

Chapter One

THE STRUCTURE OF SOCIAL CHANGE

HUMAN BEINGS ARE THE LAST SURVIVORS of a long line of bipedal primates, known as hominids, who once walked the earth. The path of descent from the first bipeds to ourselves resembles not so much a tree as a bush with many branches, some drifting off to extinction and others continuing to the present. Over the course of 6 million years of hominid evolution, however, one thing has been constant: The apes and their descendants who eventually became human beings always lived in groups. Hominids never lived or acted alone; they were always enmeshed in social networks that were themselves embedded within larger social structures.

Humans beings are fundamentally social creatures—in the words of the social psychologist Susan T. Fiske, “social to the core” (Fiske 2003:169). For members of the human species, survival is impossible outside the group. As an organism, we are characterized by an unusually long period of helplessness and dependence early in life. For years after birth, human young are incapable of feeding, clothing, and maintaining themselves without help from adults. Left alone, human infants and children quickly die. Even as adults, survival outside the group is tenuous, at best. Before agriculture—that is, for most of human existence—no single adult could possibly secure enough calories day after day, year after year, to support himself

or herself and reproduce. One individual's bad luck at the hunt or limited success at gathering would have left that person without sufficient nourishment. Moreover, all humans are inevitably incapacitated for significant spans of time by injury, illness, immaturity, and senescence; and females are routinely burdened by the demands of pregnancy, childbirth, and child rearing. As a result, food sharing characterizes all known human societies. For human beings, eating is as much a social as a biological endeavor.

The importance of social integration continues even in contemporary, post-industrial societies characterized by low mortality and long life expectancies. Even given assured access to food, shelter, and modern medicine, adults who are socially disconnected from others get sick and die at much higher rates than those who are socially integrated. Across all cultures the harshest punishment that is imposed on a human being short of death is estrangement from the group. Whereas foraging societies impose banishment, we subject our evil-doers to solitary confinement in prisons. Given our social nature, depriving a human being of the company of other people represents a harsh punishment in and of itself. Try as they might, human beings cannot escape the presence—real or imagined, concrete or symbolic—of other people. They don't like to be alone, at least not for very long.

Although individual human beings are inevitably embedded within social networks that bind them into larger communities, the size, structure, and organization of human society have changed dramatically over the course of 6 million years of evolution. The societies that now span the globe contain vastly

more people living together in higher concentrations than ever before. The denizens of today's societies live in much larger settlements of higher density and interact far more intensely across a wider array of social categories than was true just a century ago. In the words of one social historian, small-scale settlements where everyone knows everyone else constitute "a world we have lost" (Laslett 1971).

The process by which human societies evolve and change over time has long attracted the attention of social thinkers. From the dawn of history, philosophers have speculated about the nature of the ideal relationship between the individual and society. More recently, social scientists have endeavored to observe and catalogue the diversity of social forms across time and space and, on the basis of these observations, to describe generalized patterns of social structure and to formulate universal models of change.

Since the emergence of the social sciences in the late nineteenth century, thoughtful observers have proposed numerous models of social evolution. Some of them are *unilinear*, viewing social change as an unbroken, monotonic line of progress stretching from past to present. Others are *multilinear*, conceiving of social change as manifold, with different branches moving forward at different rates at different times, some reaching dead ends and others progressing toward the present. Many theories are *unicausal*, positing that the impetus for change and development lies in one or another overriding factor—population growth, technological innovation, environmental transformation, social reorganization. Other models are *multicausal*, viewing change as stemming from a complex interplay of many

different factors that influence one another in convoluted, often nonlinear ways.

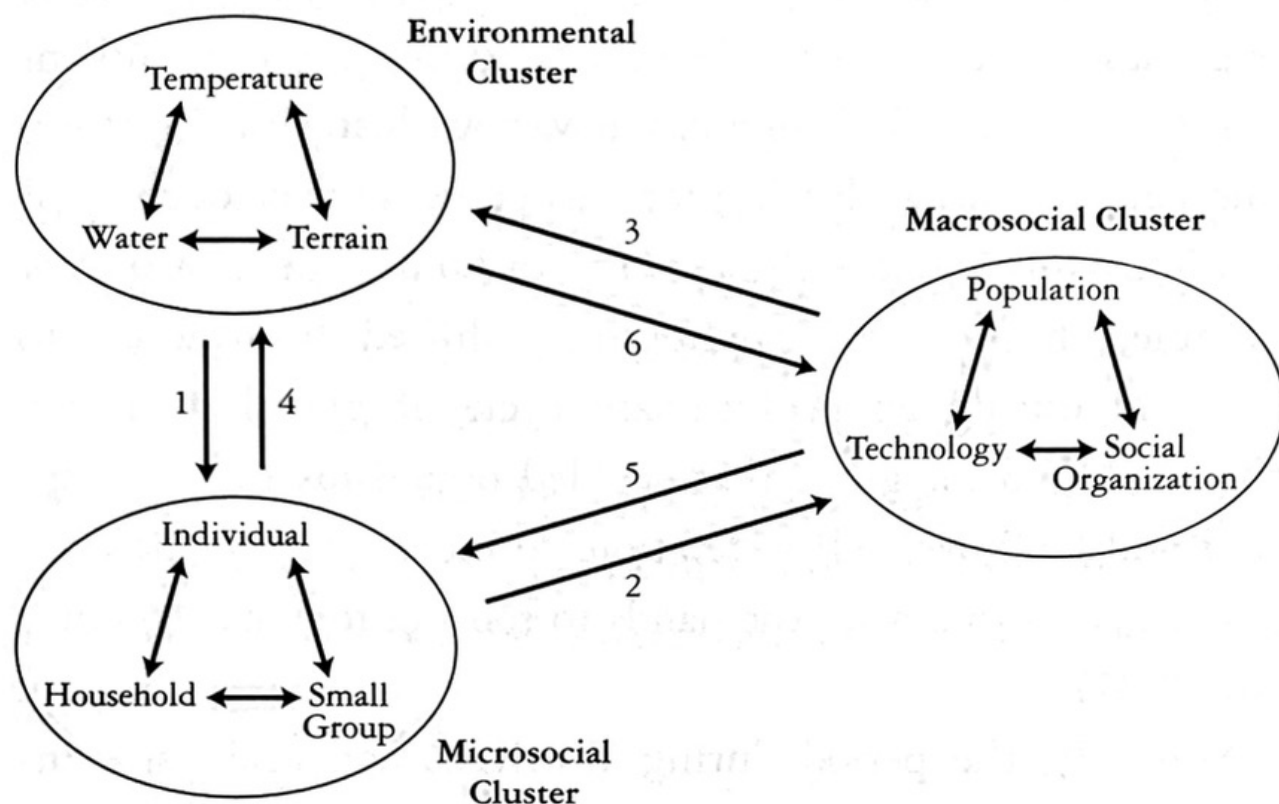
THE ELEMENTS OF SOCIAL CHANGE

After years of investigation and study across a variety of domains, most social scientists have abandoned simple unilinear and unicausal models of change and now conceive of societal evolution as a complex of multicausal, multistranded social processes with nonlinear feedbacks that affect one another non-recursively over time (see Bogucki 1999; Sanderson 1999; Johnson and Earle 2000). Although such a system is inherently complicated and unstable, its basic organization and feedbacks may be simply summarized. Figure 1.1 offers an illustrative diagram of societal change as the outcome of interactive feedbacks among three important clusters of factors: those defining the physical environment (environmental cluster); those characterizing social relations among humans at the micro level (microsocial cluster); and those affecting the social organization of human societies at the macro level (macrosocial cluster).

Across different epochs of human existence, the relative strength and importance of the various intercluster pathways (e.g., those linking environment with microsocial relations, macrosocial structure with environmental conditions, and macrosocial structure with microsocial relations) vary considerably; but over the long run of human evolution, all have come into play. Only their relative influence, not their existence, varies over time. Each cluster in Figure 1.1 is composed of three constituent elements that form a subset of relationships determining the nature, form, and relative importance of that cluster at any particular historical moment.

Figure 1.1

Schematic Model of Social Change in Human Society

*The Environmental Cluster*

The ultimate arbiter of all human behavior at both the micro and macro levels is the environment. In the absence of appropriate amounts of oxygen, water, nutrients, and warmth, human beings cannot survive. The environment to which humans must adapt is defined by a set of prevailing temperatures (which may vary seasonally); degree of access to water (in the form of precipitation and in liquid and frozen concentrations); and a particular terrain (defined by the degree and variability of elevation). In any location at any point in time, the elements of temperature, water, and terrain combine to define a particular ecological niche; if humans are to survive, they somehow must organize themselves into a combination of micro-level relationships and macro-level social structures that enable them to persist and reproduce within that niche.

The environment, of course, varies across both space and time. Temporal change may be seasonal (occurring in short, orderly cycles throughout the year) or evolutionary (occurring in long phases that persist for decades, centuries, and even millennia). Environmental change has at various historical junctures functioned as the wellspring for change in human social organization. During the earliest phases of hominid evolution, for example, the ancestral environment shifted from forest to grassland during an evolutionary cycle of global warming, which selected for genes that enabled organisms to stand upright and look over tall vegetation, to move quickly about on two legs, and to devote the hands to rooting for food (Wrangham 2001).

Similarly, the period during which human brain size increased most rapidly was one of abnormal climate oscillation that caused very abrupt changes in habitat over short periods (in the form of successive ice ages), thereby favoring an adaptive tool that could change quickly (i.e., culture), rather than one that shifted slowly across generations (i.e., genetic evolution—see Bogucki 1999). With the final expansion of the prefrontal cortex around 150,000 years ago, the *genetic adaptation* of humans to the environment effectively ceased and was replaced by *cultural adaptation*. After being confined for millions of years to Africa, southern Europe, and southern Asia, within a few thousand years the new hominids—*Homo sapiens*—were able to use culture to adapt to virtually all of the world's ecological niches, no matter how hot or cold, wet or dry, high or low.

With the emergence of culture rather than genetic evolution as the primary means of human adaptation to ecological variation, the relative influence of the environment on social affairs

(Pathways 1 and 6 in Figure 1.1) began to wane and the effect of human behavior on the environment grew (Pathways 3 and 4). Indeed, shortly after the arrival on the scene of modern humans, dozens of species of megafauna (bison, mammoths, sabertooth tigers, and the like) suddenly disappeared from the fossil record, likely owing to over-hunting. More recently, human beings have turned forests into fields, fields into deserts, and deserts into gardens; and with evidence for human-induced global warming growing stronger (Watson 2002), one could say that completion of the circle is under way, whereby human actions affect the environment in so powerful a fashion that it mandates changes in both interpersonal behavior and social organization.

The Microsocial Cluster

By far the greatest amount of waking time in the life of any human being is spent in the company of small numbers of other people assembled within some narrowly circumscribed location. At most times and in most places in the course of human evolution, the total number of people with whom individuals interacted either directly or indirectly numbered in the dozens or hundreds and did not exceed one thousand in a lifetime. From the advent of the hominid line around 6 million years ago, through the emergence of *Homo sapiens* some 150,000 years ago—indeed, until just 10,000 years ago—all human beings lived together in small groups, moving about the environment in small bands that survived by scavenging, hunting, and gathering, a way of life generally known as foraging.

Whatever else one can say about human beings, it is clear that we are adapted primarily to life in small social groups. No

matter what the circumstances, we instinctively seek out, form, and endeavor to maintain social bonds with other people. As children we bond to people with whom we share living space, usually but not always close kin. We do not seek out parents, siblings, and other household members, of course; we are automatically bound to them by shared genetics and intimate association across space and time. As we grow older, however, we come to interact in culturally expected ways with other, more distant relations, and we are instinctively motivated to form emotional bonds of friendship and trust with nonrelatives. Upon adolescence, we are socially programmed to seek out and form attachments to sexual partners, usually but not always members of the opposite sex. When social bonding does not occur for some reason, human beings generally develop severe physical, social, and psychological pathologies. (Bowlby 1982).

In dealing with other individuals as social actors, all human beings must face and overcome four inescapable and fundamental problems (Plutchik 1980). The first is *temporality*, which is imposed by the fact that life is ultimately finite. The existence of any organism is defined by the vital events of birth and death, between which unfold the sequential stages of infancy, childhood, adolescence, sexual maturity, adulthood, and senescence. Given mortality, time is always a limited good, and human beings and their social organizations generally operate to minimize its expenditure (Stephan 2004). The bookend events of birth and death make feelings of attachment and loss—the emotions of joy and sadness—intrinsic to the human condition (TenHouten 1999).

A second fundamental problem is *territoriality*. All interpersonal interactions must occur within or transcend physical

space. In order to achieve safety and security, all organisms need to achieve a certain command and control over some territory, the boundaries of which they generally seek to mark in some fashion. A fundamental emotional compulsion in all mammals is to seek and explore one's environment (Panksepp 1998), which is in turn associated with the universal emotion of surprise (Eibl-Eibesfeld 1989).

A third fundamental issue faced by all human beings is *identity*: the nature of one's membership in a social group. As already noted, isolated individuals are unable to perpetuate their genes, and functioning within a group always involves solving issues of identity that determine (1) when and under what circumstances one engages in cooperative behavior with others, and (2) how the intent to cooperate with other social beings is communicated through words, facial expressions, gestures, and symbols. Associated with identity are characteristic emotional valances: Attraction brings about social bonding and acceptance; disgust yields avoidance and rejection.

The last fundamental problem of social life is *hierarchy*: how one is positioned within a graded classification ordered with respect to some attribute of social dominance such as power, influence, wealth, status, or prestige. Hierarchy is the vertical dimension of group life and position within a classification structure that determines the organism's degree of access to food, shelter, comfort, safety, and pleasure. The relevant emotions associated with hierarchy are rage and anger, which bring about aggressive behavior that establishes location in a graded social order, and fear and envy, which trigger submissive or deferential behaviors that acknowledge another actor's higher rank.

In foraging societies, individual human beings confront these issues almost exclusively at the microsocial level, innovating social structure from the bottom-up as they forge ties with other people in their social environment to create an interpersonal network of connections to relatives and friends (Gamble 1999). Individuals thus actively construct society as a network of interpersonal ties and alliances, building up social networks, improvising scripts, and creating social life as they move through life interacting with people they encounter, a process that Giddens (1984) has labeled “structuration.” In fact, structuration is the fundamental activity carried out within the microsocial cluster.

Networks are structured sets of social ties that link human beings to one another across space and time. Humans establish social ties by exchanging one of three kinds of resources: emotional, material, or symbolic. *Multiplex ties* are those characterized by exchanges of multiple resources simultaneously, whereas *uniplex ties* are those involving the exchange of just one resource. Ties within one’s immediate family are multiplex, as they involve the ongoing exchange of a variety of emotional, material, and symbolic resources. In contrast, interacting with a ticket-taker at a theater entrance—handing over the ticket and saying “thank you” after being told “first door to the right”—is a uniplex tie because it involves a narrow symbolic exchange (a ticket in return for a greeting, admittance, and simple direction) and does not include other emotional, material, or symbolic content.

The collection of social ties that constitute any given person’s network may be characterized by a set of abstract properties (see Turner and Maryanski 1991). The *size* of a network is

simply the number of ties it contains. *Density* involves the number of ties relative to the number that could possibly exist within any fixed set of people. For any collection of N individuals, the number of possible ties is given by the formula $N!/[2(N-2)!]$. Density is defined as the number of observed social ties among N individuals divided by the value of this expression (where $N!$ indicates the combinatorial $N \times (N-1) \times (N-2) \times (N-3) \dots \times 1$). When density equals 1.0, it means that every person knows every other person in the social network. Another word for density is *connectivity*, suggesting the degree to which people within any social group are linked to one another.

In contrast, *centrality* refers to the location of a specific actor in a social network, and it is measured as the share of all network members to which that person is connected. A person who knows 19 out of 20 people in a social network is more central than someone who knows just 5 of the 20 people. Finally, *transitivity* is the extent to which a social relationship within a network transfers to another person with whom one has not heretofore interacted. Even though one may never have met one's first cousin, one can expect to be treated with more consideration and acceptance by that cousin than by a randomly selected individual who is also unknown, for kinship is transitive. Certain obligations pass through one's relationship to his or her parents through their siblings to the children of their siblings (one's cousins).

Networks that are characterized by a high degree of density, connectivity, and transitivity are said to confer a high degree of *social closure*: Information about any single individual will be widely diffused throughout the network, and any change in his

or her status will quickly be apprehended by all. For most of the time that humans have walked on earth, networks have been established and maintained through face-to-face interactions involving other people within a narrowly circumscribed locale. Although the resulting social networks were relatively small and did not extend very far in space or time, they were composed of multiplex, transitive ties arranged in configurations of high density, yielding a very high degree of social closure. Everyone repeatedly exchanged a variety of emotional, material, and symbolic resources with everyone else on an ongoing basis.

Although opportunities to interact with people who were unknown and personally unfamiliar were infrequent in preagrarian foraging societies, they nonetheless existed, yielding a basic distinction between personal and global networks. The global network is defined by the characteristic of “otherness.” A *global network* is the set of people “out there” somewhere, occupying a larger but unknown social world of strangers who are never or rarely encountered because of their removal in space and time (Gamble 1999). Given the fact that cultivating and maintaining a social tie requires time, and that time is limited, the larger the population within any defined territory, the larger the number of strangers—there are simply too many people to interact with on a meaningful basis.

Thus, a characteristic feature of human beings is their cognitive ability to exclude other people categorically from membership in social groups and networks (Colson 1978), minimizing the exchange of emotional, material, or interpersonal relations to limit the intensity of interpersonal interactions and to keep the total within manageable limits. For

example, when a person attends a sporting event with 50,000 other fans, he or she cannot possibly engage in multiplex social relations with everyone who is present at that particular point in time. Instead, one relegates everyone but one's companions to the category of "other fans" and interacts with those encountered in only the most superficial way. Human encounters with strangers are universally governed by a principle of exclusion that must be negotiated away socially for the interaction to proceed (Mauss 1967).

In contrast to the global network of unknown others is one's *personal network*, which has three components (Gamble 1999). The *intimate network* consists of multiplex ties characterized by the intense exchange of emotional resources, in addition to material and symbolic resources. An intimate network can only be maintained through ongoing face-to-face interactions over an extended period. Given this intensity of emotional investment, the size of intimate networks is quite limited. In his crosscultural study of Western societies, Milardo (1992) found that intimate networks for adults generally ranged in size from three to seven people with an average of around five. In foraging societies, most members of an intimate network are close kin, and even in the contemporary Western societies considered by Milardo, 50% of those in intimate networks were immediate family members.

A person's *effective network* consists of the social ties that are created and maintained to deal with the logistics of everyday life, the interpersonal connections that one uses to pursue instrumental goals associated with survival, pleasure, and the accumulation of emotional, material, or symbolic resources. Ties within an effective network often involve the intense exchange

of material and symbolic resources; but compared with ties in an intimate network, emotional exchanges are less frequent and less intense. In his crosscultural survey, Milardo (1992) found that effective networks ranged from 6 to 34 people and averaged around 20, only 40% of whom were immediate kin.

Finally, a personal network includes an *extended network* of social ties to people who are known to the individual and who may be brought into his or her effective network if necessary. The extended network consists of distant kin, passing acquaintances, and “friends of friends”—what Granovetter (1974) calls “weak ties.” The size of extended networks is difficult to estimate and varies considerably among people, depending on the degree of transitivity and the number of passive ties that have been accumulated. In contemporary societies, extended networks are thought to vary from around 100 to around 400 persons (Gamble 1999).

Across all cultures, the size, density, and composition of personal networks vary by sex and age. In general, as people grow older the number and range of social ties increase. The increase is particularly rapid at phases of the life cycle associated with mate selection, when individuals (and their parents) explore a wide range of ties in search of a partner and then acquire a whole new set of relatives through marriage. Moreover, because women in most cultures marry at younger ages than men, and because in pre-industrial societies they usually have a lower life expectancy as well, the size and density of female personal networks peak at an earlier age and display lower averages compared with those of men (Gamble 1999).

Throughout most of human history, people lived in small groups, participating in intimate networks of 3 to 7 people and

interacting within effective networks of 20 to 30 people who hunted, gathered, or scavenged together to produce enough calories and nutrients to survive another day. The extended networks of early foragers generally numbered no more than a few hundred and were at times even smaller. This combination of small intimate networks, modest effective networks, numerically limited extended networks, and sporadic, infrequent contact with global networks constitutes the social world to which we are adapted as organisms.

Central to the process of social change have been technological and social innovations that relax two fundamental constraints on human interaction (Gamble 1999). The evolution of human societies from small groups of foragers to post-industrial urban agglomerations has involved (1) a release from spatial proximity as a necessary condition for the exchange of emotional, material, or symbolic resources, and (2) a release from temporal promixity, the requirement that actors interact simultaneously in real time to form and sustain a social tie. The “stretching” of social relations across time and space (Giddens 1984:35) has occurred most importantly through innovations in transportation and communication (Hawley 1950).

Although we may be adapted physically and psychologically for life in small social groups, human beings in the twenty-first century will increasingly find themselves living in large, dense, and diverse agglomerations of population. But no matter how big the community or how extensive its social organization, in daily life we are still driven to form the same social bonds as our forager ancestors were, engaging in face-to-face interactions with the people we encounter. The major difference is that people now are brought together by macro-level

social structures operating within a built environment containing millions of people rather than by being born into a small group of people that occupies a particular ecological niche.

Nonetheless, whether one considers workmates meeting for gossip around the water cooler, playmates jostling on the school ground, urbanites gossiping on the front stoop, or suburbanites gathering around the barbeque, humans are driven to create and maintain the same microsocial networks as our hominid ancestors were. Human beings are not and have never been atomized individuals. They may or may not be fully rational actors (an issue addressed in Chapter Three), but they are always social actors embedded in networks of kinship, friendship, and acquaintance within which emotional, material, and symbolic resources are exchanged.

The Macrosocial Cluster

Until quite recently in human history, social change occurred mainly through the interaction of the environmental and microsocial clusters. Small bands of foragers evolved kinship systems, household structures, and social relations that enabled them to survive and reproduce within a particular ecological niche. Beyond a changeable band of interrelated households, they formed relatively few larger social aggregates, and those that did form tended to be short lived and seasonal. As a result, the size of human populations was small and most influences of the macrosocial cluster on societal evolution were through technology—the application of cultural knowledge to create symbolic and material tools to enable a more successful adaptation to the environment.

Although it was once thought that only humans were capa-

ble of inventing and using tools, their use has now been amply documented among our closest living relatives, the chimpanzees (Marks 2002; Rumbaugh and Washburn 2003). Chimps have been observed to fashion small branches to “fish” for ants, to employ medium-sized branches as digging sticks, and to wield larger ones as weapons; and they have been shown to deploy stones as instruments to break open nuts and fruit as well as to hurl as projectiles (Goodall 1986, 1999; Dunbar 1988; de Waal 1998). No doubt our earliest hominid ancestors likewise employed similar tools, which left no trace in the fossil or archeological record.

The earliest durable tools were crudely fashioned stone choppers that appeared around 2.5 million years ago and were followed about a million years later by more finely worked hand axes, cleavers, and knives that were symmetrical in shape (indicating a preconceived design). Then around 300,000 years ago the tool kit changed once again, taking the form of flint blades set into wood handles; but it wasn't until the emergence of *Homo sapiens* around 150,000 years ago that tool invention became regularized as a process of steady, cumulative innovation rather than one of sporadic, unpredictable change. Once the hominid line acquired the ability, through culture, to invent and deploy new tools, the macrosocial cluster was poised to assume a larger role driving the process of social change (through Pathways 3 and 5).

The invention of spear throwers and the bow and arrow between 50,000 and 100,000 years ago, for example, made possible changes in social organization that permitted the routinized hunting of large mammals (R. Klein 1999); likewise, the invention of nets, baskets, hooks, and boats permitted

fuller exploitation of the marine environment (Johnson and Earle 2000). As a result, the size and density of populations rose and human beings migrated and spread out to occupy the entire globe. Rising population densities, in turn, stimulated technological change and innovation (Boserup 1981), and increasing population size made possible new forms of social differentiation and led to the emergence of novel forms of social organization beyond small bands of interrelated foraging families (Bogucki 1999).

The technological change that unleashed the first true revolution in human settlement was the invention of agriculture, which in concert with the domestication of animals led to the advent of the first permanent settlements in the hills of Anatolia, the Levant, and Mesopotamia around 10,000 years ago (Burenhult et al. 1993). Wherever agriculture and animal husbandry took root, permanently settled villages emerged and then slowly grew into larger towns. Sedentary life made possible new occupational specialization and social stratification and led to the creation of novel organizational structures to maximize, manage, and distribute the resulting surplus of food (Bogucki 1999; Sanderson 1999).

Once agriculture spread from the hills of Mesopotamia onto the fertile, well-watered plains between the Tigris and Euphrates rivers, the stage was set for the emergence of cities—large, dense, and heterogeneous agglomerations of people—around 8,000 years ago. Cities for the first time concentrated at a particular place and at a single point in time a sizeable population of people who did not have to produce food for themselves or their immediate relatives (Chant and Goodman 1999). Rather, they could devote their full attention to non-

food-producing occupations such as ruling, worshiping, soldiering, and manufacturing. More important, cities gave rise to a leisured class of people with the time to think, imagine, and invent, leading to the emergence of an accelerating and self-perpetuating cycle of technological and organizational change that, with fits and starts, continues to the present day.

Since the advent of urban civilization 10,000 years ago, the process of social change has been dominated more and more by mutually reinforcing interactions among elements within the macrosocial cluster and the growing influence of that cluster on elements in the other two clusters (through Pathways 3 and 5). Over the past thousand years, in particular, technological inventions have made possible population growth and forms of social organization that have served to accelerate the pace of social and technological change and to move societal evolution forward at an exponential pace, with significant effects and increasingly powerful consequences for both the environment and microsocial relations. Indeed, the scale and rapidity of macrosocial change may now be pushing the limits of human and environmental adaptability, bringing about new and potentially powerful effects via Pathways 2 and 6.

The framework summarized in Figure 1.1 provides a way of conceptualizing the process of societal evolution over the long run of human experience, which stretches 6 million years from the emergence of the first hominids to the present. At different points in time, elements in one of the three clusters—environmental, microsocial, and macrosocial—have played more or less important roles in propelling social change. But since the system feeds back on itself through multiple pathways, it is inherently unstable; consequently, dynamism has tended to shift

over time from the environmental to the microsocial and, lately, to the macrosocial cluster. However, given that the impetus for social change has increasingly come to reside in the macrosocial cluster, the rate of change has accelerated markedly as shifts in technology, population, and social organization feed off one another in a self-reinforcing cycle.

SOCIAL CHANGE IN EVOLUTIONARY PERSPECTIVE

The foregoing heuristic model, which I will apply to interpret the evolution of human society in the ensuing chapters, builds upon foundations laid by earlier generations of social scientists. Figures such as Childe (1951), Steward (1955), Duncan (1964), Carneiro (1970), Service (1962, 1975), Boserup (1990), Sanderson (1999), and Johnson and Earle (2000) have all recounted the roles played by population, social organization, environment, and technology in accounting for social change. Most prior attention, however, has focused on links between and among elements within the environmental and macrosocial clusters, with less attention paid to the microsocial cluster. Recent advances in cognitive neuroscience and social psychology, however, make the time ripe for a reintegration of microsocial relations into the panorama of social change and societal evolution. When combined with new data and theories from anthropology and sociology, recent advances offer a new window on the human condition and a clearer vision of prospects for our shared urban future.