Book Reviews

Worst Cases: Terror and Catastrophe in the Popular Imagination. By Lee Clarke. Chicago: University of Chicago Press, 2005. Pp. xi+213. $22.50.

The Next Catastrophe: Reducing Our Vulnerabilities to Natural, Industrial, and Terrorist Disasters. By Charles Perrow. Princeton, N.J.: Princeton University Press, 2007. Pp. viii+377. $29.95.

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Hazards and disaster research in the social sciences is an interdisciplinary field that can be dated to the Strategic Bombing Surveys of World War II, some historical studies of environmental hazards (most notably floods) and disasters (multiple types) during the decades immediately preceding and following the war, and a host of social science studies of hazards and disasters completed from the mid-1970s to the present, supported primarily by the National Science Foundation (National Research Council, *Facing Hazards and Disasters: Understanding Human Dimensions* [National Academies Press, 2006]). Sociologists have made important contributions to this field in at least four general areas: isolating core properties of hazards and disasters in social as well as physical time and space; documenting the demographics of hazard vulnerability, disaster impacts, and human adjustments at individual, household, community, regional, and societal levels of analysis; examining the structure of societal roles, organizations, and social networks before, during, and after disasters occur; and undertaking cross-cultural studies of hazards and disasters. Lee Clarke's and Charles Perrow's respective books inform and are informed by this literature.

Clarke's basic argument in *Worst Cases* is that disasters, even spectacular ones (he calls them *worst cases* or *catastrophes*), are normal. They are normal, he argues, because the mix of their causes and effects is patterned by the histories, social structures, and cultures of the societies within which they occur. Clarke believes that it is wrong and misleading to define disasters as abnormal, and he criticizes both academic researchers and social policy makers for doing so. In response, he wants to inform the public and policy makers about the normality of major threats that face humankind, encourage them to think more seriously about these vulnerabilities and how they are produced, and admonish those in positions of economic and political power to behave more responsibly in confronting worst-case scenarios.

How? First, Clarke uses nontechnical language, feeling that this style will make his argument more accessible to the general reader. Second, Clarke highlights a host of major disasters, some that have occurred and some that can be imagined as possible worst-case scenarios. The disasters and worst-case scenarios he mentions include multiple types of transportation accidents, plagues, asteroid hits, volcanic eruptions, earthquakes, hurricanes, tsunamis, terrorist attacks of various types, nuclear power accidents, nuclear war, and global climate change, among others. He believes that considering worst-case scenarios requires both retrospective and prospective thinking and, in the final analysis, is bounded only by human imagination. Third, Clarke distinguishes worst-case scenarios, which are imaginary, from scientific assessments of disaster risks, which rely on probabilistic reasoning. He extols the value of imaginary disasters and criticizes misuses of probabilistic reasoning by scientific, economic, and political elites, but in the end concludes that what he terms "possibilism" on the one hand and "probabilism" on the other are complementary in postulating reasonable worst cases. Fourth, Clarke argues that the exercise of power influences the definition and communication of disaster risks, the actual occurrence of disasters, the structuring of disaster responses, and how the public makes sense of disasters before and after they happen. The disaster stories and commentary become somewhat disjointed at this point in the argument, but Clarke's central theme is fairly clear. While ordinary people tend to think and act well in facing the circumstances of disasters, complex organizations and the elites that control them need to make major improvements. Fifth, Clarke argues that all people, but especially policy makers, need to give serious attention to worst-case scenarios because societal capacity to harm future generations has become much greater. Concentrated populations and infrastructures increase vulnerability to worst-case events. The push for new technologies has associated risks. The concentration of power and authority in formal organizations diminishes flexibility. In the final analysis, Clarke believes that serious attention to worst-case scenarios can increase societal capacity to reduce disaster vulnerability and increase its ability to reorganize and improvise when worst cases occur.

Hazards and disaster researchers would certainly agree that disasters are "normal" in the sense that Clarke interprets them. But to be normal is not to be routine, particularly when considering worst-case scenarios, and so a contribution of Clarke's book is to increase sensitivity to both the probabilities and possibilities of human harm and social disruption related to major events. Indeed, if major disasters were routine, everyday concerns, there would be no reason for Clarke's book. Most directly, therefore, Clarke's argument informs and is informed by ongoing attempts to define disasters and isolate their core social properties. The events selected for study, be they real or imagined, are social catalysts. Clarke's argument is also useful because it highlights the need to reorganize and improvise before and after major disasters occur. In this regard, I believe

social scientists must give greater attention to capturing how disaster-relevant roles, organizations, and social networks facilitate or constrain bottom-up and top-down improvisations. There has been a fair amount of research on community- and regional-level improvisations (bottom-up), but very little work on improvisations related to intergovernmental response systems (top-down). The practical need for improvisation at all levels of societal response is unquestionable, particularly for major disasters, and Clarke's book provides a stimulus for the basic and applied studies that are needed.

In *The Next Catastrophe*, Perrow offers an interesting treatise on demographic vulnerabilities to a wide range of major disasters and what can be done about them. The vulnerabilities he highlights are threefold: concentrations of energy sources such as explosive and toxic materials, highly flammable substances, and dams; concentrations of populations in high-risk areas, especially areas with high concentrations of explosive and toxic substances; and concentrations of economic and political power such as are seen in the electric power industry, computing, telecommunications, and the Internet. The natural disasters highlighted initially are floods, hurricanes, and earthquakes. Using these types of events as a backdrop in the first part of the book, Perrow offers a critical commentary on the evolution and recent inclusion of the Federal Emergency Management Agency (FEMA) within the Department of Homeland Security (DHS). Perrow's criticisms of FEMA and DHS are direct, and I suspect widely shared within the hazards and disaster research community. But the book's central thrust then follows with a more detailed treatment of industrial and terrorist disasters. Considered are actual or possible nuclear power plant accidents and related terrorist threats, chemical plant and transportation accidents involving chemicals and related terrorist threats, national power grid accidents and related terrorist attacks, and attacks on computer operating systems and the Internet by hackers, criminals, and terrorists (who presumably seek to disrupt critical facilities and infrastructures).

The threefold demographic vulnerabilities to disasters are well stated and merit continuing attention from scientists, engineers, emergency management practitioners, and policy makers. Also nicely argued are Perrow's more focused discussions of industrial and terrorist disasters; indeed, his analysis of threats to computer operating systems and the Internet is quite informative. Perrow's explanation of these vulnerabilities infuses the entire book. Its foundation is the interactive complexity and tight coupling of highly technical systems. As previously developed by Perrow (normal accident theory), such structural features render serious accidents inevitable even with an assumption of excellent management practices and focused attention to safety. For Perrow, the threat of terrorism only exacerbates an already ominous situation. Building on this foundation, Perrow's explanation also highlights the importance of uncompetitive markets, consolidated economic power, executive failures (including violations

of the law), inadequate governmental regulation, and a political process that is unduly influenced by business interests. One way to think about Perrow's argument is to imagine a statistical model that isolates key dependent variables (the above threefold demographic vulnerabilities), a fairly large number of causal variables (those noted above), and unspecified interactions among these causal variables (additive or interactive). Perrow does not reason in terms of a statistical model, but perhaps he should, given the complexity of his explanation of disaster vulnerabilities and its strongly worded presentation. That presentation invites counterargument and discussion as matters of science and public policy. That is as it should be.

What can be done? The need for organizational, executive, and regulatory reforms flows directly from Perrow's description and explanation of disaster vulnerabilities. He supports these reforms but is not confident that they would be sufficient. Reducing the size and concentration of populations, infrastructures, industries, and hazardous materials certainly would be highly beneficial. Computers need not be dependent on a single operating system. Electric power grids could have multiple points of failure, better back-up systems, and alternative energy sources. Nuclear waste sites need not be dependent on the power plants that produce such waste. Concentrated industries could become more competitive through multiple and smaller networks of producers and suppliers of goods and services. The transportation of hazardous materials could be rerouted away from urban centers—and so on. Such steps would be important for reducing natural and industrial disaster threats, and they would have the added benefit of making targeting more difficult for terrorists.

Perrow recognizes that there are major obstacles to reducing societal vulnerabilities to disasters, with or without Clarke's worst-case scenarios that nobody wants. He concludes that societies cannot adequately protect themselves from major disasters. He concludes also that while small, incremental changes in policy and practice are more likely than larger ones, over time such changes can be highly beneficial. I agree. I also agree that both basic and applied research by social scientists can and should support changes in policy and practice that will work. Finally, I agree with both Perrow and Clarke that societies can do a much better job of reducing the hazards that face them and of responding to major events when they inevitably occur.