Machu-Picchu

Located

Northwest of Cuzco, Peru

Machu Picchu is a 15th-century Inca citadel, located in the Eastern Cordillera of southern Peru, on a 2,430-meter (7,970 ft) mountain ridge. It is located in the Machupicchu District within Urubamba Province above the Sacred Valley, which is 80 kilometers (50 mi) northwest of Cuzco. The Urubamba River flows past it, cutting through the Cordillera and creating a canyon with a tropical mountain climate.

For most speakers of English or Spanish, the first 'c' in *Picchu* is silent. In English, the name is pronounced /ˌmɑːtʃuː piːtʃuː/ or /ˌmɑːtʃuː piːktʃuː/, in Spanish as [ˈmatʃu ˈpitʃu] or [ˈmatʃu ˈpiktʃu], and in Quechua (*Machu Pikchu*) as [ˈmatʃʊ ˈpɪktʃʊ].

Most archeologists believe that Machu Picchu was constructed as an estate for the Inca emperor Pachacuti (1438–1472). Often mistakenly referred to as the "Lost City of the Incas", it is the most familiar icon of Inca civilization. The Incas built the estate around 1450 but abandoned it a century later at the time of the Spanish conquest.

Machu Picchu was built in the classical Inca style, with polished dry-stone walls. Its three primary structures are the *Intihuatana*, the *Temple of the Sun*, and the *Room of the Three Windows*. Most of the outlying buildings have been reconstructed in order to give tourists a better idea of how they originally appeared. By 1976, 30% of Machu Picchu had been restored and restoration continues.

Machu Picchu was declared a Peruvian Historic Sanctuary in 1981 and a UNESCO World Heritage Site in 1983. In 2007, Machu Picchu was voted one of the New Seven Wonders of the World in a worldwide internet poll.

Etymology

In the Quechua language, *machu* means "old" or "old person", while *pikchu* means either "portion of coca being chewed" or "pyramid, pointed multi-sided solid; cone". Thus the name of the site is sometimes interpreted as "old mountain".

History

Machu Picchu was mistakenly believed (by Richard L. Burger, professor of anthropology at Yale University) to have been built in the 1450s. However, a 2021 study led by Professor Burger used radiocarbon dating (specifically, AMS) to reveal that Machu Picchu may have been occupied from around 1420-1530 AD. Construction appears to date from two great Inca rulers, Pachacutec Inca Yupanqui (1438–1471) and Túpac Inca Yupanqui (1472–1493). There is a consensus among archeologists that Pachacutec ordered the construction of the royal estate for his use as a retreat, most likely after a successful military campaign. Although Machu Picchu is considered to be a "royal" estate, surprisingly, it would not have been passed down in the line of succession. Rather it was used for 80 years before being abandoned, seemingly because of the Spanish Conquests in other parts of the Inca Empire. It is possible that most of its inhabitants died from smallpox introduced by travelers before the Spanish conquistadors arrived in the area.

Daily life in Machu Picchu

During its use as a royal estate, it is estimated that about 750 people lived there, with most serving as support staff (*yanaconas, yana)* who lived there permanently. Though the estate belonged to Pachacutec, religious specialists and temporary specialized workers (*mayocs*) lived there as well, most likely for the ruler's well-being and enjoyment. During the harsher season, staff dropped down to around a hundred servants and a few religious specialists focused on maintenance alone.

Studies show that according to their skeletal remains, most people who lived there were immigrants from diverse backgrounds. They lacked the chemical markers and osteological markers they would have if they had been living there their whole lives. Instead, there was bone damage from various species of water parasites indigenous to different areas of Peru. There were also varying osteological stressors and varying chemical densities suggesting varying long-term diets characteristic of specific regions that were spaced apart. These diets are composed of varying levels of maize, potatoes, grains, legumes, and fish, but the overall most recent short-term diet for these people was composed of less fish and more corn. This suggests that several of the immigrants were from more coastal areas and moved to Machu Picchu where corn was a larger portion of food intake. Most skeletal remains found at the site had lower levels of arthritis and bone fractures than those found in most sites of the Inca Empire. Inca individuals who had arthritis and bone fractures were typically those who performed heavy physical labor (such as the Mit'a) or served in the Inca military. Animals are also suspected to have migrated to Machu Picchu as there were several bones found that were not native to the area. Most animal bones found were from llamas and alpacas. These animals naturally live at altitudes of 4,000 meters (13,000 ft) rather than the 2,400 meters (7,900 ft) elevation of Machu Picchu. Most likely, these animals were brought in from the Puna region for meat consumption and for their pelts. Guinea pigs were also found at the site in special burial caves, suggesting that they were at least used for funerary rituals, as it was common throughout the Inca Empire to use them for sacrifices and meat. Six dogs were also recovered from the site. Due to their placements among the human remains, it is believed that they served as companions of the dead.

Agriculture

Much of the farming done at Machu Picchu was done on its hundreds of man-made terraces. These terraces were a work of considerable engineering, built to ensure good drainage and soil fertility while also protecting the mountain itself from erosion and landslides. However, the terraces were not perfect, as studies of the land show that there were landslides that happened during the construction of Machu Picchu. Still visible are places where the terraces were shifted by landslides and then stabilized by the Inca as they continued to build around the area.

It is estimated that the area around the site has received more than 1,800 mm (71 in) of rain per year since AD 1450, which was more than needed to support crop growth there. Because of the large amount of rainfall at Machu Picchu, it was found that irrigation was not needed for the terraces. The terraces received so much rain that they were built by Incan engineers specifically to allow for ample drainage of the extra water. Excavation and soil analyses done by Kenneth Wright in the 1990s showed that the terraces were built in layers, with a bottom layer of larger stones covered by loose gravel. On top of the gravel was a layer of mixed sand and gravel packed together, with rich topsoil covering all of that. It was shown that the topsoil was probably moved from the valley floor to the terraces because it was much better than the soil higher up the mountain.

However, it has been found that the terrace farming area makes up only about 4.9 ha (12 acres) of land, and a study of the soil around the terraces showed that what was grown there was mostly corn and potatoes, which was not enough to support the 750+ people living at Machu Picchu. This explains why when studies were done on the food that the Inca ate at Machu Picchu, it was found that most of what they ate was imported from the surrounding valleys and farther afield.

Encounters

The Spanish conquistador Baltasar de Ocampo had notes of a visit during the end of the XVI century to a mountain fortress called *Pitcos* with very sumptuous and majestic buildings, erected with great skill and art, all the lintels of the doors, as well the principal as the ordinary ones, being of marble, elaborately carved. therefore we can consider him the first discoverer from outside the region.

Over the centuries, the surrounding jungle overgrew the site, and few outside the immediate area knew of its existence. The site may have been re-discovered and plundered in 1867 by a German businessman, Augusto Berns. Some evidence indicates that the German engineer J. M. von Hassel arrived earlier. Maps show references to Machu Picchu as early as 1874.

In 1911 American historian and explorer Hiram Bingham traveled the region looking for the old Inca capital and was led to Machu Picchu by a villager, Melchor Arteaga. Bingham found the name Agustín Lizárraga and the date 1902 written in charcoal on one of the walls. Though Bingham was not the first to visit the ruins, he was considered the scientific discoverer who brought Machu Picchu to international attention. Bingham organized another expedition in 1912 to undertake major clearing and excavation.

In 1981, Peru declared an area of 325.92 square kilometers (125.84 sq mi) surrounding Machu Picchu a "historic sanctuary". In addition to the ruins, the sanctuary includes a large portion of the adjoining region, rich with the flora and fauna of the Peruvian Yungas and Central Andean wet puna ecoregions.

In 1983, UNESCO designated Machu Picchu a World Heritage site, describing it as "an absolute masterpiece of architecture and a unique testimony to the Inca civilization".

Geography

Machu Picchu lies in the southern hemisphere, 13.164 degrees south of the equator. It is 80 kilometers (50 miles) northwest of Cusco, on the crest of the mountain Machu Picchu, located about 2,430 meters (7,970 feet) above mean sea level, over 1,000 meters (3,300 ft) lower than Cusco, which has an elevation of 3,400 meters (11,200 ft). As such, it had a milder climate than the Inca capital. It is one of the most important archeological sites in South America, one of the most visited tourist attractions in Latin America and the most visited in Peru.

Machu Picchu features wet humid summers and dry frosty winters, with the majority of the annual rain falling from October through to March.

Machu Picchu is situated above a bow of the Urubamba River, which surrounds the site on three sides, where cliffs drop vertically for 450 meters (1,480 ft) to the river at their base. The area is subject to morning mists rising from the river. The location of the city was a military secret, and its deep precipices and steep mountains provided natural defenses. The Inca Bridge, an Inca grass rope bridge, across the Urubamba River in the Pongo

de Mainique, provided a secret entrance for the Inca army. Another Inca bridge was built to the west of Machu Picchu, the tree-trunk bridge, at a location where a gap occurs in the cliff that measures 6 meters (20 ft).

The city sits in a saddle between the two mountains Machu Picchu and Huayna Picchu, with a commanding view down two valleys and a nearly impassable mountain at its back. It has a water supply from springs that cannot be blocked easily. The hillsides leading to it were terraced, to provide more farmland to grow crops and to steepen the slopes that invaders would have to ascend. The terraces reduced soil erosion and protected against landslides. Two high-altitude routes from Machu Picchu cross the mountains back to Cusco, one through the Sun Gate, and the other across the Inca bridge. Both could be blocked easily, should invaders approach along them.

Machu Picchu and other sites in the area are built over earthquake faults. This may not be a coincidence, according to 2019 research: "One simple answer, researchers now suggest, is that that's where building materials for the site — large amounts of already fractured rock — were readily available."

Construction

The central buildings use the classical Inca architectural style of polished dry-stone walls of regular shape. The Incas were masters of this technique, called ashlar, in which blocks of stone are cut to fit together tightly without mortar.

The site itself may have been intentionally built on fault lines to afford better drainage and a ready supply of fractured stone. "Machu Picchu clearly shows us that the Incan civilization was an empire of fractured rocks".

The section of the mountain where Machu Picchu was built provided various challenges that the Incas solved with local materials. One issue was the seismic activity due to two fault lines. It made mortar and similar building methods nearly useless. Instead, the Inca mined stones from the quarry at the site, lined them up and shaped them to fit together perfectly, stabilizing the structures. Inca walls have many stabilizing features: doors and windows are trapezoidal, narrowing from bottom to top; corners usually are rounded; inside corners often incline slightly into the rooms, and outside corners were often tied together by "L"-shaped blocks; walls are offset slightly from row to row rather than rising straight from bottom to top.

Heavy rainfall required terraces and stone chips to drain rain water and prevent mudslides, landslides, erosion, and flooding. Terraces were layered with stone chips, sand, dirt, and topsoil, to absorb water and prevent it from running down the mountain. Similar layering protected the large city center from flooding. Multiple canals and reserves throughout the city provided water that could be supplied to the terraces for irrigation and to prevent erosion and flooding.

The Incas never used wheels in a practical way, although their use in toys shows that they knew the principle. The use of wheels in engineering may have been limited due to the lack of strong draft animals, combined with steep terrain and dense vegetation. The approach to moving and placing the enormous stones remains uncertain, probably involving hundreds of men to push the stones up inclines. A few stones have knobs that could have been used to lever them into position; the knobs were generally sanded away, with a few overlooked.

Roads and transportation

The Inca road system included a route to the Machu Picchu region. The people of Machu Picchu were connected to long-distance trade, as shown by non-local artifacts found at the site. For example, Bingham found unmodified obsidian nodules at the entrance gateway. In the 1970s, Burger and Asaro determined that these obsidian samples were from the *Titicaca* or Chivay obsidian source, and that the samples from Machu Picchu showed long-distance transport of this obsidian type in pre-Hispanic Peru.

Thousands of tourists walk the Inca Trail to visit Machu Picchu each year.They congregate at Cusco before starting on the one-, two-, four- or five-day journey on foot from kilometer 82 (or 77 or 85, four/five-day trip) or kilometer 104 (one/two-day trip) near the town of Ollantaytambo in the Urubamba valley, walking up through the Andes to the isolated city.

The closest access point to Machu Picchu is the village of Machupicchu, also known as Aguas Calientes.

Tourism

Machu Picchu is both a cultural and natural UNESCO World Heritage Site. Since its discovery in 1911, growing numbers of tourists have visited the site each year, with numbers exceeding 1.4 million in 2017. As Peru's most visited tourist attraction and major revenue generator, it is continually exposed to economic and commercial forces. In the late 1990s, the Peruvian government granted concessions to allow the construction of a cable car and a luxury hotel, including a tourist complex with boutiques and restaurants and a bridge to the site. Many people protested the plans, including Peruvians and foreign scientists, saying that more visitors would pose a physical burden on the ruins. In 2018, plans were restarted to again construct a cable car to encourage Peruvians to visit Machu Picchu and boost domestic tourism. A no-fly zone exists above the area. UNESCO is considering putting Machu Picchu on its List of World Heritage in Danger.

During the 1980s a large rock from Machu Picchu's central plaza was moved to a different location to create a helicopter landing zone. In the 1990s, the government prohibited helicopter landings. In 2006, a Cusco-based company, Helicusco, sought approval for tourist flights over Machu Picchu. The resulting license was soon rescinded.

Tourist deaths have been linked to altitude sickness, floods and hiking accidents. UNESCO received criticism for allowing tourists at the location given high risks of landslides, earthquakes and injury due to decaying structures.

In 2014 nude tourism was a trend at Machu Picchu and Peru's Ministry of Culture denounced the activity. Cusco's Regional Director of Culture increased surveillance to end the practice.

From 1994 to 2019, the Chief of the National Archaeological Park of Machu Picchu was Fernando Astete, a Peruvian anthropologist and archeologist, who worked for more than thirty years on the preservation, conservation and research of the site. As a result of his research as director of the Park, the construction processes and functions of the sanctuary were acknowledged by the scientific community and a better understanding of the Inca landscape was given to the general public, who increasingly started to implement more sustainable tourism in the area, as a sign of respect for the site.