

ETHNOGRAPHIC PERSPECTIVES ON ARCHAEOBOTANY

JAN TIMBROOK

SANTA BARBARA MUSEUM OF NATURAL HISTORY

In California Native cultures, plants played far greater and more diverse roles than animals – in food, clothing, housing, tools, medicine, ceremony, and more. After decades of focusing on lithic and faunal remains, California archaeologists now know that an understanding of prehistoric cultures cannot be achieved without knowledge of peoples' utilization of and relationships with plants. Ethnographic research offers a wealth of information that can help archaeologists to know which species to look for, what plant parts may be found and in what condition, with what kinds of features plants are likely to be associated, and where to look for them.

To set the stage for this session (SCA 2012 Annual Meeting Symposium 12: “Whither the Twain Shall Meet: Paleoethnobotany and California Archaeology,” organized by Heather B. Thakar), I was asked to provide some perspective on the ethnographically known importance of plants in Native California culture. It seems to me – an ethnobotanist – that archaeologists tend to devote considerable effort to identifying and analyzing faunal remains and elaborately calculating meat weight of animal foods. But California Indians were not obligate carnivores. The diverse terrain and habitats of California provided tremendous diversity of plant foods that were utilized by indigenous peoples. Plant foods arguably constituted the bulk of day-to-day caloric intake in many areas and/or at certain times of year. Many plant resources – especially seeds – were harvested seasonally in large quantities and stored for long periods of time, making them especially valuable when game, fowl, and fish were scarce. They were often traded over a wide area, far from where they were originally harvested.

Acorns, of course, were widely used throughout much of the state, but not all acorns were considered equal. Ethnographic sources make it clear that native people preferred certain species over others. Often mentioned as favorites were black oak (*Quercus kelloggii*), tanbark oak (*Lithocarpus densiflora*), canyon live oak (*Q. chrysolepis*), and coast live oak (*Q. agrifolia*), all of which have higher fat content than other species (Gilliland 1985; Wolf 1945). Native people mostly did not like the taste of acorns from blue oak or scrub oak and preferred not to use them.

Most California acorns require extensive processing. Communities harvested acorns in the fall and dried them for storage. Some groups stored acorns in the shell, while others removed the shell first. Various kinds of granaries were made to store the acorns – from special structures erected on poles to large baskets on platforms inside the house. Acorns must be thoroughly dry in order to prepare them for eating. Shells and inner skin were removed, and a winnowing basket was often used. The cleaned, dry nuts were pulverized with mortar and pestle – of which there were several variations in use throughout California – and often sifted to obtain the finest flour.

Leaching, required to remove the bitter tannic acid, was done by pouring water through the flour in a sand basin or basket tray; by mixing the flour with water in a container, allowing it to settle, then pouring off the water; or sometimes by submerging the whole acorns in a flowing stream or burying them in the ground for a time, and then pounding them. The leached acorn meal was then mixed with water in a basket and boiled by immersing red-hot stones or a heated slab of steatite in the liquid, while stirring with a wooden paddle or looped stirring stick. This acorn soup or mush was served in baskets and eaten with the fingers or with spoons made from wood or shells. Leftover mush was eaten cold, sometimes sliced into pieces like polenta. The interior of a Chumash wooden bowl in the Santa Barbara Museum of Natural History shows cut marks that could have been the result of slicing congealed acorn mush (Hudson 1977).

Large seeds of holly-leaved cherry (*Prunus ilicifolia*) and buckeye (*Aesculus californica*) required even more careful preparation to remove dangerous toxins. The Chumash boiled cherry pits in

steatite ollas, using several changes of water to leach out the hydrocyanic acid in these seeds (Timbrook 1982). Other groups pulverized and leached the cherry pits like acorns. More benign seeds that required no special preparation included nuts from several species of pine, such as piñon (*Pinus monophylla*), ponderosa (*P. ponderosa*), and sugar pine (*P. lambertiana*). Other nuts included hazel (*Corylus cornuta*) and California black walnuts (*Juglans californica*). The shells of these large seeds and nuts were disposed of in different ways by different peoples – variously thrown into the fire, scattered on the ground, perhaps buried, used in dye mixtures, and so on – which may or may not leave archaeological evidence.

Peoples throughout California also ate many kinds of small seeds such as those of chia and some other sages, red maids, both native and introduced grasses, and several plants in the sunflower family. Chia (*Salvia columbariae*) was the universal favorite, being good-tasting as well as energy-rich. These seeds were usually harvested in quantity with basketry seed-beaters and stored in baskets in the home. They were generally prepared for eating by being toasted in a stone or pottery vessel or by tossing with hot coals on a basketry tray, then either left whole and mixed with water for a drink, molded into cakes, or ground into a paste eaten with the fingers (Timbrook 1986). As well as being used for food, some seeds were often given as ritual offerings – thrown into the fire at ceremonies, deposited at shrines, or buried with the dead. One burial excavated on Santa Rosa Island was accompanied by 12 qt. of red maids seeds (*Calandrinia ciliata*) (Orr 1968:200).

Some plant foods such as berries and other fruits, and new shoots and young leaves of many species, were not stored but were eaten fresh at certain seasons of the year. Some kinds of greens were cooked, although in some places this practice seems not to have been indigenous. Starchy roots, bulbs, corms or tubers – generically referred to as “Indian potatoes” and harvested with digging sticks – including yampah (*Perideridia gairdneri*), blue dicks (*Dichelostemma capitatum*), mariposa lily (*Calochortus* spp.), and others, were important food sources for many groups. There are many, many other California Indian plant foods that could be discussed – *Yucca* and *Agave* crowns and stalks in arid southern California, pond lily (*Nuphar polysepalum*) seeds and tubers in northern marshes – and those I have mentioned constitute only the barest sampling.

Diverse cooking methods were employed in preparing these various plant foods: stone boiling of liquids in baskets; or boiling in soapstone or pottery vessels over direct heat; roasting over open fire or in ashes; baking in pit ovens; and tossing with hot coals (Jacknis 2004). For all of these, fuel was required. That is another important use of plants and a potential factor in determining desirable settlement locations (King 1993). Certain woods were preferred for certain purposes. The Chumash said that manzanita (*Arctostaphylos* sp.) was best for smoking fish; willow (*Salix* sp. was the only wood used in the sweathouse; coast live oak (*Quercus agrifolia*) wood and bark made hot coals that were good for cooking and could be rekindled the next day (Timbrook 2007).

So, it is clear that people ate more than just animals; plants were extremely important in indigenous cuisine. Not only that: people could not even acquire animal foods without employing material culture items that were made from plants. Hunting required bows made from juniper (*Juniperus* spp.), piñon (*Pinus monophylla*), yew (*Taxus brevifolia*), incense cedar (*Calocedrus decurrens*), or elderberry (*Sambucus* spp.); with bowstrings of dogbane (*Apocynum cannabinum*) or milkweed (*Asclepias* spp.); arrows made from carrizo grass (*Phragmites australis*), chamise (*Adenostoma fasciculatum*), toyon (*Heteromeles arbutifolia*), spicebush (*Calycanthus occidentalis*), or arrow weed (*Pluchea sericea*); and traps, snares and nets. Fishing required fishing lines, nets, traps, watercraft, harpoons, and so on. Plant species too numerous to mention were required to fabricate all this equipment.

But – even though it preoccupies many of us most of the time – food is not the only important thing in human cultures. Shelter is another principal concern. All California Indian houses were made in part from plant materials, from the dome-shaped dwellings made with willow poles and thatched with bulrush stalks (*Scirpus* spp.) or grass in southern California, or of sycamore branches (*Platanus racemosa*) and fan palm leaves (*Washingtonia* sp.) in the desert, to conical structures formed from slabs of incense cedar in the Sierra foothills, to semi-subterranean wood plank houses in the rainy Northwest. Tule mats, various baskets, and wooden or gourd containers were common household furnishings. Plants

also provided the wood essential for making a variety of tools important in daily life, including digging sticks, wedges, reamers, leather punches, fire drills, netting gauges, thatching needles, and knife handles, to name but a few.

People's health was restored and maintained with a wide variety of plant medicines. These included widely known folk remedies like yerba mansa (*Anemopsis californica*) to purify the blood, yarrow (*Achillea millefolium*) to stop bleeding and prevent infection, and willow bark tea to reduce fever. There were also more elaborate treatments – many of which incorporated plants in some way – that were administered by highly trained specialist doctors and were intended to restore spiritual balance. Relationships with the spirit world were strengthened through the use of tobacco (*Nicotiana quadrivalvis*) and *Datura* spp. in various sacred ways.

For ceremony, religious practices, and offerings; for secular events; for musical instruments; in clothing and regalia; for jewelry and body ornamentation – for all these and more, plants played some role. In short, nearly everything California Indians did, made, and used involved plants.

Arguably, the two very most important material culture items throughout California were basketry and cordage. Margaret Mathewson suggests that basketry represented a full 50 percent of the plant material culture of most Native tribes before the arrival of Euro-Americans (Anderson 2005:225). Baskets were used for gathering, transporting, measuring, storing, preparing, and eating food. At one acorn-cooking demonstration at the Santa Barbara Museum, we counted 14 different baskets used in that process from beginning to end. Baskets carried babies. They held water, valuables, feather regalia, doctors' paraphernalia and ceremonial offerings. They were part of funerary observances, often burned or buried when someone died.

So, consider how many baskets the average California Indian family would be using every day. Multiply that by the number of families in an average village or town, by the number of towns in each cultural group's homeland, by the several hundred different sociopolitical-cultural groups throughout the state, and you arrive at a truly staggering number of baskets. And of course, since each group had their own distinct preferences, an enormous number of different species of plants were used to make these baskets.

Now consider the labor investment involved, not only in actually weaving the baskets but in first gathering and meticulously preparing massive quantities of the necessary plant materials. According to Craig Bates, in order to make half a dozen or more baskets, each and every diligent basket weaver in the Sierras had to harvest as many as 10,000 sticks in one year (Anderson 2005:215). So, if there were 25 weavers in a single village of 100 people, that one community would require 250,000 woody shoots to be collected and prepared for use.

The same is true of cordage. String is one of the most underappreciated but essential artifacts in Native California. Dogbane, milkweed, nettle (*Urtica dioica*), iris (*Iris* sp.), *Yucca* spp., and *Agave* spp. – so much of native life would not have been possible without cordage made from these plants. Plank canoes, tule balsa canoes, fishing equipment, nets for hunting, fishing, gathering, and carrying; dance regalia, belts, blankets – all these and more – anything that needed to be tied together required string. Kat Anderson calculated that one 40 ft. deer net required 7,000 ft. of cordage, made from 35,000 dogbane stalks (Anderson 2005:231). In the Clark Museum in Eureka, I was dazzled by a huge net for catching salmon in a Northwest California river that was made from iris fiber cordage, strong as wire and as fine and flexible as embroidery thread. The knowledge, skill and patience required to create that net was almost beyond belief.

The vast quantities of plant material that were used for fiber and food to support California's large indigenous population demonstrate that people were actively managing wild plants for maximum productivity, on a large scale. They capitalized on the fact that many California native plants have adapted to periodic natural fires, and they used fire strategically to enhance growth of seed-producing annuals, edible bulbs, and basketry plants; to ensure the health of oak groves and palm oases; and to provide good forage for game animals. Lightfoot and Parrish (2009) have called California Indians "pyrodiversity

collectors,” a term that is unlikely to catch on with the general public, but it does emphasize the importance of deliberate burning in subsistence ecology throughout Native California.

Two other plant management practices were also important. Heavy pruning, or coppicing, of woody shrubs like redbud (*Cercis occidentalis*), willow, and sumac (*Rhus trilobata*) induced sprouting of straight, flexible new shoots ideal for basket weaving. And digging of sedge rhizomes (*Carex* spp.) and the corms of blue dicks at regular intervals actually propagated those resources, ensuring much more abundant harvests of basket roots and edible bulbs in subsequent years (Anderson 2005).

This is just a small sampling of the kinds of ethnobotanical information that are available in ethnographic sources, and I urge archaeologists who are interested in finding, identifying, and interpreting plant remains to consult these sources. There are people living today who still practice old ways or remember traditions told to them by their elders. There are unpublished notes and botanical collections from earlier researchers. John P. Harrington (1986) is a famous example, and his notes contain enormous amounts of information, although they are challenging to work with; but there are others as well. And there is a voluminous published ethnographic literature that includes information about plants and their roles in native cultures throughout California. Descriptions of subsistence and technology are obviously worthy of note, but oral narratives, myths, and legends may also contain important clues about the complete spectrum of interrelationships between people and plants, beyond purely utilitarian ones.

But there is a caveat: even if a plant is locally available and is known to have been used in certain ways by some peoples, one cannot necessarily assume that it used in the same ways (or at all) by others. Maurice Zigmond (1941) compared the uses of a dozen plant species among several Uto-Aztecanspeaking peoples in California and the Great Basin, and found strikingly different practices even among these very closely related groups who all lived in very similar habitats. The preferences for certain basket materials – *Juncus textilis* is widespread in California but was only utilized in the south – would be another example. And in my own studies of sage species (Timbrook 1986), I found that many California peoples used the seeds of several kinds of sages for food; but no group was recorded as having eaten purple sage (*Salvia leucophylla*), and the Chumash ate only chia, not any of the other species. So an abundance of purple sage plants in the vicinity of a village site would not necessarily be a food resource.

To conclude, it is very gratifying to know that archaeologists are recognizing the critical importance of plants in prehistoric cultures. I look forward to hearing about many more discoveries in the future.

REFERENCES CITED

- Anderson, M. Kat
2005 *Tending the Wild: Native American Knowledge and the Management of California's Natural Resources*. University of California Press, Berkeley.
- Gilliland, Linda Ellen
1985 Proximate Analysis and Mineral Composition of Traditional California Indian Native Foods. Unpublished Master's thesis, Department of Nutrition Science, University of California, Davis.
- Harrington, John P.
1986 *Native American History, Language and Culture of Southern California/Basin*. Papers of John P. Harrington in the Smithsonian Institution 1907-1957, vol. 3, edited by Elaine L. Mills and Ann J. Brickfield. Smithsonian Institution National Anthropological Archives, Washington D.C. Microfilm edition: Kraus International Publications, Millwood, New York.
- Hudson, Dee Travis
1977 *Chumash Wooden Bowls, Trays and Boxes*. San Diego Museum Papers No. 13.
- Jacknis, Ira
2004 Toward a Culinary Anthropology of Native California. In *Food in California Indian Culture*,

- edited by Ira Jacknis, pp. 1-119. Phoebe Hearst Museum of Anthropology, University of California, Berkeley.
- King, Chester
1993 Fuel Use and Resource Management: Implications for the Study of Land Management in Prehistoric California and Recommendations for a Research Program. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 279-298. Ballena Press, Menlo Park, California.
- Lightfoot, Kent G., and Otis Parrish
2009 *California Indians and Their Environment: An Introduction*. University of California Press, Berkeley.
- Orr, Phil C.
1968 *Prehistory of Santa Rosa Island*. Santa Barbara Museum of Natural History, Santa Barbara, California.
- Timbrook, Jan
1982 Use of Wild Cherry Pits as Food by the California Indians. *Journal of Ethnobiology* 2(2):162-176.
1986 Chia and the Chumash: A Reconsideration of Sage Seeds in Southern California. *Journal of California and Great Basin Anthropology* 8:50-64.
2007 *Chumash Ethnobotany: Plant Knowledge among the Chumash People of Southern California*. Santa Barbara Museum of Natural History, Santa Barbara, California.
- Wolf, Carl B.
1945 *California Wild Tree Crops: Their Crop Production and Possible Utilization*. Rancho Santa Ana Botanic Garden, Claremont, California.
- Zigmond, Maurice L.
1941 *Ethnobotanical Studies among California and Great Basin Shoshoneans*. Ph.D. dissertation, Yale University. University Microfilms, Ann Arbor, Michigan.