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History Upside Down

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Guns, Germs, and Steel: The Fates of Human Societies
by Jared Diamond
Norton, 480 pp., $27.50

Guns, Germs, and Steel is an artful, informative, and delightful book, full of surprises for a historian like myself who is unaccustomed to examining the human record from the vantage point of New Guinea and Australia, as Jared Diamond has set out to do. The book is oddly titled, for Diamond has little to say about guns and steel, though he devotes a chapter to the role of germs in human history. A better title would be *History Upside Down: A Biological View of the Human Past*. But the author, a researcher in "evolutionary biology and biogeography" specializing in birds, would surely object to such a description of his book, arguing instead that it is historians who err by approaching their subject downside up, thanks to their myopic concentration on literate societies and the last five thousand years of history. No matter: there is nothing like a radically new angle of vision for bringing out unsuspected dimensions of a subject, and that is what Jared Diamond has done.

Diamond frames his book around "Yali's question." Yali, a politician of some note in his native New Guinea, overtook Diamond while he was walking along a beach there in 1972, and during a lengthy conversation asked, "Why is it that you white people developed so much cargo and brought it to New Guinea, but we black people had little cargo of our own?" "Cargo" means all the useful material objects—metal axes and the like—that Europeans introduced to New Guinea, whose peoples still used stone tools, resembling those of Europe's Neolithic Age, when traders from Europe first showed up on the island's coasts a few hundred years ago. As Diamond says, such

> huge disparities must have potent causes that one might think would be obvious.

Yet Yali's apparently simple question is a difficult one to answer. I didn't have an

> answer then. Professional historians still disagree about the solution; most are no longer even asking the question.... This book, written twenty-five years later, attempts to answer Yali.

The easiest answer is to attribute differences in levels of human technology and culture to innate differences in the minds and bodies of the various peoples concerned. "Today," Diamond explains, "segments of Western society publicly repudiate racism. Yet many (perhaps most!) Westerners continue to accept racist explanations privately or subconsciously." But, according to Diamond, "modern 'Stone Age' peoples are on the average probably more intelligent, not less intelligent, than industrialized peoples." That, he suggests, is because biological selection in Eurasian civilized societies was mainly for body chemistry resistant to infectious diseases which "had little to do with intelligence," whereas in New Guinea the major causes of death were "murder, chronic tribal warfare, accidents, and problems in procuring food. Intelligent people are likelier than less intelligent ones to escape those causes of high mortality," with the result that "natural selection promoting genes for intelligence has probably been far more ruthless in New Guinea than in more densely populated, politically complex societies, where natural selection for body chemistry was instead more potent." Why then, Diamond asks, "did New Guineans wind up technologically primitive, despite what I believe to be their superior intelligence?"

Diamond's answer is simple in principle, but complex (and largely dependent on inference) in detail, for he asserts that "the roots of inequality in the modern world lie far back in prehistory...because of differences among peoples' environments, not because of biological differences among peoples themselves." This sort of geographic reductionism is radically out of fashion these days, and Diamond's thesis, so baldly stated, seems unlikely to win many converts. Yet he makes a good case for the critical importance of

> continental differences in the wild plant and animal species available as starting materials for domestication. That's because food production was critical for the accumulation of food surpluses that could feed non-food-producing specialists, and for the buildup of large populations enjoying a military advantage through mere numbers even before they had developed any technological or political advantage.

In addition, toward the end of the book he discerns three additional environmental factors that are relevant to answering Yali's question because they have an affect on the frequency of technical inventions and the rates of their spread. These are: (1) mountains, deserts, and day-lengths, varying with latitude and "affecting rates of diffusion and migration, which

differed greatly among continents," (2) distances across open water, "influencing diffusion *between* continents," and (3) "continental differences in area or total population size." Diamond concludes:

> Those four sets of factors constitute big environmental differences that can be quantified objectively and that are not subject to dispute. While one can contest my subjective impression that New Guineans are on the average smarter than Eurasians, one cannot deny that New Guinea has a much smaller area and far fewer big animal species than Eurasia.

Quite so. No one can doubt the general accuracy of Diamond's account of the environmental differences that he makes so much of. Yet one can doubt whether there was not greater scope for what I would call "cultural autonomy" than is allowed by Diamond's effort to reduce (or raise?) history to the level of the biological sciences. What I have in mind is the way the propagation of an idea or cluster of ideas can provoke a group of human beings to alter their concepts of reality, and then by acting accordingly make all sorts of changes in their social and physical environments. It seems clear to me that human beings have been doing this ever since the invention of language permitted our ancestors to construct a world of shared symbolic meanings, and then to begin to adjust individual behavior to fit the needs and expectations of those around them. Indeed, personal and collective behavior shaped by shared meanings is what distinguishes us from other species. It is the hallmark of humanity. Diamond's effort to make human history "scientific" by emphasizing the tyranny of natural environments while neglecting the way diverse symbolic worlds shape and reshape human societies and their physical environments thus seems misguided.

Diamond does not explicitly dismiss conscious human action as a factor in history. Indeed he recognizes the importance of language and is, in fact, deeply interested in, and extraordinarily well informed about, the linguistic history of humankind. It is rather that he seizes upon the early era in the unfolding of human capacities when food production was getting started some 13,000 years ago, and then, with a single leap of the imagination, attributes all the contemporary differences among human societies to the relative advantages particular populations have enjoyed as a result of the differences in the plants and animals available for domestication in different parts of the earth.

No doubt prevailing tendencies and customs are always constrained by environmental factors. Yet the vast differences in the wealth and power that different human societies have

at their command today reflect what long chains of ancestors did, and did not, do by way of accepting and rejecting new ways of thought and action, most of which were in no way dictated by, or directly dependent on, environmental factors. But Diamond seems to think that cultural innovation is a mere reflex of numbers, because "all human societies contain inventive people." And since, when agriculture was new, local distribution of the numbers of human beings did depend rather directly on the crops and domesticable animals that happened to be available on different continents and more isolated islands like New Guinea, he feels justified in treating the usual subject matter of history, i.e., everything that has happened since, as no more than a natural process of elaboration whose pace and direction have been ineluctably dependent upon, as well as derived from, prehistoric differences in local agricultural resources.

He is, of course, well aware of how his effort to envision humankind as a biological species competing and cooperating with other species in the food chain departs from prevailing notions about the human past. "Among other factors relevant to answering Yali's question," he says,

> cultural factors and influences of individual people loom large. To take the former first, human cultural traits vary greatly around the world. Some of that cultural variation is no doubt a product of environmental variation, and I have discussed many examples in this book. But an important question concerns the possible significance of local cultural factors unrelated to the environment. A minor cultural feature may arise for trivial, temporary local reasons, become fixed, and then predispose a society toward more important cultural choices, as is suggested by applications of chaos theory to other fields of science. Such cultural processes are among history's wild cards that would tend to make history unpredictable.

Does unpredictability make human history irredeemably unscientific? Diamond does not commit himself. Instead he dodges the question by arguing that the significance of

> cultural idiosyncrasies, unrelated to environment and initially of little significance,... constitutes an important unanswered question. It can best be approached by concentrating attention on historical patterns that remain puzzling after the effects of major environmental factors have been taken into account.

If so, what historians usually concern themselves with is no more than a bothersome residual left over after the material, biological constraints on human existence have been

scientifically studied and understood.

I do not accept Diamond's dismissive appraisal of "cultural idiosyncrasies unrelated to environment." A more persuasive view might be to suppose that in the early phases of our history, when technical skills and organizational coordination were still undeveloped, human societies were indeed closely constrained by the local availability of food, as Diamond convincingly argues. But with the passage of time, as inventions multiplied and more effective modes of coordinating collective effort across space and time were adopted, the course of human history became increasingly autonomous simply because our capacities to reshape actual environments to suit our purposes became greater and greater. Cultural idiosyncrasies—systems of meaning constructed out of nothing more tangible than words and numerical symbols, and largely independent of any external referent whatever—came into their own. This is the ordinary domain of history; and Diamond is wrong to dismiss it as a mere reflection of differences of population densities arising from the initial domestication of different plants and animals in different parts of the world.

All the same, those initial constraints were never entirely overcome. As we all know, Amerindians never caught up with Eurasians, still less did the peoples of New Guinea. By emphasizing those constraints and their enduring effects across subsequent millennia, Diamond therefore draws attention to an important dimension of the human past. Indeed, his account of the domestication of plants and animals and the subsequent expansion of linguistically distinct groups of food-producers at the expense of older populations of hunters and gatherers is a brilliant tour de force. Except for a few rhetorical exaggerations, his reconstruction of what happened in neolithic prehistory struck me as very convincing, and much of what he has to say about developments in South-east Asia and the islands of the southwest Pacific was nothing short of a revelation.

After posing Yali's question (and giving its most summary answer) in the prologue, Diamond divides his book into four parts. The first part presents three short, contrasting stories, dramatizing the development of diversity among human societies from initial stages of simplicity and near-uniformity. Accordingly, the first chapter sketches human evolution and the simple and uniform life of hunting and gathering bands. Then, beginning about 13,000 years ago, food production got going in several different parts of the earth, and inaugurated radical inequalities among the populations concerned, populations that Diamond sees as the ancestors of those peoples Yali asked him about.

He then sketches "a natural experiment of history" by showing how diversely Polynesians

exploited the natural resources of different Pacific islands—coral atoll, volcanic peak, or continental fragment (New Zealand), as the case might be. For example, small communities in the Chatham Islands turned into peaceable bands of hunters and gatherers because the climate was too cold for the tropical crops their predecessors had relied upon. At the opposite extreme, in the tropical and relatively spacious islands of Tonga and Hawaii, fertile volcanic soils sustained the development of intensive agriculture, radical social differentiation, organized warfare, and large-scale political consolidation. Diamond uses this example to show how geography can cause differences among human societies that have a common starting point, and how such features of civilization as class differences, warfare, and imperial governance emerge, as it were automatically, from a mere multiplication of numbers resulting from intensive food production.

In a later chapter, Diamond highlights the proximate factors behind European expansion in modern times by recounting how Pizarro conquered the Inca Empire of Peru. Diamond attributes Pizarro's success to steel weapons, guns, horses, disease germs, maritime technology, centralized political organization, and superior information, thanks to writing and printing. "The title of this book," he observes,

> will serve as shorthand for those proximate factors, which also enabled modern Europeans to conquer peoples of other continents. Long before anyone began manufacturing guns and steel, others of those same factors had led to the expansions of some non-European peoples, as we shall see in later chapters.
>
> But we are still left with the fundamental question why all those immediate advantages came to lie more with Europe than with the New World.

Accordingly, the next two parts of his book address the "questions of ultimate causation" of contemporary human inequalities. The section called "The Rise and Spread of Food Production" is the heart of the book. The successive chapter titles show both its scope and the author's rhetorical playfulness: "Farmer Power: The roots of guns, germs, and steel"; "History's Haves and Have-Nots: Geographic differences in the onset of food production"; "To Farm or Not to Farm: Causes of the spread of food production"; "How to Make an Almond: The unconscious development of ancient crops"; "Apples or Indians: Why did peoples of some regions fail to domesticate plants?"; "Zebras, Unhappy Marriages, and the *Anna Karenina* Principle: Why were most big wild mammal species never domesticated?"; and, finally, "Spacious Skies and Tilted Axes: Why did food production spread at different rates on different continents?"

These chapters convincingly show how Eurasia, the combined continents of Europe and Asia, outstripped Africa, America, Australia, and all the lesser islands of the earth, partly because domesticable plants and animals in Eurasia were better suited to human needs than those anywhere else, and partly because the size and shape of Eurasia allowed larger populations to interchange crops and techniques more quickly and across longer distances than anywhere else.

Diamond regularly goes out of his way to emphasize the basic importance of food supplies.

> In short, plant and animal domestication meant much more food and hence much denser human populations. The resulting food surpluses, and (in some areas) the animal-based means of transporting those surpluses, were a prerequisite for the development of settled, politically centralized, socially stratified, economically complex, technologically innovative societies. Hence the availability of domestic plants and animals ultimately explains why empires, literacy, and steel weapons developed earliest in Eurasia and later, or not at all, on other continents.

Diamond's account of why relatively few herd animals can be successfully domesticated was news to me. He explains that the wild ancestors of domesticated large mammals maintained "a well-developed dominance hierarchy among herd members," and that this "is ideal for domestication, because humans in effect take over the dominance hierarchy," thereby creating a social structure bringing humans and animals into a new symbiosis. Diamond goes on to explain why, for this and other reasons, efforts to domesticate apparently promising species like African zebras, Peruvian vicuñas, and Asian cheetahs all failed; but he does not discuss why American bison have never been domesticated. Bad disposition? Tendency to panic? Do these characteristics counteract the social dominance hierarchy which, I believe, prevails among buffalo herds as it does among wild horses and cattle? Diamond never raises the question; but the failure of American Indians to domesticate the buffalo surely magnified their handicaps vis-à-vis European intruders.

Diamond's observation that some of the major fertile regions of Eurasia lie at approximately the same latitude, so that crops can travel east and west without having to adjust to seasonal differences in day-lengths, was also an eye-opener for me. He argues that this accident of geography facilitated crop exchanges across the breadth of the continent, thereby enlarging local food supplies, provoking population growth, and in general accelerating the elaboration of civilized forms of society throughout Eurasia. By contrast, both the Americas and Africa extend north-south across many degrees of latitude. This

meant that crop exchanges between fertile regions in different latitudes required genetic alterations in order to synchronize sprouting, flowering, and fruiting with different seasonal patterns. In particular, he points out that the spread of maize from its heartland in Central America was hindered by the fact that its growth pattern, linked to changing day-lengths, had to wait many centuries for random genetic variation to produce plants adapted to different latitudes.

Perhaps Diamond makes too much of Eurasia's east-west axis. After all, India and Southeast Asia occupy different latitudes from Europe, the Middle East and north China; and the deserts and highlands of central Asia pose obstacles to diffusion of crops comparable to any in Africa or America. All the same, by emphasizing climatic and geographical obstacles to the diffusion of crops and other useful innovations within the Americas and Africa, he brings out an important dimension of the past which I had never considered before.

Diamond's Part Three, entitled "From Food to Guns, Germs, and Steel," condenses recorded history into four very interesting but radi-cally inadequate chapters—inadequate, that is, in describing the richness and complexity of the cultural innovations and interactions that actually took place in Eurasia and beyond from neolithic times to the present. Yet Diamond's criteria for inclusion and exclusion are, as usual, clear, logical, and explicit. "Farmers," he explains,

> tend to breathe out nastier germs, to own better weapons and armor, to own more-powerful technology in general, and to live under centralized governments with literate elites better able to wage wars of conquest. Hence the next four chapters will explore how the ultimate cause of food production led to the proximate causes of germs, literacy, technology, and centralized government.

What he says about how infectious diseases, systems of writing, technological inventions, and political structures arose among human societies is well informed. But his point of view is provocative, for he argues that each process was the natural, inevitable result of geography interacting with increasing human numbers. This leaves scant room for human ideas and ideals, and it leads Diamond to disregard the emergence of modern science entirely and to treat religion as a mere device for making complex societies more formidable. "The remaining way for kleptocrats to gain public support is to construct an ideology or religion justifying kleptocracy," he remarks, and goes on to explain:

> Besides justifying the transfer of wealth to kleptocrats, institutionalized religion brings two other important benefits to centralized societies. First, shared ideology or religion helps solve the problem of how unrelated individuals are to live together without killing each other—by providing them with a bond not based on kinship. Second, it gives people a motive, other than genetic self-interest, for sacrificng their lives on behalf of others. At the cost of a few society members who die in battle as soldiers, the whole society becomes much more effective at conquering other societies or resisting attacks.

A biologist accustomed to studying ants or birds may find such an account of the usefulness of religion convincing. I do not, and feel that Diamond's reduction of the tangled web of recorded history to four natural processes, each apparently evolving independently of the others, is a clever caricature rather than a serious effort to understand what happened across the centuries and millennia of world history.

The last part of the book is made up of four far more satisfactory chapters dealing with the separate histories of Australia and New Guinea, of East Asia, and of the expanse of Austronesia—the vast region of the Pacific extending from Madagascar to Easter Island, in which ethnologists find island peoples speaking related languages. This is followed by a brisk comparison of Eurasian with American history. Once again, much of what Diamond has to say in these chapters was entirely new to me. I was not previously aware, for example, that archaeological investigation in the uplands of New Guinea seems to show that inhabitants of those secluded valleys resorted to food production not very long after the earliest known development of agriculture in the Middle East; and they may have contributed sugar cane and bananas to the rest of the world in subsequent centuries.

Diamond's account of how speak-ers of Austronesian languages expanded their domain across enor-mous distances was also a surprise. Starting from the southern coastlands of China, he tells us, they first colonized Taiwan, and there presumably invented outrigger canoes and used these seaworthy craft to occupy an extraordinary variety of new environments, including Indonesia and part of the Malay peninsula as well as Madagascar, far across the Indian Ocean to the west, and even the more distant trans-Pacific Polynesian islands to the east. Linguistic affinities and archaeology provide the basis for this reconstruction of one of the most far-ranging human migrations of all time. I had never before understood how its separate episodes combine into a single pattern.

I was less impressed by the epilogue entitled "The Future of Human History as a Science."

Diamond begins modestly, declaring that

> a host of issues raised by Yali's question remain unresolved. At present, we can put forward some partial anwers plus a research agenda for the future, rather than a fully developed theory. The challenge now is to develop human history as a science, on a par with acknowledged historical sciences such as astronomy, geology, and evolutionary biology.

He hopes "to quantify further, and thus to establish more convincingly the role of, intercontinental differences …that appear to be most important." In addition, "smaller geographic scales and shorter time scales than those of this book" are needed to discover why, within Eurasia, Europeans "became politically and economically dominant in the modern world."

He hopes, or perhaps merely wishes, to discover that environmental factors will suffice to explain European dominance. But the dozen pages he uses to "at least indicate the relevance of environmental factors to smaller-scale and shorter-term patterns of history" are thin and contain several dubious statements and at least one clearly incorrect remark.* I conclude that Diamond knows a lot about prehistory and linguistics, but that he has never condescended to become seriously engaged with the repeated surprises of world history, unfolding lifetime after lifetime and turning, every so often, upon single, deliberate acts.

Diamond concludes his book by admitting that

> it is much more difficult to understand human history than to understand problems in fields of science where history is unimportant and where fewer individual variables operate…. But introspection gives us far more insight into the ways of other humans than into those of dinosaurs. I am thus optimistic that historical studies of human societies can be pursued as scientifically as studies of dinosaurs—and with profit to our own society today, by teaching us what shaped the modern world, and what might shape our future.

> Quite so: but introspection, surely, tells us that conscious purposes and shared meanings govern much of human behavior; and a science of history that leaves this dimension out, as Diamond's does, is unlikely to explain satisfactorily the modern world or any other part of the human record.

LETTERS

'Guns, Germs, and Steel' June 26, 1997

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1. *
"Under Alexander the Greatpower finally made its first shift irrevocably westward," because, as he goes on to explain, the "ecologically fragile" environments of the Middle East had been destroyed by human actions. This conveniently disregards the fact that Middle Eastern Muslims exercised world primacy for about four centuries after 632 AD. ↩