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March 3, 2006  
Questions For...

## John Noble Wilford

John Noble Wilford answered questions from readers about his article, "[Under an 1815 Volcano Eruption, Remains of a 'Lost Kingdom'](#)," which appeared in this week's [Science Times](#).

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*Q: Is it possible that human tissue or bone can be preserved in some way when covered in volcanic ash such as at Mt. Tambora or Pompeii, and has this ever happened?*  
— *Kevin M. Palan*

A: The scientists report nothing of finding preserved human flesh buried under the ash of the Tambora eruption. They would have been astonished if they had. Temperatures of the gases and fiery ash are estimated to have exceeded 1,800 degrees Fahrenheit in the immediate area of the volcano, which is to say around the site of the discoveries being reported.

Bone is another matter. Fragments of bone and many teeth, usually the most durable skeletal remains, were recovered from the site. And two skeletons of adult humans were found in the ruins of the excavated house. Haraldur Sigurdsson of the University of Rhode Island told me the bones were partly carbonized, blackened from hot volcanic blast. The one whose hand is clutching a large knife is lying by a hearth, presumably the kitchen area behind the house, where a number of cooking pots were also uncovered.

Many skeletons were found at Pompeii. The stone buildings, vacation homes of wealthy Romans and their bath houses, etc., were left in ruin, but the outlines clearly revealed the structures, the sculpture and stone and metal furnishings. Often the skeletons were found where the people died, in a lifelike pose frozen in time. Scientists have even successfully analyzed DNA extracted from the Pompeii bones.

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*Q: Were the recovered artifacts produced by the Tamborese or traded in from other eastern cultures? I am interested in their technological development and your thoughts on what they may have used to trade if they did not produce these objects. Thanks.*  
— *Katherine Griffith*

A: An interesting question, and archaeologists want to learn the answer themselves. The style of some of the bronze pieces and pottery, the discoverers report, suggests some link between the Tamborans and cultures in Vietnam and Cambodia. There is no way, as yet, of knowing whether there was some ancestral relationship or only trading links. The scientists said they were especially surprised by the amount of well-crafted bronze found at the site, suggesting that this could have come from elsewhere in Southeast Asia.

From historical evidence, mainly records of the Dutch colonial administration, it is known that Tamborans had been famous in the East Indies for their honey, horses, sappan wood for producing red dye, and sandalwood used for incense and medications. Perhaps some of these items were their trade goods in dealing with more distant cultures.

We should learn more when archaeologists start a more systematic dig later this year.

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*Q: I was surprised that the exact date of Tambora volcano's eruption doesn't appear in the article. Perhaps it's not known?*

*— Jose A. Martos*

A: The dates of the Tambora eruptions are known. There was a moderate eruption on April 5, 1815. That was followed by the most explosive eruption on April 10-11, 1815. In any newspaper article, limited space means that we have to be selective in what information we print, and giving the specific dates of the volcanic eruption did not seem to be germane in telling what is essentially a story not of the event but of the discovery of remains of the culture destroyed by the volcano.

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*Q: I just read your article in the Science Times section of New York Times about the lost Tambora Kingdom. I thought it was very interesting. I chose it as my weekly newswatch assignment for my fifth grade class.*

*I would like to know something more about the radar. Is it big and does it work like an X-ray machine? Are the local people aware that they may be living above thousands of preserved bodies? Could you recommend a good Web site that talks about Mount Tambora?*

*— William Avery*

A: What is called ground-penetrating radar is standard technology in geology and, in some cases, archaeology. Forget about the huge radar antennas you may have seen for missile defense, weather forecasting, etc. This particular type of radar uses portable equipment that sends microwave radio signals into the ground. The signals have an effective range of about 30 feet in depth. As in other radar,

irregularities in the subsurface show up in the plots of the signals as they are deflected back to the radar receiver. This is how archaeologists detect buried artifacts, as variations in density from surrounding soil. Also, it's how the scientists could see variations at depths that revealed the 1815 terraced fields that were buried by the volcanic ash. And it was how they came to the remains of the buried house mentioned in the story.

I suppose all the people near the site are by now aware that they may be living on top of the remains of the "lost culture of Tambora." I did not think to ask the scientists if they had heard the people speak of their feelings about living on top of the skeletons of the dead of Tambora.

For a host of Web sites on Tambora, check out Google. Also, the U.S. Geological Survey ([volcanoes.usgs.gov](#)) has online material on volcanoes.

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