Taxonomy, Classification, and Theories of Disaster Phenomena

RONALD W. PERRY

Professor Drabek's chapter on theoretical and applied issues in developing taxonomies of disaster phenomena deals with a variety of issues that are central to understanding the fit between disaster studies and sociological theory. As an organizational device, I will partition my remarks to comment on specific contributions of the paper, the general problem of taxonomy in disaster study, and some implications of the work, particularly in terms of what needs to be done next.

Specific Contributions

Like much of Drabek's published work, this piece aims at synthesis and

organization. The question of taxonomy is approached by examining the history and variety of taxonomic efforts to date, and then building upon an existing framework to propose a classification scheme for organizations. The entire effort is enhanced by Drabek's encyclopedic knowledge of research on disasters. Among much valuable commentary, I would identify three important unique contributions to theoretical thinking in the study of disasters. The first of these relates to the development of taxonomic criteria for disasters. After reviewing a number of classification schemes that have been proposed over the years, Drabek argues that many disparities among them may be traced to the absence of agreement on the nature of the phenomena being studied. He cites in particular the need for consensus about the meaning of disaster. Rather than attempting to devise still another typology of disasters, Drabek concerns himself with the elaboration of a series of defining criteria that should be part of the process of typification. These criteria include consideration of the identity of victims, types of systems impacted, event samples, transhistorical and transcultural assumptions, the etiology of disasters and the question of mitigation or prevention. The nature of this contribution is to enrich and expand the bases for the growth of classification of disasters.

The second contribution takes the form of a discussion of issues regarding choice of taxonomic procedures and criteria when creating classifications of organizations in disasters. Specifically, Drabek grapples with the role of theory and of the importance of the "core-species" concept in taxonomy. Relative to taxonomic criteria, he examines conceptions of "organization," the idea of organizational boundaries, and the necessity of accounting for organizational emergence and decline. Like his commentary on taxonomic issues in classifications of disasters, this discussion promotes growth in organizational taxonomy by explicitly tackling both procedural and criterion-related problems. Furthermore, Drabek uses this discussion as a starting point for a third contribution, the elaboration of a typology of emergent organizational structures.

Following McKinney's (1966, 19) procedure for constructed types, Drabek selects five variables as the bases of future taxonomic work: systems permanence, structural complexity, disaster phase, organizational structure, and task orientation. Although Drabek describes his approach as focusing upon emergent structures, it contains types that reflect "old" structures addressing "regular" tasks and consequently permits the classification of nonemergent ("established") structures with differing levels of permanence and complexity across the four phases of disasters. In this sense Drabek's work provides a new superstructure for the well-known fourfold typology of organizations in disasters developed at the Disaster Research Center (Dynes 1970).

Table 12.1—*Continued*

Impact characteristics			Social definitions		
Societal Scope	Concentration in time	Concentration in space	Elites accept as "normal"	Masses accept as "normal"	Examples
	Chronic	Widespread	Normal	Normal	Poverty (US pre-1960s) Race discrimination (pre-1960s) Automobile accidents (US) Smoking deaths (pre-1960s)
			Normal	Abnormal	Industrial accidents (US)
			Abnormal	Abnormal	Race discrimination (post-1960s) Poverty (US post-1960s) Smoking deaths (post-1960s)
		Local	Normal	Normal	Slums, ghettos
	Sudden	Widespread	Normal	?	Official purges, programs against minorities (Europe 1930s)
		Localized	Abnormal	Abnormal	COMMUNITY PHYSICAL DISASTERS
SMALL SCALE NATIONALLY	Chronic	Widespread	Normal	Normal	Homelessness (pre-1980s)
			Abnormal	Abnormal	Homelessness (1980s) Mental illness (20th century) Illness, disability (modern soc)
		Localized	Normal	Normal	Economically declining small communities Pockets of rural poverty

The Role of Theory

Drabek's chapter presents a well-reasoned series of intricate discussions of relatively complex issues. To fully appreciate the elegance of his contributions—and those of the scholars whose work he integrates and extends—requires that one have more than a passing knowledge of taxonomy as a theoretical enterprise. Herein lies an important point: there is much misunderstanding among disaster researchers of theoretical matters in general, and particularly of taxonomy. In this misunderstanding we are not alone, of course. Indeed, Bailey (1973, 18) has lamented that sociologists have not yet achieved any broad consensus regarding either what typologies are or how to use them. While a distinct group of sociologists has provided leadership on the technique and use of typologies, a significant problem lies in the fact that such knowledge is not widespread among social scientists. Particularly among disaster researchers, those tools we do not understand we tend not to use and consequently cut ourselves off from potential benefits. Thus, at a minimum it is important to introduce the basic terminology and functions of taxonomy to students of disaster phenomena.

For Bailey (1973, 19) typologies serve two functions. Classification refers to the ordering of concepts into groups on the basis of their interrelationships, while identification allows for the assignment of "empirical objects" to the cells of an established classification. McKelvey (1982) treats this problem somewhat more comprehensively by distinguishing taxonomy and classification. Taxonomy is seen as the development of theories and methods for creating types; it is a process involving abstraction and conceptualization. Classification refers to the act of constructuring types (or ordering schemes) and of identifying empirical objects that fall into the type categories.

To describe the utility of classification McKelvey discusses two kinds of schemes. Special classifications group objects on the basis of a few selected attributes of particular interest. The classifications of disasters by Barton (1969) and Dynes (1970) are special ones, seen as primarily useful as broadly descriptive devices that form the basis for "highly accurate" but limited predictions about the phenomenon being classified. The limits or parameters on predictions about the classified object stem from the "usually small" number of attributes—variables—that form the classificatory framework. It is likely that many sociologists have this kind of device in mind when they discuss taxonomy, typology, and classification. General classifications group objects on the basis of all their attributes, though some of these may be more heavily weighted than others. It is these classifications for which McKelvey reserves his highest expectations. In his

view they form the basis for ordering empirical work and findings, provide the conceptual framework for classification, and form the basis for explanation and prediction—for testing hypotheses and developing general laws. There appear to be no examples of serious attempts to develop a general classification of disasters (or disaster-related phenomena). Given the lack of strong consensus about the meaning of the term *disaster*, we are clearly some distance from being able to enumerate "all" of the characteristics of disasters—a definitional necessity for general classification. In effect, McKelvey's evolutionary perspective allows him to treat taxonomy and general classification as alternatives to what many sociologists think of as theories—as collected propositions in whatever form: set-of-laws, axiomatic, or causal processes (cf. Reynolds 1971, 83). Pushed to its logical extreme, McKelvey's conceptualization does not appear to mesh well with traditional approaches to theory-building generally embraced by sociologists (cf. Hage 1972, 191–217).

Thus one must explicitly deal with the question of the role of classification (as the "product" of taxonomic thinking) relative to theories in social science. Certainly some typologies are largely phenotypic (disasters as natural versus technological) and neither entail much theoretical logic in their genesis nor in their application. McKinney (1966, 1970) has sought to explicate the role of theory in classification through his discussion of constructed types. That is, a typology needs to cross classify at least two concepts, which are linked on the basis of some theoretical logic. In this sense, a typology begins to possess some theoretical character in that it follows the function (proposed by Zetterberg [1965] for propositions) of tying concepts together.

A more comprehensive view is presented by Wallace (1971) and also implied in the work of Nettler (1970) In addressing the problem of explanation, Wallace explicates five "explanatory-predictive" strategies: two causal approaches (searching for causes or effects); two compositional strategies (searching for component properties or defining the background "wholes" of which the phenomenon is part); and a classificatory strategy. This last approach involves locating the phenomena of interest within some taxonomic scheme from which one may deduce more information than is directly known. Wallace points out that classifications thereby can achieve "explanation" (logico-deductive) in terms of the concepts that comprise the typology. However, he argues—following Nagel (1961) and consistent with Blalock (1969)—that as a theoretical device classifications serve largely as a basis from which more comprehensive theoretical systems may be developed. Classifications may also serve as a source of hypotheses, an ordering mechanism for accumulated knowledge, and as impetus for explanatory parsimony by organizing attributions of cause, effect, and the character of components.

Classification may be ... to be studied and for findings, as well as ... theory construction process. While affording explanations, the main theoretical thrust of classifications may be seen as providing the context for complex theory-building. This happens through the clarification of phenomena-to-be-explained such that one can, for example, begin to assemble larger, multistage, multivariate theoretical models that provide greater explanatory range or depth. Kreps (1985a) clearly defines classification as a device most relevant to the "scientific" goal of description (as opposed to explanation, prediction, or control). He distinguishes taxonomy as content-based and qualitative, as compared with theoretical models that he sees as form-based and quantitative. Other scholars working in the area, however, have treated this issue less directly than Kreps.

The utility of explicating the relationships among taxonomy, classification, and theory lies in the need for those studying disaster phenomena to appreciate their respective roles in the process of producing and codifying knowledge. We must acknowledge, though, that the study of disasters is carried out by a variety of actors with diverse disciplinary training. Thus we must be cautious about assuming any extensive mutual understanding of the goals or uses of taxonomy.

Implications of Drabek's Work

"Where do we go from here" is probably a misleadingly simple question. Drabek has identified and grappled with a wide variety of issues that strike at the very heart of knowledge accumulation in disaster research. The breadth, depth, and significance of these issues ensures that none are apt to be quickly resolved; although some may disagree, one should probably look askance at easy answers to hard, penetrating questions. There are at least three important "calls to future action" that flow from Drabek's thoughtful deliberations.

First, Drabek points out that we have reached a state of affairs where it is necessary to seek further consensus on what we are studying. Thus, a priority in the near term should be development of an answer to the question of "What are disasters—the phenomena of interest." Many sociologists in particular have grappled with this problem: historically they are Fritz, Barton, and Dynes, and most recently, Kreps and Quarantelli. The dialogue needs to be expanded, however, to include a broader cross-section of the different professionals who study disaster phenomena Implicit here is the question of the status of disaster research itself and how it fits into social science. Is disaster research a subdiscipline of sociology or psychology or geography? Is it a discipline in itself that draws upon the general theory of

other disciplines and generates, perhaps, middle-range theories of disaster phenomena? Or is the study of disasters simply sociology? Dynes (1966) considered this problem two decades ago—leaning somewhat toward the latter position—but others have been slow to enter the debate.

There is much to recommend Turner's (n.d.) point that the theory-building process is best served when a degree of conceptual flexibility is maintained that precludes premature closure. It does not seem unreasonable or necessarily "unhealthy" to have multiple—and even competing—conceptions of the phenomena-to-be-explained. It seems, at the same time, that Drabek is correct in arguing that ideally we need to develop a broader consensus about such definitional matters, and at a minimum we must make our definitional biases explicit and keep an on-going dialogue alive. An interesting mechanisms for addressing these issues might be the sponsorship of symposia or panels devoted to definitional issues at the meetings of the International Sociological Association Research Committee on Disasters, at American Sociological Association Meetings, or at the annual disaster workshop in Boulder, Colorado.

A second implication of Drabek's work is that there is a distinct need to develop many special classifications of disaster phenomena. Such classifications might focus upon what Kreps (1984b) sees as the "core properties" of disasters: events, impacts, social responses, and social units. They might also address what have been called "generic functions" in the social management of disasters: search-and-rescue, emergency medical assistance, warning, damage assessment, and so on. Still another topic ripe for classification is representations of disaster life cycles.

The utility in promoting such classification efforts is the role that they play in guiding research and stimulating theoretical model-building, as well as stimulating further classificatory efforts. An interesting example of such growth can be found by considering the typology of disaster organizations developed at the Disaster Research Center in the late 1960s (Dynes 1970 138). By cross-classifying task and structure, organizations were labeled established (regular task, old structure), extending (nonregular task, old structure), expanding (regular task, new structure), or emergent (nonregular task,new structure). This typology was developed by researchers who were still grappling with the idea of what constituted an organization, but needed a platform on which to stand as they continued to conceptualize. This typology—limited as it may have been—has served as the basis for two kinds of growth.

First, the typology served to stimulate further research on the types of organizations described. For example, Perry and his colleagues (1974) initiated work on emergent organizations that sought to test hypotheses derived from the typology about the life cycle of such organizations and the possibility of the same organization moving over time from possessing

the characteristics of one of the four types to another type. This research resulted in further refinements of the types as proposed by Dynes and constituted the beginning of efforts to develop a primitive "theory" of emergent organizations.

The DRC typology also stimulated continued thinking about exactly what organized behavior in disasters is; that is, a further conceptualizing of organizations. For the most part Kreps has carried this torch, pursuing deliberations about the meaning of organization that he acknowledges were stimulated by concerns with the scope and breadth of the original typology. These concerns were eventually addressed in the form of taxonomic efforts that lead to a classification with twenty-four forms of organization based upon tasks (*T*), human and material resources (*R*), activities (*A*), and domains (*D*) (see Kreps, 1985a). As evidence of theoretical growth, the Kreps typology may be seen as more firmly rooted in classic sociological theory and in the model of organizations devised by Thompson (1967).

The development of special classifications, then, constitutes a reasonable growth strategy for the study of disaster phenomena. Drabek raises the idea of "nesting" such classifications as a means of ordering information. This gets at one of the problems of accumulating knowledge from special classifications raised by McKelvey: such classifications are aimed at understanding a few select dimensions of some phenomena and it is sometimes difficult to "merge" the information about—for example—one type of organization that is assembled in three different special classifications. McKelvey sees this as an objectionable quality; Drabek does not. I agree with Drabek that there is no inherent problem here. His "nesting" solution seems feasible to me if it means that we conceptualize disaster phenomena broadly and say that special classifications "fit together" to the extent that they provide understanding of different aspects of the general class of phenomena. Still another sense of "nesting" might be the expansion—but not the creation of special classifications—by adding more dimensions to an existing special classification, as Drabek has done with the original DRC typology.

Ultimately, however, the process of creating special classifications—captured as taxonomy—is such that these entities are independent and not subject to nesting in the sense that one would add more variables to a multivariate crosstabulation to create a new classification. Presumably growth—within a developmental view of social science—would occur in the sense that the theory underlying a typology would be clarified, elaborated, or changed in the production of a new special classification—as was the case with Kreps's revision of the DRC typology of organizations.

Finally, a third implication of Drabek's chapter is that we should work toward developing a general classification of disasters. Within the limits of