

NOMENCLATURAL PATTERNS IN KA'APOR ETHNOBOTANY

WILLIAM BALÉE

*Departamento de Programas e Projetos
Museu Paraense Emilio Goeldi
66040 Belém - Pará
Brazil*

ABSTRACT.—A long history of horticulture appears to have affected plant nomenclature in Ka'apor and other Tupi-Guarani languages of lowland South America. The Ka'apor language displays patterns of and for the construction of primary productive and unproductive lexemes denoting plants. Such lexemes account for about one-third of all known folk generic plant names in Ka'apor. Five nomenclatural patterns relating to these lexemes distinguish names for traditionally cultivated plants from names for traditionally non-cultivated plants. These patterns conform to an underlying principle: productive and unproductive primary lexemes in Ka'apor ethnobotany refer to traditionally non-cultivated plants.

RESUMEN.—Una larga historia en horticultura parece haber afectado la nomenclatura de las plantas en lenguas de la familia Tupi-Guaraní, habladas en las tierras bajas de Sudamérica; una de ellas, la lengua Ka'apor. La lengua Ka'apor muestra patrones productivos e improductivos que son utilizados en la formación de lexemas que se refieren a plantas. Dichos lexemas aparecen en cerca de un tercio de todos los nombres genéricos folklóricos de plantas. Cinco de los patrones en los que participan estos lexemas, sirven para distinguir entre nombres de plantas tradicionalmente cultivadas, de aquellos nombres que se remiten a plantas no cultivadas. Estos patrones obedecen a un principio: los lexemas productivos o improductivos en la etnobotánica de Ka'apor hacen referencia a plantas tradicionalmente no cultivadas.

RESUME.—Il semble que l'histoire longue de l'horticulteur ait affecté le nomenclatureur des plantes chez les Ka'apor et chez autres langues Tupi-Guaraní des basses terres de l'Amérique du Sud. La langue des Ka'apor montre des modèles des mots primaires productifs et non-productifs qui dénotent des plantes, et la construction de ceux-ci. Ces mots expliquent à peu près un troisième des noms génériques populaires connus des Ka'apor. Cinq modèles nomenclaturels qui se rapportent à ces mots se distinguent les noms des plantes traditionnellement cultivées des plantes traditionnellement non-cultivées. Ces modèles se conforment avec un principe fondamental: les mots productifs et non-productifs chez l'ethnobotanique des Ka'apor s'adressent aux plantes traditionnellement non-cultivées.

INTRODUCTION

A long history of plant cultivation appears to have influenced ethnobotanical nomenclature itself in Ka'apor and other Tupi-Guarani languages of the tropical lowlands of South America. The Ka'apor language displays patterns of and for the construction of primary analyzable lexemes denoting plants. These nomenclatural patterns ultimately distinguish names for traditionally cultivated plants

from names for traditionally non-cultivated plants. This finding should be of considerable interest to ethnobiologists, for in Ka'apor, not only do cultivated plants tend to be "unaffiliated" with major life forms (Berlin *et al.* 1973, 1974), principles for naming them are fundamentally different from those for naming non-cultivated plants.

Primary analyzable lexemes account for about one-third of all known folk generic plant terms in Ka'apor. Although some primary analyzable lexemes denote plants that the Ka'apor are now cultivating, none refers to a species *traditionally* cultivated by the Ka'apor. In the Ka'apor botanical lexicon, productive primary lexemes denote only non-cultivated plants. Unproductive primary lexemes may designate either non-cultivated plants or introduced cultivated plants, but not plants that have been traditionally cultivated by the Ka'apor. Unproductive primary lexemes in Ka'apor ethnobotany include names modeled by analogy on names for other plants, names incorporating misleading life-form labels, semantically obscure names (by which exclusively non-botanical phenomena are designated as well as plants), and names incorporating attributives meaning 'false' and 'divinity.' Although the compound (analyzable) nature of virtually all these unproductive lexemes is also a feature of secondary lexemes (cf. Berlin *et al.* 1974:28-29), nomenclatural patterns and Ka'apor criteria of plant classification readily permit one to differentiate the two types of lexemes. In other words, compound names for traditionally cultivated plants are basically distinct in structure from compound names for other plants.

Patterns of and for the construction of primary productive and unproductive lexemes denoting plants seem to be sufficiently stable as to argue for the antiquity of horticulture and lexical oppositions between names for traditionally cultivated and non-cultivated plants in Ka'apor ethnobotany. Similar patterns evidently also exist in the ethnobotanical systems of languages closely related to Ka'apor.

TUPI-GUARANI SOCIETIES AND HORTICULTURE

The Ka'apor Indians of extreme eastern Amazonian Brazil (Fig. 1) speak a language of the Tupi-Guarani family. They have also been referred to as the Urubus (Huxley 1957, Ribeiro 1955) and Urubu-Kaapor (Ribeiro 1970). I employ here their self-designation, Ka'apor, which may be glossed as 'footprints of the forest.' The Ka'apor population is now approximately 500, dispersed in 14 settlements over a forested reserve of 530,524 hectares in the basins of the Gurupi and Turiaçu Rivers. Like many other Tupi-Guarani speaking peoples (see Grenand and Haxaire 1977), the Ka'apor are not exclusively a "forest" people. Although they depend on game, fish, and fruits from unmanaged forests, swamps, and streams, they have also, since remote times, intensively managed plants and swidden fields (Balée and Gély 1989, Ribeiro 1955).

Intensive plant management is a key cultural factor shared by diverse societies affiliated with the Tupi-Guarani family. None of the Tupi-Guarani societies of the Atlantic Coast of South America in the 16th century was reported to have been without horticulture, even though some non-Tupian speakers of the coast evidently were hunter-gatherers (Balée 1984:249, Cardim 1939:174). The coastal Tupinambá cultivated numerous species, including 28 named varieties of manioc

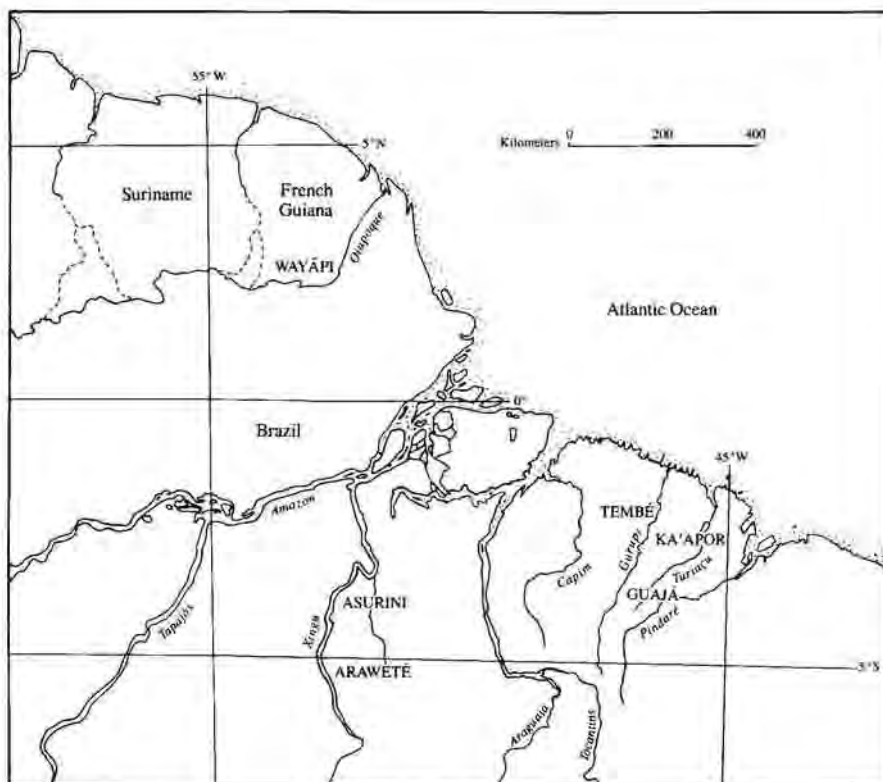


FIG. 1.—Situation Map of several Tupi-Guarani peoples of Eastern Amazonia.

(Métraux 1928:65-67). The Tupinambá of Bahia even practiced agricultural pest control. For example, they subtly detoured leaf-cutter ants away from manioc swiddens by scattering useless leaves along blind trails (Souza 1974:89).

Given the importance of horticulture in all of the ethnohistorically known Tupi-Guarani societies, it may seem curious that four of the twenty-one living languages of Tupi-Guarani are associated with exclusively foraging societies (Rodrigues 1986:33). These are the Hêta of extreme southern Brazil, the Achê of Paraguay, the Guajá of extreme eastern Amazonia, and the Avâ-Canoeiro of central Brazil. Yet ethnohistorical and "inferential" linguistic evidence (Sapir 1949) indicates that a lifestyle of foraging for the Hêta, Achê, Guajá, and Avâ-Canoeiro is a regression from previously horticultural society. The Hêta in the past evidently "practiced some plant cultivation" (Kozak *et al.* 1979:366). The Achê probably cultivated plants prior to the Spanish conquest, since their word for maize (*wate*) is cognate with words for maize in other Tupi-Guarani languages (Clastres 1968:51-52). The Guajá lived in settled villages in the 1760s rather than camps (Noronha 1856:8-9), which nearly always implies intensive plant management, at least in lowland South America. The Guajá word for maize is *waçi* (3526)¹ which is also cognate with words for maize in other Tupi-Guarani languages. At an earlier

time, the now foraging Avá-Canoeiro cultivated at least maize (Toral 1986), their term for which is *avaši* (Rivet 1924:177), also a Tupi-Guarani cognate. These maize words in modern Tupi-Guarani languages reconstruct in PTG (Proto-Tupi-Guarani) as **abati* (Lemle 1971:121). Such linguistic and ethnohistorical data suggest that the modern foraging Héta, Achê, Guajá, and Avá-Canoeiro were once cultivators of plants. They regressed to foraging apparently because of sociopolitical pressures from more powerful groups, both indigenous and not (Balée 1988:158).

PTG terms for several cultivated plants of Neotropical origin (see Lemle 1971) imply that horticulture was associated with PTG society of pre-Columbian times. The age of PTG has been estimated at 2000 BP (Migliazza 1982:502). Indeed, words for cultivated plants, swidden fields, and agricultural tools reconstruct in Proto-Tupi, the mother language of Tupi stock, of which Tupi-Guarani is one language family (Rodrigues 1988). The age of Proto-Tupi has been estimated at 4000 BP (Migliazza 1982:502). My purpose is to show that this archaic practice, horticulture, has affected the naming systems for plants in Ka'apor and evidently other Tupi-Guarani languages in highly regular, patterned ways.

METHODS

During 1984-87, I made extensive plant collections in the habitat of the Ka'apor. I carried out inventories of all plants greater than or equal to 10 cm dbh (centimeters in diameter at breast height) on two one-hectare plots of high forest (cf. Balée 1986, Prance *et al.* 1987). On one of these plots, I surveyed all vegetation in five sub-plots of 5 square meters each, collecting all species therein. I also conducted a one-hectare inventory of old fallow near a Ka'apor village, collecting all plants greater than or equal to 10 cm dbh. I made general collections in swiddens of various ages, high forest, fallow, swamp forest, and riverine forest in the region. The total number of individual plants I collected in the immediate vicinity of the Ka'apor was 1704, represented by voucher specimens and duplicates numbering more than 5000. These plant collections were made in and near four widely scattered Ka'apor villages: Urutawî-rena (1231 voucher specimens), Gurupiuna (415 voucher specimens), Šoanî (42 voucher specimens), and Šimo-rena (16 voucher specimens). I am confident that the vast majority of tree, palm, and liana species greater than 10cm dbh of the Ka'apor habitat is represented in these collections. All cultivated species of the Ka'apor have been identified and nearly all have been actually collected. Many non-cultivated grasses and herbs were also collected. The number of species accounted for by these collections is approximately 800.

Ka'apor informants were initially selected for their reputed knowledge of plants. In fact, all adults are ideally ethnobotanists. Ka'apor society is egalitarian, with distinctions of status adhering mainly to age/sex criteria, not to ranks. Adults are believed to possess the most knowledge about plants. For example, when a teenager is asked, 'Who knows about trees here?' (*Awa mîra-ta pe ukwa ko?*)², he/she invariably responds with something like 'The elders do' (*Tamûi-ta ukwa*) rather than with the name of someone, such as a headman or shaman, in particular.

Names, uses, and habitat data for all collected plants were elicited from 23 adult Ka'apor informants (17 men and 6 women). The responses to ten of these informants, divided among the four villages where collections were processed, tended very much toward agreement. These were the principal informants for Ka'apor plant nomenclature and classification. In the event of discrepancies between principal informants concerning a plant's name, I recorded the most cited name as the plant's valid name. If the main informants and/or most other informants insisted that two different names were valid responses for an individual plant (usually by saying 'It has two names'—*Makôî herr*), then both names, considered as synonyms, were recorded. There were no cases in which three or more plant names were synonymous.

Almost all interviewing was conducted in the Ka'apor language itself, in which I am reasonably fluent. With the exceptional bilingual informant, whose Portuguese (in which I am fluent) was superior to my Ka'apor, interviews were in Portuguese, but Ka'apor words for plants and uses were always obtained and recorded. With regard to each collected plant, informants were first asked, 'What is its name?' (*Ma'e herr?*), the specimen always being present before them. I also asked them several questions concerning the plant's uses, such as 'Is it edible?' (*U'u awa?*), 'Is it a remedy?' (*Awa-puhan?*), and 'Is it good for firewood?' (*Yape'akatu?*) [cf. Balée 1986].

Establishing the folk categories of Ka'apor botanical classification was based on techniques described in Berlin *et al.* (1974:51-54). Once life-form terms were discovered from discussions about the plant domain in general, the generic members of each of these categories were elicited. In order to elicit all folk generic tree names, for example, I requested informants to 'Tell me all tree names' (*Eme'u upa mira herr-ta*). These data were obtained basically from four of the principal informants, including three men and one woman. Folk specific terms (secondary lexemes) were determined by eliciting the members of each folk generic taxon in like manner. In calculating the number of folk generics in Ka'apor (see below), synonyms were included.

In addition to research with the Ka'apor, I collected a total of 1804 voucher specimens with the Tupi-Guarani speaking Araweté (October-November 1985 and March-April 1986), Asurini of the Xingu (June 1986), Guajá (May-July 1987), and Tembê (July-August 1985). Names and uses for the plants collected among each of these groups were also elicited from several informants. Ethnobotanical classification was not thoroughly investigated among these other groups, as it was with the Ka'apor, but certain patterns of plant nomenclature in their languages appear to correspond closely with those of Ka'apor, as I describe below. The orthography of plant names given in these other languages follows suggestions by Arvon D. Rodrigues (pers. comm., 1988).

KA'APOR BOTANICAL LIFE-FORM LABELS

The class 'plant' is unnamed in the Ka'apor language. In the useful terminology of Brent Berlin and his colleagues (Berlin *et al.* 1973, 1974), which I adopt in part here, the botanical "unique beginner" is "covert." Numerous words that pertain exclusively to plants and plant products in Ka'apor and other Tupi-Guarani

languages suggest that this covert category is real (cf. Berlin 1976:383-384, Berlin *et al.* 1973:214, 1974:30). Table 1 shows some of these terms in Ka'apor and four other Tupi-Guarani languages of eastern Amazonia, with the reconstructed forms in PTG.

In the Ka'apor language, the plant domain is subdivided into life-form classes (see Table 2). The semantic ranges of the labels for these classes correspond roughly to those of folk English 'tree,' 'herb,' and 'vine.' They do not correspond *precisely* with these partly because of polysemy. *Mira* ('tree') is polysemous with 'wood' and numerous finished wood products. The noun³ *ka'a* ('herb') is polysemous with 'forest.' And *sipo* ('vine') covers both herbaceous vines and

TABLE 1.—Terms associated with the plant domain in several Tupi-Guarani languages with reconstructed forms in Proto-Tupi-Guarani (PTG).

Gloss	Ka'apor	Araweté	Asurini	Guajá	Tembé	*PTG
stem	'i	'i	'iwa	'i	'iw	*'iβa
resin	hik	hi	hik	hik	hik	*hik
leaf	ho	hawe	haba	hawe	ḡwer	*oβ
root	hapo	apo	iapu	hapo	hapə	*hapo
spine	yu	yu	yu	yu	zu	*yu

a. See Lemle (1971).

TABLE 2.—Botanical life-form labels in several Tupi-Guarani languages with reconstructed forms in Proto-Tupi-Guarani (PTG).

Language	Gloss		
	'Tree'	'Herb'	'Vine'
Ka'apor	<i>mira</i>	<i>ka'a</i>	<i>sipo</i>
Araweté	<i>iwirā</i>	<i>ka'ā</i>	<i>ihipa</i>
Asurini	<i>iwira</i>	<i>ka'a</i>	<i>iipa</i>
Guajá	<i>wira</i>	<i>ka'a</i>	<i>wipo</i>
Tembé	<i>wira</i>	<i>ka'a</i>	<i>wipo</i>
Wayāpi*	<i>wila</i>	<i>ka'a</i>	<i>ipo</i>
PTG	*iβira ^b	*ka'a ^b	*iwipo ^c

a. Wayāpi botanical life-form labels are from Grenand (1980).

b. See Lemle (1971).

c. Aryon Rodrigues (pers. comm., 1988).

TABLE 3.—Productive primary lexemes denoting plants in Ka'apor.

Ka'apor	Coll. No. (a)	Gloss	Botanical Referent
'Trees' (<i>mira</i>)			
<i>aḡwa-yar-mira</i>	1017	drum-owner-tree	<i>Pseudima frutescens</i> (Sapindac.)
<i>ainumir-mira</i>	3044	hummingbird-tree	<i>Bauhinia viridiflorens</i> (Caesalpinac.)
<i>akuṣi-mira</i>	3031	agouti-tree	<i>Hirtella racemosa</i> (Chrysobalanac.)
<i>arākwā-mira</i>	2208	Little chachalacha-tree	<i>Eugenia</i> sp. (Myrtac.)
<i>arapasu-mira</i>	92	woodpecker-tree	<i>Pithecellobium pedicellare</i> (Mimosac.)
<i>arapuha-mira</i>	280	brocket deer-tree	<i>Conceveiba guianensis</i> (Euphorbiac.)
<i>āyaḡ-ara-mira</i>	(b) 2259	divinity-hair-tree	<i>Solanum surinamensis</i> (Solanac.)
<i>inamu-mira</i>	326	tinamou-tree	<i>Exellodendron barbatum</i> (Chrysobalanac.)
<i>kaḡwaruhu-mira</i>	2159	paca-tree	<i>Agonandra brasiliensis</i> (Opiliac.)
<i>maha-mira</i>	3539	white deer-tree	<i>Ocotea opifera</i> (Laurac.)
<i>makahi-mira</i>	2665	collared peccary-tree	<i>Duguetia yeshidah</i> (Annonac.)
<i>mira-howi</i>	693	tree-blue	Sapotac. indt. gen.
<i>mira-pirer-hē'ē</i>	956	tree-bark-sweet	<i>Glycoxylon</i> sp. (Sapotac.)
<i>mira-pitaḡ</i>	957	tree-red	<i>Brosimum rubescens</i> (Morac.)
<i>mira-tawa</i>	2775	tree-yellow	<i>Casearia</i> sp. 1 (Flacourtiac.)
<i>mira-wawak</i>	1279	tree-spin	<i>Sagotia racemosa</i> (Euphorbiac.)
<i>mira-wewi</i>	613	tree-light	<i>Parkia</i> sp. 1 (Mimosac.)
<i>mitū-mira</i>	2878	curassow-tree	<i>Erisma uncinatum</i> (Vochysiac.)
<i>moi-mira</i>	2795	snake-tree	<i>Poecilanthe effusa</i> (Fabac.)
<i>pa'i-mira</i>	5	priest-tree	<i>Dodecastigma integrifolium</i> (Euphorbiac.)
<i>sawiya-mira</i>	2708	rat-tree	<i>Paypayrola grandiflora</i> (Violac.)
<i>takwā-mira</i>	2922	toucan-tree	<i>Virola carinata</i> (Myristicac.)
<i>takwari-mira</i>	2206	arrow-tree	<i>Coccoloba</i> sp. 1 (Polygonac.)
<i>tamarī-mira</i>	2302	saki-tree	<i>Diospyros</i> sp. 1 (Ebenac.)
<i>tarara-mira</i>	593	shred-tree	<i>Matayba spruceana</i> (Sapindac.)
<i>teremu-mira</i>	937	masc. personal name-tree	<i>Anaxagorea dolichocarpa</i> (Annonac.)

TABLE 3.—Productive primary lexemes denoting plants in Ka'apor. (continued)

Ka'apor	Coll. No. (a)	Gloss	Botanical Referent
<i>tatu-mira</i>	437	armadillo-tree	<i>Thyrsodium spruceanum</i> (Anacardiaceae.)
<i>tayahu-mira</i>	363	white lipped peccary-tree	<i>Tapirira pekoltiana</i> (Anacardiaceae.)
<i>tupiyarima-mira</i>	101	Long tailed tyrant-tree	<i>Talisia cf. micrantha</i> (Sapindaceae.)
<i>wakura-mira</i>	2227	nighthawk-tree	<i>Sapium</i> sp. 1 (Euphorbiaceae.)
<i>wari-mira</i>	2305	howler monkey-tree	<i>Clarisia racemosa</i> (Moraceae.)
<i>yakamĩ-mira</i>	3034	trumpeter-tree	<i>Coussarea paniculata</i> (Rubiaceae.)
<i>yanu-mira</i>	3542	spider-tree	<i>Myciaria cf. pyriifolia</i> (Myrtaceae.)
<i>yapu-mira</i>	938	oropendola-tree	<i>Tovomita brasiliensis</i> (Clusiaceae.)
<i>yawa-mira</i>	1002	jaguar-tree	<i>Protium aracouchini</i> (Burseraceae.)
<i>yupara-mira</i>	2961	kinkajou-tree	<i>Coumarouna micrantha</i> (Fabaceae.)
'Vines' (<i>sipo</i>)			
<i>akuši-sipo</i>	2873	agouti-vine	<i>Alloplectus coccineus</i> (Gesneriaceae.)
<i>arapuha-sipo</i>	943	brocket deer-vine	<i>Coccoloba</i> sp. 2 (Polygonaceae.)
<i>irai-sipo</i>	1024	masc. personal name-vine	<i>Schubertia grandiflora</i> (Asclepiadaceae.)
<i>kurupi-'i-sipo</i>	3048	divinity-little-vine	<i>Cordia multispicata</i> (Boraginaceae.)
<i>maha-sipo</i>	612	white deer-vine	Connaraceae indet. gen.
<i>mišik-sipo</i>	432	roast-vine	<i>Moutabea guianensis</i> (Polygonaceae.)
<i>musu-sipo</i>	886	eel-vine	<i>Styzyphyllum riparium</i> (Bignoniaceae.)
<i>parawa-sipo</i>	3423	Mealy parrot-vine	<i>Uncaria guianensis</i> (Rubiaceae.)
<i>sipo-ātã</i>	2717	vine-hard	<i>Combretum</i> sp. (Combretaceae.)
<i>sipo-hu</i>	960	vine-big	<i>Cyclanthus funifer</i> (Cyclanthaceae.)
<i>sipo-memek</i>	618	vine-weak	Bignoniaceae indet. gen.
<i>sipo-nem</i>	3037	vine-fetid	<i>Cydista aequinoctialis</i> (Bignoniaceae.)
<i>sipo-pihun</i>	685	vine-black	<i>Forsteronia</i> sp. 1 (Apocynaceae.)
<i>sipo-pirağ</i>	30	vine-red	<i>Hippocratea volubilis</i> (Hippocrateaceae.)

TABLE 3.—Productive primary lexemes denoting plants in Ka'apor. (continued)

Ka'apor	Coll. No. (a)	Gloss	Botanical Referent
<i>sipo-šišik</i> (b)	859	vine-smooth	<i>Heteropsis longispatacea</i> (Arac.)
<i>sipo-tawa</i>	2970	vine-yellow	<i>Humirianthera</i> sp. 1 (Icacinac.)
<i>sipo-te</i> (b)	859	vine-true	<i>Heteropsis longispatacea</i> (Arac.)
<i>sipo-tuwir</i>	1013	vine-white	<i>Amphilophium paniculatum</i> (Bignoniac.)
<i>so'oran-sipo</i>	885	rabbit-vine	<i>Stigmaphyllon hypoleucum</i> (Malpighiac.)
<i>tayahu-sipo</i>	3540	white lipped peccary-vine	<i>Ipomoea</i> sp. 1 (Convolvulac.)
<i>tiriri-sipo</i>	2785	crawl-vine	<i>Davilla nitida</i> (Dilleniac.)
<i>yahi-sipo</i>	987	moon-vine	<i>Dioclea reflexa</i> (Fabac.)
<i>yaši-sipo-pe</i>	2750	tortoise-vine-flat	<i>Bauhinia rubiginosa</i> (Caesalpiniac.)
<i>yawapitaḡ-sipo</i>	632	puma-vine	<i>Coccoloba</i> sp. 3 (Polygonac.)
<i>yikiri-sipo</i>	2738	sensitive-vine	<i>Acacia multipinnata</i> (Mimosac.)
<i>wa-me-sipo</i>	2299	fruit-inside-vine	<i>Monstera</i> cf. <i>pertusa</i> (Arac.)
'Herbs' (ka'a)			
<i>akuši-ka'a</i>	996	agouti-herb	<i>Celtis iquanea</i> (Ulmac.)
<i>āyaḡ-ara-ka'a</i> (b)	2666	divinity-hair-herb	<i>Solanum surinamensis</i> (Solanac.)
<i>ipe-ka'a</i>	3058	flat-herb	<i>Psychotria ulviformis</i> (Rubiac.)
<i>ira-hu-ka'a</i>	940	bird-big-herb	<i>Lomariopsis japurensis</i> (Lomariopsidac.)
<i>irakahu-ka'a</i>	2967	weasel-herb	<i>Schiekia orinocensis</i> (Haemodorac.)
<i>ka'a-piši'u</i>	2667	herb-fishy (in smell)	<i>Siparuna guianensis</i> (Monimiac.)
<i>ka'a-riru</i>	896	herb-container	<i>Phytolacca rivinoides</i> (Phytolaccac.)
<i>ka'a-ro</i>	2668	herb-leaf	<i>Ischnosiphon</i> (Marantac.)
<i>ka'a-yu</i>	1039	herb-yellow	<i>Eupatorium macrophyllum</i> (Asterac.)
<i>ka'a-yuwar</i>	923	herb-itch	<i>Solanum rugosum</i> (Solanac.)
<i>kururu-ka'a</i>	3088	toad-herb	<i>Amaranthus spinosus</i> (Amaranthac.)
<i>kuyui-ka'a</i>	2235	Blue throated piping guan-herb	<i>Bertiera guianensis</i> (Rubiac.)

TABLE 3.—Productive primary lexemes denoting plants in Ka'apor. (continued)

Ka'apor	Coll. No. (a)	Gloss	Botanical Referent
<i>parawa-ka'a</i>	888	Mealy parrot-herb	<i>Ficus</i> sp. (Morac.)
<i>pirapiši-ka'a</i>	976	Characin fish-herb	<i>Justicia pectoralis</i> (Acanthac.)
<i>purake-ka'a</i>	815	electric eel-herb	<i>Laportea aestuans</i> (Urticac.)
<i>suruwi-ka'a</i>	2297	catfish-herb	<i>Calathea fragilis</i> (Marantac.)
<i>tapi'i-ka'a</i>	2222	tapir-herb	<i>Psychotria racemosa</i> (Rubiace.)
<i>teyu-ka'a</i>	3066	skink-herb	<i>Rania</i> sp. (Rutac.)
<i>wari-ruwai-ka'a</i>	(b) 761	howler monkey-tail-herb	<i>Lomariopsis japurensis</i> (Lomariopsidac.)
<i>yaḡwate-ka'a</i>	858	jaguar-herb	<i>Selaginella</i> sp. (Selaginellac.)
<i>yakami-ka'a</i>	3069	trumpeter-herb	<i>Psychotria racemosa</i> (Rubiace.)
<i>yakare-ka'a</i>	3070	caiman-herb	<i>Pteridium aguilingium</i> (Dennstaedtiac.)
<i>yawarū-ka'a</i>	973	black jaguar-herb	<i>Psychotria poeppigiana</i> (Rubiace.)
<i>yu'i-ka'a</i>	1033	frog-herb	Melastomatac. indt. gen.

a. Collection numbers refer to voucher specimens on the series Balée, deposited at the New York Botanical Garden with duplicates at the Museu Paraense Emilio Goeldi.

b. Synonym.

'lianas' (i.e., woody vines) as well as lashing material used by the Ka'apor in post-and-beam construction. Similar polysemous life-form labels have been noted in many other languages (Alcorn 1984:265, Hunn 1982:837-839). Ka'apor life-form labels are further not easily glossed in English, for they cover basically only non-cultivated plants, as shown below. The English glosses 'tree,' 'herb,' and 'vine' apply to Ka'apor botanical life-form labels, nevertheless, with these qualifications in mind.

Another Ka'apor word, *kapi* (PTG **kapi'i*, Lemle 1971:118), which covers numerous grasses, sedges, and other small succulent plants, seems, on initial inspection, to be a life-form label also. This is because *kapi* encompasses a large range of botanical species and Ka'apor informants consider *kapi* not to be a constituent of the other three life-form classes. The taxon *kapi*, however, is monotypic in Ka'apor, evidently containing no contrast sets (Kay 1971). In other words, *kapi* is an "empty taxon" (Hunn 1982:834, Turner 1974:34-35, 40). Folk botanical life-form labels, on the other hand, are polytypic, harboring a plurality of folk generic names, by definition (Atran 1985:307, Berlin *et al.* 1973:215, Randall and Hunn 198:330, cf. Brown 1977:319-320). The term *kapi*, therefore, may be understood either as a folk generic name which is unaffiliated with any of the life-form classes or as an aberrant life-form label.

KA'APOR BOTANICAL GENERICS

I take as an hypothesis that "nomenclature is often a near perfect guide to folk taxonomic structure" (Berlin *et al.* 1973:216, 1974:27, cf. Bulmer 1974, Hays 1983). I have thus far collected 404 Ka'apor generic plant names⁴, of which 330 (82%) are classified by informants as being members of one of the three life-form classes labeled by *mira* ('tree'), *ka'a* ('herb'), and *sipo* ('vine'). These names are distributed in the following ways: 221 (67%) as 'trees', 47 (14%) as 'vines,' and 62 (19%) as 'herbs.' Of the 74 known folk generic names not so classified, 48 (65%) denote intensively managed plants and 26 (35%) refer to certain uncultivated grasses and/or morphologically unusual plants, such as bamboos and palms (for which no separate life-form label exists, in contrast to the Aguaruna of Peruvian Amazonia—Berlin 1976:385).

Berlin *et al.* (1974:28) define a productive primary lexeme as an expression in which one of the constituents (usually the head) refers to a taxon superordinate to the lexeme in question. Hence, in folk English, a 'pine tree' is a kind of 'tree.' An unproductive primary lexeme, although also compound, contains no constituents that label a superordinate taxon. For example, a 'hog plum,' in folk English, is not a kind of 'plum' (cf. Berlin *et al.* 1974:28). Of the 404 folk generic plant names in Ka'apor, 86 are productive primary lexemes and 45 are unproductive primary lexemes. In other words, these 131 productive and unproductive primary lexemes account for 32% of the 404 botanical folk generics thus far determined in Ka'apor. The other 273 (68%) Ka'apor generic plant names are simple primary lexemes, i.e., composed of single, linguistically unanalyzable stems and/or are superficially binomial (see Hunn and French 1984:77).

Many superficially binomial generics in Ka'apor incorporate the bound suffix 'ʒ as the head term (e.g., *kanei-ʒ*, a folk generic referring to many but not all *Protium* spp. in the Burseraceae). The term 'ʒ is perhaps most accurately glossed as 'erect stem.' It should not be conflated with *mira* ('tree'), even though many organisms classified as 'trees' by Ka'apor informants incorporate this suffix. This is because in addition to constituting the head term in many 'tree' names, 'ʒ is also the head term in many palm names. The stemwood of palms, when present as such, usually differs from that of most dicotyledonous trees since it does not serve as lumber or fuel, for the Ka'apor. Also, palms are not classified under the life-form term *mira* by Ka'apor informants. Insofar as 'ʒ is a bound suffix, whereas *mira* is a free morpheme (occurring usually, although not always, as a head term in folk generic names), *mira* more closely approximates the status of life-form label than does 'ʒ. One does not ask in Ka'apor, "What are the kinds of 'ʒ?" Another bound morpheme is *rimo*, which is incorporated as the head term in several 'vine' names. For essentially the same reasons that 'ʒ does not replace *mira* as the label for 'tree,' *rimo* does not substitute for *sipo* as the label for 'vine.' All folk generic names incorporating either 'ʒ or *rimo* as the head term, therefore, are here considered to be superficially binomial, i.e., the same as simple primary lexemes for the purposes of analysis. In the Ka'apor botanical lexicon, these simple primary lexemes may designate both cultivated plants (such as *kara*, which covers yams) and non-cultivated plants (such as *kanei-ʒ*, which denotes many but not all *Protium* spp.).

Patterns of nomenclature that dichotomize traditionally cultivated plants and traditionally non-cultivated plants are perceptible in the corpus of productive and unproductive primary lexemes in the Ka'apor botanical lexicon. All 87 known Ka'apor productive primary lexemes referring to plants are given in Table 3. These denote folk taxa that the Ka'apor classify as 'trees,' 'vines,' and 'herbs.' Three pairs of synonyms (denoting a total of three botanical species) are included and counted as six different productive primary lexemes. One of these pairs (*āyaḡ-ara-mira* and *āyaḡ-ara-ka'a*), which refers to *Solanum surinamensis*, exhibits disjunct life-form heads, which is an artifact of the morphological ambiguity of the plant itself (see below).

All productive primary lexemes (Table 3) immediately designate non-cultivated plants of the Ka'apor. Further, names for traditionally cultivated plants do not incorporate life-form heads, I qualify this with the phrase *traditionally cultivated*, because five names for cultivated plants do incorporate them. These are 1) ornamental hibiscus (*Hibiscus rosa-sinensis*, no coll. no.), called *tupā-ka'a* ('thunder-herb'); 2) a medicinal, *Petiveria alliacea*, 842, called *mikur-ka'a* ('opossum-herb'); 3) a spice for fish dishes, *Eryngium foetidum*, 941, called *ka'a-piher* ('herb-aromatic'); 4) forage for mules and donkeys, *Desmodium adecendens*, 3080, called *ka'a-pe* ('herb-flat'); and 5) lemon grass (*Cymbopogon citratus*, 955), called *kāpī-piher* ('grass-aromatic'). Although this last term incorporates the head *kāpī*, whose status as a life-form is dubious (see above), it is here included precisely because of this uncertainty and to ensure full presentation of the data.

It is noteworthy that all these plants have been recently introduced to the Ka'apor. In the late 1970s and early 1980s, the government Indian agent introduced *Eryngium*, lemon grass, and hibiscus. The Ka'apor acquired *Petiveria alliacea* from the neighboring Tembê in the 1970s. The Summer Institute of Linguistics missionary introduced *Desmodium* in 1986. None of these species, moreover, seems to have been a traditional Tupi-Guarani cultigen. For example, *Petiveria* was also introduced to the Tupi-Guarani speaking Wayāpi of the Oiapoque River region in 1979 (P. Grenand, pers. comm., 1988). Lemon grass is from South India and Sri Lanka (Bailey *et al.* 1976:354, Willis 1985:328). Ornamental hibiscus is probably native to tropical Asia (Bailey *et al.* 1976:562).

One can reason that the Ka'apor named these plants with words incorporating either life-form heads or attributives because, at the moment of introduction, these plants were obviously not managed, as far as the Ka'apor were concerned. Should these plants remain under cultivation for a long time, perhaps the Ka'apor would exchange the life-form constituents of these names for terms more appropriate to the domain of cultivated plants. In any case, all these names are unproductive primary lexemes, since they were not mentioned under any of the major life-forms by principal Ka'apor informants during general elicitation. In addition to names for recently introduced cultivated plants that incorporate life-form terms, there are several other kinds of unproductive primary lexemes in Ka'apor ethnobotany.

PLANT NAMES FORMED BY ANALOGY

Pierre Grenand (1980:43) described a cognitive barrier between cultivated and non-cultivated plants in Wayāpi ethnobotany as an "uncrossable frontier." The

Wayapi, he pointed out, distinguish no genealogical relationship between cultivated manioc and non-cultivated manioc, which are in the genus *Manihot*, occupy the same habitat, and outwardly appear similar (a chief difference being that the non-cultivated species are dispersed by non-human agents). Likewise, the Ka'apor distinguish cultivated manioc (*Manihot esculenta*), the "bitter" forms of which usually incorporate the generic head *Mani'ĩ*, from non-cultivated manioc (*M. quinquepartita*), which they call *arapuha-mani'ĩ* ('brocket deer-manioc') [see Table 4].

Brocket deer are, in fact, ecologically associated with non-cultivated manioc. According to informants, brocket deer disperse the seeds of 'brocket deer-manioc' on the edges of swiddens (Balée and Gély 1989). When I asked an informant whether cultivated manioc was an 'herb' (*ka'a*), he emphatically stated "No, manioc is not an herb; manioc is manioc." This is a typical reply to similar queries about other traditionally cultivated plants. Yet 'brocket deer-manioc' is considered to be an 'herb' by the same informant, as with other informants. *Arapuha-mani'ĩ* is an unproductive primary lexeme, because it is not a member of the folk genus *mani'ĩ* (see Hunn and French 1984 for parallels). The name of non-cultivated manioc is modeled by analogy on a name for a cultivated plant to which an animal attributive is preposed (also see Berlin *et al.* 1974:38). Six other names of precisely the same structure occur in the Ka'apor botanical lexicon. These are shown

TABLE 4.—Plants names modeled by analogy on cultivated plants exhibiting animal attributives in Ka'apor.

Ka'apor	Coll No. (a)	Gloss	Botanical Referent	Botanical Model
<i>a'ĩhu-pako</i>	882	sloth-banana	Orchidac. (indt. gen.)	<i>Musa paradisiaca</i> (Musac.)
<i>ara-kĩ'ĩ</i>	2822	macaw-chili pepper	<i>Aparisthmium</i> <i>cordatum</i> (Euphorbiac.)	<i>Capsicum</i> spp. (Solanac.)
<i>arapuha-</i> <i>mani'ĩ</i>	2221	brocket deer- manioc	<i>Manihot quinque-</i> <i>partita</i> (Euphorbiac.)	<i>Manihot esculenta</i> (Euphorbiac.)
<i>tapi'i-kanamĩ</i>	973	tapir-cunami	<i>Psychotria poep-</i> <i>pigiana</i> (Rubiac.)	<i>Clibadium</i> <i>sylvestre</i> (Asterac.)
<i>tayahu-</i> <i>manuwi</i>	1045	white lipped peccary-peanut	Marantac. (indt. gen.)	<i>Arachis hypogaea</i> (Fabac.)
<i>teyu-pĩtim</i>	952	skink-tobacco	<i>Conyza banariensis</i> (Asterac.)	<i>Nicotiana tabacum</i> (Solanac.)
<i>yuruši-kĩ'ĩ</i>	990	Ruddy quail dove-chili pepper	<i>Geophila repens</i> (Rubiac.)	<i>Capsicum</i> spp. (Solanac.)

a. See note a, Table 3.

in Table 4, together with their glosses, referents, and models. In all except one case (*teyu-pitim*, which refers to *Conyza banariensis*), the animal denoted by the preposed attributive is ecologically associated with the referent, according to informants. Although *ara-kĩ'ĩ* ('macaw-chili pepper') is not a kind of 'chili pepper,' macaws eat its fruits. *Tayahu-manuwi* ('white lipped peccary-peanut') is not a peanut, but white lipped peccaries eat its rhizomes in the high forest. The arboreal orchid *a'ihu-pako* ('sloth-banana') is not a banana, but sloths eat its leaves and flowers. *Yuruši-kĩ'ĩ* ('Ruddy quail dove-chili pepper') is not a chili pepper, but Ruddy quail doves eat its small red fruits on the forest floor. *Tapi'i-kanamĩ* ('tapir-cunamĩ') is not the cultivated fish poison known as *kanamĩ* (nor is it any other kind of fish poison), but tapirs are said to eat its leaves. Regarding the one apparent exception to this pattern, although 'skinks' (*teyu*) are not ecologically associated with *teyu-pitim* ('skink-tobacco'), the two organisms do occur frequently together in the same habitat, namely, young swiddens. Other than *arapuha-mani'ĩ*, which, like its model *mani'ĩ*, is in the family Euphorbiaceae, these analogous names refer to plants that are in different botanical families than their models. In one case, a plant analogously named and its model are of fundamentally different stem habits (*ara-kĩ'ĩ* denotes the tree *Aparisthmium cordatum*, whereas its model, *kĩ'ĩ*, refers to shrubby chili pepper plants). With the exception of *teyu-pitim*, these names connote ecological relationships as well.

These analogous names are unproductive primary lexemes, not secondary lexemes. In terms of Ka'apor botanical classification, they are folk generics, not folk specifics. Two of these generics actually contain subordinate taxa. For example, *tayahu-manuwi-ran* ('white lipped peccary-peanut-false'), which refers to an indeterminate species of Marantaceae (665), is classified as a kind of *tayahu-manuwi* and *teyu-pitim-ran* ('skink-tobacco-false'), which denotes *Phyllanthus miruri* (3085), is considered to be a kind of *teyu-pitim*. Both species are non-cultivated. The models forming the head terms in the analogous generic names that incorporate animal attributives all refer to traditionally cultivated plants of the Ka'apor. These analogous names, therefore, evince a lexical opposition between cultivated and non-cultivated plants. A similar opposition is seen in the botanical lexicon of the Tupi-Guarani speaking Araweté. The Araweté cultivate seven named folk species of yam (*Dioscorea trifida*, 2086). All these names incorporate the folk generic head *kara*. These are classificatorily distinguished from an uncultivated species of *Dioscorea* (2081) called *tatētu-karā* ('collared peccary-yam'). Both species commingle in swidden fallows, but Araweté informants do not consider 'collared peccary-yam' to be a 'yam' (*karā*) and it is not elicited as such. Collared peccaries consume and disperse this species, however, according to Araweté informants.

Although a name modeled by analogy on another plant name to which an animal attributive is preposed tends to refer to a plant that is ecologically associated with the animal, this is not so with names for cultivated plants. Names for cultivated plant varieties may incorporate preposed animal attributives, but the animals are not ecologically associated with the plants themselves. Such names for cultivated varieties are, incidentally, secondary lexemes, in contrast to the analogous names, which are unproductive primary lexemes. For example, five of the 16 varieties of bitter manioc named by the Ka'apor (Balée and Gély 1989)

incorporate preposed animal attributives, while the other 11 are modified by color and/or shape terms. The names for bitter varieties incorporating animal attributives are *yararak-mani'ĩ* ('fer de lance-manioc'), *yaši-mani'ĩ* ('tortoise-manioc'), *sarakur-mani'ĩ* ('Wood rail-manioc'), *ararũ-mani'ĩ* ('Hyacinthine macaw-manioc'), and *šimokape-mani'ĩ* ('Black vulture-manioc'). Fer de lances, rails, tortoises, macaws, and vultures do not feed on manioc in swiddens (cf. Balée 1985:496-501) and, excluding fer de lances, are rarely encountered there. Hence, folk specifics for cultivated plants do not evoke ecological relationships as do most generics based on analogy that incorporate animal attributives. In other words, unproductive lexemes incorporate animal attributives in semantically different ways than do secondary lexemes referring to cultivated varieties. This is evidently not only so in Ka'apor, but in other Tupi-Guarani languages. For example, the only name for a cultivated yam modified by an animal attributive among the Tupi-Guarani speaking Tembé is *yowoi-kara* ('boa constrictor-yam') [1552]. The carnivorous boa constrictor, ostensibly, does not consume yams and no other ecological relationships between these two organisms exist.

MISLEADING LIFE-FORM CONSTITUENTS OF FOLK GENERIC NAMES

In Ka'apor, a few plant names incorporate life-form constituents that do not well describe the stem habit of the organisms denoted (some of these names correspond with Type 3 unproductive lexemes in Berlin *et al.* 1974:39). These names invariably denote non-cultivated plants. For example, *tapuru-ka'a* ('grub-herb') is classified by the Ka'apor as a 'vine,' not an 'herb,' as the head term *ka'a* misleadingly indicates. For this reason, *tapuru-ka'a* is an unproductive lexeme. Morphologically ambiguous plants may be named by synonyms displaying different head terms. For example, *ãyağ-ara-mira* ('divinity-hair-herb'), which denotes *Solanum surinamensis*, is synonymous with *ãyağ-ara-ka'a* ('divinity-hair-herb') [see Table 3]. This shrub is tall, reaching more than two meters, but not woody.

Two names incorporate the life-form label *mira* as an attributive to head terms designating traditionally cultivated plants. The shrubby *Myrciaria tenella* (947) of the high forest is called *mira-kĩĩ* ('tree-chili pepper'). An unproductive lexeme, its status as a kind of 'tree' or any other life-form is uncertain among informants. Although mallow (*Urena lobata*, 947) was introduced to the Ka'apor as a commercial crop in the 1930s, it now grows spontaneously in clearings and is no longer cultivated by them. The Ka'apor name for mallow is *mira-kirawa* ('tree-*Neoglaziovia variegata*'). The head constituent, *kirawa*, denotes a traditionally cultivated bromeliad that the Ka'apor use for making bowstrings and rope. Mallow also possesses excellent fiber from which the Ka'apor fashion bowstrings and rope in the shortage of *kirawa*. The name *mira-kirawa* is modeled by analogy on the name of a cultivated plant that incorporates a preposed life-form attributive (see Berlin *et al.* 1974:38). It is interesting that mallow is not woody and in the habitat of the Ka'apor it attains only infrequently two meters (cf. Atran 1985:305). It was not elicited as a member of any of the three life-forms. Regardless whether the attributive *mira* ('tree') would be more aptly substituted by *ka'a* ('herb') in the

construction of the word for mallow, the incorporation of *mira* may connote the traditionally non-cultivated status of mallow in Ka'apor culture.⁵

The use of a 'tree' word to label uncultivated herbs appears to be fairly common in other Tupi-Guarani languages. The Tupi-Guarani speaking Guajá, for example, refer to at least three species of non-cultivated, succulent herbs (*Dulacia* sp. [3421], *Ludwigia* sp. [3368], and *Conyza* sp. [3374]) by the life-form label for 'tree' (*wira*), even though the Guajá language has a word for 'herb' (*ka'a*). There appear to be no folk generic names in Guajá for these species. The Araweté also name several small, succulent herbs, including *Scoparia neglecta* (2048), with the life-form label 'tree' (*iwirā*).

Words for 'tree' may hold the most psychological salience of all botanical life-form labels, among the world's languages (Brown 1977, Witkowski *et al.* 1981). Trees are "semantic primitives" (Friedrich 1970:8). With these Tupi-Guarani languages, tree words also extend to non-cultivated herbs and even to some vines. The Araweté, for example, call the rubiaceous *Uncaria guianensis* (2097), which is clearly a vine (and is so lexically encoded by the Ka'apor—see Table 3) by the term *iwirā-atī* ('tree-unanalyzable constituent'). This is so despite a term for 'vine' (*hipa*) in the Araweté language. The Araweté, moreover, referred to my daily collections of forest plants in their habitat, even when these included 'herbs' and 'vines,' as *iwirā-nawe* ('tree-foliage'). The Guajá described similar collections as being *wira-riwe* ('tree-foliage') [cf. Berlin 1976:383]⁶. Tupi-Guarani life-form labels for 'tree,' hence, seem not to be merely polysemous with 'wood' and its products, but also with 'traditionally non-cultivated plant' (cf. Witkowski *et al.* 1981). The label for 'tree' in these languages, moreover, appears to be polysemously an incipient kingdom label, under which traditionally cultivated plants are conspicuously absent in folk classification.

OBSCURE PLANT NAMES

Some unproductive primary lexemes referring to plants at once denote, in their entirety, non-botanical phenomena as well. Although these (usually) compound expressions are single lexemes (see Hunn and French 1984:76), I call them "obscure" plant names because of their potential semantic ambiguity (these correspond with Type 4 unproductive primary lexemes in Berlin *et al.* [1974:39]). In Ka'apor, there are 15 such names (Table 5). Four of these names denote a cultivated plant. These are 1) *awa-i* ('person-little') for *Canna indica*; 2) *pu'i-risa* ('bead-cold') for Job's tears (*Coix lachryma*); 3) *tawa* ('yellow'), referring to turmeric (*Curcuma* sp.); and 4) *u'i-hu-ruwi* ('arrow-big-blood'), denoting bath sponge (*Luffa cylindrica*). A compound structure is noted in all these names except one, *tawa*. Although the monomial *tawa* is therefore not technically analyzable, as are all other unproductive primary lexemes in the Ka'apor botanical lexicon, it is included here because of its semantic similarity to the other terms, that is, because of polysemy. The same word for turmeric occurs also in the Wayāpi language (P. Grenand, pers. comm., 1988). As with names for cultivated plants incorporating life-form constituents, these names refer to plants that have been apparently introduced to the Ka'apor. The center of dispersion of *Canna indica* appears to be southern Brazil (T. Koyama, pers. comm., 1987). Job's tears came

TABLE 5.—Obscure plant names in Ka'apor.

Ka'apor	Coll. No. (a)	Gloss	Botanical Referent
<i>akuši-nami</i>	3024	agouti-ear	<i>Psychotria</i> sp. (Rubiace.)
<i>awa-i</i> (b)	799	person-little	<i>Canna indica</i> (Cannaceae.)
<i>āyaḡ-nami</i>	3065	divinity-ear	<i>Ipomoea setiflora</i> (Convolvulaceae.)
<i>ira-hu-ra-wi</i>	3097	bird-big-clown-light	Bromeliaceae. indt. gen.
<i>ira-kíwa</i>	987	bird-comb	<i>Asclepias curassavica</i> (Asclepiadaceae.)
<i>irapar-pukwa-ha</i>	2301	bow-grip-generator	<i>Desmoncus polyacanthos</i> (Arecaceae.)
<i>ka'uwa-pusan</i>	945	insanity-remedy	<i>Siparuna amazonica</i> (Monimiaceae.)
<i>kure-nami</i>	3072	pig-ear	<i>Kalanchoë</i> sp. (Crassulaceae.)
<i>ma'e-wira-puši</i>	2794	some-bird-feces	<i>Struthanthus marginatus</i> (Loranthaceae.)
<i>pu'i-risa</i> (b)	928	bead-cold	<i>Coix lachryma</i> (Poaceae.)
<i>suruku-yu-raši</i>	3073	bushmaster-yellow-spine	<i>Pithecellobium foliolosum</i> (Mimosaceae.)
<i>tatu-ruwai</i>	806	armadillo-tail	Polygonaceae. indt. gen.
<i>tawa</i> (b)	823	yellow	<i>Curcuma</i> sp. (Zingiberaceae.)
<i>u'i-hu-ruwá</i> (b)	965	arrow-big-blood	<i>Luffa cylindrica</i> (Cucurbitaceae.)
<i>u'i-tíma</i>	847	arrow-leg	<i>Myrcia</i> sp. (Myrtaceae.)

a. See note a, Table 3.

b. Name refers to a cultivated species.

from tropical Asia (Willis 1985:271), as did turmeric (Bailey *et al.* 1976:346-347). Bath sponge also originated in Asia, probably in India (Heiser 1979:50). Obscure names in Ka'apor ethnobotany, then, encompass traditionally non-cultivated plants and evidently do not constitute a deviation from the proposed dichotomy between naming patterns for traditionally cultivated and non-cultivated plants.

FALSE PLANTS, DIVINE PLANTS

In Ka'apor, the postposed attributive *ran* ('false') tends to be incorporated only in generic names for traditionally non-cultivated plants. Preposed attributives that denote any deity, spirit, or soul, which are all best glossed as 'divinity' (Viveiros de Castro 1986:209-215), are not incorporated into generic names for traditionally cultivated plants. The models for all these names are cultivated species, only two of which, coffee and sugarcane, are not traditionally cultivated species of the Ka'apor. All 13 folk generic names based on analogy in these ways are presented in Table 6. In contrast to the analogous names in Table 4, whose

TABLE 6.—Generic plant names incorporating attributes for 'False' and 'Divinity' in Ka'apor.

Ka'apor	Coll No. (a)	Gloss	Botanical Referent	Botanical Model
'False' Plant Names:				
<i>kase-ran</i>	3059	coffee-false	<i>Casearia javitensis</i> (Flacourtiac.)	<i>Coffea arabica</i> (Rubiaceae)
<i>katwasu-ran</i>	830	gourd-false	<i>Gurania eriantha</i> (Cucurbitac.)	<i>Lagenaria siceraria</i> (Cucurbitac.)
<i>māmā-ran</i>	2158	papaya-false	<i>Jacaratia spinosa</i> (Caricac.)	<i>Carica papaya</i> (Caricac.)
<i>mani'í-ran</i>	2691	manioc-false	<i>Stryphnodendron polystachyum</i> (Mimosac.)	<i>Manihot esculenta</i> (Euphorbiac.)
<i>murukuya-ran</i>	2657	passion fruit- false	<i>Passiflora aranjoi</i> (Passiflorac.)	<i>Passiflora edulis</i> (Passiflorac.)
<i>nana-ran</i>	2680	pineapple-false	<i>Ananas nanas</i> (Bromeliac.)	<i>Ananas comosus</i> (Bromeliac.)
<i>u'íwa-ran</i>	784	arrow cane-false	<i>Imperata brasiliensis</i> (Poac.)	<i>Gynerium sagittatum</i> (Poac.)
<i>uruku-ran</i>	3101	annatto-false	<i>Bixa orellana</i> (Bixac.)	<i>Bixa orellana</i> (Bixac.)
<i>yítik-ran</i>	879	sweet potato- false	<i>Ipomoea phyllomega</i> (Convolvulac.)	<i>Ipomoea batatas</i> (Convolvulac.)
'Divine' Plant Names:				
<i>āyaḡ-ruku</i>	807	divinity-annatto	<i>Vismia</i> sp. 1 (Clusiaceae)	<i>Bixa orellana</i> (Bixac.)
<i>kurupir-nana</i>	2680	divinity-pine- apple	<i>Ananas nanas</i> (Bromeliaceae)	<i>Ananas comosus</i> (Bromeliaceae)
<i>kurupir-pítim</i>	537	divinity-tobacco	<i>Renealmia floribunda</i> (Zingiberaceae)	<i>Nicotiana tabacum</i> (Solanaceae)
<i>kurupir-kā</i>	1011	divinity- sugarcane	<i>Renealmia alpinia</i> (Zingiberaceae)	<i>Saccharum officinarum</i> (Poaceae)

a. See note a, Table 3.

referents and models tend to be in different botanical families, the majority of the names in Table 6 refer to plants in the same families as their models. Nevertheless, these names are unproductive primary lexemes, not secondary lexemes or folk specifics for cultivated plants. In listing folk specifics of bottle gourd (*kawasu*), for example, principal informants cited *kawasu-ra'i* ('bottle gourd-little'), *kawasu-puku* ('bottle gourd-long'), and *kawasu-te* ('bottle gourd-true'), which are all phenotypically distinct varieties (in terms of fruit size and shape) of the cultivated *Lagenaria siceraria* (906). They did not include *kawasu-ran* (*Gurania eriantha*), a non-cultivated cucurbit of secondary forest. Likewise, when queried about the folk specifics of *nana* ('pineapple'), informants cited *nana-te* ('pineapple-true') and *nana-tikir* ('pineapple-unanalyzable constituent'), both of which are phenotypic varieties (in terms of the leaves) of *Ananas comosus* (1019), but not the non-cultivated *nana-ran* (*Ananas nanas*). This pattern holds true also for generic names of the other non-cultivated plants based on analogy with names for cultivated plants that incorporate constituents meaning 'false' and 'divinity.'

Three seeming exceptions are not listed in Table 6 because they concern secondary lexemes, not unproductive primary lexemes. These secondary lexemes denote, nonetheless, cultivated plants and incorporate the postposed attributive *ran* ('false'). These are 1) *taya-ran* ('cocoyam-false') [*Xanthosoma* sp. 2, 3083]; 2) *waraši-ran* ('watermelon-false') [*Cucumis anguria*, 895]; and 3) *kaka-ran* ('cacao-false') [*Theobroma speciosum*, 2261]. The first two names refer to introduced cultivated plants. *Taya-ran*, whose botanical model is a traditionally cultivated species of cocoyam (*Xanthosoma* sp. 1, 3554), was introduced by the Summer Institute of Linguistics missionary in 1985. Although the Ka'apor have cultivated West Indian gherkin (*Cucumis anguria*) since the 1950s (Ribeiro 1955:15), this species was introduced to South America in post-colonial times (Bailey *et al.* 1978:342; Willis 1985:314). The third seeming exception concerns *Theobroma speciosum*, an occasionally cultivated tree (which is classified as 'tree' by informants). This is, however, a facultative species that occurs in primary forest as well as in dooryard gardens and fallows (Balée and Gély 1989) in the region. The term which denotes this species, *kaka-ran*, is a folk specific of *kaka* (*Theobroma cacao*, no coll. no.), the cacao of world commerce. It is noteworthy that cacao was at one time exported from lower Amazonia based on debt-peonage labor of Indians, a relationship probably known to the Ka'apor prior to about 1825 (Balée 1988:156). The term *kaka*, moreover, appears to be a direct borrowing from Portuguese *cacao*, which is in turn ultimately a borrowing from Nahuatl *cacahuatl* (Berlin *et al.* 1974:279-280). Given the facultative nature of *Theobroma speciosum*, and that cacao may once have superseded it as a cultivated tree crop of the Ka'apor, one may better comprehend the apparent anomaly of its name, which incorporates the postposed attributive meaning 'false.' No other secondary lexemes referring to traditionally cultivated plants do so.

Grenand (1980:38) indicated that the cognate Wayāpi *lā* ('false') is employed, as a rule, only in names referring to useless plants instead of their presumably 'true' models, that the Wayāpi utilize. Berlin *et al.* (1974:38) made a similar observation about Tzeltal Mayan plant names formed by analogy with cultivated models. The issue of the utility of plants whose names incorporate *ran* in Ka'apor, however, is best treated as a matter of degree. Useful 'false' plants abound in

Ka'apor ethnobotany (cf. Balée 1986), even with regard to those denoted by unproductive primary lexemes (Table 6). For example, although the Ka'apor do not use the fruits of *kawasu-ran* ('bottle gourd-false') for gourd bottles, as with its cultivated model *kawasu*, they apply white sap from the stem of *kawasu-ran* to remedy lacerations of the eye. The *nana-ran* ('pineapple-false') is considerably smaller than its cultivated congener, *nana* ('pineapple'), but the Ka'apor eat the succulent fruits of both species. Many Ka'apor also eat the fruits of *māmā-ran* ('papaya-false') [Table 6], although these are somewhat bitter in taste compared to the 'real' papaya (*māmā*, 918). 'False' is not incorporated as an attributive in names for useless plants *per se*, but far more systematically in names denoting traditionally non-cultivated plants. Further evidence is seen in the variable treatment of a single species, the annatto dye tree (*Bixa orellana*). The Ka'apor name for individuals of this species that they cultivate in dooryard gardens is *uruku* (801). Non-cultivated individuals of the same species, however, encountered in swamp forest, are called *uruku-ran* ('annatto-false') [see Table 6].

A semantic (but not structural) equivalence is evinced in the preposed attributives *kurupir* and *āyaḡ* (which both may be glossed as 'divinity') and the postposed attributive *ran* in unproductive primary lexemes.⁷ For example, *kurupir-nana* and *nana-ran* are synonymous for the non-cultivated pineapple, *Ananas nanas* (Table 6). The Araweté language shows a similar pattern. In Araweté, the name for the cultivated bromeliaceous fiber plant, *Neoglaziovia variegata* (2406), is *kirawā*. This is distinguished from an uncultivated bromeliad of rock outcroppings (*Vriesia* sp., 2037), which is called *anī-kirawā*. Both exhibit the same potential uses, according to Araweté informants, the chief non-morphological differences between them being their habitat and state of cultivation. *Anī-kirawā* can be glossed as 'divinity-*Neoglaziovia variegata*' (cf. Viveiros de Castro 1986:209-215). In addition, the Araweté language also lexically differentiates between cultivated and non-cultivated annatto (*Bixa orellana*), as with Ka'apor. In Araweté, cultivated annatto is called *irikā* (2054), whereas non-cultivated annatto, of swamp forests, is named *karuwa-nata'i* ('divinity-unanalyzable constituent') [2096]. This lexical distinction is not *a priori* related to a difference in potential utility between cultivated and non-cultivated individuals of this single botanical species. Both Araweté and Ka'apor informants recognize that cultivated and non-cultivated varieties of annatto proffer dye from the pod for both clothing and the body in addition to combustible lignin used for making fire drills. In other words, constituents of unproductive primary lexemes meaning 'false' and 'divinity' do not connote an absolute measure of utility or lack thereof concerning plants, but rather the state of being traditionally non-cultivated.

The semantic equivalence of the attributives for 'false' and 'divinity' can be extended to life-form heads as well as to animal attributives referring to animals that are ecological associates of the plants thus named. All these constituents of unproductive primary lexemes are incorporated into names for plants that the Ka'apor did not traditionally cultivate.

SUMMARY AND CONCLUSIONS

Linguistic evidence for horticulture in Proto-Tupi-Guarani, which dates from about 2000 BP, indicates that all modern Tupi-Guarani languages are descended

from a language spoken by a horticultural people. Even contemporary hunting-and-gathering societies affiliated with the Tupi-Guarani family display linguistic and other relics of a horticultural past. Plant nomenclature in Ka'apor and other modern Tupi-Guarani languages has been apparently affected in patterned ways by this ancient cultural heritage.

In Ka'apor ethnobotany, five specific and complementary patterns of nomenclature suggest a lexical dichotomy between traditionally cultivated and non-cultivated plants. This dichotomy is affirmed by Ka'apor folk classification. These patterns are: 1) Primary productive lexemes refer only to traditionally non-cultivated plants. These lexemes are of the type 'hummingbird-tree' wherein the head constituent ('tree' in this case) labels a superordinate taxon, viz., a botanical life-form. Some names for cultivated plants incorporate life-form heads seemingly appropriately, but the plants denoted are introduced, not traditional cultigens. These names are unproductive primary lexemes. 2) Unproductive primary lexemes incorporating a folk generic head for a cultivated plant with an animal attributive refer to traditionally non-cultivated plants. Six of the seven such names refer to plants that are ecologically associated with the animals denoted in the attributives. For example, sloths eat the leaves of *a'ihu-pako* ('sloth-banana'), but the plant is not classified as a 'banana' (*pako*) and is even in a different botanical family than are bananas. These are compound folk generic names, not folk specifics. In contrast, folk specific names (secondary lexemes) for cultivated plants that incorporate animal attributives do so in a semantically different way. The animals referred to by these attributives are not ecological associates of the cultivated varieties whose names incorporate them. 3) Misleading life-form constituents (heads and attributives that do not designate superordinate taxa or the superordinate taxon to which the plant belongs) are incorporated into some unproductive primary lexemes. These lexemes refer to traditionally non-cultivated plants. 4) Obscure plant names are unproductive primary lexemes that denote botanical as well as non-botanical phenomena. The 15 such names in the Ka'apor botanical lexicon refer to traditionally uncultivated plants of the Ka'apor (which include four introduced species). 5) Folk generic names that are based on analogy with names for cultivated plants and that incorporate attributives meaning 'false' and 'divinity' refer to traditionally non-cultivated plants.

These complementary patterns of nomenclature in Ka'apor ethnobotany may be subsumed under one principle: Productive and unproductive primary lexemes in Ka'apor ethnobotany refer to traditionally non-cultivated plants of the Ka'apor. This principle applies, *mutatis mutandis*, to the ethnobotanical systems of several other Tupi-Guarani speaking peoples. It evidently derives from a long history of horticulture (and its concomitant effects on the lexicon) associated with the Tupi-Guarani language family. Many plant names in Ka'apor do not merely indicate stem habit or even cultural utility, but rather imply the state of cultivation of these plants. 'Tree' words in Tupi-Guarani languages are not exhaustively glossed as 'woody plants,' 'plants of tall stem habit,' and 'woody commodities.' Trees seem to be 'traditionally non-cultivated plants' before anything else in Ka'apor ethnobotany and evidently in that of other Tupi-Guarani peoples.

ACKNOWLEDGEMENTS

I am grateful to the Edward John Noble Foundation for financial support of my fieldwork during 1984-87. Research in Brazil was facilitated by the collaboration of the National Indian Foundation (FUNAI), National Council on Science and Technological Development (CNPq), and the Goeldi Museum. I am indebted to the botanists who made determinations of many of the plants cited herein: P. Acevedo Rodriguez, W. Anderson, R. Barneby, C.C. Berg, B. Boom, R. Callejas, L. Constance, D. Daly, A. Gentry, C. Jeffrey, J. Kallunki, R.J.M. Maas, A. Mennega, J. Mickel, J. Mitchell, M. Nee, G.T. Prance, J. Pruski, and C. Sastre. I gratefully acknowledge helpful comments on an earlier version of this article offered by W. Van Asdall, B. Berlin, P. and F. Grenand, E. Hunn, D. Moore, A.D. Rodrigues and one anonymous reviewer. I am alone responsible for any possible errors of fact or interpretation.

NOTES

¹All plant collection numbers cited herein are on the voucher series Balée. Voucher specimens are deposited at the New York Botanical Garden with duplicates at the Goeldi Museum. Collection numbers cited in Tables 3-6 are not reproduced in the text.

²A phonemicized orthography, adapted with minor modifications from Kakumasu (1986:399-401), is used here to represent Ka'apor speech sounds. Plain stops and affricates are *p, t, k, kw, m, n, ŋ, gw, s, š, h, rʃʃ*. The glottalized stop is *'*. Semi-vowels are *w* and *y*. Oral vowels are *i, é, u, e, a*, and *o*, all of which have nasalized and phonemically distinct counterparts (*i, é, ũ, ê, ã, and ô*). Primary stress tends to fall on the final syllable and is indicated here only in an exception.

³As a verb, *ka'a* means 'defecate.' English 'bush,' which covers both 'shrub' and 'forest' (Sykes 1983:104), may seem to be a more appropriate gloss for *ka'a* than 'herb'; on the other hand, 'bush' may be considered to be even more polysemous than 'herb' and *ka'a*, since the semantic range of 'bush' includes non-botanical phenomena as well, such as 'luxuriant growth of hair' (Sykes 1983:104). 'Herb' refers only to botanical phenomena (Sykes 1983:104).

⁴About 5% of these names are synonymous with other folk generic names. I include all such synonyms in arriving at the sum total of 404 known folk generic names.

⁵The Tupi-Guarani speaking Tembé make semantically the same distinction: *kurawa* (*Neoglaziovia variegata*, no coll. no.) vs. *wira-kurawa* ('tree-*Neoglaziovia variegata*') [*Urena lobata*, 1628].

⁶Although the Ka'apor referred to my collections of trees, vines, and herbs as *ka'a-ro* (which, on one level of analysis, means 'herb-leaves'), *ka'a-ro* is also a word for leaves in general, regardless of provenience or stem-habit of the organisms in question.

⁷It is significant that the particular divinity denoted by the word *kurupir* is a dwarf who putatively controls game supplies and whose home range is exclusively in high forest. The decidedly evil divinity *ãyağ* is also not associated with areas under cultivation.

LITERATURE CITED

- ALCORN, J.B. 1984. Huastec Mayan ethnobotany. Univ. Texas Press, Austin.
- ATRAN, S. 1985. The nature of folk botanical life-forms. *Amer. Anthropol.* 87(2):298-315.
- BAILEY, L.H., E.Z. BAILEY, and STAFF of the Liberty Hyde Bailey Hortorium. 1976. *Hortus Third: A concise dictionary of plants cultivated in the United States and Canada.* MacMillan, New York.
- BALÉE, W. 1984. The ecology of ancient Tupi warfare. Pp. 241-265 in *Warfare, culture, and environment* (R.B. Ferguson, ed.). Academic Press, Orlando.
- _____. 1985. Ka'apor ritual hunting. *Human Ecol.* 13(4):485-510.
- _____. 1986. Análise preliminar de inventário florestal e a etnobotânica Ka'apor (Maranhão). *Bol. Mus. Paraense Emilio Goeldi, Ser. Bot.* 2(2):141-167.
- _____. 1988. The Ka'apor Indian wars of

LITERATURE CITED (continued)

- lower Amazonia, ca. 1825-1928. Pp. 155-169 in *Dialectics and Gender* (R.R. Randolph, D. Schneider, and M.N. Diaz, eds.). Westview Press, Boulder.
- _____, and A. GÉLY. 1989. Managed forest succession in Amazonia: The Ka'apor case. *Adv. Econ. Bot.*, Vol. 7 (in press).
- BERLIN, B. 1976. The concept of rank in ethnobiological classification: Some evidence from Aguaruna folk botany. *Amer. Ethnol.* 3:381-399.
- _____, D.E. BREEDLOVE, and P.H. RAVEN. 1973. General principles of classification and nomenclature in folk biology. *Amer. Anthropol.* 75(1):214-242.
- _____. 1974. *Principles of Tzeltal Plant Classification*. Academic press, New York.
- BROWN, C.H. 1977. Folk botanical life-forms: Their universality and growth. *Amer. Anthropol.* 79:317-342.
- BULMER, R. 1974. Folk biology in the New Guinea highlands. *Soc. Sci. Inform.* 13:9-28.
- CARDIM, F. 1939. *Tratados de Terra e Gente do Brasil*. (Brasiliana, Vol. 168, ser. 5). Companhia Editora Nacional, São Paulo).
- CLASTRES, P. 1968. Ethnographie des Indiens Guayaki (Paraguay-Brésil). *J. Soc. Américanistes* 57:9-61.
- FRIEDRICH, P. 1970. Proto-Indo-European Trees: The Arboreal System of a Prehistoric People. Univ. Chicago Press, Chicago.
- GRENAND, P. 1980. Introduction a l'Étude de l'Univers Wayäpi. SELAF, Paris.
- GRENAND, F. and C. HAXAIRE. 1977. Monographie d'un abattis Wayäpi. *J. Agric. Traditionelle Bot. Apl.* 24:285-310.
- HAYS, T.E. 1983. Ndumba folk biology and general principles of ethnobotanical classification and nomenclature. *Amer. Anthropol.* 85:592-611.
- HEISER, C.B. 1979. *The Gourd Book*. Oklahoma Press, Norman.
- HUNN, E. 1982. The utilitarian factor in folk biological classification. *Amer. Anthropol.* 84(4):830-847.
- _____, and D.H. FRENCH. 1984. Alternatives to taxonomic hierarchy: The Sahaptin case. *J. Ethnobiol.* 4(1):73-92.
- HUXLEY, F. 1957. *Affable Savages*. Viking Press, New York.
- KAKUMASU, J. 1986. Urubu-Kaapor. Pp. 326-403 in *Handbook of Amazonian Languages* (D.C. Derbyshire and G.K. Pullum, eds.). Mouton de Gruyter, Amsterdam.
- KAY, P. 1971. Taxonomy and semantic contrast. *Language* 47:866-887.
- KOZÁK, V., D. BAXTER, L. WILLIAMSON, and R.L. CARNEIRO. 1979. The Héta Indians: Fish in a Dry Pond. *Anthropological papers of the American Museum of Natural History*, Vol. 55, Part 6. American Museum of Natural History, New York.
- LEMLE, M. 1971. Internal classification of the Tupi-Guarani linguistic family. Pp. 107-129 in *Tupi Studies I* (D. Bendor-Samuel, ed.). Summer Institute of Linguistics Publications in Linguistics and Related Fields, Publication No. 29. Summer Institute of Linguistics, Norman, Oklahoma.
- MÉTRAUX, A. 1928. *La Civilisation Matérielle des Tribus Tupi-Guarani*. Librairie Orientaliste Paul Geuthner, Paris.
- MIGLIAZZA, E.C. 1982. Linguistic prehistory and the refuge model in Amazonia. Pp. 497-519 in G.T. Prance (ed.), *Biological Diversification in the Tropics*. Columbia Univ. Press, New York.
- NORONHA, J.M. de. 1856. *Roteiro da Viagem da Cidade do Pará ate as Ultimas Colonias dos Portuguezes em os Rios Amazonas e Negro*. *Noticias para a Historia e Geographia das Nacões Ultramarinas*, Vol. 6. Lisbon.
- PRANCE, G.T., W. BALÉE, B.M. BOOM and R.L. CARNEIRO. 1987. Quantitative ethnobotany and the case for conservation in Amazonia. *Conservation Biol.* 1(4):296-310.
- RANDALL, R.A. and E.S. HUNN. 1984. Do life-forms evolve or do uses for life? Some doubts about Brown's universals hypotheses. *Amer. Ethnol.* 11:329-349.
- RIBEIRO, D. 1955. Os índios Urubus: Ciclo anual das atividades de subsistencia de uma tribo da floresta tropical. *Anais do XXXI Congresso Internacional de Americanistas*, Vol. 1:125-157.
- _____. 1970. *Os Índios e a Civilização*. Editora Civilização Brasileira, Rio de Janeiro.
- RIVET, P. 1924. Les indiens Canoeiros. *J. Soc. Américanistes de Paris*, n.s., 16:169-181.
- RODRIGUES, A.D. 1985. Relações internas na família lingüística Tupi-Guarani. *Rev. Antropol.* 27/28:33-53.

LITERATURE CITED (continued)

- _____. 1986. *Línguas Brasileiras*. Edições Loyola, São Paulo.
- _____. 1988. Proto-Tupi evidence for agriculture. Paper read at First International Congress of Ethnobiology, Belém.
- SAPIR, E. 1949. Time perspective in aboriginal American culture: A study in method. Pp. 389-462 in *Selected Writings of Edward Sapir* (D. Mandelbaum, ed.). Univ. California Press, Berkeley.
- SOUSA, G.S. de. 1974. *Notícia do Brasil*. Departamento de Assuntos Culturais do M.E.C., São Paulo.
- SYKES, J.B. (ed.) 1983. *The Pocket Oxford Dictionary of Current English*, 6th ed. Clarendon Press, Oxford.
- TORAL, A. 1986. Situação e perspectivas de sobrevivência dos Avá-Canoeiro. Xerox. Centro Ecumênico de Documentação e Informação, São Paulo.
- TURNER, N.J. 1974. Plant taxonomic systems and ethnobotany of three contemporary Indian groups of the Pacific Northwest (Haida, Bella Coola, and Lilloet). *Syysis* 7 (Suppl. 1):1-104.
- VIVEIROS DE CASTRO, E. 1986. *Araweté: Os Deuses Canibais*. Jorge Zahar, Rio de Janeiro.
- WILLIS, J.C. 1985. *A Dictionary of the Flowering Plants and Ferns*, 8th ed. Revised by H.K. Airy Shaw. Cambridge Univ. Press, Cambridge.
- WITKOWSKI, S.R., C.H. BROWN, and P.K. CHASE. 1981. Where do tree terms come from? *Man* (N.S.) 16:1-14.