PLAGUE-INFECTED FLEAS IN BALES OF JUTE BAGS IMPORTED INTO PERU FROM INDIA

In Peru, in 1934, Long and Mostajo made certain epidemiological studies of two outbreaks of human plague that were not preceded by epizootics, (Hacienda La Quebrada, in Cerro Azul, and Chimbote), and of two outbreaks of rat plague, followed by human cases, (Callao and Puerto Eten), which caused them to arrive at the conclusion that a close relationship existed between those occurrences, as they had taken place during the months when there is usually no plague in the country, and the previous unloading in the ports mentioned of variable quantities of bales of jute bags brought from India by the steamer “Solafric,” which had sailed from Calcutta some 80 days previously.

Investigations made in two haciendas of bales of jute bags, which had remained unopened, resulted in finding dead rat-fleas in the proportion of one flea to each two bales examined, it being noted that there was an irregular distribution of fleas in the bales in relation to the total number found, due probably to the varying sanitary conditions of the various factories whence the bales making up the cargo came.

Unfortunately, the lack of direct proof of the infectivity of the fleas found in the bales and the prevailing scientific opinion at that time with relation to the life-expectancy of infected fleas while fasting—opinions unfavorable to a longevity of more than one month, more or less, under the conditions reported—served as the basis for opinions, without corroborating laboratory or epidemiological studies, that the hypothesis of Long and Mostajo was lacking in importance, and even for denying its possibility.

Nevertheless, facts observed and described in the past, for which satisfactory explanations were not found, could have been explained in the light of the hypothesis of Long and Mostajo. For example, the events that occurred in 1904, in Antofagasta, Chile, when the steamer “Gladstone” imported bales of jute bags and there sickened and died certain of the employees charged with the duty of
examining the cargo; the finding in 1929, in the same port, of a certain number of fleas identified as *X. astia*, a flea native to India, the only fleas of this species ever found in the Americas; the occurrence of plague in 1930, after it had been absent for five years; these various incidents could be explained when official documents showed, on each occasion, that there had been imported some millions of kilograms of jute bags sufficiently in advance of the outbreak to account in a simple and complete form for the facts mentioned.

The reappearance of plague in Perú, in 1944 and 1945, in the rural districts of Chiclayo, even though the increase was not related to circumstances similar to the case of the “Solafric,” revived suspicions of another importation of plague from India due to the active commerce in jute bags which has been maintained despite the war.

The exceptional conditions which surrounded a shipment of 400 bales of jute, consisting of 120,000 bags, sent to the Hacienda Cayaltí, made a new investigation possible. These bales in their transit to Cayaltí had no opportunity for local contamination or infestation with fleas. Also, extensive investigations made in the hacienda showed that no plague had existed there for a number of years. The results of the present investigations are as follows:

In 3,000 bags examined, which had been imported made up into 10 bales, an unequal distribution of fleas was found. Without taking into consideration 29 fleas found principally in the external wrapping of the bales, all of which were identified as human fleas (*Pulex irritans*), our interest was concentrated on 7 fleas of the genus *Xenopsylla*. Two of these were found alive; two of the five dead fleas were damaged; all of them were in a fasting condition, and all of them were taken from the interior of the tenth bale opened and examined.

The inoculation of a triturate of these fleas into guinea pigs gave, after four passages in series in these animals, a picture of attenuated plague, with extensive glandular involvement, and with the presence of *Pasteurella pestis*, identified as such by bacteriological culture and differentiation, in the organs in quite an appreciable quantity.

This picture of attenuated plague is explained by the long time the infectious agent had lived in fasting fleas, as it has already been shown and proven that this circumstance has an attenuating effect on the virulence of the plague germ.

Later on, in the city of Huacho, we had the opportunity to continue with these experiences by the examination of 5,400 sacks taken from another imported lot shipped by steamer “Taybank” to Ayulo & Co. of the port of Huacho.

During these experiences we were able to collect 24 fleas, 10 of which were *X. cheopis*, 8 being alive. Six of these fleas were fed on one guinea pig which died of plague. The survivors of these fleas continued to feed on a second guinea pig which also died of plague. On a third test, the guinea pig survived but the flea when dead was inoculated in another guinea pig which became infected. In summary it can be said that at least one guinea pig bitten by fleas became infected and died spontaneously with plague and at least two guinea pigs inoculated with flea-emulsion incurred a similar infection. All the above gives positive evidence of the effectiveness of the plague infection transported from India by fleas contained in bales of sacks made of jute, which are unloaded in the ports along the Peruvian coast and perhaps in the bordering countries.

Certain bacteriological peculiarities of the strains of germs; the knowledge we have that plague exists in Calcutta; the conditions of humidity and temperature in the holds of the vessels that arrive via the Straits of Magellan; the insanitary conditions that the war has produced in India and which certainly have had some effect on the measure of disinsection which at one time were taken with cargos of jute bags; the epidemiology of certain “out of season” outbreaks of plague
that now, as formerly, are again making their appearance contrary to the annual cycle of plague in Peru, and above all, the findings reported herein, do not leave the least doubt but that the hypothesis enunciated by Long and Mostajo more than ten years ago is correct.

The possibility of the arrival in Peru of living infected fleas coming from India in jute bags is subject to seasonal changes in plague in India; to the origin of the bags, made in factories under different sanitary conditions and subject to variable health control; to the duration and climatic conditions of the voyage; etc. The proportion of fleas which have been transported is quite small, an average of one or less per bale, of which less than a quarter arrive alive, it being impossible to say how many of these are infected and how many of those infected would be able to enter and to transmit plague upon feeding on new hosts in this country.

The possibility that fleas arriving in jute bags might maintain their infection through a rat-flea cycle is discussed at length, and the probability of this mechanism is rejected. The main reason for the investigation was to prove the reinfection of Peruvian ports by infected fleas coming from India, the study of the mechanism to which this importation is subjected being of additional importance as regards the health purposes of this report. Scientifically, however, it has been of great interest in clarifying that danger of periodic reinfections exists as proved by epidemiological facts.

La vocación médica.—La tarea del médico exige conocimientos, facultades y moralidad. Los conocimientos los adquiere por las enseñanzas y los libros, pero las facultades sólo se desarrollan con la práctica. Es incuestionable que no se concibe al médico sin una moralidad a prueba. El médico debe tener, al decir de Siebeck, el corazón abierto, y sobre todo clara inteligencia, buena memoria, discreción, orientación y seguridad. Ha de comprender el detalle y el conjunto; no sólo ha de oír y ver, sino también hablar y actuar, siendo a la vez delicado y enérgico. Debe tratar de comprender que tiene ante sí un sujeto con cuerpo y espíritu, con una personalidad que vive en un medio determinado y que tiene relaciones y conflictos sociales. El poder llegar a este grado de madurez es la aspiración de todo médico. Y es la razón para que cada médico sea un estudioso inquieto en todo momento de su vida, de otra manera caerá en el terreno de la rutina, del prétacto, acomodándose muy fácilmente en aquella concepción de mentalidad mediocre que considera que el trato de los enfermos consiste en el arte de entretenner a un enfermo con especulaciones frivolas acerca de su padecimiento, y de contemporizar ingeniosamente con él hasta que la naturaleza cumpla con su misión de producir su deseo o de curarlo.—Aurelio Peralta V.: Rev. Méd. Per., 105, fbro. 1946.

El juicio clínico.—El juicio clínico exige conocimientos y experiencia, pero intervienen además en él, un factor personal. Los progresos extraordinarios en materia de recursos diagnósticos, no logran resolverlo todo. En última instancia, en los casos complejos, es el factor intelectual, la inteligencia—aparentemente la intuición a veces—lo decisivo para resolver el problema. Hay médicos dotados para el juicio clínico. Tal condición suele ser innata, pero mucho puede adquirirse con la experiencia, la disciplina del método, siempre que esta disciplina actúe con elasticidad, huyendo del rigor esquemático.—Juan P. Garrahan: Sem. Méd., 725, obre. 24, 1946.