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MESQUITE

Its Biology in Two Desert Scrub Ecosystems

Edited by

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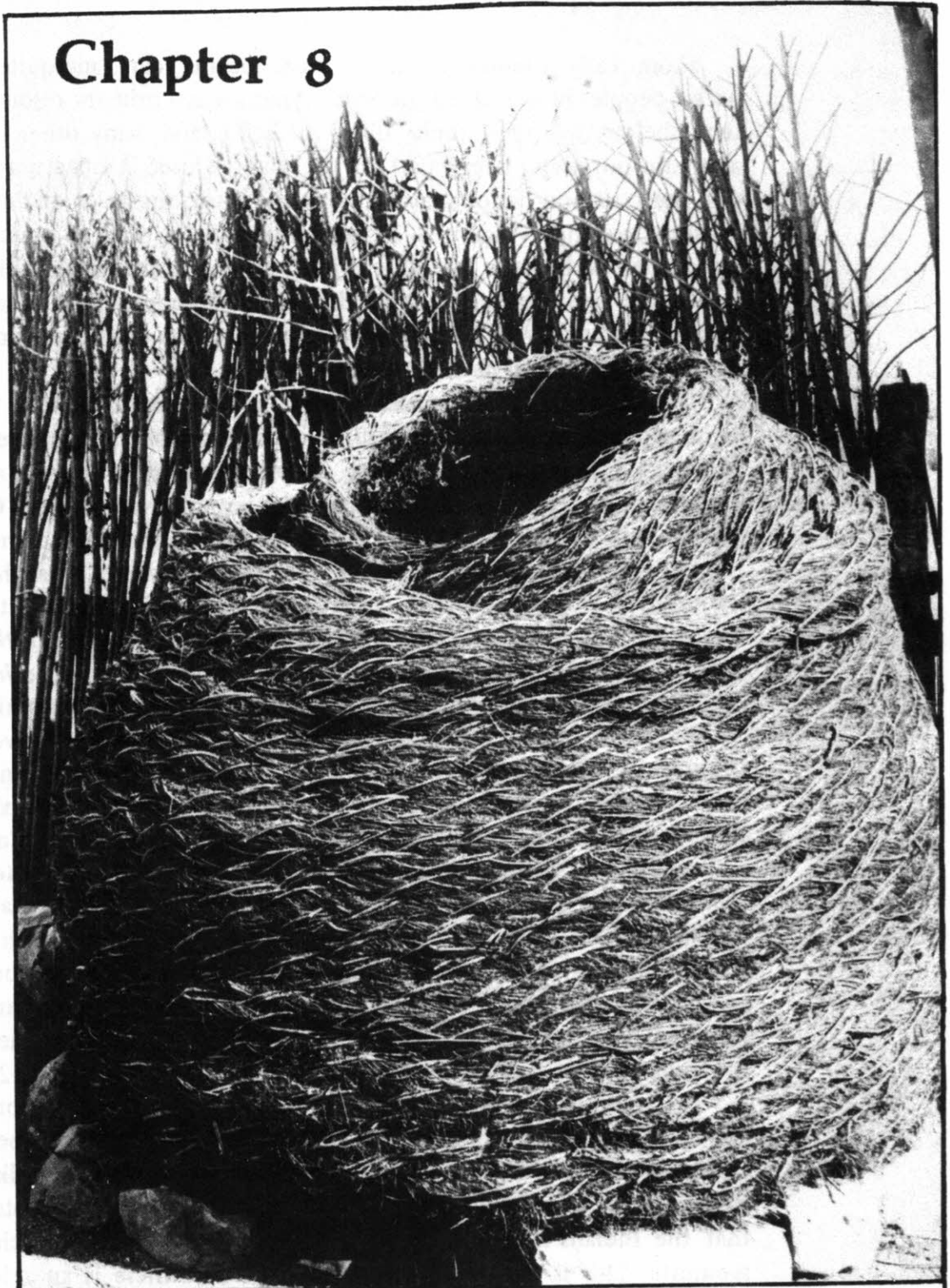
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Chapter 8



MESQUITE IN INDIAN CULTURES OF
SOUTHWESTERN NORTH AMERICA

R. S. Felger

From early pre-historic times until recent years, mesquite has served native peoples in southwestern North America as a primary resource for food, fuel, shelter, weapons, tools, fiber, medicine, and many other practical and aesthetic purposes. Every part of the plant is used. Utilization of mesquite was the common denominator among the diverse peoples of the arid southwestern lowlands (Figure 8-2), agriculturalists as well as nomadic hunters and gatherers. Because mesquite is such an important and unfailing resource, it came to figure in the everyday life of these peoples from cradle to grave. Its phenology played an important role in secular calendar events and mesquite is prominent in native oral literature.

The term mesquite or *mezquit* has become the dominant folk generic name applied to species of *Prosopis* (section *Algarobia*) in southwestern North America. Among Spanish-speaking people in Arizona, Sonora, and Chihuahua, the fruit is known as *la péchita*. This term derives from the Opata word, *péchit*, also meaning mesquite fruit (T. Hinton, personal communication; Nentvig, 1971). However, in southeastern Sonora, where more than one wild legume tree crop is harvested, cognition of *péchita* is restricted to the sweet mesocarp "pulp" of the fruit of mesquite and *guaymuchil* (*Pithecellobium dulce*, Leguminosae) which are referred to respectively as *péchita de mesquite* and *péchita de guaymuchil* (H. S. Gentry, personal communication).

While the term for mesquite varies with the different native languages, I know of no ethnobotanical linguistic differences concerning mesquite (*Prosopis* section *Algarobia*) that correspond to the different taxonomic entities (e.g., species) recognized by botanists. For example, the Cahuilla, Seri, and Quechan (=Yuma) and western Papago primarily harvested *Prosopis glandulosa* var. *torreyana* and the remaining northern Piman-speaking people and Opata used *P. velutina*. Ethnobotanically it is therefore both convenient and realistic to treat the North American members of the section *Algarobia* as a unit. In this regard, it is interesting to note that just as the various botanical taxa of section *Algarobia* are often allopatric in North America, so are the Indian groups that depended so heavily upon them (Figure 8-2).

The traditional native taxonomic concepts for mesquite in North America appear to be unambiguous: a single monotypic folk genus is generally recognized among each tribe (for a discussion of the concept of folk genus, see Berlin, 1973). Compared with modern biological species concepts, it appears that the Indians have not significantly overclassified or underclassified the mesquite. This is particularly significant because there is an axiomatic tendency in folk taxonomy to overclassify economically important species where

FIGURE 8-1. *A Papago granary basket, probably made of arrowweed (Pluchea sericea, Compositae). The granary, used by the Indians at San Xavier mission near the Silver Bell study site, is elevated on stones. Baskets such as these were used to store Prosopis pods. For details about this granary, see Kissell (1916).*

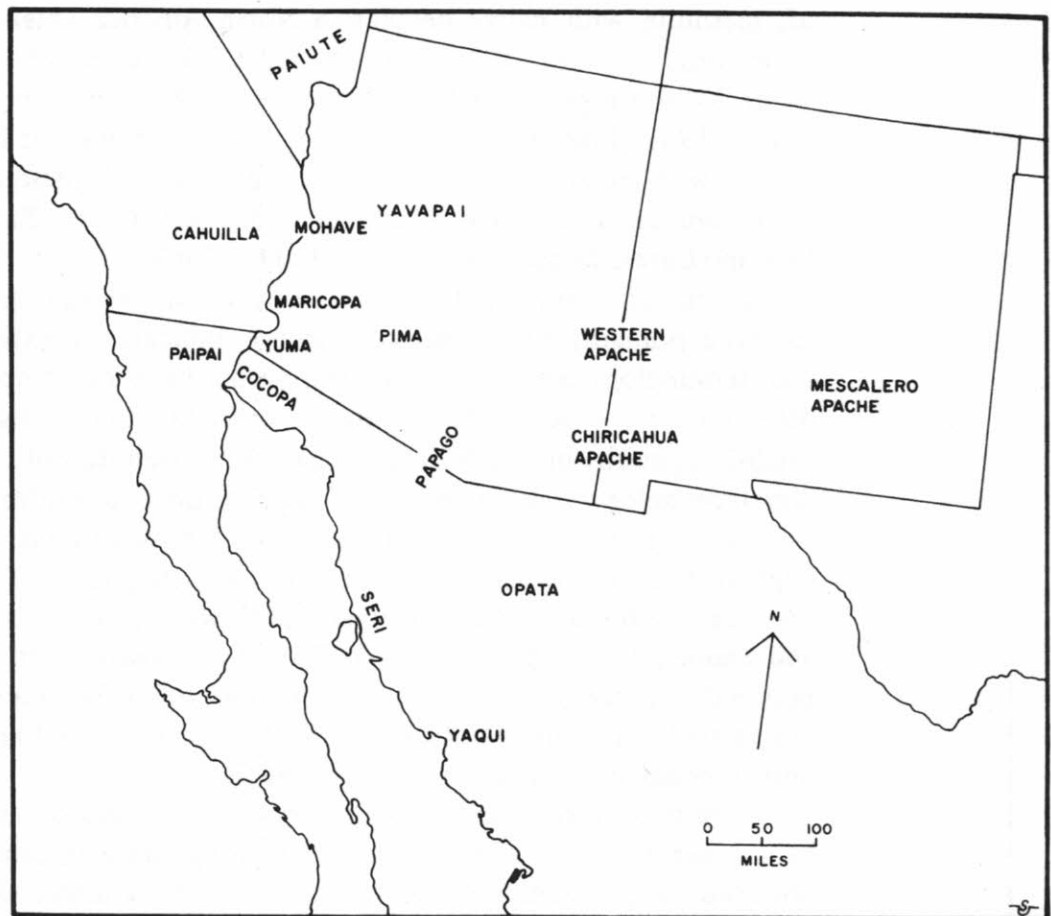


FIGURE 8-2. A generalized map showing the area inhabited by various native peoples in the southwestern part of North America who were dependent on *Prosopis* as a food item for parts of the year.

consistently recognizable differences can be identified (Berlin, 1973). Using the Seri and Papago or Pima as examples, the terms for mesquite, *ʔáas* (Seri) and *kui* (Mathiot, 1973) respectively are unanalyzable words and as such can be referred to linguistically as primary names. Such primary names characteristically suggest considerable cultural antiquity (Berlin, 1973).

Mesquite was the first plant recorded by Europeans in the American Southwest, beginning with Cabeza de Vaca's report of his epic wandering across the continent between 1528 and 1536 (Bandelier and Bandelier, 1905). Subsequent explorers and missionaries gave extensive information on mesquite, mostly as food and fuel, but also as a medicinal plant (Baeger, 1772; Bolton, 1919; Clavigero, 1789; Hammond and Ray, 1940; Manje, 1926; Nentvig, 1971; Treutlein, 1949). Much of this information on the uses of mesquite has previously been summarized (Bell and Castetter, 1937) and will not be repeated here. Rather I will emphasize here new information on the uses of *Prosopis* by the Seri and other native people in southwestern North America.

The archaeological record demonstrates that the use by, and association

of, mesquite with native peoples in North America extended into ancient times (e.g., Fewkes, 1912; Harrington, 1933; Jones, 1941; Haury, 1945, 1950, 1976; Cosgrove, 1947; Bohrer, 1962, 1970, 1973a,b; MacNeish, 1964; Smith, 1967; Flannery, 1968). In recent years analysis of human coprolites has allowed reconstruction of prehistoric diets, with mesquite being a common component in such places as southwest Texas (Bryant, 1974) and Ocampo Caves, Tamaulipas, Mexico (Callen, 1969).

A detailed report of the Seri use of mesquite (Felger and Moser, 1971), gathered primarily in the native language, indicates an extensive knowledge and terminology associated with this plant. Lack of comparable detail for other groups can be attributed largely to the fact that foreign languages (i.e., English, Spanish) in which data are gathered often do not contain the necessary terminology and concepts sufficient for the native informants to express their full meaning. Furthermore, anthropologists without botanical knowledge, or botanists lacking anthropological and linguistic skills often overlook significant ethnobotanical information. However, many sources (e.g., Bean and Saubel, 1963; Mathiot, 1973; Ruth Giff, Joseph Giff, and Sally Pablo, personal communication) demonstrate that other Sonoran Desert cultures during traditional time possessed levels of terminology and knowledge of mesquite comparable to that reported for the Seri.

A caution must be given about the reported times or seasons for phenological events such as flowering and fruiting, since information was often obtained by questioning informants rather than by direct observation. Many rural people are not overly precise about the month of an event such as a particular harvest if it is many months away or past. Such information in the present report must therefore be considered preliminary. Of the vast body of knowledge regarding native use of *Prosopis* only the barest highlights are touched upon here. The principal topics that will be covered include the use of mesquite as food, for medical and cosmetic purposes, in material industries, as fuel, in recreation, and in religious and ritual practices. There is still an extensive knowledge, retained by elderly people, that remains unrecorded, and which, because of the rapid rate of acculturation, will probably not be passed down into either oral or written literature.

FOOD

Two major classes of wild edible plants may be distinguished in arid lands: the unfailing crops and the facultative crops. The unfailing class, which includes mesquite, is composed of perennial plants that can almost always be depended upon to produce large crops year after year independent of local, short-term climatic conditions such as drought or unusually cold weather (see Bean and Saubel 1961, 1972; Felger and Moser, 1971, 1976). While it might be expected that the most severe season, late spring and early summer drought, would be a time of food shortage, it was actually a time of plenty

because of several dependable high-yield wild crops. Both hunter-gatherers and agricultural peoples stored surpluses from these unfailing crops. For the agricultural peoples these crops provided significant sustenance until their cultivated crops could be harvested. Most pre-contact maize-farming people also gathered wild plant foods such as mesquite (Smith, 1967).

Mesquite is the most widespread of the unfailing wild crops in the hot lowlands of southwestern North America. In many areas it was the single most important wild harvest, providing an essential and dependable food resource for the diverse peoples living throughout its range (Figure 8-2). Presumably, the very deep roots of the trees and its partial phreatophytic habit (Chapter 1) contribute to the predictable ripening of fruits shortly before or at the onset of the summer monsoon. Other nutritionally important unfailing crops in the Sonoran Desert, also harvested during the late spring and early summer dry season, include eelgrass (*Zostera marina*, Zosteraceae) among the Seri (Felger and Moser, 1973), Palmer's saltgrass (*Distichlis palmeri*, Gramineae) among the Cocopa (Castetter and Bell, 1951; Felger, 1975), and various columnar cacti including saguaro (*Carnegiea gigantea*, Cactaceae) and *cardón* (*Pachycereus pringlei*, Cactaceae) (Castetter and Bell, 1937; Felger and Moser, 1974a).

Facultative wild crops are plants dependent on short-term conditions such as rainfall in order to bloom and fruit, e.g., ephemerals such as *Amaranthus palmeri* (Amaranthaceae), *Plantago insularis* (Plantaginaceae), *Salvia columbariae* (Labiatae), and various perennials such as *Lycium* spp. (Solanaceae). In desert regions where climatic conditions are generally unpredictable, facultative wild crops, taken over a span of years, are less important to native people for survival than are the unfailing species.

Harvesting mesquite pods or other predictable crops during the spring dry season often meant resettlement or temporary encampment close to the resource and group cooperation (Bean and Saubel, 1972). These crops tend to produce massive quantities of fruit during a relatively short time which meant that the crop needed to be harvested quickly, and all available labor was therefore recruited. Although most wild plant food collecting was woman's work, entire families including men assisted in these arduous or complicated harvests. For many hunting-gathering societies with minimal political structure, as well as certain agricultural peoples, it was a time of coming together. Among the Quechan Indians, as the mesquite pods ripened, outlying districts were notified by runners and many people converged on the mesquite groves. The evenings were spent ". . . singing, dancing, playing games and making love" (Trippel, 1889:6-7).

The production of mesquite pods generally seems to have exceeded the desire or ability of native peoples to harvest, process, and store them. While actual quantitative data of fruit production and utilization have not been reported, fruit production does not seem to have been a factor limiting native populations. There are, however, some indications of occasional failure

of the mesquite crop (Palmer, 1878). For example, it has been claimed that when the saguaro (*Carnegiea gigantea*) and mesquite crops failed, the Pima Indians of southern Arizona made long journeys into hostile Apache territory to secure food (Russell, 1908). This lack of sufficient fruiting was a rare event and might have been due to severe winter freezing. During 1975 and 1976 extensive stands of mesquite and foothill palo verde (*Cercidium microphyllum*, Leguminosae) near Tucson failed to produce fruit. This seems to be attributable to unusually cold weather in winter and spring. However, in certain protected sites and at lower elevations productivity was high and it was possible to harvest substantial quantities of fruit.

In the subtropical thorn scrub regions to the south of the Sonoran Desert, such as in Sinaloa, Mexico, the traditional use of, and dependence on, mesquite as food diminished because of the abundance of other more desirable or preferred legume tree crops such as *quaymuchil* (*Pithecellobium dulce*) (see Gentry, 1942, 1963; Felger, 1976). Tropical and subtropical crops and the more dependable monsoon-supported agriculture made reliance on mesquite less of a necessity. Yet, in the hot subtropical lowlands of western Mexico south of the Sonoran Desert, such as southwestern Sonora and western Sinaloa, historical accounts as early as the sixteenth century document extensive utilization of mesquite as a human food resource (Winship, 1896).

At higher elevations, and eastward and northward into temperate regions, desert scrub gives way to grasslands. Here, the collecting of wild grass seed, and the hunting of animals feeding on these grasses, more or less substituted for mesquite dependence farther south. Towards the Pacific coast the distribution of mesquite halts with the waning of the summer monsoon; and in these Mediterranean climates, as well as locally along the eastern margin of the Sonoran Desert, acorns (*Quercus* spp., Fagaceae) generally assumed the role of the mesquite pods (Bean and Saubel, 1972). At its geographic limits, mesquite also served as an item of commerce. For example, the Wanikik Cahuilla of southern California ". . . who had some mesquite in their area, regularly traded their abundant acorn and piñon crops for mesquite from their neighbors in the desert" (Bean and Saubel, 1963:56).

Individual mesquite trees, as well as certain geographically-defined populations, were discovered and identified as having superior flavor and yield. These special trees and populations were specifically sought year after year, yet there is no indication of any attempt at selection or cultivation. The Seri Indians know that the mesquite groves on the coastal plains between Kino Bay and Tastiota produce sweeter, better tasting fruit than those of other populations, and certain groups of the Seri made special harvest encampments there (Felger and Moser, in prep.). At harvest time the Maricopa Indians of southern Arizona sought certain trees known to produce exceptionally large or sweet pods (Castetter and Bell, 1951). The Cahuilla knew that desert mesquite groves produced greater quantities and "tastier" fruit than trees occurring at higher elevations (Bean and Saubel, 1963), which would be at or near the desert-chaparral ecotone. Many Southwestern people, such as

the Cahuilla (Bean and Saubel, 1963) and Pima (Sally Pablo, personal communication) do not consider every tree of sufficient quality to merit harvesting. Among the Pima, fruit was gathered only from trees with the largest and thickest pods, and pods with reddish streaking are considered best of all (Sally Pablo, personal communication).

The native mesquite of Baja California (at least in the Central Gulf Coast) apparently produce bitter pods which were seldom eaten by the Indians (Baegert, 1772) and plants with sweet-tasting pods from the Mexican mainland were introduced in Spanish colonial times (Aschmann, 1959). After the Spanish conquest, mesquite was brought from the Yaqui region, or some other part of the mainland coast, and planted at the mission at Loreto and at one or two other Baja California missions (León-Portilla, 1973). These trees yielded fruit of good flavor which were subsequently eaten by the local Indians. The concept of sweet-fruited mesquite from the mainland and bitter ones from Baja California still persists.

Rural people in north-central Sonora, specifically at Cinoquipe on the upper Rio Sonora and Cucurpe on the upper Rio San Miguel, distinguish between mesquite trees yielding bitter-tasting pods and those with sweet, edible pods. Trees with sweet pods are said to be far more common than those with bitter pods, and are distinguishable only by taste.

There is considerable ethnological variation in details regarding the collection, preparation, and storage methods of the pods and their products. The following brief description of traditional Seri Indian harvest and preparation techniques (Felger and Moser, 1971), will serve to indicate generalized methodology. For the sake of simplicity the Seri terminology is omitted. However, it should be noted that Seri mesquite-associated terminology is far more extensive than it is in English or Spanish (Felger and Moser, 1971). The Seri are a Hokan-speaking people living along the east side of the Gulf of California. Traditionally they are a semi-nomadic, seafaring, hunting and gathering people (McGee, 1898, 1971; Kroeber, 1931; Griffen, 1959; Spicer, 1962; Moser, 1963, 1976; Bowen, 1976). Today mesquite is seldom harvested—it is hard work and comes at a time of very hot weather.

An indication of the former significance of the mesquite pod in Seri culture is evidenced by the fact that they have names for eight stages of growth of the fruit from the youngest (less than 3 cm long) to the fallen, rotting pod. In the second youngest stage, the pods are tied into small bundles and cooked with meat. Full-sized green pods are mashed in a mortar formed in bedrock or hard earth. The pounding is accomplished with a pestle about 1 m long made of mesquite or ironwood (*Olneya tesota*, Leguminosae). After the green pods are mashed, they are cooked in clay pots. Ripe pods picked from the tree are prepared in the same manner.

The most commonly utilized form of the fruit is the dry fallen pods which apparently have the highest mesocarp carbohydrate content. They are gathered in large quantity in shallow tray-baskets (Moser, 1973). The load is built up by placing sticks—in this case probably mesquite sticks—ver-



FIGURE 8-3. *Papago Indian Juanita Ahill uses a stone pestle in a bedrock mortar grinding mesquite pods into flour (1975).*

tically into the load of pods around the edge of the basket, then piling on more pods, and, in turn, holding these in place with additional vertically placed sticks. There are numerous variations on the methods of preparation, the most common of which are given below.

The pods may be pounded in mortars with wooden pestles and then chewed, the sweet juice swallowed, and the pulp discarded. However, the usual method is to toast the pods before pounding. To toast the fruits, the

Indians clear the ground, light a fire in the center, and then remove the coals. The dry pods are then piled on the hot earth. At the same time, four piles of sand are placed around the area and fires are burned on each pile to heat the sand. The pods are then sprinkled with the hot sand, allowing the heat from the fires plus the hot sand to toast them. Toasting probably helps eliminate potential loss from bruchid beetles (Chapter 6), but there appears to be no knowledge among the Seri that the toasting is for such purpose. Toasting the pods greatly facilitates grinding. The Seri moon or month known as "the moon to sprinkle [sand]" derives its name from the sprinkling of hot sand on the mesquite pods. This time of year, approximately the month of July, is the beginning of the new year for the Seri and other Sonoran Desert peoples such as the Pimans. It is significant that the year begins when the common desert trees and shrubs drop their seeds and the brief Sonoran Desert monsoon begins—for it is the time of greatest renewal of life in this part of the world.

After the pods are toasted, they are carried to a bedrock mortar to be pounded with a wooden pestle of mesquite or ironwood (*Olneya tesota*). A large pile of pods is placed in the mortar and more are placed on the ground surrounding the hole (Figure 8-3). Several women may then pound at the same time, each at her mortar. As the pods are crushed, more are added from those piled around the mortar hole. After the pods are mashed they are placed between deer skins to prevent spoiling in the hot and often moist July wind blowing off the Gulf of California. The pounding continues until all the pods are mashed. The woman then places the pestle across the mortar hole. Mashed pods or pulp are put in a basket and winnowed by gently tapping the basket against the pestle. Flour from the mesocarp (Figure 6-2) falls into the mortar hole, and the seeds enclosed in the stony endocarp plus pieces of fiber and exocarp remaining in the basket are set aside on a deer skin. The flour is again winnowed until it is nearly pure and then placed in a pottery vessel in which it may be stored for some time, retaining its characteristic aroma and taste. One man estimated that two women, working with a man who keeps them supplied with mesquite pods, are able to prepare about 40 kg of mesquite flour in a day.

The Seri place the flour in a large shallow basket, mix it with water, and knead it into a dough which is shaped into rolls often about 20 cm long and 5 to 10 cm thick, or into round cakes. The rolls and cakes are dried immediately in the sun so that they will not spoil. When dry they too can be stored in pottery vessels for an extended period. In former times families often had two or more large vessels filled with mesquite cakes hidden in caves for times of need. These narrow-mouthed storage vessels had lids fashioned from a large clam shell, flat stone, or piece of pottery. The lid was tightly sealed with lac from a scale insect, *Tachardiella larreae*, which is often found encrusted on the stems of creosotebush (*Larrea tridentata*). The lac is plastic when heated but hardens again on cooling, forming a strong bond closely akin to commercial sealing wax (Euler and Jones, 1956; also see Bohrer, 1962, and Standley, 1923). The lid is easily removed by severing the hard, dry lac with

a heated knife blade (Felger and Moser, in prep.). The Seri and other Indians also obtained lac from the stems of *Coursetia glandulosa* (Leguminosae), produced by the scale insect *Tachardiella fulgens* (Felger and Moser, in prep.; Euler and Jones, 1956). A third kind of lac was obtained from the stems of arrow weed (*Pluchea sericea*, Compositae) (see Euler and Jones, 1956). Preservation of a wide variety of dry plant-derived foods, both cooked and uncooked, in sealed pottery vessels was widely practiced in southwestern North America (Euler and Jones, 1956). Such vessels have generally been recovered from rock shelters.

After separation by winnowing, a second pounding, this time of the stony endocarp, breaks the pods open and frees the seed. The seed is separated from the endocarp by another winnowing and then ground on a grinding stone (*metate*). Flour resulting from grinding the seeds is mixed with water, some dry mesocarp flour, and the mixture drunk. While considerable effort must be expended to procure a significant quantity of seeds, they are nutritionally very rich, with a protein content of about 40 percent (Walton, 1923; Earle and Jones, 1962; Jones and Earle, 1966; Felger, 1975). However, utilization of the actual seed was not as widespread or frequent as use of the mesocarp tissue. Verification of use of the seed is often difficult to determine from the literature because of indiscriminate usage of the word "bean" to mean either the entire pod, the endocarp and the enclosed seed, or perhaps the actual seed itself. Among the more reliable reports of utilization of the mesquite seed are Bell and Castetter (1937:22-23), Bohrer (1970), and Felger and Moser (1971).

Extensive utilization of the actual seed seems to have been achieved by the Amargosan-Pinacateño people who occupied the 1000 km² Pinacate lava fields in extreme northwestern Sonora (Hayden, 1967, 1969). These people developed "a unique grinding tool, termed a 'gyratory crusher' . . . [which] resembles a perforated mortar, either in slab or block form, in which a wooden pestle with a projection extending through the perforation in the mortar base was gyrated, the projection providing leverage against the under rim of the hole, to grind mesquite pods. The crusher underwent modifications, and its use seems to have been discontinued with the disappearance of mesquite forests at the end of the Yuman I period, about A.D. 11-1200" (Hayden, 1967:154). Use of the Pinacate gyratory crushers (Figures 8-4 and 8-5) probably spanned three to four millenia. Julian Hayden and I recently processed oven-heated mesquite pods in one of the prehistoric Pinacate crushers. The pods were broken into two or three pieces, fed into the crusher, and pulverized with a wooden pestle (see Figure 8-5). We were able to process several handfuls of pods with very little effort in less than a minute. The stony endocarps were readily broken open, yielding seeds in considerable quantity. The mesocarp flour and seeds could then easily be separated by winnowing. Similar stone implements have been found elsewhere in Sonora, as well as in the Old World, such as the Khazinah phase deposits in Iran, dated six to seven millenia before present (Hole, et al., 1968; Hayden, 1969).



FIGURE 8-4. Prehistoric gyratory crushers in situ at *Tinaja de Tule*, Sierra Pinacate, Sonora, Mexico. These stone crushers were used to grind *Prosopis* pods in the Pinacate Regions until about 1200 A.D.

Gyratory crushers may be more widespread, and the suggestion that Old World implements may have been used to process pods and seeds of *Prosopis farcta* or other legume tree crops including the carob tree (*Ceratonia siliqua*) is most intriguing (Hayden, 1969).

The fibrous material obtained by the Seri from the first pounding of the pods is chewed for the sweet flavor and then discarded. This sweetness results from adhering bits of mashed mesocarp. Or these fibers may be pounded a second time, water added, the fibers sucked, and the pulp then discarded. Sometimes this chewed fibrous pulp is saved, mixed with sugar, toasted, and then added to water to make a special drink. (Since neither sugar nor honey were available in earlier traditional times, sugaring is obviously a recent modification.) During pre-contact times mesocarp tissue provided these desert people with one of their few sweets.

In addition to numerous variations on the methods outlined above, various refreshing drinks were prepared from the pods. After the first pounding of the pods, the Seri sometimes placed endocarps with seeds into a pottery vessel with water, weighted them down with a stone, and left them to stand until the water became sweet. This juice was a special treat to the children because at that time of year they had little or no access to sweets. Sometimes men would prepare this beverage and allow it to further ferment for several days before drinking it. This, and other mildly fermented, beer-like drinks prepared from the pods were of widespread use among southwestern Indians

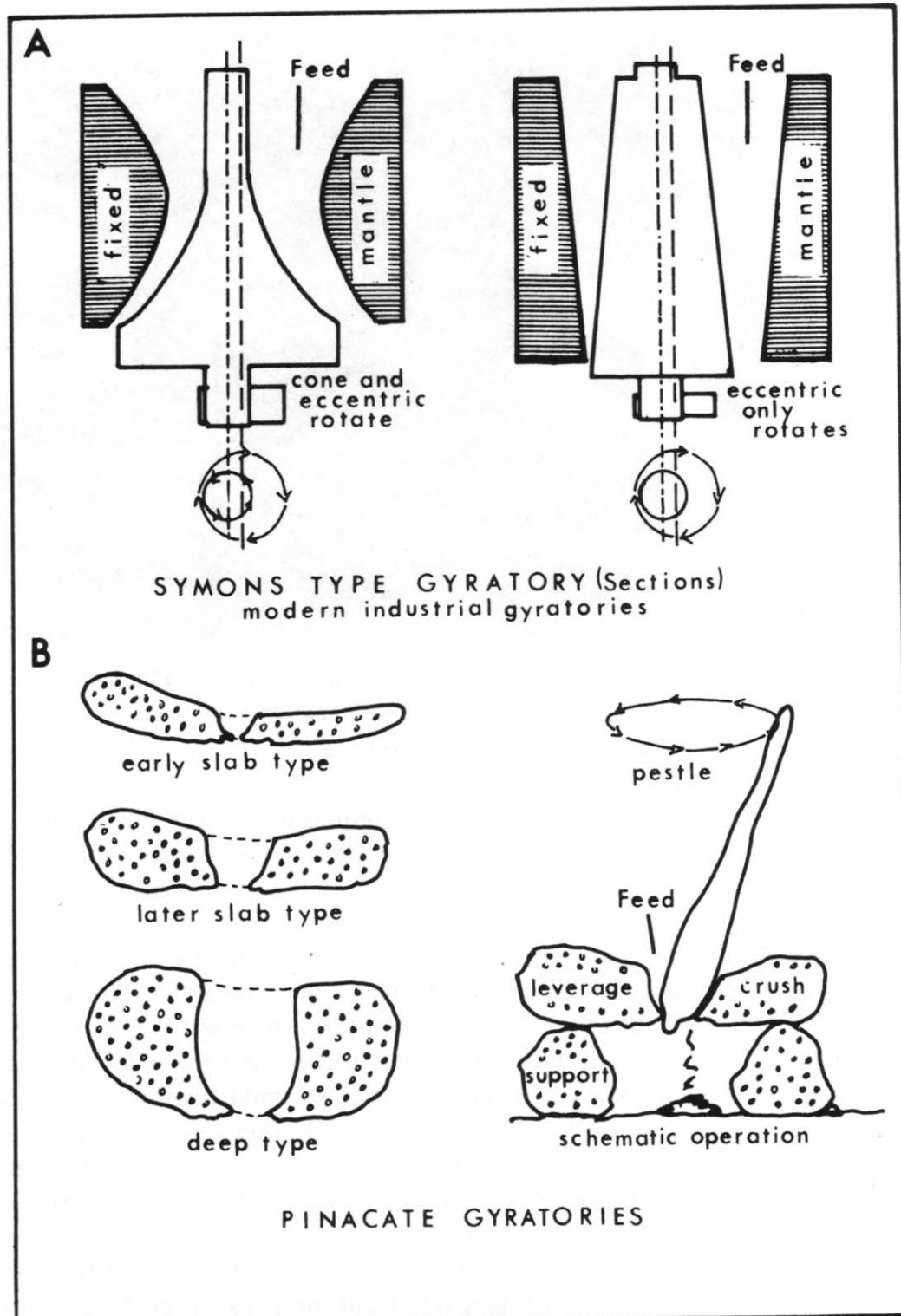


FIGURE 8-5. A diagrammatic representation of a prehistoric and a modern gyratory crusher showing the similarities in the principal of operation.

(Havard, 1896; Castetter and Opler, 1936; Bell and Castetter, 1937). In general, it does not appear to have been intoxicating and was probably very low in alcoholic content. Most of the reports (see above) refer to drinks prepared from mesquite as cool and refreshing. "Since the pods were preserved [dried], this drink was part of the year-round diet of the Cahuilla" (Bean and Saubel, 1963:58), and was drunk continuously "... during the hot summer months" (Barrows, 1967:73).

Occasional references to highly intoxicating drinks prepared from mesquite pods or flour by primitive methods of fermentation should be verified. During colonial times or later, mesquite flour was sometimes used as a sugar substitute in preparing grain-derived liquors. Earlier in this century some Seri men collected mesquite pods for a group of Mexican men with a portable, and presumably illegal, still. The distillate was a highly intoxicating liquor, but ensuing drunkenness and disagreement soon terminated the venture (Felger and Moser, in prep.).

There are numerous reports of "bread" or cakes made from mesquite meal or flour which were often like ordinary loaves of bread (Bell and Castetter, 1937). Presumably the flour was usually prepared from the mesocarp of the ripe, fallen pods. The texture varied according to the particular method of flour preparation, namely the coarseness of grinding. Mesquite cake is usually somewhat yellowish or gold-colored and farinaceous with a bran-like texture. The taste is sweeter than that of ordinary wheat bread or tortillas made from maize. Mesquite cake requires no baking: the water and flour mixture is simply allowed to dry.

Both the pods and prepared mesquite flour and cake were stored for future use. Storage time was a year or more (Felger and Moser, 1971; Bean and Saubel, 1963), but generally there was no need to store the pods or their products beyond the time of the next harvest (Ruth Giff, personal communication). Settled people such as the Cahuilla, Cocopa, Pima-Papago, and Quechan stored the whole pods in large wicker or basketry granaries atop their homes (Figure 8-6) or elevated off the ground next to the house (Figure 8-1), (Bartlett, 1854; Bean and Saubel, 1972; Castetter and Bell, 1951; Forde, 1931). Screwbean (*Prosopis pubescens*), maize, and wheat were also stored in these granaries (Ruth Giff, personal communication). Many settled people such as the Maricopa and Pima used the roofs of their houses and granaries to dry the pods, but if rain threatened, the pods were taken inside to prevent spoilage (Bartlett, 1854; Castetter and Bell, 1951). Early settlers in the Moapa Valley, Utah, remarked about seeing enormous conical mesquite cakes, weighing from fifty to sixty pounds apiece. These dried cakes were stored in grass-lined pits in rock shelters along the rear wall of Paiute wikiups (Stuart, 1943).

Damage by bruchid beetles (see Chapter 6) to stored pods and their products is well documented in the literature (e.g. Castetter and Bell, 1937; Bean and Saubel, 1972). A number of nineteenth and early twentieth century

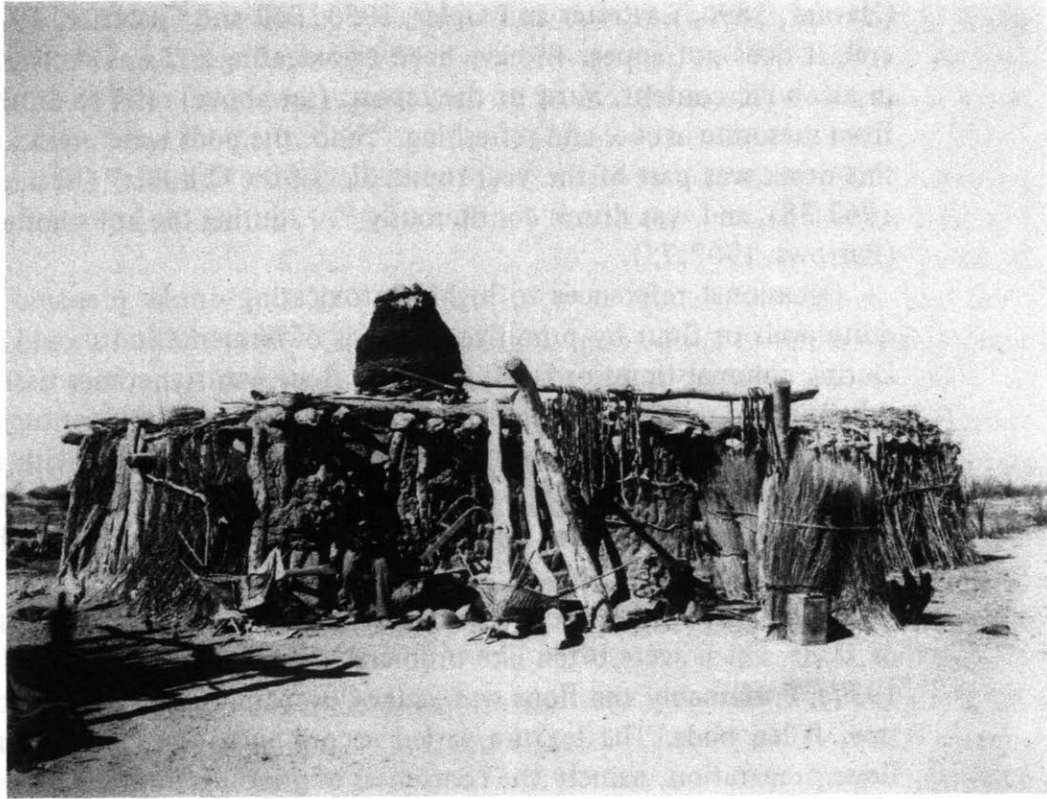


FIGURE 8-6. *A Papago wattle-and-daub construction house at San Xavier near Tucson, Arizona. The posts and larger poles are undoubtedly mesquite wood. The large basketry granaries were commonplace features of traditional houses in this region and were used to store Prosopis pods (1894).*

observers reported that the presence of substantial quantities of the larvae made little difference to the Indians, and were commonly “. . . accepted as an agreeable ingredient” (Castetter and Bell, 1937). More recently, because of changing prejudices, bruchid-containing food has become unacceptable to such people as the Pima (Ruth Giff and Sally Pablo, personal communication) and the Cahuilla (Bean and Saubel, 1972). However, the Seri custom of heat-treating the pods (see above) seems to have effectively controlled the ever present bruchids. Numerous bruchid holes are clearly evident in the carbonized remains of mesquite pods from various archaeological sites such as those recovered from the thirteenth century Point of Pines Ruin in northern Arizona (Bohrer, 1973).

Mesocarp-derived flour provided considerable caloric value (see Chapter 6) although the protein content does not seem to be nutritionally significant (Walton, 1923; Felger, 1975). Protein intake was largely obtained from wild animals (including fish) and seeds of other desert plants and crops, and in the case of the Seri and some other groups also from mesquite seeds. A convenient and abundant calorie-rich component, such as provided by the mesocarp-derived flour, would be highly desirable and a significant factor for subsis-

tence in these very arid environments, particularly during the dry season. The Seri say that food from the mesquite makes children fat and their skin light in color, both desirable conditions to the Seri (Felger and Moser, 1971).

In the hottest regions of the Sonoran Desert and where winter is particularly mild, such as in Cocopa territory at the delta of the Colorado River, the mesquite harvest began in mid-June. Further north in southern Arizona in the Mohave, Quechan, and Pima regions, the harvest usually commenced in late June and continued through most of July. In the Seri region in western Sonora, a second, but lesser, crop of pods is generally produced at the end of summer, usually in early September. Pods were harvested from this crop too (Felger and Moser, 1971). Among the Cahuilla, in southeastern California, "the mesquite is available for gathering during three months of the year, June through August, depending on the ripening times of different areas. In the lower Colorado Desert [ca 60m below sea level to about a hundred meters above sea level], it is ready in June; at Palm Springs [130 to 160 m elevation], in July; and near Whitewater [ca. 400-500 m elevation], about August" (Bean and Saubel, 1963:57).

The most common method of harvest consisted of gathering the dry pods shortly after they had fallen to the ground (Felger and Moser, 1971; Bell and Castetter, 1937). However, the Yuman people also used wooden hooks to pull down fruit-laden branches in order to pick the pods (Castetter and Bell, 1951). The Cahuilla often picked green pods directly from the tree, and then returned several weeks later to harvest the dry, fallen pods (Bean and Saubel, 1963). When picked green, the pods were ripened artificially by placing them in the sun.

The time of mesquite harvest was often extended by robbing packrat (*Neotoma* sp.) nests (Castetter and Bell, 1951; Felger and Moser, 1976, see Chapter 7). The nest was pulled apart and the packrat's supply of mesquite pods and other edible fruit or seeds was collected. In earlier times the hapless packrats were also added to the larder. The Seri robbed packrat nests up to several months after the mesquite harvest, usually in late fall. At least in the Seri region, the packrats conveniently segregate their caches according to species in easily removable piles (Felger and Moser, 1975).

Mesquite flowers were also eaten by certain people. The Cahuilla roasted the flowers in a pit with heated stones, then pressed them into balls which could be stored in pottery vessels, and at a later date eaten after being boiled in water (Bean and Saubel, 1972). The Pima ate the flows by stripping them from the inflorescences between the teeth (Russell, 1908), and also sucked them "because they are sweet" (Curtin, 1949:95). The Pima are also reported to have used the inner bark as a substitute for rennet (Russell, 1908). Seri children like to chew a kind of light-colored mesquite gum which is said to be bitter, spit it out, and then drink water. They say the water then tastes sweet (Felger and Moser, 1971). The Pima also made a candy from a white mesquite gum (Russell, 1908; Bell and Castetter, 1937). It was "... consumed raw or

... prepared by covering with hot ashes, causing the gum to swell" (Curtin, 1949:95). The Kiowa (Vestal and Schultes, 1939) and others valued the gum for chewing.

Among agricultural people the harvest of mesquite was largely replaced by that of winter wheat (William Doelle, personal communication), and for both farmers and hunter-gatherers, the trade and wage economy brought about shifts to store-bought or bartered foods. Mesquite was not among these foods. However, subsequently during times of hardship both Indian and non-Indian people have periodically relied on mesquite, and as such it appears to be the most important and frequently harvested wild food plant resource. For example, in the nineteenth century non-Indian people along the San Pedro Valley in Arizona relied on mesquite pods during times of Apache raids (Alexander Russell, personal communication). During the depression of the 1930s people at Ajo, Arizona, some of them Papago Indians, likewise made use of mesquite pods (Thomas Hinton, personal communication).

The screwbean or *tornillo* (*Prosopis pubescens*) was also an important item in the native diet of portions of southwestern North America (Bell and Castetter, 1937; Castetter and Bell, 1951; Bean and Saubel, 1972). However, its range is not as extensive as that of the mesquite, nor is it usually as abundant (Hicks, 1961). Screwbean pods ripen in mid- to late summer. They are prepared in much the same manner as are mesquite pods and are reported to be sweeter than those of mesquite. Although it was locally an important wild food, it was generally not as significant as mesquite. Since screwbeans grow in lowland places subject to frequent flooding, it is generally absent from the territories of the nomadic hunter-gatherer peoples of the Sonoran Desert such as the Seri and the western Piman-speaking peoples.

MEDICINE

Mesquite has been extensively used by American Indians for a wide range of medicinal purposes (Hrdlička, 1908; Standley, 1923; Bell and Castetter, 1937; Vogel, 1970). Mesquite gum, the black pitch or flux, herbage, roots, and bark have all been employed, usually in an aqueous solution or tea. With minor exceptions, neither flowers nor fruits were used medicinally. Dry pods were boiled and the decoction used as a "bleach" after severe sunburn by the Pima Indians of southern Arizona (Curtin, 1949:94).

Preparations involving mesquite, as well as most other native medicines in the Sonoran Desert, are usually simple. Absence of complicated formulae facilitates non-professional and individual preparations and administering, and the rapid diffusion of information through a culture (Felger and Moser, 1974b). Among Sonoran Desert people such personal medicines generally do not involve a shaman (medicine man).

While traditional remedies, such as those involving mesquite, are less practiced today because of acculturation, they may still be resorted to, at least on occasion. In many cases traditional medical practices have continued even after other vestiges of the original Indian culture have disappeared. Selected, common, traditional medical uses of mesquite, most of which may be presumed to be ancient, are briefly mentioned below.

The most common medicinal use of mesquite leaves and gum (occasionally mixed with non-vegetal substances such as certain minerals) is for eye ailments. The Aztecs used such a mixture when the eyes were hot and painful from sickness (Emmart, 1940; Anderson and Dibble, 1950-1959). The Mescalero Apache and people in Baja California ground the leaves into powder, wrapped the powder in a thin cloth, added water, and squeezed the liquid into an afflicted eye (Hrdlička, 1908; Clavigero, 1789), whereas the Paipai in northern Baja California and the Pima in Arizona boiled the leaves in water and washed an inflamed eye with the solution (Owen, 1963; Castetter and Bell, 1937). Similar usage persists in the folk medicine of Mexico (Martinez, 1959; Standley, 1923). Certain Indians and Spanish Americans in New Mexico mashed tips of the branches (probably with leaves) in water, allowed the liquid to stand overnight, and applied the solution to sore eyes (Bourke, 1894).

The most common application of the gum for sore eyes was to dissolve it in water and apply the solution as eye drops, eye wash, or lotion (Hrdlička, 1908; Standley, 1923; Balls, 1962). The Pima sometimes placed a small piece of gum in the corner of an afflicted eye and kept it there as long as the patient could bear it. Tears dissolved part of the gum, coloring the eye brownish (Hrdlička, 1908). The Papago used the gum for soreness of the eyelids; the Maricopa applied dried powdered juice of the gum to the eyelids but not the eye itself (Hrdlička, 1908). The Seri use eye drops made from a certain type of mesquite gum described as a milky sap which has hardened like resin (Felger and Moser, 1971, 1974b).

The use of emetics and purgatives to "cleanse the system" was widespread in traditional Indian medicine (Vogel, 1970). Mesquite leaves, but more often the bark and gum, were used for this purpose. The Seri made a tea from mesquite leaves which was drunk as an emetic (Felger and Moser, 1974b). The Pima used a decoction of the inner bark as both an emetic and cathartic (Russell, 1908; Standley, 1923); and the black gum, boiled in water, was imbibed to purge the system (Curtin, 1949:94). The Paipai made similar use of bark decoctions (Owen, 1963). At least certain Yuman people drank an infusion of mesquite leaves to relieve painful micturition (Forde, 1931).

Mesquite gum dissolved in water has also been widely used as a remedy for sore throat (Martinez, 1959; Balls, 1962). For this purpose the Pima drank hot tea prepared from the sap (Hrdlička, 1908), used it as a gargle

(Standley, 1923), and also drank it as a remedy for respiratory afflictions (Curtin, 1965).

During the first four days following birth, a Cocopa baby was given a decoction prepared from the inner boiled bark. A woman would dip her finger in the liquid and let the baby suck the finger (Gifford, 1933). The Pima placed powdered mesquite bark mixed with sand or other substances on a newborn baby's umbilical cord and later the navel to prevent soreness (Hrdlička, 1908). Mesquite gum was similarly used to prevent infection (Curtin, 1949). Umbilical hernias, a rare disorder among the Maricopa children, were treated by administering tea prepared by boiling mesquite roots cut into small pieces (Hrdlička, 1908). The Pima used a solution of the gum as a disinfectant for open wounds (Standley, 1923).

Diarrhea and stomach disorders, often chronic, continue to be widespread among many Indians and economically disadvantaged Mexican people. Mesquite leaves, gum, and bark have often been used for such problems. The gum, dissolved in water, is used for diarrhea in Mexican folk medicine (Martinez, 1959). In the eighteenth century the Opata in Sonora prepared a "froth," probably from the gum, as a remedy for ulcers (Nentvig, 1971). The Comanche (a tribe living farther north of the area included in Figure 8-2) used preparations of the leaves to neutralize stomach acidity (Carlson and Jones, 1940).

As a remedy for diarrhea the Pima drank a tea prepared from young mesquite roots (Curtin, 1949) and an infusion made from the gum (Standley, 1923). They also prepared a cooling drink from the crushed leaves for stomach trouble (Curtin, 1949). The Papago made use of the "white" inner bark by pounding it as fine as possible, boiling it with salt, and taking a dose daily before breakfast to ward off chronic indigestion (Hrdlička, 1908). The Papago also drank a decoction of the powdered white inner bark as an internal antispasmodic (Curtin, 1965).

As a laxative, the Seri drank the liquid produced by the bark of green or young branches which is cut into long strips, tied into rolls, and soaked in water (Felger and Moser, 1974b).

The sap or gum was widely applied topically for skin disorders, apparently with a considerable degree of success. The boiled sap (=black pitch or sap) was applied directly to pemphigus and other sores of children (Hrdlička, 1908); the black gum, boiled in a little water, was applied to sore lips, chapped and cracked fingers, and as a lotion for "bad disease" (Curtin, 1949). The Aztecs in Mexico used a decoction of the leaves to restrain excessive menses, and the bruised bark as an astringent (Curtin, 1949).

Mesquite-derived medicines were apparently rarely used for the epidemic diseases of Old World origin which have devastated American Indian populations, although the Paipai drank tea prepared from the boiled bark as a remedy for smallpox and measles (Owen, 1963).

COSMETIC

Many Indians were particularly concerned with gray or sun-bleached hair, and the use of mesquite gum hair plaster by both sexes was widespread (Palmer, 1878; Bourke, 1889; Hrdlička, 1906; Russell, 1908; Densmore, 1932; Gifford, 1932; Spier, 1933; Bell and Castetter, 1937). The plaster was usually prepared by boiling black mesquite gum or pitch, or bark covered with the black pitch, and river mud—preferably black mud. This plaster was used to kill lice, cleanse the hair, make it glossy, and dye it black. The Yavapai believed it necessary to wash out the plaster and put on a new application before daylight lest the sun “burn up the hair and turn it red or yellow” (Gifford, 1932:229). The Yavapai practiced abstinence while the plaster was on the hair. They used three or four consecutive applications (Gifford, 1932). The Quechan prepared the plaster from boiled mesquite gum and mistletoe (*Phoradendron californicum*, Viscaceae), (Densmore, 1932). Apparently the essential ingredient is the black mesquite gum or pitch.

Mesquite charcoal and sometimes the leaves were used in traditional tattooing practices. Southern California Indians used mesquite leaves to produce blue-colored facial tattoos (Palmer, 1878). The skin was punctured with a cactus spine and then moistened leaves were rubbed over the area to give the desired blue color. Mesquite charcoal was widely used for tattooing, mostly for girls during their puberty rites (Russell, 1908; Gifford, 1931, 1933; Forde, 1931), but various other kinds of charcoal such as willow (*Salix* sp., Salicaceae) probably could also have been used (Russell, 1908). The designs commonly consisted of thin lines on the chin or a vertical line on the chest. Mesquite spines were sometimes used as tattoo needles (Gifford, 1931).

The Seri made black facepaint from pieces of mesquite bark placed in water with chunks of mesquite pitch (the partially hardened oozing black exudate) and slowly cooked. Sugar was added to help darken the mixture. When sufficiently thick, the black mass was allowed to dry for a day or two and then formed into cakes or patties which could be stored until needed. When one of these cakes was rubbed into a bit of water on a stone, a paste resulted which was used as the facepaint. Facepainting among the Seri was an intricately developed art form and was practiced by both men and women until the mid-twentieth century (McGee, 1898, 1971).

RECREATION

Wooden balls, commonly made of mesquite wood or gum, were widely used in various native sports or games. Relay races in which men kicked the ball along a prescribed course were common. The Cocopa shaped a mesquite-wood ball, about 7 to 8 cm in diameter on a grinding stone (*metate*). It was sometimes inlaid with shell beads imbedded in arrowweed (*Pluchea sericea*)

gum (Gifford, 1933). The Papago made a similar game ball from either mesquite wood or a pebble imbedded in mesquite gum (Bell and Castetter, 1937). Seri women had a race, similar to the men's relay race (above), in which they rolled hoops made of strips of mesquite root. The hoop was rolled with a slender stick (Felger and Moser, 1971).

The Pima had a gambling or guessing game in which a small ball of black mesquite gum was hidden in one of four reed tubes. The object of the game was to guess which tube contained the gum ball (Culin, 1907; Russell, 1908). Maricopa men made dice from mesquite root wood, each one being about ". . . 7 inches long bearing marks burned into the face . . ." (Spier, 1933:342).

Papago girls made dolls of mesquite leaves tied with strips of corn husks for arms, legs, and heads (Underhill, 1939). Seri boys use a long mesquite spine, attached to a long stick or reedgrass culm (*Phragmites australis*, Graminae), as a toy harpoon for capturing small fish and crabs.

Certainly one of the most significant and pleasant aspects of mesquite in the lowlands of southwestern North America is the welcome shade and shelter it provides from the sun during the long hot season of the pre-monsoon drought when few other trees have foliage. In the Seri calendar, the moon or month corresponding approximately to May can be translated as the "moon to sit under shelter," implying that it is the month to sit in the shade of a ramada, such as one made of mesquite, and enjoy the pleasant spring weather.

MATERIAL INDUSTRIES

Black mesquite pitch and gum have been widely used to decorate pottery, and this is particularly well-documented among the Piman-speaking people and some of their neighbors (Hrdlička, 1906; Russell, 1908; Densmore, 1932; Castetter and Underhill, 1935; Fontana et al., 1962). The detailed report on Papago pottery (Fontana et al., 1962:77-78) describes the process of decorating pottery with mesquite-derived paint as follows, and may be taken as a model:

. . . Potters used to prepare red paint by mixing red hematite . . . with mesquite gum in the same way black paint is prepared with black mesquite bark.

Black paint, . . . is made with mesquite bark that has blackened on the tree where sap has oozed out, and with mesquite gum.

The potter strips the black bark from the mesquite trees with the help of a knife, and takes it, along with balls of clear golden mesquite gum picked from the branches, back to her house. She boils water in a small can, perhaps 1/2 to 1-gallon size, adding five or six strips of the black mesquite bark while the water is heating. She allows the water with the bark in it to come to a full boil, then removes it from the heat. At this juncture she adds a small handful of

mesquite gum, three or four balls, to the brew. She puts the can back on the heat and brings the paint to a boil from three to five more times.

When the paint nears readiness, the potter tests the color and consistency by dipping a stick into the can of paint and making a streak on a pot kept handy for this purpose. If the paint is not too runny, and if it has what seems to the potter to be the right color, she removes the can from the heat for the last time.

Some painters use feathers for a paint brush, but most use the unaltered tip of a devil's-claw (*Martynia*). They do not chew the tip or in other ways make it more brushlike. The painting implement is dipped into the paint, and a design is applied . . .

In all cases paint is applied to fired pottery which is generally, but not always, slipped. When the painting job is done, the pot is fired a second time to fix the paint. This final firing consists only of putting the painted surface of the pot directly on hot coals or in revolving the pot over flames for three or four minutes. Not only does this turn the mesquite paint a coal black color, giving it a shiny appearance where properly fired, but it tends to alter the color of the pot slightly, darkening it.

The Papago collected mesquite gum after the summer rains and made it into balls which were stored for future use. The balls could be boiled until syrupy and used like fresh sap. Mesquite gum was also used as a paint for war shields (Castetter and Underhill, 1935).

The cakes of black pigment made by the Seri from mesquite pitch, described above (see "Cosmetic," above), have also been used as a black basketry dye. The cakes are dissolved in boiling water and strips of natural basketry splints, prepared from stems of *Jatropha cuneata* (Euphorbiaceae), are immersed in the dye pot, which results in dyeing them light gray. However, black is preferred to gray. To obtain black, basketry splints which have previously been dyed reddish-brown with dye prepared from the root of *Krameria grayi* (Krameriaceae) are overdyed with the mesquite pitch preparation (Felger and Moser, 1971; Moser, 1973).

The Seri made extensive use of various kinds of strong cordage fashioned from mesquite roots (Figure 8-7). The root, with bark removed, was chewed to soften the fibers and then twisted (spun) into twine or rope. The Seri have specific names for three kinds of double-strand mesquite-root cordage, and another name for a three-strand rope. This cordage was used for harpoon lines for hunting sea turtles and spearing large fish, and for binding certain harpoon points to the shaft. A certain fish line, also given a specific name, was used for stringing fish as they were harpooned. The fisherman fastened one end of the line around his waist while wading through the water spearing fish. He strung fish on the line with a creosotebush (*Larrea tridentata*) point and trailed the fish several meters behind him in the water, so that if sharks were attracted he might not be attacked (Felger and Moser, 1971, in prep.).

Mesquite cordage was also used by the Seri to lash together bundles of

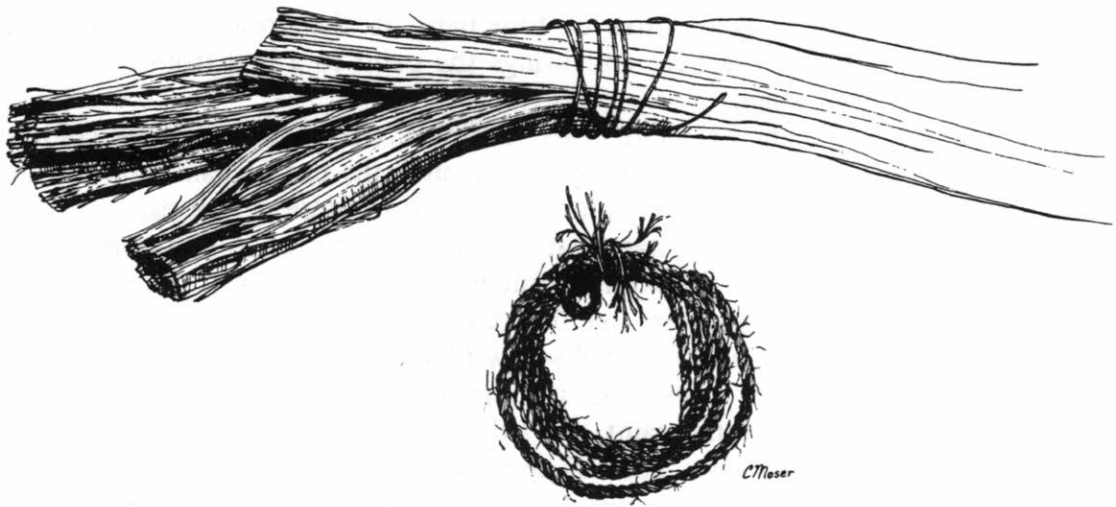


FIGURE 8-7. Fiber and twine made from mesquite roots (Seri, ca. 1965). The upper figure shows a section of root 30 cm long with the bark removed and after it has been pounded with a mano (grinding stone) that loosens the fibers. The lower figure is a 90 cm long piece of two-stranded twine.

reedgrass (*Phragmites australis*) for seagoing reed boats or *balsas*. The Seri *balsa* was sometimes 10 meters in length. The bundles were made by interweaving individual reeds, tying them with mesquite cordage, and then lashing three large bundles together to form the boat. Seri men also made temporary rafts for hunting sea turtles. These were made from pieces of driftwood tied together with mesquite cordage. After use the hunter would dismantle the raft in order to save the twine, which was regarded as a valuable possession (Felger and Moser, 1971, in prep.; also see McGee, 1898, 1971).

Seri use of mesquite twine also included waist cords and carrying nets. These nets were used to suspend the large, exceedingly thin, traditional Seri vessels, known as eggshell ware, from carrying yokes. This pottery was made as thin as possible, presumably to reduce weight, and was traditional in everyday use for carrying water (Bowen and Moser, 1968). On occasion, a small child, placed in a shallow tray basket, was carried across the desert in one of these nets swinging from a carrying yoke, the other end balanced with a water-filled pottery vessel or cargo (Moser, 1970). The assertion of Seri use of fabric woven from mesquite fiber (McGee, 1898, 1971) is not at all substantiated by present data (Felger and Moser, in prep.). The Kamia made strong twine from the inner bark which was first soaked in water for a month (Gifford, 1931). Spinning was done on the bare thigh. Mesquite roots and bark were occasionally used in basketmaking, such as among the Cocopa (Chittenden, 1901) and the Mohave (Merrill, 1923).

Immediately following the birth of the child, a Quechan, Pima, or Mohave father made a cradle from mesquite wood by bending a slender, flexible mesquite branch into an elongated U-shape and lashing to it flat slats of mesquite wood forming a flat bed. Hoops of mesquite were curved over the upper end as an awning (Forde, 1931; Bell and Castetter, 1937). Among the Yavapai the

cradle, made by women, had a frame of mesquite wood. Many other groups variously used mesquite wood, including the flexible root, in cradle construction (e.g., Gifford, 1931; Kissell, 1916; Felger and Moser, 1971). In prehistoric times the Hohokam likewise placed their babies on mesquite cradleboards (Haury, 1976). The Coahuilla made baby "diapers" and women's skirts from mesquite bark which was rubbed and pounded until it softened (Hooper, 1920; also see Palmer, 1878).

Mesquite wood served most technological functions for which wood was required. It was extensively used for making weapons: war clubs, atlatls, bows, and fending sticks (Grossman, 1873; Russell, 1908; Hooper, 1920; Gifford, 1936; Cosgrove, 1947). However, more flexible woods, such as catclaw (*Acacia greggii*, Leguminosae) or desert hackberry (*Celtis pallida*, Ulmaceae) were often preferred for bows (Felger and Moser, in prep.).

Prior to the introduction of steel, the Pima made awls from mesquite wood (Russell, 1908) and the Seri used large mesquite spines for sewing (Felger and Moser, in prep.). Planting sticks, digging sticks, weed cutters, and pestles were often made of mesquite (Russell, 1908; Forde, 1931; Cosgrove, 1947; Felger and Moser, in prep.). In the nineteenth and early twentieth centuries, the Pimans made shovels from solid pieces of mesquite wood (Russell, 1908). One of these shovels measures 133 cm in length, the blade being 43 cm long and 28 cm wide (Arizona State Museum, E-116). Trays made of mesquite wood were also prized household possessions of the Pima, and were used for such purposes as mixing bread (Russell, 1908).

A wooden bowl, usually made from mesquite, known as a *batea*, as well as spoons, have long been common kitchen items in northern Mexico (Thomas Hinton, personal communication). Use of mesquite for furniture, particularly for stools, table tops, and chairs, extends from pre-Columbian times until today in rural regions.

Uses for which the Seri traditionally have used mesquite wood include the carrying yoke, pestle for pounding mesquite pods and other hard fruit and seeds, clubs for killing fish and sea turtles, a part of the columnar cactus fruit-gathering device (Felger and Moser, 1974a), specific cooking forks, violin bows, and occasionally for the violin box (Felger and Moser, 1971; in prep.). The Maricopa made three kinds of paddles for pottery manufacture, all of mesquite wood. To seal a pottery vessel, they filled a still-hot and freshly fired pot with a fine gruel of ground mesquite pods (Spier, 1933).

Unless it is treated, mesquite wood is generally not cut during the summer months. However, it is easiest to cut during summer, from May until early September, because at that time the wood has the highest moisture content. Summer-cut wood invariably becomes riddled by a certain large wood-boring beetle larva, and the wood will be of little value unless treated. Summer-cut wood is sometimes stacked around a fire and heat sterilized. The logs are often slightly charred but the borers are killed. Another and often preferred method of curing summer-cut wood is to soak freshly cut wood in a pond for several weeks. The sap leaches into the water, producing an extremely unpleasant and strong odor and the water appears to be fermented.

The logs are then dried for about a month. Water-cured, summer-cut logs will be substantially lighter in weight than winter-cut wood, presumably because of the leaching of the sap. This is an important consideration if the wood is to be transported by pack animals (Alexander Russell, personal communication).

Since Spanish colonial times mesquite has been extensively utilized for fence posts and corrals. The traditional stacked-pole corral requires considerable skill and effort to construct. A large quantity of relatively straight logs about 1.5 to 2 m long must be obtained. Construction of a single 200-foot-square stacked-pole corral on the Papago reservation was estimated to have required seventy cords of mesquite logs (Clotts, 1915)! Although this would be a large corral, it is by no means unusual to still find corrals of this size in northern Sonora. Mesquite posts cut at the correct season or properly cured will last at least ten years after being set in the ground (Alexander Russell, personal communication).

Mesquite house posts, beams, roof supports, and smaller twigs have been extensively utilized in traditional architecture since ancient times (Haury, 1976). The corner posts and roof beams of recent Seri huts as well as the traditional ramada are commonly made of mesquite (Felger and Moser, 1971). Mesquite trunks are often crooked or forked and for this reason they were primary factors determining the low ceilings of many traditional native homes (Holden et al., 1936). Since Spanish colonial times, high ceilings have become more common, and use of mesquite for the main architectural members has waned. Yet Spanish colonial and territorial architecture makes extensive use of mesquite lintels over doors and windows, and occasionally for door posts and *vigas*. However, until recent decades mesquite door posts were commonly utilized in simple rural homes. Two posts were selected about 2.2 m long and to be as straight as possible. These were set at either side of the door, grooves cut in the posts, and a door was then fashioned from planks and hung on the post with hinges. Since the posts were seldom straight, the door had to be cut to fit the irregularities of the posts (Alexander Russell, personal communication). Forked mesquite posts were widely used to support large water-storage pottery vessels or *ollas* near the house (Spier, 1933).

Because it is water resistant and readily available, mesquite has been the preferred wood for the ribs and most of the framework of fishing boats and other small craft in northwestern Mexico since Spanish colonial times (León-Portilla, 1973; Felger and Moser, in prep.; Alexander Russell, personal communication). Curved limbs are individually selected to fit the design. However, mesquite wood is seldom suitable for the planking or keels because it does not yield long, straight-grained boards.

FUEL

Use of mesquite as a preferred as well as necessary energy source for cooking and heating has been widespread and is still popular among people

of southwestern North America (Meigs, 1939; Felger and Moser, 1971). It imparts a good flavor to food and burns evenly and hot. Excavations indicate that mesquite-fuel hearths have been a commonplace feature in the Southwest since ancient times (Haury, 1950) even though it is seldom mentioned in the literature. In many parts of northwestern Mexico mesquite wood continues to be the most important energy source for cooking meals. For domestic cooking purposes there is a strong preference for wood less than about 10 cm in diameter, and in northern Mexico housewives will often not purchase wood of larger size. The occasional larger pieces are used primarily for heating. Mesquite wood collected for fuel can be either dry dead wood, or it can be cut green during the cooler times of the year, and stacked and dried for a number of months until sufficiently dry. While cured, greencut wood is often preferred by the housewife, price and availability dictate the kind and condition of wood available. Because it is salable immediately, the dry dead wood is usually removed by commercial woodcutters before live wood is cut. For this reason, green wood is often the only wood available in populated areas.

It may be presumed that aboriginal hearths were generally constructed to utilize relatively modest quantities of firewood. Among the Seri and other Southwest Indians the kinds of foods prepared in traditional times often required only modest cooking time. For example, seeds or grains and other plant-derived foods were generally ground into flour. By reducing food materials to small particles with a high surface-volume ratio, cooking time is markedly shortened, and such foods were commonly consumed as gruels (Felger and Moser, 1975). For these hearths dead dry wood suffices and small pieces of wood are utilized. Among the Seri and others, the gathering of firewood was woman's work (Felger and Moser, 1976).

Mesquite wood is suitable for most purposes requiring high, steady heat, such as firing pottery (Bell and Castetter, 1937; Balls, 1962; Fontana et al., 1962). More recently, it has even been used for such purposes as tempering steel drills for drilling rock (Alexander Russell, personal communication).

In Mexico, woodcutters, or *leñeros*, have long been regarded as being in a low-status occupation. In recent decades their horse-drawn wagons have largely been replaced by stake-sided trucks, often about 2 to 2 1/2 ton capacity, and their tracks extend into remote reaches of the desert. The woodcutters have often been responsible for establishing access into remote places in the Sonoran Desert. After completion of the paved highway (Mexico, Route 2) from Sonoyta west to San Luis, Rio Colorado, Sonora, in 1956, which replaced the infamous Camino del Diablo (Ives, 1964), woodcutters gained access to the Pinacate region (Hayden, 1967). "The Mexican woodcutters from San Luis who immediately began to search the arroyos in the lava flows for ironwood and mesquite laid down an ever-widening network of truck tracks, many of which followed Indian trails . . . All credit must be given to the woodcutters who have, with their dilapidated trucks, with a barrel of water, a sack of frijoles, and an abiding faith in God, laid down tracks where no sensible person would have driven an army tank" (Hayden, 1967:335).

Similarly, various Indians, such as the Apache (Hrdlička, 1908) and the Papago have often supplemented their incomes by wood cutting.

With shortages and associated price increases, wood cutting has become more profitable, particularly north of the Mexican border, with a cord of home-delivered mesquite wood fetching \$50 to \$60 or more in southern Arizona cities. Four cords of wood commonly constitutes one load of a modern two ton truck (Richard Crossin, personal communication). The present harvest of mesquite wood for luxury home heating and restaurants, as well as for everyday cooking on both sides of the border, is not being practiced on a sustained-yield basis, and the resource is diminishing. Since larger diameter wood is selected for heating rather than for cooking, particularly in the case of luxury usage, wood cut in the United States tends to be from older trees and limbs than that cut in Mexico, where the primary use is still for domestic cooking. Mesquite stumps readily produce new growth after cutting, and the regrowth wood is excellent for cooking fuel. Thus, particularly in the case of domestic cooking fuel, the resource would seem well suited for sustained-yield management practices.

RELIGION AND RITUAL

While mesquite was a staff of life in arid regions of southwestern North America, it was generally not holy or venerated. It was essential but not noble. Unlike cultivated crops, human intervention seldom seemed necessary to insure production of the crop, which was nearly always available in excessive quantity. Nevertheless, other dependable or unfailing perennial wild crops, such as the saguaro (*Carnegiea gigantea*) among the Papago (Castetter and Underhill, 1935), do figure into native religious practices. Saguaro fruit was the source of an intoxicating wine and food employed in a mystical sense to bring forth rain for the planting of crops, heralding the Sonoran Desert New Year.

Among most tribes, such as the Seri, information regarding ritualistic use of mesquite is negative. With the exception of the Cahuilla, the few known cases of ritualistic practices involving mesquite generally do not center on mesquite itself as the object of the ritual. Some of the more prominent cases are mentioned below. Among the Cahuilla, "religious sanction was required prior to gathering the pods, which was accomplished by means of a rite known as 'feeding the [ceremonial] house'" (Bean and Saubel, 1963:66), which served to bring together the members of a given lineage. The ceremonial or political leader picked fruit to be prepared and eaten in the ceremonial house, after which others were free to gather the crop. A special class of men responsible for certain religious practices were entrusted with powers to regulate rain and other natural phenomena and it was their duty to bring early spring rains which the Cahuilla regarded as necessary to insure an ample mesquite crop (summer rain is rare in the California deserts). Furthermore, at

harvest time these men were responsible for holding off summer rains, so that dampness would not spoil the fruit (Bean and Saubel, 1963, 1972).

Various people, such as the Cahuilla, Kamia, Maricopa, Mohave, and Quechan, had clans or lineages named for the mesquite, some of which had totemic significance (Bean and Saubel, 1972; Bell and Castetter, 1937; Bourke, 1889; Gifford, 1918). Among the Maricopa a feathered pike of mesquite wood was carried into battle, and, since it was to be in the front of the battle, the warrior carrying it became the battle leader (Spier, 1933). A Pima warrior who killed an Apache underwent a cleansing ceremony involving plastering the hair with mesquite gum and black clay (Grossman, 1873). Similar practices were observed by the Maricopa, and during their sixteen-day purification rite the only food eaten was small quantities of mesquite *atole* or gruel (Spier, 1933).

Plasters of mesquite gum and clay were involved in a Quechan Indian girl's puberty ceremony, the plaster being applied to the girl's hair and also to the hair of men who happened to be visiting during the time of her ceremony (Curtis, 1908; Bolton, 1930; Forde, 1931).

The Papago sometimes buried their dead in a sitting position, and over the burial a roof was erected of palo verde (*Cercidium* spp.) or mesquite taken from the deceased man's house (Lumholtz, 1912). A green mesquite pole was placed on each side of the Cocopa funeral pyre (Gifford, 1933), and as early as the first and second century B.C. the Hohokam people of Snaketown in Southern Arizona cremated their dead on mesquite wood pyres (Haury, 1976).

SUMMARY

Mesquite was the most widespread and important resource of the diverse native peoples in southwestern North America. It was utilized for food, fuel, shelter, weapons, tools, fiber, dye, cosmetics, medicine, and a multitude of other practical as well as aesthetic purposes: every part of the plant was used. Mesquite and several other major perennial wild crops were predictably available for harvest at the height of the pre-summer dry season and at the onset of the short summer monsoon season, making this a time of plenty. European introduction of winter-spring agricultural crops, namely winter wheat, provided a substitute for the mesquite harvest.

The mesocarp of the pods provided a major carbohydrate or calorie-rich component in native diets. It was primarily prepared as flour, and commonly made into a gruel, cakes, and beverages. The seed was not extensively utilized in historical times even though it is high in protein content. However, a specialized tool, the gyratory crusher, appears to have been developed in ancient times for processing substantial quantities of mesquite seeds. The whole pods, flour, and prepared cakes were commonly stored in large quantities for future use. The herbage and sap or gum feature prominently in the regional pharmacopoeia, and the most common medicinal usage was for treating eye ailments.

