Current Anthropology, Volume 46, Supplement, December 2005

CA☆ FORUM ON ANTHROPOLOGY IN PUBLIC

Perspectives on Diamond's *Collapse: How Societies Choose to Fail or Succeed*

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A recurring theme in Jared Diamond's (2005) *Collapse* is that the disintegration of many ancient cultures can be traced to two fundamental vulnerabilities of urban societies. Internal sociopolitical factors affect the way societies use, regulate, and protect resources such as water or land, whereas external climatic variability introduces uncertainty and vulnerability that can limit the availability of those resources. As detailed in Diamond's book, ancient cultural collapses of advanced, urban, stratified societies such as the Maya, Anasazi, or Akkadian have been linked to these two destabilizing influences. The relative importance of these factors is debated by specialists, but evidence for both types of vulnerabilities is present for each of these case studies. The archeological records of collapse are sobering in light of the apparent complexity, sophistication, and longevity of these past cultures, with their impressively successful adaptations to often marginal physical environments.

Disquieting parallels are evident between these cultural collapses and the state of global societies today, and this is perhaps the most compelling point of the book. These parallels are so striking and familiar that they are apparent to scientists and the lay public alike. Most people appreciate the view that population growth coupled with increasing resource use eventually leads to loss of environmental quality as the carrying capacity of the land is diminished. There is no shortage of examples in the modern world in which geopolitical tensions and population growth have led to widespread human suffering through restrictions on the availability of food and water (Rwanda, Darfur, the Middle East). These socially destabilizing factors are those that cultures can hope to have some measure of control over. Societies can and do adopt better and more sustainable practices given sufficient incentive to do so. This Malthusian thread runs through nearly every example of ancient cultural collapse, and the question it raises becomes how many people the Earth can support and at what level.

The role of climate change in these examples of cultural collapse is equally disquieting. Climate sets the long-term, sustainable carrying capacity of a given region, and its year-to-year variability defines how societies can adapt to it using water management and agricultural practices. Chief among the concerns in semiarid regions, where many of these past cultures thrived, is the onset of exceptional drought. Drought is a climatic variable that we know something about not only for the past century or so but also for the past millennium through the contributions of dendrochronology and ocean and lake sediment studies.

The U.S. Great Plains Dust Bowl drought of the 1930s illustrates how the convergence of socioeconomic and climatic vulnerabilities can lead to exceptional societal disruption given a relatively modest climatic anomaly. Several years of diminished rainfall in the northern Great Plains between 1933 and 1938 led to one of the most devastating and best-documented agricultural, economic, and social disasters in the history of the United States. It displaced and impoverished millions of people, cost over $1 billion in federal relief, and extended and deepened the economic collapse which was the Great Depression.

To encourage settlement in the Great Plains in the early 1930s, western land "boosters" advertised the exceptional suitability of western land for agriculture and popularized the myth that "rain follows the plow," the pseudoscience notion that tilled soil attracts rainfall and favorable growing conditions. As the farms multiplied, these claims were fortuitously strengthened by extended periods of unusually high rainfall. In truth, however, the region was ill-suited to farming. The explorer Steven Long (Wood 1966:118–19) reported in 1820 that the Great Plains region was "almost wholly unfit for cultivation and of course uninhabitable by a people depending upon agriculture for their subsistence." Motivated by increasing crop prices and favorable climatic conditions, farm lands expanded and capitalized at breakneck pace in the early twentieth century with little regard for soil conservation. Crop prices plummeted when the national economy went into decline after the economic collapse of 1929 and were further weakened in the early 1930s when bumper crop yields flooded the market. Tragically, many farmers took on additional debt to expand operations in an attempt to recoup their losses.

A societal "perfect storm" was gathering. Unknown to the farmers at that time, ocean temperatures in the tropical Pacific and Atlantic had been gradually shifting by a few tenths of a degree from their average values. These relatively slight changes in tropical ocean temperatures diverted the rain-bearing winds coming up from the Gulf of Mexico away from the Great Plains, denying the region its normal rainfall for several years in a row. The Great Plains had become vulnerable—over-

developed and unprotected—and so when the drought took hold and the soil dried, the first strong winds lifted and carried away black clouds of topsoil, gradually erasing millions of acres of farmland. Farms and businesses defaulted by the thousands, banks failed, and unprecedented federal relief programs were introduced to stabilize the crisis. As captured in Steinbeck's classic novel, the fabric of American society was strained as millions of migrants dispersed from the Great Plains in search of jobs at a time when the country was just beginning to crawl out of the Great Depression.

The Dust Bowl era was important because society learned from past mistakes and improved its resilience to subsequent even larger drought events, including a six-year drought in the 1950s and a three-year dry period in the late 1980s which led to the burning of millions of acres in Yellowstone National Park. A current multiyear drought in the American West began in 1999 and has surpassed the Dust Bowl in cumulative water deficit. Multiyear drought events thus appear to be fairly common, occurring roughly several times per century.

However, it is the possibility of a "megadrought"—a period of extreme, widespread drought lasting from several decades to even several centuries—that is most disquieting. Megadroughts are very different from other drought events, and modern society has never experienced one. As detailed in the pages of *Collapse*, there is very solid evidence that at least three ancient cultures experienced such megadroughts (Anasazi, Maya, and Akkadian populations) and none survived intact. This is not to say that drought was the definitive agent in each case (the archeological record is mute on this issue), as there is equally strong evidence for growing socioeconomic vulnerabilities before collapse.

A spatial and temporal history of North American drought spanning the past 1,200 years has been developed using a gridded database of dendrochronological records calibrated in terms of an instrumental drought index (the Palmer Drought Severity Index). These records are particularly valuable not only for appreciating the role of climate change in cultural collapses but also for placing modern climate variability in a longer-term context and understanding its causes. The dendrochronological reconstructions of past drought indicate that in the AD 900–1300 interval, the western United States experienced an almost 400-year period of elevated aridity and epic drought, punctuated by relatively short episodes of wetter conditions. The primary characteristic that differentiates this early megadrought in the "West" from droughts experienced during the twentieth century (for example, the Dust Bowl) was its long-term persistence. Individual drought years during the Dust Bowl (such as 1934) were probably as bad as some of the worst years during the megadrought, but overall the Dust Bowl did not last even 10 years. The difference between the twentieth-century droughts we have experienced and that of the AD 900–1300 interval tells us just how bad things could get in the West.

This leads to an obvious and extremely important question: How could a 400-year period of elevated aridity and epic drought happen in the West? We know with reasonable certainty now that droughts in that western United States are often associated with the development of cooler-than-average sea surface temperatures in the eastern equatorial Pacific Ocean. This region is part of the well-known El Niño/Southern Oscillation (ENSO) system, and below-average sea surface temperatures in the eastern part of the tropical Pacific are referred to as a "La Niña" condition. So, La Niñas are associated with drought in the West, but how could one last 400 years when historical ones typically lasted only 3–7 years? The leading hypothesis relates to long-term warming over the tropical Pacific and the way it can promote the development of cool, La Niña-like sea surface temperatures in the eastern end of that system. For much of the AD 900–1300 interval, solar output was apparently above average. At the same time, large volcanic eruptions, which act to cool the atmosphere, were rare. Model results beginning in AD 1000 indicate that this combination of high solar and low volcanic activity would have produced a prolonged period of cool, La Niña–like sea surface temperatures just when the megadrought in the West occurred. If warming over the tropical Pacific Ocean led to the development of persistent droughts in the past, why not in the future as the world is increasingly warmed by greenhouse gases? The message in *Collapse* may be even more relevant for the future than we would like to believe.

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In both its style and its substantive concerns Diamond's *Collapse* is the kind of book that academic geographers have not attempted for several generations. Indeed, it uncannily echoes many of the founding impulses of geography as an academic discipline, highlighting both how far the profession has come and some of what it has lost along the way.

Diamond operates comfortably across a sweeping canvas, from prehistoric Easter Island and Norse Greenland to contemporary Rwanda, China, and Montana. While specialists will doubtless quibble with the details of particular chapters—I found his account of Montana's resource-dependent economy both superficial and half again too long—it is difficult not to admire Diamond's determination not to let conventional divisions of discipline and areal specialism stand in his way. This marks a refreshing return to the roving curiosity of Carl Sauer, the early-twentieth-century founder of the influential Berkeley school of cultural geography. Although subsequent generations of geographers were often less catholic in their interests (and all too concerned with policing disciplinary boundaries), many shared Sauer's commitment to geography as a kind of synthetic discipline bridging the social and natural sciences. Likewise Diamond brings the various places he describes to life by inter-

weaving the documentary and other source materials of the social sciences together with dendrochronological and other data from the natural and physical sciences. He boldly marshals these cases to explain the role of the environment in triggering societal collapse. In this way his book also demonstrates a return to the kind of environmentalist concern that dominated geography for the first half of the twentieth century.

Though Diamond's condemnation of reckless environmental destruction would warm the heart of most contemporary environmentalists, he is actually an environmentalist in the original sense of the word. Like the first professional geographers, he is concerned with the role of environment in shaping or even determining human history. While some might sense that he protests too much, he is at pains to distinguish his brand of environmentalism from the crude determinisms of old. "A full title for this book," he explains, "would be 'Societal collapses involving an environmental component, and in some cases also contributions of climate change, hostile neighbors, and trade partners, plus questions of societal responses"' (p. 15). His subtitle underlines his salient point that "societies *choose* to fail" (italics added). In this respect, the tone of *Collapse* is more hopeful than its title and depressing subject matter might otherwise suggest. Diamond argues that the fate of our society, like that of our planet, is still largely in our hands. By contrast, his *Guns, Germs, and Steel* (1997) suggested a biogeographical inevitability to European dominance whose spirit, if not its precise empirical details, would have been familiar to environmental determinists of a century ago.

If only by way of contrast, Diamond's book emphasizes three notable features about the evolution of geographical research since the collapse of that early-twentieth-century environmentalist paradigm. First, the research of individual geographers has become steadily more specialized and narrow in its scope. As a result, human and physical geography have been increasingly alienated from one another while within those two very broad churches further subdisciplinary specialization (the Association of American Geographers, for instance, recognizes 53 subdisciplinary specialty groups) has sometimes made it seem as if the only thing that the geographers of any department share is that their mail all gets delivered to the same address. Geography, of course, is hardly alone in facing such a dilemma. The intellectual smorgasbord on offer on my one visit to a meeting of the American Anthropological Association was almost overwhelming. Interdisciplinarity has become something of a buzzword in universities these days. If there were more of it, I might find it easier to talk with my colleagues down the hall and draw on the same dramatic range of empirical materials as Diamond does with such apparent ease.

Such interdisciplinarity is, at best, only a partial solution to a second feature of recent geographical scholarship: its lack of a public audience. In geography there is no strong monograph tradition, and the vast majority of scholarship is published in specialist journals accessible only at large research libraries and even then read only (if at all) by a select few. By contrast, Diamond's book is a trade book explicitly aimed at a wide general audience. The first thing a couple seated across from me in the dining car on a recent Amtrak journey asked when told I was a geographer was what I thought of Diamond's book, which their monthly book club was reading. Whereas there is much hand-wringing among historians about the profession's collective abdication of the role of public intellectual, geographers do not appear much bothered that about the only best-selling author in our discipline is Diamond (and even he is an interloper, having only recently been cross-appointed to the UCLA geography department after spending most of his career in the medical school). Instead, we geographers have been much more concerned about our profession's relevance for policy or lack of it. In the UK, especially, there has been a heated debate about whether the cultural turn amounted to a turn away from wider social concerns, but it is a myopic view of relevance to society (as the recent National Research Council [1997] report about geography was subtitled) that equates this solely with instrumental policy relevance. Unfortunately, the professional circuits of promotion and acclaim tend to reward peer-reviewed publication over public engagement. The first generation of professional geographers was not encumbered with such narrow understanding of the public service functions of geographical research and so made more time for the kind of popular science writing and public speaking for which Diamond is so well regarded.

Finally, by returning to the older environmentalist terrain about impacts on society, Diamond is asking some questions that geographers have shied away from in their concern with the other side of the environment-society dialectic. While *Man's Role in Changing the Face of the Earth*, as the title of Thomas's (1956) influential edited tome put it, has long been an abiding concern, the most exciting recent scholarship in geography has involved denaturalizing environmental problems and showing them to be, at base, social and cultural constructions. Such critiques are invaluable, but their denaturalizing impulse and focus on the discursive beg important questions about the extent of any environmental limits to human activity.

Diamond's book addresses that issue head-on, but he might well have drawn some different conclusions from his stories of collapse if he had paid more attention to the insights stemming from that more recent geographical scholarship. He is not especially self-conscious about his units of analysis. Many of his historical case study sites are either islands—Greenland, Easter Island, New Guinea, and Hispaniola—or, like the Anasazi, relatively isolated groups, and in keeping with his comparative method of "natural experiments" he tends to treat them as cases of endogenous collapse within essentially closed systems. The stories of their collapse make for dramatic reading, to be sure, but it is not entirely clear what, in an age of relentless global flows and interconnection, their present-day analogues would be or, for that matter,

what would constitute their "collapse." Whereas chapters about Rwanda, China, and Australia suggest that the nation-state is the relevant unit to adapt or die (an internationalist scale of reference reinforced by the maps on p. 497, which depict the blackened entirety of nations such as Mongolia as "Political and Environmental Trouble Spots of the Modern World"), Diamond's discussion of Montana suggests that it also might be a smaller spatial unit. Either way, his focus on "societies" as undifferentiated wholes tends to play down important questions about the identity of any winners and losers in their transformation. Recent work in political ecology, for example, has emphasized the importance for analysis of identity politics and social unevenness in exacerbating or alleviating environmental problems, but these are also important politically. Insofar as the audience addressed by Diamond in the final section on "practical lessons" is left deliberately vague, the book tends to appeal alternatively to individuals—Diamond offers suggestions to "anyone who asks, 'What can I do as an individual?'" (p. 487)—and to a collective global "we"—his final chapter is entitled "The World as a Polder." While the example of human rights suggests that such appeals to universal human interests do have a place, they tend to steer attention away from the difficult politics that result from differentiated social groups' having different interests in causing and alleviating environmental problems. To that extent, then, *Collapse* is more successful as an evocative warning of potential problems to come than as a guide to how to avoid them.

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Everybody seems to be reading Diamond's *Collapse*. This is probably not only because of his clear and accessible prose—his previous book *Guns, Germs, and Steel* (1997) earned him a Pulitzer Prize—but because its central theme, the ecological self-destruction of past and present societies, appeals to a widespread concern with the sustainability of contemporary, U.S.-dominated industrial civilization. Diamond's main ambition is to scrutinize a selection of archaeological and historical examples of societal "failure" and "success" in order to draw general conclusions about how modern societies ought to behave so as to increase their chances of survival. He summarizes and popularizes relevant archaeological research on socio-environmental collapse on Easter Island, Pitcairn and Henderson Islands, the Anasazi, the Maya, and Norse Greenland, contrasting such "failures" with the historical "success" of Iceland, the New Guinea highlands, Tikopia, and Japan. The book begins with a long chapter contemplating the problems and prospects of modern Montana—Diamond's cherished summer resort—and devotes four chapters to a motley assortment of other modern case studies, including Rwanda, the Dominican Republic, Haiti, China, and Australia. In the penultimate chapter we are treated to assessments of the contrasting environmental records of some industrial corporations, including two oil companies, and the final chapter includes a section on the author's experience of living in Los Angeles.

This remarkable mix of case studies predictably fills the book with peculiar analogies that few anthropologists would be prepared to draw. The mere idea of juxtaposing the fate of a few dozen prehistoric residents of Henderson Island with the prospects of modern nations such as China or Australia—as comparable "societies" confronted with similar dilemmas—seems a bizarre confusion of scales. The list of explicit analogies includes comparisons between prehistoric Easter Islanders and modern Montana farmers (p. 75), Hollywood moguls (p. 98), Romanians (p. 110), and Rwandans or Haitians (p. 151); Easter Island and "the whole modern world" (p. 119); Mangareva Island and the United States (p. 120); Chaco Canyon Anasazi and citizens of Rome and London (p. 150) or New York (p. 154); Maya kings and modern American CEOs (P. 177); the Greenland Norse and "oil-importing Americans" (p. 267), the Soviet Union (p. 272), rioters in Los Angeles (p. 273), and the Bush administration (p. 425); Japanese shoguns and President John F. Kennedy (p. 439); and so on. This proliferation of startling analogies is ironic given that Diamond himself lists "false analogy" as one reason a society may fail to anticipate problems (p. 423).

As so often happens, when a scholar with a background in natural science turns to human history, there is a disturbing silence on the role of specificities of culture and social structure in accounting for historical processes and events. (The 15-page index does not even include "culture" or "cultural.") Diamond's assumptions about failures in societal "decision-making" (p. 420) underestimate the role of power structures and irreconcilable conflicts of interest throughout human history. Ultimately, it is his notion of "societies" as a unit of analysis that is misguided. Neither the Maya, the Anasazi, nor medieval Iceland or Japan was a self-contained managerial unit that could "choose to fail or succeed"—a rhetoric more properly evoking a U.S. presidential administration or the board of an oil company. All these populations, not to mention those of modern Montana, Rwanda, and Haiti, should be recognized as components of larger regional or global systems of societal reproduction within which some subsystems progress and accumulate at the expense of others. When Diamond begins by expressing hopes that, by learning from the past, "we may keep on succeeding" (p. 3), it is not evident who is to be included in the category "we."

A paradox of this book is therefore that Diamond's recurrent recognition of long-distance trade, interdependency, and globalization does not prompt him to abandon his atomistic approach to "societies" as geographically delineated populations managing their own destinies. The concept of a world system seems as alien to him as a serious penetration of non-European cosmologies or social structures. In order to understand the specific trajectories of different societies over the past millennia, it

seems, all we need is a physiologist-cum-ornithologist with an interest in archaeology and climate change. Social science theory is completely absent, and the only reference to anthropology is a scornful mention of its generally sceptical attitude to reports of cannibalism (p. 152), which Diamond does not hesitate to identify in most of the cases he lists as "failures."

Another paradox is that Diamond's refreshing—if naïve—criticism of self-serving power elites inflicting harm on others through their "bad" behaviour (pp. 427–31) in no way seems to shake his confidence in industrial capitalism and the imperative of making profits (pp. 441–42). Although he makes a point of showing that environmental and political problems tend to go hand in hand and often demonstrates an awareness that the wealthy and powerful are the last to suffer from environmental deterioration—for instance, by being able to import resources and export garbage (p. 370)—he seems unaware of the burgeoning literature on "political ecology" and "environmental justice." His recipes for sustainability have little to offer beyond the familiar invocations of consumer power (pp. 484–85) and general pleas for new values (pp. 432–33), First World restraints (pp. 496, 519), better decision-making routines, and courageous leadership (p. 440).

Still, *Collapse* is often thoroughly entertaining reading, particularly in the well-written and detailed summaries of archaeological reports from various parts of the world. It is easy to share Diamond's fascination with the practicalities of daily life and metabolism in the dying societies of Easter Islanders, Anasazi, Maya, and Greenland Norse. He is certainly right that current debates on sustainability have much to learn from studies of past societies, and his book deserves the wide readership that it is attracting. Many anthropologists will lament that their meticulous research reports and theoretical sophistication do not sell as well as simplified popular summaries and vivid tales of cannibalism and catastrophe, but thanks to Jared Diamond many people who have hardly heard of anthropology will be excited by these tantalizing encounters with other cultures.

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5 VII 05

When U.S. universities began to import the model of the German research university in the late nineteenth century, academic culture was increasingly cast in the mold of disciplinary specialization and eventually intellectual balkanization. We have only just recently become aware of how badly we need interdisciplinary and multidisciplinary research if we are to address the world's pressing problems. Breaking down jealously guarded disciplinary barriers is not easy, as any contemporary academic knows. And for those who would dare to synthesize across disciplines (for a "popular audience," no less), venturing onto protected turf, mine fields lie in wait. When Jared Diamond came to Berkeley a few years ago to lecture on his first synthetic work, *Guns, Germs, and Steel*, (1997), one of my colleagues walked out in anger, disgusted that Diamond had "gotten the facts wrong" on some aspects of Paleolithic life. In contrast to her reaction was that of the hundreds of young students who loved what Diamond had to say because he had dared to step outside the boundaries, to try to make connections between what have become distinct and separate fields of learning.

In *Collapse* , Diamond—trained as a physiologist and biogeographer, not an anthropologist—turns to the huge question of "how societies choose to fail or succeed," a question one might think that anthropologists would have extensively researched but about which in fact there is a relatively small literature. It is not that anthropologists and especially archaeologists have not produced a significant body of relevant data on the problem, studying the rise and fall of scores of cultures and civilizations; it is largely these case studies that inform Diamond's book. If anyone makes a case for the relevance of archaeology and prehistory to the contemporary world, it is Diamond.

I am one of those whose research Diamond draws upon in *Collapse*, and I value this opportunity to assess how well or how poorly, in my opinion, he uses the data that I and my former students (such as Barry Rolett and Marshall Weisler) have generated from several Pacific islands. The particular case studies at issue here are discussed in chapters 2, 3, and 9 of *Collapse* and deal with Easter Island, the Pitcairn-Henderson Island group and Mangareva, to which they were linked by a tenuous exchange system, and Tikopia. My Stanford ecologist colleague and collaborator Peter Vitousek has proposed that islands offer ideal "model systems" for studying key ecological processes, and together we have recently argued that islands also provide model systems for understanding the complex, often nonlinear interactions between ecosystems and human populations. Easter Island, Mangareva, and Tikopia all have the potential to serve as such model systems, and it is along these lines that Diamond has drawn upon them in his book.

Easter Island, or Rapa Nui, to use its indigenous name, had become a poster child for ecological disaster and societal collapse before Diamond's book, and he highlights this compelling case early in *Collapse*. He recounts, for the most part quite accurately, the basic outlines of Rapa Nui prehistory as these have emerged from a host of archaeological studies carried out over the past 40 years. He concludes that the collapse of Rapa Nui society was fundamentally linked to human-caused deforestation of the island and observes that Easter is "the most extreme example of forest destruction in the Pacific" (p. 107). Moreover, and this is a key point in his chain of argument, it was not that the Rapa Nui people necessarily intended or initially set out to cut down their island's forests. Instead, this resulted from two intersecting factors: (1) their need for increasing areas of agricultural land as their population grew and (2) the fact that Easter's forests were inherently fragile, for several

reasons, including low rainfall and low volcanic ash input.

For the most part I concur with Diamond's analysis, but he leaves out one critical factor. We know from the work of David Steadman, an avian paleontologist who has studied bird extinctions on Pacific islands, that when Rapa Nui was first discovered by Polynesians it hosted more than 20 species of seabirds (only 2 species survived into the historic period). These seabirds must have been a huge source of nutrient inputs to the island's forests, as they harvested fish at sea and dropped their guano—rich in phosphorus, nitrogen, and other key elements—onto the land. Early generations of Rapa Nui people decimated these seabird populations until virtually no birds were left, thus eliminating this key nutrient source. That the original forests of Easter were unable to recover and that the island became so deforested resulted from a slightly more complex set of interlinked ecological processes than Diamond's account reveals. Nonetheless, I agree with his critical conclusion: that the Rapa Nui gradually followed a pathway leading to societal terror and collapse not because they were "eco-vandals" but because they lacked critical understanding of how their island's environment functioned and thus failed to take steps which might have averted their fate.

In chapter 3 Diamond turns to three islands due west of Rapa Nui, including Pitcairn of *Mutiny on the Bounty* fame, to make a case for collapse which is "triggered by the breakdown of an environmentally damaged trade partner" (p. 121). Here the societies of remote Pitcairn and Henderson Islands depended upon a long-distance exchange "lifeline," as the work of Marshall Weisler has so clearly shown. The larger island cluster of Mangareva was the "damaged trade partner" where, as in Rapa Nui, deforestation in late prehistory led to severe social problems and the abandonment of annual voyages to Pitcairn and Henderson. As in the Rapa Nui case, Diamond again does not sufficiently recognize the key role of seabirds in Mangarevan ecology. My recent excavations in Mangareva have revealed that diverse populations of seabirds abounded at the time of Polynesians' arrival, only to be extirpated by human activities. Again, a critical component of nutrient cycling was disrupted, setting off a chain of consequences that would extend beyond Mangareva to isolated islands hundreds of kilometers to the east.

In chapter 9, Diamond examines the case of Tikopia as an instance of long-term sustainability, in which an island population managed to persist over three millennia without incurring deforestation or social collapse. Here Diamond draws not only upon my archaeological work but the classic ethnography of Raymond Firth to stress the role of cultural means of population regulation in this particular historical scenario. By controlling population size (sometimes by draconian means) and by acting as a "bottom-up" decision-making community that recognized that everyone had a stake in the outcome of collective decisions, the Tikopia avoided the tragic fate that befell some other island societies.

Has Diamond been successful in pulling my data and those of my students into a broader synthesis, addressing problems and issues extending beyond the shores of a Tikopia or Mangareva? While I do not completely agree with every detail in his chapters and while I might point to the relevance of some factors he overlooks, in general I give him high marks. He has drawn upon these island cases as "model systems" to tease out patterns and processes of general relevance and not just as unique historical scenarios. Most important, he has managed to bring a disparate and formerly disconnected set of academic research studies together, to weave an interconnected whole, and to advance an argument that by understanding our past humanity just might influence our collective future. And he has done this in a book that is based on solid scientific research presented in an approachable style that is being read by tens of thousands of people. Some academics will not hesitate to critique Diamond for errors or misplaced emphasis on particular causal factors, and it is important that they set the record straight when this is warranted. But I credit him with boldly doing what too few of us in academia attempt: venturing beyond our tightly patrolled disciplinary boundaries, trying to connect the dots, and inspiring broad public interest and debate around issues that are of the utmost urgency for the future of humanity and our planet.

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Diamond begins *Collapse* by noting that the book is the counterpart to his previous *Guns, Germs, and Steel* (1997). Whereas the earlier work explored why social evolution proceeded at different rates and in different ways in different parts of the world, *Collapse* focuses on societal failures. These are obviously two sides of the same causal coin, so the reader might hope from this early statement that *Collapse* would not only examine failures but also synthesize knowledge about why the social arrangements and institutions that exist today in our species are the ones that survived the hazards of social evolution. How has history made our own societies well or poorly equipped to handle environmental challenges?

This does not seem to be the purpose of the book. I do not fault it for having a different agenda, but for a reader hoping for more of the courageous synthesis of *Guns, Germs, and Steel* it is a disappointment. The final chapters list the logically possible kinds of mistakes societies may make and briefly review classic work by people such as Elinor Ostrom (1990), but this book attempts no broader theory that might tell us why societies are good at the things they are good at and bad at solving other problems. A theory of social evolution that will help us understand why societies fail must take a stand on the reasons they succeed. Like Robert Wright's more optimistic *Nonzero* (2001), *Collapse* neglects the importance of the specific mechanisms by which social evolution proceeds. There are many nominations of influ-

ences and allusions to historical process, but nowhere is order made of the collection.

This will be frustrating for those who enjoyed *Guns, Germs, and Steel* because it took intellectual risks by pushing the limits of the comparative method. Diamond's case studies in *Collapse* could be recruited to the same enterprise. Chapter 9's study of the success of Tokugawa Japan in preventing deforestation is illuminating. For those interested in gaining insight into our own problems and how to solve them, the discussion is valuable, but without synthetic explanations we are reduced to possibly over-fitting historical circumstances to our own.

Those who want an effective modern environmental movement need working theories of social evolution. It makes a difference whether societies succeed because they conquer their neighbors or because they survive droughts. In the first case, we might expect existing societies to be good at defense and warfare but not necessarily prepared for environmental crisis. In the second, we might expect the opposite. No single answer will suffice for all parts of the world in all times, but it is useful to explore the possibilities, when each might be important, and the relative rates of social evolution each might generate. I outline four macro-evolutionary mechanisms here, ignoring only because of limited space the essential question of why persistent variation in social arrangements and institutions is so common among human societies. These are possible mechanisms by which different coordinating and cooperative institutions might spread at the expense of others.

First, social evolution might proceed by differential extinction. If some social arrangements are more likely to survive environmental calamities, these arrangements might increase in frequency among human societies. Here it is a game of society-versus-environment. How information flows through a society, how quickly it can respond to information, and how it mediates and suppresses internal conflicts of interest might all contribute to survival, as Diamond notes.

Second, social evolution might proceed by differential growth. Ammerman and Cavalli-Sforza (1984:109–13) and Sokal, Oden, and Wilson (1991) have argued that agriculture spread into Europe mainly through the spread of farmers, not the spread of farming. If some societies demographically replace others because of fecundity, this might lead to the spread of social institutions that encourage population growth. Richerson, Boyd, and Bettinger (2001) argue that agriculture, once present in a region, spread partly because numerically superior farmers could always defeat foragers in contests over territory.

Third, social evolution might proceed by differential conquest, even when groups are of comparable sizes. In his book about the rise of European world powers, *The Pursuit of Power* (1982), William McNeill argues that competition for control of land and resources between rather small European polities created a ratchet for the development of modern military institutions, technologies, and goals of elites, and these fueled the later colonial ambitions of European states. Kelly's (1985) synthetic study of the Nuer conquest of the Dinka suggests that differences in institutions do spread because of differential conquest.

Fourth, social evolution might proceed by differential influence. Societies sometimes willingly adopt the social arrangements and beliefs of their neighbors. David Boyd (2001) documents the decision-making process through which the Irakia Awa of Papua New Guinea eventually adopted the economic and ritual institutions of their neighbors, the Fore. The Irakia Awa observed that the Fore were better-off, and they set out to imitate them at the institutional level. Similarly, it is arguably true that the Japanese willingly adopted some aspects of Western society because of their perceived advantages. These transformations might operate without extinction, replacement, conquest, or coercion. Exactly what makes societies favorable in these comparisons matters, of course. If rates of extraction and consumption are what is driving social evolution, then we should not expect societies to be well-equipped to manage their environments.

How important are these different mechanisms for explaining the history of human social evolution? Geography may be important. As *Collapse* suggests, islands may foreground environmental problems. Island societies that succeed may be those that effectively manage their environments and their own impacts. Because of their relative isolation, social evolution may be slower on islands as well (*Guns, Germs, and Steel* suggests this). But the different mechanisms imply quite different internal rates of change, as well. Soltis et al. (1995) surveyed New Guinea ethnographic history to estimate the rate at which social competition (mechanism #3) might spread institutions. They concluded that social complexity would spread very slowly, requiring on the order of many hundreds of years, by this mechanism. Differential extinction by environmental failure certainly interacts with direct group competition, as Diamond notes, but its rate seems unlikely to be more rapid. In contrast, differential influence (mechanism #4) might diffuse innovations rather quickly (Boyd and Richerson 2002) because it is limited by the rate of social comparison rather than the rate of tragedy or violent conflict.

This reframing of *Collapse* is for anthropologists interested in theories of social evolution. *Collapse* is not really for these social theorists but for people who want to be better prepared to argue with those who are not concerned about environmental crisis. Those who want more of attempts at a theory of social macro-evolution should instead read the unique, difficult, and worthwhile *Historical Dynamics* by Peter Turchin (2003).

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Empires being neither up nor down do not fall.
—ABBÉ GALLIANI, 1744

Biologists have long aspired to contribute to social the-

ory. In recent years, developments in sociobiology, brain imaging, and DNA studies have given them new opportunities in social research. Since the early 1990s several prominent biologists have turned their attention to human history or cultural change, including Kenneth Watt, C. S. Holling, Peter Turchin, and Jared Diamond. Some of these contributions have been insightful or have stimulated discussion. A few must be described as naive. The value of the present work lies more in its intriguing case studies than in its ideas.

Abbé Galliani cautions us to mind our concepts: Diamond defines "collapse" as "a drastic decrease in human population size and/or political/economic/social complexity, over a considerable area, for an extended time" (p. 3). This is a useful definition but is not rigorously applied. Apparently collapse can also consist of such vagaries as "significantly lower living standards, chronically higher risks, and the undermining . . . of our key values" (p. 7). Diamond fears that environmental problems will cause modern collapses, and so he begins with the assumption that past collapses had similar causes. Early on, he acknowledges, it became evident that collapses were rather more complex. Still, slips of the pen betray a deep-seated conviction that environmental deterioration is really to blame. A modern collapse would be "triggered ultimately by scarcity of environmental resources" (p. 7). Environmental problems "undermined pre-industrial societies" (p. 35). "The Anasazi and Maya were . . . undone by water problems" (p. 490). "Deforestation was a or *the* major factor in all the collapses of past societies described in this book" (p. 487). Today's global trouble spots all suffer from environmental deterioration: "It's the problems of the ancient Maya, Anasazi, and Easter Islanders playing out in the modern world" (p. 516).

Unable to prove that environment is the answer, Diamond resorts to such vacuities as "Different societies respond differently to similar problems" (p. 14) and "Some societies evolve practices to avoid overexploitation, and other societies fail at that challenge" (p. 308). Moreover, "Societies . . . that succeed may be those that have . . . courage . . . and . . . luck," that "make bold, courageous, anticipatory decisions," and that have "the courage to make painful decisions about values" (pp. 434, 522, 523). Success or failure "partly depends on idiosyncrasies of particular individuals" (p. 439): "Leaders . . . who make strong insightful decisions . . . really can make a huge difference to their societies" (p. 306). Despite his commitment to environmental issues, Diamond's analysis comes to rest substantially on such trite ruminations.

In his previous book, *Guns, Germs, and Steel* (1997), Diamond developed a progressivist narrative of cultural evolution to explain how Europe came to dominate and colonize much of the world. *Guns* and *Collapse* are related narratives, for the development of complexity and its collapse are aspects of the same process. Digressing into *Guns* reveals that Diamond's views of cultural change are teleological, and this clarifies some of the perspectives of *Collapse*. Progressivists see cultural complexity as something to which societies aspire. This moves Diamond to ask, "Why did human development *proceed* at such different rates on different continents?" (p. 16; all citations in this paragraph are to *Guns*; all emphases in this paragraph have been added). If one sees cultural complexity as progress, one must ponder "the failure of food production to appear" (p. 93) in some suitable places. In a progressivist narrative, complex cultural features *arise*. Thus, "Agriculture was *launched* in the Fertile Crescent" (p. 141), which had "advantages for the early *rise* of food production" (p. 142). Once agriculture rises other things should, too, so a progressivist might ask, "Why did writing . . . *arise* . . . in Iraq?" or "How did government and religion *arise*?" (pp. 216, 267). "States have *arisen* independently," and social complexity develops because "dense populations . . . *arise*" (pp. 282, 284). To Diamond, the development of complexity is an intercultural race in which Eurasia had a "*head start*" (p. 364). In Greater Australia, although "Native Australian societies enjoyed a *big head start* . . . New Guinea . . . [ultimately developed] the *most advanced* technology, social and political organization, and art" (pp. 297, 305). The misfortunes of some places that also had head starts lead Diamond to ask, "Why . . . did the Fertile Crescent and China eventually *lose their enormous leads*?" and to observe that China's "*falling behind* is . . . surprising" (pp. 410, 411).

This naive perspective tinges *Collapse*. To Diamond, the Maya were "*the most advanced* Native American society" (p. 21; page citations again to *Collapse*, emphases added). Once a society has employed its "head start" to "arise" and become "advanced," what is the worst that can happen? The Maya illustrate that even "the most advanced and creative societies" (p. 159) can collapse. Collapse is "an extreme form . . . of decline" (p. 3). "The risk we face is of a worldwide decline" (p. 519). Like a Victorian moralist, Diamond lauds what he considers advances and warns of decline. His notions of virtuous leaders and societal courage are reminiscent of those of Gibbon and Toynbee, two historians who bracketed the Victorian era.

Diamond would have understood decision-making better had he paid more attention to literature that he discusses. Complexity increases as systems differentiate in structure and increase in organization. Humans employ complexity as a response to problems. Think of September 11, 2001, and the growth of bureaucracy and regulation that followed. Complexity has great utility in problem solving, but it also has costs. The evolution of complexity is a benefit/cost relation. It is thus simplistic to write of complexity *rising*, or *advancing*, or *declining*. Societies develop the complexity that is needed to solve their problems and may abandon complexity that is no longer suitable. As a benefit/cost function, complexity in problem solving can reach diminishing returns and become ineffective. Continued long enough, such complexity can produce fiscal distress that may make a society vulnerable to collapse (Tainter 1988, 2000).

Understanding that complexity develops through problem solving would have helped Diamond compre-

hend better the environmental problems that he cares about. Rising complexity in problem solving drives resource consumption. Problems occur in the present, but environmental damage may be deferred. Thus the link between benefits and costs is often hidden, and present "choices" may have little connection to whether an effort fails or succeeds (Tainter 2000). Once environmental problems are evident, their resolution usually requires still more complexity and expenditure, the predicament in which we find ourselves today (Allen, Tainter, and Hoekstra 2003).

The main value of the book lies in its interesting and well-written case studies. Intellectually, *Collapse* is neither novel nor profound. This is unfortunate, for Diamond is correct that we face environmental problems that the experiences of past people can help us to understand. Entrenched interests often stand in the way of addressing these problems. As seen in the issue of climate change, scientific findings must be derived with the highest rigor to challenge these powerful interests. Diamond's present work is not of that caliber.

References Cited

ALLEN, T. F. H., JOSEPH A. TAINTER, AND T. W. HOEKSTRA. 2003. *Supply-side sustainability.* New York: Columbia University Press.

AMMERMAN, A. J., AND L. L. CAVALLI-SFORZA. 1984. *The Neolithic transition and the genetics of populations in Europe*. Princeton: Princeton University Press.

BOYD, D. J. 2001. Life without pigs: Recent subsistence changes among the Irakia Awa, Papua New Guinea. *Human Ecology* 29:259–82.

BOYD, R., AND P. J. RICHERSON. 2002. Group beneficial norms spread rapidly in a structured population. *Journal of Theoretical Biology* 215:287–96.

DIAMOND, JARED. 1997. *Guns, germs, and steel: The fates of human societies*. New York: W. W. Norton.

———. 2005. *Collapse: How societies choose to fail or succeed*. New York: Viking.

KELLY, R. C. 1985. *The Nuer conquest: The structure and development of an expansionist system*. Ann Arbor: University of Michigan Press.

Long

MCNEILL, W. 1982. *The pursuit of power: Technology, armed force, and society since A.D. 1000*. Chicago: University of Chicago Press.

NATIONAL RESEARCH COUNCIL. 1997. *Rediscovering geography: New relevance for science and society*. Washington, D.C.: National Academy Press.

OSTROM, ELINOR. 1990. *Governing the commons: The evolution of institutions for collective action*. Cambridge: Cambridge University Press.

RICHERSON, P. J., R. BOYD, AND R. L. BETTINGER. 2001. Was agriculture impossible during the Pleistocene but mandatory during the Holocene? A climate change hypothesis. *American Antiquity* 66:387–411.

SOKAL, R. R., N. L. ODEN, AND C. WILSON. 1991. Genetic evidence for the spread of agriculture in Europe by demic diffusion. *Nature* 351:143–45.

SOLTIS, J., R. BOYD, AND P. J. RICHARDSON. 1995. Can group-functional behaviors evolve by cultural group selection? An empirical test. CURRENT ANTHROPOLOGY 63:473–94. [RM]

TAINTER, JOSEPH A. 1988. *The collapse of complex societies*. Cambridge: Cambridge University Press.

———. 2000. Problem solving: Complexity, history, sustainability. *Population and Environment* 22:3–41.

THOMAS, WILLIAM L., JR. Editor. 1956. *Man's role in changing the face of the earth*. Chicago: University of Chicago Press.

TURCHIN, P. 2003. *Historical dynamics: Why states rise and fall.* Princeton: Princeton University Press.

WOOD, RICHARD G. 1996. *Stephen Harriman Long. 1784–1864: Army engineer, explorer, investor.* Glendale, Calif.: Arthur H. Clark. [PD,ERC]

WRIGHT, R. 2001. *Nonzero: The logic of human destiny*. New York: Vintage.