genomes, notes Wang Guihai, director of the CAS Bureau of Life Sciences. It is the second project of the China Biological Resource Genomes Project, following a decision to sequence China's superhybrid rice (*Science*, 5 May, p. 795). Danish officials hope to use the knowledge to stimulate work in bioinformatics as well as to strengthen the country's pork industry. A better understanding of pig genomics would also promote the use of transgenic animals as sources of transplant organs, as disease models, and for the production of medical treatments. **–LI HUI**

Li Hui writes for *China Features* in Beijing.
With reporting by Lone Frank in Denmark.

ARCHAEOLOGY

New Site Suggests Anasazi Exodus

High in the cliffs of Mesa Verde in southwestern Colorado lie some of the world's most beautiful and mysterious ruins. For decades, scientists have puzzled over the fate of the people who once lived there, the Anasazi. Whereas conventional wisdom has them dying off or leaving slowly, archaeologist Stephen Lekson of the University of Colorado, Boulder, has now proposed a more dramatic and large-scale exodus to the south for at least some Anasazi. That effort, he argues, would have required a higher degree of social cohesion than has been attributed to the Anasazi culture.

Lekson's work involves pottery and masonry styles from three pueblo ruins in southern New Mexico, up to 470 kilometers from Mesa Verde. "These sites are significantly farther south than the Anasazi are supposed to have gone," says Lekson, who has been invited to present a paper on his finds at the Society for American Archaeology annual meeting next April. "Meanwhile, the size involved suggests whole villages picked up and moved as units. This is different from the usual picture of just individual families wandering off." Comments Jefferson Reid, an anthropologist at the University of Arizona in Tucson who has heard Lekson's presentations: "This is a highly plausible idea that can now be evaluated."

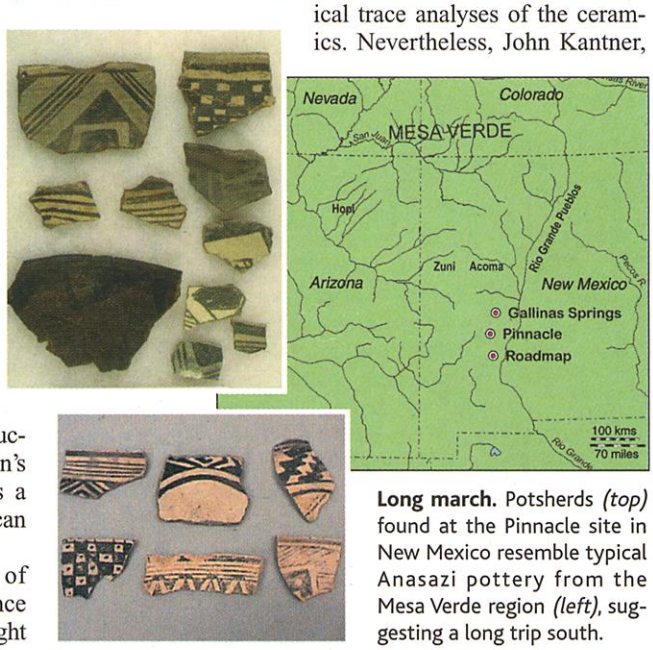
The traditional view of the Anasazi's disappearance suggests that a killer drought or large-scale political or social stresses set off a slow trickle of émigrés. Rarely are large groups imagined in motion. And rarely are the emigrants said to have moved farther than the areas that became today's pueblos in northern Arizona and New Mexico, ranging from the northern Rio Grande country in the east to the Hopi lands to the west. Lekson, in contrast, found Anasazi-like artifacts 420 kilometers south of Mesa Verde, at Pinnacle Ruin (see map), during work this summer with graduate students Brian Yunker and Curtis Nepstad-Thornberry. He says the far-south pueblo-style ruin, like two others in the region, exhibits key characteristics of Mesa Verdean culture that "stick out like a sore thumb" in their locale, he says.

Half of the pottery sherds collected at the site look very much like the Mesa Verde black-on-white style, Lekson argues. The neatly coursed masonry and layout of the multistoried room-blocks look more like the massive defensive pueblos of Mesa Verde than like the region's less organized Mogollon culture sites. And an excavated midden shows that Pinnacle's dwellers piled their trash thickly like Mesa Verdeans instead of following the local practice of spreading it thinly around habitations. Such evidence, along with the sheer size of the three southern ruins—which between them may have contained 800 rooms—"pretty strongly" argues that a sizable stream of well organized Anasazis trekked deep into southern New Mexico around 1300, Lekson says.

Several researchers who have heard Lekson's presentations are attracted to his ideas but say that more data are needed. Archaeologist Harry Shafer of Texas A&M University in College Station, for example, chided Lekson for drawing "premature" conclusions without further excavations and chemical trace analyses of the ceramics. Nevertheless, John Kantner, an archaeologist at Georgia State University in Atlanta, says that "a huge, systematic move could add another element to the picture" of greater mobility.

Lekson, for his part, says that the small amount of trash at the site suggests that his wayfarers' wanderings did not end in southern New Mexico. Moreover, the oral traditions of several pueblo peoples possibly descended from Anasazi emigrants tell of long, convoluted migrations that wended far to the south, then turned back north. "It could be these folks came here for 100 years, then headed north again," Lekson says. "Quite a trip, huh?" **–MARK MURO**

Mark Muro writes from Tucson, Arizona.



Long march. Potsherds *(top)* found at the Pinnacle site in New Mexico resemble typical Anasazi pottery from the Mesa Verde region *(left)*, suggesting a long trip south.

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MICROBIOLOGY

Listeria Enlists Host In Its Attack

It was just a small innovation—a 27–amino acid addition to a protein some 500 amino acids long. But that change likely made all the difference for a food-borne pathogenic bacterium called *Listeria monocytogenes*. As described on page 992 by microbiologists Amy Decatur and Daniel Portnoy of the University of California, Berkeley, this innovation enables *Listeria*, which can cause meningitis and death in people with compromised immune systems, to deploy a toxic protein without killing its host cell. As a result, the microbe remains comfortably ensconced within the cell and can avoid confronting antibodies, the immune system's foot soldiers.

Many bacterial pathogens are extracellular, frequently doing their dirty work by injecting toxins into cells. But not *Listeria*. When consumed, say, in a contaminated cheese, it enters the body and hunkers down in a nearby macrophage—even though this type of immune cell usually helps fend off infections.

As a macrophage first engulfs *Listeria*, it traps the microbe in a vacuole called a phagosome, supposedly out of harm's way and targeted for eventual destruction by the cell. But once inside, *Listeria* makes a pore-forming protein called listeriolysin O that tunnels into the phagosome membrane, dissolving it and setting the microbe free within the macrophage, where it can replicate before conquering other cells.

Microbiologists had long wondered why *Listeria*'s pore-forming protein doesn't bore through the macrophage's outer membrane as well and destroy the host cell. That's how a family of 19 related proteins deployed by extracellular pathogens usually work. Although these bore in from the outside, there seemed to be no reason why listeriolysin O couldn't punch holes in the membrane from within. Indeed, 6 years ago, Portnoy made a *Listeria* strain in which he replaced the