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The Porcupine's Dilemma: Strategic and Psychological Uncertainty in the Face of Global Warming

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THE PORCUPINE'S DILEMMA: STRATEGIC AND PSYCHOLOGICAL UNCERTAINTY IN THE FACE OF GLOBAL WARMING

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I. INTRODUCTION: THE NEED FOR EXPERIMENTATION AND RAPID RESPONSE

When confronted with questions of human adaptation to felt necessity, some lessons can be learned from the teachings of natural history. Let me look to the common porcupine for some metaphorical instruction.[1] The principal risks porcupines face come not from predators (who [automobiles excepted] are deterred so well by the arsenal of quills) but from their physical environment, especially from the fixed laws of gravity and the changing vagaries of climate. It so happens that porcupines are overarmed and overweight. They spend a lifetime traveling around in trees that are ill-equipped to support them; slips and falls are frequent, and virtually every porcupine suffers from broken bones, not to mention the self-inflicted quill wounds that are a necessary consequence of their heavy armament. Porcupines do the best they can to cope, of course, with various tentative, experimental, and don't-go-too-far-out-on-the-limb strategies, but the law of gravity is relentless and unforgiving.

Porcupines also confront sharp discontinuities in their decisional worlds, primarily because the chemistry of the leaves upon which they feed changes rapidly in step with the change of seasons. If you are feeding on birch and it is time to move on to aspen, you must make the switch quickly if you wish to maintain your reputation as an efficient porcupine. Empirically, it turns out, porcupines are extraordinarily good judges of their dietary options. Note, by the way, that the requirement that they keep pace with climate-induced changes in leaf chemistry means that porcupines must do a lot of traveling. Coping with their climate-environment forces them to confront risks in their predator—and gravity—environments.

It should be emphasized that the porcupine's existence is ruled by uncertainty in various guises and forms: in the margin of safety that expires at the end of every dead limb, in the chaotics of weather patterns that betray when least expected, and in the vagaries of traffic patterns that bring the risk of death to every country road.

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1. *See generally*, Uldis Roze, The North American Porcupine (1989).

II. THE LAW AND THE PROBLEM OF INDISCRIMINATE RESPONSE

It was surprising to this observer that in the course of this Conference little mention was made of the concept of systems analysis. What I mean by systems analysis is an examination of the full roster of options or responses or adaptations that a society can undertake to combat an environmental threat.

The law, and environmental law in particular, is often crudely indiscriminate in selecting among competing options. The issue is not whether there will be adaptation, but rather who adapts.

Consider the problem of noise from jet airplanes. What do you do about this problem? According to the carriers, the solution is bigger airports. It's a land use problem. But according to the airport operators, the answer is quieter planes. It's an issue of technology control. Yet from the point of view of equipment manufacturers, the focus instead should be on careless airline employees. If the pilots were better able to manage the aircraft—keep 'em high and bring them in over the river—then these other costly adjustments in the system would be unnecessary. So the solution from one perspective is improved operations, from another it's better technology, and from still another it's more space.

Consider also the spill of the *Exxon Valdez*. It has been said that the accident was the product of a combination of failures that included erratic navigation under the supervision of a drunken captain in a shoddy vessel set loose with inadequate contingency plans.[2] The Congress aimed fixes indiscriminately across this spectrum of navigation, operations, vessel condition, and planning.[3] An automatic navigation light is prescribed for Bligh Reef in Alaska's Prince William Sound.[4] Drunk driving records must now appear in the course of granting a merchant mariner's license.[5] The second-in-command can take over a vessel temporarily if two of the next most senior licensed officers believe the master is drunk or incapacitated by drugs.[6] A rule on the subject of when vessels can be operated with the auto-pilot engaged must be debated and adopted.[7] The *Exxon Valdez* itself is banished from the waters of the Sound.[8] Sister tankers will be built with double-hull

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2. See Robert W. Adler & Charles Lord, *Environmental Crimes: Raising the Stakes*, 59 G. Wash. L. Rev. 781, 782-84 (1991) for an account of the accident. *See also* William H. Rodgers, Jr., 2 Environmental Law: Air & Water (1992 Supp., Preface). The Oil Pollution Act of 1990 is codified at 33 U.S.C. §§ 2701-2761.

3. The Prince William Sound provisions of the Oil Pollution Act of 1990 are codified at 33 U.S.C. §§ 2731-2753.

4. 33 U.S.C. § 2733.

5. 46 U.S.C. § 7702(c)(2).

6. 46 U.S.C. § 8101(i).

7. 33 U.S.C. § 2734(2).

8. 33 U.S.C. § 2737.

construction.[9] A new regime of contingency planning is to be put in place.[10] Obviously, statutes such as these place enormous faith in the capacities of human institutions and human beings, and on the ability of law to bring about behavioral change. Behind the Oil Pollution Act of 1990 are a variety of assumptions about bad-weather observations, upstart second-officers, clever programmers, casual use of the auto-pilot, aggressive engineers and careful planners.

These examples of jet noise and oil spills are mentioned to underscore the necessity of not only identifying options for resisting the anticipated global warming but also evaluating the plausibility of whether humans can respond in the fashion expected of them. Porcupines have constraints upon their behavioral repertoires, and so do humans. Indeed, the challenges to species-specific predilections are profound in the context of global warming. Planning with strangers around the globe across time frames measured in hundreds of years to combat risks dimly perceived does not come easily to the human primate not long removed from the savannahs of east Africa. Predictably, while the United States goes about deciding whether global warming is a problem and what to do about it, not a great deal of attention is being given to the question of what we are equipped to do if we decide to do something.[11]

III. UNCERTAINTY: STRATEGIC AND PSYCHOLOGICAL

Let me approach this aspect of our problem through the medium of a fascinating book by the historian Simon Schama: "Dead Certainties (Unwarranted Speculations)."[12] Schama gives a riveting account of the nineteenth-century Boston murder trial of Harvard chemistry professor, John Webster, who was charged with killing a colleague in a dispute over a debt, dismembering the body and disposing of it in strategic places around the medical college. The victim was historian George Parkman, and the story is a gripping whodunit filled with vivid descriptions of events ("pieces of Parkman were coming together"),[13] and characters such as the attorney Rufus Choate (whose "whole person was a carefully organized dramatic spectacle")[14] and the presiding Judge Lemuel Shaw who "sat like a great warty toad

9. 46 U.S.C. § 3703a.

10. 33 U.S.C. § 2732(d)(6)(D).

11. Committee on the Human Dimensions of Global Change, National Research Council, Global Environmental Change: Understanding the Human Dimensions (1992) (recommending increased research on the human dimensions of global change); See Wallace S. Broecker, *Global Warming on Trial*, Nat. Hist., Apr. 1992, at 6, for the prospects of population growth swamping ever ambitious efforts to combat greenhouse gases.

12. Simon Schama, Dead Certainties (Unwarranted Speculations) (1991).

13. *Id.* at 220.

14. *Id.* at 187.

at the centre of the bench—immovable, unblinking, broad nostrils occasionally flaring at the suggestion of some impropriety, embodying in his bulk the very weight of justice."[15]

Like most good murder mysteries, the evidence in *Dead Certainties* was wholly circumstantial—Webster had motive (he had not paid his debts), opportunity (Parkman had come to visit him), and provocation (more than once he had felt the keen lash of Parkman's temper). But it was the uncertainty that made the case so ticklish. Let me put this uncertainty into the categories of the strategic and the psychological.

In those days of primitive forensics, before blood tests and DNA fingerprinting, considerable doubt attended the question of whether the various body parts that were found added up to the whole of the missing esteemed professor. In a burst of creative energy, one of the expert witnesses produced on an easel before the court a life-size drawing of a skeleton that bore an unmistakable resemblance to Dr. Parkman whose gangly figure was no longer seen on the streets of Boston:

> Turned to left profile, it was apparent that this was not some generalized skeletal diagram. The protruding jaw, the long neck, all announced a very particular personality. As if it were not already vivid enough, he was shown with his arms swinging, the left leg extended backwards, toes pointing to the ground. It was the *Pedestrian* to the life, moving briskly towards the accused.[16]

But the defense would not concede the field of uncertainty so easily. Defense lawyers found a famous dentist who couldn't say whether this jaw belonged to Dr. Parkman. And they "called a parade of seven witnesses, all of whom swore they had in fact seen Dr. Parkman in the afternoon of the twenty-third when, according to the prosecution, he was already lying dead inside the College. [These witnesses] were all unequivocal about their recollection."[17] In rebuttal, the Attorney General proposed to call a group of witnesses who *thought* they had seen Dr. Parkman during the crucial time period but upon speaking to the person, had discovered that they were mistaken. This rebuttal evidence was not accepted.

Here is a lesson in what I would call strategic uncertainty. There is no direct evidence available from anyone who spoke to Dr. Parkman. There is an unlimited supply of indirect evidence available from witnesses who *thought* they saw Dr. Parkman. The ultimate question—whether Dr. Parkman was alive at the time—is unanswerable given available techniques. Yet prospects for attempting to answer it imperfectly are unlimited. What should we do?

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15. *Id.* at 198-99.
16. *Id.* at 220-21.
17. *Id.* at 241.

This question of whether Dr. Parkman was living on that crucial day is suggestive of several of the issues surrounding global warming—most prominently, the question of predicting regional or local effects. From Dr. John Gibbon's Conference paper, "Decisionmaking in the Face of Uncertainty", it appears that the question is not answerable. Attempts to do so run into impossibility theorems having to do with the chaotic and nonlinear nature of the behavior under consideration.[18] For participants in the exercise, though, there remains the temptation to accumulate more indirect evidence; there will always be another witness who thought he saw Dr. Parkman. Therefore, the problem for policymakers is to determine whether, when, and how strategies of "more study" should be adopted. The history of environmental law offers hundreds of examples of forced choices between action, study and combinations of the two.[19] Suffice it to say that there are good and bad versions of policy, science and politics that support "more study" outcomes. That is why the issue can be characterized as an instance of strategic uncertainty.

Let me identify another construct of uncertainty that was developed nicely in the context of the missing Dr. Parkman. An observer at the trial made the telling point that "confusion and uncertainty" alone was an insufficient defense, even in light of the technical requirement that murder must be proven beyond all reasonable doubt. Why? Because "these good ordinary men [of the jury] do not wish to be confused; the precise instinct of the locksmith and the printer, the accounting of the clerk and the dry goods merchant, all rebel against it. Give them an *alternative* story they can superimpose over the histories of [the witnesses] and they perhaps may prefer it. But give them only uncertainty and they will squirm with unhappiness like children sent to bed without their story's end."[20]

In the Webster trial, an alternative and plausible scenario was produced, but it did not work to the benefit of the defense. Pliny Merrick, counsel for Webster, took the plunge by addressing the delicate question of whether a homicide, if proven, would constitute murder or manslaughter. To answer this question, Merrick said, I must "assume that the homicide was committed by the prisoner at the bar and I must assume also for the purposes of this examination the existence and the truth of the various facts of which the Government have supplied you with evidence." This was a dangerous tack, as Schama explained:

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18. *See* John L. Casti, Searching for Certainty: What Scientists Can Know About the Future (1990). *See also* Broecker, *supra* note 11, at 8. ("The global warming that caused the demise of the little Ice Age confuses attempts to estimate how much of the last century's warming is neutral and how much has been caused by pumping greenhouse gases into the atmosphere.").

19. *See* William H. Rodgers, Jr., 3 Environmental Law: Pesticides & Toxic Substances § 7.1(D) (1988).

20. Dead Certainties, *supra* note 12 at 243.

> "Assume," such a little, little word, Bemis thought. For gentlemen such as him and me and all the Harvard classmates sitting in this room, it signifies something hypothetical, suppositious, intellectually experimental. But, my learned friend and fool, you have *assumed* too much; you have used it to those good tradesmen and mechanics over there. They are more accustomed to hearing it mean "take for granted" as in "we may assume you owe me twenty dollars for these groceries."[21]

Schama continued:

> It got still better in the afternoon. For when, at last, Merrick turned narrator, the story he related (and did so pretty well), was one which set yet again in the jury's mind the indelible image of a distracted, prodigal man attacking his creditor. It was, he said, a tale of passion, and it is impossible to know how men will conduct themselves under the domination of passion in its highest excitement. Professor Webster occupied an important position—was a man of good standing in society. He had a wife and daughters dependent upon his professional labors and ability; he was poor, and all before him might look like ruin and desolation. While his blood was hot and his passion high and his victim just slain, suppose that he commits just one rash act more. There, surrounded as he was by walls which excluded the presence of all witnesses and shut out all human observation the temptation might come upon him to conceal; and the mutilation of the body would mark the first act of concealment.
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> Bemis thought: Well, you surely have convinced me, my friend.[22]

Much of this Conference, of course, has been devoted to the presentation of plausible and alternative scenarios associated with global warming. Doing nothing is not strongly recommended. Yet the details of policies-that-should-be are hardly in focus either. In this context, the fortuitous appearance of "no regrets" options[23] are almost too good to be true. We can accept the predictions of global warming, take meaningful steps to remedy the threat, yet preserve flexibility of choice for the future. Together with the porcupine, we can avoid going too far out on the limb.

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21. *Id.*

22. *Id.*

23. Office of Technology Assessment, U.S. Congress, Changing by Degrees: Steps to Reduce Greenhouse Gases 4 (Feb. 1991) (Box 1-A) ("Many of the technical options evaluated here are worth pursuing for other reasons in addition to climate change, because they address other important U.S. goals such as energy security, local environmental quality, and economic competitiveness. They can reduce emissions in the short-term, reduce total energy demand, and serve to bridge the U.S. economy from a fossil-fuel age to a nonfossil future.").