Why ancient myths about volcanoes are often true

And how the story of Atlantis may be one of them

By Jane Palmer
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Story has it that many hundreds of years ago, Tanovo, chief of the Fijian island Ono, was very partial to a late afternoon stroll. Each day he would walk along the beach, watch the sun go down and undoubtedly contemplate this paradise on Earth.

> *The cultural memory was right, and our scientific surveys were wrong*

But one day Tanovo's rival, chief of the volcano Nabukelevu, pushed his mountain up and blocked Tanovo's view of the sunset. Enraged at this, and robbed of the pacifying effects of his daily meditation, Tanovo wove giant coconut-fibre baskets and began to remove earth from the mountain. His rival, however, caught Tanovo and chased him away. Tanovo, in his flight, dropped earth at the islands of Dravuni and Galoa.

When geologist Patrick Nunn first heard this myth, it made sense that it described the volcanic eruption of Nabukelevu, with the associated ash falls on other islands in the Kadavu group. But his scientific investigation of the region concluded that the volcano had not erupted for 50,000 years, long before the island was first inhabited around 2000 B.C. The myth, it seemed, was simply a story—not a description of previous events.

The Kilauea eruption event from 1969 to 1971 (credit: US Geological Survey)

Then, two years later, when diggers carved out a road near the base of the volcano, they uncovered pieces of ancient pottery buried underneath a metre-deep layer of volcanic ash. “This clearly demonstrated that the volcano had erupted within the last 3,000 years while humans lived here,” says Nunn, **a professor at the University of the Sunshine Coast in Queensland, Australia**. “The cultural memory was right, and our scientific surveys were wrong.”

> *You attribute it to supernatural forces and you say it is a battle between the giants and the gods*

From prehistoric times to, more recently, the pyrotechnics of Hawaii’s Kilauea, volcanic eruptions have aroused fear and inspired myths. Often cultures have seen active volcanoes as the abode of gods - typically gods quick to anger.

“I think the creation of myths is essentially the human reaction to witnessing a natural process that you cannot explain, says Haraldur Sigurdsson, a volcanologist at **the University of Rhode Island, US**. “So you attribute it to supernatural forces and you say it is a battle between the giants and the gods.”

But deities aside, these traditional oral tales can contain valuable information about the type, and nature of volcanic eruptions, Nunn says. In particular they can contribute “missing data” to geologists **about events that happened hundreds or thousands of years ago**.

The lava lake at Kilauea in 2014 (credit: US Geological Survey)

“After 30 years of research in the geosciences I believe that the analysis of myths is hugely important,” Nunn says. “It can help bridge the gap between geological theory and human history and lead to scientific insights.”

Legend has it

Shortly after research volcanologist Don Swanson moved to Hawaii in 1997, a friend, knowing Swanson’s love of poetry, gave him a book of translated Hawaiian chants. One evening, as Swanson sat in an easy chair, reading the translations for pleasure, insight struck.

“This light bulb came on in my head. It didn't flash right away but it was kind of a low and then medium and then high,” Swanson says. “I realised that I was potentially reading about events that I had been studying in the field, geologically, during the preceding months.”

The volcano goddess Pele (credit: Prayitno/CC by 2.0)

The chants told the story of Pele, Deity of the volcano Kilauea, who'd initially moved to Kauai with her relatives and fell in love with a man called Lohi'au. Kauai wasn't hot enough for Pele, however, so she settled in the crater at Kilauea on the big island of Hawaii. She then asked her sister Hi'iaka to fetch Lohi'au, giving her a time limit of 40 days.

> *It was a very earthy love triangle*

Hi'iaka agreed on the condition that her sister kept her fires away from Hi'iaka's beloved grove of flowering trees. But when Hi'iaka arrived at Kauai, she found Lohi'au dead and, by the time she revived him, the 40 days were up.

Pele, thinking that Hi'iaka had stolen Lohi'au for herself, set the forest on fire. Hi'iaka then sought her revenge by returning to Kilauea and making love to Lohi'au in view of Pele. Pele's response was fast and furious: She killed Lohi'au and threw his body into her crater. Hi'iaka then dug furiously to recover the body sending rocks flying into the air. "It was a very earthy love triangle," Swanson says.

When Swanson read the story, his insights told him it related the two largest volcanic events that had happened on the island since people had lived there.

We were clearly wrong and we only realised this very recently

The burning forest most likely was a lava flow in the 15th century, one that lasted for 60 years and covered almost 430 square kilometres of the island of Hawaii. Hi'iaka's furious digging may have represented the dropping down of the Kilauea summit to form a caldera.

Until recently geologists had believed the caldera formed in 1790 during a period of large explosions, and the volcano was quiet in the proceeding centuries. But oral history says the caldera had existed for "many kings' reigns" before and that red-hot stones often flew into the air during this time. Only in the early 21st century did geologists find e**vidence to confirm the myth's timeline**.

Camping near the Vanuatu eruption (credit: US Geological Survey)

"We were clearly wrong and we only realised this very recently," Swanson says. "It's pretty embarrassing that geologists failed to take the Pele–Hi'iaka chants into account because we hadn't believed that the chants had any real meaning."

Swanson believes that many more scientific treasures lie in the Hawaiian chants, ready for scientists to decipher.

Crowdsourcing through the millennia

Perhaps one of the oldest myths of mankind is that of Atlantis - the story about a prosperous kingdom that disappeared without trace. As the story goes, the people in this utopian civilization enraged the gods so much with their moral corruption that the deities sent one terrible night of fire and earthquakes. These catastrophes sank Atlantis into the ocean, never to be found.

The ancient Greek philosopher Plato told this moral tale in his dialogues, Critias and **Timaeus**, and for centuries scholars have debated whether those events were true, or invented, and what the location of Atlantis might have been.

The caldera left by the Santorini eruptions (credit: Steve Jurvetson/CC by 2.0)

One incident that bears a striking similarity to the story was the massive volcanic eruption of the island of Santorini in the Aegean Sea near Greece about 3,600 years ago. The highly advanced civilization of Minoans who lived on the island disappeared about the same time. The eruption itself inspired the Greek poet Hesiod to write the poem **Theogony** in around 700 B.C., which described the battle of giants and gods on Mount Olympus.

> *Here was a myth that supported what archeologists found*

“I started to become interested in the myth of Atlantis and the poem Theogony because these are our only written or only documented descriptions or interpretations of this huge volcanic phenomenon,”

Sigurdsson says. “We don't have any other accounts so, if you accept that they are related to this event, then they do give you some information that you otherwise wouldn't have.”

Several studies support the theory that the volcanic disaster of Plato's story of Atlantis relates to the Santorini eruption. “And once archeologists began to dig on Santorini they looked to the legend as a form of validation of what they were finding,” says John Dvorak, a geoscientist at the University of Hawaii, US.

Marum volcano in Vanuatu (credit: Martin Rietze/SPL)

“One of the things you always look for in science is supportive evidence and consistency,” Dvorak says. “And here was a myth that supported what archeologists found. The timing was right and it looks to be consistent.”

Myths such as these have helped scientists understand some very large past events, Sigurdsson says. One such large event was **the eruption of Kuwae** in 1453, a volcano in the islands of Vanuatu in the Southwest Pacific. This proved to be one of the largest eruptions anywhere on Earth within the last 10,000 years and was so big it simply sank the island into the sea.

We can't afford to dismiss any source of information about past events

Piecing together the details of an eruption from the geological record can be tricky, Nunn says. Geologists analyse the lava, sediments and other debris that came from the volcano to determine what happened - material that's become changed, reworked and redeposited over time.

"You're trying to piece together the whole event from those isolated bits of information and it involves a huge amount of assumptions," Nunn says. "But a lot of the old histories and myths that talk about volcanic eruptions do actually give us insight into the sequencing."

Stories can set with time, just like rock (credit: Alan L/CC by 2.0)

The Kuwae myths also talk about events leading up to the eruption. In this way, they provide valuable information on how to recognise the precursors of such eruptions, Nunn says. The oral traditions **talk about sorcerers digging holes and hot water soaring out, unusual noises from the crater and the exodus of tigers, monkeys and rabbits into the villages before the final eruption**.

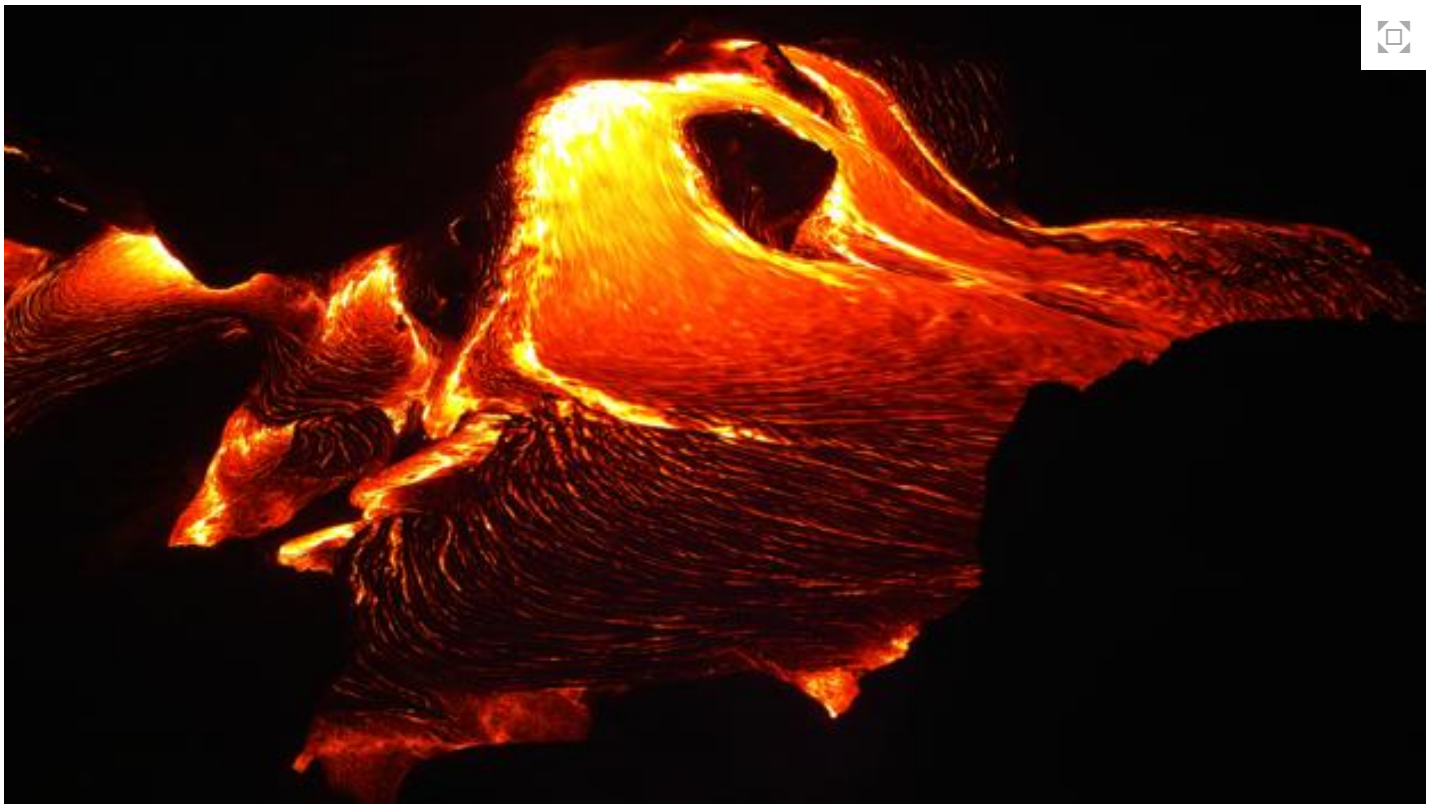
On the island of Savo in the Solomon Islands, which witnesses a major eruption every 110 years or so, oral traditions relate **the filling of the crater with water, local earthquakes and tsunamis and the die-back of vegetation as the lead up to an explosion**. From these tales the modern island inhabitants know the warning signs of an eruption and can respond optimally, Nunn says.

“I think that we can't afford to dismiss any source of information about past events,” Nunn says. “But it's taken science a long time to wake up to the value of these kinds of traditions.”

Creating meaning from mayhem

Early attempts to explain volcanic activity sound much like myths to modern day scientists. The ancient Greeks believed volcanoes came from the release of compressed air inside mountains, much like a monstrous belch. The Romans took a more engineering approach in their explanations: they blamed eruptions on chemical reactions and underground compounds catching fire.

“They were trying to attribute what they saw to natural processes rather than to extraterrestrial or godly activity,” Sigurdsson says. “They were moving away from myths and moving toward realism.”



Lave flowing on Kilauea (credit: Paul Bica/CC by 2.0)

Over the centuries **the ideas became more sophisticated**, although the theories did take a backward turn with the rise of Christian conceptions of Hell.

The physicist Sir Isaac Newton, most famous for his cosmological and gravitational studies, also practiced alchemy in a shed behind his laboratory. He showed that combining iron and sulphur lead to the release of a lot of heat. This reaction, Newton said, was the origin of volcanic activity.

Myths and rituals help people cope with disaster

“That was the same theory the Romans had put forth about a thousand years before,” Sigurdsson says.
Finally, 19th and 20th-century research in thermodynamics, petrology, geochemistry and plate tectonics moved volcanology from "divine science" and "armchair geology" to the current understanding of volcanic activity. “I think we have a pretty comprehensive working hypothesis now and it's stood the test of time,” Sigurdsson says.

But volcanologists still can’t tell when a volcano is going to erupt, and for how long, and what is going to happen when it does, Dvorak says. What volcanologists can give you are some probabilities.

“It might erupt. This may or may not happen. This is more likely than that,” he says.

The July 1980 eruption of Mount St. Helens (credit: Science Source/USGS/SPL)

Dvorak was present at eruptions in Indonesia and Mount St. Helens and heard some members of the public say, “What’s the use?”

And myths, and the belief in divine retribution, still prevail. After the 1980 eruption of Mount St. Helens in the US, two local Christian priests announced that the volcano had erupted because people had

not been charitable enough and were not taking proper care of their families. “Even in the most highly technical society, people are still trying to grasp meaning in that way,” Dvorak says.

So while science can’t provide all the answers, maybe people still need myths to make sense of the senseless and to claw some meaning from the mayhem. Maybe myths provide a valuable tool for coming to terms with destruction and disaster, or living under a constant umbrella of uncertainty.

So even in this age of advanced science and technology, myths still have their place.

Myths can provide meaning and the rituals they inspire can provide comfort and a sense of security, Dvorak says. “Myths and rituals help people cope with disaster, albeit in a very different way.”

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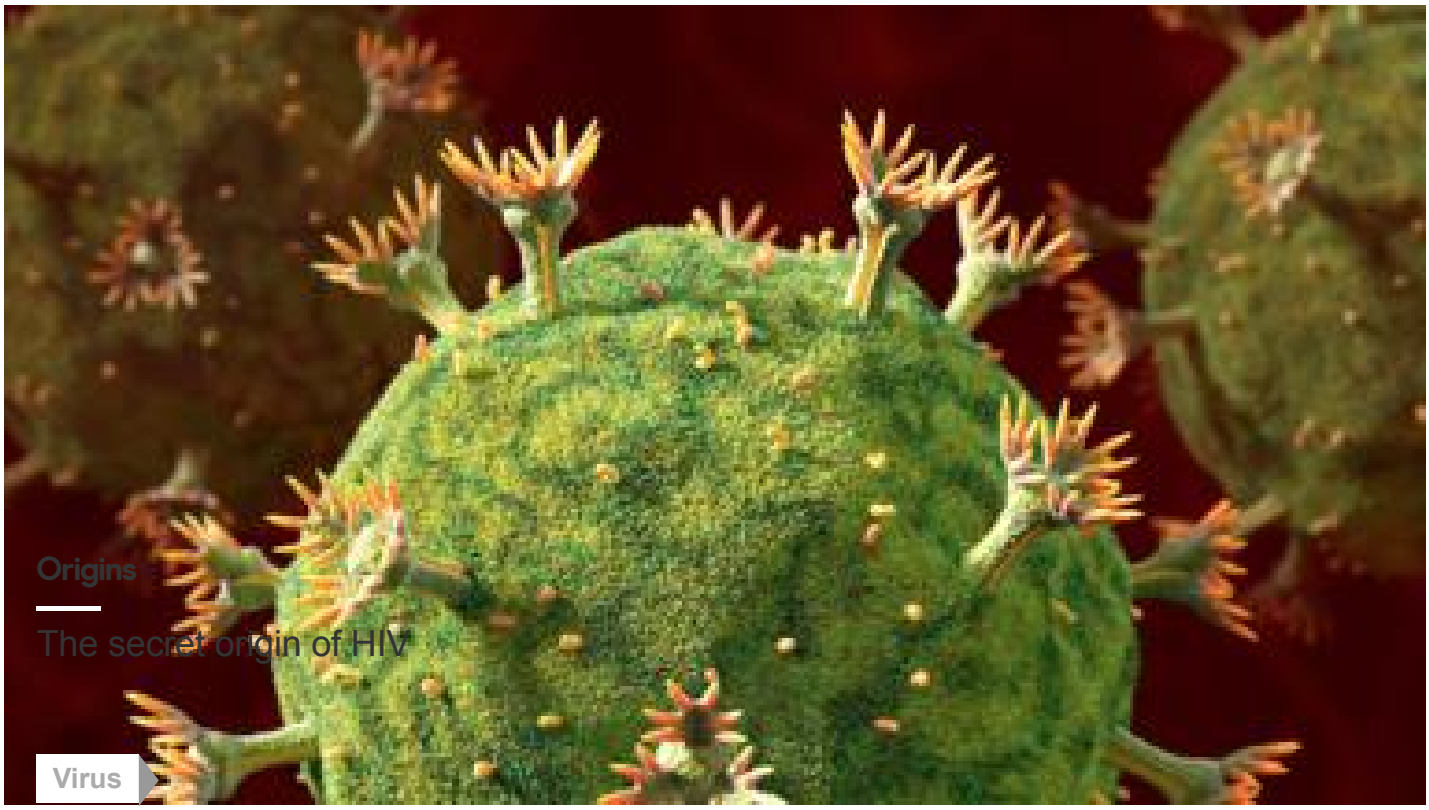

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