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SACRED PLACES IN NATURE

Mauna Kea Its name means "white mountain," a reference to the deep blanket of snow that covers Hawaii's loftiest peak in winter. According to Polynesian tradition, it is home to an assortment of deities, including the snow goddess Poliahu, who, legend tells, stopped the volcano from erupting with a frozen mantle of ice and snow. For centuries island residents have conducted rituals and offered prayers at stone shrines erected on its slopes. Here late afternoon sun casts a shadow of its 13,796-foot height. The summit of Mauna Kea houses one of the world's largest optical and infrared observatories.

MIKE THEISS

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Hostage to the dispute is a high-profile National Aeronautics and Space Administration/Caltech project that is crucial to developing the world's next generation of telescopes, a project that could be the first to image distant planets that might harbor life. The \$50-million project is already a year behind schedule. If some Hawaiians have their way, it will not be built at all.

The emotionally charged debate over modern and ancient uses of this rocky pinnacle is much more, though, than a fight over a telescope or a mountaintop. To many Hawaiians, nothing less than the future of their homeland is at stake. And it is a perfect example of the often fumbling progress of science in a multicultural world.

Once prized for the clean industry and jobs they brought to this economically challenged island, astronomers are now lumped in with the missionaries, whalers, plantation owners and golf-course developers who have taken turns carving up this island.

One of the angriest is Kealoha Pisciotta, who, at 30, is as old as the age of modern astronomy in Hawaii.

Pisciotta was one of the first Hawaiians to work at a telescope. She spent long, frigid nights at the summit as a telescope technician, steering the European/Canadian James Clerk Maxwell sub-millimeter telescope toward distant clouds of dust and gas so that astronomers could study the newborn stars cloaked within.

On the way to her high-tech job, Pisciotta would take part in an age-old Hawaiian tradition. She would stop to worship on the flanks of the mountain, bringing small offerings to her family stone, or aumakua.

But that stone has been desecrated. Once, it was taken to the town dump. Once, it was carted off by a fellow telescope employee. And once it was overturned, strewing Pisciotta's aunt's ashes on the ground. Now the stone is missing for good, and Pisciotta, angry that astronomers did not do more to protect her stone, has resigned her position at the telescope.

Today, Pisciotta is angry that astronomers pay Hawaii just \$1 per year to use land seized by Americans a century ago. She claims that, in their race to build bigger and better telescopes, the scientists have trampled not only on rare insects, native birds and the mountain's fragile geological landscape, but also on centuries of religious and cultural tradition.

"It truly is not Hawaiians versus astronomy," said Pisciotta, who is still proud of her work on the telescope but can barely contain her exasperation at astronomers. "But they never once have said, 'We screwed up and we're sorry.' They never once said, 'Thank you for letting us use your sacred temple.' "

Hawaiians imbue many natural phenomena--volcanoes, rocks, the ocean--with religious significance. Mauna Kea, at 13,769 feet, is so sacred because it is the closest thing in Hawaii, indeed in all of Polynesia, to the heavens. The towering

volcano is considered the piko, or navel, of Hawaii, from which all else arose.

The mountain holds more than 90 shrines and burial sites. None is at the very top, which is considered too sacred even for shrines and certainly for Western machines. A 1996 fire that killed three workers building the Subaru telescope on the mountain was seen by some as a curse, an ominous warning from the gods.

There is much gray area in this collision of unlikely forces. The scientists' goals are lofty ones: to view the stars and answer some of the most riveting questions of our time, questions about the origin of the universe and the beginnings of time.

"These are not greedy guys trying to build a hotel," said Tom Peek, an amateur astronomer, teacher and writer who resigned his job as a stargazing guide on the mountain because he was distraught at how Hawaiian issues have been treated by astronomers. "But their moral compasses become confused because they are blinded by the excitement of discovery."

What astronomers want from Mauna Kea they can get nowhere else in the Northern Hemisphere--pristine, transparent skies unsullied by pollution, dust, water vapor and city light. The otherworldly summit sits high above cloud layers and much of the Earth's distorting atmosphere. The smooth shape of the volcanic cone and the stable temperatures of the Pacific Ocean mean that air flows smoothly over the telescopes. And it is far easier to reach than two other areas with good viewing: the Chilean Andes and the South Pole.

The mountain's crown jewel is the Keck telescope complex: twin behemoths with 10-meter mirrors that are the world's largest gatherers of light. The summit is managed by the University of Hawaii's Institute for Astronomy. Keck is jointly run by NASA, Caltech and the University of California.

These monster "light buckets" trump the orbiting Hubble space telescope for data-gathering capability. They have imaged some of the faintest, most distant objects in the universe and unleashed a string of scientific hits. Using Keck, a Caltech team proved that galaxies formed shortly after the Big Bang, much earlier than expected.

Andrea Ghez, a leading UCLA astronomer, used the machine to pinpoint a massive black hole at the center of our own galaxy. One UC Berkeley team defied odds and used Keck to detect barely perceptible planets around other suns. Another Berkeley team measured supernovae racing away from our galaxy and showed, to the astonishment of many, that the universe is still expanding.

It is a coveted machine and an expensive one. Viewing time costs \$1 per second, or \$30,000 per night. And Keck is just beginning to flex its optics. Keck's proud director, Fred Chaffee, describes the machine as "Mozart at age 7." The instrument is likely to help answer a host of what scientists call "origins questions"--just how did our solar system form? And our galaxy? And the universe? And, perhaps most pressing of all: Are we alone?

Proud of what they do, and convinced of its importance, many mainland astronomers

chafe at the way they have been represented by islanders.

"It annoys me to see astronomers portrayed as tyrants who come in to exploit Mauna Kea. That's very unfair," said Richard Ellis, a cosmologist at Caltech who uses the Keck to study the origin and evolution of galaxies. He recently turned down the directorship of the Institute for Astronomy because he believed that political issues, including the Mauna Kea dispute, were compromising the ability to do first-rate science there.

"We're searching for truth and knowledge, the kinds of things that have motivated countries for centuries. We don't need to apologize. We need to explain what we do."

Yet the accusations cannot be completely denied.

"It comes as a shock, but there's an element of truth there, isn't there?" said Robert A. McLaren, a Canadian who oversees astronomy on Mauna Kea for the University of Hawaii's Institute of Astronomy. "Just because you have a noble purpose and you don't mean [to cause] any harm doesn't mean you don't."

"The desire is there to do a much better job," he said. "What's not negotiable is the desire to have a world-class observatory."

Litter Complaints

The imbroglio at the summit started with something very small: a few pieces of construction trash blowing down from the telescopes. In 1994, Sierra Club members noticed the debris and called Nelson Ho, a club leader, to complain.

"I'm an amateur astronomer myself," said Ho, a seasoned environmental leader who approached astronomers as colleagues. But the Mauna Kea astronomers, he said, brushed off his complaints. The trash was not cleaned up until 1995, after Ho enticed a local newspaper to write a front-page article.

By then, Ho was looking into the telescopes in detail and criticizing astronomers for taking shortcuts, ignoring environmental laws and sneaking projects in with little or no public review.

In 1996, an entomologist discovered that construction at two telescopes had destroyed critical habitats for the Weiku bug, a quarter-inch creature found only atop Mauna Kea, feasting on wind-borne insects and protected from freezing by a strange biological antifreeze.

Others were angry that the telescope builders had placed their machines too close to pu'u, or cinder cones with religious significance, even flattening some of them.

And there was an outcry over how astronomers tallied telescopes. Astronomers said that arrays of telescopes, even those with two dozen components, should count as one telescope because such an array is a single scientific instrument. Hawaiians

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Posted on: Wednesday, January 10, 2001

UH seeks millions more to pay bills

By Jennifer Hiller
Advertiser Staff Writer

University of Hawai'i officials want an additional \$31 million a year to replace old technology and implement a management plan for Mauna Kea, the mountaintop that is home to some of the world's best telescopes as well the Hawaiian goddesses of snow and mist. But they also need the money for some more mundane responsibilities: The university can't afford to pay its utility bills.

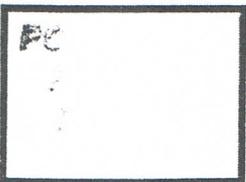
UH President Kenneth Mortimer and several UH officials made their first official trek to state officials yesterday in advance of the 2001 legislative session, meeting with the House Committee on Finance to outline the school system's needs.

While the state has given UH plenty of money for construction during the past decade, hard economic times have meant the university's operating budget has dwindled, leaving the school unable to keep up with the cost of even basic services. The state has given the university no additional financing, for example, to pay its new utility bills, which sometimes reach into the hundreds of thousands of dollars each year for some of the science buildings.

"What we've done is fund new facilities without funding their operations," Mortimer said. UH has been forced to take money away from its academic programs to pay for utilities, he said.

UH also has fallen behind in equipment replacement and in the technology in student computer labs, administrative

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Appendix H

Towering Mauna Kea gets its own caretakers

□ Ranger-guides will keep watch, offer help both cultural, scientific

By Dave Smith
Tribune-Herald

There's a new presence atop Mauna Kea. Visitors to the summit of the 13,796-foot dormant volcano may

notice new personnel keeping an eye on activities there.

Mauna Kea Support Services, which operates a visitor center at the mountain's 9,200-foot elevation, has two new employees working on the mountain.

The temporary hirings are part of a four-month, \$30,000 pilot program to determine what issues and challenges will be faced by the high mountain rangers.

Mauna Kea Support Services was contracted for the program by the Office of Mauna Kea Management, which was created last year as a condition of the Mauna Kea Master Plan.

The plan approved a year ago by the University of Hawaii Board of Regents called for the establishment of the ranger force and also established the Mauna Kea Management Board, whose appointed members advise the Hilo-based Office of Mauna Kea Man-

agement. Kahu Ku Mauna, another appointed panel created by the master plan, is providing the board with advice on Native Hawaiian issues.

The new employees are tentatively being called "ranger-guides."

Ron Koehler, director of Mauna Kea Support Services, described them as sort of a hybrid park ranger who will monitor sites and activities and provide information of a cultural and scientific nature.

Koehler said the rangers won't have enforcement powers and likely won't need them. He said there has seldom been a need for law enforcement on the summit, which depending on the type of incident is currently handled by either state enforcement officers or county police. However, the new rangers will keep track of any violations, Koehler said.

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RANGER-GUIDES: Eventually, there will be six

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"Generally speaking there are not a lot of instances where you need an enforcement officer," he said. "Just the presence of an uniformed officer and a state vehicle could deter illegal activities."

For now the ranger-guides, which started work June 8, will operate out of the Mizuka Center for International Astronomy Visitor Information Station at Hale Pohaku.

"The first priority will be to assess issues and areas of concern facing the rangers. A survey of visitors to the summit to determine the number of people and types of activities in which they are involved will likely be done, Koehler said.

In recent years there has been a clash between scientific, cultural and recreational inter-

ests on the mountain. The plan approved last year, an update of the original 1983 master plan, is designed to coordinate those interests.

The new rangers will go a long way toward that, said the Sierra Club's Nelson Ho.

Ho said the rangers, which he described as "10 years in the waiting" would provide a valuable service by informing visitors about the need to protect the summit's environment and cultural sites.

"I'm glad there will be a presence focused on interpretation and culture," he said.

According to the Office of Mauna Kea Management, eventually six rangers will be hired to ensure that at least two will be on duty on the mountain during daylight hours.

Their roles will include monitoring of maintenance and construction work involving the 13 telescopes atop the summit — up to three more are allowed in the master plan — as well as commercial tour activities.

Koehler said among other things, the rangers will help ensure that construction crews keep the area clean.

Trash left from work sites was among the concerns expressed by the Sierra Club and other critics — including some practitioners of Native Hawaiian culture — of the way the state has managed the mountain.

A 1998 report by the state auditor said the university and the state Department of Land and Natural Resources has been lax in its management of the

historic and cultural resources of the mountain.

He said the rangers will also provide information about health concerns relating to high altitudes of which visitors are often not aware.

The rangers may be a precursor to the establishment of a kiosk on the summit access road where visitors would be stopped and provided information.

Ho said the Sierra Club is worried that a kiosk will be the first step toward the charging of fees to go to the summit which might discourage visits by island residents. He said the club opposes such entry fees.

"This is a public road," Ho said. "(Fees) are the beginning of the alienation of the public and the Hawaiian nation."