

UNIVERSITY OF DELAWARE
DISASTER RESEARCH CENTER

HISTORICAL & COMPARATIVE DISASTER SERIES
#1

ITALY, JAPAN, AND THE UNITED STATES
EFFECTS OF CENTRALIZATION
ON DISASTER RESPONSES
1964-1969

Benjamin F. McLuckie

1977

FORWARD

Benjamin F. McLuckie undertook one of the very first cross-cultural studies in the disaster area when he examined responses at the societal level in three similar type disasters in Italy, Japan and the United States. Most of the field data had been gathered by McLuckie himself in Italy and Japan and reported in his Ph.D. dissertation at Ohio State University in 1970. Unfortunately, McLuckie's untimely death in 1975 did not allow for the carrying out of his plan to rewrite the dissertation for publication.

However, this rare comparative study seemed a very appropriate candidate for inclusion when the Disaster Research Center initiated its Historical and Comparative Disasters Series in 1977. Accordingly, and as a tribute to someone who in a short time contributed so much to disaster research, this work was picked to launch the series. To avoid any possible distortions of his ideas, except for minor editing the work has been left as McLuckie wrote it.

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CHAPTER I

INTRODUCTION

The Research Problem

Three natural disasters are studied in each of three countries Italy, Japan, and the United States, in this effort to understand the effect of societal context on the manner in which natural disaster response functions are performed. The study of these nations is approached from an institutional/structural perspective in which demographic, economic, political, communication, family, and religious variables are examined as they affect the warning, emergency preparedness, evacuation, inventory, victim care, security, welfare, and emergency restoration of services functions of disaster response. The general nature of the study is exploratory, and, while some attention is given to all the institutional/structural variables listed, there is particular emphasis placed on the degree of political centralization as an independent variable. In terms of the relationships between institutional/structural variables and the performance of disaster functions, the following questions were asked: How were the functions carried out? Where did the functions take place, i.e., the geographical location of the activity? Who were the individuals, groups, and organizations involved in the activities? What difficulties were encountered? The following questions about the impact of political centralization on disaster response, guided the research: At what levels of government are key decisions made? Does the level of decision making vary according to normal times versus disaster periods and/or the area, subject and content of matters being decided, and/or policy decisions versus operational decisions? Is there a different pattern of decision making in disaster response functions in a decentralized nation as contrasted to a centralized nation?

The Significance of the Research

This study seeks to contribute to disaster research, comparative research and societal level research. Although it is a relatively new area of inquiry, disaster research has made extensive gains in studying disaster response. The majority of work has been done within the United States, with a smaller amount of work being done in other nations. There has been only one study of disaster from a comparative cross-cultural perspective (Clifford, 1965), and most of the work done, both in the United States and in other nations, has concentrated on levels of analysis from the individual to the organization

to the community. Therefore, this study makes a contribution to the disaster literature at the points where that literature is most lacking, i.e., at the societal level of analysis and from a comparative cross-cultural perspective. This research shares in the significance of disaster research as it contributes to the knowledge of human behavior. Disaster research has utility on a practical level because it provides knowledge concerning human behavior in disaster that can serve as a basis for more adequate preparation for disasters. Disasters manipulate large social variables in a way the sociologist cannot do, i.e., they put stress on the social system and cause it to react, thus providing opportunities for studying small groups up to national societies and adding to the fundamental knowledge and theory of sociology.

The possible contributions of this study to comparative sociology are methodological and substantive. An example is given of a procedure for the selection of countries and research sites, a subject about which little has been written (Hyman, 1967:2). A second methodological contribution of this study is in the example it gives of field procedures in foreign research. This research makes substantive contributions as it presents empirical data, findings, and summary propositions that relate the effect of societal structure.

The possible contribution of this study to the literature on societal level analysis is in its comparison of societal level variables as they relate to behavior in nine empirical events. The research examines variables that have been found to be relevant in previous cross-national studies. In previous studies societal level institutional/structural variables have been correlated with other societal level institutional/structural variables, but this study offers an opportunity to analyze societal level institutional/structural variables as they affect specific human behavior, i.e., performance of disaster related functions.

Relevant Research and Literature

As a guide to the classification of relevant literature the writer has adopted a taxonomy constructed by Grimshaw (1968: Chart I), reproduced as Figure 1 on the next page. By classifying the research activities of sociologists into three gross types and cross-classifying these activities with the research settings in which they occur, Grimshaw has constructed a taxonomy that permits a comparison of sociologies. In one sense all sociology is comparative, but to apply the term so broadly is to take away its usefulness, therefore, here "comparative" is used to designate research that involves the explicit selection of two or more countries and the comparison of sets of data collected in a systematic way from the two or more societies. Comparative sociological studies, according to Grimshaw's taxonomy, fall in the sixth and ninth cells.

TYPES OF RESEARCH SETTING

TYPES OF RESEARCH ACTIVITY	TYPES OF RESEARCH SETTING		
	No Comparison (one country only)	Pseudo-Comparative (one country with "imagined" data for comparison)	Comparative (two or more countries are compared)
Descriptive	(1)	(2)	(3)
Replicative (testing of limits of limits of generalizations)	(4)	(5)	(6)
Explanatory (generation and testing of propositions)	(7)	(8)	(9)

FIGURE 1

A TAXONOMY OF RESEARCH ACTIVITIES AND SETTINGS

Taken from Allen D. Grimshaw, "Comparison of Comparative and Other Sociologies," unpublished paper read at the American Association for the Advancement of Science, December 28, 1963.

The review of the literature is in three major sections: first, the literature in the area of disaster research, second, quantitative and empirical societal level literature, and last, comparative administration literature are reviewed.

Literature on Disasters

Disaster literature may be divided into three classes:

(1) popular descriptions, which include such works as mass media reporting and eyewitness accounts; (2) natural science, encompassing a great deal of technical reporting and research in such disciplines as geology, meteorology, and civil engineering; and (3) social science literature, including studies by historians, political scientists, psychologists, anthropologists, and sociologists. Popular descriptions and natural science literature are of use to social scientists in building a fund of descriptive knowledge concerning disasters, in understanding the nature and behavior of disaster agents, and in explaining many of the reasons for physical destruction and the difficulties of restoration. The literature that was most useful in this research and on which this review concentrates was that which was written from a social science, particularly a sociological, perspective.

There is a thread of continuity from the early systematic efforts at social science disaster research to the present. The National Opinion Research Center collected qualitative interviews from a dozen disasters and also contributed to the field through its pioneering effort in quantitative survey in the study of the Arkansas tornadoes (Marks and Fritz, 1954). The Committee on Disaster Studies of The Division of Anthropology and Psychology of the National Academy of Sciences-National Research Council worked in the area of disaster study from 1952 to 1957, then that work was taken over by the Disaster Research Group of the NAS-NRC. Since the phasing out of the work of the Disaster Research Group there has been a continuance of that tradition by the Disaster Research Center of the Department of Sociology, The Ohio State University.

Disaster research is a relatively new area of inquiry for social scientists, but there has been a substantial amount of descriptive material collected and some explanatory studies have been carried out. There have been a large number of single disaster studies within the United States and a smaller number in other nations (cf. Disaster Research Center Staff, 1967). From these case studies a number of useful hypotheses have been generated.

Among the studies of disasters outside the United States the research sponsored by the Committee on Disaster Studies of the National Academy of Sciences-National Research Council and conducted by the Institute for Social Research in the Netherlands stands as an excellent example of the information that is available concerning disasters in other countries. This series of reports pertains to the sociological

and psychological effects of the flood of February 1953 in the southwestern Netherlands. Fifteen hundred interviews were conducted in order to analyze communications, evacuation, and community destruction, disorganization, and re-integration. Much of the similarity to generalizations and hypotheses from disaster studies within the United States would appear to be because the Netherlands is a highly industrialized nation with an advanced technology. Some of the dissimilarity may be explained by the differences in degree of centralization.

While there have been a number of case studies of disasters within the United States and a smaller number in other nations, there has been only one study of disaster response that explicitly selected two countries and compared the data which was systematically collected. Clifford compared the two communities of Piedras Negras, Mexico and Eagle Pass, United States in their response to the Rio Grande flood of 1954 (Clifford, 1956). He used the following typological constructs: "familistic Gemeinschaft" and "contractualistic Gesellschaft," "sacred" and "secular," and Parsons' "pattern variables." He typed Piedras Negras as familistic Gemeinschaft, sacred and particularistic, ascriptive, diffuse, and affective, and Eagle Pass as the other alternatives in the respective dichotomies. Clifford found that the difference in value orientations and social structures between these two communities led to different behavior patterns in response to the same disaster situation. The primary level of analysis in this study was the community, but much of what was stated may be applied to the societal level also. Thus, support is found in this study for the thesis of this research, i.e., societal context will affect the nature in which disaster functions are performed. The levels of analysis of most disaster research have varied from the individual to complex organizations to communities. There have been no studies, however, that used the societal level of analysis as their explicit focus.

In summary, literature in the area of disaster research reflects levels of analysis other than society, and there has been only one study done from a systematic cross-cultural perspective. Thus, almost all of the literature falls into the first, fourth, and seventh cells of Grimshaw's taxonomy, and there is little literature on disaster research that deals with the research problem of this study.

Quantitative and Other Empirical Societal Level Studies

Since this study will focus on the effect of societal level institutional/structural variables on the performance of disaster response functions, the literature that proved most helpful in the selection of relevant variables was that from the disciplines of political science and sociology dealing with the relationships of a number of social and political variables within societies and between societies. Three sources which are representative of a larger number of studies in the area of societal level of analysis are used extensively in this research (Banks and Textor, 1963; Russett, 1964; Sawyer, 1967).

Banks and Textor (1963) used dichotomous variables to develop associational relationships. This has been helpful because they have operationalized a large number of variables that have not been quantified. Of particular assistance are their measures of bureaucracy (1963: 53), vertical power structure (1963: 105), and a number of other variables of direct relevance for the political and administrative focus of this study.

Russett (1964) used a number of standard variables to analyze the countries of the world. His measures are interval level data and thus are suitable for a number of statistical correlational techniques that the Banks and Textor material is not. However, there are a number of variables included in Banks and Textor that are not included in Russett because they are not quantifiable. These two sources are particularly meaningful when used with each other in a complementary fashion.

Sawyer (1967) lists three dimensions of nations (size, wealth, and politics) that account for 40 percent of the variance among 236 national characteristics correlated over 82 nations. He considers these dimensions basic in that they define important concepts, correlate with a large number of variables, and sort nations into relatively homogeneous groups. "The three dimensions are defined by single variables, themselves essentially uncorrelated: population, per capita G.N.P., and political orientation (communist, neutral, western)." (Sawyer, 1967: 171)

Much of the data for classifying the three societies in this study are from the archives of the Project for the Comparative Analysis of Policy Environments (CAPE, 1970) at The Ohio State University. These archives rely heavily on United Nations statistical services. A number of other sources are also used for the archives, including the Banks and Textor survey (1963). The particular sources of data used in this study are listed as each independent variable is specified and operationalized in chapter two of this report.

The quantitative and other empirical societal level studies listed above were used to determine and measure the relevant independent variables that compare the societal context of disaster response. The three studies reviewed in this section are in the ninth cell of Grimshaw's taxonomy.

Comparative Administrative Literature

In addition to the disaster and societal level materials, literature in the area of comparative administration is of utility to this study for a number of reasons. First, administration is concerned with means for achievement of prescribed ends. It may take place in a variety of institutional settings, e.g., economic, education, and religious. Public administration is that sector of administration found in the political setting (Heady, 1966). This study proposes that the structure of the political institution is an important variable that affects the nature of disaster response, therefore, literature that deals with the study of the operational aspects of the political institution has direct

relevance to this research. Secondly, public administration, while dealing primarily with the political setting, touches on other institutional areas as it relates the political institution to the total society, therefore, the field has relevance to the general institutional/structural approach of this research. Thirdly, the field makes methodological contributions that are of relevance to the research problem. Public administration scholars have constructed theories and methods that assist them to more accurately choose the societal level institutional/structural variables that affect public administration. Some of these theories and methods were of particular relevance to this writer in specifying relevant variables for research. Fourthly, the field provides a better understanding of the operations within the political institution, and this is of central importance in this research.

The operation of public administrative systems has been viewed from the perspective of internal characteristics and from the perspective of administrative environment. From the perspective of internal characteristics some writers have stressed structural characteristics (Hall, 1962), and others have also stressed the behavioral component (Friedrich, 1963; Merton, 1949). The particular subject of this research enables the research to combine a structural and behavioral approach. Past disaster research has shown a number of activities or functions are relevant to disaster response in any setting, and this provides assistance in deciding what behavior is relevant for study. The performance of these functions is analyzed in societies that are similar in a number of variables and contrasting in a number of other variables. In the study of Italy, Japan, and the United States the societies are similar in demographic, economic, and a number of political variables. They contrast in the area of political centralization. Much of the ambiguity of a structural or of a behavioral approach each used alone is removed by using the two approaches in a complementary fashion.

In the developing literature on public administration there has been increasing interest shown in the ecological approach in which the basic premise is that the environment or context within which an administrative system operates affects its structure and function. The public administration system plays a central role in the performance of disaster response functions, therefore, following the ecological perspective, it is a central theme of this research that the economic, political, and socio-cultural systems of a society affect its disaster response. The same premise may be applied to private as well as to public administrative systems. For example, in a society where the private sector plays an important role in disaster response, e.g., the United States, the societal context within which that private sector operates affects the structure and performance of disaster response functions.

To use the contextual perspective, the relevant variables have to be selected. In the early literature in public administration the selection of relevant variables was based solely on intuitive and a priori assumptions concerning the relationship of bureaucracy to contextual societal variables. Forward (1967: 450-472) has shown how the ecological perspective in public administration can be used with some of the societal level empirical data presently available to create an empirical foundation for theorizing concerning relationships of various structures within society. By using the Banks and Textor measure of bureaucracy (modern, semi-modern, transitional, and

traditional) as a criterion variable and by correlating a large number of variables with the measure of bureaucracy, Forward ordered all variables in terms of their association with the criterion variable. Factors and the variables that define them were separated. Forward's four factors which he labeled: (1) economic, (2) communication, (3) political, and (4) socio-political, parallel the three factors found by Sawyer (1967): size, wealth, and politics. They are also in accord with the findings of Banks and Textor (1963) and Russett (1964), useful in conceptualizing the problem studied here.

While the literature in the area of comparative public administration is quite varied, studies that analyzed only one country and those which compared two or more nations have been most useful here. The literature in this field may be placed in any of the cells in Grimshaw's taxonomy.

In summary, disaster literature has been of particular relevance as background for conceptualizing disaster response functions, but has also given some insight into the importance of some institutional/structural variables. Literature from the perspective of quantitative and other empirical societal level analysis and comparative administration literature were of particular utility in identifying and measuring relevant institutional/structural variables for the research. The disaster literature was particularly relevant to the specification of the disaster response functions. Literature from all three areas discussed, particularly from previous quantitative and empirical societal level studies, was relevant to the specification and operationalization of the independent variables and also assisted the researcher by providing insight into the relationships between societal level institutional/structural variables for the research. The disaster literature was particularly relevant to the specification of the disaster response functions. Literature from all three areas discussed, particularly from previous quantitative and empirical societal level studies, was relevant to the specification and operationalization of the independent variables and also assisted the researcher by providing insight into the relationships between societal level institutional/structural variables and the performance of disaster response functions.

CHAPTER II

THEORETICAL AND METHODOLOGICAL PERSPECTIVES

To elaborate the theoretical and methodological perspectives within which the research is cast, this chapter is divided into the following seven major sections: (1) the concepts used in the research are defined and set in context; (2) a theoretical overview of the research is given; (3) some methodological issues relevant to the study are outlined; (4) the procedure for the selection of the nations and sites for study is explained; (5) the independent and dependent variables are specified and operationalized; (6) the research design is presented; and (7) the sources and procedures of data collection are outlined.

The Concepts Used in the Research

The basic rationale for this study is similar to Greenwood's "controlled observational study" (1945), and Chapin's "ex post facto" design (1955). By using elements of each of these designs, this research has sought to approximate the controls of the classical experimental design in a number of non-laboratory situations. (1) Three societies, Italy, Japan, and the United States, were chosen to provide enough similarity on relevant institutional/structural variables to allow for control and enough difference on the key independent variable, i.e., degree of centralization, to allow for contrast. (2) Disaster agents are used as test factors to stimulate stress in societies. (3) The various functions of disaster response are the dependent variables. In the development of this research design, the following concepts are necessary to define: society, centralization, disaster, and disaster agent.

Society/Nation

The most abstract concept used here is society. Talcott Parsons writes, "A society is relatively the most self-sufficient type of social system" (1966: 2). The word "relatively" is important since no society is either absolutely autonomous or self-sufficient. The more specific focus on the political dimension of a society is captured by the "nation."

A nation, in the contemporary sense of the word, exists when a political state coincides with a total society and when the polity is the dominant social network within the society. In other words, a nation is the particular kind of society that happens to be prevalent in today's world. (Olsen, 1968: 97)

For the purposes of this study, however, the words "society," "nation," and "country" will be used interchangeably.

Centralization

Centralization, in this study, is viewed in two ways: as the structure of power in a system and as the pattern of decision making. Viewed as the structure of power, centralization falls on a horizontal axis and a vertical axis. Banks and Textor (1963: 106) refer to the horizontal distribution of power as a functional distribution on the same level. In the political institution, this refers to the allocation of power between the executive, legislative, and judicial branches of government. A decentralized nation on the horizontal axis is one in which these three branches of government are "functionally autonomous," and a centralized nation is one in which there is complete dominance of government by one branch or by an extragovernmental agency. Italy, Japan, and the United States are all ranked as nations where there is a significant distribution of horizontal power among these three branches of government.

The structure of power on the vertical axis refers to the levels on which power is distributed, and in a centralized system the central, or highest level, retains power to itself. A decentralized system is one in which power is distributed among system levels. Banks and Textor (1963: 105) refer to politics with "effective federalism" as those politics where central and regional governments are "coordinate and independent in their respective spheres." Italy and Japan are classified as having a vertical power distribution that is one of "formal and effective unitarism," i.e., centralized systems (Banks and Textor, 1963: 105). The United States is classified as a nation of "effective federalism," i.e., a decentralized system.

Centralization may also be viewed as the pattern of decision making. Hammond (1968: 63) suggests simply that centralization in decision making means "fewer participants" in major decisions. Simon (1957: 234-235) designates the process of centralization as taking the actual weighing of competing considerations out of the hands of the subordinate and requiring that he accept the conclusions reached by other members of the organization. Two characteristics of centralization in decision making, decisions by fewer participants and decisions at a higher level, may be accomplished by using general rules to limit the discretion of the subordinate and by taking the actual decision making function out of the hands of the subordinate. The structure of power and the pattern of decision making may vary, with the issue being handled and through different time periods of an event, e.g., disaster.

Italy and Japan have been classified as politics that are structurally centralized and are described in the literature as centralized in their patterns of decision making (cf. Kogan, 1962 and Ward, 1967). The United States as a polity is structurally decentralized and is decentralized in its patterns of decision making relative to Italy and Japan. The guiding hypothesis of this study is that a centralized society will react to disaster in ways that are different from a decentralized system.

Disaster

Since disaster is a key concept in the study, it is appropriate that we briefly define the concept and give the rationale for its use.

Disaster is one of the many "sponge" concepts within the English language. When it is used, it often refers to different things. Initially, we can distinguish four different meanings of the term. (1) Disaster often refers to the disaster agent, i.e., a hurricane, an earthquake, a fire. (2) Disaster also refers to the physical impact which the agent has, i.e., the resulting property damage and the loss of life. The other two meanings are more psychological and sociological. (3) Disaster can mean the evaluation of the physical event. In other words, evidences of physical damage are evaluated as being disastrous. The same event, however, may be defined differentially by different individuals and by different communities. (4) Finally, disaster can mean social disruption created by the physical event. Social organization at many different levels -- family, neighborhood, or community -- may be disrupted. (Dynes, 1970: 323)

In this study we are interested in disaster in more than one of its meanings, with the major foci being on the first and fourth. In order to avoid confusion in the use of the concept, disaster in its first meaning will be referred to as the "disaster agent."

By viewing disasters as social disruptions we may consider them as part of the larger category of collective stress situations. "A collective stress occurs when many members of a social system fail to receive expected conditions of life from the system." (Barton, 1969: 38).

"Collective" stress sets disasters apart from individual tragedy. Because the stress arises from members of the social system failing to receive "expected" conditions of life, the stress may arise either from a worsening of conditions or a rise of expectations. The conditions of life that the system fails to provide include the safety of the physical environment, protection from attack, provision of food, shelter, and income, and guidance and information to carry on normal activities.

Collective stress may arise from a source either outside or inside the social system. External sources include large unfavorable changes in the environment of the system -- floods, droughts, earthquakes, blights and attacks from other systems, loss of markets or sources of supply. Internal sources include the various forms of massive social disorganization -- economic breakdowns such as depression, inflation or strikes and political breakdowns such as riots, banditry, revolution and civil wars, or such drastic increases in governmental interference with citizens as mass purges, pogroms, and growth of tyranny. (Barton, 1969: 38)

A scheme of classification other than by the dimensions of internal and external sources is that of consensus and conflict types of stress situations. A consensus type emergency is one in which there is general agreement among those affected by the disaster agent about goals, especially about the saving of lives. A conflict type emergency is one in which there is conflict about goals (Dynes and Quarantelli, 1968: 13).

This study analyzes disasters that are large scale collective stress situations. Because all the events are natural disasters they are considered to be sources external to the social system, and they are generally of a consensus type. The failure of the system to meet the expected conditions of life is "real" and not due to "rising expectations."

The Disaster Agent

A disaster agent is defined as a large unfavorable input into the social system. The research design of this study uses disaster agents as test factors. As an aid to holding the test factors as constant as possible, disaster agents may be typed according to the following critical dimensions: time (frequency, speed of onset, and duration), scope (area and intensity), predictability, and controllability.

Included in the dimension of time are the subdivisions of frequency, speed of onset and duration: frequency refers to the number of times the agent has struck in the same region; speed of onset to the suddenness of impact, rapid-gradual; and duration refers to such things as single or repetitive impact and whether impact is limited or prolonged.

Included in the dimension of scope are area and intensity. The area impacted by the disaster agent is of great importance. Disaster agents seldom strike a whole society, but the effect of the disaster may be felt society-wide. The geographical and social areas affected are of importance both in terms of the real figures and in terms of the proportion of the society affected. An area of one thousand square miles in a nation of one million square miles represents only one tenth of one percent of the nation's land area, while a one thousand square mile area in a nation of ten thousand square miles represents ten percent of that nation's total. The same principle may be applied demographically, e.g., absolute number and proportion of national population affected; economically, e.g., the absolute figure and the proportion of national income affected; and socially, e.g., the number and proportion of people in the various levels of society affected.

Another subdivision to be considered in the dimension of scope is intensity. Intensity, depending on the type of disaster agent, may be objectively measured, e.g., a flood crest reading or a Richter reading of an earthquake. Only when area and intensity are examined together do they yield the information that is necessary to build a complete picture of the disaster agent.

Predictability refers to the presence or absence of reliable indicators known to be associated with the occurrence of disaster events of various kinds. Earthquakes are low on predictability, while agents such as hurricanes are highly predictable.

Controllability has both objective and subjective elements. The reference here is to the objective element. A slowly rising river may be controlled, but disaster agents such as earthquakes and tornadoes are not controllable. The subjective elements of controllability, e.g., attitude toward the possibility, or even desirability, of controlling certain events, are considered as societal variables.

The disaster agents used as test factors in this study all occurred in the five year time span from 1964 to 1969 and are experienced with some frequency in the nations studied: one earthquake and two floods, all relatively similar in the dimensions of time, scope, predictability, and controllability.

A Theoretical Overview

Society can be viewed as a system of functionally interrelated structures and/or institutions. It is not the purpose of this research to verify the above statement; rather, the statement presents a model of society around which this research is conceptualized.

Systems may be related to other systems on a subsystem level, on the same level, and on a suprasystem level, with the same axiomatic principle applying for all levels. Thus, as a system is put under stress the various parts adapt to meet the stress; this adaptation takes place both within the same level and between levels.

Because municipalities, prefectures/states, and societies may all be viewed as systems within systems, and as open systems, the next higher level is always involved in the next lower level. The interaction between levels may increase or decrease when the system is put under stress.

Disaster agents seldom strike the entire geographical area of a nation. Most often a disaster agent will strike a municipality or prefecture/state within a nation, but the effects of the disaster may be experienced on the national level. This is particularly true in the case of this study, because the research has been limited to the analysis of large scale disasters.

As we apply these general principles to the study of functional response to disasters we see that a disaster agent may place demands on the normal functioning of a community beyond its capabilities. There must, then, be extra resources brought from somewhere. These resources may be brought from subsystems by tapping human and material resources not used during periods of normal time functions, e.g., volunteers. Resources may also be brought from the suprasocial system within which the municipality is located, e.g., prefecture/state or national governments. The city's capability to respond may also be increased by adaptations on the same system level, e.g., a fire

department may put less emphasis on its normal function of fire-fighting and devote a large proportion of manpower to search and rescue operations.

The two broad categories of factors which may influence the way in which a social system will respond to stress emphasized in this study are the nature of the disaster agents and the structures of the societal systems within which the disaster agents strike. An effort has been made to hold the disaster agents constant and thus allow the study to focus on the effects of national level systemic structural differences. This broad institutional/structural approach will allow inclusion of a wider range of nations, if the study is expanded in the future. The inclusiveness of the institutional approach is one of the chief advantages of its use when comparing nations, for it allows for the comparison of nations that have very large populations with nations that have small populations, of politically modern nations with traditional nations, of technologically developed nations with underdeveloped.

The social systems of the three countries studied may be viewed from the perspective of three basic levels of government: municipal, prefectural/state and national. The municipal and prefectural/state levels of government affect the response to disasters, and some consideration is given to this in the research; but the major focus of the study is on the effect of societal level structures. Just as the lower level political entities, such as municipalities and prefectures/states, are affected in their normal time functioning by the national governments within which they exist, so, too, the structure of the national society affects the nature in which disaster response functions are performed within that country. What, then, are the national structural variables that affect response to disaster?

The structural/institutional areas around which variables cluster are the demographic, economic, political and communications categories. The political variable, degree of centralization, is given particular emphasis. Kinship and religious variables are discussed in the research findings; but they are not given the same core position as the demographic, economic, political and communication variables. The unequal treatment of the different institutional/structural variables have precedence in the literature (Banks and Textor, 1963).

The dependent variables used are the functions of disaster response. The number of tasks that are performed in relation to disasters are grouped into eight functional areas: (1) warning, (2) emergency preparedness, (3) evacuation, (4) inventory, (5) victim care, (6) security, (7) welfare and (8) emergency restoration of services. These functions are carried out in most disasters, i.e., they transcend societal boundaries.

Methodological Issues

Five methodological issues discussed here because of their relevance to this research are: (1) unit of analysis, (2) control, (3) sample size, (4) generalizability, and (5) reliability of data. These problems are not completely independent of each other, and it is useful to bear in mind that though cross-national research exacerbates these methodological issues, they are, in principle, the same problems encountered in any kind of research. "In principle, there is no difference between comparative cross-cultural research and research conducted within a single society. The differences lie, rather, in the magnitude of certain of the types of problems that have to be faced" (Holt, 1970: 6).

Unit of Analysis

This study uses society as the basic unit of analysis, but some comparative sociologists argue for the use of lower level units. For example, Linz (1966: 267-277) argues for levels of analysis other than whole-nation comparisons and points to a number of weaknesses of comparing whole nations. The use of aggregate data to figure averages for large heterogeneous units, particularly when no account is taken of measures of dispersion, might not be the best data to use. With whole-nation comparisons there is also the problem of the limited number of cases available for systematic analysis and the question of whether the political entity called a nation is coterminous with cultural and other relevant boundaries. Can a nation be regarded as one society, and, if so, is society itself a meaningful unit for comparison?

In this study it is not argued that society is the only relevant unit of analysis, but it is certainly an important one. No matter on what level relevant variables are studied, if there are relationships uncovered they are relevant. Society, when considered as a national unit, has definite boundaries, and relevant variables can be more readily operationalized. Data for measuring these variables are more readily available than for some other units of analysis. There is a great deal more difficulty involved in setting the boundaries of a culture and in operationalizing and measuring the relevant data that make up that culture. The political institution, the key structure of a nation, is of particular importance for the subject matter of this research, i.e., political centralization.

Control and Sample Size

The issue of control is a problem in any research, but again, it is exacerbated when doing cross-national research. This issue and that of sample size are closely related and will be discussed together. When nations are compared on the societal level, and each nation is a case in the sample, it is difficult to attain an adequate size sample.

Even where a sample with an adequate number of cases is secured, the problem of whether the sample is unbiased remains. An inadequate sample, in terms of size and random selection, limits the kinds of statistical techniques applicable and the kinds of control that are possible. Randomization is not possible without an adequate number of randomly selected cases. Therefore, control of background factors must be from specification and this is not always possible when dealing with such macro-units as societies. All of these facets of the issues of control and sample size are relevant to this study. The sample of nations used in this research is small, consisting of only three nations. Even if the sample size could be expanded there would still be the problem of control because the nations are not chosen through the process of random selection, but according to a number of purposeful criteria. Therefore, control of background factors has been accomplished through the process of specification.

Generalizability

When a general event analysis approach to the study of social system is used there is the issue of how typical is the response to that particular event. Is this the kind of response that one may expect in any event? Because of the issue of generalizability, three different disasters have been studied in each country. This helps to separate the atypical from the typical and to uncover common processes of response, and it aids the researcher to use the country, and not the disaster, as the unit of analysis. The disaster event, then, becomes an aid in the study of the social system of a society. Generalizability is still a problem beyond the limits of disaster, or at least beyond the limits of stress. Disaster may, however, be used as an aid to give insight into other areas.

Reliability of Data

This study uses UN statistics and the coding decisions of the Banks and Textor (1963) study as the chief sources of data on the independent variables. There is generally a lack of consistent quality and availability of data between nations in statistics from the UN. Since Italy, Japan and the United States all have high levels of quality in national data for this study the problem was not as pronounced as it might have been, i.e., there is a tendency for the quality and availability of data to rise with the economic development in a country. There are problems of lack of agreement on definitions of certain items across nations and the deliberate or semi-deliberate distortion of data by national governments. For a further elaboration of problems attendant with international statistics, the reader may refer to Russett (1964). With the rather standard and commonly available variables used in this study, data should not prove to be much of a problem if the study is broadened at some future time.

The Banks and Textor (1963) survey subjectively coded national variables as typologies and ordinal scales on the basis of available published material and frequent consultations with area specialists. Even though such a process is difficult to evaluate in terms of accuracy, Olsen (1968b: 703) concludes, "they are the most comprehensive data of this kind available at the present time."

The Selection of Nations and Sites

The Selection of Nations

Four criteria were used in the selection of the three nations, Italy, Japan, and the United States, in this research: (1) the frequency of similar natural disasters within the national borders, (2) accessibility and receptivity of the country to social science researchers, (3) similarity of the nations on a number of structural and/or institutional parts and (4) contrast between the countries with respect to the structure of selected parts of their political and administrative systems.

1. Frequency of Natural Disasters Within the National Borders

Italy, Japan and the United States are among the most disaster-prone countries in the world. Hewitt and Sheehan (1969), taking a macro and aggregate approach to natural hazards research, did a global survey of natural disasters during the twenty-year time span from 1947 through 1967, and compiled an inventory of the type, recurrence and location of all forms of natural disasters. In relation to numbers of disasters, the United States, Japan and Italy ranked numbers one, two and one-half and seven of eighty-one countries on which data were available (Hewitt and Sheehan, 1969: 14-15). Thus, all three nations fell in the first decile of countries in recurrence of natural disasters. Japan, the United States and Italy ranked fourth, tenth and nineteenth in number of lives lost in natural disasters during the same twenty-year period (Hewitt and Sheehan, 1969: 14-15). Thus, all three countries were in the first quartile of nations in loss of life. Stated in deciles they fell in the first, second and third deciles respectively.

These three nations have similar types of disaster agents that strike within their borders: a part of each country is situated in one of the earthquake zones that pass around the earth, and all three societies experience flooding. Japan and the United States also have disasters that Italy does not have, e.g., mine disasters in Japan and the United States and tornadoes in the United States. The emphasis here, however, is on the fact that the countries have a number of similar disasters, allowing for more choice of disaster agents and sites to be studied within the countries.

TABLE 1

NUMBER OF DISASTER IMPACTS AND LOSS OF LIFE BY NATION
1947-1967

	Number of Disaster Impacts	Rank	Decile	Number of Lives Lost	Rank	Decile
(N = 81)						
United States	201	1	1	7,620	10	2
Japan	44	2.5	1	31,630	4	1
Italy	21	7	1	3,840	19	3

The societies compared here are comparable with respect to the frequency and types of disaster agents that strike within their borders. The number of disasters and the similarity of types provides an opportunity to select disaster agents that are relatively comparable in dimensions of type, time, scope, predictability and controllability. Thus, the agents were similar enough that they could be used as test factors.

The frequency of disasters in each country has created enough events in each nation so that it was possible to be selective about the sites within each country. In each country two urban areas and one rural area were chosen. The continuing frequency of disasters in these societies will allow opportunities for studies of future stress events.

2. Accessibility and Receptivity of the Country to
Social Science Researchers

The basis for evaluating nations on the criterion of accessibility and receptivity was previous research experience by DRC personnel and information accrued from the literature and from formal and informal discussions with knowledgeable professionals. DRC has had extensive research experience in the United States, and had conducted one disaster study in each country prior to the research done here.

3. Similarity of Nations on a Number of Structural and/or Institutional Parts

Herbert Hyman (1967) suggests that a researcher may gain a great deal more by reducing the principle of contrast and selecting countries that are similar in a number of respects. He goes on to say that the selection of nations often puts too much emphasis on variability and not enough emphasis on similarity. In other words, researchers may be carried away looking for countries that will provide a maximum of variability so that there will be a great deal of difference to contrast, so much contrast and complex variability that it is not possible to unambiguously isolate what the researcher wants. What was attempted in this selection of cases was to reach "an optimal blend of homogeneity and heterogeneity" (Hyman, 1967) to allow enough similarity for control and enough difference for comparison. In concrete terms, it meant choosing countries similar on a great number of structural variables and narrowing the area of contrast to difference in the degree of political and administrative centralization. As will be seen in tables in subsequent parts of this chapter, Italy, Japan, and the United States are similar on the control variables.

An observation and a truism should be made explicit at this point. First, it appears that achieving a degree of similarity between nations is more of a task than finding areas of contrast. Second, when dealing with nations, the word "relatively" similar seems appropriate. The researcher can only approximate the degree of control idealized in the "classical" design.

4. Contrast Between Nations in Degree of Centralization of Their Political and Administrative Systems

A major dimension of concern in this criterion is the degree of political and administrative centralization. On the indicator used on this dimension, i.e., vertical power distribution (Banks and Textor, 1963: 105), Italy and Japan were in the last of four categories on an ordinal scale, and the United States was in the first category. (See table 6.) Thus, Italy and Japan provide as much difference as possible on the contrast variable.

The Selection of Sites

An effort was made to select sites within nations that were similar on dimensions of size and geographical location. Because the focus of the study was on the effect of societal level variables, (particularly the variable of centralization) on the performance of disaster response functions, it was important to select sites with similar resources, (i.e., population bases) and geographically removed from the capital city of the country. It is, of course, necessary to deal in broad categories when using these criteria.

All the sites studied were well removed from capital cities. The range in community size in Italy was from a few thousand in the towns of Sicily to 7,000 in Valle Mossa, from 55,000 in Biella in the Piedmont to 430,000 in Florence. In Japan the communities ranged from 1,600 in Ashiwada Village to 237,000 in Kure City to 300,000 in Niigata City. In the United States the sites ranged from 3,800 in Pass Christian and 44,000 in Biloxi along the Mississippi Gulf Coast, from 44,000 in Anchorage to 600,000 in New Orleans. Thus, there are small communities and at least one city of the hundreds of thousands in each country.

The disasters all occurred within the five years from 1964 to 1969, and the societies in which they occurred are assumed to have not had major changes. The one area where there were changes of relevance to this study was in the specific field of disaster-related structures. This is taken into account.

If personnel from the Center go to a disaster immediately, it is done on the basis of mass media reports, information from United States government agencies and consultation with key personnel, e.g., a civil servant, newsman or academic. In the case of two of these countries, two of the disasters were chosen after some time had lapsed, i.e., up to three years. These disasters were chosen on the basis of newspaper articles on file at DRC and from information secured on previous research trips to the country, and then were verified by people knowledgeable in the field. All of these procedures were used within the framework of the above criteria for site selection.

Country	Agent	Site
Italy	Earthquake, 1963	Sicily
	Flood, 1966	Florence
	Flood, 1968	Piedmont/Vercelli
Japan	Earthquake, 1964	Niigata
	Typhoon/Flood, 1966	Yamanashi Prefecture/ Ashiwada Village
	Typhoon/Flood, 1967	Hiroshima Prefecture/ Kure City
United States	Earthquake, 1964	Alaska/Anchorage
	Hurricane/Flood, 1965	New Orleans
	Hurricane/Flood, 1969	Mississippi/Biloxi

FIGURE 2

COUNTRIES, AGENTS AND SITES

The Specification and Operationalization of the
Independent and Dependent Variables

The Independent Variables

The three nations compared in this study are highly industrial nations with large populations and are politically modern democracies. One dimension on which they differ is that of centralization; Italy and Japan are centralized nations, and the United States is decentralized. In the following pages the three countries will be compared in relation to a number of variables grouped under the following headings: demographic, economic, political and communication. The data presented show that the nations are relatively similar demographically, economically and politically and to a lesser extent similar in relation to the communication variables. One dimension along which they differ, and in relation to which they are contrasted in this study, is that of centralization.

Demographic Variables

Among the demographic variables, population size appears to be important. Sawyer (1967: 145-172) found the following three factors from 236 variables in 32 nations accounted for 40 percent of the variance in the matrix of variables: size, wealth and politics.

Closely indexing these three dimensions are three variables, themselves practically uncorrelated: population, gross national product per capita, and political orientation -- communist, neutral, or western. These three variables sort nations into groups of considerable homogeneity. Correlation between these three variables and each of the others show that size, wealth and politics highly predict a large number of other national characteristics. The prominence of these three dimensions has a number of implications for measurement, design and analysis of cross-national research (Sawyer, 1967: 145).

The total population of a country is conventionally described as de facto or de jure. A true de facto or present-in-area concept implies that all persons physically present in the country -- residents and nonresidents alike -- have been counted in the local area where they were found at the time of the census (UN Demographic Yearbook, 1968: 8). The population figures and comparisons used in this research are present-in-area estimates for the present territory taken from this Yearbook.

Urbanization, i.e., percent of population in cities of over 20,000 is also of importance in its own right and, additionally, because it is correlated with a number of other variables of importance such as size, communication, economic development status. The data on this variable are from Russett (1964: 51-52).

TABLE 2

DEMOGRAPHIC VARIABLES

Variable	Italy	Japan	United States
Population (N = 116)	49,903,878	98,274,961	179,323,175
Rank ^b	12	7	4
Decile	1	1	1
Urbanization (N = 120)	30.3%	43.2%	52.0%
Rank	37	17	9
Decile	4	2	1

^aThe "N" in this table and those which follow represents the number of countries in which the United Nations has compiled statistics.

^b"Rank" is the place the particular nation occupies among the nations of the world on which statistics have been compiled.

Economic Variables

Included in this category are GNP, GNP per capita, Economic Development Status and an Index of Differentiation. Russett (1964: 149-151) discusses the usefulness of using both GNP and GNP per capita in combination as an indicator of wealth, resources, power and general well-being of a country.

GNP, with the exception of a few countries with extremely large populations, e.g., People's Republic of China and India, is a good indicator of technological level. Russett (1964: 151) suggests, "Power in the modern world depends heavily on industrial production and scientific and technological capabilities. While these are correlated with GNP the correlation is not perfect." This variable would appear, from a substantive and intuitive perspective, to be one of the most important variables affecting the nature of disaster response functions.

Russett (1964: 149-151) discusses the advantages of using both GNP and GNP per capita in combination as a measure of wealth, resources, power and general well-being of a country. He, in fact, uses the GNP per capita as the single variable around which to build a typology of "stages" of economic and political development (1964: 293-303). Banks and Textor (1963: 65-66) show the weight they give to GNP per capita in requiring that a nation have a GNP per capita of over 600 dollars in addition to having a capacity for self-sustaining growth to be considered economically developed. Sawyer (1967: 145-172) found GNP per capita to be one of three key variables in his analysis of 236 variables in 82 countries. In all, GNP and GNP per capita seem to be substantively important variables.

GNP is given in millions of United States dollars. No definition is given in the source (Agency for International Development, 1965: 1-7). GNP per capita is the GNP divided by population. The data are given in United States dollars (U.S. Agency for International Development, 1965: 1-7).

The Economic Development Status is a measure used by Banks and Textor (1963: 65-66). This characteristic has the following two components: a ranking of the ability to sustain economic growth and a dichotomous division of GNP per capita of those over 600 dollars and those under 600 dollars. Because Japan, at the time Banks and Textor did their work, had a GNP per capita of less than 600 dollars it was ranked Intermediate on a ranking system of Developed, Intermediate, Underdeveloped and Very Underdeveloped. On the same criteria, but using more recent data, this study ranks Japan as Developed.

Substantive and theoretical perspectives indicate, furthermore, that differentiation into a number of structurally distinct and functionally specialized units plays an important part in the functioning of a society. For example, the higher the number of functionally autonomous units, e.g., police, fire, and militia, the greater the amount of time that will need to be allotted to coordination.

Societal differentiation is defined by Marsh (1967: 31) as "the number of structurally distinct and functionally specialized units in a society." The index used here is from Marsh (1967: 329-374). The components of his index include the percent of gainfully employed males in nonagricultural occupations and the gross energy consumption per capita in megawatt-hours.

TABLE 3

ECONOMIC VARIABLES

Variable	Italy	Japan	United States
GNP (N = 116) (in millions of U.S. dollars)	45,100	60,010	583,900
Rank	8	7	1
Decile	1	1	1
GNP per capita (N = 116)	893	626	3,084
Rank	23	30	2
Decile	2	3	1
Economic Development Status (N = 110)	Developed	Developed	Developed
Index of Differentiation (N = 114) (Score)	41.3	41.5	109.4
Rank	28	26	1
Decile	3	3	1

Political Variables

The particular political variables included in this study are limited to those that appear most relevant on the basis of the literature and the substantive focus of the research. All of the variables with the exception of "Political Orientation" were taken from Banks and Textor (1963). They include Westernization, Interest Articulation by Associational Groups, Political Modernization, Periodization, Ideological Orientation and Representative Character of Current Regime. These variables appear to form a complex of characteristics that correlate with the level of technology, modernization and differentiation of society. For example, nations that are economically developed and highly urbanized will most probably also be historically or significantly westernized, advanced in political modernization and conventional in political orientation.

Horizontal Power Distribution is included because of its relevance to the concept of centralization. Political Orientation is included because it was found to be one of three key variables accounting for variance in 236 variables in 82 nations (Sawyer, 1967: 145-172).

The first political variable is that of Westernization (Banks and Textor, 1963: 75-76). This typology is based on a geographical component, i.e., those nations on the European continent which fall within the limits of the Ottoman Empire. The importance of this variable is that the nations of this region rank high on economic indexes and have developed modern bureaucracies. Thus, the variable, while based on a geographical component, correlates with a number of others that are of relevance to disaster response, e.g., economic development and urbanization.

The second variable is Interest Articulation by Associational Groups (Banks and Textor, 1963: 83-84) and includes specialized structures of interest articulation such as trade unions, organizations of businessmen or industrialists, ethnic associations and civic groups. It may be hypothesized here that the presence of a significant amount of interest articulation will have some influence in certain areas of disaster response functions, e.g., welfare and emergency restoration of services, as interest groups bring pressure on government.

The third variable is Political Modernization: Periodization (Banks and Textor, 1963: 78-80) which focuses on political leadership and is concerned with the principal phases in the transfer of political power from traditional to modernizing leaders.

The fourth variable is Ideological Orientation (Banks and Textor, 1963: 80-82). This characteristic attempts to type countries on the basis of ideological commitments. A "doctrinal" commitment is judged to be the major component of ideological orientation only in Communist states. In nations of the "underdeveloped" world, there is a "dedication to developmental objectives that transcends all other forms of ideological commitment" (Banks and Textor, 1963: 81). Thus, many of these nations are typed as "developmental." The nations in this study are typed as "conventional," i.e., they rely more or less on conventionalized procedures for achieving the legitimization of new or changed power relationships.

The fifth variable is Representative Character of Current Regime (Banks and Textor, 1963: 85-86) and is attempting to type the representativeness of the present regime on the dimensions of form and content. The purpose is to type nations as to whether they are representative on a nondiscriminatory basis.

Horizontal Power Distribution (Banks and Textor, 1963: 106) is included among the controlled political variables because it is a part of the structure of power, i.e., it is the horizontal axis of the power structure and forms one dimension along which a nation may be typed as centralized or decentralized. A nation that has a "significant" amount of horizontal power distribution is one in which the executive, legislative, and judicial branches of government are functionally autonomous, i.e., it is decentralized on a horizontal axis. A nation that is negligible in the amount of horizontal distribution of power, i.e., centralized, is one in which there is a complete dominance of government by one branch or by an extragovernmental agency.

The fact that Italy, Japan and the United States are all decentralized on this dimension allows for a greater concentration of the analysis on the vertical axis of power structure and decision making, i.e., vertical power distribution.

Another political variable included in this study is "political orientation," i.e., Communist, neutral or Western (Sawyer, 1967: 153). The measure for this variable is whether in 1955 the nations had military treaties or alliances with the Soviet Union, the United States, or neither. This is one of the three variables found by Sawyer to account for 40 percent of the variance in 236 variables in 82 nations.

TABLE 4

POLITICAL VARIABLES

Variable	Italy	Japan	United States
Westernization N = 112	Historically Western Nation	Significantly Western (No Colonial relationship)	Historically Western Nation
Interest Articulation by Associational Groups (N = 111)	Significant	Significant	Significant
Political Modernization: Periodization (N = 115)	Advanced	Advanced	Advanced
Ideological Orientation (N = 87)	Conventional	Conventional	Conventional
Representative Character of Current Regime (N = 98)	Polyarchic	Polyarchic	Polyarchic
Horizontal Power Distribution (N = 82)	Significant	Significant	Significant
Political Orientation (N = 82)	Western	Western	Western

Communication Variables

A reading of disaster literature adds further support for the inclusion of the communication factor. For example, the literature on warning points to the importance of communication variables as they affect preparedness. The variables included here are newspaper circulation per 1,000 population, radios per 1,000 population, and literacy rate. Literacy rate might be in a separate category of social or educational variables, but for convenience, parsimony, and because it has some relation to the other two items, it is included under this category.

Newspaper circulation per 1,000 population is defined as the circulation per 1,000 inhabitants of general interest daily newspapers. "General interest newspaper" is any periodical publication intended for the general public which is devoted primarily to recording current events connected with public affairs, international questions and politics. "Daily newspapers" are those published three or more days per week. The data are for 152 countries in the year 1963 (UNESCO, 1966).

Radios per 1,000 population is defined as all receivers for broadcasts to the public, including loudspeakers connected to a "radio distribution system." The data refer to the number of licenses or estimated number of receivers in use (United Nations, 1963).

Literacy rate is defined as the percentage literate population aged 15 and over. The criterion for literacy is the ability to read and write a simple message. The data are from UNESCO (1961), as compiled by Russett (1964: 221-224).

The variables discussed in Table 5 on the following page are those that have been shown in previous studies to account for a large proportion of variance in societies. The countries included in this study are relatively similar on these variables, allowing for greater confidence in studying the effect of the particular independent variable on which the three nations are contrasted, i.e., centralization.

TABLE 5
COMMUNICATIONS VARIABLES

Variable	Italy	Japan	United States
Newspaper Circulation per 1,000 Population (N = 107)	123	417	312
Rank	34	5	14
Decile	4	1	2
Radios per 1,000 Population (N = 107)	162	133	941
Rank	31	34	1
Decile	3	4	1
Percentage of Literate Population Age 15 and Over (N = 118)	87.5%	98.0%	98.0%
Rank	28	15.5	15.5
Decile	3	2	2

The Contrasting Political Variable

The countries studied are relatively controlled on all of the demographic, economic, political and communication variables listed thus far. Because Italy, Japan and the United States are all decentralized on the horizontal distribution of power, the key variable on which they are contrasted is vertical power distribution. A centralized system is one in which the highest level of government retains power to itself and thus, has fewer decision makers. It was hypothesized that differences between countries on the variable of centralization-decentralization would have consequences for the performance of disaster response functions. For example, control would be from a higher level and would give less flexibility to decision makers and put delays in the decision making process.

Banks and Textor (1963: 105) classify nations on the characteristics of "vertical power distribution." "Federalism is the principle of . . . general and regional governments being coordinate and independent in their respective spheres" (Banks and Textor, 1963: 105). Countries are placed in categories on the bases of both their formal structure and its effectiveness.

The four categories are (1) effective federalism, (2) limited federalism (federal structure with limited separation or pronounced "centralist" tendencies), (3) formal federalism (formal or limited formal structure only), and (4) formal and effective unitarism (Banks and Textor, 1963: 105). Italy and Japan are placed in the fourth category and the United States is placed in the first category (Banks and Textor, 1963: Appendix A).

TABLE 6
CONTRASTING POLITICAL VARIABLE

Variable	Italy	Japan	United States
Vertical Power Distribution (N = 114)	Formal and Effective Unitarism	Formal and Effective Unitarism	Effective Federalism

In summary, the research will focus on the societal environment, ecology, or context within which disaster-related functions are performed. In general, an institutional approach will be used, and four categories of independent variables have been chosen for examination: (1) demographic, (2) economic, (3) political, and (4) communications. The cases studied are controlled on the demographic, economic, and communication variables and on a number of variables within the political institution. The cases are then contrasted on the dimension of degree of centralization.

The Dependent Variables

Previous research at the Disaster Research Center at The Ohio State University has identified eight activities and functions that are carried out in disaster situations. The experience of the Center has been that these functions are carried out in most disasters and transcend societal boundaries. If some of the functions listed are not carried out in the disasters studied in this project, this, too, would be of significance.

The following eight activities and functions are the dependent variables.

1. Warning is the process of detecting and predicting a disaster agent, disseminating this and related information to others, and receiving such information from others prior to impact.

2. Emergency preparedness (other than warning and evacuation) includes the precautions taken after warning to protect people and/or property, the coordination and control of such activities, and the degree of preparation prior to impact.

3. Evacuation is the advising, directing or ordering others to leave an actual or potential disaster area. This includes specifics such as how quickly the appeal is initiated, what kinds of appeals are used, the criteria for choices made, the procedures for establishing camps or centers, and the matter of transportation of evacuees.

4. Inventory is the assessing and mapping of the situation following impact, including the decisions and priorities established and the feedback obtained from the disaster site.

5. Victim care includes searching for and rescuing both the injured and uninjured, the providing of medical care, and the care of the dead.

6. Security is the process of guarding and patrolling the impacted areas.

7. Welfare is providing for necessities which may include food, clothing, shelter, economic well-being, and morale, and this is to be distinguished from long-term rehabilitation.

8. Emergency restoration of services is the process of putting essential services back in order and should be distinguished from long-term restoration.

Four aspects of each of the preceding functions are of interest. How are they carried out? Where do they take place, i.e., the geographical location of the activity? Who were the individuals, groups, and organizations involved in the activities? What difficulties were encountered?

The Research Design

The societal level variables are the independent variables. The disaster agent is the intervening variable, which, because it is held constant, is treated as the test factor. The eight disaster response functions are the dependent variables. (Figure 3.) The disaster is the event around which the research focuses. (Figure 4.)

The independent variables are controlled, in the case of these three countries, with the exception of the degree of centralization of the political institution. This key area, degree of centralization of the political institution, is the particular independent variable examined most thoroughly in the research. Because the disaster agents are controlled, they are used as a test factor to stimulate stress in the society. Because disasters are events, they are used in this instance to bring parameters to the study

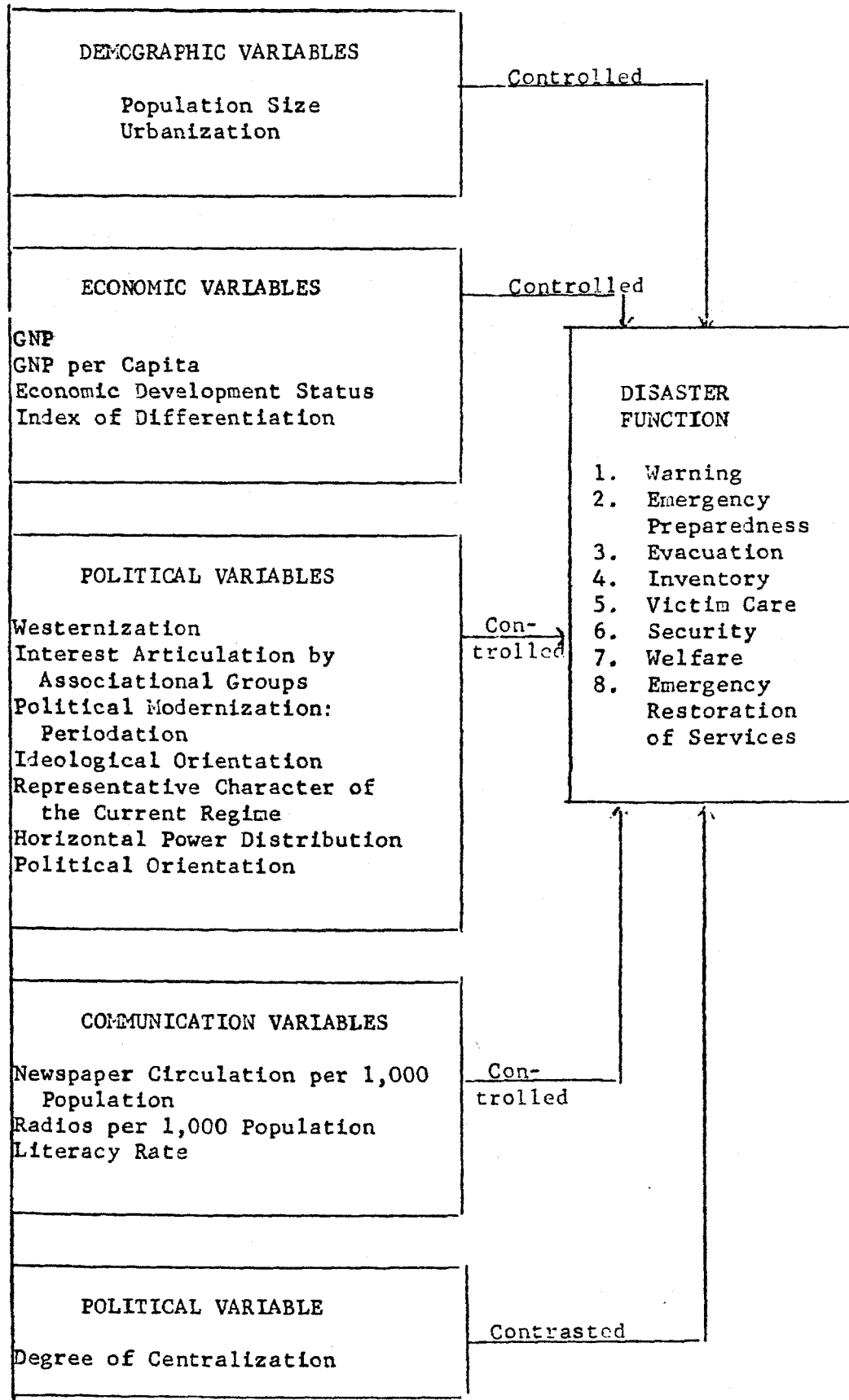


FIGURE 3

THE INDEPENDENT AND DEPENDENT VARIABLES

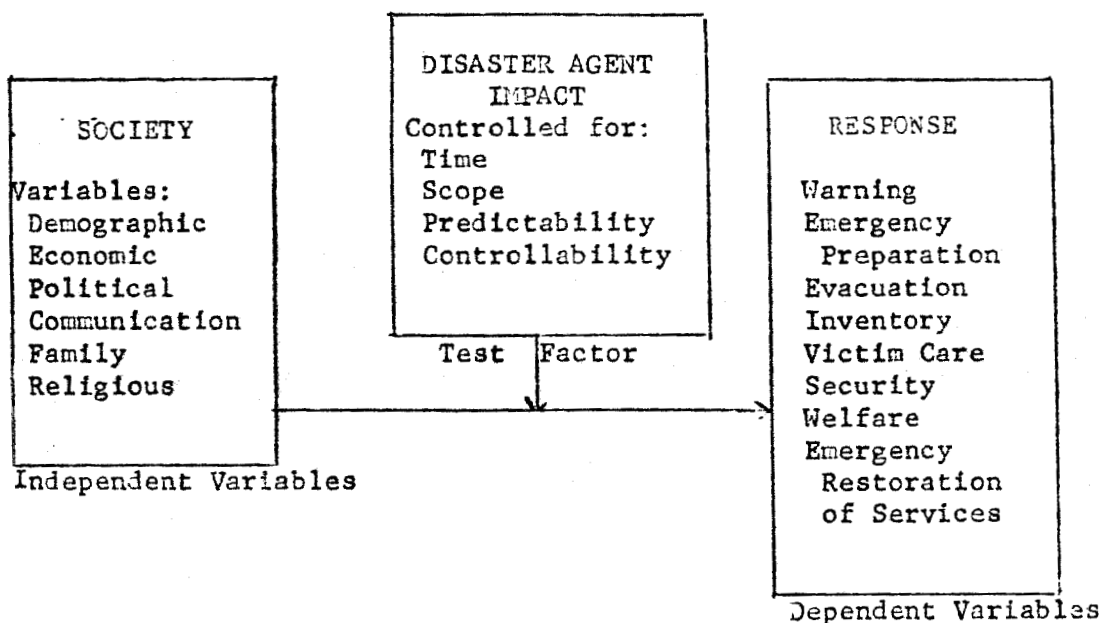


FIGURE 4

MODEL

through the method of event analysis. The disasters studied were chosen on the basis of the size of the disaster and characteristics of the site, e.g., large-scale natural disaster and location and size of site. The dependent variables are the disaster-related functions. The guiding theme of the research is that the societal context is, in part, a determinant of the disaster response.

Three disasters at three different sites in each country were chosen for study. Two kinds of disaster agents, two floods and one earthquake, were selected in each country. Two cities and one less densely populated area, none in the immediate area of the national capital, were chosen in each nation as the sites for research.

$S_{a, 1-3}$	X_{1-3}	O_{1-3}
$S_{b, 1-3}$	X_{1-3}	O_{1-3}
$S_{c, 1-3}$	X_{1-3}	O_{1-3}
<hr/>		
S = Society	X = Disaster Agent	O = Response
a Italy	1 First disaster	
b Japan	2 Second disaster	
c United States	3 Third disaster	

FIGURE 5

DESIGN

Choosing three disasters for study in each society was an aid in separating the typical from the atypical response and in uncovering patterns of response. It also helped to sensitize the researcher to links between the societal structure and the nature of disaster response by providing some contrast within societies that might be extrapolated to possible differences between societies. This helped the researcher to recognize the importance of similar contrasts on the national level, e.g., differences in GNP between nations. These within-nation differences were particularly important as a sensitizing device in this study because the nations chosen for study were so similar on most institutional/structural variables. Using two kinds of disaster agents that were relatively controlled on the dimensions of time, scope, predictability and controllability enabled the researcher to look for differences in response that might be partially attributed to the type of agent and not accounted for by the other dimensions of the disaster agent.

Data Collection

Sources of Data

The data used in this study are gathered from the following sources: (1) interviews, (2) observations on the scene, (3) supporting printed material and (4) general library literature.

In Italy there were eight interviews conducted on the Florence flood of 1966, seven interviews in connection with the Sicilian earthquake and twenty-four interviews in connection with the Piedmont/Vercelli disaster of 1963. These interviews were conducted with key personnel, ranging from National Ministry level offices to an officer of the local union.

In Japan there were twenty-eight interviews in connection with the Niigata earthquake of 1964, twenty-two interviews related to the Yamanashi Prefecture/Ashiwada Village typhoon and flood of 1966 and twenty-three interviews related to the Hiroshima Prefecture/Kure City typhoon and flood of 1967. These interviews, like those in Italy, were with officials from the Cabinet level to volunteer firemen of the local village.

In the United States, there were 251 interviews conducted in connection with the Anchorage earthquake of 1964, 134 interviews in connection with the New Orleans hurricane and floods of 1965, and 51 interviews in connection with the Mississippi/Biloxi hurricane and floods of 1969. The interviews within the United States, even those with national-level officials, were conducted at the sites of the disasters.

TABLE 7

NUMBER OF INTERVIEWS

Country	Disaster	Number of Interviews
Italy	Florence	8
	Sicily	7
	Piedmont/Vercelli	24
Japan	Niigata	28
	Yamanashi Prefecture/ Ashiwada Village	22
	Hiroshima Prefecture/ Kure City	23
United States	Anchorage	251
	New Orleans	134
	Mississippi/Biloxi	52

The interviewees were approached as informants and respondents. An informant is one who may not have experienced the event or process about which he is being interviewed but has reliable information on the subject. A respondent is one who has actually experienced the subject and is being questioned about his role. In some instances the interviewee was approached as either an informant or a respondent, and in others one person was interviewed as both respondent and informant.

The interview was semi-structured, focusing on the nature of organizational participation in the various disaster functions and averaged one hour in length. The interviews were tape recorded and were subsequently transcribed. These interviews provide the primary data base for the study.

The second source of data was observation on the scene by the field staff, with notes handwritten and later dictated onto the tape, and then transcribed. Being at the site enabled the researchers to observe interaction patterns and to understand background factors.

The third source of data came from governmental agencies, business organizations and any number of other groups. Of particular usefulness were such items as after-action reports, disaster plans, laws pertaining to disaster response, and organization charts and descriptions. In addition to this material that was generally secured on the field or sent later by mail, a great deal of information about the nations in the study was gathered from compilations of statistics and general literature in the DRC files and library and in The Ohio State University library.

Field Procedures

The DRC had field experience in each of the nations in this study prior to the inception of this research. Therefore, it was possible to combine the experience of staff members with material from the literature to adopt the most appropriate procedures.

In the three disasters within the United States sufficient data had already been collected by field teams from the DRC. Because of the large number of domestic disasters studied previously, the researcher was able to select three disasters that met the criteria for selection and for which there was sufficient material to provide reliable data on the questions used in the foreign research. DRC reports on these particular disasters were studied, selected interviews were read, and staff members who had done field work at the disaster sites were consulted. Because of the large amount of data on the disasters and sites in the United States, it was possible to secure reliable answers to the questions on the interview guideline without going to the site.

The approach most commonly used by the DRC in studying domestic disasters is to send a reconnaissance field team of at least two members to the scene of the disaster immediately after its occurrence. This team is to make a judgment on the advisability of doing further study on the disaster. If it is decided that the disaster is worthwhile studying further, the team may stay on, new and/or additional members may be sent to the field, and/or a follow-up trip may be made.

The same basic approach, with some important revisions, is used in foreign disasters. Rather than going directly to the disaster site, as is the procedure in the United States, first contacts were made on the national level, then the prefectural level and, finally, at the level nearest the disaster site. For example, in Italy and Japan, contact was first established in the capital cities with the central government agencies and the central agencies of other relevant groups and organizations. These offices and organizations were known from prior experience of the personnel, and key interviewees were asked to suggest other relevant personnel and offices. Some academic personnel in each country were also contacted in order to secure a broader base from which to build in this basically reputational approach to leadership. From the national level the researchers proceeded to the prefectural and municipal level using a similar approach.

In the United States disasters, the Piedmont flood in Italy, and the Niigata earthquake in Japan the disaster studies were conducted within ten days following the impact of the disaster agent. In the instance of the remaining two disasters in both Italy and Japan, there was a time lapse of up to three years between the disaster and conducting the field work. In comparing the two approaches, with the general focus that is used in this study, it appears the first approach is preferable. Even when the researcher does not speak the language there is a benefit to being on the scene while the disaster

response is still in the emergency period. He can then see some of the patterns of interaction and secure an understanding of the situation that is very difficult to achieve without having first-hand observation. Doing research at a later time allows problems of memory loss and organizational protection to develop. It is often difficult to get organization personnel to be completely candid, becoming more pronounced when a time lag occurs between the event and the interview and when the barrier of language is added. With some patience and by cross-checking on the same event with other interviewees, the problem may be circumvented.

In the instances of the three disasters in the United States and the Niigata earthquake, staff other than the writer were sent into the field within a week of the initial disaster impacts. In the case of the Piedmont/Vercelli floods, this writer made the field trip personally within a week after disaster impact. In the instances of the Yamanashi and Hiroshima floods and the Florence flood, data were collected by the author after a lapsed time of one and one-half to three and one-half years following the disaster impacts.

In the interviewing, language and protocol were areas to which the field team members were alert. Interpreters, more necessary in Japan than in Italy, were secured where needed. Most national officials spoke English, the language of the interviewers, but at the lower levels of government interpreters were often needed. Protocol was of some concern in Italy because of a trait that does not allow probing into particulars of a story once it has been told by the interviewee. This was not the problem it might have been because the nature of the subject matter -- disaster response -- allowed for somewhat detailed questioning without seeming to probe. Japanese tend to show great deference for those of superordinate position, therefore, the researchers had to encourage the interpreters -- often of lower status than those being interviewed -- to ask questions a second time when the answer was not clear.

CHAPTER III

THE PRESENTATION AND ANALYSIS OF FINDINGS RELATED TO DISASTER RESPONSE

This chapter, to present the findings of the research, is divided into the following nine sections: (1) the disaster agents and the disasters, (2) warning, (3) emergency preparedness, (4) evacuation, (5) inventory, (6) victim care, (7) security, (8) welfare, and (9) emergency restoration of services. In each of the sections related to the disaster response functions a description of the performance of that function in the nine disasters studied is presented. The findings related to each section are summarized at the end of that section and are further analyzed and interpreted in chapter four.

The Disaster Agents and the Disasters

Italy

Sicily

On Sunday, January 14, 1968, a series of earthquakes struck the western part of the island of Sicily. While they were relatively modest in intensity, with magnitudes ranging from 4.1 to 5.4 on the Richter scale, there were at least seventeen of them recorded in twenty-three days. Earthquakes in Sicily have generally been on the eastern part of the island, and so the location of these earthquakes varied from the usual expected pattern in Sicily.

Two small villages, Monterago and Givellina, were totally destroyed, and ten others were severely damaged. Two hundred and sixty (260) deaths were attributed directly to the earthquake and six hundred (600) injuries. Sixty to eighty thousand were made homeless, and nine thousand two hundred and ninety-four (9,294) people emigrated from the island between February and June of 1968.

Florence

This research concentrates on the response to flooding in Florence considered in the context of the larger disaster of floods which covered most of the northern third of Italy (64,000 square miles). The relevance of the larger context is always implicit and will be referred to explicitly at various points in the discussion.

Heavy rainfall was continuous during the last weeks of October and the first days of November, the rivers of Tuscany and the north regions overflowed November 4 and 5, 1966, flooding vast

areas in central and northern Italy. The day the flood struck Florence was a national holiday, an important fact since the usual pattern of business was changed.

Although the death rate was relatively low (17 in the province and about 120 for the entire disaster), the floods caused extensive damage to cities, farmlands, livestock and communications. Twenty-two thousand (22,000) people were without houses. Fifteen hundred (1,500) animals, among them most of the thoroughbred horses from the Florentine racing stables, were drowned and washed into the streets of the city. The city was without water and electricity. Thirty thousand (30,000) cars were caught in the flood. The churches, museums and libraries of Renaissance Florence were invaded by water and mud mixed with fuel oil which caused untold damage to priceless paintings, frescoes and manuscripts. Later assessments of damage indicate that early estimates were unrealistically high. The injury to some of Italy's art treasures was tragic, but from a general economic point of view, Italy did not receive the crippling blow that was at first feared. One interviewee stated the situation quite well in contrasting the flood in Florence to the earthquake in Sicily, "Florence was dramatic, but Sicily was desperate."

Piedmont/Vercelli

The Piedmont area of northern Italy had received heavy rain and flooding for two days when on Saturday, November 2, 1963, a landslide of rocks and clay came rolling off the mountain and struck the wool factory adjacent to a stream in a small community above the town of Volle Mosse. The factory temporarily halted the slide, but then it broke loose and continued down the rapidly descending riverbed, striking community after community as it made its descent to the largest valley in all of Italy. The flooding was widespread throughout a major portion of northern Italy, but the most severe damage was done in the industrial area of Biellese in the foothills of the Alps. The destruction and death were brought more by slides of rocks and mud than by water. When the flood was over, estimates of loss of life ranged from seventy-four through ninety-three, as the damage estimates ran as high as 800 million dollars. Eighty factories were damaged and, of these, twenty were declared total losses.

Japan

Niigata

The earthquake struck Niigata from an epicenter in the Sea of Japan sixty miles west of the coast at 1:02 p.m., June 16, 1964. The earthquake, which registered 7.7 on the Richter scale, was three minutes in building to the most severe quake. There were 8,637 homes totally or partially destroyed and 9,633 other buildings damaged. Communication was interrupted, and almost all sea, land

and air transportation was damaged. Thirty-three minutes after the initial shock there were recurrent tsunami strikes. Fifty percent of the city's land area was flooded, and 11,101 buildings were inundated. There were nineteen small and five major fires. One fire in a refinery burned for twelve days and destroyed ninety storage tanks, engulfed 302 residences and 197 other nearby buildings and forced 6,500 residents to evacuate. The fires might have been worse, but because the quake came after lunch and took three minutes to build up, many people either had their gas already turned off or they immediately turned it off.

One hundred fifty-two thousand four hundred and one (152,401) people in Niigata City were affected; 24,000 were evacuated to eighteen refugee centers. In each of the first two days 150,000 meals were provided by public authorities. In the city eleven were killed and 120 injured. In the remainder of the prefecture 97,399 were affected; three killed and 216 injured. A dysentery epidemic was feared, but only thirteen cases were identified, the last nine days after the earthquake.

Yamanashi Prefecture/Ashiwada Village

On September 24 and 25, 1966, two typhoons struck Japan, killing more than 190 persons and injuring 1,000. Mud avalanches destroyed two hamlets in Ashiwada Village on the north side of Mount Fuji. Typhoon Ida, which came onto the island with 85 mph winds, caused heavy crop damage in Yamanashi, and winds of 202 mph on top of Mount Fuji. In Yamanashi Prefecture there were 141 killed, 34 missing, 65 seriously injured and 143 slightly injured, for a total of 383 casualties. The total damage was estimated at 71 million dollars. There were 17,532 houses damaged to some degree; of these 295 were totally destroyed. Damage to non-dwelling houses totalled 2,027, of which 276 were totally destroyed. Two hundred and fifteen (215) public structures were damaged, of which 17 were totally destroyed.

Ashiwada Village suffered 81 dead, 13 missing, 55 seriously injured, and 38 slightly injured. Seventy-nine dwelling units, 77 non-dwelling units, and one public building were completely destroyed. A number of these buildings were actually washed into the lake. The damage estimates are as follow: roads (2,074,000 dollars), forests (2,825,000 dollars), agriculture (3,923,000 dollars), housing and others (770,630 dollars), water (82,000 dollars), and schools (14,000 dollars).

Hiroshima Prefecture/Kure City

Typhoon Billie, with winds of more than 80 mph, swept into Hiroshima Prefecture on July 9, 1967, bringing with it torrential rains that caused the worst floods in ten years and more than 1,900 landslides in its wake. Kure City was severely damaged by 47

landslides, and the statistics read as follows: 159 dead, 231 injured, 352 buildings destroyed, 551 roads damaged, 171 embankments destroyed.

The United States

Alaska/Anchorage

The Anchorage earthquake occurred on Good Friday, March 27, 1964, at 5:36 p.m. and registered 8.4 to 8.7 on the Richter scale. The epicenter was in Prince William Sound in the south central part of the state.

Property damage was estimated at more than 300 million dollars, and 116 people died. Anchorage, approximately 30 miles west of the epicenter, received the most property damage, but had only nine deaths. Seismic shock and landslides in four main areas rather than seismic waves accounted for the damage in Anchorage. Immediately following the earthquake, normal community processes were interrupted. Two of the seven Anchorage water system wells were destroyed, and the system was almost entirely drained. Eighty percent of the gas customers had service disrupted, the area's electric power failed completely, and city telephone service was disrupted.

New Orleans

A tropical depression, first noticed on August 26, 1965, approximately 675 miles east-northeast of the island of Trinidad developed into hurricane proportions as it moved northwest. When it was north and east of the Bahama Islands it began a very unusual movement. It moved south and west, struck Miami, and then continued west and north and slammed into New Orleans at 10:00 p.m. on September 9, 1965. At 10:02 p.m. winds in New Orleans were clocked at more than 100 mph, and, as the eye of the storm passed over the city between midnight and 4:00 a.m., the winds reached 125 mph.

It was not the velocity of the winds, however, that made this disaster so damaging. It was a tidal surge that followed the winds and raised water over the Industrial Canal (The Inner Harbor Navigation Canal). The city had prepared for a hurricane and now they were confronted with a totally unanticipated disaster -- a flood. In a hurricane, flooding generally occurs around Lake Ponchartrain, but this flooding also swept up the Industrial Canal and the Mississippi River. Thus, New Orleans, which has had a great deal of experience with hurricanes, was unprepared for this event.

This was the most destructive storm on the Louisiana records, with total damage in the state reaching more than one billion dollars.

Within the state boundaries 4,800 square miles were inundated, 31 people killed and 250,000 people evacuated.

Mississippi/Biloxi

Hurricane Camille was the most devastating storm to strike the mainland of the United States in the twentieth century. The eye of the storm struck Pass Christian, Mississippi at 11:30 p.m. Sunday, August 17, 1969 with a forward speed of 15 mph and winds estimated at 190-218 mph. Tides reached 20-33 feet (including wave action) above normal. The morning weather on August 17 was deceptively beautiful along the coast of Harrison County.

As of October 16, 1969, 255 persons were dead and 27 missing. The number of seriously injured was rather low throughout the storm area. The total number of homes destroyed was 36,362, house trailers destroyed totalled 590, and small businesses 432. Loss of life along the Mississippi Coast was 134 and missing 23. In Biloxi there were 526 homes destroyed, 3,265 homes with major damage, 7,320 homes with minor damage, with the total of homes destroyed or damaged reaching 11,111. House trailers destroyed or damaged were 135, and small businesses destroyed or damaged, 65. The loss of life in Biloxi was 15.

Summary: The Disaster Agents and the Disasters

In all the disasters except Niigata, there were unusual characteristics or circumstances related to the disaster agents and/or to the social systems. Separately and in interaction with each other these characteristics and circumstances had profound influence on the disaster and the nature of response.

In relation to the disaster agents, some of these "twists" to the usual patterns might be partially discredited as post facto rationalizations by officials to justify weaknesses in the performance of response functions; after making allowances for rationalizations, there is still evidence that some of the disaster agents did vary from their usual patterns. The data indicate that these deviations had a number of consequences.

In some instances, if the disaster agents had not deviated from their more common patterns, there might not have been major disasters. For example, Hurricane Betsy struck New Orleans with severe winds; the municipality had adequate warning and was prepared. It could have dealt with the destructive winds with far less property damage and fewer deaths than was the case; but in addition to the severe winds and the flooding in the usually well defined regions, there was a secondary disaster in the form of unexpected and widespread floods. Thus, the system was met with a stress agent for which it was unprepared and the result was a disaster.

In three of the disasters the affected societies were commemorating holidays. Both the Florence flood and the Piedmont floods struck when the populace was observing the national armed services day. In the instance of the Piedmont floods it was actually the day following the national holiday, but the factory workers were not at work because they had been given an extra day of leave. The earthquake in Alaska occurred late on Good Friday afternoon.

The time of the day at which the disaster agent struck was relevant in all the disasters. For example, the Sicilian earthquake occurred at night when people were asleep in their homes, and many victims were buried in their homes. Had the earthquake occurred during the day, these agricultural people might have been in the fields.

Warning

Italy

Sicily

There were earth tremors the day before the major earthquake, playing one important part in the warning function. An inspector from the Division of Civil Defense was actually on the scene inspecting minor damage when the major earthquake struck. He immediately telephoned Rome and was able to get the message out that the area was experiencing a terrible disaster before communication was broken.

Florence

At the time of the flood there was no system for alarm for the populace. Because of the heavy rain and the environmental cues a group from the prefectural government did go to observe the river, but it was not until two hours before the actual flood that it became clear to these men that the water actually would flood the city. At 7:00 a.m. on November 4, 1966, the Arno poured its debris and mud-laden waters into the streets of Florence. The population had not been warned, and those officials and shopkeepers who had been notified were able to take only the most hasty precautionary measures. "Florence could not defend herself, but she could have been advised" (Nencini, 1966: 29).

Under severe criticism, the officials of Florence have answered that they did not warn the populace because they considered that it would have been dysfunctional, since the streets of Florence are narrow and congested with traffic and the buildings are sturdy and there was no fear of their collapse. The officials reasoned that a general alarm would have caused severe traffic congestion as people,

particularly businessmen, tried to evacuate their goods from the center city area. They reasoned there would be less danger of loss of life by simply letting people evacuate to the higher floors of existing buildings as the water rose. Today there is an official group given the task of keeping watch on the Arno, and reports are made daily. This, however, "is more for the psychological well-being of the populace than any other reason" (Interview).

Piedmont/Vercelli

There was no warning of the landslides that occurred nor of the flooding itself. It has been suggested in an interview that small rivers are more difficult to watch, most news items on television and radio are national (weather forecasting for a local region is not common), and flooding more often occurs in the northwest than in the northeast; all of these factors contributed to a lack of warning.

Japan

Niigata

There was no formal or informal warning. Because it took three minutes for the tremors to build up, a number of private citizens were able to take certain elementary precautionary steps, e.g., turning off the gas. This simple procedure would appear to be the result of a rather thorough education program before the disaster.

Yamanashi Prefecture/Ashiwada Village

There was warning that this typhoon was coming into Yamanashi, but there were complications that made the warning much less effective than one would expect. The typhoon was born late, but it came toward the prefecture with unexpected rapidity. The governor of the prefecture called relevant organizations together, and they stood ready to act all through the night. The group was notified four or five hours before the time that the typhoon actually struck. The Yamanashi Police received the third phase of warning at 9:45 p.m. on September 24 and immediately passed the warning on.

The typhoon struck Ashiwada Village shortly after midnight. The village firemen were together waiting for possible flooding, but were not expecting a landslide. There had not been a landslide around Lake Saiko for 300 years. Several houses were actually shoved into the lake. A young man swam the lake and reported the disaster to a police station, from where the warning was sent to the outside world.

Hiroshima Prefecture/Kure City

An advisory was announced from the weather station at 6:00 a.m. on July 8, and the heavy rain and flood warning was ordered at 11:00 a.m. on July 9. It took only twenty or thirty minutes from the time the weather station gave its warning until the warning reached each home by broadcast. The disaster occurred between 4:00 and 5:00 p.m. on July 9. Some of the officials in Kure City suggested that the people of the city received the warning rather casually.

The United States

Alaska/Anchorage

There was absolutely no warning. Both officials and population were caught completely by surprise.

New Orleans

The storm was observed by the United States Weather Bureau on August 27, 1965 and was tracked through its entire history. At 7:00 a.m. on September 9, the weather bureau issued warnings from the mouth of the Mississippi to Galveston, Texas, and at 5:00 p.m. the same day the weather bureau reported Betsy moving directly towards New Orleans. Official organizations were warned and were gathered for planning and coordination before the storm struck. The major difficulty here was that attention was directed toward the hurricane, and the flood came as an unexpected event.

Mississippi/Biloxi

The warning system in this area of the country for this type of storm is among the most elaborate in existence. Early warnings on hurricanes are picked up out of Miami and relayed to other weather bureau stations. Warning preparations began on Friday, August 15, giving adequate time for preparation.

The meteorologist at the Mobile Weather Station advised evacuation when it appeared the storm, which had originally been predicted to strike further east, would turn. He did this on the basis of a "hunch" before he received official confirmation. Because of his willingness to assume responsibility, many residents were given more warning than they otherwise would have had. Biloxi officials, with the help of firemen using loudspeakers on trucks, warned the populace.

Summary: Warning

In Japan and the United States there are rather elaborate warning systems. Japan has five levels of area boundaries for which the Japan Meteorological Agency (JMA) is responsible for issuing weather advisories and warnings: the national forecasting area, the district forecasting area, the prefectural forecasting area, the local forecasting area, and the special forecasting area. The advisories and forecasts are issued by JMA Headquarters, District Observatory or Marine Observatory, stipulated as responsible by JMA regulations. The network of warning is clearly spelled out according to a detailed plan which specifies the particular organizations and personnel within them who are to play a role in the warning process. The United States system is very similar, with a National Hurricane Center at Miami and district offices along the Gulf Coast. There are offices at New Orleans and Mobile.

In the instances of the two typhoons in Japan and the two hurricanes in the United States there were rather extended warnings. In the case of Hurricane Camille there has been some criticism of the Environmental Science Services Administration because the path of the storm was not what had been predicted. Some criticisms also were raised about Hurricane Betsy which struck New Orleans. The JMA receives similar criticisms from time to time. However, in the disasters studied in this research in both Japan and the United States warning was broadcast in advance of impact. In all cases advanced technology was used. The case in Italy was different; in neither of the flood situations was there any kind of warning system like that in Japan or the United States put into operation. In Florence, officials were warned, but in neither Florence nor the Piedmont was there warning via mass media.

In the three disasters that were precipitated by earthquakes, there was no official warning. In the case of the Niigata earthquake, however, there was a steady build-up over the period of three minutes, allowing time for the populace to use some elementary precautionary procedures, e.g., turning off the gas in cooking stoves.

Emergency Preparedness

Italy

Sicily

Because there was no way of knowing that the earthquake would strike and no official order or recommendation for evacuation, there was no emergency preparedness (neither was there any existing plan for such a disaster). People were sleeping in their homes when the earthquake struck.

Florence

Given the limited amount of time between the issuance of warning and the impact of the disaster agent, the amount of emergency preparedness possible was extremely limited. Because emergency preparedness is so dependent on sufficient warning, and is expedited by an adequate disaster plan that is rehearsed, in Florence at the time of this disaster emergency preparedness, by any criteria, was inadequate.

Piedmont/Vercelli

There was no warning; there had been little prior experience in this area with this kind of agent, and there was no preparedness.

Japan

Niigata

Emergency preparation was only of the most informal variety. There were elaborate disaster plans, but, because of the nature of the disaster agent, it was not possible to put them into operation before impact. Most of the preparation consisted of actions by individuals to lessen the possibility of secondary crises, e.g., fire from collection of gas.

Yamanashi Prefecture/Ashiwada Village

Because of the rapidity with which the typhoon moved into Yamanashi Prefecture, the period between initial warning and impact was extremely limited. The officials who were on the alert were expecting possible floods, but not the kind of landslides that did occur.

Thus, we may say that on the official level there was a general alert, which meant that the prefectural officials and village firemen were waiting to respond to general flood and wind destruction. The population went to bed as usual. They had been warned, but there did not seem to be a great deal that private citizens could do at night except wait. Thus the region was prepared, but not for the specific disaster that struck.

Hiroshima Prefecture/Kure City

Preventive measures were taken with the warning by both the prefectural and municipal governments. Areas that are vulnerable

to flooding are listed, and preventive measures, such as sandbagging, are taken. The preparations for this disaster were insufficient because of the landslides in addition to flooding. The Kure City Calamity Counter Measures Headquarters was established at 3:00 p.m., before the disaster struck.

The United States

Alaska/Anchorage

There was no warning and no preparedness before impact. There were some disaster plans developed prior to the disaster; these were not very specific or well rehearsed, and there was no opportunity to put them into effect prior to impact.

New Orleans

Preparation for the storm had begun in the mayor's office early in the day before the storm struck. Emergency operation plans were initiated by relevant organizations: buildings were prepared for possible evacuees, the Civil Defense Emergency Operations Center (EOC) was placed into full operation and there was a general coordinating meeting at the Emergency Operations Center prior to impact.

Mississippi/Biloxi

Biloxi had a simulation of Emergency Operations Center activity for nuclear disaster just a few months before Camille; the actual damages of Camille were quite similar to the simulation. It was particularly helpful for the officials because it gave them a much better idea of what needed to be done and of the roles they were to play. Broadcasts on radio and television went from Biloxi stations, New Orleans television cooperated with this. The general approach was to show the seriousness of the situation, but not to create panic. Appeals for evacuation were delivered by the County Civil Defense director, the mayor, the sheriff, the state civil defense director, the state governor and the station manager. The stations listed shelter locations and the standard procedures for citizens to follow.

The people of Biloxi have had a great deal of experience with storms, but the magnitude of Camille appears to have been beyond their comprehension. Therefore, they were thinking in terms of what had been the most serious storm of the past, a hurricane in 1947. This familiarity with hurricanes in general, combined with the prior benchmark (1947) that was less severe than this disaster agent, tended to lessen the sense of urgency and danger among the population. The main activity of emergency preparedness was evacuation of personnel and equipment and readiness of disaster-related organizations.

Summary: Emergency Preparedness

The amount of time allowed for the warning process is extremely important for the emergency preparations function, although warning time is not a sufficient condition to negate emergency preparedness. Another characteristic that becomes particularly important for emergency is the amount of preplanning and the degree to which its existence is known. This is particularly important where there is a high level of technology, a high differentiation of function and a complex division of labor.

There are a number of commonalities that show themselves in relation to this function across the societies. In the Piedmont floods in Italy, the Yamanashi typhoon in Japan, and the New Orleans hurricane in the United States the areas affected were prepared for a different kind of agent than that which finally struck. In the case of the Piedmont the floods were usual, but, even in the cases where people were concerned about the heavy rain, the concern was for flooding and not landslides.

It was clear from all three of the countries that prior benchmarks by which to judge the effects of disaster had dysfunctional as well as functional consequences. In the United States the populace and officials of New Orleans and the populace alone of the Mississippi Gulf Coast had familiarity with prior disasters that led them to an unrealistic attitude about their ability to handle the situation. The same was true in Florence and Vercelli and in Yamanashi and Hiroshima.

A characteristic that appeared in two of the countries in this study, Japan and the United States, was the tendency of geographical and functional specificity of plans and actions to vary inversely with level of government, i.e., the higher the level of government, the lower the specificity of plans and actions. It was not possible to judge this tendency in Italy because there was little or no warning in any of the disasters and, thus, little or no emergency preparedness.

Again, in the two countries that had a sufficient amount of emergency preparation to examine, Japan and the United States, it appeared that the unit central to emergency preparedness was partially dependent on the amount of time allowed. Given sufficient time, the municipal and prefectural governments were able to activate emergency preparation responses. In the case of Niigata, where there was a three-minute build-up before the most severe quake, the only units that could take emergency preparations were individual citizens.

Evacuation

Italy

Sicily

Twenty thousand (20,000) were evacuated by any means possible with the help of any organization available from the two hardest hit provinces. Trucks were used where possible, but the impassability of roads made this impossible in many instances. Helicopters from the Italian, United States and British Armed Forces were used and figured prominently in the relocation of the seriously injured. People also began to evacuate themselves, carrying whatever was possible.

Evacuation centers were set up, but there was difficulty in getting people to leave the immediate area. Aid was given in the setting up of refugee camps by the Italian Army which had the experience and expertise for determining the type of ground needed to support large tent cities, the arrangement of tents for traffic and for leadership placement.

Florence

It is necessary to understand a little about the physical aspects of Florence in order to understand the function of evacuation in this particular disaster. Florence is an old city where a number of buildings of several stories are crowded into a central area. Many of these buildings have stood for centuries, and there was no real fear of their not standing through this latest flood. When the waters began to flood Florence, therefore, the inhabitants simply moved to the upper floors of the buildings in which they were housed.

Because the inhabitants were able to evacuate to the upper floors, and because there was not the usual business crush of people and cars, evacuation was not a big problem within the city. There was "no evacuation to speak of." What evacuation there was, was carried out mostly by the fire brigade in Florence and by civilians helping one another. Because there was no fear of heavy loss of life from the flood waters and because of the great value put on the treasures of art in Florence, "it seemed they (the people) were more concerned with getting out the great works of art than with getting out the people."

Piedmont/Vercelli

Evacuation came only after the disaster agent struck. Once again, the evacuation patterns changed through time, with most that did occur, occurring early. The carabinieri stationed in each of the villages

handled the early evacuation with local volunteers. From Friday evening through Sunday evening, Biella was completely isolated, and evacuation had to be handled locally. The city prepared a 3,000-bed evacuation center, but it was not used, for people stayed in the houses of relatives and friends.

The prefect called the air base at Aviano, north of Venice, and NATO sent helicopters. The mobile section of the carabinieri came from Turin with 120 men and four helicopters. The fire brigades and the Army also came with modern means of transport, e.g., helicopters, ducks, and trucks. Minor injuries were treated on the scene and released, and the seriously injured were evacuated to hospitals in Biella and Vercelli. On Friday the entire village of Pistodesa, population 280, was evacuated to an area two miles away.

Japan

Niigata

"Forced to leave their uninhabitable homes, victims converged on well-known localities -- primary schools, hospitals and shrines. When a substantial number of victims concentrated around such a building, the authorities designated the structure as a refugee center. This was not the procedure detailed in the local disaster plan. Thirteen such buildings, ranging from an elementary school housing 2,570 refugees to a small hotel holding twenty-three, were still being utilized in this capacity nine days after the earthquake" (Dynes, Haas and Quarantelli, 1964: 15).

These centers also became medical stations manned by the Red Cross and prefectural medical personnel.

Yamanashi Prefecture/Ashiwada Village

There was no evacuation in advance of the disaster since landslide was not expected. The typhoon did not follow the usual circular route, but came on a direct line, striking the island of Honshu at "C" and taking only one hour to come into Yamanashi Prefecture. The disaster occurred at night, and since the power line was cut off because of heavy rainfall, there was no light. Considering all of these factors, evacuation did not occur. After the disaster people were set up in emergency shelters nearby, and a permanent village was built across the lake.

Hiroshima Prefecture/Yure City

Evacuation did not occur before the disaster agent struck because of the casualness with which the citizens took the warning, and after the agent struck, evacuation was spontaneous.

The United States

Alaska/Anchorage

There was no evacuation prior to the disaster, and after impact, evacuation was on an ad hoc basis. There were early attempts to provide temporary shelter and food. Shelters were available by 3:00 p.m. on Friday. By Saturday evening, twenty-four hours after impact, only minimal numbers remained in the public shelters. A shelter was set up by the American Legion Post, another effort came from the downtown disaster control group, the Salvation Army helped staff the city shelter, and numerous other small shelters developed.

New Orleans

There were two phases to the evacuation. The first, the day before the storm for the area near Lake Pontchartrain, and the second shortly after the storm passed. Trucks, buses, and cars were used in the first phase and because of the flooding, ducks and private boats were used in the second. Hundreds of people sought shelter in the municipal auditorium and had to be moved because of inadequate facilities to maintain such large numbers. Many other people who sought shelter in public schools were moved to official shelters.

Mississippi/Biloxi

Mostly because of the adequate amount of time allowed, evacuation was deemed to be one of the more successful functions of this disaster response. The Mississippi Highway Patrol estimates there were 70,000 to 90,000 people evacuated inland from the coast.

Summary: Evacuation

The responsibility for this function and the manner in which it was accomplished varied within societies, depending partially on the nature of the disaster. In the Piedmont disaster an evacuation center was established by the city government in Biella and was not used. In Florence there was no immediate evacuation to established centers, but, when centers were needed at a later time, the prefect

ordered people into the best hotels, and the government paid the bills. In Sicily the national government, with the help of the Army, set up refugee centers.

In the Niigata earthquake the populace converged on familiar buildings, e.g., an elementary school and a small hotel, and the government designated these official shelters. In Ashiwada Village the prefecture provided temporary structures, and the national government later paid the village for extensive rebuilding.

In Anchorage a variety of groups established evacuation centers, e.g., the city and the American Legion Post. Within twenty-four hours minimal numbers remained in these shelters. In New Orleans the Red Cross handled the evacuation centers and used a public building, but, because this proved to be inadequate, the task was later given to the nearby naval station. In Mississippi the inhabitants were moved inland to safe shelter by the highway patrol. Some evacuees were housed in a state-owned hotel in the capital and others were housed by the state at a college. There did not appear to be a clear pattern across the three societies except that, under extreme emergency conditions, this operation was approached in a generally ad hoc fashion. The level of government that became actively involved depended, to some degree, on the resources available. The fewer the resources available at the lower level, the greater the tendency for higher levels of government to become actively involved.

Differences that appeared were that in Italy and the United States the populace appeared to prefer homes of relatives, when available, to the government shelters. In Sicily it was not possible to get people to move from their communities to the evacuation centers. This was explained by officials as due to demographic, economic, and family variables. These people are rural, their livelihood depends on their livestock and land, and therefore, it was necessary for them to be near the land. There was a belief that disaster aid would come to the local site. Some of this reaction was also attributed to strong kinship ties through which families were not willing to be separated, leaving workers on the scene and moving the rest of the family to evacuation centers.

In the United States evacuation centers were much more the task of the private sector than in either Italy or Japan. A final difference between the United States and Italy and Japan was the authority to command evacuation. In Italy and Japan the police had the authority to order evacuation of the populace, but in the United States the police, on at least one occasion, were forced to exceed their legal powers to force people to evacuate.

Inventory

Italy

Sicily

The question of who was in charge of the response is still somewhat open, and it seemed to fluctuate with the passing of time. In the early stages of response, the local village officials and then the prefects were in charge. There was, however, some question as to whose authority received the first priority. It would seem that from the broadest perspective the authority of the prefect was more diffuse and dominant.

In the particular villages the question arose as to whether the mayor or the local priest should be in charge of distribution of relief supplies. This conflict stems from the rivalry between the church and the communist party for control in the villages. Haas (1969) has suggested that a pattern emerged of the men looking to the mayor and the women looking to the priests.

As time progressed the national officials, particularly those from the Ministry of the Interior, were in charge of the overall coordination of the relief activities. Headquarters were set in Trapani and Agrigento and in Palermo. Commands were sent from Trapani and Agrigento to Palermo and from Palermo to Rome, and decisions were relayed back down the chain of command. This pattern was abridged somewhat by having national officials in the field, and, in a sense, then, Rome was taken to Sicily. There was a functional division of labor within the national attack. The Provincial Medical Officer (a national official) and the Red Cross carried out the inventory of medical needs. Three member commissions, of a fireman, a public works official and a local authority, were established to evaluate damage to houses. The priorities listed were in the following order: (1) search and rescue, (2) opening roads, and (3) prevention of further damage by either shoring up buildings or blasting them so that there would not be danger of further collapse.

Florence

There appeared to be hesitancy on the part of city and prefectural officials to take action until after the disaster agent had struck. After impact the prefect put into operation as quickly as possible a committee on coordination consisting of representatives of relevant organizations and offices. A prefect from the Division of Civil Protection of the Ministry of Interior was sent from Rome. He was then given overall control, but actually worked with the Prefect of Florence. Many meetings of the Committee on Coordination were conducted as well as meetings of the particular groups whose representatives sat on the Committee on Coordination.

All this coordination took a great amount of time, and until the sixth day there was inefficient use of manpower. Until coordination became effective the major tasks were being carried out by various organizations, such as the fire brigade and the Army, working autonomously from one another and from any central authority. There was also a great effort on the part of individuals to do what they could for others.

Both the prefecture as a whole and a number of organizations within the prefecture set about drawing up priorities. There is not sufficient evidence to make a conclusive judgment on this matter, but it would appear that basic human needs such as food, clothing and shelter were the highest priorities over all, but the preservation of art was given a priority that has seldom, if ever, been equalled elsewhere.

Piedmont/Vercelli

From an overall perspective we may say that inventory was at first under the authority of area leaders and particularly the mayor of Biella. Later the prefect played a larger role, and finally the Director General for Civil Defense from Rome set up headquarters in Biella and was the overall coordinator.

By a cabinet-level decision the Army worked under the direction of the Director General of Civil Defense. It appeared to work so successfully that there is at present an effort to institutionalize the procedure by law. The mayor of Biella was in charge of the city and the surrounding area the first two or three days. The prefect then added official authority to this arrangement by charging the government of Biella with responsibility for response in the city and the surrounding area of Biellese. On November 4, at a meeting in the mayor's office, an assessment was made and priorities were set. On November 5, the following plan of action was chartered: (1) opening of roads to the affected areas, (2) establishment of telephone contact and communications in general, (3) clearing of mud from houses, factories, etc., and (4) saving of woollens and other textiles.

After ten days restoration began. Visits to heads of various organizations were made, their potential for aid was reported in a meeting with the local authorities in Biella, and the necessary work was divided.

Japan

Niigata

There was a great centralization of decision-making activity. The decision-making also flowed along rather differentiated lines,

from the national through prefectural to municipal. Not only are the governmental agencies organized this way, but also the non-governmental.

Yamanashi Prefecture/Ashiwada Village

The prefectural government stands alert during the period between warning and impact, while the primary responsibility for emergency preparedness is with the mayor of each village. After impact the mayor is to assess the situation and decide what is to be done during the emergency period. The assessment is to be done by the level of government that is responsible in normal times, e.g., roads are on three levels: village, prefectural and national. The division of labor is very elaborate.

The established priorities were preservation of life, welfare and then emergency restoration of services. The level most central in response changed during the different time periods of the disaster. In the preplanning and restoration stages, the national government played a very important role in coordinating and standardizing efforts; in the emergency period, the prefectural and the municipal levels of government played more central roles.

Hiroshima Prefecture/Kure City

Measures to prevent any secondary disaster were the first priority, and repair of roads was the second priority. The responsibilities for these tasks differ depending on the task and the geographical area. While emergency assessments were made by the Finance and Construction Bureau of the prefecture, much of the long-term assessment was made by the national government, and Industrial and commercial enterprises were assessed by the municipal government.

The United States

Alaska/Anchorage

Inventory was begun on a community-wide basis at a 3:00 a.m. Saturday meeting, called to order by the mayor ten hours after impact. Present at the meeting were city department heads, civil defense officials, military personnel, public health officials, other state and federal officials, Red Cross and Salvation Army personnel. The first priority was given to search and rescue.

New Orleans

Because of electricity and telephone failure, the Civil Defense Emergency Operations Center had to be abandoned after the storm, and headquarters were moved to the mayor's office in city hall. The main control and coordination was directed from this office by the civil defense director whom the mayor appointed to be in charge of all emergency operations for the city. However, the mayor still maintained ultimate decision making power on the most crucial problems. A total of 209 individuals, representing 16 different agencies, had gathered at the Emergency Operations Center. Families accompanied emergency personnel so that they would be free from worry while carrying out their duties. Top priority was given to getting city hospitals, power plants, and sewage and water treatment operations working.

Mississippi/Biloxi

The key level of government in the area of inventory appears to have been the county. The governor of the state sent representatives to the county to assess the potential threat, but the state appeared to take the position that it would act as a back-up for the needs of the county. The same approach appeared to be true in the relation of the federal government to the state government.

Several committees met before and after impact, apparently called by the County Civil Defense director for the purpose of coordination and assessment. At a meeting on the Tuesday following the storm the decision was made to declare martial law, but that the affairs of government would remain in the hands of the executive branch of local government. Responsibility for the assessment and restoration of emergency resources was delegated in part to relevant organizations and in part to knowledgeable individuals. The following priorities were set: (1) water, (2) power, (3) communications, and (4) food.

Summary: Inventory

In all the countries studied a government official was in charge of inventory. The political institution appeared to take on a more pervasive role than in normal time activities. The particular level of government in control varied with the time period of response, but it always appeared to be the dominant political institution.

Regardless of the prior structure of society or the relative degree of centralization, there appeared to be some decentralization of authority in the early stages of the emergency period. The degree to which decentralized response occurred varied within the societies and may be explained by historical, cultural, and structural intra-national sectional differences. There appears to be, however,

an urgency in certain periods of disaster that overrides previous authority structures and patterns of decision making.

Because Florence is the prefectural headquarters as well as a city in its own right, the prefect was on the scene immediately and put operations into action as soon as possible after the flood. It would appear that the mayor, a very popular man at the time, the "hero of the flood," became the emotional leader of the city, and the prefect became the task leader. It was the prefect who called together a coordinating meeting of all relevant organizations. Until this meeting a number of tasks were being carried out autonomously by the various organizations within the structure of the city and prefecture. There was close coordination between the representative sent from Rome who had the rank of prefect and the local prefect from Florence, but who was in overall charge of the situation cannot be definitely determined. It would appear that the official authority structure would place the representative from the Ministry of Interior in charge.

A similar pattern emerged in Sicily. During the immediate post-impact period the mayors of the various communities were authorities for response, but after the prefect had time to establish himself, he became the official authority in charge. Still later, when the authorities from Rome arrived, they were in command. Within the villages there is a tight folk-type relationship, underscored by the strong influence of the family in this area. These factors made it difficult for bureaucratic leaders from Rome to establish an efficient bureaucratic structure for response. There was also a particular authority division within the communities, between those who followed the mayor and those who followed the parish priest. This appeared to follow a sex difference, with the men following the mayor and the women following the priest (Haas, 1969).

In Biella the city government was in charge from the beginning. The prefect of Vercelli Province delegated authority for Biellese to the city. This was consistent with the normal time patterns in which the industrial area surrounding Biella looks to that city as a trade center, and the agricultural area in the valley looks to Vercelli. When the representatives from Rome arrived they began to take over the responsibility for coordination. In the case of Biella, however, there appeared to be a functional division of labor developing after some time.

In Niigata the decision making was somewhat more centralized than in Yamanashi or Hiroshima. In all instances, however, there was a flow of decision making along rather differentiated lines, from the national to the prefectural to the municipal level. Not only are the governmental agencies organized this way, but also the nongovernmental. There appeared to be less need for impromptu coordination in the Japanese situations because of the extreme coordination in preplanning.

In the United States there appears to have been greater decentralization of decision making than in Japan and Italy and more decentralization during the emergency period than following it. In

the rehabilitation phase of disaster there may be more centralization than is readily discerned, because the lower level officials set limits on their decisions according to what they believe will be approved by the federal regulations.

In each of these societies the military worked under the authority of the civilian head. The military was essential in each society because of the need for a ready supply of disciplined manpower and for certain expertise and equipment the military usually possesses. In both the United States and Italy it took a high-ranking decision to activate regular troops, and in Japan there was a pre-plan for the process to work on the prefectural level.

Victim Care: Search and Rescue, Medical Care,
and Care of the Dead

Italy

Sicily

There was little coordination of search and rescue carried out by anyone on the scene. There was a lack of volunteers in the immediate post-quake period, and those volunteers that eventually worked in Sicily were, for the most part, from other parts of Italy and from other countries. The most organized group was the Army, which, while not prepared in advance, represented a large base of manpower and an existent chain of command.

The inventory of medical needs was made by the Provincial (a national official) Medical Officer and the Red Cross. The towns had physicians paid from public funds who continued to work during the disaster response, and outside medical help arrived during a few hours to two days. The first organization to be active, the Red Cross, set up mobile hospitals staffed by volunteer physicians. The towns had no existing hospitals, so a number of the most seriously injured were flown to larger communities, particularly to Palermo, and, since other injured were treated and released, the mobile hospitals were not fully used; there was actually an excess of medical aid after the first few days.

The medical problems were listed in order of immediate frequency by a Red Cross official as: (1) shock, (2) heart cases and (3) respiratory diseases such as flu, pneumonia and whooping cough. Because of the severe weather and the inadequate shelter in the camps, the respiratory illnesses became something of a problem after a short time. One official, not in the Red Cross, commented that these must have been hearty people to withstand the conditions in the camps with as little illness as there was.

The standard procedure for care of the dead is to have the magistrate and someone from the area identify the dead. This was no

problem in Sicily since, because of the smallness of the villages affected, it was a simple task to find people who were able to identify the dead.

Finding and uncovering the dead was something more of a problem. The Army was organized on the spot to do search and rescue and also uncovering and transportation of the dead. Also of great help with this function was a Yugoslav Red Cross team which had prior experience with care of the dead in earthquake-induced disasters that was flown in expressly for this purpose. Two problems experienced in this area were the difficulty of access because of damaged roads and the stench of the dead, which was so extreme that work had to be stopped for a time. There was some problem with disposal of decaying animals.

Florence

There was little coordination of the great effort of saving art treasures carried out by anyone on the scene. In the height of the physical impact, the death and injury count was low, and, therefore, evacuation could be delayed more than in some disasters without the same serious consequences. After a day there was organized effort to bring in food and provide medical care.

The public health of a prefecture is the responsibility of the Prefectural Medical Officer. Much, if not most, of the medical work was handled by the Red Cross under the coordination and direction of the Prefectural Medical Officer. The Red Cross set up hospitals, but since the injury rate was so low compared to what it might have been, these hospitals were used as shelters, particularly for the old and ill.

The police and regular Army took care of bringing the dead to be identified. This was not the problem that it is in some disasters because of the low death count of 120 for the entire flood and 17 for Florence Prefecture and the fact that most of the bodies were under water. The real problem arose from 1,500 animal carcasses washed up on the streets. Pits were dug and alkaline was poured on top of them.

Piedmont/Vercelli

Search and rescue was not planned in the towns and villages, but occurred spontaneously on the scene through volunteer help, sometimes organized by the carabinieri who were stationed locally. The victims were not difficult to find, because most of the destruction was focused and readily visible, and some people were stranded in isolated houses. The search and rescue was performed originally by volunteers and carabinieri on the scene and then later by forces from outside, e.g., the NATO base at Aviano.

Oversight of medical care was primarily the task of the Provincial Medical Officer, a national official. The central concern of the medical officer was community hygiene: (1) the water supply; (2) the possible pollution problems caused by two cemeteries that had been uprooted; and (3) vaccination against typhoid. The Red Cross took care of vaccination and distribution of food, clothing and bedding; the distribution was soon stopped, however, because the local people were able to secure adequate supplies. There was help sent from Rome to the Red Cross, but outside help was not asked for by the people of Biellese. Existing hospitals met inflated demands by putting people in beds in the corridors, while the seriously injured were flown to Biella and Vercelli hospitals. Local doctors requested supplies, but otherwise worked on their own in the villages. The Red Cross arrived on either the sixth or the seventh day.

The dead presented little medical problem. The Army, firemen and sanitary officers, with the help of additional volunteers, removed the bodies for burial. To determine the finality of death, primarily for the benefit of the bereaved families, each corpse was placed in a central location for twenty-four hours.

Japan

Niligata

Because of the low death and injury rate there was not a great need for search and rescue. "The relatively low number of casualties placed little strain on the medical facilities of the seven general hospitals in the city. While all hospitals had difficulty in operating without utilities, and some had problems as a result of housing refugees, none had to deal with a great increase in demands for medical services. One hospital with a 391 capacity, for instance, at one point housed over 700 refugees (and ten days after the earthquake, it still had 300), but it was not burdened by any influx of medical cases" (Dynes, Haas and Quarantelli, 1964: 16). Because of the low death rate care of the dead was carried out along normal channels, with the families taking responsibility for the function.

Yamanashi Prefecture/Ashiwada Village

A police officer was the first informed, he called the police station, and Fuji, in turn, called the Self Defense Forces and the fire brigades in the neighboring communities. The police also called the Red Cross hospital in the vicinity and the doctors' association. All those notified mobilized for search and rescue immediately. Fortunately the Self Defense Forces (SDF) were on the other side of Ashiwada Village from Kofu City and thus were able to get through, whereas the people from Kofu City were not able to get to the scene with heavy equipment until the roads were repaired by the morning of September 26. The local firemen appeared to be pre-occupied with their own families.

Since Ashiwada Village had no doctor, the prefecture, in close association with the Red Cross, sent two rescue squads of doctors and nurses. Because of bad roads serious injuries were flown to the nearest hospitals by helicopters. The SDF was instrumental in first-aid treatment and evacuation of the wounded, 70 people were taken to the hospitals, 350 man-days were contributed by doctors, nurses and public health nurses, instructions on disinfecting and inoculations were given.

The responsibility for the care of the dead was left to the mayor of the village. Because of religious convictions of the people there was a great deal of concern for the recovery of bodies; divers were sent into the lake, and the lake was later drained in the six month long search for the missing.

Hiroshima Prefecture/Kure City

The firemen, policemen and Self Defense Forces were instrumental in search and rescue operations with the help of private citizens. House-to-house searches were carried out. Emergency dispatching of firemen began at 3:30 p.m., but reached a peak at 5:30 p.m. when the Self Defense Forces came into the picture.

There are ten Red Cross hospitals located throughout the prefecture for medical care, and there is an emergency group stationed at each hospital. When the disaster struck, physicians and nurses from the city went directly to the affected areas and set up aid stations. The prefectural Red Cross also sent help later. A number of people who after fleeing went back to their homes to check on belongings, reported for medical aid during the night. The Red Cross received a number of people who were suffering from fatigue, but took serious cases directly to the hospitals.

Care of the dead required the services of a number of groups and people. Since the calamity was scattered, there were not more than five bodies in one place, and there was no need for a mass disposition of bodies; relatives claimed the bodies and took care of them. Identification of the dead is a police responsibility; in disaster, the overall care of the dead is the responsibility of the mayor and autopsy of the Red Cross.

The United States

Alaska/Anchorage

Most earthquake victims were discovered and taken to the hospitals before nightfall on Friday. However, search and rescue efforts continued until Sunday as a precautionary measure and because people found it difficult to believe there had been so few casualties in light of the devastation that occurred. Buildings in the damaged areas were searched carefully on three or four different occasions.

Initially, private citizens assisted people in the damaged areas, however, gradually the search and rescue took on a more organized character. Firemen became engaged in this task only four minutes after the earthquake, and within the hour a construction and maintenance official became involved with volunteers and city employees in organized rescue and inventory groups, being aided by an Army rescue group from Fort Richardson four hours later. Even after a civil defense volunteer was appointed coordinator early the next morning, there were some uncoordinated search and rescue efforts.

Providence Hospital functioned as the major medical facility in Anchorage during the emergency period; when city power was interrupted, its emergency generator took over. The other two hospitals were suffering from lack of utilities in one case and a suspected gas leak in another. Local, state and regional public health officials also worked to control public health hazards following the earthquake. Friday night, residents were instructed to chlorinate or boil all drinking water because of possible contamination. Because of the amazingly light death toll the care of the dead presented no problem to the organizations or communities involved.

New Orleans

Immediately after the storm had swept over the city, police, firemen and the National Guard began rescue operations, helped by more than 2,000 small boat owners. There was a lack of coordination in this phase of the response, and volunteer rescue workers were not instructed where to take the victims. A little coordination was brought to the task through the use of spotter aircraft.

Medical care was the responsibility of the Director of Public Health of the New Orleans Health Department. The main concerns for health were to vaccinate people for tetanus and typhoid and to keep down the mosquito problem. The Red Cross, the state health department and the United States Navy helped with the inoculation program.

The coroner's office was in charge of caring for the dead. As bodies were discovered they were brought to the Coast Guard Station and then to the coroner's office. After the autopsy the bodies were taken to the basement of the Criminal Courts Building where the Association of Funeral Directors assisted in preparing the bodies and relatives came for identification. This operation lasted about a week.

Mississippi/Biloxi

Rescues occurred before, during and after the eye passed, carried out by different organizations at different times. The organization most involved was the National Guard, probably because they had more

specialized equipment available, pre-positioned along the Mississippi coast. In the case of the Gulfport unit of the National Guard there were orders to not become involved in search and rescue, but to stand by for security duty. On the Monday following the impact most of the rescue was on a "scattershot basis"; it was uncoordinated due to the lack of communications. The Seabees were on rescue duty for about one week.

Curiously, there were few serious injuries, and the hospitals were able to meet the medical needs by dispensing simple first aid. One problem was that the hospitals themselves were under siege, and because of lack of communications, it was rumored that three hospitals had been completely destroyed. Two of these three hospitals operated throughout the storm, being evacuated after the storm, primarily for lack of adequate electric power and loss of water supply. From a sanitation perspective there was great concern with water, food spoilage, poisonous snakes, rats and mosquitos, and an immunization program was undertaken principally by the Red Cross.

The chief concern in relation to the dead was that they not be washed out to sea or buried deep in beach sand when the waters receded. The task of recovery of bodies was mostly handled by the National Guard and Seabees. The Seabees organization in Pass Christian put one man every four feet who walked through trying to detect odors and were helped by a group of teenage males who had been working with civil defense. They eventually brought in Army "sniffer" dogs to help locate bodies. The Game and Fish Commission of the State of Mississippi was given the task of maintaining the morgue, where bodies were kept until identified. The public was not allowed to view; identification was carried out by the FBI, doctors and dentists. The morgue was closed on September 7, 1969, when all but three bodies had been identified.

Summary: Victim Care

With the possible exception of the Florence flood, search and rescue for victims was the first priority in all the disasters in all the societies. There were some accusations that more concern was put into the saving of art work than into care of victims, but this statement must be highly qualified. Art did receive a very high priority in Florence, but not to the harm or endangering of life of the populace; this was true both in the function of victim care and in the welfare and rehabilitation functions.

It was also true in all the societies that highly specialized personnel might perform tasks other than those they were trained for, but those functional tasks that required high professional expertise remained more clearly differentiated than some other areas. For example, no one appeared to take the role of the doctor except doctors.

In all of the societies there appeared to be little coordination of search and rescue in the early stages of the emergency. Among

those organizations most often involved with this task were police, fire, and the military, usually aided by volunteers.

In Yamanashi there was an extravagant amount of effort put into recovery of dead bodies because of religious concern for the dead when the body has not been found. An entire lake was drained six months after the disaster in order to recover the bodies of fourteen people who had been lost.

Security

Italy

Sicily

A perimeter was set by the carabinieri, not because looting was a problem, but to keep away the large number of curiosity seekers. At one point the Army and police threatened to shoot people if they did not stay out of the area. There were reports of looting, but these were not verified. What was reported as looting in the city of Palermo was in actuality a sharp increase in breaking and entering, explained by officials as the result of having pulled a number of police from Palermo to the disaster area, leaving the city inadequately patrolled. There was some petty thievery reported in the refugee camps, and there was some black marketing of relief supplies and an increase in prices in stores. At one point the government threatened to close the shops of anyone caught raising prices to a level considered to be profiteering. Loan-sharking became a problem after the "Earthquake Omnibus Act" was passed on March 2, 1968, when, in anticipation of benefits to be received from this legislation, citizens were approached with offers of loans at exorbitant interest rates. There were also many instances of attempted bribery of officials to raise the damage estimates for repair of buildings.

Lost items recovered by workers were taken to a central location where the carabinieri took charge of them, and animals were turned over to the Agriculture and Forestry Ministry for care and feeding until their owners could claim them.

Florence

Security was not a large problem in this disaster, and there was no looting or profiteering. When the shopkeepers were able to once again open their shops, they put flood-damaged material on sale. Immediate convergence was not possible because of lack of passable routes of ingress. There was a perimeter set, but it lasted only a few days.

Piedmont/Vercelli

There was some problem with convergence by volunteers and sight-seers, thus, for the first four days only relatives were allowed into the area. There was no looting or profiteering.

Japan

Niigata

The police force was badly handicapped because 526 men, nearly half of its personnel, had sustained damage to their houses and were occupied at home. Nevertheless, only 160 extra patrolmen from 32 other police stations elsewhere in the prefecture were used, and no assistance from other organizations was needed.

Yamanashi Prefecture/Ashiwada Village

There was no looting. The police patrolled and kept people and vehicles out of the area, and since there were no lines or wires up, cars with speakers and signs were used to inform people to stay out of the area. The police in Japan are generally prefectural and national level organizations, and those working in Ashiwada were of the Yamanashi Prefecture.

Hiroshima Prefecture/Kure City

People were advised to lock up their houses when they evacuated, led from the scene by police and firemen. The Hiroshima Prefecture police were responsible for security, and there was no looting.

The United States

Alaska/Anchorage

After the earthquake, on Friday evening, a group of volunteers, deputized and given makeshift armbands with "Police" written on them, was organized to assist regular police personnel. Teams of three to six of these volunteers were sent out with a regular police officer into the damaged downtown area. They directed traffic, guarded buildings, and controlled entry by the general public into the area. On Friday evening, Army troops from Fort Richardson, who had been requested by city officials, began arriving in Anchorage to assist in

securing the damaged sections at about the same time that Alaska National Guard troops took up their positions.

New Orleans

The New Orleans Police were in charge of security, assisted by the National Guard and the Army, to guard against looting in the heavily affected areas. Volunteers were deputized as shelter workers to serve in the various evacuation centers.

Mississippi/Biloxi

The main agencies involved in security were the National Guard, with 4,000 men, the city police with 50 regulars and 25 auxiliary, and the sheriff's department with a force of 70. The Mississippi State Highway Patrol became involved chiefly on state and federal highways and were on standby as needed by local police groups. The Biloxi police established a division of labor with the National Guard and later coordinated with the Corps of Engineers to control traffic on uncleared streets. The traffic problem impeded recovery and evacuation efforts. The Biloxi police made 25 arrests for looting and had some difficulty getting a number of people to evacuate.

Summary: Security

Looting was not a problem in any of the societies studied. The most important task for control agencies in these societies appeared to be that of convergence. In each case the police devoted time to traffic control and in some cases to the establishing of perimeters.

The principal organization working in the area of security was the police. In Italy the carabinieri are a part of the Army and play a dual role, but in each disaster they served primarily as a national police unit. In the United States the National Guard is often used for police duty, and the Army and Air Force were also used in all three disasters to perform some police work. In certain emergencies the Self Defense Forces in Japan are responsible for police work, though there seems to be great hesitancy on the part of government and on the part of the Self Defense Forces themselves to use the forces in this manner. The role of the Self Defense Forces is a politically sensitive one, and thus there is a hesitancy to use them in situations that might cause controversy.

Welfare

Italy

Sicily

The first aid on the scene was from the Pontificia Opera Di Assistenza (the Papal Welfare Agency), which brought supplies from their warehouses in Rome and Palermo. Because of the large number of American citizens who had family or sentimental ties with Sicily, the Catholic Relief Services sent a great deal of aid through P.O.A. and CARITAS (the International Catholic Welfare Agency). There was some coordination problem in that Sicily is divided into four dioceses which each overlaps the earthquake area, add because of the general policy of P.O.A. of working through the local diocese, there was some problem of knowing which bishop to consult. Some of the aid from the United States went directly to particular local church workers, supplementing the collections of supplies from many private organizations and other communities. The Ministry of the Interior coordinated all volunteer organizations while the Army transported many of the supplies.

The Red Cross set up several camp kitchens for people in evacuation camps and in the two evacuation centers, at Agrigento and at Trapani. Food and clothing was sent from other Red Cross chapters in Italy and from all over Europe. Only 1,000 of the 7,000 beds at the Agrigento Village were used, for most of that area's residents remained at the site of the local village. They are an agricultural people with strong family ties that discourage separation of families, and they expected aid to be sent to the local scene and wanted to be there when it arrived.

The Italian government passed the Earthquake Omnibus Act on March 2, 1968, which contained the following provisions: (1) death benefits for surviving relatives, (2) regular workmen's compensation for all those injured or unable to work, (3) exemption from payment of national health insurance contributions for the remainder of 1968, and (4) payment to institutions for medical services and to provinces for extra sanitation costs.

Florence

Because not all hospital space was used for the injured, some of the hospitals were used for the old who needed a place to live. The Red Cross, aided by the Army and firemen, handled much of the distribution of food and clothing. To solve the most pressing, immediate need for safe water, every two hours a shipment was sent from Bologna and was then trucked to 13 distribution centers throughout Florence. Help came from Rome in terms of funds, tax write-offs, and long-term loans for home repair. The financing of this disaster recovery came from special national gasoline tax which is still

in effect.

Aid came from all over the world, and there was a problem of convergence of both personnel and material, most of this aid coming directly to Florence, not via Rome. Boots were repeatedly stacked high and went to waste. The museums were deluged with experts from around the world. At one time the cry went up, "Who will save us from our saviours?"

Piedmont/Vercelli

The Red Cross, from its central warehouses in Verona, Milan and Turin handled much of the immediate welfare needs along with the P.O.A. and unions. In the early stages the carabinieri relayed messages of need from particular villages, and food was sent from Biella.

There was no public appeal on television because the area is more self-sufficient and RAI did not want to take the burden off the government. There was money collected through La Stampa, the Turin newspaper, which was distributed to the people almost immediately as it came in. As of November 19, 1968, \$625,000 had been collected, of which all but \$25,000 had been distributed immediately.

Since the Ministry of the Interior generally does most of the work on shelter and long-range work, the government paid 80 percent of workers' salaries under a special fund and the other 20 percent was to be paid by the factories.

Welfare was of two kinds: public, handled by the prefect and mayor (the police were often used for distribution); and private, handled by the Red Cross, P.O.A., unions and La Stampa. It is interesting that some materials were actually returned.

Japan

Niigata

Welfare in Japan is primarily a job for the welfare departments of the prefectures and of the national government. In this case hospitals also doubled as shelters. The Red Cross received funds for help, but these were distributed through the prefectural welfare departments.

Water distribution appeared to be one of the major problems. Outside help in the form of specialists, technicians, and Self Defense Forces gave assistance with the water supply.

Yamanashi Prefecture/Ashiwada Village

The problem of shelter took a high priority, with municipal buildings and schools opened by order of the mayor. Food and clothing were also high on the priority list. Though the mayor was responsible for food, the governor of the prefecture worked through the welfare department to deliver food and clothing to Ashiwada Village. The prefecture was reimbursed by the national government for much of what was spent.

Hiroshima Prefecture/Kure City

The Calamity Relief Law states that the Red Cross will cooperate with the Calamity Countermeasures Headquarters for provision of welfare. The request for aid was initiated by Kure City government and the Red Cross did send extensive relief. Generally, the Red Cross prefers to give money so that people can buy their necessities and prefers to be involved only in emergency relief and not in restoration activities.

A great deal of welfare came from the prefectural funds and was actually handled under the authority of the mayor. The cost was later divided equally between the prefectural and the national governments. In Kure City the Self Defense Forces supplied pure water at various distribution points.

The United States

Alaska/Anchorage

The Salvation Army began a feeding operation in Anchorage on the evening following the earthquake and continued it throughout the emergency period. The next day the military also became involved in feeding when they set up field kitchens at a number of locations in Anchorage. During the emergency period, several public shelters were established in the community by The Salvation Army, city officials, the American Legion, and various church groups.

New Orleans

The Red Cross had responsibility for stocking and supervising the centers in which 96,000 people sought shelter. The United States Naval Station was also mobilized to handle evacuees. The major responsibility for distribution of clothing, which was sent from all over the United States, and food belonged to The Salvation Army, supplemented by kitchens set up by the Army and the Red Cross mobile feeding units.

Mississippi/Biloxi

The main social welfare organizations were the Red Cross and The Salvation Army. The emphasis of the Red Cross was on the operation and staffing of shelters, yet this organization also conducted damage and casualty surveys, administered long-term rehabilitation and assistance, gave immediate aid, distributed food and clothing and handled inquiries concerning survivors. There was a great deal of variety in the types of organizations that delivered welfare and relief in this situation.

Summary: Welfare

In all three societies the government plays a large role in long-term rehabilitation, in Italy and Japan the government is much involved in short-term emergency aid as well, and in Italy the Ministry of Interior has the responsibility for coordinating all welfare services.

In Italy the Catholic Church, a hierarchical structure, was the most decentralized in its response in that all its relief efforts used local personnel and were coordinated through the bishops on the scene.

Emergency Restoration of Services

Italy

Sicily

The priorities were set: the repair of roads and the making of houses safe by either strengthening them or completely demolishing them. People stayed in tents far beyond the time the authorities recommended because of the difficulties in getting prefabricated houses and setting them up. The manufacturers did not have a large enough supply cut, nor even a ready supply of raw material with which to cut houses.

Telephones were not replaced for some time because they were not given a high priority. Electricity was a problem, and although it was given high priority, it was not re-established in many of the areas for some time, and a number of camps were without adequate power. Water and adequate sanitation facilities also presented a problem in a number of the camps.

Florence

The most immediate service to be reinstated was the supply of water, then electricity and heat in the house. In terms of the overall plan the mud had to be removed from the streets and then the art work was to be cared for. Building contractors were immediately mobilized and they sent excavators, bulldozers, dump trucks and other heavy equipment. The Army and Mobile Columns moved in with manpower and heavy equipment, and shop owners turned out to begin the task of clearing their businesses.

The great weakness in Florence is in the area of long-term flood control projects and planning for future emergencies. For literally 500 years the Florentines have known the need for flood control; Leonardo da Vinci devised a plan, but to this day there is no prevention. For three or four months, the spirit in Florence was extraordinary, but now, years later, there is still much long-term planning needed, and many of the projects promised in the first few months, many of the dreams of restoration, remain unfulfilled.

Piedmont/Vercelli

The companies that normally supplied telephone services handled these operations during the emergency with ham operators and extra manpower supplied by the Army. Regular telephone service was in operation within four days. By November 10, seven days after the disaster, the electricity was restored to the area. Various levels of government were responsible for the repair of roads normally under their jurisdiction, aided by the Army engineers. The army, along with firemen and factory workers, supplied the manpower for banking rivers and clearing factories. Drinking water was back to normal by November 22, but it was still not in adequate supply for industry.

Japan

Niigata

The various departments of government were responsible for their respective functions, backed by extra manpower from the SDF which contributed 6,500 men, plus 7,300 from a special engineering brigade. They worked primarily on building dykes, repairing roads and railways, restoring pipelines, and in helping to purify and distribute water.

Yamanashi Prefecture/Ashiwada Village

Transportation and communication were high on the list of priorities in restoration because so much of the other restoration was dependent on adequate roads. Water was cut off on September

25, so that prefecture and private water supply cars had to be sent to give aid, and on October 3 and 4, emergency water supplies were established.

Hiroshima Prefecture/Kure City

Restoration of rivers and anti-disaster facilities were given a high priority in order to prevent a second disaster. The responsibility for restoration was extremely differentiated and complex.

The United States

Alaska/Anchorage

Power, water, telephone and gas utility crews were in action within the first hour and maintained a twenty-four-hour-a-day effort. The gas company, the only utility which could not handle the increased workload with its regular crews, called in thirty skilled workmen from Seattle and employed a number of local volunteers.

Restoration of utilities to hospitals and to control headquarters was given first priority, then restoration of services to other utilities, such as transportation and communication.

New Orleans

Special committees, headed by city councilmen, were put in charge of the different areas of restoration, with high priorities placed on city hospitals, power plants and sewage and water plants.

Mississippi/Biloxi

During the storm there was no activity, but immediately afterwards, the first priority was to restore the water supply and to clear the roads. Residents were asked to clear the streets in front of their houses to augment the official efforts. The County Civil Defense Director was the chief coordinator.

Summary: Emergency Restoration of Services

Generally, in all of the societies, high priority was placed on the restoration of transportation routes, communication facilities,

and utilities (particularly utilities to emergency installations). The patterns of similarity and the exceptions to these patterns of similarity are worthy of elaboration.

The emergency restoration of services appeared to take on a more organized approach than search and rescue and most of the other functions. In these highly advanced technological societies there are technical organizations that have an established and set procedure for the handling of emergency situations, which are followed in disaster situations. Since most of the work done by these organizations is of a noninterchangeable nature, priorities are established and worked on as adequate time develops. In a few instances, extra manpower was secured from the armed services, and Anchorage, utility crews were flown in from "the lower 48." Much of the extra workload on utilities was handled through extended shifts in all these disasters and the transfer of "desk" people to field operations.

There also appears to be a clear tendency to put the highest priority on restoration of utilities that are directly associated with the preservation of life. Water supply received top priority in a few cases, and roads were of particular importance in disasters where it was necessary to use roads for the most immediate needs.

At three of the sites there was a high priority placed on restoration that would prevent further or secondary disasters. There was a pronounced difference in the priority rating given telephone repair in Biella and the priority given the same service in Sicily.

CHAPTER IV

THE ANALYSIS AND INTERPRETATIONS OF THE FINDINGS

The analysis and interpretations of findings in this section are divided into four categories: (1) the effect of centralization on the functions of disaster response, (2) the effect of institutional/structural variables on the functions of disaster response, (3) the influence of disaster functions on functions and structure of response, and (4) general findings, which include findings regarding the effect of aspects of the disaster agent and other variables not categorized in the dimensions of the study.

The Effect of Centralization on the Functions of Disaster Response

It was originally hypothesized that the degree of centralization of government prior to the disaster would have consequences for the nature of disaster response, and it was implicitly assumed that these consequences would apply to all time periods of the response. It is now necessary to qualify that original hypothesis and those implicit assumptions. If the disaster response is divided into pre-impact, emergency, and rehabilitation periods, it becomes evident that the centralization has different effects in different time periods. These effects will be elaborated upon in this section.

The degree to which decision making is centralized appears to vary throughout differing time periods of response. In the preplanning stage Italy and Japan are centralized and the United States is decentralized. Japan has a large number of national laws, referred to as "Basic Laws," which serve as a basis for prefectural and municipal planning. These laws are elaborated on the national level in the various ministries, and on each level each operational division's responsibilities are made specific. There are national level ministries, e.g., construction ministry, that have offices on the prefectural level; but the major locus of decision making for each level is through that level of governmental structure, e.g., a city council or prefectural assembly. The centralization is apparent when one analyzes the laws and regulations that delineate the specific responsibilities of the various ministries, departments, and organizations. These are based on model national plans, and each level of government designs its plans to fit within the boundaries set by the next highest level. Thus, a great amount of centralization is related to policy formation in planning, and many of the specifics of administering those policies are left to the other levels of government. These administrative decisions are made within the boundaries of the overall policy decisions of the national government.

The Italian system is structured somewhat differently; there appears to be more of a functional division of labor from the national ministries on down. The national ministries in Italy are not as coordinated as they are in Japan. In Japan, a special high status office of the prime minister is in charge of coordinating structures, and there is a similar office on each level of government. In Italy, the responsibility for overall coordination rests largely with the Ministry of Interior, which is a specialized operational group itself. Thus, much of its effort goes towards the planning of an operational organization for response, the civil protection organization. This organization has its own operational units on the different levels, but they are not the ones which coordinate the activities of the organizations within each level.

In the United States there is an Office of Civil Defense and an Office of Emergency Planning which try to coordinate planning at the varying levels of government. They do not, however, have the authority that the equivalent group in Japan has, since much of their effort depends on the ability of various level offices to win the cooperation of other groups and organizations within the various levels.

Thus, Italy is centralized, but more along the lines of one centralized ministry with responsibility for actual operational tasks, Japan is centralized, but coordinated on each level, and the United States has a more decentralized structure.

In the actual performance of disaster-related functions the degree of centralization varies as the response moves through various phases. In the preplanning stage Italy and Japan are centralized while the United States is decentralized. In the emergency period of the disaster, particularly the early stages of the emergency period, all response in all three countries was decentralized. Thus, such functions as evacuation, search and rescue, and care of the injured were performed by those who were able to fulfill the function most rapidly regardless of prior planning or centralization. In search and rescue and evacuation the police, Army, firemen, and volunteers in each case appeared to be the ones performing the task. It was apparent that there was a time lapse before upper level officials moved to exert their authority. In the decentralized system, the United States, the more centralized levels of government came with resources, but authority for response was left to the lower levels.

In the rehabilitation stage of disaster response the authority patterns were different in the different countries. In Italy and Japan there was a centralized response and in the United States there was a mixture of centralized and decentralized response.

The differentiation of functions needs coordination on all levels. It appears that the proportionate amount of coordination necessary may vary directly with the degree of differentiation of function and the complexity of the division of labor.

Coordination is necessary on both a horizontal and a vertical axis. An example of this may be seen in the case of the prefectural medical officer in Italy, a nationally appointed position somewhat autonomous from the authority of the prefect. He is, particularly in time of disaster, responsible for coordinating and supervising all health services in the prefecture. Thus, he must work with the Red Cross and other organizations on the prefectural and other levels and coordinate these functions with the national level of his own ministry and that of other national level ministries. This is seemingly less of a problem in this specialized area of medical and health care than in such areas as the functions of the Mobile Column which carry it into the task areas of a number of other organizations.

The Mobile Column in Italy is a nationally organized fire-fighting unit which also has responsibility for coordinating other organizations. In Japan and the United States the fire departments are organized on a local municipal basis and are coordinated with other organizations on their level with no authority for coordinating other organizations. In Italy even volunteer groups work under the coordination and authority of the Ministry of Interior.

An intervening variable that appears to affect the level of centralization is the number of trained bureaucrats or managerial personnel on the various levels. In Sicily there was extreme centralization after the early emergency period. This was partially due to the lack of competent administrators on the local level. In Biella there was relatively less centralization because of the high number of experienced local managers.

Centralization in Italy appears to make lower level officials more hesitant to take the initiative for fear of overstepping limits of authority. It also delays action because of the convergence of large numbers of decisions at the higher levels of bureaucracy. This is in contrast to Japan where a number of administrative decisions are made on the lower levels and policy decisions are kept at the higher levels. Extreme centralization in Italy may be partially responsible for the delay in decision making and the seeming difficulty in getting long-term preventative actions.

In highly specialized functional areas that demand a high level of expertise there appears to be less interchangeability of functional tasks from one area to another, and authority tends to flow along vertical rather than horizontal lines.

The Effect of Institutional/Structural Variables on the Functions of Disaster Response

The institutional/structural areas, except centralization which will be treated under a separate heading, are treated in this section. Each area in which relevant findings are discerned is discussed separately and then an effort is made to see the interrelations of the independent variables as they affect the performance of disaster functions.

Economic Variables

The level of technology appears to be an important antecedent variable to the nature of response. It partially determines the institutional and geographical areas from which response will be drawn, the types of organizations needed, and the relative ranking of priorities, e.g., particularly in restoration of services. Needs that support a highly technical society are given top priority since they are necessary for carrying on the functions of that society; for example, in Biella telephone service was given a top priority for restoration as essential in this business-oriented community. Communication needs were given a top priority in most of these disasters. While wireless communications of various types, e.g., ham radio operators and official radio nets such as the police, fire, and military, are used for emergency communications, an advanced industrial and technological society considers telephone communication an essential. An exception to this in these disasters was Sicily, which is an agricultural area, and rapid communication via telephone was not an essential for a broad base of the population.

Technological level is a necessary condition for certain types of warning. The warning system in the United States depends on a very high technological level, as does the system in Japan; both these countries use weather ships, planes, and radar for detection of storms. Italy has a very high level of technological development, but this does not appear to be a sufficient condition for adequate early warning systems. Technology also played a role in the evacuation and search and rescue operations; specialized equipment such as amphibious vehicles and helicopters were used in all three countries. It is interesting to note that in Italy there appeared to be a large number of international offers of help, some in the form of specialized technical equipment; e.g., water purifying equipment was brought to Florence from France and Germany. If this type of pattern develops, i.e., regionalism among nations in the matter of aid for disaster response, some nations may be in a position to have available technological equipment and skills that they could not otherwise support on the basis of their technological level and GNP.

Societal differentiation may be viewed as a structure or process that includes all of the institutions of society, but it is included under the economic institution because economics plays such an important part in the process of differentiation. The index used to rank countries on the dimension of differentiation in this study was from Marsh (1967: 329-374) who uses two economic components to build his index, e.g., percent of gainfully employed males in nonagricultural occupations, and the gross energy consumption per capita in megawatt hours.

The three societies studied were highly differentiated, which may be seen in the division of labor of disaster functions, changing through phases of the disaster response. In the early period of the emergency there was a lack of coordination, and a number of organizations were working as autonomous groups on the functional area

with highest priority, i.e., preservation of life. The search and rescue function and the evacuation were performed by a number of organizations working as separate units on the same tasks; what coordination there was was performed by units working in the field.

After the first priority tasks of evacuation and search and rescue many organizations moved to their own specialized functional task areas. During the third period there was specialization, but with the element of autonomy removed by coordination at a higher level. For example, there were generally meetings of relevant organizations and offices to map the situation, set priorities, and divide the functions. In summary, there were three phases of functional response: (1) all units working as autonomous groups, or with some on-the-field coordination, in the area of highest priority, (2) units working in their own functional areas of specialization without coordination, and (3) units, for the most part, working in their own areas of specialty with overall coordination from a higher level.

In a society with a complex and specialized division of labor there would appear to be a higher number and proportion of units that are noninterchangeable. In societies with a complex division of labor and a high differentiation of function, coordination of the various units becomes a time-consuming task in itself. It may be hypothesized that the higher the differentiation in a society the greater the proportion of effort expended in coordination. In this kind of society preplanning becomes even more important, especially true in the functional areas that come early in the time sequence of functions, e.g., warning and emergency preparedness. The three nations studied approach the subject of planning and coordination in different ways. In Japan the central government is coordinated by an office working from the prime minister's office, and the governors and mayors are responsible for response on their respective levels. In the United States the Office of Civil Defense is responsible for coordinating response; in New Orleans and Biloxi, the Office of Civil Defense played the key role in coordination. This was not as true, however, in Alaska and in a number of other disasters in the United States. In Italy there is an organization for civil protection, but it is an operational organization as well as a coordinating organization, and there is generally some time lag between the time of impact and the time at which this organization actually begins its task of coordination.

Political Variables

The political institution is the area in which final authority for coordination of response was placed in all the disasters in all the countries studied. It would seem that the power of this institution, both in authority and influence, becomes more dominant during disasters than in normal times.

Disaster response in the United States would appear to involve the private sector more than in either Italy or Japan, probably

explainable from an historical, cultural, and structural perspective. The attempt here is to discern the structural reasons for the heavy involvement of the private sector. Structurally, the United States has a number of private welfare organizations and great technological resources in the private sector. Utility companies are most often private companies and instrumental in restoration of emergency services. There are also a number of private and religious welfare organizations and service and civic associations that figure prominently in disaster response. The level of resources and the dimensions of the disaster agent may play relevant roles in the relative involvement of the public and private sectors, as in the New Orleans flood, where two thousand private small craft were used for rescue and evacuation. In addition to New Orleans being near the sea and having a large population, that large a number of private boats would seem to indicate a certain standard of living of the populace. In the Florence flood private contractors from a number of places in Italy pooled their resources for clearing and restoring the city. In order for the private sector to play such roles not only must the society be organized with the private sector taking certain roles, but there would seemingly need to be a certain level of private industry and/or standard of living to support such actions.

The police were in charge of security through all of the disaster responses studied. In the United States they were aided by deputized volunteers and the military, but the police were in overall command. The scope of police authority showed some difference between nations. In Italy it was not an issue, but there was a contrast shown between Japan and the United States. The revised constitution in Japan has limited police powers from their pre-World War II level, but they are still much greater than police power in the United States. In the United States, evacuation cannot be ordered by the police, and if people refuse to move from their homes, the police do not have the authority to legally coerce them. When asked if the police have authority problems with evacuation in Japan, the informants simply laughed and explained that there was no question about whether a citizen would evacuate when ordered to do so by the police.

In all three countries the military played important roles in the performance of various disaster functions, and thus helped with evacuation and victim care. In Italy and the United States the military also played a role in the security function, but in Japan they did not, although they had the authority to do so by law. Because the Japanese government and military are both rather conscious of the position of the SDF there is a hesitancy to use the military in potentially controversial functions. In Italy, and to a lesser extent in Japan, the military made major contributions to the emergency restoration of services. This was not true to the same extent in the United States, where when the military was used it was chiefly as an extra source of manpower to help public or private organizations in restoration.

Communication Variables

In all three societies mass communications, particularly radio and television, are very much a part of the daily life of the populace. In two disasters in Italy and one disaster in the United States radio and television did not play the central role in warning that they could have. All programming in Italy is on a national level from Rome. Local stations must gather news and send it to Rome, from where, if it is deemed important enough, it will be broadcast nationally. A threat from weather conditions must be adjudged of sufficient magnitude to broadcast to the entire nation, limiting the number of warnings. In the case of the Mississippi Gulf Coast disaster, the broadcasting from the Mobile, Alabama station was more accurate, but more people were listening to the New Orleans station.

The Family Institution

The nature of the family institution appears to play some role in the nature of response. In Italy and the United States there was a preference among evacuees to take shelter with relatives and friends. In Alaska the public shelters were nearly vacant after 24 hours. In New Orleans many people who were rescued from the flood requested to be taken to the homes of friends and relations, and only after they discovered that these houses were also flooded would they go to the public shelters. On the Gulf Coast the threat was so extensive that there was no possibility of seeking shelter in the houses of families. In Florence, Sicily, and Biella patterns similar to those in the United States appeared. In Sicily, a convergence of demographic, economic, and family variables led to the refusal of people to leave their homes; these are agricultural people who need to care for their stock and equipment, and a people with strong family ties who are not willing to leave the head of the house to care for the land while the rest of the family moves to evacuation centers.

It is important to note, however, that strong family ties may be overridden by structural arrangements. Where families were not in a position to offer any kind of help, the government aid was accepted. In New Orleans, the Gulf Coast, to some extent in Florence and Sicily and in Japan government evacuation centers were used when the family was unable to give aid. In Japan, possibly because of the limited living space of the average home, government shelters were turned to immediately. This was also true in all three societies in relation to welfare. In Italy and Japan the government was the first sector of society looked to for welfare. In the United States people looked to a number of private organizations, but turned to the government for long-term aid in such areas as loans.

In Japan the family appeared to demand first loyalty from the workers in Niigata and Yamanashi, taking precedence over the occupational

roles they were to fulfill. It meant that a number of organizations such as police and fire were limited in the number of personnel they could field in the early stages of the emergency.

The Religious Institution

Churches were active in welfare in Italy and the United States, and in Japan the religious institutions play an important role in the way the care of the dead was handled. In keeping with the religious belief that the dead will not be at peace until their bodies are found, an entire lake was drained in Japan in order to find the bodies of the missing. It is interesting to note that the Roman Catholic Church, with its reputedly rigid hierarchy, was one of the most decentralized of all organizations in the Italian disasters; the national level church relief group worked through the bishops in the disaster areas.

The Influence of Disaster Functions on Functions and Structure of Response

Functions as Affectors

It is clear that there is not a single direction of cause and effect from structure to the manner in which functions are carried out. Functional areas may influence the process and structure of response. Certain functions exert influence on other functions, on process and structure, and on the overall response, e.g., the amount of time allowed for warning sets limits on the extensiveness of response, the types of response, and units that participate in response. For example, there was last-minute warning to officials in Florence, but this did not allow for any effective emergency preparation. There was no official warning in the Niigata earthquake, but the tremors took three minutes to build up to earthquake proportions. This short time did not allow for effective large-scale preparations, but it did allow time for many individual citizens to turn off the gas and lessen the possibility of post-quake fires.

The functions that follow warning are very much dependent on this function which precedes them in time, setting limits on the amount of coordination possible in the early stages of the disaster. For example, there was relatively more coordination in the New Orleans and Mississippi Gulf Coast floods than in the Anchorage earthquake, due in part, to the lack of warning in Anchorage. Italy and Japan do not provide adequate tests of this because of the lack of warning in the Italian disasters and the inaccuracy of the warning message in the disasters in Japan. In the Florence flood there was warning only to officials, and in the Piedmont flood there was no warning at all. In Yamanashi and Hiroshima the warning message prepared people for flooding when the disaster agent that brought the most serious destruction was, in each case, mud slides.

Certain functions affect the structure and process of response. For example, the data from all of the disasters show that the search and rescue function, particularly in the time period immediately following impact, was conducted by a number of organizations, groups, and individuals with little coordination. Even where the normal time structure of authority and process of decision making was centralized there was a certain amount of decentralized decision making during the height of the emergency. This was true to a lesser degree of the function of evacuation.

In summary, there is an urgency related to certain functional areas that overrides structure. For example, rescuing a family from a building that has collapsed is so urgent that it is done by any means possible, by almost any unit available, without too much regard for the structure of power or the pattern of decision making. This generalization is not without its limits, e.g., there may be less voluntarism outside the extended family in an area where the family is a strong dominant institution as in Sicily, but the hypothesis is true in most of the cases studied.

Preservation of Life

Preservation of life was a cultural value that took first priority in all the disasters. Search and rescue and evacuation appeared to take first priority because of their direct relation to this core value. It also appeared that the highest priorities in the restoration of services went to those services that were directly associated with the preservation of life. Water supplies and restoration of services to hospitals and repairing damaged buildings to prevent further hazards to life were given top priority.

Yutzy (1969: 34-35) in his monograph on community priorities in the Anchorage earthquake, used a social system model of the community. To Warren's five functions he added one more (1960: 9-11): preservation of life and property. Yutzy found that in the Anchorage disaster there was a vast overload on nearly all agencies which normally perform the services associated with the preservation of life and property. The data concerning each of the disaster responses in this study are in agreement with Yutzy's findings.

General Findings

Disaster Agents

The disaster agents included in the study were controlled as much as possible on dimensions of time, scope, predictability, and controllability. It became evident in analyzing the findings, however, that one of the reasons these agents precipitated disasters was that they had unusual characteristics from those of the "usual" disaster agents. These unusual patterns appeared in seven of the

nine disasters studied. Some of these "twists" to the usual patterns might be partially discredited as post facto rationalizations on the part of officials; but, after making allowances for rationalizations, there is still clear evidence that the disaster agents were irregular or eccentric in behavior.

This means that, while disaster agents can be typed and plans can be developed to meet many contingencies, there is often a unique characteristic that makes planning less effective. This applies to some response functions more than others, e.g., warning and emergency preparedness more than inventory and emergency restoration of services. It may be argued that a part of what changes disaster agents from potential to actual precipitators of disasters is the unique, eccentric, or unusual characteristics of the agents.

Stress agents, particularly in situations where they are frequent, may be dealt with in a rather routine manner by the system so that the agents are not really considered to be major, i.e., disasters. It is when the agents are so severe or unique that the systems do not have ways of handling them that they create severe stress.

This was the case, in varying degrees, in seven of the nine disasters studied. In some cases there would have been major disasters without the factor of uniqueness, but certainly the disaster was made more severe by the presence of this factor. Examples of disaster agents acting in a manner different from their usual patterns may be seen in all the disasters except the Niigata and Anchorage earthquakes. The Arno River, which bisects Florence, has flooded often from the time of the founding of the city; the worst flood on record occurred in 1333 A.D. (Nencini), and Leonardo da Vinci had a plan for flood control because of the threat of the Arno. What was a surprise to most of the people in the city was this intensity, for which they were not prepared. It would appear that familiarity, rather than contributing to alertness to danger, helped to create a sense of complacency.

Sicily has experienced earthquakes in the eastern portions of the islands for centuries and had developed special building codes to apply in this area. The western part of Sicily, however, has not experienced earthquake disasters in recent years. "While there were regulations governing earthquake-resistant construction in eastern Sicily it had generally been felt that they were not necessary in western Sicily, and none were in effect" (Haas, 1969: 1). This same lack of preparedness applies to many of the disaster response functions.

The Piedmont is not the section of northern Italy that generally experiences flooding, which occurs regularly in the northeast along the Po River. The hills in Biellese have many little streams that sometimes flood, but any destruction is generally limited to water damage. In the disaster in 1968 flooding was extensive throughout the Piedmont and the major damage done to the Biellese area was not from water, but from mud and rock slides.

In Yamanashi Prefecture the officials and the populace were accustomed to typhoons and flooding; they knew the course typhoons would generally take as they came on a circular route around Mt. Fuji. In 1966, however, Typhoon Helen did not come on the usual route, but took a straight course, which meant there was only one hour from the time the typhoon struck the coast till it crashed into Yamanashi. While firemen at Ashiwada Village were gathered waiting for possible damage from wind and flood waters, the mountain that had been solid for 300 years came crashing through their houses.

Kure City is proud of its protected position surrounded by mountains.

The city area is protected from the northwestern monsoon by the Chugoku Mountain Range and from the southeastern by the Shikoku Mountain Range in winter. Wind is westerly throughout the year. In general, Kure enjoys mild climate throughout the year, very seldom menaced by devastating typhoons and floods that are common in this country, or rocked by earthquakes of any dangerous magnitudes. (Kure City Government, 1969: 5)

In July of 1967, after extensive rain brought about by a severe typhoon, parts of those "protective" mountains slid into the city, causing loss of life and property damage.

In Hurricane Betsy which struck New Orleans in 1965 there was adequate warning, the region was alert and ready with emergency preparations, and the system might have met the increase in demands; but in addition to the winds, and the flooding in well defined regions, there was a secondary disaster in the form of unexpected and widespread floods. Thus, the system met a stress agent for which it was unprepared, and the result was severe stress, indeed, disaster.

The course of Hurricane Camille, which struck the Gulf Coast of the United States in 1969, was unusual also, in that it was expected to strike the coast further east than it did and the force of the storm was far greater than the officials and populace had ever experienced previously.

In each of these examples an unusual pattern of the disaster agent and/or the intensity of the agent helped to precipitate a disaster. This finding supports the relevance of the dimensions for typing disaster agents proposed in chapter one, i.e, time, scope, predictability, and controllability.

The dimension of scope includes area and intensity. In the example of Hurricane Betsy in New Orleans the flooding brought on by the hurricane was over a broader area and more intense. Hurricane Camille did not make the turn that it was predicted to make, and, thus, the predictability of the agent was lower than anticipated. Officials in Ashiwada Village knew a typhoon was to strike and they had been having heavy rain; therefore, foremen were in a building

for an expected flood. Instead of a flood there was a landslide which, once it started, was not controllable. These dimensions singularly, additively, and in interaction are important dimensions that must be considered in the study of disasters, i.e., the ranking of disaster agents on these dimensions is a valid and reliable test of the effect of these agents as precipitators of disasters.

Social Time*

In a number of disasters the matter of time and its associated cultural patterns was an important factor, either positively or negatively associated with the severity of the disaster. The time of day and calendar time were both relevant factors. The earthquake in Sicily was at night and, consequently, people were asleep in their houses. This led to a heavier death and injury toll than might have occurred if the quake had struck during the day when many of the workers were in the open fields. In Niigata the earthquake occurred after the noon meal when most gas stoves were turned off, and thus, there was less danger of fire. The quake in Anchorage occurred at 5:36 p.m. when most people were on their way home and not congested into the downtown area, explaining why a disaster that wrought such destruction was responsible for only nine deaths. In both the Piedmont and Florence floods the workers were not in the factories or on their way to work because of vacations associated with national holidays. In the Biellese area of the Piedmont the textile factories, the major source of industry in the area, were located along the mountain streams where the landslides occurred, and 80 of these factories were severely damaged and 20 were totally destroyed. If they had been filled with workers the death toll might have been ten times what it was.

Prior Disaster Experience

It is evident from disaster studies within the United States that prior disaster experience is an important variable in community response to disasters. The evidence found in this study is not sufficient to warrant an unqualified conclusion on this matter, although it does suggest that community level findings may be applicable on a national level. For example, when the Niigata disaster occurred the plans for response on a national level were only three years old, and elaboration and refinement of these plans, particularly those for coordination between levels of government, had been given even less time and opportunity to develop. In the cases of Yamanashi and Hiroshima the national government had had more experience in dealing with disasters and more time to develop plans to cope with them. It appeared, consequently, that the response in the latter two cases was handled by the prefectural level on a much smoother basis. It should be pointed out, however, that experience by itself is not enough to develop efficiency. There have been major disasters -- more than 1,000 people

*See Dynes (1969: 74-78) for relevance of social time to disaster.

killed -- on an average of once every two years for the past twenty years in Japan. Italy and the United States, too, have had extensive disaster experience, but there has not been a concomitant development of interlevel and prefectural/state level efficiency of response.

Previous experience and familiarity with disasters may be either functional or dysfunctional for the subsequent response. Again, the example of Niigata where a number of people turned off the gas as the shock waves built up shows a functional response due, in part, to prior experience, preventing a secondary disaster. An example of a dysfunctional response may be seen in the instance of the Mississippi Gulf Coast where a number of residents were not as alert as they might have been because the usual visual cues associated with an approaching hurricane were not present, e.g., the skies were clear and the waves on the Gulf of Mexico were not dangerously high on the morning before the disaster struck. There were also residents along the Mississippi Gulf Coast who were judging this hurricane by previous benchmarks and because of this decided to ride out the storm. The estimates of the intensity of the agents based on prior benchmarks were low, and when the hurricane far exceeded these expectations the consequences were disastrous.

Resources of the Geographical Region

The resources of the geographical region of impact are relevant to the extent and nature of prefectural and national involvement in disaster response. The resources and capabilities available for response are a relevant factor in determining higher level involvement; generally, local communities must be taxed beyond their capabilities before calling in outside aid. In Biellese there were more resources present in the immediate area than in Sicily and, consequently, less national government involvement in Biellese than in Sicily. Since New Orleans had many more resources available than the rest of the Gulf Coast or Anchorage there was concomitantly less federal government involvement in New Orleans.

The importance of the unusual pattern of the disaster agent, of social time, of disaster experience on all levels, and of local resources underscores the point that a number of variables become relevant to the response that are not due to the specific structural variables of a society as they are treated in this study. In part they are independent of societal structure and must be a part of the qualifying of any generalizations about the relation between disaster agents, disasters, and disaster response.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary of Chapters

In the preceding chapters the following topics have been presented: (1) the research problem, the significance of the research and a review of relevant social science literature; (2) the concepts used in the research, the theoretical overview, some methodological issues, the specification and operationalization of the independent and dependent variables, the research design and data collection; (3) the analyses of the findings; and (4) the interpretation. The major findings were categorized showing the impact of centralization, institutional/structural, functional and general variables on disaster response functions.

The major findings will be summarized under the following headings: (1) centralization, (2) social differentiation, (3) economic variables, (4) political variables, (5) communication variables, (6) family and kinship, (7) demographic variables, (8) response functions, (9) disaster agent, (10) social time, (11) prior disaster experience, and (12) resources of the geographical region. The summary propositions derived will be listed in the same order as the above headings. Each group of propositions will be assigned the number listed in the heading which discusses the general area from which the proposition derives, and divisions within areas will be designated by decimals. Finally, suggestions for further research will be discussed.

Summary and Implications of Major Findings

Centralization

A centralized system may be achieved in two ways: (1) there may be fewer actual decision makers and/or (2) rules may be elaborated to set limits on lower level decision makers. There are two things needed in disaster response, particularly during the emergency period: (1) rapid decision making and (2) flexibility for decision makers. Thus, a centralized system would appear to be weak at two crucial points: (1) decisions may be delayed as they are passed up and back down the hierarchy, and (2) people at the disaster site may have less flexibility.

There are a number of relevant variables that influence the amount of centralized decision making. On the most general level, the amount of centralization varies with the issue under discussion. A centralized structure is kept in some general areas of action more than in others, centralization is more likely in relation to politically sensitive issues. Natural disasters appear to be among the

areas of action in which a greater amount of decentralization is permitted. Within the area of disaster response there are two important variables that influence the amount of centralized decision making. (1) The amount of centralized decision making varies through different time periods of the response. During the emergency period, after the disaster agent has struck, there is some decentralization of decision making in both the centralized and decentralized systems. Where the major differences appear between the two types of structure are in the planning and pre-impact period and the restoration and rehabilitation period. (2) The amount of centralized decision making also appears to be related to the particular function under consideration; high priority functions are less centralized than those with lower priority. This variable is not independent of the time variable, i.e., the high priority functions tend to occur during the emergency period of disaster, and a part of the emergent decision making patterns may be accounted for by the lack of time allowed.

This study suggests that focusing on the formal structure of decision making gives the impression of a greater amount of centralization than actually occurs in the performance of disaster functions. Too, the degree of centralization varies through the different time periods of disaster response, with the least centralization occurring during the early stages of the emergency period. In addition the degree of centralization varies according to the function being performed.

Propositions related to the centralization variables are the following:

- 1.0 The frequency of centralized decision making is less in the emergency period of disaster response than in the pre-impact and restoration periods of disaster response.
- 1.1 The frequency of centralized decision making is less in the performance of the functions of evacuation and victim care than in the other disaster related functions.
- 1.2 Strongly established patterns of decision making may delay preventive action prior to impact.

Social Differentiation

This study focused on the degree of centralization as an important variable influencing the nature of disaster response. In analyzing the data it became apparent that the extent of differentiation also accounts for a number of important characteristics of disaster response, and, because of the importance of these findings, this separate section is devoted to the discussion of social differentiation. The central concern here is not with the causes of differentiation, but with the consequences for disaster response of social differentiation.

While social differentiation may be of several varieties, the one discussed in this section is that of structural or functional differentiation; synonymous with division of labor, which exists to the extent that people or groups perform different jobs. Tumin (1967: 19-20) writes about differentiation in terms of social status and

position; much of what he says may be applied to group or organizational units. Groups and organizations are distinguished from each other by the distinctive roles and the sets of rights and responsibilities they are assigned. Social differentiation is defined by March (1967: 31) as "the number of structurally distinct and functionally specialized units in society."

Greer, in his discussion of the subject of differentiation, connects social differentiation to an antecedent variable which he labels "scale of society" (1962: 54-56). Though he refers to the city, his analysis may be applicable to other levels of social organization. Basic tasks that are necessary for the continuance of the system are accomplished through a series of organized groups; ranging in size from the household to the corporation, these may be organized and grouped by the essential functions they perform. Taken together, those groups performing a given task represent a functional segment of society. "As the society increases in scale, the major functional segments ordering work, education, recreation and other activities become separated out, specialized and formalized" Greer (1962: 55). The importance of Greer's discussion for this research is that he shows the connection between the structure of action in societal subsystems and the scale of the society within which those subsystems operate. The three nations in this study are advanced in scale, and therefore highly differentiated. This, of course, has consequences for the nature of disaster response.

A highly differentiated society, then, is one in which functional segments become separated out, specialized and formalized. The three societies studied were all highly differentiated on measures developed by Marsh (1967: 329-374). The normal time activities necessary for sustaining a social system were performed by a large number of units. The degree to which disaster response was affected by differentiation varied through different time periods, through different disaster response functions and between nations.

Structurally the three nations were similar in that they were all highly differentiated societies, yet, in relation to disaster response some structural differences between the nations did appear. Two of the nations had organizations whose responsibilities included the coordination of response to disasters; in Italy the Division of Civil Protection is a part of the Ministry of Interior and works as a highly centralized functional unit, and in Japan coordination of disaster response is the function of the Anti-Disaster Councils that exist on the various levels of government. The task of the coordinating organizations in Italy and Japan was to integrate the response of the large number of units responding to the disaster.

In the United States, the national level office of Civil Defense does not have responsibility for coordination of disaster response; the local offices of civil defense have accepted the responsibility for coordination on their respective county and municipality levels. The national level organizations in the United States, then, work without the overall coordination present in Italy and Japan.

Another difference between the countries appeared in that the coordinating organization in Italy also had responsibilities as an operations task group. This meant that one organization was responsible for both coordination and the performance of many of the actual tasks of disaster response. At least to this extent there was less differentiation in Italy than in Japan.

As was stated earlier, the focus of much of the analysis in this research was on the effect of the degree of centralization on disaster response and led to the qualification of the original hypotheses and to the conclusion that differentiation is an additionally important variable that must be given closer scrutiny. The overwhelming urgency of the tasks that needed to be performed during the emergency period of disaster response led to the circumvention of centralized patterns of decision making and to committing a large number of organizations and groups to the performance of key function, e.g., search and rescue and evacuation. The pattern that seemed to prevail during the early emergency period was that several groups worked autonomously to perform the same tasks, leading to duplication of effort and inefficient use of manpower.

Because these societies were all relatively differentiated, the pattern of response had many similarities. Intrasocietal differences of response, however, suggest that less differentiated societies would have fewer units to coordinate, and the pattern of autonomous groups working in parallel fashion would not be as frequent. The response in Sicily, a rural region, showed less differentiation in response among the local units than was the case in Biella. Extrapolation of these findings to a societal level would support the proposition that the extent of differentiation influences the nature of disaster response, e.g., a less differentiated society would have fewer units to coordinate, and the pattern of autonomous groups working in parallel fashion would not be as frequent.

Propositions related to the area of differentiation are:

- 2.0 The proportion of time necessary for coordination varies directly with the extent of functional differentiation;
- 2.1 The frequency of autonomous action by responding groups varies directly with the extent of functional differentiation;
- 2.2 The number and proportion of noninterchangeable units varies directly with the extent of functional differentiation.

Economic Variables

Economic variables, particularly the level of technology, have important effects for the nature of response of the system in the following areas: (1) the ranking of functions and tasks in terms of priority, (2) the means by which functions are carried out, (3) the institutional and geographical areas from which response will be drawn, (4) the vulnerability of the society, (5) the amount

of coordination of response functions necessary, (6) the amount of interchangeability of units, and (7) the structural parameters within which cultural values operate.

A summary statement about each of these seven areas is made below.

(1) A technologically advanced society is dependent on certain machinery and expertise in order to keep the society functioning, therefore, the things that contribute to the support of that technology are given top priority.

(2) The means by which functions are carried out are influenced by the availability of certain types of technology. This may be the amount of equipment available, e.g., the number of heavy motor vehicles, or the level of technical equipment available, e.g., advanced radar equipment for detection and warning.

(3) A society with a high GNP will have a greater amount of resources available for response than a society with a low GNP. In societies with low GNP the central government may be the only organization with the resources to meet a disaster situation, e.g., the military may be the only unit with equipment and expertise for restoring roads and bridges.

(4) While a technologically advanced society has certain resources that a society with a lower level of technology does not have, it may also be more vulnerable to disorganization brought on by the impact of a disaster agent.

(5) A society that is advanced economically and technologically will need to devote proportionately more time to coordination. Such a society would be highly differentiated and have a rather specialized division of labor. A society with a "high number of structurally distinct and functionally specialized units in society" (Marsh, 1967: 329) will also need a greater amount of time and effort to be devoted to coordination.

(6) There will also be less interchangeability of functions and units within such a highly specialized system.

(7) The data from these disasters support the proposition that structural arrangements and technological capabilities set parameters within which cultural values may operate. For example, the family institution may be extremely important in a society, but people will turn to the political institution in a disaster; no matter how dependent they are on the family the resources are not there.

The following propositions are related to the economic variables in this study.

3.0 The priority given to specific technological resources varies directly with the technological level of the society.

- 3.1 The number of points of vulnerability of a society varies directly with the dependency of the society on a complex technology.
- 3.2 The severity of consequences for a society of the destruction of technology varies directly with the dependency of the society on a complex technology.
- 3.3 An advanced technology is a necessary condition for certain types of warning, emergency preparedness, evacuation, search and rescue, medical care, care of the dead, security, welfare and emergency restoration of service functions.
- 3.4 Structural arrangements place parameters on the effect of cultural values.

Political Variables

The evidence from these disasters supports the proposition that the political institution becomes more dominant and acts in a more direct manner during disaster than in normal times. The private sector plays a larger role in the United States than in Italy or Japan in normal times, and that difference carries into differences in the performance of disaster response functions.

Thus, two propositions develop around the political variables.

- 4.0 The political institution becomes a more dominant institution during disaster than in normal times.
- 4.1 Disaster response in the United States involves the private sector to a greater extent than in either Italy or Japan. It should prove interesting to study further these two propositions. Further research might examine the processes by which normal-time boundaries are re-established after the crisis. Further research might also examine the institutional/structural factors which lead to a great involvement of the private sector in the United States, e.g., normal-time public-private sector relations and economic resources and level of development, and test how generalizable these factors are to other nations.

Communication Variables

Italy, Japan and the United States are nations with relatively high numbers of radio and television receivers (See Table 5, p. 28) which are very much a part of the life of the populace. The availability of an adequate number of receivers does not guarantee the effective use of radio and television as a means of warning. As indicated in the last chapter, there were problems with the warning system in both Japan and the United States, and programming in Italy is on such a centralized basis that even weather broadcasting is channelled through a central office in Rome. This has two effects that may be dysfunctional for efficient warning: first, the weather must be of sufficient magnitude or of different enough nature to warrant broadcasting to national television, limiting the number of weather warnings; secondly, the process of centralizing the programming decision making in Rome may result in delays of warning. In

In an effort to reinforce national identification through national programming, the RAI in Italy has placed structural limitations on the possibility of an efficient warning system.

Along the Mississippi Gulf Coast there are enough radio and television receivers among the populace to warrant the wide use of this medium for warning. There are also a number of local stations so that instructions for warning can be programmed for specific areas. In the case of the 1959 disaster, however, a large proportion of viewers were watching a popular station whose information was not as accurate as that of another station whose listening audience was smaller.

These findings point out that a high level of technical equipment is not enough to insure adequate warning. The efficient performance of the warning function must take into account a large number of variables: the audience to whom the message is being sent, the medium by which it is to be sent and the structure of the system through which the warning must pass.

The Family Institution

The dominance of the kinship structure appears to have an influence on the process of evacuation and the use of shelters. In the disasters where the response provided a test it appeared that the evacuees preferred to take shelter with relatives and friends. This was true in both Italy and the United States, but not the case in Japan, perhaps accounted for by the limited living space of the average Japanese family. The strong family influence may carry over into the area of evacuation also; family commitments, in some cases interacting with economic variables, e.g., the need for agricultural people to be near livestock and fields, impeded evacuation. The data from the two disasters in Japan indicates that the family role took precedence over the occupational role in a number of instances; a number of organizations, such as the police and fire departments, had their staff depleted by as much as one third.

Two propositions developed from the family variables.

6.0 Where the family institution is dominant there will be more reluctance to evacuate and to seek official public shelters.

6.1 Where the family institution is dominant there will be greater conflict with the performance of occupational roles in disasters.

The Influence of Functions

The focus of this study was on the structure of society as the independent variable affecting the functional response to disaster, and the evidence underscores the point that this is not a one-way relationship, i.e., functions influence the structure and process of response. Functional areas considered in this study may also be

considered as independent variables affecting structure, process and other functions.

Though this research design treated disaster response functions as the dependent variables, there may be utility in considering disaster response functions as the independent variables. This is particularly true in instances where the nations being studied are similar on a large number of structural/institutional variables. There may be similar patterns of response, particularly in certain functional areas, across nations.

There were seven propositions about functions generated by the data from this research.

- 8.0 The relation between structure and function is reciprocal.
- 8.1 Specific functional areas effect the structure, process and function of disaster response more than others.
- 8.2 Specific functional areas effect other functional areas.
- 8.3 There is a sequential pattern of functional responses in disasters.
- 8.4 The functions most immediately related to the preservation of life are assigned highest priority.
- 8.5 The degree to which normal-time authority patterns are followed varies with the urgency assigned a function.
- 8.6 Prior functions in time set boundaries on the functions that succeed them.

The Disaster Agent

Even though this study used disaster agents as test factors and not as variables to be analyzed, the importance of the agent as a precipitant of disaster became quite clear. The extent of predictability of the agent was of particular importance. Because there is, to some extent, a sequential pattern related to disaster response and because such functions as warning and emergency preparedness are so dependent on reliable advance knowledge of the agent, the importance of the dimension of predictability of the disaster agent needs to be underscored. The range of error in predictability of the agent would appear to have an important influence on the amount of stress experienced by the social system.

The following propositions were generated by the disasters:

- 9.0 The amount of system stress varies directly with the predictability of the disaster agent.
- 9.1 The amount of system stress varies directly with the range of error of predictability of the disaster agent.
- 9.2 The effectiveness of the performance of the emergency and emergency preparedness functions varies directly with the predictability of the disaster agent.
- 9.3 The effectiveness of the performance of the warning and emergency preparedness functions varies directly with the range of error of predictability of the disaster agent.

Social Time

Dynes (1969: 74-78) suggests that the time of impact must be related to the social time of the community in order to understand community response to disaster. The evidence from this research supports the importance of social time as a dimension to be considered in disasters cross-culturally. Thus, one of the purposes of comparative cross-cultural research, i.e., the generalizing of concepts from one society to other societies, has been accomplished in relation to the concept of social time.

Two propositions originally generated in the study of disasters in the United States have shown importance in all the countries in this research.

10.0 Time and its associated cultural patterns affect the amount of stress experienced by the social system.

10.1 Time and its associated cultural patterns affect the performance of disaster response functions in a positive or negative fashion.

Prior Disaster Experience

Prior disaster experience appeared to have an effect on the nature of the disaster response in the direction of providing know-how for more effective response or in the direction of providing a false sense of confidence that dulls the sense of urgency and consequently effective preparation.

Three propositions were generated about prior experience.

11.0 Prior disaster experience may affect the amount of stress experienced by a social system.

11.1 Prior disaster experience may provide reference points that give a false sense of security and thus lessen the sense of urgency and adequacy of response of the social system.

11.2 Prior disaster experience may provide learning experience that has a positive effect on the effectiveness of disaster response.

Resources of the Geographic Region

It was suggested that the absolute amount of resources of a region and the amount of resources of that region relative to the surrounding regions are important factors affecting the involvement of external systems in disaster response. This may be stated in the form of a proposition.

12.0 The extent of external involvement in disaster response will vary inversely with the number of resources in the geographical area of impact. This proposition may apply to the involvement of other nations as well as the involvement of systems within a nation. There appears to be an increasing amount of international assistance in disaster response.

Summary Propositions

The summary propositions follow the order in which the findings were interpreted, that is, they move from those related to centralization through differentiation, institutional/structural, functional and general. Three statements may be made about these summary propositions.

(1) The proposition can be, in most instances, applicable to several system levels. For example, the hypothesis, "The amount of system stress varies indirectly with the predictability of the disaster agent," may be applicable to the individual level, the municipal level, the prefectural/state level and the national level.

(2) As the number of countries in the study increases there should be further elaboration, specification and qualification of these generated propositions.

(3) Because the nations selected for research in this study are so similar on a number of variables there needs to be a greater range of variance of independent variables tested.

1.0 The frequency of centralized decision making is less in the emergency period of disaster response than in the pre-impact and restoration periods of disaster response.

1.1 The frequency of centralized decision making is less in the performance of the functions of evacuation and victim care than in the other disaster related functions.

1.2 Strongly established patterns of centralized decision making may delay preventive action prior to impact.

2.0 The proportion of time necessary to achieve coordination varies directly with the extent of functional differentiation.

2.1 The frequency of autonomous action by responding groups varies directly with the degree of functional differentiation.

2.2 The number and proportion of noninterchangeable units varies directly with the extent of functional differentiation.

3.0 The priority given to specific technological resources varies directly with the technological level of the society.

3.1 The dependency of a society on technological resources varies directly with the technological level of the society.

3.2 The number of points of vulnerability of a society varies directly with the dependency of the society on a complex technology.

3.3 The severity of consequences for a society of the destruction of technology varies directly with the dependency of the society on technology.

3.4 An advanced technology is a necessary condition for certain types of warning, emergency preparedness, evacuation, search and rescue, medical care, care of the dead, security, welfare and emergency restoration of services functions.

3.5 Structural arrangements place parameters on the effect of cultural values.

4.0 The political institution becomes more dominant during disaster than in normal pre-disaster times.

4.1 Disaster response in the United States involved the private sector to a greater extent than in either Japan or Italy.

6.0 Where the family institution is dominant there will be more reluctance to evacuate and to seek official public shelters.

6.1 Where the family institution is dominant there will be conflict with the performance of occupational roles in disaster.

7.0 The potential number of deaths varies directly with the population density.

7.1 Rural populations are more reluctant to evacuate than urban populations.

8.0 The relation between structure and function is reciprocal.

8.1 Specific functional areas effect the structure, process and function of disaster response more than other functional areas.

8.2 Specific functional areas effect other functional areas.

8.3 There is a sequential pattern of functional responses in disasters.

8.4 The functions most immediately related to the preservation of life are assigned highest priority.

8.5 The degree to which normal-time authority patterns are followed varies with the urgency assigned a function.

8.6 Prior functions in time set boundaries on the functions that succeed them.

9.0 The amount of system stress varies directly with the predictability of the disaster agent.

9.1 The amount of system stress varies directly with the range of error of predictability of the disaster agent.

9.2 The effectiveness of the performance of the emergency and emergency preparedness functions varies directly with the predictability of the disaster agent.

9.3 The effectiveness of the performance of the warning and emergency preparedness functions varies directly with the range of error of predictability of the disaster agent.

10.0 Time and its associated cultural patterns affects the amount of stress experienced by the social system.

10.1 Time and its associated cultural patterns affects the performance of disaster response functions.

11.0 Prior disaster experience may affect the amount of stress experienced by the social system.

11.1 Prior disaster experience may provide reference points that give a false sense of security and thus lessen the sense of urgency and adequacy of response of the social system.

11.2 Prior disaster experience may provide learning experience that has a positive affect on the effectiveness of disaster response.

12.0 The extent of external involvement in disaster response will vary inversely with the number of resources in the geographical area of impact.

Limitations of the Research and Suggestions for Further Research

The rationale for placing both these subjects under one heading is that some of the limitations of the research are precisely the areas around which further research needs to develop. Russett (1964: Section B) refers to the issue of the use of significance tests in the type of analysis used in his research. A part of this issue is the question of the random selection of nations. The nations in this study were not chosen randomly, raising the issue of generalizability. Similarly, the observation has been made that a large amount of the comparative cross-cultural analysis done in sociology has been done with countries that are not in any way a random sample of the nations of the world. Indeed, much of the comparative research has concentrated on nations within particular regions, especially on nations of Western Europe. Is a generalization that holds between countries in Western Europe true for nations in Africa or Asia? This issue also has some relation to the issue of regionalism versus universalism in comparing nations. In many cases generalized cultural, political and social variables correlate with regional groupings. In this view, then, region is a composite index of variables of a nonregional sort. The perspective of this study is that the relevant variables that affect disaster response are structural rather than geographic, i.e., nations are similar or different in their responses because of structural reasons rather than that they are in similar geographic regions. The concentration of this study, however, does not deny the influence of regionalism on the nature of response. Even though the most macro level unit on which this study concentrated was society, there were responses, particularly in Italy, that referred to aid from other nations.

The above discussion leads to a number of suggestions for further research. The three countries in this study were chosen because of their similarity on a number of key variables. Will some of the generalizations that have developed from these three nations hold when they are tested with a larger sample? There should be value in future research using countries that contrast on a number of these key variables, and even the presence of one nation that contrasts on a number of key variables should help to give insight into the relevance of certain societal structures. The analysis of a nation used as a deviant case should help the researchers uncover further relevant variables and correct unwarranted inferences from this study. Another area for further research that has developed from an analysis of the data is a corollary to the issue of regionalism as discussed by Russett (1964: 322-340). The research showed that a rather substantial amount of assistance from other nations was given to nations struck by a natural disaster, as Italy had a rather significant amount of assistance offered in two of the three disasters studied. There is also data to show that nations sometimes pool resources on certain disaster functions, as Japan and the United States work together on a warning system. It is somewhat difficult to discern from material concerning disasters previous to the ones studied in this research whether these are recent developments, but it is the impression of this researcher that the amount of such international aid is growing. While aid in the two Italian disasters came from many nations throughout the world, and one of these disasters was a special case (Florence), the data appears sufficient to suggest future research into the area of the regional pooling of resources, e.g., the Caribbean and the European nations. If, indeed, there is such a trend, it may suggest some major changes in the approach used in this study. It will no longer be sufficient to study a single nation without greater effort being placed on the region in which it is located. For example, a Caribbean nation may be entirely different than many of the modern and economically advanced nations of the world on most of the variables studied in this research, but, because of cooperation among nations in the area, the response may have many of the characteristics of a more modern and economically advanced nation.

The level of analysis used in this study, the institutional, has the advantage of being inclusive for a broad range of nations, e.g., developed-underdeveloped and modern-traditional. Future studies of nations that are as similar as the ones studied in this research might profit from a different level of analysis, such as comparative organizational. This would have the advantage of allowing the study of particular substantive questions in the area of complex organizations and would also provide a basis for more exact research designs.

Another limitation of this research is related to the use of disasters as events for analysis. The method of event analysis helps to set parameters to the study by allowing the research to take a cross-section from the ongoing system for examination. This study treated the disaster agents as test factors and attempted to match agents as to type, e.g., floods and earthquakes; and other relevant dimensions, i.e., time, scope, predictability and control ability.

Three nations were chosen that were similar on a number of society variables and that contrasted on one major structural variable, i.e., degree of centralization. These structural variables of society were treated as the independent variables. Because of the tremendous importance of the disaster agent, further research might look at the disaster agent as the independent variable. This should work particularly well when studying similar countries such as those in this study.

In sum, the study of disaster response in Italy, Japan and the United States has generated propositions and led to conclusions that may be divided into two broad categories: those that are related to the structure of the social systems and those that are related to the nature of the disaster agent, the disaster and the response in general. A number of conclusions have developed around these areas that are generalizable across societies.

APPENDIX A

INSTRUCTION SHEETS: FIELD PROCEDURES AND SUBSTANTIVE FOCUS

A. Field Procedures and Substantive Focus

1. Our focus is at the societal or national level. We are concerned with how a total society reacts to a disaster, not how specific organizations do. Thus, our attention will be on functions rather than organizations or groups.
2. In general, we will deal only with a single society at a time. However, it is impossible to conceive of a society as not having contacts with others. Thus, some attention will be given to extra-societal activities, especially as these are seen by the society involved.
3. The response of any society is clearly conditioned by many factors. One of the more important of these, and a partial basis for the societies chosen for study, is prior disaster experiences. Thus, some attention will be given to such background factors.
4. In the light of the above, we will obtain three kinds of data:
 - a. background data,
 - b. functional data,
 - c. extra-societal data.The major focus will be on the functional data to be gathered in the field. The other two sets of data can partly be obtained at the Center prior to and after a disaster.
5. The field work will be conducted in the following way and will examine the following dimensions:
 - a. The team will make an initial contact with six organizations or groups almost certain to be involved in all major disasters. These are:
 - (1) National disaster headquarters, emergency measures group, or its equivalent.
 - (2) The national Red Cross.
 - (3) The national or federal police.
 - (4) The military office or command involved.
 - (5) The national civil defense agency.
 - (6) Major national newspaper (or perhaps radio network).
 - b. From these six, two things will be obtained. The minor aspect will be a list of other organizations and groups heavily involved in the disaster. More important, data will be obtained on functional aspects. (See Guideline for Interviews.)

c. The team will then move on to making contacts with the second set of organizations and groups, and obtain from them the same kind of functional data.

6. The extra-societal data to be obtained would include the following: activities of the UN and related agencies; international organizations with (e.g., Red Cross) or without (e.g., Church World Service) national subunits; other societies; and other organizations and groups. The perspective of the stricken society on such activities and associated problems should be the main focus of attention.
7. The obtaining of background data can be facilitated by the field team if they obtained:
 - a. Tables of organizations.
 - b. Any pre-disaster statistics on relevant organizations.
 - c. After-action reports or accounts of prior disaster experiences.
 1. Disaster plans at all levels of operation.Attempts should also be made to insure that after-action reports of groups and agencies be sent to DRC. Make clear that we will worry ourselves about any translating problems. The field team should make definite attempts to obtain at least several maps of the affected area, with clear designations of degree of damage and consequences for population.

APPENDIX B

INSTRUCTION SHEETS: GUIDELINE FOR INTERVIEWS

B. Guideline for Interviews

Our interest is in the following activities and functions. Basically we are interested in four aspects of each -- how they were carried out, where they took place, who was involved, and what problems occurred.

How? -- what means were used.

Where? -- geographical location of activity.

Who? -- groups and organizations participating.

What? -- difficulties encountered.

1. Warning -- e.g., both how warnings were received and transmitted, from and to whom, and at what time periods.
2. Emergency Preparedness (other than warning and evacuation) -- e.g., precautions after warning to protect people and/or property, coordination and control of such activities, and degree of preparation prior to impact.
3. Evacuation -- e.g., how quickly initiated and appeals used, criteria for choices made, and process and procedures for establishing camps or centers.
4. Inventory -- e.g., nature of damage assessment undertaken, initial decisions and priorities established, and degree of feedback obtained from disaster site.
5. Search and Rescue -- e.g., use of volunteers, coordination of effort, overall view.
6. Medical Care -- e.g., priorities established as to treatment, what was general nature of treatment needed, degree of self-medication and first aid undertaken.
7. Care of Dead -- e.g., how serious a problem was it visualized, were there any religious aspects that had to be considered, was mass burial undertaken.
8. Security -- e.g., was there reported and actual looting, did convergence behavior occur, were people or property of greatest concern.
9. Welfare -- includes the following:
 - Food,
 - Clothing,
 - Shelter,
 - More

10. Emergency Restoration of Services -- e.g., how was survey made of extent and degree of disruption, was there any priority assigned to restoration, what is still not restored and why.

In all instances, efforts ought to be made to establish clearly from each organization involved:

1. Who was in charge and/or control of the activity.
2. How many persons participated, "helpers" as well as victims.
3. What specific equipment and facilities were used.
4. Time of initiation, high peak, and cessation.
5. Prior disaster experience for comparison with current disaster.

APPENDIX C

ITALY

A Socio-Cultural Overview

History

The Italian people have a very ancient history. Some 200,000 years before Christ, ice age hunters crossed the Alpine barrier, following game onto the mountain-spined peninsula. Since that time Greeks traded, Etruscans built city states, the Roman Empire flourished, the medieval papacy reached through Europe, and the people of the Renaissance left their glory to the world.

Because of all this ancient history, Italy is often thought of as a very old nation, yet, in fact, the Italian state is very young. The Kingdom of Italy was proclaimed on March 17, 1861, at the Piedmontese capital of Turin. This proclamation was the result of an historical process by which a small minority of upper class liberals succeeded in uniting most of the peninsula under the house of Savoy, the ruling house of Piedmont and the island of Sardinia.

Italian unification was much if not more a product of the shrewd manipulation of international European rivalries as it was of the force and power of the revolutionaries inside the various states of the peninsula. As one statesman said at the time the kingdom was proclaimed, "We have made Italy; we must now make Italians."

The great masses of the Italian people, for the most part illiterate peasants, had remained extraneous to the struggle for unification. The state that was created was not their state. The struggle had taken place between the few legitimist supporters of the various petty tyrannies and Austrian satellites, on the one hand, and the somewhat larger number of liberal nationalists, on the other. (Fogan, 1962: 1)

The distinctive regional characteristics of the newly united Italy, the variety of dialect, and the differences of economic level would all seem to argue for considerable decentralization of governmental powers and functions. The French model of a unified, centralized state, however, appeared more congenial to Italy's leaders, and this preference was reinforced by numerous domestic considerations The centralized state was the response to the threat of

social unrest. The main function of the prefect, the agent of the Minister of the Interior and the symbol of the state in the province, was to maintain and enforce law and order. (Kogan, 1962: 4)

Culture

Culturally the church, the family, and sectionalism are essential institutions and structures that must be considered before one can understand Italy or the Italians.

In united Italy there has always been a struggle between the secular and clerical authorities. The effect of this struggle may be seen in present day Italy: religious and secular political parties, religious and secular labor unions, and religious and secular schools. After World War II the church acquired more influence in politics than at any time since the unification. This influence is material and political rather than spiritual or cultural (Kogan, 1962: 29).

The family is the most important institution in Italy. Banfield (1953) suggests that the family structure is so strong that its influence is dominant in other institutional areas and refers to Italy, particularly southern Italy, as a society of amoral familists. The family is also strong in the North, but there are other cultural factors at work that limit its dominance.

While the central focus of this dissertation is the Italian nation as a single unit, it is not possible to study Italy meaningfully without recognizing within-nation differences.

Economically and culturally Italy may be divided into two areas: north and south. Rome is a kind of middle ground between the Neapolitan South and the Genoa-Turin-Milan North. The North is by far the wealthier area, industrially and agriculturally, while the South has been poor for generations and even for centuries. Large numbers of people have migrated from the South to the North to bolster the labor pool. Closer to the standard of living of the North, Rome's modal category of workers is that of government employees; partly because the capital city would naturally have large numbers of government workers and partly because hiring people into government bureaucracy has been a means of rewarding party supporters and a means of combating unemployment.

Culturally, the North is the "Protestant ethic" or "European" area of the country. A resource person stated the difference quite well in an interview in Biella, "Work here is almost an idolatry.... When the flood struck there was rage on the part of the people." The value system of the North, including the northern rural countryside, is one that is generally "associated with a modern, urbanized society" (LaPalombra, 1964: 33).

By comparison to the North, the South is desperately poor.... The whole southern society -- economy, politics, religious practices, belief systems, and associational activities -- is typical of what one would find in any of the less developed societies currently undergoing change. (LaPalombra, 1964: 37-38)

These background factors are extremely important in understanding the human response to disaster in Italy. From the beginning of the modern Italian state there has been a conscious effort on the part of the ruling elite to keep control centralized. This effort may be seen in state functions, such as the appointment of prefects from the Ministry of the Interior in Rome, and it may be seen in state controlled firms, such as IRI (Industrial Reconstruction Institute) which centralizes broadcasting on its subsidiary R.A.I. (Radio-Televisione Italiana) so that the great majority of television programming is broadcast from Rome.

For historical, cultural, economic, and structural reasons, then, centralization is generally reinforced in both governmental and non-governmental aspects of Italian society.

Geographic, Demographic, Economic, Political, and Communication Overview

Geographically, Italy is a long, narrow, and rugged country. Though the country is slightly smaller than the state of California, its population is much larger and is crowded into limited areas because of the mountainous topography. A population of 49,455,000 places Italy in the first decile of world nations on this dimension, and Italy is in the fourth decile of world countries on the urbanization dimension. Because of the high birth rate the population is relatively young. Females outnumber males; this is politically significant because women are more responsive to church direction and influence than men and vote in higher proportion for the Christian Democratic party.

Economically, Italy is a developed nation with a GNP that places it in the top decile of world nations, but on a GNP per capita measure it drops to the third decile. On Marsh's (1967: 333-365) index of differentiation Italy falls behind most western European nations such as the Federal Republic of Germany, Sweden, France, and Austria, but places ahead of most eastern European nations such as Hungary, Yugoslavia, Bulgaria, and Rumania. It places just slightly behind Japan on the same index. The farm land, with the exception of the Po and a few smaller valleys, is marginal, and great numbers of peasants in the south are leaving the land. The country is also quite limited in natural resources, and there is a sharp discrepancy in production and standard of living between the north and the south. Industry is centered in the northwest industrial triangle of Genoa, Turin, and Milan.

Politically, Italy is western modern, conventional in ideological orientation, i.e., it uses conventionalized procedures for achieving the legitimization of new or changed power relationships; polyarchic; has a significant amount of interest articulation by associational groups; and has a significant allocation of power to functionally autonomous legislative, executive, and judicial organs of government. Its vertical power distribution is one of formal and effective unitarism. There are many political parties, three of which account for eighty percent of the vote: the Christian Democratic party, the Italian Communist party, and the Italian Socialist party. In recent years, the government has generally been a coalition between the Christian Democrats and Socialists. Party affiliation is of greater importance on the national level than on the municipal level, though on the municipal level personalities come into play a great deal more. The communists have been the party of protest, which has its major strength on the local levels and in certain regional areas, e.g., Bologna.

There are three major levels of government: national, the dominant level, prefectural, and municipal. The government rests executive power in the Council of Ministers (Cabinet). The President of the Republic nominates the President of the Council of Ministers (Prime Minister), and on the latter's proposal, then nominates the other ministers. The President of the Republic is elected by both houses of the legislature. The legislative branch is dominant over the cabinet.

Communications are big business in Italy. Since newspapers are most often owned by corporations whose primary business is other than publication, e.g., automobiles, textiles, and banking, quite often they are used as the instruments of these business for the promotion of their economic and political objectives. The newspapers show more of a regional influence than do the electronic media which are state controlled and highly centralized. Italy is in the fourth decile in daily newspaper circulation per thousand population and in the third decile in number of radios per thousand population.

The Disaster Sites

Florence

Florence, the "Athens of Italy," a thriving city of 432,138 (1961), is the key city of Tuscany. The agriculture and industry of Tuscany give it a reasonable prosperity. More than anything else, however, Florence is a capital of art. It has drawn students and tourists to itself for centuries, and the large number of hotels attests to its present day position as a leader in the field of Italy's tourist trade. The city is situated among hills and mountains and is bisected by the Arno River.

Sicily

While there have been efforts to bring industry to the area, Sicily remains a rather poor, predominantly agricultural section of Italy. Banfield and others have written about the family being the institution that is by far most dominant in the southern part of Italy. The effects of strong familism can be seen in the carrying out of many of the functions of response to the earthquake.

The island of Sicily is slightly larger than the state of Vermont, and its regional capital is Palermo. The areas hit by the earthquake were not heavily populated. The three provinces in the western part of the island that were affected are: Palermo (1,117,500), Trapani (430,711), and Agrigento (494,891) (1961 official government census).

Piedmont/Vercelli

The region of the Piedmont, of which Turin is the capital, covers 9,809 square miles, 3.4 percent of Italy's total area, and is the second largest region of Italy after Sicily. The Po River runs to the east through the largest and agriculturally most productive valley of Italy. The area had a population rise, largely due to an influx of workers from the south, to 4,145,000 inhabitants in 1961.

Vercelli Province, on which this study concentrates, had a population of 409,459 (1961 government census). The population of the province was 79.8 percent urban in 1951 and 82.9 percent urban in 1961. There are two key centers within the province, the cities of Vercelli and Biella, both with about 55,000 population. Vercelli is the political center of the entire province and the agricultural center for the rice-producing plain. Biella is the industrial center for the smaller textile manufacturing communities in the foothills of the Alps. The population of the province gravitates to these two communities which work rather independently of each other.

APPENDIX D

JAPAN

A Socio-Cultural Overview

History

In some ways the history of Japan parallels in the East the history of Italy in the West. Just as the Etruscans took much of the culture of Greece as the foundation that was to become Rome, so the native stock of Japan took the culture of China on which to build a culture and state.

Most modern scholars look to the roots of present day Japan in the Tokugawa Period, 1603-1867 (Bellah, 1958; Reischauer, 1964; and Ward, 1967). By the middle of the nineteenth century political and social changes were long overdue in Japan. The Tokugawa had succeeded in unifying the country, but they had kept the nation in isolation from the outside world for more than 250 years. They had also kept social change within the nation to a minimum. Japan was forced to break its isolation in the 1850's with the signing of a treaty with the United States in 1854 and the signing of treaties with England, Russia, and Holland soon afterward, forcing an internal change in governments in 1868. A group known as the Meiji Restoration formed around the emperor through his reign until 1912. During this period a modern state was formed by borrowing what it believed to be the best systems of business and government from other nations around the world, particularly Europe and America.

In the 1920's liberal democratic trends appeared in the government, but these trends were broken with a nationalist and militarist reaction in the 1930's. After World War II Japan's constitution was revised, and the new constitution, adopted in 1947, provides for a constitutional monarchy with a bicameral parliament. The emperor is now a symbol of national unity, while executive authority resides in the cabinet, headed by the prime minister.

Culture

Tradition is still strong in Japan. Recent studies of modernization seem to indicate that traditionalism does not need to be the antithesis of a modern society (Singer, 1966); traditionalism can be used as a basis on which to build modernism. Bellah's (1958) picture of Tokugawa, Japan being the functional equivalent of the Protestant ethic would suggest that this may be partially true for Japan. There are, however, dysfunctional aspects of traditionalism for modernization, e.g., personalism versus bureaucratic efficiency.

It should also be pointed out that Japan still has strong family traditions. Another important cultural trait is the great importance of the group in Japanese culture.

Geographic, Demographic, Economic, Political Overview

Geographically, Japan is a mountainous island with only 16 percent arable land and few natural resources. The rugged mountains have meant that Japan is not as homogeneous as it may appear to the outsider, and that unification had to be imposed by a compulsory political and social system, that of the Tokugawa. The fact that Japan consists totally of islands allowed it a position of isolation while developing its unique culture, and its island position has given the Japanese a sense of group identity toward the outside world. The scarcity of arable land and natural resources has meant that Japan has been forced into a position of world trader in order to sustain itself.

The population of 98,274,000 places Japan in the first decile of world nations. It is in the second decile of world nations in urbanization. The age distribution, with a large proportion of very young, has created a need for more workers, indicative of an increased need for social welfare in the future. The economy of Japan is based on foreign trade and low cost and efficient production. Japan has been so successful in updating the economy from a two-tier economy of cottage industry and modern industry that it has now moved into the number three position in world trade. While the GNP of Japan is among the highest in the world, in GNP per capita it ranks in the fourth decile of world nations. On Marsh's index of differentiation, Japan ranks the highest of all Asian nations and slightly higher than Italy.

Politically, Japan is significantly westernized, modern, conventional in ideological orientation, polyarchic, has a significant amount of interest articulation by associational groups, and has a significant allocation of horizontal power relationships. Its vertical power distribution is one of formal and effective unitarism.

The country, politically, is divided into 46 prefectures. The present constitutional system was adopted in 1947 and is a combination of an American and a British system. While the structure follows that of the United States and Great Britain, the "heritage and circumstances ... are far closer to those of Italy (Reischauer)".

There are three levels of government: national, prefectural, and municipal. The dynamics of authority and decision making between these three levels of government vary with the subject under consideration.

Japan is considered a centralized government, in that the national is the most important level in decision making. Not only is government

centralized, but it is concentrated around a rather limited number of bureaucratic leaders. A recent study showed that 80 percent of bureau heads and above in government service were graduates of Tokyo University.

Niigata

A port city with a population of 300,000 at the time of this earthquake, Niigata had all movement into its harbor blocked by debris and all 13 lines of the National Railway System which came into the city broken in at least two places. Crevasses and over 150 landslides caused a similar blockage of movement on all major highways and secondary roads, and damage at the airport prevented the flight of anything but helicopters and very small planes. Additional destruction came from several small and major fires that broke out after the quake. Particularly serious was the huge conflagration in one of the major oil refineries near the port area at the outskirts of the city, which, while burning for more than twelve days, destroyed 90 storage tanks, 302 homes and 197 other buildings.

Yamanashi Prefecture/Ashiwada Village

There are four settlements in the village, two of which were more severely hit during the typhoon. The hardest hit settlements, Nemha and Saiko, were both on the side of Lake Saiko. The village level government has four sections: (1) the general office section, (2) inhabitants section, (3) enhancement section (industry), and (4) planning section (tourism). This is an area that lives from agriculture, fishing, and tourism.

Hiroshima Prefecture/Kure City

Hiroshima Prefecture is situated on the Inland Sea in the southwestern part of Honshu Island. The prefecture covers 3,257 square miles with a population of 2,281,000 and a population density of 731 per square miles. The topography is mountainous with 76 percent of the total area of the prefecture taken up by forests.

The population of Kure City is 237,184 people in 74,244 dwellings. Kure City is a shipbuilding and steel manufacturing center with oil refineries and light industries. The legislature branch of Kure City consists of a council with 44 councilmen who are popularly elected every four years. The executive bureaucracy, headed by the mayor, consists of thirteen departments, four boards, and three committees, with a total of 3,270 city clerks and employees.

APPENDIX E

UNITED STATES OF AMERICA

A Socio-Cultural Overview

History

The United States had a legacy of English common law at the time of the Revolution. The nation, for its first ten years, was a confederation and only after this system did not appear to be satisfactory was a federation formed. It is important to remember, then, that the United States was not formed as one central government and then divided into states, but that the states agreed to form a federation. Thus, the central government is the creation of the states and not the other way around as in Italy and Japan. The states took this matter seriously as may be seen from the Tenth Amendment, "The powers not delegated to the United States by the Constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people." Through the course of its history the United States has become much more centralized, but the nation remains one of the world's few effective federations.

The ideals of states rights, local autonomy, and grass-roots control may be partially myths in present day United States, but they are important. Thus, federal and state officials are generally hesitant to take over control of a local community in time of disaster; assistance is given, but control generally comes from the local area.

Culture

Culturally, the United States is a young nation. It is a hybrid of many European immigrants, and the degree to which these different cultures have melted into one is not a settled question. The land areas of the United States today are almost ten times what they were when the thirteen colonies declared themselves independent. The expansion of the frontier and the tremendous growth that went along with it have played an important role in the value system of Americans.

Robin Williams (1965; 415-470) suggests a number of value orientations in America, including: achievement and success, activity and work, moral orientation, humanitarian mores, efficiency and practicality, progress, material comfort, equality, and freedom. A number of these value orientations seem to play a role in the nature of the disaster response.

Geographic, Demographic, Economic, Political,
and Communication Overview

Geographically, the United States is the fourth largest nation in the world, with a wide variety of topography and an abundance of agricultural and natural resources. Demographically, the United States is also the fourth largest nation in the world; because of its large geographical area, however, the population density is low. It is in the first decile of world nations in urbanization (percentage of population in cities over 20,000).

Economically, the United States has a wide variety of agricultural and manufactured products. Its GNP and GNP per capita place it high in the first decile of world nations. It is economically developed and has the highest index of differentiation of any country in the world. In summation, the United States is a modern, urbanized, and highly industrialized nation.

Politically, the United States is western, modern, conventional in its ideological orientation, polyarchic, has a significant amount of interest articulation by associational groups, and a significant degree of horizontal power distribution. Its vertical power distribution is that of effective federalism. The government is a constitutional democracy with a president as the executive, a bicameral legislature, and a rather autonomous judicial organ. The United States has the same three levels of government as Italy and Japan, i.e., national (federal), state, and municipal. The county level of government is relevant in certain regions of the country.

Daily newspaper circulation per thousand population was 326 in 1960, placing the United States in the second decile of world nations on this dimension. The United States had more than twice as many radios per thousand population as the second nation in the world, Canada. The United States is in the second decile of world nations in literacy rate of the population fifteen years of age and over. It should be pointed out that the percentage for Japan and the United States is 98.0, while the percentage for all the nations in the first decile of countries is 98.5.

The Disaster Sites

Alaska/Anchorage

Alaska, with 586,000 square miles, of which 95 percent is federal government land, is by far the largest state. Its population in 1960 was 226,000, of whom 43,000 were classified as native Indian, Eskimo, and Aleut. The population is concentrated around the main urban area -- 50,000 in Anchorage, 100,000 in the metropolitan Anchorage area. Several industries have grown up around the natural resources of the area: fishing, mining, lumbering, and, since 1957, oil

refining and natural gas production. The military plays a vital role in the economy of Alaska.

Anchorage is a rapidly growing community (11,254 in 1950 and 44,237 in 1960) that serves as the economic and trade center of Alaska. Approximately 40 percent of the state income came from the Anchorage area at the time of the earthquake. The city is primarily a center for transportation, communications, and logistic support for the military and is the headquarters for oil and gas exploration. The earthquake affected most of Alaska, but this study focuses on the city of Anchorage.

New Orleans

New Orleans is a city of more than 600,000 in a metropolitan area of one million. The city is one of the largest in area in the United States, covering 363.5 square miles, of which 199.4 are land area; the metropolitan area is 2,677.5 square miles. The city is located on the Mississippi River 110 miles upstream from the Gulf of Mexico, serving as the major gateway from the midcontinent United States to the Latin American countries and the world. It is a leading industrial, petroleum, financial, wholesaling, and retailing center with a mayor-council form of government.

Mississippi/Biloxi

The state of Mississippi is chiefly an agricultural state. Its population is 2,178,141 (1960) within an area of 47,716 square miles. The three counties that have land along the coast are Hancock, Harrison, and Jackson. The area concentrated on in this study is Harrison County, which includes Pass Christian (3,900), Long Beach (4,300), Gulfport (30,000), and Biloxi (44,000). Particular emphasis is put on Biloxi.

The pre-storm economy of this area relied heavily on tourism, fishing, pine lumber, and military installations. As is so typical of the southern regions of the United States, the county level of government is significant compared to some other regions of the United States.

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