THE SOCIAL FABRIC AT RISK: TOWARD THE SOCIAL TRANSFORMATION OF RISK ANALYSIS*

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JAMES F. SHORT, JR.
Washington State University

Many sins, in fact, simply augment risk.
–E. A. Ross ([1907] 1973:12)

INTRODUCTION

This paper proposes that sociological concerns with the social fabric serve as a bridge between various sociological specializations to form a basis for a "social transformation" of risk analysis. Its major thrust is to demonstrate that the focus of risk analysis on human life and health, and on economic values, has been too narrow, to the neglect of other valued and necessary aspects of human existence.

So varied are the methods and perspectives of sociological analysis that the discipline lacks a central focus. The discipline appears to be confused and chaotic, perhaps because of this lack, yet there is disagreement as to the need for, or the proper substance of, a central focus.

Running through the varied methods and perspectives of sociological analysis, however, are shared concerns with various aspects of the social fabric—from interpersonal processes and networks to social institutions and structures, from primary groups and symbolic interaction to social movements and large-scale organizations and systems. Specialization based on particular aspects of the social fabric tends to obscure our common interests and may, indeed, lead to neglect of topics which have not generated a body of specialized research or theory. Such has been the fate, until recently, of sociological attention to risk analysis.

According to one definition, "Hazards are threats to people and what they value and risks are measures of hazards" (Kates and Kasperson, 1983:7027). More precisely, risk is the likelihood, or probability, of some adverse effect of a hazard (Lowrance, 1976). The concept of risk need not, of course, be so closed or negative in connotation. A more neutral definition simply specifies that risk is the probability of some future event. Indeed there is a substantial literature concerning positive aspects of uncertainty and risk in people's lives (see Mitchell, 1983). While risk- and cost-benefit analyses focus on both positive and negative potential outcomes, benefits tend to receive short shrift in these analyses, as do positive aspects of risks. Scientific and social-policy analyses of risk are typically concerned with negative potentials, and they focus on a very limited range of things people value: their health, but not usually their mental health; their lives, but not usually their lifestyles; communities, or institutions, or the quality of their lives, their economic well-being in aggregate, but not in individual or distributional terms; the physical environment, but neither the social values associated with it nor ecological scarcity.

Risk analysis combines risk assessment and risk management. Both are driven by scientific and technical considerations based on the physical and biological sciences and applied mathematics. In somewhat oversimplified terms, scientifically measured or estimated risks, and sometimes benefits, associated with scientifically identified hazards (e.g., toxicity of chemicals, probabilities of accidents and undesirable by-products of production and consumption processes) are to be managed, in both public and private domains, by technical means. Since management involves people who must be warned, protected, and most of all persuaded of the efficacy of both scientific

*Direct all correspondence to: James F. Short, Jr., Social Research Center, Washington State University, Pullman, WA 99164.

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analyses of hazards and of proposed technological fixes, the perceptions of variously affected publics and political considerations are a necessary part of the enterprise.

The prevailing paradigm of risk analysis is thus driven by hazards and risks associated with advances in science and technology. Risks are conceptualized in terms of economic costs and benefits, and costs and benefits to human life and health. Perceptions of these risks, mediated by psychological processes, determine their acceptability. Social-science contributions to this paradigm have largely ignored how people in fact live with risks and how living with risks affects their perceptions and behavior.

In specifying the nature of hazards a broader sociological vision of risk analysis draws attention to system characteristics, as Perrow (1984) brilliantly demonstrates in his analysis of "Normal Accidents." Such analysis begins, however, with the social and cultural context of hazards and attendant risks, including determination of *what* is at risk. The perception of risk follows from these considerations, leading ultimately to the acceptability of risk. Fundamental among these are "the expectations that social actors have of one another in social relationships and social systems," expectations that constitute trust (Barber, 1983:8). The risks to which E. A. Ross referred, in the quotation at the beginning of this paper, were of this sort. The "new varieties of sin" to which he drew attention resulted, he said, from "the mutualism of our time" by virtue of which "every fiduciary relation is a fresh opportunity for the breach of trust" (Ross, 1973:12).

The present paper first reviews the history of risk analysis and sociology's relation to it, with illustrative examples drawn from criminology, a field with which I am somewhat more familiar. Suggestions for a sociology of risk are then developed focusing on: (1) the social context of risk and (2) the social fabric *at risk*. These will be followed by consideration of (3) the perception of risks, and (4) the role of mass media in the social construction of risks. The selection of topics is meant to be illustrative, rather than exhaustive, of potential sociological contributions to risk analysis. The paper closes with a brief discussion of the risks and benefits for sociology of increased attention to risk analysis.

History

In the most fundamental sense, risk analysis is concerned with cultural adaptations made necessary by scientific discoveries and the technologies based on them. Paradoxically, it has neglected the reciprocal impacts of these types of changes and social relationships and systems; paradoxically, because overcoming resistence *based* on these relationships and systems has often seemed to be its primary mission. Instead, risk analysis has insisted on its own legitimacy and pressed for policies based on technical analyses, while failing often to acknowledge the narrow focus and the tenuous quality of those analyses and ignoring the consequences of failed expertise.

An entire industry has grown up around risk analysis, complete with professional trappings, governmental agencies, and personnel drawn from a variety of disciplines and professions. Virtually all of this activity is scientifically and technologically driven. While Ogburn's (1924) vision, and his theory, may have been naively deterministic and optimistic by today's standards (Smelser, 1983), surely no one would deny the central role played by science and technology in modern society, from the personal computer on which I prepared this paper to ramifications of the "computer revolution" throughout the world, from problems such as toxic waste disposal and environmental pollution to their proposed solutions, from the creation of life to the capacity for its destruction.[1]

Granted the modern field of risk analysis is very young, it has become a full-fledged discipline in a few short years.[2] The relationship of

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[1] For some purposes it is important to distinguish risks associated with science from those associated with technology. This appears especially to be the case with respect to perceptions of risk and risk acceptability. LaPorte and Metlay (1975) report stronger public support for science than for technology, for example, but a high degree of confidence nevertheless in technical experts both as to the degree of influence they have and should have regarding decisions as to the implementation of technologies. However, sciences differ and are continually changing with respect to states of knowledge and technological applications. Yet little is known about the degree of awareness or concern about most sciences and the hazards associated with them, or applications based upon them, among segments of the general public. The extent and nature of hazards and risks associated with most sciences and technologies have been little studied despite the rapid growth of risk analysis; nor, with notable exceptions, have public perceptions across the broad spectrum of sciences and technologies been studied in detail.

[2] Inhaber and Norman (1982) report that, based on the Citation Index, mentions of the term "risk" in article titles grew exponentially between 1966 and 1982. Growth in both the number and the fraction of entries was slow until the early 1970s, followed by rapid increases, the number of entries rising by a factor of about 12, while the fraction of entries rose by a factor of 6, over the 16-year period.

scientific institutions to the federal government has been critical in this development. The "modern" phase of that relationship began—as did so many federal-private institutional arrangements—with the depression of the 1930s. Faced with the mounting problems of that depression, President Roosevelt appointed the Science Advisory Board. Later, by Executive Order, the Office of Scientific Research and Development was established, the outcome, as Merton notes, of frequent meetings between Roosevelt and influential scientists (Merton, 1977:87). World War II further solidified the relationship.

Statistical techniques were successfully applied to war-related problems, giving rise to "operations research," and later to "systems analysis" and "the creation of a massive science-based industry . . . with the federal government as its major customer" (Mazur, 1982:152). "Systems management" developed soon after. Sensitivity to technological risk entered this picture initially as a result of concerns over the peaceful use of nuclear energy which, together with burgeoning movements to protect workers, consumers, and the environment, led to a flurry of legislative activity in the 1960s, culminating in the establishment of four new regulatory agencies: the National Highway Traffic Safety Administration, in 1966; the Occupational Safety and Health Administration and the Environmental Protection Agency, both in 1970; and the Consumer Product Safety Commission, in 1972.

Sophisticated quantitative analysis of available "real world" data and hypothetical models in the absence of such data is the hallmark of risk analysis. As Mazur notes, in discussing the assessment of risks associated with nuclear power plants, "Since there was little experience . . . upon which to base empirical risk assessments . . . hypothetical reliability models would fill the gaps in real world data . . ." (Mazur, 1980:154). Similar models for estimating the risks associated with many technologies, chemicals, drugs, etc., are now common. The reliability and, even more, the validity of such models is thus of critical importance—validity in the sense of proper identification and specification of both hazard and risk.

Like the more general field of which it is a part, risk perception is derivative of other disciplines, e.g., engineering, biology (through ecology), economics, cognitive psychology, and decision analysis (see Douglas, forthcoming: Ch. 1). Despite occasional efforts of organizational theorists, environmental sociologists, and a few of our colleagues who have directly involved themselves in technological risk assessment (see, e.g., Mazur, 1981; Nelkin, 1984; Perrow, 1984), the contributions of sociologists to risk analysis have been rare and not widely recognized.[3] Even sociologists involved in risk analysis have devoted little systematic attention to what makes risks "acceptable"—the bottom line, as it were, of the entire field.

The Link between Criminology and Risk Analysis

The technical aspects of crime management and the management of risks to human health and life have much in common. In the latter, levels of risk are determined, often without firm knowledge of results which might follow from policies based on them, or of causal processes. Similarly, as Stanley Cohen notes, the "new behaviorism" in crimonology is "characterized by its insistence that causes are unimportant: the result is what matters and causal theories are either contradicted by the program or quite irrelevant to it . . . trying to figure out why people commit crimes is futile: the point is to design a system of deterrence which will work . . ." (Cohen, 1983:125). In both fields, enforcement of statutes and standards is based on technical assessments, with little or no concern for operating causes.

Distinctions between causation and control, and between determination of risks and judgments of safety, are neither straightforward nor simple. The results of neglect of such distinctions are similar for risk analysis and for criminology. Separation of causal theory and research from social policy in both areas condemns the latter to the treatment of symptoms. It is also counterproductive to the cumulation of knowledge and to the long-run goal of policy determined by a public informed by that knowledge.

Risk analysis recognizes judgments regarding safety (hence the establishment of risk levels to be tolerated and enforced) as normative and therefore political (see Lowrance, 1976). That the determination of risk—even of what is considered problematic[4]—also is normative is rarely recognized.

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[3] One recent review notes that, among professions and disciplines engaged in research on risk and decision making, only sociologists "study the influences of peer pressure on teenage smoking and drinking habits" (Kates and Kasperson, 1983:7028).

[4] While threats related to technology have been noted frequently by historians, technology has been associated primarily with the idea of progress. More recently, however, technology has been viewed increasingly as the source of hazard. The heightened perception of "technology as hazard" (Kates and Kasperson, 1983:7027) is in some respects similar to the heightened sense of propriety which developed

Criminology and risk analysis are linked conceptually by the fact that both are concerned with classes of hazard, a very broad topic which has been divided in a variety of ways, but with little theoretical coherence.[5] Study of the similarities and differences among various classes of hazards is important if "the selection of dangers" and their acceptability are to be understood (Douglas and Wildavsky, 1982). Processes involved in the "selection of dangers," and similarities as well as differences among hazards, suggest that the search for commonalities in the nature of hazards, as well as in the perception, selection, and actions taken to avoid, control, or repair damages resulting from hazards, might be fruitful (see Meier and Short, forthcoming). At the very least, sociologically informed taxonomies of classes of hazards and modes of response (see, e.g., Kreps, 1984a) would be helpful.

Criminology and the sociology of risk are linked, also, by theoretical concerns. My colleague Bob Meier and I (1982) have been especially concerned with the social (as distinguished from economic and physical) effects of crime. The argument is not new (see Sutherland, 1949), but measurement and study of the social effects of crime, particularly white-collar crime, have been virtually nonexistent. One such social effect, we hypothesize, is the damage it does both to interpersonal trust and to trust in institutions which violate the law and those which are responsible for law enforcement. We propose that measures of trust in institutions be developed which can be related to personal victimization, perceptions of the risks of victimization, and to awareness of and judgments concerning law violation.

Applied to the sociology of risk, the hypothesis holds that perceptions of risk, including judgments as to the acceptability of particular risks, are a function of the degree to which the institutions which are responsible for the assessment and management of risks are trusted. The nature of the function will vary with the perceived seriousness of risks, perhaps along lines suggested by research in the cognitive psychology of risk perception (see discussion below; Slovic et al., 1982; Douglas, forthcoming). Specification of the hypothesis would also necessitate distinguishing between different meanings of trust, such as expectations with respect to competence, fiduciary responsibility, and "the persistence and fulfillment of the natural and the moral social orders" (Barber, 1983:9). as well as related terms, such as confidence and fairness (Lipset and Schneider, 1983; Rossi et al., forthcoming).

The relationship between institutions and risk is reflexive, and causal relationships are therefore reciprocal. Douglas and Wildavsky (1982:89) note, for example, that institutions "edit" gains and losses associated with risks, and that those who have confidence in their institutions may "estimate probabilities of loss differently from people who mistrust their institutions." Trust in institutions doubtless is also *influenced by* gains and losses. This having been said, however, a host of questions remain unanswered, both as to the nature and the consequences of institutional "editing" and the nature and the consequences of trust and mistrust in institutions. Thus, as illustrated by Nelkin and Brown's (1984) interviews with workers at risk, *experience on the job* significantly affects trust in such institutions as corporate management and supervision, government regulatory agencies, and that part of the scientific community that is involved in testing of materials and conditions for toxicity and standards setting; perhaps, as well, our political and economic *system* (see also Douglas and Wildavsky, 1982; LaPorte and Metlay, 1975).

TOWARD A SOCIOLOGY OF RISK

Several excellent reviews of the research literature on risk assessment, perception, and acceptability obviate the necessity for a detailed review on my part (see, e.g., Douglas,

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among city dwellers following establishment of municipal police. Police departments made city streets safer and gave citizens a more responsive agency to call in case of "trouble." Trouble came to include conditions and behavior which previously had been handled privately, if at all, rather than as matters of public responsibility: e.g., removing drunks from the better parts of town, private fights between citizens, and family disputes. The evidence suggests that the rate of serious crimes declined in the decades following establishment of police forces, while that for less serious offenses rose rapidly (see Lane, 1969). In a similar manner, we are today in many respects safer, as a direct result of advances in science and technology, than ever before (Lowrance, 1976). Yet public concern over risks associated with technology is high.

[5] Crime and its attendant risks are distinguished from other hazards by virtue of the fact that crimes are specified in the criminal law. Crime is also distinguished in this way from violations of noncriminal statutes. The latter distinction has proven controversial, however, especially with respect to white-collar offenses (see Reiss and Biderman, 1980). Increasing use of regulatory law, including some criminal sanctions, to protect against other hazards (e.g., air, water and noise pollution, environmental damage, consumer and worker protection) also makes the distinction between crime and other law violations less useful, and serves to remind us that we still lack "a theory of the distinctively legal" (Selznick, 1968). Clearly, however, the legal status of hazards is critical to their normative status.

forthcoming; Covello, 1983; O'Riordan, 1983; Kates and Kasperson, 1983; Dunlap, 1982; Fischhoff, et al., 1981). In the Preface to her forthcoming book, *Social Factors in the Perception of Risk,* Douglas renders the following summary judgment regarding the end of a chain extending from the social fabric as the context of risk to the acceptability of risk: "As a subdiscipline, risk acceptability . . . does not seize the opportunity of developing *a probabilistic analysis of the state of society as the source of perceptual bias and of thresholds of tolerance*" (emphasis added).

What follows is a modest attempt to flesh out some aspects of Douglas's challenge regarding "the state of society as the source of perceptual bias and of thresholds of tolerance," and to add consideration of "the state of society," or what I have termed "the social fabric" in setting the theme of the 1984 ASA annual meeting, to *what is at risk.*

The Disenchantment of the World and the Need to Know

The "fate of our times," Weber noted, is characterized by the "disenchantment of the world." Paradoxically, because knowledge is increasingly esoteric and in important ways incomplete, its discovery and applications are often accompanied by mystification, misunderstanding, and impatience and disillusionment with what is known. Nowhere is this more apparent than with respect to risk analysis. It is as though the contending forces of medicine prior to the achievement of professional sovereignty by physicians (Starr, 1982) were combined with those which now threaten that sovereignty. In spite of having achieved a degree of legitimacy by virtue of association with science, engineering, and medicine, and the active support of the National Research Council (see Kates and Kasperson, 1983), risk analysis lacks social and cultural authority; and the field suffers from much the same sorts of challenges which now beset medical authority in matters of health (see Starr, 1982): challenges based on the right to safety and the right to know what is unsafe in the workplace, for example; skepticism regarding the discharge of fiduciary obligations by professionals and institutions responsible for the detection, measurement, and management of risks; social movements aimed at participation in decision making across the spectrum of personal and collective risks.

The very sciences upon which risk analysis is based are being challenged from within as well. Indeed, it is argued that science itself is at risk: "The rise of counter-establishment science, namely that practiced by now recognized scientists who work outside official research establishments and who are not members of official scientific committees, has split open the relative unity of scientific thought and exposed science to public misgiving and political doubt" (O'Riordan, 1983:347). Those doubts are enhanced by the blurring of the distinction between scientists and technologists which results, for example, when scientist-entrepreneurs become spokespersons for industry (see Pfund and Hofstadter, 1981).

This situation, O'Riordan (1983:347) observes, "provides attractive terrain for both politicians and social scientists to explore, uncluttered by a guilt that they do not understand the technical concepts and assumptions so fundamental to informed debate." But that observation can be turned around. Quite aside from the adequacy of technical knowledge, the assumption that such knowledge per se is sufficient to the task of the assessment of risk and its management is one of the chief bases for the challenges currently facing these fields.

One of the self-appointed functions of the social sciences, in an increasingly complex and technical world, has been to demystify both the familiar and taken-for-granted and the strange and esoteric (see Berk and Rossi, 1976). Risk assessment and risk management have elements of both. We are reminded every day by the media and often by personal experience that life is risky. We know intuitively that a risk-free life is impossible, however much we might wish it were not so. We know that many risks are being studied and somehow managed, but we know little of who the risk assessors and the risk managers are, except when an occasional instance of failure or challenge becomes "news." Even then we learn little of what they do. We should not leave to investigative journalism the task of demystifying risk analysis.[6]

The disenchantment of which Weber spoke has also resulted in the widespread assumption that problems need only be studied objectively and rationally in order for solutions to become apparent. This is at once the basis for public support, expectations, and disappointment regarding the assessment and management of risks. Yet all of the problems with which sociology and the other social sciences are concerned may never be completely and finally solved. This is also true of most of the prob-

[6] Regens et al.'s (1983) study of statutes governing the Environmental Protection Agency and the Food and Drug Administration finds that these agencies have substantial discretion as to how risk assessments are employed and acted upon. Dietz and Rycroft (1984) are studying the individuals and institutions comprising the "risk establishment."

lems with which risk assessment is concerned. Disabusing ourselves and others of the ultimate solvability of such problems is an important aspect of the demystification function of the social sciences, and it may be one of the greatest services we can perform for the larger society.

Human agency insures that human problems will remain ever changing. People learn, and learning has consequences for behavior which alter conditions and perceptions of what is problematic. Fateful choices regarding risks are made and acted upon, thereby altering the problems they are designed to affect, though not always as intended. These choices involve basic values by which people live, often values which are implicit rather than openly avowed. Institutions and communities, nations and economies, are affected by choices made as to hazards to be attended to and risks to be tolerated or resisted. It is with regard to these contexts that the nature of risks and risk perception can be informed by sociology.

The Relevance of Sociologically Informed Issues, Theory, and Research for Questions of Risk

Risk analysis has been directed almost entirely to assessment of economic risks and risks to human health and life. Risks are expressed in dollar terms, days lost as a result of accidents or disease, and in disease rates or body counts. Some attention has been devoted to personal stress, but risks to communities, societies, or cultures, except for physical destruction, have rarely been considered a part of the enterprise. Citizen groups have voiced their concerns over such questions, as for example when People Against Nuclear Energy (PANE) brought suit to prevent restarting the undamaged reactor at Three Mile Island. Few sociologists, however, have studied risks to the social fabric in the context of risk analysis. This neglect is as surprising as it is regrettable, in view of sociology's rich tradition of studying social change, especially change related to technology, from Ogburn, through W. F. Cottrell (1951), to more recent studies of the impact on communities of rapid growth (see Freudenburg, 1984). Studies of natural disasters abound (among the most notable, Erikson's [1976] study of the Buffalo Creek dam disaster). Kreps's (1984a) excellent review of the field points both to "basic dimensions of the social order" which are revealed by studies of disaster and to critical problems of definition and classification of basic social structures and processes (see also Kreps, 1984b).

Other theoretical beginnings have been made, but they bear only indirectly on the topic at hand (see, e.g., Albrecht, 1978). Among the most recent of these is the work of Catton and others, who challenge the assumption that the consequences of the rapid draw-down of the earth's natural resources can be avoided by technological fixes (Catton, 1980; see also Dunlap and Catton, 1979; Ophuls, 1977). Ecological scarcity, caused by exceeding the earth's carrying capacity, "presses people and nations toward zero-sum competition," perhaps to panic and to Hobbes's vision in which every man is enemy to every man (Catton, 1984:12). Knowledge of ecological scarcity and widespread education as to its constraints on human action may help to prevent disastrous conflict, but the prospects for doing so are not bright. Power differentials between and within nations raise serious *allocation* issues. Catton theorizes that, both within and between nations, ecological scarcity will intensify the importance of ". . . 'the fairness issue' " (Catton, 1984:16). Douglas, noting the need for a "sociological, cultural, and ethical theory of human judgment," observes that "issues of fairness" also heavily influence *perception of risk*.

Fairness, confidence, trust, fiduciary responsibility, moral responsibility, competence, legitimacy are all terms we recognize as vital to social relationships and systems (Barber, 1983). Sociological concerns with these phenomena range from processes of differentiation and stratification to institutional processes and structures, from primary group relationships to the largest of macro-systems, from exchange processes in the most taken-for-granted relationships to those which are more remote. These relationships and systems lie at the heart of the social fabric. While institutions and social structures have proven robust and adaptable—Kreps (1984a:323) notes that "the absorptive capacities of societies are considerable"—we need to know a great deal more about the forces which sustain them: e.g., the balance between trust and "rational distrust" which seems so vital to democratic institutions (Barber, 1984), and the relative strengths and weaknesses of kin versus associational and subcultural ties. Fischer (1982:88), noting the reduced involvement with kin associated with urbanism, observes that "kinship has always been the essential interpersonal glue of society; friendships can be seen as luxuries people develop in times of security, affluence, and freedom. One wonders about how strong unexercised kin ties will be in times of social trauma." The converse of this question may be of even greater significance: that is, how strong will non-kin ties prove in times of social trauma?

But Catton's ominous thesis should not be

accepted too easily. Comparative studies of crime and civil disorder in developing countries suggest that violence is not an inevitable response to social stress. As industrialization and mass migration to urban centers associated with "modernization" have disrupted traditional family and other institutional controls, violent behavior has been observed to increase, but then to decline, as new forms of control are institutionalized (see Shelley, 1981). Secular values assume greater importance in the conduct of life and the influence of tradition declines. Institutions of civility become established, raising expectations of civil conduct between strangers as well as intimates. The pecuniary nexus of exchange combines with these trends to make economic crimes, rather than crimes of violence, a hallmark of modern societies.

Clearly this is not the entire story, for individual and collective violence continue at high levels in many parts of the world (see Gurr, 1980; Radzinowicz and King, 1977). Contemporary violence also is *patterned* differently from that observed in primitive societies. In the latter, violence typically is carefully circumscribed by custom and tradition *based on years of accommodation to conditions imposed by limited resources* (see, e.g., Schwartz, 1972; Edgerton, 1972; Langness, 1972; Spiro, 1972; and Whiting, 1972). Rising expectations of consumption, brought about by modernization, shift competition and conflict away from traditional forms into economic forms unbounded by tradition. Violent behavior which breaks through institutionalized social controls also is unbounded by tradition. Support—even identification—of the common interest becomes elusive under conditions of extreme normative dissensus (see Rossi and Berk, 1984).

Fragmentation of the common interest has been identified as a central problem by Douglas and Wildavsky (1982), who note the highly volatile activities of sectarian voluntary associations. Observing that increasingly such associations are organized around extreme positions on narrowly defined issues, they decry the polarization, both in support of and in opposition to, often simplistic positions regarding complex issues. Lacking the ameliorative mission and capacity of more broadly based conventional institutions, sectarian voluntary associations tend to promote confrontation and conflict rather than compromise.

The potential for fragmentation and conflict depicted by Catton, Douglas and Wildavsky, and others presents challenges to all the sciences and the humanities. Alternative scenarios are, of course, possible, including the optimistic forecasts of a world of plenty depicted in Global 2000 Revisited (see Simon and Kahn, 1984). While sociologists can do little to resolve fundamental differences concerning the objective conditions and extrapolations which underlie these opposing interpretations, the ecological perspective which we share with other sciences is fundamental to understanding options and consequences. Since prudence counsels caution, especially in view of the extreme hazard posed by worst-case analysis, it is important that exploration of alternative courses of action with respect to that analysis be based on the most careful, rigorous research.

Several observations concerning special interest groups in American society can be made on the basis of sound sociological research (see Sills, 1968): (1) "spare-time, participatory associations" play important mediating roles between individuals and the larger society, including the state; (2) the American electorate typically shies away from polarized positions and, though organizational participation is widespread, most Americans do not belong to sectarian voluntary associations, in the Douglas and Wildavsky usage; (3) interpersonal network data suggest that formal organizations supplement other social ties rather than substituting for them (Fischer, 1983:111, 380); (4) organizations—even sectarian voluntary associations—often change the nature of their interests as a result of changes in the conditions with which they have been concerned; (5) institutionalization brings organizational concerns into prominence, compelled by fiscal considerations and the necessity for stability in membership and leadership; (6) voluntary associations present expanded opportunities for participatory democracy and for leadership training in the political process; (7) voluntary-association participation may be integrative, as well as divisive, for individuals and for groups in the larger society (see Fischer, 1982:109; Sills, 1968); and (8) voluntary associations have been instrumental in initiating social change, often by democratic means.

These and other research findings, including data concerning public perceptions of risks, benefits, current and desired restrictions and standards, and actions taken with respect to technological risks, are less suggestive of conflict and polarization than of thoughtful consideration of issues and of coping based upon reasonably "vigilant information processing" (see Janis and Mann, 1977) and "social rationality" (see Perrow, 1984, and below; see also Roper Center, 1984). They also suggest that the potential exists, not only for a culturally pluralist society, but for political engagement on a broad scale which admits of a variety of

types of collective response to technological and environmental dangers and ecological scarcity.

That potential may be enhanced by what has been referred to as "the distributional boomerang" (O'Riordan, 1983) created by environmental risks associated with technology and ecological scarcity:

> Western democracies are continually in a state of flux as to how power is exercised and social justice determined. The distribution of risk has never been fair (i.e., it normally falls disproportionately on the powerless and the poor) but recently certain features of environmental risk seem so ubiquitous . . . that even the wealthy and the powerful are becoming anxious. (O'Riordan, 1983:347)

The distribution of risks, costs, and benefits has been neglected by risk analysis. The distributional-boomerang hypothesis is potentially of great significance, requiring documentation as to its "scientific reality" with much the same urgency as the "nuclear winter" which might destroy the attacker as well as the attacked in a nuclear strike (see Simon, 1984:775). The existence of such conditions suggests the possibility that those who define a situation from the perspective of very different interests may nevertheless find it possible (*because necessary*) to come together in the search for solutions to mutually threatening conditions. The existence of such conditions may facilitate sufficient realization that the earth's peoples constitute a "community of fate" (Heimer's felicitous phrasing, forthcoming) to permit effective action.

While the possibility may seem utopian, the seriousness and the ubiquity of these types of risks press for cooperation and mutual political action toward decreasing the probability of their occurrence. If widely enough recognized, the existence of a world-wide community of fate, and the political principle that disparate and contending factions often unite against common enemies, offer the hope, if not the promise, of avoiding a Hobbesian scenario of nuclear destruction or other mutually destructive hazards.

Other areas of sociological analysis and methodologies are relevant not only to risks other than economic costs, health and life, but to the determination of how policies related to the management of risks are implemented. I note only two of these in passing. What happens to networks of personal relationships, to the possibilities of a culturally pluralist society, as a result of *fears* associated with risks? Fischer (1982:268) reports "that fear of crime . . . reduced people's sense of well-being," an observation confirmed by criminological studies. Further, "urban life, both because of crime and because of its subcultural variety, led to feeling more distrustful of people in the wider community" (p. 260). If "urbanism may engender public estrangement but not private estrangement" (p. 260), what are the implications for political and moral judgments and actions related to risks? Finally, the experience of local communities in dealing with risks, and of local–federal interaction in the process, also is instructive, though as yet little studied (see Meyer and Solomon, 1984; National Health Policy Forum, 1984).

On the Perception of Risks

Lowrance (1976:110) cautions against leaving the resolution of political controversies concerning complex technological and scientific matters to technically unqualified political leaders, on the grounds that they are rarely "able to deal with the questions, or perhaps even to frame them properly." But the political implications of question framing are not merely matters of technical understanding, nor is understanding what is technically hazardous to health and/or economic values the only criterion for the formation of perceptions of risks.

Douglas's summary of risk-perception research can hardly be improved upon: "The engineering contribution assumes that the public consists of isolated independent individuals who naturally behave like engineers: they want to know the facts and these, once clearly presented, will convince them of the safety or riskiness of a proposal" (Douglas, forthcoming: Ch. 1). While the addition of research from plant, animal, and human ecology produced less simplistic models of adaptation to hazards, the fact that "people whose perception is being studied are living in a world constructed from their own concepts . . . (including) the concept of what is hazardous" required help from cognitive psychology (Douglas, forthcoming: Ch. 1).

The cognitive sciences have brought together risk perception and behavioral decision theory. When these, in turn, were joined by organizational decision theory (see March and Shapira, 1982), the results challenged and modified the theory of rational behavior with which risk analysis began. The picture of perception, choice, and decision making emerging from this research and questioning does not deny rationality, but views it in terms of cognitive limitations and heuristics, and in organizational, social network, and cultural contexts.

Empirical regularities have been established—e.g., that in many matters of choice people tend to be risk aversive with

respect to gains and risk seeking with respect to losses (see Kahneman and Tversky, 1984). The limitations, the meaning, and the implications of this research continue to be debated (see Fischhoff et al., 1981; Covello, 1983; O'Riordan, 1983; Perrow, 1984; Douglas, forthcoming). A variety of critiques suggest the directions that thinking about risk analysis might take in the future. Perrow proposes that "social and cultural rationality" (shortened to social rationality) guides most people through complex problems of judgment, choice, and decisions (see also Janis and Mann, 1977). Social rationality is "embedded in social and cultural values" (Perrow, 1984:324). It "is what most of us live by although without thinking much about it" (Perrow, 1984:315–16). The heuristics discovered by cognitive psychologists—common-sense principles of reasoning, e.g., "rules of thumb" that people use when confronted with choices and the need to make decisions—are based on social rationality. They "appear to work because our world is really quite loosely coupled" (Perrow, 1984:317). In contrast, the technically complex and esoteric nature of many modern technological systems has seemed to demand commensurate technical cognitive abilities on the part of the public. But that is the case only if it is assumed that cultural values, political wisdom, and judgments as to what is worth preserving are related solely, or in some linear fashion, to technical knowledge. Alternatively, living with risks appears to be less technically than socially driven. Research on the fear of crime, for example, suggests that people respond to the "social facts" of crime in ways which reflect personal experience and values.

Fear of crime as social rationality. Studies of people's fear of crime typically report an inverse relationship between crime victimization rates and expressed fears. Much as perceptions of risk associated with, e.g., nuclear power plants, these fears have been interpreted as pathological, or at least irrational. Recent investigations, however, have begun to probe more deeply into the matter.

The data are consistent: men have higher rates of victimization than women, but women are more fearful of crime; young people are more often victimized, but the elderly express more fear. This seeming paradox is partially resolved when exposure to risk—measured by self-reported employment and number of hours spent away from home—is taken into consideration (see Stafford and Galle, 1984). Limitations of the measures employed (e.g., they are not based on detailed inquiries as to lifestyles, networks of associations and social supports) suggest that more complete data might more fully explain the paradox (see also Liska et al., 1982; Toseland, 1982; Stinchcombe et al., 1980). The social facts of differential exposure to risk help to resolve the paradox.

Further, Warr (forthcoming) has demonstrated that the assumption that "identical levels of risk (real or perceived) produce identical levels of fear among all subgroups of the population" is false. Specifically, the elderly perceive crimes to be more *serious* than do younger people, and this difference "eliminates most age effects," while "controlling for fear of other (related) offenses eliminates many sex effects and age effects" (Warr, forthcoming). In addition, fear of sexual abuse is a "core" fear for females, and the association among females of sexual abuse and other crimes differs significantly from that among males (see Maccoby and Jacklin, 1974). By way of contrast, *status* concerns appear to be central for young males, and delinquent behavior is related to those concerns (see Short and Strodtbeck, 1965; Cohen, 1955). Social rationality related to risks associated with crime is imbedded in differences such as these.

While these studies are suggestive, the need is great for more systematic inquiry into the nature of social rationality.

The social functions of social rationality. Perrow notes that social rationality "recognizes the cognitive limits on rational choice, but holds that such limits are less consequential in accounting for poor choices than cognitive psychologists believe and are, in fact, quite beneficial in other respects. *Our cognitive limits may make us human in ways we treasure*" (Perrow, 1984:321; emphasis added). Social rationality is not simply an inefficient way of muddling through. Would we have women be less concerned with the criminal violation of their bodies, or the elderly less cautious in arranging routine activities so as to avoid exposure to criminal risks?

Social rationality applauds diversity in cognitive abilities because it promotes social bonding (by necessitating interdependence) and creativity in problem definitions and solutions,[7] and it makes "domination of the many

[7] For an instructive example of the advantages of cognitive diversity, see Gould's (1984) review of the biography of Nobel laureate Barbara McClintock. McClintock's style of thinking through problems is unconventional among scientists inasmuch as it "does not follow the style of logical and sequential thinking often taken as a canonical mode of reasoning in science" (Gould, 1984:4). Instead, she relies upon her ability to integrate "many pieces into single structures." Confirmation of her theory of transposition of genetic elements, however, required careful experimental work in the more conventional

by the few more difficult" (Perrow, 1984:323). Social rationality recognizes the values placed on social ties, traditions, human "dignity, and the desire for security and predictability" (Perrow, 1984:308). The heuristics and biases in cognitive abilities discovered by psychologists thus appear to be quite functional. Perrow (1984:317) summarizes:

> First, heuristics prevent a paralysis of decision making; they prevent agonizing over every possible contingency that might occur. Second, they drastically cut down on the "costs of search," the time and effort to examine all possible choices and then to try to rank them precisely in terms of their costs and benefits. Third, they undergo revision, perhaps slowly, as repeated trials lead to corrections of hunches and rules of thumb, and do so without expensive conscious effort. Finally . . . they facilitate social life by giving others a good estimate of what we are likely to do, since we appear to share these heuristics widely. We may do something an expert would disagree with, but at least joint action . . . is possible, even if that action is not the one best line of action.

Douglas's call for cultural analysis of the perception of risk is also a research agenda:

> The question of acceptable standards of risk is part of the question of acceptable standards of living and acceptable standards of morality and decency, and there is no way of talking seriously about the first while evading the task of analyzing the cultural system in which the second take their form. (Douglas, forthcoming: Ch. 3)

> . . . human perceptions rest more upon social construction and consensus . . . A distinctive program for human cognitive psychology would take special interest in how the classifications of the world are formed, how they threaten to disintegrate and how certain social processes shore them up . . . There would need to be typologies of stable social processes and the kind of moral commitments which sustain them. Such a theoretical shift would modify the entrenched ideas that facts can be clearly separated from values, and nature from culture. (Douglas, forthcoming: Ch. 4).

Sociological research and theory concerning the social construction of social problems makes a good start toward codifying perhaps the most important social processes associated with the selection of "particular risks for public attention" (Douglas, forthcoming: Ch. 8). The theory fruitfully combines attention to claims-making and other activities of special interest groups (including professions and government agencies) and to social movements in accounting for the emergence of social conditions as social problems (see Schneider, forthcoming; Spector and Kitsuse, 1977; Mauss, 1975). The theory is weak on the operation of cultural factors, however, and the role of the media has not been adequately considered.

The Role of the Mass Media

The influence of mass media on public perceptions of risks has been much discussed but little researched, and existing models of media effects have not been applied to this area. Mass media are very much part of the social fabric. Again, therefore, the relationships are reflexive (between media, individuals, institutions, groups, and social movements). Alexander (1981) contrasts the media and the law in this respect, stressing the flexibility of the media in forming and reforming public events. He suggests that the media are "the populist counterpart to rational-legal control" in a democratic society (Alexander, 1981:25). As Ball-Rokeach et al. (1984) demonstrate, however, the media constitute a powerful force for value and behavior change. The populist function of the media, therefore, is subject to manipulation and less-than-"pure populist" influence (see also Pfund and Hofstadter, 1981).

Dependency on media information, a ubiquitious characteristic of modern societies, is the basis for the "dependency model of mass-media effects" advanced by DeFleur and Ball-Rokeach (1976).[8] Dependency on media would appear to explain some of the "biases" in risk perception discovered by psychologists, notably the tendency to overemphasize, or overestimate, the risks of extremely serious but rare hazards such as nuclear power accidents while underestimating less serious but more common risks (see, e.g., Slovic et al., 1982). That is, the dramatic event which receives extensive media coverage is likely to seem more "risky" to consumers of media, while common, everyday hazards, in addition to being perceived as less serious, are capable of being dealt with (on the basis of experience), appear less frightening and are, as a result, underestimated.

More generally, public awareness of risks

scientific mode. The cumulation of knowledge thus also benefits from cognitive diversity.

[8] Dependency is defined by DeFleur and Ball-Rokeach (1976:6) "as a relationship in which the satisfaction of needs or the attainment of goals by one party is contingent upon the resources of another party."

(DeFleur and Ball-Rokeach refer to "the media's role in agenda-setting") is heavily influenced by media coverage (see, e.g., Pfund and Hofstadter, 1981; Freimuth and Van Nevel, 1981). Study of the nature and influence of media coverage of risks is especially important in view of the fact that media coverage cannot be accounted for solely in terms of the seriousness of events, however seriousness is defined or measured (see Mazur and Mwaba, unpublished). Ease of access by the media, competition for newsworthiness among events and among media, the (sometimes conflicting) views of the scientific community and commercial interests (Pfund and Hofstadter, 1981), vested interests of news organizations and those who influence and control them, all enter into decisions as to the extent and the nature of media coverage.

Mass media clearly play an important role in *conflicts* over risk. O'Riordan (1984:347) notes that "scientifically, technologically and institutionally complicated projects" are a "focus of attention for political threatre" (see also Mazur and Mwaba, unpublished). As was the case in the civil rights and antiwar protests of the 1960s and '70s, the media have become weapons in political conflict over technological and other risks. Media coverage is perhaps even more important as a weapon with the advent of "single-issue" politics in the '80s.

Systematic research and theory into these and other aspects of the media as constitutive and facilitative of, as well as influential with respect to, the social fabric are important in their own right. The role of media in agenda setting, in problem definition, and especially in linking scientific communities with political and other communities makes such study of special importance for risk analysis.

The Risks (and Benefits) for Sociology

Perhaps the chief risk for sociology, if we do not make a major effort to engage the discipline more fully in this area, is that we will increasingly be seen as irrelevant to an area of extreme importance to all of human kind—an area in which all the major institutions, all societies, and all nations are daily affected by analyses and decisions which remain largely uninformed by sociological theory and analyses.

And if we do take the challenge seriously, what of the risks then? One of the risks, I suppose, is that we will not be taken seriously. That, after all, has been a common complaint among sociologists with respect to many social policies. A careful look, however, at the sorts of questions which are being asked *by* risk assessors, as well as *of* them, suggests that the *domain*, if not the knowledge, analyses, and insights of sociologists and other social sciences are recognized as critical. The limitations of analyses based solely on engineering, biology, systems analysis, even economic or psychological criteria and assumptions, are apparent (see Fischoff et al., 1981; Hohenemser et al., 1983).

Fischhoff et al. (1981:157–71) conclude their inquiry into acceptable risk with a chapter titled "What do we need to know?" The chapter is replete with questions within the purview of the social sciences. Consider the basic and fundamental task of developing a conceptual framework for hazard definition: "lack of a taxonomy of hazards impedes the development of generic decisions or priorities for research. Even such simple terms as 'voluntary risk' or 'exposure' present problems under closer scrutiny . . . The power of definitions is such that theoretical disagreements are often suspected of being rooted in vested interests" (Fischhoff et al., 1981:158). And, the sociologist adds, for good reason, as demonstrated by inquiries in science, knowledge, and in a variety of substantive areas (see, e.g., Ben-David, 1981; Collins, 1983). Distributional questions are also recognized, e.g., the need for "a theory of usage that would describe . . . which consequences are important to which constituencies . . ." (Fischhoff et al., 1981: 158–59).

A more serious risk for all of the social sciences is that we will promise more than we can deliver, or that, having decided to engage the issues, we will assume a posture of advocacy rather than analysis, of ideological commitment rather than commitment to careful scientific and humanistic analysis. We will then not be trusted, and our analyses and recommendations are likely to be ignored.

But what have we to offer? Is not our knowledge base so limited as to be of little use? I think not, as evidenced by theories, methods, and studies in several areas of the discipline, and by a significant number of sociologists already engaged in activities pertinent to risk analysis. Limitations of knowledge are real enough, and they must be recognized and acknowledged if sociologists are to be taken seriously. But in this respect we are not so different from other disciplines as might be feared or imagined, either by sociologists or by "hard scientists." Note, for example, the conclusion of biochemist Lowrance, former Resident Fellow of the National Academy of Sciences, regarding a Chemical Industry Institute of Toxicology conference on formaldehyde toxicity: "At the end of two days and perhaps forty papers about state-of-the-art toxicity tests and very good epidemiological studies,

the conference could not conclude a thing about health effects (Lowrance, 1981:14; emphasis in original).

Equally dramatic are the conclusions reached by a National Research Council panel concerning identification and testing of toxic and potentially toxic chemicals (see Leeper, 1984). Among the committee's conclusions: "of tens of tounsands of commercially important chemicals, only a few have been subjected to extensive toxicity testing and most have scarcely been tested at all." Furthermore, while some of the toxicity testing examined was of high quality, "of 664 toxicity *tests* evaluated, the committee judged only 27 percent acceptable" (Leeper, 1984:8; emphasis added).

The NRC report is hardly reassuring, but it does put us all in somewhat the same boat. We may even hope that it might head us in the same direction.

CONCLUSION

Sociological concern with the assessment and management of risks ranges from the trivial to "thinking the unthinkable," the destruction of all human life. Though sociologists have yet to advance a scenario as apocalyptic as the "nuclear winter" which might follow from a nuclear strike, the challenge issued by Herbert Simon (1984) to the scientific community regarding this scenario might well be applied to risk assessment. The reality of social and environmental threats is compelling as an issue requiring social science attention.[9]

The terms in which risk assessment and management are phrased—the questions asked and the acceptability of answers given—are being reexamined, and may be in the process of fundamental change (e.g., Congress is considering new legislation in the area). A "social transformation" of risk assessment and management quite as thorough as that which occurred in medicine (Starr, 1982) may well occur. Unless social scientists are effective in bringing to bear the perspectives, knowledge, and methods of their disciplines, the transformation is likely to result in the hegemony of disciplines and professions which share neither the insights nor the knowledge of the social sciences. Precisely how the concepts of hazard and risk will be dealt with in the future—theoretically, empirically, and in social policy—remains to be determined. Douglas's observation that "The growth of probability theory makes risk a conceptual package basic to modern thought" seems an accurate prophecy. So, too, Perrow's "decoding" of "normal accidents": many problems lie "not with individual motives, individual errors, or even political ideologies. The signals come from systems, technological and economic" (Perrow, 1984:352)—to which we add, institutions and other social systems. At the very least, risks to these systems should be sociologically informed.

[9] Elsewhere (Short, 1984) I have argued that the social sciences must also be humanistically informed. I do not argue for sociological hegemony in risk assessment or management, only for incorporation of the social sciences and humanities in the process.

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