RISKING IT ALL

Lisa Heinzerling[*]

Thank you for inviting me here today. I feel privileged to deliver this lecture honoring Daniel Meador, a beloved alumnus, former Dean, and colleague.

I congratulate the organizers of this year's three-part lecture series for choosing the topic "Risk and the Law." The topic is timely, full of rich possibilities for analysis, and as contentious as any matter in legal academics today. If you attend all of the lectures—mine, plus those by Professors Simon and Sunstein—I believe you will begin to see why issues of risk are so important and so hard, and I am certain you will come away with quite different lessons from each of us. Mine, of course, will be the least controversial.

Let me start with some facts. Before I go on, a warning: The facts I'm about to describe are the kinds of facts that probably led to the old joke about the definition of an optimist. What is an optimist, the joke goes—it's an environmentalist with children. They're not happy facts.

First. Forty-eight of our states have issued advisories telling their citizens to limit, or in some cases eliminate, their consumption of fish drawn from the rivers, lakes, and streams within their borders.[1] These fish advisories cover over 750,000 miles of rivers and about one-third of the lake acreage in the United States.[2] A fish advisory covers all of the water in four of the Great Lakes[3] and all of the lakes and rivers in twenty-one states.[4]

Second. Almost 160 million Americans live in areas that violate the federal Environmental Protection Agency's (EPA) new standard for ozone pollution.[5] Where I live, in a recent summer, there were nine days, when ozone levels exceeded the national standard—and that was under the old, more lenient standard.[6] When ozone levels are high, parents arrive at

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* Professor of Law, Georgetown University Law Center.

1. *See* EPA, FACT SHEET: NATIONAL LISTING OF FISH ADVISORIES 1 (2004), *available at* http://www.epa.gov/waterscience/fish/advisories/factsheet.pdf.

2. *Id.* at 2.

3. *Id.*

4. *Id.* at 4.

5. *See* Traci Watson, *EPA Tells 1 in 7 U.S. Counties to Clean up Smog: Worst Areas Get the Most Time*, USA TODAY, Apr. 16, 2004, at A1.

6. *See* Katherine Shaver, *Blue Skies and Code Red: Heat Helps Create Conditions for Year's 1st Severe Smog Alert*, WASH. POST, June 26, 2003, at B4.

schools and daycare centers to be greeted with notes announcing: "Code Red Day. Children will be playing inside today."[7]

Third. Frogs are disappearing all over the world, in many countries, in all kinds of habitats, and under all kinds of conditions.[8] Many people think frogs are the "canaries in the coal mine" of the aquatic world because of their special sensitivity to environmental disturbances.[9] Bees, which pollinate almost 75% of the world's cultivated crops, are also disappearing.[10] I could add many others to the list of the missing.

Fourth. Nursing mothers in many parts of the world have disturbingly high concentrations of industrial chemicals in their breast milk.[11] A recent study of mothers in the northwestern United States found PBDEs (Polybrominated Diphenyl Ethers), a chemical used in flame retardants, in every woman studied.[12] PBDEs have been found to have effects much like those of the long-banned PCBs—impaired memory and learning, altered behavior, delayed sexual development, and altered thyroid levels.[13] Some scientists have hypothesized that one reason why women who breastfeed their children have a lower risk of cancer is that they have (unwittingly) dumped some of their chemical load into their own babies' bodies.[14]

Fifth. Sometimes it seems that the word most commonly accompanying the phrase "the world's fisheries" is "collapse."[15] Fisheries the world over are being depleted. Even the once-mighty cod fisheries hover on the brink of complete disaster.[16] Once the oceans seemed an unlimited resource; now we know they are not.

Sixth. Glaciers around the world are retreating before our eyes. On Mt. Everest, a glacier near Edmund Hillary and Tenzing Norgay's first camp has retreated some three miles since their famous ascent.[17] The snows of

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7. *See id.*; Michael E. Ruane, *Regionwide, Sweatin' to the '90s: Workers Pour on the Fluids; Students Head Home or Chill in Air-Conditioning*, WASH. POST, June 12, 2002, at B3.

8. Juliet Eilperin, *Worldwide Report Says Amphibians Are in Peril: Ecological Stresses May be Taking Toll*, WASH. POST, Oct. 15, 2004, at A3; *NPR's Morning Edition: Disappearing Frogs* (NPR radio broadcast May 19, 1998), *available at* http://www.npr.org/programs/re/archivesdate/1998/may/980519.frogs.html; Nova Scotia Museum of Natural History, Are Frogs Disappearing?, http://museum.gov.ns.ca/mnh/nature/frogs/gone.htm (last visited Sept. 20, 2005).

9. Eilperin, *supra* note 8.

10. Arielle Levin Becker, *A Plea for Nature's Pollinators: Garden's Exhibits Highlight Need to Protect Crucial Creatures*, WASH. POST, Aug. 29, 2004, at C4.

11. *See* Philip J. Landrigan et al., *Chemical Contaminants in Breast Milk and Their Impacts on Children's Health: An Overview*, 110 ENVTL. HEALTH PERSP. A313, A313 (2002).

12. John Heilprin, *Potentially Harmful Chemicals Increasing in Lake Michigan, Flame-Retardant PBDEs Show Up in Women's Breast Milk, and Have Been Banned in Europe*, PHIL. INQUIRER, Nov. 26, 2004, at A23.

13. *See* Kim Hooper & Jianwen She, *Lessons from the Polybrominated Diphenyl Ethers (PBDEs): Precautionary Principle, Primary Prevention, and the Value of Community-Based Body-Burden Monitoring Using Breast Milk*, 111 ENVTL. HEALTH PERSP. 109, 109-10 (2003).

14. *See id.* at 112; *see also* Judy S. LaKind et al., *Infant Exposure to Chemicals in Breast Milk in the United States: What We Need to Learn from a Breast Milk Monitoring Program*, 109 ENVTL. HEALTH PERSP. 75 (2001) (analyzing contamination in breast milk).

15. *See* Douglas A. Kysar, *Law, Environment, and Vision*, 97 NW. U. L. REV. 675, 705 (2003).

16. *See, e.g.*, MICHAEL HARRIS, LAMENT FOR AN OCEAN: THE COLLAPSE OF THE ATLANTIC COD FISHERY 63-64 (1999).

17. *See* Stentor Danielson, *Everest Melting? High Signs of Climate Change*, NAT'L GEOGRAPHIC

Kilimanjaro are leaving us as well: the mountain that Hemingway once described as "wide as all the world, great, high, and unbelievably white in the sun"[18] will, if current trends continue, lose its ice and snow by about 2020.[19]

Seventh. Growing seasons are changing. There are more early and late frost events threatening disruptions to agriculture.[20] Birdsong comes earlier in the spring, and spring flowers arrive in the winter.[21]

Last. A study commissioned by the Pentagon—subtitled "Imagining the Unthinkable"—describes the food and water shortages, refugee emergencies, and national security crises that could occur if the climate changes abruptly, over the next 20 or so years, rather than gradually, over the next century.[22]

I'll stop here so we can all finish our day without spiraling into despair. None of this is pleasant to contemplate. If the Earth were our body, we would run, not walk, to the doctor's office. We would tell the doctor we felt sick, tired, and just not well. Maybe we'd even say we felt like we were dying. We would ask what was wrong with us and what could be done to help us.

Now suppose the doctor said:

> You sure do seem sick to me. And we've got evidence of what's causing your harms. We're not 100% sure, but most doctors agree on the cause. Unfortunately, some of the insurance companies that would have to pay for your treatment don't agree that you're really sick. They also say that even if you are sick, we don't know what's causing it. There is good news, though: We do know how to cure you, or at least make you feel better, if we're right about what's making you sick.

What would you say to the doctor? Wouldn't you doubt the medical opinion of the companies that have a financial stake in denying that you're sick and denying that we know why? Wouldn't you ask for the cure?

Now let's return to Earth, so to speak.

NEWS, June 5, 2002, http://news.nationalgeographic.com/news/2002/06/0605_020604_everestclimate.html.

18. ERNEST HEMINGWAY, THE SNOWS OF KILIMANJARO AND OTHER STORIES 27 (1927).

19. *See Snows of Kilimanjaro Shrinking*, WASH. POST, Oct. 21, 2002, at A9.

20. *See* Media Alert, NASA Earth Observatory, Climate Change Shifts Frost Seasons & Plant Growth (Oct. 16, 2000), http://earthobservatory.nasa.gov/Newsroom/MediaAlerts/2000/200010164120.html.

21. *See* James Owen, *Early Birds: Is Warming Changing U.K. Breeding Season?*, NAT'L GEOGRAPHIC NEWS, June 3, 2003, http://news.nationalgeographic.com/news/2003/06/0603_030603_christmasowls.html.

22. *See* Peter Schwartz & Doug Randall, *An Abrupt Change Scenario and Its Implications for United States National Security*, Oct. 2003, *available at* http://bloodbankers.typepad.com/submerging_markets/Pentagon.pdf.

For all of the problems I mentioned at the outset, there is a large body of scientific evidence showing that the causes of the problems are, at least in substantial part, the byproducts (or products) of modern industrial society—mercury emissions from power plants and other sources, ozone formed from car and factory pollution, and greenhouse gas emissions from burning fossil fuels.[23]

Granted, our knowledge isn't anywhere near perfect. We often aren't sure exactly how high exposures have to be in order to cause harm. We often don't know what the implications of harms in animals are for humans. Lots of problems have more than one cause, which makes things even more complicated. But, I submit, we know enough—in each of the scenarios I've described and in many others—to put us on our guard. To return to my medical analogy, we know enough to know we're not well, and to ask for help.

One of the most pointed expressions of this idea—that we might not know it all, but at the same time we know enough to be wary—comes from the Berkeley scientist, Tyrone B. Hayes, who has studied the effects of atrazine on frogs.[24] Atrazine is one of the most commonly used herbicides in this country.[25] Hayes has found that it causes reproductive abnormalities in frogs.[26] Hayes has described the implications of his findings in this way: "I'm not saying it's safe for humans . . . . I'm not saying it's unsafe for humans. All I'm saying is that it makes hermaphrodites of frogs."[27]

So we know we don't know everything, but we know enough to be suspicious, to be careful, to look for a treatment or even a cure.

Here's the amazing and wonderful part: we don't have to look that far. For each of the problems I identified at the beginning of this Lecture, we have—like the hypothetical doctor of my medical analogy—a treatment we can offer our ailing patient. Control technologies, process changes, efficient technologies, and even, maybe especially, conservation could be pressed into service to address the problems I've identified and others I haven't mentioned.

In addition, we know that almost every time we've tried to solve an environmental problem in the past, good old American ingenuity has come to the rescue and provided solutions that are better, more efficient, and less expensive than we expected.

And, to put the last nail in the coffin of the problems I identified at the outset, we have plenty of laws on the books that could, in principle, require that we use the technologies and other means we possess to solve the prob-

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23. *See* Lisa Heinzerling, *The Clean Air Act and the Constitution*, 20 ST. LOUIS PUB. L. REV. 121, 121 (2001).

24. *See Weed Killer Deforms Frogs in Sex Organs, Study Finds*, N.Y. TIMES, Apr. 17, 2002, at A19.

25. *Id.*

26. *Id.*

27. *Id.*; *see* FRANK ACKERMAN & LISA HEINZERLING, PRICELESS: ON KNOWING THE PRICE OF EVERYTHING AND THE VALUE OF NOTHING 223 (2004) (quoting *Weed Killer Deforms Frogs in Sex Organs, Study Finds*, N.Y. TIMES, Apr. 17, 2002, at A19).

lems we face. The laws, in fact, are so good, so strong, in many cases so clear, that people who try to address risks in fields other than environmental law (like food safety and workplace health and safety) are well-known to have a bad case of "statute envy."

So what's happening? Why are we offering such incompetent health care to our planetary patient? Why aren't our laws saving us?

I believe the answer has to do with the anti-regulatory fever that has gripped Congress, the agencies, and many academics in recent years. Each time a new regulation is proposed, a now-predictable set of stories and arguments is wheeled out to undermine the case for the new regulation. The trouble is, the stories are false, and the arguments are weak—but they're still winning the day.

Let's start with the scare stories. Anybody who has spent time studying the regulation of risk in this country has surely run into long, impressive-looking tables showing how much we spend to save a human life through regulation. The numbers are arresting. The most famous of these tables, compiled by an economist named John Morrall who works for the Office of Management and Budget (OMB), shows that we often spend tens or hundreds of millions of dollars to save a single human life.[28] Once, according to Morrall, we even spent $72 billion to save a life through a formaldehyde rule issued by the Occupational Safety and Health Administration in the 1980s.[29] Morrall concluded that the worst-performing regulations were health and environmental regulations.[30] Safety regulations—aimed at doing things like putting smoke alarms in airplanes—fared much better, according to his analysis.[31]

There are many problems with this story. One is that many of the rules on Morrall's list were never implemented by any regulatory agency, yet they continue to be cited by other regulatory observers as part of the case against runaway federal regulation.[32] Another problem is that many of the benefits of the health and environmental rules that Morrall thought cost so much were not quantified, and thus, his list understates the benefits of the rules in question.[33] For example, many environmental rules prevent a certain number of cases of human cancer, but they also do many other good things—protect against other fatal illnesses; protect against other, nonfatal illnesses; and protect other species and ecosystems. But the only benefit quantified in Morrall's list for these rules was the prevention of cancer.[34]

A last example of the problems with this list is perhaps the most fundamental. In his analysis, Morrall employed a controversial technique called

28. ACKERMAN & HEINZERLING, *supra* note 27, at 44-45.
29. *Id.* at 43.
30. *Id.* at 45.
31. *Id.*
32. *Id.* at 47-49.
33. *Id.* at 50.
34. *Id.*

"discounting."[35] Discounting is most commonly used for financial decisions in which one is trying to compare an amount of money received in one time period to an amount of money received in another time period.[36] If, say, you're trying to figure out whether it's better to receive $100 today or $200 in ten years, you'll want to know how much interest you'd receive on the $100 for ten years so that you can know which amount of money will turn out to be better for you. To do this, you convert the $200 you receive in ten years from now to "present value" using a discount rate which reflects, among other things, the rate of return you would receive on the $100 you could choose to receive today. Discounting is essentially compound interest in reverse. Just like compound interest can magically convert a small amount of money invested today into a very large amount of money in the future, discounting similarly can convert a very large amount of money received in the future into a very small amount in today's terms.

Now let's return to Morrall's list. Morrall did not apply a discount rate to a financial investment but to human lives saved in the future.[37] As I've said, the only quantified benefit of the most costly rules on the list was the prevention of cancer. Cancer typically has a long latency period—a long interval between exposure to a carcinogen and the manifestation of disease.[38] Morrall discounted the lives saved due to cancer prevention to reflect the latency period of the disease.[39] Thus, for example, if a rule prevented ten cases of cancer that would manifest themselves 25 years from now, Morrall discounted those ten cases over 25 years at a very high rate of 10 percent per year. This discounting had the effect of trivializing the benefits of the most costly rules on his list. In my own work, I have found that if one does not apply discounting to the rules on Morrall's list, the cost per life saved of those rules drop by several orders of magnitude—by as much as 1,000 times.

Why discount? Morrall and other economists have argued that discounting human lives, as if they were a financial investment, is appropriate because people prefer distant harms to immediate harms.[40] But when we're talking about risks of harms, this is not at all clearly the case. Many people fear cancer much more than they fear other diseases—even diseases that might manifest themselves sooner than cancer—and have proven willing to pay more to avoid cancer than other diseases.[41]

In addition, notice the large value judgments lurking in the seemingly arcane decision to discount. Is a life saved due to cancer prevention worth less than a life saved via fire safety? Are the lives of people in future gen-

35. *Id.* at 51.
36. *Id.* at 51-52.
37. *Id.* at 52.
38. *Id.* at 51.
39. *Id.*
40. *Id.* at 191-92.
41. *See* Lisa Heinzerling, *Environmental Law and the Present Future*, 87 GEO. L.J. 2025, 2050 (1999).

erations worth almost nothing at all? These are the value judgments obscured by the technical debates over discounting. I believe we ought to bring these judgments out into the open and not hide them in a list of numbers.

Here's another scare story used to undermine the case for protective regulation. When he was head of the Harvard Center for Risk Analysis, John Graham and several co-authors looked, as John Morrrall had before them, at the costs of various life-saving interventions.[42] They found, like Morrall, that some interventions cost a great deal. Unlike Morrall, they looked not only at regulatory costs, but also at the costs of non-regulatory interventions like medical treatments.[43] Again, they found that environmental rules fared the worst.

Graham and his co-author Tammy Tengs tried, in later work, to determine the opportunity costs of choosing one set of life-saving interventions over another.[44] What they found was notable: they found that if we shifted our life-saving resources to the most cost-effective life-saving interventions, we could save 60,000 more lives per year while spending the same amount of money.[45] Graham has used this figure to accuse regulatory agencies of engaging in "statistical murder" when they issue rules with high costs.[46] Graham implies that they are engaging in statistical murder because they could be saving more lives by doing something else.

There are many problems here, as well. Again, many rules on Graham and Tengs' list were never issued by any agency; indeed, many were never even proposed.[47] Of the ninety environmental rules listed by Graham and Tengs, seventy-nine were never implemented.[48] It's hard to make a case against the current regulatory situation based on rules that do not exist.

Another problem with using the Graham-Tengs Study to argue against environmental protection is that the vast majority of the 60,000 lives in their analysis were saved due to shifting priorities in the health care and safety fields—*not* the field of environmental regulation.[49] This has not stopped Graham, however, from using his proposal to argue against environmental regulation.[50] And these days, his arguments simply can't be ignored: he's the head of the regulatory office within the White House that reviews all major federal rules before they can be issued.[51] And he hasn't hesitated to

42. ACKERMAN & HEINZERLING, *supra* note 27, at 45.
43. *Id.* at 239 n.7.
44. *Id.* at 45-47.
45. *Id.* at 43, 53.
46. *Id.* at 43.
47. *Id.* at 49.
48. *Id.* at 55.
49. *Id.* at 53.
50. Ellen Nakashima, *For Bush's Regulatory 'Czar,' The Equation is Persuasion*, WASH. POST, May 10, 2002, at A35.
51. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 110-11.

send rules back to the agencies when he thinks they don't jibe with the President's policies and priorities.[52]

One final scare story merits our attention. I have recently written a book on economic analysis of environmental policy with an economist named Frank Ackerman. Frank likes to call this last scare story the "regulations of mass destruction" story. The claim in this story is that costly regulations are actually killing people because they're so costly.[53] The theory is that when regulations impose costs, individuals end up paying the costs, and when they do, they have less money to spend on health care and other things that make them healthier and help them live longer.[54] How much does a regulation have to cost to kill someone? Estimates have ranged from as low as 3 million dollars to as high as 50 million dollars.[55]

What's wrong with this story? There are lots of problems, but I'll focus on the most basic. The people who propound the "regulations of mass destruction" theory never take into account the fact that regulatory costs don't just vanish into a hole. Regulation doesn't require firms to just burn money. Instead, regulation requires firms to put on control technology, to change production inputs, to opt for efficient equipment, and so forth. All of these things cost money, it is true, but the money spent goes to someone—it goes to the firms that make the control technologies and other things that lead to regulatory compliance.[56] Pollution control is a huge business in this country, and the "regulations of mass destruction" story hasn't grasped this basic fact.

Now I'd like to turn away from the scare stories and focus on a different kind of argument that has been used to undermine protective regulation in recent years. That argument is offered under the banner of so-called "sound science." The argument is that courts and agencies have not engaged in "sound science" in imposing liability on risk-producing industries and in issuing regulations to reduce risk; they have, in fact, used "junk science" in doing so.[57] What we need, according to this school of thought, is better science before we regulate.

I think it's worth noting the origins of this line of argument. The focus on the mirror images of "junk science" and "sound science" was something dreamed up by none other than the tobacco industry.[58] When it started to

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52. *See* Nakashima, *supra* note 50.

53. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 53-56.

54. *Id.* at 56.

55. *Id.* at 56-57.

56. *See id.* at 58.

57. *See* Steven Milloy, *Smoggy Statistics*, FOX NEWS CHANNEL, Nov. 18 2004, *available at* http://www.foxnews.com/story/0,2933,139013,00.html (criticizing statistical study of smog's lethality).

58. *See* Jonathan M. Samet & Thomas A. Burke, *Turning Science Into Junk: The Tobacco Industry and Passive Smoking*, 91 AM. J. PUB. HEALTH 1742, 1742-43 (2001) (discussing the smoking industry's attempts to discredit scientific data linking active and secondhand smoke to health problems); *see also* Derek Yach & Stella Aguinaga Bialous, *Junking Science to Promote Tobacco*, 91 AM. J. OF PUB. HEALTH 1745, 1745-47 (2001) (criticizing the tobacco industry for attempting to cloud scientific evidence linking smoking to health problems).

become clear that smoking threatened not just smokers but the people around them who breathed secondhand smoke, the tobacco industry became very worried that its longstanding fixation on the voluntary nature of the risks of smoking would no longer carry the day.[59] So the industry decided to start funding attacks on the kind of science (epidemiology and risk assessment) used to demonstrate the harms of secondhand smoke.[60] These attacks, if successful, would redound to the benefit of the tobacco industry, but they wouldn't come directly from the industry itself and, therefore, would appear more credible.

One of the largest fruits of these efforts is something called the "Data Quality Act," also known as the "Information Quality Act," a one-paragraph measure slipped into an appropriations bill without debate.[61] The law directs the OMB to issue guidelines to ensure the reliability of information disseminated by federal agencies.[62] It seems harmless enough, but in the hands of those opposed to protective regulation, it is proving an important tool. Many complaints have been filed against agencies for allegedly disseminating unreliable scientific information.[63] Some have been bold indeed. One group took the EPA to task for alleged inaccuracies in public comments filed by a private group.[64] Another group recently complained about information offered by states with respect to an environmental matter.[65] The Data Quality Act threatens to divert precious agency resources, requiring them to respond to petty and self-interested complaints from the industries regulated by the agencies.

Another product of the "sound science" movement has been an obsession with scientific peer review.[66] Let me hasten to say I don't think there's anything wrong with peer review. But many agencies, especially the EPA, which has come under some of the most withering attacks from the "sound science" crowd, already engage in peer review and heavily rely on peer-reviewed studies in coming to their decisions.[67] Requiring even more peer review threatens, again, to divert precious agency resources to a task that has little to commend it.

I could go on. There are many unsettling developments underway which pose a real danger to the scientific enterprise. We are seeing a large-scale

59. *See* Samet & Burke, *supra* note 58.

60. *See* Yach & Bialous, *supra* note 58.

61. *See* SEAN MOULTON & CHERYL GREGORY, OMB WATCH, THE REALITY OF DATA QUALITY ACT'S FIRST YEAR: A CORRECTION OF OMB'S REPORT TO CONGRESS 2 (2004), *available at* http://www.ombwatch.org/info/dataqualityreport.pdf.

62. *See id.*

63. *See id.* at 6.

64. *See Industry Targets University Research Under Data Quality Act*, INSIDE EPA, Apr. 25, 2003, at 13; *see also* EPA, INFORMATION QUALITY GUIDELINES—REQUESTS FOR CORRECTION (RFC) AND REQUESTS FOR RECONSIDERATION (RFR) SUBMITTED TO EPA, http://www.epa.gov/quality/informationguidelines/iqg-list.html (last visited Sept. 20, 2005).

65. *See* EPA, *supra* note 64.

66. Karl S. Bourdeau, *Information Quality Act Challenges to Flawed Use of Science*, 19 NAT. RESOURCES & ENV'T 41, 46-47 (2002).

67. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 110-15.

infusion of politics into the scientific process. We are also witnessing quite ferocious attacks on the scientists who dare to publish research that makes the case for more protective environmental regulation. Tyrone Hayes, the scientist I mentioned earlier who has shown a link between the herbicide atrazine and reproductive abnormalities in frogs, is one of many scientists who has suffered destructive attacks on his scientific integrity as a result of his research.[68]

My basic point is this: the call for "sound science" is a veiled effort to undermine the scientific case for protective regulation. Because "sound science" sounds so good, so reasonable, it is hard to mount an attack against this movement. People who do are accused of being against science itself. Nothing could be farther from the truth. Science has always been the friend of environmental protection, and if allowed to maintain its independence, it always will be. It's scientists, after all, who told us about mercury in fish, the harms of ozone, the disappearing frogs and bees, the retreating glaciers, and on down the depressing list I provided at the outset.

Beyond the scare stories and sound science lie arguments about economics—arguments that form the final part of this anti-regulatory "trilogy," if you will. These arguments draw upon the scare stories I have described, claiming that because regulation has done such a bad job—costing lots of money, setting misguided priorities, even killing people—we need a new way of deciding what to regulate and how much. And that new approach is cost-benefit analysis.

Professor Sunstein, who will deliver a lecture in this series in the spring, has proclaimed the arrival of the "cost-benefit state."[69] He thinks the debate over cost-benefit analysis is over, that the proponents of this analysis have won the day, and that we should move on to second-order questions about how to make the analysis as good as possible.[70]

I disagree. Not only has cost-benefit analysis not won the day in academia—I'm living proof of this fact—but it has not won the day in the law. Only one of our environmental laws calls for formal cost-benefit analysis, including the criterion of "willingness to pay."[71] That law is the Safe Drinking Water Act, with the cost-benefit provision at the bottom of the large controversy over EPA's revised standard for arsenic in drinking water several years ago.[72]

Most of our environmental laws do not require or even allow cost-benefit analysis. Some prohibit the consideration of costs altogether.[73] Most

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68. *See* Kerry Tremain, *Profile: Hopping Mad*, SIERRA MAG., July-Aug. 2004, at 20, 22.

69. *See* CASS R. SUNSTEIN, THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION ix (2002).

70. *See id.*

71. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 168; *see also* 42 U.S.C.A. § 300g-1(b)(3)(C)(iii) (1996).

72. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 91-92.

73. *See* Jill DiPasquale, *John Graham, Office of Information and Regulatory Affairs: More Than a Watchdog: Regulator Broadens OIRA's Role*, FED. TIMES, May 19, 2003, at 22.

allow the consideration of costs but do not contemplate the quantification and monetization of environmental benefits. Instead, most environmental statutes, in essence, require polluting firms to do their best—to install the best control technology or engage in the cleanest production processes they can. The fundamental difference between this form of regulation and cost-benefit analysis is that it is not indifferent between regulating and not regulating; it does not, as cost-benefit analysis does, take a "show me" approach, which starts out by assuming that it would be just fine to do nothing in response to the environmental problem at hand, so long as the numbers work out that way.

So cost-benefit analysis has not won the day in the statutes on the books. But it has gained large influence in recent years due to John Graham's role as our "regulatory czar."[74] On his watch, cost-benefit analysis has become an important weapon against protective regulation.[75] He has been more aggressive than any of his predecessors in policing agency rules and rejecting rules that do not meet his economic criteria.[76] He has asserted that he does all of this in the name of "smart regulation."[77] But the trouble is, his office doesn't bother to do economic analysis when the proposal being considered is for deregulation rather than regulation. In other words, at OMB today, cost-benefit analysis continues to be what it has always been—a one-way street to deregulation.

Even if cost-benefit analysis were performed evenhandedly, its results would tend to skew against environmental protection. There are several reasons for this.

First, cost-benefit analysis requires numbers: it requires the analyst to first quantify the costs and benefits of a decision. For benefits of environmental rules, this means quantifying the human lives saved, human illnesses averted, and ecological harms prevented by the rules. However, as I have said, in many cases the only benefit that can be quantified is the prevention of cancer. This means, in the formal cost-benefit analysis, there will be a big fat "zero" in the column of benefits other than cancer prevention—even when those benefits are real and important.

Sometimes cost-benefit analysts will try to address this problem by describing, in qualitative terms, the unquantified benefits of a rule. But when push comes to shove, observers have tended to focus on the numerical bottom line and have left all of the unquantified benefits behind. Indeed, several years ago, a federal court overturned the EPA's ban on asbestos partly because it concluded that the agency could not rely in any significant way on unquantified benefits in justifying the ban.[78]

74. Nakashima, *supra* note 50.

75. *Id.*

76. *Id.*

77. *See* Amy Goldstein & Sarah Cohen, *Bush Forces a Shift in Regulatory Thrust: OSHA Made More Business-Friendly*, WASH. POST, Aug. 15, 2004, at A1.

78. *See* ACKERMAN & HEINZERLING, *supra* note 27, at 250 n.41.

So here we see an initial, large problem with cost-benefit analysis: insofar as regulatory benefits must be quantified in order to be taken seriously by regulators, much environmental protection starts off facing an uphill battle.

It only gets worse as the analysis continues. Cost-benefit analysis also requires the translation of regulatory costs and benefits into monetary terms—the "monetization" of things like life, health, and nature. Since lives, health, and nature aren't sold directly in the marketplace, economists have had to devise a way to measure their dollar worth indirectly.

People do pay money to decrease risks in their daily lives. They buy safer but more expensive cars. They pay for health club memberships. They buy homes in more expensive but less crime-ridden neighborhoods. The idea is, if we can figure out, for example, how much the additional safety features in a safer car cost, we can come to some conclusion about how much people are willing to pay to avoid the risk of injury in an automobile accident.[79]

Another approach is to study whether workers in risky jobs are paid more than workers in less risky jobs, and if so, to figure out how much of the extra wage is attributable to the risk alone.[80] Based on these so-called "wage premium" studies, the EPA concluded in the late 1990s that a human life was worth a little over six million dollars.[81]

In order for these kinds of studies to be useful, of course, we need to know several things. We need to know that the people who are making these indirect tradeoffs between money and risk actually know the tradeoffs they face, understand the risks, and have, nonetheless, decided to make a tradeoff.[82] We need to know that they made this choice freely—that they weren't pressed by dire economic circumstances, for instance, to take on a dangerous job. Otherwise, instead of measuring "willingness to pay," we might only be measuring ability to pay.

To understand other problems with valuing life in monetary terms, there is some terminology you must know. When economists talk about the value of preventing death, they say they are preventing the loss of so-called "statistical lives."[83] So the six-million-dollar value I mentioned would be referred to as the value of a "statistical" life. What does this mean?

To explain this idea, I have to back up. Imagine that we are trying to figure out the value of life and death itself. Imagine that someone asks you how much you would be willing to pay in order to avoid having that person kill you. My strong suspicion is that your answer would depend completely on how much money you have in the bank to offer that person. Your answer, in other words, would reflect ability rather than willingness to pay. If

79. *See id.* at 2.
80. *See id.* at 2, 75.
81. *See id.* at 61.
82. *Id.* at 76-77.
83. *Id.* at 67.

you have $100 and Bill Gates has billions, I do not believe this means you value your own life less than Bill Gates values his.

Even if you turn the question around, problems remain. Suppose the person asks you how much you are willing to accept in order to allow that person to kill you. I suspect that most people would say, "Are you crazy? No thanks. No deal. I'm not in the market for death right now."

Economists have recognized this problem for some time. Years ago they came up with an answer: the concept of statistical life. Instead of thinking about the value of life in terms of life itself, economists began to think about the value of small risks to life.[84]

The way the process works is this. For simplicity's sake, suppose 100 people each face an increased risk of dying of 1/100. Suppose each person is willing to pay $1 to avoid this risk. In this case, we would say that the value of the "statistical life" in question is $100: 100 people pay a total of $100 to avoid the death of one person. A "statistical life" is an aggregation of life-threatening risks in a population such that, if the risk is not avoided, one person will die as a result of the risk.[85]

Economists will tell you that there is a large difference between a life and a "statistical" life. They will tell you that valuing statistical life in terms of money is perfectly fine and involves no moral dilemma, even if valuing non-statistical lives in terms of money would be morally problematic. If I ask you how much you will pay me to avoid having me kill you, you will likely not just think I have made a faux pas; you will likely think I have misunderstood some of the basic norms that underlie a civilized society.

But what makes statistical lives different from non-statistical lives? Only the inability to identify the people who have died. When 100 people each face an extra 1/100 risk of cancer due to exposure to a chemical, we can almost never identify who ended up being the unlucky one to die from that exposure. When economists talk about "statistical" lives, they are referring to the fact that we cannot know who will end up dying if we decide it's not worth it to protect them.

I believe this inability to identify the people who have died from environmental exposures is not a morally relevant consideration. In reality, there are no "statistical" people. When a person dies, even if we don't know why, she really dies; her family really grieves; her friends really mourn her loss. The modifier "statistical" makes it seem as though she is a phantom, a ghost, not real. But this is false.

Thus the contrivance of "statistical life" glosses over, but does not resolve, the fundamental moral dilemmas at the heart of deciding whether one person will be allowed to harm another because of economic expediency.

84. *See id.*
85. *Id.* at 68.

There are many other problems with cost-benefit analysis in the context of environmental protection. Let me mention another one, a big one, in closing.

Many of the environmental problems we face today are potential, imminent, or even ongoing catastrophes. The contamination and depletion of our fisheries, the large-scale consequences of global warming, the loss of biodiversity—all of these are catastrophic matters. They are catastrophic because of their scope and also because of their irreversibility; when the last frog dies, we cannot make a new one.

Economics is not good at advising us about how to deal with catastrophes. Economics finds its most comfortable home at the margins of problems, figuring out how to do something most cheaply, identifying incentives that will influence behavior at the margin, and determining price fluctuations based on rather small changes in supply. When outcomes are discontinuous, irreversible, or disastrous, economic analysis will lead us astray.

I began by identifying some of the enormous and terrible environmental problems we face today. I've tried to solve the mystery of why we aren't doing more about them by telling you about the scare stories, unsound science, and misplaced economics that have been used to argue against protective regulation. I'd like to close on an optimistic note—a genuinely optimistic note.

I will take just one of the problems I mentioned at the outset, and I will tell you how we might begin to solve it using just the laws and scientific knowledge we have today. The problem is mercury pollution. Mercury contamination is responsible for about three-quarters of the fish advisories I described.[86] Mercury accumulates in fish; we eat the fish; we then are exposed to mercury and its effects.[87]

If we lower mercury emissions, there is good evidence we can see a rapid and positive response. A recent study in the Everglades looked at mercury concentrations in fish before and after new restrictions on incinerators went into effect.[88] Mercury levels in the fish dropped noticeably within just a couple of years, and they dropped in the area around the plants affected by the new restrictions.[89] Also, evidence from Canada is showing us that "new" mercury deposition (the kind prevented by new regulations) is the most bio-available to fish, and thus, the most risky to us—to put the point positively, to get rid of new deposition is to get rid of the mercury that's most threatening to our health.[90] There is more good news: companies ex-

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86. *See* U.S. Geological Survey, *Fish Advisories Nationwide*, Nov. 27, 2002, http://minerals.usgs.gov/mercury/advisories.html.

87. *See* Heinzerling, *supra* note 41, at n.63.

88. *See* Press Release, Florida Department of Environmental Protection, Florida Everglades Study Reveals Decline in Mercury Levels (Nov. 6, 2003), *available at* http://www.dep.state.fl.us/secretary/news/2003/nov/1106.htm.

89. *Id.*

90. *See* The Academy of Natural Sciences, New Mercury Becomes Bioavailable Faster (Apr. 24, 2002), http://www.acnatsci.org/press/mercury.html.

pecting a new rule for mercury from power plants have been feverishly working to develop new technologies for controlling mercury.[91] And if these new technologies for some reason aren't used, then the alternative technologies we would use to control mercury also control other harmful air pollutants.

And we already have a law on the books, section 112 of the Clean Air Act, which clearly instructs the EPA to set a strict new rule for mercury in the circumstances in which we find ourselves.[92] Thus, both current science and current law are aligned in a way to make us hopeful about what we can do to solve the mercury problem.

Unfortunately, so far the EPA has not seen it this way, and it has proposed a terribly weak rule for mercury from power plants which might not produce any new restrictions on mercury for over almost fifteen years.[93] It's interesting to note that all the scare stories, arguments about sound science, and economic claims I've discussed today have been deployed in defense of this bad rule.

I think we should try it my way instead. Be attentive to the problems we face. Be happy and hopeful when there's a treatment for them. And try, as best you can, to ignore—or better yet, rebut the arguments of—the skeptics who tell us we're not sick, or if we are no one knows why, or if they do, we shouldn't reach for a cure.

91. Press Release, Northeast States for Coordinated Air Use Management, New NESCAUM Report Shows Mercury Controls Now Feasible: U.S. EPA Urged to Act (Sept. 6, 2000), *available at* http://bronze.nescaum.org/airtopics/mercury/pr0906000hg-innov-tech-press-release.pdf.

92. *See* 42 U.S.C. § 7412 (2000 & Supp. 2005).

93. *See* EPA, FACT SHEET: EPA PROPOSES OPTIONS FOR SIGNIFICANTLY REDUCING MERCURY EMISSIONS FROM ELECTRIC UTILITIES (2004), *available at* http://www.epa.gov/air/mercuryrule/hg_factsheet1_29_04.pdf.