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SOCIOLOGICAL INQUIRY AND DISASTER RESEARCH

G. A. Kreps

Department of Sociology, College of William and Mary, Williamsburg, Virginia 23185

Abstract

This article reviews and critiques recent studies of hazards and disasters from a general sociological perspective. Historical attempts to define and interpret disasters in sociological terms are important, and such efforts inevitably raise basic questions about the social order. C. E. Fritz's earlier definition of disaster is revised to reflect the growing awareness in the field that patterns within the social order are both causes and consequences of environmental vulnerability. The revised definition points to four core dimensions of disaster: events, impacts, social units, and responses. Using the latter two for illustrative purposes, recent research on social networks and organizational forms of association related to disasters is highlighted. This section is followed by a review of the kinds of questions that sociologists have been asking about the social order, as evidenced by several recent large-scale studies. While contemporary work has greater substantive breadth and more methodological rigor than earlier studies, there are continuities over time as well. The paper closes by presenting some comments about interdisciplinary and cross-cultural research on disasters.

INTRODUCTION

Given the great volume of work to be covered, the first *Annual Review of Sociology* article on disasters by Quarantelli & Dynes (1977) provided a useful, programmatic summary of the sociological studies done since World War II. They noted but did not discuss the growing involvement of social scientists from other disciplines in the post-1970 period. The multidisciplinary character of disaster research has grown even stronger in the past seven years. Sociological studies are also being done amidst growing pressures to make research

responsive to the perceived policy needs of national, state, and local governments. My strategy for reviewing the more recent disaster research will be similar to Quarantelli and Dynes's, but I will also raise several basic issues that were only implied or treated quite briefly in the first article. While the content and tone of the discussion is sociological, the issues raised are important for and considered to varying degrees in other disciplines as well.

This paper will address the following kinds of questions: In what sense are disasters a sociological construct? What theoretical and methodological strategies characterize the field, and what are the key findings from recent studies? What are the primary reasons for studying disasters, and why should such phenomena be of particular interest to sociologists? How has disaster research changed, and what are the continuing themes? My responses to these questions reflect both my reading of the newer work and my agreement with a particular point of view about disasters and the social order. The point of view is simply this: Disaster studies provide rich data for addressing basic questions about social organization—its origins, adaptive capacities, and survival. These questions were considered fundamental by the classic figures of sociology and the earliest students of disasters. Devoting sustained attention to them will enhance sociological knowledge and contribute to disaster prevention.

Let me begin with a brief example that I hope illustrates both the link between disasters and the social order, and the conceptual problems facing this specialty. Some of the critical societal issues we face concern the use of technology. Since disaster research became an established specialty in the 1950s, researchers have been asked with increasing frequency to compare the problems stemming from technological and natural hazards, with the latter being more frequently studied by social scientists (Quarantelli 1981b, Kreps 1981, Perry 1982). Emergency managers, other government officials, and the general public have good reasons for being attentive to the comparisons. First, there are both benefits and risks associated with the development of technology. Second, the prevention of any disaster, regardless of type, is important. Third, if prevention fails, questions about the physical and social impacts and recovery from them are important.

When researchers compare technological and natural hazards or are asked to provide informed views for or against the integration of programs related to both of them, the discussion usually gets bogged down over what usefully distinguishes *two* general types. It is a commentary on the current confusion that the National Science Foundation has different research programs for natural and technological hazards, even as government officials from all levels speak to the need for comprehensive or integrated emergency management. This situation suggests that sustained efforts are needed to define and interpret disasters (or hazards for that matter) sociologically. Serious attempts to do so characterized the field very early on (Prince 1920, Fritz 1961), they have

continued as the field has evolved (R. H. Turner 1967, Barton 1970, Dynes 1970), and they remain critical to its future. I begin by addressing disaster as a sociological concept. This section is followed by a review of the kinds of questions that sociologists have been asking about the social order. While recent work has greater substantive breadth and methodological rigor than earlier studies in the field, continuities have also persisted over time. I will close with comments on the multidisciplinary character of disaster research and the prospects for collaborative cross-cultural studies of disasters.

THE NATURE OF THE PHENOMENA UNDER INVESTIGATION

Disaster is a vague term that has defied simple interpretation. Starting from Fritz's (1961) venerable definition highlighting the consequences of specific events, some researchers (usually sociologists) have periodically focused on one or more analytical dimensions (e.g. duration of impact) in an effort to compare the problems resulting from different kinds of disasters (Barton 1970, Dynes 1970, Drabek 1970, Quarantelli 1981a, Perry 1982). Other researchers have emphasized the physical side of disaster and the need to prevent or mitigate potentially disastrous events and have therefore replaced the term with equally elusive phrases like "natural and technological hazards" (Burton et al 1978) or "environmental extremes" (Mileti et al 1975, Mileti 1980). Despite all the confusion about what is or is not a disaster (or hazard), most authors are referring to the physical impacts of or problems caused for human communities by unplanned and socially disruptive events. The most visible characteristics of these events are that they may do considerable harm to people and the physical environment; that their occurrence (or at least the designation of their occurrence with disasters that have a slow onset) is sudden and acute; and that something can be done to mitigate their effect either before or after they happen (Erikson 1976). So interpreted, the term disaster serves only (albeit usefully) as a sensitizing concept; one, like many other global concepts used in science, that calls attention to a number of characteristics related to some phenomenon and gives it a label. But it is the subsequent identification and measurement of these characteristics that makes the concept useful theoretically.

Fritz's definition points to four core properties. Disasters are (a) *events* that can be designated in time and space, which have (b) *impacts* on (c) *social units*. The social units, in turn, enact (d) *responses* (or adjustments) to these impacts. The list of events may be large; its size depends on how one defines the boundaries of the field. The impacts include both the physical damages and losses incurred by a social unit and the disruption of the unit's routine functioning. The social unit can vary from a single individual or family to an entire society, with the individual and social impacts expressible at various levels of

aggregation. Both the new demands created by the actual or potential event and its impacts, and the continuing requirements of maintaining a viable social unit must be confronted. Fritz's definition implies that event and impact characteristics are independent variables while social units and responses are dependent variables. His emphasis has been retained in much of the recent work (Wright et al 1979, Bates et al 1982, Bolin 1982, and many others). But researchers are also paying more and more attention to prevention or mitigation (Kunreuther et al 1978, R. H. Turner et al 1980, Drabek et al 1983, and many others). These students of disaster, in effect, reverse the causal argument. In either case, it is easy to see the mutual relevance of theories of the social order (regardless of their field of origin) and studies of disasters (Burton et al 1978, Davis 1978, B. A. Turner 1979, Battisti 1980, Pelanda 1980, Dombrowski 1981).

Logically, it is quite all right to define disaster and the social order in terms of each other. In so doing, however, we must break out of the tautological trap of explaining something in terms of itself. We must make choices about which variables are independent and which dependent in given studies and theoretical models. In fact, researchers have been making such choices all along, and they are slowly unraveling the puzzle of how disasters and the social order interact. A slightly revised version of Fritz's definition more accurately represents ongoing research. Thus, disasters are: *events, observable in time and space, in which societies or their larger subunits (e.g. communities, regions) incur physical damages and losses and/or disruption of their routine functioning. Both the causes and consequences of these events are related to the social structures and processes of societies or their subunits.*

The Classification Problem

The above definition appropriately encompasses studies from all of the social and management sciences. A concept like disaster can only point to the kinds of properties important for theory building. These properties must then be specified, and the key ones must be measured by researchers in the respective disciplines. The identification and measurement of events, impacts, social units, and responses are not obvious. The "property spaces" of each of these general dimensions can be physical, temporal, or social, with the relative emphasis depending on which one or ones are being examined. For example, events can be characterized by their energy release (physical), their periodicity (temporal), or their formal declaration as a disaster (social). Impacts can be distinguished in terms of damage to the natural or man-made environment (physical), duration (temporal), and degree of disruption (social). Social units vary by location (physical), time of origin relative to the occurrence of the event (temporal), and societal level (social). Responses may involve structural engineering (physical), be relevant before, during, or after the impact is felt (temporal), or result from a variety of social and organizational processes (social).

With four general properties and three general dimensions for locating the property spaces, the classification problems are enormous (Bailey 1973, McKelvey 1982). They can be confronted, however, in terms of a commonly accepted, formal statement of what is being studied. Sociologists emphasize the study of social units and responses, and so we should. But we must be sensitive to the major taxonomic problems that permeate our work, as well as to the broader problems of classifying the very events we select for research. I will illustrate the classification problems related to social units and responses below, as well as how they have been addressed in three recent studies (Drabek et al 1981, Leik et al 1981, Kreps 1983a,b).

Recent Research on the Classification of Social Units and Responses

The simple point is that societies or their larger subunits can respond to disasters in many different ways (Wenger 1978). They can just absorb the impacts of disasters with little or no premeditated action and rely on improvisation to meet immediate and long-term needs. But as the awareness of potential disasters to a given social unit increases, the possibility of planned and formally directed "adjustments" (e.g. efforts to distribute the risk, modify impacts, or prevent disastrous events) also increases. The degree of hazard awareness, as well as the types and mixes of responses adopted by societies, varies widely with the kinds of hazards faced, cultural orientations, the amount of knowledge about or experience with these hazards, and the resource bases of different levels of society (Hutton & Mileti 1979, Mileti 1980, Geipel 1982).

Classification problems are basic and general sociology plays a particularly important role because it is in this context that fundamental questions about the social order must be raised. What is a response? What is a social unit? What is organization? What distinguishes organization from other types of social action? Perhaps an example from my own work on organized responses (Kreps 1983a,b) will illustrate some of the subtleties involved in addressing these not so simple questions:

An organization of search and rescue emerges following an earthquake. The event takes place without forewarning (few to no warning cues); is regional in scope (diffuse); destructive in magnitude (high as documented by many measures of damages and losses); and its prompt (ground motion) and most secondary (tsunami and early aftershocks) effects are over within minutes to several hours (short duration). The central business district and a large residential area of a major city are seriously damaged. Immediately following impact many individuals who happen to be in or near these areas engage in interdependent actions related to search and rescue of victims. A few of these early responders have search and rescue training but there is no formal organization of search and rescue activity. Within an hour many search and rescue teams converge on the impacted areas. Both formal and informal, they come from city agencies, other municipalities, the military, and several voluntary search and rescue groups. A task structure emerges among some of these disparate groups

within several hours after impact, with prominent roles played by members of a mountain rescue group and members of an emergent "damage control" group. The legitimacy of an integrated search and rescue operation is not fully recognized by city government officials until about 12 hours after impact. By then it is operating, now formally, out of the city's public safety building. Formal search and rescue actions continue for another 24–30 hours.

Disaster researchers are familiar with such instances of organization (Forrest 1978, Hannigan & Kueneman 1978, Stallings 1978, Bardo 1978). Equally interesting examples could be drawn for a variety of spheres of social action before, during, and after the disaster. The authors of two recent, large-scale studies suggest that the above example should be treated as an emergent social (i.e. multiorganizational) network. Drabek et al (1981), in a study of search and rescue efforts, and Leik et al (1981), in an examination of severe weather warnings, successfully identify the established and emergent social networks that respond to these demands. They do so by determining the structural links (i.e. interorganizational relationships) among relevant units, using an innovative technique called blockmodeling (White et al 1976). The data base for blockmodels is a matrix of dyads that indicates the presence and absence of interaction among social units. Both studies emphasize the structure of the social networks, as it could be determined inductively. The authors devised descriptive social maps that reveal network communication, decision-making, and control structures while depicting the roles of the member units involved in them. This blockmodeling disclosed much of the subtlety of social action as well as several management problems—e.g. communications gaps, coordination breakdowns. For classification purposes, Drabek, Leik, and their colleagues argue that social networks are key types of social units that respond to disasters and that are definable and interpretable on their own terms.

Drabek's and Leik's and their colleagues' studies suggest that actual or threatened disaster impacts translate as domains (i.e. spheres or functions) of social action enacted by individuals, families, groups, organizations, and increasingly, by larger social units. These domains encompass time periods before, during, and after a disaster. Some social units are established prior to the events' occurrence (e.g. families, bureaucracies, firms) and continue to exist after they are over. Others, such as the search and rescue actions described above, are emergent and short-lived. The often fascinating array of disaster-relevant responses reveals the social order from its most elemental to its most complicated forms. It follows that a typology of disaster domains organized according to the time phases of a disaster provides an important taxonomic link between events and impacts on the one hand and responses on the other. In other words, such a typology is needed because it encompasses the social dimensions of disaster that are not captured by the more conventional (but no less problematic) comparisons of events in terms of the physical and

temporal dimensions of impact. As Quarantelli & Dynes (1977) point out, the very designation of a set of circumstances as a disaster is a social process.

Research has consistently indicated that social responses to disasters are performed in ways that reflect alternative forms of association. Not all families are affected by or respond to disasters in the same way. Some groups and organizations have well-defined and legitimated domains, while many others do not. Many social networks of individuals, families, groups, and organizations are improvised rather than planned. There are key analytical problems in identifying the core social elements of these multifaceted forms of association.

Referring to social units other than individuals, interpersonal relationships, and families, for example, I have argued (Kreps 1983a,b) that forms of association enacted during disasters reflect sequences of 1 to 4 basic elements of social organization: domains (D), tasks (T), human and material resources (R), and activities (A). The elaboration of these elements draws heavily from Simmel's, Weber's, and Durkheim's interpretations of the social order as well as from much previous disaster research (particularly Weller 1969, Weller & Quarantelli 1973, Kreps 1978). In analyzing 423 instances of response to 15 events, this work suggests that each of the 4 elements may be critical—at a given time and place—in affecting the initiation, maintenance, and suspension of the other 3 as the response unfolds. Accordingly, I have developed a taxonomy of forms of association that represents all logically possible patterns among the 4 elements. The taxonomy includes 24 types encompassing all 4 elements (labeled instances of organization) and 40 forms of association that involve from 1 to 3 elements (labeled social networks). The above case description of search and rescue illustrates an $A \rightarrow R \rightarrow T \rightarrow D$ sequence where activities and resources dominate the initiation of emergent organization. This polar type is sometimes referred to as collective behavior. Clearly the emphasis is on treating organization as process rather than structure (Giddens 1979). The polar opposite to the above example is $D \rightarrow T \rightarrow R \rightarrow A$ where collectively shared representations of what is taking place precede the mobilization of resources and the performance of activities. This form illustrates Weber's conception of formal rationality (Kalberg 1980), which is frequently evidenced by government units and voluntary agencies that are involved in disaster response. The many possible forms of association between these polar types capture much of the complexity of human response to disaster. Thus, studies of social networks such as those by Drabek and Leik and their colleagues reveal the same organizational dynamics that I have discussed. All three studies show clearly that a variety of "means-ends relationships" (Merton 1957) are relevant and that simple judgments about what is efficient or effective social action are unwarranted.

As noted earlier, the forms of association related to disasters are enacted by

identifiable social units (Weick 1981). In the example from my research, the description points to emergent organization, but disaster domains are obviously performed by large numbers of established units as well. Their location and relevance may be local, regional, national, or international in scope. Hence, classifications of responses by form of association and by type of social unit are of equal importance analytically. Recent research suggests that sociologists should seek out "populations" of social units that carve out "niches" related to disaster domains (Hawley 1950, Hannan & Freeman 1977, McKelvey 1982). While each response is clearly identifiable as a boundary-spanning system, it could very well be that social units can be grouped by what they do and how they do it. The resulting taxonomy would not be expressed in terms of commonsense categories of groups and organizations—e. g. firms, government units, voluntary agencies, special interest groups, mass media, the military—but in terms of populations of social units that engage in similar domains and/or initiate, maintain, and suspend similar forms of association.

There are, then, important links between disaster research and fields such as human ecology, the study of complex organizations, collective behavior research, and environmental sociology. Because disaster is but one of many relevant contexts that researchers in these and other fields can study, unambiguous statements about the nature of the phenomena being investigated are essential prerequisites for any convergence of research interests. For example, those studying firms might compare responses to disasters with adjustments following abrupt changes in market conditions or government regulations. Those interested in social movements might learn something about their origins by studying emergent organization during disasters. Students of the family can observe how families carve out instrumental domains just as formal organizations engage in actions that are expressive in character (R. H. Turner 1967). It is not enough simply to note that links are possible; experience suggests that such pronouncements are quickly forgotten. Students of disaster must repeatedly point to them in their work.

Some members of the population ecology school are interested in developing a "core species concept" that underlies all forms of social organization. Perhaps in the forefront of work on this problem are McKelvey & Aldrich (1983, McKelvey 1982) who emphasize "dominant activity" as part of their evolving core species concept. This approach resonates well with references in disaster studies to domains and tasks, and their related conception of dominant competence (Thompson 1967, Perrow 1967) highlights the linkages among tasks, resources, and activities. Although they do not invoke the biological metaphor (and perhaps it is not needed), students of collective behavior search for continuities between institutional and noninstitutional action by looking at the basic dimensions that underly both (Weller & Quarantelli 1973). Disasters are also important contexts for those using an evolutionary perspective in studies of

social organization. Processes related to ecological change, enactment, selection, and retention are observable, sometimes within highly circumscribed limitations of time and space (Weick 1981). In ecological terms, disasters are interesting contexts for using both autogenic and allogenic models of evolutionary processes. In more traditional sociological terms, they provide a common ground for micro and macro as well as subjective and objective perspectives on social change.

In summary, the conceptual problems that confront sociologists interested in disasters are fundamental, multifaceted, and certainly difficult, but not overwhelming. A sensitivity to the classification of social units and responses, in particular, should be important in all disaster studies. Should this perspective become the norm, the inevitable result will be improved collaboration among those participating in disaster research and in many other fields in sociology.

QUESTIONS ABOUT THE SOCIAL ORDER IMPLICIT IN DISASTER RESEARCH

Although space limitations restrict my comments to only the larger, more recent projects, the several hundred papers and publications reviewed in preparing this article all deal with one or more of the four dimensions of disasters outlined earlier. The most notable changes in this literature over the last seven years have been a greater emphasis on large-scale surveys and time series designs; increasing use of formal decision models; a heightened concern about mitigation of disaster impacts, reconstruction, and long-term recovery; and long overdue reflection about how disasters should be interpreted as a social problem. Recent disaster studies can be roughly categorized in terms of their relative attention to one or more of four general questions about the social order.

How Do People Cope with Disaster Impacts, and What Is the Motivational Basis for Responding to Them?

Given the breadth of theoretically relevant events that could be studied, students of disaster have emphasized a relatively small number of natural and technological hazards that are perceived as having potentially high aggregate impacts on larger social units (i.e. communities, societies) (Drabek 1981). But there is no established threshold of potential or actual impacts that determines the selection of events. Most disaster studies in the United States have involved events whose short-term impacts (i.e. those occurring within several days to a few weeks) were modest relative to the remaining local resources, and they appear to have been well contained by a sometimes bewildering array of social units (Kreps 1981). The longer-term consequences of these events (i.e. over

several months to a decade)—at least as evidenced by selective data on census tracts, communities, and regions—have generally been quite limited (Wright et al 1979, Friesema et al 1979). It is only at the individual and household level that there is considerable ambiguity about the short- and long-term effects of "average" US disasters (Leik et al 1982). Notwithstanding this ambiguity, it remains clear that the motivation to help disaster victims is powerful and is reflected in a variety of forms of association related to disaster assistance (Fritz 1961, Barton 1970).

Rossi et al (1982a) present the most positive assessment—in relative terms—of the effects of disasters in a national sample of households reporting experiences with floods, tornadoes, hurricanes, earthquakes, and fires (1970–1980 period). The objectives of this study were to determine the rates and costs of victimization, the institutional resources used to meet these costs, and problems of equity in the provision of disaster services. Among many other things, the authors find that property damage is the predominant cost of disaster in the United States; that the degree of loss is strongly related to the amount of assistance received; that there are no serious inequities in access to disaster services by race, income, housing tenure, or size and age of household; and that most victimized families are satisfied with the assistance they receive and recover quickly through self-help and a variety of informal and formal types of assistance.

The authors of other, more intensive studies of selective events extend Rossi's findings, point to necessary qualifications, and provide a way of interpreting them all sociologically. Based on one of the few "before and after" studies of disaster using probability sampling of local residents, for example, Drabek & Key (1983) apply Fritz's (1961) and Barton's (1970) concept of the therapeutic community to comparisons of victim and nonvictim families following the Topeka tornado in 1966. Their study provides considerable evidence that social bonds are produced or enhanced during disasters and that altruism plays an important role. They also point out that families and formal helping organizations have common domains related to the instrumental (e.g. food, clothing, shelter, financial support) and expressive (e.g. socioemotional services and support) needs of the families affected. These and other researchers' (e.g. Tierney & Baisden 1979, Fairchild & White 1981, Quarantelli 1982) further development of the therapeutic community concept provides an interpretive framework for Rossi's national profile of victimization and response. This framework points to the social dimensions of disaster impacts, the motivational basis for dealing with disasters, and the possible forms of association that are an integral part of social responses to human suffering.

Identifying such forms of association is important for, as several studies suggest, patterns of involvement in the therapeutic community are not random. Bates et al (1982), for example, find that individuals with lower socioeconomic

status (SES) and members of minority ethnic groups suffered greater relative loss from the Guatemalan earthquake and recovered at a much slower rate than their counterparts. Drabek & Key (1983) find that black, elderly, and lower-income victims are less likely to receive external aid. Bolin (1982) and Bell (1978) discover that elderly victims underuse formal assistance. Bolin & Trainer (1978) also note that there are cultural differences in victims' reliance on kinship-based, as opposed to government-based, disaster assistance; the former predominates in Nicaragua, the latter, in the United States. In effect, these and other studies show that status characteristics are related to how physical impacts are interpreted by victims, the speed and extent of individual and family recovery, reliance on various types of assistance, and involvement in helping activities. Thus, contemporary researchers point to the continuing value of this historical concept of the therapeutic community and refine it by showing (a) how impacts have social as well as physical dimensions and (b) how involvement in the therapeutic community is socially patterned. It is interesting to note that the concept was originally based on studies of both war and peacetime disasters. Certainly Fritz and Barton saw important theoretical similarities between these events.

Interpreting a disaster's impacts on the victims is not easy. In "average" disasters in the United States, most victims escape bodily injury while experiencing varying degrees of physical and symbolic damage to their dwellings and possessions. Others experience personal trauma related to the death, injury, or economic hardships of loved ones or friends. Sociologists, psychologists, and psychiatrists have long debated the mental health effects of disasters, and two competing positions continue to draw adherents. Proponents of the first suggest that disasters produce both short- and long-term adverse psychological reactions among the victims. Advocates of the competing position assert that, although disasters may produce stress reactions, there are few severe, long-lasting psychological consequences. Part of the reason that debates about mental health consequences remain hopelessly confused is that proponents on each side draw on different conceptions of impacts (i.e. mental illness vs problems of living), different methods of measuring them, and often different types of events (Perry 1983). But an even more basic conceptual problem is highlighted by two recent sociological studies: Taylor et al's (1976) research on the Xenia tornado, which occurred in 1974, and Erikson's (1976) award-winning study of the Buffalo Creek dam break which took place in 1972.

Taylor and her colleagues' rigorous study shows that the Xenia tornado did not trigger widespread severe mental illness in either the short- or long-term (i.e. within a year and a half). According to the authors, it did produce stress reactions and problems of living among some victims but induced extremely positive reactions among others. In general, their study points to disaster victims' adaptiveness and resilience, and it is strongly in keeping with main-

stream sociological interpretations of disaster. Erikson comes to precisely the opposite conclusion. While the devastation in Xenia was quite severe, the "impact ratio" in Buffalo Creek seems to be unprecedented in the United States. Here, virtually every family in a small mining community suffered injury or death. Erikson reports that over 90% of the survivors suffered major psychiatric impairment. One interpretation of the difference between these two events (alluded to by both Erikson and Taylor et al and seriously discussed by many others) is that Buffalo Creek was a "statistical outlier"—a truly extreme event because the dam break destroyed not only the physical but also the social fabric of the community.

Such an interpretation is representative of classic social psychology—implying that the subjective condition and behavior of individuals can be explained by the presence of disaster and the absence of social organization. In effect, disaster, the social order, and mental health are viewed as inextricably linked, but by ill-defined concepts and variables as well as elusive thresholds. If such an interpretation is to lead us anywhere, sociologists must reach a consensus about the defining properties of disaster and social organization, so that they can then measure them and show how they are related. Therefore, the debates about the mental health effects of disasters only illustrate once again the major theoretical problems within both the specialty and the discipline.

How Do People Deal with the Immediate and Long-Term Threat of Disaster?

With regard to immediate danger, contemporary research supports the following axiom in disaster research whose origins can be traced to Quarantelli's statement on panic: When danger is recognized as imminent and personally threatening, people seek safety or escape and their behavior is generally adaptive (Quarantelli 1954, 1980). In other words, rather than engaging in irrational acts that may increase the danger, people generally take action to protect themselves, their families, and others. People will seek confirmation of official warning messages and supplement official information with information exchanges with neighbors, friends, and relatives. When evacuation is deemed appropriate, decision-making usually becomes a social matter. The resulting flight from danger is most often orderly and goal-directed. Documented instances of panic flight are rare. Even when extremely violent impacts are being experienced, most people continue to be concerned about the safety of their families, close neighbors, and friends.

Three large-scale studies of evacuations (Perry et al 1981, 1983; Leik et al 1981) provide continuing support for this axiom. They also supply much additional information through elaborate causal modeling (based on collective behavior and decision theories) of how evacuation takes place. In their initial study of how the residents of four communities inundated by floods decide

whether to evacuate, Perry and his colleagues develop a three-stage path model of warning response. The response varies from doing nothing, to taking protective action, to evacuating. Consistent with the axiom on panic, Perry et al find positive relationships between warning response and the level of perceived risk, the content of warning messages, and confirmation behavior. Interestingly, they also discover that having previous disaster experience and an adaptive plan (e.g. evacuation routes) are inversely related to warning response at some sites. Using similar modeling techniques in studies of 15 tornado, flood, and hurricane events, Leik et al present findings that are quite consistent with Perry et al's on most essential points, while showing a more consistent and positive relationship between adaptive planning and the decision to evacuate. In the latest study, Perry et al replicate the earlier findings, provide additional support for a positive relationship between adaptive planning and evacuation compliance, and show that these patterns hold for white, black, and Hispanic populations. They also find that ethnic groups vary in their attributions of credibility to different warning sources, the means by which they receive and confirm warnings, and the type of adaptive plans they develop.

The three studies by Perry, Leik, and their colleagues are rich in details about the relationships between disaster experience, perceptions of risk, warning communications, confirmation behavior, adaptive plans, and warning responses. Making precise predictions about evacuation decisions will remain difficult, yet we continue to see that people usually make the right choices under immediately threatening conditions. Finally, these studies point to the need for more research on the forms of association within and between threatened populations and on formal warning systems for different types of events.

What of longer-term threats? Recently reported findings support the conventional wisdom (among sociologists at least) that most natural and technological hazards are not articulated as social problems—until they happen. The annual probability that a disaster will affect given individuals directly and severely is quite low (Rossi et al 1982a), and there is solid experimental evidence that people avoid thinking about events whose probability is below some threshold (Kunreuther et al 1978). With the exception of hazards managers, disasters are relatively low on the agendas of government officials, economic actors, political elites, and the residents of hazardous areas (Burby & French 1980, Mader et al 1980, R. H. Turner et al 1980, Rossi et al 1982b, Drabek et al 1983). A politics of inaction or outright opposition prevails until the danger is imminent. This does *not* mean that people deny or do not fear the threat of disaster. Rather, it suggests that they are necessarily preoccupied with the immediate problems and concerns of daily living.

In a massive longitudinal study (a three-year panel design) of individual and societal response to a variety of earthquake prediction pronouncements in

southern California (e.g. about the "Palmdale bulge"), R. H. Turner et al (1980) show that the earthquake threat is low on most residents' agendas. When earthquakes are mentioned directly, however, a majority say they are frightened or worried about them. Moreover, Turner provides convincing evidence that fear does not lead to a "head in the sand" attitude. Quite the contrary, people want more information about earthquake prediction, mitigation, and preparedness, and this desire is sustained in the face of highly publicized false predictions. The several false or "near predictions" that occurred during the study period did not lead to disillusionment with earthquake prediction, did not create a false alarm ("cry wolf") effect, and did not have any adverse economic consequences in southern California. Turner's general conclusions are very straightforward: People are aware of the earthquake threat. They want and need concrete information about what to do both personally and through public and private agencies to mitigate the hazard. Such information should be provided on a continuing basis. Turner's most pointed policy recommendation can also be simply stated: When earthquake prediction information of value exists, it should be published promptly.

Research by Turner and several others shows that individual knowledge about hazards and what to do about them is generally scant. Greater knowledge about and sensitivity to hazards, however, is positively associated with the perceived seriousness of the threat, direct experience with hazards, or social relationships with others who have taken preventive steps (Wenger et al 1980). Disaster researchers fully recognize that mitigation and preparedness programs are difficult to initiate or sustain because, in the absence of a recent event, more routine social problems command public attention [National Academy of Science-National Research Council (NAS-NRC) 1978b]. When hazard mitigation programs are proposed, they are more likely to generate organized opposition than support (Turner et al 1980, Drabek et al 1983). Disaster researchers need to view disasters as relatively unique (i.e. nonroutine) social problems (Drabek 1981) and to conduct research on the forms of association related to opposition or advocacy of disaster prevention. As things stand now—in the United States at least—disasters are easily accepted as problems at the national level, where the emphasis is on calculating the annual costs. With the exception of the infrequent, extreme event, however, the case is less compelling at the regional, local, or even household level of analysis. The picture at these levels is one of relatively rapid recovery of those victimized. Most disaster researchers at least imply that they are studying a social problem. Some emphasize the need to avoid disasters through prevention, while others discuss issues related to recovery. In either case, the sociological properties of the disaster as "problem" are, in point of fact, the defining properties of disaster itself.

How Great an Impact Can Social Systems Absorb, and What Are the Long-Term Consequences of Disasters?

From Bates et al (1963) to Wright et al (1979), researchers have shown that communities in the United States recover rapidly from disasters (*a*) because they improvise after the disaster has struck, (*b*) because they rely on formal and informal disaster assistance, and (*c*) because disaster impacts, large though they are sometimes, pale in comparison to remaining societal resources. Similar experiences are documented in the post-World War II reconstruction of devastated cities in Europe and Japan, where the resources of many societies enhanced the recovery of those most seriously affected. We know far too little about the social processes of recovery, but recent studies in developing societies are providing some useful leads (NAS-NRC 1978b, 1979; Kreimer 1978; Torry 1979; Snarr & Brown 1980). They suggest that disasters must be interpreted not only in terms of immediate damage and disruption but also of the degree to which they change already existing trends.

This perspective is developed skillfully in Bates et al's (1982) longitudinal study of the consequences of both disaster impacts and relief programs on the structure and process of inequality in Guatemala following the devastating earthquake of 1976. Based on observations of 1400 households and a quasi-experimental design, samples of households from 14 communities that suffered moderate to heavy damage were compared with samples from 7 communities that suffered either light damage or none at all. Examining 5-year trends (1975-1980) in domestic assets, their findings suggest that earthquake damage and types of aid have important effects on the mobility of households. While damage had significant, negative effects on mobility—which was not surprising given the massiveness of the earthquake—the type of aid received was a more powerful independent variable. Households receiving lamina roofing were no better or worse off than those receiving no aid at all; those receiving temporary housing fared worse than anyone; and those receiving permanent housing experienced a net gain in mobility. Combining household with community-level comparisons, Bates and his colleagues conclude that reconstruction assistance and, to a lesser extent, damage in some manner contributed to an increase in inequality in the areas that suffered greater damage. Thus, the possible leveling effects of permanent housing were counterbalanced by other forms of aid and by community and societal dynamics that were difficult to pin down. In any case, the Guatemala earthquake highlights the “extreme event” where individual and collective trauma are severe and where social, economic, and political consequences follow. On the other hand, studies by Bates and many others of disasters in developing countries support the historical conclusion that the absorptive capacities of societies are considerable. Often these capacities are not even seriously tested when disasters occur.

There are limits to the survivability of any social unit, but we know precious little about them. Some sociologists have suggested developing demographic measures of the ratio of disaster impacts to the remaining resources of the affected social unit (e.g. housing losses in proportion to total housing stock of a community or the local market value of the physical damages to a household in proportion to the household's total domestic assets). Such measures are useful because they can be aggregated or disaggregated to reflect the impacts at various societal levels. When they are used with ingenuity (e.g. Wright et al 1979, Bates et al 1982), they can also provide considerable insight about some dimensions of recovery, their timing, and their relationships to various forms of assistance. Does this demographic strategy shed light on the survivability of social units, however? Some families suffer death and injury and lose all of their possessions, yet remain viable. Some communities experience devastating casualties and damages but recover quickly, in part because the broader society remains intact. Some societies endure the ravages of natural calamity, sustained civil unrest, or war through self-help and international aid. Does the explanation of viability lie simply in having an increasingly higher level of aggregated resources until the global limit is reached? I think not. If we are to examine the limits of the social order seriously, we must study its basic social structures (i.e. social units) and processes (i.e. responses as forms of association). Students of disaster have an intellectual tradition that makes these structures and processes their points of departure.

To What Extent Do Disasters Exhibit Patterns of Organization and Disorganization That Facilitate or Obstruct Disaster Prevention, Preparedness, Response, and Recovery?

Disaster researchers have shown a curious ambivalence about human responses to disaster. From the earliest statements to the most recent work, scholars remain uncertain about the degree to which the responses of social units reflect either elemental structuring and restructuring or disorganization. Thus, most studies point to deficiencies in disaster prevention and preparedness, just as they argue that hazards managers should be more flexible and document the positive consequences of improvisation. Most studies also point to varying problems of authority and control, even as they provide empirical support for the idea that the responding social units must remain loosely coupled (Weick 1981). And many indicate that emergency management is essential, while providing solid reasons for rejecting simple notions of efficiency and effectiveness and remaining circumspect about what the core principles of emergency management are (Drabek 1983).

Most researchers would agree that disaster prevention, preparedness, response, and recovery reveal basic dimensions of the social order (Smith 1978; Blanshan 1978; Ross 1980; Wolensky & Miller 1981; Quarantelli 1981b,

1983). Organization seems elusive to everyone interested in disasters. What is it? Is it an outcome or a process? In either case, what are the necessary and sufficient conditions for organization to emerge so that we can do something about its absence? What types of organization are there? And, what distinguishes organization from other types of social action? The fact that problems of definition and classification plague this field does not make disaster research unique. These problems are endemic to sociology, they are far too often finessed, and they need to be addressed by a critical mass of scholars.

THE MULTIDISCIPLINARY AND CROSS-CULTURAL CHARACTER OF DISASTER RESEARCH

At its origin, disaster research fell primarily within the domain of sociology. It now attracts participants from all of the social and management sciences and is defined formally (by the National Science Foundation, for example) as a multidisciplinary and applied field. Moreover, the idea that research at some point should meet the practical needs of hazards managers has been strongly emphasized over the last 10–15 years. The Federal Earthquake Hazards Reduction Program (1977–present) illustrates both the multidisciplinary and applied emphasis of disaster research in the United States (NAS–NRC 1978a).

Notwithstanding the major methodological problems of studying disasters (Killian 1956, Drabek 1970), the most rigorous research designs and techniques available in the social sciences have been used. Alternative forms of association related to various spheres of social action before, during, and after a disaster have been identified. Elaborate demographic models of impacts and their long-term consequences have been produced. Sophisticated decision models have been developed that indicate how people respond to the long-term and imminent threats of disaster. The conception of prosocial action has been refined by documenting its social patterns. In all cases, fact and speculation have been separated by ever more precise descriptions of events, impacts, social units, and responses. In doing so, disaster researchers have provided many pointed suggestions to hazards managers about how to deal with the symptoms, if not the social causes, of disasters (e.g. Dynes et al 1979).

How can the field maintain its multidisciplinary character while allowing for the special contributions of each discipline? The strategy I propose is an extension of what Dubin (1978) calls contiguous problem analysis. His approach emphasizes the unique contributions of each discipline while stressing the additivity of our knowledge about the phenomenon under investigation. Contiguous problems lie close to one another, yet differ in important ways. Related theories and models may range from few to many; will lie along a continuum from totally competitive to largely complementary explanations; and will tend to share some (but not all) key concepts and boundaries (National

Science Foundation 1980, Changnon et al 1983). Dubin rejects any attempt to reduce contiguous problems to their lowest common denominator because he believes the net result is less knowledge. Rather, his strategy is one of disciplinary distinctiveness with interdisciplinary cooperation. A recent example that highlights Dubin's strategy while revealing the inevitable strain toward reducing contiguous problems to their lowest common denominator is Kunreuther et al's (1978) excellent study of market failures in earthquake and flood insurance.

I offer one caveat to what I trust will continue to be productive exchanges among all interested people. Given the conceptual difficulties we face, debates about whether nuclear hazards, civil unrest, terrorism, or war fall within the boundaries of the field are more apparent than real barriers to progress. For example, who would argue that war and peace are not forms of association? Who would assert that war is not a disaster, or a hazard, or an extreme environmental event? Who would state that matters of war and peace should not be studied? The underlying principle is that students of disaster must have intellectual freedom and be accountable as social scientists. That is, they must be able to compare a wide range of events but, in so doing, be responsible for separating fact from speculation. This freedom is essential to open inquiry, and we must be accountable no matter what we study. To take a very controversial example, those making comparisons that involve nuclear hazards should have intellectual integrity and not become "strawmen" for those opposing or supporting particular ideas or solutions (e.g. nuclear technologies, arms control, or civil defense). Such arguments add nothing to our knowledge and, in my opinion, contribute little toward dealing constructively with disasters and their consequences.

Finally, although the vast majority of studies have historically been of American disasters or have been undertaken by American nationals, this picture has changed in the last decade. For example, disasters in developing societies are receiving increasing public attention and are being studied by scientists from many countries (e.g. NAS-NRC 1978b, 1979). The longitudinal research on the Guatemala earthquake by Bates et al (1982) cited earlier, for example, could not have been completed without the cooperation and assistance of local scholars. Thus, the prospects for collaborative, cross-cultural studies are excellent. Nascent or established programs of disaster research can now be found in over a dozen countries. For American sociologists, the most extensive links are with European, Canadian, and Japanese scholars. They are largely aimed at mutual exchange of findings, most recently from studies on earthquake mitigation, where links between US research and major Japanese studies of earthquake prediction are in the forefront (e.g. R. H. Turner 1978, Stallings 1982). But there are more direct collaborative efforts as well (e.g. Hirose & Perry 1982), and there is little doubt that many more are in the offing.

The opportunities for collaborative studies have been enhanced recently by formal meetings in Japan and Europe and by the establishment of a Research Committee on Disaster within the International Sociological Association (ISA). In addition, there are two journals with a cross-societal as well as a multidisciplinary focus: *Disasters*, published in England, and the *International Journal of Mass Emergencies and Disasters*, published in Sweden.

The three sections on disasters at the 1982 ISA meetings in Mexico showed that sociologists from several countries are concerned about the problems of defining the field and relating the basic questions it raises to broader sociological issues. The fact that sociologists draw on studies of a wide range of events in different societies can only increase our collective appreciation that knowledge of disasters is bounded by theories about the social order. Disasters both reveal elemental processes of the social order and are explained by them.

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