IN DEPTH

After his acquittal, Giulio Selvaggi (*left*) talks to Bernardo De Bernardinis, who remains convicted.

PHOTO: AP PHOTO/SANDRO PEROZZI

SEISMOLOGY

Relief greets acquittals in Italy earthquake trial

But some still fault scientists for hasty risk assessment

By **Edwin Cartlidge**, *in L'Aquila, Italy*

For families of the victims, it came as a stunning, painful reversal—"an earthquake after the earthquake," a lawyer for several of them said. But many scientists are relieved by the latest development in a 5-year legal saga that triggered heated debates in Italy and unnerved earth scientists around the world.

On Monday, an appeals court acquitted six experts convicted of manslaughter and sentenced to 6 years in prison in 2012 for advice they gave ahead of a 2009 earthquake that killed 309 people in this provincial town. Only one of the seven originally found guilty remains convicted: Bernardo De Bernardinis, who in 2009 was deputy head of Italy's Civil Protection Department and who has been given a 2-year suspended jail sentence, pending any further appeals. "The L'Aquila trial was a false prosecution of individuals for what was a failure of a national risk communication system," says Thomas Jordan, an earth scientist at the University of Southern California in Los Angeles. "Judicial sanity prevailed."

Only 6 days before the fatal quake struck, the experts had attended a meeting of the National Commission for the Forecast and Prevention of Major Risks. The meeting, held on 31 March 2009, had been organized to evaluate the threat posed by a series of small and medium-sized tremors that had been shaking L'Aquila for several months. In the 2012 trial, Judge Marco Billi ruled that the commission members carried out a "superficial, approximate and generic" risk analysis, and that they made a number of reassuring statements that led 29 of the quake's victims to remain indoors at the time of the disaster, even though two moderate tremors had struck several hours beforehand.

The tough sentence Billi handed down shocked the Italian research community. It led many to argue that science itself had been found guilty, even though the judge emphasized that he had not convicted the experts for having failed to predict the earthquake—which science can't do—but rather for having failed to carry out their legally binding duties as "public officials." He said the experts hadn't analyzed a series of factors indicating a heightened seismic risk, including the fact that previous quakes that destroyed L'Aquila were preceded by smaller tremors.

Lawyers for the convicted experts took aim at both the alleged negligence of their clients and the claim that their statements swayed people's decision to stay indoors, in buildings that later collapsed. They disagreed that the panel could be blamed for the notion that the earlier, smaller tremors were a good thing because they discharged energy. Witnesses at the original trial said that idea—which most scientists regard as incorrect—led their relatives to remain indoors.

The defense lawyers claimed that this idea could not have been endorsed by the commission as a whole, as Billi argued, because it was stated publicly only by De Bernardinis, in an interview before the commission's meeting. "No one said, 'Stay at home because there is a discharge of energy,' " said Marcello Melandri, the lawyer for Enzo Boschi, former head of Italy's National Institute of Geophysics and Volcanology. But prosecutor Romolo Como pointed out that none of the participants had replied when asked about the energy-discharge idea during the meeting. "Why didn't anyone object to this?" he demanded.

In the new verdict, which must be explained in writing within 3 months, a panel of three judges headed by Fabrizia Francabandera concluded that only in De Bernardinis's case could a link be proven between the expert's words and the actions of some of the victims. De Bernardinis said that, notwithstanding his renewed conviction, he could face "God and men" with a clear conscience. Some L'Aquila citizens afterward expressed indignation at what they saw as a further betrayal on the part of the Italian state. Lawyers for relatives of several of the victims say they will appeal the verdict in the Supreme Court of Cassation in Rome.

Boschi told *Science* that he felt unwell during the final hearing and that he only realized he had been acquitted a quarter of an hour after the verdict was read out. He says that "there is nothing to celebrate," but that he is "relieved" and hopes eventually to go and speak with people in L'Aquila "without lawyers."

Willy Aspinall, a risk expert at the University of Bristol in the United Kingdom, is relieved as well. But he believes the trial should serve as a warning. The L'Aquila risk analysis "wasn't done properly, competently, and neutrally," says Aspinall, adding that the brief duration of the commission's meeting—it lasted about three quarters of an hour—showed the seven were "taking a bit of a gamble that they could serve their political bosses and that would be the end of it." He argues that scientists should be "much more cautious about how they give advice, to put it in writing rather than just verbally." ■

Edwin Cartlidge is a science writer in Rome.

Adult mosquito emerges from its watery nursery.

Craving human blood is in mosquito's DNA

Researchers have isolated a gene in the mosquito *Aedes aegypti* that helps explain why the species has such a yen for human blood. *A. aegypti*, which transmits dengue and other viruses to humans, can interbreed with a close, nonhuman-biting, forest-dwelling relative in Africa. Carolyn McBride, an evolutionary neurobiologist at Princeton University, and her colleagues compared the two subspecies, finding that human-biting "domestics" have distinct versions of a gene called *Or4* and make a lot more of this odor-sensing protein than the forest mosquitos. McBride and her colleagues report this week in *Nature*. The domestic mosquito homes in on an odor component called sulcatone, which humans produce in abundance. Although there are likely to be other factors involved in human preference, "it seems the one identified is a, if not *the*, major factor," comments Jeffrey Powell, an evolutionary geneticist at Yale University. **http://scim.ag/mosqDNA**

PHOTO: ALEX WILD/ALEXANDERWILD.COM

BY THE NUMBERS

999

Number of unique proteins produced by human sperm—compared with the human brain's 318—according to the latest version of the online Human Protein Atlas, launched last week.

25%

Estimated increase in pollen production—and perhaps allergy suffering—as atmospheric CO_2 increases from the current 400 ppm to 450 ppm, suggests a study in *PLOS ONE*.

$1.2 billion

Amount that Google will pay NASA over 60 years to lease its historic Moffett airfield in northern California. Google plans to spend $200 million to convert the 83-year-old hangar into a research center for space, aviation, and robotics technologies.

and cancer research—in which preprint sharing hadn't been routine. About 28% of authors, who come from 44 countries, have revised their papers, presumably after getting feedback from readers, says John Inglis, executive director of CSHL Press. For scientists who might worry that posting a preprint will jeopardize its chances at a journal, Inglis points out that one-fourth of bioRxiv's papers have later appeared in journals including *Science*, *Nature*, and *Cell*. **http://scim.ag/bioRxiv1yr**

Historic Lick Observatory saved

SAN JOSE, CALIFORNIA | The Lick Observatory has gained a new lease on life. The first permanent mountaintop observatory in the world when it opened in 1888, Lick was targeted for closing in 2013 by University of California (UC) administrators faced with shrinking funding. A "Save Lick" campaign spearheaded by UC astronomers and amateur stargazers ensued. Then, in a 29 October letter, the administrators said they had scrapped the plan, noting that University of California Observatories (UCO), which manages the observatory program for the university system, had convinced them that UCO could pay for a slimmed-down program without sacrificing other priorities. But the observatory's financial future remains tricky, with a spartan $1.5-million-a-year budget and shrinking staff. **http://scim.ag/LickObserv**

Ebola beds still needed, says WHO

GENEVA, SWITZERLAND | Some once-overwhelmed Ebola treatment centers now have empty beds because the epidemic has waned in certain areas, particularly Monrovia—but the World Health Organization (WHO) warns that a serious bed shortage still exists elsewhere in the country, as well as in hard-hit Sierra Leone and Guinea. According to WHO's 5 November Ebola "situation report," only 22% of a planned 4707 beds are "in operation." A key problem, the report notes, is a shortage of medical teams, not the beds themselves. All told, the three countries had only 10 of 38 needed medical teams.

NEWSMAKERS

Polio pioneer heads India science

Science now has a more potent voice in India's government. Prime Minister Narendra Modi appointed physician **Harsh Vardhan** on 9 November as minister for science and technology and earth sciences and elevated him to full Cabinet rank. Vardhan, 59, had served as India's health minister since Modi formed his government in May; he is known for his pioneering role in the eradication of polio from India, which earlier this year was declared free of wild poliovirus. As health minister he also promoted Ayurveda, the traditional Indian system of medicine.