Scientists’ perceptions of their discipline clearly influence how they frame their research agenda. Seeing bioarchaeology as anthropology profoundly affects the problems that capture one’s interest, the questions that one seeks to answer, and the methods one uses to resolve them. Bioarchaeology as anthropology reaffirms a worldview that incorporates an intradisciplinary biocultural approach with a cross-cultural perspective. The field is committed to understanding the adaptation and the evolution of social systems. Given the postprocessual rejection of cultural evolutionary theory, rejection of scientific methodology, rejection of culture as a means of extrasomatic adaptation, rejection of culture as a system, rejection of ecological interpretations, and rejection of etic analysis (Johnson 1999), the perspective presented in this chapter may be seen as a defense of an earlier era of scientific anthropology. Emotionally, a rejection of the postprocessual criticism may feel like the best response; however, a reasoned evaluation of the criticism and measured response is a much more effective strategy. This strategy is reflected in Charles and Buikstra’s (2001) effective use of “mitigated objectivism” championed by Wylie (1992). I will argue that bioarchaeology as anthropology, by incorporating aspects of the postprocessual and antiprocessual critiques, has positioned itself to make new and significant contributions to knowledge.

In this essay, I have two objectives. The first is to discuss the development of bioarchaeology (Larsen 1987, 1997) from within anthropology at the time the discipline espoused a four-field approach. The second objective is to demonstrate the usefulness of an intradisciplinary bioarchaeology in understanding problems in contemporary human adaptation. Specifically, I will suggest how the post-Neolithic transformation may play a role in helping us understand health problems related to diet and disease in contemporary society.
neutral and not influenced by the values of contemporary culture, the knowledge they gained would be relevant to understanding contemporary cultural adaptation.

Throughout its early history, skeletal biology reflected the anthropological fixation on race. Skeletal biology contributed to this obsession with its use of craniology to support the ranking of races (Morton 1839, 1844). This role for skeletal biology should not be surprising given the anthropologists’ interest in supporting the social order. Years later, with the founding of the *American Journal of Physical Anthropology*, racial typology remained a defining feature of the discipline and was a major focus of study. In the inaugural issue of AJPA, Ales Hrdlicka, the journal’s founder and first editor, whose biases are now evident (Blakey 1997), proposed that “[t]he paramount scientific objective of physical anthropology” was the study of the normal white man living under ordinary conditions (Hrdlicka 1918:18).

Even when publications seemed to anticipate the modern era, race overshadowed the innovative features of the studies. E. A. Hooton’s *The Indians of Pecos Pueblo* (1930) has been described as one of the most important publications of its time. It is frequently cited as the defining moment in the birth of modern skeletal biology. Hooton established the paleoepidemiological approach that introduced quantitative analysis as a methodology. He enumerated the observations that he could make for a specific lesion and noted the percentage of pathologies. Although this may seem a minor innovation, until the late 1960s, researchers routinely failed to provide this information. It was not until the 1970s that rudimentary epidemiological methods became a basic research methodology in bioarchaeology. Nonetheless, in *The Indians of Pecos Pueblo*, Hooton distilled a racial typology that described the skeletal population as a composite of a number of racial groups. He accepted the premise of “pure races” defined by fixed immutable genetic traits present since their origins. Although Hooton claimed that the racial typology of Pecos was only an exercise that did not necessarily reflect population history, he argued later in the book that the “African” racial types found at Pecos were features that the population retained as a result of their African heritage. These racial features, according to Hooton, were present when ancestral populations migrated out of Africa (Armelagos 1968). Even with its innovative approach to paleopathology, the epidemiological perspective of Pecos remained a footnote to history. It was the racial typology that captured the interest of other researchers.

The early 1950s saw a remarkable confluence of publications in anthropology that offered two dramatically opposing paradigms. In 1952, George Neumann (1952) published “Archeology and Race in the American Indian” in James B. Griffin’s influential *Archeology of Eastern United States*, which provided the methods for reconstructing the culture history of Native Americans using cranial morphology. Neumann’s (1954a, 1954b) contribution was deemed so important that it was selected for publication in the *Yearbook of Physical Anthropology* for 1952.

At about the same time, S. L. Washburn (1951) published “The New Physical Anthropology,” one of the most influential publications of the modern era, which was also reprinted in the *Yearbook* (Washburn 1953a) and later revised for the widely read *Anthropology Today* (Washburn 1953b). Washburn described the transformations that defined the “new physical anthropology.” In its rebirth, classification would give way to processual studies, theory now would become paramount, new technology would supplant anthropometry, and hypothesis testing would displace mere speculation.

In line with the focus on the genetic approach to biological anthropology, William C. Boyd’s (1950) *Genetics and the Races of Man* proclaimed the death of skeletal biology with the renaissance of genetics. He argued that blood groups of known genetic inheritance would become the future of biological anthropology. Boyd specifically targeted osteology, saying that genetics would make skeletal studies “passé.” Blood groups would dominate the discipline because they were inherited, mathematically manipulable, objective and not subject to prejudice, and insulated from environmental influence. Boyd claimed that since an individual’s blood type did not change during one’s lifetime, it could be assumed to be immune to selection. This remarkable misunderstanding of evolutionary mechanisms did not dampen Boyd’s influence, and blood groups became the preferred method for population analysis. Interestingly, while geneticists claimed to be at the cutting edge of research, their major contribution remained the descriptive typological analysis of race. The retention of typology in physical anthropology demands to be examined more fully.

Until the 1980s, skeletal biology remained a descriptive undertaking, which contributed to its moribund state (Armelagos et al. 1982). The field was plagued by a fundamental worldview that had little theoretical or methodological foundation. In the drive to reconstruct culture history, racial models were used to analyze similarities in morphology that implied genetic relationships. Cranial similarities were considered sufficient evidence to establish cultural relationships between and among populations.
Even as it attempted to move beyond culture history, skeletal biology seemed trapped by its historical perspective. Some paleopathologists, for example, claimed their primary objective was the diagnosis of skeletal lesions that could be used to determine a disease's temporal and geographic distribution. The field was challenged further theoretically by the indiscriminate application of advanced medical technology to diagnose pathological conditions. The standard by which progress in paleopathology or skeletal biology was measured was the researcher's ability to incorporate the latest advances in medical instrumentation or statistical analysis (Arlmelagos et al. 1982). New technologies—whether they were the latest imaging system or the most up-to-date multivariate statistical package—were applied without a concern for solving a problem beyond the issue of diagnosis or description. The cultural context of disease or the adaptive aspects of the morphological feature were not a major concern.

Even as bioarchaeology was developing, skeletal biologists continued to engage in typological studies, including some not-so-subtle attempts to imply a differential evolution of racial groups. Carleton Coon's (1962, 1965) racial studies represented the most prominent of such models. After the obvious racist intent of craniology was overcome, racial typology remained the means by which skeletal biologists reconstructed the biological history of a population. For example, influential biological anthropologists such as W. W. Howells (1973, 1989; Howells and Crichton 1966) continued to use crania to reconstruct population history. Although Howells abandoned the term race, he defined geographic groups that corresponded to his earlier racial groups. There is now a computer program, Fordisc 2.0 (Owsley and Jantz 1996), packaged for personal computers that uses the Howells database and claims to be able to classify an unknown specimen into one of Howells's geographic populations. Tests of the Fordisc 2.0 program with homogenous African samples from ancient Nubia demonstrate its failure (Belcher et al. 2002; Leathers et al. 2002): nearly one-half of the crania were classified as belonging to populations outside of Africa.

In a sense, the current application of mitochondrial DNA to reconstruct human migration patterns is analogous to the typological studies of blood groups or crania in earlier research. L. Cavalli-Sforza (Cavalli-Sforza and Minch 1997; Cavalli-Sforza and Piazza 1993; Cavalli-Sforza et al. 1988) and others (Jorde et al. 1997; Torroni et al. 1993; Torroni et al. 1994) are using mitochondrial DNA and other genetic systems to reconstruct the origin and dispersion of human populations out of Africa. These studies use sophisticated genetic techniques to answer typological questions reminiscent of an earlier era of anthropology (Terrell and Stewart 1996).

**Development of Bioarchaeology**

The conflicting paradigms within paleopathology delayed its impact on bioarchaeology. Paleopathology has two major perspectives with quite divergent objectives: (1) the determination of the chronology and geography of disease from a biomedical, even clinical, perspective and (2) the reconstruction of societal lifeways from an anthropological focus. The incorporation of an anthropological perspective in paleopathology was essential in the development of bioarchaeology. Most early paleopathologists were physicians or anthropologists strongly committed to a biomedical focus, and paleopathology clearly had its beginning in medicine with an interest in diagnosis. In their widely read synthesis, Ortner and Auferheide (1991) ally paleopathology with biomedicine rather than with anthropology and its biocultural perspective (Armelagos 1994). These two distinctive viewpoints remain the forces that define the field in different ways to this day.

The birth of bioarchaeology can be seen as the blending of methods and data from skeletal biology and archaeology. Hypothesis testing was featured in both approaches. The fact that skeletal material can be used to independently measure outcomes represents one of bioarchaeology's greatest strengths. Even as archaeology debated the postprocessual critique, bioarchaeology retained its concern for process and its commitment to hypothesis testing. The contribution of postprocessual thinking to bioarchaeology has been an interest in framing hypotheses in a political-economic context, using the analysis of skeletons to measure the effects of social, political, and economic transformations on health and illness. Postprocessual archaeology that reflects a more political perspective (Leone 1995) and bioarchaeology share overlapping interests. Race (Blakey 1998), violence (Martin and Frayer 1997), power (Blakely et al. 1997), gender (Grauer and Stuart-Macadam 1998), and inequality (Goodman et al. 1995) are topics of mutual concern.

The incorporation of a population perspective was an essential first step in the modern transformation of paleopathology. Although the individual is the unit of diagnosis, the population is the unit of analysis. The disease process from a bioarchaeological perspective can be understood only in the context of population analysis. Bioarchaeologists have used populations to analyze regions and ecosystems (i.e., agriculture in tropical ar-
In addition, more recent advances in skeletal biology resulted from examining the skeleton at the organ, tissue, cellular, and subcellular levels. Analyses of bone histology (Martin and Armelagos 1979) and chemistry (White and Armelagos 1997) to study osteoporosis, the use of stable isotopes to reconstruct diet (Schwarz and Schoeninger 1991) and determine age of weaning (Katzenberg et al. 1996), the analysis of antibiotic use (Armelagos et al. 2002), and the DNA identification of pathogens (Braun et al. 1998) provide new dimensions to bioarchaeology. Developing from this theoretical perspective, a new journal has appeared recently called *Ancient Biomolecules*, specializing in research that focuses on subcellular analysis.

Culture as a component of an individual’s environment can influence the disease process in many ways. As a part of the environment, culture can buffer individuals from some environmental insults (Bates 1953) while at the same time producing different insults (May 1960) that can disrupt an individual’s physiology (by definition a stress indicator). By reconstructing cultural behavior, the bioarchaeologist can evaluate its effectiveness as a buffer, its failure to buffer, and its role in producing anthropogenic insults. Considering adaptation in this context has led to a more systematic analysis of human health and disease interaction that characterizes bioarchaeology. By examining stress indicators, “cracks” in the process of adaptation can be used to evaluate the ability of a cultural system to respond to stressors (Goodman et al. 1988).

The third advance important in the development of bioarchaeology was the recognition that multiple indicators of stress (i.e., congenital defects, growth disruptions, nutritional deficiencies, infections, degenerative conditions, and trauma) (Goodman, Martin, et al. 1984; Larsen 1987, 1997) and patterns of cranial (Carlson and Van Gerven 1977; Van Gerven et al. 1976) and postcranial (Ruff 2000) skeletal morphology are indispensable factors in reconstructing patterns of adaptation. The use of multiple stress indicators can reveal patterns that are often missed by studies that use only single stress indicators. For example, instead of being concerned only with the evidence of scurvy or rickets in a population, a study in which a suite of skeletal indicators is taken together may reveal a pattern of nutritional deficiencies.

The final step in the revitalization of bioarchaeology and the attainment of its full potential was the use of skeletal evidence as a key element in archaeological investigation (Blakely 1977; Buikstra 1977; Cook and Buikstra 1979). With these tools, bioarchaeology has been in the vanguard in determining issues such as the impact of cultural practices on human adaptation or maladaptation. The regional approach that characterized the work of Cook (1979), Buikstra (1977), and Larsen (1984), in which the archaeology and the skeletal biology of a region were controlled, was a major stimulus in the development of bioarchaeology. The archaeological record provides unique opportunities for comparative analyses because archaeological sites provide access to a vast array of ecological settings, including pre/post contact, urban/rural, inland/coastal, highland/lowland, preagricultural/agricultural, and preindustrial/industrial.

**Neolithic Transformation**

The origins of agriculture remains an issue that continues to whet our anthropological interest. Ester Boserup (1965) authored an influential study that proposed a feedback system in which an increase in population pressure is key to understanding changes in agricultural production. The increase in population, she argued, stimulated agricultural production, which further increased the population pressure that further stimulated production. Mark N. Cohen (1975, 1977), expanding on Boserup’s model, suggested that an increase in population pressure might also be the key to understanding the origins of agriculture.

Whatever the trigger that pushed the development of agriculture, agriculture was assumed to have benefited the health of the farmers. The conventional wisdom for many years was that agricultural populations experienced improved health and nutrition. This view was championed by V. G. Childe (1951), who suggested that food surpluses generated by agricultural subsistence were the source of improved nutritional health, which in turn explained the population explosion following the Neolithic.

The early research of paleopathologists was designed to document the role that agriculture played in improving health. However, the results from Sudanese Nubia (Armelagos 1969) and Dickson Mounds, Illinois (Lallo et al. 1978) produced paradoxical findings that indicated that agricultural populations were experiencing significant increases in nutritional deficiencies and infectious disease. The results were so fundamentally different from what was expected that they demanded further bioarchaeological analysis that might also help to clarify the role that population pressure may have played in the origins of agriculture. If Cohen was correct, then one would expect that as population pressures increased, there would be an increase in pathological conditions. As agricultural production increased, the pathologies would
dissipate. It was the possibility of testing alternative hypotheses that framed the discussion at the symposium entitled “Paleopathology at the Origins of Agriculture” (Cohen and Armelagos 1984).

The symposium considered case studies in which a transition from horticulture to intensive agriculture occurred and in which the health status of 19 populations that experienced the transition had been evaluated. There were a number of interesting findings. To begin with, it appears that with the onset of sedentism, whether the population was practicing agriculture or not, there was an increase in infectious disease. This increase was not solely dependent on the practice of agriculture; for example, in California some groups were so successful in collecting acorns that a sedentary pattern of living became possible (Dickel 1984). Similarly, gatherer-hunters from the Northwest Coast were living in such a resource-rich environment (Cybulski 1994) that they were also able to maintain a large sedentary population. In both of these cases, the development of sedentism increased the infectious disease load. However, if and when sedentary patterns of agricultural intensification occurred, a rise in nutritional deficiencies would also become apparent.

In many instances, the impact of agricultural subsistence was dramatic. At Dickson Mounds, Illinois, the transition to intensive agriculture (A.D. 950–1350) corresponded with a rapid, significant increase in infectious and nutritional diseases (Goodman, Lallo, et al. 1984). Iron deficiency anemia as measured by porotic hyperostosis increased from 13 percent to 51 percent. Systemic infections as indicated by periosteal reaction more than doubled, from 21 percent to 51 percent. There was also a synergistic relationship between nutritional and infectious diseases, and in individuals with both lesions, the manifestation of both conditions was more severe (Lallo et al. 1978). In addition, the studies showed an increase in trauma, an earlier onset of degenerative bone joint disease, and changes in patterns of growth as evidenced by enamel defects (Blakey and Armelagos 1985; Goodman et al. 1980; Rose 1977). Given the knowledge that we have about the rates of enamel formation (Goodman, Rose, and Armelagos 1984), we can determine the period when adults suffered childhood stress. In this sense, teeth have a memory of earlier metabolic events. With this information, it is possible to show that adults who experienced growth disruptions as infants and children had an earlier onset of death (Goodman and Armelagos 1988).

Despite declining health, agriculturalists were able to increase population size by reducing birth spacing (Armelagos et al. 1991). A reduction in birth spacing and the change in subsistence resulted in considerable biological costs to segments of the population, with women of reproductive age, infants, and children being at greatest risk (Goodman and Armelagos 1989).

There are a number of complex factors that may explain the decline in nutritional health following the development of primary food production. While agriculture can produce surpluses, the seasonal cycle frequently creates a “seasonal hunger” period (Bentley et al. 1999). During the spring when stores have been depleted and the work in the field intensifies, nutrition will suffer. Agricultural production may be crippled by blights or droughts that can plague the group for an extended period.

Although gatherer-hunters may have to deal with “patchy” resource distribution and experience the vagaries of nature, they seem better able to cope with shortages. For example, the !Kung have a variety of plants and animals that provide their food, as they recognize 365 species of plants and animals as edible (Lee 1968). Western scientists calculate that this represents about 73 percent of the edible items in the environment. Nineteen species are considered minor foods that are available locally and seasonally. The 14 items in the primary and major food categories make up 75 percent of the foods consumed by the !Kung, and the simple digging stick is necessary to recover about a quarter of the plants eaten. The range of plants and animals available for gatherers and hunters in periods of shortage is an insurance against famine.

In agricultural groups, certain dietary items gain the status of “super” foods that are the dietary mainstays and are important in ritual and ceremonial life. In many Native American groups, maize is the primary food item. Maize, unfortunately, is an incomplete source of essential amino acids because of a deficiency in lysine (Katz et al. 1974). While many groups complement maize with beans, which have lysine, maize is used exclusively as a weaning food and as the food of choice for those who are ill. Other cereal grains contain phytates that bind certain minerals such as iron, reducing their bioavailability and thus contributing to anemia.

The weaning process appears to be an especially critical phase in the life cycle (Cuthbertson 1999). Because of an economic demand for children, there is pressure to wean infants as soon as possible, but the type of weaning food is critical. If maize were used exclusively, this would lead to deficiencies because of the insufficiency of lysine.

Trade affects the availability of food in interesting ways. Often the most nutritious foods are traded for goods
that may have symbolic value. In the Third World today, where foods are produced for the Western table, local populations have experienced a decline in dietary health. The money they receive for their labor is used to buy expensive imported foods, such as caffeinated colas, that do not provide a balanced diet. Although political-economic factors are frequently considered in our analyses of modern inequalities, they are frequently overlooked in studies of ancient times (Goodman et al. 1995). Following the Neolithic, class differentiation became a fact of life in many world regions. The inequality within groups and between groups would have certainly led to disparities in the availability of food for some segments of the population. Social and economic inequalities often lead to inequalities in health. The gap that existed within and between groups continued to widen in post-Neolithic times, creating an unprecedented gap between the “haves” and “have-nots” (Armelagos and Brown 2002).

What Can Bioarchaeology Tell Us about Emerging Infectious Disease and Nutritional Problems?

The present period of unprecedented emerging disease has captured the interest of the public (Drexler 2002) and the medical community (Hughes 2001; Lederberg 1998). In the past two decades nearly two dozen pathogens such as Ebola and HIV have emerged, seemingly out of nowhere. In reality, most of these “emerging” diseases have existed for years and were only “discovered” when they impacted people in power (Farmer 1996). We frequently fail to consider political and economic contexts that bring humans into contact with pathogens. For example, extreme poverty is the greatest cause of illness and death in the world (WHO 1992). The World Health Organization (WHO 2001: appendix A) reports that of the 55 million global deaths in the year 2000, 14 million were the result of infectious, parasitic, and respiratory diseases. The magnitude of the problem is the result of the world economy expanding into new ecological zones, and practices such as logging and mining have had a major ecological impact that has changed disease ecology.

The movement to new ecological niches and the evolution of cultural systems would have changed the relationship between humans and pathogens. The concept of epidemiological transition (Omran 1971) has been broadened to reflect the reality of the evolution of disease (Armelagos et al. 1996). Human populations have undergone three epidemiological transitions (Barrett et al. 1998). The first transition corresponded to a universally completed shift from food gathering to primary food production. Although it occurred in multiple locations and in slow, complex ways, this transition had revolutionary implications for subsequent human life on the planet. The Neolithic revolution both allowed and required population growth and increasing levels of social inequality, forever altering human/pathogen interaction.

A second epidemiological transition began early in this century with the decline of infectious disease and the emergence of chronic disease. The rise in the prevalence of chronic disease is related to the increases in longevity that have occurred over the past few centuries. Changes in nutrition and reduced exposure to risk have resulted in a larger percentage of individuals reaching the oldest age segment of the population. The technological advances such as antibiotic use that characterize the second epidemiological transition create the problems of the third epidemiological transition. The expansion of our globalized economy requires the exploitation of people and resources from the Third World, which increases worldwide environmental degradation.

We are currently entering the third epidemiological transition, characterized by the emergence and reemergence of antibiotic-resistant infectious disease on a global scale (Armelagos 1998). Within our lifetime, antibiotics that have been vastly successful in fighting disease may become ineffective, since so many pathogens are becoming resistant to all of them.

To comprehend how we arrived at this state, we need to understand that emerging diseases have been part of the epidemiological pattern since the Neolithic. Primary food production resulted in the first epidemiological transition, in which there occurred an acceleration of “new” disease (Barrett et al. 1998). Farming practices disrupted the local ecology, and the domestication of animals increased contact with insect vectors. Frequently these insects developed a preference for human blood and became the source of diseases such as malaria, yellow fever, sleeping sickness, and elephantiasis. Some of the disease vectors (i.e., Aedes aegypti) that spread yellow fever and dengue fever became dependent on human habitats and needed stagnant water found in open containers. Various agricultural practices such as irrigation and the use of human feces for fertilizer increased contact with nonvector parasites.

Food production was a huge economic change that is associated with sedentary settlement patterns and population growth. It would be difficult to overemphasize the importance of social stratification on health indications in prehistory or the present. The Neolithic revolution
marks the beginning of the social stratification that is
the prime determinant of health differentials both within
and between societies. The “inequality gap” in health and
wealth accelerates with later cultural evolution.

Urbanization is a relatively recent innovation in hu-
man history. Problems in removing human waste and de-
ivering uncontaminated water to the public are ever
present in urban centers. With urbanization, for the first
time, diseases such as typhus and the plague could be
spread from person to person, and populations became
large enough to maintain disease in an endemic form.
Measles, mumps, chicken pox, and other viral diseases be-
came entrenched in the population. Prostitution in urban
centers was a primary factor in the spread of venereal
disease. On a larger, cross-cultural scale, what is an en-
demic disease in one population may become an epidemic
in other populations through differential susceptibility,
cross-population interactions, and cultural practices.
Cross-continental trade and travel resulted in a series of
unprecedented epidemics (McNeill 1976). The plague in
Europe in the 1300s killed approximately 25 million
people. The impact of smallpox and measles on the New
World population following European contact was an ex-
ample of the globalization of disease process.

The process of industrialization magnified social and
environmental problems of cities. The industrial cities
that rose about 200 years ago created industrial wastes
and polluted water and air. Slums became focal points
for poverty and the spread of disease. Smallpox, typhus,
typhoid, diphtheria, measles, and yellow fever epidem-
ics that originated in slums have been well documented.
Tuberculosis, pneumonia, and bronchitis, exacerbated by
harsh working conditions and crowding, became a com-
mon problem. In reality, urban population centers are
population sinks. Their extremely high mortality outstrips
their reproductive capacity, and in-migration is needed
to maintain population size. Given the rapid increase in
the size of cities, waves of in-migration from rural areas
came the reality.

**Nutritional Disease**

In the United States only 14 percent of adults com-
ply with the national Recommended Dietary Allowances
(RDAs) and only 30 percent consume fewer than 30 per-
cent of their calories from dietary fats. Only two percent
of Americans are in compliance with both recommenda-
tions (Murphy et al. 1992). Given these startling statis-
tics, the obvious question is why *Homo sapiens*, with
their superior knowledge of nutrition, do not eat a healthier diet.

A search into our evolutionary past to answer this
question has resulted in limited success. Understanding
primate evolution provides some insights into modern
dietary habits, as the evolution of the primate gut allowed
for the processing of secondary compounds and fibrous
plant materials. K. Milton (1993, 2000) has shown that
gut transport time affects the absorption of plant pro-
tein. Humans transport food through the gut more rap-
idly than do the chimpanzees and orangutans, as a result
of their longer small intestine and shorter large intestine
than those found in the great apes. The human gut is well
adapted to process high-quality, high-density food that
can be readily digested.

Early hominid dependence on high-density foods
necessitated the development of more efficient food
search techniques to offset the costs of finding dispersed
high-quality foods (Aiello 1992; Aiello and Wheeler
1995). The time saved by consuming high-density foods
increased the occasions for social interaction. If humans
selected plants containing toxins or foods with large
amounts of nondigestible fiber, those foods required cul-
tural processing to remove the toxins and to break down
the plant fibers. From a bioarchaeological perspective,
the evolution of processing techniques such as fire for
cooking and other practices can be uncovered in the ar-
chaeological record (Wrangham et al. 1999). In modern
contexts, the ability to process large amounts of high-den-
sity food may explain some aspects of overconsumption.

In addition, humans possess a neurological basis
for tastes (Drewnowski et al. 1992) such as sweet,
salty, sour, bitter, and umami (taste for glutamate found
in protein) (Bellisle 1999). If a sweet solution is intro-
duced into amniotic fluid, the fetus of a human will
suckle. Humans are “hardwired” to find the sweet taste
as pleasant (Desor et al. 1977). This propensity for the
sweet taste is not surprising from an evolutionary per-
spective, since sweetness is a predictor of high-energy
food sources. Our sweet tooth represents a problem when
the food system can deliver large amounts of refined
sugars, such as that seen during and after the post-
industrial era. Our sweet tooth may be necessary for un-
derstanding the near-universal use of sugars, but the
existence of a social-economic system is what transforms
these tastes from a curiosity and a luxury into a low-cost
“staple” (Mintz 1979, 1985).

Humans are food generalists, reflecting our ances-
try as omnivores. Omnivores faced a dilemma in their
search for new food items, however. While they searched
for new dietary items, they often feared eating them. This
neophobia was resolved by the development of cuisine
(Rozin 1982), which allows hominids to mediate between
nature and culture with respect to what is edible, how it should be prepared, and how it should be eaten. The concept of cuisine is part of a cultural system that helps individuals minimize the omnivores’ dilemma.

Humans and other mammals are also characterized by their need for dietary variety. If you consume any food for any extended period of time, you will likely experience “palate fatigue” in which you lose interest in that particular food item. In our evolutionary history, this ensured that variety would be maintained in the diet and that the diet would more likely be balanced. The narrowing of the dietary niche following the Neolithic reduced the variety of available foods, but an illusion of variety was maintained by preparing the same food items in many different ways. A trip to any supermarket’s cereal aisle will illustrate how far this idea can be pushed. The impact on our nutrition may be reflected in the statistic that only two percent of Americans are following the recommended dietary guidelines. Bioarchaeological analyses need to be incorporated into understanding the political and economic dimension of contemporary nutritional problems. Compliance by gender, ethnicity, and class has a prehistoric dimension.

Conclusion

Bioarchaeology as anthropology will not provide solutions to all the miseries that humans face. However, it can provide insights that are essential for understanding our relationship to our environment, how we interacted with it throughout history, and how we are interacting with it now. Bioarchaeology is at the forefront in documenting the evolution and adaptation of human populations and the disease consequences of changes that occur. The inequality that is reflected in the differential access to resources that characterizes much of the contemporary world has been a part of our evolutionary history. We can document the increase in the gap within and between societies that affects the differential survival based on differences in gender, race, and class. That this reality is part of our evolutionary history does not mean that it is “natural” and “immutable.”

The esoterica of our past is often enough to drive our interest in bioarchaeology. The anthropological perspective has moved us to concerns for the practical aspects of everyday life. We are enriched when essential insights drawn from the past provide a prologue to the future. Understanding the successes and failures of our ancestors helps us to understand how we live and how we die. Bioarchaeology, along with the rest of anthropology, should search for relevance to contemporary life. The experience may help us understand ourselves more deeply. Of the many reasons that we anthropologists find to apply our craft, I can think of no better justification than that found in the following words:

Readers who have come thus far need not be told in many words of what the facts must already have brought to their minds—that the study of man and civilization is not only a matter of scientific interest, but at once passes into the practical business of life. We have in it the means of understanding our lives in and our place in the world, vaguely and imperfectly it is true, but at any rate more clearly than any former generation. The knowledge of man's course of life, from remote past to the present, will not only help us forecast the future, but may guide us in our duty of leaving the world better than we found it.

These are Edward B. Tylor's (1881:439-440) words that he chose to close his book, Anthropology, written over a century ago. This is advice that we can live with today.

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