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Scientists on Trial for What They Said

The ordeal of Italian seismologists reveals the risks of researchers' going public when an emergency looms

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Paganica, a 13th-century town near L'Aquila, Italy, was severely damaged by the 2009 earthquake, and is still largely in ruins.

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Rome

When Italy's National Commission for Forecasting and Predicting Great Risks held a special meeting in the central Italian city of L'Aquila on March 31, 2009, the earthquake-prone area had been shaking with low-level tremors, as frequently as three or four a day, for the previous six months.

Just one day earlier, the country's Department of Civil Protection had censured an amateur scientist in the city, who claimed that he could predict earthquakes by measuring levels of radon gas. The officials accused him of instigating a public panic.

On that Tuesday evening in L'Aquila, prominent Italian geophysicists met with national and local officials for about an hour to discuss the "seismic swarms" that had so alarmed the populace. Finally the vice director of the civil-protection agency emerged to tell reporters that there was "no danger," and that seismic conditions in the region were "certainly normal."

Six days later, L'Aquila was hit by a strong earthquake that left 309 people dead, injured more than 1,500, and destroyed some 20,000 buildings.

Now seven members of the risk commission—six of them scientists—are on trial for manslaughter, on the grounds that their negligence contributed to the casualties by producing a false sense of security. The scientists in particular are charged with making a "generic and ineffective" assessment of the danger, and with offering "incomplete, imprecise, and contradictory

information about the nature, causes, and future developments of the seismic hazards." They could face up to 15 years in prison.

Their trial, which opened on September 20 but has been adjourned until October 15 to allow defense attorneys to examine new evidence, has provoked incredulity and outrage among their colleagues around the world. More than 5,000 scientists have signed an open letter supporting the defendants. The head of the American Association for the Advancement of Science wrote to Italy's president, Giorgio Napolitano, calling the charges "unreasonable" and "unfair and naïve," given the impossibility of predicting an earthquake. The letter warned that the trial could "have a chilling effect on researchers."

Issues of legal culpability aside, no one is presenting the episode as a model of effective crisis communication. According to experts on earthquakes and disaster management, the L'Aquila case illustrates the challenges—also highlighted by other recent disasters, such as Hurricane Katrina and the earthquake and tsunami in Japan—that scientists increasingly face as they take part in advising the public about potential emergencies. Those challenges include collaborating with nonscientists and with experts in other disciplines, and not underestimating the intelligence of laypeople.

Both physical and social scientists argue that greater attention to the social and psychological aspects of managing emergencies—alongside more-tangible and quantifiable questions of organization, equipment, and personnel—will be necessary to avoid fatal misunderstandings in the future.

Academe must also respond, they say, with researchers and instructors in disaster management paying greater attention to how scientific assessments of hazards are explained to decision makers and to the public.

Not Making Sense

A fundamental task in disaster management is translating the specialized language of science into laymen's terms.

"When seismologists try to talk to other seismologists, they have a way of talking to each other that can convey information very accurately," says Michael K. Lindell, a professor in the Hazard Reduction & Recovery Center at Texas A&M University. "The problem is that the words that [seismologists] use to talk to each other don't make sense to the rest of the population."

The geophysicists in the L'Aquila case seem to have overcompensated by oversimplifying their assessment for public consumption.

Thomas H. Jordan, director of the Southern California Earthquake Center at the University of Southern California, was chairman of an international commission created by the Italian government to assess earthquake predictability in the aftermath of L'Aquila.

The geophysicists on the Italian risk commission were "correct in a narrow sense" that the risk of a major earthquake remained low in absolute terms, he says, but they failed to communicate that such an event had become significantly more probable than normal in light of the low-magnitude tremors.

Mr. Jordan imagines the scientists reasoning that "our uncertainty in projecting probabilities is very high, and we're talking about at most maybe a 1-percent probability, so basically that's negligible. ... That's not really good enough information to tell the public. ... They're going to misunderstand us." As a result, he concludes, they withheld potentially alarming data that residents may have wished to take into account.

For Lee Clarke, a professor of sociology at Rutgers University, the L'Aquila case offers a "perfect example of 'elite panic,'" a term he and a colleague coined to describe a tendency by experts and government authorities to downplay genuine dangers out of exaggerated fear that the public will overreact to them.

Mr. Clarke saw the same tendency at work after the Japan earthquake in March of this year, when a prominent nuclear engineer continued to reassure residents near the Fukushima Daiichi nuclear-power plant for a week after reactors at the plant had melted down.

One of the L'Aquila prosecutors' main complaints is that the risk commission failed to consider factors beyond the purely geophysical, such as the density of inhabitation and the stability of buildings, when assessing the hazard that the region faced.

But if the seismologists had commented on issues, such as structural engineering, beyond the boundaries of their field, argues Benigno E. Aguirre, a sociologist on the faculty of the University of Delaware's Disaster Research Center, they would have violated international norms of emergency management, which strictly separate the responsibilities of experts in different disciplines.

Taking Control

Another element of the prosecution's case against the risk commission is that it failed to tell people what to do in case of a serious earthquake, or to give any practical advice at all, beyond an official's jocular suggestion to reporters that everyone should enjoy a glass of Montepulciano wine.

Practical advice is a crucial element of crisis communication, observes Maureen Y. Lichtveld, chair of environmental policy at Tulane University's School of Public Health and Tropical Medicine.

"People who are in crisis and who are fearful are much helped by them taking control even over a little bit of the overall action," through tasks such as preparing food and water supplies, she says. "The more passive you make communities, the more anxious they become."

But, as with questions of disciplinary specialization, the responsibility for offering such counsel should be clearly allocated.

"You get experts to talk about the technical aspects, and you get elected or appointed officials ... talking about what the recommendations are for people's actions," says Mr. Lindell, of Texas A&M. "It's idiotic for them to try to give technical briefings, just as it's idiotic for physical scientists, or engineers or social scientists, for that matter, to say, 'This is what people ought to do.'"

The L'Aquila case also demonstrates the risk of letting nonscientists speak for their expert advisers.

One of the most notorious of the March 31 statements to the press by Bernardo De Bernardinis, at the time vice director of the civil-protection agency, had to do with the supposed stress-reducing effect of low-level tremors, which he suggested had actually made a large earthquake less probable.

"The scientific community continues to assure me that ... it's a favorable situation because of the continuous discharge of energy," he said.

Southern California's Mr. Jordan attributes that statement, which he calls "clearly scientifically incorrect," to a "miscommunication or at least misunderstanding" between the bureaucrat and the risk commission's seismologists.

"What you really need is some fairly formalized procedures" for internal communication, he says. "You've got to be careful about how scientific advice is transmitted and received within these decision structures."

The presence of experts with a multidisciplinary background, such as seismologists with knowledge of engineering and social psychology, can help to avoid such misunderstandings, Mr. Lindell says. But ideally, in his view, each specialist will finally speak for himself or herself:

"When there's a news conference, somebody stands up and says, "OK, here's what we're going to do: We're going to have physical science first, we're going to have the seismologist give a briefing on seismology, we're going to have an earthquake engineer, then were going to have an economist or some social scientist, an emergency manager, and each one is going to give a part of the briefing."

That approach might seem to court the danger of information overload, but, according to Mr. Jordan, the age of the Internet has vastly enhanced the public's appetite for detail.

"There is a rising public expectation that scientists will deliver, in a transparent way, basically everything they know," the geophysicist says. "It's the information revolution that's occurred with social media. People have their fingers, through their smartphones and computers and whatnot, on a huge wealth of information. They just expect information to be there."

Connecting Expertise

Effectively transmitting that information in crisis situations, Mr. Jordan says, requires tapping the expertise of social scientists who work in risk communication, which emerged as a subfield of public health in the 1980s and has gained ever greater salience since the terrorist attacks of September 11, 2001.

While the number of degree programs in emergency and disaster management has proliferated since then (the Federal Emergency Management Agency's Web site lists well more than 100 at all levels), so far only a handful pay extensive attention to communication, says Tulane's Dr. Lichtveld, who helped develop competency standards for such programs for the Association of Schools of Public Health.

At Tulane, she notes, a disaster-management specialization within the master's program in public health does focus on social and psychological issues, including communication—an emphasis that she says reflects the New Orleans campus's own devastating experience with Hurricane Katrina in 2005.

That ordeal not only revealed the superiority of certain communications media in crisis situations—cellphone and the Internet rather than land lines—but showed the value of engaging community leaders, both as sources of on-the-ground expertise and as "trusted conduits" of warnings during an emergency.

Tulane students thus not only hear lectures from military and government officials experienced in crisis communication, but they also work with local pastors and high-school teachers to develop appropriate preparedness plans and identify especially vulnerable populations, such as pregnant women and the elderly.

However it is transmitted and whatever its quality, the flow of emergency communications will only grow in the coming years, predicts Mr. Clarke, the Rutgers sociologist.

"We're going to have more of these extreme events," he says. "More and more people are concentrating themselves, and so there are more vulnerabilities to earthquakes. And problems of climate change are going to make this issue of who does the warning and how the warning happens just incredibly important."