

The Mummies of San Lorenzo Island

Guido P. Lombardi, Uriel García - Cáceres

Laboratorio de Paleopatología, Cátedra Pedro Weiss. Clínica Javier Prado
Av. Javier Prado Este 499, Lima – 27, Perú

Natural mummification, Paleopathology, San Lorenzo Island, Schistosomiasis, Paleoepidemiology

KEY WORDS: natural mummification, paleopathology, San Lorenzo Island, Schistosomiasis, paleoepidemiology

Abstract

San Lorenzo Island is 5 miles off the coast of Lima, Peru. This island, as well as the whole Peruvian coast, presents several environmental conditions that make natural mummification a very common phenomenon. This paper explains the reasons for this phenomenon and presents an overview of the bodies recently uncovered by a team of archeologists led by the Peruvian Navy.

Introduction

San Lorenzo Island, the largest oceanic island in Peru, lies just 5 miles off the coast of Lima. Nevertheless, different reasons have caused it to be almost totally isolated from the intense life of the Peruvian capital. Historically, fishermen are known to have come to the island since the pre-ceramic period, around 5.000 years ago, or even before. No permanent settlements could ever be founded – at least during the pre-historical periods, since there San Lorenzo lacks any sources of fresh water. Indeed, San Lorenzo resembles any other part of the Peruvian coastal desert, only that a bit drier. Drizzle precipitation is reduced to few centimeters a year, especially over the Southern hemisphere winter months (Fig. 1).



Fig. 1 - San Lorenzo Island.

Those harsh conditions of dryness and isolation spared full population of the island up to present. Nevertheless, its strategic location just across the major port of Callao, provided the island with opportunities of specific use over the centuries. In pre-historical times — before the 16th century, San Lorenzo just worked as a camping site for fishermen, as well as a burial site. Since the 16th century, over the whole colonial period, and early republic, the island's use shifted toward prison while it continued to be both a camping site for fishermen and sailors, as well as a cemetery. It was mainly during the 1800s that the island became a quarantine station for ships bound to Peru from all over the world. Ill passengers were secluded in a makeshift sanitary station until full recovery or death (*Caleta Panteón*). Accordingly, a neighboring area was assigned as the station's cemetery (Fig. 2).



Fig. 2 - Caleta Panteón Cemetery.

San Lorenzo island, now under the administration of the Peruvian Navy, as well as the whole Peruvian coast, has several environmental conditions that cause mummification to be a very common phenomenon. This paper presents the reasons for this phenomenon to occur, as well as it reviews the circumstances and importance of some of the bodies recently uncovered by a team of archeologists at *Caleta Panteón*.

Materials

Human remains from nine individuals were studied *in situ* by our team. In some cases, samples or whole individuals were

taken over to mainland Lima for more comprehensive analyses. The state of preservation ranged from poor (skeletonized) to very good (completely mummified). Accordingly, their study was individualized but in general comprised ectoscopy, physical anthropology, photography, radiology, and special analyses. Only in one case we were authorized to perform a non-destructive autopsy. The study was complemented with a review of the literature regarding mummification processes in the Peruvian coast as well as in the history of the island, particularly on some aspects related to the individual cases.

Coastal natural mummification factors

Several external factors hold a synergetic mummifying effect in the Peruvian coast. Their occurrence explains the distribution of mummies in a north – south gradient. These are the following:

- The soil: Sand, especially wherever rich in saltpeter and/or silica. In a given place, closeness to a water source is a factor that could promote a faster rate of decay. E.g. distance to a seasonal stream (valleys and *quebradas*) or to the water table (seashore).
- The Humboldt Current and the Trade Winds: The North Western bound trade winds from the South Pacific lose almost all their humidity before reaching the Peruvian coast. This is due to the influence of the Northern bound chilly waters of the Humboldt current. Consequently, there is no significant precipitation between the Atacama desert and the Galapagos Islands. Nevertheless, the intrusion of a tropical Southern bound current – *El Niño* – along the Peruvian coast sometimes reverts the *status quo*, producing heavy and devastating rains particularly on the northern coast.
- The Andes: This long and high mountain range physically prevents all rain and humidity from reaching the western coast of the South American continent, with the exception of a narrow gap in Northern Peru at Porculla Pass.

Resulting from the encounter of all these factors, natural mummification occurs predominantly in the southern coast of Peru, and is almost absent in the North (North South Dehydration Gradient). In the central coast, particularly for San Lorenzo Island, mummification depends on the distance from water sources.

San Lorenzo Mummies

It is estimated that several hundred people lie under the sands of San Lorenzo Island. E.g., in 1624, the Dutch Army while trying to conquer Peru buried at least 70 of its men there (Bradley, 1981). According to an agreement with the Peruvian Navy, our team was able to study the bodies of seven males archeologically recovered from *Caleta Panteón* cemetery (Lombardi and García – Cáceres, 2003). All but one of the bodies were buried in wooden coffins, and all were found lying down in a prone position. The degree of preservation of their bodies ranged from pristine to almost

skeletonized, according to the depth of the burial and the closeness to the water table. Although the historical dating of these burials and the site itself is still ongoing, they roughly belong to the second half of the 19th century.

Burial I

It is the mummified body of an adult man in an excellent state of preservation. His mouth is open despite the fact a kerchief was tied around the head in order to prevent this from happening. This body was observed and sampled in order to determine the cause of death. Some samples were taken to Dr. Marvin Allison's Laboratory in order to perform some immunological essays (VMC, Richmond, VA). The results so far performed have ruled out cholera as the cause of death but revealed the presence of *Salmonella spp.* Antigens

Burial IX

It is the mostly skeletonized body of an adult male over 50 years old at death. Death was most probably caused by a large fracture of the occipital bone. This suspicion is strongly supported by the remarkable preservation of his hands and feet, which show pathological positions neurologically linked to decerebration: Internal rotation of arms and extension of feet (Fig. 3). The fatal event could have triggered a massive cranial hemorrhage, endocranial hypertension, and brain stem herniation. A depressed fracture in the right scapula further suggests this man died after being attacked from the back.



Fig. 3 - Burial IX: Internal rotation of arms.

Burial X

It is also a mostly skeletonized body of a middle-aged adult male. The most relevant findings are the fractures involving both forearms and the right leg, and the absence of both hands and the right foot. The field hypothesis that this person lost his limbs due to a blast could not be ruled out. In fact, some rusted metal fragments are still imbedded in some areas of the bones, particularly the right tibia. The only mummified tissues remaining in this body are the brain and the left foot.

Burial XIa

It is another mostly skeletonized body of an approximately 25-year-old male. Although no direct cause of death could be demonstrated, the observation of a sling *in situ* around his right arm and a bandage on his right foot suggest this

person's death was associated to multiple trauma. The observation of a linear fracture in the manubrium was not conclusive either.

Burial XIb

It is the skeleton of an approximately 16 to 18 year-old subadult. The observation of fractures on both forearms, the left leg, the left zygomatic, in the absence of both hands, indicate this person's death was associated to a violent event, too. A healed fracture on the nose suggests this violent period could have lasted for at least a few months prior to his death.

Burial XIV

It is the mummified body of a young adult man in a remarkable state of preservation. The observation of pustule-like lesions on some areas of his skin made it necessary to remove the body from the grave to perform a closer study on an island's makeshift laboratory. The pustule-like lesions were salt crystals, which often appear on the surface of bodies exposed to varying ranges of atmospheric humidity. Thus, we ruled out smallpox as the cause, as it had been initially thought. During that study, we noticed the pathological position of the left leg, externally rotated and slightly flexed. Since these signs typically suggest the fracture of the femoral neck, a closer look made us notice a pathological eminence in the upper thigh. Since at that time the body was ready to be reburied, it was decided to take some samples *in situ*. Small samples were taken then from the fractured femur and a few skin 'lesions' of the forehead. The diagnosis so far is a pathological fracture – the fracture of a diseased bone. The original disease of the bone could be infectious or neoplastic.

Burial XVI

It is the mummified body of a 152-cm tall man in a very good state of preservation. Radiologically, its age was determined between 25 and 30 years. Careful study of his clothing turned out to be of Asian origin. No bone pathologies were demonstrated through plain radiology and CT-scanning. A minimally destructive autopsy (Lombardi, 1992) demonstrated lung and liver pathology. Both lungs were collapsed, but the left one showed a pleuro-pulmonary bands. The right hemidiaaphragm was depressed due to a possible massive pleural effusion. Representative samples of thoracic and abdominal organs were taken, as well as some hair for opioid testing. Following standard paleopathological procedures, clusters of eggs of *Schistosoma japonicum* were readily demonstrated in the liver (Fig. 4). This is the first time Far Eastern schistosomiasis has been demonstrated in a mummy out of Asia (Aufderheide and Rodríguez – Martín, 1998; Verano and Lombardi, 1999). The results from this study confirm the terrible conditions in which Chinese

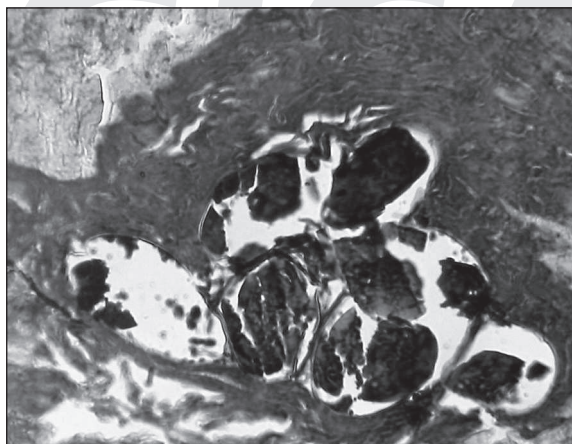


Fig. 4 - Burial XVI: *Schistosoma* eggs in mummified liver.

immigrants were brought to Peru in the mid-1800s (Padilla, 1998).

Importance of San Lorenzo Island Mummies

San Lorenzo Island has many reasons to become the source of numerous and important studies in paleopathology. From the point of view of the biological sciences, the island cemeteries provide an intact collection of pre-antibiotic era mummified pathogens from around the world. It also contains time capsules – the mummies — of human migrations and their pathologies. From the standpoint of epidemiology, it illustrates a testimony of success of early public health measures with the creation of quarantine at San Lorenzo's Sanitary Station. Finally, the island might provide some answers to unsolved historical mysteries, as the real etiology of the defeat of the Dutch Conquering expedition of 1624 (Bradley, 1981; Eslava, 2000).

Literature Cited

- Aufderheide A and Rodríguez - Martín C. 1998. The Cambridge Encyclopedia of Human Paleopathology, University Press, Cambridge.
- Bradley PT. 1981. Jacques l'Hermite, the Nassau Fleet and the Blockade of Callao (1623-6). In: The Lure of Peru, St. Martin's Press, New York.
- Eslava J. 2000. Crónica de Piratas en la isla San Lorenzo: Camposanto de altamar. Rumbos 5(24):75-80.
- Lombardi GP. 1992. Autopsia de una Momia Nasca: Estudio Paleopatológico. MD thesis, Universidad Peruana Cayetano Heredia, Lima.
- Lombardi GP and García-Cáceres U. 2003. Protocolo de Investigación: "Paleopatología en la Isla San Lorenzo", presented to DIMINMAR, Lima.
- Padilla A. 1998. Inmigración China, Boletín de Lima 114:69-74.
- Verano JW and Lombardi GP. 1999. Paleopatología in Sudamérica Andina. Bulletin de l'Institut Français d'Études Andines 28(1):91-121.