of what manufacturers know about the toxicity of their product (with penalties for covering up or lying), and of hazards in the public's midst (like community right-to-know laws). These recommendations are not panaceas but make good first steps.

In addition, *Doubt Is Their Product* reminds one of deeper risks that threaten scientific fields and democratic deliberation. When science affects commercial interests, there are substantial temptations for researchers or their employers to substitute the ethics of the marketplace for the ethics of careful, objective evaluation of the data to understand the world, environmental threats, and health risks. Such substitution can result in the corruption of the scientific literature and the breaking of incremental links in chains of evidence on which researchers and the public depend, and it also tends to undermine properly informed political and judicial decisions. The scientific community and the public need to be on guard against such abuses; Michaels's history of these events sounds an alert that must not be ignored.

References

1. Brown and Williamson Tobacco Company, *Smoking and Health Proposal* (Brown and Williamson document no. 680561778–1786, 1969); http://legacy.library.ucsf.edu/tid/nvs40f00.
2. *Daubert* v. *Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993).

10.1126/science.1162339

THE GONZO SCIENTIST

Chasing the Biggest Shadow of All

Choosing which extreme sport to pursue in one's life is difficult. Most people are content with the likes of bungee jumping, ice climbing, or street luge, but not scientists. In addition to thrills, they want their sport to produce useful data. I tried out an extreme scientific sport last month: eclipse chasing. The objective is to take very sensitive equipment to very remote locations, very punctually.

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The roots of the sport go back to ancient China, where astronomers experienced, in the words of the late television anchorman Jim McKay, both "the thrill of victory" (prestige in the emperor's court) and "the agony of defeat" (beheading for miscalculation). Eclipse chasing has come a long way since then (more data, less beheading)—and made headlines around the world in 1919. On 29 May that year, after struggling with biting insects and tropical storms on a volcanic island, a British team recorded starlight bent around the eclipsed Sun by gravity, an observation that was widely trumpeted as confirming Albert Einstein's theory of relativity.

For my first taste of eclipse chasing, I joined a team of scientists (*1*) hoping for a rendezvous with an eclipse 1 August in the wild west of Mongolia. To get to the site, we made a night trek over the Altai Mountains, which nearly killed us when our driver nodded off at the wheel. On the day itself, we worked in the intense heat and dust of the Gobi desert, which actually did kill a telescope motor and camera. But just as the eclipse was getting started, I drove a few kilometers away with astrophysicist Ray Jayawardhana, to take part in a shamanistic ritual that involved a hundreds-strong chorus of screaming, shouting, and clapping at the sky. We found ourselves surrounded by terrified Mongolian locals convinced that a monstrous god called Rah was eating the Sun. But that is another story.

While Rah captured the Sun, our team captured gigabytes of data. Like astro-paparazzi, we harvested hundreds of digital images through a pair of telescopes—a refractor and a reflector fixed to a motor-driven astrograph built by team member Kosmas Gazeas—during the 2 hours of partial and 2 minutes of total eclipse. And we weren't the only ones ogling the darkened sky. A team led by Jay Pasachoff, an astrophysicist at Williams College, Massachusetts, was observing to the north in Siberia (*2*). And to the south, *Science*'s Beijing correspondent, Richard Stone, was watching in western China with researchers from the National Astronomical Observatories, Chinese Academy of Sciences, and other institutions (*3*).

But how useful are all those data? With orbiting telescopes like Hinode trained on the Sun—and capable of creating their own eclipse anytime by simply occluding the Sun's photosphere with a metal disk, can ground-based observation add anything? "I get that question all the time," comments Pasachoff. In fact, he says, data produced by earthly eclipse chasers are more valuable than ever. The space telescopes, put in place at enormous cost, provide only part of the picture. By design, "the spacecraft can't observe a huge region around the Sun, the whole inner and middle corona." Studying the dynamics of these superhot solar gases should lead to better modeling of solar wind and answer a nagging riddle: Why is the corona hundreds of times hotter than the Sun's surface? Not only are the eclipse chasers equipped with "more modern and efficient" charge-coupled device cameras, explains Pasachoff, but "the resolution on the corona that we get by processing eclipse images is finer than that obtainable by any spacecraft." To understand the Sun, astronomers still need the Moon to cover it.

Pasachoff, who has seen 47 solar eclipses, wants to rename the sport. Rather than a chaser, "I am an eclipse preceder," he says. After all, successfully predicting and getting to the site of an eclipse is the name of the game. For next year's eclipse, a blockbuster event in the International Year of Astronomy (*4*), record numbers of people are expected to chase—or rather, precede—the 22 July solar eclipse in Asia. So prepare your telescopes and book your tickets now.

References and Notes

1. The team comprised four astrophysicists—Ray Jayawardhana (University of Toronto), Kosmas Gazeas (Harvard-Smithsonian Center for Astrophysics), Kazuhiro Sekiguchi (National Astronomical Observatory, Japan), and Katrien Kolenberg (University of Vienna)—and remote-sensing researcher Tuvjargal Norovsambuu (National University of Mongolia).
2. www.williams.edu/astronomy/eclipse/eclipse2008.
3. R. Stone, *Science* **321**, 759 (2008).
4. www.astronomy2009.org.

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10.1126/science.1164877

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