Evolutionary History


Diamond has written an entertaining and intriguing evolutionary history of the world. It deals with all of human history from the Neolithic or Agricultural Revolution to the present, from Western Europe to the Pacific Islands. It is decidedly not Eurocentric. As befits such a large canvas, time generally is measured in millennia and space in continents. The shorter time spans and restricted areas that most historians examine are used as examples, much in the way that we might use the comments and experiences of individuals to illustrate an analysis of national affairs.

Guns, Germs, and Steel is an interdisciplinary history, drawing on anthropology, archaeology, linguistics, and sociology—although, sadly, not economics. As Diamond’s temporal reach extends beyond typical histories, so does his intellectual reach extend beyond most interdisciplinary histories. He summons geography and all forms of biology, from botany and zoology in the large to immunology and genetics in the small. He extends McNeill’s thesis—first presented twenty years ago—that disease was a neglected factor in historical conflicts and that the interaction of agricultural peoples and their domestic animals was key to the etiology of many deadly diseases.\(^1\) The theme that ties these various approaches together is evolutionary theory.

It is characteristic of Diamond’s approach and his sprightly prose that he does not claim to have set out to write the history

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of the world, but to answer a question posed to him by Yali, a politician in Papua New Guinea: "Why is it that you white people developed so much cargo [that is, trade goods] and brought it to New Guinea, but we black people had little cargo of our own?" (14). This is one of the central problems of the late twentieth century; Yali was hardly the first person to pose it. Cameron, for example, opens his economic history of the world with Yali's question in more prosaic form: "Why are some nations rich and others poor?" Diamond is not the first person to pose an answer. Political scientists and those who follow their lead cite the form of government in the third world as a reason. Economists and those who follow their lead focus on the economic policies of the less developed countries (LDCs). All social scientists direct their attention to events of the past few decades, making the implicit assumption that questions of relative income involve comparatively short-term processes. This account appears to be confirmed in the dramatic economic progress of the newly industrialized countries (NICs) of Asia. It finds expression in a recent presidential address to the American Economic Association that wondered how the policy recommendations of the United States to LDCs during the Cold War could have been so wrong, which presupposes that enough time has passed for us to know that these policies were misguided. 3

Diamond hardly talks about events since World War II. To answer Yali's question, he reaches back into history more than 10,000 years. By contrast, the literature about economic growth and development barely contains any references to events 100 years ago. Even Cameron, who extends his investigation to Paleolithic times, discusses the Neolithic revolution only briefly before proceeding to more recent events. 4 Which approach is more informative? Are the approaches cumulative or competitive?

This essay discusses the implications of doing such long histories and of drawing from such varied sources. The upshot is that evolutionary history and more conventional theories of economic growth complement each other, collaborating to make a more

complete explanation. In addition, Diamond's evolutionary theory illuminates events in the distant past that growth theory generally ignores. Diamond has written a fascinating history of the world, filled with illuminating anecdotes from both past and present, as well as with curious historical facts about familiar and unfamiliar phenomena and events.

After 400 pages of narrative and analysis, Diamond states, "The hand of history's course at 8000 B.C. lies heavily upon us" (417), reflecting that the people who first introduced agriculture in the Neolithic Revolution still dominate the world today. We have more cargo than Yali's constituency in Papua New Guinea because our distant ancestors were located in more fortunate settings than his. This strikingly simple conclusion follows directly from Diamond's use of evolutionary theory.

Biological evolution is a slow process. Events 10,000 years ago are still relevant to the distribution of wealth because evolutionary processes are slow—ponderously slow. There is no directed activity. Chance slowly produces mutations, and natural selection determines which ones survive and multiply, resulting in major changes only after many generations. In evolutionary terms, millennia are short periods. Applying this model to human history produces the emphasis on the longue durée in Diamond's book.

The historical application of evolution is based on two assumptions. The first is that a bigger population provides more opportunities for mutation or, when we move from biology to history, innovation. In economic jargon, there are economies of scale in the production of new products, new productive processes, and new organizations of these processes. Many economic models of the "new growth theory" that try to approach Yali's question formally have embodied this reasoning.

New growth theory differs from old growth theory by not taking changes in productivity to be exogenous, that is, unexplained. 5 Many models of economic growth include the production of knowledge, and many of them share the characteristic that productivity grows more rapidly when the population is larger.

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4 Cameron, Concise Economic History.

The reasoning is evolutionary; more people generate more ideas. Kremer tested the proposition that population growth—used as a proxy for productivity growth—has been a positive function of population size throughout the past "million years." Looking at continents during the same long periods that Diamond surveyed, Kremer verified that larger areas had greater population density and more rapid population growth.6

The second assumption is that geography matters. The physical setting of people determined their biological setting, which in turn determined their opportunities to change from hunter-gatherers to farmers. Innovations of all sorts moved more easily to the East and West than they did to the North and South. People located on "horizontal" continents had more opportunities to extend their inventions and benefit from economies of scale than people on "vertical" continents. (Eurasia is counted as one large, horizontal continent.)

Social scientists concerned with the short run tend to ignore geography. Appeal to the conditions in which people live is thought to lie outside any respectable model. Although economic historians have cited the role of coal deposits in the Industrial Revolution, the causal effect of resources is not without controversy.7 According to one view, the influence of natural resources has declined over time. Resources either are endogenous—a creation rather than a cause of economic growth—or irrelevant to economic growth. The United States provides an example of the former condition; Japan, of the latter.8

Diamond takes issue with this reasoning. He stresses the importance of location, although he also defends himself against the charge of "geographical determinism" by asserting, "Without human inventiveness, all of us today would still be cutting our meat with stone tools and eating it raw, like our ancestors of a


million years ago" (408). Diamond is a sophisticated geographical determinist who allows for the evolution of human behavior as well as the evolution of species.

The history based on these two evolutionary premises begins with the Neolithic Revolution.9 Agriculture emerged independently first in the Fertile Crescent and then in China, Central America, the Andes, and the eastern United States. It may have originated or spread to a few other sites as well, like the New Guinea highlands, even before its indigenous introduction in some places. Diamond explains why only a few plants, a few trees, and a few animals could be domesticated, although not why the plants and animals suitable for domestication differed among regions. Agriculture spread across longitudes far more easily than across latitudes; the East-West pattern typifies the migration of people throughout history. The growth of population that resulted from agricultural productivity eventually led to writing, political organization, and religion (which Diamond, like Karl Marx, sees as a tool of politics)—in short, to civilization. Population density and interaction with domestic animals led originally to greater disease and then to resistance to these diseases. Diamond links all of these developments, particularly the ecology of germs, to the growth of agriculture.10

The second stage of this evolutionary history began with the ability to navigate the oceans. Those who had the best agricultural resources and had been farming the longest had the most efficient technology, the most dangerous germs, and the most articulated organizations. They overwhelmed their opponents, often exterminating them. Those who got a late start or had fewer animals to domesticate in the Neolithic Revolution and were not killed by disease or warfare became the poor of the world—in answer to Yali's question.

Social scientists ask why these survivors did not adopt the technology of the invaders. Diamond's approach does not delve into this matter. In biological evolution, populations at risk adapt or die—adaptation occurring at the glacial pace of evolution.

9 See Diamond, The Third Chimpanzee (New York, 1992), for his account of history earlier than the Neolithic period.
Diamond infers that human populations under duress cannot move more quickly to adopt new technologies or organizations than they would under other circumstances. They may even stagnate completely if diseases from the invaders decimate and disorganize the resident population.

The Industrial Revolution—typically the centerpiece of world history—figures only tangentially in Diamond's history because of his preoccupation with population interactions. The growth of population and income in isolation is, for him, a simple consequence of the Neolithic Revolution. Any acceleration since 1800 is peripheral to his main story. The demonstrated capacity for travel and transport is far more important; industrialization counts mostly to the extent that it made air travel and transport feasible.

To support this thesis, Diamond weaves a variegated fabric of evidence, drawing on disciplines usually omitted from “inter-disciplinary” history. The most striking data come from biology. Charles Darwin observed domesticated plants and animals to research natural selection in the wild; Diamond describes natural selection in the wild to provide evidence for his story of domestication, involving plants and animals, as well as germs. The importance of this last item has been appreciated only recently.

Diamond reasons that the many diseases originating from the domesticated animals of invaders proved lethal to the populations invaded. He infers that domesticating populations became resistant to these diseases through childhood illnesses or natural selection.

Evidence for economies of scale is provided by the experiences of Austronesian migrants to the Pacific islands. Small populations on the islands did not advance technically; sometimes they regressed to hunting and gathering. The presence of economies of scale for larger populations is less direct; Diamond draws on the inventive history of large societies and on sociological theories to support his theory.

As befits the time frame of millennia, Diamond draws heavily from archaeology, accompanied by a linguistic analysis that is as unusual as it is illuminating, to chart population movements. Diamond argues that languages diffuse and evolve in ways that mirror the spread of a biological population. Linguistic evolution is faster than biological evolution, but still slow compared with conventional historical time.

For the progress of sedentary populations beyond the Neolithic Revolution, Diamond retells a story that becomes increasingly familiar as it approaches the present. He relies on sociology and anthropology to describe less formal organizations of society, reinterpreting much of what conventional history regards as autonomous development as the result of population density allowed by agriculture and, more recently, by industry.

It is an ambitious undertaking to recast all of human history in this evolutionary framework. The account of European expansion fits this story, but it is only one example. We would like to have another test of this model, with another population to confirm that the variables isolated in the evolutionary account are critical.

Although Diamond does not test his theory like Kremer does, he offers an illuminating counterexample, using his beloved New Guinea. He recounts the expansion of the Neolithic Austronesian population from what is now southern China to Taiwan and on into the South Seas. This population of farmers, with all of its attendant advantages over less advanced resident populations, for some reason did not expand into the highlands of New Guinea. Does the evolutionary model tell what kept them out? It does. The New Guinea highlands were one of the sites for the early adoption of agriculture. When the Neolithic Austronesians confronted the New Guinea highlanders, they had no advantage with which to dominate. These were two Neolithic populations at roughly the same level of development. The resulting stand-off, whereby Austronesians circled the highlands of New Guinea without penetrating them, confirms the evolutionary model (351).

It is an exception that proves the rule.

The evolutionary story is compelling, but it deals with extraordinary events and long time periods. How does it relate the smaller events and shorter periods of conventional history? Diamond grapples with this question in an epilogue: Just as we can safely predict that 100 coin tosses, or, even more precisely, 1,000 coin tosses will come up heads approximately half the time but not so safely that a single coin toss will do so, his evolutionary model can handle large time frames better than it can handle

Economists interested in economic growth often summarize their work in "growth regressions"—that is, in attempts to explain the different rates of countries' growth since World War II—adding variables to those suggested by Solow in an effort to improve explanatory power. Most of these variables come from either the new growth theory or the institutional context stressed by North and others. Geographical location is one that appears to be statistically robust, that is, to have a clear impact on the level of income and the rate of economic growth. Economists do not have a theory for this variable, but Diamond does. Evolutionary history provides part—but not all—of the answer to Yali's question. Geographical variables reflect the importance of processes of longer duration than most other variables, their robustness in growth regressions being evidence of the importance of evolutionary processes.

Hence, evolutionary history is a partial answer to Yali's question, as it is for other historical events. The evolutionary argument leaves ample room for individual initiative and unpredictable outcomes—for example, transformation of the Fertile Crescent into a desert. Diamond notes that this environment was fragile, but that is an ex post description. Had the irrigation systems of the ancient world survived, the agriculture now returning to the Middle East might have existed without interruption. Moreover, the Chinese rulers, as Diamond notes, had discretion for good or ill. Nothing in the evolutionary model entails that they had to act for ill or predicts when they would reverse themselves and act for good. Gerschenkron used to talk about the tension within economically backward societies that found relief in dramatic political change. The difference between the NCs and their less prosperous neighbors may have more to do with which group is in charge than in the general composition of the population.

12 Diamond uses the sex of babies to make this point about probabilities (423).
The evolutionary model has some uncomfortable corollaries. An example comes from the inverse of the NICs. African-Americans came to North America from a continent the backwardness of which is well explained by the evolutionary model. But if Chinese migrants to Southeast Asia retain their Neolithic edge even now, it follows that African-Americans carry their Paleolithic handicap with them. More generally, an open immigration policy has brought immigrants to the United States from parts of the world that were not in the Neolithic vanguard. Does the evolutionary model predict that integration of these diverse groups will force this country's population to fall to their level instead of raising them to ours?^{18}

It is awkward to draw this conclusion from evolutionary history because Diamond is a great pains at the start of his book to assert that groups of people do not differ in their intelligence. As Goody argued, the difference between savages and civilized people is in their tools, not in their intelligence.^{19} Diamond goes further to assert that the harsh life of primitive peoples selects out the slow ones and produces a more intelligent population. Yet, his discussion of population movements and his assertion that evolutionary processes are slow compel him, in the end, to distinguish people by groups—perhaps not by intelligence, but by a trait less tangible that inclines in the same direction.

Such inferences stretch the evolutionary model to the breaking point. Evolutionary history provides a vision of the grand sweep of history, but its logic may not extend to all questions. Even if universally valid, evolutionary history may be like the second law of thermodynamics. Even though, in principle, entropy increases, long and extensive decreases in entropy can occur. Nothing in thermodynamics determines how long they can last. The evolutionary theory of history may indicate that China is bound to deviate ever more from Yali's New Guinea, but the timing could vary as much as several centuries. In the fullness of evolutionary history, it may not matter whether China's lag behind Western European industrialization lasts for two, three, or four centuries, but it surely matters to us now. As John Maynard Keynes succinctly put it, "In the long run we are all dead." What happens in the short run of decades, and even centuries, is our vital interest, and it is still the province of more standard interdisciplinary history.

But even the most conventional historian will want to consider the questions raised by evolutionary history, and all the interdisciplinary ones certainly will enjoy reading the results of stretching the usual boundaries of our field. Guns, Germs, and Steel is a tour de force. Evolutionary history provides a way to unify the broad reaches of history.

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18 For a controversial approach to this question, see Richard J. Herrnstein and Charles Murray, The Bell Curve: Intelligence and Class in American Life (New York, 1994).