Researchers now need to determine whether other Andean societies arose around 5,000 years ago, comments Charles Stanish of the University of California, Los Angeles, who works at prehistoric sites in that region. —B. BOWER

Fallout Feast

Vent crabs survive on victims of plume

In an undersea twist on the family dog appearing just as pizza slips off a plate, crabs at Taiwan's shallow-water hydrothermal vents swarm to feast on the gentle rain of plankton killed whenever toxic plumes shoot straight up from the vents.

Peter Ng of National University of Singapore and his colleagues puzzled over what bonanza could support the many crabs observed at shallow vents around Kueishan Island in northeastern Taiwan. Hazardous scuba dives to watch the crabs plus dissections of captured specimens led them to propose the plume-kill scenario in the Dec. 23/30, 2004 *Nature*.

"I was completely surprised" by their finding, says deep-water oceanographer Cindy Van Dover of the College of William and Mary in Williamsburg, Va. "It makes sense, once you think about it."

Hydrothermal vents releasing sulfurous brews from inside Earth can occur in shallow water, such as near Taiwan, in the Mediterranean, and even off California. However, most attention has gone to deep-ocean chimneys, with their rich, otherworldly ecosystems of giant tubeworms, clams, and blind crabs. Sulfur-metabolizing microbes form the base of the deepwater-vent food chain.

In the late 1990s, when Taiwan opened access to Kueishan Island, scientists moved in to study vents only 8 to 20 meters below the surface—within scuba diving range.

The intense concentrations of sulfur compounds "make it very unpleasant," says Ng. "The plumes are also very hot, so one has to be careful not to get scalded." The area's high seismic activity keeps the seafloor unstable, and frequent landslides on a cliff on the nearby shore drop boulders into the water.

While diving, coauthor Ming-Shiou Jeng of Academia Sinica in Taipei discovered that thousands of about 2-centimeter-wide brown crabs (*Xenograpsus testudinatus*), but no larger organisms, lurk at these vents.

On a serendipitously timed dive, Jeng saw that the crabs swarmed when the tides and currents permitted the plume to rise vertically. When the plumes trail sideways, the plankton they kill drop far from the crabs.

When the scientists dissected crabs, they found that the creatures had been feasting on tiny copepods, which could have come from overhead. During repeated dives to the vents, if visibility was good, Jeng would even see a "snow" of small fish and some other creatures killed by the toxic plume.

The feasts remind Verena Tunnicliffe of the University of Victoria in British Columbia of reports from other kinds of danger zones. "Real nasty places to live," says Tunnicliffe, can offer opportunities, such as nutrients, to animals that can survive there.

The idea of plume-kill feasts supporting the crabs "does sound plausible to me," says James Childress of the University of California, Santa Barbara, who studies deep-sea vent crabs. —S. MILIUS