

# ARCHITECTURE AND PLANNING

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# MARANPAMPA

The discovery  
of a lost city



It is being hailed as the most important Peruvian archaeological find since Yale's Hiram Bingham discovered Machu Picchu in 1911: Maranpampa, a second Inca settlement that appears to be far larger than its better-known neighbor located close by, discovered and named in the summer of '86 by GSAUP graduate student Reinaldo Chohfi.

Chohfi, with the guidance of GSAUP professors Richard Schoen and Baruch Givoni, both experts on energy conserving designs, has been studying the famous ruins of Machu Picchu since 1978. It is part of his ongoing inquiry into primitive architecture that incorporated the use of renewable natural resources, particularly solar energy. And like many scientific discoveries, Chohfi's find was a derivative from his original research.

Most scholars believe that Machu Picchu served as the Inca's religious center, and Chohfi shares that view.

"The whole Inca empire was 'keyed' to the physical environment," says the 31-year-old, who is working on dual master's degrees in architecture and archaeology. "They worshiped the elements of the natural environment, and viewed the sun as their primary god. Even today in Peru, people who live in the small villages make an offering by drinking a beer to the mountain's honor. They have respect for the mountains."

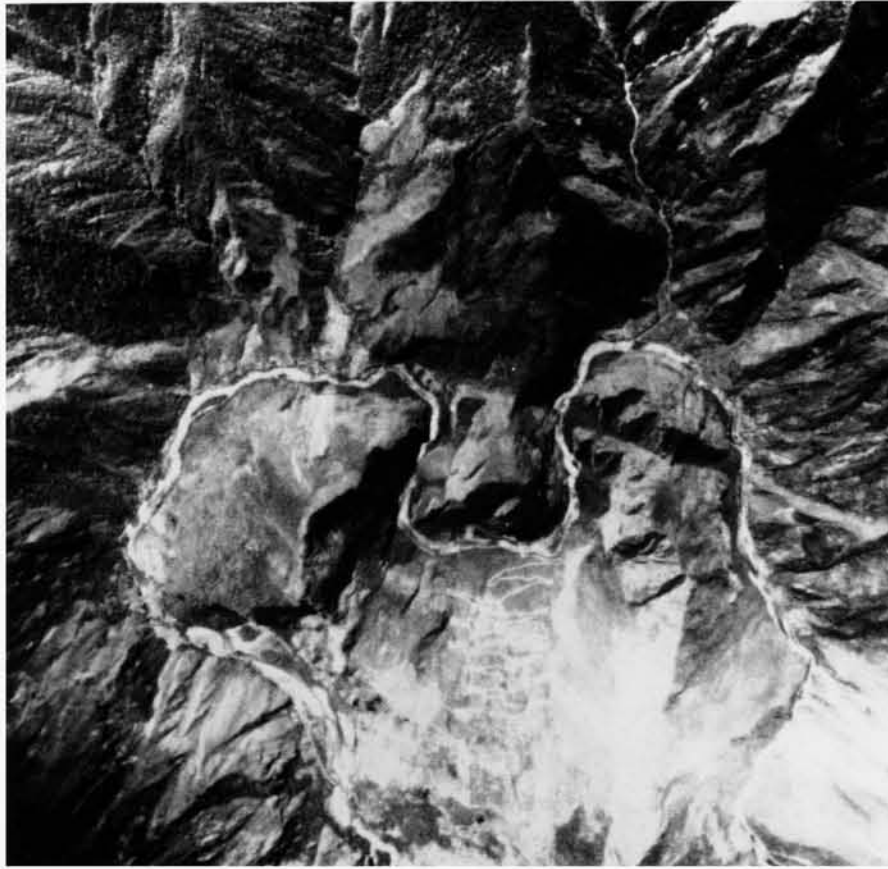
Chohfi felt that if the Incas worshiped their natural surroundings, then it was likely they designed their buildings with their environment in mind. Traveling to Machu Picchu in 1978, Chohfi discovered that his theory was valid: "Machu Picchu was very advanced. It had access to the sun, without one building blocking the other. All the buildings were in a natural greenhouse and orientated to the sun."

Chohfi found that the orientation of most of the buildings allowed them to take advantage of solar energy

throughout the year from early morning to mid-afternoon. The ruins are surrounded by higher peaks that allow for the formation of a cloud ring on winter days, which contributes to an increase of diffuse solar energy. The cloud cover also prevents overheating of the site during a summer day, and on a typical night reflects longwave nighttime radiation, thereby preventing frost from occurring.

The buildings were designed to be sheltered from the prevailing winds, and arranged so that in winter, the eastern walls were struck by the sun's rays at a lower angle, generating more warmth, while in summer they struck at a higher angle, keeping the walls cooler. The exceptions to this were the major agricultural terraces, which were orientated to maximize the gain of solar energy throughout the day.

Over a 10-year period, Chohfi charted a comprehensive picture of the Incas from both an architectural



(above) One of the aerial photographs of the Machu Picchu area used by Chohfi to discover Maranpampa.

(inset, preceding page) Reinaldo Chohfi, leaning against eight foot tall wall, part of the ruins of Maranpampa.

and geographical perspective. In his own detailed maps and reports, Chohfi noted the climatically responsive nature of the buildings and the ruin's site orientation, as well as such geographic features as the area's vegetation and ecological systems, topography, all earthquake fault lines and ruptures, drainage, soil deposits, the distribution of the alluvial terraces used for planting (that were formed naturally by the river Urubamba), and the agricultural terraces built by the Incas, who dragged soil from the lower elevations to the 8,000-foot level of Machu Picchu.

From these studies and the location of Machu Picchu, perched as it is on a rock cliff, Chohfi concluded it could not have had enough resources to grow the crops necessary to support its population and allow trading for other products, and thus must have been supported by other nearby villages. In a subsequent visit to the Peruvian weather bureau *Senamhi*, Chohfi learned that there existed aerial photographs of the Machu Pic-

chu area that were taken in 1956 for a topographical study of the Andes. Chohfi returned to UCLA to continue his studies, later obtaining copies of these photos from the *Servicio Aerofotografico Nacional del Peru* that showed the Machu Picchu area.

At UCLA Chohfi took a class in remote sensing, the science of using aerial photographs and satellite imagery to study objects on the ground. After long analysis he discovered that the photos, although shot from a high altitude, showed certain images (or "signatures" in geography parlance) that stood out from the various tones of photographic gray, and that appeared to indicate a possible new archaeological site. An example of such a signature might include vegetation growing on the top of a ruin where a wall or building may have existed; this will grow less vigorously than vegetation in the earth, thus appearing a lighter gray on black and white film. One such signature that Chohfi found appeared as a long straight line and, as he says, "The natural environment doesn't have straight lines like that one."

Chohfi decided it was necessary to visit the area to see if the signatures he had found in the aerial photographs were indeed an undiscovered site. In the fall of 1986, financed by family friends, Chohfi flew to Peru, where he first checked with Peruvian anthropologists and archaeologists of the *Instituto Nacional de Cultura* (INC) of the city of Cusco, to see if they knew of any archaeological site located northeast of Machu Picchu. They did not, so Chohfi, accompanied by a friend, Octavio Fernandez, an archaeologist at the INC, set out to explore the area.

Leaving Cusco they traveled by train to the Machu Picchu station, then walked to the privately-owned Mamdor Farm, located northeast of Machu Picchu at a 5,450-foot altitude. From there they continued their climb toward the site, which was difficult, given that the area surrounding Machu Picchu is largely inaccessible and covered with dense vegetation. After some effort the two arrived at the alluvial terrace where Chohfi thought the ruins should be. And there the evidence Chohfi needed was fairly well-exposed and easily identifiable.

Their first finds were two mortars, used by the Incas to grind grain. "We continued walking and we found stone walls everywhere," recalls Chohfi, "covered with dense vegetation. We hacked some of it away with our machetes and found a massive wall 1,000 feet long, eight feet high, and six feet thick, that was probably used to pre-

vent erosion. It was the straight line I had seen on the aerial photograph."

They also noticed the soil quality at the site, a thick layer of black humus that added to Chohfi's belief that this settlement, and probably others in the area, might have supplied food and additional resources for Machu Picchu.

Lacking exploration equipment, the two did not stay long. On their return Chohfi notified the director of the INC and, with Fernandez, named the site "Maranpampa," a combination of two Quechua Indian words meaning "a level field with mortars." Back at UCLA, Chohfi now continues his studies and his examination of the photographs. "I would very much like to go back, especially since I have identified, from the photos, about eight other possible sites," he says.

Yet he is not eager to extensively excavate Maranpampa. "I don't want to clear the vegetation that covers the site," he says. "It's better to leave it alone because once exposed, it will simply accelerate the process of decay. Currently it is in a stable state, and it would take a great deal of money to protect the sites, if they were excavated in their entirety like Machu Picchu." He does, however, expect to conduct a few core test excavation bits to develop an absolute radiocarbon chronology for the new sites.

While the research methodology and techniques of archaeology have allowed him to bridge the past to the present, another reason for not wanting to extensively excavate the area is that his research emphasis is not in archaeology. He intends to continue his studies of ancient site dwellings for their natural resource utilization, with the hope of applying this knowledge into design tools that can be used by today's architects and planners.

"I would like eventually to work in developing countries, helping them to utilize their natural resources more efficiently in architecture and urban design," he says. "Right now, energy conservation practice is nonexistent on a large scale in countries like Peru and Brazil. Yet historically, as I think I've shown, that has not been the case. Once again, it's a realization that we can learn from our past."