

A History of Ethnobotany in Remote Oceania¹

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ABSTRACT: Ethnobotany has had a relatively short history as a scientific or scholarly discipline, and according to R. L. Ford still lacks a unifying theory. In this paper the history of ethnobotany in Remote Oceania is reviewed. In sequence, the roots of Pacific ethnobotany in European exploration and colonial expansion are discussed, then the contributions of early foreign residents, and finally the rapidly growing field of scientific ethnobotany during the latter part of the twentieth century. Examples of key research from the disciplines of botany, anthropology, archaeology, and geography, as well as major trends in ethnobotanical research in Remote Oceania, are described.

DURING THE MUTINY on HMS *Bounty* in 1789, rebellious sailors forced Captain Bligh and his loyalists off the ship. Later, the mutineers threw carefully tended breadfruit seedlings overboard. It is well known that the *Bounty* was intended to take breadfruit cultivars from Tahiti to the West Indies. It is less well known that Bligh (1792) recorded eight names for Tahitian varieties of this tree crop, *Artocarpus altilis*, and included descriptions for some of them. Fragments of ethnobotanical information, such as Bligh's notes on breadfruit, can be gleaned from the earliest Western accounts of Pacific Islanders and their environments. However, it was not until the end of the nineteenth century that Westerners began systematic research into the traditional uses of plants by indigenous peoples. The first use of the word "ethnobotany" to define the study of plants as understood by "primitive and aboriginal people" is dated December 1895 and is credited to the American botanist John W. Harshberger (1896).

Before "ethnobotany" became a defining term, others words were adopted, some of which are still in use. "Aboriginal botany," for example, drew attention to "all forms of the vegetable world which the aborigines used for medicine, food, textile fabrics, ornaments, etc." (Powers 1873–1875: 373). "Eth-

nobotanical" research, focusing on "theoretical and applied non-western, non-commercial aspects of human uses of plants," was contrasted with "economic botany," which focused instead on "applied economic, agricultural, western, or commercial aspects of human uses of plants" (McClatchey 1999). In its broadest sense, ethnobotanical research came to have a wider purview than just native use, and now includes the study of many other traditional, non-Western relationships, such as native folk taxonomies, as well as beliefs regarding origins, growth, seasonality, and therapeutic value (see Table 1).

GEOGRAPHICAL FOCUS

Until recently, Western scholars divided Oceania, or the Pacific Region beyond Southeast Asia and Australia, into three subregions: Melanesia, Micronesia, and Polynesia. A two-part regional division of Near Oceania and Remote Oceania based on such factors as linguistics, degrees of insular isolation, and adaptation to small islands has been suggested recently (Green 1991) (Figure 1). Human settlement of Near Oceania (essentially western Melanesia) and Australia occurred at least 40,000 yr ago. The islands of Remote Oceania, which include the Santa Cruz group (the easternmost Solomon Islands), Vanuatu, New Caledonia, Fiji, and all of the islands lumped into Polynesia and

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TABLE 1

USES AND FUNCTIONS OF PLANTS ON TROPICAL PACIFIC ISLANDS

ECOLOGICAL USES AND FUNCTIONS OF PLANTS			
Shade	Soil improvement	Temperature control	Flood/Runoff control
Erosion control	Wild animal food	Animal/Plant habitats	Weed/Disease control
Wind protection			
CULTURAL AND ECONOMIC USES OF PLANTS			
Timber	Cages/Roosts	Hats	Fishing gear
Tools	Poison	Baskets	Boat/Canoe building
Fuel	Insect repellent	Fertility control	Boundary markers
Weapons/Hunting	Toothbrush	Mats	Teas
Containers	Totems	Scents/Perfumes	Body ornamentation
Torches/Lamps	Brooms	Ritual exchange	Meat tenderizer
Sails	Decoration	Toilet paper	Preservatives
Fibers/Fabrics	Abrasive	Recreation	Medicines
Dyes	Insulation	Fire making	Musical instruments
Glues/Adhesives	Cordage/Lashing	Dancing grounds	Metaphors/Symbols
Toys	Floats	Prop or Nurse plants	Commercial products
Switches	Caulking	Staple food	Subjects of mythology
Brushes	Spices/Seasonings	Supplementary food	Deodorant
Aphrodisiacs	Masticants	Snack/Wild/Emergency food	Embalming corpses
Abortifacient	Drugs		Religious images
Magico-Religious	Plaited ware	Parcelization/Wrapping	Secret meeting grounds

Note: Based on research conducted in both high islands and atolls (after Thaman 1990) and demonstrating the great diversity of resources that plants provide.

Micronesia, were first discovered and settled by humans only within the past 3800 to 1000 yr (Kirch 1997). In this paper eastern Melanesia, Micronesia, and Polynesia are treated as subregions of Remote Oceania.

The remarkable achievement of reaching the very isolated islands of Remote Oceania in the late Holocene involved exploratory and accidental discoveries by peoples collectively referred to as Austronesians. They had a common heritage of language and other cultural traits, including relatively similar "transported landscapes" of agroforests, irrigated swamps, dry-field agriculture, and a "portmanteau biota" of consciously and accidentally introduced organisms (Anderson 1952, Crosby 1986, Kirch 1997). These anthropogenic landscapes and other cultural relationships with native and alien plants are the focus of much contemporary ethnobotany.

Although some authors have reviewed the history of ethnobotany for specific areas of Remote Oceania (e.g., Whistler [1985] for the Cook Islands, [1991a] for Tonga, and [2000]

for Samoa), this essay marks the first systematic review of the region as a whole. The emphasis is on Western discovery and study of traditional use of plants. Following the three-stage model that Kay (1972) used to describe Western study of natural history of the Hawaiian Islands, this history of ethnobotany in Remote Oceania is divided into three periods: (1) the period of explorer-naturalists, from the late sixteenth century to the mid-nineteenth century; (2) the period of resident-naturalists, from the early nineteenth century to the early twentieth century; and (3) the period that includes the rise of science in the twentieth century when ethnobotanical research reached its most mature form.

THE EXPLORER-NATURALIST PERIOD

Ethnobotany is largely an outgrowth of interest in New World and other native peoples encountered by European explorers, beginning with the Columbian voyages of the late fifteenth century. In Remote Oceania,

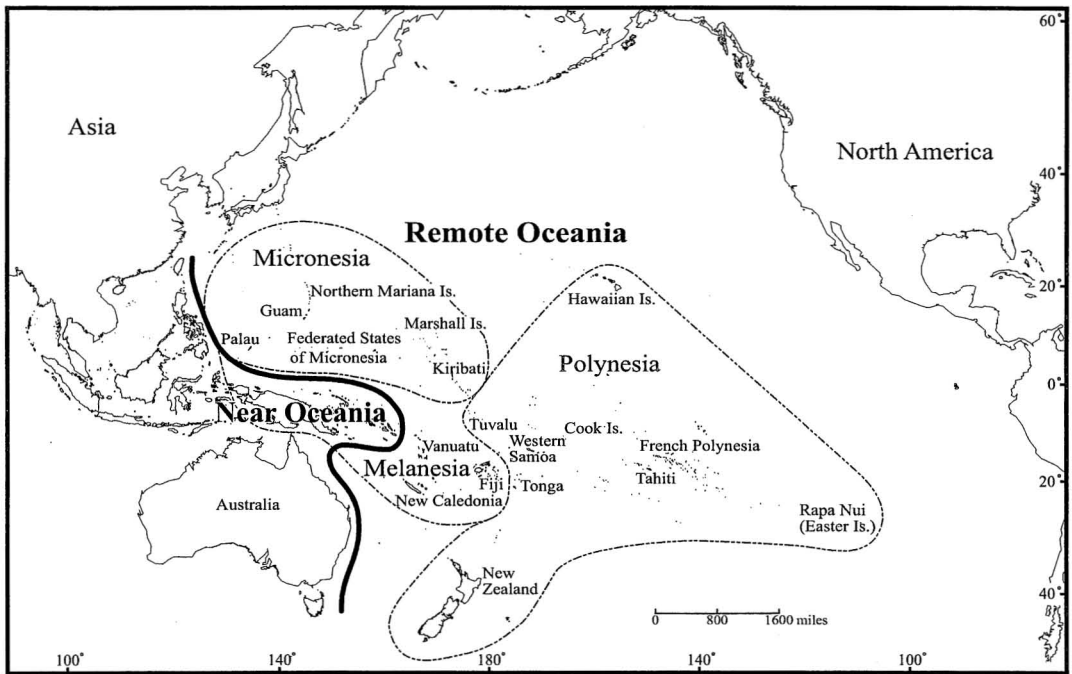


FIGURE 1. Map of the Pacific region showing traditional regions of Melanesia, Micronesia, and Polynesia, along with the more recent regional division of Near and Remote Oceania.

the explorer-naturalist period began with the arrival of the Spanish in the sixteenth century, followed by other explorers from Europe and North America. The early European expeditions into this vast and isolated region were prompted by colonial and imperialist designs. In the eighteenth century, the impetus became one of expanding knowledge of an unknown and unexplored region. As a consequence, progressively more observation, documentation, collection, and description of natural and cultural phenomena of Pacific Islands occurred. The early accounts of sea captains, their officers, and observers were limited by short visits and because most of them lacked knowledge of the native languages. Nevertheless many of the accounts provide valuable insight. The journals of Captain Cook stand out because of Cook's extensive experience in the Pacific and because of the naturalists who accompanied him (Beaglehole 1955–1967).

Cook's voyages carried several natural history-oriented volunteers as well as officers who were instructed by the Admiralty to document customs and useful biota along with other phenomena they observed (Beaglehole 1955–1967). For botanical observations and collections, Joseph Banks and Daniel Solander were on the first voyage (1768–1771); the Forsters on the second (1772–1775); and David Nelson on the third and last (1776–1780). The journals and travel accounts of these botanists are mines of ethnobotanical information (Merrill 1954) (Figure 2).

John Reihold Forster (1778) and his son George (1777) both published accounts of island societies they visited, with notes on traditional uses of plants. George Forster's (1777) account of Cook's second voyage was influential in that it "not only charmed and inspired Alexander von Humboldt, but was the harbinger of the coming era of scientific

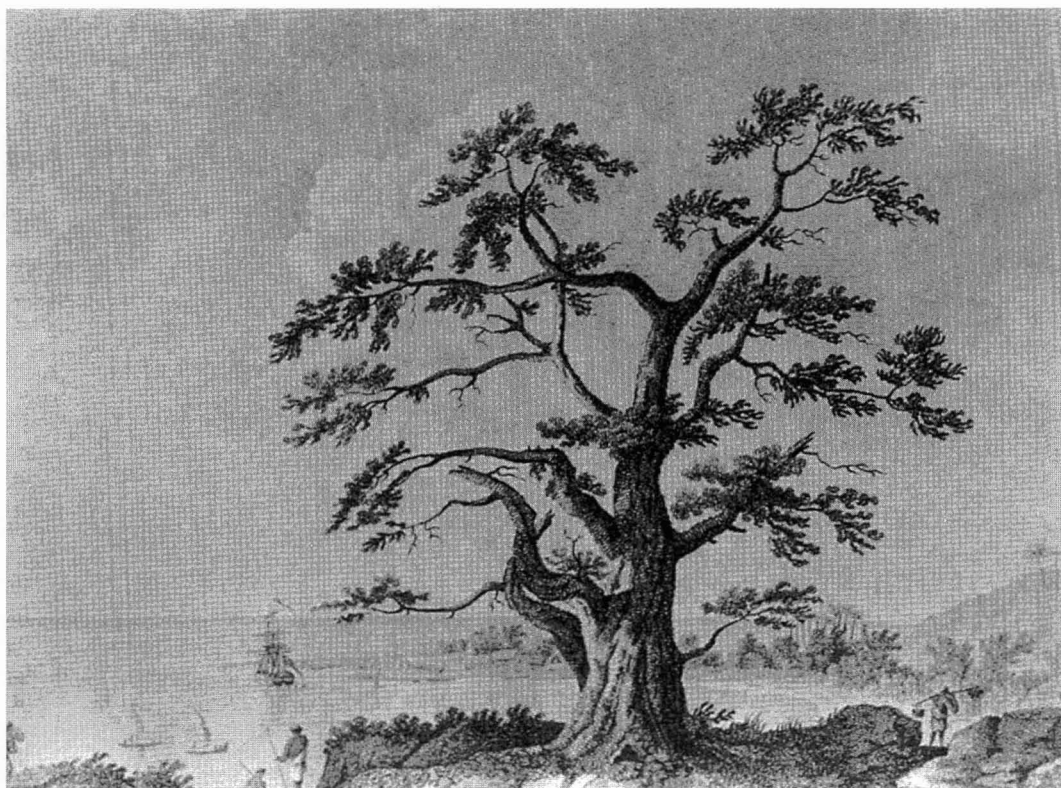


FIGURE 2. Matavai Bay, Tahiti, showing breadfruit tree in foreground and the HMS *Endeavour* at anchor in the background. (From an engraving in Hawkesworth 1773.)

travel undertaken by Humboldt, Darwin, Livingstone, Stanley, Bates, Wallace, and many others" (Glacken 1967: 502). Among Forster's ethnobotanical observations is his description of the copious feeding of "a very fat man, who seemed to be a chief of the district," in Tahiti. In the preparation of the food, Forster tells us that "two servants were preparing [the obese man's] desert, by beating up with water some bread-fruit [*Artocarpus altilis*] and bananas [*Musa* sp.?], in a large wooden bowl, and mixing with it a quantity of the fermented sour paste of bread-fruit, (called *mahei*)." In an unpublished essay on the breadfruit tree ("Der Brothbaum"), Forster suggested that humans "are probably responsible for the distribution of this plant, that it is not found in uncultivated places." He also suggested that it spread into Remote

Oceania from Southeast Asia, where he thought this species and other "valuable products" originated (cf. Glacken 1967).

The accounts of Captain Otto von Kotzebue and the botanist Adelbert Chamisso document a voyage of discovery (1815–1818) that included visits to several islands in Remote Oceania. Kotzebue (1821) provided the earliest account of edible screw pine (*Pandanus tectorius*) fruit and its use by the native peoples of the Marshall Islands. On a relatively dry atoll in the Radak chain, he tells us that the Marshallese "had nothing with them except a few grains of pandanus, which they constantly chewed" (vol. 2: 8). Kotzebue indicated that he was given "pandanus juice" made from stone-bruised fruit (phalanges) that "had a sweet and spicy taste" (vol. 2: 10). He claimed that all Marshallese "are

great lovers of sweet things; and their chief food, which they draw from the sweet pandanus fruit, is probably the reason, that even children of ten years old have not good teeth, and that they have generally, lost them all in the prime of life" (vol. 2: 17).

Chamisso (in Kotzebue 1821, vol. 3:150) described several pandanus trees, commenting on those intentionally planted as "diligently cultivated" and that the "numerous varieties, with improved fruits, which are to be ascribed to cultivation, are propagated by layers." He also tells us how pandanus paste was made, essentially describing the method used today. Chamisso noted that this paste was "carefully preserved as valuable stock for long voyages," an early insight into the effective, ancient dispersal strategy of the Austronesians who were the first to travel widely in Remote Oceania.

One of the last grand-scale Pacific explorations was that of the United States Exploring Expedition (1838–1842) commanded by Lt. Charles Wilkes. The official objectives were commerce and science. In a period of 4 yr, 280 separate islands were visited, and important advances were made in mapping islands previously unknown beyond the region. However, the most significant results derived from the generally high standard of work, which were first published in five volumes in 1845 (Wilkes 1970). These included notes and comments of ethnobotanical interest about several islands in Remote Oceania, including the earliest list of Tongan breadfruit cultivars, and the expedition's diligent collection and documentation of voucher specimens prepared the way for later, more accurate botanical identification.

The early accounts of Western explorers in Remote Oceania are an invaluable source of baseline information about the ethnobotany of the region at a time before and not long after first European contact. Some of these reports should be regarded with caution. Indeed, as early as 1822, a reviewer of the English translation of Kotzebue's narrative and Chamisso's observations criticized the translator for "deplorable ignorance of his subject; hence the work abound in errors of the grossest kind" (Safford 1905: 28). In this in-

stance, however, Chamisso's own records can be checked (Chamisso and Schlechtendal 1826–1836).

THE RESIDENT-NATURALIST PERIOD

A second and more significant phase of ethnobotanical research began with the arrival of Europeans and others who took up residence in Remote Oceania in the nineteenth century and began to document a variety of natural and cultural phenomena. These early "resident-naturalists" included missionaries, physicians, merchants, administrators, and teachers, who stayed for various periods of time, depending upon motives, adaptability, and success in surviving (Figure 3). A remarkable report on Polynesian culture is found in the account of William Mariner (Martin 1981), who was stranded as a youth in Tonga in 1806. Narrowly escaping death after his ship was attacked and set on fire at Ha'apai, Mariner was protected by an influential chief until he fled to England in 1810. He learned the Tongan language and his observations of the local culture include the traditional use of plants and local medicinal practices (see Martin 1981).

Thirty years later, a resident French Catholic priest on Futuna, the Marist missionary Pierre Chanel, began daily entries in the "Journal de Mission" during the years 1838–1839. This recently translated diary (Kirch 1994b) provides ethnobotanical information about a time when the Polynesian culture of Futuna was largely unaffected by the intrusion of Western civilization. Père Chanel's journal recorded the yearly cycle of agricultural activities, identifying specific relationships between the observation of certain celestial phenomena (e.g., the appearance of the Pleiades, *Mataliki*) and the use of some key crops (e.g., drinking kava, *Piper methysticum*; processing turmeric, *Curcuma longa*; and planting yams, *Dioscorea* spp.).

In the Cook Islands, the missionary William Gill (Gill 1876, 1885, 1894) recorded traditional customs and collected numerous specimens, thereby documenting the traditional use of plants and subsistence agricul-

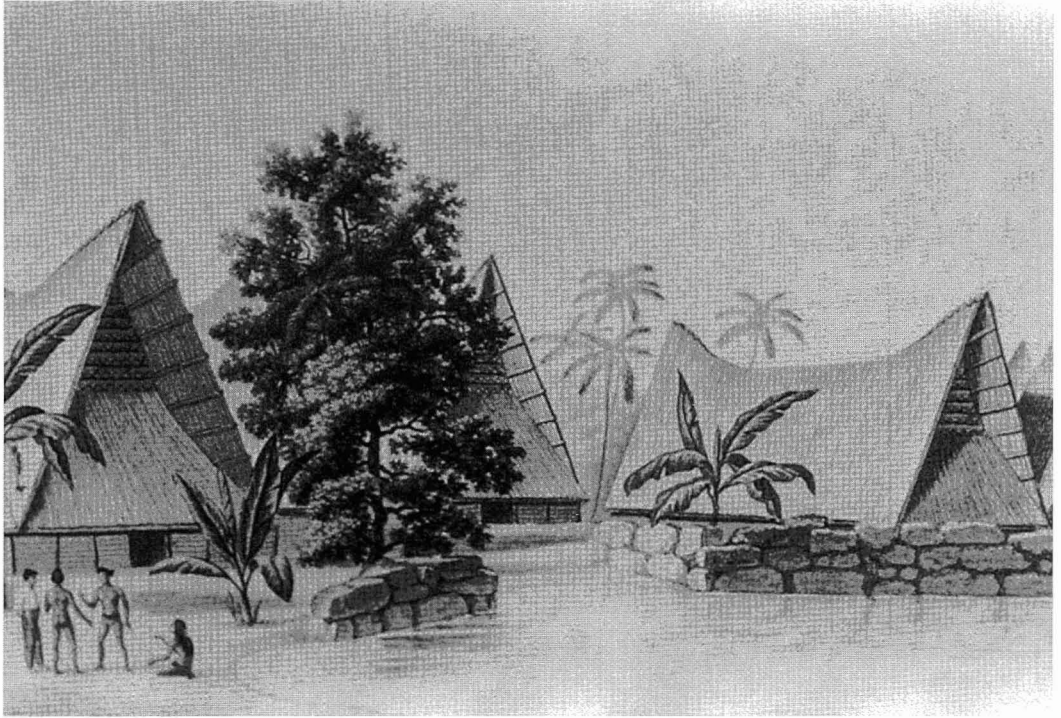


FIGURE 3. Village on Kosrae, eastern Caroline Islands, showing cultivated bananas and breadfruit. (From an engraving in Duperrey 1826.)

ture in Rarotonga and Mangaia. In the Hawaiian Islands, missionaries, merchants, and other foreigners made many significant contributions to knowledge of natural history during the nineteenth century (Kay 1972, 1997). Among the early botanical contributions were those of Reverend William Ellis (1827), who, in his narrative of a tour around the island of Hawai'i, recorded observations on the use and exploitation of sandalwood (*Santalum* spp.) and the ti plant (*Cordyline fruticosa*) (Merlin and Van Ravensway 1990). Physician William Hillebrand's (1965) *Flora of the Hawaiian Islands*, originally published in 1888, an outstanding contribution to botanical science of the time, included comments on traditional uses of plants in Hawai'i: the fruit of *Pisonia*, for example, "exudes a very viscid glue which the native woodmen make use of for catching birds" (1965:368) and "the tuberous rhizome of [*Smilax melastomifolia*] was eaten

by the Hawaiians in times of scarcity" (1965:441).

The scholarly and scientific work of the nineteenth century "resident-naturalists" in Remote Oceania enriched the literature with insight into the intricate associations of human beings and plants in one of the most isolated areas of the world. However, as Abbott (1992:ix) pointed out, "Their interpretations of the data, inevitably colored by the debates and assumptions of the Victorian era, need to be questioned in the light of modern scholarship and must often be set aside."

ETHNOBOTANY AND MODERN SCIENCE

The third and most productive period of ethnobotanical research in Remote Oceania involves the worldwide rise of scientific professionalism, accompanied by an explosion of interest in ethnobotany (Ford 1994,

Schultes and von Reis 1995, Balick and Cox 1997). This now includes the work not only of botanists, but also of anthropologists and other researchers as well. Cox and Banack (1991) referred to ethnobotany as a kind of “scientific orphan,” facing difficulties of integrating the expertise of scholars and scientists from different fields (see also Etkin and Meilleur 1993). To this day, a lack of communication between researchers in different disciplines has limited the extent of ethnobotanical studies in Remote Oceania. Nevertheless, as the interdisciplinary needs of ethnobotany are addressed, so the contributions of botanists, anthropologists, archaeologists, and geographers will be brought to bear.

The First Three Decades

Anthropologists and ethnographers were among the first professional scientists to arrive in Remote Oceania. Johann Kubary (1895), an Austrian ethnographer who traveled to almost all the high islands and atolls in the Carolines—from Palau in the west to Kosrae in the east—described the cultures of the Carolinians and documented early traditional plant use in the region. In the first decade of the twentieth century, the German South Sea Expedition of 1908–1910, one of the most important academic excursions in the tropical Pacific, was sponsored by the Ethnological Museum in Hamburg and sent eight ethnologists to carry out research on 34 islands, mostly in Micronesia. The results, scattered through 11 volumes of 40 separate bound parts and more than 6400 pages (Thilenius 1983), includes references to traditional use of plants on many islands. Augustin Krämer, who produced a monumental work on Samoa (Krämer 1902–1903), including ethnobotanical information, was a member of this expedition (see Krämer 1929 on Palau).

In the 1930s and 1940s ethnographers such as Te Rangi Hiroa (Peter Buck), of Maori descent, and Edwin Burrows studied the material culture of several Polynesian societies, documenting many traditional uses of plants, especially cultivated species (e.g., Buck 1930, Burrows 1937).

Although much ethnobotanical information for Remote Oceania had been recorded by the mid-twentieth century, most of it dealt with agricultural uses of plants. This body of knowledge was also usually somewhat peripheral to the main goals of many researchers, such as anthropologists concerned with other aspects of Remote Oceanic island cultures and botanists whose primary focus was the documentation and description of the floras of these islands. This limited focus on ethnobotany in the region began to broaden toward the end of the first half of the twentieth century.

Over the last 50 to 60 yr, botanists, anthropologists, and geographers have begun the process of systematically documenting and analyzing the ethnobotanical traditions of Pacific Islanders. The crucial historical aspect of this relatively recent work is that it is occurring about as rapidly as these traditions are disappearing as a result of the globalization of commercial economy and loss of cultural heritage.

The Botanists

Since 1940, a trio of classical botanists has dominated the field of Pacific ethnobotany. Elmer Drew Merrill was the trailblazer, Jacques Barrau detailed the understanding of traditional subsistence agriculture, and Douglas Yen pioneered botanical methodologies and new techniques in field archaeology.

Merrill has been referred to as the “American Linnaeus” (Verdoorn 1946). He was a much-honored botanist who among many other appointments held the directorship of both the New York Botanical Gardens (1930–1935) and the Arnold Arboretum of Harvard University (1935–1946). His wide-ranging botanical, agricultural, and historical interests in different areas of tropical Asia and the Indo-Pacific, including Remote Oceania, are summarized in more than 30 publications, perhaps the best known of which are his botanical bibliographies (Merrill 1937, Merrill and Walker 1947). They are mines of botanical, mycological, agricultural, and ethnographic information and include references to traditional uses of plants in

Remote Oceania. Merrill believed that the botanical ancestors of most of the plants used traditionally by Pacific islanders at the time of first European contact were brought from the west (Southeast Asia and Near Oceania) by early prehistoric voyagers. Consequently, he was highly critical of Heyerdahl's (1952) theory that islands in Remote Oceania could have been settled by Native Americans (Merrill 1954).

Jacques Barrau, a French botanist, significantly advanced the modern field of ethnobotany in the Pacific in the 1950s and 1960s. He made many contributions to our regional understanding of the cultivated species in traditional subsistence agriculture of Southeast Asia, Near Oceania, and Remote Oceania and provided insights into the origins of cultivated plants and their domestication in Oceania (e.g., Barrau 1958, 1961, 1965*a,b*).

Douglas Yen began his professional career in the 1940s as a plant breeder, but became, in his own words, an "economic botanist." His definitive work on the enigmatic origins (Yen 1974*a*) of the sweet potato (*Ipomoea batatas*) was but a preface to later work in economic botany, prehistory, and anthropology in the Pacific. An innovator, he used cytological and morphological methods in the investigation of plant variation and new techniques in field archaeology enabling identification of plant remains in situ in prehistoric agricultural systems. Yen has given particular attention to agricultural origins in New Guinea, now assumed to be the source of much of the traditional agriculture in Remote Oceania (e.g., Yen 1971, 1991*a,b*, 1998). He has also described traditional island agricultural systems on Anuta (Yen 1973), Santa Cruz (Yen 1974*b*), and Tikopia in the Solomon Islands (Kirch and Yen 1982).

In the last two decades, Paul Cox made several contributions on Samoan ethnobotany (1980, 1982, 1993, Cox et al. 1989) and on Polynesia as a region (Cox and Bannack 1991). He has also focused attention on possible drug discovery (Cox and Balick 1994) and on the science and ethics of ethnobotany (Cox and Elmquist 1991, Balick and

Cox 1997). W. Arthur Whistler has documented and interpreted ethnobotany in Polynesia in general (1991*a*, 1992*a*), and medicinal plants in particular, in surveys of traditional plant use in Tokelau (1988), the Cook Islands (1985, 1990), Tonga (1991*b,c*, 1992*b*), and Samoa (1996, 2000). Will McClatchey, an ethnobotanist with formal training in anthropology and pharmacology, has applied his interdisciplinary approach to the study of ethnobotany (McClatchey 1993*a*) and ethnopharmacopoeia (McClatchey 1996) on Rotuma. He has also focused on the traditional uses of sago palm, *Metroxylon warburgii* (McClatchey and Cox 1992), and turmeric, *Curcuma longa* (McClatchey 1993*b*), in Rotuma. The botanists Isabella Aiona Abbott (1992) and Beatrice Krauss (1993) have published comprehensive studies of traditional use of plants in Hawai'i, summarizing much of the known ethnobotanical information for that island group.

Anthropologists and Archaeologists

Following Kubary, European, North American, and Japanese anthropologists, archaeologists, and ethnographers sailed into Remote Oceania in the twentieth century. Their major interests included material culture, medicinal plant use, traditional subsistence systems, and the human impact on the environment. Among archaeologists focusing on Pacific Islanders and their environment, Patrick Kirch (1985, 1988*a*, 1997) has dominated the field with meticulous documentation on, and acute insight into, the many facets of Pacific prehistory. His analyses of prehistoric agricultural systems in Near and Remote Oceania (Kirch 1991, 1994*a*), and of "the wet and the dry" as key to the development of complex sociopolitical structures, are central to perceptions of prehistoric subsistence and social structure in Remote Oceania. His interpretations of cultivation and human-plant interaction highlight significant environmental impact in the precontact period (Kirch 1982, Kirch and Yen 1982, Kirch et al. 1992, Kirch 1996, Kirch and Hunt 1997). Kirch has also contributed to archaeobotany in Oceania (Kirch 1988*b*, 1989,

Hather and Kirch 1991) and has discussed the impact of artificial selection on food crops such as cultivated fruits and nuts in the tropical Pacific (Lepofsky et al. 1998).

Other anthropologists, archaeologists, and archaeobotanists who have recently contributed to our understanding of precontact agriculture and the environment in Remote Oceania include Spriggs (1982), Flenley and King (1984), Ayers and Haun (1985), Hunter-Anderson (1991), Hather (1992, 1994), Pollock (1992), and Athens et al. (1996).

The Geographers

The contributions of geographers to ethnobotany center on traditional agriculture, the human impact on vegetation, and on the use of plants in Remote Oceania. Randy Thaman, William Clarke, and Harley Manner have focused on agricultural systems, documenting the significance of traditional agroforestry for sustainable development (Thaman 1976, 1994, Clarke and Thaman 1993, Manner and Clarke 1993). Thaman (1982, 1995) has made an important connection between traditional food plants and nutritional well-being in Remote Oceania. In this context, Thaman has recorded traditional uses and significance of coastal and forest plants in the region, especially for the atolls of Kiribati (Thaman 1990, 1992). Manner has applied the principles of cultural ecology in his studies of Pacific agricultural systems and ethnobotany, also documenting traditional use of plants on atolls (Manner 1987, 1994, Manner and Mallon 1989).

As the twentieth century closes, one sees two general trends in the study of ethnobotany in Remote Oceania. On the one hand, there has been a substantial increase in ethnobotanically related research. At the same time, many societies in the region experienced significant habitat alteration and relative loss of knowledge and interest in traditional use of plants. In an attempt to encourage the conservation of cultural and biological diversity, geographers produced a series of locally oriented environmental education textbooks that help document tradi-

tional use of plants in Micronesia (Merlin et al. 1992, 1993, 1996, 1997, Merlin and Juvik 1996; also see Morrison et al. 1994*a,b*).

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