 1764

Abstract. *A written account implicating Phlebotomus sand flies as vectors of Carrion's disease and cutaneous leishmaniasis in Peru was published by Cosme Bueno in 1764. Bueno's report precedes other publications implicating sand flies in the transmission of human pathogens by nearly a century and a half.*

Evidence that *Phlebotomus* sand flies transmit *Bartonella bacilliformis* (Carrion's disease) and *Leishmania* spp. remained circumstantial for many years. During the present century these minute flies were initially incriminated as vectors of Carrion's disease in 1913 (1). *Bartonella bacilliformis* was transmitted experimentally in 1928 to *Macaca mulata* by exposing the monkey to wild-caught sand flies collected in an area where the disease was endemic (2). The first published reports suggesting *Phlebotomus* sand flies as potential vectors of human pathogens

(*Leishmania tropica* and sand fly fever virus) appeared in 1905 (3-5).

A recent note by Gooneratne (6) quoted an 1884 report by Mitford (7) on cutaneous leishmaniasis (Aleppo boil) in the Middle East; the disease was thought to be caused by "some mineralogical impregnation of the water, or some minute insect that inhabits it." Although in this case the possible participation of some insect was considered, its exact role in the transmission of the Aleppo boil was not clearly indicated. The first solid evidence that sand flies were involved in the epidemiology

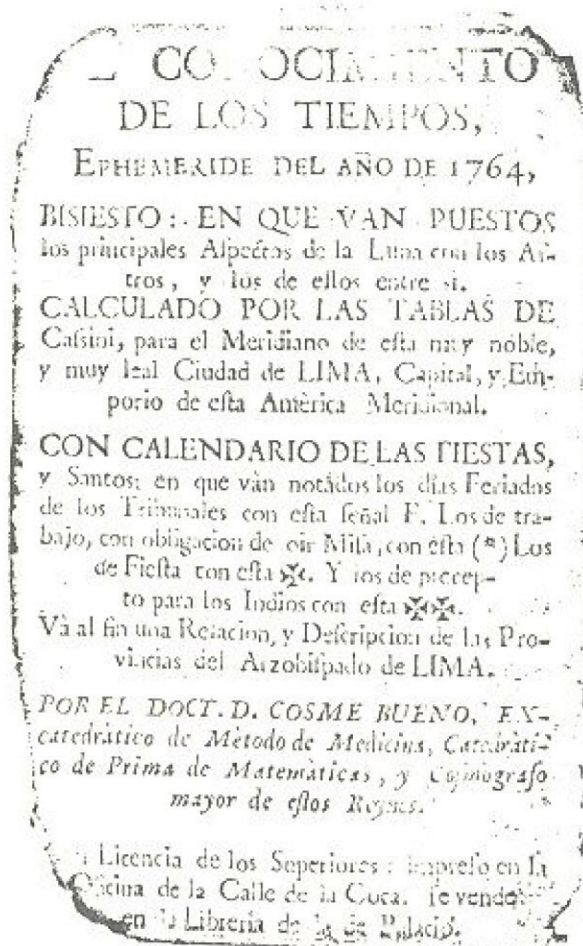


Fig. 1. Front cover of *El Conocimiento de los Tiempos*, a kind of almanac published in Lima, Peru, under the direction of Cosme Bueno during the 18th century. A single copy of this publication is available in the Biblioteca Nacional, Lima. This copy was partially burned during a fire on 10 May 1943.

gy of the disease came in 1921 when a volunteer developed cutaneous leishmaniasis after being inoculated with a triturate of wild-caught *Phlebotomus* (8). In 1941 *Leishmania tropica* was transmitted to volunteers through the bite of experimentally infected *Phlebotomus papatasi* (9). Subsequent investigations have supported the hypothesis that *Phlebotomus* sand flies are the principal if not the sole vectors of human bartonellosis and leishmaniasis.

The first written account describing human bartonellosis appeared in 1630 (10) in Peru, only a century after the arrival of the first Spaniards. Carrion's disease, and a peculiar epidemiological form of cutaneous leishmaniasis called uta, are endemic in certain areas of the Peruvian highlands. Their antiquity has been substantiated mainly on the basis of linguistic considerations (11) and certain pathological representations in Peruvian anthropomorphic potteries from the Inca and pre-Inca times (12). The endemism of both diseases in small and isolated areas of the Peruvian Andes has also been pointed out as an indication of their great antiquity (13). In 1764 Cosme Bueno discussed in *El Conocimiento de los Tiempos* the folklore about the natural transmission of both diseases as follows (translated from the Spanish):

The narrow valleys are very unhealthy where two kinds of maladies are noted; these diseases are also present in other cool provinces. One is verruga [Carrion's disease] which happens to be very troublesome and dangerous if not accompanied by cutaneous eruptions. The other results in corrosive ulcers, located on the face, is very difficult to cure, and causes the death of some people. It is said that both diseases originate from the bite of a small insect called uta [sand fly].

The term uta is still used synonymously for the vector and the disease of cutaneous leishmaniasis in certain areas of the Peruvian highlands.

Cosme Bueno was born in Spain and arrived in Peru in 1730 at the age of 19. He studied in Lima, where he became recognized as a distinguished physician, mathe-

matician, and geographer. He traveled extensively throughout the Peruvian territory and other South American countries. Much of the information published in *El Conocimiento de los Tiempos* was gathered by Bueno himself. His report precedes other early records implicating sand flies as the vectors of leishmaniasis and Carrion's disease by about a century and a half.

An epidemiological peculiarity of uta and Carrion's disease is their persistence in the same areas for centuries. The diseases remain endemic today in the regions where Carrion's disease was reported by Vadillo in 1630 (10) and both diseases were reported by Bueno in 1764 (14). The antiquity of both diseases in Peru may explain the existence of the rich folklore about them.

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