

El Bosque Petrificado Piedra Chamana

Sexi, Peru



El Bosque Petrificado Piedra Chamana is a petrified forest near the village of Sexi, Peru, located about 100 kilometers east of the city of Chiclayo. The site is protected by the government of Peru through the National Institute of Culture, and by the Association for the Preservation and Defense of the Fossils of the District of Sexi (the APDFS), located in Sexi. The fossil forest is open for the public to visit. Upon arrival, visitors need to contact the APDFS to arrange for a guide.

Volcanoes, Rocks and Fossils

As you stand at the site of the fossil forest, looking across the dramatic landscape of the Rio Chancay canyon toward the Continental Divide, it is hard to image explosive volcanoes erupting and producing large plumes of ash that rise high into the air. Before human beings existed on Earth — before the modern Andes Mountains rose up to their high elevations — volcanoes were active in this area.

The eruptions produced volcanic ash that was carried by the wind and eventually settled to the ground, trapping leaves that had fallen from the trees and covering the earth to a depth of about a meter. Some of the volcanic ash combined with rainfall to create small balls of ash that fell from the sky like hail stones. Rain falling on the loose ash created volcanic mudflows called *lahars* that flowed downhill like wet cement, knocking over trees, covering the ash layer, and burying the forest.



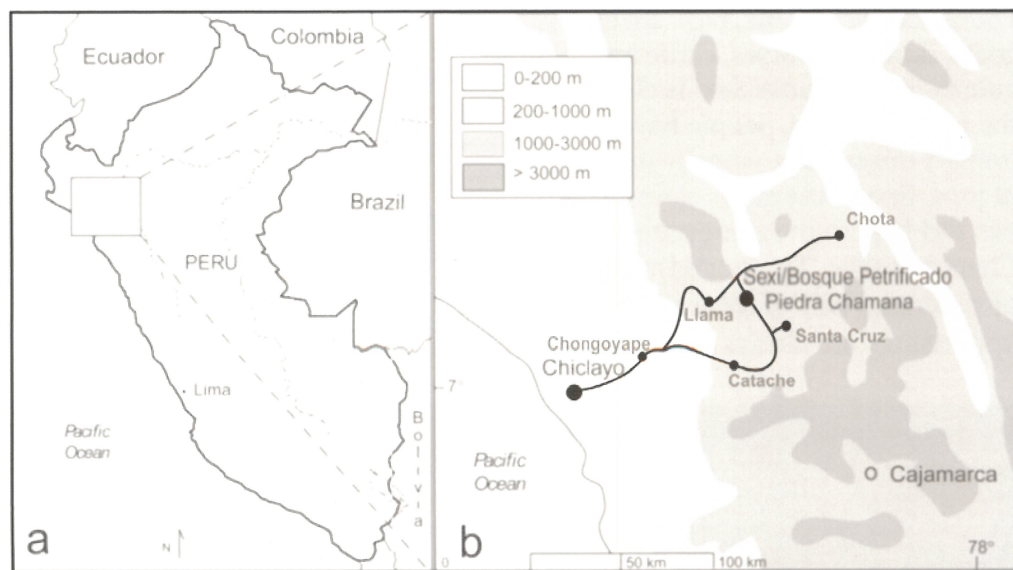
Large petrified logs such as “Palo Tendido” are preserved in volcanic mudflows.

Gradually the ash and the mudflow hardened to form rock, and much of the plant material trapped within the rock began the process of fossilization. The leaves buried in the ashfall decayed, and fossil impressions in the rock are all that remain. Little by little, water permeated through the ash that surrounded the trees, transporting some of the ash's minerals as it filtered through the rock. This solution deposited mineral matter within the

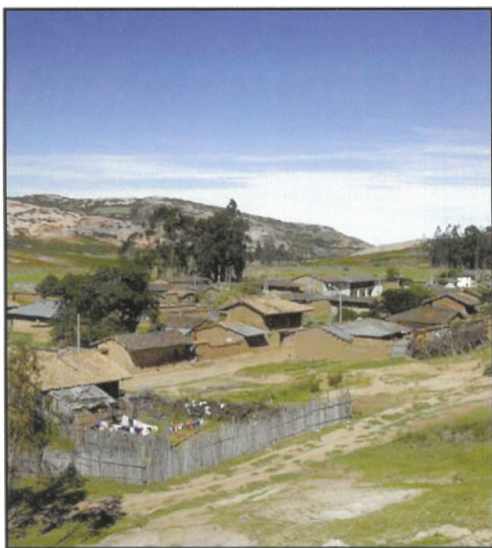
cells of the wood, replacing most of the organic matter with stone. This form of fossilization, petrification, is the process that preserved the finely detailed anatomical structure of these trees. Today, we find some of the tree stumps preserved in their original vertical growth positions, and others that were moved by the ancient mudflows to form horizontal “log jams” with many uprooted trees preserved together.

Scientists come to Sexi to study these ancient plants and the processes of fossilization. They prepare the fossil specimens in laboratories and use microscopes to identify the various tree species. This type of scientific exploration helps researchers to begin to understand what the forest was like when it was growing here about 39 million years ago, during the Eocene epoch of Earth's history. The fossils at Sexi are especially important scientifically because they date from a time when the South American continent and Earth's climate were very different from today. Scientific analysis of the fossils and their characteristics can also tell us about how environments and climates have changed over time.

Sexi is located in the Huancabamba-Amotape Biogeographic Zone, an area between the Northern and Central Andes with a great diversity of plants and animals. Today the area around Sexi is a mosaic of pastureland, eucalyptus plantations, bare soil and intact patches of native forest that show the effects of human activities. Native plants form a dense evergreen forest or shrubland. Many trees have bromeliads and orchids growing on them. These plants obtain water from



Map of the area from Chiclayo to Sexi



The village of Sexi is located a short distance from the petrified forest.



Weaving is a tradition for the women of Sexi.



Unusual plants such as bromeliads are common in the area.

fog that is common in this area. One of the most abundant plants is the Chamana (*Dodonaea*), an evergreen shrub that gives its name to the fossil forest — Piedra Chamana, or Stones of Chamana.

The ancient forest was clearly very different from the present-day vegetation found here. The high-elevation, seasonally dry environment of today is a striking contrast to the tropical environment that is reflected in the fossil record. In the past there was a diverse array of trees, some very tall, including several species of palm trees. The tropical forests that we see in South America today occur at much lower elevations. The ancient forests grew at a time when the world's climate was much warmer. Some scientists think that the ancient forest here was at a lower elevation and that the forces that raised the Andes Mountains pushed this area up to its present elevation.

HUMAN ASPECTS

Although the town of Sexi was founded as recently as 1942, it has a distinct culture. The townsfolk are pioneers who settled in the area after land reforms brought an end to the Hacienda system. The new residents developed pasture lands for ranching. As a result of long-term drought conditions beginning in the 1970s, the once thriving population of several thousand has decreased to about 400. Nevertheless, residents have met such challenges with resourcefulness and ingenuity.

An interesting feature of life in Sexi is that many women are weavers. A number of artisans have attained great mastery in spinning and dyeing wool and using several different weaving techniques. They weave

mainly for their own households — blankets, ponchos, tablecloths, chair covers, “alforjas” (typical shoulder bags), saddle blankets and a unique and distinctive style of crocheted hat. The people also have considerable knowledge of the uses and medicinal properties of plants in the area. Cultural celebrations include many religious holidays as well as “rodeos,” which are round-ups held twice a year to bring in all the free-range domestic stock to be marked and counted.



Fossil leaf impressions are preserved in volcanic ash.

The main economic activities of the town are semi-subsistence agriculture and animal husbandry. Primary crops are maize, potatoes, peas and wheat. People raise chickens, pigs, sheep, goats, donkeys, horses, cattle and guinea pigs. Because Sexi is close to the coastal valleys, people have traditionally migrated seasonally in search of jobs, first in the sugar cane haciendas and later in the rice estates of the Chancay Valley. The limited availability of water and lack of local economic opportunity are always a concern for

the people and continue to influence migration to the cities along the coast.

CONSERVATION ISSUES

The environment of Sexi is sensitive to change and, unless cared for, many fragile resources could disappear. Conservation efforts for the fossil forest and its protection as a resource for science, education and tourism have been an important concern for the community. Researchers from Peru and the United States support the community in its effort to preserve these resources for all local residents and visitors to enjoy.

The native vegetation, growing on poor soils in a highly seasonal climate, is being affected by the intensity of human use. Many local residents recognize the environmental changes that have occurred over their lifetimes and welcome efforts to protect their beautiful native forest and its many unique plants and animals, including plants people rely on for medicines, dyes and other uses.

WARNING

El Bosque Petrificado Piedra Chamana, specifically designated by the National Patrimony of Peru, is protected by Peruvian Law 28296 and falls under the jurisdiction of the National Institute of Culture. Peruvian law protects the site and the fossils and prohibits the removal of fossils from the site and the buying and selling of fossil materials. Local authorities are charged with upholding the laws protecting the site and bringing offenders to justice. The cooperation of everyone is required in order that the site and its fossils remain as a resource for the town, its citizens and future researchers.

Fossil collecting prohibited.

