

The Use of Palms by the Apinayé and Guajajara Indians of Northeastern Brazil

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Abstract

The use of palms by two tribes of Indians in Northeastern Brazil, the Apinayé and Guajajara, was studied to determine both specific uses and the overall degree of dependence of these people on palms in their daily lives. Three indigenous reserves in Brazil were visited: Caru and Pindaré in the State of Maranhão, and São José in Goiás. Dependence on palms was inversely related to the people's degree of acculturation. As the natural resource base declined (including the availability of palms), people began to cultivate the so-called "modern crops" and reduce their utilization of wild palms. Seventeen species of palms were found to be used by these two groups of Indians, of which *Orbignya phalerata*, the babassu palm, was of greatest value, yielding a variety of important products. In this area palms provide food, fuel, shelter, fiber, construction materials, medicine, magic and other basic necessities of life. Loss of knowledge concerning palm uses indicates the urgency with which plant usage must be catalogued among indigenous groups.

Key words: palms, ethnobotany, Apinayé Indians, Guajajara Indians, Brazil

Resumo

Foi estudado o uso que fazem das palmeiras, duas tribos de índios do Nordeste do Brasil—os Apinayé e os Guajajara—com a finalidade de conhecer tanto os usos específicos como, de um modo geral, o grau de dependência destes povos quanto às palmeiras, na sua vida diária. Três reservas indígenas foram visitadas: Caru e Pindaré no Estado do Maranhão e São José, em Goiás. O grau de aculturação destes povos está diretamente relacionado ao uso que fazem das palmeiras. Assim que o ambiente natural em torno deles se declina (inclusive a disponibilidade de palmeiras), começam a cultivar as chamadas "culturas modernas," com a redução do uso de palmeiras. Encontrou-se que dezessete espécies de palmeiras são usadas por estes dois grupos de índios; *Orbignya phalerata*, o babaçu, é a de maior valor. Nesta área, as palmeiras fornecem alimento, combustível, abrigo, fibras, material de construção, remédios, elementos de magia e demais coisas básicas da vida. Os estudiosos devem continuar registrando a notável diversidade de uso de plantas pelos indígenas, pois estes conhecimentos estão sendo perdidos em ritmo acelerado.

I. Introduction

This paper reports on a survey of the use of palms by two tribes of Brazilian Indians, the Apinayé and Guajajara, carried out during August–

September 1983. The purpose of the fieldwork was to collect germplasm of the babassu palm (*Orbignya phalerata* Mart.), as part of a long-term study of the domestication of this genus for oil, charcoal and meal production. The study

team comprised scientists from the New York Botanical Garden (NYBG), the Centro Nacional de Recursos Genéticos (CENARGEN), Brasília, and the former Instituto Estadual do Babaçu (INEB), once located in São Luís, Maranhão. We carried out in-depth studies on the taxonomy, utilization and folk-classification of the palms in the Apinayé and Guajajara territory. Additionally, collections were made of other useful indigenous plants as well as of crop plants; these will be the subject of a forthcoming paper.

II. The Apinayé

The Apinayé are one of the indigenous groups of Northeastern Brazil. They speak a language of the Gê Family; Apinayé is very similar to other dialects of Northern Kayapó (Davis, 1966).

The Apinayé presently live in two settlements ("aldeias"), Mariazinha and São José (6°30'S; 47°30'W). These are located in the Municipality of Tocantinópolis, in Northern Goiás (Fig. 1). Nimuendajú (1983) wrote that during his first visit to the area in 1928, this group lived in four aldeias: Cocal, Gato Preto, Bacaba and Mariazinha. According to Pereira (1982), the Apinayé comprised 4200 people in 1823, declined to a low of 150 in the late 1800's and early 1900's, and in recent times (1981) numbered 448. Epidemics of smallpox, fever and other health problems are blamed for much of the decline in population. Our work was carried out at São José, as the people there utilize babassu and other palms to a far greater degree than at Mariazinha.

The Fundação Nacional do Índio (FUNAI) reserve consists of a total of about 101,000 hectares of land. The absence of a land survey has led to conflict with the settlers inhabiting the region around Tocantinópolis, the major urban center for the area. The Trans-Amazon highway passes some 3 km from the aldeia of São José. This has changed the community, and there is presently a substantial trade of producing handicrafts for sale to the travellers along that road.

Traditionally, the Apinayé depended heavily on the babassu forests that cover their land. Farming, hunting and fishing were also important, although the latter is of less importance at present. Today, a cooperative for the collection and sale of babassu exists, and this is probably the major gathering activity of the people. In

addition, a great deal of leaves of jaborandi (*Pilocarpus jaborandi*, Rutaceae) is collected for sale to pharmaceutical laboratories for processing into the drug pilocarpine, used to treat glaucoma. During the period of our visit, the inhabitants collected jaborandi leaves one or two days per week on a large scale basis. A truck, operated by a person acting as a middleman, periodically collects the dried leaves.

In 1980, FUNAI developed a cooperative project of rice, corn and bean production (Pereira, 1982). According to our observations, present day agriculture includes the cultivation of a large quantity of rice, beans, cassava and corn. Other cultivated crops include sweet potatoes (*Ipomoea batatas*), yams (*Dioscorea* spp.), banana (*Musa sapientum*) and pineapple (*Ananas comosus*).

The most complete account of the culture of this group was written by Nimuendajú earlier in this century; this reference has been recently reprinted by the Museu Paraense Emílio Goeldi in Belém, Pará (1983). There have also been studies by Da Matta (1973), Maybury-Lewis (1960), Pereira (1982), Oliveira (1930), Lowie (1946), and others. Information on the language has been gathered by FUNAI working in collaboration with the Summer Institute of Linguistics (SIL). They have prepared a four volume set of language primers (1975a, 1975b, 1975c, 1976).

According to the Indians, the present site of habitation was recently settled only six months or so prior to our visit. It contains several dozen palm thatch houses constructed in a circle around an open field, to one side of which is a small stream used for bathing, drinking and irrigation (Figs. 2, 3). The former site, a few kilometers away (but within the reserve), did not have enough water for their needs and was abandoned. That site was said to have been occupied for "many years."

III. The Guajajara

The Guajajara were visited at two sites. The first location was the FUNAI post, Caru, along the Rio Pindaré near the junction of the Rio Caru and Rio Pindaré (3°40'S; 46°05'W) (Fig. 1). This is in the Municipality of Bom Jardim, Maranhão state. Caru is a more isolated site, recently made more accessible by nearby construction of the



FIG. 1. Location of the three reserves visited: Caru, Pindaré and São José.



FIGS. 2, 3. FIG. 2. Side view of Apinayé houses at São José. House walls and roof are made from *Orbignya phalerata*. Note circular placement of village houses. FIG. 3. Front view of Apinayé house. Note dense stand of *Orbignya phalerata* behind houses.

Carajás railway. We entered Posto Indígena Caru by driving for many miles along the uncompleted railway bed and crossed the Rio Pindaré by foot to reach the village. Several days after our arrival we were informed that the railroad bridge between us and the only accessible road would be closed to vehicular traffic within a day or so, and railroad ties installed across it. Had we stayed in Caru, there would have been no way of returning with our vehicle, except by building a barge on the river four to six months in the future when the water level had risen to an adequate height. We chose, therefore, to leave this post and travel to Posto Indígena Pindaré, another site of Guajajara habitation. This is also located in the Municipality of Bom Jardim, along the Rio Pindaré, about 15 kilometers west of the town of Santa Inês (3°30'S; 45°30'W) (Fig. 1). As Posto Indígena Pindaré is near a paved road, the reserve has much more infrastructure and facilities, such as electricity for a portion of the night. Consequently, due to this accessibility, there is a high degree of acculturation among the group, and less primary forest in the region as a result of past exploitation.

Posto Indígena Caru was founded in 1975. According to the most recent census, 84 people live in the village. There appears to be a great deal of intermarriage between Indians and local settlers, much more so than at any of the other reserves visited during this study.

The development of the Carajás railway system has an impact upon the lives of the villagers in Caru. In return for the use of their land, the Indians report that they were provided with consumer goods, such as refrigerators. In addition, a well was dug for drinking water and a pump installed, forests were cleared and fenced for pasture, and other improvements made in the community. A cement block structure serves as a community center and school, and is staffed by a full-time teacher (Fig. 4).

We were not able to get information on the size of the Caru reserve. Services provided, in addition to those previously mentioned, include some health care, electricity (although the generator was not functioning when we were there), and sanitary services. The population at Caru came originally from Pindaré. There is also some minimal contact with another tribe, the Guajá, in an area near to the reserve. The Guajajara we spoke to estimated that, over the past 15 years,

perhaps 20 persons have settled in a provisional FUNAI post (Posto Indígena Awá) with an undetermined number of Guajá still living in the forest. The Guajá, much more dependent than the Guajajara on babassu palms for subsistence, obtain starch, protein, oil, fiber, and fuel from the wild stands of palms.

The crops grown in the Caru reserve include rice, corn, cassava and beans, as well as yams and peanuts. Local varieties of these crops are still grown, and, according to our informants, modern varieties of rice and corn have also been introduced and accepted.

The FUNAI representative at P.I. Pindaré noted that the most recent census counted 87 families in the village, 195 females and 192 males. The post was founded around 1914, and probably as a result is relatively developed. In contrast to the palm thatch/mud huts found in the other reserves visited, the Guajajara of Pindaré have cement houses provided by the government (Fig. 5). Interestingly enough, however, many of these houses have additions built of palm thatch. People report that the traditional type construction remains much cooler in the hot weather, and therefore choose to live in palm thatch huts.

Cultivated plants at P.I. Pindaré include rice, corn, manihot, banana, beans and cucurbits. Material of these and other crops for the CENARGEN germplasm bank was collected here, as well as in the nearby village of Jurongo a few kilometers away. People were very eager to share their indigenous cultivars with us, and refused to accept compensation. Collections of traditional varieties included *Arachis*, *Cucurbita*, *Dioscorea*, *Oryza*, *Ipomoea*, *Manihot*, *Phaseolus*, *Ricinus*, *Sesamum*, *Vigna*, as well as *Orbignya*.

Much ethnological information on the Guajajara is found in Wagley and Galvão (1948, 1949). During fieldwork in 1941-1942, the authors estimated the population of the Guajajara to number more than 2000. The Guajajara refer to themselves as Tenetehara, and are part of the Tupí-Guaraní linguistic family. The Guajajara are very much involved in shamanism and with divinities. The shamans cure by means of sucking or massaging, to remove the harmful element from the person afflicted. We found that the Guajajara claimed to use greater numbers of plants in ritual baths and ceremonies for stimulating healing than did the Apinayé. However, in view of the short duration of our visits, it would be



FIGS. 4, 5. FIG. 4. Main avenue of village at Caru. Note cement school house/town hall. FIG. 5. Typical house at Pindaré; note that one section is constructed from cement block while the addition is constructed from *Orbignya phalerata*.

presumptuous to attempt an accurate comparison of medicinal and magic plants between these groups, as this area of knowledge is often the most closely guarded and secret, while we were primarily interested in food plants. We had contact with two shamans from São José, one Apinayé, as well as a Shavanté from the same region.

Boudin (1978) provides much information on the language spoken by the Guajajara in his "Dicionário de Tupi Moderno." Included in this work are plant names.

Gomes (1977) provided a great deal of information on the Guajajara, based on his fieldwork in the region in 1975. Several chapters in his study are devoted to the economy of these people, and a number of extractive plant products are mentioned: babassu kernels (*Orbignya phalerata*), copaíba oil (*Copaifera langsdorffii*), jutaica and jatobá resins (*Hymenaea* spp.), almecega resin (*Protium* sp.) and cumaru nuts (*Diopteryx odorata*).

The use of *Cannabis indica* by the Guajajara, as reported by Wagley and Galvão (1948) has continued to the present. These authors noted that native tobacco (presumably *Nicotiana rustica*) and *Cannabis* are smoked as a "general pastime," and that native tobacco is frequently used by shamans to treat illness. We did not observe frequent use of the *Cannabis* in either village, although workers who have had contact with Guajajara in other areas report *Cannabis* smoking to be a traditional activity. In general, the traditional use of hallucinogens or stimulants seemed to be minimal relative to the use of these substances by Indians elsewhere in lowland Amazônia.

IV. Palm Utilization

To simplify the presentation of the data on palms, the species used by both the Apinayé and Guajajara will be presented together, in a list arranged alphabetically by Latin binomial. Comments on the morphology of the palm, the common names by which it is known, uses, and voucher specimens are included under each binomial heading. Apinayé and Guajajara (Tenehara) names for palm species are transcribed using symbols mostly from the International Phonetic Alphabet. Voucher specimens have been deposited at CEN and NY; these two institutions

also have duplicate material that will be distributed in the future.

Acrocomia aculeata (Jacq.) Loddiges ex Mart.

Portuguese: Macauba.
Guajajara: Pãrena, mukazá.
Apinayé: Róni.

This is a tall palm to 6 m in height or more. The trunk is covered with spines. Large panicles, to ca. 1 m in length contain hundreds of round fruits ca. 3.5 cm in diam., that turn green-yellow when mature.

Use: The yellowish fruit mesocarp is said to be very nutritious and contains an edible oil. The endocarp is woody and durable, and surrounds an oil-rich endosperm similar in consistency to coconut. The endocarps are boiled in water or roasted directly on the fire, cracked and eaten. For oil extraction, the ripe fruits are cracked open and the oleaginous endosperm macerated with a mortar and pestle, releasing the oil. The air-dried kernel contains 53–65% oil (Balick, 1979). According to the Guajajara at Caru, this oil is preferred to oil from babassu.

In previous times the Guajajara would find a stem that had already fallen and strip off the outer portion. The central portion was then burned and the resulting ash used to fertilize crops such as rice, corn and manihot.

Voucher specimens: Balick et al. 1556, 1623.

Allagoptera leucocalyx (Drude) Kuntze.

Portuguese: Coco de chapada.
Apinayé: Graçaré.

This low growing, acaulescent palm is common in the scrub savanna on sandy soil (vegetation known in Brazil as "chapada"), where it is often found in association with *Orbignya eichleri*. Small panicles of fruit are borne in the center of the rosette of leaves.

Use: The fruits are eaten when ripe or when still green.

Voucher specimen: Balick et al. 1572.

Astrocaryum campestre Mart.

Portuguese: Tucum da chapada.
Apinayé: Roře.

This acaulescent palm grows to ca. 0.5 m tall and has spiny, gracefully pinnate leaves. Small

panicles of fruit appear from the center of the rosette of leaves, subtended by a papery prophyll and a sturdy bract ca. 50 cm long \times 6.5 cm wide. It is common in the chapada area of the Apinayé reserve, growing in association with *Orbignya eichleri*.

Use: The Apinayé use the dried fruits to make beads and ornaments for necklaces. The endocarps are carefully polished and carved into a variety of figures (Fig. 6). The fruits are edible, with a tasty nut-like endosperm. This palm is harvested as a source of palm heart (palmito). The leaves furnish a purported cure for venereal disease. To prepare this cure, leaves of foře are collected, macerated and made into a tea with water. The concoction is put outside the house at night, and consumed early the next morning. The young leaves are made into thread by stripping the bundles of fiber from the leaves and rolling them together. This thread is used for many purposes.

Voucher specimen: *Balick et al. 1586.*

Astrocaryum munbaca Mart.

Portuguese: Marajá.
Guajajara: Marazu'a.

This palm is commonly found in the Pindaré reserve, growing in association with *Orbignya phalerata*. Marazu'a is a caespitose palm, bearing thin trunks to ca. 4 cm in diam., and growing to 4 m tall. The stem is covered with rings of flattened brown spines.

Use: The Guajajara use this palm as a source of edible fruit. When green, the entire fruit can be eaten; when ripe, only the endosperm is edible.

Voucher specimen: *Balick et al. 1479.*

Astrocaryum vulgare Mart.

Portuguese: Tucum.
Guajajara: Tucumã.
Apinayé: Roindí.

This is another caespitose species of *Astrocaryum*. The trunk is much more substantial than the other two species collected during this study, growing to 10–17 cm in diam. Tucumã grows to 4–5 m or more in height, and is common in old fields (capoeira), near dwellings and in the forest in both Caru and São José. The heavy panicles

are 1–1.4 m in length and bear many globose fruits ca. 5 cm long \times 3.5 cm wide.

Use: The Guajajara harvest immature fruits and consume the liquid endosperm (Fig. 8). It is a somewhat tart drink that satisfies thirst. Other species in this genus throughout the Amazon Valley are similarly harvested to consume the liquid endosperm. This is a useful fiber plant. The Guajajara process the young inrolled leaves into bowstrings, local crafts (Fig. 9), etc., and the spines are used in weaving fringes on hammocks—to mark the spots where designs are to be fashioned. These fringes are called Kihawmu-pirãg (“that which reddens the hammock”).

Voucher specimens: *Balick et al. 1475, 1626.*

Bactris sp.

Portuguese: Marajá do campo.
Guajajara: Marari'iw.

This is a small caespitose palm found in the secondary forests of the Caru reserve. The palm has slender stems, ca. 4 cm in diam., covered with rings of flattened black spines 3–6 cm long, and grows to 5 m in height. The leaves are pinnate, ca. 3 m in length.

Use: The fruit is edible, with the mesocarp tasting somewhat sweet-acidic. The Guajajara harvest the stems to weave fish traps.

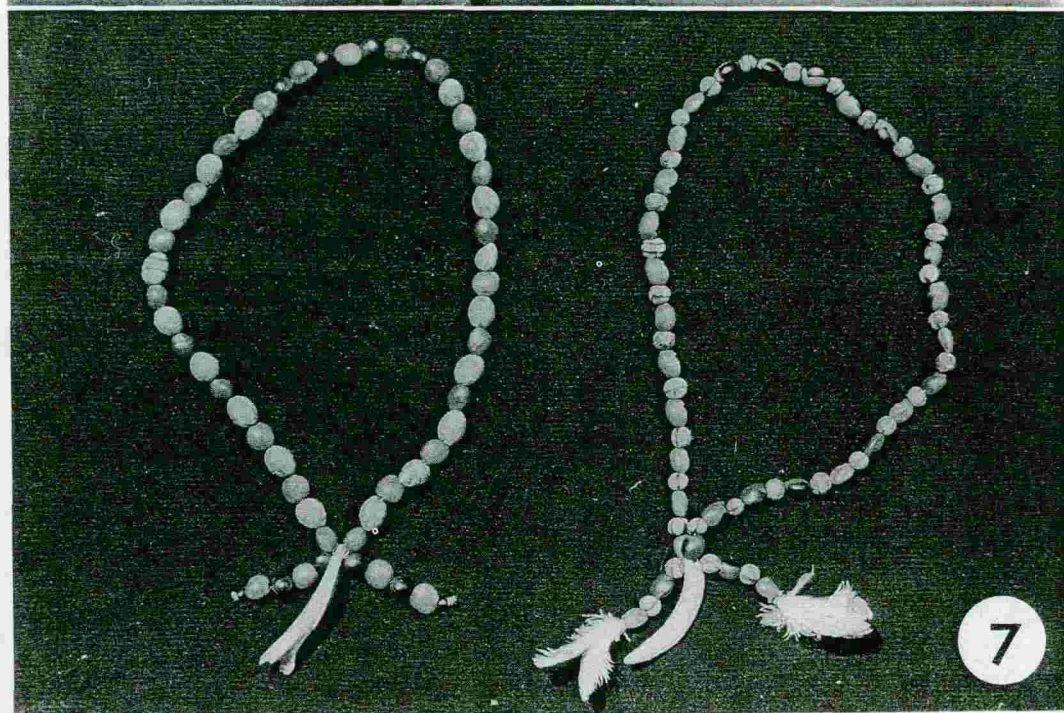
Voucher specimen: *Balick et al. 1525.*

Desmoncus polyacanthos Mart.

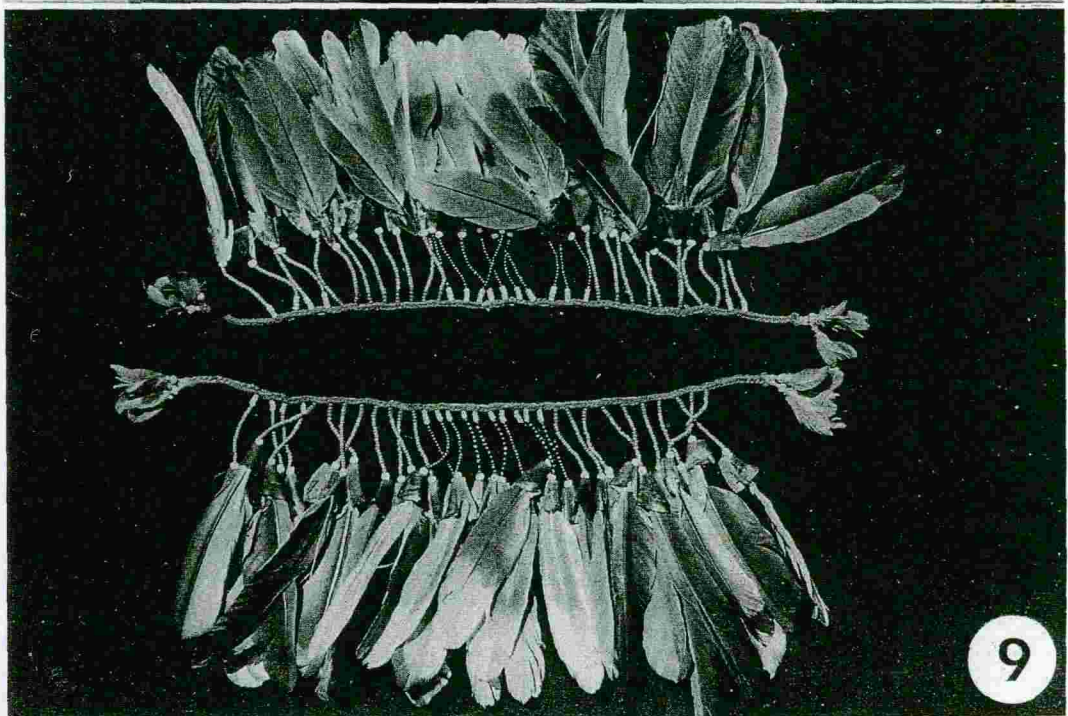
Portuguese: Titara.
Guajajara: Iwipo-tsu.
Apinayé: Roingandí.

This is the only genus of vining palms in the New World. It is common in both the Caru and São José reserves, growing in the secondary forests (capoeira) often in association with babassu. The palm was observed growing to 7 m or more into the forest canopy. The apical pinnae on the leaves are modified into reflexed spines, which attach onto surrounding vegetation. Small panicles of greenish (unripe) fruits were observed on the stem.

Use: The Guajajara use the central portion of the stem, after cutting away the spiny leaf bases, to attach arrow points to arrows. The Apinayé use the fruits of this species as a curative, when a stomachache, caused by consuming too much



FIGS. 6, 7. FIG. 6. Apinayé necklace made from unidentified seeds beaded on *Astrocaryum campestre* thread with fish carved from the seed of the same species. These necklaces are for personal use. FIG. 7. Apinayé necklaces made for trade or sale. Necklace on left is made from seeds of *Oenocarpus distichus* and *Ormosia* sp.



FIGS. 8, 9. FIG. 8. Guajajara drinking liquid endosperm of *Astrocaryum jauari*. FIG. 9. Traditional feather ornaments worn by the Apinayé; cord on which feathers are strung is made from *Astrocaryum campestre*.

Acrocomia occurs. Eating a few fruits of foingandí is said to ease the pain.

Voucher specimens: *Balick et al.* 1470, 1493, 1588.

Euterpe oleracea Mart.

Portuguese: Juçara.

Guajajara: Watsa'iw.

Apinayé: Kambíre.

This caespitose palm is found in moist areas of Caru and São José, growing to 7 m in height. It grows along streams and in primary forest remnants. It is common throughout much of lowland Amazônia, and the cluster of tall, thin stems bearing gracefully drooping, pinnate leaves is strikingly beautiful in the landscape. Juçara, or açai as it is more widely known, yields heavy panicles of purple, globose fruits ca. 1 cm in diam.

Use: Both the Guajajara and Apinayé collect the fruits of this palm and eat them fresh or make them into a beverage. People claim that juçara fruit is full of vitamins. The dried seeds of this species are also used by the Apinayé to make necklaces, along with seeds from *Ormosia* sp. (Fig. 7). They are pierced with a hot needle and put on strings. The *Euterpe* seeds often are dotted with black color from *Genipa* dye, and animal teeth or feathers are also added to the necklace. These were used traditionally by the people and are now offered for sale along the highway.

Voucher specimens: *Balick et al.* 1476, 1621.

Geonoma pohliana Mart.

Portuguese: Içai.

Apinayé: Teeré.

This is a diminutive understory palm found in the disturbed forests around São José, growing in association with *Orbignya*. The slender stem, 2.2 cm in diam., supports a tuft of pinnate leaves 4 m above the forest floor. The ripe panicles consist of red rachillae and round black fruits 0.5 cm in diam.

Use: The Apinayé use this as a remedy for stomachache caused by drinking too much *Euterpe* beverage. Young developing leaves gathered from the crownshaft (palmito) are used to make an infusion with water. The tea is con-

sumed warm and is said to calm the stomach and lessen the pain.

Voucher specimen: *Balick et al.* 1587.

Mauritia flexuosa L. f.

Portuguese: Buriti.

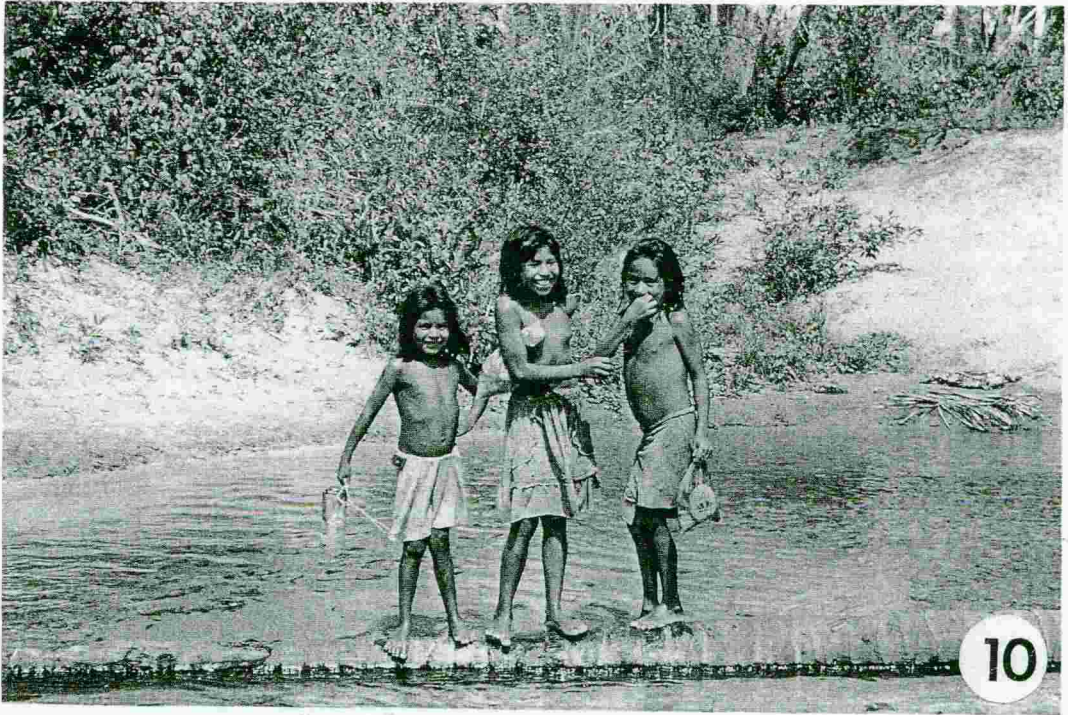
Guajajara: Miriti'iw.

Apinayé: Ngrá.

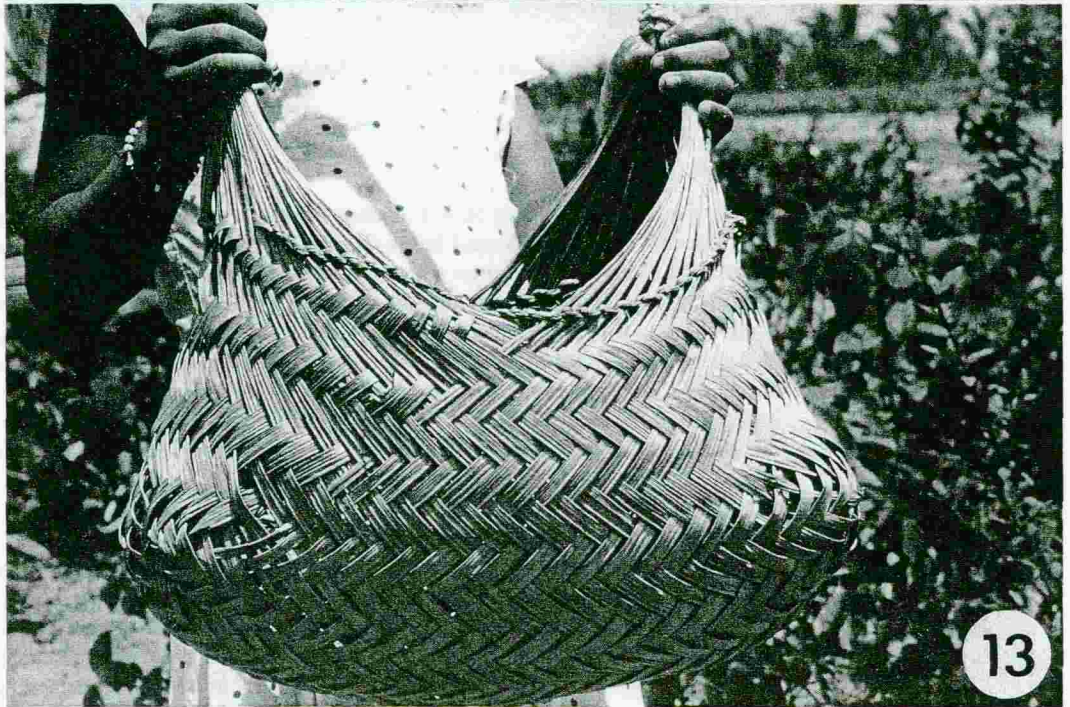
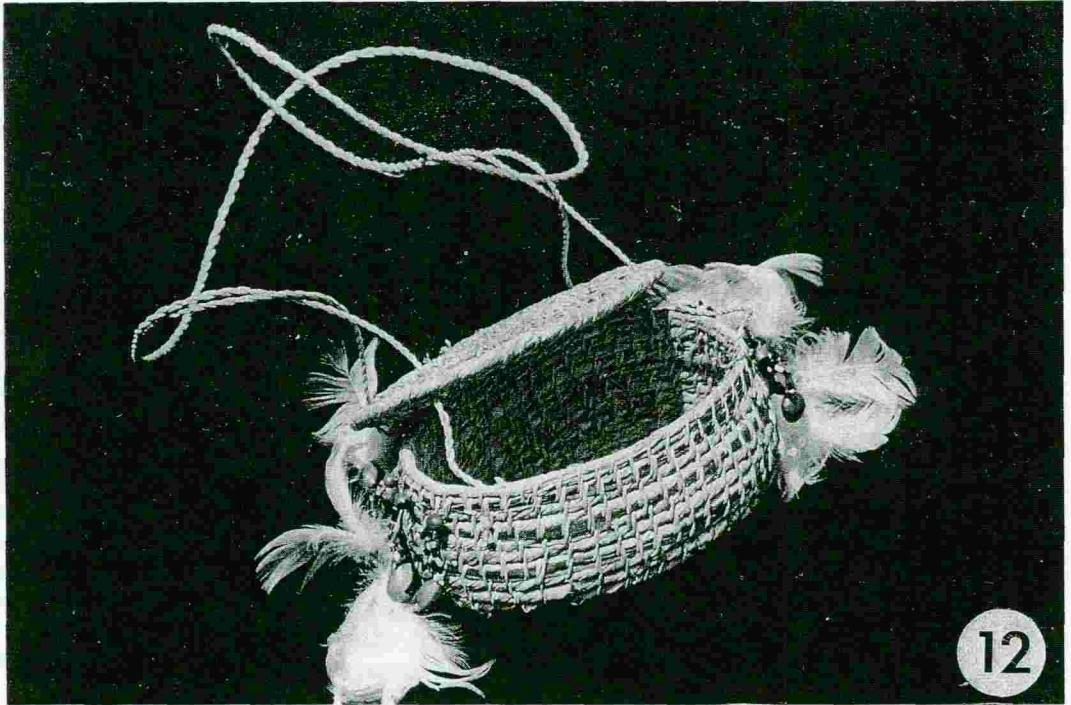
This is a tall species, to 15 m in height, with palmate leaves. It is common in moist areas such as along the margins of the river and in the moist gallery forests near São José and Caru. The trees bear massive panicles of ovoid, rust-colored fruits. These fruits can be 5 cm in length, and are covered with small scales, under which is a yellow, oleaginous mesocarp.

Use: The Apinayé consume the mesocarp of this fruit as a regular component of their diet. It is common to see people walking around with baskets or bags of these fruits and, after stripping off the scales, sucking on them to remove the pulp (Figs. 10, 11). The Guajajara also eat this fruit. It is very important as a fiber plant. The Apinayé collect the young, inrolled leaves, cut off the segments and place them in the sun to dry. The segments are beaten with a stick and shredded into many fibers. These are rolled between the hands to form a cord and used to make baskets (Fig. 12), belts, head straps for pack baskets commonly constructed from *Orbignya* pinnae, and necklaces. It is common to see bunches of the fiber hanging in people's houses. The artifacts are sold along the Trans-Amazon highway and in Tocantinópolis. In addition, the outer portion of the leaf petiole provides fibers for weaving the baskets that are used to press cassava, known as tipi-tipi or sebucan elsewhere in the Amazon Valley. The petiole fiber is said to be quite durable.

The gurá palm is a part of the traditional folklore of the Apinayé. When a young man wishes to marry, he must first prove his strength by carrying a piece of the trunk of *Mauritia flexuosa* (at least 1 m long) from the forest to the middle of the encampment. Upon his arrival, he is met and surrounded by a circle of singing women from the village. The sister of the bride and her godmother ("madrinha") take the groom by either arm to greet his bride. A meal is shared by the



FIGS. 10, 11. FIG. 10. Apinayé children collecting fallen fruits of *Mauritia flexuosa* growing along the river. FIG. 11. Apinayé children eating *Mauritia flexuosa* fruits. Note pack basket made from *Orbignya eichleri*.



FIGS. 12, 13. FIG. 12. Basket woven from *Mauritia flexuosa* fiber; this style is often sold along the road by the Apinayé. FIG. 13. Carrying basket used by the Apinayé woven from *Mauritiella armata*. Headstrap (not shown) is woven from *Mauritia flexuosa*.

bride and groom and they are considered to be married.

Voucher specimen: *Balick et al. 1624.*

***Mauritiella armata* Mart.**

Portuguese: Buritirana.

Apinayé: Gřařære.

This is a much smaller palm than the previous species, but it is found in similar environments—moist areas and gallery forests close to the river. Buritirana grows in clusters of 4–6 trunks, to 7.5 m in height, and has stems covered with spines. The leaves are pinnate, with a waxy bloom on their underside. Fruits are borne in panicles ca. 1 m long, are ovoid, and 2.5 cm long × 1.3 cm wide, turning orange when ripe.

Use: The mesocarp is pulpy, although not as thick and oleaginous as the previous species. The fruits are eaten and made into a beverage by soaking in water. The segments of the leaves are woven into baskets (Fig. 13) and other handicrafts, and the stem wood is used to make bows.

Voucher specimen: *Balick et al. 1622.*

***Maximiliana maripa* (Correa da Serra) Drude.**

Portuguese: Inajá.

Guajajara: Inazá.

Apinayé: Rigré.

This species is commonly found in association with babassu, in the forests and fields cleared for cultivation. Because it provides a useful product, and because of its massive stem, it is usually left when clearing the forest. The palm grows to 8 m or more in height, and the stem is 25–30 cm in diam. The large pinnate leaves are often 7.5 m in length, with pinnae irregularly spaced along the rachis and inserted at various angles to the plane of the leaf. Heavy panicles of fruit are produced each year.

Use: The Guajajara eat the fruits. These can be boiled or roasted, and the endocarp split to obtain the coconut-like endosperm. The mesocarp is oleaginous, and in some areas is exploited for oil; no mention was ever made of this practice during the present study, however. I have also seen the leaves woven into thatch, but did not notice it used for this purpose at any of the villages visited. It appears to be of lesser impor-

tance, as the babassu palm is in such great abundance and provides superior products.

Voucher specimen: *Balick et al. 1555.*

***Oenocarpus distichus* Mart.**

Portuguese: Bacaba.

Guajajara: Pinuwa'iw.

Apinayé: Kamberdí.

This distinctive palm is common in the primary forests around São José and Pindaré, where it grows in association with babassu. It can be easily identified by the 2-ranked arrangement of its pinnate leaves. The palm is solitary, growing to 12 m in height, with a massive trunk ca. 26 cm in diam. Another distinctive feature of this species is its hippuriform or horsetail inflorescence, in which over 100 pendulous rachillae hang from a stubby primary axis in the same manner as a horse's tail. The fruits are deep purple, ovoid, ca. 2 cm long × 1.5 cm wide and are borne in great abundance.

Use: The fruits of kamberdí are edible, and the mesocarp rich in oil. In addition to being consumed as a refreshing beverage, the Apinayé use the drink to treat hepatitis. Fruits are macerated in warm water, and the mesocarp removed. This is boiled and the fibers filtered out. It is allowed to cool off and then is consumed once per day for three days of treatment. Balick (1986) discussed the high nutritional quality of the fruits in this complex, and it is likely that this beverage serves to fortify the patient during bouts of hepatitis. The Apinayé were also seen gathering the newly-emerging pinnae for weaving into baskets (Fig. 14), and stringing the dried endocarps into necklaces (Fig. 7).

Voucher specimens: *Balick et al. 1527, 1615.*

***Orbignya eichleri* Drude.**

Portuguese: Piassava.

Apinayé: Rôdîfê.

This is a common palm in the chapada vegetation in the area where the Apinayé hunt, Cabeceira do Riberão Serrinha. It is an acaulescent palm, growing to ca. 1 m tall. Small bracts to 60 cm long are produced in the center of the rosette of leaves and bear curled panicles with 7–16 fruits, each about 5 cm long. The leaves are pinnate, with pinnae arranged in irregular groups on

the rachis and at various angles to the plane of the leaf.

Use: The fruits contain an oleaginous kernel, and are harvested by some Apinayé for eating and for oil production. However, as the fruits of *Orbignya phalerata* are much more abundant and yield more kernel per fruit than *O. eichleri*, the former species appears to be the preferred palm, especially in this region where it is so predominant in the landscape. The mesocarp of *Orbignya eichleri* is chewed by rodents and the fruits cracked open by larger animals. Because of this, a field of *O. eichleri* is a good location for hunting game. While we were working with a Shavanté Indian who lived in the reserve, he disappeared with his shotgun into the cerrado. We assumed that he had become bored with our laborious examination of palm germplasm, so we kept on working. Shortly thereafter, I sensed that another person had joined us, and turned around to see who it was. There was our Shavanté friend covered with woven leaves of *O. eichleri*, with his shotgun pointed at us (Figs. 16, 17). He had transformed himself into a "walking blind," and blended in completely with the surrounding vegetation. "I wanted to show you how we hunt and stalk game without them knowing," he said proudly, as he lowered his gun. We were amazed at his skill in "stalking" us, without making a sound or attracting our attention during the entire time.

Voucher specimens: Balick et al. 1578, 1579, 1580, 1597.

Orbignya phalerata Mart.

Portuguese: Babassu (Babaçu).

Guajajara: Wahú.

Apinayé: Rõõo.

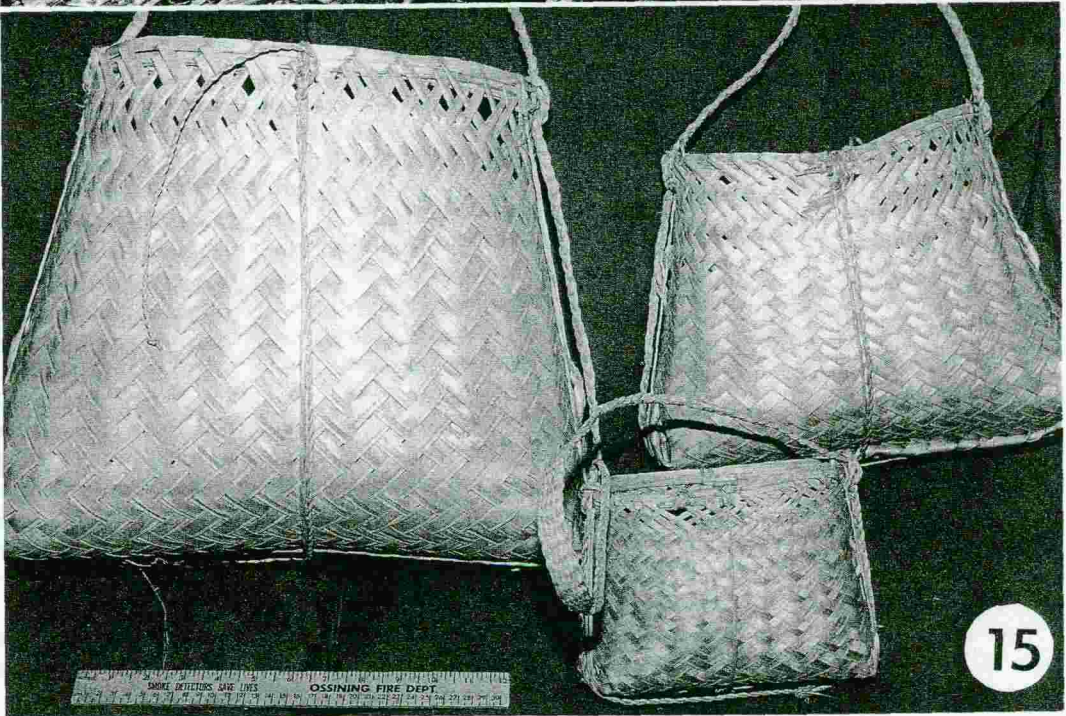
This is a tall, stately palm with a massive, solitary trunk to 15 m tall. The leaves are pinnate, spirally arranged on the stem, and have regularly deposited pinnae. The massive panicles contain up to several hundred ovoid brown fruits, each weighing 250 g or more. When mature, these fall to the ground and germinate within a few months. Because of its characteristic cryptogean germination, the apical meristem of the seedling is pushed into the ground, where it is protected from predation and fire. The young stems become established underground, and then begin to grow above ground after a few years (Anderson & Anderson, 1983). Babassu is found scattered

throughout the primary forest in all three reserves visited, and when the land has been cleared, forms dense monospecific stands.

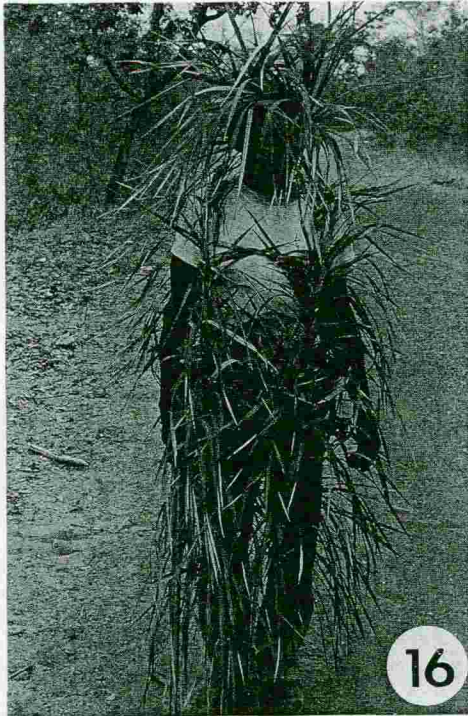
Use: The subsistence economies of the Apinayé and Guajajara depend heavily on their use of the babassu palm. The subsistence utilization of babassu in general in the northeast of Brazil is discussed in depth in another article (May et al., 1985) and will not be duplicated here. Table 1 is a summary of the uses presented in that paper. However, it is interesting to note some of the more unusual ways in which this palm is employed by the Guajajara and Apinayé.

After making a rather complete collection of *Orbignya* germplasm at the Caru reserve, one of our party cut his hand and it began to bleed. As I unpacked the first aid kit, one of our informants said that he wished to treat the problem. He selected a young plant of babassu and cut off one of the newly-emerging leaves. He stripped off the pinnae and peeled the rachis, exposing its white pithy portion (Fig. 20). After a bit of scraping, he had a mass of fibrous cotton-like material in his hand, and squeezed this on the open wound. The clear juice that came out had styptic properties and the wound stopped bleeding within a few seconds (Fig. 21). According to our informant, this bitter juice stops the flow of blood and allows the wound to heal more quickly. It is used for injuries while working in the field or walking in the forest.

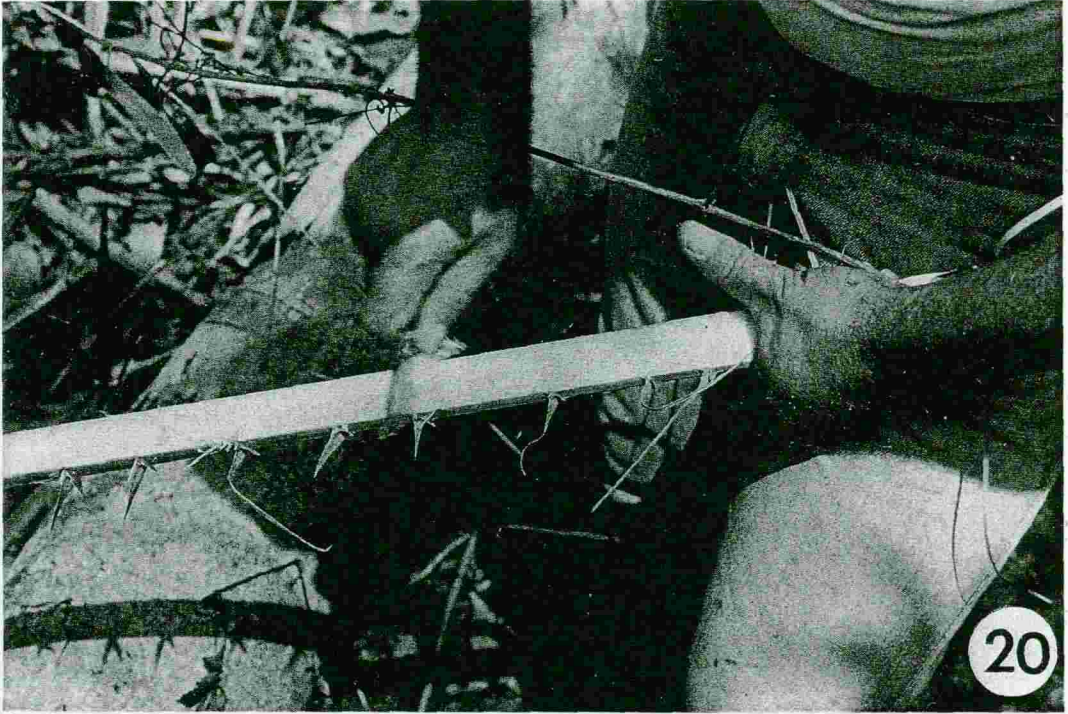
At São José we were able to document the preparation of "farinha" or meal made from babassu (Figs. 23–29). While this is not commonly prepared, having been replaced by cultivated cassava, one of the women agreed to prepare it for us in the traditional manner. People say that the preparation of babassu flour is more common outside of the reserves, such as among the Guajá Indians. Fruits of babassu are selected and tasted to make sure their mesocarp has not spoiled (turned "bitter"). Informants report that the bitterness of the mesocarp varies from tree to tree. When only the bitter variety can be obtained, the mesocarp is removed, put in a basket and soaked in the river for 24 hours; it is subsequently used for processing. The preparation we observed was with non-bitter fruits. The fruits are selected and put out in the sun to dry, until the mesocarp is somewhat powdery. The epicarp is removed with a knife (Fig. 23) and the mesocarp is beaten with a stick until it falls off in



FIGS. 14, 15. FIG. 14. Apinayé man cutting young emerging leaf of *Oenocarpus distichus* to weave a basket. FIG. 15. Apinayé pack baskets made from *Orbignya* species: left: large basket made from *O. phalerata*; right (upper): medium-sized basket made from *O. ×teixeirana*, a hybrid palm; right (lower) smaller basket made from *O. eichleri*.



FIGS. 16–19. FIGS. 16, 17. Camouflage hunting outfit woven from *Orbignya eichleri* leaves. FIG. 18. Bridge in São José constructed from *Orbignya phalerata* stems. FIG. 19. Apinayé hunting traps covered with pinnae of *Orbignya phalerata*.



FIGS. 20, 21. FIG. 20. Scraping the rachis of *Orbignya phalerata* to make a styptic for wounds. FIG. 21. Guajajara applying a styptic liquid from rachis of *Orbignya phalerata* to stop bleeding.

Table I
Subsistence uses of babassu fruits

Kernels	
Snack nut*	
Milk	stewing meat and fish beverage
Liquid endosperm	treatment of sties and bleeding beverage
Oil*	cooking soapmaking burning in lamps
Residues	animal feed substitute or filler for coffee shrimp bait
Larvae*	food for people fish bait
Husks	
Charcoal*	primary source of fuel for cooking
Smoke*	insect repellent smoking rubber
Anesthetic Handicrafts*	condensed gases and tar from burning used to alleviate toothache pencil holders, keychains, figurines
Mesocarp	
Animal feed	
Flour*	substitute for manioc flour and former staple among Indian tribes chocolate-like beverage medicine for gastrointestinal complaints
Hunting	attractant for rodents
SUBSISTENCE USES OF BABASSU LEAVES	
Fibers*	
Baskets	storage and transport
Mats	doors, windows, rugs, grain-drying
Fans	ventilating fires
Sieves	sifting manioc flour and rice
Others	twine, torches, whisks, bird cages, hunting blinds, animal traps
Construction materials*	
Thatch	roofing and walls
Laths	support for clay-packed walls frames for windows
Rails	fencing to protect agricultural plots from animals and delimit hunting zones
Agricultural uses*	
Leaves	burned in shifting cultivation plots to promote nutrient recycling and pest control
Rachis	crop stakes and building raised planters
Living leaves	provide shade in pastures for livestock and feed during dry periods
Medicine*	
Liquid	expressed from rachis and used as antiseptic and styptic
SUBSISTENCE USES OF BABASSU STEMS	
Construction*	
Bridges	
Foundations	
Benches	
Palm heart*	
Food for people	
Feed for animals	
Ripening agent for banana	

Table I
Continued

Sap (collected from stump of felled palms)
Fermented drink
Attraction of beetle larvae that are eaten or used as fish bait
Planting medium (obtained from decayed stems)
Salt (made from ash of burned stems)

From: May et al., 1985. Asterisks (*) indicate major categories of uses observed among the Guajajara and Apinayé.

clots from the fruit (Figs. 24, 30). These pieces are put in a mortar and pounded with a stick until the mesocarp is turned into a powder (Fig. 25). The powder is sifted through a screen; currently a plastic screen is used, but in earlier times the material was sifted through a woven basket (Fig. 27). A bowl of water is added to the powder and the doughy mass put into a pan and heated over a low cooking fire. While it is heating, the preparer stirs the mass with a spoon and breaks it up into small granules (Fig. 28). The final product (Fig. 29) is a darker shade of brown than the original mesocarp. When freshly cooked, the farinha is soft and can be eaten as is, or mixed with cassava flour, meat, beans or other food. With time the babassu farinha hardens a bit. The Apinayé call this substance "tvan-gla."

Charcoal made from babassu is used to dye certain fibers for basket weaving.

Pack baskets are commonly made from the three species of *Orbignya* found at São José (Fig. 15). Small baskets for young children are made from *Orbignya eichleri*, medium-sized baskets for older children are made from *O. × teixeirana* and large packbaskets used by adults to harvest crops and collect firewood are made from *O. phalerata* (Fig. 33).

The Apinayé distinguish various types of babassu, based on the ease of cracking the fruits. Several dozen people go into different areas of the forest on an almost daily basis to crack babassu fruits for the cooperative (Figs. 22, 31). The usual method of cracking babassu fruits is to place them on an upturned axe head and pound them with sticks until they open. Some stands of babassu are considered to yield fruits that are too hard to crack, while others are considered easier. The Apinayé ignore stands of palms where the fruits are known to be difficult to crack, favoring instead to work with stands where production is easier. One special variety was shown

us that could be cracked with a knife instead of the usual way. This type is of great interest and was collected for the germplasm banks in Maranhão and Piauí. Naturally, any fruit that is able to be broken with less energy would be of value for industrial processing with mechanical equipment.

As previously mentioned, the harvest of babassu has been organized into a cooperative by the Indians. In Pindaré the harvest has declined over the past few years. In 1980 ca. 2000 kg of kernels per week was harvested. In 1983, with greater agricultural production, ca. 1000 kg per week was harvested, an average of about 50,000 kg of kernels annually from this reserve. It was estimated that each family cracks enough fruits to obtain ca. 600 kg per year. In Caru there was not an organized babassu harvest, as more people depend on agriculture for their livelihood. In São José, the babassu cooperative recorded the collection of 294 kg of kernels over a two day period, and estimated that 50–100,000 kg of kernels were collected for sale each year. The kernels were sold to a middleman who transports them to a factory for the extraction of oil and animal feed. At the time of this study the Indians received 140 Cruzeiros per kg, which at the official rate of conversion in effect during that time was equivalent to US\$0.20.

Other miscellaneous subsistence uses for babassu included employing stems to make bridges across streams (Fig. 18) and leaves for making animal traps (Fig. 19).

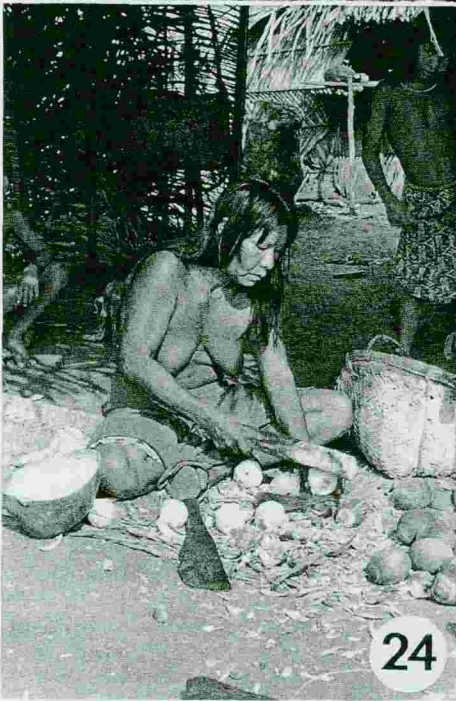
Voucher specimen: *Balick et al. 1468.*

Orbignya × teixeirana Bondar (pro sp.).

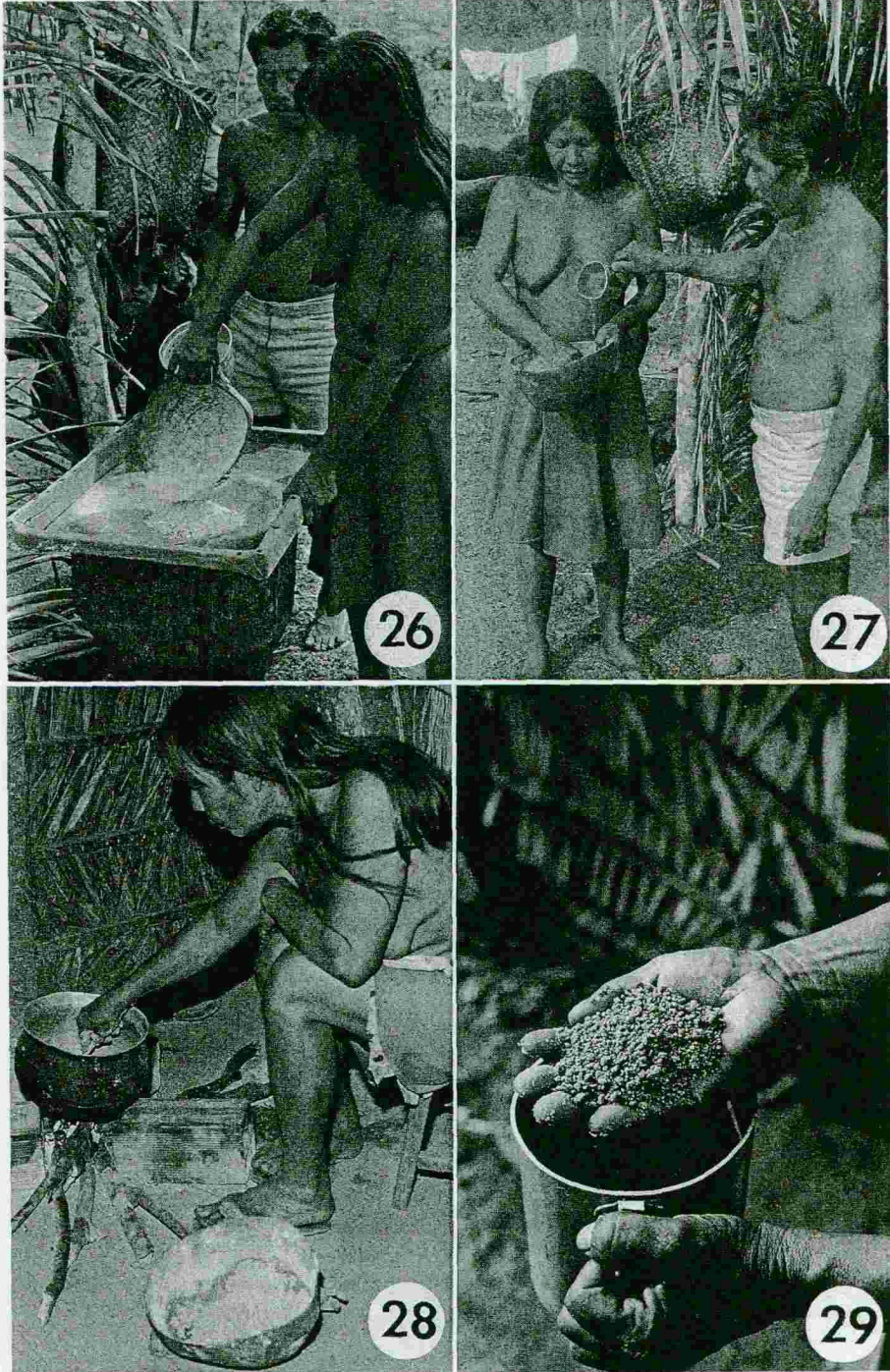
Portuguese: Piassava.

Apinayé: Rôfê.

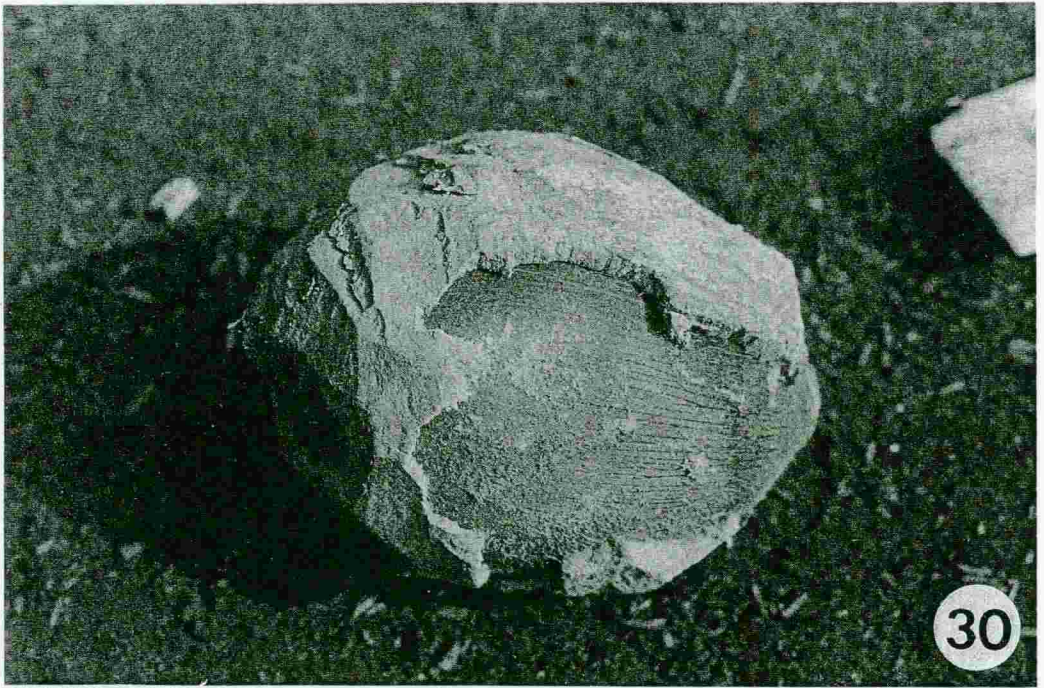
This is a hybrid species; the preceding two palms are the parents. It is variable in mor-



FIGS. 22–25. FIG. 22. Apinayé cracking *Orbignya phalerata* fruits in the forest to harvest oil-rich kernels. FIGS. 23–29. Preparation of farinha from mesocarp of *Orbignya phalerata*. FIG. 23. Cutting off epicarp with knife. FIG. 24. Pounding fruits to release mesocarp. FIG. 25. Grinding mesocarp.



FIGS. 26-29. FIG. 26. Passing mesocarp of *Orbignya phalerata* through a sieve. FIG. 27. Adding water to mesocarp powder after it is passed through sieve. FIG. 28. Cooking mesocarp powder in a pan. FIG. 29. The final product, "farinha do babaçu."



FIGS. 30, 31. FIG. 30. Fruit of *Orbignya phalerata* after pounding with pieces of mesocarp still attached. FIG. 31. Village members of São José assembling for the day's work of collecting *Orbignya phalerata* kernels in the primary forest near their village. Person third from left is a FUNAI representative; sixth from left is a member of our party.



FIGS. 32–34. FIG. 32. Apinayé child's bow made for shooting small animals with stones, produced from *Syagrus cocoides*. FIG. 33. Apinayé children carrying the day's harvest of *Orbignyia phalerata* kernels in pack baskets. FIG. 34. Apinayé child fishing with bow made from *Syagrus cocoides*.

phology; some individuals have distinct trunks while others do not. Panicles range in size from slightly larger than *O. eichleri* to smaller than *O. phalerata*. The Apinayé do not distinguish this from *O. eichleri*, and it is given the same name. An in-depth study of this hybrid complex is presented in Balick et al. (1987).

Use: This palm is used in the same way as *Orbignya eichleri*.

Voucher specimens: Balick et al. 1596, 1603, 1604.

Syagrus cocoides Mart.

Portuguese: Pati.

Apinayé: Voti.

This is a slender palm, to 7 m in height, with a thin, erect stem ca. 10 cm in diam. The pinnate leaves are 2.5 m long and are spirally arranged on the stem. Pinnae are deposited in groups of 2-4 and inserted at various angles to the plane of the leaf. The panicle is ca. 1.5 m long and has a dozen or more rachillae bearing round green fruits ca. 3 cm long.

Use: The Apinayé use this palm to make bows. Formerly, bows were the chief means of hunting, but with the advent of the shotgun have assumed lesser importance. Bows are now made for sale to travellers along the Trans-Amazon highway. A few are still made for personal use. However, children use bows extensively, both for fishing (Fig. 34) and to propel stones for hunting birds and small mammals (Fig. 32). These bows are made of wood from *Syagrus cocoides* with a bowstring of *Mauritia* or *Astrocaryum* fiber.

Voucher specimen: Balick et al. 1616.

V. Conclusion

The use of palms by these two groups of Indians is extensive. On the one hand, as cultivated crops are introduced by outside civilization, the utilization of palm products diminishes in everyday life. On the other hand, when so called "modern" houses are built for these people, their more traditional houses are constructed alongside as the palm huts are felt to be more livable in the local environment. Palm products still have a significant impact on the lives of both tribes of Indians at the three reserves we visited. In some areas the palm resource is declining and people are altering their lifestyles to adjust to this reality.

In other areas the stands of aggressive species such as babassu are increasing and the people will probably continue to depend on the harvest and sale of this resource for the foreseeable future. In fact, Balick (1985) has estimated that over US\$100,000,000 of commercial products are obtained annually from wild stands of six genera of native palms in Brazil. If one were to quantitatively assess the levels of utilization of different plant families in the different regions visited, it is clear that the palms would be identified as the most important group, providing food, fuel, shelter, fiber, construction materials, medicine, magic and other basics of life. The present state of knowledge about palm utilization among Neotropical Indians is still quite poor, although studies have been carried out among various groups (Anderson, 1978; Balick, 1979; Beckerman, 1977; Boom, 1986). The present survey, while undertaken over a brief period, has documented several important uses of palms and other items of information new to the literature. The interest in the domestication and utilization of native palm resources in Latin America has blossomed in the last five years, with research initiatives underway in many countries (see for example FAO, 1983, as well as other contributions in this volume). The indigenous people in this region possess the greatest body of knowledge about the rational exploitation of these plants, having depended on them during centuries of existence in a well-managed, stable ecosystem. It is important that modern science, in its quest to develop plants for agriculture, not ignore the knowledge and experience of the Indians in dealing with these species. Ethnobotanical surveys must be recognized as an important way to establish criteria for germplasm collection and plant domestication, not only for palms and other tropical trees but for the many plants utilized in agricultural production systems around the world.

VI. Acknowledgments

The inhabitants of the three reserves we visited (Posto Indígena Caru, P.I. Pindaré and P.I. São José) are gratefully acknowledged for their gracious hospitality, curiosity, and collaboration with this study. This paper is dedicated to the Apinayé and Guajajara people who worked with us, freely

sharing their knowledge for the benefit of others. Strong institutional collaboration between the Centro Nacional de Recursos Genéticos (CENARGEN) and The New York Botanical Garden (NYBG) has supported the six year program of babassu domestication. I am particularly grateful to Lidio Coradin (CENARGEN) for his help in making this trip possible. Permission from the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Fundação Nacional do Índio (FUNAI) enabled us to carry out the studies reported in this paper. I am very grateful to William Balée for transcribing my field notes on common names into a standard format. The field team consisted of José Mario F. Frazão, José G. A. Vieira, Walber S. da Silva, and myself. I thank these colleagues for their enthusiastic participation in the fieldwork.

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