

*Does the Precautionary Principle
point us in any helpful direction?*

The Paralyzing Principle

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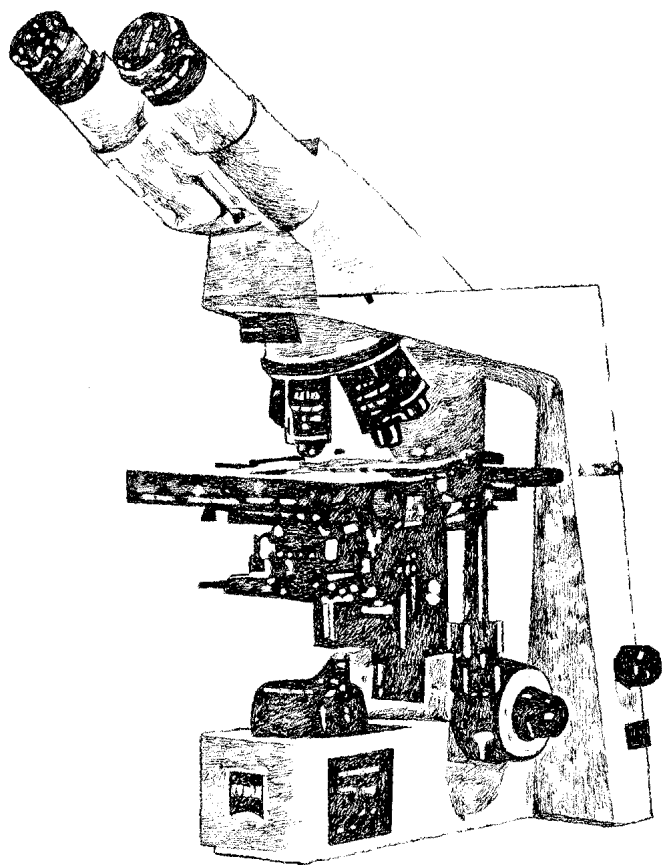
ALL OVER THE WORLD, THERE IS increasing interest in a simple idea for the regulation of risk: the Precautionary Principle. Simply put, the principle counsels that we should avoid steps that will create a risk of harm; until safety is established through clear evidence, we should be cautious. In a catchphrase: Better safe than sorry.

In ordinary life, pleas of this kind seem quite sensible. People buy smoke alarms and insurance. They wear seatbelts and motorcycle helmets, even if they are unlikely to be involved in an accident. Should rational regulators not follow the same approach as well? Many people believe so.

In many ways, the Precautionary Principle seems quite sensible, even appealing. To justify regulation, a certainty of harm should not be required; a risk, even a low one, may well be enough. It makes sense to expend resources to prevent a small chance of complete disaster; consider the high costs, pecuniary and otherwise, that are spent to reduce the risk of terrorist attack. On reasonable assumptions, the costs are worth incurring even if the probability of harm — in individual cases or even in the aggregate — is relatively low.

The Precautionary Principle might well be seen as a plea for a kind of regulatory insurance. Certainly the principle might do some real-world good, spurring us to attend to neglected problems. Nonetheless, the principle cannot be fully defended in those ways, simply because risks are on all sides of social situations. Any effort to be universally precautionary will be paralyzing, forbidding every imaginable step, including no step at all.

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DEFINITION AND APPEAL

The Precautionary Principle enjoys widespread international support. But what does the principle mean or require? There are numerous definitions, and they are not all compatible with one another. We can imagine a continuum of understandings. At one extreme are weak versions to which no reasonable person could object; at the other extreme are strong versions that would appear to call for a fundamental rethinking of regulatory policy.

The most cautious and weak versions suggest, quite sensibly, that a lack of decisive evidence of harm should not be a ground for refusing to regulate. Regulation might be justified even if we cannot establish an incontrovertible connection between, say, low-level exposures to certain carcinogens and adverse effects on human health. Thus, the 1992 Rio Declaration states, "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

Strong version The weak versions of the Precautionary Principle are unobjectionable and important. Every day, people take steps (and incur costs) to avoid hazards that are far from certain. We do not walk in moderately dangerous areas at night; we exercise; we buy smoke detectors; we buckle our seatbelts; we might even avoid fatty foods. Because the weak versions are sensible, I will not discuss them here. Instead, I will understand the principle in a strong way, to suggest that regulation is required whenever there is a possible risk to health, safety, or the environment, even if the supporting evidence is speculative and even if the

In 1982, the United Nations World Charter for Nature apparently gave the first international recognition to the strong version of the principle, suggesting that when "potential adverse effects are not fully understood, the activities should not proceed." The widely publicized Wingspread Declaration, from a meeting of environmentalists in 1998, is another example of the strong version:

When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not established scientifically. In this context the proponent of the activity, rather than the public, should bear the burden of proof.

Unlike the weak version of the Precautionary Principle, the strong version is not limited to threats of serious or irreversible damage and reverses the burden of proof.

Belief in the strong version of the Precautionary Principle is not limited to any particular group. All over the world, the idea has been a staple of regulatory policy for several decades. In the United States, both Congress and the federal courts, without using the term explicitly, have built in a notion of precaution in some important cases, allowing or requiring regulation on the basis of conservative assumptions. The Precautionary Principle has played a significant role in international documents, to the point where it has become ubiquitous.

PARALYSIS

The most serious problem with the Precautionary Principle is that it offers no guidance – not that it is wrong, but that it forbids all courses of action, including inaction. To understand that point, it will be useful to anchor the discussion in some concrete problems:

■ One of the first controversies faced by the current Bush administration involved the regulation of arsenic in drinking water. There is a serious dispute over the precise level of risks posed by low levels of arsenic, but in the "worst case" scenario, over 100 lives might be lost each year as a result of the 50 part-per-billion standard that the Clinton

administration sought to revise. At the same time, the proposed 10 ppb standard would cost over \$200 million each year, and it is possible that it would save as few as six lives annually. (See "The Arsenic Controversy" special report, Fall 2001.)

■ Genetic modification of food has become a widespread practice. But the risks involved are not known with precision. Some people fear that genetic modification will result in seri-



economic costs of regulation are high. To avoid palpable absurdity, the idea of "possible risk" will be understood to require a certain threshold of scientific plausibility. To support regulation, no one thinks that it is enough if someone, somewhere, urges that a risk is worth taking seriously. But under the Precautionary Principle as I shall understand it, the threshold burden is minimal, and once it is met, there is something like a presumption in favor of stringent regulatory controls.

ous ecological harm and large risks to human health. Other people claim that genetic modification will have significant health benefits.

- Scientists are hardly in full accord about the dangers associated with global warming, but there is general agreement that global warming is occurring. It is possible that global warming will produce, by 2100, a mean temperature increase of 4.5 degrees C; that it will result in well over \$5 trillion in annual monetized costs; and that it will also produce a significant number of deaths from malaria. The Kyoto Protocol would require most industrialized nations to reduce greenhouse gas emissions to between 92 and 94 percent of 1990 levels in an effort to reduce the degree of warming. Such reductions would impose substantial costs.

- Many people fear nuclear power on the ground that nuclear power plants raise various health and safety issues, including some possibility of catastrophe. But if a nation does not rely on nuclear power, it is likely to rely on fossil fuels, and in particular on coal-fired power plants. Such plants create risks of their own, including risks associated with global warming. China, for example, has relied on nuclear energy as a way of reducing greenhouse gases and other air pollution problems.

- There is a possible conflict between the protection of marine mammals and military exercises. The U.S. Navy, for example, engages in many such exercises, and it is possible that marine mammals are threatened as a result. Military activities in the oceans might well cause significant harm, but a decision to suspend those activities might also endanger military preparedness.

In those cases, what guidance does the Precautionary Principle provide? It is tempting to say that the principle calls for strong controls on arsenic, genetic engineering of food, greenhouse gases, threats to marine mammals, and nuclear power. In all of those cases, there is a possibility of serious harms, and no authoritative scientific evidence suggests that the possibility is close to zero.

If the burden of proof is on the proponent of the activity or processes in question, the Precautionary Principle would seem to impose a burden of proof that cannot be met. Put to one side the question of whether the principle, so understood, is sensible; let us ask a more fundamental question: Is more stringent regulation really compelled by the Precautionary Principle?

OPPORTUNITY BENEFITS

The answer is that it is not. In most of the cases above, it should be easy to see that in its own way, stringent regulation would actually run afoul of the Precautionary Principle. The simplest reason is that such regulation might well deprive society of significant benefits, and for that reason produce risks and even deaths that would otherwise not occur. In some cases, regulation eliminates the “opportunity benefits” of a process or activity, and thus causes preventable deaths. If that is so, regulation is hardly precautionary.

The most familiar cases involve the “drug lag” produced by a highly precautionary approach to the introduction of new medicines and drugs into the market. If a government takes such an approach, it might protect people, in a precautionary way, against harms from inadequately tested drugs. But it will also prevent people from receiving potential benefits from those drugs. Is it “precautionary” to require extensive pre-marketing testing, or to do the opposite?

Or consider the case of genetic modification of food. Many people believe that a failure to allow genetic modification might well result in numerous deaths, and a small probability of many more. The reason is that genetic modification holds out the promise of producing food that is both cheaper and healthier, which would have large benefits in developing countries. Now the point is not that genetic modification will definitely have those benefits, or that the benefits of genetic modification outweigh the risks. The point is only that if the Precautionary Principle is taken literally, it is offended by regulation as well as by nonregulation.

Substitute risks Sometimes regulation would violate the Precautionary Principle because it would give rise to substitute risks in the form of hazards that materialize, or are increased, as a result of regulation. Consider nuclear power. It is reasonable to think that in light of current options, a ban on nuclear power will increase dependence on fossil fuels that contribute to global warming. If so, such a ban would seem to run afoul of the Precautionary Principle. Or consider the Environmental Protection Agency’s effort to ban asbestos, a ban that might well seem justified or even compelled by the principle. The difficulty, from the standpoint of that very principle, is that substitutes for asbestos also carry risks. Or return to possible risks to marine mammals from the U.S. Navy. Some people are concerned that efforts to eliminate those risks will endanger military preparedness, if only because of the rise of new administrative barriers to training exercises. In those circumstances, what is the appropriate approach, according to the Precautionary Principle?

The problem is pervasive. In the case of arsenic, EPA has expressed concern that regulation, by virtue of its cost, will lead people to cease using local water systems and to rely on private wells, which have high levels of contamination. If that is so, or even if it might possibly be so, stringent arsenic regulation violates the Precautionary Principle just as less stringent regulation does. That is a common situation, for opportunity benefits and substitute risks are the rule, not the exception.

Regulatory costs A great deal of evidence suggests the possibility that an expensive regulation can have adverse effects on life and health simply by reducing income. Richer societies are healthier societies; richer individuals tend to be healthier too. If regulatory policies are expensive and lead to higher costs, less employment, and more poverty, the net effect may be to harm individual health. The empirical question is: How much money, in terms of regulatory costs, will lead to the loss of a statistical life because of the wealth-health relationship?

To be sure, both the phenomenon and the underlying mechanisms are disputed. Low-end estimates suggest that a statisti-

cal life is lost for every expenditure of \$7 million resulting from regulation; it has also been estimated that the requisite expenditure is \$50 million per statistical life; and one of the most careful studies suggests a cutoff point of \$15 million per statistical life. (See “Safety at Any Price?” Fall 2002.) A striking study suggests that poor people are especially vulnerable to this effect — that a regulation that reduces wealth for the poorest 20 percent of the population will have twice as large a mortality effect as a regulation that reduces wealth for the wealthiest 20 percent.

I do not mean to accept any particular amount here, or even to suggest that there has been an unambiguous demonstration of an association between mortality and regulatory expenditures. The only point is that reasonable people believe in that association. It follows that a multimillion dollar expenditure for “precaution” has — as a worst case scenario — significant

tistically larger; the Precautionary Principle, in practice, is much affected by that fact.

The myth of a benevolent nature Loss aversion is often accompanied by a mistaken belief that nature is essentially benign, leading people to think that safety and health are generally at risk only or mostly as a result of human intervention. A belief in the relative safety of nature and the relative risk of new technologies often informs the Precautionary Principle. Because natural processes are often dangerous and human interventions often promote safety, a commitment to nature can be life threatening.

The availability heuristic It is well known that people focus on some risks simply because they are cognitive-

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adverse health effects, with an expenditure of \$200 million leading to perhaps as many as 30 lives lost.

If the Precautionary Principle argues against any action that carries a small risk of significant harm, then we should be reluctant to spend a lot of money to reduce risks, simply because those expenditures themselves impose risks. Here is the sense in which the Precautionary Principle, taken for all that it is worth, is paralyzing: It stands as an obstacle to regulation and nonregulation, and to everything in between.

PRECAUTIONS AND RATIONALITY

But if the Precautionary Principle, taken in a strong form, is unhelpful, how can we account for its extraordinary influence, and indeed for the widespread belief that it can and should guide regulatory judgments? Undoubtedly, self-interested political actors invoke the principle strategically. For example, European farmers invoke the idea of precaution to stifle American competitors who are far more likely to rely on genetically modified crops. But apart from that point, I suggest that an understanding of human cognition provides some useful clues:

Loss aversion People dislike losses far more than they like corresponding gains. The result is that out-of-pocket costs, or deteriorations from the status quo, seem much worse than opportunity costs, or benefits lost as a result of continuing the status quo. In the context of risks, people often tend to focus on the losses that are associated with some activity or hazard, and to disregard the gains that might be associated with that activity or hazard. A closely related point is that unfamiliar risks produce far more concern than familiar ones, even if the latter are sta-

ly “available,” whereas other risks are not. When the Precautionary Principle seems to require stringent controls on one risk, even though other risks are in the vicinity, the availability heuristic is a common reason. And when the availability heuristic is at work, certain hazards will stand out whether or not they are not statistically large. The hazards associated with heat waves, for example, receive little public attention, while the hazards associated with air travel are a significant source of public concern; one reason is that the latter hazards come readily to mind. That is a serious problem because the less salient risks, including those from heat waves and poor diet, can be the serious ones.

Probability neglect People are sometimes prone to neglect the probability that a bad outcome will occur; they focus instead on the outcome itself. The Precautionary Principle often embodies a form of probability neglect. At least, that is the case when people invoke the principle to favor stringent controls on a low-probability risk and when the consequence of those very controls is to give rise to new risks of equal or greater probability. In the context of the sniper attacks in the Washington, D.C. area in October 2002, people were far more concerned, and took many more precautions, than the statistical realities warranted, in part because the high salience of the attacks led to a form of probability neglect. It is highly likely that some of those precautions, including those that involved extra driving, actually increased people’s risks.

System neglect The Precautionary Principle often reflects

a general neglect of the systemic effects of regulation. When a single problem is placed in view, it can be difficult to see the full consequences of legal interventions. Sometimes, the principle has the appearance of being workable only because a subset of the relevant effects is “on screen” — and hence there seems to be no need to take precautions against other possible adverse effects that do not register. I suggest that the Precautionary Principle seems appealing to many people in large part for the same reason.

REJOINDERS, ADJUSTMENTS, AND SALUTARY GOALS

Is there anything that might be said, at this stage, by proponents of the Precautionary Principle? There are several possibilities:

The weak version and context It might be tempting to revert to the weak version of the principle — a version that is entirely unobjectionable. Alternatively, it might be urged that in many cases in which the principle is invoked, the risk at issue is the one that deserves the most sustained attention. In the context of global warming, for example, the Precautionary Principle might be triggered on the (controversial) ground that the potential risks of warming are far greater than the risks associated with the reduction of greenhouse gases. But that step points toward a sensible and substantial refashioning of the principle, one that ensures that low-probability catastrophes are given careful attention, and that the various risks at issue will be weighed and balanced in accordance with the facts.

Biases Advocates of the Precautionary Principle might urge that environmental values are systematically disregarded in the regulatory process or not given their due, and hence that the principle helps counteract systematic biases. A particular problem here is myopia: Perhaps government officials, uninformed by the principle, would fail to attend to risks that will not occur, or be seen to occur, in the short-run. Another problem is that some people tend to be unrealistically optimistic. As a result, many low-level risks do not register at all. When people think that they are “safe” even though they face a statistical risk, they might well be responding to emotions, seeking to avoid the anxiety that comes from an understanding of the inevitability of (some) risk.

On that view, the principle can be defended pragmatically, if not theoretically, as a way of emphasizing the importance of attending to issues, especially environmental issues, that might otherwise be neglected. In some settings, the pragmatic defense is undoubtedly plausible, and the Precautionary Principle, applied narrowly, undoubtedly leads to some good results.

But two problems remain. The first is that environmental values are sometimes on both sides; consider the nuclear power controversy. The same is certainly true of health and safety, as shown by the case of extensive premarket testing of pharmaceuticals. The second is that, even when environmental values are on only one side, the interests and values on the other side might well be at a comparative disadvantage too; consider the potential beneficiaries of genetic modification of food.

Distribution It might be tempting to defend the Precautionary Principle on distributional grounds. The Clean Air Act takes a precautionary approach, requiring an “adequate margin of safety” and hence regulation in the face of scientific uncertainty. At the same time, the Clean Air Act appears to be giving disproportionate benefits to poor people and members of minority groups.

Aggressive action to combat climate change might be more beneficial to poor countries than to wealthy ones. That is partly because wealthy countries are better able to adapt; it is partly because agriculture (potentially vulnerable to climate change) is responsible for a small percentage of the economy of wealthy nations but a large percentage of the economy of poor nations. It is also because one of the most serious health risks posed by climate change consists of an increased incidence of malaria, a nonproblem for wealthy countries. In the context of global warming, at least, the Precautionary Principle might be invoked to prevent especially severe burdens on those in the worst position to bear them.

Of course, it makes sense to be concerned with the distribution of domestic or international risks. The problem of global warming owes its origin to the actions of wealthy nations, and hence it makes special sense to ask those nations to bear a disproportionate cost of correction if poor nations are likely to be hit hardest. The distributional effects of global warming are among the strongest points in favor of aggressive regulation of greenhouse gases — at least if (and it is a big if) that regulation does not hit poor countries economically. But in too many cases, the Precautionary Principle, as applied, would have unfortunate distributional effects. The case of genetic modification of food is an example; here the benefits are likely to be enjoyed by poor people, not the wealthy.

The case of DDT is similar. While a ban on DDT, supported by reference to the Precautionary Principle, is probably justified in wealthy nations, such a ban is likely to have bad effects in at least some poor countries where DDT is the cheapest and most effective way of combating serious diseases, most notably malaria. Distributional issues should indeed be a part of a system of risk regulation, but the Precautionary Principle is a crude, indirect, and sometimes perverse way of incorporating distributional concerns.

Risk vs. uncertainty A more subtle point involves situations of risk (where probabilities can be assigned to various outcomes) rather than uncertainty (where no such probabilities can be assigned). In a situation of uncertainty, when existing knowledge does not permit regulators to assign probabilities to outcomes, some argue that people should follow the “Maximin” Principle: Choose the policy with the best worst-case outcome.

Perhaps the Precautionary Principle, as applied, is a form of the Maximin Principle. In this form, the principle asks officials to identify the worst case among the various options, and to select the option that has the least-bad worst case. Perhaps the Maximin Principle would support some proposed applications of the Precautionary Principle by, for example, urging aggressive steps to combat terrorism or global warming.

The problem is that the Precautionary Principle is not the Maximin Principle. If the latter principle is what is meant, then we should be discussing that principle directly, and evaluating it against the alternatives. The Precautionary Principle obscures those issues. It does so because it is invoked across-the-board, in situations of risk as well as uncertainty.

Salutary goals We are now in a position to appreciate some of the goals of those who invoke the Precautionary Principle. In the

ability of harm is, under many circumstances, a sufficient reason to act. Both individuals and societies sometimes have a tendency to neglect the future; the Precautionary Principle might be understood as a warning against that form of neglect. There are good reasons to incorporate distributional considerations into risk regulation; the Precautionary Principle seems, some of the time, to be a way to protect the most disadvantaged against risks of illness, accident, and death.

The problem is that the Precautionary Principle, as applied,

The problem with the Precautionary Principle is not that it leads in the wrong direction, but that – if taken for all it is worth – it leads in no direction at all.

context of tobacco, for example, a serious public health movement was muted simply by virtue of some scientific doubt—even though reasonable people take steps to reduce likelihoods, not only certainties, of adverse effects. The Precautionary Principle can be taken as a reminder not to require proof. To the extent that the principle emphasizes obligations to the future, it is entirely salutary. Those who invoke the principle undoubtedly are motivated, much of the time, by the goal of protecting the most vulnerable people against risks to their safety and health.

Nothing I have said is meant to draw those goals into doubt. My claim is that the Precautionary Principle is not a helpful way of promoting the relevant goals—and that if it is taken seriously, it is paralyzing and not helpful at all.

CONCLUSION

In this article, I have argued not that the Precautionary Principle leads in the wrong directions, but that if it is taken for all that it is worth, it leads in no direction at all. The reason is that risks of one kind or another are on all sides of regulatory choices, and it is therefore impossible, in most real-world cases, to avoid running afoul of the principle. Frequently, risk regulation creates a (speculative) risk from substitute risks or from foregone risk-reduction opportunities. And because of the (speculative) mortality and morbidity effects of costly regulation, any regulation—if it is costly—threatens to run afoul of the Precautionary Principle. We have seen that both regulation and nonregulation seem to be forbidden in cases involving nuclear power, arsenic, global warming, and genetic modification of food. The Precautionary Principle seems to offer guidance only because people blind themselves to certain aspects of the risk situation, focusing on a mere subset of the hazards that are at stake.

To some extent, those who endorse the principle are responding to salutary political or moral motivations that it might be thought to embody. Well-organized private groups sometimes demand conclusive proof of harm as a precondition for regulation; the demand should be resisted because a prob-

is a crude and sometimes perverse method of promoting those various goals, not least because it might be, and has been, urged in situations in which the principle threatens to injure future generations and harm rather than help those who are most disadvantaged. A rational system of risk regulation certainly takes precautions. But it does not adopt the Precautionary Principle. **R**

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