**Toxicology**

**Arsenic Victims to Take British Science Body to Court**

CAMBRIDGE, U.K.—The British Geological Survey (BGS) is gearing for a court battle over claims that it could have averted a wave of arsenic poisoning in Bangladesh over the past decade. A High Court judge in London last week gave the go-ahead for a trial pitting two Bangladeshi residents against BGS’s parent body, the Natural Environment Research Council (NERC). The plaintiffs, both of whom are said to suffer from arsenic poisoning, are claiming unspecified damages.

The arsenic poisonings are a tragic and unforeseen consequence of good intentions. In the late 1970s, UNICEF and other relief organizations began drilling drinking water wells to bypass sewage-tainted surface waters blamed for deadly outbreaks of cholera and other bacterial diseases. They were not aware that the groundwater in some parts of Bangladesh contains high levels of arsenic. Over the past few years, researchers have linked escalating rates of particular cancers—including bladder and lung—and skin lesions in Bangladesh to high levels of arsenic in drinking water, prompting the government in 1998 to alert communities to the hazard and to take emergency steps to provide alternate water supplies to the worst-hit regions.

The court case hinges on whether BGS should have tested for arsenic when it was commissioned by the British Overseas Development Administration in 1991 to help improve wells used mainly for irrigation and fish farming in Bangladesh’s floodplains. As part of that study, BGS sampled for trace elements in 150 wells to find out “how the groundwater was flowing, particularly around the boreholes,” says hydrogeologist David Holmes, director of environment and hazards at BGS. “It wasn’t aimed at testing the [water] supply for drinking quality.” In its 1992 report, BGS listed levels of 36 elements and compounds, including aluminum, iron, manganese, phosphorus, and silica. Arsenic was not tested, Holmes says, because at the time it was not known to be abundant in floodplains.

The lawsuit alleges that BGS was negligent not to probe for arsenic and that it should have expected that its report would be seen as a pronouncement on the safety of drinking water. “People were relying on the report ... [as] a test of water quality,” asserts Bozena Michalowska, a lawyer for the plaintiffs. She contends that “they should have tested for [arsenic],” because BGS found high levels of iron in compounds relatively poor in oxygen, which could be explained by arsenic leaching into the water. Three years before the work in Bangladesh, BGS “had identified this to be an issue in British groundwater,” says Michalowska, and had subsequently surveyed for arsenic there.

Holmes acknowledges that BGS found iron in reducing conditions in Bangladesh in 1992 but says it is unfair to contrast those findings with the earlier U.K. study. “We didn’t test for [arsenic] because we didn’t expect it, whereas in the U.K. we would have expected it to be there;” he says. He adds that BGS scientists first heard about arsenic in ground water in Bangladesh at a conference in 1995.

NERC says it will appeal the judge’s decision to hear the complex case. “We are confident that there is no case to answer,” says NERC spokesperson Marion O’Sullivan. But if the claims do go to trial, Michalowska says that a successful outcome will pave the way for a class-action suit that could include hundreds of victims of arsenic poisoning.

DANA MACKENZIE

**Number Theory**

**Prime-Number Proof’s Leap Falls Short**

All math students know the feeling of dismay when the teacher finds a mistake in their “right” answer. Now it’s happened in one of the most exciting recent discoveries in number theory.

In March, Dan Goldston of San Jose State University in California announced that he and Cem Yıldırım of Boğaziçi University in Istanbul, Turkey, had proved that prime numbers—integers that can be evenly divided only by themselves and 1—cluster on the number line in tighter clumps than was previously known (Science, 4 April, p. 32). Their estimate beat all previous results on “small gaps” by a stunning margin. It also marked the biggest step in decades toward proving one of the oldest and most famous hypotheses in number theory: the Twin Prime Conjecture, which posits that there are infinitely many pairs of primes at most 12 numbers apart. The result was heartbreakingly close to the Twin Prime Conjecture. Suspecting that it was too good to be true, they decided to double-check Goldston and Yildırım’s work.

After two restless nights, Soundararajan and Granville found an error in a routine computation. “It was a little bit surprising, because arguments of this kind are frequently used,” says Soundararajan. “You get comfortable with it, and you don’t realize that this case is different.” Goldston spent days trying to patch the hole in the proof, in vain. “It occurs in just about any approximation of this type, and therefore there is no quick fix,” he says.

Goldston believes he can still top previous estimates on prime clustering, but by nowhere near as dramatic a margin as before. “[The original claim] was like Bob Beamon’s long jump in the 1968 Olympics, when he beat the world record by 2 feet,” says Brian Conrey, a number theorist at the American Institute of Mathematics in Palo Alto, California. “This would be like finding out he scratched on that jump and beat the record by only an inch.”

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