

Human destinies and ultimate causes

Guns, Germs, and Steel: The Fates of Human Societies

by Jared Diamond

Norton: 1997. Pp. 480. \$27.50. Jonathan

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Colin Renfrew

Why did the peoples of Europe come to dominate so much of the world? Or, in the words of the author's New Guinea friend Yali: "Why is it that you white people developed so much cargo [material goods] and brought it to New Guinea, but we black people had little cargo of our own?"

In setting out to answer this question and give the reasons for the regionally differing courses of history, Jared Diamond has written a book of remarkable scope: a history of the world in less than 500 pages which succeeds admirably, where so many others have failed, in analysing some of the basic workings of culture process. Its special quality is its clear-headed search for causes, for the underlying factors that gave some groups in human history the edge over others. Right at the start, the author rejects any ideas of genetic superiority — indeed he speaks of a "likely genetic disadvantage" of the Europeans — and he claims, with conviction, that "there really are broad patterns to history, and the search for their explanation is as productive as it is fascinating".

The book is a popular account and readable, leaving bibliographic references to a 'Further Reading' section at the end. The title is misleading, for the book focuses on a considerable time span, ranging over the past 10,000 years. Guns are little discussed and steel scarcely mentioned. But this should not deflect the reader from taking the work seriously, for it is one of the most coherent analyses of human history that I have read, and one that will stand on my bookshelf alongside Fernand Braudel's *The Mediterranean and the Mediterranean World in the Age of Philip II*. In its awareness of the underlying processes that have shaped human destinies, it is comparably encyclopaedic, yet broader in its geographical and chronological scope. In a manner comparable to Braudel's, it raises questions about the nature of historical explanation, and successfully avoids the methodological pitfalls that made Arnold Toynbee's *A Study of History* such an unsatisfactory contribution, for all its scope and erudition.

The author asserts: "History followed different courses for different peoples because of differences among peoples' environments, not because of biological differences among peoples themselves." Diamond is a physiologist, with experience in evolutionary biology and biogeography, and his focus is upon the environmentally related

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Culture clash: the Spanish conquistador Francisco Pizarro who defeated the Incas in Peru.

diversification of human societies. Some will, therefore, view his approach as materialist, or even as determinist. Certainly his acknowledgement of the role of human individuals is a brief one, and his treatment inevitably lacks the fine texture of more detailed historical accounts — Braudel's *l'histoire événementielle* — yet many of his arguments carry conviction.

Diamond's earlier book *The Third Chimpanzee* (HarperCollins, New York, 1992) gives a very accessible account of human evolution and the present volume is, in a sense, a sequel, taking the year 11,000 BC as its starting-line. In Part I it dramatizes and exemplifies the initial question of the clash of cultures, with chapters on the successful domination by the Maori people of the Chatham Islands, and on the more famous encounter between the Spanish conquistador Pizarro and the Inca emperor Atahualpa. Part II devotes seven chapters (in effect the core of the book) to "The rise and spread of food production". Part III, in four chapters, proceeds with an examination of the evolution and significance of germs, writing, technology and systems of government. Part IV, "Around the world in five chapters", deals with the histories of Australia and New Guinea, of east Asia, of the Austronesian expansion, of Africa, and of Eurasia set in comparison with that of the Americas.

Diamond concludes with an epilogue, "The future of human history as a science", in which he asserts that the histories of human societies — like the histories of dinosaurs, nebulae and glaciers — may belong as much to the sciences as they do to the humanities.

Such a synthesis draws heavily on recent archaeological research, and the discussion of the origins and consequences of food pro-

duction in Part II constitutes the heart of the book. Diamond draws too on the work of the linguist Joseph Greenberg, whose classification of the African languages gives the key to the patterning observed on that continent. For his treatment of the Pacific and of South-East Asia, he relies on several archaeologists, notably Peter Bellwood, who have investigated the correlations between linguistics and archaeology.

Surprisingly, however, he makes little explicit reference (other than in the bibliography) to the impact that molecular genetics is now having upon our understanding of human dispersals. It may be that the rather easy, narrative style makes it difficult to refer directly to the underlying data (with which he is evidently familiar), but this informal approach does, on the other hand, allow him to bring in elements from his own personal experience, notably from his fieldwork in New Guinea. This includes first-hand acquaintance with hunter-gatherers and with simple agricultural communities (including that of his interlocutor Yali), revealing a personal understanding of, and sympathy with, contemporary non-urban societies and the people who live in them.

The great strength of the book lies in the assured manner in which the author takes the reader from what he terms the "proximate causes" of successful cultural dominance (the guns, germs and steel of the title) to what he regards as the "ultimate causes". These are, in effect, the basic geographical factors, not least the original distributions of potentially domesticable plants and animals, which allowed the early development and expansion of food production, notably in Eurasia. What he does not seek to confront,

and in effect avoids, is the whole series of controversies that underlie this apparently seamless synthesis. Greenberg's linguistic groupings have been criticized by many linguists, and this may be one reason why the author has very little to say about the Americas before Columbus.

I myself had one severe criticism of Diamond's *The Third Chimpanzee*, where I thought he misinterpreted the evidence for the domestication of the horse, setting the date of that domestication earlier than the current data allow, and confusing its early exploitation for food production around 4000 BC with the role of the mounted warrior in military conflict, which did not emerge until after 1500 BC and thus after the princely use of the horse-drawn chariot that is so clearly documented in the Near East and in the Mycenaean world. This may be one reason why his treatment of Europe (which is lumped together in a single chapter with the Americas) is sketchy. Another could be the current and very interesting disagreement among geneticists involving the notion of a significant population diffusion into Europe with the dispersal of farming (the 'demic diffusion' model of Cavalli-Sforza and his associates) being called into question by researchers at Oxford using data from mitochondrial DNA, only to be re-asserted by Pääbo and others who suggest that the effective mutation rate of the relevant mitochondrial DNA 'hot-spots' may have been gravely underestimated. (See L. L. Cavalli-Sforza, P. Menozzi and A. Piazza, *Science* 259, 639–646, 1993; M. Richards *et al.*, *Am. J. Hum. Genet.* 59, 185–203, 1996; and S. Pääbo, *Am. J. Hum. Genet.* 59, 493–496, 1996.)

Others may be critical of the limited role that is here expressly assigned to the operation of specifically human cognitive abilities. For there is little discussion about the differing natures of the cultures seen on the different continents: why Aztec culture took the form it did or why Chinese civilization differed from that of ancient Egypt.

There may, at first sight, be little in this book for the current school of 'post-processual' archaeologists, with their emphasis upon the uniqueness of each human society and their reluctance to make generalizations about human history. But to accept this would be to overlook the book's greatest strengths. It is willing to simplify and to generalize; and it *does* reach conclusions, about ultimate as well as proximate causes, that carry great conviction, and that have rarely, perhaps never, been stated so coherently and so effectively before. For that reason, and with few reservations, this book may be welcomed as one of the most important and readable works on the human past published in recent years. □

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Hitch-hiker's guide to the Solar System

The NASA Atlas of the Solar System
by Ronald Greeley and Raymond Batson
Cambridge University Press: 1997. Pp. 369.
\$150, £100

Carl D. Murray

By any criteria, the comprehensive exploration of our Solar System has to be regarded as one of the major scientific achievements of the century, if not the millennium. In the 40 years since the launch of Sputnik 1, a few generations have been privileged to witness the first images from the surface of the Moon, Mars and Venus, as well as *in situ* data returned from the robotic spacecraft that have visited all the planets from Mercury to Neptune.

For technical achievement and sheer audacity of purpose, the highlights of this exploration have to include the results from the two Voyager missions to the outer Solar System. In the 12 years after their launch in 1977, these NASA spacecraft have provided close-up images of Jupiter, Saturn, Uranus and Neptune and of their attendant moons and ring systems. Without such successful NASA missions, any attempt to produce a Solar System atlas would be as pointless as publishing a world atlas but restricting it to maps of Europe.

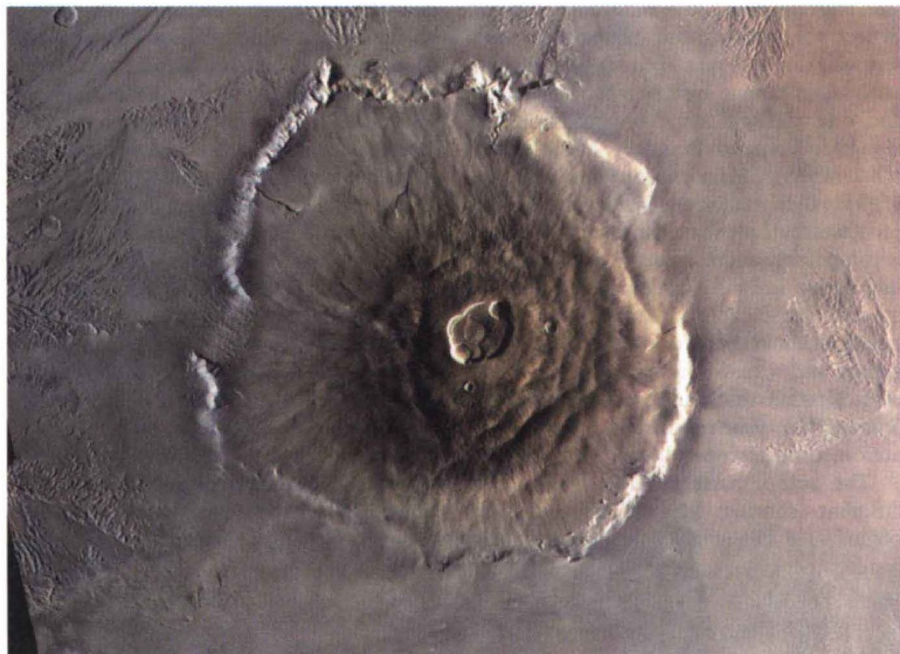
There is probably no ideal time to produce an atlas of the Solar System. With spacecraft such as Mars Pathfinder and Mars Global Surveyor about to provide another order-of-magnitude increase in our knowledge of one planet, and with the Cassini-Huygens mission to Saturn waiting

in the wings, a delay of another decade or so would produce a more complete work. However, the natural pause produced by the end of the radar mapping of Venus by Magellan, and the full analysis of the data from the Galileo spacecraft orbiting Jupiter, means that now is as good a time as any to undertake this ambitious project.

The understated goal is "to provide a set of maps of uniform format and consistent scales, organised by planetary system for all of the objects seen thus far". This is a massive undertaking and, thanks to the map-making skills of the US Geological Survey, the results are truly spectacular.

Although the authors make no claim to have produced a textbook, the atlas is much more than a collection of maps. As well as a general introduction, background information is provided for each planetary system, complete with colourful, informative diagrams and clear explanations. Every solid surface that has been viewed with sufficient resolution has its corresponding geological, reference and shaded relief map, with the occasional bonus of a colour photo mosaic for objects such as Mars, Io, Europa and Triton. For reasons of clarity, not all features are named on all maps, but the atlas includes a complete gazetteer listing every named feature from Aananin (a crater on the Saturnian moon Rhea) to Zwicky (a lunar crater), together with its latitude and longitude on the respective body and a brief description of the name's origin.

This is a reference book *par excellence*. The design is superb, with the uniform format making it easy to carry out comparative planetology. Small touches such as the outlines of planetary orbits at the top of the page are particularly helpful, with the orbit of the current system highlighted for the browser



The martian volcano Olympus Mons, photographed by Viking Orbiter.