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## ANTHROPOLOGY

**Arrival of chocolate in the United States**

Before the arrival of Spanish conquistadors, the Mesoamerican elite participated in the ritual preparation and drinking of chocolate in special ceramic cylindrical jars. Because of the importance of cacao seeds and beverages to its culture, researchers thought



Cylinder jar from Pueblo Bonito.

the ritual had been performed only in Central America. However, by studying ceramic cylindrical jar sherds uncovered in northern New Mexico, Patricia Crown and Jeffrey Hurst have found evidence that these rituals were shared with residents of Pueblo Bonito, the largest archaeological site in Chaco Canyon. Previously, archaeologists considered the pottery an enigma. Dated by decorative style to between 1000 and 1125 A.D., no specific use for the vessels could be determined. Crown and Hurst's

analysis using liquid chromatography and mass spectrometry revealed the presence of theobromine, a chemical signature of chocolate. The chemical was absorbed by the jars, indicating that the cacao was in liquid form, according to the authors. The similarity of the New Mexico pottery to Mesoamerican cylinder vases suggests their likely use in ritual activity, they say. These findings may confirm a long-distance exchange of goods and rituals between native peoples in the American Southwest and Central America, the authors conclude. — C.A.

“Evidence of cacao use in the Prehispanic American Southwest” by Patricia L. Crown and W. Jeffrey Hurst (see pages 2110–2113)

## ANTHROPOLOGY

**Ancient hominin had nutcracker jaws**

Fossil skulls of *Australopithecus africanus*, a hominin of the Plio-Pleistocene epoch, are notable for their large, heavy premolars. Massive teeth are thought to indicate a diet consisting

of small, hard objects or a large volume of food. Using finite element stress–strain modeling of *A. africanus* skulls, David Strait et al. have come to a modified conclusion: The premolars served as a nutcracker for opening large, hard nuts during times when preferred foods were scarce. The authors compared strain patterns in *A. africanus* with those in an extant monkey species and found that the

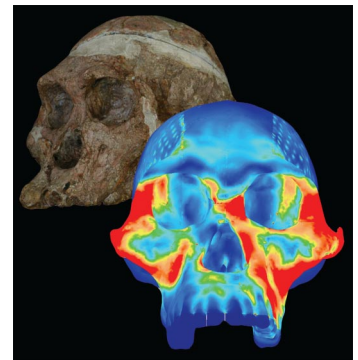
*A. africanus* skull deformed differently, indicating a diet-influenced morphology. Reinforced pillars along the opening of the nasal cavity showed signs of compressive strain during premolar biting. However, such strain was absent when force was applied on all postcanine teeth, which rules against adaptation to high-volume diets. Moreover, the tooth surfaces showed no microwear caused by eating small, hard objects. The authors suggest that analysis of the inner structure of hominin premolars will reveal deep cracks in the tooth enamel caused by heavy nutcracking essential to survival of the species in hard times. — K.M.

“The feeding biomechanics and dietary ecology of *Australopithecus africanus*” by David S. Strait, Gerhard W. Weber, Simon Neubauer, Janine Chalk, Brian G. Richmond, Peter W. Lucas, Mark A. Spencer, Caitlin Schrein, Paul C. Dechow, Callum F. Ross, Ian R. Grosse, Barth W. Wright, Paul Constantino, Bernard A. Wood, Brian Lawn, William L. Hylander, Qian Wang, Craig Byron, Dennis E. Slice, and Amanda L. Smith (see pages 2124–2129)

## BIOPHYSICS

**Zooming in on focal adhesions**

Characterizing the molecular species that interact in dynamic cellular structures such as focal adhesions is currently a challenge with limited solutions. Fluorescence resonance energy transfer is relatively insensitive; raster image correlation spec-



Craniofacial morphology of the African Plio-Pleistocene hominin.

