Organizational decision making in emergency warning systems is rigorously dissected by John Sorensen and Dennis Mileti. They suggest that decision-making uncertainty is a major constraint to warning effectiveness.

Walter Peacock, Charles Killian, and Fred Bates extend their analysis of the long-term impacts of the 1976 Guatemalan earthquake on families. By focusing on the difficult methodological problem of measuring the assets of a household prior to and in the years following this catastrophe, they offer several important conclusions regarding policy that were permitted by the increased rigor of their methods.

Two insightful statements comprise the "Feedback from the Field" section of this issue. Eve Gruntfest describes her experiences in a flood mitigation planning effort and highlights four significant issues that may confront many communities involved in such activities. Risa Palm summarizes an update of her earlier studies on the implementation of legislation in California that requires real estate agents to advise prospective purchasers that the house they are considering is located near a known earthquake fault. Her interviews with local officials and real estate developers highlight the difficulties and tensions inherent in many mitigation efforts.

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I. THEORETICAL AND RESEARCH ARTICLES

WHAT SHOULD WE STUDY? QUESTIONS AND SUGGESTIONS FOR RESEARCHERS ABOUT THE CONCEPT OF DISASTERS*

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INTRODUCTION

There is no one in this audience who does not immediately recognize the descriptive referent of two phrases we will utter--the Challenger space shuttle accident, and the spread of the AIDS virus. However, we would also venture to say, with confidence, that the quick recognition of what we are talking about would not be accompanied by a similar consensus that both, one or the other, or neither, should be thought of as a disaster for research purposes. On the other hand, there is probably no one in this audience who will not only recognize, but agree, that the referents of the terms Bhopal and Chernobyl are, and should be, looked at as disasters. Why? Few of us would have trouble characterizing some aspects of the recent Mexico City earthquake or the Amaro, Columbia, volcanic mud slide as a disaster. Yet many of us would hesitate to characterize in the same way the clashes between the Soviet Union military and the native guerrillas in Afghanistan, the American air strike on Lybia or the current war between Iran and Irak. Do the deaths from the famine in Ethiopia qualify as a disaster? If

*This is a written version of the Presidential Address presented at the ISA Research Committee on Disasters session at the World Congress of Sociology, New Delhi, India, August 1986. The oral address was not referenced, but we have added a bibliography from which we derived the core of the ideas we used in both our oral and written remarks.

yes, what about the much larger number of people who die daily as a result of cigarette smoking? Why do we and other researchers characterize certain occurrences as disasters but deny this label for other phenomena also involving loss of life, substantial great destruction of property, and/or major disruption of social life?

This paper struggles with the problem of what we, as researchers, should study as a disaster. In our view, this is by far the most important task currently facing the field of disaster studies, as undertaken by social and behavioral scientists. We are not going to proclaim the definitive answer. Instead, we ask some questions and advance some suggestions for researchers about the concept of disaster.

HISTORICAL USES OF THE TERM

First, we should note that the referent of the very word "disaster," as used in the English language, has changed through time. At least the source of the phenomena has been attributed differently at different historical times. If nothing else, this suggests that any attempt to derive an absolutely final conceptualization that will be forever accepted is a chimerical exercise.

There has been an interesting evolution in the course of human history with respect to certain aspects of the term disaster. Apparently the word etymologically entered the English language from a word in French (desastre), which in turn was a derivation from two Latin words (dis, astro), which combined meant, roughly, formed on a star. So, in its early usage, the word disaster had reference to unfavorable or negative effects, usually of a personal nature, resulting from a star or a planet. So we have Shakespeare, in 1605, writing in the Play, *King Lear*, that, "we make guilty of our disasters the sun, the moon and stars" (Act 1, Scene 2), and Sir Slingsby, writing in his diary in 1684, that, "I am very ill of a disaster upon my stomach."

In time, the word disaster was applied more to major physical disturbances such as earthquakes and floods, or what came to be traditionally known as Acts of God. With the spread of more secular and non-religious ideologies, nature was increasingly substituted for the supernatural and the term natural disaster came to the fore. In more

recent decades, as it became progressively impossible to attribute all responsibility to God or nature, there arose the notion of "Acts of Men" to go along with Acts of God or natural disasters. In the last few years, reflecting the changed status of women, we now have references to disasters as Acts of Men and Women. In addition, and increasingly so, disasters, in certain intellectual circles, have come to be seen as having their source in "society," or, as some recent social scientists have phrased it, disasters are seen as manifestations of the vulnerabilities of social systems. Thus, while the notion of disaster as being something of an undesirable happening has prevailed from the beginning, there also have been the indicated changes about the perceived source of the problem going from the stars, to God, to nature, to men and women, and now to society.

(Of course, those among us who are knowledgeable of Durkheim's contribution to the sociology of religion will recognize his equation of the pressures of society with the human creation of the concept of God, so perhaps the change in attributed source is less significant than may appear at first glance.)

SOME NEW PHENOMENA

This was the past. But what of the present? We are particularly interested in the question of whether we should treat as "disasters," for research purposes, a number of actual or potential undesirable happenings that, in one sense, seem to be new to human history. We have reference to a variety of non-traditional phenomena that sometimes dominate the news headlines around the world. Every time we turn around these days we seem to be faced with a new risk or threat to our collective well-being.

Let us start with one newspaper headline.

"Indoor air pollution: A growing threat to health." We are told that modern, well-insulated buildings not allowing air to recirculate from the outside are resulting in dangerous levels of carbon monoxide, nitrogen dioxide, sulfur dioxide, various kinds of particulates and trace toxic substances in the indoor air we breath and which can result in everything from heart failure and lung cancer to

respiratory ailments and frequent "colds." In Los Angeles, persons who go inside during a smog alert can actually find concentrations of pollution 20 times higher inside than outside.

If we go outside to escape the indoor pollution, we are told that one-third of all Americans live in metropolitan areas where the ozone pollution exceeds the limits set by the Clean Air Act. In Switzerland it is said that in some regions 46 percent of all the trees are dying because of acid rain. In Canada, and elsewhere, lakes are becoming increasingly acidic and hostile to animal and plant life and are effectively dead.

If we try to rise above the pollutants at the surface, we are told that the atmospheric buildup of various gases, primarily from the burning of fossil fuels, are creating a greenhouse effect for the whole world. This will result in a warming trend that will raise global temperatures above any level experienced in the past 100,000 years. This, in turn, will change sea levels, storm frequencies, and localities of droughts. This, in part, will lead to massive coastal flooding in lands from Bangladesh to Egypt.

However, this may not matter too much because, for other reasons, 80 percent of the sandy coastline of the United States, for example, is already badly eroding. Slightly inland, the situation is not too good either since there is the problem of land subsidence. More than 40,000 square kilometers of the United States in 38 states is slowly sinking because of human activities, of which recent sinkholes in Florida and Ohio are only dramatic manifestations. In fact, structural damage done by expansive soils cost about six billion dollars a year in America alone. Elsewhere, it is said that Bangkok, Thailand may sink below sea level by the year 2000, while London is sinking at the rate of about a foot a century, and Mexico City at nearly a foot a year.

If you try to hide from all of this in your basement, you have to watch for radioactive radon gas seeping in from the Reading Prong, a uranium-laden geological formation that stretches underneath parts of Pennsylvania, New York and New Jersey. In fact, one headline recently read, "One of eight homes in the United States is contaminated by radon" (Washington *Post*, August 8, 1986). A headline in an

Australian newspaper of August 2, 1986 was, "Radon: the gas that has us all aglow" (Australian *Magazine*).

This could lead one to drink. But that would not have been a good choice recently if you picked certain Austrian, Italian, Chinese or German wines since they were contaminated, having been laced with methanol (the economic losses to Italian agriculture alone was at least $636 million, and there were at least 20 deaths). Nibbling at some cheeses, milk and watermelons would not have been healthy either. Earlier this year nearly a hundred people died and many thousands got ill from eating these products which, in some instances, were contaminated. In 1985 there were also several dozen deaths from contaminated cheese in California.

What about sticking to plain water? Fine, except you need to ignore the headline and story which reads:

> The seas below are threatened. Actually they are not seas. They are collections of water in permeable strata, called aquifers.... We get 88 billion gallons of water in this country every day from these groundwater sources, and that includes about half of our drinking water.... They are not in mortally bad shape yet. The Office of Technology Assessment estimated last year that only 1 percent or 2 percent of the US groundwater supply may be polluted. But there is consensus that the problem is increasing. If not in mortally bad shape, the groundwater is mortally threatened. (Wilmington *News Journal*, July 21, 1986).

There are some groups out there, however, who are trying to help us. Some, for instance, are developing and using the process of food irradiation which is an alternative to pesticides and will provide food that will stay fresher longer and be more wholesome to eat. But, according to others, this new nuclear technology of irradiation creates new chemicals called "radioytic" products, including hazardous compounds such as benzene and formaldehyde which may be linked to the eventual appearance of cancer, kidney and liver diseases, and some birth defects.

Then there are those who are engaged in genetic engineering, that is, altering the genes of living organisms to produce wonders ranging from frost, disease and herbicide resistant plants, to oil and chemical waste-eating bacteria. But major controversy has developed over releasing such

genetically altered organisms into the natural environment with critics saying there could be runaway viruses against which there may be absolutely no protection. Our ability to custom design living organisms almost insures that one day there will be some Frankensteinian bacteria, plant or animal let loose on the world.

There are also those in the United States trying to dispose of 20,000 metric tons of solid and liquid waste already produced and which will reach 100,000 tons by the year 2020. This high-level radioactive waste will first have to be transported all across the country and then buried deep somewhere. According to critics, there are safety problems in both transporting and burying the wastes. The problem is one that exists for all countries with nuclear plants.

We will only mention in passing newer health threats as manifested in such recent problems as Legionnaire's disease, toxic shock syndrome and thalidomide, to mention but a few. In the chemical area, we have such happenings as Love Canal and Times Beach in the United States, Seveso in Italy, and Sverdlovak in the USSR, as well as numerous asbestos risk situations and dramatic incidents such as the spread of PBBs in the ecological life chain in Michigan which has now gotten into a second generation of human beings, and the multi-nation pollution of the Rhine River in Europe. It is also estimated that pesticides regularly used in agriculture fatally poison about 10,000 persons a year and injure 400,000 more around the world (*Newsweek*, July 14, 1986).

Apart from biotechnology-related problems, there are also a series of other new potential threats and dangers. A recent federal report noted that about 200,000 of the 574,000 bridges in the United States are "structurally deficient" and, increasingly, one collapses, as happened in the last several years in Ohio and Connecticut. In addition, we supposedly have around 1,900 unsafe dams in populated areas.

In America, we are also faced with the record-setting encroachment of the Great Salt Lake and all five Great Lakes on surrounding land, at the same time, every year urban drought is becoming an increasing possibility. The New York City water reservoir system fell to less than 54

percent of capacity in 1985. Rural drought is not new, but urban drought is hardly a traditional problem.

There are also some massive engineering efforts projected which some see as having untold dire, or at least unforeseen, consequences. For example, there is a serious proposal in the Soviet Union to reverse the flow of Siberian rivers to irrigate central Asia, but which environmentalists, both within and outside the country, argue will generate climatic and ecological changes which cannot be other than negative. The so-called Star Wars project of the United States would, among other things, necessitate hundreds of satellites in orbit, each one likely to be nuclear powered (Washington *Post*, June 8, 1986). We should also mention the possible "nuclear winter" that the United States and the Soviet Union could jointly produce in a hostile exchange of missiles.

Now our earlier examples have been of new dangers, threats and risks which seemed to have surfaced. We have left aside the old perils, the hurricanes, floods, earthquakes, tornadoes and so on because, while they generally may have far greater impact in the modern world because there is more to impact, as natural disaster agents they appear to be relatively constant, at least in terms of the historical record. Apparently this is not totally true either, if we go beyond direct human experience.

For example, volcanologists have recently called attention to the phenomena of resurgent caldras. These involve massive volcanic collapses that would combine the destructiveness of earthquakes as well as huge volcanic eruptions. As a United Nations report recently noted:

> Very occasionally, explosive volcanic eruptions occur on a scale far beyond the experience of modern man. Within the past 50,000 years, cataclysmic eruptions of this kind have occurred, for example, once in the Naples area of Italy, three times in the North Island of New Zealand, three times in Kyushu, Japan, and once each in Sumatra, Greece and the western United States. The average frequency of cataclysmic eruptions somewhere in the world is about once in every thousand years or so. Known occurrences in the past 10,000 years are Crater Lake, Oregon (7,000 years ago), Taupo, New Zealand (1,800 years ago), and Tambora, Indonesia (170 years

ago). There are probably several others of similar age which have not yet been identified and/or dated.

An eruption of such magnitude would create volcanic hazards on an unprecedented scale. If it were to occur in a populous area such as Indonesia, Japan or Italy, it would either entail evacuation on a scale larger than has ever before been attempted, or would cause loss of life on a scale never before experienced in a natural disaster. Several million people might be involved and tens of thousands of square kilometres devastated. (*Volcanic Emergency Management* 1986, pp. 14-15)

We are obviously talking here of possible cataclysmic eruptions dwarfing anything ever seen in the historical record of the human race.

Finally, we should observe that we have not discussed, except in a fleeting reference in our first paragraph, all conflict types of situations such as wars and civil strife where the involved parties are deliberately trying to damage one another. These kinds of situations involve, for the most part, old kinds of risks. We do have, in the conflict area, relatively new kinds of threats and dangers ranging from the hi-jacking of planes and the use of suicide truck bombs by organized terrorists, to tampering with medicinal products such as Tylenol and Excedrin by presumably isolated perpetrators (the manufacturer of the first product lost more than $250 million in income, after taxes, just as a result of two incidents).

We could continue for a long time with many more examples of actual and potential risks and dangers which already have, or could have, devastating effects on life, well being, property, the ecology, and the general routines of human beings and societies. As Kates (1985) has written:

... the hazards that we cope with today have changed markedly. There has been a shift in emphasis from visible problems of automobile smog and raw sewage to less visible problems posed by low concentrations of toxic pollutants. We are less concerned with the acute consequences of a hazardous technology such as the automobile... than we are with the chronic consequences of a hazardous technology such as toxic chemicals ... because either we do not understand the causation or the effects are still latent. Our concerns have shifted

in temporal scale as well. We are less worried about the daily recurrence of commonplace accidents than about confronting the frightening possibility of rare but catastrophic accidents and in spatial scale we are shifting attention from the local to the regional and global--from local improvement in water or air quality ... to regional frustration in dealing with acid rain, stratospheric ozone depletion, and tropospheric ozone enrichment, and to global uncertainty about carbon dioxide, trace gas enrichment, and nuclear winter. (p. 47)

Kates focuses on the shift from better to lesser understood, from visible to invisible problems, from acute to chronic consequences, from everyday accidents to rare catastrophic occurrences, and from local to larger scale happenings, primarily in the area of technological innovations. However, as we tried to illustrate by some of our examples, we think that the collective threats and hazards have also increased in non-technological areas as well as in the non-innovating technology area. Be it as it may, we hope we have come across as a believable forecaster of some of the future, rather than as a scientific Cassandra.

THE BASIC QUESTION POSED BY THE EXAMPLES

It seems to us that the examples just given pose a major question for researchers who do social and behavioral studies of what they call disasters. Should all, most, some, or none of the instances be treated as disaster? Whatever the answer, there obviously is some basis for inclusion and/or exclusion. Furthermore, to the extent that any of the above phenomena are classed as disasters, can they be treated as members of one relatively homogeneous class or are there some quantitative or qualitative differences which necessitate the development of subtypes? If a nuclear winter affecting the world is seen as basically in the same category as a small scale tornado striking a rural area, what is the rationale for such a treatment (or vice versa, if some sort of typology is used)? Fundamentally, of course, both questions posed rest on how we define or conceptualize a disaster.

This question--What is a disaster?--while not new, has, at the present time, come to the fore in the area. As

Drabek noted in a paper earlier this year, there has been a recent and noticeable upsurgence of interest among social and behavioral science disaster researchers about the definition and conceptualization of what is presumably their key concept, namely, disaster. Since the origin of this field of study, there have always been a few scholars who have struggled to clarify the term, but it is only in the last few years that so many researchers and theorists have so explicitly raised the question: What is a disaster?

We think there are significant reasons why the conceptual problem has come to the fore now and why we also believe that question will not soon go away. Reasons are both internal and external to the field of disaster research.

Internally, the field has matured substantially as a second generation of workers is taking over from the pioneer generation. One consequence of this transition is that the enthusiasm of the pioneers to open up a new field of study is being replaced by a desire of the second generation to consolidate the area. In my view, there often is an unfortunate loss in this as questions tend to get replaced with answers. (Questions are more important than answers, for the latter fundamentally depend upon the former; also no answer can improve upon poor questions.) The seeking of answers leads to attempts to develop propositions, models and theories. If one is going to attempt to develop formal statements about, for example, the mental health consequences of disasters, how disaster conditions affect the delivery of emergency medical services, or in what ways mass media operations change during disasters--three topics of prominence at the moment in the field--there develops a necessity to define and conceptualize disaster more clearly. If a disaster supposedly has certain effects on mental health, it is difficult to discuss the relationship unless, as we said in a recent paper, one has some clear conception of the phenomena that is the disaster, which presumably is generating the observed outcome. (Thus, the greater majority of the controversy on the mental health effects of disasters stems from different conceptions of disasters being used by different writers, and not from methodological deficiencies, the quality of the data being used, or similar matters sometimes advanced as the source of conflicting views about the issue. See Quarantelli 1985.)

However, perhaps more important in the recent attention being paid to the question of what is a disaster, are those factors that sociologists and historians of any field have long pointed out, namely, the conditions external to an area which tend to force researchers and theorists to face up to what they are studying. These factors are of varying kind, and impinge on the field in different ways. Instead of trying to systematically outline them, we shall merely list or note some of the more major ones in no particular order of importance.

We have just illustrated the newer kinds of threats and risks that have come to the fore. Their very public visibility cannot be ignored. Thus, researchers and theorists are faced with the choice of including and/or excluding such phenomena as being within the subject matter of their study.

In many countries, the existing disaster planning and response organizations have to consider whether they should get involved on certain matters. In the United States, for instance, such agencies as FEMA, EPA, NRC and NIMH (in terms of its crisis intervention program), as well as others, as a matter of bureaucratic operation, have to decide if they are within whatever their legislative mandate indicate are disaster parameters. In most countries, there usually is a general catchall phrase to the effect "and any other threat to the welfare of the nation" which, of necessity forces the possibly relevant organizations to at least consider who has responsibility for the newer dangers when they become public.

The mass communication system, fulfilling its usual agenda-setting role, both selects and reflects as important the kinds of newer social phenomena we described above. In fact, in almost all of the cited examples, it was journalistic stories about the newer threat which caught our attention. For reasons of its own, the press has, and will, continue to give wider and greater attention to dramatic phenomena.

In addition, in certain societies there are various kinds of citizen or public interest groups who see it as their role to alert the general citizenry to newer perils. These groups, given their often self proclaimed advocacy function, actually have a vested interest to discover and publicize the

potential dangers. In some instances, there is also a self interest for certain industrial sectors, such as the chemical area, to join in calling public attention to new threats or risks.

With all these forces at play, there is no reason to think that the problem of what is a disaster will go away soon. In fact, it seems reasonable to assume that most of these factors will become even more important. In combination with the increased value societies are placing on securing the security of their citizens, increased attention will be paid to "disasters" whatever the referent. Since research is generally dependent on governmental bureaucracies for funding, even if there was no theoretical interest, researchers will have to increasingly address the issue of what is a disaster.

LACK OF CONSENSUS

If we look at the explicit and implicit conceptions of disasters which prevail today, the conclusion has to be that there is little consensus on the referents of the term. There would be widespread disagreement on which of the newer social phenomena given as examples earlier would be included and excluded as disasters. As students of disasters, it is clear we are studying something about which there is little consensus either outside or within the scientific area, and the newer potential candidates for inclusion are not making the problem any easier.

Thus, popular usages of the term appear to be applied to every conceivable individual and collective happening which someone might see in an unfavorable light. The range covers everything from a highly individual or personal mishap or embarrassment, to a threat, risk or danger, to the very existence of the human race.

This typical heterogeneity of references of everyday words is, incidentally, something that seems to escape the attention of those who appeal for the use of common sense notions in scientific work, or, as it is frequently phrased, doing away with jargon and using labels "everybody" understands.

There are, of course, widely varying operational and legal usages of the term disaster which are applied by a

variety of international groups, national states, governmental agencies and private groups. Whether the term be applied by FEMA, the World Health Organization, the Red Cross, or UNDRO, the references are quite varied. They are not only inconsistent with one another, but, often, also with popular and scientific usages.

Within the area of science, we discussed in another paper seven major referents of the term disaster in the scientific literature (Quarantelli 1982). Three are primarily stated in terms of physical features and are the kind of formulations that tend to be used by geographers and others with an interest in natural hazards and mitigation measures. Four tend to use more social referents--essentially, they tend to equate disasters with a disorganizing event, a perceptual construction, a particular political definition, or a certain kind of crisis occasion. Social and behavioral scientists, especially those interested in emergency planning and management, tend to use these kinds of conceptions.

However, as discussed in that earlier paper, the various formulations are not only at variance with one another, but tend to be misapplied even in their own terms. The well known Fritz (1961) definition of a disaster, for example, would leave out of consideration, we would argue the vast bulk of what most disaster researchers have studied as disasters. Remember that he defines a disaster as:

> ... an event, concentrated in time and space, in which a society or a relatively self-sufficient subdivision of a society undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of essential functions of the society is prevented. (p. 655)

How many events have disaster researchers looked at in which, quote, "the fulfillment of all or some of the essential functions of the society is prevented"? Extremely few we would say. Even Bhopal or Chernobyl might not fit that demanding criteria.

The definitional problem plagues the Research Committee under whose auspices we are meeting at this World Congress. If looked at carefully, the charter of the Committee is rather implicitly vague about what constitutes a disaster.

Its journal, *Mass Emergencies and Disasters*, is explicitly ambiguous by the use of the first term, mass emergencies. This was not because the people responsible for the title of the journal were not aware of the problem, it was just the opposite. The definitional problem led them deliberately to be somewhat vague, so as to prevent premature closure on the focus of the field.

A consequence of the operation of the just noted internal and external factors is that the dialogue and the dialectic among all the involved parties many times resembles a famous scene from the children's classic, *Alice in Wonderland*. At one point there is the following passage:

> There's glory for you said Humpty Dumpty
> I don't know what you mean by glory, said Alice
> I mean there's a nice knock down argument
> said Humpty Dumpty
> But glory doesn't mean a nice knock down argument
> said Alice

In principle most of us would probably go along with the arbitrary nature of definitions as advanced by Humpty Dumpty, but in practice we frequently act like Alice who assumes there is only one true meaning, almost always the one we use.

TIME FOR A REFORMULATION

In less poetic or dramatic terms we have a situation at the present time parallel to something that happened to some areas of sociological research in the late 60s and early 70s in the United States. This was during the disturbances on college and university campuses, as well as those in the black urban ghettos of American society. To a considerable extent there was confusion and contradictory views about the nature of the phenomena going on, ranging from the notion of irrational expressive reactions to the idea that what was happening was the appearance of student elites who were going to lead a violent political revolution that was going to sweep American society. At the social science level, researchers and theorists in the field of collective behavior struggled to see if what was often happening outside their university office windows made any sense in terms of the conceptual tools and explanatory models which

were available, e.g., the concept of crowd and the theory of social contagion. Most scholars soon concluded there were some serious difficulties with basic collective behavior definitions and ideas. This forced the emergence of new paradigm, theories, concepts and hypotheses regarding the phenomena of collective behavior.

In our view, we are at the threshold of a possible similar paradigmatic revolution in the field of disaster research. For this to occur, new conceptualizations are needed, including a basic reformulation of what constitutes a disaster. The scholar, Kuhn, has observed that scientific revolutions and basic paradigmatic changes tend to occur when there are too many anomalies which cannot be fitted into existing views of whatever is being studied by a particular field or discipline.

We think we are at this stage in the field of disaster research. The anomalies--illustrated by examples of the newer threats and perils we discussed earlier--are forcing a rethinking in the area. They are necessitating a thinking through of the definition and the concept of disaster (we well understand a definition and a concept are not necessarily the same, but for purposes of this paper we use the two terms interchangeably).

We need to rethink, for research purposes, the central question of what is a disaster. Although we cannot address the reasons why in this presentation, we also feel that the word *disaster* should remain central. Substituting the term "hazards" would, in our view, be a retrogressive step and lead us away from the importance of activities in the emergency time period, treating them as epiphenomena rather than as what basically has be explained. (Students of collective behavior will, of course, recognize that a similar tendency to treat collective behavior phenomena as simply epiphenomena was one factor which long retarded the development of that sociological specialty area; let us not repeat that error in disaster research.) The label "risk situations" is far better than hazards, and, in our view, is going in the right direction. But the word "crises" is even better (and would be our own choice if the field were to be miraculously restarted as it was in the 1950s). There is something to be said about maintaining historical continuity of terms, so we prefer "disaster," although, fundamentally,

what is crucial is the referent of the label and not the symbolic term as such.

A POSSIBLE PATH

To make some headway, we would suggest the following as starting points.

1. We should accept and recognize that there *cannot* be one all purpose term with a single referent which can meet all needs--legal, operational, scientific or what have you--and be equally useful for all users. What is important is not consensus on one definition--an impossible goal--but clarity of the term and its referent on the part of various users. This multiple usage will undoubtedly complicate communication, but we should recognize the validity of Humpty Dumpty's position and the falsity of Alice's implicit position.
2. We should, *as researchers*, develop a concept for social science purposes, especially for research use, and stop worrying about other usages and needs. This means, among other things, rooting the concept in existing social science theories, models, and formulations, rather than common sense notions. The goal should be a concept linked to a social science perspective and useable primarily for research studies.
3. We should realize the concept of disaster is not a matter of empirical determination, but *a logical and definitional* matter. At least to those of us who see concepts as word tools, the question is not of finding something for which the label is appropriate, but rather of having a label which can be applied. The label is something that precedes rather than reflects the empirical world.
4. The word disaster should be thought of as a *sensitizing concept*, in Blumer's use of sensitizing. As such, it should give us general guidance. Both as a word tool and as a sensitizing concept, the term, thus, will not, and need not, be ultra precise.
5. The definition of disaster should be exclusively in *social terms*. References to physical phenomena ought to be absent, and references to space and time should be to social time and space, a point Sorokin and Merton made a long time ago about sociological concepts. High

impact ratio notions, for example, are not social dimensions, nor are they involved in most formulations which struggle with physical agent characteristics or features.

6. In defining disasters, we should stop confusing antecedent conditions and subsequent consequences with the *characteristics* of a disaster. That which produces something--antecedent conditions and/or that which generates something, that is subsequent consequences--are clearly different from the intermediate category--the characteristics of disasters. Most of the conceptual discussions about disasters hopelessly intermingle the three Cs, the conditions for, the characteristics of, and the consequences from disasters (as an indication of the complexities involved, we will comment that John Stuart Mill said a long time ago that a disaster is a rapid consumption of goods that would eventually have been consumed anyway, but some toxic chemicals today can suddenly create irreversible or intergenerational negative effects).
7. In characterizing disasters, we should conceptualize them as part of *social change* rather than social problems. The latter tends to emphasize dysfunctional aspects, but it should be a matter of empirical determination, not definition, as to what consequences, if any, are negative (in actual fact, there are always winners and functional results of disasters among such categories as lawyers, politicians and volunteer groups to mention a few which usually come out on the plus side as a result of disasters). A social change context not only allows for positive consequences, but more important, sets disasters within the social dynamics of social life, an integral part of what usually goes on in the social structure rather than as an external intrusion from outside, as Carr pointed out in 1932. A social change emphasis also avoids the extreme relativism and the ideological biases inherent in any social problem approach, along with elite views of what constitutes problems (that researchers sometimes act as surrogates for political and economic elites may partly disguise, but does not circumvent the issue).
8. In characterizing disasters, it would be better to think of them more as *occasions* than events. The idea of

social occasion draws from Irving Goffman and tends to emphasize the notion of an opportunity for something to happen, whereas the word event tends to imply an outcome (it is, perhaps, no accident that the word event, drawn from the Latin, is the equivalent of outcome from the Saxon). Put another way, we think disasters ought to be thought of as providing multi possibilities for development, rather than involving one linear path to an end result; in short, the emphasis on occasion instead of event is not merely a semantic change, the referent is to something different.

9. We suggest disasters should be thought of as certain kinds of social *crisis* occasions. A long time ago, DRC drew a distinction between agent and response-generated demands. We think building on the latter notion of response generated demands, i.e., the need for a new assessment of the situation, for a different information flow, for the mobilization of resources, and for a new kind of coordination, would be a fruitful way of characterizing these social crisis occasions. Let us define disasters in terms of social characteristics of responses in crisis occasions that are part of social change. (An alternative conceptualization at the population rather than organizational level we have played with, is in terms of the *social characteristics of crisis occasions* such as the proportion of the involved population, the social centrality of that population, its length and rapidity of involvement in the crisis, the recurrency, predictability and depth of involvement, and the unfamiliarity of the crisis; see Quarantelli 1985.)
10. Finally, we see most useful the conceptualization of disasters as involving collectivities in which there is *consensus* on attempting to cope with crises. There are conflict crises in which there is social disagreement about how to cope with the crises. It would seem best to keep these definitionally separate from consensus-type crises. The collective effort in the former is different from the latter, as we illustrated a long time ago when we contrasted the accommodation groups that typically emerge in natural and technological disasters compared with the conflict groups that appear in civil disturbances and riots (Quarantelli 1970).

THE NEED FOR TYPOLOGIES

In concluding, we would like to make two additional points. First, our view is that a reformulation of the concept of disaster will not be enough. In addition, we need at least two typologies. One is to place disasters within some larger framework as Barton did so well 15 years ago, but which no one has followed up. We also need a typology within the category of disaster itself, in particular, to handle what some have called the threshold problem. We would like to note that a long time ago a four-fold DRC typology implicitly suggested a distinction between accident, emergency, disaster and catastrophe by taking into account organizational involvement in disasters (see Quarantelli 1966). If only established organizations were involved, there was an emergency. If latent emergency organizations which expanded their activities were involved, such as the utilities or the Red Cross, there was an emergency. If, in addition to expanding, there were also extending organizations, this was a disaster. If new groups instead of old organizations became involved, there was a catastrophe. We suggest that using the notion of sequential organizational and group involvement in response might be reexamined for the threshold problem and the need for a typology internal to disasters themselves. It would also root the definition in the genuinely social setting of communities and societies mobilizing their organizations and groups to cope with potential and actual crisis occasions.

As we have done a number of times before, we want to restate that to pursue the current popular fad of distinguishing between so-called natural disasters and technological disasters is to pursue an unfruitful path. We recently have been involved in the following situation. In a South American country, the pumping of oil in a large field has increasingly led to subsidence of land around the field. Dikes have been built to prevent flooding of land from the lake in which the oil field is situated. However, studies have shown that an earthquake (the region involved is very earthquake prone) could lead to liquification which would undermine the dikes leading to major flooding for 80,000 people living in the artificially created flood plain. Is this to be classified as a potential disaster resulting from

natural or technological agents? (It has also recently been hypothesized that continuing air pollution that increases carbon dioxide levels will make some hurricanes up to 60 percent stronger in the next century, and we recently finished reading an article with the headline, "In California, this year's fires may bring next year's floods," New York *Times*, July 14, 1985.)

There is no time here to consider further the supposed differences in character between so-called natural and technological-type disasters, a distinction usually advanced by researchers with little or no field experience in studying both kinds of occasions. (Ironically, the Disaster Research Center is sometimes cited as having primarily a natural disaster orientation, but five of the first seven disasters researched by the Center were of the non-natural type and through the years several hundred incidents or situations involving human created crises have been field researched.) Let us simply note that, from our perspective, the overall management of problems in the emergency time period undertaken by coping organizations are essentially the same across various kinds of agents. *There are differences between disasters*, but they do not result from their supposed source in nature or technology, a simple minded, common sense distinction at best. Overall, all disasters are basically natural in that their consequences are socially rooted, and, indirectly, always stem from human and group actions. Put another way, there were no disasters before human beings evolved despite the cataclysmic physical upheavals in the evolution of the planet!

What we need for disaster research is a typology based on general dimensions that not only cut across different disaster agents, but also the same disaster agent. As many have said, what is important is not the physical difference between an explosion or an earthquake, but the fact, for example, that neither usually allow time for warning. Or, as others have stated:

> ... a flash flood resulting from a broken dam might have more similarity to a sudden tornado than to a slowly rising Mississippi River flood. (Stoddard 1968, p. 12)

or,

> ... a flood in Cincinnati for which there may be two weeks warning, is simply not comparable to a flood in Denver with six hours warning, or to one in Rapid City where warnings were received as flood waters entered dwellings. (Mileti et al. 1975, p. 5)

or,

> ... the differences between damaging events due to the same natural or man-made agent may be larger than between events initiated by a different agent (Hewitt and Burton 1971, p. 124)

If we could develop typologies of disasters based on combinations of meaningful dimensions of social crisis occasions, we could better grasp the commonality of sociobehavioral phenomena across various agent differences and differences within the same agent.

In our view, scholars working on the typology or taxonomy issue are addressing an important problem. Unfortunately, as we see it, all the typologies advanced and all the dimensions proposed for typological comparisons are very seriously flawed. Often they do not start out with a clear conception of disasters or they mix together dimensions that are not on the same level or plane.

THE EVENTUAL OUTCOME

Finally, what might ultimately be the result of proceeding in the directions we have suggested for research purposes? We think that what will happen will follow the typical course in the development of scientific concepts. Pioneers start out with common sense or everyday notions. Those that follow reformulate the basic ideas so that in time key concepts have more meaning within the scientific discipline than they have in popular discourse. In fact, the scientific concepts and ideas eventually get to be rather distant from common sense notions (e.g., that color is an integral characteristic of physical objects, or that heavier objects fall faster than lighter ones, or conversely, that bats, whales and human beings share many characteristics in common as mammals).

Put another way, we need to follow the lead provided by biology which draws a distinction between phenotypes and geneotypes. We should not be disturbed, as researchers, if our concept of disaster eventually is geneotypical. That is the road to scientific progress.

To be sure, such a concept may violate common sense. Assuming, for example, the consensus-conflict distinction we drew earlier, there might be a conceptual distinction between e.g., a plane crash generated by a terrorist bomb and one by an engine malfunction. So what? The issue is whether we can learn and study more that way, rather than whether distinctions violate common sense or not. It is on the research payoff that the judgment is to be made. We will have made tremendous progress when, as researchers, we will be able to talk meaningfully of type X or type Y disasters rather than of hurricanes or chemical poisonings; in fact, we would not use such terms for research purposes as tornadoes or explosions because different ones of such social occasions would be classified as Types A, B, C, D, etc. disasters--the A, B, Cs etc. eventually being given labels for which no common sense or everyday terms presently exist. (Who will be the first disaster research to develop the equivalent of the chemical table of elements?) To raise questions about the development of jargon misses the point. Scientific jargon, after all, makes for precision rather than the reverse as common sense might imply.

Our responsibility as researchers is the long run research payoff. Benjamin Franklin was once attacked for flying kites in thunderstorms. A question he was asked about the practical outcome of what he was doing missed his objective of studying the general nature of electricity. Actually, Franklin answered the question of the value of his study with a question of his own. He asked: who have saved more lives--the carpenters who build better lifeboats or the astronomers who first studied the distant stars which eventually contributed to better ship navigation?

We think we ought to be astronomers. Carpenters are needed, but as researchers we have a different responsibility, the same as the astronomers. Such a path will take us away from the familiar, but it is the one which will have the greatest payoff in the long run.

To start on this journey requires a major first step. We suggest this involves answering the question of what we are studying. We have tried to offer a few guides for those following this path.

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