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The Great Alaska Earthquake of 1964: Human Ecology

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General Introduction, Conclusions, and Recommendations

Ecology is the study of the interrelationship of organisms and their environment; the human ecology of an earthquake is a study of how men, individually and collectively, interact with the effects of a sudden extreme geophysical change in their environment. This volume on the human ecology of the Alaska earthquake is a scientific report of the impact of the earthquake on human behavior and society, how men responded to the event, and what men can learn from it.

The organization of the volume moves from the general to the more specific. Three introductory articles assess the implications of the earthquake, the information gained on human adjustment to the earthquake hazard, the impact of the event on the future economy of the state, and the lessons learned from the earthquake for coping with disaster.

The second part of the volume includes selected studies assessing the major impacts of the earthquake on people and earthquake-related behavior. The third part deals with public administration activities at all levels.

A source-book account of the human response in selected communities concludes the volume. These accounts provide a basis for present and future scientific studies of human behavior at the time of the earthquake, in the hours following, and during the 3 years of reconstruction. They are also dramatic and readable documentaries of how Alaskans fared in a time of sudden and unexpected stress.

Though the volume represents the best efforts of many people concerned with human behavior, it is far from complete. It reflects the strengths, limitations, and even prejudices of the Panel on Geography, a heterogeneous assemblage of experts from several fields. None of the Panel had had previous experience in the study of earthquakes:

their expertise lay in other fields that the Committee perceived as useful for its needs. The first chairman of the Panel was a geographer; he was succeeded in mid-1968 by a sociologist. The Panel comprises an anthropologist, an economist, a lawyer, and an architect.

Edwin B. Crittenden is a practicing architect in Anchorage whose firm produced the plan for the central business district and designed several major buildings that successfully withstood the earthquake. From January 1967 to July 1968 he served as Director of the Alaska State Housing Authority. J. Eugene Haas, now Professor of Sociology at the University of Colorado, was at the time of the earthquake a codirector of The Ohio State University Disaster Research Center (DRC). With his research team, he arrived in Anchorage a few hours after the earthquake to record organizational behavior in disaster. Robert W. Kates, then Assistant Professor in the Graduate School of Geography, Clark University, has as a major research interest the study of human adjustment to natural hazard. Margaret Lantis, now Professor of Anthropology at the University of Kentucky, through a distinguished career in government service and research, had gained a deep knowledge of Alaska and its native population and a thorough familiarity with its health services. George Rogers, Research Professor of Economics at the University of Alaska, has written widely and authoritatively of the structure of Alaska's unusual economy. Norman Williams, Jr., Visiting Professor of Law at Rutgers University Law School, is a leading authority on urban planning law, as well as a planner with varied experience.

In accordance with the Committee's charge, the Panel sought to identify all current research in its fields that related to the earthquake as well as to identify subjects on which earthquake-related research was needed. The completed inventory of research in progress was depressingly small: behavioral research or even data-collecting was practically nonexistent. The work of DRC was the major source;

economic-behavior studies made by the Institute for Defense Analyses (IDA) and several papers by local Alaskans, particularly health-service people, were the only other professional inputs.

The absence of human research with an earthquake focus underlines a basic difficulty in social-science research. Unlike engineers and physical and natural scientists, social scientists have no substantive interest in earthquakes. There are no earthquake sociologists, but only sociologists who may, as did those of DRC, perceive an earthquake as a kind of stressful situation in which to study their substantive area, organizational behavior. Thus when an opportunity occurs to study the human ecology of an earthquake or any natural disaster, no independent corps of scientists is at hand to organize immediately the research effort; that the effort will be made at all cannot be taken for granted as it is in many sciences.

Contributing to this lack of social-science research was the absence of a government agency with a mission related to human behavior during and after earthquakes. At least half of the research and data-collection on the Alaska earthquake was performed by three agencies—the U.S. Geological Survey, the U.S. Coast and Geodetic Survey, and the U.S. Army Corps of Engineers—none of which employs social scientists or considers them basically essential to their research or operations mission.

Without an organized group of earthquake-oriented social scientists and in the absence of direct federal or state responsibility for the human-behavior aspects of earthquakes, the Panel sought research proposals on the human impact of the disaster, on behavior during and after the earthquake, and on lessons to be learned from the earthquake regarding future public policy.

Despite a prolonged search for support of the proposed studies, only a single research proposal was funded. Minor financial assistance came from the Committee, and some released time was provided by federal, state, and private agencies and institutions. In all, a liberal estimate of the total funds expended for social- and behavioral-science research would be a mere 1 percent of the estimated \$20 million for the total Alaska earthquake research and data-collection effort.

This small expenditure indicates the poverty in which social-science research operates today in relation to the physical and life sciences. More importantly, it reflects attitudes toward funding certain kinds of scientific research—particularly research into human behavior during such unscheduled events as natural disasters or social upheavals—as well as the inflexibility of criteria applied by funding agencies in determining what constitutes scientific research.

Although some aspects of such unscheduled events as earthquakes or riots can best be studied only in the turbulence of their occurrence or immediate aftermaths, flexible

financial support for organizing standby capability for such research is practically nonexistent. The normal governmental and private budgetary process does not provide for disaster research, and even with organizations that had given thought to the need for such research, the Panel's quest for funds was unavailing. For example, one large foundation that, prompted by the disaster of the Alaska earthquake itself, had set up a contingency fund for the organization of emergency studies of postdisaster economic behavior, withheld support for such a proposed study in Alaska on the grounds that the fund was for future events, not past ones.

Then, other applications for funding social-science research were denied because they failed to meet the criteria of pure research in their fields. Little of the work projected for this volume would have advanced research frontiers; most of the studies here concern the application of the science of society to a problem of society. The standard research-evaluation procedures in each discipline seemed inappropriate for proposed research that fell somewhere between the usual categories of basic and applied science.

In the absence of either independently generated or contracted research, the volume became essentially a contribution of the authors and their affiliate institutions. Half of the volume was written without financial support for other than minor expenses. Three-fourths of the articles were written wholly or in part by Panel members, though nonmembers have also contributed substantially. A volume born under these difficult conditions may leave much unsaid or inadequately covered, but the result is nevertheless a unique record of the impact of a great earthquake on man.

The picture that emerges in this volume is markedly at variance with the public notion of man's behavior in catastrophic events and with the singular quality of the earthquake as a great geophysical event. In absolute terms, the impact of the earthquake is neither fully measurable nor debatable. The 115 lives lost, the loss of \$300 million in property, and the destruction of several native communities are the raw facts of record. In relative terms, the death toll was amazingly light, the damage sparse. Stripped of myth, the record of behavior during and immediately after the earthquake is of positive, but not unique actions. Most men behave well under the stress of the catastrophic moment, and Alaska had its share of heroes, wise men, and fools. In the aftermath of the earthquake, over five years later, Alaska is materially better off, but not exceptionally so. While the earthquake helped arrest its failing economic position, the opportunities to reconstruct in a substantially better way were not fully utilized.

The record indicates that this, one of the greatest of geophysical events, had little long-term human impact—evidence of the resiliency of the social structure. An influenza epidemic might have killed more people, the closing of a military base has had greater economic and social impact,

accumulated destruction by fire has already equaled that of the earthquake in some communities. Yet the discernible impact on the social and economic fabric is not the full measure of human response. The awe, fear, and compassion evoked by a great movement of the earth and the devastation it wreaks are intense and long remembered by the individuals caught up in the catastrophe. But if almost all the effort inspired by the strong emotions and the needs of the movement is directed toward the restoration of things as they were before the disaster, toward repairing rather than improving the social structure, then the final public record may reflect only inadequately the actual human event.

CONCLUSIONS AND RECOMMENDATIONS

The Alaska earthquake of March 27, 1964, had serious consequences for communities in Alaska and elsewhere on the Pacific coast. Though future earthquakes will also be destructive and disruptive, many of the negative effects need not occur again if officials and citizens alike will take seriously the lessons to be learned from the series of events following this earthquake.

The earthquake produced injury, loss of life, and illness due to exposure and overwork. Damage to structures, equipment, roads, and public utilities produced significant changes in familial, economic, judicial, educational, and health and welfare activities. Communication nets at the local and regional levels and transportation systems were drastically altered. Religious and leisure-time activities were less seriously affected. Many private organizations and numerous agencies of the federal and state governments were involved extensively. Whole communities were moved to new locations.

Inevitably, the response to large-scale disasters involves local, state, and national groups both public and private. Thus, citizens in each community and responsible officials at all levels have a stake in efforts to minimize losses from earthquakes through preventive measures and rapid relief and reconstruction programs. The following conclusions and recommendations of the Panel cover a broad range of human concerns; no ranking of priority among them is intended here:

- A national policy of reducing earthquake losses is needed. Many problems can be handled at local and state levels, but an overall national program is essential. To aid contingency planning at the state and local level and to expedite critical decisions that must be made soon after a damaging earthquake, the relevant federal policies must be known and thoroughly understood in advance. Unnecessary delay, uncertainty, and mistrust are inevitable in the absence of clearly stated policy.

Policy issues should include but not be limited to guarantees to local governments against loss of revenues, to earthquake insurance and mortgage indemnification, and to an interest rate on special long-term loans for business. Policy should also include restrictions on federal financing in the relocation of privately owned real property damaged or destroyed by an earthquake, and restrictions to be applied in the location of new federal and federally aided construction, to minimize such building in risky locations.

- Programs at national, state, and local levels will be most effective if earthquake loss-reduction functions are combined with those of organizations and programs that deal with other more persistent sudden-impact hazards. Without such a combination, organized countermeasures against earthquakes alone tend to atrophy between disasters.

- State agencies should be responsible for establishing policies in advance of disaster for both immediate relief efforts and long-term reconstruction programs. States should also have programs to make available to requesting communities technical assistance and legal advice on pre-disaster planning and postdisaster decision-making. It would also be useful to local communities if states would establish guidelines for land-use planning based on knowledge of geologic hazards.

- The planning and implementation of earthquake countermeasures will be more relevant and effective when these efforts are understood to be primarily a local responsibility. In each community a single agency should be assigned the responsibility to lead in planning and to coordinate operational efforts.

- Because a major disaster presents a rare opportunity to reorganize urban structure, planning at the local level for postearthquake physical reorganization is important. The state can aid plans for orderly redevelopment of heavily damaged areas by legislation permitting the state to institute condemnation proceedings to obtain ownership of property in limited areas.

- Up-to-date earthquake and geologic-hazard maps, including information on tsunami hazard, are vitally important for land-use planning. At the local level there is a variety of legal and administrative mechanisms that can be used to carry out land-use policies in earthquake-prone areas. In locating public facilities, strict land-use control policies can be followed through local administrative power to specify the location of capital improvements. The federal government can demand, as a prerequisite to funding various grant-in-aid programs for the construction of public facilities, that location of the proposed improvements be guided by established policies on land-use safety controls and building codes in seismic areas. Policies for the development of privately owned facilities can be carried out through normal police-power controls, together

with the use, in some cases, of partial compensation. The density of development and redevelopment can be controlled by zoning restrictions. Safety of construction can be ensured by enforcement of appropriate building-code regulations. The effectiveness of zoning and building-code regulations depends on the willingness of local administrations to enforce them.

- The experiences following the 1964 Alaska earthquake suggest a host of human problems that will recur following future earthquakes. The adequacy of a tsunami warning system as well as evacuation and population-control procedures is an especially critical problem. Search and rescue procedures tend to be haphazard. Knowledge concerning the availability of critical supplies of food, clothing, and medicines as well as specialized equipment and skilled personnel tends to be fragmentary and scattered.

Little is known of the immediate and longer-term consequences of an earthquake disaster on mental health.

Responsible public officials and health personnel should be thoroughly acquainted with the legal requirements for establishment of a presumptive death (body not recovered) so that the necessary testimony of survivors and material evidence can be obtained before people are dispersed, repair undertaken, or evidence destroyed. In a population with a high proportion of transients this can become a difficult problem. Although not a serious problem in the 1964 Alaska earthquake, contingency plans for prompt medical care are critical in densely populated areas. Members of all health-protection professions can anticipate that, regardless of the number of dead and injured, there will be a sharp increase of respiratory illness and gastrointestinal ailments. Elderly persons who can care for themselves in a normal situation may not be able to do so following a disaster when water must be carried and heat is unavailable. Whereas young adults may be able to remain in the disaster area, elderly people, especially those who live alone, usually cannot do so. Pharmacies and research laboratories are not immune to earthquake-caused damage. The management of drug supplies, of virus cultures, and of infected animals needs to be carefully considered in advance.

Immediate relief efforts are often characterized by overlap, excess, and omission. Appropriately planned public-information releases would probably reduce the incidence of rumors and subsequent uncertainty. Plans and standardized procedures for the prompt inspection of damaged structures by competent specialists can speed greatly the return to normalcy. Where damage to local industries and

businesses is extensive, temporary jobs and unemployment compensation for those affected become vital, as does the decision whether to use local or outside labor.

Without prior policy decisions and local contingency plans these and other problems tend to overwhelm public officials and leaders in a stricken community.

- Alternate standby communication networks and procedures are necessary to ensure effective tsunami warnings, efficient rescue efforts, prompt medical care, and coordinated emergency-relief operations.

- In most cities and towns there are voluntary associations whose members have critically needed skills and equipment. These groups have intimate knowledge of the community that an outsider lacks. Groups such as medical, nursing, engineering, architectural, legal, and disaster-relief associations should play a central role in both planning and postearthquake efforts.

- In order to maximize personal safety, residents of earthquake-prone areas need to be reminded repeatedly of appropriate steps to take in response to tsunami warnings, ground motion, and localized earth movements.

- Understanding of human response to the effects of an earthquake requires a continuing program for the collection of base-line data on social behavior between earthquakes. Responsibility for the collection of such data should be included specifically in the missions of appropriate agencies, both federal and other.

- Systematic research is a prerequisite for a range of policy decisions and programs that heretofore have been developed largely intuitively. Several specialized research centers operating both within and outside of the government could do much to provide the needed knowledge and to ensure adequate funding of social-science research after a major disaster.

- Narrowly conceived "problem-oriented" research often adds very little to a sound knowledge base. But "problem-oriented" research that is broad in scope and theoretically based can be extremely fruitful. Without attempting to specify all of the research areas deserving attention, we suggest that, as a first step, research is needed to determine the most common problems that prevent the optimal readjustment and reconstruction of a community following a large-scale disaster.

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