Quake prediction causes own shakes

On June 28, hospitals and emergency services were on the alert, some patients had reportedly been sent home to free vital bedspace, and doctors and nurses had been advised to be prepared for a sudden need of their skills. The site of the furor was Lima, Peru, reacting to a U.S. scientist's prediction of a major earthquake off the Peruvian coast. It is a seismically active part of the world, and the prediction was calling for a potentially catastrophic quake of magnitude 7.5 to 8.0 on the Kanamori scale. Yet Peruvian and U.S. officials were urging the populace to ignore the warning. The chief of the U.S. Geological Survey's office of earthquake studies, John Filson, had even flown to the city to show his contempt for the forecast.

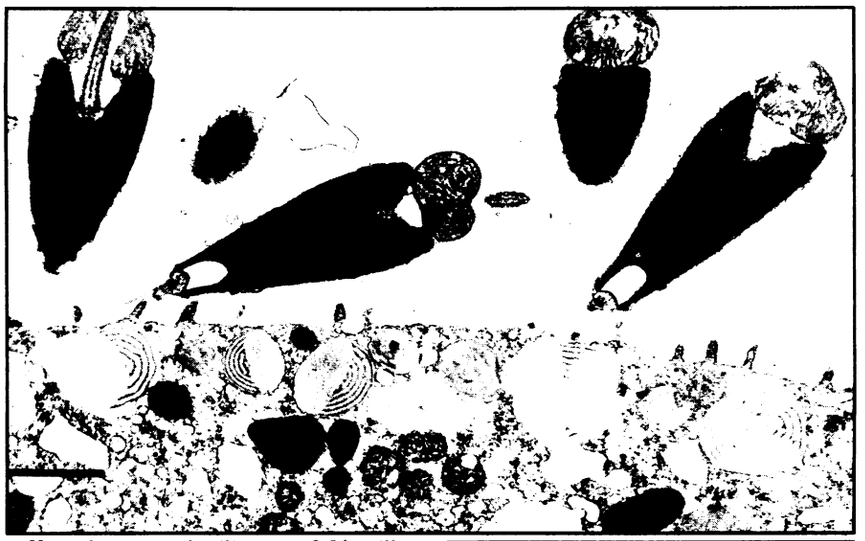
Filson survived, and few if any of his colleagues were surprised. But the prediction, by Brian Brady of the U.S. Bureau of Mines, had already been creating tremors on its own for months. Brady's prediction forecast a 7.5 to 8.0 event on or about June 28, a 9.2 event around Aug. 10 and a 9.9 quake about Sept. 16. It was made public in Peru late last year, prompting Peruvian officials to ask the U.S. government that it be reviewed, a task that fell to the U.S. National Earthquake Prediction Evaluation Council. The council's response, after a January meeting with Brady and USGS colleague William Spence, was unambiguous: "The Council regrets," said its prepared statement, "that an earthquake prediction based on such speculative and vague evidence has received widespread credence outside the scientific community. We recommend that the prediction not be given serious consideration by the Government of Peru" (SN: 2/14/81, p. 100).

At the root of the disagreement is the reasoning cited by Brady for his prediction. His theory is complex, involving not only conventional geophysics and the like but also such areas as general relativity theory, quantum mechanics and analogies from black-hole physics. Council members maintain that Brady repeatedly failed —some say refused—to show a clear link between his theory and his interpretation of the available data. According to Spence, however, there were shortcomings on both sides. When Brady wanted to spend "a couple of hours" detailing the theory before progressing to the data-interpretation that depended on it, the council "cut him off at the pass and refused to let him talk more than a few minutes on the theory." In what Spence describes as an "antagonistic" meeting, Brady "got his back up," and the final result was "a standoff." Says Spence, "Everybody lost."

Though not an author of the involved theory, Spence had worked with Brady since 1974, but now has disavowed himself of the prediction, citing three primary reasons. One is that a "nearly necessary condition" for the three predicted quakes was a series of foreshocks in mid-September of last year and another last month, "and based on many discussions and my total understanding of what Dr. Brady meant by these foreshocks, I don't think that any reasonable person would now independently agree that these foreshock series had occurred." Secondly, says Spence, the magnitude 9.9 quake foreseen for September should already be showing a wide range of conspicuous precursory geophysical phenomena, "and I haven't heard of anything anomalous." Last week, in fact, he adds, former Peruvian Geophysical Institute head Alberto Giesecke reported that two major strain-gauge networks in and around Lima have revealed "no anomalies within the last nine months compared to 15 years prior." Finally, according to Spence, Brady's theory began with an analysis of the aftershocks of a major Peruvian quake in 1974, but Spence believes that "there is another, very conventional, easy way to explain all these characteristics without necessarily invoking [Brady's] model."

The lack of a major quake near Lima on June 28, says Spence, does not by itself rule out Brady's theory, which cited the specific dates only as calculated points within "windows" that could be weeks in length. But the lack of more generally accepted precursors is considerably more troublesome. Making matters worse for researchers who would attempt to evaluate Brady's proposal is that he has yet to publish a detailed, written version of its intricate essentials. "I haven't seen the whole theoretical development myself," Spence notes. Still, he says, "Brady is a gifted scientist .... Personally, I think he will be vindicated in certain aspects of his theory ... I think that the theory may be correct in many ways, even if the prediction is wrong." In Lima, where improved knowledge of quakes would be very welcome, many citizens could hope that Spence is right on both counts. □

New insights into conception



Photos: Lennarz et al.

How do sperm fertilize eggs? It's still a mystery, but insights are being provided by William J. Lennarz and colleagues at Johns Hopkins University School of Medicine in Baltimore as they unveil some of the actions of how a sea urchin sperm fertilizes a sea urchin egg. (The work is done with sea urchins because fertilization in these animals occurs externally and is replicable in test tubes.)

The researchers have found that sea urchin sperm bind to specific receptors on the surface of the sea urchin egg (above), which are so large that chemical techniques do not exist to isolate and study them in their entirety. The Hopkins scientists have not, however, learned why, of the thousands of sea urchin sperm that bind to an egg surface (right), only one sperm fertilizes the egg. The remaining sperm will detach from the surface of the egg and will die.