

Ethnobiology

Edited by

E. N. Anderson

Department of Anthropology, University of California, Riverside, California

D. Pearsall

Department of Anthropology, University of Missouri, Columbia

E. Hunn

Department of Anthropology, University of Washington

N. Turner

School of Environmental Studies, University of Victoria



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List of Contributors

- Karen Adams, PhD, Crow Canyon Archaeological Center, Cortez, CO
- E. N. Anderson, PhD, Department of Anthropology, University of California, Riverside, CA
- Kelly Bannister, MSc, PhD, Director, POLIS Project on Ecological Governance, and
Adjunct Professor, Faculty of Human and Social Development, University of
Victoria, BC
- Andrew Barker, MS, Applied Geography, Department of Biology, University of North
Texas
- Cecil Brown, PhD, Department of Anthropology, University of Northern Illinois
- Luís Manuel Mendonça de Carvalho, PhD, Botanical Museum-Instituto Politecnico de Beja
- Iain Davidson-Hunt, PhD, Natural Resources Institute, University of Manitoba
- Harvey Eshbaugh, PhD, Department of Botany, Miami University
- Nina Etkin, PhD, Department of Anthropology, University of Hawaii
- Richard I. Ford, PhD, Department of Anthropology, University of Michigan
- Catherine Fowler, PhD, Department of Anthropology, University of Nevada-Reno
- Michael Gilmore, PhD, Integrative Studies, New Century College, George Mason
University
- Preston Hardison, BA, Tulalip Tribes of Washington, Tulalip, WA
- Christine Hastorf, PhD, Department of Anthropology, University of California, Berkeley
- Eugene Hunn, PhD, Department of Anthropology, University of Washington
- Leslie Main Johnson, PhD, Dept of Anthropology, Athabaska University
- Harriet Kuhnlein, PhD, School of Dietetics and Human Nutrition, McGill University, and
Founding Director, Center for Indigenous Peoples' Nutrition and Environment
- Dana Lepofsky, PhD, Department of Anthropology, Simon Fraser University
- Łukasz Łuczaj, Wild Garden, Pietrusza Wola, Wojaszówka, Poland
- Letitia McCune, PhD, unaffiliated
- Heather McMillen, PhD, People and Plants International, Bristol, VT
- Justin Nolan, PhD, Department of Anthropology, University of Arkansas
- Manuel Pardo-de-Santayana, Senior Lecturer, Universidad Autónoma de Madrid, Spain
- Deborah Pearsall, PhD, Department of Anthropology, University of Missouri, Columbia
- Andrea Pieroni, University of Gastronomic Sciences, Pollenzo/Bra, Italy
- Ray Pierotti, PhD, Ecology and Evolutionary Biology and Global Indigenous Studies,
University of Kansas
- Charles Randklev, PhD Candidate, Biological Sciences, University of North Texas
- Caissa Revilla-Minaya
- Norbert Ross, PhD, Department of Anthropology, Vanderbilt University

viii List of Contributors

Susan Smith, PhD, Bilby Research Center, Northern Arizona University, Flagstaff,
Arizona

Peter Stahl, PhD, Department of Anthropology, State University of New York, Binghamton

Ingvar Svanberg, PhD, Uppsala Centre for Russian and Eurasian Studies, Uppsala
University, Sweden

Tamara Ticktin, PhD, Department of Botany, University of Hawai'i-Manoa

Nancy Turner, PhD, School of Environmental Studies, University of Victoria

Steve Wolverton, PhD (Anthropology), PhD (Environmental Science), Department of
Anthropology, University of North Texas

Sveta Yamin-Pasternak, PhD, Department of Anthropology, University of Alaska-Fairbanks

Rebecca Zarger, PhD, Department of Anthropology, University of Florida

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Chapter 1

Ethnobiology: Overview of a Growing Field

E. N. ANDERSON

Department of Anthropology, University of California, Riverside, CA

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God put the fever in Europe and the quinine in America in order to teach us the solidarity that should prevail among all the peoples of the earth.

—Bolivian folk botanist (quoted Whitaker 1954, p. 58)

DEFINITION OF A FIELD

Ethnobiology is the study of the biological knowledge of particular ethnic groups—cultural knowledge about plants and animals and their interrelationships. This textbook documents in summary form the progress and current status of ethnobiology. Ethnobiology remains a small, compact, and rather specialized field, developing from earlier work in ethnobotany

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and ethnozoology (Ford 2001, 2011; Hunn 2007). However, it covers a broad range of approaches, from strictly cultural and linguistic studies to strictly biological ones. Toward the former end are studies that focus on semantics: vocabulary, linguistic concepts, meaning and symbol, and art and religion. In the middle zone, where anthropology and biology fuse, are studies of how people actually think about their use and management of plants: ethnomedicine, food production and consumption, and ethnoecology. Further toward biology, but still using anthropological approaches, are the archaeological fields of archaeozoology and archaeobotany, in which we reconstruct past lifeways from biotic data. Studies of natural products chemistry, field agronomy, genetics, and crop evolution verge on purely botanical approaches, and as such are not included in the present book.

In this volume the field is divided into archaeological and ethnographic researches, and within that by major biological units: plants, animals, fungi, and aquatic life-forms. Special topics include food and foodways (a research area with a vast and often specialized literature), landscape, and traditional resource management. Since many chapters deal primarily with hunting-gathering peoples, a chapter on particular problems of agricultural studies has been added. Very important, indeed basic to our entire project, are chapters on the history of the field and on ethics.

AN INTERDISCIPLINARY FIELD

These various studies blend imperceptibly into their related (or parent) fields. Economic botany, once largely confined to prospecting for new crops and medicines, has moved close to ethnobotany. The “archaeo” fields have close ties with archaeology. Linguistic anthropologists link studies of native categories to linguistic and semantic theories. Major contributions to our knowledge of how people think about nonhuman lives have been made by anthropologists like Claude Lévi-Strauss (e.g., 1962), psychologists like Douglas Medin (Ross, 2011), and social thinkers like Bruno Latour (2004, 2005). Conversely, ethno-science has contributed important understandings to linguistics and communication studies (Sanga and Ortalli 2003). Cognitivists draw on this work for studies of human cognition (e.g., Kronenfeld 1996).

Many students of traditional knowledge do not now call themselves ethnobiologists, although they usually use ethnobiological techniques. They have often gotten them from H. Russell Bernard’s text *Research Methods in Anthropology* (2006) or similar general works; ethnobiological methods have gone mainstream.

Ethnobiological knowledge is far too important to ignore. It is vitally important in the traditional cultures of the Indigenous and rural societies of the world, and these societies do not want to lose it. In many areas Indigenous people have now taken a leading role in recording, saving, and using this knowledge. Traditional knowledge is emerging as important, even necessary, for managing key resources and ecosystems. Ethnobiology continues to be a source for knowledge about medicines, crops, agricultural techniques, conservation and management, and much more.

Much of this knowledge is *traditional*, that is, learned long ago and passed on with varying degrees of faithfulness for at least two or three generations. However, ethnobiological knowledge can change rapidly. Every tradition had a beginning (cf. Hobsbawm and Ranger 1983), and was itself a new creation in its time. Ecosystems change, new plants and animals arrive, and people learn new ways of thinking; ethnobiological systems change accordingly, and are typically flexible and dynamic. Field-workers have observed new knowledge being incorporated into systems around the world.

Ethnobiology has usually been concerned with small-scale, local, and Indigenous peoples. “Indigenous” originally meant “native to the place where they live”, as opposed to recent immigrants. Now, however, it has acquired a political meaning, never officially defined but generally accepted. (See, e.g., the United Nations in their Declaration on the Rights of Indigenous Peoples, final version adopted in 2007, in which the definition is implicit but not explicit: http://www.cbc.ca/news/pdf/UN_declaration.pdf.) This restricts the term to colonized minorities, such as the Native peoples of the New World and Australia. It has become problematic in countries such as China, dominated by majorities that are Indigenous by the old standard and in which the minorities are not officially considered to be “colonized”. Such minorities are always referred to as “Indigenous” in the literature, however, and are treated as such by the United Nations. Much more problematic are Creole groups like those of Louisiana and the Caribbean. They have a rich ethnobiological tradition (Brussell 1997; Quinlan 2004). They developed where they now live, had no prior history, and often have a continuity reaching back hundreds of years. They are often minorities and are sometimes subjected to discrimination. They tend to arise from immigrant communities, and they remain hard to classify. Ethnobiologists have never restricted their studies to “Indigenous” groups (by any definition), but the question of indigeneity becomes serious in dealing with intellectual property rights and other ethical issues.

Some have contested the use of terms like “ethno-”, “folk”, and “traditional” for local knowledge, holding that such terms are pejorative. I find this attitude deplorable; the correct procedure should be to insist on the value of folk creations and traditional ideas and practices. Folk, ethnic, and traditional music, art, dance, drama, narrative, and food have certainly won full appreciation and acceptance from every sensitive observer. Folk knowledge deserves the same respect. Claiming that “folk”, “ethno-”, and “traditional” are *pejorative* terms is unacceptable snobbery.

LOCAL BIOLOGY AS SCIENCE

The extent to which local traditions are considered “science” depends on the definition of science used. The Latin word *scientia* covered cognitive knowledge in general, but certainly focused on knowledge of the wide outside world. The Latin *historia naturalis* more specifically covered the nonhuman environment, but could include humans in their relationship with nature. Both terms were brought into English fairly early. Other languages had similar words, not equivalent to modern “science” but comparable to *scientia*. The Chinese, for instance, had a rich and complex language for talking about knowledge of the “myriad things”, and had a thoroughly logical and scientifically analytic tradition (Harbsmeier 1998) including such things as case–control experiments as early as the second century BC (Anderson 1988). India and the Middle East had ancient and well established scientific traditions, in constant touch with and greatly inspired by the Greeks (see, e.g., Nasr 1976). Recently, arguments for viewing traditional Mesoamerican knowledge as science have been adduced very persuasively by Roberto Gonzalez (2001; Anderson 2000).

The broad consonance between folk and scientific systems around the world is devastating to the view that science is purely a cultural or social construction. People everywhere focus on inferred biological relationships, and see more or less the same (obvious) ones. Brent Berlin (1992) and Scott Atran (1990) pointed to striking similarities in cross-cultural naming as proof that humans have a natural tendency to see and classify the world in a particular way—among other things, inferring natural kinds (see also Hunn and Brown, 2011). Roy Ellen has criticized this view in a number of publications (notably Ellen 1993), but his

critique stands more in the line of qualification than of refutation. “Bird” remains a universal concept even though cultures may differ on whether bats are birds or not. (The vast majority lumps them as birds; the Germanic world is quite unusual in having long grouped them with furry creatures, as zoologists do—German *fledermaus*, middle English *reremouse*, both meaning “flying mouse”.) The fact that some cultures class mushrooms with plants, some (correctly!) with animals (Lampman 2008), and some as totally separate (Yamin-Pasternak, 2011) is, again, less interesting than the fact that almost everybody recognizes them as a category.

On the other hand, the real differences between cultures (Ellen 1993) and the strong influence of utilitarian reality on systems (Hunn 1982, 2011) shows that science, whether folk or contemporary, is indeed a cultural construction. The point is that it is constructed on the basis of continual interaction with an external biological reality, which must be accurately apprehended to allow survival in society.

Modern laboratory science has diverged somewhat from traditional classifications (as they have from one another). Thus Carol Kaesuk Yoon (2009) sees a “clash” because genetics has now showed us that birds and dinosaurs are closer than lizards and dinosaurs, and for that matter humans and carp are closer than carp and sharks. Indeed, this somewhat problematizes the classic life-form categories “bird” and “fish”. However, traditional taxonomies may be more accurate than European science. The Yucatec Maya, for instance, lump branchtip-nesting orioles (three species known to them) as *yuyum* and palm-crown-nesting ones (another three species) as *jonxa’anil* (literally, “palm dwellers”). Genetic research has just confirmed that these are two separate clades within the genus *Icterus*. The Sahaptin of Washington State correctly distinguished two plants that botanists had failed to separate (Hunn and Brown, 2011).

“Science”, in the broad sense that includes these traditions, means knowledge of the natural world that is not only more or less accurate but that is predictive, defined by certain key postulates, and able to incorporate new knowledge. Gonzalez points out that the postulates need not always be true; the Zapotec he studied believe in the Earth God and deduce much from this. More to the point, the Zapotec share with all the Old World traditions a belief in “hot” and “cold” qualities that go beyond temperature to include many phenomena. This belief lasted in European scientific thought until about the end of the nineteenth century, and attenuated forms of it continue (Anderson 1996). Indeed, much earlier Western science is now discredited, from astrology to static continents. Some current international science, such as string theory, is controversial enough that many serious experts would class it with the Earth God. Science need not be true. In fact, a science made up of proven facts is a dead science; science must explore and challenge. Modern laboratory science is not some sort of perfect, flawless enterprise of modeling and analysis, but as human as any other activity (Latour 2004, 2005; Merton 1973; Wimsatt 2007).

Various modern definitions of science are more restrictive. Positivist traditions insist on explicit deduction and verification or falsification procedures (Kitcher 1993; Martin and McIntyre 1994; Popper 1959). Some add requirements for predictive mathematical modeling or highly controlled experimentation (laboratory or very systematic field trials). The latter would, of course, rule out not only folk science but all field sciences, from geomorphology and astronomy to most of field biology and paleontology. It would also rule out all Western science before the late nineteenth century. This seems excessive; cutting off modern science from the Greek, Near Eastern, and Renaissance, and even from the “Scientific Revolution” of the seventeenth century, does not seem useful. If we are to recognize ancient Greek science as such, we cannot deny the label to comparably elaborate and rationalized non-Western traditions.

Traditional knowledge, however, is not always separated from other activities or given a name equivalent to “science”. Gonzalez (2001) had to separate, artificially, Zapotec “science” from what the Zapotecs simply called “knowledge”. Traditional knowledge is holistic, or at least it usually fuses what English would call “science” with what English would label “religion”, “economics”, and so forth.

Thus, ethnobiologists, from the beginning, have dealt with traditional ecological knowledge as one package—ideally recording myths, religious practices, spiritual beliefs, economic activities, kinship associations, and other related material along with strictly cognitive or “scientific” knowledge of plants and animals. An early and excellent work of this sort was Frank Cushing’s study of maize and other grains among the Zuñi of New Mexico; it originally appeared as articles in *The Millstone*, a trade journal, in 1884 and 1885 (Cushing 1920). Work of another pioneer, Paul Radin, has recently been edited and discussed by Callicott and Nelson (2004). Radin was among the first to examine both the nature of traditional knowledge and the traditional knowledge of nature.

Ethnobiologists often study the religious symbolism of plants and animals (Hunn 1979). Flowers, leaves, medicinal herbs, and other botanicals are routinely drawn on for religious symbolism (Carvalho, 2011). Every culture that knows trees seems to have a sacred tree or a set of tree myths. The birch in north Eurasia, the oak in ancient European paganism, the banyan in south and southeast Asia, and the red cedar (*Thuja plicata*) in northwest North America, provide examples. The “tree of knowledge of good and evil” in the Bible is traditionally considered an apple, but apples did not grow in the regions known to the ancient Israelites, and the tree might have been the date, the wheat plant, or a purely imaginary tree.

Animals are similarly revered. The cow in India has attracted attention (Harris 1966; Simoons 1994). Also in India, the wild goose (*hamsa* in Sanskrit; the word is cognate with “goose”, “gander”, and *Anser*) is the symbol of the soul, because wild geese appear in the fall and disappear in the spring, never staying to breed. In ancient times nobody had the slightest idea where they went or how they reproduced. In Mesoamerica, the duck is the symbol of the wind god (Ehecatl in Aztec civilization), perhaps for similar reasons; millions of ducks used to winter in Mesoamerica, most of them disappearing in spring. The ornithologist Herbert Friedmann devoted many years to exploring the religious symbolism of animals and birds in Renaissance paintings of Saint Jerome (Friedmann 1980).

Traditional people generally distinguish between such lore and their working knowledge of nature. They recognize the difference between natural taxonomies and special-purpose, human-adapted ones. They know perfectly well the difference between a well known, well practiced technical operation and a prayer. The former is effective because one knows what to do; the latter is only effective because the gods might possibly listen. (The marginal and long debated case of “magic” might problematize this, but may be ignored here.)

Modern ethnobiology was born from this research on the traditional classification and cognition of nature. It developed from biological, linguistic, and cognitive anthropological research at Harvard and Yale in the 1950s and early 1960s. This led to the field of “ethnoscience”, a term coined by a group of George Murdock’s students at Yale in the 1950s. Notable among these was Harold Conklin (1957), whose ethnobotanical work was mentored by the veteran botanist H. H. Bartlett. Charles Frake (1980) and others at Yale were quickly recruited. Scholars at Harvard and other leading schools very soon followed suit. Separate threads later joined in this cognitive program, including Cecil Brown’s work (1984; Hunn and Brown, 2011), which showed the universality of life-form categories like “tree”, “vine”, “snake”, and “bird”, and then Brent Berlin’s great summary *Ethnobiological Classification* (Berlin 1992). Medical ethnobiology also flourished (e.g., Etkin 1986, 1994, 2006; Etkin et al., 2011; Lewis and Elvin-Lewis 2003; Moerman 1998).

The new cognitive and cultural approaches of ethnobiology had been substantially pre-saged by developments in ethnobotany. In this the University of Michigan was critically important, because of the links there between ethnobotany and archaeoethnobotany (Ford, 2011) as well as cognition, notably Scott Atran's work (Atran 1990; Ross, 2011). Other important centers of archaeoethnobiology, including the University of Arizona and the University of Florida (where Elizabeth Wing led archaeozoology over a long and distinguished career), had increasing influence within ethnobiology from the 1960s onward. Specialized archaeological techniques for analyzing flora and fauna arose (Adams 2001; Delcourt and Delcourt 2004; Pearsall 2001; Piperno and Pearsall 1998; Weber 2001; Weber and Belcher 2003; and the many relevant chapters in the present book).

In the 1960s, Harvard botanist Richard Evans Schultes shifted his self-label from economic botanist to ethnobotanist. As a leading scholar and popularizer of traditional medicines and drugs, he had much influence (e.g., Schultes 1976, 1978; Schultes and Hofmann 1992). He and his associate Siri von Reis Altschul edited a major (if uneven) review of the field of ethnobotany (1995). Thereafter, economic botany attracted more and more ethnobotanists. Scholars in both fields became more interested in careful documentation of traditional societies than in appropriating new plants for international economic purposes. The Society for Economic Botany (founded in 1959, currently around 800 members) has become strongly ethnobotanical, along with its journal *Economic Botany* (founded 1947 by Edmund Fulling). Economic botany, however, does not include ethnozoology or—usually—archaeological approaches.

The rise of ecological and environmental anthropology has led to a large border zone developing between mainstream ecological anthropology and the ethnobiological approach. At first, relations could be far from cordial, as is seen in one leading cultural ecologist's scathing denunciation of ethnoscience (Harris 1968) and subtler but unmistakably dismissive answers (Frake 1980). Time led to accommodation and mutual learning, and ethnobiology was incorporated into ecological anthropology.

Inevitably, younger scholars in archaeobotany, archaeozoology, cultural ecology, and ethnoscience discovered each other. The Society of Ethnobiology was founded in 1977 by paleoethnobotanists Stephen Emslie and Steven Weber. Its existence became widely known after the first meeting, and ethnobiologists joined in numbers. The new core group was exciting. For years, the Society of Ethnobiology was a major powerhouse of archaeological and cultural-anthropological theory and method.

The society has continued expand its intellectual base and to flourish. It now has over 500 members, and publishes the *Journal of Ethnobiology* (since 1981).

ETHNOBIOLOGY SPREADS OUT

More and more anthropologists have found ethnoscience methodology useful in studies far beyond natural history. Steven Feld used elicitation techniques not only to study the biology of the Kaluli of Papua New Guinea, but also their classification of musical genres and their discourse on emotions (Feld 1982). Later Feld collaborated with Keith Basso in editing *Senses of Place* (1996), which launched a tradition of studying cultural perceptions of landscapes (see Johnson and Davidson, 2011). Ethnoscience methods have been propagated in studies of the arts, emotions, learning, and phenomenology, and have been absorbed into the broad stream of anthropological methods. Since early anthropology, many of those interested in ethnology, ethnobiology, and cognition have studied traditional map sense, navigation, ethnogeography, and place naming. This chain runs from Franz Boas and his students

in the late nineteenth and early twentieth centuries up to recent work. Recent studies show that human and animal abilities to navigate, map, and track are far greater than previously thought. Contrary to old ideas about human cognitive limitations in this regard, humans form extremely detailed mental maps (not like printed maps, but no less effective) as well as navigating by landmarks and known paths, and have complex and multiply structured mental representations of landscapes (Istomin and Dwyer 2009). This allows us to understand the incredible performances of traditional navigators (Gladwin 1970; Hutchins 1995).

A major new area of research has been ethnoecology. This field was developed largely in Mexico, by the great scholar and conservationist Victor Toledo (1992, 2002). A journal, *Etnoecología*, began under his direction, but did not survive. More recently, ethnoecological research has addressed landscape management and modification by hunting and gathering peoples (Nazarea 1999). Formerly considered to be almost without impact on “natural” landscapes, these groups have proved to be extremely important creators of vegetation types and biotic assemblages. The research in question brings together biologists (M. K. Anderson 2005; Turner 2005; Davidson and Johnson, 2011), archaeologists (Delcourt and Delcourt 2004), geographers (Denevan 2001; Doolittle 2000), cultural anthropologists (Blackburn and Anderson 1993), and others (even political scientists; Kay and Simmons 2002) in impressive cooperation.

These understandings have seriously problematized “saving wild nature”. If wild nature is not only not wild but not natural either, how can we save it? Do we maintain traditional bow-hunting? The volume edited by Kay and Simmons poses this question. Europe has had to face similar dilemmas for a long time, in dealing with the question of saving their agroecological landscapes. National parks there are usually set up to preserve landscapes known to be human-created; indeed, there are no even remotely “natural” landscapes in Europe (Blavascunas 2008).

As ethnobiologists realized that they had to look comprehensively at entire traditional knowledge systems, they began producing large works with wide appeal, and publishers were often charmed. We now have beautiful large-format works like Richard Felger and Mary Beth Felger’s *People of the Desert and Sea* (1985) and David Yetman’s *The Great Cacti* (2007), as well as Amadeo Rea’s great trilogy of Oodham knowledge, *At the Desert’s Green Edge* (1997), *Folk Mammalogy of the Northern Pimans* (1998), and *Wings in the Desert* (2007). Rea mentored Gary Paul Nabhan, one of the earliest members of the Society of Ethnobiology. Nabhan’s numerous books (see, e.g., Nabhan 1987, 1997, 2008) have won many prizes for nature writing and popular science.

Botanic gardens, among others, have published many ethnobotanies, such as the huge *Ethnoflora of the Soqotra Archipelago* (Miller and Morris 2004) from the Royal Botanic Garden Edinburgh. Major journals have devoted special issues to ethnobiology (e.g., Ellen 2006).

Following the success of Richard Evans Schultes’ books on drug plants, and the revival of interest in traditional remedies and alternative medicine in general, many popular and well illustrated medical floras have appeared. “Trade” publishers have thus seen it worthwhile to publish some landmark ethnobiological works, such as Daniel Moerman’s *Native American Ethnobotany* from Timber Press (1998).

Ironically, just as it was becoming more popular in the wider world, ethnobiology was facing some academic opponents. Biology has moved toward molecular and cellular research, where funding has been better than for organismal biology. Agricultural research, which long provided support for economic botany and zoology, has faced limited funding. Anthropology in the 1980s turned dramatically away from scientific and interdisciplinary approaches. Cultural and social anthropology became overwhelmingly dominated by

“postmodern” approaches derived from philosophical and literary studies. Not only scientific anthropology but even mainstream cultural anthropology was largely displaced as a source of ideas by literary criticism and interpretive history. In ecological anthropology, the focus shifted from studies of traditional cultures to studies of the effects of modernization, globalization, and world politics on local groups. Usually, this reduced these groups to the status of mere victims, their own traditions and languages being unimportant. Ecological and environmental anthropology lost ground at several universities. Fortunately there were always exceptions to this trend, and after 2000 anthropology moved back toward its traditional focus.

ETHNOBIOLOGY GOES INTERNATIONAL

In 1988, the International Society of Ethnobiology emerged (see Stepp et al. 2002). European, Latin American, Asian, African, and Oceanian ethnobotanists now abound. The field is one that can and does flourish in “Third World” countries, since it requires little fixed capital investment and since most Third World countries have diverse populations with many rich traditions of local knowledge and use of flora and fauna.

Ethnobiology has flourished in Mexico. The University of Yucatan has been issuing an “Etnoflora Yucatanense” series for almost 20 years, and it includes several superb and major works in ethnobotany, culminating in a monumental compilation by Arellano et al. (2003), which lists almost 1000 species of plants with their uses and names in Spanish and/or Yucatec Maya. A leading ethnoecologist, Enrique Leff, has also had influence far beyond specialized circles; Leff is in fact one of the great social theorists of Latin America. His work is, alas, far too poorly known in English (see Leff 1995). Latin American ethnoecology has linked outward to the whole area of Indigenous rights and politics, and thus has gone beyond the scope of the present volume. A survey of this area for Anglophone readers was sorely needed, and has indeed appeared, in Arturo Escobar’s magistral survey and study *Territories of Difference* (2008).

An Indian ethnobotanical society emerged in India around S. K. Jain in the 1970s; Jain’s journal *Ethnobotany* continues to flourish. The importance of work in India, China, and other countries has made ethnobiology one of the few scientific fields in which Third World countries are leading players with important journals and centers. Ethnobiology has been something of a western hemisphere field, but rapidly increasing numbers of studies in the eastern hemisphere are making it more international.

The clearest and worst limitation of the present volume is its lack of specific and detailed coverage of these regional traditions. Unfortunately, no one has stepped forward to provide a ready synthesis. (In any case, the present volume was intended to introduce topical areas, not geographic ones. A major effort by a number of European ethnobiologists led to a chapter reviewing European ethnobiology, but no comparable efforts could be organized in other areas.) Obviously, a world summary of ethnobiology is sorely needed, and we hope to address this in the near future.

“TEK” and its Sorrows

An emergent problem is a cost of partial success at convincing governments and agencies that traditional knowledge is worthy of attention. Traditional ecological knowledge has become “TEK” (often pronounced as one syllable, “tek”). From a vast and fluid pool of wisdom, it has become a bureaucratic object. Paul Nadasdy (2004, 2007) has pointed out

that, once thus pigeonholed, TEK can all too often be quarantined and ignored, and so can the people who possess it (see also Schreiber and Newell 2006). Even among those with better intentions, TEK is often relegated to a past that is considered possibly romantic but surely irrelevant. This is a false stereotype. TEK is highly accurate, flexible and adaptable, and thus extremely relevant to all aspects of managing natural resources in today's world. In fact, the survival of the human race may depend on saving not only the specifics (plant drugs, new crops) but, more importantly, the traditional ways of managing resources and motivating people to conserve them (Anderson 1996).

One of the problems Nadasdy identifies is that traditional people often have trouble discussing their knowledge in analytic language. This is because so much of TEK is experiential and procedural, or culturally constructed from procedural knowledge. It is notoriously difficult to talk about procedural knowledge, as all psychologists know (and see Goulet 1998; Marcus 2002). Conversely, the bureaucratic biologists Nadasdy studied were not field trained (as biologists in my generation were); they were apparently trained almost exclusively in classrooms and laboratories. They had only analytic, linear knowledge of biology. They lacked the hands-on, experiential, procedural knowledge that biologists of earlier generations acquired. Field time with First Nations persons improves the situation (Nadasdy, pers. commun., 2007). Conservation biologists and other practical field workers need to work with rural traditional people, for mutual benefit.

Such considerations have led to a renewed interest in how traditional knowledge is transmitted. We know that children learn what their parents and peers find important. Children attend to their elders' ideas of salience. We also find that traditional knowledge everywhere is taught through stories, songs, physical participation in activities, and other methods that engage the emotional, aesthetic, and physical as well as the cognitive portions of experience. This is total-person learning. It is part of a rich, full engagement with the world, rather than being isolated as rote memorization in a classroom. The desperate need of the modern world to educate children about nature and to use these ways of doing it is now well known (Louv 2005). Once again we can learn from traditional cultures. A major need of ethnobiology is to point out the different "ways of knowing" (Goulet 1998) and to teach people to learn each others' ways.

MOVING TOWARD MORE LOCAL PARTICIPATION

The 1990s saw a rapid growth of new ethical standards (see Bannister and Hardison, and Gilmore and Eshbaugh, present volume). Certain notorious and well publicized cases of appropriating traditional wisdom for individual gain led to coining the term "biopiracy", and to powerful opposition to it. As early as the 1960s, Mexico failed to capitalize on its original monopoly on the wild yams that were the source of the birth control pill; the story is told in a major recent history book (Soto Laveaga 2009). The most noted cases involved attempts to monopolize traditional South Asian ethnobotanical knowledge through patenting. United States patent rules in the 1980s and 1990s had evolved to favor corporations and patenters against public access, "prior art", and claims of common knowledge. This allowed a scientist to attempt to patent neem oil from the tree *Azadirachta indica*, used medicinally in India (and more or less everywhere Indians have gone) for thousands of years (Shiva 1997). Then an American attempted to patent the term "basmati", originally a North Indian word for fragrant rice varieties, for a new rice variety that was not even fragrant. This would have made it difficult or impossible to use the term for real basmatis in the lucrative export market. Indian scientists, and eventually the Indian government, took the lead in fighting such

expropriation. Vandana Shiva (1997, 2001) has been a powerful and vocal advocate for tighter ethical standards. She and many others have argued that current pro-corporation interpretations of patent law, especially by the U.S. Patent Office, are extreme, counterproductive, and on very shaky legal ground (see Aoki 2008; Brown 2003; Vogel 1994, 2000).

This led to questioning even legitimate and well intentioned plant and medicine exploration and bioprospecting (Berlin and Berlin 1996, 2000; Hayden 2003), and eventually led to the virtual shutdown of such efforts. The drug firms, in particular, which spend large sums and take large risks in developing drugs from plant and animal sources, have essentially closed down their natural products operations except in cases where open access and public record are undeniable. Paradoxically, the success of the giant firms in getting their way in patenting had shut down an entire promising industry. Many ethnobiologists know excellent remedies that would help the world, but their lips are now sealed. The toll in human suffering increases every day that this impasse remains unresolved.

Full collaboration with local and Indigenous people is no new thing in anthropology; Native American ethnographers have been active since the mid-nineteenth century. An early classic of ethnobotany was Gilbert Wilson's collection of agricultural knowledge from Buffalo Bird Woman, a Hidatsa farmer (Wilson 1917). It has recently reissued under Buffalo Bird Woman's name. Many works followed, as collections of "native life histories" and other relevant documents became standard in anthropology. Native Americans and other Indigenous people often became professional anthropologists and ethnographers and did their own collecting; one ethnobiologically important example is the Greenlander ethnologist Knud Rasmussen (see, e.g., 1999). Among more recent classics are the works of Ian Saem Majnep, a Papua New Guinea subsistence farmer and folk biologist who has collaborated with Ralph Bulmer (Majnep and Bulmer 1977, 2007). Jesus Salinas Pedraza's wonderful ethnography of his Nyahnyu community in Mexico (Bernard and Salinas Pedraza 1989) also contains much fascinating ethnobiological material; an outsider would not be likely to record under uses of the mesquite tree the fact that it is delightful to lie under the tree and watch the birds playing in it.

It has now become common for Indigenous and non-Indigenous coworkers to coauthor books, as in the case of the many ethnobotanies of Nancy Turner and collaborators (e.g., Turner et al. 1990; and for other examples see, e.g., Anderson and Medina Tzuc 2005; Hunn 1990). Larry Evers worked with Yaqui deer-singer Felipe Molina on a collection, *Yaqui Deer Songs* (Evers and Molina 1987), that brings together some of the finest nature poetry anywhere. We are, hopefully, at the beginning of a major flowering of Indigenous works on local biological knowledge.

INTERFACING WITH POLITICAL ECOLOGY

Political ecology arose as an early spinoff of cultural ecology; the term was introduced by Eric Wolf (1972). It rose to prominence in the 1990s. Political agendas led to renewed interest in traditional knowledge. Conversely, those interested in traditional knowledge became more and more concerned with its fate in the modern world. Many major works in political ecology are particularly relevant to ethnobiology, and typically draw on its methodology (see, e.g., Agrawal 2005; Cruikshank 2005; Tsing 2005; West 2006). The boundary between political ecology and ethnobiology is completely blurred by research that focuses on the political ecology of particular species and of conservation efforts, such as Janice Harper's *Endangered Species* (2002) and Celia Lowe's *Wild Profusion* (2006). Problems of nature

reserves, which often exclude the very Indigenous people who created the “nature” in the first place, have received particular attention (West et al. 2006; cf. Scott 1998).

Ethnobiologists have been able to address ethical and political–ecological questions on the basis of highly rigorous knowledge of actual circumstances among Indigenous and small-scale communities. Major collections of papers addressing these issues have now appeared (Laird 2002; Maffi 2001; Stepp et al. 2002). Anderson (2003, 2005; Anderson and Medina Tzuc 2005) used ethnobiology to address political ecology. Eugene Hunn (1990) addressed political questions in a major ethnobiological study. Nancy Turner’s ethnobotanical work has moved toward political application (Turner 2005).

ETHNOBIOLOGY AS FUTURE

Johann Herder (2002; original papers, late eighteenth century) was apparently the first person, at least in the Western world, to argue explicitly and in detail that other cultures deserve full consideration and appreciation as creations of the human spirit. This view entered anthropology, largely via Adolph Bastian and his student Franz Boas. Boas spent his life trying desperately to record local traditions, especially art and oral literature, before they went down before the onslaughts of racist colonialism. The Herder–Boasian view became rather widespread, though far from universal, in anthropology. It remains almost unknown in many other fields. Tragically (from an ethnobiological point of view), it is particularly lacking in the fields of economic development and global education. In spite of lip service, most development and change agents display little recognition that local traditions—including TEK—are worthy of respect.

Indeed, recent decades have seen a sad retreat even in anthropology from the old goals of valuing diversity, saving local achievements, and respecting other people’s works. Much of the Boasian agenda is dismissed as “salvage ethnography”. Some fear that Boasian ethnography freeze-frames a culture. Yet, field ethnobiologists are aware that folk knowledge systems are dynamic and innovative, and we study their changes and developments assiduously.

There is also a desperate need to record knowledge that is being forgotten, and, far more importantly, to save the cultures, languages, and ecosystems whose death is causing the forgetting. Many of the finest creations of the human spirit are dying out. Often, the destruction is genocidal; few nations are not stained with the blood of their Indigenous peoples.

More often today the destruction of culture is the result of deliberate or inadvertent policies in education, media, and popular commercial arts. If people wish to give up their traditions, outsiders cannot stop them, but too often Indigenous groups have been bullied or tricked into accepting their oppressors’ destructive agendas. All persons of goodwill must join to fight genocide and culturicide. In recent decades many groups have recovered at least some of their languages and cultural forms from old ethnographies. Denying future generations the right to do this, and to protect the habitats on which they depend to maintain their ways of life, is a social injustice. Ethnobiology is a major part of the ongoing effort to save these natural and human worlds.

A Note on Usage

Per Canadian practice (many of our authors being Canadian), and increasingly the practice elsewhere, Indigenous is capitalized. (In Canada it refers to a specific designated set of people, and thus is a proper noun; elsewhere, usage is moving in that direction.)

Otherwise, authors use standard, linguistically-accurate transliterations and spellings, but have been free to choose when there are alternative adequate systems.

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Chapter 2

History of Ethnobiology

RICHARD I. FORD

Arthur F. Thurnau Professor Emeritus of Anthropology, University of Michigan, Ann Arbor, MI

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THE BEGINNING

Ethnobiology was first formally defined by Edward F. Castetter at the University of New Mexico (Castetter 1944: 160) as “. . . utilization of plant and animal life by primitive peoples . . .”. His goal was to integrate two well established ethnoscience fields—ethnobotany and ethnozoology. Both fields began without a name and had ancient antecedents in Asia and the Mediterranean basin. These were the recorded observations of “the other”, cultures that differed from the dominant culture outside urban areas in state-level societies, by explorers, traders, and government officials. Some of the first were in Egypt, China (Anderson 1988), and India, especially of plant and animal medicines and foods (Minnis 2000: 6). Other Europeans reported local plants from colonial areas, and Georg Eberhard Rumphius’ *Herbarium Amboinense* was an influence on Carl Linnaeus during the eighteenth century when developing the biological classification system that became universal in the biological sciences. These biological observations and reports were useful as part of state expansion and colonialism.

In the New World similar records of uses of plants and animals by “the others” were part of a process of familiarization with a new land and its peoples. Columbus started the process,

but other explorers and traders did the same, for example, Champlain, Kalm, Bartram, and the Jesuits (Thwaites 1901). In Mexico Ortiz de Montellano (1990) has documented how natives were brought into formal education by Bernardino de Sahagún and recorded Aztec uses of nature in what is called the *Florentine Codices* (Hunn 2007).

Colonial America witnessed records by the travelers and traders as well as scientific explorers from Europe (Josselyn 1672) and the *intelligentsia* of the colonies (Rush 1774). With the founding of the United States, agents for the new government investigated the continent to assist colonization of new lands. The Lewis and Clark Expedition (Cutright 2003), boundary surveys (Emory 1857; Hunter 1823), and railroad surveys (Wheeler 1889) all included scientists to identify the plants and animals they encountered. Spanish missionaries and agents did the same in Arizona. By the middle of the eighteenth century specialized botanists (Brown 1868; Palmer 1871, 1878), zoologists (Wheeler 1889), and educated adventurers (Powers 1874) were observing the use of nature in the west by Indians. It was only a matter of time before the topics of numerous publications would be codified into distinctive disciplines.

ETHNOBOTANY

Stephen Powers made the first effort by calling the uses of plants by California Indians “aboriginal botany” (Powers 1874). Several others used this term, but in 1895 the botanist John Harshberger coined “ethno-botany” to account for the many uses of plants by ethnographic and prehistoric cultures (Harshberger 1896). Quickly the field was informally defined, although Harshberger did not provide a definition. Some used his spelling (Fewkes 1896) and although a few did not adopt the term (Chestnut 1902), the first PhD in the field was awarded in Chicago in 1900 to David Barrows (1900). The discipline was distinctly American and was mainly utilitarian in focus. By the middle of the twentieth century many Indian tribes had at least one ethnobotany, and a few—Hopi, Navajo, Iroquois—had several (see *Handbook of North American Indians* for tribes and references). At the start of the twentieth century most reports were written by botanists or anthropologists with a botanist to identify the plants (Robbins et al. 1916). A few were produced by Indians (e.g., Parker 1910), and only two by women, Stevenson (1914) and Friere-Marreco.

Ethnobotanical studies in the United States became specialized by topic, and the field expanded as practitioners entered it with different training and interests. Studies about basketry, textiles (Safford 1914), dyes, medicines (Smith 1929), hallucinogens, especially peyote (La Barre 1970), and food plants (Waugh 1914; Yanovsky 1936) appeared. These were topics of anthropological interest.

Before the mid-twentieth century, ethnobotany was a recognized subdiscipline in anthropology. Several Indians published reports (Nequatewa 1933; Tantaquidgeon 1928; Teit 1928), women were prominent, and the majority of the publications now focused on paleoethnobotany (archaeology), which interpreted plant remains based on ethnographic analogy. The main definition of ethnobotany was provided by Jones (1936): “the study of the interrelations of primitive man and plants”. Ethnobotanical plant references for American Indians were so numerous that they formed the basis for two encyclopedic references by Moerman (1986, 1998).

The utilitarian phase of ethnobotany is the international approach to the field with its goal of using the new information about plants to launch economic production in the home country. This reflects the influence Richard Schultes (Schultes and von Reis 1993)

had with his emphasis on “economic botany”. Today there are more ethnobotanists in India than in any other country (Ford 2001: 4).

In the United States academic ethnobotany shifted to plant nomenclature and classification as a way to learn about plants from the natives’ perspectives. Harrington, during his studies of the Tewa speakers in the Southwest, began to recognize the importance of names, their relationships, and the plant characteristics selected to recognize them (Robbins et al. 1916). This detailed linguistic approach was rarely followed until Conklin (1954) carried out Hanunóo work in the Philippines and was quickly followed by Berlin and co-workers (Berlin et al. 1974) and later by students with the highland Maya (Hunn 1977) and in Peru. These linguistic studies allowed generalizations about ethnoclassification (Berlin 1992) and comparative analysis (Brown 1984). The “new ethnography” altered the study of ethnobotanical fieldwork. Ethically, ethnobotanists are expected to gain permission from the local group before commencing research, to have the scope of the work and final products understood by the group, to work in the local language, and to express plant names in the local language as well as by international botanical binomials.

Paleoethnobotany has been very productive with the advent and near universal application of dry sieving of sediment, water, and chemical flotation of soil, pollen analyses, phytolith identification, and wet site plant recovery. These have produced enormous quantities of data which have yielded special insights into the reconstruction of past environments, diets, and lifeways (Pearsall 1996). The same methods and DNA analyses of plant tissue and seeds have enhanced our knowledge of plant management and domestication (Smith 1998; Staller et al. 2006). These are methodological revolutions in comparison to the desiccated plant parts and macro-remains that Volney Jones had to work with when he started the American identification of archaeological plant remains (Griffin 1978; Jones 1936). The topic that has generated the most interest and attention has been the pathway to domesticated plants, using accelerator dating methods on small samples to resolve the chronologies (Smith 1990).

The maturity of ethnobotany as a scientific field is reflected in its professional membership associations and methodological manuals. The professional organizations include the Society for Economic Botany, Culture & Agriculture, the Society of Ethnobotany (India) and the journals *Ethnobotany and Medicine*, *Ethnomedicine*, *Journal of Ethnobiology and Ethnomedicine* (online), *Culture and Agriculture*, *Ethnobotany Research and Applications*, *Journal of Food and Nutrition*, and *Ethnomedizin* (Germany). The standard ethnobotanical methodology is found in Alexiades (1996), Cotton (1996), and Martin (1995). We will later discuss ethnobotany further as an important part of ethnobiology.

ETHNOZOOLOGY

This subdiscipline developed later than ethnobotany but, ironically, the first ethnosciences named was “ethno-conchology” (the study of shell money), as part of this field (Stearns 1889). It is defined as the study of the past and present interrelationships between cultures and the animals in their environment. It includes nomenclature and classification of zoological forms, beliefs about them, and the use of wild and domestic animals. An international component started early because British missionaries and colonial officers were birders (e.g., Sibree 1891). However, as the utilization of animals became part of local ethnographic study, most of the publications in the nineteenth century concerned American Indian tribes (Mearns 1896; Murdoch 1898; Ross 1861).

In the beginning few complete ethnozoologies were published. The exception is the pioneering study of Tewa ethnozoology by Henderson (zoologist) and Harrington (linguist) (1914), who were also to use the term “ethnozoology.” This study lists the animals by order and scientific and Tewa name. It gives the habitat of each and its cultural uses. Two Pueblo studies followed later in the century but neither approached Harrington for thoroughness (Beidleman 1956; White 1947). Several Native American groups have had more comprehensive studies. Malkin (1962) recorded the Seri, and Fradkin (1990) the Cherokee. Another comprehensive study was by Gilmore (1950) who produced a thorough overview of Indian uses of animals on the South American continent. Most studies concentrated on a single zoological order such as mollusks (Harrington 1945), insects (Bodenheimer 1951), reptiles and amphibians (Speck and Dodge 1945), fish (Rostlund 1952), and birds. There are very few local tribal ethnozoology studies.

Ethnozoology moved away from its utilitarian emphasis in research to classification and intellectual interests. Bulmer’s research in New Guinea contributed cultural insight into classificatory research (Bulmer 1967a,b). The ethnozoology monographs published in the past 40 years are very different from those of earlier generations. Students of Berlin well versed in the theory of animal classification wrote dissertations that broke the mold of earlier studies (Anderson 1967; Hunn 1977). Rea (1998, 2007) reported on the Northern Pima in ways that set new standards. Ellen (1993) rephrased the intellectual debate in ethnozoology and showed why religious studies (Douglas 1957) were critical to understanding human–animal relations. Nabhan’s (2003) sea turtle study reveals another example of belief systems and animal appreciation. Ethnozoology is now well integrated into current anthropological theoretical discussions.

Zooarchaeology employs the techniques used by morphological zoologists, comparative anatomical studies, and DNA analyses. The remains are retrieved from sediment with some of same techniques—sieving and flotation—that paleoethnobotanists use. However, the interpretations of the bones do not depend upon ethnographic analogy from published ethnozoology studies (Reitz and Wing 2007). Most are local studies of faunal remains from single sites (Reitz and Scarry 1984) or those in local regions (Cleland 1966). The excavation of sites representing state societies in the Near East and historic United States allowed zooarchaeology to present arguments about past animal care and harvesting, and provisioning urban populations, which are missing from written records (Zeder 1990). The major sub-field of study has been on animal domestication. This was first tackled with morphological examination of bones and then most recently with DNA analyses (Zeder 2006). Europeans have been major contributors to all these studies (e.g., Anthony 2007; Clutton-Brock 1999).

STAGES OF ETHNOBIOLOGY

The ethnobiology discussed at the University of New Mexico in the early twentieth century was not distinctive (Hough 1931). It basically subsumed two existing fields, ethnobotany and ethnozoology. The criticism applies to the ethnobiology program Castetter created there. His definition of the field was a constellation of people–plants–animals (Castetter 1944: 160). The resulting publications were a compilation of biological facts but lacked a paradigm to integrate them, for example, Castetter (1935) and Castetter and Bell (1951). Castetter did recognize the merit of exploring culture to understand the relationships and