Living as gatherers and/or hunters comprised most of our human career. Our earliest hominid ancestors appeared between 4 and 5 million years ago in Africa. The first groups of farmers lived in western Asia around 11,000 years ago. During the intervening period of roughly 4 million years, our activities shifted from a peripatetic quest for food by small groups of a generic apelike ancestor to an elaborate pattern of intensive food collecting and storing by large groups of fully modern humans living in permanent communities. In fact, hunter–gatherers have continued to exist at the margins of modern society until very recently. Understanding the archaeology of the beginnings of humanness, the origins of fully modern behavior, and our background as foragers is essential to understanding ourselves and our place in nature. In a sense, our life in megalopolistic societies with highly structured hierarchical organizations, highly advanced technologies, and extraordinary communication and exchange is too new to be understood without knowledge of the baseline behaviors from which it derived.

The roots of human behavior, then, are to be found in our past as hunter–gatherers. The changes that took place in that period are both biological and cultural: primarily biological at the beginning; almost exclusively cultural toward the end. The three chapters in this section of *Archaeology at the Millennium* document that journey from first hominids to complex hunter–gatherers. In the following pages, Kathy Schick and Nicholas Toth discuss the field of paleoanthropology at the turn of the millennium and recent discoveries regarding our earliest ancestors. Richard Klein considers the questions surrounding the origins and spread of fully modern humans. Robert Bettinger reports on Holocene hunter–gatherers and distinguishes this pattern from earlier Pleistocene models of human behavior. These chapters take us from the beginning of gathering and hunting to the emergence of farming cultures and the rise of transegalitarian societies that are the subject of the next section.

Schick and Toth focus on the archaeology of our earliest ancestors in Chapter 3, tracing their emergence as bipedal hominids, the rise of stone tool making, and the spread of hominids out of Africa. It is an extraordinary story, all the more remarkable because of the paucity of evidence that exists and the energy and imagination required to learn about this era. This is a time so long ago, with so few remains preserved, that paleoanthropologists are still in the process of discovering variability; pattern recognition is extremely difficult. Each new find introduces more variation and requires new interpretation. Approximately a dozen hominid species are now recognized in this period. Following our divergence from an apelike ancestor between 4 and 7 million years ago, the human line pursued two experiments in bipedality, the robust australopithecines and the more gracile *Homo* forms, appearing between 2 and 2.5 million years ago (mya).

Schick and Toth summarize the two periods of the Early Stone Age in Africa—Oldowan and Acheulean—extending from the first stone tools about 2.5 mya until the beginning of
the Middle Stone Age approximately 200,000 years ago. The Oldowan is characterized by simple cores classified as choppers, discoids, polyhedrons, heavy-duty scrapers, or flakes normally unmodified but sometimes shaped into light-duty scrapers and awls. Much of the patterning in the Oldowan industry appears to result from least-effort flaking rather than deliberate and intentional shaping. The Acheulean is denoted by the presence of deliberately formed handaxes that have been shown to be very efficient butchering tools.

Information on the behavior of our earliest ancestors is limited. The concentrations of remains that are considered sites in this period are highly variable in terms of artifact density, size, typology, raw material, faunal remains, and geological context. Almost no two sites are alike, and again the range of variability is not well understood. The putative range of activities at such locations includes tool manufacture, processing/consumption of foods, re-concentration of food resources for sharing, sleeping, grooming, and socializing. A home-base model for early hominids is not strongly supported by the evidence, and research emphasis has shifted to landscape approaches focusing on large-scale patterns in the distribution of stone and bone materials.

Early hominid diet is an important question in understanding the way of life, yet the answers are not readily forthcoming. Isotopic investigations of diet indicate robust australopithecines had a diet rich in fruits and nuts from trees and shrubs along with tubers, roots, and corms. In addition, however, the isotopic evidence indicates that about 25% of the diet came from either C4 plants such as grasses or the animals that ate those plants. The significance of hunting has dominated discussions for years. But consensus now seems to favor scavenging as the primary means for obtaining meat, although debate continues as to whether access to carcasses was primary or secondary. An emphasis on scavenging has dominated in recent years, but the discovery of 400,000-year-old throwing spears in Germany has made a strong argument for effective hunting by the later part of the Early Stone Age.

_Homo erectus_ (a.k.a. _ergaster_) evolved in Africa ca. 1.7 mya with a larger body size and longer legs. The handaxe and the Acheulean appeared almost simultaneously with this new species. Such morphological changes might suggest larger territories and perhaps population expansion for these groups, but other species (e.g., felids and wolves) also were expanding at that time. Whatever the cause, members of this species became the first hominids to move out of Africa shortly before one million years ago. Important early sites in Asia and Europe include ‘Ubeidiya in Israel 1 to 1.4 mya, Dmanisi in Georgia ca. 1 mya, and Atapuerca in Spain ca. 900,000 years ago.

Major questions about behavior in the early Pleistocene concern some of the first culturally acquired traits beyond the use of stone tools, including the use of fire and shelter and the role of symbolic behavior. Although there are a number of reports for the controlled use of fire and the construction of shelter or structures, the evidence for such activity is equivocal until the end of the middle Pleistocene, about 200,000 years ago. _Homo erectus_ sites are often found in high-energy stream contexts and secondary deposits. Such conditions of discovery make inferences about context and behavior difficult. Evidence for symbolic behavior in the form of art, ornamentation, or intentional burial is completely missing from the record of our early ancestors. Most of the behavior witnessed in this period seems directly related to basic survival and the acquisition of food. The archaeological evidence indicates nonmodern behavior in every aspect, including nonstandardized artifacts, uniform assemblages, an absence of art and ornamentation, a lack of structures, and a limited ability to hunt.
The appearance of fully modern humans, discussed by Richard Klein in Chapter 4, represents the fourth major transition in human evolution after our divergence from an apelike ancestor between 4 and 8 mya, the rise of the genus *Homo*, responsible for the first archaeological sites around 2.5 mya, and the emergence of *Homo erectus* (a.k.a. *ergaster*).

Klein considers the question of the origins and spread of fully modern humans in detail. Sometime before 100,000 years ago, fully modern humans evolved in Africa, Neanderthals occupied Europe, and nonmodern humans, representing evolved end products of classic *Homo erectus*, lived throughout much of Asia. Current evidence indicates that *Homo sapiens sapiens* had a restricted origin in Africa and spread from there, replacing existing populations. The evidence for this pattern in western Asia and Europe is good; evidence from eastern Asia is limited. Modern genetic evidence shows that all living humans are so similar that they must have shared a common ancestor within the last 200,000 years; Neanderthals are so different genetically that their last shared ancestor with the hominid line was 500,000 to 600,000 years ago.

Thus biologically modern humans emerged in Africa before 100,000 years ago. Intriguingly, however, culturally modern behavior—exhibiting technological innovation, observable social organization, and ideological sophistication—was absent until its abrupt appearance ca. 50,000–40,000 years ago in association with the spread of fully modern humans out of Africa. Klein argues that this cognitive and cultural transformation of the species also began in Africa, as evidenced by early bone artifacts and shell beads, and resulted from neural changes in the brain, perhaps allowing modern speech patterns. For whatever reason, this shift to fully modern cognition was responsible for the very human behaviors witnessed in the Upper Paleolithic and the rise of more complex Holocene hunter–gatherers and farmers.

Robert Bettinger’s discussion of recent hunter–gatherers in Chapter 5 focuses on evolutionary perspectives. Bettinger notes the contributions of Julian Steward in emphasizing technology and environment as major factors in the life of hunter–gatherers. Certainly foraging groups were closer to nature; the ecological aspects of such adaptations appear to dominate. More recent versions of this perspective have incorporated evolutionary ecology and optimal foraging theory, emphasizing diet breadth and patch choice as strategies for explaining intensification and the shift to agriculture in the Holocene.

Bettinger emphasizes the fact that recent hunter–gatherers are not relicts of the Pleistocene, but distinctive adaptations using complex technologies in different natural and social environments. Recent climatic evidence indicates that the Holocene witnessed much more stable and abundant environments than the preceding Pleistocene. Higher CO\text{2} levels starting at the end of the Pleistocene also meant the expansion and increased production of many plant species, likely making plants more important in the diet. Previously low-rank ing foods, such as fish, shellfish, nuts, cereals, and other plants, became more important. In response to this shift toward more productive foods, complex ground stone, microblade, ceramic, trapping, netting, fishing, and food preparation technologies were invented for more efficient utilization of these resources.

The social environment changed as well. Shortly after the close of the Pleistocene, virtually all the habitable environments on the planet had been occupied. The social environment became one involving population pressure from neighbors, often for the first time. Moreover, many of these hunter–gatherer groups had to contend with expanding groups of agriculturalists and eventually nation-states, which led to cataclysmic changes, including absorption or replacement.
In this context, Bettinger notes that the modern view of hunter–gatherers has added to Steward’s original model in three ways: (1) considering population and social relations as important as environment and technology, (2) rejecting the notion that these are independent dimensions of behavior, and (3) using the concept of adaptive strategy to simplify the analysis of these complex relationships. Adaptive strategies are combinations of settlement, subsistence, organization, and demographic tactics that promote hunter–gatherers’ success.

Bettinger explores two models for distinguishing such behaviors: (1) forager–collector strategies described by Binford and (2) his own traveler–processor model, which emphasizes how population growth and resource depletion affect the way hunter–gatherers allocate time, use space, and acquire energy. Travelers are time minimizers and mobile, moving from patch to patch collecting a few large bundles of food and collectively sharing resources. Processors are energy acquirers, sedentary groups working harder to amass many small units of food that are stored and distributed in different ways. A related perspective, proposed by Woodburn, distinguishes immediate and delayed return systems.

Bettinger’s model suggests that under conditions of growing population in the Holocene, energy acquisition replaced time saving as a fundamental goal of subsistence behavior. From this perspective, the important changes that differentiate Holocene hunter–gatherers are new adaptive strategies rather than technological innovation. The quest for food shifted from time-minimizing activities to energy-maximizing patterns associated with increasing residential sedentism, territoriality, and storage. It was in this context among Holocene hunter–gatherers that social differentiation and inequality began to appear, marking another break from the Pleistocene. Particularly important is the contrast between the logic of collective action in time-minimizing groups and the potential for conflicts of interest between individuals and between individuals and groups among energy maximizers. The dynamics of social inequality and pathways to power in transegalitarian societies are the subject of Chapter 7 by Brian Hayden in Part III of this volume, following the discussion of the origins of food production by Bruce Smith in Chapter 6.

The archaeology of hunter–gatherers holds great promise in the coming years. Certainly major questions regarding this early human way of life remain to be answered, including the significant forces operating to drive the biological evolution of early humans, the behavioral correlates of Paleolithic artifactual remains, the causes of the initial human population expansion out of Africa and the movement of Homo sapiens sapiens along the same paths, the nature of the cognitive changes that mark the onset of fully modern behavior, and the intensification of subsistence and settlement that distinguish more recent hunter–gatherers and the first farmers.

At the same time, exciting new finds, innovative methods, and changing theoretical perspectives will provide insight into those questions. Based on the trajectory of discovery, it is clear that better documentation of the divergence between apes and humans and the origins of Homo will be discovered in the fossil record in the coming years. The relationship between Neanderthal and fully modern humans will be clarified by discoveries in Europe and the Near East. Ongoing and future investigations in Africa and Asia will reveal fossil and other material remains pertinent to questions regarding the evolution of fully modern humans, including the peopling of Australia and the New World.

Many of the most important discoveries in the coming years will be made in the laboratory. New dating methods will begin to resolve the chronological obscurity of many of the fossil and artifactual finds from the Plio/Pleistocene. Studies of modern and ancient
DNA holds extraordinary promise for revealing information on relationships between groups and the dates of important evolutionary events. The isotopic chemistry of bone and tooth enamel from human remains are already revealing remarkable data on aspects of diet and movement with more to come.

There are important intellectual trends at the beginning of this new millennium that may influence the direction that hunter–gatherer studies take in the near future. Two major volumes on hunter–gatherers have appeared recently: Richard Lee and R. Daly have edited the *Cambridge Encyclopedia of Hunter–Gatherers* for Cambridge University Press, and Lewis Binford has assembled decades of thought and research in *Constructing Frames of Reference: An Analytical Method for the Archeological Use of Hunter–Gatherer and Environmental Data*. These works will no doubt provide a foundation for hunter–gatherer studies for years to come. No doubt, as well, new models for extending our understanding of life in the Pliocene and Pleistocene beyond our knowledge of recent hunter–gatherers will be developed. In addition, there are new general perspectives on complex systems that may foretell a paradigmatic shift in the way we will look at the past. This perspective argues that complex adaptive systems, such as human societies, cannot be explained by the application of hierarchical models. Systems that are large and complex, but not governed by top-down rules, are said to be self-organizing. Biological complex systems employ distinctive mechanisms such as adaptation and connectivity to change states and evolve. The study of self-organized complex adaptive systems involves the connections, interactions, and feedback loops among the parts of the system, known as agents, and emphasizes individuality and locality.

The future is almost as difficult to predict as the past. Certainly the coming years will see new discoveries, techniques, and ideas that we cannot begin to imagine today. That, of course, is one of the very reasons it will be such an exciting time.

At the same time, however, the start of the new millennium marks a perturbing milestone in the study of hunter–gatherers—this way of life has ended in virtually all parts of the world. For years anthropological textbooks have charted the geographic location of foraging groups on global maps and noted their declining numbers through time. Those maps are now blank. Such living societies have essentially disappeared from the face of the earth over the last century and now exist almost exclusively in the archaeological record.

In virtually every corner of the globe, hunter–gatherers have been incorporated into the global economy. There are charter trips to the Andaman Islands. Kalahari Distillers Ltd. sells a glass calabash decorated with San art and filled with “Kalahari Thirstland Liqueur.” A major highway is built through the land of the Hadza. Skin drums have been replaced by electric guitars, seal liver with Carnation instant breakfast, sleds by snowmobiles in the lives of the Netsilik. It is a poignant moment, but also a stark reminder of the distance that remains to be traveled in our developing understanding of the foraging way of life.