BOOKS: ECOLOGY

The Human Role in Environmental History

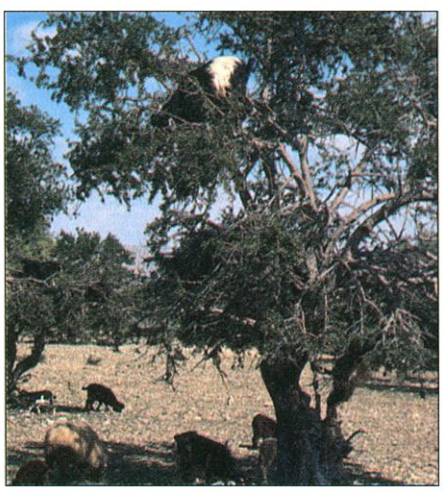
Karl W. Butzer

On Earth Day 1970, no one could have predicted the tortuous turns to be taken by scientific research and popular sentiment in environmental issues. The groundswell of support for environmental legislation during the 1970s has been replaced by a gridlock among polarized groups. Many more environmental scientists are now being trained, but the label "environmental science" is also being appropriated by mundane policy programs. Other individuals and groups seek to convert environmental issues into jealously guarded niches, relying more and more on self-citation and publicity stunts to keep themselves in business. When scholars in English departments can heap indignation on Spaniards for their alleged despoliation of the New World, environmental history risks losing its anchor in pragmatic data to postmodern discourse.

Human Impact on Ancient Environments
by Charles L. Redman
University of Arizona Press, Tucson, 1999. 255 pp. $45. ISBN 0-8165-1962-5. Paper, $22.95. ISBN 0-8165-1963-3.

There is indeed a problem when an educated public is confused by the dissonance—for example, when pronouncements on global change are increasingly met with cynicism. In the long run, it is fortunate that researchers are stepping back from simple models and striving to replace naïve assumptions with attention to an increasing range of feedback processes. But our quandary is also about communication. In the past as in the present, key problems will have been identified and addressed through human cognition, perception, and decision-making. We need less stereotyping and more community-based studies of environmental behavior, by cultural ecologists as well as historians. And we should pay more attention to the environmental successes and failures encoded in the settlement and land-use histories to which archaeologists are privy. Integrating all these perspectives into an informative coherent whole is a challenge because each step of a multidisciplinary argument must be carefully explained for an audience with a diversity of backgrounds. The sooner we all understand that misconceptions and dissonance are a normal part of learning to deal with crises of any nature, the easier it will be to maintain harmony between the academy and the public.

In *Human Impact on Ancient Environments*, Charles Redman makes a serious effort to address the issues and key themes of environmental history and its human dimensions. The author is a professor of anthropology and director of the Center for Environmental Studies at Arizona State University. Through three introductory chapters, he offers pointers that deserve attention. For example, environmental deterioration through human action is not just a recent phenomenon but has ancient precedents. Natural environments, productive strategies, and social institutions have co-evolved over many millennia. Archaeology, in conjunction with interdisciplinary efforts from the biological and Earth sciences, can provide rich empirical data and fruitful models to examine changing subsistence strategies, demographic patterns, and environmental transformation. Case studies of land-use change, such as the degradation of Easter Island, help convey how such variables may be interlinked with social organization.



Long necks not needed. Goat foraging on leaves and twigs in the crown of an oak.

As Redman demonstrates, the strands of "Western" thinking about the environment, beginning with Genesis and the classical authors, are complex, even contradictory. They do not support a dichotomy of Western versus non-Western attitudes. Nature and culture are interlocking components of a single system. People convert natural phenomena into cultural objects and reinterpret them with cultural ideas. As a result, distinct, culturally constructed understandings of environmental matters can lead to faulty diagnosis or response. Relevant here are the recurrent myths of a "golden age," or the utopianist notion of a "primitive Eden" destroyed by Western materialism. Economic models do not take into account the hidden costs of ecological impacts. Environmental preservation and regulation impact different socioeconomic groups or segments of the interdependent global economy differently and even unfairly.

Following this overview of behavioral concepts, Redman devotes the core of the book to a range of primarily archaeological case studies. Three chapters discuss animal extinctions and habitat destruction, the environmental anchoring and implications of early agropastoralism, and the intensification of land use and environmental pressures that result from urbanization. A fourth chapter examines "forces that grew with society" and considers the Danish economist Ester Boserup's hypothesis of the relation between demographic growth and labor investment, as tempered by heightened disease loads and malnutrition, within increasingly complex societies. In the concluding chapter, Redman skillfully picks up some of the initial themes to link past and present and to offer thoughtful suggestions for contemporary environmental strategies.

The primary value of this small book is its breadth. Even where it skips from one idea to another with only light documentation, the reader is forced to reflect. This provides a salutary mental workout that brings a new awareness of historical ecology. Redman's presentation is engaging and rarely categorical; he frequently lets the reader choose among alternative interpretations.

My research and teaching fall within much the same agenda; however, I see some matters differently. A number of the case studies include speculative interpretations that are based on reified anthropological assumptions or that project dubious social consequences. I accept that such scenarios are stimulating, but they are poor models for an integrative science. In my take, pastoral systems can be either ecologically beneficial or maladaptive. Given its time depth, Mediterranean agriculture was far less destructive than Redman suggests, particularly when one focuses on watersheds rather than narrow site perimeters. Population growth creates environmental pressures, but does not necessarily accelerate environmental damage. Bursts of disequilibrium seem to become less common in later prehistory, which suggests that regional conservationist ex-

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perience is cumulative. Soil erosion more typically peaked during times of depopulation and rural abandonment, a sign that insecurity was a major factor in opting for short-term, survivalist strategies. And although the degradation of isolated island ecosystems has proven heuristic value, it is unrepresentative of larger terrestrial systems that have much greater resilience.

Despite such examples of disagreement, I recommend Redman's book as a welcome eye-opener. *Human Impact on Ancient Environments* should be required reading for undergraduates of any persuasion and will interest anyone who is concerned about the environmental problems that confront us today.

BOOKS: HISTORY OF SCIENCE

Many Facets of a Noble Dane

Nicholas Jardine

Tycho Brahe was a man of many parts: duelist who lost much of his nose, his honor having been allegedly impugned by mockery of his astrological prediction of the death of a sultan already dead; Paracelsian medical chemist, busily poisoning himself and his friends with mercury; accomplished neo-Latin lyric poet; astronomer who combined bold speculations on the form of the world system with a monumental program for surveying the heavens; astrological consultant to the Danish royal family; aristocrat who flouted conventions by marrying a commoner; landlord who ruthlessly exploited his peasants (or so some of them complained); and builder of the mighty Uraniborg, at-once country manor, temple, museum, laboratory, and observatory.

On Tycho's Island
Tycho Brahe and His Assistants, 1570–1601
by John Robert Christianson

Cambridge University Press, New York, 2000. 463 pp. $34.95, £30. ISBN 0-521-65081-X.

What was Uraniborg? Traditionally historians of science have treated it as an observatory, indeed as the first great European observatory. Historian John Robert Christianson shows the reader it was far more than that. Paracelsus had taught that Earth and the heavens reflect each other. This belief is echoed in the legends of Tycho's emblems for the fields of astronomy and chemistry: "By looking up I see down," and "by looking down I see up." Tycho's Uraniborg was itself a microcosm of this Paracelsian world; its observatory towered above an underground chemical laboratory that was cunningly illuminated by skylight. What, then, was Tycho's extended family of scholars, artists, mathematicians, and erudite aristocrats? Christianson shows in compelling detail how Uraniborg functioned as a community within the conventions of service to a landlord, of aristocratic domestic life, and of learned friendship cemented by gifts, poems, and visits. He spells out the ways in which Tycho and his innermost circle viewed themselves as demigods, creators of "a magical environment for the study, understanding, and control of the forces of nature."

Looking up. Tycho's emblem of astronomy from his *Astronomiae instauratae mechanica* (1598).

The establishment of the unprecedented institution of Uraniborg, with its extended family of scholars, technicians, craftsmen, and servants, required extraordinary feats of organization. Christianson shows how Tycho's high nobility allowed him to obtain, through shrewd operation within the honor- and status-bound Danish system of patronage, the vast resources needed for the building of Uraniborg and its community. Excited by Tycho's astronomical and chemical plans, King Frederick II in 1576 granted Tycho the island of Hven as his fiefdom along with the money to support his building projects. The proud freeholders of the island were transformed into Tycho's tenants and servants. Craftsmen were recruited from the king's building works at Elsinore. Instrument-makers and artists were brought in from Nuremberg and Augsburg. Graduates of the University of Copenhagen were invited for visits to participate in Tycho's scholarly family, and some of them were contracted for longer periods of study and research. By the early 1590s, Tycho's learned household—with its astronomical instruments of unheard-of accuracy, its library of 3000 volumes, its paper mill and printing press, its ornamental medicinal gardens—had become the center of a Europe-wide network of astronomical correspondence and collaborative endeavor.

Tycho's high nobility and domineering habits, the keys to his success in creating Uraniborg, were also his undoing. Vulnerable because of his doubtfully valid marriage to a commoner, insolent in his dealings with the young King Christian IV out to tame overmighty subjects, and increasingly suspect in his theology, Tycho was forced on pain of humiliation to leave Denmark in 1597. Christianson movingly narrates the wanderings of Tycho's caravan of instruments, books, and retainers. Tycho's journeys ended with his appointment as imperial mathematician at the court of the Holy Roman Emperor Rudolph II, where he would die within a couple of years.

All in all, this is a fine book. The story of Tycho's rise and fall in Denmark, and of his final brief triumph in Prague, makes for compulsive reading. Christianson contrives to place Tycho's activities within the conventions of patronage and aristocratic conduct without in the least depriving him of his splendid individuality. Equally well balanced is the handling of Tycho's many bitter controversies and lawsuits. Christianson consistently writes with sympathy to Tycho while fairly presenting the opposing points of view. (This partiality goes too far, however, when the author endorses Tycho's claims that his geo-heliocentric world system was plagiarized by Nicolaus Reimers Baer, an autodidact who started life as a swineherd and rose to be Tycho's predecessor as imperial mathematician. The evidence cited—from Tycho himself and from the secretary of Erik Lange, a close friend of Tycho—is inconclusive.)

Perhaps the most remarkable feature of this work is the way in which it does full justice both to the varied significances Tycho's enterprises held for him and his contemporaries and to their consequences for the later developments in astronomy. Thus Christianson reveals Uraniborg as a temple of the muse Urania in which Tycho and his familiars combined astrology and astronomy with Platonic philosophy and Paracelsian medical chemistry in their quest for complete understanding and mastery of the cosmos. At the same time, *On Tycho's Island* allows us to appreciate Uraniborg as the site of enormous practical and theoretical advances in astronomy and as a model for many later scientific institutions.

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