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the Cahuilla Indians, ...the memories are still fresh of a Palm Springs thick with mesquite groves, yet completely devoid of putting greens.... [But] the stark reality is that the Cahuilla elders... are becoming fewer and fewer with each passing year." We must be grateful to Sauvel and Elliott for preserving these memories. The poet Gary Snyder once said that in twenty-first-century California, Kroeber's *Handbook of the Indians of California* might become an essential survival manual. The prophecy is chilling; but in such dire straits, *A Dried Coyote's Tail* might also be on the best-seller list.

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Tending the Wild: Native American Knowledge and the Management of California's Natural Resources.

M. Kat Anderson. Berkeley: University of California Press, 2005. xxix + 526 pp. \$39.95.

Reviewed by E. N. Anderson

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This major volume presents a comprehensive study of Native American plant management in one of America's most plant-rich environments. Most readers of this journal know Kat Anderson's main conclusion: California's native nations were nothing like the classic "hunters and gatherers" of old textbooks, who wandered about the landscape affecting it hardly at all. California had a relatively dense population, averaging perhaps one person per square mile, and that population managed the landscape quite intensively.

Kat Anderson (who is not related to this reviewer) is a botanist who became fascinated with Native Californian plant management, and has spent a good deal of the last 20 years in the field, collecting traditional knowledge. More unusual for an ethnobotanist, she also performs experiments to test its effectiveness. Not much of the experimentation appears in this book—it has been well published in specialized journals—but readers should remember that her claims about particular plant management are usually backed up by thorough and meticulous botanical research.

Differing—again—from other ethnobotanies, the book is arranged by management topics, not by plant or by "tribe." This gives the data a certain homogenized quality—one always wonders how many groups performed a given manipulation on how many species. It also leads to repetition, since the same facts and sometimes the same quotes are repeated when they are relevant to two or more chapter topics. On the other hand, it makes the book more user-friendly to restoration biologists and others directly interested in managing plants. One can always find the relevant information thoroughly recounted under a given heading.

The book begins with a brief introduction, then moves to an excellent and detailed account of the natural resources available and the ways people could take them. Then follows the story, all too sadly familiar to readers of this journal, of the destruction of Native Californians by white settlers. The real meat of the book is in the following section: some 200 pages on actual management strategies—both the specifics of how to manage plants, and the general rules for doing it. This is followed by a final section giving detailed applications, both for rehabilitating native cultures and communities and for rehabilitating California's terribly abused landscape. Finally, the bibliography is comprehensive (fully 60 pages long).

California native people, like other native groups all over the continent, had simple, reasonable conservation rules: don't take more than you absolutely need, don't take too much (sustainable levels could hardly remain unknown), leave some for others, manage and harvest in season, leave the biggest and smallest bulbs to multiply, never waste, take responsibility to care actively for plants when you see a need, and so on. Religion and legend enforced these rules. Many stories gave more or less mythologized examples of what happens when people take too much: the resources disappear. Stories often phrase this as the result of disrespect; the spirits take offense and stay away. Taking care of the land is respecting it. Neglecting it is sinful. Excessive or wasteful extraction is most disrespectful of all, and insults the spirits of the wild so that they withhold resources.

The present review cannot summarize the detailed lore that exists on plant management. Some of the techniques include pruning, coppicing, root-pruning, sowing, irrigating, transplanting, thinning, weeding, clearing, beating nuts down (which incidentally prunes the tree—as the native people well knew), cultivating, and, above all, burning. Native people used fire as a precise, flexible, and sophisticated tool. They burned individual clumps to force tall straight new growth for baskets; they burned patches of grass to make new growth for seed; they burned whole landscapes to thin brush, drive game, and maintain a healthy regrowing stage that yielded more berries, seeds, and forage for game. More or less every part of California that would burn was burned.

Anderson writes largely of nonagricultural practices. True agriculture flourished in the southeast part of the

state and in a few other areas, but it is already described elsewhere, and is out of Anderson's purview.

Readers of recent ethnobotanical literature will note similarities between California and aboriginal Australia, Canada, Mexico, East Africa, and elsewhere. There are also striking similarities with another Mediterranean landscape: the Mediterranean region itself. Grove and Rackham's magisterial work *The Nature of Mediterranean Europe* (2001)—and similar works—lists most of the same methods, invoked for the same reasons and done in the same ways. So an area intensively agricultural for thousands of years continues to manage wild plants as the Californians did.

Clearly, recent work around the world has broken down the once-sharp separation between hunter-gatherers and agriculturalists. Anderson has little patience with the “noble savage in harmony with nature” stereotype. She has even less with the early-day anthropologists who persisted in regarding the native people as simple, animal-like foragers, in spite of much evidence to the contrary. It is, indeed, embarrassing to an anthropologist to see how many of her quotes are from settlers, naturalists, and even amateur anthropologists like Frank Latta, compared to the few from academic anthropologists. She is perhaps a bit unfair—e.g., on page 135, when she says that Theodora Kroeber and Robert Heizer (writing in *Almost Ancestors*, 1968) “never fully understood” the degree of management; from working and studying under Heizer's direction, I wonder about this—and I certainly doubt if Theodora Kroeber was that slow on the draw. But, in general, Anderson is all too correct, and proves it with long quotes, notably from A. L. Kroeber (e.g., page 251). She correctly points out that A. L. Kroeber's own findings disproved his generalizations. Kroeber was an expert and sympathetic observer, but was blinded by his preconceptions. This serves as a warning to all of us.

Several issues require discussion in a review of this book.

First, would native management have much effect? I think I can answer this from my own work with the Maya of southeast Mexico, who continue to practice a similar system. In some of the most remote communities I visit, people live at low population densities and have little interaction with modern technology. To be sure, they have agriculture, but it is based on regular burning rather than on plow, harrow, and livestock. They are also continually

out and about in the forest, unobtrusively managing it in countless small ways—pruning, trimming, thinning, gathering medicinal plants, collecting basketry material and poles, taking the odd game animal. After thousands of years of this, the forest has become a thoroughly managed landscape. From species composition to the growth habits of trees and herbs, it is more a farm or orchard than a wildland.

They have the same conservation rules as the Californians. These rules are adequate at low population densities, but the denser the population, the more the large animals and rare medicinal roots are impacted. Hamlets I studied could take all the deer they needed, without thought of sex or season, so long as no one killed wantonly. A town cannot do that and maintain deer populations. The growth of a hamlet into a town leads, insidiously, to an increasing overdraft on the deer, not noticed until too late. This observation has obvious relevance for the well-known decline of California's more vulnerable coastal resources as human population increased.

Second, wouldn't California burn anyway? Much of California has regular summer storms with considerable "dry lightning." Colleagues (notably Richard Minnich, an expert on California wildfire) have often questioned in conversations with me the ability of native people to affect natural fire cycles. Obviously, fire was frequent in California before people came, because all the vegetation (except in the more remote deserts and high mountains) is conspicuously fire-adapted, as Anderson points out. Some of these adaptations go back millions of years.

We cannot know, but Anderson's case is persuasive. The native people probably had an enormous effect in the coastal and northwestern regions, where dry lightning is very rare. Eventually, fire comes even in such areas, caused by anything from volcanoes to spontaneous combustion in old rat nests, but the timing and frequency are most unlike the native routines. On the other hand, the southern Sierra and the Peninsular Ranges have so many storms in summer, with so much dry lightning, that local fires happen no matter whether humans start them or not. Anderson quotes one study suggesting that lightning fires were rare; I am aware of other studies that come to the opposite conclusion. There are major problems with evaluating the evidence—did a burn scar on a tree come from a wildfire, or from a lightning bolt that hit only that tree? Certainly

lightning starts plenty of fires today, but these are quickly suppressed—to the cost of the forest, and, eventually, of everyone, because of the resulting enormous holocausts that follow from years of fuel buildup.

Third, what of bad effects? Burning on the scale reported here—and observed and recorded in great detail by such early Spanish observers as Pedro Fages and Juan Crespi—would lead to heavy erosion. Southern California saw what could happen when the enormous fires of late 2003 were followed by the second-wettest year in history (2004–2005). Slopes not yet regrown simply washed away. Stream courses turned into vast, lifeless boulder plains. Essentially all riparian plant life in the burns was destroyed. Recovery would take many times the normal fire return rate, and thus will simply not happen.

Burning also dissipates nitrogen and other nutrients. This is now replaced by nitrogen from smog (!), but in pre-automobile times the constant burning would have depleted the land. One result would surely be that which is so visible in Maya Mexico: dominance of nitrogen-fixers. In Mexico, that means leguminous trees. In California, it means not only legumes but also *Ceanothus*, mountain mahogany, alder, and other native plants with symbiotic root-knot microorganisms that fix nitrogen from the air. It also favors plants like pine and walnut that have symbiotic root fungi particularly active in scouring the soil for every stray nutrient. These plants dominated much of the state at contact. How much did the Californians have to do with that? Probably a great deal.

Then there is the question of overhunting. The "Pleistocene overkill," much debated (and certainly much exaggerated) in the literature, is far too long in the past to have anything to do with modern Californians. (Modern Native Americans are sometimes attacked because "they" killed off the mammoths, but the idea of taking contingent events thousands of years in the past as having contemporary applications is preposterous. My Celtic ancestors were fighting naked, painting themselves blue, and taking heads only 2,000 years ago—much more recently than the last megafauna hunt.) But William Hildebrandt has argued, reasonably, that more recent hunting drove the pinnipeds from mainland shores to outer islands, and Anderson cites William Preston's point that the tragic loss of most Californian native people after Spanish contact allowed a huge rebound of game

animal populations, explaining the almost unbelievable figures soberly reported by early settlers. (On these issues, see the important volume edited by Kay and Simmons, 2002, especially the articles by Broughton, Preston, and Hildebrandt and Jones.) We do not know of any species exterminated in the last 10,000 years, but the native people must have cropped the land very closely. How did this affect the landscape?

Finally, what does this all say about human ecology? One thing it says is that optimal foraging models will be fiendishly difficult to apply to California. The problem is the one well known from agricultural societies: if people can change the parameters at will, one can't model optimal foraging without knowing how the people decide when and how to change. California native people had enough control over their environments to decide how to shape them, and thus how to affect the foraging. (Do we burn for deer this year, or for grass seeds, or for basketry materials, or for a bit of all three? Let's see—are we apt to be more short of deerskins, or of food?) OFT models remain useful, but with the appropriate cautions.

Hunting-gathering people can have very complex societies indeed. Anderson, as a botanist, is more aware of the recent findings on ecological complexity than of those on social, economic, and political complexity. Anthropologists now know that Californians were as far from social simplicity as from foraging simplicity. Californians were involved in “small world-system” dynamics (Chase-Dunn and Mann 1998), had such extensive trade that some communities may even have depended on imported staple food (Arnold 2004), had stable villages of hundreds of people that sometimes asserted hegemony over many small communities, and in general were at least as socially complex as many agricultural societies.

The problems for classic forager models are not confined to California. Nonagricultural peoples from the Northwest Coast to Australia and from the European Mesolithic to Jomon Japan had large, complex settlements with considerable management of the local landscape. Even small, sparsely-peopled social groups, like the interior Athapaskans of Canada, now appear to be highly sophisticated plant and animal managers (see e.g. Turner 2004). The standard model of simple foragers, still dominant in anthropology textbooks, is based heavily on groups that we now know to have been affected by larger

and more powerful agricultural or herding groups in the neighborhood. (Think of the San, Ache, Hadza, Agta, Mbuti....) Discounting these groups, who have what may be called artificially simple societies, there would seem to be more exceptions to the “band-level” forager model than societies that fit it. The old claim that the Northwest Coast people are somehow exceptional because they lived in such a “rich environment” was always silly. First, the environment isn't that rich. Now it seems that the Northwest Coast people were not even exceptional.

The broad implications for “wilderness” management are obvious (though, of course, “the devil is in the details”). Anderson, like Kay and Simmons (2002) and many others, points out that North America has not been “wilderness,” in the sense of “untouched by human hands,” for many millennia. In fact, the whole modern ecological regime, and probably many actual species, has arisen since humans came. The landscape has coevolved with Native American societies. We have to take human agency into account in managing even the most remote lands. We have to learn from the exquisitely fine-tuned knowledge and management techniques developed by indigenous peoples.

We now try to “save wilderness” by shutting almost everyone out, and basically forgetting about it. We manage the rest of the landscape by turning it into shopping malls, clearcuts, and intensive non-organic monocrop farms. The native model of managing every part of the land, but doing it comprehensively, for long-term and wide-flung payoffs rather than for the short-term profit of a few people, remains an alternative.

Clearly, we need some drastic rethinking of models, and accordingly of our theories of human evolution and evolutionary ecology.

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The Island Chumash, Behavioral Ecology of a Maritime Society

Douglas J. Kennett. Berkeley and Los Angeles: University of California Press, 2005. 310 pp., 22 b/w photographs, 23 line illustrations, 15 maps, 20 tables, \$60 (cloth).

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Douglas Kennett's *The Island Chumash* is an important contribution to our growing knowledge of the prehistory of the northern Channel Islands and will serve as a basic reference on the subject for many years to come. He has done an admirable job of compiling and integrating information from a large number of specific studies to produce a coherent, easy-to-read synthesis of the prehistory of these islands. The book is based on his doctoral dissertation (Kennett 1998), but in the book under review he has revised his set of theoretical arguments for interpreting the data patterning he identifies.

After a brief introduction to the archaeology of the northern Channel Islands, Kennett presents the theoretical perspectives derived from Human Behavioral Ecology (HBE) that he uses in developing explanations for different aspects of prehistoric cultural development on the islands. In the following two chapters, he summarizes knowledge of island environments and the status of archaeological research in the region, and in the next chapter presents an analysis of the geographic context of ethnohistorically documented Island Chumash village locations. The next two chapters are the core of the book, in which he presents his analysis of Island Chumash prehistory. He divides the prehistory into three broad periods, Early, Middle, and Late Holocene, and discusses the processes of cultural change within each of these periods. The concluding chapter, entitled "Synthesis," includes an evaluation of cultural change with respect to the theoretical perspectives presented in the second chapter, although it is obvious that these perspectives also guided the analysis presented in the two core chapters. Overall, Kennett's study is well organized and clearly written.

There are some notable features of the book worth highlighting. First, Kennett's discussions of the theoretical perspectives he uses are more lucid than is often the case;