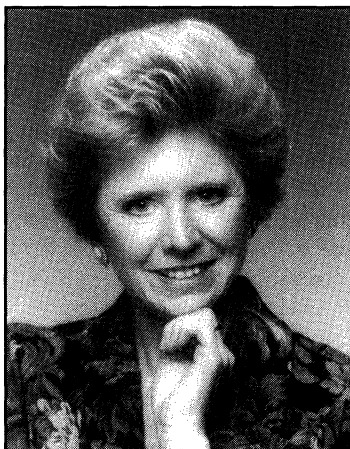# THE SOCIOLOGICAL STUDY OF SOCIAL CHANGE*
1996 Presidential Address

Maureen T. Hallinan
University of Notre Dame

I call attention to the restrictiveness of the assumptions of continuity and linearity underlying most sociological theories of social change. I argue that mathematical models built on assumptions of discontinuity and nonlinearity hold promise for analyzing contemporary social change. These models demonstrate the possible outcomes of periods of dramatic social upheaval at both the macro and micro levels, and they have metaphorical value for the conceptualization of social change and upheaval at both levels as well. These mathematical models have analytic value for testing new theories of social change.

I call for a new way of thinking about social change. Most sociological theories assume that social change is a continuous process and assume that change is linear and predictable. Even those theories that focus on social upheavals seldom explicitly characterize social change as a discontinuous or nonlinear process.

Due to their reliance on the assumptions of continuity and linearity, contemporary models of social change typically describe only

certain periods in the life of a social system and only inadequately address other critical phases. In particular, social theories tend to ignore the various possible responses of a system to a major disruption. Based on our theories, then, we do not know whether a system, in the aftermath of a disruption, can be expected to collapse completely, regenerate in a form resembling its former structure, or emerge as a totally new social structure.

Catastrophic societal events that create discontinuities in a social system, at either the macro or the micro level, present the greatest challenges to current theories of social change. And much recent history has been characterized by such events. In the past decade alone, we have experienced the collapse of Communism, interruptions to the peace talks in the Middle East and Northern Ireland, terrorism in various parts of the

world, the dismantling of the welfare system and the emergence of a third political party in the United States, revolution and famine in Africa and Eastern Europe, the spread of AIDS, and the computer revolution. Dramatic social events such as these can propel a social system into collapse, can set it on a new trajectory, or can precipitate a period of erratic behavior. Thus, sociological theory requires explicit models of how social systems respond to major disruptions.

While our present theories of social change have made significant contributions to our understanding of social changes in less dynamic, slower paced periods of history, theories must now address social change during times of accelerated change, global connectedness, instant communication, and sophisticated technology. It is both timely and imperative that we reexamine our models of social change and the assumptions on which they rest, and formulate new models that better portray and explain complex, contemporary social events. We must question the assumptions of continuity, linearity, and stable equilibrium that form the foundation for most models of social change and replace them, when necessary, with more realistic assumptions that better fit the data.

Before discussing new conceptualizations of social change, let us recall the sociological work that led us to this point. Nisbet (1972) defined social change as "a succession of differences in time in a persisting identity" (p. 1). This definition makes clear that a necessary prerequisite for the study of social change is a description of these persisting identities—that is, an analysis of social structure. Sociologists thus spent the early part of the twentieth century dedicated to the study of social structure.

The effort to conceptualize and model social structure was remarkably successful. With an enthusiasm analogous to the excitement among today's scientists involved in the human genome project, sociologists described the structure of numerous social entities, such as organizations, social networks, the labor market, and cities. To create formal models of social structure they used mathematical concepts from graph theory, Boolean algebra, spatial and projective geometry, finite mathematics and complex analysis.

In statistics, the works of Lazarsfeld (1950) and Goodman (1965, 1969) on contingency tables depicted discrete social categories, while later developments in mobility modeling compared social structures by analyzing population distributions. These methods relied on cross-sectional data, which sociologists gathered enthusiastically.

By the middle of the twentieth century, the foundational work on social structure was firmly in place, and sociologists turned their attention to the systematic study of social change. Dramatic social, political, and economic events intensified sociologists' interest in change processes. Simon (1968) reported the results of a survey of over 100 sociologists who were elected or appointed members of ASA organizations or editorial boards. In answer to a question about the relevance of various subfields in sociology, the respondents ranked social change first in terms of its importance to sociological inquiry and first as the area in which too little work was being done. Articulating this conviction, Swanson (1971) claimed, "[T]he explanation of social change will be the greatest fruit of the study of social organization and . . . our ability to explain social change [will] provide us with the most rigorous test of sociological theory" (p. ii). Wiswede and Kutsch (1978) stated, "[T]he analysis of social change represents the touchstone of sociology" (p. vii).

A second set of circumstances in the 1970's boosted the study of social change. By this time, the methodological tools for the study of social structure were firmly in place, providing the foundation for developing models of change. Methodologists quickly formulated sophisticated deterministic and stochastic models to depict dynamic processes. Cox (1972) incorporated regression-like arguments into life-table analysis. Hauser and Featherman (1976) showed how past demographic situations smooth and prolong contemporary processes of social transformation. Clogg (1981) developed a latent structure approach to the analysis of mobility tables that made it possible to account for intervening unobservable states in the transition from one state to another. Tuma (1976) formulated methods of event-history analysis, treating time as an explanatory variable and focusing attention

on what *causes* change rather than what *accounts for covariation*. Raftery and Hout (1993) presented a model of transition rates that allowed for the separation of the effects of cohort and social origins. Mare (1996) developed a model that links demographic factors to the intergenerational transmission of inequality and the evolution of social hierarchies. These methods disseminated rapidly, and numerous opportunities were available to learn them.

At the same time, federal, state, and private agencies began providing considerable funds for the collection of nationally representative longitudinal data sets, and these surveys quickly became part of the public domain. Easy access to longitudinal data enabled sociologists to undertake empirical analyses of social change that were not possible before.

Theoretical research on social change kept pace with this rapid development of methodology. Sociologists extended and refined earlier theories of social change, including functionalism, Marxism, developmental evolution, and conflict. Smelser (1968) presented change as a complicated series of equilibrium processes and identified the factors that governed which equilibrium process would dominate at a point in time. Inkeles and Smith (1974) proposed a social psychological model of the modernization process in developing countries. Alexander (1985, 1992) incorporated change processes created by war and conflict into differentiation theory. Calhoun (1992) argued that a theory of social change must include a conceptualization of social relations as a dimension of social integration, including secondary and tertiary relations.

Despite a heritage of rigorous theoretical and methodological studies of social change during the last half century, many sociologists complain that available change theories do not adequately explain a number of recent major social events. This dissatisfaction raises two fundamental questions about the study of social change: Is it even possible to develop an adequate theory of social change? What explicit assumptions underlie theories of social change?

Sociologists who believe it is impossible to formulate a theory of social change make three arguments. Historical relativists claim that one cannot generalize from patterns that exist in one setting at one point in time to another setting or time frame because the conditions governing change in one situation are unlikely to occur in another context. Other critics argue that social change is extremely complex and that the interrelationships accounting for change are too intricate to be specified. The third argument is that patterns of change are superimposed on events by the observer—that is, change is in the eye of the beholder. As Fisher (1935), the distinguished historian, states,

> One intellectual excitement has . . . been denied me. Men wiser and more learned than I have discovered in history a plot, a rhythm, a predetermined pattern. These harmonies are concealed from me. I can see only one emergency following upon another, as wave follows upon wave, only one great fact with respect to which, since it is unique, there can be no generalizations . . . , the play of the contingent and the unforeseen. (P. *vii*)

Most social scientists, however, would counter the claim that theories of social change are meaningless by pointing to existing theories that have made significant contributions to our understanding of social change processes. For example, Eisenstadt (1963) utilized the framework of structural functionalism to conceptualize a major type of sociopolitical regime, the bureaucratic empire, and described it as an aspect of world history. Wallerstein (1974), taking a world-system perspective, characterized the capitalistic world economy as a single entity, and traced the history of the whole system from its origins to its projected future. These and related theories have provided a useful framework for examining social, economic, and political processes in our increasingly interconnected world.

Other sociologists have seen theories of social change as emerging from historical case studies. Moore (1966) built generalizations about social change on a foundation of case histories and comparisons of alternate routes to change for agrarian states in the modern world. Skocpol (1979) developed a state-centered critique of the Marxist model of change on the basis of an historical account of the French, Russian, and Chinese revolutions. Tilly (1984) attempted to obtain insights into change processes through con-

crete and in-depth historical analyses of large structures. These and other case studies have provided important sociological insights about social change processes and have increased the validity of theories of social change.

Since existing studies provide evidence that valid change theories are possible, one asks a second question, namely, what are the assumptions on which change theories are built? Some theories assume that social change is pervasive and constant; others suggest that change is apparent only in the short term and is less identifiable over the long term. Some theories view change as an aberration or disruption; competing theories see change as a natural state that promotes growth and development. It is important to make explicit the assumptions underlying theories of change in order to better judge the relevance of the theory to the reality observed and to understand why certain conclusions are drawn from analyses of change processes.

GLOBAL AND SPECIFIC THEORIES OF SOCIAL CHANGE

Sociological theories of social change are either global or specific. Global theories explain change at an abstract level. They identify the agents of change, describe how change occurs, and predict its likely consequences. Specific theories of change typically evolve from more general theories and elaborate in greater detail the broad ideas outlined in the general theories. Often, specific theories are favored over global ones because they can better explain social events, albeit limited ones. Social science history reveals cycles in which (1) the formulation of a global theory of change is followed by (2) applications of that theory to specific situations, after which (3) the applications are integrated and generalized to yield a modified or new global theory.

Early global theories of social change favored simplicity and focused on one or a small number of factors as causal agents. Seldom were these theories very useful. For example, migration was explained in terms of population growth, and bureaucratization and division of labor were related to industrialization. Efforts to formulate more complex global theories of change became more

common, but these too had limitations. The task of identifying a large number of determinants of change and of specifying how they interact is complex and difficult.

One weakness of many existing global theories of social change is their failure to specify the relationship between macro- and micro- level processes. Coleman (1990) argued that the next big task for sociologists is to link macro- and micro-level analyses. We have theories that link societal characteristics to social outcomes, like Weber's (1930) theory of capitalism, and theories that explain individual behavior, like rational choice theory (Coleman 1990). But we seldom find examples of theories that state propositions at the systemic level, explain the causal connections by means of a micro-level theory of actor and action, and then formally link the systemic and micro-level propositions. Global theories often simply ignore the micro-level processes that may account for a hypothesized causality, or they simply assume that the micro-level processes operate in a certain way.

It may be that current global theories of social change fail to explain the responses of social systems to disruptive events because such theories do not specify the links between macro- and micro-level processes. If one acknowledges that a period of discontinuity may be inherent in some social systems, then the source of the discontinuity must be sought at either the macro- or the micro-level. Once the source of an upheaval is identified, one must specify how the macro- and micro-level processes affect each other before hypothesizing how the whole system will react to the disruption.

Specific theories of social change focus on particular domains and analyze the social systems within those domains. Generalizations are made, based on insights obtained from the cases studied. Recently, developments in Central Europe have motivated a number of nation-specific change theories, such as Kennedy's (1991) analysis of Poland, McFalls' (1995) research on East Germany, and Ekiert's (1996) study of East Central Europe. Lipset's (1996) explanation of the resilience of American democracy also may be viewed in this light.

Specific theories of social change must carefully guard against historicism, in which

a theory is based on assumptions related to a normative or political agenda. On these grounds, Goldthorpe (1992) criticized both liberal industrial and Marxist proletarian theories of change in the structure of employment in advanced Western societies. He pointed out that liberal theories predict an upgrading of work over time in industrialized countries, brought on by requirements for more sophisticated technological skills, while Marxist theories predict the reduction of skilled labor accompanied by subsequent loss of worker autonomy and discretion. The contradictory predictions of these two theories stem from their historicist nature and diminish their validity.

Some global and specific theories of social change fail to incorporate a theory of action that describes persistent characteristics of individuals in social situations. Rational choice theory is an example of an individual action theory that permits variance across normative, social, and political contexts. Change theories that incorporate rational choice or some other similar individual-level explanation of behavior have greater generalizability than do those more circumscribed by time, historical events, and personalities.

Finally, both global and specific theories of social change have tended to ignore or inadequately conceptualize discontinuities in the change process. Most theories tend to portray change at the societal level in terms of an identifiable pattern of variation, either cyclic or developmental. Those which see social change as a cyclic process describe societal events as passing through three stages—growth, maturity, and decline. Theories of cyclic change (e.g., Spengler 1926–1928; Sorokin 1937–1941; Toynbee 1934–1961) actually come close to conceptualizing social change as being potentially discontinuous. Nevertheless, even cyclic theories tend to pay little attention to whether decline is likely to be permanent or whether it may precipitate a rebirth and generate a new cyclic process of change. Those theories which view social change as a developmental process tend to depict change as linear, moving in the direction of greater complexity, increased technological sophistication, and expanded social organization and differentiation. Developmental theories pay little attention to the tendency of some systems to

revert to a former stage of development or to disintegrate entirely.

Global and specific theories of social change would be enhanced and strengthened by conceptualizations of the factors that govern discontinuous change. Regardless of the level of theoretical development, change theories must take into account the different responses of social systems to social change. Some systems seem to have an inherent tendency to self-destruct. Others disintegrate, but rebuild themselves and resume the societal processes that characterized them before the upheaval. Still others recreate themselves in a new image and establish new relationships and patterns of change. Thus, change theories must seek to identify the conditions that lead to discontinuous social changes and conceptualize the processes that govern the variable societal reactions to social events.

FORMAL MODELS OF SOCIAL CHANGE

Theories of social change can be formalized by using mathematics or statistics. The choice of a formal model to depict a change theory is more than a methodological decision; it has considerable theoretical significance. The selection of a model makes explicit the assumptions on which a theory is built and can determine what is stressed and what is ignored in conceptualizing a change process.

One way of representing social change is by a *deterministic model*. In a deterministic model, a social process is assumed to follow a particular pattern and to have a fixed outcome. To assume that a social process can be depicted by a deterministic model characterizes the change process as governed by a social law and de-emphasizes deviations from that law.

A powerful advantage of a deterministic model is that the relatively simpler mathematics described by the initial mathematical equation or graph permits the researcher to add conceptual complexity to the model without increasing the difficulty of the mathematics to an unmanageable degree. While the change process is known not to "obey" the law depicted, the model can be seen as an approximation of the data and can take us

far in analyzing the consequences of the modeled relationships. Theorists who see social change as continuous and stable over time are apt to prefer deterministic models. Similarly, these models are often preferred by those who are more interested in advancing theories of change than in testing the empirical fit of models.

A second way of formalizing social change is by a *stochastic* or *probabilistic model.* While a stochastic model can depict the same basic process as a deterministic model, the stochastic model provides a more accurate fit to empirical data. The deterministic model yields the expected value of a population distribution while the stochastic model takes the total distribution into account. To provide a better fit to the data, however, the stochastic model must include cumbersome mathematical equations. The greater mathematical complexity of stochastic models is an obstacle to greater conceptual complexity.

A danger in employing stochastic models in studying social change is that these models make it easy to avoid stipulating the nature of the change process. Coleman (1964) claimed that the stochastic model often gives no added information to a theory and may do little more than formalize our ignorance. Applied atheoretically, stochastic models fail to reveal causal relationships or to specify the interactions among variables. This misuse of stochastic models resembles the mindless application of factor analysis in the absence of a conceptual framework or our past fascination with modeling the diffusion of information or participation rates in group discussions. Since the study of social change is an extremely complex process and is only in its initial stages, it is tempting to avoid the difficult process of conceptualizing change and take the easier route of using stochastic models as a curve-fitting exercise. This would be a regrettable detour in our progress toward understanding social change.

Increasingly sophisticated computer technology provides a third kind of formal modeling of social change—computer simulations. A computer model can be programmed, a wide array of parameters can be set, and numerical analyses can be carried out. The limitations of this kind of modeling, of course, are that the conceptual model can be exceedingly difficult to program and

that the solution is not a general one, but rather depends on the parameters selected and the particular values they hold. Nevertheless, it is easy to run a model several times to obtain a distribution of outcomes. Further, the computational ease provided by computer simulations permits a conceptual complexity precluded by mathematical modeling. Computer simulation is increasingly becoming a more useful methodological tool in the difficult task of conceptualizing social change.

A NEW CONCEPTUALIZATION OF SOCIAL CHANGE

The significant progress made in the sociological study of social change over the past several decades has prepared us for the next step in this critical scientific enterprise. Fortunately, new developments in the physical and natural sciences can serve us well as we try to improve existing theories of social change, formulate new theories, and improve the research methodology.

Mathematicians have long been aware that a set of one or two simple, well-specified differential equations can describe a system that at some point or points in its life exhibits a dramatic change in behavior. Models of this kind are referred to as *catastrophe models.* They yield a variety of complex responses over a range of parameters or conditions that include discontinuities in the change process.

In the 1970s, applied mathematicians and other scientists, particularly those working in chemical reaction dynamics, fluid mechanics, quantum physics, and plant and animal population dynamics, began to use catastrophe models to study certain change processes (May 1974; Woodcock and Davis 1978). They identified systems that have more than one stable state. A catastrophe occurs when the system jumps from one equilibrium state to another.

An example of a process that changes equilibrium states is a ball on a grassy plain at the top of a hill. When on the plain, the ball is in a state of equilibrium, and it moves in a predictable path, dependent on wind, friction, and other factors. But if the wind gusts, propelling the ball off the plain, the ball will roll down the hill until it reaches a new equilibrium state at the bottom. If con-

THE SOCIOLOGICAL STUDY OF SOCIAL CHANGE ditions at the bottom of the hill are similar to those on the grassy plain at the top before the wind gusted, the ball will move in the same predictable path at the bottom as it had on the top. Another example is our cycle of sleeping and waking. Typically this cycle is stable, but it can be disrupted by jet travel. After a period of irregular sleep, the system soon returns to its original, or even a new equilibrium state. The spread of measles and the flow of water from one channel to another are other systems that can be described by catastrophe models.

Mathematicians and other scientists have a long history of studying sets of nonlinear differential equations that yield regular or periodic oscillations. More recently, they have focused on other sets of nonlinear deterministic differential equations that describe a system that under certain conditions will move into a period of wildly erratic or chaotic behavior, which for all practical purposes looks like random behavior. These models are called chaos models (Prigogine and Stengers 1984). Until recently, chaos models received little attention in applied mathematics or the sciences because it was believed that few systems exhibiting this behavior existed. In the past few years, however, with improved technology and more powerful computers, numerous instances of chaotic systems have been identified in both the natural and the social sciences.

Educational psychologists have used chaos theory to model the relationship between a student's knowledge and the length of instruction and time between lessons. Increasing the length of instructional time or decreasing the time between lessons can increase the amount the student learns during a lesson. However, at a certain point, perhaps with long and frequent lessons, the student may become discouraged or overwhelmed, and the amount the student learns may change erratically from lesson to lesson.

Examples of the use of chaos models in economics include the association between change and volubility on the stock market and the relationship between technological growth patterns and levels of investment. Psychologists have employed chaos models to study behavior before and after an addiction occurs in a person's life. Sociologists have used ideas from chaos theory to explain

the development of antiacademic normative systems in secondary schools, to investigate the progression of cooperative behavior, to study responses to public and corporate policies, and to explain the power yielded by citizen movements.

Catastrophe models, which depict systems that exhibit discontinuities or periods of regular oscillations, show considerable promise as a methodological tool for the analysis of social processes. Chaos models, which describe a system that oscillates over time without a repeated cycle, may be less useful, at least in the short term, because of data demands. Chaos models exhibit nonperiodic movement and are extremely sensitive to beginning conditions. Critics argue that measurement problems in social science increase the difficulty of using chaos models in the study of social processes. For example, time-series data tend to cover short periods, making it difficult to prove deterministic chaos. Further, social data usually are "noisy," making it hard to distinguish between chaos and random fluctuations (LeBaron 1994).

Proponents of chaos theory counter these arguments by stressing the fit between chaos models and central substantive concerns about social change. They argue that this congruence will motivate social scientists to meet the data demands and solve the measurement problems. They further point out that the impetus for many types of social change is inherent in the social system under investigation, making both catastrophe and chaos models powerful tools for their analyses.

On a theoretical level, catastrophe and chaos theories can make a significant contribution to how we conceptualize social change. Allowing the possibility of unanticipated and inexplicable social change as a natural social development represents a radical shift in sociological thinking. It challenges us to question Leibniz's (1981) conviction that "Nature never makes leaps" (p. 57). Continuity is a fundamental concept in Darwin's theory of evolution, in our development theories, and in nearly all of our other theories of social change. Even in cyclic theories of change, which may be thought to predict discontinuity, the focus is on change processes before a major disrup-

tion and not on the response of the system to that disruption.

The assumption of continuity causes difficulties in studying certain social processes both at the macro level, such as revolutions or social movements, and at the micro level, such as communication flow and altruistic or deviant behavior. Nisbet (1972) has argued that the idea of continuity has been one of the greatest barriers to the proper appreciation of large-scale change. Catastrophe and chaos theories can motivate us to set aside the sometimes troubling assumptions that social change is continuous or linear and to examine other models of change that include assumptions of nonlinearity, discontinuity, and periods of irregular behavior.

Moreover, catastrophe and chaos theories demonstrate how two or more nearly identical systems, located in nearly identical environments, can display dramatically different behaviors, based on even modest changes in environment. This insight should inform our thinking about why some theories are supported in one setting but not in another. It may also change our approach to cross-national and cross-cultural comparisons by sensitizing us to the subtle conditions that might produce dramatically different responses in similar systems.

On a methodological level, catastrophe and chaos theories have implications for how we should study social change. First, chaos theory demonstrates the utility of using both quantitative and qualitative methods. Chaos models require a large amount of longitudinal data over long periods of time to map patterns and periods of erratic behavior. Since such data are usually difficult to find, especially for large systems, qualitative methods, including interviews and observations, can provide important supplementary information about shocks to the system that can move the system toward dramatic social change. This approach combines a preference for the detailed study of a small number of big structures and large processes (e.g., Tilly 1984) with the preference of survey researchers for extensive statistical analysis of a large number of cases. Regardless of the substantive issue being studied, of course, combining qualitative and quantitative methods usually enhances our understanding of social events.

Finally, catastrophe and chaos theories suggest that we emphasize *explanation rather than prediction* in our models of social change. Current theories have fared poorly in their ability to predict recent social and political events, such as the fall of Communism. With only a few exceptions, including Collins (1986) and Szelenyi (1988, 1989), sociologists were unprepared for the Communist collapse. These failures in prediction are understandable when we realize that we may have mistakenly assumed that the political, social, and economic structures of the Soviet Union were changing in a continuous manner, whereas in actuality the change process was approaching chaos. Chaos models suggest that the Soviet political and economic systems could have reached that critical point at which a slight perturbation to the system was sufficient to send it into turmoil. The exact point at which that would happen was virtually impossible to predict.

The possibility that catastrophe or chaos is inherent in a system leads us to search for a trigger event that could place a system on the path to upheaval. Tracing the influence of the trigger event as the system moves toward disruption has a greater potential for increasing our understanding of social change than trying to predict when a similar disruption might occur in the same or a different system in the future. Gregersen and Sailer (1993) have pointed out that even better measurement, larger samples, and more sophisticated statistical models will not improve the predictive power of theories that attempt to describe chaotic systems. However, improved data collection and measurements can help identify the conditions and events that led to a particular period of disorder.

In short, catastrophe and chaos theories provide us with conceptual and methodological tools that can help us rethink the process of social change and formulate theories that describe a broader range of events than have been considered previously. They sensitize us to dynamic interactions among the components of a social system and the possibility that certain interrelationships can propel a system into totally unexpected change. Finally, the theories remind us that unexpected change may be inherent in a social system and is not always occasioned by external conditions.

CONCLUSION

Thomas Kuhn (1962) points to two kinds of science: normal science and extraordinary science. Normal science describes the slow accumulation of knowledge that occurs incrementally through minor modifications of hypotheses, slight adjustments in theories, modest reorderings of data, finer specifications of parameters, or as Kuhn says, through "the steady extension of the scope and precision of scientific knowledge. Normal science does not aim at novelties of fact or theory" (p. 52). Clearly, most of what we do in sociology passes as normal science.

In contrast, extraordinary science produces breakthroughs that fundamentally change the way we look at the world. Such scientific revolution occurs when one or more people sense that an existing paradigm is no longer appropriate or useful, and a new world view emerges, not from the accumulation of knowledge in the existing paradigm, but from a sense of its inadequacy. Paradigm shifts have occurred, for example, in response to the theories of Copernicus, Newton, Darwin, Mendel, and Einstein.

Is sociology on the verge of a scientific revolution or a paradigm shift? This notion may sound grandiose, especially since sociology is still a young discipline. Moreover, this idea has been heard before, as, for example, when sociologists first became familiar with the general linear model. Nevertheless, the remarkable progress sociologists have made in the last century in their studies of the opportunities and constraints governing human behavior in society does suggest that today may hold a defining moment for sociology. We now have a strong foundation on which to build a more complex and realistic science. Existing theories of social change are valuable and will continue to contribute to our understanding of change processes. Nevertheless, new theories and new models are needed to explain recent cataclysmic societal changes.

If sociologists agree that contemporary theories cannot explain the dramatic social upheavals of the past decade and if we suspect that our assumptions about social change are not universal, then dissatisfaction with current theory may indeed lead us to a fundamental shift in how we view social change processes. We must be able to describe social change in a society that is instantaneously and globally connected, economically interdependent, highly technologically sophisticated, and in which the distribution of resources is increasingly less equitable. Powerful new models such as catastrophe and chaos models may stimulate us to rethink our fundamental assumptions and broaden our perspective on social change.

As we approach the twenty-first century, world events and remarkable accomplishments in the natural and social sciences provide sociologists with the building blocks and opportunities to make major breakthroughs in how we understand social change. Our challenge is twofold: first, to demonstrate the intellectual curiosity, openness, and discipline that can enable us to renew our efforts to understand the processes and patterns of social change in contemporary society; and second, to follow Popper's (1994) recommendation to "be willing to let our ideas die for us" (p. 12), that is, to have the courage to reject even our best efforts of the past if new information and events point us toward innovative and unexplored perspectives.

Maureen T. Hallinan *is White Professor of Sociology at the Univeristy of Notre Dame. Her research focuses on the effects of organizational characteristics of schools on student learning and social relations. She is currently examining the determinants and consequences of ability grouping for the academic achievement of students who differ in background characteristics.*

REFERENCES

Alexander, Jeffrey C., ed. 1985. *Neofunctionalism.* Los Angeles, CA: Sage.
————. 1992. "Durkheim's Problem and Differentiation Theory Today." Pp. 179–204 in *Social Change and Modernity,* edited by H. Haferkamp and N. J. Smelser. Berkeley, CA: University of California Press.
Calhoun, Craig. 1992. "The Infrastructure of Modernity." Pp. 205–36 in *Social Change and Modernity,* edited by H. Haferkamp and N. J. Smelser. Berkeley, CA: University of California Press.
Clogg, Clifford C. 1981. "Latent Structure Models of Mobility." *American Journal of Sociology* 86:836–68.
Coleman, James S. 1964. *Introduction to Math-*

ematical Sociology. New York: Free Press.

————. 1990. *Foundations of Social Theory.* Cambridge, MA: Belknap.

Collins, Randall. 1986. *Weberian Sociological Theory.* New York: Cambridge University Press.

Cox, David R. 1972. "Regression Models and Life-Tables." *Journal of the Royal Statistical Society* (Series B) 34:187–220.

Eisenstadt, Shmuel N. 1963. *The Political Systems of Empires.* New York: Free Press.

Ekiert, Grzegorz. 1996. *The State Against Society: Political Crises and their Aftermath in East Central Europe.* Princeton, NJ: Princeton University Press.

Fisher, Herbert A. L. 1935. *A History of Europe.* Boston, MA: Houghton Mifflin.

Goldthorpe, John H. 1992. "Employment, Class, and Mobility." Pp. 122–46 in *Social Change and Modernity,* edited by H. Haferkamp and N. J. Smelser. Berkeley, CA: University of California Press.

Goodman, Leo A. 1965. "On the Statistical Analysis of Mobility Tables." *American Journal of Sociology* 70:564–85.

————. 1969. "How to Ransack Social Mobility Tables and Other Kinds of Cross-Classification Tables." *American Journal of Sociology* 75:1–40.

Gregersen, Hal and Lee Sailer. 1993. "Chaos Theory and Its Implications for Social Science Research." *Human Relations* 46:777–802.

Hauser, Robert M. and David L. Featherman. 1976. "Equality of Schooling: Trends and Prospects." *Sociology of Education* 49:99–120.

Inkeles, Alex and David H. Smith. 1974. *Becoming Modern: Individual Change in Six Developing Countries.* Cambridge, MA: Harvard University Press.

Kennedy, Michael D. 1991. *Professionals, Power, and Solidarity in Poland: A Critical Sociology of Soviet-type Society.* Cambridge, England: Cambridge University Press.

Kuhn, Thomas S. 1962. *The Structure of Scientific Revolutions.* Chicago, IL: University of Chicago Press.

Lazarsfeld, Paul F. 1950. "The Interpretation and Computation of Some Latent Structures." Pp. 413–72 in *Measurement and Prediction,* vol. 4, *Studies in Social Psychology in World War II,* edited by S. A. Stouffer. Princeton, NJ: Princeton University Press.

LeBaron, Blake. 1994. "Chaos and Nonlinear Forecastability in Economics and Finance." *Philosophical Transactions of the Royal Society of London* (Series A) 348:397–404.

Leibniz, Gottfried W. 1981. *New Essays on Human Understanding.* Translated and edited by P. Remnant and J. Bennet. Cambridge, En-

gland: Cambridge University Press.

Lipset, Seymour M. 1996. *American Exceptionalism: A Double-Edged Sword.* New York: W.W. Norton.

Mare, Robert D. 1996. "Demography and the Evolution of Educational Inequality." Pp. 117–51 in *Social Differentiation and Social Inequality: Theoretical and Empirical Inquiries, Essays in Honor of John C. Pock,* edited by J. Baron, D. Grusky, and D. Treiman. Boulder, CO: Westview Press.

May, Robert M. 1974. "Biological Populations with Nonoverlapping Generations: Stable Points, Stable Cycles, and Chaos." *Science* 186:645–47.

McFalls, Laurence H. 1995. *Communism's Collapse, Democracy's Demise? The Cultural Context and Consequences of the East German Revolution.* New York: New York University Press.

Moore, Barrington. 1966. *The Social Origins of Dictatorship and Democracy.* Boston, MA: Beacon.

Nisbet, Robert A. 1972. *Social Change.* New York: Harper and Row.

Popper, Karl R. 1994. *Knowledge and the Body-Mind Problem: In Defence of Interaction.* London, England: Routledge.

Prigogine, Ilya and Isabelle Stengers. 1984. *Order Out of Chaos.* New York: Bantam Books.

Raftery, Adrian E. and Michael Hout. 1993. "Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education, 1921–75." *Sociology of Education* 66:41–62.

Skocpol, Theda. 1979. *States and Social Revolutions.* New York: Cambridge University Press.

Simon, Rita J. 1968. "What Is Important in Sociology." *Sociological Quarterly* 9:405–09.

Smelser, Neil J. 1968. *Essays in Sociological Explanation.* Englewood Cliffs, NJ: Prentice-Hall.

Sorokin, Pitirim A. 1937–1941. *Social and Cultural Dynamics.* 4 vols. New York: American Book Company.

Spengler, Oswald. 1926–1928. *The Decline of the West.* 2 vols. New York: A. A. Knopf.

Swanson, Guy E. 1971. *Social Change.* Glenview, IL: Scott, Foresman.

Szelenyi, Ivan. 1988. *Socialist Entrepreneurs.* Madison, WI: University of Wisconsin Press.

————. 1989. "Eastern Europe in an Epoch of Crisis: Toward a Socialist Mixed Economy?" Pp. 208–32 in *Remaking the Economic Institutions of Socialism,* edited by V. Nee and D. Stark. Stanford, CA: Stanford University Press.

Tilly, Charles. 1984. *Big Structures, Large Processes, Huge Comparisons.* New York: Russell Sage Foundation.

Toynbee, Arnold J. 1934–1961. *A Study of His-*

tory. 12 vols. London, England: Oxford University Press.

Tuma, Nancy B. 1976. "Rewards, Resources and the Rate of Mobility: A Nonstationary Multivariate Stochastic Model." *American Sociological Review* 41:338–60.

Wallerstein, Immanuel. 1974. *The Modern World System*. New York: Academic Press.

Weber, Max. 1930. *The Protestant Ethic and the Spirit of Capitalism*. New York: Charles Scribner's Sons.

Wiswede, Gunter and Thomas Kutsch. 1978. *Sozialer Wandel* (Social Change). Darmstadt, Germany: Wissenschaftliche Buchgesellschaft.

Woodcock, Alexander and Monte Davis. 1978. *Catastrophe Theory*. New York: E. P. Dutton.

PAST PRESIDENTS OF THE AMERICAN SOCIOLOGICAL ASSOCIATION

Lester F. Ward	William F. Ogburn	Louis Wirth	George C. Homans	Peter H. Rossi
William G. Sumner	Howard W. Odum	E. Franklin Frazier	Pitirim Sorokin	William Foote Whyte
Franklin H. Giddings	Emory S. Bogardus	Talcott Parsons	Wilbert E. Moore	Erving Goffman
Albion W. Small	Luther L. Bernard	Leonard S. Cottrell, Jr.	Charles P. Loomis	Alice S. Rossi
Edward A. Ross	Edward B. Reuter	Robert C. Angell	Philip M. Hauser	James F. Short, Jr.
George E. Vincent	Ernest W. Burgess	Dorothy Swaine Thomas	Arnold M. Rose	Kai T. Erikson
George E. Howard	F. Stuart Chapin	Samuel A. Stouffer	Ralph H. Turner	Matilda White Riley
Charles H. Cooley	Henry P. Fairchild	Florian Znaniecki	Reinhard Bendix	Melvin L. Kohn
Frank W. Blackmar	Ellsworth Faris	Donald Young	William H. Sewell	Herbert J. Gans
James Q. Dealey	Frank H. Hankins	Herbert Blumer	William J. Goode	Joan Huber
Edward C. Hayes	Edwin H. Sutherland	Robert K. Merton	Mirra Komarovsky	William Julius Wilson
James P. Lichtenberg	Robert M. MacIver	Robin M. Williams, Jr.	Peter M. Blau	Stanley Lieberson
Ulysses G. Weatherly	Stuart A. Queen	Kingsley Davis	Lewis A. Coser	James S. Coleman
Charles A. Ellwood	Dwight Sanderson	Howard Becker	Alfred McClung Lee	Seymour Martin Lipset
Robert E. Park	George A. Lundberg	Robert E. L. Faris	J. Milton Yinger	William A. Gamson
John L. Gillin	Rupert B. Vance	Paul F. Lazarsfeld	Amos H. Hawley	Amitai Etzioni
William I. Thomas	Kimball Young	Everett C. Hughes	Hubert M. Blalock, Jr.	Maureen Hallinan
John M. Gillette	Carl C. Taylor			