



**The "sealed crustless sandwich" patent application also depicts a special cylinder (left and above) to cut and crimp the sandwich.**

can evaluate an invention's uniqueness. In addition, the researchers recommend ending the antiquated "one size fits all" approval process, suggesting that today's knowledge frontiers require a process that separates complicated ideas—genes, pharmaceuticals, Web technology—from simpler inventions like the latest mousetrap or broomstick. They also advocate a reversal of the trend toward jury trials in patent litigation—which has meant asking ordinary, untrained citizens to decide highly technical and specialized cases with enormous consequences for businesses. Lerner says that corporate officials share a growing sense that the current system is

thoroughly broken, and this may bring some sort of reform in the next three to five years. For too long, the authors note, a small cadre of District of Columbia patent lawyers has controlled the process and reaped huge fees for guiding clients through the muddle of modern

patent law. Lerner says that he and Jaffe wrote the book partly to make an obscure and poorly understood corner of the legal world accessible and engaging to a wider audience with a stake in the outcome, because "[P]atent policy is too important to be left to patent lawyers."

~GARRETT M. GRAFF

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**CHIMERICAL SHIVERS**

# Society's Casino

**I**N THE FALL of 2001, Americans drastically revised their travel habits. "Driving went up, and flying went down," says David Ropeik, director of risk communication at the Harvard Center for Risk Analysis. "Air miles

flown dropped precipitously after 9/11." As a result, more Americans probably died on the roads than would have perished in the air. A study by the University of Michigan Transportation Research Institute indicates that motor-vehicle

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crashes claimed 1,018 more lives from October through December of 2001 than in the fourth quarter of 2000. "Driving feels safer to many, especially after plane crashes are in the news," Ropeik explains. "We have a sense of control when behind the wheel—and any risk over which we have physical control evokes less worry and concern than ones over which we have no control. But by most measures, driving is a lot riskier than flying. Even so, it felt a lot safer to people, and that perception gap contributed to a substantial proportion of those excess deaths."

Ropeik, who is based at the Harvard School of Public Health, is coauthor (with George Gray, lecturer on risk analysis) of the 2002 book *Risk: A Practical Guide for Deciding What's Really Safe and What's Really Dangerous in the World around You*. He delivers guest lectures on risk perception and communication in Harvard courses; after 20 years as a television news reporter in Boston, he's an experienced communica-

**In 2003, this hardware and home-furnishings store on New York's Upper East Side sold \$25,000 worth of duct tape and plastic sheeting in one week after U.S. officials mentioned them as possible defenses against biological or chemical terrorism.**

tor. "It's not necessarily the case that we are too afraid of risks," he says. "There are some risks that we don't fear enough. The perception-versus-reality gap is what's dangerous in either direction. This is why effective risk communication is such a vital tool for public health. If people are better informed, they'll make safer choices."

Risk analysis marshals data to estimate the actual level of danger that potential hazards—artificial sweeteners, electrical power lines, genetically modified food, air pollution, nuclear power, breast implants, pesticides, vaccines, x-rays—pose to human health and survival. It's an alternative to what people usually do: make intuitive choices,



CATHERINE LEUTHOLD/GOBBIS

subconsciously using both facts and feelings to decide what to be afraid of and how afraid to be. "That can be dangerous," Ropeik says, "especially in a more complex world than we've ever known. No doubt the developed world is now

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## Right Now

safer in many ways, but we *feel* as though it's a very risky time to be alive." Communications technologies amplify these anxieties. "SARS [severe acute respiratory syndrome] as an *idea* traveled the world much faster than SARS as an organism," Ropeik notes. "And the more aware of a risk we are, the more concerned we are."

The gap between perception and reality threatens public health in three ways, he says. First, people's intuitive perceptions can recommend dangerous personal choices. During the anthrax scare of late 2001, for example, tens of thousands of people took antibiotics prophylactically, creating a run on the drug Cipro. Unfortunately, "It doesn't work that way, it's not a vaccine," Ropeik explains, but the

overuse of antibiotics, he adds, helps fuel the proliferation of new strains of drug-resistant bacteria. In case of a bioweapons attack (or any disease outbreak), simple, common-sense steps like washing hands frequently, not shaking hands, and wearing gloves are the most effective countermeasures, according to *Risk*.

Second, hazards that trigger emotional responses can drive demands for disproportionate government intervention. "We have a war on cancer, but no war on heart disease," says Ropeik. "Yet roughly 25 percent more Americans a year die from heart disease than from cancer." The National Cancer Institute's 2004 research budget was \$4.8 billion, while the National Heart, Lung, and

Blood Institute spent \$1.8 billion on heart-disease research. The "dread factor" plays a role, Ropeik says: "The nastier a way to die it is—the more painful, awful, and horrible—the more fear it evokes. And cancer evokes that fear more than heart disease, so we spend accordingly."

Third, ample research connects stress (like chronic worry about threats and risks) with suppressed immune function, chronic cardiovascular damage, gastrointestinal diseases, impaired fertility, osteoporosis, diabetes, and accelerated aging, among other effects. Wild animals have the same flight-or-fight response as human beings, but are either killed or quickly return to normal, says Ropeik, citing the book *Why Zebras Don't Get Ulcers*, by Robert Sapolsky

'78. The human mind and social environment make chronic stress possible.

Take terrorism, for example. In May 2002, Ropeik lectured on risk perception to the Executive Office for Homeland Security, then headed by Tom Ridge '67. The official color-coded system of threat levels responded to public pressure for "warnings" of terrorist attacks. "But there was no advice as to what we should or could do," says Ropeik. So the administration launched a campaign and a website, [www.ready.gov](http://www.ready.gov), on ways to be prepared for emergencies. Grasping for a sense of control, as many as 3 percent of Americans may have purchased duct tape or plastic sheeting to seal off their homes. Ropeik advised Ridge to keep risk in context, noting that "even if there should be another attack, the risk to the average American is extraordinarily low." In retrospect, he says, "That calming message is not particularly appealing to a government that wants to go to war, create a new department, or pass laws that reorient our thinking about civil liberties." The benefits of duct-tape purchases, he adds, are largely limited to duct-tape manufacturers.

Shortly after Ropeik's lecture, then-Attorney General John Ashcroft announced, with fanfare and from Moscow, the arrest of José Padilla, who had allegedly plotted with others to attack a U.S. city with a "dirty bomb," a conventional bomb laced with radioactive material that could, Ashcroft said, cause "mass deaths." "He introduced this term, 'dirty bomb,' into the lexicon as a weapon of mass destruction," Ropeik says. "But, as physicists soon explained, it's *not* a weapon of mass destruction, and would not kill many more people than a conventional weapon. But by describing it as a WMD, Ashcroft did two things. He made the success in arresting Padilla seem bigger than it was. And he introduced a whole new fear to our already elevated fears of terrorism. It's impossible to say he did that part on purpose. But he nonetheless triggered those stress responses." ~CRAIG LAMBERT

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