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Catastrophe: Risk and Response, by Richard A. Posner

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refuting mystifying ideologies of growth, critical debate, transnational labor movements, moral considerations in social science, and even neo-classical price mechanisms that place disincentives on extractive economies. In the end, our authors differ less than they would have us believe. The livable environment is seriously threatened. Some things are being done about it, but no one seems to know exactly which long-term solutions are both technically effective and politically possible.

Ironically, the problem may lie in the globalizing frameworks employed in these analyses. It is one thing to note that environmental problems transcend national borders but quite another to look for global or all-encompassing solutions. The world in which we live and cope consists of local places. It is in these settings that reforms must inevitably be tested and, with luck, adapted to other places based on what is learned about the interplay of concrete strategies and conditions. How, for example, did the Amazon's National Union of Rubber Tappers, headed by Chico Mendes, challenge deforestation and bring to the world's attention the idea of "extractive reserves" managed by indigenous people? How has Brazil effectively shifted from fossil fuels to sugar-cane ethanol and why does the AP-6 claim that is impossible? What can we learn from Nicaraguan cooperatives that produce locally and market internationally organically grown coffee? Nothing is done globally. Environmental preservation begins with good ideas and the collective action to realize them in local places, one at a time.

REVIEWS

Catastrophe: Risk and Response. By Richard A. Posner. New York: Oxford University Press, 2004. Pp. 322. \$28 hardcover.

Judge Richard Posner, known throughout the legal community for his contributions to the subject of law and economics, applies his unique focus on the topic of risk and uncertainty in *Catastrophe: Risk and Response*. The focus of Posner's work deals with the presence of catastrophic risks in our world and how law can play a vital role in the development of policies and institutions for risk analysis and response. Posner recognizes that we are living in tenuous times, with the threat of global terrorism, environmental degradation, and disease greatly affecting the planet. Based upon such concerns, Posner seeks to identify catastrophic risks and what particular ramifications they can have on our society and its institutions.

In recognition of the contributions that economics and other social sciences have made in the study of risk, Posner creates a persuasive argument for a need of increased awareness within the legal

community about the scientific and technological aspects of risk and disasters. In addition to economics, political science and sociology have contributed greatly to risk analysis, yet legal scholarship about risk has been limited to key areas such as environmental law or health law.

Judge Posner challenges the reader to reassess our present state of affairs in a time of globalization and technological advancement around the world. In this sense, *Catastrophe: Risk and Response* calls into question the present ability of law to deal with the scientific revolution of today. In Posner's view, our present legal system is too court-specific and does not adequately support the needs of a society in environmental, political, and social transition. Science, as an area of study and application, is given scant attention in America's law schools, which leaves students ill-prepared to deal with the techno-legal issues so pressing in light of recent events such as the great Tsunami of 2004, bioterrorism, and global warming. Unless law students, and practicing attorneys, pursue advanced degrees in areas such as environmental law, few specialists are being developed in order to deal with the risk-based crises of the present age.

Catastrophic risks are identified in great detail by Posner, and he is most concerned with those natural and scientific (i.e., technologic) risks that have low levels of probability yet can produce massive devastation (i.e., high levels of severity). Low frequency-high severity disasters include nuclear warfare, bioterrorism, pandemics, asteroids, and other phenomenon difficult to imagine. It is against this backdrop of catastrophic risk that Posner begins his detailed analysis of just what law can do to protect the survival of the human race.

A central theme running throughout Posner's work is the contention that technological and scientific action, or inaction, can produce substantial social consequences. We live in a complex and inter-dimensional world wherein various socio-political and economic forces grapple with problems of the environment and humanity. Catastrophic risks are unique in their manifestation in the sense that they produce infrequent occurrences of loss. Due to a low frequency rate of catastrophic events, social and legal institutions are unfamiliar in dealing with the unknown risks associated with them.

Judge Posner organizes *Catastrophe: Risk and Response* around four classes of risks: those of a natural origin, risks of a scientific or technological creation, unintentional yet manmade risks, and deliberately made risks (e.g., bioweaponry). In chapter one, Posner examines each of the four classes of catastrophic risks and the relevant literature in the various disciplines that address these risks. Under the classification of natural catastrophes, asteroids receive extensive attention. Posner posits that over one billion asteroids orbit the sun and

can create a risk of collision due to their variances in orbit. An estimated 1,148 asteroids, each with a diameter of one kilometer or more, present near-earth hazards due to their size and proximity to Earth's orbit (p.24). Although risk of collision may be low, the effects of a collision on Earth would be devastating.

In addition to asteroids, Posner demonstrates how pandemics can greatly destroy a society. Ranging from an examination of the 1918–1919 flu epidemic to the present-day AIDS virus, Posner examines the inter-complexities of public health with science, technology, and the law. Pandemics and the problem of overcrowding are also addressed by Posner when he demonstrates the linkage, well known by public health scholars, between population factors and epidemiological concerns.

Particle-acceleration experiments and bioweaponry are considered by Posner as scientific advances that have the potential to create massive destruction in relatively short periods of time. In addition, Posner notes that changes in artificial intelligence can also produce difficulties and potential disasters (as in the case of robotic or computer-based failures).

Under the heading of unintended yet manmade catastrophes, Judge Posner points to the harmful effects of global warming and the depletion of the Earth's ozone layer. Deforestation and the burning of fossil fuels are also examined with regard to overpopulation and globalization concerns, as increased demands are placed on natural resources by the world's population. Posner closes chapter one with a chilling examination of a "Nuclear Winter" (p.71) and a detailed analysis of the increasing possibility of bioterrorism (p.75).

The difficulty of addressing catastrophic risks is examined in chapter two. Due to the low frequency rate of catastrophic disasters and the complexities in social response to such concerns, Posner provides a diverse evaluation of the political, scientific, economic, and psychological dimensions of catastrophic risks. Key subjects receiving Posner's attention include the application of public choice theory to risk management and scientific illiteracy. Posner begins the analysis by examining cultural factors affecting public and institutional perceptions of catastrophic risks.

Scientific illiteracy is described as a contributing factor to America's risk exposure. According to Posner, few institutional leaders in government, and law in particular, have demonstrated the type of scientific and technological competence that is needed to address catastrophic risks. Judge Posner demonstrates that a preexisting tension is present between scientific and religious worldviews, yet he cautions against science worship as a solution to risk analysis. The influence of science fiction also causes misperceptions about science among the

public, as popular culture promotes books and films that depict catastrophic events with little substantive evidence for support.

Promulgators of doomsday scenarios also influence the misperception of catastrophic risks when otherwise competent scientists make predictions without sufficient qualifications. With equal determination, other individuals manifest what Posner calls an "optimistic backlash" (p.112) wherein critics of doomsday scenarios take an alternate view, arguing that catastrophic disasters can never happen and are out of the realm of possibility. Differences in political and philosophic views also play a role in awareness levels of catastrophic risks. Similar to religion, political and philosophic perceptions greatly affect societal development and the establishment of norms and values. Variances in risk perception are also influenced by psychological factors such as temperament or what Posner refers to as an "economy of attention" (p.120). With so many risks present in daily life, it is often difficult to be concerned with the possibility of collision with asteroids.

Economic concerns are also interwoven into the analysis of risk, as Posner observes the interrelationship between economic development and technology as influential factors in assessing catastrophic risk potential. Since fears of possible catastrophe can hinder scientific or technological growth and restrict professional advancement, innovators are hesitant to reveal possible risks that have low levels of catastrophic potential or frequency rate.

Inherent in the increase of catastrophic risk are the elements of globalization and decentralization. In order for global risks to be addressed, international cooperation is needed. As noted by Posner, a true catastrophic event would almost certainly affect more than one nation-state and may very well have trans-national ramifications. In the area of environmental protection, Posner addresses the Kyoto Protocol and the reasons why the United States has been reluctant to fully accept the treaty's provisions (pp. 125, 127). The analysis of why little is being done to address catastrophic risk can also be realized through public choice theory, as modified by Posner at the end of chapter two.

In traditional circles of political science and economics, the public choice theory refers to how public policy is realized via the dynamics of rationally based self-interested behavior. It is the public choice theory that transformed bureaucracy quite readily throughout the 1980s and 1990s. Principal in the promulgation of the public choice theory were scholars that stemmed from the "Virginia School" of economics and policy, such as James Buchanan and Mark Crain. The public choice model often refers to the economic study of decision making within the non-market realm. The premise underlying the public choice theory rests on the idea that markets are assumed to work

through somewhat voluntary exchanges between various self-interested individuals. Over time, these markets move toward a state of equilibrium in which it becomes disadvantageous to buy or sell a different product or change one's occupation (For additional examination of the public choice model, see Richard Stillman's book, *The American Bureaucracy*, 2nd Edition). In *Catastrophe: Risk and Response*, Posner modifies the public choice theory to demonstrate the interaction between politicians (as sellers of policy) and the public (as buyers or consumers of policy outcomes). As noted by Posner, under this particular construct, votes take the place of currency in the transactional process between voter and politician.

Some risks do present benefits, as in the case of nuclear power. Despite the hazards that are associated with nuclear energy, its ability to provide power to large segments of the population is apparent. To criticize the nuclear power industry is to upset a significant industrial stakeholder, which can lead to negative political consequences for politicians as well as a loss of campaign funding for some. With regard to high energy particle accelerators and catastrophic risk, federal funding for such experimentation has reached levels exceeding \$750 million per annum despite the potential hazards involved. Posner closes his public choice analysis by demonstrating how difficult it may be for politicians to support risk management strategies when risk of loss from a particular catastrophic risk is low (pp. 136, 137).

Judge Posner supports the cost-benefit analysis as a means for addressing catastrophic risk in chapter three. Posner's position on the advantages of cost-benefit analysis is certainly not of new fruition and is manifested in additional writings by the author. However, Posner recognizes that the cost-benefit analysis model must be modified in order to address the unique nature of catastrophic risks. The application of a modified cost-benefit model is explained by Posner as it relates to Brookhaven Institute's Relativistic Heavy Ion Collider (pp. 140, 148). Posner closes chapter three with an examination of the Precautionary Principle (pp. 148, 150) and an analysis of various economic forms of risk measurement ranging from Present Value Discounting to Human Life Valuation models.

Of particular interest to scholars of risk evaluation is Posner's approach to risk and uncertainty. One method of coping with uncertainty is to create risk management-oriented "information markets" wherein predictions about particular risk factors can be bought and sold. Additional forms of risk coping mechanisms include Posner's idea of an "Inverse Cost-Benefit Analysis" (pp. 176, 184), a "Tolerable Windows Approach" (pp. 184, 185), and Risk-Risk Assessment and demonetization of death (pp. 186, 187).

Chapter four of *Catastrophe: Risk and Response* provides the reader with a glimpse into Posner's views on what institutional reforms need to take place in order to effectively deal with catastrophic risks. In addition to Posner's call for a scientifically literate bench and bar, the author also seeks to instill in law students an interest in the interrelationships between law and science. Posner argues that there is an increasing need for legal-scientific experts in a world complete with environmental risks. Some law schools have heeded Posner's call and have established environmental law curriculum for first-law-degree students as well as for graduate law students.

The idea of a "science court" is also an interesting concept to envision when one considers catastrophic risks and the law. Posner considers the concept of a science-based court in chapter four and examines the benefits that such a specialized court could bring at both appellate and trial levels. In a similar vein, Judge Posner presents an argument for an interdisciplinary and interprofessional center for catastrophic risk assessment and response. Such a center of practice and research could provide a forum wherein complex matters of risk control and management would be addressed. As noted, various academic disciplines and professions contribute to risk analysis and a comprehensive center for the study of risk would bridge the gap between concerned practitioners and academics. At the present time, there is an impetus for such research at various institutions. The University of Delaware supports the renowned Disaster Research Center (predominantly focused on sociological aspects of risks and disasters), while the University of Colorado at Boulder has established the Natural Hazards Center. In addition, the newly formed International Society for Justice and Safety Research promotes the interdisciplinary and inter-professional study of risk as manifested through concepts of safety and justice.

Fiscal tools that can be developed in catastrophic risk response are analyzed by Posner at the end of chapter four. Posner calls for the creation of an international environmental protection agency similar to the U.S. Environmental Protection Agency. Such an agency has long been promoted by many scholars and Posner's view is well-envisioned. The agency would most likely be affiliated with the United Nations and enforce environmental norms created by various treaties. One problem to consider is what affect such an agency would have on other U.N.-based agencies that already deal with various social and technological risks. At the present time, the World Health Organization (WHO), the International Atomic Energy Agency, and the International Civil Aviation Organization are all involved in dealing with risks associated with their particular areas of concern. The same is true for the

International Labor Organization and the International Maritime Organization with regard to workplace and maritime safety, respectively.

Judge Posner also considers the concept of an international bioweaponry agency to be housed within the present WHO. According to Posner, such an agency could be responsible for enforcing worldwide security against the threat of bioweaponry. In lieu of its placement in the WHO (not known for a police-oriented philosophy), Posner posits that Interpol could be a good alternative for such a bioweaponry security agency and program. Additional measures, some admittedly controversial, that could be brought to bear on the catastrophic risk problem range from mandating congressional catastrophic risk review of future projects to limiting science study at the collegiate level for some foreign students that meet pre-selected risk criteria. Posner also considers the tension that exists between civil liberties and police actions designed to fight terrorism and the potential that computer hackers can have on national and global security.

In an explanatory style reminiscent of the author's earlier works, Judge Posner's *Catastrophe: Risk and Response* serves as a valuable contribution to the study of risk control and management. In many ways, Judge Posner has challenged the legal profession and academy to take note of the significant risks that catastrophic events bring to our world. Despite the criticism that the Law and Economics School receives from newer schools of jurisprudence, Judge Posner demonstrates, with clarity and reason, the various nuances that are presented through a more comprehensive and flexible law and economics approach to the catastrophic risks that are ever-present in our world.

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Searching for Sustainability: Interdisciplinary Essays in the Philosophy of Conservation Biology. By Bryan G. Norton. Cambridge University Press: New York, 2003. Pp. 554. \$30.00 paper; \$85.00 hardback.

An unbridgeable gap separates anthropocentric and nonanthropocentric perspectives on environmental protection. To bridge this gap, philosopher Bryan Norton presents the "idea of sustainability" as the foundation for a normative theory of environmental protection. In *Searching for Sustainability*, Norton explains that the gap arises because the anthropocentric perspective values economic entities, whereas the nonanthropocentric perspective values ecological entities. Both perspectives must shift to embrace and protect natural *processes* as the source of all values. Just as these natural processes can be modeled as