From Social Darwinism to Self-Organization: Implications for Social Change Theory

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This article reviews the impact of evolutionary thought on social change theory. It argues that social Darwinist assumptions underlie many of the efforts to understand social change. Partly for this reason, social change theory has languished in recent years. Recently, however, nonequilibrium theories have generated a new interest in the notion of emergence, specifically, self-organization. Theories of self-organization are now being used by post-Darwinian evolutionary theorists, and they provide a promising alternative to the traditional view that social change arises primarily through external conflict and selection.

At the same time that social work has focused on clinical interventions, attempts to develop a theoretical foundation for policy practice have been sporadic and of marginal success. A key element of this knowledge base is social change theory, but the development of this theory has languished in recent years. Attempts have been made to resolve differences between both evolutionary and conflict theories of social change. Functionalist, systems, and ecosystems approaches exemplify these attempts. Many of these efforts have largely failed not only because of their lack of observational grounding but also because each implicitly assumes the centrality of conflict and competition in social change, drawing on assumptions from both the social Darwinists and the neo-Darwinians.

Given the problems in developing a comprehensive yet practical theory of social change, it is not surprising that most approaches to planned social development, whether they involve community organiza-

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tion, social administration, or social policy advocacy, lack an integrative theoretical framework. Approaches in each of these fields represent various combinations of political ideology, practice wisdom, and a plethora of analytic, administrative, or organizing techniques. James Midgley, whose recent work begins to address this need, points out that "in the absence of a framework of this kind, it is likely that social development efforts will be fragmented, disorganized and inefficient" (Midgley 1995, p. 150).

A central thesis of this article is that because social change theory has largely been driven by evolutionary theory, usually by outdated versions of it, the central problems of social change will not be overcome until a post-Darwinian theory of evolution is more fully developed, one that goes beyond earlier formulations of emergence to incorporate current theories of self-organization. The beginning development of such theories in recent years has led to a refinement of the classical notion of emergence, which was introduced first by J. S. Mill (McLaughlin 1992), and the discovery of a range of mechanisms through which a particular type of emergence takes place, namely, self-organization. This article will argue that, when applied to both evolution and social change theory, the notion of self-organization represents a major milestone that both provides a basis for understanding cooperative as well as conflictual social processes, especially those that are internally driven, and contributes an essential element to the theoretical foundations of planned social change. This article thus reviews the concurrent developments in both evolutionary and social change theory, the notions of emergence and self-organization, and their implications for strategies of social development. It aims to facilitate the development of a more comprehensive model than currently exists, one that integrates both cooperative and competitive social processes, the origins of which may be either internal or external to the system of interest.

From Social Darwinism to Sociobiology

Of the various developments in the history of ideas, perhaps none has been more influential in social change theory than that of evolutionary thought, particularly Charles Darwin's ([1857] 1952) theory of natural selection and its application to social change theory through the social Darwinian legacy of Herbert Spencer (1874). Although Darwin did not originate the theory of evolution, he developed the version based on natural selection. It has been proposed that his work was the culmination rather than the initiation of evolutionary thought (Degler 1991, p. 5). The earliest variations of evolutionary theory go back to the Greeks and to the Hindu Vedantic tradition (Laszlo 1996). Others originated during the eighteenth-century Enlightenment. Immanuel Kant, for instance, suggested that the universe developed over eons (Degler 1991, p. 5).

Perhaps most relevant to this discussion is the pre-Darwinian evolutionary theory of the French naturalist and philosopher Jean-Baptiste Lamarck ([1809] 1984), who argued that behavioral adaptations drive evolutionary processes. This is a position that most contemporary biologists have largely rejected.

According to Darwin, the engine of evolution is natural selection, which operates on variation among organisms. This variation, which is seen as having its primary origins in both sexual reproduction and chance mutation, is constantly subjected to the struggle for survival. Darwin's emphasis on such struggle is part of the legacy of the Reverend Thomas Malthus ([1798, 1872] 1971), who argued that each species inevitably reproduces faster than food supplies can be expanded, leading to an unrelieved struggle for existence within and between species. Based on this belief, Malthus went so far as to recommend eliminating the poor laws and increasing the mortality rate among the poor. Specifically, he proposed that "instead of recommending cleanliness to the poor, we should encourage contrary habits. In our towns we should make the streets narrower, crowd more people into the houses, and court the return of the plague, and particularly encourage settlements in all marshy and unwholesome situations" (Malthus [1798, 1872] 1971, pp. 411–12). The theory of natural selection was based on the notion that such struggle for survival is inevitable and whichever adaptations survive will be reproduced at a faster rate and will become dominant. The subtitle to Darwin's *Origin of the Species* epitomizes this perspective: "*The Preservation of Favored Races in the Struggle for Life*" (Darwin [1859, 1896] 1972).

Darwin believed that evolutionary developments were fueled by those chance mutations and sexual pairings that confer a survival advantage. The incremental accumulation of many small changes, according to the theory of natural selection, results in the gradual development of new and often more complex species. Darwin himself preferred the notion of natural selection and avoided the phrase "survival of the fittest," which was introduced by his contemporary, the sociologist Herbert Spencer (1874). Darwin, however, eventually relented in adopting Spencer's more popular phrase (Degler 1991, p. 11). Yet, in Darwin's theory, it was never clear whether organisms survived because they were fit or were fit because they survived. An independent definition of fitness has been elusive. As a tautology, the phrase explains little and has been a key vehicle for the indiscriminate application of principles of natural selection to theories of social change.

Beyond the definitional problems, there have been several persistent criticisms of the theory of natural selection that have not been effectively countered by its proponents. One is a question of probabilities; statistical studies over the years show an extreme improbability that new species could develop incrementally, given the complex synchronization of various new features that would be required (see Cohen 1984; Kauffman

1993). For instance, computer simulations show that about 80 percent of random mutations are lost within 90 generations. About a fifth (18 percent) persist and come to be shared by 50 percent of the population (Guastello 1995).

Another problem is the tendency of fossil records to show long periods of stability and few of the changes required for accounting for the transition from one species to another. The popular neo-Darwinian Stephen Jay Gould has attempted to address this problem through the theory of punctuated equilibrium: species compete, and when one disappears or when other catastrophic changes take place, the surviving species undergo very rapid change, through both natural selection and other processes, to fill the new niche (Gould and Eldredge 1977). Perhaps the most compelling challenge to evolutionary theory's exclusive reliance on natural selection comes out of the field of microbiology. Michael Behe (1996) provides extensive and persuasive documentation of the "irreducible complexity" of microbiological processes—Darwin's "black box"—such as the immune response, blood clotting, and cellular propulsion, showing that, in many instances, until multiple and highly unlikely processes are simultaneously linked, there is no survival advantage to the incremental accumulation of the components of complex biological systems.

Setting aside the rejection by creationists of the very notion of evolution, it should be noted that the debate has not been whether natural selection takes place but rather its centrality to evolutionary processes. Most contemporary biologists would be classified as neo-Darwinians, those who believe that a somewhat expanded version of natural selection is the primary, if not exclusive, engine of evolution. Other biologists, such as Stuart Kauffman (1995), who can be considered post-Darwinians believe that additional processes such as self-organization also work alongside natural selection to drive evolutionary processes. This is a subject that will be explored in a later section of this article. It has been suggested that natural selection may function as a screen for incremental adjustments in biological mechanisms that have already been developed through other means (Baum 1988).

Since Darwin introduced the theory of natural selection in the mid-nineteenth century, the theory has undergone considerable transformation. One of the most immediate involved its application to social change by the conservative English philosopher and sociologist Herbert Spencer (1874). Social Darwinism, especially when combined with the laissez faire economics of Adam Smith and the infamous population theory of Malthus, suggested that virtually any kind of mutual support or social welfare only serves to perpetuate unfit individuals and degrade the human race. Others, such as William Graham Sumner and Thomas E. Huxley, were also effective popularizers of the doctrine of natural selection (see Leading Edge Research Group 1995*a*).

Social Darwinism was rejected by most social scientists at the time, including the social worker Amos Warner, who pointed out in 1894 that "if acquired characteristics be inherited, then we have a chance permanently to improve the race independently of selection, by seeing to it that individuals acquire characteristics that are desirable for them to transmit" (Warner 1894, p. 120). It has been argued that although Darwin may have made some statements sympathetic to Spencer's approach, there was nothing in his theory that precluded changes in behavior from being inherited and, thereby, altering over time the racial characteristics of populations (Degler 1991, p. 20). Many have pointed out fundamental flaws in social Darwinism, most commonly, the existence of altruism and cooperation, which in both human and nonhuman populations confer a considerable survival value for those individuals and groups that exhibit such qualities (see Lux 1990; Guastello 1995). The tendency of unregulated economic competition to result in monopolies also diminishes the belief that economic competition should be the primary engine of social development. Most biologists currently reject Malthus's doctrine. For example, the biologist Lewis Thomas writes in *The Lives of a Cell* that "most of the associations between the living things we know about are essentially cooperative ones, symbiotic in one degree or another; when they have the look of adversaries, it is usually a standoff relation, with one party issuing signals, warnings, flagging the other off" (Thomas 1995, p. 7).

Although the science of genetics did not exist when Darwin proposed his theory, its later development, beginning with Mendel, provided considerable support for natural selection. In fact, its impact included delivering a near fatal blow to the earlier Lamarckian theory of evolution that involved the impact of acquired behavioral characteristics on biological development (Lamarck [1809] 1984). The purported scientific disproof of Lamarckianism was offered as early as 1889 by the embryologist August Weisman, who had shown that no matter what kind of changes occurred in an animal's body or behavior during its lifetime, none appeared in its offspring. He concluded that there was a fundamental disjunction between heredity and environment and that only changes in the germ plasma could be passed on to future generations (Degler 1991, p. 22). At the same time that biologists concluded that genetic rather than any behavioral successes or failures controlled evolutionary change, others, such as Francis Galton, argued for the application of principles of social Darwinism to society by means of the eugenics movement (see Rutledge 1995, p. 246). Each of these developments—the discrediting of Lamarckianism and the development of genetics, including the application of genetics in the eugenics movement and its final perversion in the "applied biology" of the Nazi era—contributed to a fundamental split between the social sciences and the biological sciences.

By the middle of the twentieth century, Darwin's theory of natural selection was systematically integrated with Mendelian genetics, as well as with a range of other developments in the biological sciences, to initiate what has been referred to as the "evolutionary synthesis," or more commonly, neo-Darwinism (Behe 1996). J. B. S. Haldane (1932), along with Ronald A. Fisher ([1929] 1958) and Sewall Wright (1986), were its initial proponents. In response to their work, a series of meetings was organized in 1947 at Princeton University among leading scientists in genetics, paleontology, comparative anatomy, embryology, and other areas, which formalized many of the tenets of neo-Darwinism (Leading Edge Research Group 1995*b*; Behe 1996). The impact of this synthesis was that it added random events and both spontaneous mutations and recombination to natural selection—and dropped adaptive responses to environmental changes—as the driving forces of evolutionary change. Since then, neo-Darwinians have also included environmentally induced random responses, such as radiation effects, to the repertory of evolutionary causes (Mayr 1970). The earlier abandonment of the role of acquired characteristics and adaptive responses to environmental changes in evolutionary thinking may very well have been a stimulus for the eugenics movement in the early 1900s (Degler 1991, p. 24).

Evolution and the Social Sciences

It is perhaps no accident that at about the same time biologists developed their evolutionary synthesis, which excluded most theories emphasizing either environmental forces or factors intrinsic to the organism, many in the social sciences came to subscribe to what John Tooby and Leda Cosmides (1992) have dubbed the Standard Social Science Model (SSSM), in which social development proceeds largely independently of or, at the most, under only very general constraints of biology. Many social scientists, thus, have felt free from any obligation to consider the impact of biology on their models as well as the reverse, yet they borrow the metaphors of natural selection and the struggle for survival as the driving force of social change, even as they are careful to avoid any obvious application of social Darwinism. In *The Descent of Man,* Darwin ([1857] 1952) argued for the continuity of animal and human development. In contrast, social scientists have sought to establish their independence from many of the traditional sciences, including biology, and to reject any hint of reductionism, thereby creating an artificial split reminiscent of Descartes's separation of mind and body. The evolutionary synthesis and the SSSM, no doubt, were central contributors to the growing divide between the biological and social sciences. One result of this divide has been the stagnation of social change theory.

While few social scientists openly endorse social Darwinism, many consider themselves Darwinians. In the closing years of the twentieth

century, the many advances in biology–from research in ethology to the human genome project and developments in the neurosciences–have profoundly challenged the divorce of the social sciences from the biological sciences. One part of this reapproachment is sociobiology, which developed out of the work of Edward O. Wilson and Richard Dawkins. This patently reductionistic approach attempts to explain many of the details of human behavioral patterns in terms of genetically encoded carryovers from prehuman ancestry, minimizing the many instances in which more recently developed human functions, such as language and culture, have an independent impact on behavioral and social change. Wilson (1998), in his book *Consilience,* proposes that even ethics and religion may ultimately be explainable in terms of biology. Similarly, Dawkins (1986) argues that genes have an independent life of their own. He has gone as far as using the metaphors of genetic action and natural selection to characterize the spread of ideas and other elements of culture, which are now referred to as memes. Wilson (1975) echoes this view and proposes that there may be a gene that will even explain cooperative human action. The impact of both Wilson and Dawkins is vividly illustrated in the recent and widely cited works of Herrstein and Murray, *The Bell Curve* (1994), and Steven Pinker, *How the Mind Works* (1997). These works openly endorse the direct application of principles of natural selection to social and psychological development. Herrstein and Murray, for instance, propose that the allegedly fixed spread of IQs between caucasians and blacks has a genetic basis and compensatory education is, thus, both a waste of time and public resources. This clearly echoes the sentiments of Spencer. Others, such as William Calvin (1999), use natural selection in the theory of neural Darwinism to explain cognitive functioning as a process involving competition and selection among the most dominant neural mappings. Exceptions to this trend include opponents of sociobiology, such as Stephen Jay Gould (1996) and Richard Lewontin (1985), who have denounced the efforts to seek an evolutionary basis for all human actions.

Another aspect of the reapproachment of the biological and social sciences has been exemplified in recent years by various post-Darwinian biologists who have identified additional mechanisms of evolutionary change. For example, Lynn Margulis (1981) received widespread acclaim for her endosymbiotic theory of evolution, the theory that mitochondria, the energy sources for plant and animal cells, evolved from a separate bacterial organism that then developed a symbiotic relationship with eucaryotic cells and were eventually completely incorporated. She emphasizes cooperation and symbiosis, rather than competition and other forms of conflict, as critical evolutionary processes. Recent studies also challenge the conventional wisdom that behavioral changes can have no impact on the germ plasma, and they have sought to demonstrate the existence of directed or nonrandom mutations. Other devel-

opments include the work of Stuart Kauffman (1995) at the Santa Fe Institute, who demonstrates the role of self-organization in the development of complex adaptive systems. A very recent development is the work of several scientists who find evidence that subcellular quantum level processes associated with the emergence of consciousness in evolution may have generated directed or nonrandom mutations based on the enormous information-processing potentials of quantum computation (Ogryzko 1999). Erwin Laszlo (1996) proposes a general theory of evolution that integrates physical, biological evolution, and social change processes, using various elements from complex systems theory.

Thus, while sociobiologists and their social science proponents emphasize the mammalian basis for social action, others, such as Margulis, Kauffman, and Laszlo, have pursued a post-Darwinian theory of evolution that emphasizes behavioral adaptation, cooperation, and self-organization and that provides a rich repertory of processes for social theorists to draw on in understanding the mechanisms of social change. But before considering the contributions of complexity theory and self-organization to evolutionary and social change theory, this article reviews social change theory and its stagnation in recent years.

Social Change Theory and Its Foundations in Evolutionary Thought

It is argued here that the assumptions and metaphors of social Darwinism pervade and undermine efforts to formulate workable theories of social change at the same time that social scientists seek to divorce their efforts from biological research. The concepts of variability, conflict, and selection of the fittest underlie the earlier evolutionary or organismic social change theories, such as that of Auguste Comte (1876), as well as the cyclical and macroconflict theories and several more recent efforts to resolve differences between these perspectives, such as through ecosystems theory. Two pervasive themes of these approaches are (i) the emphasis on conflict, especially competition for resources, status, or survival; and (ii) the identification of the origins of change as exogenous to the system of interest. Both the conflict and the resulting selection may take place on either the micro- or macrolevels, typically as a result of external environmental changes. These approaches are characterized by a pervasive tendency to minimize processes of cooperation, interdependency, self-organization, and especially internally—rather than externally—generated change. It has only been in recent decades that there have been concerted efforts to model cooperative action in social change processes, and it has only been since the 1980s that internally generated change or self-organization has been pursued. Because of the decline of interest in social change theory, to date there have been only sporadic

efforts to apply post-Darwinian approaches to the understanding of social change.

For the first half of the twentieth century, the major efforts within sociology involved the study of social structure, and it was not until the middle of the century that efforts shifted to understanding social change. The study of social structure tended to portray change as an aberration or disruption rather than as an ongoing natural condition of life (Hallinan 1997). Both evolutionary incrementalism and the study of social structure created for many the sense that change, to the extent that it exists, is very gradual, and for this reason, stability and homeostasis are emphasized. Darwin pointed out that "as natural selection acts solely by accumulating slight, successive, favourable variations, it can produce no great or sudden modifications; it can act only by short and slow steps" (Darwin [1859, 1896] 1972, chap. 15). That physicists and astronomers believed the universe to be eternal and unchanging—until Edwin Hubble made his discovery of the expanding universe—was certainly an important backdrop, reinforcing both creationism and the incrementalism of the Darwinians. Those who either ignored change or portrayed change as an incremental process, as many social scientists have done, leaned toward deterministic models in which external conditions determine internal organization, change, and growth. Free will and human purpose, as well as chance and accident, have not been so easily modeled and are often discounted. Assumptions of incremental, continuous, and deterministic change tend to undermine efforts to understand social movements and revolutions on the macrolevel and deviant behaviors on the microlevel and, thus, undermine efforts to intervene in a systematic manner. For example, when persons with serious mental illnesses are cast as "chronic" or "process" schizophrenics, mental health professionals tend either to ignore these people or to provide services designed merely for maintenance and control.

Evolutionary and Organismic Theories of Social Change

Auguste Comte (1876), widely regarded as the father of sociology, often used the metaphor of the biological organism to characterize society. This has been an image that has proven to have great durability among those classified as evolutionary theorists (Appelbaum 1970, p. 21). Proponents of this position have typically viewed social change as naturally smooth and continuous (Hawkinshire and Liggett 1990) and as being based not so much on large scale conflict and selection between classes or nations as between ideas and individuals. Change is seen as a function of increasing adaptability resulting from a process of structural-functional differentiation, specialization, and increasing complexity (Applebaum 1970, p. 130). Most of the original evolutionary theories, including theories of modernization, have tended to be unilinear in that they treat Wes-

tern and industrialized societies as end products of social evolution. In addition to Comte, theorists typically associated with this tradition include Spencer (1874), Pitirim Sorokin (1947), Julian Steward (1964), Ferdinand Tönnies (1964), Neil Smelser (1968), and, less commonly, Emile Durkheim ([1893] 1964) and Max Weber (1947).

Durkheim ([1893] 1964) worked within the organic tradition as he focused on the role of increasing social complexity and interdependency. Despite his many differences with the social Darwinist Spencer, Durkheim also emphasized the role of competition in social survival, as exemplified by his argument that "there are a number of circumstances where different functions enter into competition. Thus, in the individual organism, during a long fast, the nervous system is nourished at the expense of the other organs, and the same phenomenon is produced if cerebral activity develops too considerably. It is the same in society. In time of famine or economic crisis, the vital functions are obliged, in order to maintain themselves, to support themselves at the expense of less essential functions" (Durkheim 1895, p. 271). Although the functionalists such as Durkheim shared some of the assumptions of the social Darwinists, they began to emphasize cooperative social relationships and, thus, they are precursors to the self-organization theorists, who will be considered in the next section of this article.

A direct extension of this tradition are the various twentieth-century theories of modernization. These have typically emphasized developing technology, including increasing specialization, centralization, bureaucratization, urbanization, nucleation of the family, democratization, and secularization as key causes, correlates, or outcomes of the process of modernization (Applebaum 1970, p. 41; Hawkinshire and Liggett 1990). A more recent generation of theories, initiated by the work of Daniel Bell (1973), is in many respects a direct extension of the earlier evolutionary social change theories. These theories focus on the transition from industrial to postindustrial societies, that is, the shift from the production of goods to the production of knowledge, sometimes referred to as the information economy or globalization. Often cited features of globalization are increasing economic specialization among nations and the reduction of trade and other barriers to free competition (Bell 1973; Morris-Suzuki 1988; Toffler 1991; Bartos 1996). The linkage between these perspectives and unilinear evolutionary theories of social change is apparent: societies follow a singular line of development that is driven by technological innovation. Applebaum's suggestion that the principal link between evolutionism and functionalism is the concept of differentiation, by which he means the development of functionally specialized societal structures (Applebaum 1970, p. 54), is thus especially relevant to current theoretical and societal developments.

Although many evolutionary theorists have characterized development as unilinear, as proceeding through a fairly well-defined set of

stages, there are important exceptions. Those who have espoused multilinear theories of social evolution include Marshall Sahlins and Elman Service (1960) and Steward (1964). For instance, Sahlins and Service argue that social development moves simultaneously in two directions. On the one hand, specific evolution is the "philogenetic, ramifying, historic passage of culture along its many lines, the adaptive modification of particular cultures" (p. 38). On the other hand, general evolution is "the passage from less to greater energy transformation, lower to higher levels of integration, and less to greater all-around adaptability" (p. 38).

Cyclical Models

Although proponents of cyclical models, such as Oswald Spengler (1939), Arnold Toynbee (1939), and Sorokin (1962), can be characterized as adherents of multilinear evolutionary theory, they differ with other such adherents in that they minimize the cumulative impact of these developments and instead see them as patterned and recurrent. They typically consider societal events as passing through three stages: growth, maturity, and decline (Hallinan 1997, p. 5). Toynbee's theory of "challenge and response" treats societal change in essentially evolutionary terms (see Laszlo 1996, p. 108). Similarly, Spengler treats cultures as organisms and world history as their collective biography. He argues that "each culture passes through the age-phases of the individual man. Each has its childhood, youth, manhood, and old age" (Spengler 1964, p. 21). In contrast, for Sorokin, the emphasis is on supersystems that integrate diverse cultural elements. These supersystems are based on the most "general of all ontological principals, namely, *the one defining the ultimate nature of reality and value*" (Sorokin 1947, p. 590). Societies can be characterized as incorporating sensate systems, based on the sensory validation of beliefs; ideational systems, based on supernatural validation of beliefs; and idealistic systems, based on validation by both sensation and the supernatural. Societies, therefore, tend to oscillate among an emphasis on science, religion, or rationalism, with rationalism being the intermediate form (Sorokin 1962). Similarly, Weber characterized societies as fluctuating among three types of authority: the charismatic, the transitional, and the rational, none of which he considered to be stable. Like the evolutionary theorists, he also emphasized increasing rationalization and bureaucratization in a variety of institutional arenas, especially in economic development in the West (Weber 1964). In some respect, these theorists are an offshoot of the evolutionary or organic school and can be treated separately only to the extent that change is seen as multilinear and cyclical. Just as was the case with the evolutionary theorists, conflict and the survival of the fittest—in these cases the fittest societies, nations, institutions, or belief systems—are regarded as the driving forces of social change.

Conflict Theories

Conflict theories originated from the dialectical materialism of Karl Marx and Friederick Engels ([1848] 1932). In contrast to organismic theories, change was assumed to be pervasive and ubiquitous and specifically discontinuous and often disruptive (Hawkinshire and Liggett 1990). While most versions of organismic theories emphasized conflict, such conflict was regarded as primarily involving individuals, unlike in conflict theory per se, which focuses on clashes between interests, classes, or other large groups. Marx claimed that "without conflict, no progress: this is the law which civilization has followed to the present day" (Marx and Engels [1846/1847] 1959, p. 21). In addition to Marx and Engels, proponents of variations of macroconflict theory have included Crane Brinton (1952), Lewis Coser (1956), Ralf Dahrendorf (1964), and Georg Simmel (1964).

Impressed with Darwinism, Marx and Engels also incorporated Georg Wilhelm Friedrich Hegel's evolutionary theory of the history of ideas, which involved the spiraling of theses, antitheses, and syntheses into ever higher levels of development as part of their theory of dialectical or historical materialism. They cast development in terms of class struggle over the control of the means of production. Similar to the unilinear evolutionary theorist, they saw technology as central to determining the organization of production processes: technology enables the separation of the control of capital from the means of production, resulting in the exploitation of the working class. In their theory, conflict and change are a function of inherent contradictions that arise under the centralized authority system required by evolving technologies and the resulting impact on the ownership of productive property (Appelbaum 1970, p. 84). All other social realities, such as institutions, values, and beliefs, are secondary superstructures that overlay the separation of capital from the means of production.

There have been numerous critiques of Marxist social theory, many of which have been an outcome of historical developments over the course of the twentieth century. Societies have often failed to polarize as Marx predicted, especially given that working classes have become considerably more varied in their interests than he expected. Marx also failed to distinguish between the functions of ownership, control, and technical expertise in the leadership of corporations. He did not consider the functions of bureaucracy or other social groups in mediating and resolving conflict (Applebaum 1970). Similarly, Dahrendorf (1964) has criticized Marx for restricting the resolution of class conflicts to violent upheaval. Such critiques have led to the development of various post-Marxist conflict theories, such as elitism and pluralism, which are more palatable to current political philosophies. However, in both its Marxist and post-Marxist versions, conflict theory is a close cousin of social Darwinism: it emphasizes conflict among and survival of the most powerful

interests, classes, elites, or interest groups as the driving force of social change.

Equilibrium Theories

At about the same time that biologists adopted the neo-Darwinian synthesis, which banished environmental and behavioral factors from evolutionary theory, many social scientists moved away from the use of evolutionary theory and biological metaphors. Instead, they focused on the conditions of equilibrium and deemphasized social change. It has been pointed out that in some respects equilibrium theory is a direct legacy of earlier evolutionary theory in that it posited slow, continuous change. For example, Smelser (1968) explained change as a complicated series of equilibrium processes, and he held that factors that governed equilibrium processes would dominate during a given period of time (Hallinan 1997, p. 3). The focus became homeostasis, and the metaphor of choice became the thermometer exemplifying the operation of negative feedback loops. Positive feedback loops, involving processes that feed on and amplify themselves, were rarely considered in understanding sudden transitions to more or less favorable conditions. Variations of equilibrium theory have included cybernetics, general systems theory, functionalism, and some of the most recent incarnations of these approaches, such as social entropy theory, living systems or the ecosystems approach, and cultural transformation theory. Each has unsuccessfully sought to reconcile differences between the earlier micro- and macrotheories of social change. At the same time, each has preserved the legacy of natural selection through an emphasis on change as resulting from attempts to resolve microlevel conflict and maintain equilibrium in response to external influences.

Talcott Parsons's (1951) functionalism was one of the first versions of equilibrium theory. According to Richard Appelbaum, Parsons argued that "society consists of specialized systems and their subsystems, each engaged in a series of boundary exchanges with the other and with other 'environments' external to the social system itself. . . . All of these changes pose problems for the systems, forcing the system to specialize in one or another of the four functional prerequisites for existence—adaptation, goal attainment, integration, and latent pattern maintenance [AGIL]" (Applebaum 1970, p. 69). Functionalism involves the examination of the relationships of parts and wholes, and it focuses on the functions of social institutions, often through the AGIL scheme mentioned in the foregoing quotation. These functions are analyzed on multiple systems levels: the organismic, personality, social, and cultural. To the extent that he considered social change, Parsons regarded it as changes in controls at the highest levels of society (Marx's superstructures). Under Parsons's assumptions, major social changes, if they take place at all, originate

exogenously to the system (Appelbaum 1970, p. 71). Parsonian functionalism dominated sociology from the 1950s into the 1970s, when it met with increasing criticism. It was seen as teleological, tautological, static, untestable, and conservative (Bailey 1994, p. 25). It ultimately failed to directly confront the problem of social change, and thus, it has largely been ignored in social development theory.

Since the demise of functionalism, there has been an effort to develop more operational and specialized models of social change processes, for example, cultural lag theory. William Ogburn's (1922) cultural lag theory attempts to account for crises in social development as reflecting lags between the rates of technological and cultural development. One of the most recent applications of cultural lag theory is that by the Nobel Laureate Robert Fogel (2000) of the University of Chicago, who argues that most of the major transformations in American history can be understood as the result of technological developments outpacing cultural norms, leading to a variety of reform movements, often religious in origin, which eventually become secularized and institutionalized.

A recent version of equilibrium theory, and one which is specifically sociological in its focus, is Bailey's social entropy theory (SET) (Bailey 1994). The theory postulates that there are three sets of conditions relevant to the analysis of social change: (i) global conditions, having to do with society as a whole, such as population, level of living, organization, technology, and spatial area; (ii) immutable characteristics of individuals, such as gender and race; and (iii) mutable characteristics of individuals, involving both individual achievements and changeable distributions of jobs, skills, education, and the like. The theory employs both *Q*-analysis among objects and *R*-analysis among variables to understand how these three types of conditions interact to maintain suitable levels of entropy in society. The theory emphasizes equilibrium and regards change as an anomalous deviation from a steady state of energy flow.

Ecological theory is another recent version of equilibrium theory that has an impact in the profession of social work. Like general systems theory, this approach has roots in the work of the classical ecologists who argue that the biotic level is distinct from the cultural or societal levels: "If the biotic level is characterized by subsocial competition, the cultural level is characterized by communication, custom, and consensus" (Appelbaum 1970, p. 76). An underlying concept is that of homeostasis, that is, for any given habitat or configuration of conditions, "populations will tend to distribute themselves in such a fashion that the final patterning will prove stable and resistant to further change" (p. 77). One version of this approach, living systems theory, as developed by Miller (1978), proposes a multilevel scheme that includes analyses of systems on the level of cells, organs, and organisms, as well as on the group, organization, community, society, and supranational levels.

Within social work, equilibrium theory has found a home in the eco-

systems perspective of Carol Germain (Germain and Gitterman 1980) and others, such as Max Siporin (1980). The ecosystems model has been traced back by some to social Darwinism, and more recently, to Kurt Lewin's field theory (1947). It focuses not so much on change but on the abilities of individuals to negotiate and compromise with their social environment (De Hoyos and Jensen 1985). While the alleged association with social Darwinism may seem harsh, as long as the sources of change are seen as external to the individual system, the concept of social selection, derived from that of natural selection and unmodified by more current concepts of emergence or self-organization, will continue to underlie the thinking of many contemporary theorists and practitioners. Despite these limitations, the integration of systems and ecological theory represents an advance, especially as the problem of assumed equilibrium appears to be ameliorated somewhat as compared with the original renditions of general systems theory (see Siporin 1980, p. 509).

In each case, the proponents of the various equilibrium theories sought to achieve grand syntheses of the earlier approaches to social change, but they have often ended up closer to the traditional organismic or evolutionary approaches than to macroconflict theories. Although recently there has been a reapproachment with the biological sciences, as reflected in the living and ecosystems versions, this tradition, on the whole, has been based on a strict separation of social and biological change processes (the SSSM model). One of the effects of this split has been that many social change theorists fail to stay abreast of recent developments in post-Darwinian biology and complex systems theory, and they too often borrow tacitly from the traditional metaphors of natural selection—survival, conflict, and selection–at the same time that they eschew any overt association with social Darwinism. The obvious contradictions of such a stance, however, are easily obfuscated by the highly abstract language of these theories, which unfortunately has contributed to the stagnation of social change theory in the last third of the twentieth century.

Emergence and Self-Organization

Identifying the particular processes that drive the development of complex adaptive systems, whether biological or social, is a contentious and largely unresolved problem. One response in the closing decades of the twentieth century is the application of what are referred to as the "sciences of complexity," which typically include autopoietical system theory (Varela, Maturana, and Uribe 1974), catastrophe theory (Thom 1983), chaos theory (Çambel 1993), dynamical system theory (Laszlo 1996), and nonequilibrium thermodynamics (Prigogine 1996). These approaches attempt to model "far from equilibrium" adaptive systems and to identify fairly simple underlying rules that generate their com-

plexity. This section does not attempt to review this field as a whole, since there are many publications that specifically do this (see Çambel 1993). Instead it explores the principle of self-organization—characterized by a type of "order for free" (Prigogine and Stengers 1984)—and the proposal that self-organization functions as a complementary process driving both biological and social development, a principle that is at least as important as that of natural selection. Self-organization is often mistakenly equated with the notion of emergence, rather than viewed as a particular type of emergent phenomena.

Emergence

Although emergence has become a central feature of complex system theory (R. Lewin 1992, p. 175), it is a notion that is not new, and it can be traced back to the British Emergentists of the nineteenth century, the most well known of which was J. S. Mill (see McLaughlin 1992). This school attempted to provide an alternative solution to the mind-body problem that rejected Descartes's dualism while avoiding the pitfalls of physical reductionism. This traditional variation of emergence proposed that while the fundamental entities of psychological and social processes are material, "when processes reach a certain level of structural complexity, genuinely novel properties emerge to characterize the structural aggregates," and these are not merely the additive combination of the underlying components (Markič 1999, p. 3). Nonemergent properties are those that are simple functions of the qualities of the underlying components, whereas emergent properties cannot be accounted for in such a fashion.

The theory of emergence has both weak and strong versions. Weak versions typically assert only that properties on the more complex system levels are not explainable or predictable from the lower levels and that these properties are in some sense novel. For example, a definition from the *Dictionary of the Philosophy of Mind* asserts that "properties of a complex physical system are emergent just in case they are neither (i) properties had by any parts of the system taken in isolation or (ii) resultant of a mere summation of properties of parts of the system" (Eliasmith 1999). Such weak versions have been popular among physical epiphenomenonalists, those who see mental experience as arising out of and determined by, but not strictly reducible to underlying physical processes. Strong versions, however, go further. They include the idea that on the more complex levels, the emergent properties may become independent of the particular units on the lower levels in the sense that these may be replaceable. Even more controversial is the idea that these higher level properties may attain a causal power to influence underlying components. Independence from the lower levels can easily be argued by citing the example of a computer program that can operate on diverse computers

and maintain its essential characteristics, or the example of an organization that maintains its identity and functions despite a complete turnover of personnel. The power of the more complex levels to influence lower levels, sometimes referred to as "downward causation" or "backaction," is currently rejected by many scholars, including some in the cognitive and behavioral sciences who consider mental experience as essentially epiphenomenal and reflective of biological processes, that free will is a convenient fiction (e.g., Bargh and Chartrand 1999). For example, one author attempts to claim that "there are no independent mental causes with respect to physical effects. This principle is one of the basic scientific principles and it seems that rejecting it would be too high a price" (Markič 1999, p. 6).

Unlike self-organization, which focuses on the development of structures out of simpler components (see next section for definition), emergence is a much broader concept that involves any properties apparently unique to complex systems. Typically, but not necessarily, those who invoke notions of self-organization subscribe to one or another variation of strong emergentism. The range of weak to strong positions can be considered as reflecting alternative levels of development of system complexity, with the higher levels being more intractable to traditional methods of analysis. Currently, weak versions of emergentism are popular in the cognitive sciences, and stronger forms are part of the core assumptions of some social scientists such as the functionalists discussed earlier, as well as this author.

Many but not all proponents of complex systems theories actively draw on the idea of emergence. Both Robert Axelrod (1997) and Thomas Holland (1998) have done extensive work on modeling the development of cooperative social relationships, using computer simulations that effectively demonstrate the emergence of higher order structures out of interacting units that are governed by simple interactional rules. Just as Axelrod (1997) explains emergent properties of a system as resulting from "the large scale effects of locally interacting agents" (p. 4), Holland (1998, p. 141) defines emergence in generated systems as "persistent patterns with changing components." In contrast, Chris Langdon of the Santa Fe Institute adopts a decidedly strong version of emergentism, as is reflected in his statement: "from the interaction of the individual components . . . emerges some kind of global property . . . which turns back to influence the behavior of the individuals" (Merry 1995, p. 138).

Often cited as critical features of systems that exhibit emergence are interacting units or subsystems and constrained rules or generating procedures that govern the interaction of these units. An optimal network density, involving a sufficient level of connectivity between the components, has also been proposed as a prerequisite for emergent phenomena to occur (Holland 1998). Other features of emergent systems

include their overall coherence or correlation among components, their dynamic or changing patterns, and the fact that they are "ostensively recognized" (Goldstein 1999, p. 50). One of the goals of research in this field, whether the systems are biological or social, involves the identification of the underlying rules that are not only necessary for emergent phenomena but also sufficient for such developments to occur.

In its weak version, the concept of emergence is used not so much as an alternative to Darwinian natural selection or to the operations of Adam Smith's "Invisible Hand" but as a means of restating and even arguing for the primacy of such processes. This version suggests that from the fairly simple rules governing self-interest, selection, and survival, complex biological and social forms are eventually generated. Zohar (1994, p. 121) points out that "the apparent law of 'survival of the fittest' in Darwinian biology or the laws of thermodynamics that describe the behavior of mechanistic systems are also emergent in this sense." Thus, in its weak form, emergence is a rather innocuous concept, one which can be used to construct any number of competing theories. The weak version of emergence has provided a convenient rationale for social scientists to divorce their efforts from the biological and physical sciences. In its strong version, we see living systems with "irreducible complexity," and possibly, systems that become independent of and able to transform their underlying components. But even in the strong form of emergence, we do not have a particular theory but rather a general framework for investigating a far richer range of change processes, one of which is self-organization.

Self-Organization

Perhaps the person most closely associated with self-organization theory is Ilya Prigogine, who in 1977 won the Nobel prize for his discovery that self-organization occurs in dissipative structures. These are systems that exist at far-from-equilibrium conditions and do not follow the general rules of the classical sciences (Bütz 1997). There have also been several biologists since then who have identified what they consider to be the "spontaneous appearance of organized structure throughout biological evolution and social development" (Hayles 1990, p. 21). Kauffman (1995), for instance, argues that self-organization is a "great undiscovered principle of nature" and that it and natural selection are the twin engines of the biosphere.

Just as is the case with emergence, self-organization is difficult to define. A review of typical definitions suggests that it has three primary components that distinguish it as a particular type of emergent phenomenon: (i) characteristic structures or organizations are created: "Self-organization is a process whereby, in effect, components at one level interact and amalgamate to create a structure at a higher level.

Components at that higher level interact and combine to again create an even higher level" (Merry 1995, pp. 172–74); (ii) such creation occurs with a minimum of external interference: a system is defined as self-organizing "if it acquires a functional, spatial, or temporal structure without specific interference from the outside" (Haken 1988); and finally (iii) the foregoing happens with apparent spontaneity: "Self-organization [is] a spontaneously formed higher-level pattern of structure or function that is emergent through the interactions of lower-level objects" (Flake 1998). Although self-organization is commonly associated with nonconflictual processes, it encompasses both cooperative and competitive processes. What is perhaps most characteristic of self-organization is that there is an interaction of local units according to identifiable rules that results in the spontaneous formation of a higher-order structure, whether or not this interaction involves cooperation or conflict.

The literature contains several explanations for the underlying dynamics of self-organizing processes that involve (i) dissipative structures, (ii) "edge of chaos" phenomena, (iii) the operation of local activity rules, and (iv) the coupling of lower-order systems. Some theorists have also emphasized the need for a minimum level of redundancy and reliability, the presence of noise, semipermeable system boundaries, and systemic correlation or coherence (Goldstein 1995, p. 54).

Prigogine established that dissipative systems are prerequisites for self-organizing processes (see Çambel 1993, p. 128). The example most commonly cited of a dissipative structure is the whirlpool, in which energy is sucked in from the environment, becomes organized, and is dissipated or dispersed at a higher or lower level. For example, Danah Zohar and Ian Marshall (1994, p. 198) explain that "self-organizing systems are like whirlpools. They take material or information from the surrounding environment and form it into a dynamic pattern. In the case of biological systems, they take material and form it into patterns of tissue or organism. In the case of mind, information is formed into patterns of thought, patterns of meaning."

Several authors have focused on a phenomenon referred to as the "edge of chaos" as another precondition necessary for or conducive to self-organization (Packard 1988; R. Lewin 1992; Waldrop 1992; Richards 1996). The phrase "edge of chaos" refers to systems in which there is order and predictable periodicity amid other processes that mathematicians have referred to as a type of chaos. The mathematical notion of chaos refers to processes that will never repeat themselves despite their display of generalized nonrepeating patterns ("strange attractors"). Roger Lewin (1992, p. 51), for example, argues that "the edge of chaos is where information gets its foot in the door in the physical world, where it gets the upper hand over energy. . . . Being at the transition point between order and chaos not only buys you exquisite control—small

input/big change—but it also buys you the possibility that information processing can become an important part of the dynamics of the system."

Just as Lewin points out the information processing potentials of systems at the edge of chaos, psychologist Ruth Richards (1996) argues that the ability to function at the edge of chaos is one of the most important conditions for creativity and effective problem solving. Because chaotic processes, by definition, never repeat themselves, they represent an endless source of novelty. Prigogine also sees the edge of chaos as another critical condition for self-organization. He explains that many natural systems spontaneously organize themselves while on the borderline between order and chaos (Zohar 1994, p. 199). He argues that the maintenance of organization in nature cannot be achieved by "central management" but only through self- organization: "Self-organizing systems allow adaptation to the prevailing environment . . . and make the system extraordinarily flexible and robust against perturbations from outside conditions" (Prigogine 1996, p. 71).

Just as global properties can emerge from rules governing the interactions of the parts of a system, global structures can be demonstrated to self-organize on the basis of the operation of local activity rules. The V-shape of a flock of birds can be shown to occur not so much because of some overall plan on the part of the birds but because each bird follows simple inbred rules concerning how one bird should follow another.

A commonly cited dynamic that contributes to many self-organizing systems is that involving the coupling of lower-order systems (Merry 1995, p. 47). While Margulis (1981) is well known for her identification of such processes in cellular evolution, Laszlo (1996) extensively cites examples of the linkage of lower order systems, which he suggests is a function of the lower bonding energies that exist on the more complex system levels. Kauffman (1993, 1995) provides extensive documentation of the role of biological processes involving autocatalysis, cross catalysis, and nucleation in linking subprocesses to form higher processes, a linkage that typically happens, he argues, under conditions involving an optimal density of the component parts or processes. These subprocesses, then, link to form complete multistaged feedback loops, eventually creating higher order adaptive self-replicating systems.

Self-Organization and Social Change

To date, the concept of self-organization has been one of the few viable alternatives to an exclusive reliance on natural and social selection for understanding social change. Recently, Laszlo applied these notions to social systems in his attempt to place chaos and complex systems theory into a broader perspective. He proposed a theory that he refers to

as the grand evolutionary synthetic theory (GEST) (Lazslo 1987) or general evolutionary theory (Lazslo 1996). He characterizes the dynamics of this transformational process as lying in the interaction of a "β-Function" of auto- and cross-catalytic cycles governed by negative feedback, in which systems governance is centralized, and a "γ-Function" of deviation-amplifying positive feedback, in which systems governance shifts to the periphery. Social evolution is thus seen as the alternation of long epochs of stability, governed by negative feedback loops, with much shorter crucial periods of revolutionary change, dominated by positive feedback loops (Lazslo 1984). Supplementing the idea of self-organization, which mainly takes place in short pivotal periods, is the notion of "co-evolution," in which various individuals and social entities continually adapt to each other's adaptive efforts, "tuning themselves to the point of maximum computational ability, maximum fitness, and maximum evolvability" (R. Lewin 1992, p. 62; see also Kauffman 1995).

In simulation studies of phenomena involving social influence and attitude change, Bibb Latané, Andrzej Nowak, and James Liu (1994, p. 3) report that a degree of randomness actually increases the likelihood of self-organization. They demonstrate that ordered attitudinal patterns emerge solely "from the dynamic interaction of individual elements," which leads to global order and self-organization. Specifically, their model demonstrates that social systems achieve one of four possible states with respect to attitude changes: (i) unification or consensus; (ii) stable equilibria, involving incompletely polarized systems in which further interaction no longer leads to change; (iii) dynamic equilibria, in which the systems achieve global order but where individuals continue to change; or (iv) disordered evolution, when change at the individual level takes place without the emergence of any global order (Latané et al. 1994).

Self-organization has also been used to explain the emergence of culture. Liane Gabora (1988) uses Kauffman's theory that autocatalytic networks are a driving force in biological evolution as a metaphor to describe how individuals' discrete memories become woven into an internal model of the world as well as self-triggered streams of thought, which in turn, self-organize into larger culture patterns. Although she borrows from Dawkins's theory that natural selection governs the spread of memes—ideas, values, and other units of culture—she sees this as only one of the processes involved, operating alongside the spontaneous self-organization of memes both within and between individuals. Her theory, thus, is one example among several applications of self-organization that deemphasize conflict and external influence in favor of explanations that focus on the logic and operation of simple local activity rules that often generate cooperation between or integration of subsystems into larger systems.

Another example of the operation of self-organization in social sys-

tems involves Kauffman's application of his theory of autocatalysis to economic development. He argues that a critical diversity of goods and services is necessary for continued economic development. This development depends in part on the continual discovery of ever new ways of combining these goods and services to create more useful, complex, and valuable products. As soon as metal can be smelted, saws can be fabricated, enabling new building technologies, and so on. He explains that in each period the goods and services previously created generate novel and usually unpredictable opportunities to create still more goods and services. The economic frontier expands and builds on itself (Kauffman 1993, p. 29). Those, such as Kauffman, Axelrod, and Holland, who have done extensive work using computer simulations to model processes of self-organization and cooperative social action present persuasive arguments and data pertinent to an identification of some, but certainly not all, of the conditions under which self-organization takes place. Yet, research on self-organization is only in its beginning stages, and it now faces the challenge posed by Behe (1996) to incorporate actual data rather than the simulated exploration of the consequences of hypothesized systems, however plausible the assumptions might be. Behe complains that Kauffman's work represents a type of "fact free" science. Although self-organization is accepted in physics, in biology it is viewed with considerable suspicion, since much of evolutionary theory involved removing seemingly mystical explanations (R. Lewin 1992, p. 183). In the social sciences and social services, it has made only very limited inroads.

Discussion

Self-organizing systems represent a recently identified class of phenomenon. Specifically, they represent a type of emergence that involves the apparently spontaneous development of structure in complex systems in response not so much to external conflicts or the struggle for survival but to the internal logic of the interacting subsystems. The theory of self-organization thus represents an advance over the traditional and weak forms of emergentism, which have had a pervasive influence in such fields as sociobiology and the neurosciences. In this respect, the notion of self-organization represents a critical expansion of our understanding of the processes that drive both evolution and social change. As important as conflict and its management may be in competition for resources, power, status, and the like, the theory of self-organization suggests that there is a logic—"constrained generating rules"—internal to individuals and social systems that orchestrates the emergence of novel structures under conditions involving dissipative energy flows at the edge of chaos. Just as in the case of biological evolution, in which the theory of natural selection has some explanatory power in accounting for incremental ad-

justments in an existing species to changing conditions, conflict-based social change theory—whether it involves microlevel organismic and equilibrium approaches or macrolevel dialectical theories—works well in accounting for gradual changes in, as well as breakdowns of, existing structures. But because most existing social change theories borrow excessively from traditional evolutionary metaphors involving conflict and selection and often overemphasize the attainment of equilibrium between conflicted forces, they fail to account adequately for discontinuous patterns of growth and for the spontaneous emergence of novel social and political structures.

The theory of self-organization is, of course, consistent with traditional social work values, such as mutual support, self-determination, and self-help. It emphasizes looking to the internal direction, motivations, and capabilities of the individual or group and deemphasizing the use of external inducements, whether these involve carrots or sticks, to generate conflict and change. It reinforces the use of Roland Warren's classic principle of "least contest," in which community organizers are asked to first consider cooperative action, and if this is not possible, then to resort to negotiation, or finally, to conflict (see Warren 1963). It addresses the need to fully incorporate an understanding of the strengths of target systems in the planning of social action, such as is done in John Kretzmann and John McKnight's (1993) asset-based community development approach to "building communities from the inside out." In this respect, it emphasizes change efforts developed internally in target systems rather than those interventions externally administered. It tends to support decentralized, grassroots approaches to advocacy planning, community action, and social development in which the change agent joins with the target population, and it tends to discourage highly centralized, top-down models of social administration in which the change agent functions as an exogenous influence. In these respects, the notion of self-organization provides a theoretical foundation that is consistent with much of the historic practice wisdom inherent in the social services and the social work profession.

At the same time that self-organization theory supports many of the field's core values, it also provides some critical theoretical tools and practical opportunities. The idea that dissipative energy flows are ubiquitous in biological and social systems reinforces the need for better understanding the dynamics involved in the flow of resources and information and how characteristics of these flows have an impact on individuals and groups who cling to bygone eras of adjustment and equilibrium. For example, the growing divide between the information "haves" and "have nots" will no doubt emerge as a central issue in the twenty-first century. Complexity theory suggests that conditions involving the edge of chaos and the resulting possibilities of creativity and growth may be at least as important as, if not more important than, equilibrium–adjustment, sta-

bility, adaptation, and person-environment goodness-of-fit—a cherished goal of much social work. Self-organization theory suggests that traditional notions of mental health will need to be reformulated to incorporate a nonequilibrium perspective, one which recognizes nonpredictable growth processes and the sometimes sudden transitions to novel states. The theory of self-organizing systems also suggests that careful attention needs to be paid to the rules that govern the interactions between the component individuals and subgroups in a social system and the optimal density of their interconnections. Such rules are typically expressed through learned behaviors and cultural patterns, administrative procedures, or political and legal decision-making processes. For example, much of deinstitutionalization represents the impact of not so much national policies, such as Kennedy's Community Mental Health Act of 1963, but the cumulative impact of multiple psychiatric commitment decisions based on increasingly stringent criteria. Thus, the focus of social action needs to more often involve changing the basic ground rules of social relationships. Neglect of these ground rules is one of the most frequent sources of the unintended consequences of many global social policies.

Practitioners will be severely hamstrung in their motivation and ability to intervene to the extent that they assume the presence of only weak emergence in social systems. At the same time that they may acknowledge that the whole may be greater than the sum of its parts, they may fail to consider downward causation or "backaction" involving the impact of consciousness, larger social systems, and culture on biological and physical systems. They will assume that their choices cannot be novel or self-directed or have an impact that is disproportionately great as compared with their initiating action, as chaos theory has so dramatically demonstrated. Furthermore, they will minimize the importance of joining with and mobilizing the choices and committed actions of their clients and communities, and they will instead see mental health and community integration as determined by external biological or economic forces. In these respects, self-organization theory provides a critical building block—but by no means the only one—for the conceptual and empirical foundations for planned social action and development.

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