

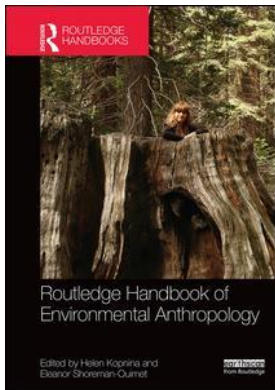
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3

ETHNOBIOLOGY AND THE NEW ENVIRONMENTAL ANTHROPOLOGY

E. N. Anderson

Introduction

Ethnobiology has moved through several stages: descriptive, cognitive-analytic, ecological, widely inclusive, and multidisciplinary. The field has rapidly evolved from one concerned with the ancient traditions of small-scale societies to one concerned with all aspects of environmental knowledge and wisdom. It has thus expanded to investigate cosmology, worldview, and ontology, and has tended to merge with or blend into political ecology, environmental science, natural history, and psychology.

Eugene Hunn (2007) has divided the history of ethnobiology into four stages. First came a long period of recording names and uses. A second phase began with the application of cognitive, linguistic, and cultural theories to plant and animal knowledge, in the “ethnoscience” movement of the 1950s (see e.g. Conklin 1957; Sturtevant 1964). A third period came with the expansion of ethnoscience to include ethnoecology, and the subsequent fusion of ethnoscientific and ecological anthropology; a pioneer in this effort was Victor Toledo (1992). A fourth period emerged from all the above, in which Indigenous peoples are writing their own ethnobiological texts (Bernard and Salinas Pedraza 1989; Saem Majnep 2007; Saem Majnep and Bulmer 1977) or cooperating with academics in coauthored works (Anderson and Medina Tzuc 2005; Hunn and Selam 1990; Turner *et al.* 1990 and other works).

None of the later stages replaced earlier ones. They simply added new tasks and inquiries. The vast majority of ethnobiological accounts today remain documentations of names and uses. However, much of the interest in the field has shifted to the later concerns. The present chapter is structured according to Hunn’s useful divisions.

Collecting knowledge

Ethnobiology began with the first detailed recordings of biological knowledge. Early scholars had to draw heavily on folk wisdom for their material. Marja Eloheimo (2013) refers to this as a stage of a specificity paradigm, and of “appropriation,” because it was largely a matter of learning useful knowledge from other cultures. In the colonial period, this became exploitative in more than a few cases. Useful plants were adopted without compensation or permission.

Even in the earliest recorded history of ethnobotany, the Indigenous voice has never been totally absent. Theophrastus' ancient Greek botany (Theophrastus 1916, originally written c. 300 BC) was already using and citing local knowledge systems, including such matters as the different values of trees for firewood and timber. Pedanius Dioscorides, composing his herbal in the second century, drew on his enormous and detailed knowledge gathered from local communities around the Mediterranean (Riddle 1985); this herbal was to become the most influential medical botany of all time, inspiring two millennia of studies that steadily increased the number of herbs and the details recorded about their medical uses (Collins 2000).

The early Chinese were less candid about their sources, but it seems clear that such works as the *Shen Nong Herbal* (Yang 1998), China's equivalent of Dioscorides, drew heavily on folk knowledge. This herbal was named after the ox-headed god of agriculture, Shen Nong ("Divine Farmer"), who supposedly lived in the twenty-eighth century BC. The herbal was actually written around 100 AD, then edited and updated by the great Chinese polymath Tao Hongjing in the sixth century.

Later Greek, Arab, Chinese, and Indian science drew heavily on folk knowledge, sometimes acknowledged. A vast literature pursuant to Theophrastus and Dioscorides grew up in the Near East and later in Europe. In China, a similarly huge literature followed the early *bencao* ("basic herbal") works. An early ethnobotany is the *Nanfang Caomu Zhuang*, a description of useful and valuable Southeast Asian plants written in 304 AD (though updated subsequently; Li 1979).

An encyclopedia of Near Eastern medicine, the *Huihui Yaofang*, was compiled for the Chinese under the Mongol Empire. The greatest herbal in Chinese imperial times, the *Bencao Gangmu* of Li Shizhen, appeared in 1593, and remains standard to this day in Chinese medicine (Li 2003).

At the same time that the Mongols were bringing Near Eastern medicine to China, European scholars were bringing it to Europe, translating the great medical texts. More significant in terms of actual ethnobiological exploration was the Spanish effort in Mexico, which involved working with Native American consultants, artists, and writers. Hernández (1959 [1577]) and Sahagún (1956, 1950–1969) drew heavily on Native advisors. Ruiz de Alarcón (1982, original c. 1600) transcribed Indigenous texts that include valuable ethnobiological material. One Indigenous Mexican, the Nahua writer Martín de la Cruz, produced a great ethnobotany (1964, from a sixteenth-century manuscript). In Peru, Garcilaso de la Vega (1987, original c. 1600) and other writers of Inca descent produced works with considerable ethnobiological content.

Toward the end of the nineteenth century, scholars discovered traditional small-scale cultures. John Harshberger coined the term "ethnobotany" in 1895 (Ford 2011). The other "ethno-" terms were coined later, following Harshberger's usage. Both ethnographers and archeologists recorded data (Ford 2011; Pearsall 2001), with rapidly growing research on ancient Egypt (see e.g. Manniche 1989), Mesopotamia, China, Greece, and other ancient civilizations. Nor have alcoholic drinks been neglected (McGovern 2009).

In the "Golden Age" of ethnography, the early twentieth century, vast compilations of local lore included varying, but usually considerable, amounts of material on ethnobiology. Bronislaw Malinowski included much data in his general works, and wrote an entire, thorough, excellent work on gardening and related activities in the Trobriand Islands (Malinowski 1935).

Many colonial and settler voices reduced Indigenous people to the category of "survivals" of "the primitive." However, even at the dawn of modern anthropology, this was not a

universal approach. As early as the 1870s, Frank Cushing contrasted his attempts to capture Indigenous systems of knowledge in their entirety with the sort of ethnobotany that consisted solely of recording names and uses without indigenous systems and cosmologies (see Cushing 1920). Several Native American ethnographers worked during this period; notable for ethnobiological recording was Francis La Flesche, an Omaha anthropologist (Fletcher and La Flesche 1906; La Flesche 1921–1930).

Franz Boas recorded thousands of pages of texts and encouraged Native American consultants to record thousands more (e.g. Boas and Hunt 1902–1905, 1906). The most industrious of his students was Edward Sapir, who died rather young, leaving much material. His most forthcoming Indigenous consultant and coauthor, Tom Sayach'apis of the Nuu-chah-nulth, now has a great-granddaughter, Charlotte Coté, teaching Native American Studies at the University of Washington (see Coté 2010; Sapir 1922). Not only Boas, but also J. Wesley Powell, head of the Bureau of American Ethnology, trained Native American ethnobiologists, and the great Greenlander ethnographer and ethnobiologist Knud Rasmussen was trained by the Danish anthropologist Kai Birket-Smith (Rasmussen 1931, 1932, 1999 [1927]). This turned out to be basic to the rising discipline, since it thoroughly introduced the next generation to truly Indigenous worldviews. It was left to Marjorie Halpin (1978) to rescue from the shadows the Tsimshian chief William Beynon, who now emerges as a monumental ethnographer and ethnobiologist (e.g. Barbeau and Beynon 1987).

Ethnoscience

Ethnoscience crystallized after World War II. The first work was actually on the navigation systems of the Micronesians (Gladwin 1995; Goodenough 1953). These were followed by studies of botany, zoology, and other matters, including path-breaking studies by Harold Conklin (1957, 2007) and Charles Frake (1980). The group coined the term “ethnoscience” for the subject of their work. Eloheimo (2013) sees this as a phase of studying classification, with a systemic paradigm informing it. The systemic paradigm dominated ecology during this period also, with enormous attention devoted to defining and modeling ecosystems—a new concept at the time. Eloheimo defines a structural paradigm, more related to ethnoecology in her thinking, but applicable here as well, since the early ethnoscienceists were highly informed by structural linguistics, cognitive psychology (which emphasized structures of thought at the time), and structural anthropology (see Lévi-Strauss 1962, 1963 [1958]).

Much of the interest at this time was in finding “native categories”: the full meanings, or at least the full denotational meanings, of terms in local languages and their classification systems. At the time, cognitive psychology was developing, and influencing linguistics. The “cognitive revolution” (Gardner 1985) was taking place at this point, with enormous paradigm-shifting impacts on psychology, information science, and anthropology. Ethnoscienceists felt they were getting at structures of thought, or at least of language.

Claude Lévi-Strauss's related structuralist program reduced thought to the rational oppositions and orderings which Immanuel Kant (1788 [1798]) identified when he invented anthropology as a field. Critics, however, showed that human thought structures can be more or less transient results of an often chaotic process of change, interaction, negotiation, and ambiguity (Bourdieu 1977, 1990). Historical and linguistic research by Cecil Brown (1986), Hunn (1982), and other scholars proved that folk classification systems do emerge from negotiation and debate, but they can be stable for long periods of time.

Ethnoscience was criticized at the time for attention to arcane matters, especially by Marvin Harris (1968). Harris cited the study by Duane Metzger and G. Williams (1966) of

Tzeltal Maya firewood knowledge. Harris was apparently unaware that firewood gathering occupied hours per week, and sometimes hours per day, of Maya time. On a worldwide scale, firewood, then as now, was the leading use of wood—well ahead of papermaking or construction. A more humorous example of classification that made a difference occurred in a trial in New York in 1818 (Burnett 2007). The trial concerned whether a whale was a fish or a mammal. Whale oil was a major commodity at the time, and fish oil was taxed in New York, while mammal fat was not. It will surprise no one to learn that, in spite of the best zoological testimony, the state held and the court ruled that whales were fish.

One problem with ethnoscience, as with most anthropology at that time, was its tendency to treat local societies as if they were isolated, self-contained units, slow to change, living in functionalist harmony. We now see human ecology and ethnobiology as fields for conflict, power, and debate (Anderson 1972). Because of such realizations, the field of political ecology appeared at this time, invented by Eric Wolf in 1972.

The importance of biology to ethnoscience reached a whole new level with the work of Richard Evans Schultes at Harvard in the 1950s to 1980s. Schultes had worked in the Amazon, and become interested in medical and psychotropic plants. He trained a whole generation of ethnobotanists who are now leaders in the field, including Michael Balick, Robert Bye, Paul Cox, Wade Davis, and Mark Plotkin, to say nothing of alternative medicine advocate Andrew Weil. The book by Schultes and Von Reis Altschul, *Ethnobotany: Evolution of a Discipline* (1995) gives a fascinating and idiosyncratic view of this era. Balick and Cox (1996) provide an excellent introduction to ethnobotany from this tradition. (See also Amadeo Rea [1983, 1997, 1998, 2007], for a different biological tradition). The journal *Economic Botany*, formerly a practical journal of agricultural and horticultural exploration and experimentation, has become an ethnobotany journal. A peak in the search for medicinal plants (bioprospecting) followed, with high hopes of major medical breakthroughs (see e.g. Plotkin 1993, 2000).

The major legacy of the ethnoscience phase or period in ethnobiological research lies in methodology. All respectable studies of traditional environmental knowledge now make serious attempts to use the methodology developed by the ethnoscience pioneers: get the meanings of the words right, using frame elicitation and similar methodology. The technique of using repeated field walks over designated routes is now also standard practice. Most studies go on to develop some idea of local classification systems, cosmological systems, and knowledge systems in general. These are added to more traditional social-science methods such as focus groups, field checking, and traditional participant observation; and to essential biological methods, notably collection of voucher specimens (for plants and insects) or photographs, or comparable field data (for larger animals).

More formal studies add techniques like pile sorts and Likert scales; more humanistic ones add textual and discourse analysis, depth interviewing, and interpretation in the tradition of Geertz, Ingold (2011), and other phenomenological anthropologists (Anderson *et al.* 2011; Bernard 2006; Frake 1980).

Ethnoecology

Ethnoecology grew naturally from ethnobiology, adding ecology to the list of things studied. Ethnobiologists now look at how people classify environmental features: soil types, weather and climate, and other ecological subjects (Johnson and Davidson 2011; Johnson and Hunn 2010). Ethnoecology merged with a wider concern with places and landscapes, which stems from Carl Sauer's brilliant work in the early twentieth century (Sauer 1963;

Tuan 1969). Landscapes are taken to be human-influenced environments, in which the cultural and social production of space (and sometimes time) is a critically important question to study. How people see the landscape is determined by both social and ecological factors. Management becomes a very complicated matter of integrating perception, cognition, and action.

Earthquakes happen whether one believes they are due to continental drift, to the earth expanding or shrinking (as many geologists used to believe), or to a giant underground animal moving about (as many traditional cultures teach). The assumed cause may not matter. On the other hand, it does matter if one believes that trees have powerful good spirits within them, rather than seeing them as mere timber or mere clutter on the landscape. The former idea was instrumental in keeping Southeast Asia 90 percent forested until the late twentieth century; the latter led to the eastern United States being 90 percent deforested by European settlers by 1920. (The population densities were similar; wealth differences were not overwhelming.)

An issue of interest has been the striking difference in the ways that traditional people perceive the land as opposed to the ways that new settlers or visitors from outside perceive it. This literature usually contrasts Indigenous and settler societies, as in Veronica Strang's classic *Uncommon Ground* (1997) and Paul Nadasdy's *Hunters and Bureaucrats* (2004), but rural and urban white Americans can be almost as distant and uncomprehending of each other (Breslow 2011; Brugger 2009). Landscape research has led to major regional syntheses of traditional or pre-modern resource management (e.g. M. K. Anderson 2005; and the three-volume series Denevan 2001, Doolittle 2000, Whitmore and Turner 2001). Interesting and important findings include the extreme complexity of mental maps that local people can have for their environment (Istomin and Dwyer 2009).

Many studies highlight the non-meeting of minds between urban biologists and local people. Typically, these contrast the biologists' book-learning (without field experience) with the local people's field experience (without book-learning). As one would, sadly, expect, Indigenous knowledge is most often devalued and even held in contempt (e.g. Nadasdy 2004, 2007). However, Indigenous people are not alone. It turns out that even educated white males often have their field knowledge subjected to disrespect and disapproval by urban biologists. Several excellent recent studies report this (Argandoña 2012 and unpublished research; Breslow 2011; Hedrick 2007). It appears that being a member of a privileged class is little help when a newly-minted MA in environmental studies is dismissing several generations of "mere" field experience because it wasn't in the textbook.

The views of "savages" as wasteful wreckers, or as "ecologically noble" and "in harmony with nature," are equally wrong. Some groups are model conservers (Pinkaw 2001; Wang 2013), some are totally indifferent to conservation (Alvard 1995; Alvard *et al.* 1997; Kay and Simmons 2002), and most are somewhere in between (Anderson 2014; Beckerman *et al.* 2002). Pioneer settlers in particular are destructive, not knowing the local system and not having an obvious need to save it; this is true from ancient Polynesia to nineteenth-century America and twenty-first-century Amazonia (Anderson 2014).

Another concern involves environmental justice (Anderson 2010). Conservationists have often displaced local communities (Brockington *et al.* 2008; West *et al.* 2006). Usually, these are Indigenous or impoverished groups that can ill afford the loss of their lands. However, well-to-do whites are far from safe. They too may be summarily displaced for bureaucratic reasons (Brugger 2009). In Australia, white settlers first stopped the Aboriginal people from burning the environment, then they found that healthy plant growth depended on fire, and healthy animal populations depended on the plant growth (see e.g. Bliege Bird and Bird 2008; Bliege Bird *et al.* 2012). Aboriginal burning has been restored in some areas

(Anderson 2014). The same basic facts about fire prevention hold for California (M. K. Anderson 2005; Minnich 2008), but controlled burns remain rare.

In East Africa, displacing the Maasai led to deterioration of the lands they had kept open, causing loss of African hunting dogs and other wildlife (Brockington *et al.* 2008; Igoe, ongoing research). The Maasai do not hunt except to kill predators that take their stock; and Maasai burning and grazing open the fields for the vast herbivore herds so familiar to tourists. Without such activity, the savannahs grow up to brush and the herbivores decline. Just as we are now aware of “nature’s services” (Daily 1997), we need to be aware of “culture’s services.”

Indigenous involvement

Today ethnobiologists regularly coauthor books with field consultants. There are also countless Indigenous people from all parts of the world who are full-fledged PhDs—often without losing their traditional culture or their role in it. Examples range from the Akha minority anthropologist Jianhua Wang in China (Wang 2013) to the Tsimshian environmental social scientist Charles Menzies in British Columbia (Menzies 2006). Nancy Turner of the University of Victoria in British Columbia has produced a literal 5-foot shelf of ethnobotanies, all done with acknowledgement and most done with actual coauthorship of Indigenous experts (e.g. Turner *et al.* 1990). Eugene Hunn and Yakama Nation leader James Selam published a detailed study of Yakama ethnoscience (Hunn and Selam 1990).

Ethnobiologists also work with Indigenous individuals to publish their own academic books. Russell Bernard’s Mezquital Valley consultant Jesús Salinas Pedraza (Bernard and Salinas Pedraza 1989) produced a superb ethnography, and Bulmer’s friend and field collaborator Saem Majnep, of highland Papua New Guinea, produced books on mammal and bird knowledge (Saem Majnep 2007; Saem Majnep and Bulmer 1977).

All this exemplifies a developing paradigm that Eloheimo (2013) calls “relational”; it involves real relationships between people working across cultures and across social and linguistic lines, taking account of Indigenous paradigms and scientific theories. Native American zoologist Ray Pierotti not only brings Native American knowledge into the mainstream; he uses it to inform biological science (e.g. Pierotti 2011). The Nuu-chah-nulth anthropologists Richard Atleo (2004, 2011), Earl Maquinna George (2003), and Ki-Ke-In provide detailed accounts of the Nuu-chah-nulth worldview, which is heavily involved with the animal world.

Many “outsider” writers on local knowledge draw on Indigenous accounts. Paige West (2006, 2012) has produced excellent, trenchant studies of local ecological knowledge and practice. West says:

My worry is that environmental anthropology in the guise of political ecology—in its rush to show how external structures affect local socioecological lives—has begun to translate local environmental understandings and actions in ways that generify them and that fail to show them to be aesthetic, poetic, and deeply social.

(West 2005: 639)

Many Western scholars have turned to their own roots in rural American, British, European or other societies. For instance, Joshua Lockyer and James Veteto have studied Appalachian America and modern ecological action there (Lockyer and Veteto 2013).

Many now go far beyond plant name lists and into Indigenous ontology, epistemology, and metaphysics. Most early anthropologists would have dismissed the thought that

non-Western small-scale societies could have such abstract philosophy, though early scholars such as Paul Radin (1916, 1927, 1957) realized it. *Worldview* normally suggests a general, rather informal, set of everyday perceptions, beliefs, and understandings of the world (Kearney 1984). *Cosmology* refers to beliefs about the wider environment—heavens and earth, origins and fates thereof, and basic principles behind all.

Recently, much attention has been given to *ontology*: the study of what is, what is not, and what might be. Western scientific ontology holds that real things are made up of quarks, electrons, photons, and other “particles,” the quarks being bound up into baryons. The Shuar ontology recorded by Kohn (2013) includes jaguar spirits, dog dreams that foretell the future, and visionary snakes. Neither are close to the hard-headed ontology of Aristotle, with its small nearby stars, solid rocks, and Prime Mover. The research of the Colombian anthropologist Gerardo Reichel-Dolmatoff (1971, 1976, 1996) was path-breaking. Far more radical is the work on Indigenous ontologies by recent writers such as Eduardo Viveiros de Castro (2015), Mario Blaser (2009, 2010), and Eduardo Kohn (2013). Other noteworthy work includes that of Deborah Rose in Australia (2000, 2005) and Rane Willerslev in Siberia (2007). Arturo Escobar (2008) has synthesized many approaches in masterful work on local agency, power disparities, and on-the-ground wisdom and difference in Colombia. Like West, he stresses the agency and adaptability of local cultures, and decries the common reduction to “mere victims” in literature on international aid, development, and politics.

Many societies use words broadly translated as “respect” to construct their moral relationship with non-human realms. Atleo (2004) discusses the Nuu-chah-nulth word *isaak* in this regard: basically it means “respect.” The Mongol *shuteekh* and *khundlekh* are similar in force and usage (personal research in Mongolia; email from Marissa Smith, 8 July 2013; Kenin-Lopsan 1997; Metzo 2005). The Akha of Southeast Asia use the word *taqheeq-e*, also meaning “respect,” for this purpose (Wang 2013 and personal communication). The focal meaning of all these words is respect for one’s elders and for one’s social world; it is extended to the non-human world because the latter is considered to be part of society. Mongol *shuteekh* even extends to rocks; a young Mongolian friend of mine felt guilty about collecting pretty rocks because moving rocks for no good reason is disrespectful.

Among the deepest lessons from traditional society are those that teach us how to look at the natural world. Indigenous writers clearly have the advantage: they know and understand these deep lessons, from their early experience. Indigenous ontology is often religion, in the Durkheimian sense of community cooperation growing into cultural knowledge and from that into ethical behavior (Durkheim 1995 [1912]). This realization has led many to study religion and its role in constructing and managing the non-human realms. From political ecology, Fikret Berkes has constructed *Sacred Ecology* (2008) and Leslie Sponsel *Spiritual Ecology* (2012; see also Anderson 2010; West 2012).

This reinforces the need for a united *biocultural* field: cultural documentation and interpretation, with biological grounding. This type of fusion has been done since the field began, and is now exemplified by such scholars as Nancy Turner, Gary Nabhan (e.g. 1985), and many others, in model studies. Collaboration of biologists, anthropologists, and Indigenous people (who are often biologists or anthropologists themselves) is routine. The opposition of “humanistic” and “scientific” anthropology is fatal to such understanding. One can easily imagine the benefit accruing as scholars interface studies such as Beckerman and Lizarralde’s relatively biology-oriented study of the Barí of Colombia (2013) with Kohn’s more humanistic study of the ecologically similar Shuar of Peru (2013).

A challenge

One challenge to ethnobiological research is the problem of intellectual property rights. In a world of patenting and corporate control of patents, any Indigenous and local knowledge is subject to predatory appropriation (Brown 1998, 2003; Shiva 1997). This “biopiracy” has been blocked by desperate and expensive action of the Indian Government in at least two cases: attempts to patent neem oil (used universally for thousands of years in India) and to patent the name “basmati” for a rice that was not even a real basmati (Aoki 2008; Muchit and Thompson 2007; Shiva 1997).

In an earlier case, Mexico lost the income from the birth control pill, developed from a Mexican yam and now possibly the most profitable drug in the world; this was not outright biopiracy, since Mexico had essentially signed off, through a series of ill-considered agreements (Soto Laveaga 2009). In consequence of that and other cases, Mexico has shut down bioprospecting entirely (Hayden 2003).

Problems of biopiracy are compounded by the lack of licensing within anthropology, such that anyone can call him- or herself an “anthropologist.” Many self-appointed or untrained anthropologists inflict annoyance, tactless behavior, and even biopiracy on a community. And legitimate scholars often fail to publish their results. Now that the vast majority of people worldwide are literate, and most have some access to the Internet, there is no excuse for not making data available. Many traditional societies have their own rules for use and sharing of knowledge. Pacific Northwest Coast societies in Canada and the United States have elaborate ownership systems for songs, dances, ceremonies, designs, and displays. These are structured along kinship lines. The Yucatec Maya have varying degrees of protected knowledge, taught only to apprentices. Highly structured systems like these can provide sources for improvements to modern patent laws.

In many areas, individuals and institutions, including the Missouri Botanical Garden and the University of Hawaii, have worked out accommodations with local people. However, these agreements may not always be legally enforceable, in the corrupt and cut-throat worlds of international patent law and drug development.

What next?

Anthropology was launched by Immanuel Kant, whose *Anthropology from a Pragmatic Point of View* (1778 [1798]) basically invented the field. The vision that has truly made anthropology came from another Enlightenment German: Johann Gottfried Herder (Herder 2002). He was the first person to maintain, unflinchingly and without qualifications, that all cultures and folk traditions are achievements of the human spirit, and deserve respect, recognition, and admiration because of that. To my knowledge, all statements to that effect—not only cultural relativity (Brown 2008), but modern multiculturalism and celebration of diversity—go directly back to Herder.

Anthropology has today become so concerned with power and politics that it has often fallen into the trap of turning its subjects into mere victims. We often find ourselves dealing with modern horrors that are far from the admirable small traditions that Herder valorized. There is nothing worthy, nothing of the Herderian human spirit, about genocide, or denying medical care, or starving people to death as a point of policy (Sen 1982, 1992). Yet people remain truly creative. The complex, intricate, perfectly tuned landscape management systems of the Yucatec Maya (E. N. Anderson 2005), the Akha (Wang 2013), and the California Indians (M. K. Anderson 2005) are as amazing and, in their way, as beautiful as Chartres

Cathedral or the Vatican. This is not mere imposed romanticism. The people that create them are sensitive to the beauty of their well-managed landscapes. In the words of an old African-American spiritual, their legacy “outshines the sun.”

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