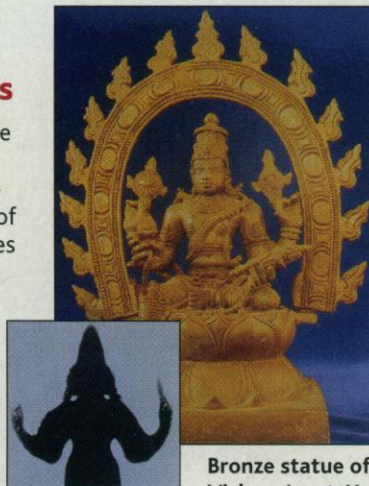


## "Fingerprinting" India's Bronze Gods

Opening up a new front in the war against illegal art traffic, scientists in India are compiling unique chemical profiles of famous ancient bronze statues to protect them from forgers and thieves.

The so-called Chola bronzes, representations of Hindu gods that date from the 9th to the 12th centuries, are found in temples throughout southern India. The statues, national treasures whose sale is forbidden, can fetch several million dollars apiece on the black market. Once a stolen statue has been recovered, it is difficult to prove whether it is an original or a fake. A well-known example occurred in the 1970s, when Indian authorities convinced a British court of the identity of a stolen statue



Bronze statue of Vishnu. Inset: X-ray reveals casting defects in another statue.

called the Pottuur Nataraja only after flying in an old priest who was able to recall some unique markings.

Chola bronze aficionado Baldev Raj, a top nuclear chemist at the Indira Gandhi Center for Atomic Research in

Kalpakkam, is now assembling a statue identification database. Each figure, Raj explains, was cast by an individual craftsman from a unique combination of metals, such as tin, lead, copper, zinc, arsenic, antimony, silver, and gold. Using x-ray fluorescence to determine the exact proportions of metals in each statue, as well as map their individual sets of cracks and crevices, Raj's five-person team has so far profiled about 100 of the better known statues. Ultimately, it hopes to turn the project over to Indian museologists.

"We now have a foolproof way of establishing the original identity," says Rajinder Kumar Sharma, a conservation chemist with the Archaeological Survey of India, in Dehra Dun. "It will make the job of the fake statue makers and thieves much more difficult."

## Melting Minimalist

Snow artists may wow the general public with shimmering ice castles and albino leopards, but a team of ice auger-wielding mathematicians recently served up a treat for colleagues. In a snow-sculpting competition held last month in Breckenridge, Colorado, the gelid geometers carved out a nearly 4-meter-tall rendering of a "minimal" surface—a version discovered a mere 15 years ago.

Starting with a 20-ton block of snow, Maryland-based mathematician-sculptor Helaman Ferguson and teammates from Macalester College in St. Paul, Minnesota, set out to reproduce the Costa surface, the equations for which were discovered in 1984 by Brazilian mathematician Celso Costa. A minimal surface is one whose area is increased by any distortion. Imagine dipping a warped wire loop in soapy water. The resulting film—resembling a potato

chip or a saddle—will have "negative" curvature. This means that from any point, the surface curves up in one direction and down in another.

In theory, the Costa surface is composed of an infinite number of saddles fitted together to create a trio of tunnels. The snow version, which resembled a flared musical instrument from a Dr. Seuss story, gained "great structural strength" from its negative curvature, says team member Stan Wagon. That allowed the snow to be shaved to less than 10 cm thick.



## JAMA Firing Reverberates

The dismissal of a popular editor at *The Journal of the American Medical Association* (JAMA) has triggered an outpouring of indignation. But as the rhetoric heats up, the search for a new JAMA editor is gearing up, too.

On 16 January, AMA executive E. Ratcliffe Anderson sacked George Lundberg for allegedly injecting the journal into presidential politics by rushing into print an analysis of a 1991 college sex survey. The paper, published on 20 January, said most undergraduates didn't regard oral sex as "having sex."

Other medical publications have since rallied to Lundberg's defense. The *British Medical Journal's* Web site ([www.bmj.com](http://www.bmj.com)) has drawn dozens of e-mail messages labeling the sacking as everything from "tragic" and "disgraceful" to "barefaced censorship." Among the few defenders of Anderson's action is an Indian anesthesiologist who pointed out that the information in the sex paper is "dated."

In the 3 February issue, the JAMA editorial board affirms its commitment to editorial independence and says its members "strongly disagree" with the decision. *Lancet* editor Richard Horton went further, declaring in his journal's 23 January issue that "JAMA is no longer part of a free press."

The principals in the fray are staying mum. Meanwhile, the AMA announced last week the creation of a committee to find a new JAMA editor. The panel, headed by Roger Rosenberg, editor of the *Archives of Neurology*, includes *Science* Editor-in-Chief Floyd Bloom.

Culminating a decade-long legal saga, the Second Circuit Court of Appeals in New York ruled last week that two U.S. physics societies did not en-

## Physics Societies Victory

gage in false advertising when they published a survey showing that physics journals published by Gordon and Breach Science Publishers (G&B) cost more than anyone else's did. The court reaffirmed an August 1997 decision that had called the suit part of a "global campaign by G&B to suppress all adverse comment upon its journals."

In a statement, the American Institute of Physics expressed relief over its "sweeping vindication." Gordon and Breach could not be reached for comment. Litigation is still pending in France and Switzerland (see [barschall.stanford.edu](mailto:barschall.stanford.edu)).