BEHAVIORAL SCIENCE and CIVIL DEFENSE

Edited By

GEORGE W. BAKER
LEONARD S. COTTRELL, JR.

Disaster Research Group

Disaster Study Number 16

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DISASTER RESEARCH GROUP

The Disaster Research Group is an activity of the Division of Anthropology and Psychology, National Academy of Sciences — National Research Council. It succeeds and carries on many of the functions of the Committee on Disaster Studies, which met under the auspices of the Division of Anthropology and Psychology from 1952 to 1957.

The Group conducts research, sponsors conferences and publications, and generally provides advice on problems of human behavior in disaster and civil defense. To assist the new Office of Emergency Planning it has created the NAS - NRC Committee on Behavioral Research (Advisory to OEP). The Group continues publication of the Disaster Study Series initiated by the Committee on Disaster Studies.

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CONTRIBUTORS

KENNETH E. BOULDING, The University of Michigan
ARNOLD S. FELDMAN, University of Delaware
RALPH L. GARRETT, Office of Civil and Defense Mobilization
HERMAN KAHN, The RAND Corporation
CHARLES P. LOOMIS, Michigan State University
EDWARD A. McDERMOTT, Office of Civil and Defense Mobilization
WILBERT E. MOORE, Princeton University
JUM C. NUNNALLY, Vanderbilt University
CHARLES K. SHAFER, Office of Civil and Defense Mobilization
EUGENE J. SLEEVI, Office of Civil and Defense Mobilization
RALPH E. SPEAR, Office of Emergency Planning
LOUIS JOLYON WEST, University of Oklahoma Medical Center

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INTRODUCTION

The papers appearing in this volume were presented at a conference on Behavioral Science and Civil Defense held in Washington, D. C., on 18 and 19 May 1961 under the auspices of the Disaster Research Group's newly organized OCDM-NRC Advisory Committee on Behavioral Research.[1]

The purposes of the conference were two-fold: (1) to acquaint the newly formed Advisory Committee with the scope and nature of the problems confronting the Office of Civil and Defense Mobilization on which help and advice were needed from the Committee; and (2) to call the attention of the wider community of social scientists to the needs and opportunities that the field of civil defense presented for both basic and applied research in the several behavioral science disciplines.[2]

In planning and conducting the conference it was the Executive Council's explicit intention and policy not to select participants or restrict authors so as to present one view and suppress others. Those invited to

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[1]The organization of the Committee's Executive Council in 1960 and the rest of the Committee in 1961 was designed to supplement the Disaster Research Group's regular advisory and consultant research services for the Federal civil defense agency. Since the formation of the National Academy of Sciences-National Research Council's disaster program in 1952, Federal civil defense personnel have manifested interest in the program. From fiscal year 1957 through fiscal year 1961, the civil defense agency provided, by a contract with NAS-NRC, financial support for the Disaster Research Group. For fiscal year 1962 support was provided by the new Office of Emergency Planning. In recognition of this source of support the Committee's name was changed in the fall of 1961 to the NAS-NRC Committee on Behavioral Research (Advisory to OEP).

[2]This may be the first time that the Federal civil defense agency has sought to create a continuing independent advisory behavioral science committee. However, numerous contacts between the agency and individual scientists were established well in advance of the Committee's formation. A decade earlier Irving Janis (1951) gave serious and insightful attention to the subject of civil defense, including the planning of a shelter program.

prepare papers were instructed to set forth their own views whether or not these views were favorable to current governmental policies and programs. The objective was full and free discussion of the problems of civil defense as seen by research scientists in the behavioral disciplines. In view of this role, the Advisory Committee was committed to consider seriously the problems of OCDM and to provide constructive criticism and suggestions concerning its behavioral research needs and programs. The Committee was given freedom to examine any and all problems that came within its competence from any point of view it regarded as contributory to clear and critical thinking.

As will be seen, all authors took the problems of civil defense seriously; but they did not always agree with respect to either policies and programs or priorities of research problems. This the Executive Council expected and regarded as healthy. On the other hand, it was pleased and reassured to observe that there were substantial convergences among scientists and between scientists and representatives of the civil defense agency as to areas of research need and opportunity that should receive attention from competent investigators both in and outside the government.

The papers from the conference fall rather readily into four general groups. In Part I attention is chiefly on the kind of civil defense problems presented by the capability of nuclear weapons, how the Federal civil defense agency perceived those problems, and what it had done and was planning to do to meet its responsibilities. Part II contains the papers that grapple with the basic problems of policy and decision making concerning civil defense programs in general. The papers in Part III illustrate three conceptual approaches to the analysis of problems relevant to civil defense, as well as to other systems that produce strains in the total society. Part IV contains two papers: one representing the governmental agency's perception of the substantive problems on which social science research is needed; and the second representing a sociologist's view of the scope of problems on which research should be undertaken. Finally, we have included a retrospective commentary on the conference by a non-military defense official. We feel that these papers reflect both an intensification of interest in civil defense as such and the growing awareness of broad problems of policy that require attention from social scientists.

Those responsible for planning the program of the conference are acutely aware that we fell far short of any adequate sampling of the range and complexity of the problems in this field. These cannot be fully identified and explored in the context of a two-day conference. Nor can such a relatively brief meeting insure the acceptance and implementation by a

client agency of any findings that emerge from the conference.[3] However, we are confident that the meeting itself, as well as this report, will stimulate our colleagues to see opportunities for significant research afforded by this area. We are hopeful also that this effort will help make clear the responsibility social scientists have for full utilization of their disciplines in helping the people in this country to make wise decisions regarding policy and programs of action. If this responsibility is not exercised, we may be assured that the agency will have to act without competent scientific advice.

At least three significant changes in the civil defense area occurred soon after the May 1961 conference. First, the President announced strong support for the civil defense program in his 25 May 1961 message to Congress. Second, civil defense responsibilities were transferred from the Executive Office to the Secretary of Defense; to assist the President in coordinating civil defense functions, the old Office of Civil and Defense Mobilization was reconstituted as a small staff agency within the Executive Office and given the title Office of Emergency Planning (Documents on reorganization . . ., 1961). And third, as a result of the increased Presidential support for the program, the level of public discussion of civil defense increased appreciably during the summer and fall of 1961. That the discussions touched on some important values in our national society was evident from the strong and divergent views which were developed by various sectors in the population. Professional groups in particular were rather vocal on the subject of shelters. In some of their utterances it was not always clear to the casual listener that scientists sometimes spoke, as is their right, as outraged citizens rather than as scientists. Not having made their citizen role clear, the scientists' opinions were sometimes put in a context which was not justified.

Each of these three changes had some implications for the Advisory Committee as well as for behavioral science in general. The transfer of operational civil defense functions to the Department of Defense has posed special problems. Of particular concern is the fact that the Office of Civil

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[3]While the impact of the "scientific establishment," including the social and behavioral scientists, on government policies and programs has grown increasingly important in our national society (Price, 1962), acceptance of the scientists' recommendations by a Federal agency is not and should not be routinely assured. Scientists do, however, have a right to expect that their work will be objectively and competently evaluated. The social scientists who advise the Federal government may experience more difficulty in certain agencies in this matter than the members of the older professions since the latter have been insisting for more than half a century "that strictly professional work must not be entrusted to men who have had no professional training or experience" (Lowell, 1926, p. 274). Conceivably, this general matter may be of interest to the President's new Office of Science and Technology.

Defense, which received the bulk of the non-military research funds, has not had, at the time of this writing, the services of an independent behavioral science advisory committee. Since the application of behavioral science talents to non-military defense remains a challenging task, it is our hope that this deficiency will be remedied without delay.[4]

George W. Baker
Leonard S. Cottrell, Jr.
26 July 1962

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[4]A meeting of the Disaster Research Group's NAS-NRC Committee on Behavioral Research (Advisory to OEP) in May 1962 was devoted to an intensive examination of many aspects of behavioral research in the non-military defense area. A report of the findings from the 1962 meeting has been published (Emergency planning and behavioral research, 1962).

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PART I

CIVIL DEFENSE AND NUCLEAR WEAPONS

CHAPTER 1

PUBLIC SUPPORT OF CIVIL EMERGENCY PLANNING

Edward A. McDermott
Office of Civil and Defense Mobilization

It is a pleasure to welcome you to this symposium on Behavioral Science and Civil Defense. I bring to you the warm and personal greetings of Frank B. Ellis, the Director of the Office of Civil and Defense Mobilization. As you may know, at the request of President Kennedy, we have been engaged in a thoroughgoing review of the entire framework of civil emergency planning. A preliminary report has now been submitted to the President. Of course, such an examination cannot be carried out in depth during a period of weeks, but the tentative results are in, and I anticipate the President will reach some firm decisions in the next month.

As you can imagine, a good deal of this investigation revolves around the research effort to which you will address yourselves in the next two days. And I hope your deliberations and discussions will prove fruitful in cataloguing and shedding more light on the complex questions of public behavior and civil emergency planning.

I think you know that your committee is an outgrowth of the Disaster Research Group of the National Academy of Sciences-National Research Council, which has done invaluable work for OCDM in studies of natural disasters, shelter habitability, and research programming. In fact, it was the success of these earlier projects which demonstrated both the value and the need for a permanent committee of the most authoritative people to provide continuing advice to OCDM as our research activities in the behavioral fields go forward.

Before expressing the views I have formed on the matter of public attitudes, permit me to disclaim any professional competence in the disciplines of psychology and the other social sciences. Looking over the agenda of your two-day meeting, I am somewhat awed by the calibre of scientists and scholars who will be speaking to you. Perhaps I can find some comfort in the maxim that when one begins to know that he doesn't know, he first begins to know a great deal. At any rate, I have done a stint as an

academician and I am keenly aware of the distinguished company in which I find myself. I shall try not to abuse the privilege.

It seems to me the question of public attitude can be broken down into two main categories: first, how the public responds to disaster itself, and, second, how the public reacts to insistent urging to prepare for a disaster that could happen.

I am frankly less concerned about the first category than I am about the second. While we must continue to probe the problems relating to mass behavior in a disaster, considerable evidence has been gathered to refute the notion that violence, hysteria, and general mayhem would be rife under such conditions. Some sociologists go so far as to say that disaster has a calming effect on its victims by producing a sense of unity in the face of common danger. I don't know whether the proposition can be carried that far, but our experience with natural disaster seems to support the idea to some degree.

But the premise that there is public apathy toward a possible disaster is, I believe, unassailable. The question of how we increase public support lays bare a whole gamut of ideas and inspirations. To approach this question by an indirect route, let me first discuss some arguments which, in my judgment, do not hold up under examination.

There is a tendency to find fault with the use of conventional information media--the newspapers, magazines, television, radio, and the like. I don't believe this is the root of our difficulties, though failure to use the media effectively might be a contributing factor. But let me give you some examples. To date, OCDM has distributed about 18 million copies of a pamphlet called "The Family Fallout Shelter." It contains simple and graphic descriptions of five different shelters within the means of the average pocketbook. It has not produced 18 million shelters and I venture an educated guess that in your own communities shelter construction has not reached epidemic proportions.

Let us look at television for a moment. We've had excellent coverage in this medium. Only a few weeks ago the Armstrong Circle Theater, which specializes in real-life documentaries, did a fine show dramatizing an experiment in shelter living which has been carried out under the auspices of OCDM. In so doing, it put the entire civil emergency program in a most favorable light. The immediate response was gratifying, but there is a great void between awareness and action. Again, I do not believe that significant action can flow from this effort. I don't wish to downgrade conventional information programs. They are essential in backstopping the policies of OCDM, but they cannot do the whole job.

Let me go on to some other popular theories put forward to explain the meager interest evidenced by the public. And for this purpose I've gone back to a book I hadn't touched since my university days--Principles of Psychology by William James (1890). Now I'm aware that a considerable body of knowledge has accrued since this psychologist and philosopher gave us his wisdom. But there are some enduring truths in the work of the man regarded by many as the father of modern psychology.

In his chapter on "Will," James wrote:

> When a dreadful object is presented, or when life as a whole turns up its dark abysses to our view, then the worthless ones among us lose their hold on the situation altogether, and either escape from its difficulties by averting their attention, or if they cannot do that, collapse into yielding masses of plaintiveness and fear.

This is a provocative thought germane to the whole question of public attitude in the thermonuclear age. It covers two of the currently fashionable explanations of our problem. The first I call the "endless euphoria" idea, or the feeling that nuclear war is so terrible it could not happen. The opposite extreme is the "Armageddon attitude" which assumes it could happen, but if it does, whoever and whatever is left won't be worth saving.

I needn't point out the fallacy of this reasoning to you people. The fact that it springs from the emotions rather than the intellect, and that it is unscientific, unsound, and unsupported by the facts, does not make it any less dangerous. We know that Communism will exploit human weakness in every possible way. There is a very definite parallel between the exploitation of our deeply felt aspirations for peace and our horror of war, and the use of similar tactics in actual war, where the objective is to destroy the enemy's capability of fighting plus his will to fight.

And yet I reject the view that this phenomenon has reduced most Americans to hopelessness and futility. Let me again pick up William James. He continues with this passage:

> But the heroic mind does differently. To it, too, the objects are sinister and dreadful, unwelcome, incompatible with wished-for-things. But it can face them if necessary, without for that losing its hold upon the rest of life..... He can stand this Universe.....He can still find a zest in it, not by "ostrich-like forgetfulness," but by pure inward willingness to face it. . . .

Of course the obvious question is: How many heroes are there among us? Therein, I believe, lies the key to the problem of developing a positive and vigorous public acceptance of civil emergency planning. For James concludes,

> But just as our courage is so often a reflex of another's courage, so our faith is apt to be a faith in someone else's faith.

In plain language, translated into today's world, I am convinced that Presidential support, coupled with Congressional support in the form of appropriations which we have requested, will be the spur needed to induce a change for the better in the public attitude. What the citizen will think is "If the President thinks it important, if Congress thinks it important, if respected scientists urge this program, then it must be worthwhile." I am equally certain that such support will be forthcoming in the months ahead.

Against this backdrop, I ask that you furnish us with the foreknowledge of mass behavior which will be needed more than ever as our programs pick up momentum. As I have indicated, civil emergency planning has never been given a fair opportunity under favorable conditions to perform a mission vital to the nation's safety and security. I expect that the acid test will be made in the next few years. With your help and knowledge, I have a deep conviction we can prove its effectiveness in coping with the challenge of these turbulent times.

CHAPTER 2

EFFECTS OF NUCLEAR WEAPONS

Charles K. Shafer
Office of Civil and Defense Mobilization

In recent years, we have heard a great deal about the devastation that would result from a nuclear attack on the United States. Many of the statements on this subject have been more sensational than enlightening. Although the results of a nuclear attack on the United States would in fact be devastating, the situation would not be hopeless. By proper planning and action the overall effects of a nuclear attack can be substantially reduced and the chances for survival greatly increased. The purpose of this paper is to provide information on the effects of nuclear weapon detonations.

There are three effects of a nuclear detonation which can seriously damage or destroy life and property. These are blast, which constitutes about half of the total energy released; heat, which constitutes about one-third; and nuclear radiation, which constitutes the remaining 15 per cent of the total energy released.

With respect to blast, we have found that blast-created overpressure of three to five pounds per square inch will destroy most brick or wood frame houses. Our studies in Nevada and at the Pacific Proving Grounds show that a 10-megaton bomb exploded on the surface of the earth would cause severe destruction out to about seven miles from ground-zero. A 20-megaton surface detonation would extend this degree of destruction to almost 10 miles from the point of explosion.

The heat from a nuclear explosion could cause severe burns and set fires at distances where the blast wave would have little effect. However, the extent of the thermal effect will vary with the height of the burst and transparency of the air. For example, on a clear day, a 10-megaton surface burst might set fire to easily ignitable materials out to about 12 miles from the point of the explosion. If a 10-megaton weapon were exploded not on the surface but two to three miles above the surface of the earth on a clear day, easily ignitable materials would probably be set on fire as far as 20 miles from the point of explosion.

When a large nuclear weapon explodes on or near the ground, its blast and heat pulverize and vaporize thousands of tons of earth and other matter. The tiny dust particles are sucked into the mushroom cloud and contaminated by the radioactive fragments produced by the fission process. The cloud of radioactive debris rises into the stratosphere perhaps 15 miles or higher. Then the tiny particles of radioactive matter are scattered by winds as they fall gradually back to earth, perhaps hundreds of miles from the point of explosion. This, of course, is radioactive fallout. Although the radioactive particles with which we are most concerned are quite small--about one-half to one-tenth the size of an average grain of salt--because of their great abundance, these particles would generally be visible as they settled through the air, at least in areas of serious contamination.

In discussing the fallout problem, the term roentgen will be used frequently. The roentgen is simply a measure of gamma-radiation exposure. Based on current information, a group of people will not become significantly incapacitated, or their ability to work be seriously affected, if their exposure over a few days does not exceed 200 roentgens. If the exposure during a few days exceeds 200 roentgens, there will be radiation sickness requiring medical assistance--the more the exposure, the higher the incidence and the greater the severity of radiation sickness. If the exposure over a short time exceeds 600 roentgens during a short period of time, almost everyone so exposed will die during the following month.

However, given an opportunity, the body can repair most of the acute damage from exposure to radiation. Therefore, if the exposure is spread over a longer period of time, a dose greater than 200 roentgens can be tolerated without incidence of radiation sickness. Actually, under extreme emergency conditions, exposures up to 1,000 roentgens could be tolerated, if more or less evenly distributed over a period of a year, without incidence of serious radiation sickness. However, this would be acceptable only on a command-decision basis that exposures of this magnitude to a few emergency civil defense workers would be instrumental in the saving of hundreds of lives. These exposure criteria are statistical in nature, intended to apply to group response. The criteria cannot be expected to apply to all individuals in every case. Susceptibility to acute radiation damage varies from one individual to another. With a short-term radiation exposure of 200 roentgens, perhaps five to ten per cent of the members of a group so exposed will require some medical attention. However, this will not significantly affect the ability of the group to continue to perform emergency functions.

There are three types of radiation emitted by fallout--alpha and beta particles and gamma rays. Alpha particles have limited penetration power and pose no external hazard. Beta particles can cause serious radiation burns on the skin, but this can be prevented by wearing heavy clothing to keep the particles off the skin or by thorough bathing after exposure. The most

damaging form of radiation in fallout is gamma radiation. Clothing provides no shielding against gamma radiation. Like X-rays, gamma rays penetrate deeply and must be stopped by dense materials if they are to be prevented from penetrating the body in harmful amounts.

Shielding afforded by two and one-half inches of lead will decrease the radiation exposure by a factor of one thousand. To get the same degree of protection from other materials, we would need seven inches of steel, 24 inches of concrete, 36 inches of earth or brick, 50 inches of water, or about 90 inches--more than seven feet--of wood.

Radiation from fallout decays or "loses its power" quite rapidly. For example, if the radiation-dose rate were 100 roentgens per hour one hour after the explosion, it would decay to about 10 roentgens per hour at H plus seven hours, and to perhaps two roentgens per hour after one day. The point to be emphasized is that the hazard does not remain forever. In fact, after about two weeks most fallout areas would be relatively safe.

To illustrate the spread of fallout, let us assume that a 10-megaton weapon, 50 per cent fission--50 per cent fusion, has been exploded on the surface at Offutt Air Force Base near Omaha, Nebraska. The fireball resulting from such a surface detonation would be roughly comparable to that of the first hydrogen-bomb detonation, called Ivy Mike. This November 1, 1952, fireball was more than three miles in diameter, and the temperature at its center was about 18 million degrees fahrenheit. It produced a crater more than a mile wide and 175 feet deep at the center. It is estimated that 50 million tons of coral were blasted out of the crater by this single explosion.

One hour after the burst of our hypothetical bomb, the serious fallout area would be about 30 miles wide and 45 miles long. This pattern would cover much of the Omaha area and extend about 40 miles into Iowa. In the central core the radiation-dose rates would be more than 1,000 roentgens per hour, and possibly as high as 5,000 roentgens per hour at some isolated points. The zone of heavy blast and fire damage would extend outward from ground-zero for about 15 miles, covering about 700 square miles. Seven hours after the assumed explosion, the fallout would have spread 130 miles across Iowa, almost to Des Moines. It would be about 50 miles wide. The radioactivity would have decreased by a factor of 10. In the inner area the dose rate would have decreased from 1,000 roentgens per hour during the first hour to 100 roentgens per hour seven hours after the explosion. After 18 hours, the fallout pattern would extend approximately 320 miles, across Iowa and into western Illinois. Although the fallout situation would be less serious in central and eastern Iowa than in the western part of the state, considerable radiation sickness might occur in these areas if protective measures were not taken.

For example, following the assumed attack on Offutt Air Force Base, the unsheltered radiation dose in eastern Iowa during the first two weeks after attack would be about 200 roentgens at Iowa City. To keep the exposure of personnel well below 200 roentgens during these two weeks and to prevent radiation sickness, people would have to remain indoors on the first floors of their homes. This type of shielding would reduce the radiation exposure to one-half that outside the house--from 200 roentgens to 100 roentgens at Iowa City in this case.

In central Iowa, the theoretical dose for the unsheltered during the first two weeks would be approximately 2,000 roentgens at Des Moines. Here people would have to remain in the corners of their basements in order to keep their radiation exposure to 200 roentgens or less. This type of shielding will reduce the exposure to about one-twentieth of that outdoors, or from 2,000 to 100 roentgens at Des Moines in this case. However, the degree of protection afforded by a basement will vary with its depth and the extent of walls exposed above ground. At Atlantic, in western Iowa, the theoretical dose for the unsheltered during the initial two-week period might be as high as 20,000 roentgens. Here people could keep their radiation dose below 200 roentgens by remaining in a surveyed and marked community shelter or family shelter. This type of shielding will reduce the radiation exposure to one one-hundredth of the amount outside. Family shelters can be built by the home owner with materials costing $150 or less.

In the event of a nuclear attack on the United States there will be many surface detonations. The fallout patterns will overlap one another and be far more complicated than the simplified pattern just described. Further, with a different attack pattern or with different winds, the situation that has been described could change materially. Consequently, we cannot advise that the first floor or the basement of a home in any specific area will provide adequate protection. Rather, all families are strongly urged to adopt protection measures recommended in the OCDM Family Fallout Shelter Booklet MP-15.[1]

We shall use a hypothetical attack pattern as an example of the degree and extent of fallout which might occur across the United States after a nuclear attack. There are assumed to be fifty 20-megaton surface bursts, one hundred 10-megaton surface bursts, and one hundred five-megaton bursts. The energy released by the 250 bombs in this attack would be equivalent to that contained in two and a half billion tons of T.N.T. There are 144 areas

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[1]Superseded by Fallout Protection: What to Know and Do About Nuclear Attack, Department of Defense-Office of Civil Defense, December, 1961.

attacked; these include military, population, and industrial objectives. One hour after attack, 10 per cent of the total national land area would be covered by fallout, and each fallout area would be 30 to 70 miles long, depending upon local wind speed. In the centers of these zones the levels of radiation could exceed 3,000 roentgens per hour at H plus one hour. Seven hours after attack, fallout could have spread over about 40 per cent of the national land area; however, the levels of radiation would have decayed by a factor of 10, and the dose rates in the inner portions of these areas would range as high as perhaps 400 roentgens per hour. One day after attack, approximately 70 per cent of the country's total area could be affected by troublesome levels of fallout, and about 20 per cent of the land area could have a very serious fallout condition. Shortly after the first day, radiation decay would begin to predominate over further areal spread of fallout. Then the boundaries of the fallout areas would begin to shrink gradually toward the ground-zeroes or explosion centers.

After one week, the radioactive areas would have decreased in size and intensity as a result of decay until about a third of the nation's area would be affected. This reduction in intensity would continue, and two months after the attack we would find only isolated, elongated islands of troublesome fallout. It is emphasized that this is just one attack pattern; it has been developed from the actual wind and weather conditions of one day, November 21, 1956. Had we selected a different attack pattern or the weather for another day, the fallout situation would have developed quite differently. Actually, these generalizations regarding the extent and intensity of fallout are theoretical in nature and can be used for planning purposes only. We don't know enough about the mechanics of fallout formation and deposit to express these things with this degree of precision for operational purposes. However, these data do give us a rough indication of the fallout problem against which we must plan countermeasures.

The analyses which we have been making of these hypothetical attacks point to certain definite and significant conclusions. Let us briefly summarize these conclusions. First, under conditions of heavy nuclear attack, an extremely serious survival problem would develop within a few hours after attack if fallout shelter were not available. Second, small areas of the country would be unsuitable for permanent occupancy for periods of weeks to months unless these areas could be partially decontaminated. Even those homes, farms, and industrial plants which escaped blast or thermal damage would be of questionable value during the survival period if they were in heavily contaminated radioactive areas. Third, the study emphasizes the need for fallout shelters on a national basis and a national fallout-monitoring capability during the initial period after attack, when levels of radiation are highest. Within two weeks after nuclear attack, the levels of radiation would have decayed to tolerable limits over most of the national land area. Finally, if effective fallout shelter is available on a national basis for use during the immediate post-

attack period, an effort could be undertaken to monitor the areas for radiation and to evacuate survivors to the safer areas where they could apply themselves to the tasks of rebuilding the nation.

CHAPTER 3

STATUS OF PLANS AND OPERATIONS FOR CIVIL DEFENSE

Eugene J. Sleevi
Office of Civil and Defense Mobilization

There persists in many minds the image of civil defense as something apart from regular government, something which could spring into being in case of attack. This is a false image. The National Plan for Civil Defense and Defense Mobilization (Office of Civil and Defense Mobilization, 1958) defines civil defense as the protection of life and property by preparing for and carrying out non-military functions to prevent, minimize, repair, and recover from injury and damage. Defense mobilization is the mobilization and management of resources and production for this purpose. The responsibilities for civil defense in this nation rest squarely on regularly constituted government at local, state and federal levels, and upon people themselves. The Office of Civil and Defense Mobilization and state and local civil defense offices serve a staff function to help elected officials perform their vital emergency preparedness roles by using all the built-in capability of existing government structures.

I propose to present some of the principal emergency preparedness measures taken in non-military defense by federal, state and local agencies. Much of what has been accomplished to date, of course, has been in the planning area. But, as OCDM Director Frank Ellis stated recently, "What we need today is actual execution. We have the launching platform built. With added help now we can put into orbit the plans that will give us a strong civil defense." Because of time limitations this must be a quick review rather than a detailed presentation. It is designed to give some idea of the nature and scope of the programs for which our agency has responsibility.

Early Warning and Communication

Our operations plan, facilities, and personnel are closely tied to the distant early warning system. Members of our staff are stationed at Air Defense Headquarters and the other major military warning centers, and are part of the operations of those headquarters on a 24-hour basis. Through the National Warning System (called NAWAS) we could provide warning and warning intelligence instantaneously to every state in the Union. Attack-

warning information can be transmitted to some 447 strategic locations known as warning points within 15 seconds after an attack is detected. Further fan-out of warning is made through state and local systems, and time required varies according to the type of dissemination used.

A Command Communications Network (called NACOM) is in operation. It connects the National Emergency Location near Washington with Operational Headquarters at Battle Creek, Michigan, with our eight regional offices, and with the state governments. This system can bypass damaged areas if necessary. It is backed up by radio to all OCDM regional offices and is being extended to the states.

CONELRAD (Control of Electromagnetic Radiations), invoked by the Commander of North American Air Defense, will be used as another means to alert the public. It is also the principal means of keeping the population informed on emergency developments. Under CONELRAD, all stations suspend broadcasting and, in a few minutes, participating AM radio stations return to the air. About 1,300, or roughly one-third, of all U.S. stations will broadcast vital information and instructions on either of the CONELRAD frequencies, 640 or 1240 kilocycles.

These, then, are the mechanics of our attack-warning system. Assurance that the public will respond satisfactorily to the warning signals is another matter. The manner in which people might respond to the warning signals of an actual attack has been the subject of research in three accidental or false alerts.

Control Centers

The federal agencies have developed plans to move to relocation sites near Washington as soon as warning is received. These same agencies have also selected more than 300 relocation sites throughout the country for their staffs--all outside primary target areas. As yet few are equipped for fallout protection.

OCDM's staff operations are dispersed to facilities at Battle Creek, and our regional headquarters to facilities away from target areas. Permanent underground sites are planned for the regional offices. The first of these is being constructed at Region Five Headquarters in Denton, Texas. Each region has plans to expand in an emergency, drawing heavily from the regional offices of other federal agencies, military units, industries, colleges, universities, and other private groups.

Control centers like the one located in a hillside near Portland, Oregon, with its 26-inch concrete roof, are being built in various parts of the country. This center can house 300 people for two weeks. It has its own

electric and sanitation systems as well as food and water supply. The Federal Government has matched funds with the states and cities to assist them in building control centers such as the one in Dupage County, Illinois, which serves the Chicago area. It can withstand a blast pressure over and above existing atmospheric pressure of thirty pounds per square inch, has its own water and power supply, and can house 60 people for two weeks. Today there are 70 state control or alternate control centers in the United States, and close to 1,800 below the state level. These range from fairly adequate ones to makeshift centers which will serve until better ones can be built.

Monitoring Radioactive Fallout

Four times every day, the Weather Bureau provides fallout forecasts throughout the nation. These are based on observations of wind direction and speed. This service is distributed to about 1,500 federal, state, and local offices. We have purchased more than one million radiological instruments. Ninety per cent of them are being distributed to state and local governmental agencies and schools for training and emergency use. The remaining 10 per cent are held in reserve.

About 120,000 monitors have been trained in the techniques of measuring radiation-dose rates and in reporting procedures. In addition, several thousand radiological defense officers and monitoring instructors have been trained. This, of course, is only a start. Where training programs exist at state and local levels, emphasis is on monitor training. Radiological equipment is being used by 15,000 high school science departments in their courses. Should an attack come, these instruments are available to civil defense units for their use in monitoring.

We have created a federal fixed-station monitoring network using the existing facilities and personnel of other federal agencies. As of April 1, 1961, there were about 2,800 federal monitoring points in continuous operation. State and local governments have almost 20,000 stations in operation.

Encouraging as these initial efforts are, a good deal more needs to be done before we are adequately prepared for radiological defense.

Training for Civil Defense

Our training capability not only in radiological defense but in all areas of civil defense is growing. We maintain a Staff College and a Chemical, Biological and Radiological Defense School in Battle Creek, as well as Federal Instructor Training Centers at Manhattan Beach, New York, and at Alameda, California. About 25,000 persons have been instructed in the Staff College, and another 7,000 instructors have attended the training centers. In addition, a civil defense adult education program is underway in

seven states, and more states will be added during Fiscal Year 1962. Further, there are some 51 state and local training facilities located throughout the United States. Twenty-two of these are equipped to train people in many of the skills essential in war-caused or natural disasters, like the one at Ann Arbor, Michigan, which includes a fire-control and rescue-training tower. Twenty-nine other centers in the United States specialize in rescue training. OCDM has matched funds with the states and local communities to help establish many of these centers.

Stockpiling Critical Materials

The Federal Government maintains many stockpiles to support civil and defense mobilization. These include strategic and critical materials, civil defense items, and machine tools. Commodity Credit Corporation food supplies, acquired under price support programs and stored largely in commercial stockpiles, also would be available for use in an emergency. Supplies of strategic and critical materials meeting stockpile specifications have an original value of eight billion dollars. The strategic stockpile consists of 77 materials, mostly minerals and metals necessary for defense production. They are stockpiled in more than 200 dispersed locations.

We have stored 225 million dollars worth of medical and engineering items. These are stored in 42 warehouses throughout the country. The warehouses are of three types: small-capacity, located on a calculated risk basis in or near principal cities; larger ones located away from likely target areas; and depot-type warehouses, at still greater distances from probable targets. For example, the underground storage location at Neosho, Missouri, is a former limestone mine. It has the available capacity of 8,000 tons of medical supplies. Equipment has been installed to provide controlled dehumidified storage. Into these warehouses have gone more than 160,000 tons of medical supplies including emergency hospitals, which contain everything from bandages and X-ray machines to equipment for three operating rooms.

We have placed more than 1,500 of these emergency hospitals in small towns, town halls, schools, churches, armories--locations that could be converted to hospital use. These, plus units on loan to the states for training purposes and those in federal warehouses, give us a total of 1,932 emergency hospitals purchased to date.

We have stockpiled about five and one-half million doses of atropine--the life-saving drug used to combat the effects of nerve gas. There are two types of protective masks in OCDM warehouses for civil defense operational personnel--some 32,000 organizational masks and about 50,000 protective masks. These are available to state civil defense personnel for demonstration and familiarization purposes. Five thousand chemical warfare detection kits are also being distributed to the states for familiarization purposes. To

perfect rapid identification methods for biological warfare agents, we are conducting research through the Department of Health, Education, and Welfare.

Besides the Federal Government's stockpiling efforts, the manufacturers of medical supplies have agreed to store some of our material in bulk on their premises. For example, the Lederle Laboratories located at Pearl River, New York, have stocked vaccines and other medicines. Millions of dollars worth of medical supplies are located at other manufacturers' sites. These stores include 59 million doses of biologic materials such as vaccines, sera, and antitoxins. The management of the medical-supply stockpile is now the responsibility of the Department of Health, Education, and Welfare.

There are 45 engineering stockpiles located throughout the country. Each contains 10 miles of eight-inch pipe, pumps, generators, water purifiers, and water tanks. This equipment also is used in natural disaster relief. States and local communities have improved their preparedness through the purchase of such items as rescue trucks under the matching-funds program. By matching funds totaling more than 101 million dollars, states and cities throughout the country have also purchased engineering equipment, radiological defense items, and medical and communications equipment. New York State alone has purchased 200 emergency hospitals under this program. Preparedness of many communities has been increased with federal surplus property which includes a wide range of items. All states and Puerto Rico have participated in the program, and so far we have received about 170 million dollars worth of generators, motor vehicles, trailers, rescue and firefighting equipment, crash trucks, communications equipment, and numerous other items.

Regional and Local Planning

OCDM places emphasis on activities at the regional level. The country might be so segmented after a major attack that it would be some time before central government could be resumed. All 50 states, divided among eight OCDM regions, have completed some civil emergency planning, and 240 area plans have been completed within the states. In addition, some planning and organization has been developed in 2,500 local political subdivisions. Based on the use of total state, area, and local resources, these plans spell out in detail what is expected of each element of government as well as of each citizen.

We believe an attack would create isolation of governments and groups of people for extended periods of time. This isolation, coupled with the overwhelming magnitude of the disaster, means that problems of survival must be solved at the lowest possible organizational level. Individuals and families must be prepared to exist on personal stocks of survival items in homes and shelter areas for two weeks following attack. States, cities, and counties

should be prepared to sustain their populations for at least four weeks. While the Federal Government will help states and localities as soon as possible after meeting military and other essential federal requirements, there will undoubtedly be extended periods of delay in many areas.

Shelter Program

To encourage family and community preparedness, Congress has appropriated funds for a prototype shelter program. OCDM is constructing over 800 prototype shelters throughout the country to provide information and guidance to the public. These are dual-purpose shelters which will have practical peacetime uses. Private industry, too, has shown considerable interest in the design and construction of family shelters.

A home preparedness program is being conducted on a nationwide scale by the state civil defense chairmen of national women's groups. Farm organizations are supporting a national rural program which is bringing vital information to the nation's farm population. Over 60 per cent of the nation's counties are participating in this program.

General Preparedness

These few examples illustrate the present program emphasis. It is directed toward these basic objectives: first, to inform the public of modern weapons effects and how to protect themselves; second, to have governments at all levels take steps now to assure their ability to function after an attack; and third, to build civil defense into all elements of government.

We are currently stressing that every citizen must know and take action upon five fundamentals: (1) warning signals and what they mean; (2) community emergency plan, (3) protection by shelter, (4) first aid and home preparedness, and (5) CONELRAD, 640 or 1240 on radio, for official information and direction.

We have an active program for states and their political subdivisions which will improve their chances of continued service after an attack. It includes establishing lines of succession, preserving records, designating or preparing alternate locations, and planning for maximum use of all their personnel and resources. Continuity of government legislation has been approved in 43 states. Its enactment authorizes localities to provide continuity of their own leadership and the capability to operate in an emergency. Two legislative measures have been prepared to assist the states in developing a program for the preservation of records needed for emergency government operation and the protection of the rights and interests of citizens and governments. Both measures are submitted to the states for consideration through the Council of State Governments.

All states and some of the largest cities have provided alternate sites for the emergency operation of their governments. Most must have more protection and special equipment to meet operating requirements. Securing the sites against nuclear attack involves a budgetary problem, of course, but the Federal Government will provide matching funds. Twenty-three state and local governments have completed specially developed emergency operating centers with various degrees of protection, and 43 have such centers under development.

Non-military defense mobilization hinges greatly on the active participation of all departments and agencies of the Federal Government. Each department must know its emergency assignment in order to develop a state of readiness through current training and organization. Emergency preparedness orders have been issued which assign certain civil defense and defense mobilization functions to major agencies. Each agency, subject to policy direction and central program control by OCDM, is planning for maximum use of its personnel and preparing to provide the basic necessities for survival such as food, water, housing, health services, power, fuel, and other essential commodities. Plans of each agency, as completed, become parts of the overall National Plan, and are now reflected in the Annexes. For example, the food program is a responsibility of the Department of Agriculture. USDA will be assisted by the Food and Drug Administration of the Department of Health, Education, and Welfare, by the Fish and Wildlife Service of the Department of the Interior, and by other appropriate agencies. Shifts in population and radiological contamination would create serious problems in water supply. The Department of Health, Education, and Welfare has been given responsibility for handling this matter; the Departments of Agriculture and Interior, the Housing and Home Finance Agency, as well as the Army Corps of Engineers, also assist.

The task of arranging for emergency housing has been assigned to the Housing and Home Finance Agency. Power and fuel support has been assigned to the Department of the Interior; it will be assisted by the Federal Power Commission. The manpower-supply role has been given to the Department of Labor. When federal employees are concerned, close coordination will be required between OCDM and the Department of Health, Education, and Welfare, the Selective Service System, and the Civil Service Commission.

Federal support for the nation's health and medical care programs has been assigned to the Public Health Service. Planning for the entire welfare program has been assigned to the Department of Health, Education, and Welfare.

Transportation will be coordinated by a new emergency agency which will include portions of several existing agencies. These include the Department of Commerce, the Interstate Commerce Commission, the Department of

the Interior, the Civil Aeronautics Board, and the Federal Aviation Agency.

These are but a few examples, for there are many other agencies and many more fields of endeavor involved in the full utilization of existing government.

OCDM continues to concentrate on certain physical aspects of the nation's preparedness which are the responsibility of civil defense. To increase our attack-warning capability, we plan to extend the number of warning points to 500. Our ultimate goal is simultaneous warning of attack, not only to every part of the country, but to all our people as well. A demonstration of an indoor warning system--called NEAR--was held in Michigan in late 1960. Tests continue and hold great promise for an indoor supplement to outdoor warning. Radio back-up, for use in case landlines are disrupted, is provided for our command communications, from emergency headquarters to the regions, and, by 1962, to the states.

At least one fixed federal monitoring station is planned for each county of the United States. The over-all goal is to have a minimum of 100,000 monitoring stations at state and local government facilities. Monitoring points will include fire, police, welfare, health, highway patrol, conservation, agriculture, and forestry offices, as well as airports, military bases, and weather observatories. This network should be completed by late 1963.

These, in brief, are some of the emergency preparedness measures that have been or are being taken. We believe that substantial progress has been made in developing civil emergency preparedness measures. Nevertheless, it is apparent to all of us that much more remains to be done in many areas. In fact, because of rapid changes in weapons technology our patterns of planning and preparedness must be continuously adapted to the new developments. We face many unanswered questions and many unsolved problems which provide challenges to a broad range of research skills.

PART II

POLICY AND DECISION MAKING

CHAPTER 4

A RATIONAL BASIS FOR DECISION MAKING ON CIVIL DEFENSE POLICY*

Herman Kahn
The RAND Corporation

In civil defense one is entering a field which is, in some sense, new; in which there is no one with adequate experience; nobody has fought and survived a thermonuclear war. We must therefore try to find partial substitutes for experience. We must think about the problem, using paper and pencil, drawing on what experience we can, and finally always remember that a war is likely to bring some unpleasant surprises. We must also be conscious that attitudes toward civil defense will be influenced by a mixture of reason and emotion.

There are three major reasons why people object to civil defense and one reason why they favor it.

Some Common Attitudes toward Civil Defense

1. It is completely ineffective

2. It is too effective--will touch off a United States-Soviet Union arms race or even a United States or Soviet Union strike

3. It is both 1 and 2 above

4. It is neither 1 nor 2 above

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*Following the May 1961 Symposium on Behavioral Science and Civil Defense, the author testified before the Subcommittee of the Committee on Government Operations, House of Representatives (U. S., Congress, 1961). This chapter is taken from the testimony on 7 and 9 August 1961. The testimony before the Subcommittee represented an amplification of his remarks at the Symposium.

Each of the first three positions listed is argued with great intensity and force, and often rather persuasively by its adherents.

Effectiveness of Civil Defense

The first position is that civil defense is completely ineffective; that it is not worth buying; that even modest amounts of money, energy, or thought spent on such preparations are wasted; that all money spent for civil defense should go to other objectives and means. This position is held by different kinds of people for different reasons. For example, some argue against civil defense because it is defensive. They argue that one cannot win a war by digging holes in the ground, that civil defense is a form of Maginot-mindedness, that history has shown that defense is a mistake.

Such worries have an ancient tradition behind them. In an operation in the field, where a man may have to send his comrades, himself, or his friends to their death, it is likely to be disastrous to his morale if he worries too much about what the enemy can do to him. There are many historical examples of military disasters being caused by commanders being too cautious or afraid. However, it simply is misleading to argue by the slogan "offense versus defense." Whether one wants to be on the offensive or the defensive side cannot be determined solely by appeals to aphorisms or even by the question of the morale of the participants. From the morale point of view, it is much better to be on the offense than on the defense. The offense also usually has the advantage of the initiative. However, these advantages of the offense may not dominate; they may not determine whether you win or lose the war--whether you survive or die. If there is a war, even excellent morale and initiative may be useless as a protection against blast and fallout.

This brings up the much more serious reason for some people's worry--civil defense being ineffective. This is that it will not do the thing it is supposed to do, that civil defense will not actually defend or otherwise perform as promised.

Some of the early work in this field tried to evaluate civil defense by its ability to contribute to the post-attack war-mobilization base. That is, if one goes back to World War II, he finds this is the classical reason for civil defense. Civilians represented a second line of defense; they supplied men, materials, and morale to the fighting forces. It is historically true that the United States found its ability to mobilize men and materials after the war had started crucial to its success in the Civil War, World War I, and World War II. Post-attack mobilization has also been the main purpose of civil defense in European countries.

However, today almost all strategists believe--there are some exceptions--that it is not possible to defend a war-mobilization base, even

by heroic efforts in the civil defense area, against a determined attack by an enemy who is trying to prevent war mobilization. The size of the military effort that could be supported by a post-attack mobilization is so small compared to the effort that has been carried out by the forces that were in being before the war started, that, in most situations, it is not very inaccurate to ignore the military resources that can be mobilized post-attack.

The classical reason for civil defense--to aid the war effort directly--has disappeared. When I ask myself, for example, what is it about the Soviets that frightens me, I do not ask about their war-production capabilities after the war has started. The fact that we can give some protection to a factory worker or a machine tool or a mine or even a city would not, by and large, make the Soviets fear the United States any more than if we could not protect these particular things. We protect people because we are people.

Without people there are no values and, therefore, one can ask a different question: Can we go into civil defense or should we go into civil defense not because it helps us fight a war more effectively but simply because war can happen and it is better to have a country after the war is over than not; because it is better to have more people than fewer people; because it is better to have more property than less property; because it is better to recuperate rapidly than slowly.

In other words, we may want civil defense simply as insurance. In fact, insurance is a very good analogy here. If one buys fire insurance on his house, this does not mean that he is reckless with matches. He does not buy insurance because he plans to risk a fire, but simply because a fire can occur. If one buys a safety belt for his car, he generally does not drive more recklessly. The buyer may simply feel that an accident can happen and that the safety belt will give him some added and worth-while but still insufficient protection.

The next question which comes up is: Can civil defense be used to protect lives, protect property, or to facilitate recuperation after a war is over? Rather surprisingly, I think most people have the impression that the answer to this question is also "No." The following tabulation indicates some reasons for this point of view.

Tragic but Distinguishable Postwar States

Dead	Recuperation (Years)
2,000,000	1
5,000,000	2

Dead	Recuperation (Years)
10,000,000	5
20,000,000	10
40,000,000	20
80,000,000	50
160,000,000	100

It should be possible for any person to distinguish between wars which result, say, in 20 million dead Americans and wars which result in 40 million dead Americans. But it is practically impossible for people to say: "If war occurs, I prefer a war which results in 20 million dead to one which results in 40 million dead." They want to say: "Why should I have a war at all?" They say: "Why do you tell me to choose between a war in which there will be 20 million dead Americans and a war in which there will be 40 million dead Americans? I do not want to choose." Because they do not want to choose, they choose by default. They ignore the problem. I have actually been severly criticized by colleagues and others for emphasizing this notion that 20 million dead is better than 40 million dead. Almost everybody is willing to remark that 40 million dead is worse than 20 million dead. That appears to be a reasonable remark. The reason I turn it around is to get certain programs started. When one is trying to get a program done, it can only be done by giving people a reasonable goal.

We spend in this country, or were spending, about $5 billion a year for air defense. It is no particular secret that this system has serious inadequacies. Many of them occurred because some of the air defense enthusiasts were trying to do too much. They were trying to get a system which would work close to 100 per cent, and in the attempt failed to get a system which would work well at much lower levels. I am not criticizing air defense. There are many complicated reasons why what was done was done. In any case, it is a valuable system. However, I am pointing out that even if there are billions of dollars authorized for a system, the designers, by aiming too high, can get too little. One must aim for realistic goals.

This applies with particular force to civil defense programs. I think we are going into civil defense in a very realistic fashion: we are explicitly saying that we are not trying to save everybody in every circumstance. Instead we are saying, "Let us save those that can be saved." This does not mean that we do not care about those who cannot be saved. It simply means that, if deterrence fails, we cannot do anything about those we cannot save. If you believe this, if you believe that it is better to have only 40 million dead as opposed to 80 million, or better to have 80 million than 160 million, then I think you can show that civil defense is effective. Under many plausible circumstances, it can almost without question move

the results of a war from the bottom part of this list of postwar states (above) to somewhere near the top. Whether or not you think this is worth doing seems to be mainly correlated with how willing you are to face the fact that war may occur--that our programs to avoid war may fail.

Let me add one comment to indicate why I think it is important to have explicitly limited goals. Let us assume that under current conditions, if war occurred we would expect to have 60 million Americans killed, and that, by dint of great efforts, by working very hard, by being very clever, very intelligent, and very dedicated, we developed a system such that, if a war occurred, 20 million would be killed instead of 60 million. Assume also that we then had a war, and 20 million people were in fact killed and not 60 million. That is, the system worked perfectly. Can you imagine the designers, builders, and operators then saying, "We had a success. The system has indeed worked well." And then going around congratulating themselves? They could not do it. There would be 20 million dead Americans--men, women, and children--and few would claim that the result was even a qualified success. Most would say it was a failure.

Actually, I would claim it was a success, in some very relevant sense. Unless we recognize that it is a success, we cannot expect people to build such systems. Few if any people will work hard for goals which are defined as being failures right from the beginning. I believe this is the main reason why people actually think of civil defense as ineffective. They think it is ineffective because even a success is not very successful in their eyes. It still looks like a failure. It is only a success in comparison with what could have happened. Unless you keep your sights clearly on that fact, you simply won't be able to say the system is effective.

There is one important question which is raised by the effects of modern weapons today--the question of survivors envying the dead. This is an important point, the most frightening posssible point. This question is raised mainly because modern weapons have long-lasting effects. If there is a war today, the environment which is created by the war will be more hostile to human life for, say, 10,000 years. Now, one can argue this statement; it might be wrong. However, the best scientific evidence indicates that it is correct. I am thinking now of the longer-lived radioactivity due to carbon 14.

To many people this statement carries the implication that it is not worth living in that hostile environment. That is, of course, much too quick and shallow an opinion. The survivors can rebuild, they can reconstruct, and, in many cases, they would not notice the greater hostility of the environment. It would be a statistical effect which would be discernible in the mortality tables, but not by the average individual's personal observation. The average individual would go through life running

somewhat greater risks of various types of diseases and greater risks of having genetically deformed children, but when these risks are compared to the risks normally run today, they are not startlingly larger. The quality of life would not necessarily have been changed dramatically.

When trying to explain this point, when trying to explain that civil defense is not ineffective because of these long-lived, long-term effects, one can get into very serious trouble. Let me go over some of the phrases which I have just used to indicate what happens.

Normal Postwar Life

I made the comment, both here and in my book (Kahn, 1960), that objective studies indicate that the postwar environment would not be so hostile as to preclude normal and happy lives. I would conjecture that I have gotten about 50 letters, mostly from psychiatrists, taking me to task for that remark. Partly, I think, they object to the term "normal and happy"; I suppose they would argue that people are not normal and happy today, so why do I think the war would make a difference? I am not, of course, claiming that the war would make people happier or more normal, but what I claim to say--and, as far as I know, it has not been contradicted by any evidence--is that insofar as one can lead a normal and happy life today, the long-term physical conditions after most wars would not be such as to preclude living a normal and happy life then.

I think the reason why I received such a hostile reaction to this remark has to do with some very natural human reactions. Let me give a sort of homely example which illustrates one of the problems one must surmount if one wishes to explain what we might face postwar. Imagine for a moment that you have a friend, who is a mother and who has just lost her only child, and that she is grieving over her loss. Life looks totally black. She may literally not be able to envisage ever recovering from her grief. The world may seem permanently out of kilter. This is the end. You might walk up to this woman and say: "In five years you will in some sense have recovered from your grief; you will be laughing at jokes. You won't forget your child. You may even be reminded of him very intensely every now and then. But nevertheless you will be leading a normal and happy life."

That is, by and large, an accurate prediction. But she won't thank you for making it. She will be very angry with you, and so will all of her friends. They will say it was not appropriate to bring this analogy up; the mother's grief deserves respect. One should not ignore it, and by making this comment you seem to be ignoring it. However, in designing a civil defense program, one must be this hardheaded--this callous, if you will--in order to understand the problems involved. For most people deep grief is transitory; most people recover; life does go on.

There is another reason why people think civil defense is ineffective. This is more technical than the ones I have discussed. This reason is illustrated in the following list.

Factors Essential to Complete Analysis of a Thermonuclear War

1. The prewar time-phased program
2. Performance during attacks
3. Post-attack fallout problems
4. Postwar survival, patch-up, and restart
5. Interim production, inventories, and imports
6. Long-term recuperation
7. Postwar medical problems
8. Genetic problems

There are good sound technical reasons for worrying about the effectiveness of civil defense. Any man today who says that we, as a nation, can survive a war is saying something very complicated. He is saying that we can handle all the problems that are lumped together in each of the eight phases of a thermonuclear war listed above. If we fail on any one of these phases in a crucial way, then we may have failed completely. In a sense, one gets no credit at all for a grade of 90 per cent, even if it deserves an "A" for effort.

He is saying, first of all, that we will have the program in place the day the war occurs. By and large, defense programs in this country have lagged, and unless an urgent effort is made they will continue to lag. So one must worry that the program will be in place at the time it is needed. This worry about phasing also includes worries about possible enemy reactions. One must worry that the enemy does not go faster than we do, so that by the time we have procured programs adequate for 1960, it is 1965 and we are facing a new threat which has rendered our 1960-type preparations obsolete.

There is one important factor which helps alleviate the problem of obsolescence. There are many different kinds of wars which can occur, and there are many different prewar circumstances which can change the character of the war. I will have a lot to say about this in a few minutes. But I would just like to mention that even though the program may be obsolete for some wars and some circumstances, it is likely to retain much value for other wars or circumstances. However, it is difficult even for professional analysts to keep these many cases in mind.

We have again a psychological reaction which is very hard to fight. Most people, including professional analysts, want to worry about the worst

case that can happen. Now, it is literally true, as far as I can see, that if the enemy is determined to kill Americans with a surprise attack out of the blue that is directed against population, then no program that is currently being suggested is going to cut the loss of lives much below half the population. However, even here one can argue that he prefers 90 million dead to 180 million dead.

But our weakness in the worst case does not settle the problem. Most wars that are likely to occur would have a quite different character, and programs designed to meet less ferocious or less difficult wars can be very valuable. We do not refuse to go to a doctor when we have pneumonia because he cannot cure cancer. His ability to cure pneumonia is valuable to us precisely because we may catch pneumonia when we do not have cancer. The same principle is applicable to programs designed for special situations. Programs that will not work in all situations may still be valuable in the special situation.

The next problem is protection against the effects of fallout. This has been discussed elsewhere by me and others. Important as fallout protection is, it may have been over-emphasized recently to the neglect of other very important aspects of civil defense.

The problem of getting things started again is a very difficult one to analyze. In fact, it is quite clear that nobody can do a study which will prove rigorously that if you give the social organism the kind of shock that a large thermonuclear war would give, the social organism would not in some sense die. Nobody can demonstrate rigorously how things can be put together after the disorganization of an attack. This inability to demonstrate viability is not a shocking or a new thing. If you lose a leg, no doctor can demonstrate that if he gets you to the hospital he can stop the bleeding and you will survive, even with the best medical treatment. He cannot do this rigorously because no one knows enough about the bodily process involved to demonstrate the details of the healing process. One has to depend on faith and previous experience. Other people have lost a leg and have survived, and, therefore, one believes that others can also survive under those circumstances.

Civil defense has the same characteristic, except that we lack enough relevant experience. In order to argue that the social mechanism will restart, one must have faith in the ability of people to improvise, to meet emergencies reasonably intelligently. Then one can give people facilities and make other preparations to help them meet these emergencies, to improve their capability to improvise and organize. But even after elaborate preparation, one will still be depending upon the survivors' ability to rise to the occasion. If the survivors were robots that could only rigidly obey preset instructions, one would indeed have serious doubts about the possibility of restarting things.

Insofar as we have historical examples, and some of them are close to thermonuclear wars in intensity, people do seem to rise to the occasion. Faith that they will do so is not an unreasonable or desperate hope. It is the expected thing. It is what a gambler would be willing to bet will happen, even though one cannot prove it will happen. Therefore, while whatever studies that are done will have an important gap in them, I do not believe that our inability to demonstrate feasibility rigorously is an annihilating weakness. On the other hand, it is clear that much fruitful work can be done in analyzing feasibility and looking for difficulties and ways to circumvent them.

The next problem is the maintenance of economic momentum. One must recuperate before one runs out of supplies to such an extent that major additional hardships are inflicted on the survivors. One thing which makes me optimistic about U. S. recovery is the fact that, for the highest priority items (food, shelter, water, and clothing), we need not have any shortages, at least nationally. In other words, all the attack patterns that we have analyzed, at least for the early 1960's, leave enormous stocks of these items; therefore, one does not have the problem of split-second timing in post-attack recuperation. For example, we will not face starvation even if we do not get agriculture going for a year or two.

Of course, preparations must be made for utilizing these resources, particularly food. Plans are being drawn up to predistribute the food before the attack, so that we will not have to depend on the national transportation system for distribution after the attack. These preparations might not be necessary, because studies indicate that the national transportation system would work adequately. Most of us think it will work, but we cannot rely on these studies. We prefer to insure against the transportation system not working, against our studies being wrong.

The next problem is the long-term recuperation problem. Recuperation here has many facets: economic, social, political, psychological, and, in a subtle way, moral and cultural. The only one that has been studied with any care is the economic, and even here the studies are, given the importance of the problem, surprisingly superficial. However, I believe we can say with some confidence that if we can handle phases 4 and 5 adequately, the economy will come back with amazing resilience; in other words, countries like the United States are extremely competent, once they get started, at producing capital and consumer goods. Depending upon the war, one would conjecture that we could rebuild the destroyed wealth in less than a generation--in all likelihood in 10 years after the kind of war that is usually envisaged.

In terms of studies that have to be done, and in terms of the most serious questions that remain unanswered, the social, psychological,

political, and moral questions are currently the hard questions. Many feel that they are the dominating questions. However, most people will not be psychologically deranged. One is not, for example, going to break up family relationships because of a war. While everybody's lives and thoughts will be affected by a war, the character structure of the survivors is unlikely to be changed in any startling fashion.

The political questions are more difficult. We live today in one of the few countries in the world in which the government does not worry about revolution and subversion as major problems. However, such problems could occur as a result of a war. Thus, even if we won the war, it is conceivable that we might no longer live in a democracy. I hope, however, that this and similar statements will soon be subjected to a deeper, more careful examination.

I will not discuss the postwar medical problems and the genetic problems, the next two items on the chart. In the middle and late fifties there was a widespread belief among scientists--among people who should know--that one could not survive these problems. Today, by and large, these extreme views are no longer held--at least for the kind of war that seems plausible in the early and mid-sixties. The end of the world, end of history, doomsday, and so on, are not appropriate descriptions. I believe that we have the knowledge today to build doomsday machines. The fact that they can be built is, correctly, the source of the gravest apprehension. This fact is one of the main things which gives urgency to our attempts to negotiate arms control. Many people--and I am among them--believe that unless we have adequate arms control such devices will be built, say, before the year 2000, and that is a very serious problem indeed. But I do not expect them to be built within the next five or ten years.

This summarizes, in rather rough form, the complexity of the belief that a nation can survive a war. I would like to emphasize again its complexity. The man who believes we can survive a war believes we can handle every one of the problems on our list, each one of which is by itself incredibly complex and uncertain. The man who believes we cannot survive a war simply has to believe that we fail on one of these problems. To use a standard phrase, there are no prizes given for handling seven of these problems; we have to handle all eight. So, to believe that a nation can survive a war is a complicated belief. To believe that one cannot survive a war is a simple belief. And, by and large, it is easier for most people to believe simple things than complicated ones. I believe that a persuasive case can be made for national survival, but it is a difficult one to make in a give-and-take debate.

Let me now return to the list of attitudes. To summarize my reaction to the first attitude--the common belief that civil defense is completely

ineffective--I would simply state that, for a very large range of programs, one can make a case strong enough to stand up before the most skeptical and most hostile audience. These programs are more than effective enough to justify the money that is to be spent on them, so long as the criteria of effectiveness include the questions: "If a war occurs, how many lives are likely to be saved, how much property is likely to be saved, how much is recuperation facilitated?" In other words, I believe that the argument of total ineffectiveness under all reasonable circumstances is completely wrong and can be dismissed by serious people.

The second attitude is more complicated and controversial, and is exactly the opposite of the first attitude. Many antagonists of civil defense argue that it is too effective, that it will touch off an arms race or even a Soviet Union or United States strike. I will discuss the arms race first. To the extent that one feels that civilians are a target, an attempt to protect civilians may touch off a greater effort by the Soviets to be able to destroy them. If we build an adequate shelter system, they may then build larger missiles and procure more of them. Or, equally important, if the Soviets fear that because we have civil defense preparations we are more likely to strike them in a crisis or emergency, then they may have to keep their forces more alert. This could make them more accident-prone or trigger-happy. We might then have the problem of what is known as false pre-emption or anticipatory retaliation. That is, they may strike us because they think that we are going to strike them. This is sometimes called striking second, first.

All of these problems could be raised by certain kinds of civil defense programs. I do not believe that, by and large, either the program being recommended today or even much larger programs would raise such problems in a serious fashion. I think that most of the people who worry about this are worrying about the so-called self-fulfilling prophecy, not as an analytical proposition but as sort of a magical proposition. Let me describe what I mean.

The term "self-fulfilling prophecy" refers to the fact that if you are hostile and suspicious toward a person, you will often act in a manner that reflects your hostility and suspicions; even if the other person is innocent, he will notice your hostility, and this will arouse in him reactions of hostility and suspicion. You will then observe his reactions and say, "See, I was right." And since he will indeed have confirmed your hostility and suspicion, you will become more hostile and suspicious; in time this will make him more hostile and suspicious. The mutual action and counteraction will build up to such a point that it can either lead to violence or stabilize at such a high level of hostility and suspicion that the possibility of violence is ever-present. It is quite clear that this self-fulfilling prophecy does occur between both individuals and nations. However, there can also be a

"self-defeating prophecy." For example, it can happen that if one prepares for war, he deters the war. This has happened in the past. The self-defeating prophecy plays as big a role in international and other human affairs as the self-fulfilling prophecy.

For this reason we simply cannot reject programs just because they reflect some hostility and suspicion of the Soviet Union. Some hostility and suspicion is justified. There are reasons why we have it. This hostility and suspicion was not created overnight by our own imaginations working overtime. I believe that, as long as the nation chooses appropriate programs, the problem of stimulating the arms race has been grossly exaggerated. This does not mean that one could not stimulate the arms race. While we are in a dangerous arms race today, we are not running nearly so fast or hard as we could. We could make it more dangerous.

It seems to be true, for the current programs of both sides, that both sides are being prudent. Neither side seems to be doing the kinds of things which they might do if their only concern were to beat the enemy. Both sides are acting with a great deal of restraint, both budgetary and technological, and one would like to keep these restraints operative and even increase them. One would not like frivolously or carelessly to increase the pressures toward an accelerated arms race except, perhaps, in response to a changed situation.

The Berlin crisis may well result in an increased arms race, but this is mostly not our fault. It is the result of a crisis that has mainly been manufactured by the Soviets, and one may have to react to it. In fact, it is exactly the threat that we may accelerate the arms race that might lead the Soviets to be cautious.

As to the next attitude--the belief that civil defense by the United States might lead to a preventive war by the Soviet Union because they were afraid that we intended to be aggressive, or even a preventive war by the United States because of our belief that we might hold casualties to less than 50 million--I find this almost beyond belief. The notion that unless one can guarantee total annihilation the other side will not be deterred, or, conversely, that unless we can promise the Soviets that every single citizen we have will be killed, he will worry about our striking him in a surprise attack, seems to be a gross overestimate of both sides' desires to strike each other.

It is my personal belief that one could protect every citizen of this country and every citizen of the Soviet Union from being a casualty with 100 per cent reliability, and both sides would still be deterred under most circumstances. After all, the empty cities are still hostages. This property, which has been so laboriously created and which has such immense historical

and cultural significance, is a very precious and valued hostage. In the real world, a country is not going to war lightly just because it could reduce fatalities from 60 million to, say, 20 million. Twenty million dead is a very impressive number of dead, and the property, in addition, is a very impressive hostage all by itself.

There are circumstances, particularly in a very tense crisis, in which certain kinds of civil defense programs might tend to convert the crisis into a war. But these are the very circumstances under which these programs are most needed. I will come back to this later in my discussion of the different kinds of wars, but I just want to make the point now that hard situations can occur. In these situations, a total unwillingness to face any immediate risk of war may simply mean that one must choose surrender or appeasement, and perhaps war eventually.

Let me repeat it, because it could be so important. Harsh choices can occur. We may have to choose between risk of immediate war or be willing to appease or surrender. Under these circumstances civil defense can make a difference in our choice and thus increase the risk of immediate war.

Let me now discuss the third reaction--the belief that civil defense is simultaneously both completely ineffective and too effective. At first this sounds like and often is a contradiction, a lapse in logic, by a critic who is not thinking very hard. However, sometimes the point is made in a sophisticated fashion. The critic could say, for example, that the civil defense program does not work, it is ineffective, but it will fool the Government to the point where it is more reckless, or the civil defense program will fool the people, and then the people will themselves be more reckless or allow the Government to be.

Now, I happen to think that this last view is almost completely wrong. I take position number 4. I think the suggested civil defense program does work, but that it does not work so well that it triggers off an accelerated arms race or preventive war. I think the common reaction of both 1 and 2 is simply a visceral reaction to dismiss the whole subject. The critics do not want to think about a thermonuclear war actually being fought. Civil defense forces them to think about this possibility, so they use any argument which comes to mind to dismiss the possibility. Most people--and I am including many professional analysts in this category--do not want to face the reality of potential thermonuclear war as something which might be fought. They prefer deterring it, abolishing it, wishing it away, thinking it away, ignoring it, or in some other way denying its existence as a problem worthy of consideration together with other programs. An incredibly large number of people believe that if you build shelters you will have to use them. Most of these beliefs are not based on analysis but on the same kind of superstitious fear that motivates a woman to refuse to go to a doctor to be examined for

cancer for fear he will find cancer, or that motivates a man to refuse to buy life insurance for fear he will die.

Let me continue this discussion about "thinking about the unthinkable" --about why people set up psychological blocks. Partly this is because such blocks are one way of preserving sanity. It would be morbid for any man in this audience to dwell on his oncoming death. We are all going to die. We all know this, but we do not spend much time thinking about it because we cannot do anything about it. We make preparations that have to be made and then we ignore the problem. We even deny the phenomenon. It can be a perfectly healthy reaction.

In the case of thermonuclear war, if the necessary preparations had been made, then the denial of the possibility of thermonuclear war would also be a healthy reaction. I do not want my children or my wife or friends thinking every day about thermonuclear warfare. But we have not made the necessary preparations, and until they are made it is necessary to bring the subject up. We must make people think about it.

There is another reason why people do not want to worry about surviving a thermonuclear war. The belief in automatic mutual annihilation simplifies the argument and most people like simple arguments. This belief is illustrated by the statement: "Don't bother me with facts. The enemy would never take the risk. Both he and I have made up our minds." This I label "The Subtle View of Deterrence." Even professional strategists sometimes do not want to concern themselves with the details of the balance of terror--the obvious possibilities for miscalculation, unauthorized behavior, accident, or even war by calculation. They do not want to consider these possibilities seriously, in the sense of letting them affect programs. The automatic balance of terror is not only a simple view of the world; it is in some ways a comforting view. An example of why it can be comforting is given by Nixon's remark when he visited Russia. He was quoted as saying to Krushchev, "We must live together or die together." Now, that is a comforting remark. The reason why it is comforting can be illustrated by considering another remark Nixon could have made. He could have said, "We must live together or one of us will die." This last is a very frightening remark. It has a rather threatening sound.

Both remarks, of course, are inaccurate, but if I had to choose, I would say that the second one is probably more accurate than the first. If you want to make an accurate remark, you must start off by saying that we must live together or one of us will be hurt to some great degree and the other to a somewhat lesser extent depending on the details of how the war starts, how it is fought, and how it is terminated. A detailed discussion of some of the possibilities will be found in On Thermonuclear War (Kahn, 1960).

Considering the real range of possibilities--estimating the probable outcome of a particular thermonuclear war--is a very complicated thing, and most people do not like complexity.

If one believes that unless a particular arms-control measure is adopted the world will automatically go into thermonuclear war, and that this thermonuclear war will result in an end of history, then one does not have to bother thinking any more. He can say it is quite clear that this arms-control measure is better than the present policy, because it cannot be worse; therefore, it must be better.

However, one can also have the view that just because one is in serious trouble with the current policies does not mean that any other policy is a better one. I am not, in other words, an apologist for the current system. I do not think the current system is sensible. I do not think it will work indefinitely, but I do believe that it is useful to fix it up, to repair it, to make it safer, and to hedge in various ways against its breakdown while we are looking for a better system or while a better system evolves on its own. This policy may not work, but I do not know of a better one. I am very conscious that some systems are suggested which seem to me, to put it mildly, decidedly worse than the current system. Even a system that evolved as a result of a war or very intense crisis might be better than some of these alternatives. One of the major reasons why some people refuse to believe in the possibility of survival is that they want to convince themselves that nothing can be worse than the current situation and they can then stop thinking. I believe that unless one understands there is a range of possible wars, a range of possible situations, one cannot fully appreciate the potential effectiveness of the different kinds of civil defense programs which might be recommended. This very crucial point has been ignored in most discussions.

Let me start with the targeting objectives that an attacker might have. Five alternative target systems that the attacker might aim for are presented below.

Five Possible Attacks

1. Countervalue
2. Counterforce + countervalue
3. Straight counterforce
4. Counterforce + bonus
5. Counterforce + avoidance

The first system is the so-called countervalue system. The attacker is mad at the defender and wants to destroy that which the defender values most, irrespective of whether it helps the attacker to achieve his positive

objectives. Now, it is easy for most people to believe an attacker would want to do this. They visualize themselves as a defender and think of an attacker as being angry with them, and therefore, he is going to try to hurt them. We value most highly people and property, in that order. Therefore, if we believe that the attacker is out to hurt us, we may study countervalue attacks, and indeed such attacks could occur. We wish to study this kind of attack because it may happen.

The second type of attack that could be studied might be called the counterforce plus the countervalue. In this attack the aggressor concentrates his weapons on the things which might hurt him--the defender's strategic forces--and the things which the defender values--his cities, his people, and his property. This is the attack that is usually envisaged in most discussions of thermonuclear war.

The third type, straight counterforce, might be called the modern attack. The attacker says to himself, "This other man's cities can't really hurt me. He is not going to manufacture anything in them that is important; he is not going to draft any soldiers; there is no morale problem, especially since there are not going to be any elections between the time this war starts and the time it ends. Adding up all of this, why should I bother hitting cities?" So the attacker then goes for the other side's strategic forces. If he goes for them in a straightforward way, ignoring the cities completely, we would call it a counterforce attack. This is a reasonable pattern of attack which might well occur.

A fourth category might be called counterforce plus bonus. It is basically motivated by the same considerations as the counterforce attack, except that the attacker says to himself, "I would still like to destroy as much of the other side's people and property as possible. I will, therefore, change or compromise my target system. I will change my designated ground-zeros. I will use somewhat different yields. I will ground-burst instead of air-burst, even though militarily it may be most effective to air-burst. I will do all this in order to increase the bonus damage." Such an attack would result in quite different casualties than would the straightforward counterforce attack, even though the primary objectives are much the same.

The last attack pattern on the list is counterforce plus avoidance. In this attack, the attacker says to himself, "I am not mad at the enemy's civilians. There is no reason why I should kill them. I only want to protect myself. I want to destroy the other side's forces, but, to the extent that I can, I will avoid his people and his property." He might do this for two separate reasons. The first is sheer morality. Nobody wants to kill 100 million people without a good reason for doing so. One might not even want to kill 100 million people even if he had very good reasons. The second

reason for the avoidance tactic is that the attacker can use the enemy's people and property as hostages. He can say to the other side, "I haven't killed your people. If you start killing my people, I will kill your people in reprisal." In other words, one can try to make deterrence work after the war has started.

Now, Americans, by and large, find this very hard to believe. It is difficult for them to believe that once a war starts they would be deterred from any action against the enemy by fear of further reprisal by the enemy. They have a feeling that the war must be all-out and uncontrolled. This is, in two separate ways, a very naive point of view. It is naive because it is not sensible, and it is naive because it may not be true. Even if one tries to be uncontrolled, one may find himself being threatened so persuasively by the enemy that he will control himself at the last moment. I have several illustrative examples in my book of pre- and post-attack coercion, and I am told that I have made the possibility, under some circumstances, quite persuasive.

One reason why we Americans and much of the West do not fully understand these possibilities is that we have been bemused by the examples of World War I and World War II. These were, indeed, two of the most all-out wars in history. In these wars there was very little attempt to negotiate during the war. The attitude was to destroy the enemy and then, having destroyed him, to dictate a peace. One did not negotiate during the course of the war unless one was either clearly victorious or clearly defeated. While these wars are prototypes for most people, actually they were rather extraordinary wars.

If one goes over the history of warfare, one finds very few periods in which the World War I and World War II ideas of how a war should be fought held sway. The more classical war is fought for some definite objectives--generally limited objectives. In particular, one does not try to destroy the other side, but to attain some desirable objective for oneself or to prevent the enemy from attaining some objective. Countries tended to limit their actions--fighting, pressures, and reprisals--to be in some sense consistent with the objectives they were trying to attain.

Modern technology is such that the ability to fight uncontrolled is greater than it has ever been in history. However, even though it is easier today to fight uncontrolled wars, it is also more disastrous; the sanctions against fighting uncontrolled wars are much greater than in the past. We found this out in Korea. Before Korea, very few Americans would believe that we would limit ourselves the way we did in Korea. After Korea, we learned that, just like anybody else, we can be scared. We can be cautious; we can be responsible. One way to phrase this is to observe that Americans are no tougher than, say, the Japanese or the Germans, and these people surrendered rather than fight to the last man. Similarly, we may be

restrained by sufficiently large threats. This restraining can happen after the attack as well as before the attack.

I suspect that the main reason why Americans find it difficult to believe a war can be fought rationally or reasonably is that, by and large, in our country we do not give force any rational or reasonable role. We feel that only a violator, a criminal, a desperado, an insane man, or a sick person uses force, and, therefore, when we find somebody using force he is not only our enemy, he is an enemy of humanity and should be exterminated or locked up or treated, not negotiated with. We then go all out in our attempt to destroy or control him. This is, I am afraid, a somewhat naive view of the world. Force has been around for many years. It has been used by good, bad, and indifferent people. It has been used rationally and reasonably as well as irrationally and unreasonably. In particular, it is perfectly possible for us or the Soviets to use force in a rational and reasonable fashion, at least in the sense that we do not use it in a wildly irrational or wildly unreasonable fashion.

This is true even if it is in some sense unreasonable to settle disputes by the use of force. Having unreasonably decided to use force, one might still decide to use the force in a reasonable fashion. To the extent that the other side tries to keep one's people as hostages, he can threaten even after the war has started. He can say, "If you destroy my cities I will destroy your cities, but for the time being I am not destroying your cities." To the extent that he destroys your cities in his first attack, he cannot destroy these hostages in a later attack.

This is one of the ways in which civil defense can decrease deterrence. If one puts people in fallout shelters in the centers of cities, one has improved the enemy's capability to make them hostages. If they were not in the shelters, they would have been killed. To the extent that he can hope to limit your response by the use of such blackmail tactics, to that extent he may be more willing to go to war. In addition, just thinking through the civil defense problems is likely to make the decision-makers of a country think of a war as an experience rather than as an end of history. This is the proper psychological preparation for post-attack blackmail. Therefore, it is quite possible that the suggested civil defense program might actually decrease our deterrence against some kinds of attacks.

This is not an overwhelming argument against civil defense. On the one hand, civil defense does not decrease our deterrence very much while, on the other, it increases markedly our ability to survive a war if a war occurs and is fought by what might be called rational methods. And as I will discuss later, it may also increase our ability to deter other kinds of attacks or provocations.

Let me be specific about some of the kinds of wars that can occur. In addition to the differing target systems we or the enemy might adopt, there are many different situations in which a war could start. I have listed eight of these:

Special Counterforce Situations

1. Controlled wars
2. Inadvertent wars
3. Favorable military circumstances
4. Chinese attacks
5. "Small" countries
6. Arms control
7. Technological breakthrough
8. Rise of a "Hitler"

Almost all of them can be characterized as being lower-priority situations than the ones normally studied. Yet all have the characteristic of being sufficiently important so that they must be considered.

One of the real difficulties of a country like the United States, or perhaps of any country, is paying sufficient attention to relatively low-priority but absolutely important missions. The international situation today is such that an objective which is fifth priority can still, if inadequately prepared for, kill you. Let me now discuss some of these lower-priority wars which can occur and in which civil defense may perform a lot better than would be expected if it were evaluated only in the worst case. These are still probable enough and important enough so that, if we designed a particular civil defense program for only one of these situations and it was useless for all the others, one might still be able to justify the expenditures for such specialized civil defense.

The first one--the controlled wars--I have already discussed. These are wars in which one side or the other attempts to use force in a rational and discriminating way. This controlled-war notion is directly opposed to what I have called the spasm war. In a spasm war each side is trying to get rid of all its weapons as fast as it can in sort of an orgiastic spasm of destruction. The controlled war includes withholding tactics, an adequate command and control capability, the use of intrawar deterrence, bargaining, and negotiation. One way to think of the controlled war is that is is a limited general war. While this strikes most people, when they first hear about it, as a sort of academic absurdity, it does not take very long--just an hour or two--until one can make almost everybody take it very seriously. I predict that it will be taken seriously in both our country and the Soviet Union. Indeed, the President in his message to the Congress has already made the

point that he wanted a command and control system that would enable him to control the forces after the war has started. He specifically added that he wished to be able to use the force with discretion, even after the hostilities have broken out.

Inadvertent wars are started as the result of accident, miscalculation, unauthorized behavior, a catalytic process, and so on. Some inadvertent wars might be much more destructive than the calculated ones simply because they have not been calculated and are therefore uncontrolled. Others are much less destructive because the planning, preparation, or tactics are poor or inappropriate. Depending on the kind that occurs, the suggested civil defense program could perform with a wide range of effectiveness.

The third possibility is a situation with an unexpectedly favorable military circumstance. This possibility is almost always ignored. Let me give you two examples. Consider a situation in which violence has broken out in Europe. A limited war might be raging, and, worse, it might seem to be getting out of control. I would assume we would then be more than willing to evacuate our cities. I could make the point more strongly. We could not stop the evacuation. People would leave the cities, and the only questions that would occur are: Is the evacuation reasonable or unreasonable, effective or ineffective? Is the population being evacuated to places of protection and safety, or to overcrowded facilities which are vulnerable or otherwise dangerous? Such an evacuation could take place over a period of days or weeks or months. It is not an evacuation in which one is trying to outrun the ballistic missile. This is a strategic evacuation; we have warning. The warning was not supplied by an intelligence agency; it was supplied by The New York Times, The Washington Post, The Evening Star, and the New York Herald Tribune. Have I named all the proper newspapers? In other words, the events themselves gave us adequate warning.

There is another favorable military circumstance which is often ignored. This is the possibility that we may be much more competent than the enemy; we could also be militarily less competent; it could go either way. Let me give an example: During the Korean war our fighters had a number of aerial combat duels with the fighters of the other side. It has been reported that, for every one of our planes that they shot down in these duels, we shot down 16 of theirs. If I had been discussing this problem of fighter duels in, say, 1949, I would not have had the nerve to conjecture that we might be 16 times more potent than the other side; I would not have had the nerve to suggest a program that would work well if we happened to be 16 times better but wouldn't work very well if we were not. We might be interested in the 16 times worse case as insurance, but not 16 times better.

Things like this do and can occur. When they occur, it can change the effect of the war by orders of magnitude. Trying to be in position to be

able to exploit being militarily more efficient, if you happen to be, is different from the wishful thinking that would rely on being more efficient militarily. Let me discuss item number 4 in the list--Chinese attacks. By the late 1960's or the early 1970's the Chinese will probably have a strategic nuclear capability. It may be a rather effective one. However, unless we are careless, it is unlikely that they will be able to launch a surprise attack on the United States and prevent a reasonably massive retaliation, though they may be able to blackmail us under many circumstances. To the extent that we wish to be resistant to accident, blackmail, or irresponsibility by the Chinese, we must start putting in today the systems that we will need to handle this and other late-1960, early-1970 situations.

In spite of the consensus on the China problem, it is very difficult to take seriously these potential military problems of the late 1960's or the early 1970's. I grappled with almost exactly the same problem in the mid-fifties. Everybody knew the ballistic missile was going to be an important element of military power in the early sixties. While almost nobody in the mid-fifties argued about this, it was still difficult at that time to motivate decision-makers to spend large sums of money to defend against these hypothetical missile threats of the early 1960's.

In the same way that the missile was a hypothetical and academic threat in 1956, the Chinese are a threat today. To the extent that we worry about China and even smaller countries, we must make preparations today. Many of the necessary measures have long leadtimes. It may be five or ten years before they are really effective. To the extent that we are looking at ten-year systems, we must today prepare for 1971; 1971 certainly includes a Chinese military capability. Adequate civil defense is likely to take ten years or so; it would be well to get into the business.

I should say that the problem of protecting against Chinese attack is quite different from the problem of protecting against Soviet attack. If you think of the Chinese as being in the same relation to the Russians as NATO is to the United States, they are about five years behind, technologically, and much smaller in numbers. A system specifically designed to take advantage of Chinese weaknesses might be totally ineffective against the Soviets, but still effective against the Chinese. I believe it would be worth-while to spend money on such hypothetical threats.

The arms-control possibility--number 6 on our list--is also important. As I mentioned earlier, we have some arms control today. Neither we, nor, I believe, the Soviets are building the most destructive systems possible. There are militarily potent systems that could be built which are not being built simply because nobody wants to own them. If we had time, I could discuss the most spectacular and ominous possibility, the doomsday machine, in detail. In one were simple-minded, one might believe both sides were

building such devices today. Such devices would indeed render obsolete many suggested civil defense programs. But so far as I know, neither we nor they are building them.

Other types of arms-control measures may be implemented, but even if we have elaborate signed agreements with the Soviets and others, that does not mean war cannot happen. Barring a world government or other arrangement, we will still be in the business of defending our country. The agreements may be deliberately broken, they may be abolished, or they may be accidentally violated. With many arms-limitation programs, some of the problems which might become almost intolerable if we got into a full-fledged arms race are sharply alleviated. Many of the defense programs which are being considered today are completely compatible with many arms-control measures, and indeed work better with the arms-control measures than without them. They may be both militarily effective and tend to reinforce the arms-control measures. Therefore, this possibility must be considered.

The next possibility is the technological breakthrough. One must admit that most of the technical people feel it is more likely that technological breakthroughs will hurt rather than help civil defense, but this is not inevitable. In particular, there are real possibilities in active defense. Of course, active defense today has serious problems, though they are perhaps not so serious as some think who discount it completely. I happen to think one can procure valuable levels of active defense, but with current technology and vigorous use of countermeasures by the attacker, active defense can have some serious deficiencies. However, these measures of active defense do tend to reinforce civil defense measures.

In addition, we are working hard at various systems, and one can have technological improvements in defense as well as offense. Some of these improvements cannot be predicted. When they occur we would like to be in a position to take advantage of them. If we have not started the necessary programs we cannot take advantage of these improvements even if they occur. Not only does active defense complement fallout shelters; it may also complement blast shelters. Some argue that blast shelters were not compatible with active defense. This may or may not be true, depending on what the system is.

The last, and I hope, the least likely contingency is the rise of a Hitler. It is commonplace today to say that Krushchev is not like Hitler. I think that is true. He is not so reckless, not so determined, not so malevolent. Some, most notably A. J. P. Taylor, have said that Hitler was not like Hitler. In particular, in the period 1933-43, Hitler and his government were relatively cautious as compared to the image we tend to remember. He acted much more rationally and prudently than most of us recall, and, in fact, came close to achieving his objectives. But even then he was an

incredible threat to his war-weary, peace-loving opposition. Today a Hitler type, armed with thermonuclear bombs, particularly one who is crazy or realistically simulates being crazy, has the edge.

If somebody comes up to you and says, "One of us has to be responsible and it is not going to be me, so it has to be you," he has a very effective bargaining advantage. If he can convince you that he is stark, staring mad and if he has enough destructive power, then deterrence alone doesn't work; you have to cave in or be annihilated. It is difficult for Krushchev to convince us that he is stark, staring mad because we can see what he is thinking. I should add that I do not think we can convince him that we are stark, staring mad.

It may happen that a leader will take over somewhere, sometime, who either is or tries to act that role. Our only ability to handle him, the only way we can challenge him, is to have a method of putting our people in a place of safety so we can say, "Look, if you are really mad, we will fight it out." Let me summarize this last point by the following: If somebody says, "I would rather be Red than dead," he is a coward, and I think very properly an object of contempt and scorn. If somebody says, "I would rather have everybody Red than everybody dead," he is making a sort of reasonable remark. It is a perfectly reasonable position to take. You may not agree with it, but I would agree with it. I would rather have everybody Red than everybody dead, but we must not allow a situation to occur in which this last is the choice that is presented to us. We must always have an ability to say: "That is not the question. Our nation and system will survive the worst you can do and we are willing to accept large casualties rather than surrender." We cannot handle a Hitler on just resolve. It takes programs because he may well have more resolve than we have, particularly if he is not listening.

I would like to sum up now in terms of where civil defense is and where it might want to go, and I would like to start from the less important and go on to the more important. But, as I mentioned earlier, the less important can still be very important indeed. It can even be close to essential.

The first thing I would like to suggest is the need for more research. Research, of course, is always a good thing. Everybody calls for more research, and even if the call is made in a ringing fashion, it would still make very few enemies. It may take some courage to say you are against research, it takes very little to say you are for it.

You may make a few enemies if you put a dollar price on the suggestion. I would suggest something like $100 to $200 million per year. This is not a completely thoughtless number; it is a number which came out of the work we did at RAND in 1957. All the work I have done since tells me that, in terms of the need for knowledge, this number is not high. It is low.

What makes it high is that today we could not spend that much money efficiently. It would be spent inefficiently, in the sense that after we had spent it we would notice, if we spent it very well, that about half the expenditures had not produced interesting results. If we spent the money badly, then maybe 95 per cent would be wasted in this sense. However, this question of per cent waste is a poor measure of efficiency. If we ask, "Is the total knowledge gained worth the total waste involved in all of the research projects together?" the answer is likely to be, "Yes." Even if we ask the harder question, "Could this valuable information have been obtained as expeditiously without such wastage?" the answer is likely to be "No."

I am suggesting a sort of crash program in research because we have a whole series of very difficult problems in this area, some of which take very expensive research to do adequately. Let me give one example. For some years the Atomic Energy Commission spent about $10 or $20 million a year studying strontium 90. Their studies were almost completely concentrated on the peacetime problem. I made a comment once in a briefing to the AEC that they had spent less than $20,000 specifically on the wartime strontium 90 problems. (This statement was made some years ago and is not true today, although even today the spirit is not wholly false.) A member of the AEC staff who was at the briefing came up to me later and said, "Where did you get that sum? It seems to me too large. We don't spend anything on wartime studies." I replied, "Well, I believe you had someone brief the President. You have spent at least that much on that briefing." He said, "You either overestimate the time that chap spent or his salary."

The reason why this is an important example is that the wartime strontium 90 problem may well be more important than the peacetime problem and also much harder to understand and alleviate. Yet we cannot get any intense research effort on it because it is not here today. It is again one of those hypothetical and abstract academic problems. However, the peacetime problem is here now, and so it does get attention because people think of strontium 90 as a very serious public health hazard. As a result, a great deal of money has been spent investigating this problem. Well, I would now like to see money spent on the hypothetical wartime hazards which are, in my view, just as important, possibly more important. A war might not be extraordinarily likely, but it is possible, and the strontium 90 question is then a question of survival, as opposed to being one of a number of peacetime public health problems. However, I do not believe we will get adequate studies of these wartime problems unless (a) people are very friendly to such studies and (b) the money is available.

If there is a relatively large total budget, then the problem is not one of fighting for each separate study but one of, "Well, we have got to spend this money anyway. Let us look for problems to spend it on." That is the only way you will get serious consideration of some of the less-obvious

possibilities and problems. Therefore, I would suggest a large sum of money for research in all aspects of civil defense. The civil defense problem is in many ways more complicated than most research and development problems. Let me make some comments on why this is true.

First of all, we have to show imagination. This is true in any kind of research. It is more true in civil defense than in most areas because we are often not faced with concrete and checkable problems. Therefore we must use our imagination not only in inventing but in checking. When somebody builds a Ballistic Missiles Early Warning System, he not only builds the system, but he tests it to see if it actually picks up missiles. Since one is right at the edge of the art and a failure will be very noticeable even in peacetime, he works very hard. If you are building a mach 3 plane, you actually have to fly the plane. If it doesn't work, the plane will fall down and everybody will notice it. Most research and development ends up with things which are at least partially checkable. But research and development for civil defense has the unfortunate character--or fortunate, depending on which side you are on--that you don't test it in a war and you don't test it any other way, by and large. We haven't worried sufficiently about the complete range of problems partly because of lack of imagination.

This comment or a similar one can be made on the complete range of social, political, economic, psychological, and moral problems. The Disaster Research Group and its predecessor, the Committee on Disaster Studies, has for many years looked at, collected information on, and analyzed data on natural disasters, on panic, and matters of that sort. However, almost all of their reports will contain a statement to the effect that it is dangerous to apply this experience to thermonuclear war because conditions then are different. This is, of course, correct. But the net result is that there is almost no work aimed directly at thermonuclear war. That is, there is no attempt to apply the data at all. The number of reports--and I speak here not as an expert but a person who tries to get these reports and read them--that actually seriously address themselves directly to the social science aspects of the post-attack world is negligible. I know of about six that really make a serious attempt, and at least three of these could still be regarded as off-the-top-of-the-head variety. The others are either too slight or insignificant even to be considered.

This task is important for two reasons. First, it is important because it is possible such studies may show we may need special preparations which will facilitate recuperation or prevent damage. For example, I could imagine special preparations to preserve the free press, the political system, the political parties, labor unions, churches, and things of this sort which will help a free society recuperate. I could imagine a situation in which if we didn't make preparations for the preservation of such institutions, we might find that it was more difficult, or impossible, to restore the kind of society

we had previously. This is an almost unexplored field except for some financial measures, and even there it is only a barely explored field.

A second reason is that even if you can't make preparations you still want to predict what will happen, or at least understand the possibilities. You want to do the analysis, even if you can't affect the events. The main reason for doing this is first to understand what the risks of thermonuclear war are, and secondly to justify or condemn, as the case may be, various proposals. Let me discuss a rather specialized example. I don't know how many people have taken up with me the question of post-attack grief. This is the notion that because of the enormous number of casualties, all of the pleasure and all of the taste will permanently go out of life for almost everyone. Unless we learn to think soberly about these effects, to estimate correctly those which are likely to be there and to dismiss or discount those which are not, I don't believe we will have serious programs in this country. Nobody is going to work hard for a program of just saving life, unless they feel that the quality of life is somehow worth-while.

This is an intrinsically unpleasant problem and an unpleasant subject. In addition, discussion is hampered by the tendency of critics to misquote or to quote out of context. Let me give an example of this kind of problem that could affect our research program in an unfortunate way. In RAND Report RM 2206-RC (Kahn, 1958), I suggested that it might be a wise thing to look at historical examples of overcrowded conditions--for example, concentration camps, lifeboats, Russian or German freight cars--to try to get a feeling of what human beings can take, to show that people who had to live under these conditions had been able to survive, and to pick up any hints that one could for guiding our own preparations. Such overcrowding can happen to us. Before we can build all the shelters we need, we have to build half of them. If the war occurred when only half were built, then the shelters would be overcrowded. Therefore, we might want to design the first half of the shelters so that severe overcrowding can be better accepted.

I have tried to have designs made, in order to define and understand overcrowding, in which one per cent of the inhabitants would die in the shelter. This is overcrowding in a severe but not the most severe sense. Everything that we add to this "one per cent death shelter" is a luxury in the sense that, if worse came to worse, we would prefer going into such a shelter to being unprotected and having more than one per cent die. To the extent that we build shelters with a greater performance than this, rather than build more shelters for other people, we have misdirected the early part of the program.

Well, several people suggested I leave this whole section out because of the misquotation problem. Indeed, it has been widely quoted, sentence by sentence. But I think I was right in insisting on leaving it in. If we are

afraid to face some unfair discussion on such an important issue, what are we willing to face? We cannot study the civil defense problem in a reasonable way unless we are willing to look at such problems. The only way is to go ahead and treat these problems in a straightforward way, with good taste, with discretion, but in a very straightforward fashion. If you get into trouble, you have to live with it. Eventually all but the most frantic critics will get tired of misquoting out of context. The others will just understand that that is what the world is like. I once saw a cartoon caption which describes my attitude perfectly: "Stop the world; I want to get off." But if you cannot get off, then you must face it. To do this we need hardheaded, detached research and argumentation.

It should be noted that not all of the attitude of emotional rejection comes from the "left"; a good deal of it comes from the "right." I know any number of very patriotic Americans, including an ex-Cabinet member or two, who objected to civil defense because they felt digging holes in the ground was cowardly. And I have read an article by a retired Army general, a very intelligent man, who said that this is nonsense about civil defense--this nonsense about shelters or evacuation. He claimed that what we needed was high morale, that we had to train people against panic, and that we had to train people psychologically to face up to the enemy. The comment I made to this gentleman when I met him was that we had done studies on the effects of thermonuclear weapons on people, and if they are unprotected it doesn't make any difference in the casualty estimates whether they have high morale or not.

I would also tend to discount the criticism that civil defense is an unwarranted incursion of militarism on civilians. It can, indeed, bring into the home the fact that war can occur. In that sense it is a militarization of civilian life, but to such a mild degree that I don't think anybody has a right to object to civil defense on these grounds. We are in a situation much less militaristic than that of the pioneer. He had to carry a gun because the Indians might attack him. If the facts of life call for it, we Americans must be willing to accept this sacrifice in the same way we have accepted conscription, the draft, and high budgets. The only way to get these new attitudes across is for the people in charge to be very clear on what civil defense does and does not do for us. They must explain why these other attitudes are inappropriate even though the explanation will arouse some hostility toward the person giving it. Creating the appropriate attitudes toward civil defense is of tremendous importance, and the attempt should be properly supported. We will not get adequate support as long as people misunderstand why it is that they should support civil defense.

However, the most important thing that civil defense needs in the public relations area is an objective capability in being. I would feel very bad if anybody said, "Since we have got to change attitudes, and do research,

let us postpone obtaining a capability in being. Let us do the other things first." This is not the attitude in any other military field. People do not wait for more research before procuring a minimum capability in being, and for both objective and psychological reasons civil defense needs a minimum capability more than most programs. Let me comment on the latter. As a result of past neglect a set of attitudes has developed that what we are really trying to do is get the ability to have something on which to build. We are always building for the future and, of course, that future never comes. I think nothing would do workers and planners more good in terms of interest, hardheaded work, stimulation, and serious consideration of what the problems are than to make it clear right now that we intend to procure a capability that can save 10 million or 20 million or 50 million lives under some reasonable circumstances, and that we want this capability fast. It is true that these circumstances may not be the most important, but they still can happen. Therefore, we will have something which is worth having because it really will make a difference to the survival of this nation under certain circumstances which can occur.

There are at least two kinds of programs which are of special interest in this connection. One is exactly the program the administration is establishing. That is, to identify, count, label, and make plans to utilize existing protection so that those people who are not in target areas can in fact have their lives saved as far as fallout goes. Now, it is true that this could mean that people will have to move in toward cities and thus make a better target for any enemy that wishes to aim at cities. There are reasons why he might not. In any case, in most situations trying to use the fallout protection in cities will not increase the number of deaths very much when the attacker is trying to kill people, and it does decrease the number of deaths enormously in the other cases.

The second kind of program could be called an improvised program. It would be useful in the event that something happened which scared the nation. It is almost identical with a part of the Soviet program, only done more intelligently. Leon Gouré has testified that Russia plans to build much of its fallout shelter after a threatening situation is declared. I would guess that if this country spent a mere $10 million to $20 million on plans and preparation for such improvisation on a week's notice during eight or nine months of the year, it could put 95 per cent of the people in a place of relative safety. This could be done by moving them out of the towns and cities to country areas, and building protection for them as we move them.

One can improvise protection. For example, if the worse came to worse, one could dig a foxhole in 24 hours and it could be lined with doors from nearby buildings. The reason this is an eight- or nine-month system is that without elaborate and expensive preparations it would probably not be possible in the winter months to accomplish the movement and improvisation with only a week or so of warning.

While the above can be done cheaply we want to do better than this. I would also guess that it would cost a great deal to improve this performance in terms of both having a year-round capability and decreasing the necessary time. In any case, these possibilities should be studied in a serious way. It is one of the things we don't usually study because we are so bemused with this image of a war in which the Soviets strike out of the blue at civilians and we get only 15 minutes of warning, or less. This is the only case we tend to look at with any intensity. I would suggest that the threatening situation in which people evacuate from cities, because they are afraid to stay there any longer, is just as important as a strike out of the blue. Possibly it is more important.

This case of adequate warning has the enormous advantage of being easier to prepare for than the surprise attack and, as far as civil defense is concerned, is probably as important if not more important. This is another place where we could easily be in business in a serious way without the expenditure of much money.

If we implement specialized programs for specialized situations we should not fool ourselves that we have a complete program. We will still have only a very incomplete program. We ought to be able to protect people reasonably adequately under a large range of circumstances. The only worthy objection to this argument that I know of is the arms-race and stability question. In my opinion, an opinion shared by a lot of people, these arguments would have great force only if we tried to do the program on a crash basis, spending, say, $5 to $10 billion a year. The way to develop this program is to do it gradually and accept the disadvantages of a gradual approach.

We will, of course, never restore real safety until we control weapons throughout the world in some reasonable way.

CHAPTER 5

A PURE THEORY OF DEATH: DILEMMAS OF DEFENSE POLICY IN A WORLD OF CONDITIONAL VIABILITY

Kenneth E. Boulding
The University of Michigan

Death as a System Boundary

Death is a subject which is more often associated with the macabre half-light of Gothic fancy than with the sunshine of reason, science, and general systems research. It is, however, a phenomenon which is common to many systems and there is no reason why it cannot be examined in the light of systems dynamics. It may be defined as a system-break or a point of no return in the dynamic course of a system. It is a semi-permeable boundary around a system which has the property that it can be crossed from the inside to the outside but cannot be crossed from the outside to the inside. When the dynamic course of a system carries it beyond this boundary, therefore, it can never return. The system is excluded forever from the old paths.

Death may be followed by transfiguration or it may not. A system that crosses a death boundary may reform itself within another boundary. Sometimes, however, a system passes the irreversible boundary into sheer disintegration and nothingness. This raises, of course, the ancient conundrum about when is a system not a system, when does a set of variables in the course of their dynamic development stop being System A and start being System B. I doubt very much if any answer can be given to this question in logic; it can only be given in experience and in utility. We divide the great system of the universe into sub-systems such as people, animals, plants, things, and organizations--largely for our own convenience and because it pays us to do so. I shall argue that there is nothing wrong with this although it may seem untidy to the pure logician; there is nothing wrong, that is to say, with the payoffs of arbitrary classification, provided they do not turn out to be a cheat and disappointment. I will take, therefore, a fairly naive view of the universe as consisting of a large number of reasonably identifiable sub-systems, the boundaries of which I shall derive from experience rather than from logic.

The poetic images of death give us an important clue to its ubiquity as a systems phenomenon. A pitcher goes to the well once too often and is

shattered; Humpty-Dumpty falls from his wall; and all the king's horses and men cannot put him together again. A clock stops; a flame is blown out; all these events are simple models of death at low systems levels. A static pattern like a china vase exists through time until some point where too great a strain is put upon it and it disintegrates never to be reassembled. A simple cyclical-mechanical system like a clock endlessly repeating a pre-ordained cycle may stop because one small link in the causative chain is broken, and to start it again requires the incursion of a much more complex system in the shape of the watchmaker. All clocks left to themselves eventually stop. This is a consequence of the great and universal law of increasing entropy. If they are to be restarted, entropy must be diminished from outside. The flame is a still closer analogue of life. It is one of the simplest of the open systems; it is a system, that is, with a role structure. At each point in the flame, there is a chemical state which can well be described as a role. The molecular occupants of this role are continually passing on to the state immediately above and are continually renewed from the state immediately below. An open system is a system in which a given structure is maintained in the midst of some kind of a through-put of role occupants. When the flame is out, the role-structure disappears. The candle and the oxygen may still be there, but the temperature is not high enough to maintain the role-structure of the flame. There is a physical boundary here within which the flame can exist and outside of which it cannot exist. The candle may be burnt out; that is, the food supply which provides the molecular occupants for the first roles in the system may disappear. The waste products may accumulate to the point where the last molecular occupants of the last role cannot leave it, and this stops the flow of material through the system. The surrounding temperature may be reduced to the point where the chemical reactions which sustain the system can no longer be carried on. This is what happens when we blow out the flame. In any case, once a flame is blown out, it cannot reestablish itself. The system has passed a one-way boundary through which it can never return under its own dynamic. If the system is to be reestablished, it must be through the act of some outside system. Usually energy must be supplied to the system, although in some cases the reestablishment of a system may involve the withdrawal of energy. In all cases entropy must be withdrawn from it, and organization supplied.

Life as a Homeostatic System

The taxonomic boundary that separates non-living from living systems is perhaps hard to draw, as a fine line. We do not have to cross very far over it, however, before we are aware that we are in a new country and in a new type of system. It is the peculiar characteristic of life, as Schroedinger has said, that it feeds on entropy. The flame cannot defend itself against the wind. If it dies, it can only be reestablished from outside.

A living system, by contrast, is capable of at least nimimum defense against its environment. It exhibits, that is to say, the phenomenon of homeostasis. Homeostasis is something a little different from mechanical equilibrium (of which it is the Greek translation). In a homeostatic system, information begins to play an essential role. Because of this, homeostatic systems are self-sustaining in a way that mechanical systems cannot be. If a clock runs down, it has to receive energy from outside; if it breaks, it has to receive organization from outside, that is, negative entropy. A living system is not passive in regard to its environment; it goes out and seeks sources of energy, and because it has information as an essential element it can create organization within itself. When a candle is burned out, the flame simply comes to an end: it does not wander around the room looking for a new candle. When even the simplest living thing is hungry, it seeks food. It does not simply maintain itself passively as an open system. When its open system is threatened, either by the absence of inputs or the inability to get rid of outputs, it indulges in at least scanning or seeking behavior in the endeavor to find a new environment in which it can survive.

Four Degrees of Homeostasis

We may distinguish perhaps four kinds of homeostasis. We have first, the homeostasis of a state, cybernetics. This is a type of system, of course, which extends below the threshold of life and there are many examples of non-living cybernetic or control systems of which the thermostat is the most often cited. Even non-living cybernetic systems, it should be observed, involve information as an essential variable. They must have the following components: (1) An ideal state of the system (the temperature at which the thermostat is set); (2) a receptor, that is, an apparatus for perceiving the actual state of the system and recording the divergence between the actual and the ideal states (the thermometer); (3) a communication system which can communicate the information acquired by the receptor (2), and (4) an executive or decision-maker who can interpret this information and transform it into instruction to (5) an effector (the furnace) which can effect the environment. All living organisms and all social organizations exhibit a great variety of these cybernetic or state-maintaining systems, and a great deal of behavior, although by no means all of it, can be explained by cybernetic models.

The second aspect of homeostasis is role-maintenance, that is, the maintenance of an occupant in each role of the system. The simplest level of an open system is one in which we have a structure of roles, holes, or slots in each of which is some kind of occupant, and which are connected by lines of transportation along which occupants can move. In a simple, one-way open system, each role is connected by a line of transportation to some role below and to some role above. As the current occupant of the role passes to the role above, a new occupant must be received from the role below. In the flame, the gases pass from one chemical zone to the one immediately above it and

each zone receives the appropriate molecules from the one below and passes them on to the one above. In the river, another interesting example of a non-living open system, each segment of the river receives water, gravel, sand, vegetation and fish from a segment immediately above, and passes similar items on to the segment immediately below. In a university, sophomores become juniors and are continually recreated by freshmen. In any self-maintaining organization, a job which has become vacant either because of death, removal, or promotion of its occupant has to be filled either from another position in the organization or from the outside. At the simple biological level, as we have seen, such phenomena as hunger and thirst, and from the point of view of the species, sex, can be regarded as role-maintaining activity. In an industrial organization, the personnel office is the role-maintaining organization at lower levels; at the higher levels of the organization, the peer group tends to be the role-maintaining apparatus. The self-perpetuating board of trustees is, of course, the ideal type of the role-maintaining peer group.

A third and still higher organizational level of homeostasis might be described as "maintenance-maintenance." This is the apparatus for maintaining the role-maintenance apparatus itself. Thus, at the biological level, food-growing can be thought of as maintenance-maintenance, whereas mere food-seeking is role-maintenance. The food-grower sees to it that there is a supply of food for the food-seeker to find. Food-growing clearly represents a higher level of organization than mere food-seeking, and it is no accident that food-growing, that is, agriculture, signalized the passage from pre-civilized societies to civilization. The movement from civilization to post-civilization through which we are now passing reflects perhaps a fourth degree of homeostasis, in which, for instance, scientific research enables us to grow more food more easily and so support a still higher level of organization. Scientific research then is seen as the maintenance or even the improvement of the maintenance-maintaining activity.

Organizations as Defense against Death

It is not unreasonable to think of these increasing degrees of organization and homeostasis as successive levels of depth in defense against death. The flame has no defense against death. If its environment changes to the point where it goes out, it simply goes out. A simple cybernetic system has some defense against changes in the environment. When the weather gets cold, the furnace works harder, and the temperature of the house is maintained. Cybernetic systems, that is, build little islands of stability in a changing world. Even at this level, we can perhaps distinguish between two systems of defense which might be labeled "flight" and "fight." In flight, a worsening of the immediate environment which is perceived as dangerous is followed by a removal of the system to a new environment. If the system has receptors which inform it as to whether the environment is getting worse or getting better, and if there is a continuous field of more or less favorable

environments, this procedure can be quite successful. The snake, who is too hot in the sun, for instance, will crawl into the shade. In cold weather he retreats into the warmer ground. By contrast, the so-called warm-blooded animals maintain an internal environment which is in a degree independent of the external environment. When the external environment worsens, they do not necessarily flee (although in practice fight and flight responses are frequently combined), but they put more energy into the system in order to maintain a favorable internal environment even when the external environment is unfavorable. When we get cold, we burn more fuel, we insulate ourselves, our teeth chatter, we become more active, and so on. When we become hot, we perspire, we relax, we seek the shade, and so on. Similarly, the firm which finds itself in an increasingly unfavorable market environment--which finds, for instance, its inventory of product accumulating or finds that it cannot sell its output except at a loss--will develop new forms of activity. It may cut back its output; it may go in for price-cutting; it may go in for a sales campaign; it may even merge with another firm. All these are possible defenses against its death, that is, the dissolution of the organization.

The Theory of Conflict and Viability

Up to this point, we have assumed that the state of the organization is simply part of a generalized state of nature, and that the defenses against death are defenses against the "worsening" of an abstract external environment. We must now move one step towards reality and suppose that the environment includes other organizations or organisms. The system then becomes much more complex, since we now have a system of interaction among organisms. The defenses against death then involve not merely defenses against a worsening external environment, but defenses against other organisms. We now move into the theory of conflict, in which death may be the result of a loss of a conflict or of the dominance of one party over another. This is the system, of course, which is of peculiar interest from the point of view of national viability or national defense. It is derived largely from the economic theory of duopoly or oligopoly.

I have developed it in some detail in my book entitled Conflict and Defense (Boulding, 1962), and I shall only summarize it here. The essential concept is an undefined variable which I call simply "strength." The only significance of this concept for the pure theory is that it serves to define the dominance relationship. One of the systems is said to be dominant in any part of the field in which its strength is greater at that point than the other party. To fix our ideas and to bring us closer to the problems of the day, let us suppose that the systems are two nations and that they exist in a geographical field. For purposes of simplicity, let us suppose that this is a straight line. The two nations are located at A and B in Figure 1. For each nation, we postulate a strength function over the field, represented by FHG for A and LKM for B. As we have drawn these functions in the figure, we have supposed

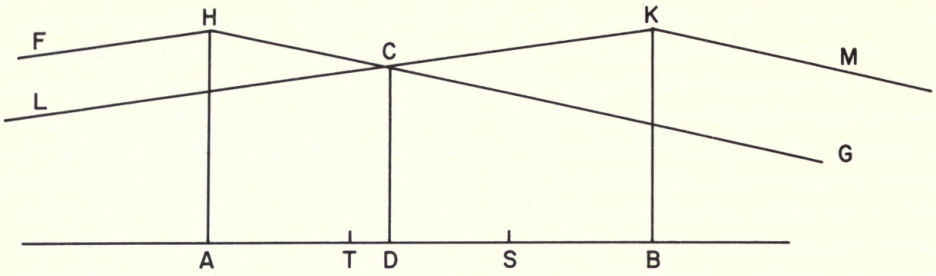

Figure 1. Areas of Dominance and the Boundary of Equal Strength: Unconditional Viability

that the maximum strength for each nation is at its home base. This is a reasonable but not a necessary assumption--that the strength of each nation is the greatest at is home base but declines as it goes away from home in any direction. The point of intersection of the two strength functions at C, is the boundary of equal strength D. Anywhere to the left of D, A is dominant, anywhere to the right, B is dominant. The situation of Figure 1 is what I would describe as mutual unconditional viability. Each party is dominant in its own territory and neither can destroy the other.

Consider, however, the situation of Figure 2. Here nation A is dominant over B at all points in the field including B's home base. Assuming

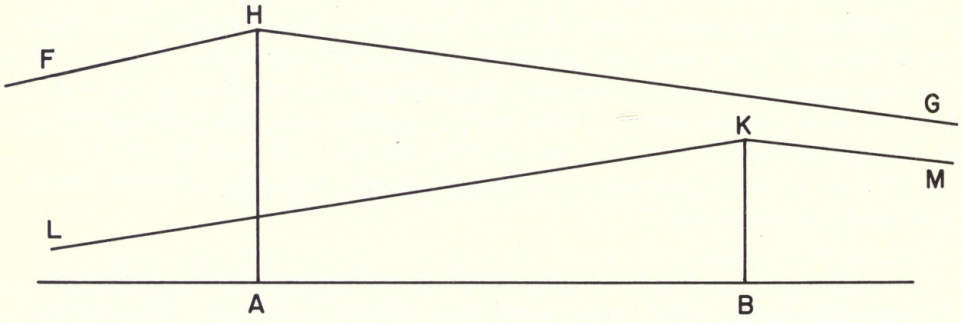

Figure 2. Conditional Viability

that dominance implies the ability to destroy, then I would say that in this case, B was only conditionally viable. The condition here is that A is unwilling to use his power to destroy. Here we may distinguish two further sub-cases. If A has the power to destroy B, but it is not to A's interest to do so, we may call this secure conditional viability. If A has the power to destroy B and it would be in its interest to do so, but for some reason or other, either through ignorance or sheer lack of imagination, it refrains from doing so, this might be described as insecure conditional viability.

Consider now the extraordinary case of Figure 3, in which the strength of each country increases as it goes away from home. Here B is clearly

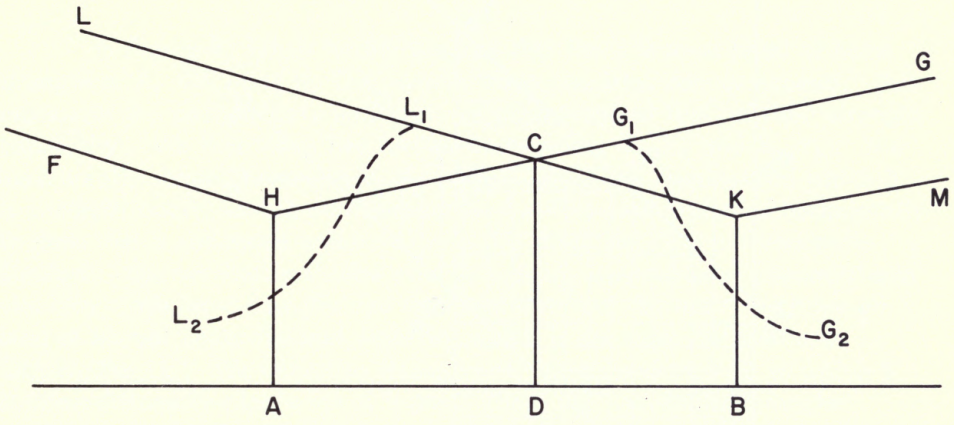

Figure 3. Mutual Conditional Viability

dominant over A to the left of D whereas A is dominant over B to the right of D. That is to say, each country can dominate the other one at the other's home base. This is what I would call mutual conditional viability, for each country can destroy the other. This is the sort of situation that we are moving to very rapidly on a world scale, if indeed we have not already arrived there.

In the case of military defense a further complicating factor arises. War may be defined as men throwing things at each other with malicious intent. In this kind of system, the range of the deadly missile is a variable of great importance. Thus, to return to Figure 1, if the range of the deadly missile is equal to AT or BS, the countries would still be unconditionally viable because each can dominate an area beyond its home base equal to the range of the deadly missile. If, however, we suppose the range of the deadly missile increasing, shall we say to AS (= BT), the situation reverses itself. Under these circumstances, neither country can dominate an area beyond its home base equal to the range of the deadly missile and neither of them, assuming that the missiles exist, is any longer unconditionally viable. If, under these circumstances, both had the deadly missiles, we have a situation which is known as deterrence, which is also roughly where we are today.

If the strength functions are linear, they can be described by two very important parameters. One is the home strength, AH or BK, that is, the strength at the home base. The other is the loss of strength gradiant, that is, the slopes of the lines HF, HG, LK, and KM. With this simplification,

we can now relate the viability conditions to the home strengths of the two nations concerned. Thus, in Figure 4, we measure the home strength of A

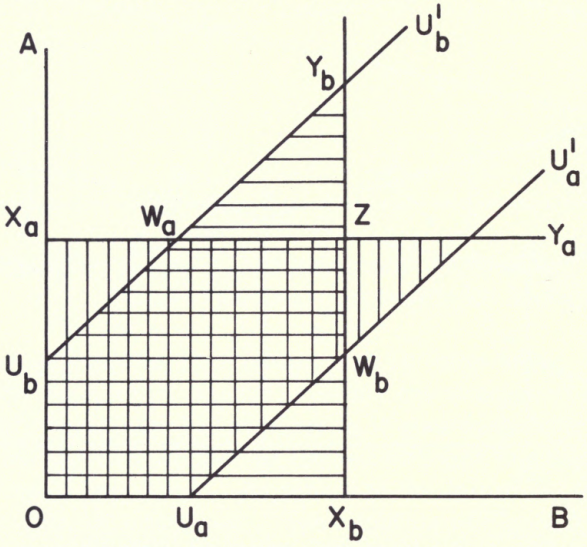

Figure 4. The Unconditional Viability Boundaries

along OA and of B along OB. Referring now to Figure 5, we see that if A's strength function HG passes through K, B is only just unconditionally viable.

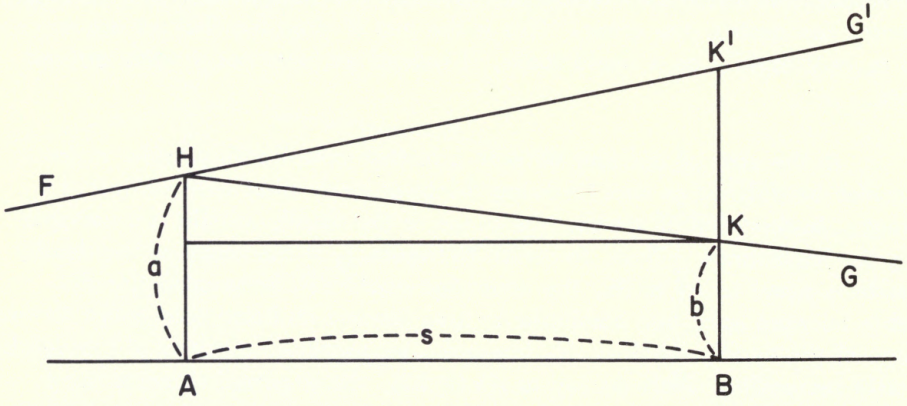

Figure 5. Situation on B's Unconditional Viability Boundary

This condition is expressed by the equation a - b = cs, where a and b are the respective home strengths, s is the difference between the nations (equal to AB) and c is the loss of strength gradient or the slope of the line HK. In Figure 4, this is the equation of the line $U_b\ U'_b$. This is an unconditional viability boundary for B. At any combination of home strengths above and to the left of this 45° line, B is no longer unconditionally viable because A can dominate him at its home base. That is, we have a condition like Figure 5.

Similarly the line $U_a U'_a$ is the unconditional viability boundary for A corresponding to the equation $b - a = cs$. This would be the situation in Figure 5, where BK' was the home strength of B and AH the home strength of A.

In Figure 4, let us further suppose that there is some level of home strength of A, OX_a and B, OX_b which these countries cannot exceed. This represents the economical, political, or psychological limit of their strength capability. We then have two further boundaries, $X_a Y_a$ and $X_b Y_b$. The horizontally shaded area $OU_b Y_b X_b$ is that part of the field within which B is unconditionally viable with respect to A. This area is shaded horizontally to show that B can move unilaterally in this direction, but not vertically. Similarly, the vertically shaded area $OX_a Y_a U_a$ is A's area of unconditional viability. We have now divided the field into four regions. We have an area of mutual unconditional viability which is the cross-hatched area $OU_b W_a Z W_b U_a$. We have two triangles, $U_a W_b X_b$ and $W_a Y_b Z$ in which B is unconditionally viable but A is not. There are two similar triangles vertically shaded in which A is unconditionally viable and B is not. Then there is the unshaded area of the field in which neither country is unconditionally viable, and we have mutual conditional viability.

Remembering now that $OU_b = OU_a = cs$ in Figure 4, we can see immediately the effect either of a decline in the loss of power gradient c or diminution of the distance between countries s or, more exactly, a diminution of what might be called the effective distance, which is the distance between them minus twice the range of the deadly missile, or the distance TS in Figure 1. Any of these things moves the lines $U_b U'_b$ and $U_a U'_a$ closer together in Figure 4, diminishing the cross-hatched area or the area of mutual unconditional viability. By the time either c or s reaches zero, the area of unconditional viability has been eliminated. This, again, I would argue, is close to the condition that we face today.[1] It is easy to develop variations on Figure 4 with different assumptions about the viability boundaries. The maximum home strength of each country, for instance, may be a function of the home strength of the other, in which case the lines $X_a X'_a$, etc. may bend toward or away from one of the other axes. None of these various cases, however, destroys the fundamental conclusion regarding the systems-effect of a decline in the loss of strength gradient or an increase in the range of the deadly missile.

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[1] If r is the range of the deadly missile, the unconditional viability boundaries are $a-b = cs - 2cr$, and $b-a = cs - 2cr$. An increase in the range of the deadly missile therefore diminishes OU_b or OU_a in Figure 4 by twice the increase in range.

Viability in the Interpretation of History

These models may seem abstract, but they imply a whole interpretation of history, and, in particular, they imply a conclusion about the nature of the present crisis which is both startling and is certainly not generally accepted. The interpretation of history is that with each diminution in the loss of strength gradient as a result of improvements in methods of transport and as a result of a continual increase in the range of the deadly missile, the size of the unconditionally viable unit has been continually growing. We have now got to the point where the range of the deadly missile is close to 12,500 miles. This is the end of a long historical process. Unconditional viability has now disappeared from the earth. If we think of unconditional viability as the essence of what might be called the classical system of national defense, we can put the matter even more strongly by saying that the system of national defense has now come to an end. It has been succeeded by a quite different system which is the system of deterrence. This is, unfortunately, a system which is only metastable. It is stable for small disturbances, but not for large, like Humpty-Dumpty on the Wall. Unfortunately, also, there is no guarantee that disturbances will not be large enough to upset Humpty-Dumpty and then all the king's horses and men will never put him together again.

I think it can be demonstrated historically that where unconditional viability has disappeared in any human or organizational relationship, the system of deterrence which has succeeded it has turned out to be so disagreeable and unstable that the system has always either fallen back into defense, that is, into unconditional viability, because of some regression in technology, or else it has gone forward into a system that might be called community. This has been true, for instance, in the field of personal combat. We have achieved personal disarmament not by any agreement--the American constitution, indeed, explicitly guarantees the individual the right to bear arms--but by a disarmament race, initiated unilaterally by individuals because of the sheer personal danger of living under a system of deterrence. Unconditional personal viability disappeared with the crossbow and was completely finished off by the revolver. If anybody seriously wants to kill me, there is practically no way in which I can stop him. There is, perhaps, a certain second-strike capability in the hands of the law, but certainly not in my hands, as I know of no way of killing a man after I am dead. But even the operation of the law is highly uncertain, and it is doubtful whether it acts as much of a deterrent. It certainly does not succeed in preventing homicide, although it does perhaps succeed in limiting it. We have now arrived at the same condition of conditional viability in regard to the relation of nations to which we have long been accustomed in the relation of persons. Unconditional viability has disappeared, and with it the whole classical concept of national defense. Unless we can go forward into world community, we are almost bound to slip back. The only way to go back to national defense, however, is through a widespread technological collapse as a result perhaps of a nuclear war.

Adaptive Systems Survive Periods of Transition

The moral of all this rather abstract argument is that we live in a time of history of quite unprecedented system-change. The only period in history which remotely approaches what we are now going through is the transition from pre-civilization to civilization which began about 3000 B.C. In periods of very rapid change, it is the adaptive systems that survive rather than the simple equilibrium systems. The difference between these is illustrated in Figure 6. Here we suppose that each point in the plane of the

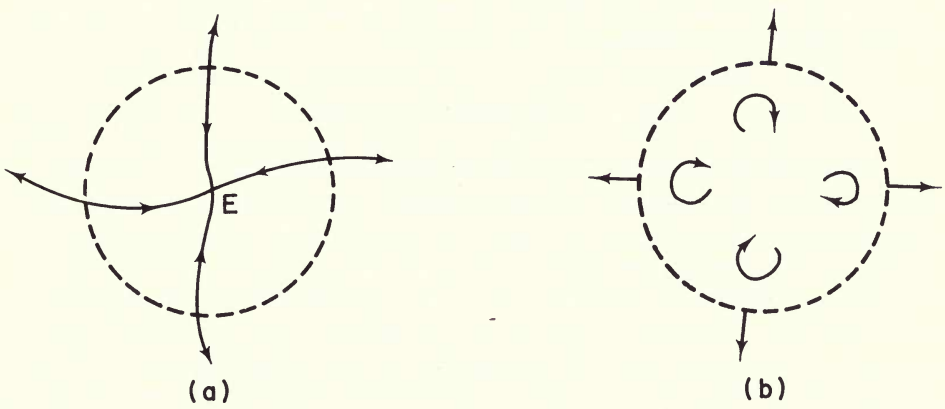

Figure 6. Adaptive Systems

paper represents a different state of some system or organization. In each case, the heavy dotted line represents the "death boundary." Within it, all the points represent the states in which the system is viable. Outside it, the system is not viable and will disintegrate or be transformed. The lines with arrows represent the possible dynamic paths of the system. In Figure 6a, which is an equilibrium system, all the dynamic paths lead to an equilibrium system at E, within the death boundary. As long as E is within the death boundary, that is, in the viable area, the organism will survive indefinitely. If, however, the death boundary shifts so that E is no longer within the viable area, the organism has no defenses against this shift and will not survive.

In Figure 6b, we see by contrast an adaptive system. Here, as the dynamic course of the system turns it toward the death boundary, this fact is "perceived" and forces are brought into play to turn the system away from it. There may or may not be a single position of equilibrium within the death boundary. This does not matter, however, as the system is defended against passing the death boundary by its adaptive nature. If there is a shift in the position of the death boundary, the system perceives this and adapts accordingly. A good example of an adaptive system would be a man in a car driving towards a railway crossing with a red light flashing. His behavior and the

resulting motion of the vehicle is a function of the distance between the vehicle itself and the perceived death boundary. An equilibrium system by contrast would be a vehicle proceeding at a constant rate of speed no matter whether the danger signals were flashing or not. Clearly, the more rapid the rate of system change, the more important it is for a system to be adaptive to survive. In the relatively stable world and in a relatively stable environment, equilibrium systems may have high survival value. They may indeed be better adapted to a particular stable environment than an adaptive system would be, for we almost always have to pay a certain price, in complexity if nothing else, for adaptivity. In the rapidly changing environment, however, equilibrium systems are continually finding themselves outside the viability zone and they have no recourse against this disaster.

The Crisis of National Defense

With these considerations in mind, let us take a look at the present crisis of the system of national defense. I have argued that we are here facing a true system-breakdown in national defense, in that no nation is now unconditionally viable, and national defense implies a world system in which unconditional viability is possible. There are several possible adaptations to this situation. We may attempt to restore unconditional viability and the system of national defense. Two approaches are generally suggested to this problem. One is arms control, world organization, and the elimination of war as a social system. The other is the development of defensive weapons or other defensive apparatus to reduce the strength of the potential enemy in the neighborhood of the home base of the defender. Let us suppose that in Figure 3, by defensive measures, we could lower the strength-line KL to KL_1L_2 and the line HG to HG_1G_2. Unconditional viability has now been restored, for each party is stronger than the other at home, provided that the defensive measures are not so expensive as to destroy the internal viability of the nations concerned. This, in essence, is the theoretical base of those who would argue that we should go underground in the face of a nuclear weapon. The feasibility of this proposal is partly technical, partly psychological and ethical. I am no expert in the technical feasibility of these proposals. I am, however, highly skeptical about them, even if they are technically feasible, for the price of defense under these circumstances seems to be absurdly high. Furthermore, if there are any lessons from history, it is that defensiveness of this kind is always obtained at an extremely high cost, especially in mobility and other forms of adaptiveness. Neither the turtle nor the knight in armor ever got very far, and though the tank had a brief success, its day seems to be over. The truth seems to be that the concentration of effort on defensiveness in this sense, that is, on city walls, Maginot lines, armor plate and civil defense, either is inimical to survival or, if it succeeds, succeeds only at a fantastically high cost in terms of the nature of the organism which is defended. If the continuance of the system of the sovereign national states implies that we shall all live on algae in caverns, then I say, "To hell with it." There

must be better solutions to the problem than this.

The anti-missile missile represents a variant of the above case. This might be called the defensive-aggressive weapon, or the interceptor which is designed to destroy the enemy's deadly missile before it reaches its target. Here again, I cannot judge the present technical feasibility of such systems. I may be permitted, however, to express extreme skepticism about them. There is a profound tendency for defensive measures to become obsolete, and for offensive weapons to outrun them. The deadliness of the nuclear weapon is so great that I shall be extremely surprised if any defense for it is ever found. Just as firearms destroyed armor, and the revolver led to personal disarmament, now I suspect the nuclear weapon will likewise lead to the destruction of national sovereignty and to world disarmament. The final answer to those who advocate the practicability of nuclear war seems to me to lie in the purpose of such a war, which is to restore the system which produced it! If the price of national sovereignty is a nuclear war every generation or so, again I say," To hell with it," for the loyalties on which national sovereignty depends will not stand up under these circumstances. The best form of loyalty to a hopelessly insolvent organization is to bankrupt it as soon as possible so that it may be reorganized into a viable form.

The Necessity for Adaptive Conflict Control

The world system in which we now live has a positive probability of nuclear disaster built into it, and though we do not know how great this probability is, it is certainly of an order of magnitude to be seriously disturbing, even if it is only one per cent per annum. Under these circumstances, it is desperately necessary to develop adaptive systems, especially adaptive social systems, which can diminish and rapidly eliminate the probability of this disaster. The attempts to build equilibrium systems of defense on stable deterrence seem to me to be doomed to failure. The world changes too rapidly and, as we have seen, it is the adaptive system, not the equilibrium system, that will survive under these circumstances. The adaptive system which is required here is a world system of conflict control. By this I mean social institutions which will be able to detect the dynamics of conflict situations and will be able to throw in counterweights, or countervailing forces, which will prevent these systems from reaching the crisis point of system-breakdown into overt violence involving the use of national armed forces. Such institutions already exist on the national level. In the less-developed countries this may take the form of conflict-suppression rather than control, which is dangerous in the long run. In the developed countries we have an extremely elaborate set of social institutions--the law, the courts, the regulative agencies, collective bargaining, arbitration, and so on--all of which are designed to divert conflicts into peaceful channels and to diminish the reactivity of conflict processes. At the world level, we have the beginnings of such institutions but they are not yet adequate, and we do not even

have the information institutions which will warn us when we are approaching a system boundary. We desperately need something which will be the equivalent of national-income statistics in the field of international tensions. As it is now, we often do not know what is happening until it is too late. We should ask ourselves, for instance, by what world institutions could we have dealt with Hitler, and this, incidentally, is a most unusual and unlikely case which may not occur again for a thousand years. We must then seek to build these institutions and put our major efforts in this direction.

The Armed Forces as Destroyers of Defense

There are, of course, even more urgent tasks than the development of the long-run institutions of conflict control. My personal view is that the armed forces of the world have become a social system almost completely divorced from the states which they ostensibly defend and which pay for them. They have become a highly reactive dynamic and isolated social system and it is, paradoxically, the armed forces themselves that have destroyed the system of national defense which they are supposed to embody. Under these circumstances it is an urgent task to build organizational ligaments between the armed forces of the world. I have argued elsewhere that, just as we resolved the religious question by the ingenious device of separating the church from the state, to the great mutual benefit of both parties, so we must solve the question of war by the separation of the armed forces from the state. In this case, however, the armed forces will wither away unless they can find other functions, for an armed force is one organization which has no justification apart from the existence of another organization of like kind. It is this which makes the interaction of the world armed forces a unique social system.

The bargaining problems involved in this movement are difficult, but they are not insoluble; this, however, would have to be the subject of another paper. In the meantime, we must exploit and strengthen all the tacit agreements which we have. Bargaining is not necessarily a matter of explicit agreement. Most of the important bargains of social life are never made explicit, and many of them are even unconscious. The tacit "agreement" that we have with the Russians to do nothing really serious about civil defense, for instance, is an extremely important element of the stability of the present situation, as Schelling (1960) and others have observed.[2] If either side breaks

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[2]The incredibly dangerous situation which resulted from Kennedy's civil defense program of late 1961, the quiet sabotage of this program by the good sense of the American public, and the inability of Leon Gouré to persuade us that mysterious doors in Moscow subways constitute a civil defense program appropriate to the nuclear age are all tributes to the stability of this "agreement," even though it may rest on little more than mutual inertia.

this, the results might be disastrous for all. Tacit agreements, however, are somewhat insecure, and there is much to be said for trying to reinforce them with explicit agreements, as long as the attempt to write explicit agreements does not destroy the tacit.

The Price System as an Adaptive Mechanism

In the present state of the world, one must look not only toward the postponement--one hopes the indefinite postponement--of disaster; one must also look beyond disaster. We should certainly give thought to the nature of the adaptiveness of the social and economic system to recovery from a nuclear disaster. We may face a certain dilemma in that activity which is directed towards more rapid recovery from a disaster may make that disaster itself more probable, just as insurance probably increases the number of fires. For the most part, however, I am optimistic enough to think that some measures which would make for recovery from disaster would also postpone it, or at least would not make it more probable.

The major victim of a nuclear disaster is likely to be large-scale organization of all kinds, private or public, as the central offices and records of large-scale organizations are almost all concentrated in large cities. Some relatively simple measures, however, in the way of the establishment of a monetary system, of some form of quick allocation of the equity in the remaining property among survivors, and of a minimum of law and order, would be sufficient to set in motion a rapid process of recovery. The system of private enterprise is peculiarly well adapted to such a situation. Even Communist Russia, for instance, had to adopt the New Economic Policy which involved a partial restoration of private enterprise in the 1920's after an extensive economic collapse.

The extraordinary recovery of West Germany from the holocaust of the second World War is a good example of the adaptability of systems of this kind, and their remarkable powers of recuperation. Such a system, of course, requires a certain minimum of government. It requires a reasonably stable monetary unit, and it requires reasonable security of property. Once these are assured, however, the price-profit system has extraordinary powers of regeneration and recuperation. Even though a nuclear war, for instance, would see the United States with an extreme maldistribution of resources, with far too much in agriculture and not enough in manufacturing, provided that the holocaust led to a considerable collapse of restrictive and regulative government institutions, recovery should be swift. If a price system can be established, agricultural prices and incomes would fall very low and there would be a very rapid migration out of agriculture into construction and industry. Very large payoffs would appear at the places in the society where they were needed, and resources would move accordingly. Recovery might even be assisted by the destruction of much of the apparatus of the Federal

Government, or at least of its past laws, which on the whole would prevent adjustment and strangle developments under these circumstances.

Learning to Live with Conditional Viability

Even though I have a good deal of confidence in the adaptiveness of the social and economic system, I have very little confidence in the adaptive nature of the national state, and it is this institution which I think is really threatened by the existing technology. No national state, not even the United States or the Soviet Union, can guarantee to its citizens that minimum area of peace and security which alone can justify its sovereign existence. The political organization of the world is bankrupt. It is as obsolete as the sword. Unfortunately, we have no social institutions for bankrupting it decently and quietly, and for reorganizing it in a more stable and more satisfactory form. The present system is, I think, almost certain to end in catastrophe. The question remains, then, do we change the system before catastrophe or after it? If we prepare to change it before, we may be successful, in which case the catastrophe will be avoided. But even if the catastrophe is not avoided, preparation to change the system will bear fruit after the catastrophe, if this is not wholly fatal to mankind. It is the great genius of man that he is able to anticipate catastrophe in his imagination. He develops early-warning systems that warn him when he is approaching the cliffs. It is hoped that we can still do this in the crisis which now confronts us.

The problem is essentially one of learning under conditions of very rapid system-change. There is no doubt that this learning is going on. The Krushchev doctrine of peaceful coexistence, incompletely thought out as it is, represents a very fundamental learning process within Marxism. Our own ideology is not so explicit, but still one can detect in our actions a certain learning process. The crucial question is, "Will it be rapid enough?" At the present time, the mass of the American people, and to a large extent what might be called the "establishment," still have an image of the world which is fundamentally obsolete. It is an image of the world in which national defense and unconditional viability still exist as they did for the United States before 1949. Among the more sophisticated, the realization is spreading that we have suffered a system-change, and that we must adapt our behavior accordingly. In particular, we must learn to live with conditional viability if we expect to survive as a society. This means a national posture very different from what we have been accustomed to in the past. It is a posture, however, which is not wholly alien to what is best in our tradition. It may be that in this day the ability to survive and to avoid the impending death of our society may depend upon our ability to learn certain skills which have long been preached but very little practiced--the skill, for instance, of loving our enemies, of saving our life through being willing to lose it, and of being meek, adaptable, and teachable. These, I think it can be shown,

are the skills that lead to survival in an age of conditional viability. They are skills that we have not taken seriously. We have regarded them as platitudes and preachments. In the past, on the whole, we have relied on unconditional viability and national defense, and we have gotten away with it. Now, I suspect, we can get away with it no longer. We must unlearn the lessons of experience; the payoff function has changed and we had better find this out before it is too late.

My final plea, therefore, is that we correct a massive misallocation of our intellectual resources. We put most of our resources into the study of physical and biological systems, but very little of the study into social systems. It is here, however, that the problems lie. We have now got to the point, I believe, where major efforts in this direction would not only have a very high rate of return in terms of sheer dollars and cents, but might make the difference between life and death for our system. We can no longer rely on the machinery of state-maintenance, role-maintenance, or even maintenance-maintenance to defend us against death. We must go to the fourth level, the level of the metatask. We have spent too much time and energy in trying to find the best way of doing things that should not be done at all. We must now put a major effort in finding those things which should be done and which must be done if we are to survive.

PART III

THREE CONCEPTUAL APPROACHES TO CIVIL DEFENSE

CHAPTER 6

PUBLIC APATHY TOWARD CIVIL DEFENSE: A CASE OF ANXIETY

Jum C. Nunnally
Vanderbilt University

There are three principal reasons why I am considering the topic of civil defense. First, as a citizen I am very much concerned with the perils of our time, and like any other citizen I would do whatever I could either to help win the Cold War or, better, to help thaw out the present dangerous antagonism. Second, as a psychologist, I believe that there is much that the behavioral sciences have to offer in girding the nation for defense and in insuring a peaceful world for our children. Third, for over six years I studied a social issue which has a number of features in common with civil defense: public reactions to mental illness (Nunnally, 1961).

This paper is primarily concerned with how the public is reacting to civil defense--what it knows, what it feels, what its action tendencies are, and how these may be modified by communication programs in the mass media and elsewhere. As background for certain hypotheses about public reactions to civil defense, some of the major results from studies of public reactions to mental illness will be presented and their implications for studies of problems of civil defense suggested.

Conclusions suggested here regarding the present public reaction to civil defense may sound pessimistic because the evidence indicates that the public is poorly prepared to help prevent atomic disaster or cope with it if it comes. Also, the evidence indicates that current programs of public information are not only ineffective in many ways but may actually be having a negative effect. While the extent of our knowledge in the behavioral sciences does not justify promises to answer all questions in this area, we do have basis for making some important and constructive comments and suggestions.

Results from Studies of Mental Illness

The studies of public reactions to mental illness on which I shall report began in 1954 at the University of Illinois. They were financed by a series of special grants from the National Institute of Mental Health during the period 1954 to 1960. The purposes of the studies were to determine what

the public knows and feels about mental illness, and how misinformation and lack of knowledge and undesirable attitudes can be corrected by programs in the media of mass communication and in other channels. Included in the research were (a) investigations of public opinion, (b) studies of psychologists, psychiatrists, and other professional groups, (c) analyses of the content of television, newspapers, and other mass media, and (d) experimental studies of the differential effectiveness of different communication strategies. The following are some of the findings that have implications for research on public reactions to civil defense.

Early in our research we found it necessary to make a careful distinction in our studies between what people know in terms of facts about mental illness and how they feel or how they are prepared to react when confronted with mental-illness phenomena. We refer to the former as public information and to the latter as public attitudes. The distinction is important because very different conclusions are reached about the current states of public information and attitudes. For example, it is much easier to teach people new factual material than it is to develop new attitudes, and the communication strategies required in the two situations are frequently quite different. This distinction is very likely to prove important for studies of civil defense. By not heeding this distinction in the past we may have hindered our efforts to create a better understanding of civil defense and greater readiness to cooperate in its programs.

In our studies of public information about mental illness we expected to find a misinformed public; instead we found an uninformed public. That is, rather than holding many incorrect notions about mental illness, the average man has very few ideas, correct or incorrect. This may sound like mere hair-splitting, but the difference is important for communication programs.

When people are lacking in ideas they are usually more easily persuaded than when they already have relatively articulate notions. This proved to be our experience in communicating information about mental illness. We were surprised how readily people would accept almost any information that we gave them. Over-simplified and palpably incorrect information about the causes, treatment, and effects of mental illness was frequently accepted as correct. It is probable that much the same is true of public reactions to civil defense.

We found that public attitudes with respect to mental-health phenomena are as bad as generally suspected. There is a rather widespread panicky fear of mental illness, a loathing of the mentally ill, and a distrust of mental treatment methods. There appears to be a generalized anxiety reaction toward everything related to mental illness. Even thinking about, talking about, or receiving information about mental illness is disturbing. Anxiety is the key to understanding public reactions to mental illness; the management of anxiety

is the key to changing attitudes and promoting useful action. There are reasons to believe that anxiety is also the key to public reactions to civil defense.

To induce more constructive attitudes and action tendencies toward mental-illness phenomena, anxiety must be reduced. There are several ways of accomplishing this. Anxiety can be reduced by not discussing danger and gory details. Anxiety can be reduced by providing ways to handle or avoid problems. Anxiety can be reduced by simplifying problems and by communicating only easily understood messages. Anxiety can be reduced when authorities all say the same thing and when their messages are reassuring.

Implications for Civil Defense

Effective Use of Threat

Our studies of mental illness tell us something of the difficulties of trying to control human behavior in anxiety-provoking situations. Learning usually is more effective when positive incentives can be used. In civil defense, as in mental illness, we have customarily used the threat of punishment. Communications about civil defense usually emphasize the dangers of being blinded, rendered sterile, or of being obliterated. To avoid these threatened dangers people are expected to learn complex instructions about civil defense; to invest their time, energy, and money in elaborate precautions; and to steel themselves for the holocaust. It is very difficult to teach such complex, highly skilled responses under the threat of punishment.

If threat of punishment is to be effective, the source of punishment must be localized in space and time. Spankings are effective in preventing children from playing in the street because children can see the street and they know that one step too many means quick punishment. The threat of atomic disaster is not so concrete; you cannot see it, have never experienced it, and, consequently, can make believe it does not exist. For punishment to be an effective aid to learning, the punishment must actually be sampled, preferably in small doses. The child will avoid the street only if he is actually punished, not merely threatened. As any parent knows, the child will not avoid the street solely because of the threat of being killed by an automobile. He has never been run over "in small doses" and probably has never witnessed a severe accident. The threat is abstract and unreal, and consequently, not nearly as effective as the concrete and sure spanking. If punishment, or the threat of it, is to be an effective agent in modifying behavior, the punishment must be close in time to the avoidant response. We try to teach people to avoid atomic obliteration by building and equipping shelters, but because the threat is distant and lacking in concreteness it is ineffectual.

When people are constantly threatened, when the threat is appalling, and no sure ways of escape are available, several things happen. First, people manifest an anxiety reaction when dealing with, talking about, or even thinking about anything directly or indirectly related to the issue. This happens with the subject of mental illness, and probably also occurs with respect to other potentially threatening topics such as cancer, economic depressions, and with the topic of thermonuclear disaster. Second, the anxiety creates a distrust of professionals concerned with the problems--psychiatrists with mental illness, physicians with cancer, government economists with depressions, and civil defense specialists with thermonuclear disaster. Third, there is a general withdrawal reaction to the topic and everything related to it. The individual is reluctant to talk about or learn about the phenomena, even though he places himself in actual danger by his reluctance. Following from this is a general state of apathy, and it is this apathy that lets people go to pieces without seeking professional help, smoke two packs of cigarettes a day regardless of the threat of lung cancer, and fail to take even the simplest precautions against atomic disaster.

If the situation is as bad as I have pictured it, what are we to do about it? If we are going to continue to employ a type of avoidant learning in civil defense communications, we should use threat more effectively. Some ways of doing this are:

1. Decrease emphasis on the threat--it is already too strong. Supply fewer gory details of what would happen in an atomic assault. We have operated on the premise that the stronger the threat the more incentive for preparedness, and this obviously has not worked.

2. Present a more consistent front among experts. When anxiety is high and experts disagree about what to do, the public is confused and rendered more fearful. The feeling is much like what one would get from lying in a hospital bed and overhearing several surgeons argue about where the incision should be made. Of course, experts have a perfect right, and even an obligation, to disagree when the truth is in doubt. But it would be far better if these controversies were not aired in public.

3. Communicate simple, easily understood information. When people are anxious, they want, and can assimilate, only simple rules and procedures. For this reason it is better to over-simplify if necessary.

4. Communicate only that information which directly relates to ways and means of solving problems. When people are anxiety ridden, their intellectual interest is low. Consequently, general scientific information about fallout patterns, military preparedness, and biological effects are of relatively little interest. People look for simple rules for avoiding impending danger.

5. These are some of the rules that we have found effective in threat-provoking situations. But suppose that all the information that you want to communicate does not conform to these rules? Then, my suggestion is to communicate less. It is easy to assume that sheer volume of communication is good, that if the media of mass communication are flooded with civil defense messages the public will learn and prepare. But if communications have the wrong psychological properties, many of the messages will backfire and produce undesirable results. In this case, a large volume of communication will be far less effective than a much smaller volume of communication which is carefully composed.

Use of Positive Incentives

In addition to doing a better job of using punishment, it would be wise, insofar as possible, to use positive incentives to promote desirable attitudes and actions. Many people will build shelters if you put their picture in the paper, if they are cited for being good citizens, if they are respected by members of their fraternal organizations, and if other positive incentives are used. We may laugh at the Russians when they give medals for outstanding efforts by production-line workers, but it is effective. I suspect that they are systematically using such positive incentives to prepare for civil defense. For participating in civil defense preparedness activities, for heeding defense instructions, for acting as plane-spotter, etc., the individual should be recognized as being a good citizen. These kinds of things serve as potent sources of positive reinforcement, and to the extent to which we can use such positive incentives instead of threats, we may be able to increase active public cooperation.

General Observations

In addition to the foregoing specific suggestions for more effective programs to secure public interest and cooperation, some general observations are in order:

1. In my opinion the behavioral sciences can be used more effectively than they have been in the past. There are many behavioral scientists who have worked on problems that relate to civil defense whose knowledge and skills are not being utilized. The problem is that of translating research ideas and findings into a form useful in civil defense action. Also, many of the issues relating to civil defense are amenable to research, and, if appropriate planning and support are provided, many behavioral scientists would be found to address themselves to these problems.

2. In developing effective communication about civil defense, a fine line must be drawn between providing information to the public and manipulating the public. In a democracy we cherish the concept of "free information,"

and anything that smacks of propaganda is objectionable. However, government agencies do have programs to promote and want to communicate as effectively as possible. The government is in favor of soil conservation, non-pollution of streams, polio vaccination, and many other things; and efforts are made to convince the public that it should cooperate. Is it wrong for the government agencies to hold points of view and try to persuade the public to cooperate? This would be a difficult position to defend. It is not necessary to deceive the public, but it is necessary and legitimate to select and order communicated material to maximize impact. As a scientist it is not my responsibility to say what the policy should be, but it is my obligation to contribute whatever knowledge my discipline has or can get that bears on policy issues and implementation of policy decisions.

3. It would be unwise to expect too much of the public. I do believe that much can be done to help people defend themselves against thermonuclear attack, but it may be unrealistic to expect more than a relatively small percentage of the public to become well informed about the complexities of civil defense. Those who study public opinion find that the majority of the people are poorly informed about most national issues. For example, if you quiz members of the public about the current situation in Laos, it would probably be found that 50 per cent or more could not locate Laos as a country in Southern Asia, and an even greater per cent could not tell you anything of the nature of the opposing factions. This does not necessarily mean that the public is grossly ignorant or stupid, but rather that there are so many competing issues and communication sources that it is hard for any one issue to remain salient. Also, the attention of the "average man" is largely taken up with the more immediate concerns of daily living. In this context it is hard for national issues, such as civil defense, to compete for attention. Unless a very concentrated and sustained program of public information is undertaken, it may be unrealistic to expect the average person to learn more than a few simple facts about civil defense. Much of the civil defense preparation will probably have to be done for the public by special governmental and civic groups.

4. With respect to helping the public, we should carefully consider which groups in the population should be the major targets for communication programs. It may be wise to devote special efforts to inform and motivate civic and professional leaders, teachers, law enforcement agents, physicians, and other key persons. I suspect that one of the primary reasons why there is so little active cooperation in civil defense programs is that many key persons presently regard civil defense as hopeless, economically unfeasible, and a poor investment of the nation's energy. It would be difficult indeed to obtain cooperation from the public at large if its key people are not well informed and convinced of the importance and practicality of the program.

5. The problems of civil defense are too urgent to wait for long-range basic research in the behavioral sciences. We may already have a

great deal of knowledge about human behavior that can be used to guide programs of communication. What is needed is to organize what we already know, translate it for use in planning and conduct of action programs and for assessing the effectiveness of these programs. To aid in this, it would be wise to study the methods used in other countries. We may learn a great deal from studying how they inform, persuade, and manage their populations for civil defense purposes.

6. As a final point I would like to touch on what we all know to be the heart of the problem. As I mentioned earlier, civil and industrial leaders, scholars and professional people, and other key people are divided and unsure about the merits of heavy investments of the Nation's energy in civil defense. Should we build atomic swords rather than develop better civil defense armor? Should both sword and armor be melted into plowshares for the hungry, uneducated, sick, and oppressed people of the world? Until these questions are more firmly answered, until we develop consistent, long-range national goals, and strategies for implementing them, key people in the nation will remain divided and uncertain, programs of communication and action will be half-hearted, and the public will remain anxious and unprepared.

CHAPTER 7

SOME PSYCHIATRIC ASPECTS OF CIVIL DEFENSE

Louis Jolyon West
University of Oklahoma Medical Center

Introduction

The problems of civil defense are of legitimate concern to psychiatry. We can conceive of human society as a living body with assets, liabilities, and a certain structure we can try to understand. Society has its areas of health and of pathology, and war is its worst disease. Analogies that derive from this point of view may clarify some of the problems confronting the OCDM-NRC Advisory Committee on Behavioral Research.

Psychiatrists have had experience with the problems involved in preparing people to deal with stressful, difficult, mysterious, or terrifying events (West, 1958). Recently it has become possible to undertake new research into various aspects of human adaptation to stress--aspects that may be crucial in determining whether our social insanity will in truth be the death of us. I hope to give you a brief progress report on the infancy of this budding science, a portion of which can be termed "experimental psychopathology."

Defense Dilemma

We are all very much aware of the dilemma that surrounds the necessity for us to face the possibility of thermonuclear war, and the corollary requirement for defending ourselves against potential attack. The possibility that atomic attack could occur is unpleasant but real, and the danger of inadequate defense is a real danger even though its extent cannot be measured accurately. The dilemma arises from the view that there is danger also in defending ourselves, a danger that cannot be quantified, either. The danger in defenselessness is destruction. The danger in defense is more complex.

It is not only the ordinary citizen but also the enlightened person, scientist, and statesman who fears the prospect of undertaking civil defense measures such as a shelter program. Many of us view with concern the risks of further arousing foreign animosities, of stirring up warlike attitudes, of inducing feelings of resignation or acceptance among our own people

regarding the inevitability of war, of wasting money that might effectively be spent on promoting peace, of a domestic drift toward a garrison state or a "shelter mentality," or of the emergence of a clear-cut challenge that will force our opponents further into a one-way escalator leading irrevocably to a thermonuclear holocaust.

If we could gain some protection without the necessity for a campaign to arouse public alarm (e.g., by emphasizing that the Russians are building more shelters than we are, that there's a missile gap, etc.) the danger would not be so great. For example, in Oklahoma we might develop a complete, state-wide system of tornado shelters (acceptable to one and all without concern) which could also serve as fallout shelters. Insofar as fallout shelters add to safety, the cause of civil defense would have been quietly served. Indeed, it has been stated by such authorities as Leon Gouré (1962) that the civil defense program of the Soviet Union has been developed in just such a way, without public alarm or propaganda. Their shelter-construction program, for example, would appear to have been routinely incorporated into the total construction program of housing and public buildings, whose nether regions automatically meet Soviet civil defense requirements. Foreign tourists and other observers would not easily be able to estimate the extent of the preparations under such circumstances, and the uninformed, still unsheltered domestic population would not be stirred up by their less favored situation. In the United States a similar program could not be covertly undertaken. The public, before buying an expensive civil defense establishment, must be sold on the necessity for it. "Selling the public on the danger" suggests a vigorous information campaign of some sort, and the risk of panic[1] and other undesirable emotional public reactions to such a campaign seems more dangerous to many than does the present actual danger of attack.

A dilemma of this nature is not new to mankind. At one time in the history of infectious disease it was problematical which was the more dangerous: smallpox, or inoculation against smallpox. A certain risk was inherent in both. In later years, however, many a person's decision for or against modern vaccination was based upon emotional considerations and had nothing to do with a scientific understanding of what was involved. Similarly, many Americans today are beset by the emotional pros and cons of developing or not developing a fallout-shelter program. Their considerations often have little to do with the available facts about modern military, political, and psychological warfare, the facts about life in shelters, the facts about "fallout," or the facts about radiation sickness.

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[1]Panic here defined psychopathologically should be differentiated from the concept of group panic defined in disaster literature (Janis, Chapman, Gillin, & Spiegal, 1955).

The Roots of the Dilemma

From the psychiatric point of view the mature individual is one who is able to assess his problems, to make some kind of objective soundings about them, to avail himself of consensual validation from other sources, and to arrive at solutions which take into account all known factors. The mature society should be able to do the same. By contrast, the child's way of dealing with a problem may be to give free reign to his emotions and let them propel him into a course of behavior to which he has no logical commitment whatsoever. That civilized human society may react in a childish way is only too apparent at times.

For example, consider the issue of racial discrimination. Our country has known for a long time that its residue of racial discrimination is not only morally odious and economically stupid, but also is one of the most potent psychological weapons that the Communists use against us in the struggle of ideologies. It is obvious that reforms are both desirable and inevitable. Why, then, are we so slow in instituting them? The answer lies in our emotions, not our logic; and in this way we reveal the immaturity of our society. Adolescence, it has been said, is a distinctly American phenomenon. Other cultures cannot afford such a luxury, and perhaps we no longer can either. Fortunately, it is possible for individuals and societies to grow up fast when faced with a situation of great danger. And today, with time running out on us, we must quickly solve many complex problems, including those of our civil defense.

One horn of the defense dilemma, then, grows out of our society's proclivity to react emotionally to a clear-cut threat. If we must accept this human fact, and if we must both study the dangers that face us and decide upon a course of action, how can we avoid falling prey to dangerous and disrupting emotional side-effects? To solve this problem one must first know something about the nature of the human emotional response.

Psychological Mechanisms of Defense

There is a strong propensity on the part of anyone to defend himself against whatever is unpleasant, dangerous, or anxiety-provoking. Such defense is a natural psychobiological state of affairs. In the process of adaptation and survival, however, a certain amount of consistent reality-testing must be undertaken in order for the individual to survive.

Reality-testing is an information-processing aspect of brain function that requires both a scanning operation, or survey of incoming information that constitutes a sampling of reality, and a screening operation, or blocking out of awareness of large amounts of information in order to give greater attention to that which is most pertinent, germane, or significant for the survival of the individual. These operations apparently are digital-type

processes. In addition, reality-testing requires some analogue-type processes, i.e., the in-coming information, representing a scanned and screened sample of reality, must be matched against previous experiences in order to acquire further value, meaning, identification, emotional significance, etc. On the basis of such data-processing or reality-testing, then, action (both automatic and deliberate) results.

The healthy individual functions, thus, with fair efficiency. However, an individual cannot function in a healthy way if he is overwhelmed by threat or handicapped by inner conflicts. Rather, he may resort to certain relatively standard defenses. Defense mechanisms do not exist in the sense of mechanical aspects of brain function (although today neuro-biology can provide a fair description of their physiological substrata), but as concepts of personality function they have proven valuable in helping us to make predictions about human behavior. The pathological (excessive, ineffective, or inappropriate) use of defense mechanisms results in clinical syndromes, some of which have grim counterparts in certain recent reactions to the threatening reality issues of national defense.

Two reality issues can be briefly defined: (1) Certain countries in the world are spending over ten billion dollars a year on weapons; ours is one of these, and there is at least one other. (2) In the history of mankind, whenever two great antagonistic foci of power have developed enormous military strength, they ultimately have used it against each other. The reality is not that war is inevitable, or that we must resign ourselves to an eventual conflict, or that humanity might not in some way avert what it has never been able to avert before. The reality is that a danger exists, a destructive threat that cannot be quantified accurately but which is there for us to recognize.

Certain public reactions to this threat bear striking resemblances to unhealthy or maladaptive reactions of individuals: obsessional phobias, panic reactions, hysterias, and depressions.

1. Obsessional phobia. One neurotic way of dealing with life's reality problems is the formation of an unreasonable fear called a phobia. The phobia is a consuming, conscious fear of something (possibly quite irrelevant) that is actually a substitute for a more significant source of danger that the patient cannot face. Normal fear alerts us to danger and prepares us psychobiologically to react to the threat. Phobias are false or unrealistic fears based upon magical assessments rather than upon an objective appreciation of danger. They are not useful in terms of adapting to reality. Rather, phobias are paralyzing. They are brooded upon obsessively, and the relief obtained from compulsive rituals is only temporary. A man with a phobia about germs does not analyze the nature of the risk he perceives in acquiring infectious disease through contact with dirt. As he compulsively washes his hands a hundred times a day in a ritual to ward off the dreaded invisible

filth, he does not calculate that this behavior is uneconomical, or that it may make him more vulnerable to other ailments or to other more genuine risks.

Today, when our society is under great stress, we can find groups of people who displace all their fears onto circumscribed areas of concern (e.g., evil mental health programs, insidious flouridation of drinking water, etc.) that are not the objective source of danger. Some dedicated men and women of wealth and power are anxiously involved in ritualistic activities supposedly designed to counter the risk to the republic from communist agents (a group defined so as to include former Generals Marshall and Eisenhower, for example). Such phobic groups often seem inappropriately unconcerned with the physical defense of the nation against an avowed enemy overtly equipped with an impressive arsenal. In their magical assessment of the mysterious menace, they invite comparison with the phobic Salem witch-hunters of 1692.

2. Panic reactions. Panic reactions are based on fears that are grossly out of proportion to the real threat. Panic clearly is maladaptive, and its clinical effect in individuals finds its counterpart in group panic reactions. I have known a pilot to shoot himself through the head in a panic over fear of flying.

In war, hot or cold, a clever adversary always tries to instill panic. Today we can find groups of people so panicky about Mr. Khrushchev's threats regarding the growing danger of nuclear war that they are rendered quite noneffective. Some become vulnerable to formulae such as "Better Red than Dead," which seems very much like blowing out one's brains to escape a dangerous combat mission. Others become "minute men," arming to the teeth to resist the imminent invader, and frantically scrambling about on privately organized "maneuvers."

3. Hysteria. In ordinary parlance, "hysteria" is often used as a synonym for panic, but in psychiatry the term has another meaning. The hysterical patient suffers from a disability or functional inadequacy that becomes bizarrely disassociated from the basic anxiety that has engendered it. For example, the hysterically blind person may not appear to be upset about his loss of vision which symbolically makes it possible for him to avoid facing his problems. In fact, he may be astonishingly bland or indifferent about it. "La belle indifference" of the hysteric enables him to be cheerful and even silly about his situation. "Being blind is quite a nuisance; I keep bumping into things, you know!"

There are those around us whose defense against the painful reality of the present world situation is quite similar: "Yes, atomic warfare threatens and it certainly is a terrible state of affairs. I hope somebody does something about it. Who do you think will win the World Series?" I am not referring

to the indifference of the uninformed, the naive, or the feeble-minded. I am describing a pathological indifference which is part of a defense against the anxieties attendant upon threatening and poorly tested reality. Attempts to frighten the hysterical person into an appropriate concern toward what threatens him will merely increase his defenses. Whipping up public anxiety, as in a war-scare to sell civil defense, not only may bring increased phobic and panic behavior, but also may paradoxically increase the indifference (sometimes mis-labelled "apathy") of hysterical reaction-types.

4. Depression. In clinical depressions, gloom, sadness, despair and apathy are often prominent symptoms. I do not use apathy here in its lay sense as a synonym for indifference. Rather, the clinically apathetic individual is one to whom the future looks hopeless. A sense of futility is strong within him and he feels defeated in advance. Carried along by events that he cannot influence sufficiently to bother making the effort, he awaits his doom. If his apathetic state is severe enough, he may welcome destruction as a solution, feeling, perhaps, that it is his due.

The apathetic response to the threat of thermonuclear war should not be confused with the response born of unawareness or of failure to appreciate the real danger through inadequate public information. Instead it must be recognized as an understandable but unhealthy response to stress. The depressed person's view is, "Yes, an awful war is bearing down on us and we're helpless to do anything about it. Shelters are a futile gesture. I wouldn't want to survive, anyway, to live like a savage in the radioactive wastelands; I just hope the first bomb drops on me." Obviously, such a person's reaction will only be intensified by new, more alarming information about the gravity of the danger he faces.

These clinical analogies between maladaptive psychological ailments of individuals and troublesome public reactions to the danger of thermonuclear war may be useful to us when we consider the problems involved in achieving a realistic and appropriate civil defense program for this country. First, such analogies may add to our understanding of how and why some of these reactions occur, and second, such analogies may usefully be extended into the realm of treatment. Psychiatrists know that we cannot expect to overcome apathy by telling the patient to cheer up. We do not persuade a phobic individual to give up his unreasonable fears by saying, "You don't need to be afraid." There's no use telling the person with hysterical blindness that there is nothing organically wrong with his eyes and that he should try to face his problems. Instead, one must determine what profound underlying problems are affecting the individual and, at the same time, actually help him to come to grips with reality.

Our society has many significant problems that are the legitimate concern of the psychiatrist, the cultural anthropologist, the social psychologist,

and all social and behavioral scientists. To meet these problems we first must view our society in its entirety--its structure, its function, its health, and its ailments. The problem of building fallout shelters is not an isolated one to be solved by some kind of social or human engineering unrelated to everything else that is taking place. Furthermore, we cannot afford to ignore the empirical knowledge that is available to us and which points toward possible solutions of these problems.

Having considered certain analogies between pathological uses of psychological defense mechanisms by the individual on the one hand, and apparently maladaptive public responses to the present dangers requiring national defense measures on the other, let us turn to our own recent history for examples of how emotional responses to stress can influence a nation's actions and policy.

After World War II our government wisely recognized the need for encouraging and sponsoring basic research in human behavior. The Air Force, for example, had several research agencies devoted to this area alone. Then, Russia launched its first Sputnik, and the American public's response was violent. Apparently no second thought was given by many elected representatives of public opinion as to what was valuable and what was not. Much of the behavioral-research program collapsed and research money was redirected into hardware. Our vital need to know more about human factors involved in decisions, planning, operations, etc. (information our manned space program now requires) was perforce neglected. Our society reacted with an emotional response to a momentary crisis and behaved inefficiently, or, as Freud put it, uneconomically.

Another example might be termed "the great brainwashing hoax." During operations Little Switch and Big Switch nearly 5,000 American prisoners were released from China. Even prior to their return, the word "brainwashing" had entered our language (Hunter, 1951) and rapidly acquired its current common meaning of "influencing anybody to do anything." The threat implicit in the word itself and the shocking revelation of certain flyers' false confessions of germ warfare (erroneously attributed to "brainwashing" rather than prolonged forceful interrogation) were severe psychological blows to the American public. How did we react to these blows, and what did we learn from them?

One emotional reaction was to emphasize our tragedy and find someone to blame for it. Among the prophets of doom that lifted their voices was one in the fashionable guise of an Army psychiatrist, who related that wholesale brainwashing of American prisoners-of-war had been successfully accomplished by the Red Chinese. Mayer lectured extensively throughout the country, and taped versions of his talks are still widely circulated. An Army-approved story summarizing his view appeared in a popular news

magazine (Mayer, 1956). Its essence was that one third of the American captives had succumbed to brainwashing and had actively collaborated with the enemy, demonstrating that our national character has deteriorated. Since such characterological weaknesses have their origins in infancy and childhood, it must follow that our national institutions (the family, the school, the church, and the community) are rotten to the core and have failed to imbue our youth sufficiently with those patriotic and religious values which inspired the intrepid pioneers and American heroes of the past. This view was eagerly if unhappily embraced by the public. Ever since Socrates was forced to drink the hemlock in 399 B. C. for corrupting the youth of Athens, it has been regularly possible to convince the public that the youth of any day has become corrupt, and to find scapegoats.

Objective data regarding both "thought reform" (or "brainwashing") and false confessions were gathered carefully by scientists like Segal (1956) from the Army prisoners-of-war, and Biderman (1957) from the Air Force prisoners-of-war. Their work, like that of Lifton (1956), Schein (1956), and others (Farber, Harlow, & West, 1957; Hinkle & Wolff, 1956; West, 1957) suggested that the popular version and the conclusions drawn from it were erroneous. However, the public was not concerned with the unemotional facts, and, to this day, congressional committees sometimes call forth once again Mayer's brainwashing story as part of a national breast-beating exercise.

Meanwhile, the military establishment began to train its men for the eventuality of encountering "brainwashing" or forceful interrogation in the future, a legitimate correction of what had been a tragic oversight (West, 1958). Paradoxically enough, this effort met with great public opposition. One news story (Ordeal . . . , 1955) implied that airmen being trained to resist captors were being put through awful tortures. In an otherwise respectable literary magazine there appeared a scurrilous editorial entitled, "School for Sadists" (1955), denouncing the program at Stead Air Force Base where survival-training procedures were conducted. Members of Congress, pressured by their aroused constitutents, began to pose questions such as: "Doesn't training people for danger actually make them more nervous and anxious and thus less able to perform?" and "Wouldn't it be better if they didn't know anything about it?" The astonishing truth is that the public's emotional reaction to the survival aspect of the military training program was such that the operation was closed down and remained inactive for over a year, despite research data supporting its value and despite the official report of a well-organized group of scientists under the direction of Melton (1956) which gave sound reasons why the program should be resumed and even expanded.

Here, then, we see two contradictory emotional reactions on the part of our society to what it viewed as a threat: "brainwashing"--a relatively minor and limited danger compared with nuclear war. Well-researched,

objective data were available and could have been used to assess the problem, to evaluate what the danger really was, and to apply to appropriate preparations for future training. The data were available, but they were not utilized. Instead, on one hand the emotional cry was, "Our soldiers are weak, vulnerable, and unable to resist brainwashing because of unpatriotic, godless, corrupt, materialistic, self-centered attitudes and poor moral fiber." On the other hand: "If you try to train our soldiers for a potential stress, you brutalize them to their detriment, you turn your training personnel into sadists, and you make yourself as bad as the enemy by even bringing up the subject."

The purpose of this discussion is neither to criticize nor to renew old debates, but rather to remind us of the ways in which irrational, emotional, and uninformed elements in the matrix of public awareness can work against logical, objective, and realistic programs of preparation for a potential danger. Examples from recent history are all too grimly available in Shirer's The Rise and Fall of the Third Reich (1960), which reminds us not only of Germany's neuroses but also of the phobic reactions, panics, hysterical blindnesses, and suicidal apathies of many who lived in the democratic countries during the rise of Hitler.

Decisions about civil defense should be based upon a rational assessment of all the facts, and they should be dynamic rather than static decisions. Whether or not to have shelters, what kind and how many to have, where they should be, and what they should cost are issues to be determined by the data at hand, and as new facts emerge, our policy must constantly adapt to our new knowledge. Always, insofar as possible, policies should be carried out on a rational and objective basis rather than an emotional, magical, or symptomatic one. If the American people decide not to build fallout shelters, it should not be because they are afraid to think about thermonuclear war, or because they have gloomily given in to the inevitability of extinction, or because they just don't have enough energy to turn to this question, or because they don't understand the value of such shelters, or because of the magical assumption that the non-existence of shelters would ensure peace, or because of emotional shibboleths regarding "the shelter mentality" or "dying at least like men rather than like moles," etc. It should be because they are in possession of the available facts that science and the Government have to offer and because they have a good understanding of the alternative possibilities. It should be that they have decided on the basis of those facts and those alternatives, until new facts and new alternatives call for new decisions.

Experimental Psychopathology

The maladaptive behavioral response, and the psychological basis for it, have recently come into the field of experimentation. Time does not permit a comprehensive review of the development of human experimental

psychopathology. At best it permits me to point out some of the ways in which this area of research affords us opportunities for an understanding, through the technique of the controlled experiment, of what we have been forced in the past to observe primarily from experiments of nature.

Psychopathological reactions involving reality-testing can be produced experimentally by numerous techniques, all of which are definable in terms of information-processing. In the sensory-isolation experiment, the input of information may be insufficient. Cut off from environmental stimuli, the individual may develop considerable impairment of contact with reality, to the point of experiencing hallucinations (totally false impressions of external reality) which actually arise from within the individual and are projected into his environment. Do not groups or societies, in the absence of sufficient information from the outside, project frightening images that are actually reflections of their own internal problems?

A contrasting technique utilizes information input overload, which may have a similar effect of impairing adaptation and breaking down the subject's orderly appreciation of reality. What happens to a society which is subjected to a vast amount of information so inadequately coded by priority, and so devoid of accompanying criteria for meaning, that each item of information must be given consideration?

Hypnosis permits us to induce in the experimental subject strange behavioral responses resembling those seen in mental illness. The trance-state is effected by narrowing the field of awareness down to a single channel through which come repeated suggestions given with great authority. Such suggestions may be accepted in the face of clear, contrary, and readily available evidence from the real world all around. Have we not, in our lifetime, seen whole nations responding like individuals to such a maneuver?

Certain drugs produce periods of behavior resembling insanity. They all have basic features in common: to distort information input (sensory poisoning) and create arousal (central stimulation). What cultural poisons (racism, for example) can be seen to produce manifestations of social insanity?

There are additional techniques that will be described in a forthcoming publication (West, in press) of a symposium at the World Congress of Psychiatry, Montreal, June, 1961. Deprivation studies have revealed what the individual's sanity requires in the way of food, oxygen, sleep, and even dreams. May not a society have basic needs, the deprivation of which will just as certainly lead to disease? In other recent research, experimental manipulation of social forces has demonstrated how such changes can alter the adaptive behavior of both individuals and groups.

Research in experimental psychopathology may define principles pertinent to human nature that are applicable to both individuals and groups. Unfortunately, our information about ourselves is still too fragmentary to hold all the answers to the questions posed by the dilemma of civil defense. Our growing mountain of facts about the physics of thermonuclear destruction exceeds our small collection of information about human behavior. The former data serve to increase our anxieties, and the latter do not yet provide us with completely effective means of reducing it.

Psychiatric experience, both clinical and experimental, may provide some approaches to treatment of the ailments that concern us here. First, we must decide what we want and know what facts are available. Reality should be defined and clarified. Reasonable amounts of priority information should be circulated widely and repeated frequently. Top-level leadership should spell out the steps to be followed. The examples set by respected public figures should be coordinated in order to be helpful and effective and not move at cross-purposes. Must the citizen have a fallout shelter? If so, give him a chance to be serious in discussing it, to become knowledgeable in building it, to see it as a positive rather than a negative maneuver, to use it in peacetime for something worthwhile (e.g. school cafeterias underground), to accept it as a deterrent necessity rather than a passive inevitability, to be a part of a community-wide and nation-wide civil defense program in which precept, preparation, and practice are the watchwords. If public support for a successful and widely-accepted civil defense program must be developed, we know of many psychological factors to be considered. We also know of research approaches to such issues, from which further understanding may come. I hope that this presentation will help to clarify some of the human ingredients that require study and better understanding if the planning and implementation of such a civil defense program are to be successful.

CHAPTER 8

SOCIETY AS A TENSION-MANAGEMENT SYSTEM*

Wilbert E. Moore
Princeton University

Arnold S. Feldman
University of Delaware

Specialists in sociological theory have remarkably little to say about discordant elements in social systems and even less about social change or the viability of the social order under conditions of crisis. There is one common assumption in sociological theory--that societies are self-equilibrating systems--which makes a consideration of change very difficult. Yet the crude facts of change provide a rather severe challenge to a social theory that abstracts from dynamics or treats it only as an exogenous variable (see Moore, 1960).

The Autobiography of Some Ideas

We should like to trace out a sort of autobiography of some ideas as a way of illustrating how difficult it may be for the specialized scholar to arrive at points which to laymen, that is, intelligent people in other specialties, were obvious all along. This thoughtful evolution occurred in a field of scholarship that has interested us for some time, that of the social aspects of economic development of underdeveloped or newly developing areas. Here one finds a rather interesting conceptual framework informing virtually all of the literature. It is a rather simple three-stage model of social evolution.

One starts with the static stage A, the preindustrial stage, in which everybody presumably was in stasis of some sort, whether homeo or not; a dynamic stage B, the focus of interest of all students of economic development, viewed as transitional, with many interesting problems arising from the mixture of traditional and modern elements in an unstable compound; and then, usually implicitly in this literature, static stage C. By this implicit inference history comes to a period after the industrial revolution. Presumably there

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*This paper is based on a book now being completed, to be entitled Order and Change in Industrial Societies. The project has been sponsored by the Center of International Studies, Princeton University.

are no more interesting problems at this stage.

Now, both static stages are, of course, mythical. The pre-industrial stage of underdeveloped areas is not necessarily a stage lacking in contact with the rest of the world. One contemplates, for example, the 400 years of Spanish and Spanish-American rule of Indian communities in Latin America prior to modernization, during which 400 years presumably some contact was had between the Indian communities and the Spanish and Spanish-American governors. Moreover, all societies change of their own accord, and some may be hotbeds of social dissension. These comments apply to some of the little tribal communities that the anthropologists study, as well as to the old but non-industrial complex civilizations.

In this autobiography, however, we should like to concentrate on some ideas of the relationship of stage B, the transitional stage, and stage C, the post-industrial-revolution stage of societies.

Our work on the social aspects of economic development started with the problems that accompany the recruitment and commitment of non-industrial labor to an industrial labor force (see Moore & Feldman, 1960, Ch. 1-4 & 20). However, labor force transition was used as a deus ex machina for examining the whole complex of interrelated social changes that constitute economic development. When we examined our procedure or methodology, it became clear that we were employing two quite different sources of evidence for our description and diagnosis of industrialization. Not only were we using the scattered and often quite inadequate evidence from currently industrializing societies around the world, but we also depended quite heavily upon the richer evidence from the historical and contemporary record in industrial societies.

It is important to note our use of the contemporary record in advanced societies. The obvious implication is that this evidence was of use not only because these societies had experienced industrialization, but also because they were incessantly experiencing social and economic transition. We concluded that to a great extent the structural problems of newly industrializing countries are known because they are never fully solved. We thus arrived at the point that was obvious to the layman all along--the continuing dynamics of industrial societies. And although our route was somewhat circuitous, we felt enlightened by our arrival at this destination.

We may suggest several examples of the kinds of "transitional" problems that are really permanent features of both industrialization and industrialism. First let us consider man-machine relationships, the relationship of the man to the physical environment, the technological environment at the work place, including all the problems of the machine pacing the worker and the competition of worker with the machine. It is an error, of course, to anthropomorphize

these inanimate objects, but it is possible to conceptualize the man-machine relationship as competitive. The competition certainly does not decrease with time.

As a consequence of technical and other changes, there is a rapidly changing set of skill demands and skill distributions within the labor force. This is true of all stages of industrial development.

There is a complex division of labor and a complex machine-line interdependence of human parts, but we should be naive indeed if we thought this was a frictionless machine at any stage of the process.

There is the problem of authoritative coordination in industrial production, and a very tricky problem of legitimating the authority, of institutionalizing the system in a way sufficiently convincing that the final subject, the last man in the chain of command, agrees wholeheartedly with his position at that point in the unequal order.

There is the whole problem of the stickiness of labor markets, the circumstance that you may have simultaneous surpluses and shortages at equivalent levels of skills as measured by training time, but non-convertible to one another. There is a kind of Balkanization of labor markets in industrial society, with very substantial border problems among these various sub-entities within what we call the labor force.

There are problems of equity in income distribution, and we should be naive again if we thought that any industrial society, including the socialist ones, have entirely set everybody's mind at rest as to the equity of his particular position and income distribution.

There is a whole set of problems on the relationship of the family or the kinship system and the work place. This is usually portrayed as the disruption of the extended family system in industrialization. However, the work place and the family are competing for the breadwinner's time, attention, energy, and so on, in every industrial society. This is a persistent tension that is not solved by economic development.

We have very interesting problems of social stratification that are never solved, including the degree of integration of various sytems of social stratification. In the developing areas there are competing systems of stratification, the archaic one and the one that more aptly fits the distribution of skills and rewards for an industrial society. But this latter system is less systematic than it appears at first glance. No industrial society has a purely rectilinear system of social stratification. It is a myth perpetuated by some sociologists that if our measuring instruments were precise enough we could locate every last family in the population on an exact scale of a rectilinear

character, and the only reason we cannot do this is that the measuring instruments are bad. This is a total misreading of the system.

This series of illustrations exemplifies the way in which, if one looks at something presumably alien and exotic, one starts to get a renewed perspective on what is going on at home. It led us to an insight into the obvious. Industrial societies change. They change at a rapid and accelerating rate. And this goes largely unnoticed or at least unstudied by social scientists, because they have taken their own static models of society far too seriously.

The chief feature of the model of society that most sociologists and anthropologists use, whether they say so or not, is its emphasis on system and the strict interrelations of social events. A sociologist or anthropologist moderately well trained should be able to relate anything to anything, although it may take a little bit of conversation to bring it out. This functional or static-system approach emphasizes the continuities, which are real and essential elements of social systems, and it provides a kind of check-list for tracing out the consequences of given changes. Its chief errors, of course, are that it tends to obscure tensions and strains, to pay no attention to the variable probabilities of change occurring within the system, and especially the important and growing element of deliberate change in social systems.

The functional approach to the analysis of society is not to be discarded as useless. If social phenomena cannot be treated in terms of systems, then all hope for social science must be abandoned. Yet clearly the analytical scheme must be supplemented. "Disequilibrating" variables must be written in, or else the scheme will have an ever-growing discordance with empirical reality, like mathematical economics, for example, which resembles no economy living or dead.

This analytical problem has led us to a rather simple "tension" or "strain" theory of social change. We may assume that persistent strains, such as those previously discussed, are highly probable sites or points of social change, including deliberate efforts to remove the strains. If these strains are recognized as problems, it is notable that, semantically, problems have solutions or hoped-for solutions. Otherwise, it is just the way things are. Once something is defined as a problem, it is marked to have something done about it. And this sort of problem-definition of the persistent sources of strain is a way of looking at a social system in terms of the deliberate efforts to resolve these problems.

To recapitulate, it seems societies persist as viable entities on the basis of two principal components of order: (1) structural regularities, the kind that text books in sociology are quite adequate in portraying as the basis for day-to-day predictability in social behavior (if we did not really believe social behavior was predictable, we would not dare get out of the bed in the

morning); (2) the capacity to manage a multitude of tensions, as well as a capacity to recover from crises and disasters. Of course, the capacity to manage a multitude of tensions implies that a state of tension is a normal characteristic of social systems. We hold that societies are both hosts for tensions and devices by which they are managed.

The Tensions of Industrial Societies

The tensions of industrial societies are much more consistent than the modes of managing them. The notion that industrial societies are growing more alike, that time will eventually reduce all differences, is a rather incorrect inference from rather incomplete facts.

What does appear is that the structural regularities, and particularly those that can be most intimately traced from their connections with the system of production, do appear to increase in similarity. And some of the interplay, such as between the work place and the family, seems to have remarkable similarity from one industrial society to another. Yet these structural features do not mean that industrial societies are growing more alike. Indeed, what is worrisome is that they may be going at accelerating speed in opposite directions. This seems to be particularly true of the friction points between the major functional areas in society and the ways that the resulting internal tensions are managed.

Even the balance among the functional sectors--the polity and the economy, for example--are by no means maintained in the same way. Surely American social structure, despite the efforts of people to get us over our political apathy, is only minutely politicized as compared with the Soviet social structure. This is one thing we mean by a pluralistic society, that there is a kind of functional containment of politics, of religion, of the economy, of a variety of other things, and a relatively low carry-over between these functional areas.

It has been claimed that American society is one of the most economics-oriented of all societies. This may be true in terms of the kind and proportions of goods and services, of things and experiences that move through the market. This is not the same as saying that American society is materialistic. Surely one of the most materialistic of all Western societies is the French, not the American, as any traveler to France can testify. But the true materialists are the "have nots," not the "haves." This is perforce their situation. A prosperous economy can afford to be spiritual; an unprosperous one cannot.

The differences that are most striking between the Soviet bloc and the Western bloc are precisely their different ways of containing, managing, and tolerating their internal sources of tension. One of the ways that the Soviet

system manages tensions is by a lot of political participation. We think of the Western democracies as the areas of popular political participation, but on any kind of time-budget study of political activity, multiplied by participants, the Soviet bloc clearly is much more highly politicized in this sense also. Whether this gives the man in the street genuine political power is a different kind of issue. All we are saying is that political participation is a consciously developed tension-management system in a Soviet-type society to a far greater degree than it is in Western societies.

There is no single "correct" analytical scheme for identifying the tensions inherent in social systems. Different taxonomies are useful for different purposes. One approach is to proceed from the role conflict experienced by individuals through group conflict, to the level of values, which may be divisive as well as integrative. Another is to identify the analytical sources of strain--for example, the imperfect resolution of persistent human problems, and the intrinsic sources of uncertainty in social systems (see Moore, 1960). Still another, which uses the first two as pervasive elements, would pay attention to the main parameters or limiting conditions of social life--for example, numbers, space, and time--and the principal structural components of social systems concerned with such functions as production, consumption, allocation of power and rewards, and so on.[1] Any sensible scheme purposefully pursued will be a great improvement over the "equilibrium models" currently used in social analysis.

Vulnerabilities and Tension Management

In a sense, every source or locus of strain and tension in a social system is a source of vulnerability. At the individual level, the individual who is in acute role conflict is likely to be the one who shows up in the psychiatrist's office, or ought to be. He is displaying his vulnerability by being caught in this kind of acute tension situation.

At the inter-group level, we ought to think of group conflict in at least two ways. There are those groups that have a common membership, the kind of functional vying between the family and the work place, or between two voluntary associations with largely overlapping membership. Here the individual counterpart is perhaps role conflict or tension, but the group counterpart is clearly vying for the loyalty, the time, the resources, the other scarcities of their members, and perhaps trying to expand their membership coverage.

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[1]This is the approach we are actually using in our analysis of change in industrial societies.

This is quite different from the group conflict that takes place between mutually preclusive groups and their membership--between political parties, for example, or religious denominations. There are some dedicated joiners that belong to several religious denominations, but they are a small minority and we do not need to worry about them. The fascinating cases of group conflict, and the ones that really get us into the areas of overt social conflict, are those involving groups having preclusive memberships--not those groups that are vying for the loyalty of their common membership. Overlapping groups and modes of organization are fairly common in all societies. Competing groups, without a common membership, present special problems in industrial societies, and particularly when the groups are structurally interdependent.

Interdependence may exist without equivalent values and procedures for assuring performance and continuity--for example, the interdependence between economic interest groups or between occupational groups. The famous French sociologist Emile Durkheim may not have been the first--but is usually so credited by sociologists with short historical sense--to develop rather thoroughly and to demonstrate at least logically and somewhat empirically that interdependence by no means insures social solidarity; that the fact that one is dependent on someone else and, in turn, other people are dependent on you is no guarantee at all that you are going to love one another. Often, on the contrary, unless interdependence takes place within a common framework of values and of procedures for settling the frictions, it may lead to some of the most bitter kinds of tension and conflict because of the mutually preclusive character of membership in these interdependent entities (Durkheim, 1947).

The strength of industrial societies in some respects rests precisely on this complex division of labor, upon the capacity, given sufficient size, also to have sufficient administrative and other mechanisms for utilizing variety and for coordinating variety into larger common purposes.

Often in administrative organizations, such as industrial corporations, very small proportions of the entire membership may be interested in cooperation, and very few interested in the alleged mission of the organization. Indeed, if one had such organizations in a benign and changeless environment, there would be no occasion for anyone to be concerned with accomplishment of the mission of the organization. That would simply be a by-product of their performance in their jobs, having responded to whatever compensation they have been willing to accept. They have been adequately rewarded to do whatever it is they are assigned, and the mission of the organization is a kind of impersonal by-product. The only occasions for people to get worried about goals is when the viability of their organizations is threatened.

The strength of industrial societies is, of course, also one of their principal sources of weakness. By extrapolating a little bit from where we are in terms of economic interdependence, one can think of the situation in which single individuals not very highly placed could bring the whole operation to a halt by failing to do an essential job. There are certainly ample illustrations of this in industrial organizations, where one or a few people, in the absence of a stand-by or emergency organization, can really exercise a powerful negative control, a "veto," on the entire operation. We read about such events regularly in the public press. Little labor unions--we are not anti-labor, but it happens to be a good illustration--that one did not previously know existed, just like little countries that we did not previously know existed, can be extremely troublesome. Little labor unions can tie up New York City, or at least Manhattan, in ways that can get so severe that food, fuel, and other necessities of life can get in very short supply. A strike of tugboat operators in New York harbor, for example, can virtually bring New York City to its knees.

This kind of interdependence heightens the vulnerability of a social system, unless there are ways of adjusting disputes without work cessation or unless there are stand-by mechanisms for emergency "plugging in" when the regular mechanisms are not operating. It is often the function of government to be prepared at a point to put in the stand-by organization when an interdependent system does not work.

So far as vulnerability to attack is concerned, interdependence is a troublesome feature of industrial societies. But decentralization carried to extremes destroys a complex integrated system. The reason why China was historically able to swallow its conquerors was that there was no China. There was only a geographical or ecological distribution of villages, which were the real core of the whole social system, and there was no central or crucial place to knock out. This is not the situation in most industrial societies, and there are serious problems in achieving the precise degree of optimal decentralization. Decentralization, of course, has important advantages, such as getting decisions made somewhat nearer the place where specific crises arise. The problem is how to secure these advantages without abandonment of the advantages of unity.

A second major source of tension in industrial societies is the rapidity of change, of adjustments and leads and lags, and, particularly, the growing use of deliberate change. Now, usually this is phrased in terms of changes in physical technology, and the slow, inadequate, lagging adjustment of other social institutions to this. This is often known in sociology as the "culture lag" hypothesis, which is attributed to the late William F. Ogburn (1922). There are all sorts of reasons, empirical and otherwise, for rejecting this particular formulation. In underdeveloped areas, for example, what has obviously changed, with rather dismaying rapidity, is a set of values and

aspirations, and what is patently lagging is the technology and economic resources for implementing them. It is the technology there that is clearly lagging.

We can reformulate the idea, however. Any change that leaves other interdependent structural elements not attended to at the same time will leave those elements lagging. The alternation may be in legislative structure or in the organization of the courts or in personnel policies as well as in physical technological fields. The lags may run in many different directions. Part of the process of deliberate change is, of course, an attempt to forecast and possibly to control the secondary, tertiary, and quaternary effects of deliberate change. Our confidence in social science in the present or foreseeable future is not so great that we think that this will ever be a highly precise prediction. That is, it would be our expectation that there will be some unanticipated consequences of virtually any deliberate change, and our further expectation that not every one of them will have a positive sign by it (Merton, 1936).

The sequence as well as the rapidity of a series of deliberate changes may produce strains. The extent to which a particular change can be "contained" within a social system may be a function of the immediately preceding change and of the change that will follow. What is involved here are both the content of the different changes and the time intervals that separate them. The capacity of industrial society to contain its own changes is highly variable. Again we are perhaps most attentive to those that seem to be the products of physical technology. But, note, machines do not really cause anything. People who invent machines and make investment decisions to install machines are, if there are villains, the villains in the piece.

There are severe problems of maintaining rapid technological development, not only in product design but in cost-saving and other procedural kinds of improvement, and in which the changes somehow or other dealing adequately with the personnel either throw out of work altogether or displace from levels of skill very difficult to re-acquire in another area because there are inherent lags in training time. This is part of the persistent stickiness of labor markets. This is almost certainly another area where the government must encroach, as a matter of necessity if not a matter of principle. The government of any society is the residuary legatee of its unsolved social problems, and must be. The reason why over the long term governments seem to expand functions is that they must, especially when other non-governmental means fail to solve the problems.

Now, there are ways of trying to solve, let us say, unemployment problems by trying to place this technological displacement as a charge against the employer. There is a certain equity in that. After all, why should the

worker be the one factor of production which can be displaced at no cost to the employer whereas the obsolescence of machinery and other factors of production are borne at the employer's expense before he makes his cost calculation to install the new equipment? The trouble is that "private" solutions will not work if there are substantial changes in major segments of the economy. If one tried to charge to the American coal industry more than they are already bearing in the way of displacement costs, the "equitable" solution would only speed up the loss of their market for fuel. If one tried to get all of the automobile companies to pool their employment plans and have convertible seniority between companies, this still would not basically affect the circumstance that we are going to be able to produce automobiles with fewer and fewer production workers.

The charges of relocation, and especially of adult retraining, will have to become a public responsibility. "Adult education" has been largely confined to flower arrangement, ballroom dancing, bookbinding, and contract bridge. There is something to be said for the cultivation of hobbies, of the constructive use of leisure in industrial societies. There is also much to be said for that kind of education that will re-equip displaced workers, to restore them to approximately the same level of skills that they have found unsalable on the labor market.

Tensions, in other words, that do not manage themselves will either be managed by collective action or they will accumulate and result in sporadic outbreaks of violence or in discontented and withdrawn segments of the system, which may be captured for more concerted action against the system. A totalitarian system will attempt to identify its discontented elements and re-educate them or suppress them. A pluralistic society has somewhat more difficult problems, for public policy is based on considerable measure upon the ideal of individual choice.

In effect, an "operational definition" of liberty is realistic choice, and a consequence of choice is uncertainty as to the outcome. If it has been certain all along, then there has been no choice. This toleration of some uncertainty is intrinsic in any industrial society, for the provision of complete predictability would require a detail of control that is simply not feasible. Even with all the techniques of coercive control and the use of amateur espionage available to a totalitarian state, the administrative costs of terror are impressive. Where liberty is built into a system, as a matter of value, there will be attempts to reduce uncertainty by statistical predictability. That predictability will be increased by the reasonable expectation that at least some of the players are playing by the same rules.

There is, for example, the rule of rationality. For the last 15 or 20 years we have heard a growing emphasis on man's irrationality. If he does something that looks rational, this is really a subconscious response to some

deep libidinal urge that he is attempting to fulfill. If he speaks courteously to someone, that person is obviously a father image, and he is scared to death. Clearly, we have gone to some ridiculous extremes in discounting the overt aspects of behavior. The essential point is that in many contexts of human behavior rationality is institutionalized. The reason is deep-seated. If the individual plays according to the rules, his psyche need not deeply concern us. The rules in all sorts of decisional contexts are the rules of rationality, that is, the best available, relevant information, and logical inference therefrom. This tends to shift the burden of proof to the person who would do it the old way or who has just consulted his favorite necromancer or who takes pride in his anti-intellectualism--the man who says, "I fly this ship by the seat of my pants." Most large organizations cannot tolerate those individuals any more. They have put them out to various pastures where they cannot do damage.

Besides the rules for decisions, industrial societies develop a second set of modes of tension management. These are the techniques of arbitration, of adjudication, of compromise. If these are not developed privately, ad hoc--a kind of industrial common law, for example for management-union relations, or a kind of modus vivendi worked out between competing voluntary associations--the government almost certainly will. If it does not, the system is in dire trouble.

A social system also has available tension-diversion, and perhaps tension-mobilization. The famous turn-of-the-century psychologist, William James, sought among other things a "moral equivalent of war." War has a very substantial capacity to contain and mobilize internal tensions. This also was known long before Durkheim, no doubt, but it is another Durkheim principle in sociology--that up to a point an external enemy produces internal cohesion in a social system. This principle has been known pragmatically by authoritarian governments since time immemorial, and is being used all over the world today. It almost appears that we must convincingly populate a near-by planet with hostile forces if we are to get some substantial easing of international tension on this particular planet.

We seem also to need, perhaps with some urgency, to develop the moral equivalent of the strike in the American economy. The strike has a very moral value in all sorts of ways. But it does have rather frightening consequences for the viability of an interdependent economic system, and the moral equivalent seems to be something that is not quite at hand. Of course, a major problem of tension-management through tension-mobilization is that it may be ultimately self-defeating. The social energy that is mobilized is probably not freely transferable, but rather is limited to the physically or morally equivalent enemy. Thus the resultant social action may be most wasteful in that the system becomes a captive of its real or imagined enemies, and is increasingly unable to act independently.

Then there is tension-dissipation, the obfuscation of issues, which we suggest is the sort of thing that holds our unsystematic system of social stratification together. The tremendous multitude of incomparable ways in which people get judged is one of the circumstances that avoids their looking too closely at any one way and worrying about its equity. A man can be first in some field if he just looks hard enough. This is increasingly true even in the occupational structure. More and more there is tremendous lateral distinction in the occupational structure at roughly equivalent income levels. This is an obfuscation of a rigorous system of social stratification. There are other elements of obfuscation that may be more hazardous. It has been charged that Americans have no common values, once they are defined. Everybody subscribes to democracy, but do they attach a common meaning to the term? We are not convinced that there is a lack of common values, but we do think that there are a lot of areas in which verbal agreement is all we need, and indeed this may be the preferable basis on which to operate, because if we really understood one another on some points we would understand how deeply we differ.

Finally, change itself is not only a creator of tensions but also a tactic in their management. The very rapidity of change in industrial societies is partly what keeps people from noting their discomfort with the way things are. Mark Twain, one is reminded, had an appropriate comment on New England weather: "If you don't like it, just wait a minute."

Concluding Comments on Social Survival

We have attempted here to look at the intrinsic sources of change in social systems, and the tensions that both produce and follow from change. Our primary unit of observation has been the "society," which in political terms has an approximate "boundary coincidence" with the national state. To an ever-growing degree, of course, societies are units of a larger world order, the continuous viability of which is very much in question. At the same time, there is also a sense in which the major functional components of single societies--for example, education, technology, religion, market organization--are units of functionally specialized international systems. The degree to which such specialized systems are "politicized" in nationalistic terms is variable, but rarely completely absent. The easy assumption that various forms of technical or cultural cooperation will help in dissipating political tensions has very little foundation in fact and not much grounding in theory. Political considerations can be neglected only if they can be taken for granted, and this is scarcely the situation internationally.

Of the various modes of retaining internal political control and a widespread sense of collective identity, surely the most dangerous is that of aggressive nationalism or ideological proselyting in "uncommitted" areas. Although we are not highly optimistic about the prospects for inventiveness

in the creation of new mechanisms for peaceful political adjustments, neither are we impressed with the sanguine conclusion that they will somehow just appear if we simply have enough time without a war of annihilation. Positive and purposive effort to find the bases for compromise and adjudication, to keep international tensions at a manageable level, would appear to be essential. For any one national state, the source of its strength lies not only in its capacity for defense in a military sense--and that source has clear limits and manifest dangers--but also in its capacity for continuous change that, in net balance, is regarded as constituting progress. This means an increase of goods but also of services, of prosperity but also of justice.

PART IV

APPLICATIONS OF SOCIAL SCIENCE TO CIVIL DEFENSE

CHAPTER 9

SOCIAL SCIENCES RESEARCH PROGRAM: REVIEW AND PROSPECT

Ralph L. Garrett
Office of Civil and Defense Mobilization

Civil defense planning constitutes a vital response to certain aspects of the present international conflict. Our major functions are planning, communicating information, and motivating a variety of audiences to take essential preparedness actions. Programs are addressed to all elements of the population. Responses of these audiences are conditioned greatly by the socio-political and psychological factors of the current world-wide conflict.

The National Plan for Civil Defense and Defense Mobilization (Office of Civil and Defense Mobilization, 1958) sets forth the courses of action and governmental responsibilities from which our research tasks are derived. They are broad and manifold--as are the disciplines that are brought to bear on the questions and problems that concern us.

The Agency's Social Science Research Division is responsible for planning, coordinating, and conducting research to:

1. Develop knowledge of the effects of war and tension upon society and its institutions.

2. Determine the reactions of people to conditions before, during, and after attack.

3. Provide data for developing measures such as shelter, evacuation, and dispersion, for protecting the population.

4. Develop data for planning relief and rehabilitation programs, embracing essential community and government functions.

5. Determine effective means of securing active cooperation of people in promoting civil emergency planning measures throughout the nation.

I wish to emphasize the fact that a major element of our responsibility consists of research planning and coordination; a lesser part is that of contracting and supervising research activities; a minor element is in-house research. The research that we have conducted was formulated to meet specific needs of OCDM operating units for data to be used in conducting their programs.

Disaster Research

Our continued interest in natural-disaster research stems largely from the applicability of its findings to war-caused disasters. We are presently reviewing these findings to determine what additional research is needed. The products of the Disaster Research Group (DRG) are somewhat reflected by the publications in its Disaster Study Series. Our Social Sciences Division has actively supported the program of the Disaster Research Group of the National Academy of Sciences-National Research Council, and its predecessor, the Committee on Disaster Studies. Relationships have been formalized by annual contracts between the Academy and our agency to secure consultant and other services.

The work that DRG has performed for OCDM was reexamined in 1960 by the Academy-Research Council and by civil defense personnel. This resulted in the selection by the Academy-Research Council of the OCDM-NRC Advisory Committee on Behavioral Research.[1] I would like to express again the appreciation of OCDM, and my Division in particular, for the willingness of this new unit to contribute to our common program.

With the introduction of some personnel changes in DRG, it was felt appropriate to engage in some stock-taking of the study of human behavior in disaster. One important result of this is the preparation of a manuscript to be published in 1962 by Basic Books, Inc. This work, Man and Society in Disaster is being edited by George W. Baker and Dwight W. Chapman (1962). Several of the contributors are present at this symposium and I should like to thank them for their most helpful contributions. Another stock-taking product has been produced for DRG by Allen H. Barton of Columbia University. His manuscript, "Social Organization Under Stress: A Sociological Review of Disaster Studies," will be published as the seventeenth report in the Disaster Study Series.

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[1]Following the 1961 reorganization of civil defense, the name of this body has been changed to NAS-NRC Committee on Behavioral Research (Advisory to OEP). As its name suggests the Committee now advises the Office of Emergency Planning. In addition to its other activities, the Disaster Research Group is the Committee's staff.

DRG has continued its interest in promoting scientific studies of human behavior in disaster. For the first time, it is supporting through the use of funds from a Ford Foundation grant, a comprehensive effort to find out how individuals, organizations, and a community adjust to and recover from a major disaster, Hurricane Audrey, in 1957. A re-study of the disaster-struck community in 1961 by Frederick L. Bates of Louisiana State University will add an important dimension to our understanding of disaster behavior. We are indebted to DRG for its current efforts in integrating the results of three earlier studies of post-warning behavior (see Mack & Baker, 1961).

Assessing Public Opinion and Attitudes

The effectiveness of our civil emergency planning is critically dependent upon public understanding, support, and active citizen participation. By its very nature, our program requires wide involvement of people and organizations. How to obtain this is a major problem because there are many obstacles standing in the way of getting people involved. They include lack of conviction of the need for civil emergency planning and erroneous ideas and deficiencies in both motivation and education. Developing data on which to base programs that will overcome these obstacles and effectively mobilize public support is one of our important tasks.

Between 1950 and 1957 we sponsored a number of attitude and opinion surveys that were carried out by the Survey Research Center (1951a, b, c; 1952a,b; 1956a,b; 1958; Withey, 1954) of the University of Michigan. Broadly speaking, these measured: the state of citizen preparedness in terms of his information, knowledge, expectancies and skills; the degree of citizen involvement and participation in civil defense; probable behavior in time of crisis; and influencing factors. These studies produced valuable data for the problems then under consideration.

We believe that investigations of this nature should be resumed, but with a broader base. Such studies would include people's understanding of, and attitudes toward, general nuclear war, the issues of the day that might lead to war, and other factors conditioning responses to civil emergency preparedness measures. Accordingly, we have again engaged the University of Michigan to conduct a national survey to assess attitudes toward civil emergency planning and Cold War tensions. The survey is designed to develop recommendations on ways and means of improving public acceptance of our various programs.[2]

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[2]Subsequent to the May 1961 symposium the survey was completed and its findings reported (Withey, 1962).

Last year, at our request, the DRG engaged the Opinion Research Corporation (ORC) of Princeton, New Jersey, to develop attitude-survey instructional kits for field use in connection with the OCDM prototype shelter program. Six survey kits with illustrative materials were produced, in which are outlined a series of related field studies of attitudes (ORC, 1960).

Distribution of these survey materials has resulted in our receipt of research proposals for studies of public attitudes in connection with prototype shelters. Four studies are now under way and two additional ones are in process of being contracted. Two of these are being conducted by ORC. They are designed to: (1) develop information on community knowledge and attitudes toward civil defense and fallout shelters, and suggestions for improvements; (2) identify obstacles to building home fallout shelters and suggestions on how to overcome them; (3) provide guidance to local civil defense officials in their efforts to inform the public and motivate people to appropriate action.

A study of attitudes toward family fallout shelters is being conducted at the University of Denver by John S. Gilmore (1961) of the Denver Research Institute. Its purpose is to determine the degree of acceptance of optional family fallout shelters offered in a Denver Housing Development, and to provide suggestions that might result in improved acceptance.

A fourth project is under way at George Washington University under the direction of C. E. Tuthill and H. R. Ludden (1961). Their objective is to determine the steps that might be taken to facilitate acceptance by the general public and local public officials of programs for the construction of underground classroom fallout shelters in schools.

Findings from these studies will relate to some aspect of the communication process. Application of the results should help improve current techniques of communicating effectively with the public and aid in solving the problems of getting people actively involved in support of the shelter program.

Training and Education

Our need in this area is to develop more knowledge regarding training requirements, methods, and materials to meet current and changing conditions.

Evaluations have been made of the effectiveness of training provided in five OCDM courses in terms of later use on the job. These studies, completed in August 1960 by Applied Psychological Services of Wayne, Pennsylvania, under the direction of Arthur I. Siegel (Fox & Siegel, 1957; Siegel & Fox, 1957) provided useful data and recommendations for organizations of courses, content, and methods of instruction. For example, findings suggested that more emphasis on the "attitudinal" type of instruction was needed and

could be achieved by more extensive use of case studies. Twenty-three case studies and exercises were developed under the direction of Elmer Engstrom and Harry Ellis of Harbridge House, Boston, Massachusetts. These case studies present problems taken from actual situations, and require students, most of whom are state and local civil defense officials, to grapple with the problems and formulate solutions. Because of the interchangeability of the case materials between different courses, they have greatly strengthened the entire training curriculum.

Training in rapid and complex management decision-making is also needed. Accordingly, we recently engaged the Remington Rand Univac Division of Sperry Rand Corporation to develop a three-day simulation exercise designed to improve this kind of decision-making. We have developed a contract with the University of Wisconsin which is designed to determine the civil defense training and educational needs at the community level of government officials, auxiliary personnel, and the general public.

Continuity of Government

In the important area of continuity of government, information has been developed on questions such as: What legal bases and authorities are required in the several states to ensure succession to public office in time of emergency? What legislation and administrative organization is required for the efficient preservation and management of essential records? What records are needed to establish legal identity of persons after an enemy attack?

Legislative research on lines of succession to public office has resulted in the development of an enabling state constitutional amendment and model state legislative provisions. This research was done at Columbia University. A second study by the same university resulted in the preparation of a sample state statute and supporting data on selecting and preserving essential state and local records (Council of State Governments, 1959). A companion study on records management was conducted by De Paul University. It resulted in the development of a sample "State Records Management Act," (Council of State Governments, 1960). The Act, when adopted, will facilitate records preservation through efficient management of state and local records.

The first phase of a study entitled "An Inventory and Evaluation of Public Records Relating to the Identification of Individuals During Emergency and Post-Emergency Periods" was completed in April 1961 by the George Washington University (Shames, 1961). The project was undertaken to describe, evaluate, and give the location of public records which would be essential to the identification of persons during an emergency. When completed, this project is expected to result in recommendations for improvements in present records systems, guidelines for exchange of essential records, and uniform procedures for recording and using data.

Shelter Habitability and Management Studies

Our shelter research grew out of the need for information on shelter habitability, which was basic to design plans and cost estimates. Questions to which we sought answers included: What facilities, equipment, and supplies would be indispensable? What sleeping, seating, and space arrangements would be most effective? How well would people tolerate shelter confinement? Would they be willing to enter shelters? How would their willingness to remain in shelters be affected by the length of time they might be required to stay? What organization, management, and leadership elements of a shelter program are indispensable? How would shelter experience affect the occupants' ability to face the stringent demands of post-shelter survival and reconstruction after leaving shelter?

To help answer these questions, the DRG offered to assist in the formulation of a research program. A consultant Panel on Shelter Habitability was formed, from which we received valuable aid. A review and analysis of the literature on experiences that have elements in common with living in fallout shelters was done for us by DRG. The findings are reported in Human Problems in the Utilization of Fallout Shelters (Baker & Rohrer, 1960).

A basic study of the management requirements of large, single-purpose shelters--using the systems-analysis approach--was completed by Dunlap and Associates (1959). The study analyzed the factors that could affect maximum economy and utility of a 1,000-person shelter. It considered design, facilities, equipment, supplies, organization, training, operating conditions, and management methods. This was followed by a companion study on the Use of Existing Structures as Fallout Shelters (Dunlap & Associates, 1960), which was an effort to develop data for a basic manual on the use of existing structures as fallout shelters.

But before such shelter potential could be used, local authorities had to know what to look for, how to make use of what they found, and how to make adequate preparations for managing and operating shelters. Procedures for developing and preparing shelters were suggested, including examples of how to go about improvising shelter in typical buildings such as a bank, a school, an office building, and a church.

A third study, a further application of Dunlap's basic analysis (Dunlap & Associates, 1961b), was recently prepared for the Department of Health, Education, and Welfare by Daniel Furman, with support from OCDM. It investigated the plans which would be necessary for the post-attack protection and care of residents of welfare institutions. Case studies were made of several institutions for aged, young, and handicapped persons.

The fourth Dunlap study (Dunlap & Associates, 1961a) developed data for a manual for the use of citizens in determining their stay-time requirements in fallout shelters.

Several occupancy studies involving a total of about 530 subjects have been completed for OCDM. The first of these studies, Project Hideaway, was made by Jack Vernon (1959) at Princeton University. Its objective was to determine if a family with small children could remain confined in a family fallout shelter for an unbroken period of two weeks and to determine the nature and gravity of the problems associated with family life. No problems developed that were of sufficient gravity to cause termination of the test. The problems that did develop had to do with heat, ventilation, odor, humidity, and other physically produced conditions.

The tests in the second study, which involved 100 persons, were carried out in a shelter that was designed and constructed as an adaptation of a standard corrugated-steel underground munitions chamber (Strope, Etter, Goldbeck, Heiskell, & Sheard, 1960). This was part of a larger study of a shelter system conducted by the Naval Radiological Defense Laboratory (NRDL), at Camp Parks, California, (Strope, Porteus, & Greig, 1959) aimed at developing a standardized design to meet basic specifications at minimum cost. Major objectives were to determine the effects of ventilation and other physical features and facilities on habitability. The tests offered opportunity to examine organization and management plans. In these tests several different types of food rations, including an experimental wheat diet developed by the Department of Agriculture, were evaluated (Olson, 1960). Some routines, diversions, and management techniques were tested. The occupants came through in good physical and mental condition. Fewer difficulties and medical complaints developed than were expected. Noise, crowding, sleeping conditions, insufficient seating capacity, temperature during the summer, restricted use of water for purposes other than drinking, and diet were ranked as the greatest difficulties (Goldbeck & Newman, 1960).

Our most substantial occupancy study was conducted in Pittsburgh during the spring and summer of 1960 by the American Institute for Research (Altman, Smith, Meyers, McKenna, & Bryson,1960). The study provided information on the social and psychological aspects of shelter occupancy. Space was originally considered a major concern of the study. However, the smallest space the design permitted (8.33 square feet and 66.67 cubic feet per person including toilet and living and storage space) was found to be adequate from the psychological and sociological point of view. In fact, slightly less than six square feet of space per person was provided during the last 20 hours of a two-week test without evidence of severe discomfort.

Since an adequate system for controlling and measuring temperature and humidity was a part of the shelter installation, it was possible to use

temperature as a major experimental variable. Although there were no severe psychological reactions that could be directly attributed to temperature variations in these tests, personal discomfort increased rapidly as the effective temperature approached 85°F.

The other main experimental variable used in these tests was the presence or absence of trained and designated shelter managers. In two of the tests, trained managers were present. In two other tests, trained managers were absent. The investigators concluded that trained and designated managers increased the subjects' adjustment to shelter conditions and enhanced their attitudes toward shelters, civil defense, and people in general. Extrapolation to conditions of an actual nuclear attack situation would suggest a vital role for trained and designated shelter managers. There are important implications in the fact that, under the guidance of trained managers, it was found feasible to provide survival training for in-shelter and post-shelter situations.

Subjects reported the lack of water for washing to be the greatest over-all discomfort factor. However, the groups subjected to effective temperatures up to 85°F. reported temperature and humidity to be a greater source of discomfort than lack of water for washing. Other discomfort factors frequently mentioned were lack of exercise, crowding, dirt, and sleeping difficulties. This emphasizes the importance of flexibility in bunk design and arrangement so that space can be used efficiently.

Although our studies provided significant data on psychological and sociological adjustment capabilities, we know that more information is needed and much more investigation remains to be done. We must keep in mind the limitations of these studies. The effects of the stresses inherent in a real attack situation were not involved. Different groups were used under each set of experimental conditions. We do not presume to have tested a random sample of any population.

I have briefly sketched the major Social Sciences Research programs. I hope that in this brief account you have sensed implications and needs, which transcend our current budgetary limitations. Fresh appraisals and wider research horizons are needed. A major task is to bring together knowledge to support civil emergency planning in its broadest sense. Reappraisal of our regular programs plus new ideas for research are needed to strengthen civil emergency planning. Once research is adequately defined, programs and projects that cannot be accommodated within the OCDM budget may be assigned to other government agencies or funded from other sources. We hope the Committee can assist us in reviewing and evaluating suggestions for new research. It is with this in mind that we have developed the following illustrative questions and suggestions.

Needed Research in the Prototype Shelter Program

In Eugene Sleevi's presentation, "Status of Plans and Operations for Civil Defense" (Chapter 3, this volume), you heard about the prototype shelter program and the shelters already constructed. These include shelters of concrete block and other types located in basements, aboveground and underground. To date research on habitability has been largely on simulated shelters. Now, however, the different types and sizes of prototype shelters located throughout the country provide many ready-built laboratories that can be used for habitability research and other studies as well. Our family shelter habitability research, while yielding some significant findings, has also indicated the need for more comparative data.

As in the case of the family shelters, the prototype community shelters offer many different types of structures and settings for developing research data. They are located in such places as schools, civic centers, lodge halls, hospitals, abandoned subways, and under thruways. These shelters can be used for the study of problems relating to the habitability and management of large-group shelters.

In the event of thermonuclear war, millions of lives could be lost through exposure to radioactive fallout. Our studies indicate that most of these lives could be saved by the use of fallout shelters. The case for their use is theoretically straightforward. Yet our experience since the announcement of the National Shelter Policy in 1958 suggests that the idea of fallout shelters is a difficult one to sell. It appears, therefore, that we need a better understanding of the social and psychological environment in which such programs must take root and be developed. Shelters must be built and other preparedness measures must be developed now in a period of ideological, sociopolitical and economic warfare. Undoubtedly, there are many attitudes and beliefs related to these phonomena that have direct bearing on public response to appeals to build shelters and to accept other civil emergency programs.

In order to understand the problems of promoting effective response to civil emergency readiness measures, we must know how people feel about our programs. We must also know how people feel about the prospects of our programs achieving national goals. National programs are not judged in isolation as if they stood alone in time. Civil emergency readiness programs are undoubtedly intermingled in the minds of people with many factors that influence their thinking. Such factors include the effectiveness of economic aid and information services, the likelihood of limited or guerilla type warfare, the imminence of general nuclear war, adequacy of military defense, and the Nation's ability to deter war.

Adequate readiness programs require active public support and acceptance. They require effort, commitment, and sacrifice. They have many unique characteristics which undoubtedly make them difficult to promote. Among these is the problem of distance, both psychological and physical, from the threat situation itself. The threat is complex. It does not seem real and this lack of reality is intensified by its remoteness.

We must view the various civil emergency programs including the promotion of fallout shelters in this environment. In order to understand responses to these programs we must know more about the breadth of public understanding of requirements, and actual and potential policies in the current Cold War conflict.

If civil defense is to carry out its action programs on a long-range basis, there is need for more and better information on people's understanding of, and commitment to, the purposes, policies and actions of the government. Civil defense can be directly related to knowledge of how Americans see themselves, their governments, and their Nation in the Cold War contest and in changing conditions of world affairs. It would be useful to know how certain sectors of the public--national leaders, mass communicators, educators, and others--feel about these questions, problems and perspectives.

What are the Implications For Research in the Concept of Induced Sociocultural Stress?

John Gillin, in his chapter prepared for publication in Man and Society in Disaster (Baker & Chapman, 1962), has suggested the possibility of deliberately induced sociocultural collapse--disaster growing out of the current socio-political conflict. Major points in a modern sociocultural system where breakdown could be expected to produce disaster--in the sense of the system's being rendered incapable of satisfying major goals--include: depletion or blockage of nature-derived energy sources; interference with knowledge and belief systems; inadequate application of knowledge; faulty coordination of social units; collapse of control through communication failure; leadership errors and loss of confidence in basic values and goals. Ultimate collapse might come when the basic underlying values lose their appeal. This usually occurs when subgoals and instrumentalities have been eroded and confidence in them has disappeared.

Gillin points out that the Cold War is not as simple as we have sometimes been led to believe. It is not a contest of slogans or of intellectual arguments regarding basic values. It is global conflict in the geographical sense, but, more important, it is global in the sense that all value aspects of the sociocultural system under attack are explored for purposes of aggression. This points to the necessity for basic studies of our social system with respect to its vulnerabilities to this type of attack. Also needed are studies of

alternative ways of strengthening our system without, at the same time, destroying the very values we seek to preserve.

Research on Social and Psychological Effects of Nuclear Attack

Successful civil emergency planning requires that research attention be directed to an analysis of the probable physical, economic, political, social, and psychological conditions following a nuclear attack. If we assume that substantial numbers would survive a thermonuclear attack, our problem becomes largely that of developing greater understanding of how man might organize his society to cope with the changed conditions resulting from an attack. Much of our planning for this post-attack period is directed to this central issue. Here I should like to emphasize that civil emergency planning is aimed at the recovery of society, as well as the survival of people and resources. Many authors have described social systems under stress, disaster, and disruption. A current effort to draw these findings together in a publication called Man and Society in Disaster (Baker & Chapman, 1962) has already revealed the need for additional definitive disaster research in a number of areas.

Conclusion

I have outlined the major functions of our Social Sciences Research Division and the highlights of our research programs. As I consider suggestions for additional new research to which the behavioral sciences can contribute, I am aware of the diversity and magnitude of the problems presented. Diversification was by intent--and in the knowledge that this group represents a wide spectrum of applicable research interests. The magnitude of some of the questions posed reflects the comprehensive and complex nature of the problems presently confronting us. I believe that these and similar questions and problems should receive high priority. I hope that the material that I have presented will stimulate further thought and action in the development of a more adequate research program.

CHAPTER 10

TOWARD SYSTEMIC ANALYSIS OF DISASTER, DISRUPTION, STRESS AND RECOVERY--SUGGESTED AREAS OF INVESTIGATION

Charles P. Loomis
Michigan State University

It has been stated that "the realistic estimate of the result of a nuclear attack is the fragmentation of America into scattered remnants that would vary widely in their degree of self-sufficiency and capability of recovery. Whether the United States could be reconstructed area by area over a period of time may well depend on today's leadership, today's action plans and their implementation" (Advisory Committee on Civil Defense, 1958, p. 21). The report from which this quotation is taken concludes: "An important part of the United States can survive what we believe to be the most probable form of attack--provided there has been proper preattack planning and action" (p. 31).

Most social systems exhibit mechanisms that function to prevent disruption from stress and disaster. However, no social systems have been subjected to the disastrous impact of all the facilities now available for modern warfare. Whereas in the past military strategists seldom planned on completely knocking out a powerful nation in the first few hours or days of warfare, this outcome is now viewed as a distinct possibility. It is, therefore, fitting to consider the type of information and knowledge which is required if we are to survive.

Survival may very well be possible only if some of the ablest minds of our society find effective employment in social science investigations, of both the applied and fundamental types. Elsewhere the concepts required for disaster research have been defined and the findings from social science pertinent to the explanation and understanding of the persistence of social systems collected and codified (Loomis, 1960, Essay 3). That analysis and presentation was organized in terms of a conceptual scheme called the Processually Articulated Structural Model (hereafter referred to as the PAS Model) presented in Table 1. Based upon the conceptualizations of many social scientists, both dynamists and structuralists, the schema provides a means for codification, analysis, and (hopefully) eventual explanation of both the structural and processual features of organization.

TABLE 1

Elements, Processes and Conditions of Action of Social Systems
The Processually Articulated Structural Model (PASM)

Processes (Elemental)	Structural-functional Categories*	Elements
1) Cognitive mapping and validation	Knowing*	Belief (knowledge)
****2) a) Tension management and b) Communication of sentiment	Feeling	Sentiment
***3) a) Goal attaining activity and b) Concomitant "latent" activity as process	Achieving	End, goal, or objective
4) Evaluation	Norming,* Standardizing, Patterning	Norm
5) Status-role performance**	Dividing the functions	Status-role (position)
****6) a) Evaluation of actors and b) Allocation of status-roles	Ranking	Rank
***7) a) Decision making and b) Its initiation into action	Controlling	Power
8) Application of sanctions	Sanctioning	Sanction
9) Utilization of facilities	Facilitation	Facility
Comprehensive or Master Processes 1) Communication 2) Boundary maintenance	3) Systemic linkage 4) Institutionalization	5) Socialization 6) Social control
Conditions of Social Action 1) Territoriality	2) Size	3) Time

*These categories have been called processes by some writers. Thus Howard Becker writes that "it would be quite proper always to speak of human activities as essentially 'knowing-desiring-norming.' " Howard Becker, "Current Sacred-Secular-Theory and Its Development," in Howard Becker and Alvin Boskoff, Modern Sociological Theory in Continuity and Change (New York: Dryden Press 1957), p. 140. Elsewhere Becker calls these categories processes. Ibid., p. 165. They are also used as activities, Ibid., pp. 141 and 175. Becker's term, knowing, is equivalent to the above category knowing, his category, desiring, carries part of what is covered by the above terms achieving and feeling, and we are indebted to him for his term "norming" which had been previously called "standardizing and patterning."

**Status-role, alone of the concepts, includes both element and process.

***The structural-functional categories, achieving and controlling have primacy in the kind of pattern which may be designated as external, to use that term somewhat in the sense attributed to it by George C. Homans and others. Likewise the elements, end and power, and their respective articulating processes, goal attaining activity as process and decision making and its initiation into action have primacy in the external pattern. This in the present author's conceptualization constitutes a more Gesellschaft-like aspect of the social system than the internal pattern.

****The structural-functional category, feeling has primacy in the kind of pattern which may be designated as internal, to use that term somewhat in the sense attributed to it by George C. Homans and others. Likewise the elements, sentiment and its articulating process, the communication of sentiment has primacy in the internal pattern. This in the present author's conceptualization constitutes a more Gemeinschaft-like aspect of the social system than the external pattern.

Source: Charles P. Loomis, Social Systems: Essays on Their Persistence and Change (Princeton, New Jersey: D. Van Nostrand, 1960), pp. 8-9.

For the evaluation and analysis of any organization, whether it be of the nature of the Cooperative Agricultural Extension Service engaged in attempting to introduce improved practices, or whether it be the German Air Raid Protection Service of World War II, or an agency as yet unknown which is assigned the responsibility of the management of a fallout shelter, it is necessary that certain data be collected on a categorical basis. Before an investigator can effectively evaluate an organization's performance, he must know the goals and attend to the mode of their attainment. He must likewise consider unintended and unrecognized consequences of these activities. He should be able to evaluate action in its cognitive, affective, and normative aspects, both structurally and processually. Organizationally speaking, he should analyze both the structural and processual aspects of the division of tasks and functions involving action among equals as well as among unequals in both power and rank. The consequences of sanctioning and the effects of technological or "facility" considerations must likewise be considered (Table 1), as must the comprehensive or master processes such as communication, institutionalization, boundary maintenance, systemic linkage, socialization, and social control. The analyst will be sensitive to the patterns of action, whether these involve the internal or the external activities of the members of the system, and to the conditions of space, time, and size to which those activities are subject.

I do not believe that variations in the effectiveness of the German Air Raid Protective Service in the various cities of Germany during World War II can be effectively explained by omitting many of these considerations--an observation which is equally applicable to the defense plans of this country, both the tried and the untried. Systemic attributes of a given defense organization (for example the Air Raid Protective Service) and of the cities and their sub-systems which are being served by the defense organization, as well as the linkages among these, will be important determinants of the relative importance of the various concepts. Thus in Germany under bombardment, war-supporting morale varied with size of city, religious composition of the city, bombing experience, dedication to Nazi ends, norms, sanctions and many other considerations (Loomis, 1960; U. S. Strategic Bombing Survey, 1946, Vol. 2; see also Form & Loomis, 1956, pp. 180-185). The remainder of the paper will be devoted to those considerations and others. Since none has any inevitable primacy, they will be treated here in the order of the items of the PAS Model as they are listed in Table 1.

Knowing

Belief (knowledge) as an element. Any proposition considered to be true is a belief. If Lenski's (1961) and other studies are valid, the different patterns of behavior exhibited by Catholics, Protestants, and Jews are correlated with different beliefs concerning time, money, and facilities, as well as with different goals, norms, and sentiments. Will these and other

groups whose belief systems differ manifest correlated variations in behavior under the impact of thermonuclear bombardment and other crises? And will chance for survival of social units be influenced by these beliefs?

It is possible to build civil defenses which foster a false security, as the French did behind their Maginot line.[1] A better policy than that of attempting to establish an impervious defense is the cultivation of some fundamental principles of human resistance whereby man can overcome and recover from disaster, whatever its type and source. The execution of such a policy would require that social sciences be advanced far beyond their present state. In the meantime, social science can furnish some leads. One such lead would be found in analysis of prevailing beliefs, whether those beliefs be based on empirical evidence, whether they embody such self-fulfilling prophecies as the "eventual decay and extermination of free individual enterprise" or the suicidal prophecy of defeat (see Merton, 1957, p. 427). The cognitive aspect of action in all stages of disaster has not received the amount or kind of attention that the subject merits. I suggest that various carefully designed experiments with some features of those carried on by the military with "survival units" be applied to civilian units to ascertain the significance of knowledge for survival.

Cognitive mapping and validation as process may be defined as the activity by which knowledge, or what is considered true and what false, is developed. The phenomenon commonly recognized as "shock" or "daze" which is observable immediately after a disaster has been interpreted rather differently by psychologists and sociologists. Some of the latter have

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[1]At one stage in the development of the Office of Civil and Defense Mobilization, this "Maginot-line" thinking seemed to exist. Thus in its Information Bulletin for January 10, 1961, we read, "Over 400 prototype fallout shelters are being constructed throughout the country. These are dual-purpose shelters which will have practical peacetime uses. Results have been impressive. Over one million family fallout shelters have been built throughout the country. Many new housing developments incorporate shelters in new homes. Many contractors are engaging in the business of building shelters. OCDM surveys show that over 25 per cent of the people have adequate shelter space today." How much this was "Maginot-line" thinking is revealed by a later issue of another organ of the same organization, the Weekly News Digest of April 28, 1961, which carries the following: "Ellis' Shelter Findings Endorsed: Editorial in Battle Creek, Michigan, Enquirer and News, April 11: 'Frank B. Ellis, new director of the Office of Civil and Defense Mobilization, said last week that the home shelter program has been a failure. He will not receive much argument on this statement from those in a position to know!' "

interpreted the phenomenon as a period during which cognitive mapping of a new and suddenly changed situation takes place. Research is needed to explain variations in the phenomenon and to determine whether the various interpretations are differences in mere definition or whether more fundamental factors are involved. Likewise studies should provide more specifications for the findings of Wilbert Moore and Melvin Tumin (1949, pp. 791-792) and Louis Schneider (1960) to the effect that ignorance is functional in social action (see also Killian, 1956). The Disaster Research Group provides considerable evidence that faulty cognitive mapping and validation may in the future result in heavy loss of life. Research findings can correct such errors, especially those accompanying warning and interpretation of the impact of the disaster-producing phenomenon. Likewise, research should remove the qualifications from the following statement, which seems of great importance and which comes from the Disaster Research Group. "There is some evidence which suggests that the possession of information about the danger situation, even when the actor can do nothing about it, is itself positively correlated with calm behavior" (Williams, 1957, p. 17). If the statement is validated, research may be able to demonstrate at what age children should learn about the true facts of modern thermonuclear and biological warfare for optimum recovery from the impact of such disaster-producing agents. How such learning should be imparted may also be ascertained. This brings up consideration of the sentiments involved in disaster.

Feeling

Sentiment as an element. Whereas beliefs are cognitive and represent what is known, sentiments are affective and represent what is felt. Future research should reveal why, according to the reports of the Disaster Research Group, the children in the Vicksburg theater disaster (Perry, Silber, & Bloch, 1956) suffered more trauma and other psychological disturbances than the rural children of Delta Town (Perry & Perry, 1959) in the schoolhouse disaster. Perry, Silber and Bloch, the authors of the Vicksburg study, express considerable concern over the failure of Vicksburg parents to engage in tension-release through verbalization about disaster, death, and feelings associated therewith. Pursuant to this line of thinking the question may be posed: Are the same cultural factors which make Anglo-Americans, Latin-Americans, Negroes, Italians, and Jews behave differently in pain operative in the situation reported in these studies (Zborowski, 1952; Loomis, 1960, Essay 7)? How valid is the claim that even the "Spartan" Anglo-Americans who have experienced disaster need to "work through" the experience by talking about it?

Tension-management may be defined as the process by which the elements of the social system are articulated in such a manner as to (1) prevent sentiments from obstructing goal-directed activities and (2) avail the system of their motivating force in achieving goals.

Under what condition can family members be separated and morale retained? Is the German experience generalizable to the United States? In line with German experience, may it be expected that national morale will, irrespective of the objectives and facilities, fall rapidly if families are separated without opportunity for frequent contact? What are the relative contributions to morale breakdown in the case of separation of different members? For instance, is the mother's separation from the children more or less morale-breaking than the father's, and does this vary with the age of the children? We are reminded in this connection of the findings presented by Richard Titmuss (1950).

A phenomenon operative in disaster situations leads toward an oft-reported "compulsion toward activity." The phenomenon is reminiscent of Parson's observation that in medical practice uncertainty and incurability of certain medical cases result in a "bias in favor of operating" which he likens to Pareto's "need to manifest sentiments by external acts" (Parsons, 1951, p. 466). Thus Harry Williams writes, "We know that in the early stages of disaster, rescuers, helpers, and officials, feel a great urgency to act--to do something" (Williams, 1957, p. 17). Likewise, this compulsive activity is accompanied by what is called "the speed mania," noted by Raker, Wallace, Rayner and Eckert (1956, p. 27). This results in shock states among the victims which are more attributable to the manner in which they were driven to the hospital than to the disaster's impact. Of what significance are these observations from past disasters for defense plans which anticipate a thermonuclear attack? Will the unreleased tensions of millions of people waiting for many days in fallout shelters they dare not leave constitute a morale problem of hitherto unknown magnitude? Should incumbents of status roles responsible for certain activities in disaster or fallout shelters be skilled at expressive activities and other behavior calculated to reduce stress? The significance of such status roles as priests, ministers, and so forth should be ascertained by research just as the effectiveness of the various rites of intensification should be determined. The question might be raised: Under what conditions does survival in modern warfare require that groups develop more facility for self-entertainment and less of what is sometimes called "spectatoritis"?

In closing this discussion of needed research in the nature of tension-management, I should like to recommend that much more effort and support be applied for the purpose of developing programs which Irving Janis (1960, pp. 125-129) has called "emotional inoculation." These research efforts, which should combine several fields including sociology and psychology, should provide the basis for developing programs by which the bulk of the American population would be made more ready for nuclear warfare than is now the case. Such "inoculation" must deal with both the cognitive and affective aspects of individual and group life. We must be readied both cognitively and emotionally for long and inactive periods in shelters. We

must also be readied for return in the post-nuclear attack period to the ruin and carnage with which we must deal. This readying must deal with both the "over-actors" and the "under-actors." It must provide effective cognitive mapping without producing paralysis, anxiety or apathy. For Americans whose ancestors saw their loved ones killed on the frontier and who are oriented to doing rather than to withdrawing this "inoculation" should not be impossible to achieve.

Communication of sentiment is the process by which members of a social system may be motivated to achieve goals, conform to norms, and to carry out systemic action through transfer of feelings by symbols. The various research studies and literature on disaster indicate that intense activity during emergency phases of the disaster is followed by what is called a "halo" effect. Some have likened this to the emergence of the so-called therapeutic community. A tremendous outpouring of fellow feeling, sympathy, well wishing, and unselfishness submerges other sentiments. How universal is this "great outpouring of love, generosity, and altruism" in disaster, as reported by Fritz and Williams (1957). I have hypothesized that the disruption which communist agents cultivate is productive of this halo effect (Loomis, 1959a, pp. 383-390; see also Loomis, 1959b). Is there any support for such a hypothesis? If such halo effects are inevitable under bombardment, and if they have been made use of by totalitarian agencies, may they not be used for constructive purposes in advancing goals of nations and communities under bombardment? For people who actually believe that the United States cannot survive bombardment, would it not be wise that they learn of the strength provided to groups by the so-called halo effect even when large numbers have been killed or injured? Such knowledge might counteract the "self-fulfilling or suicidal prophesy" mentioned by Merton (1957, pp. 128-129) which leads to apathy or fear and inactivity in preparation for the horrors of bombardment.

Achieving

End, goal or objective is the state that members of a social system expect to achieve through interaction. It may represent changes from the present state, or in some cases, the retention of the status quo. Much of Herman Kahn's discussion (Chapter 4, this volume) during this conference fits in this category, including systems analysis, game theory, and many other types of activity which are amenable to analysis through the use of the means-end schema. Through research we should ascertain the goals and the significant dimensions of these goals of various sytems operating at various stages in all kinds of disaster, particularly those not unlike the results of bombing. How were the goals of the German Air Raid Protection Service which bombarded victims acclaimed (or of our own Salvation Army similarly acclaimed) different from those of our own National Red Cross which at certain stages of disaster is likely to meet with opposition? How do the

goals of each coincide with the goals of the units they are designed to serve? How are goals and their accomplishment related to the "halo effect" in disaster? These are only a few of the questions for which research should provide answers.

Goal attaining and "latent" activity as process is the change resulting from purposeful effort expended (both intended and unintended and recognized and unrecognized). Is the goal of succor for the disaster-stricken area altered in its fulfillment when coupled with the goal of fund-raising? How do fund raising requirements on the part of an organization affect its activities? What are the variations in the activities exhibited by systems representing different strata, classes or castes, and under what conditions do the goals exhibited by such systems converge? Under what conditions do they clash? What can be learned from experience in concentration camps, prisons, isolated radar bases, submarines, and so forth, for existence in fallout shelters (Baker & Rohrer, 1960)? How do the goal attaining activities of informal and formal groups vary at different stages of disaster (Form & Nosow, 1958)? Do members of highly integrated systems when encountering conditions of extreme deprivation become "animal like" or otherwise altered so that no commitment to social goals remains? Under what conditions does this take place? As Biderman (1960, p. 57) and West (n.d.) have noted, the phenomenon of "deculturation" or emergence of animal-like urge and struggle to live among severely deprived prisoners of war has been observed and reported, as well as what on logical grounds may be considered as an opposite type of behavior, the "give-up-itis," "loss of will to live," and "fatal withdrawal." The low rates of most forms of suicide in all known wars is noted in this connection.

Norming, Standardizing, and Patterning

Norm as an element may be defined as the rule which prescribes what is acceptable and unacceptable to members of a social system. For our considerations here we may inquire to what extent, under what conditions, and at what stages do intense disasters provide legitimacy for violating ordinary cultural norms, for instance, segregation norms in the South or property norms in the capitalistic societies generally? Many norms related to risk and safety offer fertile fields for sociological investigation. Situational hypotheses may be designed and furnish the basis for the validation of propositions which will explain such differences as the following: Americans use available safety belts in commercial airlines and seldom use them in privately owned automobiles. English and Swedish citizens seem to have more fallout shelters than Americans. How do norms of rationally organized systems or bureaucracies relate to other systems in communities during disaster? For example, the so-called means test for rehabilitation as employed by the National Red Cross has been reported as condemned by middle class members for some reasons and by lower class members for quite different reasons.

Do disasters provide opportunity for breaking with the normative order of the past? Under what conditions should subjection to disaster provide legitimate violation of norms? Are disaster victims, for example, children, to be defined as sick and not held to school attendance and other normal requirements? If so, under what conditions?

Evaluation is the process through which positive and negative priorities or values are assigned to concepts, objects, actors, or collectives, or to events and activities, either past, present or future. Various hypotheses may be tested under this heading. For example, consider the following hypothesis: The greater the urgency for action, which if not taken will be fatal or disastrous, and the fewer the alternatives to such action, the greater will be the tendency toward a high evaluation of such action. Also, we may test the hypothesis that, in disasters, evaluative judgments are made more difficult by the ambiguity of norms. For instance, the so-called life style norms of middle class residents may prove ambiguous when broken by temporary family residence in tents or other make-shift shelters in back yards after disasters which have resulted in the destruction of houses. Survival experiments conducted by the military and other agencies may provide opportunities to learn the significance of various types of ambiguity, lack of "social certitude," etc.

Other areas of investigation under this heading suggest themselves: When norms of agencies specify equality for all relief and rehabilitation activities within certain normative standards (the means test for the National Red Cross, for example) what happens to evaluation as ascriptive caste-like norms reassert themselves in an ascriptive, stratified community? When professionals, such as physicians, have internalized one set of standards, and the emergency situation imposes another, how can the temporary "lowering" of standards be legitimized? (For example, under what conditions can veterinarians with surgical training conduct human surgery, and so forth?) Under what conditions does an intensification of religious activity or fatalism develop? What hypotheses useful to the OCDM grow out of the observations that during World War II, war supporting morale was greater under bombardment in Germany for Nazis than for non-Nazis, and the greater the dedication to Nazism the higher the war supporting morale? What is the function of various rituals after disaster for morale? The variety of research activities related to evaluation appropriate to disaster is very great. Groups subjected to survival experiments of various types may reveal much not now known about human evaluation.

Dividing the Functions

Status-role. The two-term entity incorporating both element (position) and process (role activity) determines in large part what is expected from an incumbent and how this incumbent is to perform. What are the ingredients

of training and organization when incumbents, of, say, an Air Raid Protective Service, once "in status-role" remain so even though other contradictory statuses, such as that of family member, make claims upon them? What role models are important for disaster victims yet alive (Chapman, 1960, pp. 222-224; Powell, 1955; Rayner, 1958)? Is it functional for survival that saga and story idealize the actor who never gives up and "can take it" and ridicules or disparages the actor who submits? What types of organizations can supply role models for expressive and/or integrative leaders for long waits in fallout shelters and other situations?

Many studies have demonstrated the importance of meaningful status-roles for group morale (Rayner, 1960, p. 49ff.). Studies designed to ascertain the optimum arrangement for establishing, allocating, and making known the status-roles for fallout shelter existence should be made. The OCDM's official list of shelter manager, medical supervisor, technical supervisor, administrative supervisor with various suggested committees may or may not be the best pattern. This is too serious a matter to leave to the determination of Dunlap and Associates on the basis of their studies. Their claim that the matching of "jobs and people" in the medical and technical activities is all important, but that such matching in other activities is unimportant is more than a little unconvincing. Indeed, the report itself seems contradictory, recommending as it does that makework activities be resorted to because "within the shelter we are not looking for cost/manpower efficiency but rather utilizing more manpower than we need" (1959, p. 11), but in another context making a case against requiring that shelterees wait in line for food (p. 43). Studies by OCDM and the Disaster Research Group of life on submarines, prisoner of war camps, radar bases and elsewhere are meaningful and enlightening. At the same time there may be as yet untapped sources which could yield new information concerning the creation and maintenance of morale. Why, for example, have unionized strikes not been studied for leads on how to maintain morale and manage populations under bombardment? Anyone who has witnessed a textile mill strike, particularly in the South, will realize that morale is not alone dependent upon doctors and mechanical technicians. Expressive leaders of all kinds including singers and preachers have important contributions to make.

I am reminded of the Waco disaster when soldiers and civilians were mixed to augment manpower (Moore, 1958, pp. 11-15, 310-317; see also Loomis, 1960, p. 153). How can members of bureaucracies specializing in disaster, rescue, and similar work augment their manpower from outside their own organizations in the local areas? Too little is known about such augmented systems to formulate plans, but apparently modern bombardment indicates the need for such plans.

Ranking

Rank (or standing) represents the value an actor has for the system in which the rank is accorded. It has been suggested that disaster in underdeveloped areas of the world would be conducive to hostility toward the elite, whereas in industrial societies with strong middle classes, it would not. This hypothesis may be tested even within the United States (Form & Loomis, 1956; Loomis, 1960, p. 154).

The magnitude and probable dispersion of targets for thermonuclear and other weapons are so great that no centrally-based mobile and efficient regional bureaucracies can hope to carry all the burden of rescue and emergency reconstruction. Although something is known about the ingredients of efficient rational organizations, such as fire fighting units of the Forest Service, the German Air Raid Protection Service, and similar ogranizations previously mentioned, too little is known about the optimum form of local services involving both professional and volunteer personnel. At present community rank on the part of members of a local organization may assist that organization in raising funds but prove detrimental in relief and reconstruction. Such ideas may be formulated and tested.

Evaluation of actors and allocation of status-roles as processes. If I read correctly the Dunlap and Associates report, Procedures for Managing Large Fallout Shelters, a remarkable device for selecting leaders has been invented. "In the event that the pre-selected manager does not arrive, access [to food] is gained by removing a number of large lug nuts. . .some at a height of almost nine feet. Thus, at least two people cooperating (one on another's shoulders) will be required to open the door [for food] and other shelter members will observe and cooperate by waiting until the door is opened. When the door is opened, emergent management, observed by at least some of the other shelter members . . .is thereby enhanced" (1959, p. 19). Most social scientists here will be skeptical concerning the efficacy of this means of finding leadership. The literature on disaster contains many instances of high ranking officials in predisaster systems who failed to function effectively in disasters. The literature likewise contains many interesting accounts of very low ranking persons so far as predisaster systems are concerned who during disaster become so important that they emerge as heroes. Apparently, there are many factors involved, personality, social and cultural factors, as well as many elements of pure chance. In any case ex-post-facto studies and studies to come which will be based on the observations during disasters yet to occur should reveal what personality and situational factors are responsible for the development and maintenance of leadership in crises. When individuals of very low rank in the pre-disaster system become heroes in disaster, as frequently happens, is the important determinant their personalities, or are social system variables such as sanctions important? Do they have less to risk and more to gain than others? This

writer does not believe personality psychology conceived narrowly will produce the answer. There are probably important sociological factors as well.

There are many other researchable areas here. How necessary for high morale in the disaster system is consensus of members concerning rank? Which of various status-roles in a role-set (to use Merton's term) demand priority of attention after impact in a disaster? Are there definite patterns of role-sets for families (Clifford, 1956; Young, 1953; Young, 1954)? Will the husband first rescue the wife, then the children, for example? Some research indicates such patterns, but they have not been completely validated. Do any patterns exist? Before leaving the discussion of the category "Ranking," we may quote from the 1960 report entitled The Use of Existing Structures as Fallout Shelters, by Dunlap and Associates on the selection of managers for fallout shelters who live and/or work near the shelter: "Pick, too, people who have a certain status in the community (ministers of religion, police, medical and nursing personnel and the like) and those who will really give some time and attention to their problems" (1960, p. 57). Certainly no one will deny that such a formulation leaves much to be desired. Formulations based upon solid research foundations are indicated.

Controlling

Power is the capacity to control others. It has many components which may be classified as either authoritative or nonauthoritative control. Authority is the right as determined by the members of the social system and as defined by the status role to control others. On the other hand, unlegitimized coercion and voluntary influences are non-authoritative. As previously suggested, prescriptions by Max Weber, Wilbert E. Moore, and others for efficient rational organization for rescue and emergency work may be tested. Also, it is well known that in underdeveloped areas, industrial and other organizations emerge which lack some of the features prescribed in the past for efficient bureaucratic organization. Have any of these features importance for plans for organizations which must function in disaster-ridden communities and in situations of wide-spread disruption?

Many other organizational problems need specific research. Are there means during a disaster for fitting local untrained recruits into professional and highly specialized bureaucracies that may be brought into the disaster-struck area? The case of the interspersion of citizens as co-workers in army units in the Waco tornado disasters as mentioned above comes to mind. The survival studies carried on by the Army and the analyses of behavior of American soldiers held prisoner as a result of the Korean War suggest hypotheses concerning the claim that retention and legitimation of certain authority patterns reduce the probability of personality collapse and suffering. Studies utilizing past experience, future disasters, as well as experimentation, should

be designed to learn what authority patterns under what conditions have optimal significance for Americans.

Decision making and its translation into action as process. Decision making is the process by which the alternatives available to members of a system are reduced. Decisions are translated into action when directives carrying these decisions are carried out. Frank P. Zeidler, mayor of Milwaukee, suggests that the metropolitan areas of the United States are characterized by "incapacity to act in self-protection and [are] matched against a hardened system such as the Soviet Union--which can order populations to move, force the relocation of industry, and reduce vulnerability" (1957, p. 76). The implications suggest broad areas of research of social and many other sciences for the investigation of power and its employment. Perhaps the 11th hour for the execution of both experiments and demonstration projects involving large-scale population and other adjustments has passed. To this writer, the consensus among social scientists concerning the value orientation of Americans leaves no doubt that such research and experimentation will be undertaken if the threat which provokes its need is not removed. Achievement oriented, activistic, manipulative, and instrumentally inclined Americans (even those who place top priority evaluations on "equalitarianism" or "non-authoritarianism") are not going to sit back and submit to either blackmail or annihilation as Zeidler implies.

Dunlap and Associates write: "We want to maintain maximum shelteree autonomy." In the same vein they continue "We prefer the shelterees to solve most problems on their own" (1959, p. 9). Here we see the American value system manifesting itself, although we do not know that it will win wars. I believe Mayor Zeidler has a point, but I believe also that Americans can submit to authority if it is necessary. The ambiguous nature of authority in American society is reflected in the Dunlap and Associates report, Procedures for Managing Large Fallout Shelters. Non-authoritarian relations are clearly preferred at the same time that the whole idea of proposed shelters for Americans is labelled an "authoritarian system" (1959, p. 99). The same ambiguity may be seen in the analysis of the experience of the Korean war prisoners. As Albert Biderman notes, "there is the complaint that Americans are too dependent on authority, and do nothing without being told; on the other [hand] that they are too independent of authority and reject direction in time of crisis. . . There is, indeed, this contradiction" (1960, p. 51). Here the investigator and the agencies supporting research may follow a rule of thumb prescription. When opposing explanations are given for behavior which is important for action, additional and more definitive research is indicated.

Experiments will and must be developed to form the patterns of control best adapted for the American scene. Is not a rule for survival which has held through the ages the following: When two organizations are pitted

one against the other, each will take on those traits and instruments of the other necessary for its own survival. Perhaps the most important problem the differentiated or pluralistic democratic societies now face is how to obtain the advantages of maneuverability, strategy and striking force provided by power-centered and monolithic systems and, at the same time, retain the advantages of flexibility which our power-diffuse pluralistic systems offer. Let us assume that all social science and other contributions will be employed to obtain peace such as we want for our children. If and when this is of no avail, somehow, the unwieldly masses in the mosaic of overlapping power entities in the metropolitan areas must be brought under enough centralized control to achieve survival potential. It is high time that the colossal research and administrative undertakings necessary to design and try out various plans to this end be initiated. This consideration, among others, leads to the system component, sanction.

Sanctioning

Sanction as an element may be defined as the rewards and penalties used to attain conformity to ends and norms. What are the sanctions necessary to bring enough power-centeredness and control into systems of metropolitan areas to be able to exert the highest possible defense and greatest recovery potential? What sanctions, if any, can prevent the phenomenon of convergence which in most major disasters disrupts all communication facilities and which could jeopardize a society under bombardment? What is the role of sanction in preventing particularistic attachments of friends and kin from disrupting rescue, emergency construction and other activities? What positive sanctions or rewards can come from the so-called "fund of good will" (Sower, Holland, Tiedke, & Freeman, 1957) of communities and societies to foster solidarity and resilience under stress? What sanctions have been found most effective in maintaining life under conditions of extreme deprivation and disruption? What do post-factum studies of survival operations of military units and other groups offer by way of models?

Application of sanctions. In various types of social action directed change has been augmented by application of sanctions from various reference groups. Thus farmers have in certain instances been able to increase their incomes through "joining" one-crop or one-variety communities on the condition that there be no freedom of choice in crops to be grown. For example, in marketing certain varieties of cotton, gins in multi-variety communities mix the lint and thereby reduce the chances of obtaining premium prices. In "one-variety communities," premium prices may be obtained and the pressure of sanctions on deviants and nonconformists who might want to grow different varieties may be very great. The social scientist familiar with various programs of this type may experiment with security programs, including fallout shelters, and other facilities.

Much research is needed to ascertain the best strategy for sanctions, the optimal referent, the best means of application, and other considerations for a given objective. What institutional forms have been found most effective in providing sanctions under extreme deprivation and disrupted social existence? What are the respective functions, disadvantages and advantages, of brute, stark force and legitimized normative action for various objectives? Under conditions of both sudden or intermittent and continuous nuclear bombardment, how can suspects be judged by panels of equals in jury trial patterns, and how can rule under law be maintained?

Facilitating

Facility is a means used within the system to attain the ends to which the members of the system are committed. Most research involving facilities and specific technologies falls outside the social sciences and in the various areas represented by the professions devoted to the so-called pure and applied sciences. Nevertheless, all social sciences can gain from study of the use of facilities within systems in disaster. What facilities are the minimal necessary for group survival, and for what periods under extreme deprivation and societal disruptions? What systemic attributes promote persistence of sharing as opposed to the animal-like individualistic existence reported in some accounts of extreme deprivation?

Utilization of facilities as process. When the tables of fate are so turned that a flashlight or a chainsaw or a glass of water may have more value to a victim or a group of victims at a given time than a million dollars or the Hope Diamond, various so-called social science postulates such as those expressed in the idea of distributive justice, noblesse oblige, social certitude, and others may be put to the test. Under conditions of privation, economists may be able to work out some interesting and useful demand and supply schedules. All social science investigators may learn more about social and personality systems than about technology when studying social action in disaster.[2] Post-factum studies of tragedies such as that of the Donner Pass, military units which have been deprived of the essentials of human existence, stranded and isolated ocean crews, and other units may yield meaningful returns along this line. The analysis of Indian raids reported by Wallace (1955) may have lessons to teach as may the barter and

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[2]For instance, the differentiation and evaluation of escape initiators or leaders as ranking lower than survival initiators in a mine disaster is in part accounted for by the fact that escape initiators used up water and food through extreme exertion and endangered the lives of others (Beach and Lucas, 1960).

trading in POW and concentration camps as reported by Biderman (1960, pp. 31ff.).

Such studies should be conducted in terms of a conceptual scheme and frame of reference which will make it possible to articulate the knowledge gained to that now available. To that end, the categories of the present paper were developed. They will of course, continue to be used only if they are found to be efficient for the objective at hand. Although initially used for codification purposes, their design permits the eventual formation of so-called "if x then y" statements. For example, other things being equal, (and in terms suggested by the element "facilities" and the process "utilization of facilities" as defined in the PAS Model) investigations might be addressed to the validation of such "quantitative" hypotheses: If fallout shelters of such and such type are readily available to x per cent of the population under thermonuclear bombardment of such and such type, losses will be y_1; if such shelters are not available losses will be y_2.

Comprehensive or Master Processes

Communication is the process by which information, decisions, and directives are passed through the system, and the means by which belief is gained and sentiment is formed or modified. Few areas of specialty in social science can profit more from disaster research and few can perhaps contribute more than that of communication. The process of communication as ordinarily conceived is indeed comprehensive and broad. This is demonstrated by the fact that social systems by definition cease to exist when members no longer communicate with one another.

From many studies it now is evident that rumor is an important disaster phenomenon. Diffusion of false information is shown to be no less important in "psychological warfare" than in the winning or losing of important battles. The Disaster Research Group's studies of rumor as social action preceding anticipated disaster has yielded much useful information and should be continued (Danzig, Thayer, & Galanter, 1958; Disaster Research Group, 1961; Larsen, 1954). Many hypotheses concerning rumor in disaster remain to be tested. Is it possible to develop a typology of rumor which would be related to various typologies of disaster? Would various measures of communication disruption correlate positively with various measures of "quantity" of rumor and misinformation being circulated? Is it possible to so indoctrinate or "inoculate" populations (Baker & Rohrer, 1960, pp. 125ff.) which may be subjected to bombing or other forms of disaster in such a manner that rumor will be anticipated and counteracted or discounted at the same time that legitimized and accurate information be accepted?

Any means of retaining communication, re-establishing communication, or reducing disruption resulting in communication blockage may

contribute to survival in the future. For example, how can the above-mentioned and almost universal phenomenon of convergence behavior which disrupts transportation and communication in disaster-afflicted areas be avoided either in war or peacetime (Baker & Rohrer, 1960, pp. 125ff.; Fritz & Mathewson, 1957; Loomis, 1960)? How can families, as well as hospitals, police departments, fire departments, and other similar groups receive adequate and accurate information on crucial matters during disasters? In Germany under bombardment during World War II, disruption of transportation seems to have lowered morale more than disruption of other facilities (U. S. Strategic Bombing Survey, 1947, Vol. 1, p. 1). Studies should be made to determine the relationship between morale and effectiveness of communication. Survival experiments should have communication research considerations built into them.

Boundary maintenance is the process by which members of a social system retain the system's solidarity, identity, and interaction. Studies should ascertain the relation between measures of predisaster social cohesion and/or solidarity of systems and the speed of recovery after disaster. One study of disaster reports, "A socially cohesive community is likely to recover more quickly from the impact than a community characterized by lack of solidarity. . .close social relations among an affected population also have a negative aspect--namely, that the secondary shock of the loss of members . . . is more widely shared" (Fritz, 1957, p. 8). Several researchable hypotheses may be abstracted from this statement and tested. What are the ingredients of boundary maintenance for various disaster systems at various stages? As communities pass through the so-called "halo stage" after disaster, are boundaries of sub-systems strengthened, or are they weakened?

Systemic linkage is the process whereby the elements of at least two social systems come to be articulated so that in some ways and on some occasions they may be viewed as a single system. Hypotheses may be developed from another statement from a disaster report--namely, "The organizations that arrived on the scene soon after the impact . . . were successful to the degree to which they fitted themselves into the rescue pattern already established by the local groups" (Form & Nosow, 1958, p. 112). Likewise, hypotheses for testing may be developed from the following: "Personnel representing a higher class group . . . if not engaged in earlier activities of disaster, and if uniforms and equipment appear ostentatious, find difficulty in linking to disaster systems" (Loomis, 1960, p. 161; Killian, 1956). As many organizational leaders, including priests, ministers, governmental and business executives have noted, the problems of linking efficient rational bureaucracies to communities and families are many and the consideration provides many possible areas of both fundamental and applied research possibilities.

Institutionalization is the process through which human behavior is made predictable and patterned, social systems are given the elements of structure, and the potential for carrying out the processes central to characteristic functions is increased. This paper opened with a quotation which raised the question as to whether the United States could be "reconstructed area by area" after nuclear bombardment. Such reconstruction would require the reinstitutionalization of life, perhaps on a very different level than that common to prebombardment existence. Under periods of long bombardment, the German Air Raid Protective Service became institutionalized with training programs, with certification for competence of incumbents in various status-roles, with research institutes, libraries and newspapers. Careful systemic analyses of such organizations may provide some assistance in developing plans for the future. Despite the realization that future bombardments, should they come, may not be comparable to those of the past, it nevertheless would be folly to be blind to the many errors recorded in the past experiences of agencies functioning in communities during and after bombardment, and to be inattentive to the corrective measures suggested by those errors.

Socialization is the process whereby the social and cultural heritage is transmitted. As a part of any industrial community's existence, firemen, policemen, physicians, electricians, engineers, and many others are socialized to their status-roles. Likewise, the huge corps of professionals and others who will be responsible for such activities as air raid protection must learn the skills, attitudes, and other components of their status-roles.

Research on socialization in any of the professions, especially those that require a high level of dedication should provide useful information for training plans for disaster professionals and workers. The many sociological studies in the medical profession and programs such as that of the Russell Sage Foundation for in-service training should provide leads. What are the role-models for air raid protection specialists? Certainly, the teams of professionals who must perform as air protection service specialists in modern warfare with the dangers of radiation, poison, bacterial dispersion both to themselves and to their families must have a dedication to duty which is difficult to comprehend. As important as socialization for specialized status-roles is that which must take place for everyone irrespective of age, sex, vocation and other walk-of-life determinants. I refer to general socialization for the atomic--or, if you will, the thermonuclear--age, a socialization which has been vigorously advocated by the avant-garde among the nuclear physicists since the middle 1940's, and without which defense techniques can scarcely be expected to be widely adopted.

Social control is the process by which deviancy is counteracted. Many pertinent problems have been mentioned which are related to this process. The American value system may pose special problems with its

emphasis on individualism and equalitarianism as opposed to subordination to collective norms, ends and so forth, as characteristic of totalitarian states which deemphasize individual initiative and individual self-sufficiency. How can isolation and individualization be prevented and the motivation for individual sacrifices necessary to develop solidarity under conditions of extreme deprivation and disruption be encouraged? It has been hypothesized that certain aspects of deprivation lead to socialization of facilities previously privately owned. Are such hypotheses supported by experience or does disaster individualize its victims? If both individualization and collectivization take place under deprivation what are the conditions which give primacy to either? What are the implications for social control of such mechanisms as martial order, formal passes, roadblocks, reveille, and so forth?

Conditions of Social Action

Conditions of social action are those factors which are not under the control of the members acting in social systems. Here, space, time, and size of population will be considered.

Territoriality is the setting of the social system in space. The following quotation from one of the earliest students of disaster may be cast in the form of a hypothesis: "Relief in disaster varies inversely as the square of the cost distance" (Prince, 1920, p. 115; cf. Fritz & Mathewson, 1957, p. 44; see also Wallace, 1956). A similar hypothesis may be evolved in which measures of "face to face communication" (always intense in disaster areas) is substituted for "relief." One study (Altman, Smith, Meyers, McKenna, & Bryson, 1960) of simulated life in a fallout shelter reports that the Dunlap and Associates (1960, p. 12) recommend "idealized" space of 9 square feet or 81 cubic feet per shelteree as more than adequate. This finding is supported by European experience. However, the same study reports that as temperatures rise over 85 degrees F., difficulties arise. All of us who have worked in the South and Southwest know that summer heat when electricity cannot be counted on is more than 85 degrees. Research to ascertain the relation between space needs and such variables as temperature should be investigated. The same study stresses the advantages to morale of shelterees when a common value system prevails. Research should be conducted to ascertain how variations in values of shelterees affects optimal space and other arrangements.

Various of the provisions for defense against fallout involve territoriality. Other things being equal, for those areas where the terrain may negate destruction from bombardment what is the most efficient areal distribution of rural fallout cellars designed both as separate residences and for linkage to mobile housing units such as trailers? This question presumes that distribution of shelters should not compromise efficient communication between shelters. Some guidelines for such studies may be available from research

designs of the U. S. Department of Agriculture studies of the "social" efficiency of various land settlement patterns or the U. S. Navy's development of patterns of convoys of ships.

Over and over it is contended by those who should know the nature of future wars that civilians and their performance and staying power will be as important in victory or survival as the performance of the professional soldier. It still remains necessary for military units to practice mobile action relating themselves to terrain to maintain efficacy. It takes no logician, particularly if he has had conventional military training, to know that similar mobility will be necessary for civilian groups. Must not experience in moving large numbers of families and other units be developed? What past experiences hold lessons for such operations (see Disaster Research Group, 1961; Janes, 1942)? Would a project which proposes, say, to move 2,000 volunteer families from Detroit to Carlsbad, New Mexico, via trailer have utility? No doubt alert social scientists would learn a great deal from a carefully planned study of such an experience. Do the studies of transplanted communities have any utility either in research design or experience? Would survival tests of different groups of civilians comparable to those carried on by the Army be of value?

When cities with indispensable factories are subjected to heavy bombardment and must be evacuated, which members of the family should remain and with what consequences? In industrial areas what are the the critical ecological ties? Work and home? Home and school? Or others? What useful data are already available to answer such questions (Duncan, 1957, pp. 304-305)? What existing groupings in cities should furnish the organization for air raid protection? Studies of World War II which indicate that block organizations were not as efficient as some other patterns so far as communication is concerned may be pertinent (Sanders, 1949). What do the ecological and traffic flow studies of cities have to offer for those planning bunkers and so forth for air raid protection?

Time. Many of the studies of disaster specify various stages, but there is no complete agreement. Future research could develop various procedures for standardizing the time dimension of disasters in terms of stage analysis. From social science has emerged the hypothesis that if morale of social units is to be maintained, instrumental activities must be balanced in some time sequence with expressive activities. Does this type of phase analysis square with experience from disaster? Can recreation and expressive activity be dispensed with during long bombardments or threats of bombardment when indulgence is dangerous? If so, for how long? What types of entertainment and expressive activity are appropriate for various conditions? Most writers who discuss bombardment in detail assume that under future bombardment members of groups may for survival be required to remain inactive for long periods during which stress is great. For such groups may

it be assumed that the informal group leader will differ in personality or in the manner in which he relates himself to his followers from the informal leader in groups in which it is believed that task oriented activity is necessary? Can survival research teams provide answers to these and other similar questions?

Size. Crucial for various plans are the limits which numbers place upon span of control and communication. Can research projects be developed which specify the optimum size of units and groups for various organizations for civil defense generally and for shelters specifically? Dunlap and Associates write that "our systems analysis of management procedures is, in general, a rectangle with its long dimension just about twice that of its short dimension" (1959, p. 12). Presumably the size is also determined by systems analysis. I should like to comment again that the form of analysis which determines such important prescriptions be put to various types of validation.

Summary

Obviously, no more than suggestive areas of research activity, both applied and fundamental, have been reviewed. A set of concepts which has been employed to codify previous research has been used as a base for the suggestions.

The social scientist may, through participation in disaster and survival research, contribute fundamentally to his discipline. How can answers concerning the optimum type of authority pattern for air raid protection service or convoys of moving families be provided without advancing knowledge concerning social organization? How can bunkers be effectively located without available ecological social science knowledge? There are great opportunities for advancement of social science in disaster research. If social science research is manned by capable investigators, it may be indispensable for survival under modern nuclear and bacteriological warfare conditions.

EPILOGUE:

A PUBLIC OFFICIAL'S REFLECTIONS ON THE MEETING

EPILOGUE: A PUBLIC OFFICIAL'S REFLECTIONS ON THE MEETING*

Ralph E. Spear
Office of Emergency Planning**

As will be obvious to the reader at once, this paper differs from the preceding ones in several respects: (a) it was not delivered at the meeting; (b) it is not written by a social scientist; and (c) it probably reflects an undue amount of suppressed reaction. A fair question arises immediately: Why was it written at all?

When plans for the meeting were being developed, we in the Office of Civil and Defense Mobilization (now the Office of Emergency Planning) agreed among ourselves that we would stoutly resist the temptation to inject ourselves into the argument and discussion. We all shared a strong desire to extract the greatest possible benefit from the views of the participants in the limited time available. Thus, after the initial information briefing, we lapsed into a silence which, in as stimulating a meeting as this, was maintained with some difficulty.

The invitation to contribute this "maverick" piece to the published volume of symposium papers resulted from an informal discussion of several suppressed reactions experienced during the meeting.

At the outset, it should be emphatically stated that we were overwhelmed by the response to the invitations to participate in the symposium. We have heard much about public apathy with respect to civil defense and emergency preparedness. Whatever may be the validity of this observation as applied to the general public, it is clearly not applicable to social scientists! For the interruption of busy schedules, for the time and thought devoted to the preparation of thought-provoking papers, and for the valuable exchange of views in the discussions which followed them, we are deeply grateful.

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*The views expressed in this paper are personal ones, and do not necessarily reflect the position of the Office of Emergency Planning.

**In May 1961 the author was the Director, Program and Policy, Office of Civil and Defense Mobilization.

Few programs in government require as widespread public understanding and involvement as emergency preparedness in its broad sense, and I know of none which has so many psychological barriers to such understanding and involvement. The guidance contained in the preceding papers on such matters as effective communications with various publics, promising avenues of behavioral research, the utilization of applicable research findings in related fields, and a more sophisticated understanding of the obstacles to be overcome has been and will be invaluable to the program officials who must cope with these problems.

Some elements of the discussion, however, led me to reflect on the role currently being played by scientists--both physical and social--in the development (hopefully) of national consensus on appropriate steps to enhance the national security. Such reflections raise a few questions in my mind--questions which I think are basic not only to the national security, but also to scientific disciplines.

Are we really disposed to approach these complex issues in a truly scientific spirit? Many instances come to mind of conclusions reached by physical scientists on which facts on human behavior are available but are rejected in favor of intuitive views. Similarly, social scientists--even a few of them in the symposium--on occasion either disavow any knowledge of the physical facts or delineate the basic problem by rejecting them in favor of their own conclusions. These, I know, are likely to be fighting words in the scientific world, but how else can one view acceptance of the technically discredited "On the Beach" view of the post-nuclear attack world? A large body of information is available with respect to the effects of radiation. Certainly a scientist should avail himself of these facts as a base for the formulation of conclusions.

Are not some of us inclined to view the issues of nuclear war in stark "either/or" terms? We seem to find ourselves too often at the crossroads, required to take one direction or another. The issues tend to be discussed in terms either of bringing about world disarmament or of creating a civil defense. It is difficult to understand the acceptance of this choice, since in virtually every other field of our society we accept the necessity of working for the elimination of hazards while adopting proper safeguards against those that remain with us. For example, I am sure there would be a general consensus that prevention is to be preferred to cure, yet in the field of medicine we do not abandon the apparatus designed to cure diseases because we are directing important efforts toward their prevention. We would all agree that there would be time enough for that when prevention had become an accomplished fact. Similarly, we need detract nothing from our efforts in the pursuit of world order simply because we invest in reasonable precautions against world disorder.

Are we perhaps inclined to pursue goals and ideals while obscuring the real facts of the world around us? There is a danger, for example, that we accept propaganda which indicates a lack of Soviet civil defense preparations, while rejecting much objective evidence that such preparations have, in fact, been considerable. Certainly all of us desire above all a peaceful world in which the distressing problems of nuclear war will not confront us. No effort should be spared in the pursuit of this ideal. On the other hand, we must avoid rejecting the facts of international life in favor of an idealized view of the international environment. I find it very difficult to understand the view that prudent passive defense measures are likely to be provocative, while large-scale offensive military preparations are not so regarded.

We need to develop the kind of balanced perspective that was demonstrated by most of the speakers at the symposium. Possibly what we need is further cross-disciplinary pioneering in the field of science. The terms "biochemist" and "social psychologist" are familiar ones to us. The term "physico-sociologist" has an entirely unfamiliar ring. The problems that confront us, however, in the field of emergency preparedness are problems which require the synthesis of many scientific disciplines. Is it too much to ask that the physical scientists and the social scientists incorporate more of each other's knowledge into their conclusions rather than leaving so much of the synthesis to those of us who are trained in neither scientific discipline?

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Dr. Rensis Likert, Director, Institute for Social Research, University of Michigan

Mr. Ralph E. Spear, Director, Program and Policy, Office of Civil and Defense Mobilization (Now, Director of Policy Development, Office of Emergency Planning)

Dr. Louis J. West, Head, Department of Psychiatry, Neurology, and Behavioral Sciences, University of Oklahoma Medical Center

---

*Ex officio

Other Committee Members

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Prof. George M. Beal, Department of Economics and Sociology, Iowa State College

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Dr. Kenneth B. Clark, Department of Psychology, College of the City of New York

Dr. Joseph D. Coker, Director, National Resource Evaluation Center, Office of Civil and Defense Mobilization (Now, Office of Emergency Planning)

Dr. Gertrude Cox, Head, Statistical Research Division, Research Triangle Institute

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Dr. Gordon Dunning, Assistant Director, Office of Health and Safety, Atomic Energy Commission

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Prof. Ward H. Goodenough, Chairman, Department of Anthropology, University of Pennsylvania

Dr. Philip M. Hauser, Chairman, Department of Sociology, University of Chicago

Dr. Reuben Hill, Director, Minnesota Family Study Center, University of Minnesota

Dr. Allan R. Holmberg, Department of Sociology and Anthropology, Cornell University

Dr. H. Max Houtchens, Chief, Clinical Psychology Division, Psychiatry and Neurology Service, Veterans Administration

Dr. Charles E. Hutchinson, Chief, Behavioral Sciences Division, U. S. Air Force Office of Scientific Research

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Dr. Daniel O. Price, Director, Institute for Research in Social Science, University of North Carolina

Dr. Henry Riecken, Head, Office of Social Science, National Science Foundation

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Dr. Jack A. Vernon, Department of Psychology, Princeton University

Dr. Stafford L. Warren, Dean, Medical School, University of California at Los Angeles

Dr. Robin M. Williams, Jr., Department of Sociology and Anthropology, Cornell University

APPENDIX 2

PARTICIPANTS*

Col. Donald C. Almy, Directorate of Research and Technology, Deputy Chief of Staff, Development, The Pentagon

Mr. Wayne G. Althaus, Deputy to the Deputy Assistant, Director for Manpower, Office of Civil and Defense Mobilization (Now, Manpower and Services Office, Office of Emergency Planning)

Dr. James W. Altman, Director, Engineering Psychology Program, American Institute for Research

Capt. Bennett F. Avery, Medical Education for National Defense, Department of the Navy

Dr. Joseph M. Babbitt, Assistant Director, National Institute of Mental Health

Prof. Allen H. Barton, Department of Sociology, Columbia University

Prof. H. D. Beach, Department of Psychology, Dalhousie University

Mr. F. S. Bechner, Operations Planning Office, Office of Civil Defense, District of Columbia Government

Dr. David K. Berlo, Head, Department of General Communication Arts, Michigan State University

Mr. Albert D. Biderman, Senior Research Associate in Social Psychology, Bureau of Social Science Research, Inc.

Mr. Richard Bottorf, Assistant Civil Defense Representative, Department of Public Health, District of Columbia Government

Prof. Kenneth E. Boulding, Department of Economics, University of Michigan

Prof. Claude C. Bowman, Department of Sociology and Anthropology, Temple University

---

*In addition to Committee members listed in Appendix 1.

Dr. Charles W. Bray, Special Research Director, Research Group in Psychology and the Social Sciences, Smithsonian Institution

Dr. Carey Brewer, Deputy Director for Program and Policy, Office of Civil and Defense Mobilization (Now, Civil Affairs Office, Office of Emergency Planning)

Mr. Rogers S. Cannell, Manager of Industrial and Civil Defense Research, Stanford Research Institute

Mr. Fred Carr, Social Sciences Division, Office of Civil and Defense Mobilization (Now, Project Coordinator, Research, Office of Civil Defense)

Dr. Ira H. Cisin, State of California Department of Health

Dr. Hymen E. Cohen, Biophysics and Medical Sciences Division, Office of Civil and Defense Mobilization (Now, Planning Officer, Plans and Program Directorate, Office of Civil Defense)

Mr. John J. Colbert, Instructor General, Office of Civil Defense, District of Columbia Government

Dr. W. Palmer Dearing, Director, Health Services, Office of Civil and Defense Mobilization (Now, Executive Director, Group Health Association of America)

Dr. Earl H. DeLong, Technical Director, Research Analysis Corporation, The American University

Dr. N. J. Demerath, Director, The Social Sciences Institute, Washington University

Miss Diana de Vegh, Research Assistant, National Security Council

Col. John Devlin, Consultant, Training Project, Office of Civil Defense, District of Columbia Government

Mr. Calvin S. Drayer, Division of Health Mobilization, Department of Health, Education, and Welfare

Miss Gladys Dunn, Deputy Director, Emergency Welfare Services, Department of National Health and Welfare, Ottawa, Ontario

Mr. Robert C. Edson, National Director, Disaster Service, American National Red Cross

Miss Lavinia Engle, Staff Officer, Defense, Social Security Administration, Department of Health, Education, and Welfare

Dr. H. J. Friedsam, Director, Department of Sociology, North Texas State College

Prof. Charles E. Fritz, Department of Psychiatry, College of Medicine, University of Florida

Dr. Henry T. Gannon, Professional Associate, Division of Medical Sciences, National Academy of Sciences-National Research Council

Dr. Murray Glanzer, Division of Neuropsychiatry, Walter Reed Army Medical Center

Mr. Jack C. Greene, Director, Planning and Coordination Office, Research, Office of Civil and Defense Mobilization (Now, Special Assistant, Technical Operations, Office of Civil Defense)

Mr. James P. Greenstone, Special Assistant, Public Affairs, Office of Civil and Defense Mobilization (Now, Special Assistant, Office of Emergency Planning)

Prof. Edward T. Hall, Jr., Department of Anthropology, Washington School of Psychiatry

Dr. Norman A. Hanunian, Systems Operations Department, The RAND Corporation

Dr. Lindsey R. Harmon, Director of Research, Office of Scientific Personnel, National Academy of Sciences-National Research Council

Dr. M. Dean Havron, Technical Director, Human Sciences Research, Inc.

Dr. Regina Flannery Herzfeld, Head, Department of Anthropology, The Catholic University of America

Dr. Norman A. Hilmar, Division of Public Health Methods, Public Health Service, Department of Health, Education, and Welfare

Mr. Ralph B. Hirsch, Assistant to National Coordinator, Medical Education for National Defense, Department of the Navy

Mr. Harold Horowitz, Assistant Director for Technical Programs, Building Research Institute, National Academy of Sciences-National Research Council

Mr. George B. Hotchkiss, Jr., Director, Policy Development Office, Office of Civil and Defense Mobilization (Now, Special Assistant to the Director of Research, Policy and Review, Office of Emergency Planning)

Prof. Bradford B. Hudson, Department of Psychology, Rice University

Dr. Thelma Hunt, Department of Psychology, The George Washington University

Mr. John J. Hurley, Technical Liaison Officer, Research, Office of Civil and Defense Mobilization (Now, Research, Office of Civil Defense)

Prof. Irving L. Janis, Department of Psychology, Yale University

Dr. M. E. John, Head, Department of Agricultural Economics and Rural Sociology, Pennsylvania State University

Dr. Paul Johnstone, Operational Analyst, Institute for Defense Analyses, Weapons Systems Evaluation Group

Mr. Herman Kahn, Physics Department, The RAND Corporation (Now, The Hudson Institute)

Col. L. E. Kenyon, Director, Directorate of Survival Operations and Plans, Army Headquarters, Ottawa, Ontario

Dr. Andie L. Knutson, Director, Behavioral Science Project, University of California School of Public Health

Dr. Melvin L. Kohn, Acting Chief, Laboratory of Socio-environmental Studies, National Institute of Mental Health

Prof. Lawrence Krader, Department of Sociology and Anthropology, The American University

Mr. Herbert Kunde, Program Coordinator, Social Sciences Division, Office of Civil and Defense Mobilization (Now, Project Coordinator, Research, Office of Civil Defense)

Dr. Roy Lachman, Research Psychologist, The Johns Hopkins Hospital

Dr. John T. Lanzetta, Research Professor and Director, Center for Research on Social Behavior, University of Delaware

Miss Marion La Sater, Social Sciences Division, Research, Office of Civil and Defense Mobilization (Now, Social Science Research Analyst, Office of Civil Defense)

Dr. Charles P. Loomis, Research Professor, Department of Sociology and Anthropology, Michigan State University

Mr. J. Daniel Loubert, Department of State

Mrs. Mildred R. Loubert, School Psychologist, Briggs-Montgomery School

Dr. William Lybrand, Senior Research Scientist, The American University

Mr. Robert W. Macauley, Defense Coordinator, Federal Housing Administration

Major John L. Masin, Air Force Systems Command, Andrews Air Force Base

Dr. Douglas H. McAllister, Public Health Advisor, Department of Public Health, District of Columbia Government

Prof. Glenn C. McCann, Department of Rural Sociology, North Carolina State College

Mr. Wade W. McCoy, Training, Education and Public Affairs Office, Office of Civil and Defense Mobilization (Now, Foreign Service Division, United States Information Agency)

Mr. Edward A. McDermott, Deputy Director-Designate, Office of Civil and Defense Mobilization (Now, Director, Office of Emergency Planning)

Mr. James T. McGloin, Program Officer, Natural Disaster Office, Office of Civil and Defense Mobilization

Dr. T. W. Milburn, Supervisory Psychologist (Social), U. S. Naval Ordnance Testing Station, China Lake

Prof. Harry E. Moore, Department of Sociology, University of Texas

Prof. Wilbert E. Moore, Department of Sociology, Princeton University

Dr. Peter G. Nordlie, Senior Research Scientist, Human Sciences Research, Inc.

Mr. M. Starr Northrop, Vice-President, Opinion Research Corporation

Prof. Jum C. Nunnally, Jr., Department of Psychology, Vanderbilt University

Miss Sue Ossman, Emergency Welfare Service, Department of Health, Education, and Welfare

Dr. F. C. Pace, Special Weapons Consultant, Department of National Health and Welfare, Ottawa, Ontario

Mr. Richard Park, Technical Director, Advisory Committee on Civil Defense, National Academy of Sciences-National Research Council

Mrs. Robbie W. Patterson, Child Welfare Specialist in Civil Defense Planning, Social Security Administration

Dr. James C. Pettee, Acting Director, Economics Research Division, Office of Civil and Defense Mobilization (Now, Analysis Section, National Resource Evaluation Center, Office of Emergency Planning)

Mr. Robert D. Popper, Research Associate, Human Sciences Research, Inc.

Prof. E. L. Quarantelli, Department of Sociology, Ohio State University

Dr. John W. Raker, Massachusetts General Hospital

Dr. Eugene A. Ramskill, Head, Protective Chemistry Branch, Naval Research Laboratory

Miss Jeannette F. Rayner, Research Assistant, Human Resources Research Organization, The George Washington University

Prof. Matilda White Riley, College of Arts and Sciences, Rutgers University

Dr. David McK. Rioch, Director, Division of Neuropsychiatry, Walter Reed Army Medical Center

Miss Mary Robinson, Project Coordinator, Conference Program on Public Affairs, The Brookings Institution

Prof. Eva J. Ross, Department of Sociology, Trinity College

Dr. Herman J. Sander, Behavioral Sciences Division, Air Force Office of Scientific Research, United States Air Force

Dr. Julius Segal, Program Analyst, National Institute of Mental Health

Mr. Charles K. Shafer, Director, Plans Office, Chemical, Biological, and Radiological Defense, Office of Civil and Defense Mobilization (Now, Plans Branch, Office of Civil Defense)

Mr. Eugene J. Sleevi, Director, Briefing Division, Public Affairs, Office of Civil and Defense Mobilization (Now, Special Activities Directorate, OASD, Public Affairs, The Pentagon)

Dr. Hans Speier, Chairman, Research Council, The RAND Corporation

Dr. Philip I. Sperling, Chief, Neuropsychiatry and Psychophysiology Research Branch, Research Division, Office of the Surgeon General

Prof. Shirley A. Star, Department of Public Health Administration, The Johns Hopkins University

Prof. R. W. Stephens, Department of Sociology, The George Washington University

Mr. Robert W. Stokley, Senior Planning Officer, Special Projects Office, Office of Civil and Defense Mobilization (Now, Civil Affairs Office Office of Emergency Planning)

Mr. Spencer Swanson, Program Support Office, Public Affairs, Office of Civil and Defense Mobilization (Now, Information Specialist, Office of Civil Defense)

Mrs. Eleanor C. Taylor, Technical Publications Writer Editor, U. S. Department of Agriculture

Dr. James D. Thompson, Director, Administrative Science Center, University of Pittsburgh

Mr. Ralph B. Thompson, Director of Assignments Division, Federal Readiness Office, Office of Civil and Defense Mobilization (Now, Planning Officer, Policy Development, Office of Emergency Planning)

Prof. Curtis E. Tuthill, Department of Psychology, The George Washington University

Dr. Theodore R. Vallance, Deputy Director, Program Development, Human Resources Research Office, The George Washington University

Dr. Austin Van der Slice, Chairman, Department of Sociology and Anthropology, The American University

Mr. Paul F. Wagner, Deputy Assistant Director, Training, Education and Public Affairs, Office of Civil and Defense Mobilization (Now, Selvage and Lee, Inc.)

Dr. Anthony F. C. Wallace, Director of Clinical Research, Eastern Pennsylvania Psychiatric Institute

Dr. Theodore Wang, Operations Analyst, Operations Research Office, The Johns Hopkins University

Dr. Francis J. Weber, Chief, Division of Radiological Health, Public Health Service, Department of Health, Education, and Welfare

Mr. Anthony J. Wiener, Brookline, Massachusetts (Now, The Hudson Institute)

Dr. Jane Wilcox, Bureau of State Services, Public Health Service, Department of Health, Education, and Welfare

Mr. Theodore M. Willcox, Social Sciences Division, Office of Civil and Defense Mobilization (Now, Project Coordinator, Research, Office of Civil Defense)

Major Harold L. Williams, MSC, Chief, Department of Clinical and Social Psychology, Walter Reed Army Medical Center

Dr. Charles D. Windle, Program Analyst, Human Resources Research Office, The George Washington University

Mr. Sidney Winter, Jr., Economics Department, The RAND Corporation

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