1990

Risk, Courts, and Agencies

Clayton P. Gillette
NYU School of Law, Gillette@exchange.law.nyu.edu
James E. Krier
University of Michigan Law School, jkrier@umich.edu

University of Pennsylvania Law Review

FOUNDED 1852

Formerly
American Law Register

VOL. 138 APRIL 1990 No. 4

ARTICLES

RISK, COURTS, AND AGENCIES

CLAYTON P. GILLETTE† AND JAMES E. KRIER††

Risk inheres in our condition. Whether brought on by nature in such forms as earthquakes and disease, or by humans with mundane

† Professor of Law and Harry Elwood Warren Scholar in Municipal Law, Boston University.

†† Earl Warren DeLano Professor of Law, University of Michigan.

Earlier versions of this Article were presented in workshops at the University of Arizona, Boston University, Harvard University, the Hoover Institution at Stanford University, Georgetown University, the University of Iowa, the University of Michigan, Northwestern School of Law of Lewis and Clark College, Northwestern University, the University of Pennsylvania, and the University of Southern California. We are grateful for comments from the participants and from the following colleagues and friends: Kenneth Abraham, Robert Abrams, T. Alexander Aleinikoff, Gregory Alexander, Robert Bone, David Carlson, Ronald Cass, Richard Craswell, Merritt Fox, Jason Johnston, Leo Katz, Jeffrey Lehman, Richard Lempert, Peter Menell, Roger Noll, Christine Papajohn, Richard Pildes, Daniel Polsby, Lawrence Sager, Frederick Schauer, Gary Schwartz, Steven Shavell, Kenneth Simons, Mark Van Putten, and Peter Westen. Research support was provided by Boston University School of Law and the William W. Cook Endowment for Legal Research at the University of Michigan.

machines like the automobile and high technologies like nuclear energy, hazard is ubiquitous and inevitable. Hence selective aversion to certain risks, most particularly to the manmade risks of advanced technologies, can prove to be counterproductive. Selective aversion might foreclose progressive new technologies that are, despite their dangers, on balance beneficial. A world with vaccines and nuclear power plants is not perfectly safe, for example, but might be safer than a world without. In other words, though risk by definition is costly, avoiding risk is costly as well.[1] It entails the costs of controls and other risk-reduction measures, and at times the costs of forgone benefits (a risky new technology might guard against even more threatening natural hazards, such as disease; it might displace the greater risks of a technology already in place, or produce units of output at a lower cost than the existing technology, or both). So the objective of risk management must be not the elimination of risk, but rather the minimization of all risk-related costs.[2]

All of this sounds platitudinous, yet it happens to be extraordinarily controversial — especially in the case of "public risks," a recently coined name for the distinctive hazards of high-tech times. Public risks have been defined as manmade "threats to human health or safety that are centrally or mass-produced, broadly distributed, and largely outside the individual risk bearer's direct understanding and control."[3] "Private risks," in contrast, are either of natural ori-

---

[1] Technically speaking, "risk" refers only to the probability of an event, with something like "gravity" designating its possible adverse consequences. Moreover, "risk" has classically referred only to probabilities that can be precisely estimated, all other instances being consigned to the realm of "uncertainty." *See, e.g.*, F. KNIGHT, RISK, UNCERTAINTY, AND PROFIT 19-20, 197-232 (1921) (arguing that the crucial difference between risk and uncertainty is that the former is "measurable" while the latter is "immeasurable"). Following current practice, we ignore the foregoing distinctions and use risk *in the technical sense* to mean an expected value arrived at by multiplying the potential adverse consequences of an event — loosely, its costs — by the probability that the event will occur (the probability might be objective or subjective). Later, we introduce and consider the meaning of risk *in the popular sense. See infra* notes 124-75 and accompanying text.

[2] The objective, in other words, is to minimize the *sum* of the costs of risk and the costs of avoiding risk. *Cf.* G. CALABRESI, THE COSTS OF ACCIDENTS 26 (1970) (stating "as axiomatic that the principal function of accident law is to reduce the sum of the costs of accidents and the costs of avoiding accidents"). While risk cost minimization is an important end of risk management, it is not the only one. For example, the distribution of risk — demographically, spatially, and temporally — also has to be considered, partly for reasons of justice and partly because distribution has a bearing on the measure of risk costs that one might hope to minimize. *See infra* notes 145-47 and accompanying text.

[3] Huber, *Safety and the Second Best: The Hazards of Public Risk Management in the Courts*, 85 COLUM. L. REV. 277, 277 (1985).

gin or, if manmade, produced in relatively discrete units, with local impacts more or less subject to personal control. In these terms, then, disease is a natural private risk; the hazards of commonplace artifacts like automobiles and wood stoves are manmade private risks. Public risks, on the other hand, originate in new or complex technologies like chemical additives, recombinant DNA, mass-produced vaccines, and nuclear power plants.[4]

The public-private distinction is hardly perfect (consider the pollution pouring into the atmosphere from thousands of automobiles, or from thousands of wood stoves), but it is useful enough, especially for purposes of illuminating a currently important controversy that centers on the idea of cost minimization in the risk context.[5] Public risks are precisely the risks that have recently captured the attention of the legal community and the world at large, in no small part because they give rise to such novel problems for lawyers and such grave apprehensions among lay people. Public risks have moved the legal system to relax doctrines — regarding, for example, standards of causation and culpability, burdens of proof, sharing of liability — that were designed to deal with the private risks that once dominated the landscape. And public risks have moved lay people to intensify their demands for risk control measures. These developments suggest that public risks are subject to especially harsh treatment, yet such treatment might often be contrary to minimizing the sum of all risk-related costs. If some public risks, whatever their dangers, are in fact safer or otherwise more beneficial than the risks they would displace, then cost minimization requires open-minded efforts to encourage many of the very technological threats that current legal and popular opinion would instead deter. As a consequence, the question of what to do about public risk has become a subject of considerable (and sometimes heated) debate.

That debate is our concern throughout all that follows. We begin in Part I with a summary of the contending views in the ongoing argument about public risk, giving particular attention to two important points of contention. The first of these has to do with attitudes. The general public, and to some degree the legal system as well, have a particular aversion to public risk. Is this justified? The

---

[4] *See id.* at 277-78.

[5] Huber acknowledges that the public-private distinction is a simplification: "[R]isk distributions come in a continuum, not in two neat categories." *Id.* at 278 n.4. While this is obviously true enough, the distinction nevertheless nicely captures the essence of the risk debate that concerns us in this Article. Those interested in refining the categories should find some suggestions implicit in our discussion.

second point of contention, intimately related to the first, has to do with institutions, and especially with judicial versus administrative rule. At present, the courts are playing an important part in shaping the legal response to public risk. Is this sensible?

According to one powerfully stated outlook — an outlook that runs directly against the grain of prevailing sentiments — the answer to each of the foregoing questions is a firm "no." Our actions increase, rather than minimize, risk costs. We worry too much about public risks and not enough about private ones. We control public risks with a haphazard mix of market, judicial, administrative, and legislative measures that too often proceed in the wrong direction, without coordination, and with too little reliance on agencies and too much on courts. The courts especially are said to pander to uninformed and irrational risk attitudes; their decisions show a myopic bias against new technology and in favor of its victims. New or complex technologies are subjected to a degree of scrutiny that riskier but established (often private) risk sources never underwent and could not survive. As a result, we have too much private risk and too little public risk, not more safety but less.[6]

Some of the critics advancing this line call for a reduction of the judicial role in risk assessment and management, and for more reliance on administrative agencies. Agencies, they argue, have more expertise, are more objective and rational, can be more attentive to the net effects of technological advance. Courts, they conclude, should defer to them.

This is the set of views that we call into question here. After sketching the lines of debate in Part I, we turn in Part II to a prefatory discussion about why risk has to be regulated at all, and under what circumstances. Part III and much of Part IV then address the debate about institutions, taking up courts and agencies in turn. In Part III, we model the litigation process in a way that suggests how courts might well be managing risk much more productively than one would at first suppose. In Part IV, we pursue a similar model to show why agencies might fall far short of what is claimed on their behalf, were the courts to be more deferential. A significant portion

---

[6] *See id.* at 295-99, 309-11; Huber, *The Old-New Division in Risk Regulation*, 69 VA. L. REV. 1025, 1073-75 (1983); *see also* H. KAHN, W. BROWN & L. MARTEL, THE NEXT 200 YEARS: A SCENARIO FOR AMERICA AND THE WORLD 150-51, 163-66 (1976) (arguing that, on balance, technological advances should not be discouraged, but rather fostered with prudence and caution); A. WILDAVSKY, SEARCHING FOR SAFETY 48-50 (1988) (arguing that efforts to reduce risk often generate and increase collateral risks).

of the agency discussion is devoted to attitudes about risk. The question of attitudes has been begged in the legal debate about public risk, yet the topic is of fundamental importance: attitudes about risk — about the *meanings* of risk — have much to do with choosing or devising the right management institutions.

The comparative analysis of courts and agencies in Parts III and IV leads us to conclude that ambitious proposals to increase the scope of agency authority at the expense of judicial scrutiny are remarkably premature.[7] We stop short of saying that the present institutional arrangements are, however imperfect, the best we can hope for given current understanding. We insist, though, that those critics who would alter existing arrangements through sweeping delegations to experts and bureaucrats have utterly failed to carry a reasonable burden of proof. A careful comparative assessment simply raises too many doubts about the wisdom of wholesale abdication to technocratic rule.

Part V underscores this conclusion with some speculation about the larger implications of technocracy in a democratic system. Our concerns in this respect lead us to consider an alternative and currently popular view that public risk should be managed through one or another version of participatory democracy. We end up being as skeptical here as we are about technocracy. Obviously, then, we think that much ground has still to be covered before anyone can confidently come forth with ambitious programs for risk assessment and management. As we see it, the public risk debate presently rests at the inside edge of a vast and expanding universe, an unsurprising thing given that risk has only recently been highlighted on social and legal agendas. The entire topic — its attitudinal, institutional, and scientific aspects — is still so shrouded with uncertainty that it is difficult to be confident about anything other than the need for more information and more argument. What we hope to do is move matters forward by bringing into view some considerations that must (but thus far do not) figure in the ongoing debate.

---

[7] We do not deny that there are advantages to relying chiefly on administrative agencies, rather than courts, in particular situations. For example, administrative regulation might be superior to adjudication where injurers are unable to pay for all the harm they cause, thus making the threat of ex post damages insufficient to induce optimal levels of care. *See* Shavell, *Liability for Harm Versus Regulation of Safety*, 13 J. LEGAL STUD. 357, 360-61 (1984).

I. LINES OF DEBATE[8]

Understand that we are sketching here not our own views, but the views of those on the two sides of the debate about public risk. As mentioned above, part of the debate is about attitudes, and part about institutions.

A. *The Debate About Attitudes*

The dominant popular attitude seems to reflect a strong aversion to public risk, as opposed to private risk alternatives (and in some instances as opposed to older, conventional or established, public risk sources). This point of view is revealed by contrasting popular reactions in various risk settings. People protest when required to fasten seatbelts in their cars, yet they obey orders to buckle up in commercial aircraft; they object to mandatory vaccination but insist on a right of access to incompletely tested miracle cures; they oppose the state's application of a pesticide only to apply the same chemical themselves under uncontrolled conditions; they condemn nuclear power plants but not conventional ones, and welcome alternative decentralized energy sources; they fear additives alleged to be carcinogenic yet consume natural foods that contain carcinogens. In short, they oppose the new, the high, and the centralized; they regard public risk as especially dangerous.

A considerable number of observers regard this popular mindset as remarkably odd. They argue that public risk sources of production and consumption, new sources in particular, are generally safer than conventional public and private alternatives — safer, at least, in terms of expected mortality and morbidity. And it is true that, *measured in these terms,*[9] commercial air travel is safer than travel

---

[8] Our summary of the risk debate encapsulates the discussion in Huber, *supra* note 3, at 280-305, where interested readers will find abundant documentation. Beyond this, much of what we say throughout the pages that follow is framed with reference to Mr. Huber's discussion. He argues with considerable passion on behalf of public risk, and takes particular issue with two "eloquent spokesmen" in the risk debate. *See id.* at 277 n.1 (citing Rosenberg, *The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System,* 97 HARV. L. REV. 851 (1984); Yellin, *High Technology and the Courts: Nuclear Power and the Need for Institutional Reform,* 94 HARV. L. REV. 489 (1981)). We focus on Huber in a similar spirit because, among other reasons, he draws together a number of observations about public risk that are related but have nevertheless appeared only piecemeal in the larger literature sampled in our discussion.

[9] Measured, that is, in terms of the technical sense of risk. *See supra* note 1. Whether new public risks are also generally safer when measured in terms of the popular sense of risk, terms that go beyond mortality and morbidity, and whether the

by automobile, vaccination less risky than no vaccination (despite side effects and the occasional vaccination-induced disease), public pest control programs less hazardous than private application. In the same terms, conventional centralized power plants are probably safer than wood stoves, perhaps safer than alternative decentralized power sources (such as solar), perhaps safer, even, than energy conservation (insulation is not free of danger)[10] — with nuclear power the least risky of all in the view of a considerable number of experts. There are artificial food additives that, though toxic themselves, may more than pay their way by inhibiting the formation of natural carcinogens. Public water supplies are said to be safer, usually, than private wells; saccharin is said to be safer than sugar for consumers suffering from diabetes or obesity, and the newer sugar substitutes, aspartame and cyclamate, arguably safer yet.

A way of summarizing the foregoing viewpoint, which figures very prominently in the public risk debate, is to say that "(1) newer is generally safer than older, and (2) public is generally safer than private."[11] If these statements are correct, then the public's aversion to public risk — an aversion championed by those on the opposite side of the argument — is generally unjustified, and inconsistent with the objective of minimizing total risk costs.

B. *The Debate About Institutions*

An influential segment of the legal community — many trial lawyers, some scholars and judges, and no doubt a number of legislators — has embraced the public's aversion to public risk. The result is a series of measures, some only proposed but others realized, to subject public risk sources to singular constraints, whether by way of

---

popular sense of risk is acceptably rational, are important questions that we consider later. *See infra* notes 124-75 and accompanying text.

[10] *See, e.g.*, Gulf South Insulation v. United States Consumer Prod. Safety Comm'n, 701 F.2d 1137, 1147-48 (5th Cir. 1983) (vacating ruling by the Consumer Product Safety Commission because the Commission failed to meet the "substantial evidence" requirement before issuing a ban on formaldehyde foam insulation); Borden, Inc. v. Commissioner of Pub. Health, 388 Mass. 707, 736-37, 448 N.E.2d 367, 385-86 (1983) (allowing the introduction of evidence supporting contention that insulation contained a known carcinogen), *cert. denied*, 464 U.S. 936 (1983).

[11] These two heuristics, or rules of thumb, are Huber's. *See* Huber, *supra* note 3, at 307. He attributes the relative safety of new public risks to technological advance and to mass production (itself a technological advance). *See id.* at 295-304. Huber's generalizations identify him as an adherent to a viewpoint we have elsewhere described as technological optimism. *See* Krier & Gillette, *The Un-Easy Case for Technological Optimism*, 84 MICH. L. REV. 405 (1985).

increased legislative and administrative regulation,[12] enhanced judicial review of suspect regulatory activity,[13] or expanded liability in tort.[14] While all these measures are regarded with consternation by people who see public risk as relatively benign, the critical literature has focused particularly on moves to enlarge the role of the judiciary at the expense of administrative agencies.

Essentially, two concerns come into play, the first growing directly out of the debate about attitudes described above, the second leading explicitly into the debate about institutions described here. First, if adjudication is dominated by judges and juries who share the general public's aversion to public risk and therefore saddle public risk sources with special burdens (whether through more extensive tort liability or more intensive judicial review of agency decisions), then we might well end up with more, not less, hazard. Novel public risk sources will be made to bear costs that existing risk

---

[12] *See, e.g.*, Federal Environmental Pesticide Control Act of 1972, Pub. L. No. 92-516, § 2, 86 Stat. 979 (codified at 7 U.S.C. §§ 136a-136y (1988)); Nuclear Power and Waste Disposal Voter Approval and Legislative Certification Act, 1982 Mass. Acts. ch. 502 (codified at MASS. GEN. LAWS ANN. ch. 164 app. §§ 3-1 to -9 (West Supp. 1989)); Massachusetts Pesticide Control Act, 1978 Mass. Acts ch. 3 (codified at MASS. GEN. LAWS ANN. ch. 132B §§ 6a-14 (West Supp. 1989)); Ginsberg & Weiss, *Common Law Liability for Toxic Torts: A Phantom Remedy*, 9 HOFSTRA L. REV. 859, 928-40 (1981) (proposing legislative creation of a compensation fund maintained by taxes on industries generating hazardous wastes).

[13] *See, e.g.*, Natural Resources Defense Council v. EPA, 824 F.2d 1146, 1150-52 (D.C. Cir. 1987) (granting review of administrative action despite plaintiff's failure to exhaust administrative remedies); Union of Concerned Scientists v. Nuclear Regulatory Comm'n, 824 F.2d 108, 113 (D.C. Cir. 1987) (refusing to defer to administrative agency's statutory interpretation); Ohio v. EPA, 784 F.2d 224, 229-31 (6th Cir. 1986) (vacating an EPA ruling because of agency's failure to validate theoretical pollution model with actual on-site testing); Furrow, *Governing Science: Public Risks and Private Remedies*, 131 U. PA. L. REV. 1403, 1436-65 (1983) (proposing that courts provide injunctive relief when administrative agencies lag in their regulatory efforts); Yellin, *supra* note 8, at 553-60 (proposing closer judicial review of agency approval of broad new technological initiatives); *see also* Huber, *supra* note 3, at 283-84 (citing the Yellin and Rosenberg proposals concerning judicial intervention).

[14] *See, e.g.*, cases cited first paragraph *infra* note 52; *see also* Bohrer, *Fear and Trembling in the Twentieth Century: Technological Risk, Uncertainty, and Emotional Distress*, 1984 WIS. L. REV. 83, 122-28 (proposing tort liability for psychic distress inflicted by technological developments); Rosenberg, *supra* note 8, at 866-68 (proposing a relaxed burden of proof, and liability for risk itself — as opposed to requiring materialized injury — in cases of mass exposure to technological threats). *See generally* Elliott, *Why Courts? Comment on Robinson*, 14 J. LEGAL STUD. 799, 799-800 (1985) (agreeing that courts, in cases involving exposure to toxic substances, are moving away from the traditional tort law rules of causation); Huber, *supra* note 3, at 284-85; Robinson, *Probabilistic Causation and Compensation for Tortious Risk*, 14 J. LEGAL STUD. 779 (1985).

sources escape, and this might perversely put risk-reducing technologies at a competitive disadvantage. Production and consumption will tend to shift away from public risk and in the direction of alternatives that are, according to this critique, commonly more dangerous.[15]

This suggests, second, that courts simply should not play a significant role in public risk assessment and management, partly because they share the uninformed popular mindset and partly because they are inept assessors and managers in any event. If the goal is to minimize net risk costs, then the way to proceed is through an approach that is self-consciously comparative and aggregative in terms of the costs introduced and those removed by any new technology. Ideally, risk management institutions should be free of predisposition and single-mindedness, capable of understanding and assessing not only the risk-generating but also the risk-reducing features of particular innovations, technically sophisticated, and analytically adept. Courts, the argument goes on, can hardly come close. Adjudication is dominated by judges and jurors who are institutionally and psychologically biased, systematically partial to injured plaintiffs and to the status quo, and indiscriminately inclined to reach into the deep pockets of defendants. The plaintiffs' bar, more interested in personal gain than in advancing social welfare, aggravates the problem. And judicial intervention is a poor method of risk management in any event, because it proceeds episodically rather than continuously, in response to the "luridness" of events,[16] and without regard to much relevant data. The data would only be puzzling anyway, because the courts — whether actively overseeing administrative actions to regulate risk, or regulating on their own through the tort system — are ill equipped to amass and process the information crucial to a felicitous risk calculus.

Concisely summarized, the critics argue that courts and juries have "little capacity to make risk choices wisely."[17] Wittingly or not,

---

[15] *See* Huber, *supra* note 3, at 291-93, 314-16. *See generally* P. HUBER, LIABILITY: THE LEGAL REVOLUTION AND ITS CONSEQUENCES (1988); J. Calfee & P. Rubin, Liability for Reducing Risk 4, 16-20, 27-28 (unpublished manuscript, Oct. 4, 1987). For a forerunner of the argument, see Henderson, *Extending the Boundaries of Strict Products Liability: Implications of the Theory of the Second Best,* 128 U. PA. L. REV. 1036, 1068-89 (1980).

[16] *See* Huber, *supra* note 3, at 317.

[17] *Id.* at 319. *See generally* Elliott, *supra* note 14, at 803 (stating that "there is . . . reason to believe that other institutions are better equipped than lay courts and juries to assess risks"); Jasanoff & Nelkin, *Science, Technology, and the Limits of Judicial Competence,* 214 SCI. 1211, 1215 (1981) (noting the need for a *political,* as opposed to a

they hamper progressive new technologies, such "that our gross output of public risk steadily declines, but our aggregate consumption of risk begins to increase."[18] The solution to the problem is thought to be straightforward. Public risk cannot be left entirely to the discipline of market forces;[19] it can, however, be consigned to an institution with comparative advantages when it comes to risk regulation — "expert administrative agencies."[20] Agencies, though hardly perfect, are (the claim runs) vastly superior to courts. They can engage in systematic inquiries, gather and deploy technical resources, perform comparative assessments; they can provide the informed and open-minded public perspective — on risks averted as well as those incurred — that risk regulation requires.[21] Courts, the argument concludes, "should defer to the experts."[22]

II. Risk Production and Risk Reduction

We review here some of the market imperfections that suggest a need for intervention (whether through courts or agencies or both) in the case of public risk. Review should help us understand what it is that regulation aims to cure.[23] To begin, consider the incentives

---

judicial, role in scientific and technical areas); Stewart, *The Role of the Courts in Risk Management*, 16 Envtl. L. Rep. 10,208 (1986) (describing judicial shortcomings relative to effectively functioning administrative agencies). *Cf.* Henderson, *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 Colum. L. Rev. 1531, 1531-40 (1973) (discussing the limitations of courts in establishing product safety standards).

[18] Huber, *supra* note 3, at 279.

[19] The reasons for this, all of them obvious enough, are summarized *infra* notes 23-43 and accompanying text.

[20] Huber, *supra* note 3, at 329; *see also* Elliott, *supra* note 14, at 803 (stating that "[a]dministrative agencies are superior to judges in making risk assessment decisions that turn on scientific and technical evidence"); Stewart, *supra* note 17, at 10,209 (noting that "primary responsibility for managing risk must be given to administrative agencies").

[21] *See* Huber, *supra* note 3, at 331-32; Stewart, *supra* note 17, at 10,209. Huber argues that the courts are incapable of considering risks averted because litigation brings forth only the victims of public risks, and not the beneficiaries. He acknowledges that defendants would be happy to act as surrogates for the beneficiaries, but believes that "industry serves very poorly in this representative capacity, for the obvious reason that it has every incentive to claim risk-reducing benefits whether or not they exist." Huber, *supra* note 3, at 332. To be sure. But there is a difference between merely claiming benefits and actually giving reliable evidence for them. Defendants would have strong incentives to develop concrete evidence of benefits that would provide the courts with useful information about risks averted.

[22] Huber, *supra* note 3, at 333. They should do so, that is, in cases of public risk. Huber does accept that courts are effective in the private risk setting. *See id.* at 331.

[23] We review market imperfections only to suggest the motivations for and

of producers and consumers (in each case, of products and of risks) to engage in behavior tending to minimize the costs of public risks absent any regulatory forces other than those imposed by the market. The point of the inquiry should be obvious. If the risk market is nicely self-regulating, neither judicial nor administrative oversight is necessary. Even when the market falls short of the ideal, it might nevertheless succeed in controlling some discrete instances or amounts of risk. To that extent regulation is again unnecessary, at least from the standpoint of cost minimization.[24] Regulation belongs most clearly in the domain that remains, the size and shape of which can be roughly gathered from a sketch of the risk market.

We assume that firms producing public risks try to act in a rational, profit-maximizing manner. On this assumption, they are motivated to reduce the risks of their products or production processes only when it is in their self-interest to do so, regardless of a particular measure's potential social benefits. It follows, since risk reduction measures are typically costly, that producers will have little interest in them unless they generate gains that producers can realize themselves.[25]

These observations suggest some important instances in which the engine of egoism (including the egoism of consumers and employees, whom we also assume to be self-interested) might have

---

targets of interventionist moves, rather than to justify the moves themselves. A central point throughout our Article is that *all* institutions are imperfect, the implication being that casually substituting one institution for another may make matters worse rather than better. Given this, we should logically undertake to compare market imperfections to the faults of competing regulatory institutions, in an effort to determine whether leaving matters to the market might on occasion be best — or least bad — after all. Yet we forgo such an interesting and ambitious comparative-imperfection exercise, not because we think its outcome would be obvious, but rather because we regard it as sufficiently non-obvious that it is better left to another article. For now, we limit our attention to a comparative analysis of courts and agencies in the realm of public risk.

[24] This assumes that the government could not control the same discrete instances or amounts of risk at less cost than the market; if it could, regulation would be appropriate on cost-minimization grounds even though the market is coping to some degree. It also assumes (as does this entire part of the Article) that risk minimization is the dominant regulatory objective. In fact, of course, there may be other considerations that justify intervention even when the market is doing a good job at minimizing risk costs — considerations having to do, for example, with the way market forces distribute risk costs. *See supra* note 2.

[25] Theoretically, we suppose, firms could be motivated by something other than self-interest: they might be moved by altruism to implement measures that reduce risk at considerable cost but no net benefit to themselves. But the argument from altruism is, as we said, surely theoretical, precisely because our assumptions about the producer mind-set are such realistic ones.

sufficient horsepower to drive the market to near-optimal levels of public risk. For example, in a competitive market serving well-informed consumers with the means to pay (if they wish) for increased safety, recalcitrant producers will lose sales and profits to competitors who respond to consumer demand.[26] Another familiar instance is that of risky job sites. In competitive labor markets with workers aware of employment risks and responsive to them, employers offering dangerous work conditions will lose their best employees to competing firms that offer safer sites or pay offsetting wage premiums. Competitive pressures, then, can be expected to stimulate all firms, and their employees, to take appropriate risk reduction steps.[27]

The transactional nature of these instances helps to explain their dynamics.[28] Productive transactions, though, require good information processing, a consideration that limits considerably the force of our examples in many instances of public risk. Commonly, producer firms simply won't *have* good information about risk (often because, as we shall see, they are not stimulated to have it) or, if they do, won't act on it or share it with typically underinformed consumers and employees.[29] To be sure, our examples suggest that firms with

---

[26] A variant of this example pictures well-known risks that consumers can choose to tolerate or avoid on their own, in either case at a cost less than that of producer avoidance; here consumers will rightly not wish for a safer product.

[27] This, at least, is the typical economics perspective. Literature from other disciplines suggests that job conditions and job selection are not particularly sensitive to the risk/wage premium mix. *See, e.g.*, D. NELKIN & M. BROWN, WORKERS AT RISK 178-83 (1984) (describing how workers anxious about the pervasive presence of chemical risks in the workplace nevertheless believed that they had no genuine opportunity to choose safer employment); Anderson, *Values, Risks, and Market Norms*, 17 PHIL. & PUB. AFF. 54, 62 (1988) (discussing how the market norms of cost-benefit analysis contradict the norms and values that shape workers' perspectives on risks to life and health).

[28] Because firms are in a bargaining — a transactional — relationship with employees and customers, they have incentives to take cost-justified safety precautions: employees and customers will compensate for the precautions by accepting lower wages, or paying higher prices, in exchange for enhanced safety. But when transactions do not take place (say with bystanders, because of high transaction costs), the firms' incentives would essentially disappear. *Cf.* R. POSNER, ECONOMIC ANALYSIS OF LAW 152-54 (3d ed. 1986) (discussing industry customs regarding safety in transactional and nontransactional settings). *But see supra* note 27; *infra* notes 29, 33 & 36.

[29] *See* Felstiner & Seigelman, *Neoclassical Difficulties: Tort Deterrence for Latent Injuries*, 11 LAW & POL'Y 309, 317, 319-20 (1989) (reviewing evidence that firms seldom make comprehensive efforts to inform employees of job risks, and sometimes conceal information or take steps to see that information is not developed. For instance, "[i]n the asbestos context, the manufacturers had the information [about job risk] and aggressively concealed it from exposed workers").

an earned reputation for safety can enjoy competitive advantages in product and labor markets. But certain distinctive characteristics of public risks tend to dampen the incentives otherwise created by reputation and profit concerns. Many public risks are latent in their materialization. Adverse effects do not appear until long after exposure.[30] In addition, public risks are often diffuse in their impact, spread over many victims, so the costs to any one victim might be small even though the aggregate cost to the total victim population is very large.[31] Similarly, public risks are by definition probabilistic, and the likelihood that exposure will lead to adverse effects is often remote.[32] The effects themselves might be of dramatic dimension, should they occur, but by virtue of low probabilities their expected costs are nevertheless negligible.

These characteristics skew the incentives of presumably self-interested producers and consumers of public risks. Even assuming some knowledge of risks, for example, consumers (including consumers of jobs — employees) and producers alike will generally discount the information because of long latency, low probability, or both. Where latency periods exceed ten to fifteen years, discounting effectively means ignoring the risk altogether.[33] Where probabilities are low, actors commonly (if inappropriately) ignore potential consequences, notwithstanding their likely magnitude should they materialize.[34] And diffuse effects are, on an individual basis, usually small to begin with, and thus of little interest. For any or all of these rea-

---

30 Latency may also be a feature of some private risks, such as medical malpractice, but it tends to exist systematically in the case of public risks. *See, e.g.*, Page, *A Generic View of Toxic Chemicals and Similar Risks*, 7 ECOLOGY L.Q. 207, 213 (1978) (discussing characteristics of environmental risk).

31 *See* Huber, *supra* note 3, at 277 (noting the broad distribution of public risks); Krier, *Environmental Watchdogs: Some Lessons from a "Study" Council*, 23 STAN. L. REV. 623, 664 (1971) (noting the breadth and diffusion of environmental risks).

32 *See, e.g.*, Farber, *Toxic Causation*, 71 MINN. L. REV. 1219, 1228 (1987).

33 The impact of latency on the incentive to take safety precautions is reviewed in Felstiner & Siegelman, *supra* note 29.

The standard formula for discounting a dollar amount to its present value is $\$x/(1+r)^n$ (where r = a stated interest rate and n = the number of periods during which the interest rate is earned). Assume a .01 probability that an event will occur in 10 years and that, if it does, there will be a loss of $100,000,000. The expected value of the loss is $1,000,000 in 10 years. The present (discounted) value of that loss at an interest rate of 5 percent is $615,000; at 10 percent it is $385,000. If the event will materialize, if at all, only in 20 years, then the present value figures are $375,000 and $150,000 for 5 and 10 percent respectively.

34 *See* D. PARFIT, REASONS AND PERSONS 73-75 (1984) (discussing error inherent in ignoring small chances); Shrader-Frechette, *Parfit and Mistakes in Moral Mathematics*, 98 ETHICS 50, 54-55 (1987) (noting also the difficulty in assessing the causation of consequences).

sons, patterns of consumption are unlikely to be duly influenced by the presence of risk, so risk producers will receive misleadingly muted market signals.[35]

The foregoing considerations are exacerbated where (as is likely) self-interested managers have incentives to make decisions that diverge from the actual interests of their firm. Even where managers of risk-producing firms are aware that possible calamity lies ahead, they still might not be sufficiently wary. The decision to discover and address possible long-term risks requires that costs be incurred in the short term, and managers with an interest in profits now will be disinclined to dedicate firm resources to programs the benefits of which will accrue to the firm, if at all, only in the distant future. Even managers who extend the time horizon by plotting the value of their remaining careers can be expected to discount, perhaps even disregard, risks with long latency periods. The lag between cause and effect shelters managers from the consequences of their decisions: evidence disappears, or the managers do.[36]

The systematic tendency to resolve uncertainty in the direction of insufficient risk avoidance is especially acute in those instances where benefits consist of the *non*appearance of a problem. Imagine, for example, a manager with sufficient resources to invest in either of two ventures, but not both. The first venture bears a .1 probability of increasing next year's profits by $10 million. The second is expected, with the same probability, to avoid distant losses from injuries by an amount presently valued at something more than $10 million.[37] A desire for tangible and relatively quick indicia of success will incline the manager to pursue the former strategy, even if the latter has a higher expected value, simply because the manager can't

---

[35] *See* Henderson, *supra* note 15, at 1037.

[36] On the short time horizon of corporate decision making, see Felstiner & Siegelman, *supra* note 29, at 309-12; Hayes & Abernathy, *Managing Our Way to Economic Decline*, HARV. BUS. REV., July-Aug. 1980, at 67; Henderson, *Product Liability and the Passage of Time: The Imprisonment of Corporate Rationality*, 58 N.Y.U. L. REV. 765, 781-82 (1983); Robinson, *supra* note 14, at 784-85. If the same short-term bias pervades the management class, then there is no reason to suppose that the market for managers will solve the problem. Even if manager responses to risk were heterogeneous, it is unlikely that managers would be selected primarily for their skill in handling remote, distant risks, rather than for their skill in conducting more common business affairs.

[37] Since we are considering the incentives of risk producers and consumers in the absence of any regulatory forces (such as tort liability) other than those provided by the market, *see supra* text following note 23, we simply assume that the injury losses would be brought to bear on the manager's firm through contractual provisions, loss of reputation and business, and so forth.

demonstrate that she triggered a benefit by arranging that something bad won't eventually happen. This incentive to pursue tangible gains, rather than to avoid ethereal losses, may become greater as the relative certainty of the former increases, notwithstanding that the expected value of the two options is equal. Suppose that the first venture in our example is regarded as almost certain to increase profits by $1 million, while the second venture would avoid injury losses totaling $100 million were they to materialize, but the probability of materialization is only .01. The manager will now be even more tempted to pursue the first strategy, because certain and demonstrable gains are likely to enhance her standing in the firm more than would the tenuous avoidance of losses.[38]

The distorting incentives arising from diffuseness, latency, and low probability, troublesome as they are, would be less so were effects reversible once they materialized.[39] Yet one of the most sobering characteristics of modern-day public risks is the permanence of their effects.[40] Irreversibility forecloses the benefits of learning by trial-and-error, and hence correction by that means; tremendously important information, arising from events, is rendered virtually useless.[41] It is most painfully useless in the case, again prevalent in public risks, of zero-infinity problems — those with a small probability (approaching zero) of ever eventuating, but with catastrophic consequences (approaching infinity) if they do.[42]

The point of this discussion is that the risk market can fail even when risk transactions are possible. The market contains an ill-defined domain that calls for external control of some sort. The domain enlarges extraordinarily when we step outside the world of transactions, and hence out of ordinary markets. Risk is commonly

---

[38] On this "certainty effect," see Kahneman & Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 265-66 (1979).

[39] Reversibility here means not simply that the act of undoing is possible, but also affordable.

[40] *See* Page, *supra* note 30, at 214.

[41] Useless, at least, as to correcting the irreversible consequences; the information might still prove useful regarding future events.

[42] *See* Page, *supra* note 30, at 211. Catastrophic risks pose the additional problem that many victims will likely not be compensated by risk producers, since liability might easily exceed the total value of the offending firm. *See* Shavell, *The Judgment Proof Problem*, 6 INT'L REV. L. & ECON. 45 (1986) (suggesting that firms will ignore risks that create potential liability greater than the assets of the firm); L. Kornhauser & R. Revesz, Apportioning Damages Among Partially Insolvent Actors, 19 J. LEGAL STUD. (forthcoming 1990); *see also* Shavell, *supra* note 7, at 360-61 (concerning the advantage of administrative regulation relative to judicial regulation in the instance of a judgment-proof defendant).

produced and consumed not just as product but also as by-product. *X* can choose whether or not to purchase the risky widget of *Y*, but this isn't so as to *Y*'s (or *Z*'s) risky pollution. *E*, who has chosen on informed and compensated terms to work for *F*, can't bargain with all those other firms for whom she doesn't work but who nevertheless subject her to the costs of risk. Yet without such transactions, risk producers receive no signals to inform their self-interested behavior — absent intervention from outside the market. This is the familiar world of external costs, the part of the risk domain most likely to benefit from measured controls.[43]

III. Risk, Courts, and Lawyers

Many of the public risks that figure so prominently in the ongoing debate are simply the most recent generation of environmental problems.[44] It should not be surprising, then, that conventional analysis in environmental law anticipated by several decades some of the argument about judicial strengths and shortcomings in the management of public risk. Yet, despite the fact that much of the underlying reasoning has held constant over the years, the conclusions reached in the early literature are exactly contrary to those drawn by the courts' new generation of critics.

For example, Professor N. William Hines, in one of the earliest articles to address the matter, considered in 1966 some of the reasons why public risk problems cannot be capably managed through private lawsuits.[45] One "fundamental difficulty," Hines wrote, "is the inherent inability of courts to deal efficiently with issues of a scientifically complex nature. [The evidence involved] is often highly technical and next to impossible for even the most conscientious and alert judge or layman to assimilate and evaluate."[46] Moreover, "court action is entirely too fortuitous an event to serve as the basis for a reliable . . . control program. [And courts lack the] expertise, [the] capacity to plan ahead, [and] the ability to administer a flexible program"[47] that are essential to effective regulation. "Finally, and

---

[43] *But see supra* note 23.

[44] *See* Page, *supra* note 30, at 207 (referring to a "new type of environmental problem").

[45] *See* Hines, *Nor Any Drop to Drink: Public Regulation of Water Quality*, 52 Iowa L. Rev. 186, 196-201 (1966).

[46] *Id.* at 199.

[47] *Id.* at 200.

perhaps of most importance, the adversary system . . . does not adequately assure representation of the public interest in . . . control."[48]

These, of course, are precisely the points we hear echoed today, but in support of a view strikingly different from the one developed earlier by Hines. Those who now oppose judicial control of public risk contend that the courts deter public risk too much;[49] Hines found them incapable of deterring enough. He asked a question that can be generalized to encompass any public risk: do private lawsuits provide "sufficient restraint to keep water pollution within tolerable bounds?"[50] His answer was "a categorical no."[51]

It is a simple matter to account for this striking difference in outlook. The contemporary critique is based on various expedients thought to favor public risk victims unduly — such as the relaxed burdens of proof regarding injury or causation that one finds developed in some recent public risk cases[52] — and argues that judicial

---

48 *Id.* at 201.

49 *See supra* notes 15-18 and accompanying text.

50 Hines, *supra* note 45, at 197.

51 *Id.*

52 *See, e.g., In re* "Agent Orange" Prod. Liab. Litig., 597 F. Supp. 740, 758-59 (E.D.N.Y. 1984) (involving court's approval of class action settlement despite difficulty in proving causation), *aff'd in part and rev'd in part on other grounds,* 818 F.2d 145 (2d Cir. 1987); Tinnerholm v. Parke Davis & Co., 285 F. Supp. 432, 440 (S.D.N.Y. 1968) (stating that plaintiff need not disprove every possible ground of causation in order to recover for injuries arising from use of DPT vaccine), *aff'd,* 411 F.2d 48 (2d Cir. 1969); Oxendine v. Merrell Dow Pharmaceuticals, 506 A.2d 1100, 1104-08 (D.C. 1986) (admitting expert testimony to the effect that Bendectin produced by defendant was cause of plaintiff's injuries, despite the fact that no single study alone would support such a conclusion); Hymowitz v. Eli Lilly Co., 73 N.Y.2d 487, 511-12, 539 N.E.2d 1069, 1078, 541 N.Y.S.2d 941, 950 (1989) (holding market share theory to be appropriate basis for plaintiffs' recovery for injuries resulting from use of DES during pregnancy), *cert. denied,* 110 S. Ct. 350 (1989); Martin v. Abbott Laboratories, 102 Wash. 2d 581, 600-06, 615-17, 689 P.2d 368, 380-82, 388 (1984) (en banc) (allowing plaintiff's recovery on modified market share theory).

Before too readily concluding that cases like the foregoing demonstrate a firm pro-plaintiff bias in public risk litigation, one should note the substantial (and perhaps increasing) number of cases that cut in the opposite direction. There are, for example, recent decisions suggesting some antipathy to the liberal causation theories that followed the market share liability theory developed in Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 611-13, 607 P.2d 924, 936-38, 163 Cal. Rptr. 132, 144-46 (1980), *cert. denied,* 449 U.S. 912 (1980). *See, e.g.,* Richardson v. Richardson-Merrell, Inc., 857 F.2d 823, 829 (D.C. Cir. 1988) (finding insufficient causal link between Bendectin and birth defects), *cert. denied,* 110 S. Ct. 218 (1989); Lynch v. Merrell-National Laboratories, 830 F.2d 1190, 1194 (1st Cir. 1987) (finding studies of chemical "analogous" to Bendectin to be insufficient proof of a causal link between Bendectin and birth defects); Viterbo v. Dow Chemical Co., 826 F.2d 420, 422-24 (5th Cir. 1987) (upholding summary judgment for defendant and rejecting offer of expert testimony of causal relationship); Hull v. Merrell Dow Pharma-

shortcomings aggravate the undesirable effects of these doctrinal shifts. Hines also considered the shortcomings of courts to be aggravating, but in the opposite direction: they intensify unwarranted impediments to successful victim litigation. Surveying the tort system (primarily nuisance doctrine), Hines found it to be hostile to potential plaintiffs. It requires material harm, restricts standing, limits liability to "unreasonable" conduct defined on narrow utilitarian grounds, provides "overly solicitous" defenses, and puts a heavy burden of proof on plaintiffs — especially regarding who caused harm, and to what degree, in cases involving multiple defendants.[53]

Considerations like these are examples of what we call *process bias,* denoting factors that work systematically for or against the interests of plaintiffs *once their public risk claims reach the courtroom.* Observers like Hines saw a process biased against victims. Contemporary critics of the courts, on the other hand, see a process biased in the victims' favor. But litigation is affected by more than matters

---

ceuticals, 700 F. Supp. 28, 29-30 (S.D. Fla. 1988) (granting defendant's motion for summary judgment on basis of plaintiff's failure to establish causation in Bendectin case); Jones v. Ortho Pharmaceutical Corp., 163 Cal. App. 3d 396, 403, 209 Cal. Rptr. 456, 460 (1985) (stipulating that testimony of "reasonable possibility" that drug had adverse effect was insufficient to deny directed verdict for defendant). Even the California Supreme Court has drastically restricted the reach of *Sindell* by holding that market share liability cannot be imposed in fraud and breach of warranty cases, and by holding that strict liability does not apply to drug manufacturers. Thus, market share liability can be imposed only on individual defendants proven to have acted negligently, and the need to prove negligence on the part of an individual firm largely wipes out the advantages plaintiffs realize by being allowed to neglect proof of individual causation. *See* Brown v. Superior Court, 44 Cal. 3d 1049, 1069-71, 751 P.2d 470, 483-84, 245 Cal. Rptr. 412, 424-25 (1988).

Consider also Henderson & Eisenberg, *The Quiet Revolution in Products Liability: An Empirical Study of Legal Change.* 37 UCLA L. REV. 479 (1990), claiming that, contrary to assertions about a liability crisis, recent trends in products liability actually favor defendants. The study by Henderson and Eisenberg considers cases involving private as well as public risks (for example, swimming pools, handguns, off-road vehicles), and thus provides less than perfect grounds for generalizations about public risk trends. It nevertheless shows that one should be very cautious about concluding that present law is biased in favor of public risk victims. All of the literature claiming to see such a bias seems to rely on the same few instances — cases involving Agent Orange, DPT vaccine, Bendectin, asbestos. Even if these cases uniformly reflected abrogation of traditional tort law doctrine, and they do not, it might still be that they are only idiosyncratic exceptions. Beyond that, the cases might be much more neutral in their impact than at first appears. Rather than unduly favoring public risk victims, they might simply reflect an awareness that traditional doctrine (regarding the burden of proof in particular) demands too much of the victims of many modern technological risks, and that correctives are therefore necessary. That argument is implicit in Rosenberg, *supra* note 8, at 856-58, and addressed more explicitly in Robinson, *supra* note 14.

[53] *See* Hines, *supra* note 45, at 197-99.

of process; a thoroughgoing critique must be mindful of *access bias* as well. We use this term to refer to factors that work systematically for or against the interests of plaintiffs *as they seek to get their public risk claims into court in the first place.*

Process bias arises from the interplay of legal doctrine and adjudicative decision makers. It concerns the ways in which judges and juries interpret and apply the law that defines the rights and liabilities of the parties before them. Access bias, on the other hand, arises from the interplay of legal doctrine, the structure of litigation, and the nature of public risk. It concerns the ways in which victims decide whether (given prevailing doctrine, among other things) litigation is worthwhile, and the ability of victims to initiate claims. Access is anterior to process; only when obstacles to access are overcome, so that claims are actually filed and prosecuted, can process bias come into play.[54]

Process bias and access bias can combine in various ways. They can work in tandem and pull together for public risk victims (this would be the case if victims have easy access to the courts and the courts treat their claims too sympathetically). Here public risk would probably be deterred too much, as contemporary critics of the courts claim. Alternatively, the two kinds of bias can work in tandem but in favor of public risk producers (considerable obstacles to victim access combined with harsh treatment of victim claims by the courts), resulting in too little deterrence of public risk, as Hines concluded. But process bias and access bias can also work in opposing directions, and this clouds the picture considerably from the standpoint of deterrence. Victims might have a fairly easy time getting into court, only to find their claims treated with hostility once there. Or victims might confront considerable barriers to access but enjoy a process bias in their favor should they manage to get before a judge or jury. In either event, any excessive deterrence that might otherwise result from one kind of bias could be offset, perhaps effectively neutralized, by the presence of the other. Litigation could thus end up more or less unbiased on balance and not nearly as hard on modern technology as critics of the courts maintain.

So we have four alternatives. Which of them most accurately

---

54 As the text implies, process bias and access bias are to some degree interdependent. If, for example, courts process claims in a way that favors (disfavors) plaintiffs, this increases (decreases) the expected value of litigation to plaintiffs and hence, as we shall see, effectively reduces (enlarges) barriers to access.

depicts the case of typical public risks? This is the question we consider in some detail below.

A. *Access Bias*

Professor Hines did not consider the matter of victim access to the courts; had he done so, his conclusion that judicial control insufficiently deters public risk would have been all the more emphatic. To see why, we must return to some of the structural features of public risk described in Part II, add to the list of attributes developed there, and overlay on the enlarged picture a similar depiction of the structure of litigation.

Public risks, as we saw, are commonly latent in their manifestations, diffuse in their impacts, and of low probability.[55] Moreover, as their name suggests, they share the characteristics of collective goods (or, here, collective bads). They tend to be nonrival: their adverse effects may have simultaneous consequences for a multitude of victims. Given the nature of modern technologies, these nonrival effects will commonly be dispersed over large geographic areas, so that victims — potential plaintiffs — are themselves broadly distributed. And as is always the case with collective goods and bads, public risks tend to be nonexclusive. This means that the benefits of abatement (should it occur) necessarily extend to all victims, and cannot be withheld on a piecemeal basis.

To see the significance of these characteristics, consider the general structure of litigation and how it relates, first, to *private* risks. Lawsuits are costly, and risky of themselves; prosecution entails the investment of time and money, and success is hardly assured. Only those among the injured who calculate expected judgments (judgments discounted by the probability of success) in excess of litigation costs will likely seek access to the adjudication process. In the case of private risks, where substantial injuries are typically discrete, immediate, and readily cognizable, the obstacles to recovery (identifying the responsible defendants, establishing their liability, showing causation, proving the dimensions of loss) may be relatively low. Thus, expected recoveries for victims of private risk are often sufficient to create incentives to sue, though even here collective goods effects can damp the rate of litigation. Potential plaintiffs who have been injured by a product or service identical or similar to the one at issue in an initial lawsuit can benefit from the information and the

---

[55] *See supra* notes 30-35 and accompanying text.

precedential value generated by that suit, even though they made no contribution to its prosecution. Thus potential plaintiffs find themselves in a strategic relationship — each wishing and waiting for others to file the initial suit — notwithstanding that all the plaintiffs want any lawsuit to succeed. This temptation to freeride on the efforts of others can induce even victims with current positive expected recoveries to hold back in hopes of enlarging their net recoveries later.[56]

There are, however, considerations that combat the incentive to freeride in the case of private risk litigation. First, immediateness of injury reduces the difficulty of identifying the injuring party and showing cause and effect, and thus reduces the costs that contribute to the freeriding temptation. Second, injury is often sufficiently fact-specific to limit the expected gains of waiting for somebody else to proceed. Where the defendant's conduct placed a limited number of people at risk (as in slip-and-fall cases) or the plaintiff's conduct is a datum relevant to liability (as where a power lawnmower is alleged to expose users to unreasonable dangers of laceration), the chance of finding a significant number of others who suffered injuries under sufficiently similar circumstances to merit freeriding is remote. These and other features of private risk litigation suggest that injured parties (and their lawyers) will not generally figure their expected judgments to be increased by strategic delay.[57]

Incentives to sue and disincentives to freeride usually diminish as risk moves from the private toward the public end of the spectrum. The characteristic diffuseness of public risks, for example, can mean small costs per victim notwithstanding large losses in the aggregate. From the individual litigant's perspective, a relatively small injury usually will not warrant the substantial costs associated with proving a case and recovering a judgment. The situation is aggravated by process concerns, legal doctrines that complicate the plaintiff's job and thus increase litigation costs. We have in mind, for example, the requirement of identifying a particular defendant who more probably than not caused the plaintiff's injury. Unlike the

---

[56] *See* Rubin, *Why is the Common Law Efficient?*, 6 J. LEGAL STUD. 51, 60 (1977). The focus here is on the incentives of public risk *victims*. The incentives of victims' *attorneys* are discussed *infra* text following note 63.

[57] Because there is no overlap between one victim's status and that of other victims, the first victim will make his or her decision parametrically (without attention to the conduct of others) rather than strategically (taking into account the expectations of others). *See* Hampton, *Free-Rider Problems in the Production of Collective Goods*, 3 ECON. & PHIL. 245, 255 (1987).

case of typical private risk litigation, where the party who caused the injury is usually readily identifiable, public risks often emanate from mysterious or multifarious sources. In either case, it may be that no one is sure who is responsible for what.[58]

Victims might try, of course, to cope with relatively large litigation costs by forming a coalition, with each victim contributing a modest sum to what could be a substantial legal war chest. But the broad geographic dispersion of public risks means that victims too will be dispersed, and under these conditions coalition is cumbersome. Coalition can be difficult even when risks are concentrated, thanks to the strategic implications of nonexclusivity. Since public risk is borne in common, so too is its mitigation; abatement at the source benefits not only actual plaintiffs but potential ones as well. If *P* sues *D* successfully, *I* will win too.[59] Why, then, should *I* agree to share a part of the burden of anybody else's lawsuit? Why not free-ride instead, especially given the absence of the countervailing considerations — discussed above[60] — that combat freeriding in the private risk context? Public risks tend to be involuntarily or passively borne, making each individual plaintiff's conduct largely irrelevant; the fact-specific inquiries that help defeat strategic behavior in the setting of private risk litigation play little part in public risk cases.

As the incentives to freeride tend to increase with public risk, so too do the costs of seeking individual (as opposed to collective) redress. The latency typical of public risks, for example, attenuates the connection between cause and effect. Statutes of limitations might foreclose recovery altogether; in any event, the difficulty of proving the necessary cause-effect relationship renders victim lawsuits more difficult (costly) and their conclusion less certain. Efforts to overcome these obstacles by suing now for exposure to risks the effects of which might materialize later run head on into a host of troubles arising from the probabilistic nature of public risks. Unable

---

[58] *See, e.g.*, J. KRIER & E. URSIN, POLLUTION AND POLICY 52-61 (1977) (discussing uncertainty surrounding sources of air pollution in Los Angeles). For a discussion of the legal difficulties caused by uncertainty about the sources of injuries, see Robinson, *Multiple Causation in Tort Law: Reflections on the* DES *Cases*, 68 VA. L. REV. 713 (1982).

[59] This is obviously so if injunctive relief is ordered, but the point applies as well to damage awards if their likely effect is to induce abatement. The freerider problem is recognized and discussed by Huber, *supra* note 3, at 305, yet, surprisingly, Huber makes no effort to square the existence of the problem with his claim that tort litigation unduly favors public risk victims. Moreover, Huber assumes that agency regulatory activity solves the freerider problem, see *id.* at 328-35, but that assumption is a very questionable one. *See infra* notes 101-11 and accompanying text.

[60] *See supra* notes 56 & 57 and accompanying text.

to show a matured injury, individuals at risk face expected recoveries discounted not only by the likelihood of losing but also by the uncertainty that the alleged risk will result, eventually, in actual injury.[61]

In short, public risk litigation is structurally biased against victim access. Victims who might wish to seek redress in the courts confront significant obstacles that diminish the incentive to sue.[62] Pros-

---

[61] Thus a right to sue for the imposition of risk itself is not nearly so favorable to plaintiffs as some critics of the courts imply. *See, e.g.*, Huber, *supra* note 3, at 284, 315 (noting that mass producers are held to "stringent standards of liability" and may be liable for risk created as well as injury actually caused). In any event, most jurisdictions have refused to recognize a cause of action for being placed at risk, if no physical harm has materialized. *Compare* Jackson v. Johns-Manville Sales Corp., 781 F.2d 394, 412 (5th Cir.) (stating that an action for risk of future cancer will be allowed where future development of cancer is reasonably probable and where there is current, legally cognizable injury), *cert. denied*, 478 U.S. 1022 (1986) *and* Anderson v. W.R. Grace & Co., 628 F. Supp. 1219, 1230-32 (D. Mass. 1986) (stating that plaintiff may recover for increased risk of future disease only when the future disease is a reasonable probability and is part of a disease process developing from a harm that has already produced an injury), *remanded on other grounds*, Anderson v. Cryovac, Inc., 862 F.2d 910 (1st Cir. 1988) *with* Ayers v. Township of Jackson, 189 N.J. Super. 561, 567, 461 A.2d 184, 187 (N.J. Super. Ct. Law Div. 1983) (holding that plaintiffs could not recover for a present condition of enhanced risk of cancer because the risk was not quantifiable and therefore could not be determined to produce a reasonable probability of future harm), *aff'd in part and rev'd in part on other grounds*, 202 N.J. Super. 106, 493 A.2d 1314 (N.J. Super. Ct. App. Div. 1985), *aff'd in part and rev'd in part on other grounds*, 106 N.J. 557, 525 A.2d 287 (1987). *See also* Note, *Increased Risk of Cancer as an Actionable Injury*, 18 GA. L. REV. 563, 587, 591-92 (1984) (arguing that refusal of ten courts to award damages for risk of future illness undercompensated plaintiffs in cases of exposure to carcinogens); *cf.* Metropolitan Edison Co. v. People Against Nuclear Energy, 460 U.S. 766, 777-79 (1983) (holding that the Nuclear Regulatory Commission is not required to consider psychological injury to residents from operation of nuclear power plant); Payton v. Abbott Laboratories, 386 Mass. 540, 544-57, 437 N.E.2d 171, 174-81 (1982) (no cause of action for emotional distress caused by increased risk).

Some jurisdictions have permitted recovery based on existing manifestations of fear that defendant's prior tortious conduct will cause subsequent injuries, even if no cause of action is permitted for the increased risk of that injury. *See, e.g.*, Hagerty v. L & L Marine Servs., 788 F.2d 315, 317-19 (5th Cir.) (allowing an action to recover damages for fear of developing cancer when the fear is reasonable and there is an actionable injury), *modified*, 797 F.2d 256 (5th Cir. 1986); Sterling v. Velsicol Chemical Corp., 647 F. Supp. 303, 319 (W.D. Tenn. 1986) (holding that residents could recover for fear of potential harm from drinking water contaminated by improperly buried chemical waste), *aff'd in part and rev'd in part on other grounds*, 855 F.2d 1188 (6th Cir. 1988); Eagle-Pitcher Industries, Inc. v. Cox, 481 So. 2d 517, 527-29 (Fla. Dist. Ct. App. 1985) (holding that if plaintiff can demonstrate actual physical injury from inhalation of asbestos fibers, plaintiff can recover damages for emotional distress based on fear of contracting cancer).

[62] We recognize that there are means by which groups sometimes manage to engage in effective collective action despite freerider problems and other obstacles, but we doubt that these have much application to the litigation access difficulties discussed in the text. For example, privatized by-products (such as a "free"

magazine subscription for people who agree to pay dues and join a group) are often used to induce self-interested individuals to finance collective efforts. *See, e.g.*, R. HARDIN, COLLECTIVE ACTION 31-35 (1982) (noting that while the by-product theory can serve to explain contributions to existing collective organizations, the theory fails to explain the organization process itself); M. OLSON, THE LOGIC OF COLLECTIVE ACTION 132-34 (1971) (stating that large or latent pressure groups will succeed in enlisting individual support only if they have the power to coerce or to offer a non-collective benefit as an inducement). A conceivable example of this in the setting of public risk litigation would be, say, a newsletter for victims of Agent Orange who contribute to a litigation fund. As another example, consider that the sheer attraction of participation in a group effort may at times overcome the individual inertia that forestalls collective action, an observation that has been used to explain popular voting. *See* H. MARGOLIS, SELFISHNESS, ALTRUISM AND RATIONALITY 21-24 (1982); Gillette, *Plebiscites, Participation, and Collective Action in Local Government Law*, 86 MICH. L. REV. 930, 950-51 (1988). But the argument for participation seems less compelling when the relevant community is defined by virtue of disease or victimization, though we can think of counterexamples — Vietnam Veterans, Disabled American Veterans, a gay community solidified by the AIDS crisis. In instances like those, though, members of the groups in question usually have preexisting characteristics in common, whether of status (as veterans, as homosexuals) or experience (such as combat duty). These facilitate communication and probably also make for greater participatory benefits than can be realized by people who share nothing but the plight of being victims.

There are reasons to suppose that people exposed to risk would assiduously avoid membership in voluntary collectives formed to seek group benefits. The process of self-selection instrumental to the formation of such groups would entail admission of prior exposure to dangerous conditions, and various psychological mechanisms — cognitive dissonance in particular — could push mightily against acknowledging regret of prior conduct. *See* Akerlof & Dickens, *The Economic Consequences of Cognitive Dissonance*, 72 AM. ECON. REV. 307, 310-14 (1982); Robinson, *Rethinking the Allocation of Medical Malpractice Risks Between Patients and Providers*, 49 LAW & CONTEMP. PROBS. 173, 191 (Spring 1986). *But see* A. HIRSCHMAN, EXIT, VOICE AND LOYALTY 92-97 (1970) (suggesting that past choices may lead individuals to work to ensure the success of their ventures when the threat of failure arises). Still, a failure to support litigation may be consistent with a desire to believe, perhaps erroneously, that prior events or behavior entailed little risk. Only when confronted with the actual materialization of injury might victims seek legal redress. This was evident in testimony at hearings on the fairness of the proposed settlement in the Agent Orange litigation. Judge Weinstein discovered that a significant number of veterans were more concerned with public acknowledgment of government misconduct than with compensation for their injuries. Many of the veterans urged the Judge to reject the proposed settlement so they could have their day in court. *See In re* "Agent Orange" Prod. Liab. Litig., 597 F. Supp. 740, 770-71 (E.D.N.Y. 1984), *aff'd in part and rev'd in part on other grounds*, 818 F.2d 145 (2d Cir. 1987).

Salience is another consideration; it too can ease the burdens of collective action. *See, e.g.*, Krier & Gillette, *supra* note 11, at 423 (arguing that voters' stakes in a salient political issue will be disproportionate to the impact that resolution of the issue will have on them personally). Unhappily, though, public risks are most likely to become salient issues only *after* the risks have materialized.

Quite obviously, the full implications of palliatives like those discussed above remain to be worked out. Even granting their operation, public risk litigation is likely to be in too short supply. *Cf.* R. HARDIN, *supra*, at 11 (suggesting that voluntary action in settings like that of public risk will be negligible in any event).

ecution may well not be worthwhile from any individual victim's self-interested perspective, even if it would be socially desirable.[63]

Might the potentially powerful triumvirate of entrepreneurial lawyer, class action, and contingent fee be a cure for at least some of these ills? The argument is that the lawyer — capable of building a portfolio of class suits seeking large recoveries, entitled to a percentage (say a quarter or more) of any recoveries obtained, and sufficiently skilled to win or favorably settle enough of the cases in the portfolio to make the enterprise profitable — will manage to surmount at least some of the structural obstacles that stand in the way of effective victim access. The lawyer can largely avoid freeriding and other strategic maneuvers. He typically needs relatively little money to initiate an action and rarely seeks active assistance from dispersed class members. Diffuse individual costs can be amalgamated into one large social cost and brought to bear on the responsible parties, the plaintiffs' lawyer(s) earning a nice fee in the process.

This picture looks sufficiently promising that one could imagine public risk lawsuits proceeding at a pace that actually exceeds the social optimum. Recent scholarship, however, suggests that the opposite is true, partly because class actions also induce strategy — on the part now of self-interested lawyers, not litigants.[64]

Class attorneys are likely to select for their litigation portfolios only those cases that promise expected personal benefits in excess of personal costs (including opportunity costs). They will reject cases that fail this threshold test even if the cases would yield net social benefits.[65] And while expected damages for a class (and thus the attorneys' expected personal benefits) might commonly be large in

---

63 *See* Shavell, *The Social Versus the Private Incentive to Bring Suit in a Costly Legal System*, 11 J. LEGAL STUD. 333, 337-38 (1982).

64 Critics of the courts share the assumption of attorney self-interest. *See, e.g.*, Huber, *supra* note 3, at 318, 328 (arguing that the failure of plaintiffs' attorneys to acknowledge the existence of competing risks or to accept limits on liability distorts the effectiveness of litigation as a means of ordering good and bad risks).

65 *See, e.g.*, Coffee, *Understanding the Plaintiff's Attorney: The Implications of Economic Theory for Private Enforcement of Law Through Class and Derivative Actions*, 86 COLUM. L. REV. 669, 684-90 (1986) (arguing that the incentives faced by plaintiffs' attorneys create a situation in which private enforcement of the law is underfunded); Kane, *Of Carrots and Sticks: Evaluating the Role of the Class Action Lawyer*, 66 TEX. L. REV. 385, 391 (1987) (arguing that fee awards create major incentives for plaintiffs' attorneys to litigate class actions); *cf.* Dam, *Class Actions: Efficiency, Compensation, Deterrence, and Conflict of Interest*, 4 J. LEGAL STUD. 47, 56-61 (1975) (arguing that in derivative class actions, plaintiffs' attorneys have an incentive to settle early). Of course, net personal benefits might be garnered from suits with little probability of success — if, for example, the attorney can anticipate settlement for nuisance value. *See* Coffee, *supra*, at 701-19.

public risk cases, the costs of litigation can generally be expected to be large as well.[66] Lawyers must first fight to get their class actions certified. If successful, they must then confront procedural and substantive difficulties dealing with proof of causation, standard of liability, identification of defendants, and (if there are multiple defendants) allocation of responsibility among them. Considerations such as these underlie concerns — voiced, for example, by Professor Rosenberg — about the sheer, and costly, complexity of public risk litigation.[67] Proceeding from the observation that the tort system delegates total discretion over public risk claim initiation to the plaintiff attorneys' bar, Rosenberg argues convincingly that lawyers tend to avoid new public risk lawsuits in favor of more rewarding alternatives ("sporadic accident" cases).[68] They do so because public risk suits, rather than presenting overwhelmingly attractive entrepreneurial opportunities, actually offer relatively unprofitable investments. The suits can, to be sure, generate much larger judgments than sporadic accident cases, but their complexity calls for a disproportionate amount of a lawyer's time and other resources. Exceptions like the ongoing asbestos litigation show that not every public risk case is regarded as unmarketable by plaintiffs'

---

66 The expected damages that form the basis for a contingent fee might be less than one would suppose, even if the probability of a successful lawsuit is high. Awards for harms that will materialize only in the future (for example, lost earning capacity) will be reduced to present value; compensation for risk itself will be discounted to reflect the generally low probability that actual injury will result (if compensation is allowed in this latter instance at all, see *supra* note 61). Litigation costs are, of course, incurred in present dollars, and the amounts can be very substantial. In the Agent Orange litigation, Judge Weinstein awarded the Plaintiffs' Management Committee $1,711,155.87 for expenses. Related attorneys were granted additional amounts in excess of $1 million. The amounts did not cover total attorney costs; Judge Weinstein did not compensate for what he regarded as duplicative tasks. *See In re* "Agent Orange" Prod. Liab. Litig., 611 F. Supp. 1296, 1307, 1325, 1344-46 (E.D.N.Y. 1985), *aff'd in part and rev'd in part on other grounds*, 818 F.2d 226 (2d Cir. 1987).

67 *See* Rosenberg, *supra* note 8, at 855-59.

68 *See id.* at 889-92. "Sporadic accidents" are isolated, ungeneralized wrongs such as automobile collisions, *see id.* at 854-55, as opposed to "mass exposure accidents" that can have "catastrophic consequences." *Id.* at 851-52. Sporadic accidents, then, typically grow out of what Huber calls private risks, and mass accidents out of public risks. *See supra* notes 3-5 and accompanying text. Huber, recall, indicts the courts only as a means of dealing with public risks; he endorses them in the private risk setting. *See supra* note 22 and accompanying text. Rosenberg, on the other hand, endorses the courts as a means of dealing with public risks, but considers that the tort system may well deal ineffectively with sporadic accidents, or private risks. *See* Rosenberg, *supra* note 8, at 854-55.

attorneys,[69] but Rosenberg nevertheless considers it "clear that such attorneys . . . will systematically reject mass exposure claims."[70]

Some of Professor Coffee's research points in the same direction.[71] He too views plaintiffs' attorneys as risk-taking entrepreneurs and concludes, with respect to environmental and mass tort litigation as well as other kinds of cases, that the attorneys' private incentives to litigate class actions are often "inadequate in terms of their social benefits."[72] A lawyer who contemplates (as the contingent fee payment) only a percentage of any damage award will be unwilling to invest in cases unless the expected fee exceeds personal costs, and the discrepancy between personal and social break points can be dramatic. Thus a lawyer anticipating personal costs (including opportunity costs) of $500,000 will reject a case with a contingent fee of 25 percent unless the client's expected recovery (damages discounted by the probability of success) exceeds $2,000,000.[73] Since, as we

---

69 *See* Rosenberg, *supra* note 8, at 892.

70 *Id.* at 891; *see also id.* at 892 ("Thus, the 'private law' allocation mechanism, which relegates case selection to plaintiff attorneys, is systematically biased against mass exposure claims."). But Rosenberg's conclusions in these respects are based on the assumption that class actions are unavailable. *See id.* at 890. He believes that an improved class action device could much improve the access problem. *See* Rosenberg, *Class Actions for Mass Torts: Doing Individual Justice by Collective Means*, 62 IND. L.J. 561, 569-73 (1987). We are skeptical, for the reasons discussed in the text.

71 *See* Coffee, *supra* note 65, at 676-77; Coffee, *The Regulation of Entrepreneurial Litigation: Balancing Fairness and Efficiency in the Large Class Action*, 54 U. CHI. L. REV. 877, 882-96 (1987) [hereinafter Coffee, *The Regulation of Entrepreneurial Litigation*]; Coffee, *Rethinking the Class Action: A Policy Primer for Reform*, 62 IND. L.J. 625, 628 (1987).

72 Coffee, *supra* note 65, at 676.

73 *See id.* at 686-87. The divergent interests of principals and agents are thoroughly analyzed in recent literature on agency costs. *See, e.g.*, Cass, *Allocation of Authority Within Bureaucracies: Empirical Evidence and Normative Analysis*, 66 B.U.L. REV. 1 (1986) (analyzing the impact of agency costs on various structures proposed for the allocation of review authority in administrative bodies); Coffee, *The Regulation of Entrepreneurial Litigation*, *supra* note 71, at 883-89 (discussing the diverging interests of attorneys and clients in class actions); Jensen & Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure*, 3 J. FIN. ECON. 305 (1976) (relating principal-agent problems to a theory of the firm). Notice that the need for a fee incentive even more dramatically reduces the possibility of obtaining representation in suits for injunctive relief, or for administrative relief if no statutory attorney's fee is provided. *See, e.g.*, Pennsylvania v. Delaware Valley Citizens' Council for Clean Air, 483 U.S. 711, 723, 728-29 (1987) (holding that additional fees beyond standard lodestar are unavailable for purposes of compensating contingent fee attorneys for risk of loss in case under Clean Air Act); North Carolina Dep't of Transp. v. Crest St. Community Council, Inc., 479 U.S. 6, 15 (1986) (holding that the award of fees under Civil Rights Attorney's Fees Awards Act is appropriate only for actions enforcing one of the civil rights laws listed in the Act, not for unrelated injunctive actions to which plaintiffs also are a party).

have already noted, doctrinal constraints on recovery in public risk cases are significant, one would expect the discount rate for success to be quite high.

Even when class actions are taken into the entrepreneurial attorney's litigation portfolio, there remain opportunities for behavior that can end up understating the social costs of public risk. Since class members are unlikely to have the day-to-day contact and information that they need to monitor their attorneys' conduct, attorneys, in turn, face few disincentives to skew results in favor of their self-interest.[74] They will be tempted to file claims merely in order to establish a stake, then neglect vigorous prosecution either because of rising opportunity costs or in the hope that damages will increase in the interim. They will also be tempted to settle on self-interested terms for an amount too small to vindicate victim interests but structured so as to include a handsome attorney's fee.[75] Hence the filing and "successful" prosecution of class actions nevertheless leave reasons to suppose that the rate of recovery falls short of the optimum.

To summarize, public risk litigation is probably marked by too few claims and too little vigorous prosecution, with the likely consequence that too much public risk escapes the deterrent effects of liability. Those who think otherwise must believe that public risk claimants find an easy path into court and effective representation once there. If that conviction is founded on a denial of structural impediments, we can only respond that the point is neither clearly stated nor sufficiently examined, and that it flies in the face of current understanding. The same response is due those who might think that the trinity of entrepreneurial lawyer-class action-contingent fee can work litigation miracles.

B. *Process Bias*

We have just seen that an exclusive focus on obstacles to access supports the conclusion that the judicial system is biased in favor of

---

[74] *See, e.g.*, Goodman v. Lukens Steel Co., 777 F.2d 113, 124 (3d Cir. 1985) (observing that "the class representatives furnish the factual basis [for the action], but the lawyers shape the claims"), *aff'd*, 482 U.S. 656 (1987); Coffee, *The Regulation of Entrepreneurial Litigation*, *supra* note 71, at 884, 898 (noting the attorney's dominant position in the attorney-client relationship and the inability of the client to monitor the attorney's performance); Kane, *supra* note 65, at 395-96 (listing conflicts of interest potentially dividing attorneys and clients); Miller, *Some Agency Problems in Settlement*, 16 J. LEGAL STUD. 189, 203 (1987) (arguing that current incentive structures often motivate the attorney to pursue goals not aligned with those of the client).

[75] *See* Coffee, *supra* note 65, at 687-90, 717.

too much public risk. Conversely, though, if one looks only at matters of process — at how claims are treated once they reach the courtroom — it is not unreasonable to reach exactly the opposite conclusion. Purely for the sake of argument, then, we shall assume that judicial doctrine presently overstates the liability of public risk producers,[76] and thus creates a substantial bias against public risk.[77]

From one perspective, this process bias promises exactly the consequences we suggested earlier in discussing the lines of the public risk debate. "Liability rules that disfavor certain producers will either drive their risky products out of the market entirely, or inflate their prices so as to force at least marginal shifts in consumption toward less strictly regulated sources of hazard."[78] The trouble with this conclusion, of course, is that it rests on an account that examines process bias in clinical isolation, rather than as something attached to a larger structure. Of themselves, doctrinal trends and proposals might indeed work too much in favor of public risk victims. But when considered in a context that recognizes judicial processing of claims as only half (if that) of the story, the same biased developments can be seen to play a different role. Rather than threatening to distort, they promise to correct.

C. *Bias on Balance*

The thrust of our argument must be apparent by now. The producers of public risks will be inclined to overindulge, absent signals that align their self-interest with the larger social interest. At times, market transactions can generate the necessary signals, in the form

---

[76] There is, moreover, a considerable literature urging the courts to go further. *See, e.g.*, articles cited *supra* notes 13 & 14.

[77] Turns in the opposite direction are discussed *supra* note 52. There are also underway legislative developments that would limit the scope of liability. *See, e.g.*, MODEL UNIFORM PROD. LIAB. ACT, 44 Fed. Reg. 62,714 (1979) (a model act designed to reform and stabilize product liability law); *see also* Dworkin, *Product Liability Reform and the Model Uniform Product Liability Act*, 60 NEB. L. REV. 50, 51-52, 61, 73-74 (1981) (arguing that the Model Uniform Product Liability Act's impact will be slight because it incorporates most aspects of current statutory and common law on product liability, including the availability of "open-ended" awards for pain and suffering); Schwartz & Mahshigian, *A Permanent Solution for Product Liability Crises: Uniform Federal Tort Law Standards*, 64 DEN. U.L. REV. 685, 686-90 (1988) (arguing that the Federal Product Liability Risk Retention Act of 1981 has not resulted in lowering the cost of liability insurance because tort law remains highly unpredictable). For a compendium of state product liability statutes, many of which tend to reduce liability periods, limit joint and several liability, and limit damages for non-economic injury, see [2 Manufacturers-Distributors-Retailers] Prod. Liab. Rep. (CCH) ¶¶ 90,112 to 95,270.

[78] Huber, *supra* note 3, at 315-16.

of price. Government intervention can generate price signals too, by way of the compliance costs of rules and regulations, by way of fines and other sanctions for violating those rules and regulations, and — most particularly here — by way of liability for court judgments. Risk producers make decisions not simply in reaction to but also in anticipation of any of these price signals, and in the latter event discount the signal (by the likelihood of its imposition) to an expected value. Our analysis suggests that access bias, *viewed in isolation,* may make the expected value of the signal generated by court judgments too low. When claims go unfiled, the social costs they represent are not brought to bear on producer decision making. Because the signal emanating from the courts is thus weakened, there is likely to be too much public risk. Those who conclude otherwise argue from process bias, again *viewed in isolation;* they contend that harsh doctrine makes the expected value of liability too high. Victim claims are treated too tenderly. Too many costs are internalized. Public risk producers are saddled with burdens that other risk producers avoid, and exit the market even though their activities are the less hazardous. There is likely too little public risk.

What this summary account makes apparent is that access bias and process bias have to be considered together, on balance, as elements of a larger system, rather than separately, each on its own. After all, only when obstacles to access are overcome, so that claims are actually filed and prosecuted, can any doctrinal bias come into full play.[79] Litigation comprises two imperfect parts. Because each part is imperfect, isolated examination tends to reveal only flaws, and can inspire corrections that could actually make matters worse. Hence observers who focus mostly on problems of access should cautiously avoid advocating reforms that could accomplish too much. Similarly, so should those who fix their attention on process.

Taking bias on balance, the judicial system might simply be working to increase the expected value of producer liability for public risks to appropriate levels, with the overstatements induced by process offsetting (and offset by) the understatements caused by access.[80] Liability judgments that look too harsh of themselves take on a different character when placed in this larger perspective.

---

[79] For a discussion of the interplay of access and process bias, see *supra* note 54.

[80] The argument here is similar to arguments on behalf of treble damages in antitrust conspiracies, increased criminal fines when the probability of detection is low, and punitive damages for intentional torts. *See, e.g.,* R. POSNER, *supra* note 28, at 194, 204, 207, 293-94 (discussing the relationship between the magnitude of a fine or liability judgment and the probability of its imposition from the standpoint of

Consider in this respect the handful of cases that so concerns some of the courts' critics.[81] Any one or all of these can readily enough be criticized for subjecting particular public risk producers to unduly harsh treatment. Such expansive liability can drive relatively safe enterprises out of the market, and in this sense the decisions in question are costly. A systemic view, however, suggests the possibility of an accompanying benefit. By inflating the liability imposed on *any* public risk producer brought to judgment, process bias increases the expected liability that must be anticipated by *all* public risk producers in the market, so long as public risk claims enter the liability system on an essentially random basis.[82] On this view, the social costs resulting from inflated liability in any particular case are simply the premium paid for the service of augmenting expected values that are probably otherwise too low. The enhanced recoveries amplify a signal that is weak at its origin. The premium exacted in the process may be unavoidable, and in any event worthwhile. There is, in short, a flip side to laments about public risk liability in the courts. All things considered, public risk producers as a *class* might be treated evenhandedly, suffering no marked disadvantages relative to the private risk producers whose judicial handling is said to be acceptable.[83]

This conclusion is necessarily tentative, because our model does little more than identify some important empirical questions that the present debate ignores. For example, are access barriers in fact as substantial as we suggest? On the other hand, is process bias as substantial as the courts' critics would have us believe? How does the

---

optimal deterrence). There is a good possibility that what we label process bias serves not only to correct for problems of access but also to neutralize traditional rules of judicial claims processing that work too harshly against victims in the case of public risks. In other words, liberal process rules might not be biased in favor of victims at all; rather, they may simply neutralize older, conservative process rules that are biased in the opposite direction. If so, judicial doctrine should be liberalized even further, to compensate for the access bias that remains despite the present generation of process reforms.

[81] *See, e.g.*, cases cited first paragraph *supra* note 52.

[82] If claims enter the system on a random basis, public risk producers are unable to predict which risks will result in inflated liability and which not; hence all producers will feel the deterrent effects of enhanced liability. Contrast Huber, *supra* note 3, at 320 (stating that tort litigation "is likely to be largely random in its choice of risk targets," and that "[i]t is plain that random regulation entails social costs without commensurate benefits").

[83] *See supra* note 22. The conclusion we reach in the text leads us to recant a view we stated several years ago — that judicial intervention can do little to curb undesirable technological trends and may actually only aggravate them. *See* Krier & Gillette, *supra* note 11, at 420 n.51.

system work out on balance? Is the risk premium (as we have called it) worth the benefits for which it pays? Issues like these have to be investigated before embarking on the sweeping reforms proposed by the critics of the courts.[84] The critics argue for substantial judicial retreat; hence they bear a substantial burden of proof. Our model shows not that they are wrong; it shows, rather, how they fail to prove themselves right in their claims about judicial bias against the producers of public risk.

D. *Judicial Competence*

Even if the courts are balanced in their treatment of public risk, it does not automatically follow from this that the judiciary is a good risk management institution. The claim that the judicial system is "institutionally predisposed to favor regressive public risk choices"[85] might fail for lack of proof, but the claim of judicial incompetence would still remain.[86]

---

[84] To see how difficult some of these issues might be, consider the following complications, suggested to us by a very illuminating correspondence with Professor Richard Craswell of the University of Southern California Law Center. Craswell observes that although access bias and process bias probably do work in opposite directions, it does not necessarily follow that they offset in a neat way. One would have to know more about the magnitude of each kind of bias, and about the setting in which the biases operate. Suppose, for example, a setting in which (1) some firms that should be held liable manage to escape detection, but (2) other firms that should not be held liable are held liable nevertheless. Here there would be offsetting effects in terms of the impact of liability on any firm's expected profits, but there would not be offsetting effects in terms of deterrence. Consideration (1) might induce firms to ignore the creation of undue risk, because the firms expect to avoid detection. Yet consideration (2) can have exactly the same effect, because firms figure that there is some probability they will be held liable even where liability is inappropriate.

Now hold consideration (1) constant, change consideration (2) to suppose that firms are never (or almost never) held inappropriately liable, and add, as an additional consideration (3), that firms held liable are hit with damages much larger than the expected value of the risks they imposed. Here consideration (1) would still undermine deterrence, but consideration (3) would work in the opposite direction. The issues that then arise have to do with the magnitude of the two effects — does consideration (3) just nicely cancel consideration (1), or does it not do enough, or does it do too much?

At bottom, the questions are whether tort liability in the public risk case works in a setting more like that characterized by considerations (1) and (2), or more like that characterized by considerations (1), (2), and (3) — and, in the latter event, what the magnitude of the effects of considerations (1) and (3) might be. The general lesson is that what appear to be offsetting "pro-defendant" and "pro-plaintiff" biases might not be offsetting at all, and even if they are, the magnitudes of the biases are important. It is for reasons like these that we state our own conclusions in less than conclusive terms.

[85] Huber, *supra* note 3, at 329.

[86] *See supra* notes 16-22 and accompanying text.

Imagine, for example, that the risk premium exacted by the courts proves to be worthwhile. Could it nevertheless be avoided or at least made significantly smaller? Are there alternative institutions that can achieve something like the optimal amount of public risk in a more adroit (less expensive) way? For critics of the courts, the answer is yes. Administrative agencies, however imperfect themselves, would be a very considerable improvement.[87] For this reason, courts operating in the civil liability setting are implored to defer to the experts of administrative agencies that have undertaken "searching and complete . . . regulation."[88] If an agency has deter-

---

[87] *See, e.g.*, Elliott, *Goal Analysis Versus Institutional Analysis of Toxic Compensation Systems*, 73 GEO. L.J. 1357, 1374 (1985) (stating that administrative agencies can deal with many liability issues more effectively than can the courts); Huber, *supra* note 3, at 331-35 (arguing that regulatory agencies are better equipped to resolve issues concerning large scale public risks than are courts); Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89, 130-31 (1988) (noting judicial insensitivity to the goals of regulatory legislation and fundamental judicial misunderstanding of the evidence used by administrative agencies for risk assessment); *see also supra* note 20.

[88] Huber, *supra* note 3, at 334. Notice the vagueness of the relevant standard, an especially striking vagueness given that Huber has criticized others, most notably Professor Yellin, for proposing a similarly loose guideline ("complex technology") to determine when close judicial scrutiny of agency regulatory decisions is appropriate. *See id.* at 312-14.

Professor Kip Viscusi, an economist, has also argued that compliance with administrative regulations should, in certain instances, foreclose civil liability. "Firms should be exempted from potential liability in court actions if they can demonstrate either compliance with a government regulation that leads to an efficient degree of safety, or the use of a hazard warnings program that leads the market to promote an efficient level of risk." Viscusi, *Product Liability and Regulation: Establishing the Appropriate Institutional Division of Labor*, 78 AM. ECON. REV. 300, 303 (Papers & Proceedings 1988). Viscusi's test, like Huber's, would be extraordinarily difficult to apply. Beyond that, both tests could prove to be counterproductive. Agency regulations might set standards that are efficient, but only from the standpoint of the median firm in the regulated industry — meaning that the standards would be unduly lax as to firms that can produce safety at lower than the average cost, and unduly demanding as to firms with higher than average safety costs. In this connection, consider Huber's observation that courts and agencies alike commonly agree that "administrative risk regulation is intended to set only a safety 'floor' — a threshold of performance, a minimum degree of 'acceptable' safety." Huber, *supra* note 3, at 334. It appears, though, that Huber thinks this pattern holds only where "the administrative regulatory regime is casual or sporadic, as with consumer products," and not in the case of "comprehensively regulated industries" that produce vaccines and pesticides or build and operate electric power plants, apparently because here regulation is "searching and complete." *Id.* If agencies set standards that are efficient only on average, then exemption from civil liability on the grounds of compliance with the regulatory program could yield suboptimal amounts of safety: firms with lower than average costs would underinvest. The matter is a complicated one, though, because denying the compliance defense could result in overinvestment in safety by firms with higher than average costs. *See* Schwartz,

mined (in the course of a licensing proceeding, for instance, or through regulatory hearings) that a particular public risk is progressive, liability on the producer's part should thereafter be foreclosed so long as it meets the terms of its license or complies with applicable regulations.[89]

In another setting, judicial review of administrative activity, the prescription once again advanced is judicial deference to agency decisions. This is why Mr. Huber, a chief critic of the courts and an earnest champion of the agencies when it comes to public risk, criticizes Professor Yellin and others for proposing expanded and more intrusive judicial oversight of the regulatory process.[90] Such proposals would simply repeat the shortcomings of related reforms in the area of civil liability. Under Yellin's program, for example, only new sources of public risk would receive heightened scrutiny. They alone would be burdened with the direct costs of the review process and the indirect costs of delay. Huber objects to this by arguing that new risks are already disadvantaged by premarket regulation, and that expanded judicial review would only make matters worse. The costs of the process could keep some progressive new risks off the market; their introduction would in any event be delayed by protracted inquiry, and meanwhile society would suffer unnecessary hazards.[91]

The difficulty is that the argument on behalf of agency expertise fails to provide a satisfying systemic account. Suppose, for example, that courts *do* end up biased against public risk. Might agencies tend to be biased in the opposite direction? Barriers to access could, after all, result in agency bias if they limit the ability of potential public risk victims — but not public risk producers — to influence agency thinking. Similarly, agencies might process risk decisions in a biased way. Or suppose that courts *are* incapable of dealing with risk in a highly competent fashion. Might administrative agencies and the experts they employ be something less than competent themselves? A respectable comparative approach would consider questions like these. Whether in the setting of civil liability or in that of judicial review, a sensible assessment of the courts has to confront the skeptic's query: Compared to what? It is hardly enough to catalog judicial weaknesses and administrative strengths; the other side of each

---

Proposals for Products Liability Reform: A Theoretical Synthesis, 97 YALE L.J. 353, 388-91 (1988).

89 *See* Huber, *supra* note 3, at 334-35.

90 *See id.* at 312-14.

91 Remember Huber's assertion that on average new risks are safer than the old risks they displace. *See supra* note 11 and accompanying text.

institution has to be considered too. Having done some of this with the courts, which the critics attack, we turn now to the agencies, which they defend as the less biased, more competent institution. Is their case a convincing one?

IV. Risk, Agencies, and Experts

Since their birth a century ago, their great endorsement during the New Deal, and their extraordinary proliferation over the last fifty years, administrative agencies have come to be seen by some as the ideal institution for managing complex social problems. In principle, after all, agencies can provide what markets and courts sometimes cannot: expert regulation in the public interest. Given the complexity of public risk, the problems of market failure, and the shortcomings of the courts, administrative rule seems an obvious course to take.

Obvious, though, only if one envisions agencies in the idealized terms of the New Deal.[92] If, instead, one is motivated — by simple curiosity, by skepticism, or by allegiance to a persistently systemic investigation — to consider how reality might depart radically from the ideal, then a rather different image comes into view. One can see that agencies, like markets and courts, are themselves easily capable of failure. The generalization is obvious, but we are interested in particulars. Most to the point here, we are interested in the possibility of agency failure of a very specific sort — a systematic tendency in favor of too much public risk. In pursuing this line of inquiry we aim to provide not an exhaustive or decisive account, but only a suggestive one. The issue is whether the courts should defer to administrative agencies in cases of public risk. Our account suggests that the answer is much more complicated than a sanitized vision of administrative decision making might suggest.

---

92 The New Deal image is one of agencies with considerable expertise exercised free of political influence and judicial meddling. *See, e.g.*, B. Ackerman & W. Hassler, Clean Coal/Dirty Air 4-6 (1981) (discussing New Deal affirmation of expertise insulated from central political control and judicial oversight). A commentator like Huber obviously endorses the idealized view of administrative agencies. In *Safety and the Second Best, supra* note 3, he stresses administrative expertise, assumes political neutrality, and argues for limited judicial oversight of agency decisions. A similarly idealized view of agencies underlies the argument in Kelman, *The Necessary Myth of Objective Causation Judgments in Liberal Political Theory*, 63 Chi.-Kent L. Rev. 579 (1987). The view is criticized for its unworldliness in Epstein, *Causation — In Context: An Afterword*, 63 Chi.-Kent L. Rev. 653, 678-80 (1987); Schwartz, *Causation in Private Tort Law: A Comment on Kelman*, 63 Chi.-Kent L. Rev. 639, 649-51 (1987).

A. *Risk Assessment and Management*

Risk management and its antecedent, risk assessment, are relevant to much of the following discussion, so it makes sense to start with a brief and highly stylized sketch of some methodological fundamentals.[93]

Take risk assessment first. Whatever the suspected hazard in question, estimating its dangers involves essentially four lines of investigation: defining the conditions of exposure, identifying adverse effects, determining the probabilistic relationships between exposure and effect (such as dose/ response), and calculating overall risk. Each of these tasks obviously calls for information; each also calls for judgment — in fixing the scope of inquiries, conducting investigations, interpreting findings, determining their weight. How difficult it will be to get reliable information, and the degree to which judgment enters the assessment process, range from the trivial to the extraordinary. In some cases, for instance those concerning the risks of driving at various speeds, experience will have generated abundant quantities of unexotic data, much of it already compiled into transparent statistical statements. Here assessment is a relatively straightforward exercise. The exercise becomes more taxing, and the role of judgment increases, in instances where directly relevant data about hazards have not been gathered or do not exist. Determining the risks that might attend new applications of some familiar drug, for example, commonly requires epidemiological studies as well as clinical experiments. Both kinds of work are difficult and expensive to design, execute, and interpret, so risk assessments based on them present significantly greater challenges than in the first sort of case. Consider finally a third category of instances, those involving technologies (such as recombinant DNA or various aspects of nuclear power) "so new that risk assessment must be based on

---

[93] One can look at any number of references for an introduction to risk methodology. We draw our account from I. HOOS, SYSTEMS ANALYSIS IN PUBLIC POLICY: A CRITIQUE 288-92 (rev. ed. 1983); W. LOWRANCE, OF ACCEPTABLE RISK: SCIENCE AND THE DETERMINATION OF SAFETY 18-44 (1976); Fischhoff, Svenson & Slovic, *Active Responses to Environmental Hazards: Perceptions and Decision Making*, in 2 HANDBOOK OF ENVIRONMENTAL PSYCHOLOGY 1089, 1091-1102 (D. Stokols & I. Altman eds. 1987); Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears: Understanding Perceived Risk*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 463-84 (D. Kahneman, P. Slovic & A. Tversky eds. 1982) [hereinafter Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears*]; Slovic, Fischhoff & Lichtenstein, *Rating the Risks*, ENV'T, Apr. 1979, at 14, 15 (Fig. 1) [hereinafter Slovic, Fischhoff & Lichtenstein, *Rating the Risks*]; Wilson & Crouch, *Risk Assessment and Comparisons: An Introduction*, 236 SCI. 267, 267-69 (1987).

complex theoretical analyses such as fault trees . . . , rather than on direct experience."[94] These are the cases at the heart of the public risk debate and, thus, the cases of greatest interest to us. They are the most important and controversial. They are attended by the least information. They call for the most judgment.

The fault (or decision, or event) trees referred to above are a diagrammatic means to subject important decisions about uncertain events to the discipline of careful thinking. They are called trees "because of the tree-like schematic design used to depict relationships within the system" in question.[95] Slovic, Fischhoff, and Lichtenstein, who say (as already suggested) that "[f]ault trees are used most often to characterize hazards for which direct experience is not available,"[96] give as an example a tree depicting the possible escape into the environment of radioactive material from nuclear wastes buried in a salt mine. At the base of the tree are boxes indicating the many external influences (one hopes all) that might permit waste to escape (for example, rock pressure, fault movement, accidental drilling) into groundwater (the next level up the tree) and subsequently into the atmosphere (at the top of the tree). The escape route could also bypass groundwater and carry radioactivity directly into the atmosphere if a volcano erupts, a nuclear weapon explodes, or a meteor collides with the earth. Slovic and company drolly conclude their brief description of the fault tree methodology by observing that it "may be used to map all relevant possibilities and to determine the probability of the final outcome. To accomplish this latter goal, the probabilities of all component stages, as well as their logical connections, must be completely specified."[97] Even then the risk assessment exercise is not finished. One would still have to construct an additional or extended tree based on "release into the atmosphere" and branching off to consider all the different ways (subject to meteorological and other variables) radioactivity might affect human and other resources, and when, and to what degree, and with what possible consequences. Following that, and to get to the management side of the question, one would need a tree depicting alternative courses of action (which could include doing nothing), together with estimates of the size and distribution of their expected costs and benefits. One would also need a means to compare the risk in question to the extant risks it might serve to displace.

---

[94] Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears*, *supra* note 93, at 463.

[95] I. Hoos, *supra* note 93, at 288.

[96] Slovic, Fischhoff & Lichtenstein, *Rating the Risks*, *supra* note 93, at 15 (Fig. 1).

[97] *Id.*

All of these stages, of course, are once again dependent on good information and good judgment. It is doubtful whether even the most well-intentioned agencies can perform the required tasks with anything close to the comprehensive rationality implicit in the method. As we shall see, a developing literature suggests that human problem solving suffers from limited computational capacity, incomplete searches for alternatives, limited information, and uncertainty about consequences,[98] yet failure in any of these respects can have a profound effect on ultimate judgments about risk.[99] Risk assessment and management are neither neutral sciences nor well-mastered arts.

B. *Access and the Problem of Capture*

With the foregoing background in mind, we focus in this and the next section on some of the possible consequences of pronounced deference to administrative agencies. We are concerned not simply with how agencies actually behave currently, but also with how they might be expected to behave were they granted more freedom than at present. What might the practice of risk assessment and management look like then?

As a way of beginning, recall the argument that in the *litigation* setting public risk victims (and their attorneys) are susceptible to incentives that work at cross purposes with actual victim interests and hold them back from the courts. As a result, and absent any corrective, one could expect too little by way of deterrence coming out of the courts because too little by way of claims goes in. The *administrative* setting looks at first to be different, because agencies are not formally dependent on outside initiative; they need not wait for victim claims in order to embark on "searching and complete"

---

[98] *See, e.g.*, H. SIMON, ADMINISTRATIVE BEHAVIOR at xxviii-xxxi (3d ed. 1976); March, *Bounded Rationality, Ambiguity, and the Engineering of Choice*, 9 BELL J. ECON. & MGMT. SCI. 587, 589-91 (1978) (noting that substantial error is likely in anticipating future consequences of present actions); Simon, *Human Nature in Politics: The Dialogue of Psychology with Political Science*, 79 AM. POL. SCI. REV. 293 (1985). On the less theoretical side, see GENERAL ACCOUNTING OFFICE, PROGRAM EVALUATION AND METHODOLOGY DIVISION 87-14, HEALTH RISK ANALYSIS: TECHNICAL ADEQUACY IN THREE SELECTED CASES 82-83 (1987), a study of the procedures used by federal agencies responsible for regulating environmental health and safety. The GAO study found that agency decisions about what information to gather tended to be based on what information was available and on what other agencies were doing.

[99] *See, e.g., infra* notes 211-12 & 216-24 and accompanying text.

regulatory efforts.[100] Hence it seems they can avoid the problem of access that burdens the judicial system.

Administrative power to seize the initiative is especially appealing to anyone who believes that when public agencies act, they act in the public interest. Just such a faith seems to be reflected in some of the views voiced by Mr. Huber, particularly the claim that public agencies can supply "a 'public' point of view on the problem"[101] of risk assessment and management. Less clear is the source of this public point of view, or the basis for believing that agency initiative would necessarily serve it.[102] Assessment and management are, as we saw, heavily dependent on a wide range of information and values. How any particular risk decision comes out is likely to turn in part on what happened to go into an agency's deliberations. Hence an abiding faith that outcomes are in the public interest requires an underlying conviction that information and values filter into and out of agencies in some evenhanded way. If, however, risk producers have a comparative advantage over risk consumers in getting the administrative ear, then agency decision making might be marred by access bias just as judicial decision making is.

The problem we have in mind is a variation on some central themes in the literature about agency "capture," a body of theory and evidence familiar enough to require only a brief account here.[103] Capture theory proceeds from the notion that the motivations and behavior of private citizens and public officials in political markets are similar to those of producers and consumers in ordinary economic markets. Citizens (in this case, risk producers and risk consumers) and officials (here, those involved in the process of risk regulation) are assumed to be substantially self-interested and to

---

100 *See supra* notes 88-89 and accompanying text.

101 Huber, *supra* note 3, at 331. Beyond this, a faith in the good public-mindedness of agencies is implicit in Huber's argument for judicial deference to agency expertise. The argument could not even start to make sense absent a conviction that agencies can be expected to rise above the influence of narrow private interests and act to serve some broad public interest instead.

102 *See* Noll, *Government Regulatory Behavior: A Multidisciplinary Survey and Synthesis,* in REGULATORY POLICY AND THE SOCIAL SCIENCES 9, 24 (R. Noll ed. 1985); Posner, *Theories of Economic Regulation,* 5 BELL J. ECON. & MGMT. SCI. 335, 336-44 (1974).

103 For a sample of general treatments written from various perspectives, see W. NISKANEN, BUREAUCRACY AND REPRESENTATIVE GOVERNMENT 36-42 (1971); Cass, *supra* note 73; Cutler & Johnson, *Regulation and the Political Process,* 84 YALE L.J. 1395 (1975); Noll, *The Political Foundations of Regulatory Policy,* 139 J. INSTITUTIONAL & THEORETICAL ECON. 377 (1983); Peltzman, *Toward a More General Theory of Regulation,* 19 J. L. & ECON. 211 (1976); Posner, *supra* note 102; Stewart, *The Reformation of American Administrative Law,* 88 HARV. L. REV. 1667 (1975); Stigler, *The Theory of Economic Regulation,* 2 BELL J. ECON. & MGMT. SCI. 335 (1971).

want their private interests served by political and regulatory processes in ways that may have little in common with what would serve the larger public interest.[104]

Self-interest is easy enough to picture in the case of risk producers and consumers, but its meaning regarding political officials, administrators in particular, is worth a few words. With respect to public actors, self-interest can mean something as obvious (and acceptable) as wanting to avoid embarrassing technical errors in the course of making decisions, as trivial as wanting to save time and effort during the day-to-day routine (in order to nurse the agency budget or enhance agency leisure), or as substantial (and possibly tainted) as wanting to advance agency or personal power and resources. Agency and personal advancement, in turn, are likely to be a function of the reactions to agency decisions by the legislative and executive branches, by the electorate, by the presumed targets and supposed beneficiaries of agency action, and by potential employers of agency personnel, whether within the government, or without.

Just as public officials have the means to satisfy the interests of private citizens, citizens have the potential to serve the interests of officials. They can provide information and points of view. They can contribute money to political campaigns and administrators' pockets. They can assemble blocks of voters. They can offer employment opportunities. These examples mix sinister elements with benign ones, but the capture argument hardly depends on the former. There is nothing sinister in the fact that various citizens might cluster into interest groups for the purpose of contributing resources — data, perspectives, arguments — to administrative deliberations. Nor is it troubling that each such group might hold some sort of proxy for one or another popular attitude or value (whether the proxy is measured in the number of votes, or the number of dollars, that the group might be able to deliver to the political backers of administrators who make acceptable decisions). Information, points of view, voter attitudes, and dollars as a measure of intensity of voter attitudes are, after all, obviously relevant to making decisions in the public interest (unless the public interest means something utterly unrelated to what the public is interested in).

---

[104] Notice from the text that we regard citizens and officials as "substantially" (not ruthlessly) self-interested; moreover, we concede that private and public interests may at times be entirely congruent, but also think it obvious that on many occasions they are not. Given all of this, our purpose is to trace the implications of a tendency, in the setting of public risk regulation, to behave in a self-interested way.

That interest groups express their views by these means, then, does not necessarily imply tawdry politics; to the contrary, there might be no other practical way to discern much of the meaning of "the public interest" in a democratic system. The model is interest group pluralism and its idea that agency output (self-interest notwithstanding) will approximate the social good as long as the output results from countervailing pressures brought to bear by any number of interested groups, each of which has roughly equal access to the decision making process. Capture theory shows how the pluralist model can go wrong. Almost by definition, interest group pluralism can endorse decisions as "in the public interest" only if all the various interest groups are indeed able to voice their wants effectively. If, instead, some groups enjoy a comparative advantage in catering to administrative needs and desires (that is, if the pluralist process is too singular, not sufficiently plural), there arises the danger that agency attention will be captivated by too narrow a range of interests and be diverted from an appropriately public perspective.[105]

Whether, and how much, bias is likely to result from asymmetric access to the administrative process depends considerably on the nature of any particular item on the regulatory agenda. In the case of public risk generally, though, the problem appears to be a substantial one, as should be obvious from our discussion of access bias in the courts.[106] We saw in that discussion how the typical characteristics of public risk — impacts that are latent, diffuse, widely dispersed, of low probability, and nonexclusive — limit the ability of potential and actual public risk victims to gain access to the courts.[107] Our point here is that they can also frustrate the efforts of victims to mobilize for the purpose of influencing agency decisions about risk. Whatever the objective of the mobilization effort (it might be to prepare and provide a good research product for agency consideration, or to present a convincing brief for the victim point of view, or to gather a crowd to attend public hearings, or to organize an effective lobby), considerable amounts of time, effort, and money

---

105 Noll suggests that some regulatory agencies are particularly susceptible to domination by selected interest groups because their "single-purpose" mission and limited range of authority render them unable to accommodate all interest groups. Our treatment, in contrast, emphasizes the relative abilities of all people interested in an agency's decisions to influence agency action, whether or not the agency has a single-purpose mission. *See* Noll, *supra* note 102, at 44.

106 *See supra* notes 55-75 and accompanying text.

107 *See supra* notes 55-61 and accompanying text.

will be required.[108] These resources will also, however, be hard to find. The diffuseness of public risks, coupled with the fact that materialization of any physical injury will usually be remote in time (latent) and in probability, reduces incentives to contribute much to the common cause. So does the nonexclusive nature of favorable agency action.[109] Efforts to overcome some of these obstacles by appealing directly to potential group members for support confront the same obstacles. The appeals themselves require a force of personnel sufficiently large and energetic to address victims who will usually be dispersed over broad geographic areas. Hence the problem of mobilization remains.

Look now at the other side of the story, and consider the ability of public risk producers to muster effective interest groups. Their organizational burdens will generally be lighter for any number of well-known reasons: there are fewer potential group members; each member will usually know the identity of most others; each member is likely to have a relatively large, concentrated, and immediate stake in agency decisions, as compared to public risk victims; each has greater assets (wealth, information, personnel, facilities, and so forth) to tap than any one or several (or even many) victims; commonly all or many of the members will already be organized, say through a trade association. Taken together, these considerations facilitate effective communication, provide opportunities to monitor individual contributions and chastise noncontributors, increase the likelihood that the private benefits of group action will exceed private costs, and forestall freeriding behavior.[110] In short, the costs of organizing collective efforts will generally be lower for the producers than for the victims of public risk, and this in turn means producers will generally enjoy a considerable comparative advantage in mobilizing interest groups and exercising influence, whether by benign or sinister means.[111]

The foregoing analysis simply elaborates a familiar generalization. Large groups seeking agency decisions that would yield diffuse,

---

[108] The power to vote, while a relatively inexpensive form of citizen participation in policy making, is seldom a good substitute for organized interest group activity aimed directly at agency deliberations. *See* Krier & Gillette, *supra* note 11, at 422-23.

[109] If the action benefits any risk victim it will likely benefit virtually all, so each victim will be tempted to freeride on the supposed contributions of others.

[110] *See* Krier & Gillette, *supra* note 11, at 424.

[111] Note that Huber seems to concede this when he mentions in passing that "[a]gencies will point out that they rely mostly on data furnished by the regulatees themselves." Huber, *supra* note 3, at 334.

remote, dispersed, and nonexclusive benefits are handicapped relative to small groups seeking decisions that would avoid (or fighting decisions that would impose) concentrated costs. The generalization applies to the case of risk regulation as much (if not more) as to any other, which is not to say that it is free of interesting exceptions. One can no doubt point to instances of risk regulation, and even to instances of risk-regulation agencies, that stand in contrast to our account.[112] But we are concerned with tendencies, and especially with tendencies that would exist if there were broader deference to agency rule than at present. In this context, the problem of asymmetric access suggests that agency decisions would tend in the direction of producer interests, and thus toward too much public risk.

Before closing this section, let us briefly mention two points directly related to our earlier discussion of access bias in civil-claim litigation. First, note that just as class actions are not an easy answer to access barriers in the judicial setting, public interest organizations are not an easy answer in the agency setting (including within that setting judicial review of agency activity). Public interest organiza-

---

[112] Commonly, though, the exceptions can be explained in ways entirely consistent with the idea that small groups, or groups that can largely privatize the benefits of their activity, have a comparative advantage when it comes to influencing government activity. *See* Krier & Gillette, *supra* note 11, at 424-26; *supra* note 62.

It is possible that agency officials may at times find it in their own interests to regulate risk very strictly — more strictly, indeed, than the public at large would wish. Picture as an example a drug manufacturer who must obtain administrative approval of a new product that promises to be very beneficial but can also have severe side effects. Administrators may be motivated to drag their feet, perhaps even to deny the new drug access to the market, out of fear that the salience of severe side effects that could result if the drug were to be approved would bring more blame to them than would the likely much less salient loss of benefits that could follow from turning down the drug. *See* J. ELSTER, ULYSSES AND THE SIRENS: STUDIES IN RATIONALITY AND IRRATIONALITY 131 (1979). Generally speaking, then, one could suppose that bureaucrats charged with licensing risky (but risk-reducing) products and activities feel some temptation to act conservatively — a complaint frequently aired by drug manufacturers.

Notwithstanding the foregoing, and speaking more generally still, any overregulation induced by salience or other considerations in the short term is likely to get worn away over the course of time (for instance, stiff regulations might be relaxed later on, or implemented and enforced in a way more friendly to risk producers). Risk producers are, as we saw, commonly more intensely interested and better organized than are potential victims; hence they are more motivated and more able to maintain concerted pressure on the regulating agencies. Concerted pressure, in turn, has the most promise of success in instances where any adverse side effects of agency decisions friendly to producer interests could be expected to appear only after a long period of latency — for then the bureaucrats making decisions have less reason to fear eventual blame. They will be long gone. *See infra* text following note 269.

tions themselves require support — they are not a costless enterprise — and will, for just the reasons canvassed above, have difficulty getting it. Almost by definition, the organizations are likely to be in too short supply. Second, it is possible that agencies might present victims with more substantial access problems than do courts. Individual victims of public risk have at least some incentive to proceed on their own with claims in court for damages. In the agency setting, however, the notion of effective individual victim action seems virtually nonsensical: almost never would one or a few victims find it worthwhile (or possible) to deliver items of substantial interest to self-interested administrators. That public risk producers can initiate administrative but not (usually) judicial liability proceedings provokes further concern. This lets them anticipate problems and mobilize to influence an agency's agenda well in advance of focused public concern and pointed regulatory decision making, much in the manner of building bulwarks against an expected tide.

C. *Process and the Meaning of Risk*

The last section's story was a cautionary tale, warning that a deferential attitude toward agency decisions could lead to too much public risk. The story in this section ends with the same lesson, but it begins in a very different way. We worried above that asymmetric access might distort an egoistical agency's image of the public interest. Here we abandon the assumptions on which those concerns were based, happily grant every wish of public interest theorists, and hence suppose that agencies are invulnerable to undue outside influence and selflessly dedicated to a rational vision of the social good. Still, we think, the likely result of deference to such agencies would be too much public risk, at least so far as the public is concerned.[113]

---

[113] Since we are curious about what might go on inside an utterly uncaptivated agency's publicly interested mind, we imagine for now an agency with pure and selfless intentions that are incorruptible because the agency is perfectly insulated from outside influences (or subject to exactly offsetting ones). The idea of insulated agencies is briefly addressed in S. Rose-Ackerman & J. Peracchio, Administrative Law and Political Economy, Report on a Conference of Columbia University's Center for Law and Economic Studies 6-8 (Working Paper No. 6, Nov. 1985) (remarks of B. Ackerman and J. Krier). That our agency image is fanciful does not preclude its being useful for present purposes, but should unsettle anyone skeptical about the capture story that figured in the last section. A real-world account would consider that the tendencies we investigate in this section no doubt work *in concert* with those explored in the last, and that concerted action is likely only to exaggerate forces working in the direction of too much public risk. *See infra* text following note 176; notes 177-79 and accompanying text.

The key to this conclusion can be found by asking an important question that all the discussion thus far has simply begged: What does "risk" *mean*? To anticipate our argument, suppose that the concept signifies different things to different people — more particularly, one thing to agency experts and another to the lay public.[114] Suppose, in addition, that while each of these meanings is sensible, the expert definition implies levels of public risk that are, by the lay definition, almost invariably too high. It then follows that a selfless agency, determined and free (because of expansive deference) to assess and manage public risk in accord with its own conception, will end up regulating less than called for from the public's point of view. The resulting contest is, at bottom, one of competing rationalities, and its resolution is a matter of ethics and politics, not technical expertise. Nothing in the training, credentials, or legitimacy of risk assessors or bureaucrats qualifies them to settle the issue. Hence deference to agencies would grant them ground they have no right to claim. Deference would beg a central question in the control of public risk.

That, in a paragraph, is our argument. Problems of *access* aside, bias can still result from the way agencies *process* risk decisions. Hence regulatory efforts might be misdirected for reasons entirely independent of those considered in the last section.[115]

To begin the discussion, return to the central question: What does risk mean? We asked this, but only implicitly, many pages ago — and alluded to one answer. Risk, we suggested, can be seen as the function of expected mortality or morbidity, or what we shall here

---

114 *See* Kasperson, Renn, Slovic, Brown, Emel, Goble, Kasperson & Ratick, *The Social Amplification of Risk: A Conceptual Framework,* 8 RISK ANALYSIS 177, 181 (1988) ("[R]isk has meaning only to the extent that it treats how people think about the world and its relationships. Thus there is no such thing as 'true' (absolute) and 'distorted' (socially determined) risk.").

115 In this connection, see Noll, *Economic Perspectives on the Politics of Regulation,* in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION 1253 (R. Schmalensee & R. Willig eds. 1988):

> [A]gencies may be populated by professionals that genuinely attempt to pursue public interest objectives, but who have a narrow or uninformed perception of where that interest lies. One potential problem is an overemphasis of a particular bias in the methods of a professional group, such as the emphasis of economists on theoretical efficiency, lawyers on procedural equity, or medical care professionals on risks to health.

Id. at 1278. Noll goes on to distinguish this problem of what we call process bias from the "problem . . . that analysts may be forced to rely on selective information that is controlled by interest groups," an illustration of the access bias that we considered in the last section. *Id.*

refer to as expected annual fatalities or "body counts," and in these terms many public risk technologies might indeed seem to be relatively safe.[116] Those who favor modern technological developments do so in part precisely because they, like most experts, gauge risk in just this way. They may disagree about details, such as whether one looks at total expected deaths, deaths per person or per hour of exposure, or loss of life expectancy due to exposure,[117] but generally speaking "experts appear to see riskiness as synonymous with expected annual mortality [and morbidity]."[118] So, for example, when technical experts are asked to rank the risks of various activities and technologies, "their responses correlate highly with technical estimates of annual fatalities."[119] When experts write about relative risk, they implicitly or explicitly use body counts as the relevant measure.[120] And, in a way seemingly consistent with the logic of their method, they insist that a death is a death is a death — 1,000 lives lost in a single anticipated annual catastrophe, or through many accidents expected every year, or lost ten-fold but only once every decade on average, or lost in a single community or across the country, are all the same to them.[121]

---

116 *See supra* note 9 and accompanying text.

117 *See, e.g.*, Fischhoff, Svenson & Slovic, *supra* note 93, at 1095; Fischhoff, *Managing Risk Perceptions*, ISSUES IN SCI. AND TECH., Fall 1985, at 83, 89.

118 Slovic, *Perception of Risk*, 236 SCI. 280, 283 (1983) (citation omitted); *see also* Slovic, Fischhoff & Lichtenstein, *Facts and Fears: Understanding Perceived Risk*, in SOCIETAL RISK ASSESSMENT: HOW SAFE IS SAFE ENOUGH? 181, 191-92 (R. Schwing & W. Albers, Jr. eds. 1980) (experts view risk as synonymous with technical fatality estimates).

119 Slovic, Fischhoff & Lichtenstein, *Regulation of Risk: A Psychological Perspective*, in REGULATORY POLICY AND THE SOCIAL SCIENCES 241, 263 (R. Noll ed. 1985) [hereinafter Slovic, Fischhoff & Lichtenstein, *Regulation of Risk*]; *see also id.* at 266 (Fig. 4) (showing that experts' risk judgments are closely associated with annual fatality rates); Slovic, Fischhoff & Lichtenstein, *Rating the Risks*, *supra* note 93, at 19 (study results showed that "[t]he experts' mean judgments were so closely related to the statistical or calculated frequencies that it seems reasonable to conclude that they viewed the risk of an activity or technology as synonymous with its annual fatalities").

120 *See, e.g.*, Huber, *supra* note 3, at 294-304, 300 n.92, 314 n.138 (discussing the hazards of various goods, services, and technologies in terms of the number of people affected).

121 *See, e.g.*, Nichols & Zeckhauser, *The Perils of Prudence: How Conservative Risk Assessments Distort Regulation*, REGULATION, Nov.-Dec. 1986, at 13, 23 (expressing skepticism about the notion that the loss from one large accident is greater than that from the same number of deaths occurring either one-at-a-time or in smaller clusters), discussed *infra* notes 163-68 and accompanying text. Nichols and Zeckhauser do not necessarily equate all deaths, however; for instance, they recognize the argument that public aversion to death by cancer should be given weight in policy decisions about which deaths to prevent. *See* Nichols & Zeckhauser, *supra*, at 20. Moreover, Zeckhauser has advocated the use of a scale involving Quality

In the view of experts, then, risk is a one-dimensional phenomenon, a fact that has filtered its way into even the popular literature. A review article in *Science 85* reports that "[w]hen experts assess the risks of a technology, they are most concerned with how many people die from it in an average year."[122] Another article, appearing in a magazine section of *The Washington Post,* says that "[r]isk for the experts means how many people will die, but risk for the public means that plus a great deal more."[123]

For the lay person, risk is *n*-dimensional, as William Lowrance suggested in an early study. He observed that a variety of considerations in addition to expected fatalities and injuries affect people's judgments about risk: involuntary exposure, delayed effects, scientific uncertainty about the hazard in question, "dreaded" versus common hazards (for example, the threat of death from invisible radiation as opposed to an auto accident), irreversible consequences, and others.[124] Since the time of Lowrance's work, any number of studies have found "that many attributes other than death rates determine judgments of riskiness" by lay people, whose "model of what constitutes risk appears to be much richer than that held by most technical experts."[125] Thus the public is known to be concerned about risks that have catastrophic potential, that are unfamiliar, uncontrollable, or involuntary, that threaten future generations, that would concentrate fatalities in time or space, that are distinctively threatening as opposed to widespread and shared by the general population, that are manmade as opposed to natural.[126]

Adjusted Life Years (QALYs), which would vary with groups or individuals, for evaluating the social value of avoiding specific harms that fall on discrete groups. *See* Zeckhauser, *Measuring Risks and Benefits of Food Safety Decisions,* 38 VAND. L. REV. 539, 559-60 (1985).

122 Allman, *Staying Alive in the 20th Century,* SCIENCE 85, Oct. 1985, at 31, 35.

123 Russell, *Risk vs. Reality: How the Public Perceives Health Hazards,* Wash. Post, June 14, 1988, at 14 (Magazine) (quoting Peter Sardman, head of the Rutgers University environmental communication research program in New Jersey).

124 *See* W. LOWRANCE, *supra* note 93, at 86-94.

125 Slovic, Fischhoff & Lichtenstein, *Regulation of Risk, supra* note 119, at 243; *see also* Fisher, Chestnut & Violette, *The Value of Reducing Risks of Death: A Note on New Evidence,* 8 J. POL'Y ANALYSIS & MGMT. 88, 97 (1989) (noting that for many people "the way of dying is important in addition to the probability of dying").

126 *See, e.g.,* C. PERROW, NORMAL ACCIDENTS: LIVING WITH HIGH-RISK TECHNOLOGIES 324-28 (1984) (comparing public and expert perceptions of risk and concluding that "dread" is the best predictor of perceived risk among lay people); Slovic, Fischhoff & Lichtenstein, *Rating the Risks, supra* note 93, at 36 (finding that "ratings of dread and severity along with . . . subjective fatality estimates" are "closely related to lay persons' perceptions of risk"); Slovic, Fischhoff & Lichtenstein, *supra* note 118, at 194 (noting that the risk judgments of lay persons can be

Consider in this respect some research by cognitive psychologist Paul Slovic and his colleagues on "riskiness" rankings — of activities, substances, and technologies — by expert and nonexpert groups.[127] As might be expected, the various groups' rankings differed. Experts rated electric power, surgery, swimming, and X-rays as more risky than did nonexperts. These same experts viewed nuclear power and mountain climbing as less risky than did their nonexpert counterparts.[128] As might be expected, the expert rankings were relatively consistent with statistical or calculated frequencies of death. Indeed, the correlation was sufficiently strong that the report of the research found it "reasonable to conclude that [the experts] both knew what the technical [fatality] estimates were and viewed the risk of an activity or technology as synonymous with them."[129]

The lay ratings of risk described above did *not* differ from those of the experts simply because the lay subjects made inaccurate fatality estimates. To the contrary, when the investigators asked lay subjects to estimate annual fatalities, they found "only a low to moderate agreement between" lay fatality estimates and lay riskiness judgments. Quite clearly, something other than mortality rates — something omitted in the expert calculations — was motivating the nonexperts. That "something," confirmed by Slovic and his associates in subsequent rankings with a fuller list of risks, comprised the characteristics of catastrophe, involuntariness, unfamiliarity, and severity discussed earlier.[130]

When forced to do so, experts proved able to consider activities in terms of these same characteristics, and then "the difference between the experts and the public all but disappeared."[131] Yet experts persistently ignored the factors when they shifted from risk characterization to risk ranking.[132] For them, in the end, "a death is a death."[133] Their "perceptions of risk are *not* related to any of the various risk characteristics or factors"[134] so important to the public.[135]

"predicted almost perfectly from ratings of dread and severity, subjective fatality estimates, and disaster multipliers").

127 *See* Slovic, Fischhoff & Lichtenstein, *supra* note 118, at 189-205.

128 *See id.* at 190.

129 *Id.* at 192.

130 *See id.* at 194-205; *supra* note 126 and accompanying text.

131 C. PERROW, *supra* note 126, at 325.

132 *See id.*

133 *Id.* at 326.

134 Slovic, Fischhoff & Lichtenstein, *Regulation of Risk*, *supra* note 119, at 265.

135 *See id.*

Disagreements between lay people and expert risk assessors cannot be attributed to simple ignorance or ineptitude on the part of either group. The divide, instead, results from fundamentally different world views. For lay people, " 'riskiness' means more . . . than 'expected number of fatalities.' "[136] For experts, it doesn't. The implications of this split are hardly trivial. Given that risk means more to ordinary people than a mere body count, expert assessments of the high-technology hazards so prominent in the public risk debate will commonly be understated when viewed from the popular perspective, because lay assessments work up from the point at which experts tend to stop — expected mortality and morbidity.[137]

How might we resolve this difference in outlook, and the conflicting risk assessments that result? The easy way would be to reject one of the opposing views as senseless or irrational. The expert perspective hardly deserves this treatment, as intuition alone makes obvious: surely risk and its minimization have *something* to do with actual human loss, measured in death and illness. The sense of body counting is thus apparent. Some experts, though, are unwilling to concede that more than bodies count, and that the lay view, too, makes sense; they are generous only in their scorn. They take the easy way and dismiss "the public's understanding" as "insane" at worst, "irrational" at best.[138] Their contempt, however, is utterly unwarranted.

Rather than discuss why this is so, we could perhaps appeal once

---

136 *Id.* at 270.

137 *See, e.g.*, Fischhoff, Svenson & Slovic, *supra* note 93, at 1094 (stating that "nuclear power may be much more attractive when *risk* is defined as 'expected annual fatalities' than when extra weight is given to losses of life from catastrophic accidents"). But expert assessments will not invariably understate the public's assessment. For example, one study found that experts view electric power and X-rays as more risky than do lay people. *See* Slovic, Fischhoff & Lichtenstein, *Rating the Risks*, *supra* note 93, at 19.

138 *See* Slovic, *supra* note 118, at 285. Slovic quotes a "noted psychiatrist" who referred to the " 'irrational fear of nuclear power plants,' " and "a nuclear physicist and leading advocate of nuclear power plants" who argued that " 'the public has been driven insane over fear of radiation [from nuclear power].' " The word "insane," the physicist said, was used " 'purposefully since one of its definitions is loss of contact with reality. The public's understanding of radiation dangers has virtually lost all contact with the actual dangers *as understood by scientists.*' " *Id.* (emphasis added); *see also* I. Hoos, *supra* note 93, at 289 (risk assessors and other systems analysts "claim that theirs are the conclusions that are 'scientific' and 'rational,' while others, which do not fit the model, are 'emotional' and 'irrational' "); Otway, *Experts, Risk Communication, and Democracy*, 7 Risk Analysis 125, 126 (1987) ("Public fears were often ridiculed as being 'irrational,' apparently because they weren't expressible in technical jargon."). The idea that public attitudes about risk are irrational runs throughout Huber's article. *See generally* Huber, *supra* note 3.

again to intuition and leave the matter at that. Surely the characteristics that nag at the popular mind have — like body counts — *something* to do with risk, hazard, threat.[139] It is worthwhile, however, to move beyond the intuitive and state explicitly at least a few of the arguments that support the lay understanding, partly because some of the arguments undermine the contending expert conception. Hence making out the case for the public's picture of public risk will give us grounds to reconsider body counting. Our objective is not to show that the popular perspective is best, though we happen to think it is; our purpose, rather, is simply to establish it as an obviously worthy and fully admissible point of view in the public risk debate.

Return, then, to the public's rich image of risk, and reflect for a moment on its many dimensions. People have a lower tolerance for involuntary than for voluntary exposure.[140] Even on its surface, the concern here is easily understood, and closely related to the dimensions of uncontrollability and uncertainty. Voluntary exposure presupposes knowledge. Knowledge coupled with freedom of action facilitates individual choice and efforts to control events bearing on the choice. To be forced to face a risk, on the other hand, or to be ignorant of it, or to sense that no one is really in command of it, leaves one's well-being in the hands of others, or of no one. Either alternative is obviously inferior, under most circumstances, to being in charge.[141]

---

[139] *See, e.g.*, Otway, *supra* note 138, at 126 (research has shown "that there are other, objective characteristics of risk besides death and injury which matter to people (such as voluntariness, control, delay, catastrophic potential), and that it is perfectly normal to care about them").

[140] *See* Starr, *Social Benefit versus Technological Risk: What Is Our Society Willing to Pay for Safety?*, 165 SCI. 1232, 1237 (1969); *see also* Slovic, *supra* note 118, at 281-83 (discussing Starr's findings). There is some indication that the voluntary-involuntary distinction actually serves as a proxy for other concerns, such as catastrophic potential, dread, uncontrollability, and like factors discussed *supra* notes 124-37 and accompanying text. *See, e.g.*, Fischhoff, Svenson & Slovic, *supra* note 93, at 1111 (calling this a "double standards" phenomenon and noting that it is to be expected); Slovic, Fischhoff & Lichtenstein, *supra* note 118, at 205-07 (concluding that "society's apparent aversion to involuntary risks may be mostly an illusion, caused by the fact that involuntary risks are often noxious in more important ways such as being inequitable or potentially catastrophic").

[141] This same concern motivates some of the literature on informed consent to medical procedures. An expanded role for patients is justified not on the ground that they are better able to make medical decisions than are licensed physicians, but rather because patients are thought to be made better off — not just in the medical sense — if they play some part in deciding what is to be done with, and to, their bodies. *See, e.g.*, Swartz, *The Patient Who Refuses Medical Treatment: A Dilemma for Hospitals and Physicians*, 11 AM. J.L. & MED. 147, 150 (1985) (noting in the context of informed consent that the weighing of risks relative to an individual's fears and hopes

Upon deeper examination, this sense of voluntariness might trivialize the true concern. Suppose my situation (say I am an unskilled worker) "forces" me to "choose" a risky occupation, in exchange for some wage premium. Is my exposure to the risk "voluntary"? Suppose, more generally, that I rightly see life as full of difficult choices. Is it sensible to say that, given my power to choose — given that any choice is "voluntary" — I should accept without complaint whatever consequences follow? The answer might be yes if the world were organized in a way consistent with ideal values and principles, but it is not. Behind the notion of voluntariness, then, there may lurk more fundamental concerns about autonomy and equality and power among individuals in the society, for it is the preexistence of these that lets free choice be morally interesting. People perhaps are saying that some risks seem consistent with such ideals and others not, and registering the view by showing a greater acceptance of risks that they regard as "voluntary" in fundamentally important ways, as opposed to "chosen" in some narrower sense.[142]

The foregoing account enlightens us about other popular dimensions of risk, such as the enhanced dislike of delayed (latent) effects, and of irreversible ones. Latency frustrates knowledge, and irreversibility frustrates control. They make it more difficult for us to govern our own circumstances — and also to govern our governors. How do we hold accountable officials whose mistakes or misdeeds manifest themselves only decades after a term of office? And how do we correct for what they have done, if what they have done is uncorrectable? Latency and irreversibility practically deny us the fruits of trial-and-error, perhaps the best means yet devised by which to resolve uncertainty.[143]

What of the special dislike of manmade as opposed to natural hazards? Once again, a story grows out of what has been said thus far: Humans might treat each other with motives that Nature could never have, and this matters. Mark Sagoff develops this theme in the course of considering why the government should regulate artificial

---

is not an expert skill); Note, *Informed Consent and the Dying Patient*, 83 YALE L.J. 1632, 1646 (1974) ("Only the patient knows sufficiently his own value preferences, capacity for pain and suffering, future business and social plans, and religious beliefs to evaluate the desirability of a particular treatment so it will maximize the patient's satisfaction.").

142 *See* M. Sagoff, Technological Risk: A Budget of Distinctions 2-7 (1986) (unpublished manuscript); *see also* Anderson, *supra* note 27, at 60-63 (contrasting the self-understandings of workers with the picture of them presupposed by cost-benefit analysis).

143 *See infra* notes 265 & 266 and accompanying text.

risks more strictly than natural ones, even if they are "no more dangerous" (obviously, in the sense of body counting). First, people are responsible for artificial risks, but not for natural ones, and the government's job is to regulate what people do. Second, only manmade risks can, in any meaningful sense, threaten autonomy, an additional reason to be especially wary of them. Third, the harms we suffer because of the acts of others carry special injury; we mourn the deaths from a natural flood but resent, deeply, the ones from a broken dam. We "are concerned not simply with safety but with responsibility and guilt as well."[144]

These same concerns arise in the case of those manmade risks we and others classify as "public": risks generated by highly centralized high technologies. The is especially so because public risks entail so much uncertainty (given their complexity), imply such considerable power, and are capable of such calamitous effects. The last consideration, in particular, implicates the public's aversion to the possibility of disastrous consequences and brings us to the cluster of factors that enter into what is termed "dread." Dread correlates significantly with some aspects of risk that we have already discussed, such as involuntariness and uncontrollability, but also with such others as inequitable distributions, threats to future generations, and catastrophic potential[145] — each of which speaks almost for itself.

The idea of inequitable distributions, for example, reflects the view that just as a right thinking society should concern itself with the distribution of wealth, so too should it do so with the distribution of risk. For example, risks that might result in death or disease are often considered worth taking because they confer significant benefits not otherwise available. This risk burden may be regarded as equitably distributed only if it is borne by those who simultaneously enjoy the benefits. Burdens imposed on others, or diverted to future generations, generate worries about exploitation. Alternatively, risks concentrated in time and space might be regarded as inequitable or otherwise unacceptable because concentration can result in losses that are avoided by broader distributions. This suggests, then, a link between inequitable distributions and catastrophic potential. Concentrated risks can threaten whole communities, and the loss of a community (think of Love Canal, of Chernobyl) is the loss of a val-

---

[144] M. Sagoff, *supra* note 142, at 15. On the resentment that built up after the disaster at Buffalo Creek, see K. ERIKSON, EVERYTHING IN ITS PATH: DESTRUCTION OF COMMUNITY IN THE BUFFALO CREEK FLOOD 177-83 (1976).

[145] *See* Slovic, Fischhoff & Lichtenstein, *supra* note 118, at 199-200.

ued thing distinct and apart from the disaggregated bodies of a community's citizens.

Imagine, for instance, a decision maker who is forced to choose between two actions. The first action poses a 1 in 1000 chance of causing 100,000 deaths spread randomly across the country; the second has a 1 in 1200 chance of causing the near obliteration of a city of 100,000. A rational decision maker could obviously select the first alternative, notwithstanding its larger expected loss. Either action could cause physical injuries, the end of families, grief among survivors. Only the second, though, would provoke the "collective trauma" of disasters that wipe out neighborhoods and entire networks of relationships — losses that cannot be measured merely in terms of lives and property destroyed.[146] The possibility of catastrophe, then, is clearly material to choices among risks. Aversion to catastrophic losses is also consistent with the commonplace observation that people are regularly willing to pay a premium in order to soften the blow of very costly (but very unlikely) events.[147] Ordinarily this insurance premium is paid in dollars, but it is exactly the same thing to pay the toll of a statistically given number of deaths in order to avoid the chance, though small, that a great multitude of deaths will otherwise occur. Simple body counting — a death is a death is a death — denies the chance to buy insurance against an uncertain future.

Several revealing exercises suggest additional reasons to appreciate the public's vision of public risk. Fischhoff, Svenson, and Slovic consider how one might calculate the value of a life, and hence of a death. The loss of a first life might be taken as of extraordinary significance — it might mark "an enormous watershed, making the technology lethal and the society that accepts it callous. Subsequent deaths have increasingly little effect, either on society's functioning or on its moral stature."[148] Plotting this on a graph with social cost on the vertical axis and number of lives lost at one time on the horizontal results in a concave curve that attaches decreasing value to each additional life lost. Conversely, the view might be that some early losses are tolerable, because risk cannot be obliterated. But even though society must "accommodate some losses," the judgment might still be that "it cannot absorb very large accidents. An energy technology that is expected to kill 10 people per GWyr

---

146 *See generally* K. ERIKSON, *supra* note 144; Rabin, *Dealing with Disasters: Some Thoughts on the Adequacy of the Legal System,* 30 STAN. L. REV. 281 (1978).

147 *See* W. ROWE, AN ANATOMY OF RISK 152-56 (1977).

148 Fischhoff, Svenson & Slovic, *supra* note 93, at 1106.

[Gigawatt year] on the average probably does that by, say, killing 1000 once in every 100 GWyr — an intolerable possibility."[149] The curve reflecting this judgment would have a convex slope, indicating an increasing value to each additional life lost. If, finally, all lives were regarded as equal whatever the circumstances, there would result a straight line drawn at an angle of forty-five degrees from the origin.[150] Simply note for now that expert risk assessors would choose this last function, although it is only one among a set of equally sensible alternatives.[151]

As another way of seeing the same point — that not all (expected) deaths, and lives, are obviously equal — consider Douglas MacLean's game of Russian roulette, played with six players (forced to participate) and six six-shooters and six bullets (the same, probabilistically, as the familiar game played with one pistol and a single bullet). The six bullets can be distributed in any manner among the six pistols; then one pistol could be selected at random and fired once at each of the six players, or all six pistols could be distributed by lot, one to each person, each of whom spins the chamber and fires once. There are, according to MacLean, about four million variations on the game, with a rich array of outcomes, ranging from one certain death, but no others, to the possibility that no one will die, to the possibility that all will die, with many probabilities of zero through six deaths distributed in between. The responsibility of choosing which game to play would seem to present an extraordinary quandary, but not for expert risk assessors. One choice or another, it's all the same to them — because the ex ante risk of death to each player is always one in six.[152]

Let us reconsider this expert definition of risk as equal to expected fatalities. We said earlier that the sense of the definition is apparent, because fatality data are obviously material to the measure of risk. But should they ever be so conclusive as expert practice would have them? A negative argument could start (and perhaps end) by observing the remarkably meager image projected by stark death data. The picture lacks details that so clearly seem to matter. Laurence Tribe has expressed this shortcoming in terms of the professional risk assessor's habit of "dwarfing soft variables." Yet this understates the matter, because soft variables and "fragile values"

---

149 *Id.* at 1106-07.

150 *See id.* at 1106-07 & Fig. 29.7.

151 *See supra* notes 9 & 116-37 and accompanying text.

152 *See* MacLean, *Social Values and the Distribution of Risk*, in VALUES AT RISK 75, 78-85 (D. MacLean ed. 1986).

are not simply dwarfed, they are ignored — as Tribe proceeds to recognize. The difficulty, he says, "goes deeper" and amounts to "reducing entire problems to terms that misstate their underlying structure, typically collapsing into the task of maximizing some simple quantity."[153] Others have made the same point. Douglas MacLean, for example, wonders whether risk analysis as professionally practiced can "adequately subsume or encompass all our values, across the board."[154] The problem is "that whatever metric is used to measure or compare values will introduce distortions and leave some values out of account."[155] So "if we report the expected consequences of a decision as the average risk per person, there are many ways in which importantly different consequences will look equivalent"[156] when on any sensitive view they are not.[157]

None of these difficulties is a secret, least of all to risk assessment enthusiasts. In the course of defending the "philosophy and legitimacy" of quantitative approaches to risk, for example, Herman Leonard and Richard Zeckhauser readily concede that "some costs and benefits tend to be ignored because they are much more difficult to measure than others."[158] But to the charge that risk assessment methodology is "systematically biased toward consideration of the quantifiable aspects of decisions," their plea is confession and avoid-

---

153 Tribe, *Policy Science: Analysis or Ideology?*, 2 PHIL. & PUB. AFF. 66, 96-97 (1972).

154 MacLean, *Introduction* to VALUES AT RISK 3, 3 (D. MacLean ed. 1986).

155 *Id.* at 4.

156 *Id.* at 7.

157 *See id.* at 3-5, 7; *see also* T. NAGEL, MORTAL QUESTIONS 137 (1979) (examining the shortcomings of "exclusionary overrationalization" in a general setting, and mentioning the dangers of dismissing all considerations that cannot be rendered in quantitative terms); Anderson, *supra* note 27, at 54, 56, 64 (observing that "market mechanisms are insensitive to many ethical distinctions which we should and do make in deliberating about risk," and wondering why life and health should be treated "as mere commodity values" and why such concerns "as how the social relations within which . . . risks are imposed and controlled should be changed, are left out of account"); Tribe, *supra* note 153, at 97 (discussing the manner in which systems methodology anesthetizes moral feeling, referring in particular to how "talking of gruesomely burned human beings as part of a 'body count' [during the Vietnam War] hideously masks the truth"). None of these remarks should be taken, however, to suggest that the information (commonly quantitative) generated by risk assessment and related methodologies is irrelevant. The point, rather, is that the information should not be regarded as exclusively relevant, or even of dominant importance.

158 Leonard & Zeckhauser, *Cost-Benefit Analysis Applied to Risks: Its Philosophy and Legitimacy*, in VALUES AT RISK 31, 43 (D. MacLean ed. 1986). The admission reveals more than might have been intended by its reduction of *everything* to merely "costs and benefits."

ance. "This is unquestionably true," they say,[159] but not particularly interesting because no one seriously maintains that something like risk assessment should be "the sole or final arbiter of public decisions."[160]

Judging from their own account, though, Leonard and Zeckhauser come perilously close to maintaining exactly that. For instance, with reference to distributional concerns (and in a once again reductionist fashion) they say that "it is theoretically quite possible to build such concerns into [the analysis by] merely . . . defining carefully what is meant by a benefit or a cost."[161] They conclude, however, that this is not a "good idea"; distributional concerns should be dealt with systematically, and not on a project by project basis. Distribution aside, it would be acceptable to "give social values an appropriate role," presumably either by building them into "benefits and costs" or by having them somehow straddle the analytic process. Under the latter approach, "[w]idely held and vitally important social values" could "trump" the results of quantitative exercises, but "we must be very careful that only genuinely impor-

---

159 *Id.* at 43.

160 *Id.* at 34; *see also id.* at 38 (arguing that quantitative analysis "is surely not a complete guide for social decision-making").

Leonard and Zeckhauser concede that cost-benefit analysis (and, implicitly, risk assessment as typically practiced) is biased toward the "quantifiable aspects of decisions," but they consider the bias

> ethically neutral unless it can be shown that the quantifiable considerations systematically push decisions in a particular direction. In other words, it is not sufficient to argue that cost-benefit analysis does not handle perfectly what is obviously a very hard task; rather, its detractors must show that its errors are systematically unjust or inefficient — for example, that it frequently helps the rich at the expense of the poor, or that the environment is systematically disadvantaged to the benefit of industry. We have not seen any carefully researched evidence to support such assertions.

Id. at 43-44.

But why should the burden of proof be on the detractors? If we begin with the proposition that quantitative methodologies are incomplete from the standpoint of social values, then should not those who defend the methodologies show, with "carefully researched evidence," how this incompleteness is inconsequential? And in any event, why should we assume that the absence of systematic errors, in the sense used by Leonard and Zeckhauser, somehow results in a benign cancelling-out of mistakes? Suppose, for example, that two erroneous decisions are made, one of them adversely affecting some wealthy people and the other adversely affecting some poor people. If different wealthy and poor people are implicated in the two decisions, we can hardly conclude that the mistakes cancel out. But even if the same people are involved in each instance, we can hardly conclude, without much more information, that the two wrongs make a right.

161 *Id.* at 39.

tant and relevant social values be permitted to outweigh the findings of an analysis."[162]

This sounds begrudging. If expert risk assessors share the attitudes of Leonard and Zeckhauser (a reasonable assumption), then we see little reason to suppose that they would, if left to their own devices, take much notice at all of the so-called social values, other than in the course of rationalizing them out of the way. Even if they did take notice, because they were supposed to, they would likely diminish the values because they do not share them (and in fact regard them as irrational).

Consider, for example, whether someone like Professor Zeckhauser could take very seriously the public's concern with catastrophic potential. He recently addressed this dimension of risk in an article (written with another co-author, Albert Nichols) on "the perils of prudence."[163] Framing the issue in terms of "Risk Aversion and Risks to Society," the article poses as an example two alternative pesticides and considers how a regulator should decide which is to be allowed on the market (whichever is allowed, a million users will be exposed). Pesticide A would cause about 10 extra cancers a year; B has a 5 percent chance of causing 100 extra cancers annually and a 95 percent chance of causing none. "As pesticide B offers half the expected number of cancers, any rational individual would prefer to be exposed to B. Nevertheless, some believe that society should choose A on the grounds that, ignoring the probabilities, fewer people would die if the worst case were to result."[164] The article continues by stating that this argument

> is made most often in the context of nuclear power plants, which pose the risk of a major catastrophe albeit with extremely low probability. . . . The rationale is that the simultaneous death of 1,000 people in the same incident is somehow worse than the isolated deaths of 1,000 otherwise identical people in separate incidents. We are extremely skeptical of such views. Although it is clear that a single large accident attracts more public attention and concern than the same number of fatalities reaped one or a few at a time, it is far from obvious that the total loss is greater.[165]

---

162 *Id.* at 42.

163 *See* Nichols & Zeckhauser, *supra* note 121, at 22-24.

164 *Id.* at 23.

165 *Id.* at 22. A public worried about catastrophic potential and the cluster of concerns gathered under "dread," *see supra* notes 124-26 and accompanying text, would fare just as poorly if they had for their risk assessor someone like Mr. Huber, who shows considerable disdain for concepts like "ominous," "major," "grave," and "irreversible" consequences. Anything, after all, can entail those consequences. "A

Perhaps, but it is also far from obvious that it is not. We have already seen that catastrophes can generate special concerns and reactions.[166] They can also trigger a desire to avoid the worst case scenarios referred to by Nichols and Zeckhauser, even where avoidance might produce a higher expected death rate than some alternative. When Nichols and Zeckhauser refer to people who would choose pesticide A "on the grounds that . . . fewer people would die if the worst case were to result,"[167] they are unsympathetically alluding to a common, and perfectly sensible, aversion to the regret one might come to feel about some decision. From this standpoint, it is not at all irrational to act in a way that minimizes the maximum possible regret that could follow from an action, given all possible states of the world.[168] Choosing pesticide A in the Nichols-Zeckhauser example would accomplish that objective.

Why are body counters so insistent (and defensive) about their method? We can imagine any number of reasons, all of them plausible and some of them relatively innocent. They might have a commitment to a particular brand of utilitarianism. Less grandly, they might merely wish to keep doing what they do best, and to realize some return from the time, money, and effort they devoted to learning it.[169] They might sense and enjoy the power and privilege that accompany their method, inaccessible as it is to ordinary people. They might have a hidden ideological agenda — whether about something as general as the structure of a well-ordered society or about something as specific as the virtues of modern technology — and favor their approach because they think it promotes the

---

new bathtub filled with water 'threatens' 'grave' environmental consequences too; in a 'worst conceivable' accident the citizens of the nation might line up in front of the tub and drown themselves, one at a time." Huber, *supra* note 3, at 312-13. For a far more credible treatment of this "doomsday scenario" argument, see Stich, *The Recombinant DNA Debate*, 7 PHIL. & PUB. AFF. 187, 189-91 (1978).

166 *See supra* notes 145-47 and accompanying text.

167 Nichols & Zeckhauser, *supra* note 121, at 23.

168 *See* K. ARROW, *Alternative Approaches to the Theory of Choice in Risk-Taking Situations*, in 3 COLLECTED PAPERS OF KENNETH J. ARROW: INDIVIDUAL CHOICE UNDER CERTAINTY AND UNCERTAINTY 5, 32-34 (1984); K. BORCH, THE ECONOMICS OF UNCERTAINTY 82 (1968); Bell, *Risk Premiums for Decision Regret*, 29 MGMT. SCI. 1156, 1165-66 (1983); Loomes & Sugden, *Regret Theory: An Alternative Theory of Rational Choice Under Uncertainty*, 92 ECON. J. 805, 820-23 (1982).

169 *See, e.g.*, I. HOOS, *supra* note 93, at 128-29 (arguing that experts value technical virtuosity, without much regard for the larger value of their exercises); Slovic, Fischhoff & Lichtenstein, *Regulation of Risk*, *supra* note 119, at 273 ("Even experts' understanding may be incomplete; indeed, their professional training may have limited them to certain traditional ways of looking at problems.").

cause.[170] They might regard quantitative assessment, whatever its shortcomings, as essentially more rational, and thus better, than any alternative.[171] Most likely of all, they no doubt see that some elegant numeraire, such as expected annual fatalities, is absolutely essential to the precise comparative assessments that they (but not others) regard as so informative. The multiple dimensions of the public's image of public risk simply do not lend themselves to convenient reduction and mechanical manipulation.[172]

Whatever its motivations, the experts' approach to risk is obviously not senseless. Yet neither is the public's approach. This is why we said in the introduction to this section that the problem comes down to one of competing rationalities.[173] Admit this, and it unarguably follows that the choice of approach is an ethical and political one that technical experts have neither the knowledge nor the authority to dictate, because the issue transcends technocratic expertise. Were we to defer to agencies simply on the basis of their technical proficiency, the ethical-political question would be begged entirely. Agencies could be expected to resort to methods the use of which denies the very values at stake (it is, after all, the claim of methodological proficiency that grounds the argument for deference in the first place).[174] And, to return to the idea with which we began this section, methodological proclivities would bias agency risk processing in the direction of too much public risk — as viewed from the public's perspective.[175]

---

170 *See generally* M. DOUGLAS & A. WILDAVSKY, RISK AND CULTURE (1982) (arguing that underlying social agendas color perceptions of risk).

171 *See, e.g.*, Leonard & Zeckhauser, *supra* note 158, at 34 (defending a related methodology, cost-benefit analysis, on the ground that "it is not perfect, but it is better than the alternatives").

172 *See, e.g.*, Tribe, *supra* note 153, at 97 (noting that "quantitative decision-making techniques are likely to bias conclusions in the direction of the considerations they can most readily incorporate"). It appears that risk assessors particularly favor some numeraire, or "unidimensional index" of risk (such as expected fatalities), because this permits easy comparisons of hazards. The difficulty is that such risk comparisons are not particularly satisfactory in the first place. *See, e.g.*, Slovic, *supra* note 118, at 285 (criticizing such comparisons as inadequate for measuring acceptability of risk or improving perceptions of risk magnitude). *But see* Wilson & Crouch, *supra* note 93.

173 *See supra* text following note 114; *see also* C. PERROW, *supra* note 126, at 315-24 (discussing types of rationality).

174 *See supra* notes 20-22 and accompanying text. On the proficiency of experts, see *infra* notes 209-30 and accompanying text.

175 *See supra* notes 113-15 and accompanying text.

D. *Bias on Balance Again*

Our discussion of the courts introduced the idea that two kinds of bias (access and process) might affect judicial risk regulation, examined the likely operation of each, and concluded that critics of the courts have no reasonable basis for their confident charge that the current liability system diminishes safety by deterring public risk too much. Even if the courts process public risk claims in a very stringent fashion, to stop the analysis there neglects the fact that public risk victims have restricted access to this favorable judicial treatment. If access bias promotes public risk, then process bias is a kind of corrective that might help re-establish balance.[176]

The agency picture is different. In the judicial setting, access and process bias almost surely cut in *opposite* directions. In the case of agencies, however, they probably tend in the *same* direction, and toward undue public risk (judged from the public's point of view). Without externally imposed discipline, either capture or body counting could, of itself, produce this result. Where the two work in concert the result seems all the more likely.[177] One need only consider how neatly the expert definition of risk already fits the interests of public risk producers,[178] then simply couple with that the producers' independent comparative advantage in bringing their views to agency attention. Conversely, public interest victims are burdened in their efforts to reach agencies, and should they manage to arrive it is usually to a hostile reception.[179]

The confluence of bias in the agency setting complicates the institutional picture considerably. For example, suppose — contrary to our own views — that the courts do in fact end up regulating public risk too much. Evidence to that effect, even very convincing evidence, would hardly be conclusive because agencies might well be regulating, on balance, too little. Hence, even if the critics' charges against the courts are justifiable, there remains the difficult problem of figuring out whether, and to what degree, judicial stringency, rather than representing overkill, serves instead to correct for administrative laxity. At present, after all, both institutions regulate

---

176 *See supra* notes 79 & 80 and accompanying text.

177 *See supra* note 113.

178 The expert definition fits the interests neatly because public risks generally look safer in terms of expected fatalities than they do in terms of richer measures. *See supra* note 9 and accompanying text.

179 Note, then, the irony of Huber's assertion that agencies can provide "a 'public' point of view on the problem" of public risk. *See* Huber, *supra* note 3, at 331.

risk,[180] and there is some indication that risk producers are more responsive to the threat of judicially imposed liability than they are to agency regulation.[181] What are the concrete grounds for altering the balance that presently exists in this larger judicial-administrative system?[182]

Consider finally the possibility that *agencies* regulate public risk "too much" — in a sense very much like that developed in our account of the courts.[183] Some students of the subject believe that although agencies fail to control many risks that should receive attention, they "overcontrol" the ones that do receive attention.[184] If so, the administrative system too may have a kind of self-correcting mechanism, so long as the risk producers subjected to overcontrol

---

180 *See* Shavell, *supra* note 7; Viscusi, *supra* note 88.

181 *See* G. EADS & P. REUTER, DESIGNING SAFER PRODUCTS: CORPORATE RESPONSES TO PRODUCT LIABILITY LAW AND REGULATION at vii (1983). This Rand Corporation study focused on nine large American manufacturers generally regarded as safety leaders; it found that products liability law administered by the courts, though generating an "indistinct signal," affects manufacturers' safety decisions far more than do market forces or the prospect of regulation. *See also* Schwartz, *Directions in Contemporary Products Liability Scholarship,* 14 J. LEGAL STUD. 763, 767 (1985) (discussing the Rand study and noting that "[s]cholars who scrutinize appellate opinions have argued, variously, that products liability law goes too far or does not go far enough. Given the abstraction of this debate, there is strong value in gaining some knowledge about how products liability doctrine actually operates on manufacturer conduct").

182 A passage from an article by Professor Viscusi, a leading student of the economics of risk regulation, inadvertently reveals how easy it is to confuse the ideal with reality in doing comparative institutional studies. His views on the courts are implicitly sympathetic to our own, yet they lead him to endorse, in an utterly unexamined way, agency regulation of risk — because he imagines that agencies "work."

> One cannot rely on tort liability in lieu of regulation since product liability incentives are ill-suited to the task. Not all injured parties file claims, and court awards are far below what is required to promote efficient safety incentives. In the case of fatalities, the courts' valuation of the appropriate compensation for wrongful death is more than an order of magnitude below the value of life that is appropriate from the standpoint of injury prevention. *Society should rely on regulation rather than tort liability to address any market failures.*

Viscusi, *supra* note 88, at 303 (emphasis added); *see also supra* note 92 (discussing the idealization of administrative agencies).

183 *See supra* notes 76-78 and accompanying text.

184 *See, e.g.,* J. MENDELOFF, THE DILEMMA OF TOXIC SUBSTANCE REGULATION: HOW OVERREGULATION CAUSES UNDERREGULATION AT OSHA 3-4 (1988) (arguing that overregulation of occupational risks from toxic substances has generated resistance to further regulation, the result being excessive controls in a few instances and insufficient controls in many others).

are drawn into the regulatory web essentially at random.[185] Is this, however, an argument for increased deference to agencies? The idea underlying the argument would have to be that because agencies end up sending out about the right signal and courts simultaneously send out an overstated one, the message emanating from the larger (judicial-administrative) system deters, on balance, too much public risk. But this is convincing only if courts do in fact overstate matters (because, for instance, process bias swamps access bias). Beyond this, one would have to establish that agencies would act in the same fashion *even if* the courts were to treat agency decisions more deferentially, and this is implausible. It is likely that agencies act as they do now only because their actions are subject to judicial scrutiny. After all, if expanded judicial deference to agencies would simply result in their behaving substantially as they do at present, then why would anyone bother to argue for more deference to agencies in the first place?

E. *Administrative Competence*

We saw earlier how critics of the courts have failed to carry their burden on the claim that the judiciary is biased against public risk.[186] We can see now how they also fall short in making their case for administrative agencies: they fail to address too many of the considerations that might lead agencies to be biased in exactly the opposite direction. Still, though, we have to deal with comparative competence.

Recall the charge that courts lack the technical competence and institutional capacity thought to be essential to successful risk assessment and management, the assertion that expert administrative agencies are much better equipped in these respects, and the conclusion that, for these reasons, "courts should defer to the experts."[187] Our discussion of judicial competence more or less conceded that the judiciary is not particularly adept at technical exercises, but wondered whether agencies might be less than entirely competent themselves.[188] Let us now consider some of the grounds for our skepticism.

We saw earlier that risk assessment and management require a

---

185 Random (unpredictable) overregulation forecloses strategic behavior on the part of risk producers. *See supra* note 82.

186 *See supra* notes 81-84 and accompanying text.

187 Huber, *supra* note 3, at 333; *see also supra* notes 17-22 and accompanying text.

188 *See supra* notes 85-92 and accompanying text.

great deal of judgment, particularly in the case of new or especially complex technology — the sort of technology that is most at issue in the public risk debate.[189] Judgment and intuition are essential to the process simply because the risk sources *are* new and complex. Their novelty reduces the value of history and experience; their complexity demands something more than simplistic analysis, yet confounds efforts to be perfectly thoroughgoing. Practical lines must be drawn. So, addressing the particular case of nuclear reactor mishaps, Slovic, Fischhoff, and Lichtenstein observe that "[t]he technology is so new and the probabilities in question are so small that accurate risk estimates cannot be based on empirical observation. Instead, such assessments must be derived from complex mathematical models and subjective judgments."[190] "Someone, relying on educated intuition, must determine the structure of the problem, the consequences to be considered, and the importance of the various branches of the fault tree."[191]

How "educated" can intuition be in cases of the new and the complex — whether the problem is to determine the probabilities of events that have never happened, gauge their consequences if they do happen, or figure out how to build in safeguards against them?[192] Here, intuition amounts to speculation, as even the champions of expertise seem ready enough to admit. Peter Huber, for example, discusses at considerable length the difficulties of risk assessment in the case of "diffuse, low-probability, multi-lateral, and temporally-remote harms."[193] He characterizes the task as "difficult, often speculative, and always time-consuming";[194] he calls excess risk "a very

---

189 *See supra* notes 93-99 and accompanying text.

190 Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears, supra* note 93, at 486.

191 *Id.* at 463.

192 For example, Slovic, Fischhoff & Lichtenstein, discussing nuclear reactors, write:

> One major concern is that important initiating events or pathways to failure may be omitted, causing risks to be underestimated. Another problem in assessing the reliability of reactor designs is the difficulty of taking proper account of "common-mode failures," in which ostensibly independent systems designed to back up one another fail because of the same unanticipated common cause.

Id. at 486; *see also* Hacking, *Culpable Ignorance of Interference Effects,* in VALUES AT RISK 136, 143-54 (D. MacLean ed. 1986) (interference effects refer to interactions among new technologies, as opposed to the interactions of a technology with the pre-existing environment — a side effect); MacLean, *supra* note 154, at 12 (discussing ignorance of "interference effects").

193 Huber, *supra* note 3, at 331. *See generally id.* at 320-26 (discussing the difficulties associated with methods of public risk analysis).

194 *Id.* at 320.

elusive quantity";[195] and he describes his ideal of comparative risk assessment as "more difficult than it may first appear,"[196] "an exercise fraught with . . . uncertainties and ambiguities,"[197] a task of "extraordinary complexity."[198]

Huber's purpose in presenting this litany is to support his admonition that we should defer to agency experts. Who but an expert could possibly cope with the rigorous demands of risk assessment? Ironically, though, Huber's dreary account tends to cut in a direction exactly opposite to that intended. Consider first how his argument for agency expertise stumbles over its own premises. He insists that we should respect not any old expert (say one a court might appoint to serve as a special master or technical consultant), but only the experts employed by regulatory agencies, because "[t]he scientific community is large and heterogeneous, and a Ph.D. can be found to swear to almost any 'expert' proposition, no matter how false or foolish."[199] This is rather clearly troublesome, since we haven't a reason in the world (none is given) to suppose that only true and not spurious experts happen to work for agencies.

But even assuming, purely for the sake of argument, that not a single charlatan can find a place on the rolls of administrative personnel, there remains a second reason to be skeptical about agency expertise. Stated most briefly and generally, experts, however adroit, are merely human. They bear the burden of human limitations. We alluded earlier to the growing literature that traces the implications of some of these limitations in the case of administrative and organizational behavior.[200] We know from this literature that classical models of fully "rational" decision making do not describe how people actually behave. Even regulators who consciously and conscientiously aspire to comprehensive analysis of all possible alternatives will fall well short of what they strive to achieve.[201] Their rationality is "bounded," such that optimal decisions are forgone in favor of satisfactory ones. The "best" is sacrificed for what is "good

---

195 *Id.*

196 *Id.* at 321. On comparative risk assessment, see *supra* note 172.

197 Huber, *supra* note 3, at 322.

198 *Id.* at 323.

199 *Id.* at 333.

200 *See supra* note 98 and accompanying text.

201 *See, e.g.*, McGarity, *The Role of Regulatory Analysis in Regulatory Decisionmaking*, in ADMINISTRATIVE CONFERENCE OF THE UNITED STATES, REPORTS AND RECOMMENDATIONS 107, 208-12 (1985) (pointing out that even the supporters of "rational" regulatory decision making acknowledge the limits of that process).

enough"[202] — even though the point at which the process stops might lead to choices inferior to other, neglected options.[203] These are widely accepted views; to grasp their meaning in the specific case of expert risk assessment and management requires elaboration.

Begin with some research in cognitive psychology. Many studies suggest that people use a variety of shortcuts to cope with the sorts of uncertainties involved in questions of risk. The most notable of these are heuristics, rules of thumb "which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations."[204] Heuristics can be useful enough, "but sometimes they lead to severe and systematic errors."[205] Consider, for example, the *representativeness* heuristic, and imagine someone who faces the problem of deciding whether to have her basement tested for the presence of radon. Talking to neighbors and to friends around town, she finds that a number of them have had their homes tested and that only one test proved positive. According to the heuristic, our subject is likely to determine that the probability of radon in her basement is low — if she sees her situation as representative of that of her friends and neighbors. If, on the other hand, most of the others she talked to found radon in their basements, but she sees her situation as *not* representative of theirs, she will again be likely to regard the probability as low. In either case, of course, her judgment might be a good one, but it also might not be. The conclusion about representativeness might be based on a stylized (stereotypical) and misleading picture. Taking our first case (most others found no radon), all of the basements might appear to be free of cracks. The difficulty is that the basements of others could be well protected to prevent radon from entering, whereas the subject's basement might have hidden passages that permit entry, but no paths of exit. Taking the second case (most others found radon), the subject might again

---

202 *See* J. MARCH & H. SIMON, ORGANIZATIONS 140-41 (1958) (stating that an optimal alternative presupposes that all other possible alternatives have been considered).

203 *See, e.g.*, Diver, *The Optimal Precision of Administrative Rules*, 93 YALE L.J. 65, 97-98 (1983) (stating that "[s]electing the optimally precise form for a given rule" requires qualities of human perfection inconsistent with the ordinary qualities of real policy makers).

204 Tversky & Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 3 (D. Kahneman, P. Slovic & A. Tversky eds. 1982).

205 *Id.* There is a considerable literature on heuristics. We draw our account from the essay just cited, and from the larger collection of essays in the book by the same name. For a very accessible account, see Heimer, *Social Structure, Psychology, and the Estimation of Risk*, 14 ANN. REV. SOC. 491 (1988).

observe that her basement is apparently flawless whereas the other basements are full of obvious leaks and cracks. The difficulty here is similar to that discussed above: the gas might enter and leave the dwellings of others, but enter and stay in hers. Moreover, our subject should consider that the sample of people she talked to is very small, and should check to see whether government reports indicate a high or a low incidence of radon in her general vicinity. She should understand that the average chance of finding radon in the average basement is of itself not particularly informative.

Suppose that the subject has been taking her radon poll over the course of a few years and that early reports were favorable (no radon) but more recent ones unfavorable, or vice versa. Suppose, alternatively, that the poll results are favorable but that the local newspaper has an occasional story about the presence of radon in town. The *availability* heuristic suggests that these patterns will probably be meaningful, even though they probably shouldn't be. People assess frequencies and probabilities in terms of the ease with which instances come to mind, and this can be misleading. Recent reports and reports from friends are likely to be more salient than earlier ones[206] or ones read in newspapers, and hence come more immediately to mind; so too with detailed, concrete reports (a friend's long, nervous, but ultimately relieving account; a newspaper story that is very dramatic and also fresh) as opposed to abstract though arguably more relevant ones.

A tendency opposite to that brought on by availability emerges when we imagine, finally, that our subject concludes, based on early results from her poll (and on other information she gathers), that the probability of radon in her basement is extremely low. Now *anchoring* can enter and bias subsequent calculations. Anchoring predicts that the subject will have difficulty adjusting her initial estimate as contrary information comes to her attention.

Framing can also bias risk judgments, in that normatively inconsequential changes in the way a decision problem is formulated can affect the problem's resolution. As an example,[207] imagine a disease

---

206 But earlier events can at times be the more salient, such as when nostalgia functions to bring events of long ago immediately to mind.

207 We draw our example from Slovic, Fischhoff & Lichtenstein, *Regulation of Risk, supra* note 119, at 250-56. For a further discussion of framing, see Arrow, *Risk Perception in Psychology and Economics,* 20 ECON. INQUIRY 1, 6-7 (1982); Tversky & Kahneman, *Rational Choice and the Framing of Decisions,* 59 J. BUS. S251, S255 (1986) (presenting a decision problem that illustrates framing); Tversky & Kahneman, *The Framing of Decisions and the Psychology of Choice,* 211 SCI. 453 (1981) ("Because of

expected to kill 600 people, and two ways to combat the disease: Program *A*, which will save 200 people; Program *B*, which has a probability of .333 that 600 people will be saved and a probability of .667 that no one will be saved. *Problem 1:* Which program should one choose? Now change things slightly and consider two new programs — a Program *C* under which 400 people will die, and a Program *D* with a .333 probability that no one will die and a .667 probability that 600 will die. *Problem 2:* Which program should one choose? In a test conducted with college students, 72 percent chose *A* over *B* in Problem 1, and 78 percent chose *D* over *C* in Problem 2. Yet "the two problems are essentially identical. The only difference between them is that the outcomes are described by the number of lives saved in Problem 1 and the number of lives lost in Problem 2."[208]

In all of the foregoing examples the judgments in question were being made by lay people; but experts, too, use heuristics,[209] and "[e]xperts' judgments appear to be prone to many of the same biases as those of the general public, particularly when experts are forced to go beyond the limits of available data and rely on intuition."[210] Experts, being human, are susceptible to the cognitive limitations that burden all of us, and this is one reason why instances of expert failure are so familiar to everyone. Huber reminds us of Bhopal.[211] The Challenger and Chernobyl come naturally to mind. And case studies of other events are easy to find: the accident at Three Mile

---

imperfections of human perception and decision, . . . changes of perspective often reverse the relative apparent size of objects and the relative desirability of options.").

208 Slovic, Fischhoff & Lichtenstein, *Regulation of Risk, supra* note 119, at 252; *see also* Silbergeld, *The Uses and Abuses of Scientific Uncertainty in Risk Assessment,* NAT. RESOURCES & ENV'T., Fall 1986, at 17, 19 (suggesting that bureaucratic decision makers "are affected differently when confronted with a risk assessment depending on whether it is stated as a probable incidence of 1:100(10^{-2}) or as two excess deaths per year"). Silbergeld concludes that the difference leads agencies to provide less protection to people who are subjected to high levels of carcinogens but live in sparsely populated areas than to people who are exposed to lower levels but live in densely populated areas. *See id.* at 19.

209 Consider, for example, the two "rules of thumb" discussed *supra* note 11 and accompanying text.

210 Slovic, *supra* note 118, at 281; *see also* Fischhoff, *supra* note 117, at 91 ("Available studies suggest that when experts must rely on judgment, their thought processes resemble those of lay people."); Slovic, Fischhoff & Lichtenstein, *Rating the Risks, supra* note 93, at 38 (noting that "we have no assurance that experts' judgments are immune to biases once they are forced to go beyond their precise knowledge and rely upon their judgment," and that "[a]lthough judgmental biases have most often been demonstrated with lay people, there is evidence that the cognitive functioning of experts is basically like that of everyone else").

211 *See* Huber, *supra* note 3, at 277.

Island; the breach of Grand Teton Dam; the circus that led to the issuance of the Susan B. Anthony dollar.[212] We mention these disasters not to blame experts for making mistakes, nor to imply that courts (or any lay body) could do better, or even as well. Mistakes, including mistakes by experts, are inevitable in the face of virtually impenetrable uncertainties,[213] and no doubt experts can perform technical analyses of those uncertainties with a virtuosity that the rest of us could never hope to achieve. Our point, rather, is that expert competence nevertheless falls considerably short of the demands of the very comprehensive rationality that experts would strive to serve, and this matters in the choice of institutional arrangements. It matters especially if, by deferring to fallible experts, we create too much public risk. Let us close this discussion by suggesting some reasons why that might follow.

Even if agency experts make mistakes rather regularly, their errors need not cut uniformly in the direction of undue risk. Experts might, for example, overestimate relevant variables as often as they underestimate them, miscalculate this way one time and that way another, or overlook a bad thing but also a good thing. As a result, there could be a rough balance between excessive risk in some cases and excessive caution in others — a risk portfolio that manages to be about right or even biased in the direction of safety.

The literature on heuristics and biases suggests, though, that a picture like this might be too optimistic. A survey by Slovic,

---

[212] *See* I. Hoos, *supra* note 93, at xxi-xxvi, 288-93; C. Perrow, *supra* note 126, at 15-31, 233-38; *see generally* H. Petroski, To Engineer is Human: The Role of Failure in Successful Design (1985).

[213] Robert Dahl has observed that when "uncertainties and trade offs . . . are combined, the superior competence of experts diminishes to the vanishing point." R. Dahl, Controlling Nuclear Weapons: Democracy Versus Guardianship 47 (1985). Dahl, of course, is not an expert (on matters of expertise), but he refers to others who are. He cites Armstrong, *The Seer-Sucker Theory: The Value of Experts in Forecasting*, Tech. Rev., June-July 1980, at 18, an essay by J. Scott Armstrong, "himself an expert on problems of long-range forecasting." R. Dahl, *supra*, at 98 n.18. According to Armstrong's seer-sucker theory, " 'No matter how much evidence exists that seers do not exist, suckers will pay for the existence of seers.' " Armstrong, *supra*, at 19. Despite the whimsical tone, Armstrong's message is a serious one. His conclusion, based on his own professional work and on studies by others in such fields as psychology, economics, medicine, sports, and sociology, is that expertise (beyond a very minimal level) and accuracy are unrelated and perhaps even inversely related. The particular kind of expertise addressed by Armstrong concerned forecasting (of, for example, stock market performance, human behavior, and public opinion), but *not* the forecasting of risk, and he concedes that his theory might not hold in all cases. *See id.* at 19-21. But he considers it "wise to put the burden of proof upon the experts to show that their expertise in a given area is valuable." *Id.* at 24.

Fischhoff, and Lichtenstein, for example, says that a "particularly pernicious aspect of heuristics is that people typically have great confidence in judgments based upon them"; more to the point, "experts, once they are forced to go beyond their data and rely on judgment, may be as prone to overconfidence as lay people."[214] And overconfidence in the case of risk assessment might tend systematically in the direction of too much risk because one of its common manifestations is insensitivity to incomplete fault trees (trees that omit important relevant information).[215] Even if fault trees are complete, overconfidence can render them dangerous. One example is the Grand Teton Dam. Subsequent study attributed its breach "to the unwarranted confidence of engineers who were absolutely certain they had solved the many serious problems that arose during construction."[216] A related but more notorious example is the Nuclear Regulatory Commission's 1975 Reactor Safety Study (the Rasmussen Report), where various probabilities on various branches of the fault tree were badly underestimated.[217] Subsequent review of that assessment "concluded that despite the study's careful attempt to calculate the probability of a core meltdown in a nuclear reactor, 'we are certain that the error bands are understated.' "[218] Understatement resulted from an inadequate data base, poor statistical treatment, and inconsistent handling of uncertainties.[219] As Ida Hoos puts it, "[i]f . . . one were to accept the assumptions of the Reactor Safety Study, one would have to conclude that the accident at Three Mile Island never occurred."[220] But of course it did, thanks

---

214 Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears*, *supra* note 93, at 472, 475.

215 *See id.* at 475. Slovic and his colleagues go on to list "common ways in which experts may overlook or misjudge pathways to disaster," for example: "[f]ailure to consider the ways in which human errors can affect technological systems" (the example given by the authors is Three Mile Island); and "[f]ailure to appreciate how technological systems function as a whole" (an example given by the authors is dams, which make flooding less frequent but for this very reason promote development of flood plains, with the result that "although floods are rarer, damage per flood is so much greater that the average yearly dollar loss is larger than before the dams were built"; the authors add that "[f]ailure probabilities are typically not even calculated for new dams even though about 1 in 300 fails when the reservoir is first filled"); and "[f]ailure to anticipate 'common-mode failures,' which simultaneously afflict systems that are designed to be independent" (the example given by the authors is the nuclear reactor at Browns Ferry, Alabama, where a single fire damaged all five of the reactor's emergency core cooling systems because the electrical cables controlling the multiple systems were not spatially separated). *See id.* at 477-78.

216 *Id.* at 477.

217 *See* Slovic, Fischhoff & Lichtenstein, *Regulation of Risk*, *supra* note 119, at 248.

218 *Id.*

219 *See id.*

220 I. Hoos, *supra* note 93, at 290.

to expert overconfidence. John Kemeny, the mathematician who chaired the presidential commission that studied the Three Mile Island incident, later said:

> In the course of our commission's work, we again and again ran into cases where emotions influenced the judgments of even very distinguished scientists. . . . I kept running into scientists whose beliefs border on the religious and even occasionally on the fanatical. . . . These people distort their own scientific judgments and hurt their reputations by stating things with assurance that they know, deep down, could only be assigned small probabilities. They become advocates instead of unbiased observers.[221]

As for the Nuclear Regulatory Commission — one of the expert agencies whose judgments some would have us accept deferentially — Kemeny said that (as of 1979) it "was a total disaster. It was clearly not part of the solution but a serious part of the problem."[222] It published "tons" of unimportant regulations but ignored fundamental issues. It gave little attention to operator training, to inspection and enforcement. It "absolutely, literally . . . had *no* systematic way of learning from experience."[223] Once again, overconfidence was the root of the problem; the NRC was "an agency convinced that the equipment was so foolproof that nothing bad could possibly happen; they therefore honestly believed that whatever they were doing was sufficient to assure nuclear safety."[224]

It isn't difficult to find this same mindset among those who argue on behalf of public risk, criticize the courts, and offer testimonials to agency expertise. Mr. Huber, for example, is a prominent voice on that side of the public risk debate, and he can also claim more technical expertise than most of us.[225] So, addressing the issue of liability limits for nuclear power plants and the position of those who argue that the very claim for limits shows the hazards of the

---

221 Kemeny, *Saving American Democracy: The Lessons of Three Mile Island,* TECH. REV., June-July 1980, at 65, 70. We should add that Kemeny found the same attitude at both extremes of the nuclear debate. *See id.*

222 *Id.* at 69.

223 *Id.*

224 *Id.* at 69. Huber, however, appears to have considerable faith in the NRC. *See* Huber, *supra* note 3, at 334-35. More recently, others have voiced agreement with Kemeny's 1975 assessment of the NRC. A recent review mentions "the failure to resolve the basic institutional problems of the Nuclear Regulatory Commission despite the Kemeny Report." Linstone, Book Review, 27 TECH. FORECASTING & SOC. CHANGE 438, 438 (1985).

225 In addition to a law degree, Huber has a Ph.D. in mechanical engineering from the Massachusetts Institute of Technology, and was for a time on the M.I.T. engineering faculty.

plants to be too high, he says that "[t]he argument is laughable. Nuclear power, civil aviation, commercial drugs, and the like are creatures of science and engineering, and their risks are therefore both predictable and inherently self-limiting."[226] Contrast with this the far more sober view of Henry Petroski, director of graduate studies in civil and environmental engineering at Duke University. In his book, *To Engineer is Human,* Petroski shows that failure is a central part of engineering and design, rather than something that engineering and design routinely limit or avoid. "[T]he truly fail-proof design is chimerical,"[227] Petroski writes. "The ways in which a structure or machine can fail are many, and their effects range from blemishes to catastrophes."[228] New technologies in particular — "departures from traditional designs" — "are more likely than not to

---

[226] Huber, *supra* note 3, at 328-29. Ida Hoos found a remarkably similar attitude upon reading an article promulgating the notion that nuclear power is

> "even safer than engineers had presumed" prior to the accident at Three Mile Island. Such presumption was based on what the author of the article called "the concept and criteria behind the design safety of nuclear reactors." These, he averred, resided in the "defense in depth philosophy" which implied (a) the best quality assurance; (b) highly redundant and protective systems; and (c) engineered safety systems.

I. Hoos, *supra* note 93, at 277 (citing Gilbertson, *Nuclear: The Safest Energy Around,* FUSION, Sept. 1980, at 18). Hoos observes that "[e]xperience has shown that such paper-drawn Maginot lines do not stand up well under the pressure of reality." *Id.*

Slovic, Fischhoff, and Lichtenstein identify yet another "pathway to disaster" as "overconfidence in current scientific knowledge." Slovic, Fischhoff & Lichtenstein, *Facts Versus Fears, supra* note 93, at 477. Experts, because they are highly trained, quite naturally think they know much. Yet Robert Dahl observes that knowing much *necessarily* means knowing little. "The specialization required in order to acquire a high degree of expert knowledge is today inherently limiting: one becomes a specialist in *something,* that is, in *one* thing, and by necessity remains ignorant of other things." R. DAHL, *supra* note 213, at 44.

In a sense, then, ignorance grows over time, as we can gather from any number of different viewpoints. Mary Douglas, the anthropologist, and Aaron Wildavsky, the political scientist, speak in their book on risk of "the double-edged thrust of science, generating new ignorance with new knowledge." Science, they say, "has actually expanded the universe about which we cannot speak with confidence." M. DOUGLAS & A. WILDAVSKY, *supra* note 170, at 49. And Thomas Kuhn, the eminent historian of science, lends his own authority to the same proposition. "Though the bulk of scientific knowledge clearly increases with time, what are we to say about ignorance? . . . Is it not possible, or perhaps even likely, that contemporary scientists know less of what there is to know about their world than the scientists of the eighteenth century knew of theirs?" T. KUHN, *Logic of Discovery or Psychology of Research,* in THE ESSENTIAL TENSION 266, 289-90 (1977).

[227] H. PETROSKI, *supra* note 212, at 217.

[228] *Id.*

hold surprises."[229] Engineers do best when they go forth "without hubris."[230]

Attitudes, values, and ideology can color presumably objective quantitative operations.[231] Experts proceed within the framework of their education and training in particular disciplines, which are replete (at any point in time) with given abstractions, principles, and commitments. Experts learn within a setting of shared conceptions that they come themselves to share, and this necessarily shapes, in an extraordinarily durable way, their views of the world.[232] The "facts" experts observe are regularly "inseparable" from the "values" they hold, "particularly when the facts in question refer to predictions of likely consequences in a highly uncertain environment."[233] Scientific expertise can extend at best only to phenomena "that are deterministic or whose probability of occurrence can itself be stated precisely. . . . Events whose probability of occurrence is itself highly uncertain [are in the domain of] trans-science."[234] In the realm of trans-science, experts must be particularly cautious (and we particularly cautious of expertise); their special knowledge should have no

---

229 *Id.* at 219; *see also* Kates, *Success, Strain, and Surprise,* ISSUES IN SCI. AND TECH., Fall 1985, at 46, 50-51 (despite the fact that minimization of surprise is a goal of risk assessment, "surprise persists and, paradoxically, grows"; "[s]urprising hazards are an inevitable outgrowth of technological change," and "[i]dentifying potentially hazardous technologies may become more difficult because of a troubling characteristic of the so-called high technologies, . . . the blurring of the roles of the basic scientist, the technologist, and the entrepreneur," which "denies to hazard management one of its strongest sources of early hazard identification — knowledgeable but independent basic scientists").

230 H. PETROSKI, *supra* note 212, at 223.

231 *See, e.g.,* T. KUHN, *Objectivity, Value Judgment, and Theory Choice,* in THE ESSENTIAL TENSION 320, 329 (1977) (stating that "the choices scientists make between competing theories depend not only on shared criteria . . . but also on idiosyncratic factors dependent on individual biography and personality").

232 *See* T. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 11 (2d ed. 1970). Misplaced scientific faith seems to have influenced the Swine Flu vaccine program of the 1970s. *See* R. NEUSTADT & H. FEINBERG, THE SWINE FLU AFFAIR: DECISION-MAKING ON A SLIPPERY DISEASE 86-103 (1978). Similarly, a recent history of atomic science research meticulously documents the setbacks that developed because the finest minds in the scientific community proceeded on the basis of conventional assumptions. The scientists' commitments to prior theories led experimenters confronted with evidence of neutral subatomic particles (neutrons) to ignore the possibility that those particles could explain other inexplicable physical phenomena. *See* R. RHODES, THE MAKING OF THE ATOMIC BOMB 161-62 (1986). Similar commitments blinded experimenters to the possibility of fission and led to false hypotheses selected because they were more consistent with existing theories. *See id.* at 247, 260.

233 Tribe, *supra* note 153, at 99.

234 Weinberg, *Science and Its Limits: The Regulator's Dilemma,* ISSUES IN SCI. AND TECH., Fall 1985, at 59, 61.

special weight. Yet, sensing this, experts must surely be tempted to transport issues back into their own rightful world, thus giving rise again to the problem of facts and values. Diverse training and experience will cause individual scientists to respond differently to similar factors. A "scientist who believes that nuclear energy is evil because it inevitably leads to proliferation of nuclear weapons,"[235] for example, will judge the same data differently than will "a scientist whose whole career has been devoted to making nuclear power work."[236]

To be sure, lay people too have ideologies, values, and world views; hence they also have an agenda — though it might not be quite so hidden as that of experts.[237] When it comes to public risk, there simply is no objective view, there are only "conflicts between two sets of (inevitably subjective) judgments."[238] This takes us back to ground already covered. Because the conflicts in question are not and cannot be objectively grounded, they cannot be resolved on objective grounds. Much less should they be consigned to experts whose competence lies in the technical arts. The question isn't technical.

V. RISK, TECHNOCRACY, AND DEMOCRACY

A. *A Summary*

We began this Article with the observation that the public risk debate proceeds along two lines, one concerning attitudes (should public risk be feared, or should it be favored?) and the other institutions (should courts be much involved with public risk regulation, or should they defer to agencies?). These lines are necessarily tangled together, but we tried to follow each separately, beginning with institutions. On the question whether judicial rule deters public risk unduly, we concluded that given what we know now, the interplay of

---

235 *Id.* at 67.

236 *Id.* at 67; *see also* Nelkin, *The Role of Experts in a Nuclear Siting Controversy,* 30 BULL. ATOM. SCIENTISTS 29 (1974) (noting how experts on different sides of a scientific issue emphasize different findings in support of their views); Note, *The EPA and Biotechnology Regulation: Coping with Scientific Uncertainty,* 95 YALE L.J. 553, 560-63 (1986) (stating that assumptions based on political and ethical preferences affect scientific assessment).

237 *See generally* M. DOUGLAS & A. WILDAVSKY, *supra* note 170 (discussing the ways in which particular groups select and evaluate different kinds of danger); Cotgrove, *Risk, Value Conflict and Political Legitimacy,* in DEALING WITH RISK 122, 133 (R. Griffiths ed. 1981) (stating that differing views about political or social issues affect risk perception).

238 Fischhoff, Svenson & Slovic, *supra* note 93, at 1097; *see also supra* note 114.

access and process bias makes it very hard to say. On the matter of judicial competence, we said an informed judgment turns on the alternatives — in this case administrative rule — because courts might be limited but then agencies might be too. So we turned to agencies and considered some reasons, again having to do with access and process bias, why they might end up regulating public risk too little, and then considered how this might cut, on balance, in the context of a larger regulatory system that includes courts and agencies alike. Again, it's hard to say, but we are inclined to the view that without substantial judicial intervention there would probably be too much public risk. At the least, critics of the courts (and champions of the agencies) simply have not carried their case. We went on to consider the question of expert administrative competence, and found little reason to alter this conclusion.

Much of our inquiry has, of course, been speculative, but it is worth noting that the chain of argument can afford weak links. For example, interest group capture is not essential to our critique of agencies, because body counting could bias uncaptured agencies, as could problems of competence and the limitations of expert rationality. Each of these influences is probably powerful by itself. That they might work in tandem only adds to our concerns.

The purpose of our examination of agencies and experts was not, however, to show that they are plainly inferior to courts; the point, rather, was to question the premises from which the argument for deference to expertise proceeds and to show how proponents of the argument have failed to carry their burden that agency rule would be superior. The case for administrative superiority rests in large part on selective idealization, but the lesson to be drawn from capture, body counting, and bounded rationality is that administrators, like judges, are prisoners of their own environment and victims of their own human limitations. Agencies and courts alike proceed episodically, the one pushed on by interest groups, the other by litigants. Agencies and courts alike bring particular perceptions to questions of risk. Agencies and courts alike cope with uncertainty in a fashion far from perfect.

Even supposing agencies could be much better than they are at what they do, we have suggested how they might nevertheless be good at the wrong thing, resulting in more public risk than the public, for its own sound reasons, wants. This recalls the debate about attitudes and the question of what risk means. Until that question is resolved, much of the ongoing debate about how to control public risk is emphatically off the point. No one can talk sensibly about

whether judicial control yields too little public risk, or administrative control too much, without knowing how risk itself is to be conceived. One conception might suggest one set of reforms, and the other another. If, for example, risk is to be measured by body counts, then agencies seem to have an advantage. But if risk means what the public would have it mean, then agencies look to be remarkably limited and courts much less so.[239] The courts are, after all, criticized in part precisely because they accommodate the public's attitudes. A purported liability of judges and juries — that they are *not* experts — turns out to be an asset.

Without an understanding of what risk is to mean, we cannot begin to answer the institutional questions that lie atop that basic attitudinal puzzle. Yet even were the puzzle solved, and in favor of the expert view, and even were we to concede all the alleged advantages of expert control, still it might not follow that expertise provides the best route to safety, because expert control can give rise to special dangers.

B. *The Political Risks of Technocracy*

In *Ecology and the Politics of Scarcity,* the political theorist William Ophuls draws a dark picture of a future that is to be avoided, if at all, only by the exercise of extraordinary restraint. Briefly, he argues that population growth, dwindling supplies of energy and other resources, and increasing amounts of pollution promise an end to the abundance that nourished political liberalism over the last several centuries. No longer can technological advance be expected to provide the easy solutions we have learned to take for granted; if anything, technology aggravates the problem of ecological scarcity.[240]

This image, a familiar neo-Malthusian one, differs remarkably from that found in a work like Peter Huber's *Safety and the Second Best,* making it all the more troubling that Huber and Ophuls end up at

---

239 In addition to many obvious reasons for this observation, implicit in our discussion, consider the fact that courts generally adjudicate risks that have materialized rather than regulate risks that could materialize. This permits them to reflect the public distinction between statistical lives and identifiable lives. Several commentators have noted the tendency to expend resources to rescue individuals whose welfare was not thought worth protecting ex ante. *See* G. CALABRESI & P. BOBBITT, TRAGIC CHOICES 21, 221 n.2 (1978); Schelling, *The Life You Save May Be Your Own,* in CHOICE AND CONSEQUENCE 113, 115-19 (T. Schelling ed. 1984).

240 W. OPHULS, ECOLOGY AND THE POLITICS OF SCARCITY 116-27 (1977).

the same place when it comes to the question of control. Each would rely on management by experts. According to Huber:

> Regulatory agencies are equipped to make the risk comparisons on which all progressive transformation of the risk environment must be based. The courts are simply not qualified to second-guess such decisions; when they choose to do so they routinely make regressive risk choices. Requiring — or at least strongly encouraging — the courts to respect the comparative risk choices made by competent, expert agencies would inject a first, small measure of rationality into a judicial regulatory system that currently runs quite wild.[241]

As for Ophuls, "the mounting complexity of technology along with the staggering problems of managing the response to ecological scarcity . . . will require us to depend on a special class of experts in charge of our survival and well-being — a 'priesthood of responsible technologists.' "[242] To be sure, the critical management decisions will be " 'trans-scientific' in that they can only be made politically by prudent men, [but] at least the basic scientific elements of the problems must be understood reasonably well before an informed political decision is possible."[243] Such decisions, hence, will be beyond the capacity of the average citizen, who lacks the time, the knowledge, and perhaps even the intelligence "to grasp the issues, much less the important features of the problems."[244] The decisions will also be beyond the gifts of ordinary politicians. "If we grant that the people in their majority probably will not understand and are therefore not competent to decide such issues, is it very likely that the political leaders they select will themselves be competent enough to deal with these issues?"[245] Seeing the answer to be no, Ophuls turns to Plato for instruction. "Plato argued that the polity was like a ship sailing dangerous waters. It therefore needed to be commanded by the most competent pilots . . . , an elite class of guardians."[246] Ophuls concludes that "[t]he emerging large, highly-developed, complex technological civilization operating at or very near the ecological margin appears to fit Plato's premises more and more closely, foreshadowing the necessity of rule by a class of Pla-

---

241 Huber, *supra* note 3, at 335.

242 W. OPHULS, *supra* note 240, at 159.

243 *Id.* at 159-60.

244 *Id.* at 160.

245 *Id.*

246 *Id.*

tonic guardians, the 'priesthood of responsible technologists' . . . ."[247]

While Huber and Ophuls seem to be in remarkable agreement, there is nevertheless an important difference between the two. Only Ophuls acknowledges the "profound political issues"[248] raised by what he foresees. Society "will not only be more authoritarian and less democratic than the industrial societies of today . . . but it will also in all likelihood be much more oligarchic as well, with only those possessing the ecological and other competence necessary to make prudent decisions allowed full participation in the political process."[249] In a line, "democracy as we know it cannot conceivably survive."[250]

As it happens, Ophuls' account contains the seeds of its own destruction, for scattered throughout the pages of his book are convincing illustrations of the limits of technocracy. Robert Dahl has recently pursued exactly this point in exactly Ophuls' terms in order to remind us that reality cannot deliver on the Platonic Ideal. Guardians possessed of the necessary instrumental knowledge and moral virtue simply do not exist.[251]

Suppose, however, that they did. Might the case for technocratic control of public risk nevertheless fail even as (and because) it succeeds? By definition, technocratic management would seem to foreclose much meaningful participation by the public,[252] yet the public's sense of alienation is at the core of the public risk problem. Recall that "dread" is a term of art for the public's sentiments about modern risks, and dread — as we saw — is itself a catchall for concerns about a lack of control.[253] Given this, the program should be not to alienate but to include the public. Let *it* decide what *it* shall expose *itself* to, make *it* familiar with the exotic, give *it* control.[254]

---

247 *Id.*

248 *Id.* at 161.

249 *Id.* at 163.

250 *Id.* at 152.

251 *See* R. DAHL, *supra* note 213, at 19-51.

252 One can, to be sure, imagine expert managerial forms nominally open to public input, but the reality would likely be otherwise, if for no other reason than that the very techniques by which questions are technocratically put and technocratically resolved tend to exclude the laity from a meaningful role in a meaningful process. *See, e.g.*, Tribe, *supra* note 153, at 82-83 (arguing that the policy sciences, by focusing too exclusively on end results, ignore the important role played by process in human experience). This, perhaps, is why Ophuls would simply bypass ordinary citizens rather than invite them to participate in a charade.

253 Among other things. *See supra* note 126 and accompanying text.

254 An alternative would be to *educate* the public — with policy makers striving to

A growing body of literature advances just this view. Its authors argue that the appropriate response to public risk is to democratize the management process, specifically by increasing public participation.[255] Because risk presents intractable problems and tradeoffs, those placed at risk should have a role in deciding which games are worth what candles. Just as participation in general is a means by which individuals can exercise control over their political circumstances and reduce their sense of civic isolation,[256] so participation in the management of risk can reduce the sense of helplessness that arises from involuntary exposure to hazards.

The idea behind participation, then, is not necessarily to

---

change lay attitudes about risk, rather than take them as given — and *then* give the public a fuller participatory role. But the fundamental difficulty here should be obvious. Why assume that it is the public's point of view that should be reformed to resemble that of experts, rather than the other way around? As we saw, each outlook has its own rational grounding, *see supra* notes 114-75 and accompanying text, so to talk about education really begs the question of who should educate whom about what. Education could amount to nothing but indoctrination, with experts striving to lead the public away from its own legitimate concerns. And even at that, education might accomplish little. *See, e.g.*, Dawes, *The Robust Beauty of Improper Linear Models in Decision Making*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 391-403 (D. Kahneman, P. Slovic & A. Tversky eds. 1982) (reviewing evidence that even improper linear models may yield predictions superior to the predictions of skilled clinicians); *see also id.* at 391-459 (discussing "Corrective Procedures").

[255] The idea, then, is to move beyond mere democratic representation. *See, e.g.*, L. WINNER, THE WHALE AND THE REACTOR: A SEARCH FOR LIMITS IN AN AGE OF HIGH TECHNOLOGY 110-11 (1986); Anderson, *supra* note 27, at 63 ("The ideal of letting people make decisions about life and health for themselves would be better realized through institutions of democratic participation. The people who are placed at risk should have the opportunity to participate directly in the decisions which affect them."); Furrow, *supra* note 13, at 1422-36 (outlining the benefits of public participation in risk management); Otway, *supra* note 138, at 126 (footnote omitted) (democracy is "working poorly if all involved do not recognize the legitimacy of the process and the right of each to participate. Since risk analysis first emerged in response to controversy, and our main focus is on risks to the public, we should have something to offer. I think we do, but not by developing yet more rational methods of analysis (heaven knows, we have enough of them already), but rather by helping to make these processes more democratic and, thus, more effective."); *see also* Fiorino, *Environmental Risk and Democratic Process: A Critical Review*, 14 COLUM. J. ENVTL. L. 501 (1989) (arguing for more effective procedures and mechanisms for citizen participation in managing public risk).

Our brief discussion of democratic participation in this and the next section introduces issues addressed in a body of literature too large to acknowledge in any fashion that would give much guidance. Interested readers might, however, begin by consulting, in addition to the works more particularly cited, B. BARBER, STRONG DEMOCRACY: PARTICIPATORY POLITICS FOR A NEW AGE (1984); D. HELD, MODELS OF DEMOCRACY (1987); C. PATEMAN, PARTICIPATION AND DEMOCRATIC THEORY (1970); Fiorino, *Technical and Democratic Values in Risk Analysis*, 9 RISK ANALYSIS 293 (1989).

[256] *See* H. ARENDT, ON REVOLUTION 272-73 (1963); C. PATEMAN, *supra* note 255, at 22-44.

improve the technical accuracy of risk decisions, but rather to enhance the legitimacy of the decision making process.[257] Given the stakes in questions of public risk, it is easy to see why the public should have an intimate role. And given that accuracy could actually be served by a public presence — because responsible risk assessment and management, however conceived, must depend to some degree on what the public knows, values, and prefers — public participation seems only the more appropriate.

C. *The Environmental Risks of Democracy*

The difficulty is that direct democratic participation poses special problems in the case of public risk. One of the most challenging items on the agenda of future debates will be to consider whether, and how, we can nourish a fragile political system while simultaneously protecting a vulnerable environmental one.

Sensible risk regulation depends on an equally sensible grasp of the risk situation. The skeptics are probably right that, on the technical side of the matter, little can be expected of the ordinary public. A special feature of the problem arises from the heuristics and biases that can influence risk judgments in counterproductive ways.[258] True, lay person and expert alike are subject to these,[259] but there seems to be little reason to suppose that participatory processes provide good means for filtering out cognitive errors, and some reason to suppose they might aggravate them. Hence, there is the danger that fuller participation will either generate undesirable results or, if lay input is routinely ignored, disappoint public expectations.

Another problem has to do with exactly how participation is to be realized. The arguments developed in the last section suggest that the government itself should take an active role in expanding the range of voices to be heard in the decision making process. Those in power, however, might well be reluctant to do so.[260] Even

---

257 The argument is similar to that made for the value of participation in the judicial process. *See* Resnik, *Due Process: A Public Dimension*, 39 U. FLA. L. REV. 405, 406, 419-20 (1987); Mashaw, *Administrative Due Process: The Quest for a Dignitary Theory*, 61 B.U.L. REV. 885, 902-04 (1981) (linking self-respect to public participation and arguing that increased self-respect encourages an even more active role in the decision making process).

258 *See supra* notes 204-08 and accompanying text.

259 *See supra* notes 209-13 and accompanying text.

260 A well-known instance to the contrary is the effort of the United States Environmental Protection Agency and William Ruckelshaus, then its Administrator, to enhance public understanding and participation with regard to the continued operation of the Asarco copper smelter in Tacoma, Washington. EPA estimates

if they are not, we can imagine frustration. Earlier we considered at some length the substantial barriers that stand in the way of citizen access to supposedly participatory processes.[261] These do not disappear with the wave of a shibboleth about the importance of self-governance. Yet measures designed to reduce obstacles to access — whether subsidies or other alternatives — pose the danger of granting too much voice to too few interests. At bottom, the choice of means by which to encourage participation calls itself for participation in the process of choosing, so the problem of access runs deep.

But a far deeper problem, we think, arises from the fact that truly effective participation probably requires a considerable degree of decentralized decision making and locally accessible decision forums.[262] Public risk sources, however, typically call for highly centralized management. Their extraordinary power generates costs and benefits, and effects and side effects, that commonly reach beyond even the largest community and in some cases wrap around the globe. Given this, the idea of local control seems unacceptable. Decisions made in any one locality are likely to consider only parochial interests, resulting on some occasions in too little public risk, and on other occasions too much. Proceeding in an uncoordinated fashion, some communities will protect their own backyards and leave no place for risky but, from a larger perspective, beneficial developments.[263] Other communities will find ways to realize the benefits of development while exporting its costs to neighbors (an

---

indicated that arsenic emissions from the smelter were causing four excess lung cancer deaths per year, but the only remedy — closing the plant — would have eliminated about 600 jobs. *See* Ruckelshaus, *Risk in a Free Society*, 14 ENVTL. L. REP. 10,190, 10,192 (1984). Ruckelshaus was sensitive to what he called "the chemical products and by-products of modern technology and the potential social disruption associated with the processes we have created to control them." *Id.* at 10,190. He concluded that the plant-closing decision should be preceded by a series of public hearings, workshops, meetings with community leaders, and distribution of information about relative risks. The idea was not to delegate an EPA decision to the vote of the affected group, however, but rather to achieve informed deliberations. *See id.* at 10,192. Reactions to the exercise were mixed. *See, e.g.*, Reich, *Public Administration and Public Deliberation: An Interpretive Essay*, 94 YALE L.J. 1617, 1632-34 (1985) (describing the controversy provoked by the Tacoma incident); Rubin, *Environmental Policy and Environmental Thought: Ruckelshaus and Commoner*, 11 ENVTL. ETHICS 27, 48-49 (1989) (questioning whether the exercise accomplished anything).

[261] *See supra* notes 55-75 & 106-09 and accompanying text.

[262] For a discussion of this topic, and references, see Schill, *Intergovernmental Takings and Just Compensation: A Question of Federalism*, 137 U. PA. L. REV. 829, 868-69 (1989).

[263] *See, e.g.*, Marks & von Winterfeldt, *"Not in My Backyard": Influence of Motivational Concerns on Judgments About a Risky Technology*, 69 J. APPLIED PSYCHOLOGY 408, 408-15 (1984) (examining how people initially favorably disposed toward a particular

example would be polluting factories using tall smoke stacks). Still others will simply accept risks that their neighbors wish to avoid, but in the nature of things cannot (a decision by one locality to accept a toxic waste dump essentially negates the decision of a neighboring community to reject the same project).

Finally, those who propose increased democratization of risk management will have to confront the fact of democracy's historic reliance on trial and error as a means of resolving uncertainty in the course of making policy. The tendency to muddle through, as Charles Lindblom called it in a well-known essay,[264] is a commonplace to close observers of American politics.[265] A chief virtue of the method, which relies on trial-and-error to promote incremental learning, is its capacity to resolve uncertainty simply by the simple act of acting, even if the action is mistaken.[266] In the case of public risks, however, muddling is also fraught with vices. The reactive technique of trial-and-error is useful only to the extent that information generated by one (successful or unsuccessful) experiment can be considered and exploited in a subsequent one. But with many public risks, the potential to learn from error is simultaneously the potential to bring about catastrophic consequences. Errors might in any event be of little educational value, thanks to latency. Latency means that what we learn, we learn late. This promotes irreversibility and limits opportunities to correct mistakes through a relatively quick series of many trials.

There are reasons, then, to avoid a participatory, incremental, trial-and-error method of muddling in favor of holistic, systematic, "synoptic" methods of expert comprehensive analysis (perfectly represented by quantitative risk assessment). These are said to be preferable when "small errors in policy can cause irreversible or even

---

technology often become hostile toward it when it encroaches on "their own back yard").

264 *See* Lindblom, *The Science of Muddling Through,* 19 PUB. ADMIN. REV. 79 (1959); *see also* Lindblom, *Still Muddling, Not Yet Through,* 39 PUB. ADMIN. REV. 517 (1979) (supporting incrementalism because neither revolution nor drastic policy change, nor even planned large steps, are ordinarily possible).

265 *See, e.g.,* J. COHEN & J. ROGERS, ON DEMOCRACY: TOWARD A TRANSFORMATION OF AMERICAN SOCIETY 133-34 (1983); W. OPHULS, *supra* note 240, at 191-93 (describing "muddling through" as the decision making style characteristic of all our institutions).

266 *See, e.g.,* J. KRIER & E. URSIN, *supra* note 58, at 287-95 (discussing the constructive role of incremental learning in the formation of air pollution policy); Diver, *Policy Making Paradigms in Administrative Law,* 95 HARV. L. REV. 393, 399 (1981) (discussing incrementalism as a process of remedial adjustments made in reaction to errors).

catastrophic harm."[267] Unfortunately, however, the synoptic methodology is itself troublesome, on a number of grounds. First is the widely accepted opinion that it depends on "firmness of data and consensus on goals"[268] — things hard to come by in the case of public risks. Second is the problem of latency, which might well affect even the incentives of expert analysts. Consider, for example, the mundane point that weather forecasters are regarded by careful students of such matters as being among the very best and most reliable of prognosticators. There are, no doubt, technical and technological reasons for this, such as regular advances in meteorology and the development of orbiting satellites, but there is also the intriguing fact that weather prediction is performed in such an elegant system of almost instantaneous meaningful feedback. Bad weather-folk simply don't survive.[269] In the case of bad public risk assessors, though, latency frustrates the forces of natural selection that might otherwise help eliminate poor assessors and managers. By the time their errors are discovered, they are likely to be out of office, perhaps even deceased, making it difficult (or impossible) to hold them accountable. The absence of long-term accountability could result in shirking, laxity, and an unwarranted focus on the short term. Third is the apparent fact that synoptic decision making can itself lead to calamity, suggesting perhaps that the sheer intractability of public risk makes muddling through the lesser of two evils. Robert Dahl seems to reach this conclusion. He argues against expertise despite the dangers of bad guesses by ordinary people, comforting himself with the notion that "the opportunity to make mistakes is the opportunity to learn."[270] In the same vein, Ida Hoos, a staunch critic of systems methodology, reckons that "[m]uddling through is probably safer in the long run than the wrong cure."[271]

From the standpoint of democratic participation in risk management, a dilemma arises if views like these are rejected — if incrementalism, after close examination, is revealed as the obvious thing *not* to do. Active participation appears to go hand in hand with incremental decision making, suggesting that the two must stand or fall

---

267 *See* Diver, *supra* note 266, at 431.

268 Lowi, *Deconstructing American Law* (Book Review), 63 TEX. L. REV. 1591, 1596 (1985).

269 *See, e.g.*, Lichtenstein, Fischhoff & Phillips, *Calibration of Probabilities: The State of the Art to 1980*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 306, 321-22 (D. Kahneman, P. Slovic & A. Tversky eds. 1982) (finding superb calibration for weather forecasters' precipitation predictions).

270 R. DAHL, *supra* note 213, at 51.

271 I. Hoos, *supra* note 93, at 246.

together. Muddling through has allowed even the uninformed to play a role and learn by doing. The method is said to be "basically democratic."[272] Now, though, it might also prove catastrophic, something to be borne heavily in mind by those who argue for a greater public role in the management of modern technology.

* * *

The challenge of public risk is to devise solutions as powerful as the problems they confront, problems that courts and agencies were hardly designed to solve. We need to imagine institutional breakthroughs that match our technological ones, and we may need a new politics to replace the old. Tolerant, open-minded, penetrating argument is an excellent pathway to imagination. In these respects, though, the current debate about public risk falls short.

---

[272] *See* W. OPHULS, *supra* note 240, at 191-93. Note as well that muddling through meshes nicely with the democratic case for decentralized decision making: localities can independently explore different avenues for solving mutual problems, compare experiences, learn from each other's successes and failures. *See supra* notes 262 & 263 and accompanying text.