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## Human history as a natural science. Review of: Guns, Germs, and Steel: The Fates of Human Societies by Jared Diamond

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their data to general audiences. Terrestrial ecologists involved in long-term monitoring projects will find the book interesting because it will encourage them to think about different data interpretation and presentation tools. However, although the authors may win some new followers, they are not likely to change the opinions of hard-core critics of integrated indexes.

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## HUMAN HISTORY AS A NATURAL SCIENCE

**Guns, Germs, and Steel: The Fates of Human Societies.** Jared Diamond. W. W. Norton, New York, 1997. 480 pp., illus. \$27.50 (ISBN 0-393-03891-2 cloth).

Evolutionary biologist Jared Diamond's latest book came highly recommended, and with good reason. It is without question one of the most significant books of the decade—indeed, it won the 1998 Pulitzer Prize for general nonfiction. Why? It represents one of the few (along with Flannery 1994), and certainly one of the best, applications of the methods of natural science to the questions of human history. The reframing of the basic historical questions and the discovery of some of their answers, which this approach makes possible, are enormously enlightening, and Diamond's writing style makes the

process of discovering them a joy.

Diamond starts with a question he was asked 25 years ago by a New Guinean politician named Yali, who asked, "Why it is that you white people developed so much cargo and brought it to New Guinea, but we black people had little cargo of our own?" Diamond generalizes this question to: "Why did wealth and power become distributed as they now are, rather than in some other way?" He pushes the question sequentially back to the origins of humans on the planet and uses it to motivate an inquiry into the general questions of not only how, but also why human societies developed in the ways, the places, and the times that they did.

To answer these questions, Diamond synthesizes a vast array of data and analytical tools, from paleoecology, to geology, to geography, to linguistics, to the traditional oral and written histories of the world's peoples. He makes several key points that evoke in the reader the kind of feeling of enlightenment that comes when a stunningly obvious but unnoticed aspect of a problem is suddenly revealed. For example, the fact that the Eurasian landmass has a largely east–west orientation, whereas the Americas and Africa are oriented north–south, makes a huge difference in how life on these continents evolved. Eurasia has huge areas of roughly equal latitude (and therefore climate) over which plants, animals, and humans migrated easily. The Americas and Africa, conversely, have many different climate zones of much smaller area at different latitudes, as well as mountains and other barriers to east–west migration. This wide range of climate zones and the presence of physical barriers to intracontinental migration have had a tremendous influence on the evolution, spread, and domestication of plants and animals globally.

Diamond uses this seemingly simple geographic observation as a key "ultimate" factor in developing a theory that explains the broad patterns of human history. In Diamond's theory, the causation runs something like this: The east–west axis determines the ease of species spreading; the more easily that species can

spread, the more likely it is to be domesticated<sup>1</sup>; the more plant and animal species that are domesticated, the larger the food surpluses and food storage; the more food that is stored, the easier it is for large, dense, sedentary, stratified societies to develop that then produce the "proximate" factors of the pattern of history, namely, technology (guns, steel), political organization, writing, and epidemic diseases (germs). Diamond fleshes out this broad outline with a host of additional observations and insights to get at a range of interesting questions, including what caused the spread of food production, how ancient crops developed, why most big wild animal species were never domesticated, and why food production spread at different rates on different continents.

This background then allows Diamond to embark on a detailed analysis back through the causation chain of the evolution of germs, of writing, of technology, of government, and of religion. All of the chapters are gems of both scientific logic and writing style. The book then comes full circle to address Yali's question as part of a discussion of the history of Australia and New Guinea, which is followed by the histories of East Asia, Austronesia, Eurasia, the Americas, and Africa, all from the broader perspective and theory developed in the early chapters. Diamond's analysis reveals that the broad patterns of human history and the distribution of wealth and power are a function of the (sometimes subtle and complex) patterns of the environment and the ways in which those patterns have interacted and coevolved with human societies. In response to Yali, Diamond suggests that Europeans and their descendants do not possess more "cargo" today because they are inherently smarter than their New Guinean, African, or

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<sup>1</sup>The percentage of potential plant, and especially animal, species that are actually domesticatable is to some degree a matter of luck, and Eurasia was particularly lucky in this regard. For example, fully 18 percent of the species of large mammalian candidates for domestication occurring in Eurasia were eventually domesticated, whereas only 4 percent of the candidates in the Americas and none of those in sub-Saharan Africa and Australia were domesticated. The reasons for these differences make for fascinating reading in Diamond's book.

Australian counterparts. In fact, Diamond makes a convincing argument for just the opposite—that New Guinean and other hunter-gatherer peoples are on average “smarter” than their “civilized” European counterparts, but in ways that are hard to measure on standardized tests. The broad patterns of history are also not explainable from the actions of a few key individuals, as some historians have argued. Rather, according to Diamond, the patterns are ultimately caused by accidents of geography and ecology interacting with human societies over time.

To my mind, Diamond’s book is an example of the way that all history should be written. It is comprehensive and explanatory and, therefore, a useful guide to future policy. It allows for the unique contributions of individual humans but puts these actions in the proper context. It helps us to understand our world and our place in it at a level that is essential to have any hope of designing a sustainable human presence on the planet.

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## MANIPULATING NATURE

**Experimental Ecology: Issues and Perspectives.** William J. Resetarits Jr. and Joseph Bernardo, eds. Oxford University Press, New York, 1998. 470 pp., illus. \$89.00 (ISBN 0-19-510241-X cloth).

The ghost of Robert H. MacArthur continues to haunt community ecology. In the 1960s, MacArthur and his colleagues revolutionized community ecology by developing simple but effective models of species interactions based on the unifying principles of competitive exclusion and the ecological niche. The equations were often presented with a modest

amount of non-experimental field data that nicely matched the qualitative predictions of the models. When MacArthur died at an early age, his colleagues and students gathered for a symposium and produced *Ecology and Evolution of Communities* (Cody and Diamond 1975), which represents the apex of the MacArthurian approach.

But right from the start, trouble was brewing. Dissatisfaction with the MacArthurian paradigm was expressed in three developing research fronts. First, theoreticians

quietly extended MacArthur’s models and found that the predictions often rested on some delicate mathematical assumptions (e.g., Armstrong and McGhee 1980). Expanding the modeling framework generated complex and exciting dynamics but eroded the simple predictive power of the original models. Second, a heated debate developed over the standards of evidence and the evaluation of non-experimental data (Strong et al. 1984). In particular, proponents of null models asked how community patterns would appear in the ab-