

THE GENUS ANADENANTHERA
IN AMERINDIAN CULTURES

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This monograph is dedicated
in
affectionate memory to the late

DANIEL HERBERT EFRON, PH.D., M.D.
1913-1972

cherished friend of the author and of the
Botanical Museum, a true scientist devoted
to the interdisciplinary approach in the
advancement of knowledge.

1855

June
15th
65

In preparing the snuff, the roasted seeds of the Niopo are placed in a shallow wooden plate, which is held on the knee by means of a broad handle grasped in the left hand; then crushed by a small pestle of the hard wood of the Paso de Arco (*Tecoma* sp.) which is held between the fingers & thumb of the right hand.

The snuff is kept in a mull made of a tiger's bone, closed at one end with pitch and at the other stopped with a cork of *marina*. It hangs from the neck, and has attached to it the tubiferous ^{suberose} rhizomes of some *Cyperaceae*. (*Hypoxylon nutans*, *Hees* (?)) which are slightly odoriferous. These, or the tubers of some allied species, are used throughout the Amazon, Rio Negro, Haupé &c among the Indians of the forest. With a piece of *Piripirioca* (the name given to them in *Lingua Geral*) about the person, one is safe from the bad wish & evil eye.

The instrument for taking the ^{snuff} is made of bird's bones, & differs somewhat from that used by the Catawizi Indians (see Jour. Bot. v. 5. p. 246.) Two tubes end upwards in little black balls (the endocarps of some species of *Astrocaryum*) which are applied to the nostrils, while the single tube in which they unite at the lower end is dipped into the "mull," and thus the Niopo is snuffed up the nose.

I enclose a piece of *Caapi*, from which the Indian who was grinding the Niopo every now & then tore a strip with his teeth & chewed with evident satisfaction. It had been slightly toasted over the fire. "With a chew of *Caapi* and a pinch of Niopo,"

June
15th
65

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INTRODUCTION

“... Hay vidas que son noches eternas, embriagadas de yopo, embalsamadas de selvas tropicales.” (Ybarra, 1950)

Among those plants with chemical constituents that Lewin (1931) classified as Phantastica and which today are referred to as hallucinogens or psychotomimetics (Hofmann, 1959), we might include two species of the small leguminous genus *Anadenanthera* Spegazzini. This genus, formerly considered as section *Niopa* of the genus *Piptadenia* Benthham, is the probable source of the so-called narcotics best known as *Cohoba*, *Vilca* and *Yopo*. I use the word ‘narcotic’ in the classic sense, to indicate a substance one of whose effects consists of a benumbing activity on the central nervous system.

I first became interested in *Piptadenia peregrina* (L.) Benthham in the spring of 1955 and planned an investigation of this species with regard to its distribution and its uses among the Indians of the West Indies and South America. However, I soon recognized that taxonomic work was needed on this and related species. J. P. M. Brenan stated in a letter later in the same year (November 4, 1955), “. . . I regard *Piptadenia* as a combination of the few true species of that genus, and a rubbish bin for a large part of. . . imperfectly known species. . .” While the genus *Piptadenia*, like many of the *Mimosoideae*, is not free from questions of delimitation, there is agreement that the species of section *Niopa* comprise an especially natural group. On the basis of the data gathered during the course of the taxonomic study, including evidence from morphology, anatomy and chemistry of the seeds as well as from geographical distribution, I came to agree with at least two other botanists (Brenan, 1955; Spegazzini, 1923) that these species are better relegated to the separate genus *Anadenanthera*. Unlike *Piptadenia*, *Anadenanthera* is endemic to the New World. It is easily distinguished from species of *Piptadenia* by its having, among other distinctive characters, capitate, rather than spicate, inflorescences. The species that fall within *Anadenanthera*, as here interpreted, number only two, each composed of two geographical varieties. *Anadenanthera peregrina* (L.) Spegazzini and *A. colubrina* (Vell.) Brenan are defined in terms of certain small, present-absent morphological characters which are always maintained, even where the geographical distributions of these species overlap. The trees of the species of *Anadenanthera* are so similar to one another in gross appearance that it would not have been reasonable to make an ethnobotanical study of anything less than the whole genus. Bearing out their gross similarities, the species of *Anadenanthera* have been found to be chemically similar one to another with respect to the psychotomimetic constituents of their seeds; these are the parts most commonly used for magico-religious purposes, usually as snuff. The distinctiveness of *Anadenanthera* from *Piptadenia* is emphasized by the fact that species tested from *Piptadenia* have been found to yield the same or related compounds in much smaller amounts. My work with herbarium specimens and experimentation with a technique for identifying the species by leaflet anatomy tended further to confirm this line of reasoning. I was also fortunate to be able to see both species growing under more or less natural conditions and to obtain the photographs of them (Altschul, 1964).

The taxonomy of *Anadenanthera*, along with speculations as to the history of the distribution of the species, was presented originally as Part I of my doctoral thesis and has been published (Altschul, 1964). Part II of the thesis treated the ethnobotany of *Anadenanthera* and is published here. It includes among other data, some facts which support the statement in Part I of the thesis that man probably introduced *Anadenanthera peregrina* into the West Indies. This possibility was suggested by the taxonomic study, but it seemed more plausible to me after consulting archaeological and ethnological sources. Furthermore, it would not be the only instance where a narcotic was carried widely by man, some important examples being *Caapi* (*Banisteriopsis*) and *Coca* (*Erythroxylon*).

The ethnobotanical portion presented here consists of a series of separate Indian culture-areas with information extracted from sources in the literature and from correspondence with anthropologists and ethnobotanists who have had first-hand experience with the Indians in question. This portion of the thesis is intended to help establish, on the basis of the known distribution of the species of *Anadenanthera*, the correctness of reported uses of substances derived therefrom. It is important to bear in mind that some remarkably extensive trade routes have operated from time to time among the Indians of South America. It should be remembered, too, that the information on the distribution of the species is limited by the number of specimens — about 200 — examined in the course of study.

The cultures of concern here are treated as much as possible in the ethnographic present. In some places, I have discussed the possible origins of practices associated with the uses of *Anadenanthera* by the Indians as they were found at the time of earliest contact with the Europeans. Some of the questions which are raised by this treatment and which I have tried to answer, where possible, are: What are the indigenous common names associated with *Anadenanthera* substances? To what do they refer—to which plant or plants, to what part of the plant, to what other materials, acts or ceremonies? What other botanical materials are employed as adulterants? What are the culture-items associated with the preparation and administration of *Anadenanthera* substances? How are these substances prepared? How are they administered? What are the reputed physical effects, as described by Indian informants or by outside observers? What are the actual physical effects as found in recent laboratory experiments? What is the nature of the phytochemistry and pharmacology involved? What is the cultural setting of the practice? Who, in the tribal community, uses the materials, from the standpoint of the socio-religious structure of a society and of sexual division? Is the use of *Anadenanthera* in a particular form associated with cultures at certain stages of development? What are the historical intercultural relationships, if any, of the various peoples who use *Anadenanthera* narcotics? Were the uses invented at a single centre and disseminated outward therefrom, or were they independently discovered in several culture-areas? Was man a force in the distribution of *Anadenanthera* species? Were they cultivated? What were the earliest forms in which *Anadenanthera* substances were employed — in *chicha*, enemas, snuff or in other ways? Why were they used at all? Finally, what does the archaeological evidence suggest?

My studies of *Anadenanthera* do not begin to deal with the important relationships, both historical and contemporary, that must exist between *Anadenanthera* and other tropical New World genera which are also the source of narcotics or stimulants, such as *Banisteriopsis*, *Datura*, *Erythroxylon*, *Mimosa*, *Nicotiana*, *Olmedioperebea* and *Virola*. A detailed knowledge of the species of these genera is needed to understand fully the ethnobotany of *Anadenanthera*; but this will have to await studies of broader scope and greater detail. In the course of six years, I examined nearly four hundred fifty sources and have received some sixty personal communications on the ethnobotany alone. The taxonomic work already published should help to bring new clarity to a small group of plants from a large and difficult subfamily. The ethnobotanical data, being to my knowledge more comprehensive than any heretofore compiled on the subject, may provide some useful information for workers in the fields of phytochemistry, pharmacognosy, pharmacology and experimental psychiatry.

I conclude this introduction with a quotation providing, as does the line at its beginning, an allusion to *Yopo*. It is interesting to note here the apparent survival of an indigenous tradition in the contemporary, popular literature of the descendants of the conquerors:

“Caricari, momia decrepita, salió penosamente del letargo senil en que vivía sumido, tomó unas polvadas del ñopo que le ofrecía Ponchopire a fin de que entrase en el trance adivinatorio y comenzó a absorberlas por la nariz, primero despacio y progresivamente más aprisa, mientras la comunidad y los forasteros lo contemplaban con religioso respeto.

“De pronto el vejete entró en estado convulsivo y en seguida delirante, mascullando palabras extrañas, las más de ellas sin sentido alguno, con las cuales anunciaba que ya su nahual lo llevaba volando por los aires sobre grandes ríos torrentosos y altísimas sierras y cuando los guainaris le oyeron decir que ya veía, allá abajo, la churuata de ellos, sacaron del cutumari los despojos mortales y se los pusieron entre las manos trémulas de senectud y de delirio de yopo.

“Ya Ponchopire le había explicado previamente que se trataba de una muerte misteriosa, de la cual había sido víctima un racional que hacía treinta años regía aquella tribu del Arapani, padre de los mestizos que ahora le pedían ahincadamente que les dijese de qué había muerto.

“El visionario proveyó, gimiendo como un niño, palpó, olfateó y luego apretó contra su pecho aquellas repugnantes cosas, mientras sus ojos en blanco seguían por los aires del delirio el vuelo del gavilán de su nahual y al cabo de un rato de gimoteos y de convulsiones de trance comenzó a balbucir frases entrecortadas y en su mayor

parte ininteligibles, que si nada preciso decían respecto a lo que se le preguntaba, en cambio parecían expresar una esperanza mesiánica, pues — traducidas y reconstruidas por Marcos Vargas — anunciaban que en todas partes ya estaban colmadas las calabazas donde se prepara el curare, porque los ríos comenzaban a correr hacia sus cabeceras y esto significaba que ya ‘ella’ venía contra ‘él’ desde el fondo de la gran noche sin lunas. Pero la alusión al curare fue suficiente para que los mestizos se convencieran de que su padre había sido envenenado.” (Gallegos, Décima Ed.)

BRIEF TAXONOMIC DESCRIPTION OF

ANADENANTHERA

Taxonomic details and photographs are presented in the systematic treatment of the genus (Altschul, 1964). For our purposes here the following description should be adequate.

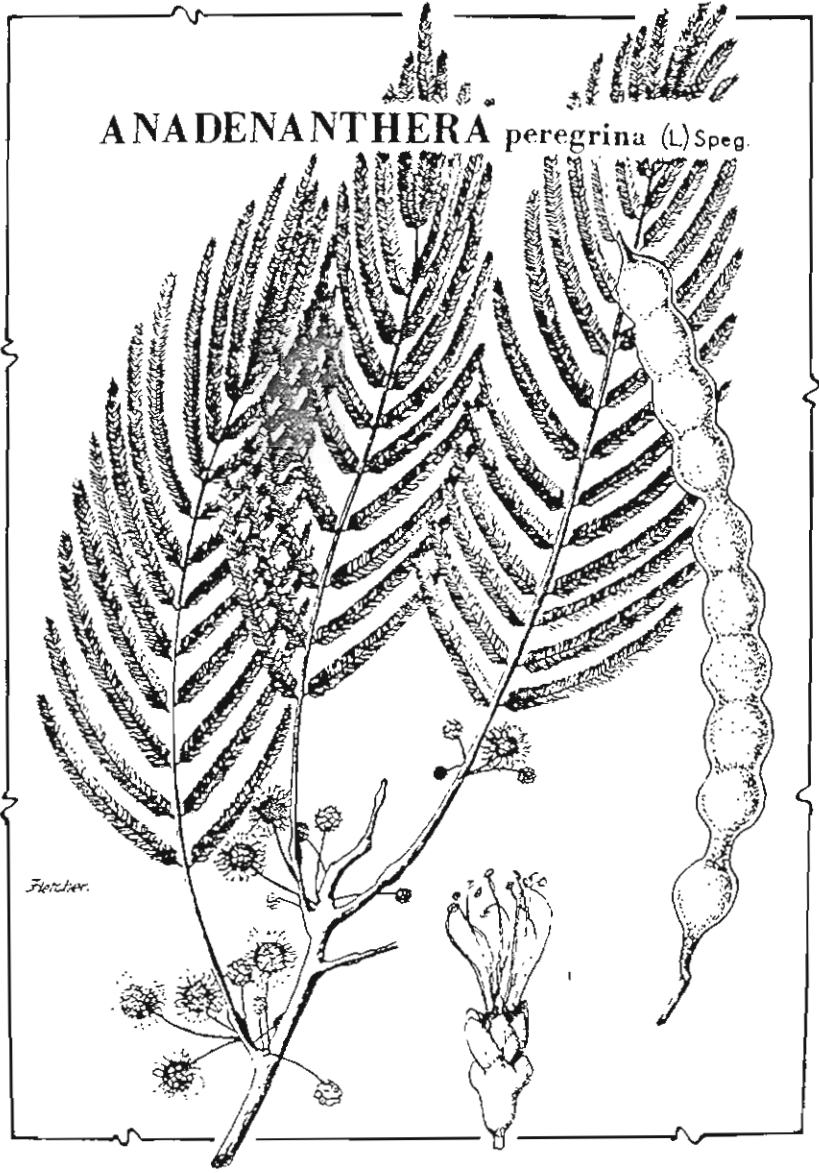
Anadenanthera belongs to the subfamily *Mimosoideae* of the *Leguminosae*. Its representatives are feathery-foliaged, elegant trees and shrubs of the West Indies and South America. The leaves are bipinnately compound with leaflets .9-8 mm. long. The trunks may be smooth or armed with mammillose projections; the bark may be thin or corky. The flower heads are up to 20 mm. in diameter and range from white or greenish white to orange-yellow. The pods are up to 35 cm. long and up to 3 cm. wide; they are more or less flat and unilocular, dehiscing along one suture only, brownish outside, containing 8-16 thin, flat orbicular and shiny brown or black seeds 10-20 mm. in diameter. Representatives of this genus are described typically as occupants of savannas, or relatively open areas along rivers and streams; they are known to grow up to altitudes of at least 2100 meters. *Anadenanthera* is endemic to the New World and possesses capitate inflorescences; by these characters it may be distinguished from *Piptadenia*, which is not restricted to the New World and which possesses spicate inflorescences.

Anadenanthera is composed of two known species. *Anadenanthera peregrina* (L.) Spegazzini has dull, scurfy to verrucose pods and anthers which are eglandular in the bud; the involucre which subtends the flower head is found three-quarters of the way up from the base of the peduncle. This is the more northern-ranging species and occurs from southern Brazil to the Greater Antilles. *Anadenanthera colubrina* (Vell.) Brenan has nitid, smooth to reticulated pods and anthers which are glandular in the bud; the involucre subtending the head lies just below the knob-like receptacle. This species seems to be limited to the southern hemisphere and is found from central Peru to northern Argentina to northeastern Brazil. Each of these two species may be divided further into two geographical varieties. Within each species the differences between varieties are relative. *Anadenanthera peregrina* var. *peregrina* is found in northern Brazil, British Guiana, Colombia, Venezuela and in the West Indies. *Anadenanthera peregrina* var. *falcata* occurs in southern Brazil and Paraguay; most parts of this tree are shorter and thicker than in the first variety. *Anadenanthera colubrina* var. *Cebil* is found in Argentina, Bolivia, Brazil, Paraguay and Peru. *Anadenanthera colubrina* var. *colubrina* occurs in Argentina and southeastern Brazil; it is distinguishable from all other elements in *Anadenanthera* by a tendency for the flowering heads to be arranged in terminal racemose-paniculate patterns rather than in the customary position axillary to the leaves and subterminal.

The distribution of *Anadenanthera* appears to be largely natural, except for the probable introduction by man of *A. peregrina* into the West Indies.

The trees of the two species are similar in gross appearance. Preliminary chemical analyses of the seeds of the two species showed them to be very similar with respect to suspected psychotomimetic agents. The seeds are the parts most commonly used for magico-religious purposes by the Indians of the New World both today and in the past. The distinctiveness of *Anadenanthera* from *Piptadenia* is emphasized by the fact that species tested from *Piptadenia* have yielded the same or related compounds in much smaller amounts.

ANADENANTHERA peregrina (L) Speg.



Fletcher

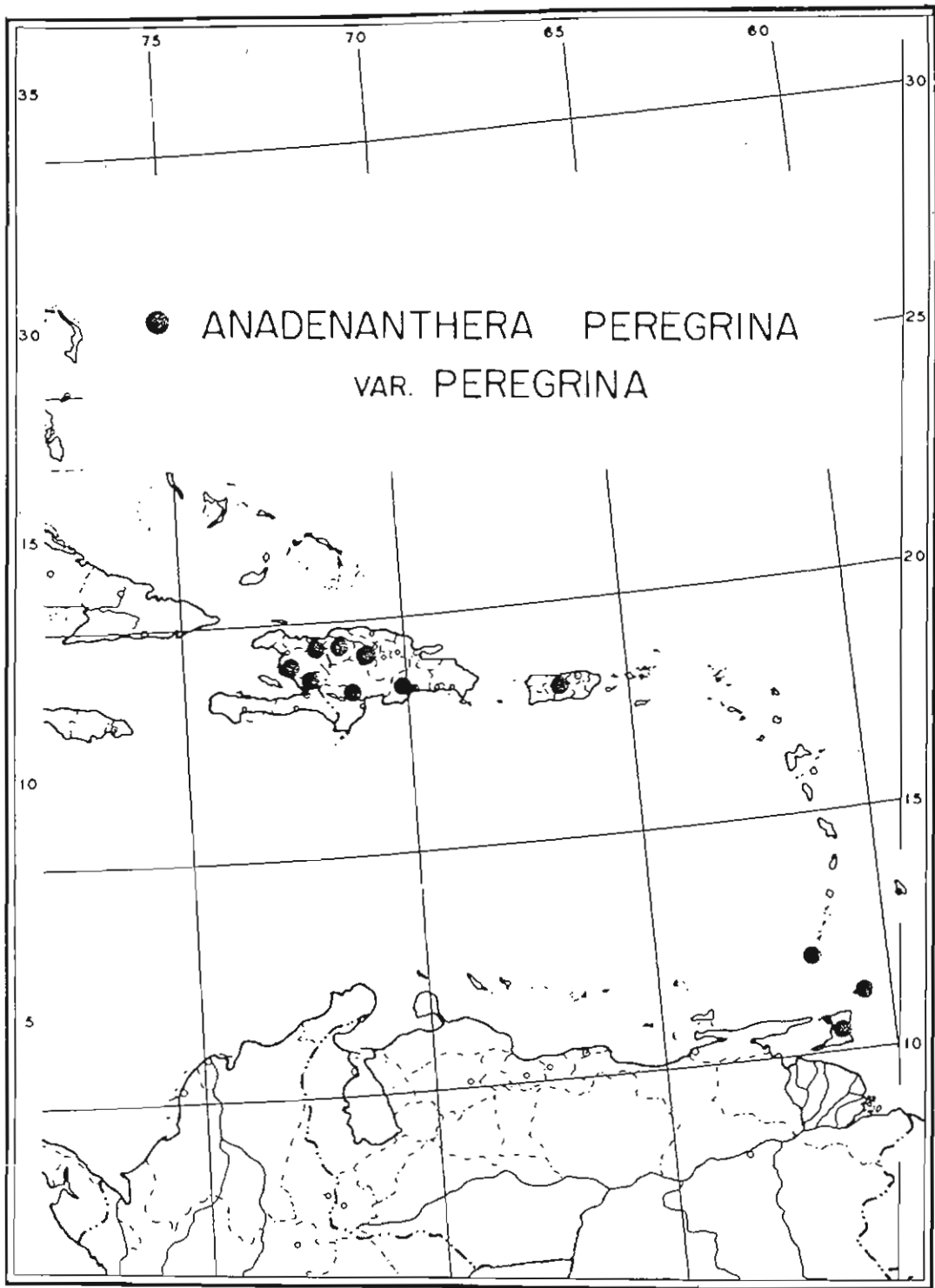


A. A view up through the feathery-leaved crown of *Anadenanthera peregrina*. Boa Vista, Amazonian Brazil.
Photograph: R.E. Schultes.



B. Tree of *Anadenanthera peregrina*. In savannas near Boa Vista, Amazonian Brazil.
Photograph: R.E. Schultes.





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Overbrook Farm, Stamford, Connecticut, August 1971

S. v. R. Altschul

TREATMENT BY CULTURE

In the following portion of this paper, Murdock's *Outline of South American Cultures* (1951) has been used as a basis for the distribution of ethnobotanical data into cultural units. Murdock's *Outline* is founded upon the cultural divisions used in Steward's *Handbook of South American Indians* (1946-50). In the *Outline*, South America and the West Indies are divided into culture-areas. Each culture-area consists, in turn, of a group of cultures. Each culture is made up of one or more tribes. The geographical divisions used in the *Outline* and in this paper are based on boundaries of the Indian cultures rather than upon current political borders of the countries in which they may occur. The distribution of these cultures is intended to approximate that which existed at the time of early contact with the Europeans. The ethnographic present is used in presenting the data.

This study treats only those cultures reputed to include, among their traits, the use of substances derived from *Anadenanthera*. All other stimulants, 'narcotics' and so on, have been omitted, except where directly related to the subject at hand. A second kind of outline (to be distinguished from the *Outline* above) has been used for each culture, to permit pertinent data to be broken down into components meaningful from the viewpoints of botany, ethnology, linguistics and medicine. Where information was meager or where it was evident that species other than those of *Anadenanthera* were involved, this outline has been supplanted by a brief discussion. Archaeological information has been treated in discussion form, too, and has been placed under the culture located in the area containing the site or sites in question. This does not preclude recognizing that the Indians occupying a particular area at the time of contact may have been unrelated to earlier peoples living there. A number of theoretical, speculative questions have also been discussed under the cultures to which they seemed most pertinent. These relate to origins of terms, traits and so on and are most fully dealt with in this treatment under the Caribbean and Peruvian culture areas.

The organization of the material which follows is such that, while the whole is intended to be a continuing exposition, each culture can be referred to as a separate entity. The data have been extracted from the literature, from conversations and from correspondence. They are presented within the outline of each culture as a composite of descriptions, without interpretation or time sequence, unless otherwise indicated. These reports have been left, where translated, as close to the words of the originals as possible. The sometimes awkward, though literal, word-for-word phrasing has been maintained in order to facilitate more accurate interpretation. Variations in capitalization, italicization, orthography and diacritic marks will be seen in the text, especially among the vernacular or Indian names of a given plant species; although these variants may appear as inconsistencies, they represent the attempt to be faithful everywhere to differing sources.

Each culture is dealt with as a whole. The tribes included under the cultures are not considered separately unless so treated in a note accompanying the particular culture. Not all categories of the outline have always been completed, because information was sometimes lacking.

The compilation of data for each culture is followed by a list of sources referable to the *Bibliography and Literature Cited* at the end of the paper.

For only a few of the peoples reputed to use *Anadenanthera* substances can it be said with certainty that such substances are employed through identification of voucher materials obtained from the Indians themselves. Numerous tribes are suspected of using or of having used them for snuff and other purposes. In many instances, reports describe practices commonly associated with the uses of *Anadenanthera*. The trees are known to grow where the people referred to normally live. However, without positive identification the employment of *Anadenanthera* substances must, in such circumstances, be classified, for the time being, as likely but not verified. The question of the botanical identity of the plants involved has been taken up for each culture in a part of the outline following the ethnological data. An evaluation has been made even though the data are limited by the number of specimens available for study and though the number of botanical collections available to the author does not necessarily represent the frequency of the trees in any given area. The fact that some areas of South America

have not been well explored botanically is also a limiting factor. Western Amazonas and some parts of the adjacent Andes are of particular interest from the standpoint of the species in question. I have seen no specimens of *Anadenanthera* from those regions. Yet reports of snuffing and enemas of plant substances are numerous from those regions.

The following treatment is, I believe, the most comprehensive on the subject. It includes the cultures with which *Anadenanthera* has commonly been associated for medical, magical or religious purposes. It is my hope that responses from other students may add to the data already compiled and clarify aspects still in doubt.

Many literature sources related to the subject of this compilation remain to be examined. The bibliographical citations at the end include some of these sources, a number of which has been published since 1961. A few new papers have been incorporated into this treatment.

Finally, I must emphasize that I am not an anthropologist and that, therefore, my handling of material in this discipline may be imperfect and incomplete. In presenting it in the form adopted, I trust that I may act to stimulate more thorough anthropological research on the drug and its use.

CULTURE AREA CARIBBEAN

TAINO CULTURE:

TRIBES: Ciguayo and Taino.

LANGUAGE: Arawakan stock.

NAME: *Cogioba*, *Cohaba*, *Cohoba* (*Cehobbâ*, *Cahoba*, *Cohiba*, *Cohobbâ*, *Kohobba*).

REFERS TO: a tree bearing pods with black, round and very hard seeds; a plant-derived powder, and the act and ceremony of its usage.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the dried and finely ground material has a tawny, cinnamon color and is taken through a cane about a foot long; the tube is bifurcated at about two-thirds of its length and is made of the same material as is a rounded, concave table or dish, finely wrought of beautiful, smooth, bright black wood and used as a container for the powder when it is to be administered.

MANNER OF ADMINISTRATION: the bifurcated end of the tube (*tabaco*) is applied to the nostrils and the powder inhaled from the table or dish.

PHYSICAL EFFECTS: the person, who is seated with his head leaning to one side and his arms around his knees, becomes at first unconscious from the dose, then awakens and, with his face turned toward the ceiling, speaks unintelligibly; the Indians say that the house in which the powder is taken then appears to be upside down and they themselves seem to be walking on air. (Hofmann reported in 1959, p. 246, his reaction LSD-25, a compound related to substances found in the seeds of *Anadenanthera*: “. . . at times the floor seemed to bend and the walls to undulate. . . I felt as if I were out of my body. . . My ego seemed suspended somewhere in space. . .”). Hallucinations or dreams accompany the episode.

CULTURAL SIGNIFICANCE: for divinatory purposes of tribal importance and for medical magic as a purifier and to discover the cause of illness. The powder is taken to communicate with idols (*cemis*) on whose heads the dish is kept and which are maintained in special houses by the caciques or chiefs.

USED BY: caciques or chiefs (shamans).

SOURCES: de las Casas, 1909 ed.; Columbus in Bourne, 1906; Oviedo y Valdés, 1851 ed.; Pane in Bourne, 1906. The accounts of these four authors are used here exclusively as a basis for the outline above because they are the earliest eye-witness records of a culture which deteriorated rapidly after contact with Europeans.

BOTANICAL IDENTITY: I have examined specimens of *Anadenanthera peregrina* var. *peregrina* from the West Indies from (south to north) Trinidad, Tobago, Grenada, Puerto Rico and Hispaniola. *Underwood & Griggs 771* is labelled *Cojobilla*, an indication that the term is still applied in Puerto Rico, here in the Spanish diminutive, to this species. Safford (1916a) was, however, the first to point out that Urban (1905) had given *Cojoba* or *Cojobo* as the common name on Hispaniola for *A. peregrina*. The common name today is given for Puerto Rico as *Cojoba*, *Cojobana*, *Cojobillo* and *Cojobo* (Britton & Wilson, 1923, 1924; Perkins, 1907); for Hispaniola as *Cojoba* (Barker & Dardeau, 1930). It is interesting that neither Linnaeus' original description of the species (1753) as *Mimosa peregrina* nor Urban's publication gives any hint as to the use of the tree for snuff or narcotic purposes. I explain these omissions by a quotation from a letter of Walter H. Hodge (June 16, 1955):

“. . . the original inhabitants of the larger West Indian Islands disappeared very rapidly after the Spanish conquest. Such few pure Indians as remained were engulfed by the importation of Africans who interbred freely presumably

with them. Because of this many, if not all, of the old plant uses of the Greater Antilles were forgotten and disappeared. The only native aborigines in the West Indies at this time are the very few, almost a handful, of island Caribs who live on Dominica. In investigations made on the ethnobotany of these remaining Indians I have never found any present day use or previous history of the use of *Piptadenia* by the Caribs.

"My guess would be that if this species was used in the Greater Antilles at the time of the discovery, then its use was probably pretty well distributed through the Lesser Antilles as well since most of the aboriginal inhabitants of the larger islands, at least as far west as Hispaniola, came, it is believed, from the South American mainland by way of the Lesser Antilles. This was certainly true, at least, of the Arawak who inhabited Hispaniola at the time of the Conquest and the Caribs who were the chief occupants of the Less Antillean chain."

If the old uses of *Anadenanthera peregrina* var. *peregrina* were to be looked for today in the West Indies at all, the only place where they might yet exist would be in Haiti, among the mountain people who still practice a kind of black magic, strongly African in nature. Larimer Mellon, Jr., who operates a hospital in the back country of Haiti, wrote (in a letter, September 29, 1956) that many of the local people use snuff but that he did not know what it was made of nor had he heard the word *Cohoba* used.

Not much is known as to when the Antilles were first populated by man. The possibility that *Anadenanthera peregrina* var. *peregrina* was introduced by man into the West Indies is supported to some extent by what information is available as to the peoples who came to occupy these islands. It is believed that the Indians who settled in the Antilles and who lived there at the time of the discovery came from the northern coast of South America. Pictography, philology, technology and religion, as shown by their ceremonies and beliefs, indicate that this is so, and that these peoples advanced northwards through the Antilles gradually, island by island (Fewkes, 1903). The fact that representatives of *A. peregrina* var. *peregrina* occur no farther west in the Greater Antilles than Hispaniola implies a distribution which at first seems arbitrary but which, in fact, correlates with the extent of the culture of the Taino in the Caribbean area at the time of the discovery.

Of the three main groups of peoples inhabiting the West Indies in 1492, the Ciboney occupied the western extremities of Cuba and Haiti (Gower, 1927). These Indians were mostly cave-dwellers, with a simple economy based on *manioc* (*Manihot* sp.) and seafood. The culture of the Ciboney represents the most primitive of three overlapping epochs distinguishable in the West Indies, and their shell heaps are found from Trinidad to Cuba (Fewkes, 1915). These peoples probably did not use *Anadenanthera peregrina* as a narcotic.

A second group of peoples was the Arawak, who lived in the Greater Antilles and included the Taino of Hispaniola, the Igneri of Trinidad, the Boriqueno of Puerto Rico and the Lucay of the Bahamas (Murdock, 1951). (Murdock has included the Ciboney in this group, as the Sub-Taino of Cuba and Jamaica). The term 'Island Arawak' is used by Murdock (1951) to distinguish all these peoples from the Arawak of the mainland. The Arawak of the mainland may represent a prototype from which the Island Arawak developed a different culture, resembling it only in general customs and language. The Island Arawak were characterized by having an organized religion and a high grade of polished stone work (Gower, 1927). The Island Arawak peoples represent the second cultural epoch distinguishable in the West Indies: that of agriculturists. This culture existed at one time on many of the islands of the Antilles but was surviving at the time of discovery only on (Cuba,) Hispaniola, Puerto Rico, (Jamaica,) and the Bahamas. The most populous islands were Hispaniola and Puerto Rico (Fewkes, 1915). I have examined specimens of *Anadenanthera peregrina* var. *peregrina* from Hispaniola, Puerto Rico, Grenada, Tobago and Trinidad. Botanical collections do not necessarily reflect the population size of a given species in any area; but it may be significant that I have examined from the West Indies specimens of *A. peregrina* var. *peregrina* as follows: Hispaniola (Haiti and the Dominican Republic): 14 numbers (no collector, Delessert Herbarium 33454; Allard 13900; Buch 839; Ekman H2237, H2262, H3494, H10460, H12624, H14278; Fuertes 1561; Holdridge 1069; Leonard 7541a, 8472, 9050; Valeur 423). Puerto Rico: twenty-one numbers (Britton 27 or 124; Britton & Britton 8970, 8986, 9856, 9979, 10074; Britton & Britton & Brown 6338; Britton & Hess 2697; Cowell 630; Heller 6329; Otero 418; Sargent s. n., 369; Sintenis 738, 1117, 2082, 3396, 5327 or 5317, 6706; Stevenson 1756; Underwood & Griggs 771). Grenada:

three numbers (*Beard 164; Broadway s. n., 1750*). Tobago: one number (*Broadway 3809*). Trinidad: three numbers (*Broadway 9258; no collector, J. D. Smith Herbarium 1004; no collector, Trinidad Botanical Garden 3675*). Hispaniola, Puerto Rico and Trinidad are the larger islands on which *A. peregrina* var. *peregrina* is represented. One might, therefore, expect relatively more specimens from those places. It is also true that these islands were comparatively highly populated by Indians at the time of the discovery. If introduced by them, these trees might be expected to be found rather frequently there, even today.

Perhaps of greater significance is the fact that, among the specimens examined, *Anadenanthera peregrina* was not represented from the other islands, including those of the Lesser Antilles. The species is believed to occur there but may well be rare. The possible importance of this circumstance lies in the fact that the third group of peoples inhabiting the West Indies at the time of the discovery was the Carib. These nomadic, war-like Indians appear to have overrun the Lesser Antilles up to the eastern end of Puerto Rico, except for the islands of Tobago and Trinidad (Fewkes, 1903, 1915), which were probably too large for them to conquer (Fewkes, 1914a). The Carib represent the third cultural epoch found in the West Indies (Fewkes, 1915). It seems doubtful to me that the Carib ever used *A. peregrina* as a narcotic. Lovén (1935) stated that the forked tubes of the Taino never were employed by the Island Carib, who did not snuff any powders. I have seen no reports which indicate otherwise. Hodge's letter (June 16, 1955) tends to confirm that this is also true today for the remaining Carib. Finally, the reason for the Carib's not employing *Anadenanthera* narcotics may be found in their origins. Cruxent (1951) has described the surprising existence in Venezuela of multi-legged, Panamanian-inspired pottery which appeared shortly before the time of discovery. This Isthmian tradition, he says, belongs to a high cultural level and signifies the arrival of conquering and colonizing groups from Central America sometime between 1300 and 1700 A.D. The sites at which the pottery was found correspond not only in chronology and typology but also in geographical distribution with the Indians that are "poorly termed Carib" by the chroniclers. If Cruxent's explanation is correct, then the reason for the Carib's not using *Anadenanthera* snuff is clear: they were not familiar with it. The genus is not represented in Central America nor in western Colombia. Nor is there information suggesting that such materials were ever traded into those regions.

Relative to the problem of the derivation of the Carib is the fact that the language of the Island Carib differs from that of the mainland Carib. Fewkes (1914b) stated that it was not known whether the two languages had differentiated before or after the Island Carib had left the mainland; that, although the Guiana Carib are sometimes thought to be derived from those of the islands, the Island Carib are probably of independent origin; and that the linguistic similarities between the two Carib groups were due to ancestral factors. Whatever more recent findings may indicate, it is possibly of interest to ethnologists and archaeologists that, regarding cultural relationships, nowhere, not even in British Guiana, where *Anadenanthera peregrina* var. *peregrina* is naturally represented, is the use of the narcotic reported among the Carib. Legends of the Arawak and Carib of the mainland insist that tobacco came from the Antilles, and it is believed that tobacco was secondarily disseminated from there into northeastern South America (Brett, 1879; Radin, 1942). *Anadenanthera peregrina* apparently was not introduced into northeastern South America from the islands and not used at all there by the Arawak or Carib. Lovén (1935) stated that the true Arawak of the coast of Guiana were never acquainted with the taking of any kind of snuff through the forked reed as used by the Taino, and the *Cohoba* ceremony did not exist among the true Arawak.

It may be pertinent to discuss in greater detail some of the reports concerning the use of *Anadenanthera peregrina* and to raise a few questions about archaeological artifacts, linguistics and mythology. Safford (1916a) first identified the snuff of the ancient Taino as from the plant now known as *A. peregrina* var. *peregrina*. I agree that this species probably was used, but I cannot agree entirely with his interpretation of the statements of the chroniclers. Safford asserted that in the early descriptions of *Cohoba* snuff there is nothing to indicate the nature of the plant producing it and that Oviedo y Valdés confused it with tobacco. In a second article (1916b), he infers that Oviedo y Valdés incorrectly stated that the substance was ignited and its smoke inhaled through the bifurcated tube. Safford says further that the physiological effects could not have been caused by tobacco.

First, Safford appears to have overlooked a small passage in Oviedo y Valdés (1851 ed., Tomo Primero, p. 347) which indicates the nature of the plant, *Cohoba*: among various trees, some "...llevan unas arvejas ó havas negras é redondas é durissimas é no para comerlas hombre ni alguna animal. É a queste cohoba lleva unas arvejas que las vaynas son de un

palmo é mas é menos luengas, con unas lentejuelas por fructo que no son de comer, é la madera es muy buena é recia." (The wood of *Anadenanthera* is, incidentally, well known throughout the West Indies and South America as the source of a strong and excellent timber for carpentry, civil construction, etc.). This passage and its separation, in the text, from the passage in which Oviedo describes the absorption of the smoke of plant materials through various tubes suggest that the chronicler may not have been aware of the narcotic uses of the tree, *Cohoba*. It seems probable that the Indians would not have informed him of its magical importance, an assumption supported by the lack of botanical identifications of the source of *Cohoba* by any of the chroniclers, although the identity may be implicit in Pane's account discussed later.

Oviedo's description of the inhaling of smoke from burning tobacco leaves through tubes ought to be accepted, I think, as it is related. Oviedo y Valdés stated that the plant used was a cultivated herb with short, broad, thick, downy leaves, and that even the Christians, as well as the negroes, had begun to use it. Unlike the *Cohoba* ceremony, this smoking appears to have been an activity in general of the Taino males.

As for the physiological effects of tobacco, it seems possible that strong smoke in large doses might overcome participants, particularly after wine, as Oviedo y Valdés indicated was sometimes the circumstance. Furthermore, the part possibly played by psychological suggestion ought not be overlooked.

Probably both *Anadenanthera* and tobacco were used by the Taino, the former being associated more strictly with *ceimi* worship and shamanistic curing, the latter tending perhaps to be somewhat more secular in employment (Roumain, 1942). That tobacco is cultivated and available easily to the population would encourage general use. The more highly narcotic and less easily obtained fruits of the *Cohoba* tree might have been limited in use to the élite. I believe that the Taino sometimes may have burned *Anadenanthera* materials with tobacco and inhaled the smoke of the two substances together. The practice of inhaling the smoke of the burning seeds of what may well be species of *Anadenanthera* is reported for some Indians of British Guiana (see under Mura) and for Indians of Chile or Gran Chaco (see under Atacama).

Ramón Pane (in Bourne, 1906) speaks of *Cogioba*, as well as of an herb called *gueio*, which he describes as having leaves like basil, thick and broad, whose juice is used in divination. In one of the origin myths of the Taino, Pane mentions a *guanguaio* full of *Cogioba*. I would deduce from this that the *guanguaio* (container of some sort?) may have been used originally to hold tobacco, a *guan-guaio* (= *guan-gueio*?), and later come to be employed as a container for *Anadenanthera* snuff. If this be correct, it might suggest that the Taino had been acquainted with tobacco earlier than with *Anadenanthera peregrina*.

Without recognizing it, Pane may have indicated the identity of *Cohoba* in a myth concerning how the Indians make their *cemis* or idols: a tree in the forest speaks to a passing Indian and asks him to carve the tree into an idol and to make *Cohoba* for it so that the spirit which resides in the tree and speaks from it may tell him important things. Trees were important in the religion of the Taino, and it would be reasonable to interpret the tree referred to above as *Anadenanthera peregrina* var. *peregrina*, in which case the Taino might be 'enthusiasts' partaking of the god himself in order to commune with him.

Among the most puzzling archaeological materials found in the West Indies are the elbow-stones, stone collars and three-pointed idols, as they are variously called, endemic to Puerto Rico, Hispaniola and possibly to eastern Cuba (Fewkes, 1913). These polished stone objects are superior to any found in the Lesser Antilles (Fewkes, 1912-13). Fewkes stated (1913) that earlier investigators recognized that the 'shoulder ridge' of the stone collars faintly resembled the lashing of the two ends of a hoop; Joyce had suggested that the Antillean stone collar was a copy of an archaic *ceimi* made of tree branches bent into a hoop and fastened at their ends, and he first associated the stone collars with tree worship. As Fewkes has said, both the stone collars and elbow stones were used probably for similar ceremonial purposes, being regarded as idols, the figures carved on them representing *cemis* or spirits. The spirit represented by the faces on the elbow stones is believed to be a bark- or tree-spirit. He (1913) stated that the spirit was called *yucayu* and that it was thought possibly to cause *manioc* to germinate and increase. I suggest the possibility that this spirit might alternatively be that of the *Cohoba* tree.

Ernst (1889) intimated that the word *Cohoba* may be of Guaraní origin, from *cui* (powder); *cuyú* (to eat, absorb); *cui-guabo* or *cuyubo* (eating, absorbing): the act of taking the powder. The word *taboca* or *tabaco* (reed) is also Guaraní and came to be applied to any tube used for absorbing materials through the nose (Oviedo y Valdés, 1851 ed.). How the Guaraní language could have gotten into the Antilles is difficult to explain. Ernst (1889) said that some tribes of northern Haiti referred to by de las Casas were supposed to have spoken a language or languages totally different from the rest of the island; there is some evidence that their speech was derived from Guaraní. One of the tribes was that of the Ciguayo, who, according to Ernst, must have been acquainted with some exciting powder; they used *tabocas*. It is interesting that the word *Curupa*, which may be closely related to the Guaraní roots given by Ernst, appears in various forms referring to intoxicating snuffs or enemas among the Tupi-Guaraní-speaking peoples of the Cocama, Omagua, Chiriguano and Guaraní cultures. The same word, referring to similar practices, also is found among the Otomac, Sáliva, Yaruro and Guahibo cultures, whom Murdock has described as speaking independent or isolated language-stocks. It may be significant that a linguistic classification suggested by Greenberg & McQuown (1960) claims the languages of the Otomac, Sáliva and Guahibo to be closely related to Tupi-Guaraní (see map. p. 67).

Ortiz (1947) has proposed that there may be more than a chance similarity between the word *Cohoba* of Hispaniola and the word *cobo*, which meant anciently on Hispaniola, and still means today in Cuba, "snail". According to Ortiz, there is an abundance of the large marine snails, *Strombus gigas* L., in the Antilles; that on many of the islands they were the only hard material available for utensils may be responsible for their becoming one of the basic characteristics of the archaic cultures established there. Ortiz maintains that powdered shells were mixed with tobacco and smoked in the magic ceremonies of *Cohoba*. (Where he got his information I cannot say but, like many of the writers on the subject, he is probably mistaken in attributing unquestionably the botanical substance to tobacco and in saying that it was smoked in the *Cohoba* ceremony). Ortiz asks whether the Indians ground the shells to partake of a supernatural power presumed to reside in the snail shell and whether the *cobo* might not have been an ancient vessel for the rites of *Cohoba*.

It is true that the *cobo* does play a part in the origin myths of the Taino, as related by Ramón Pane (in Bourne, 1906), and may well have been regarded as endowed with special powers; but the taking of *Cohoba* snuff is described as entirely unrelated to the snail, suggesting that, if, as Ortiz believed, the word *Cohoba* was derived from the word *cobo*, the derivation must have taken place at a time beyond the folk-memory of the Taino of Pane's time. It does not seem wholly unlikely to me that the word used by Pane, *Cogioba*, for the practice of taking (*Anadenanthera*) snuff may be related to *cobo*, as Ortiz implies: however, I believe that *Cogioba* or *Cohoba* might better be explained as a combination of the Guaraní (*Curupa* as transformed into) *Cuyubo* and the word *cobo*. This would imply a meeting of the culture of the Ciguayo or other Guaraní-speaking tribes of Ernst (1889) with that of the more primitive Ciboney. The Ciboney did not know of *Anadenanthera* materials but may well have taken some kind of snuff stored in snail shells and could have contributed other elements, as well, to the snuff-taking customs of the peoples of Hispaniola.

Among articles which have not been well explained from the Taino are the set-up idols, which are not found among any of their closest relatives on the mainland to the south. These idols have been attributed to Mayan influence from the west, as has, sometimes, the Taino's smoking of cigars. The Taino use of tobacco in a profane manner is certainly not derived from practices found on the mainland at the time of discovery; tobacco smoking was there a ritual element in treating the sick. The uttering of oracles among the Taino is intimately connected with the *ceimi* idols in situations where the snuff was placed on the circular disk surmounting and made in one piece with the idol's head (Lovén, 1935).

Another puzzling question is the similarity of the West Indian word *caoba*, for *Swietenia Mahogani* L., to *Cohoba*, which Lovén (1935), in fact, spells *Caoba*. Was there originally some confusion, among the Spaniards, of the ceremony of *Cohoba*, or *Caoba*, with the wooden apparati employed in its performance? Is there any connection between this ceremony and *caoba*, *S. Mahogani*? In Pane's account of the origin myths of the Taino, there is also a tree mentioned called *Iobi*, *Iobo*, *Jobo* or *Hobo*, which was said to be known otherwise as *Mirobalans*; Bachiller y Morales (1883 ed.) said that a tree of that name still grew and its fruit was still in use in Santo Domingo. Did the words originally refer to *Anadenanthera peregrina*, like *Yopo*, the term used for *Anadenanthera* snuff by some

Orinoco Indians. The word *Iobi* (or variants of it) is used in a narrative on the origin of the Indians of Hispaniola, as related by the Taino to Pane; the men ancestral to the Taino were said to have been going off to fish when they were taken by the sun and transformed into trees called *Iobi*.

Lovén (1935) has referred to the similarity between the *Caoba*-meetings of the Taino and the *mirrayes* of the Achagua to the south on the mainland who use *Yopo* snuff in the same way as the Taino did *Cohoba*, or *Caoba*. He added that the *Caoba* ceremony belongs to a culture-complex which was not part of the true Arawak culture of the continent. It was characterized by intoxication from inhaling snuff through a forked tube and originated in the western Orinoco region, where the Achagua practiced a ceremony of that kind. The forked tubes of the Taino differed from all those of South America in that they were not made of bones; there were none suitable on Hispaniola. Lovén believed that the forked tubes of the Taino, as well as their method of application, were imported, via Trinidad, from the western Orinoco and northwestern Amazonas, after the Taino had settled the Antilles. This interpretation was based on Lovén's belief that tobacco, not *Anadenanthera* materials, was used. Substituting one for the other, however, need not upset the theory for the derivation of the other culture-elements mentioned. On the basis of the research done for this paper, it is reasonable to state that, whatever part tobacco may have played in the snuffs of these Indians, *Anadenanthera peregrina* was used probably by both the Taino and the Achagua, as well as by other Orinoco Indians (see below).

IGNERI CULTURE:

TRIBES: Igneri

LANGUAGE: Arawakan stock.

The only material from about the time of contact is an excerpt from an historical document written in verse about the Trinidad Indians by de Castellanos (1852 ed., Tomo Cuatro, p. 93):

“Libres están de la pomposa ropa
Y de cubiertas duras el acero,
Do quiera que mireis allí se topa
Macato, chicha, vino más grosero:
Uno toma tabaco y otro yopa
Para poder saber lo venidero;
Estaban plazas, calles y caminos
Llenos de hechiceros y adevinos.”

Apparently, both tobacco and *Anadenanthera peregrina* were known and used. Lovén (1935) indicated that tobacco was used in powder form and that snuff-taking for ritualistic purposes was common. He also believed that tobacco snuff was the most ancient indigenous snuff powder used on Trinidad, even though both tobacco and *Yopo* powder were used.

Among the specimens of *Anadenanthera peregrina* var. *peregrina* examined from Trinidad was *Broadway 9258*, labelled *Savannah Yoke* (Could the last epithet be confused with *Ya-kee*, *Virola* spp., as found in Schultes, 1954?); the notation also indicated that the tree was only “perhaps native”. Marshall (1930) and Williams (1931) both describe this species as doubtfully indigenous, and Beard (1946) does not include it in a list of trees native to Trinidad.

According to Fewkes (1914a), the archaeological materials from Trinidad have greater affinity with the pottery of South America than with that of the northern islands of the Antilles. The Trinidad materials are similar to those of the Arawak on the Orinoco. The natives of Trinidad were probably most closely related to the Warrau (Guarano) of the Orinoco delta. The Trinidad culture was a localized development from South America belonging to the same

general insular culture or cultures found in the Antilles from Trinidad to Cuba and the Bahamas. This culture persisted on Trinidad and the larger islands probably because the Carib (see Taino) could not conquer them (Fewkes, 1914a).

In attempting to understand the significance of the snuffing of *Anadenanthera* materials in the West Indies or elsewhere, it is helpful to know whatever is possible of the history of its users. The Carib having been removed from consideration, only the Ciboney and the Island Arawak remain to be considered.

Fewkes (1903) has said that the West Indians were probably most closely related to the Warrau (Guarano) now inhabiting the Orinoco delta. The Warrau culture is considered in Murdock's *Outline* (1951) with the Orinoco cultures, among whom the Otomac, Sáliva and Yaruro apparently employ *Anadenanthera* snuff; I have no information on the Warrau, but it would seem likely that they might use it, too. The three cultures mentioned all utilize *A. peregrina* as snuff, and all three have two words for it: *Curuba* (*Curupa*, *Curuva*) and *Niopo* (*Yopo*, *Yupa*, etc.). In early times, according to Fewkes, numerous sedentary peoples who had developed a high degree of culture and were distinctly related in language, customs and religion, lived a fluvial life along the banks of the Orinoco (before they were driven out by the Carib).

More recently, Crucent (1951) stated that pottery found at the site of Barrancas, Venezuela, at the delta of the Orinoco is associated with a culture which also existed to some extent in the Antilles (as well as in Amazonia and in the Andes of Ecuador and Peru, as shown by the appearance of Barrancoid motifs in these areas). This culture seems to have moved northward across the Antilles, being transformed in the process.

Crucent also mentioned a cultural movement which is responsible for a ceramic material known as Valencia Red, which is not as fine art as the earlier Barrancas and not derived from, though it develops on top of, the Barrancoid horizon. This second cultural movement appears to have travelled northwards in the same direction as the first and may have been Arawak, but very little is known about it. (Both this cultural movement and the earlier one described preceded the tradition in Venezuela which Crucent attributes to the 'Carib' or Isthmian from Panama).

Crucent suggested that there may have been a cultural connection between the Peruvian highlands and the cultures of Brazil, Venezuela and the Antilles at a time perhaps contemporaneous with Chavín civilization in Peru (about 1000 - 500 B. C., according to Gordon R. Willey, in lectures). He further suggested that the Venezuelan cultures may have been connected by several routes to Peru: a) descent of the Amazon, followed by movement up the Rio Negro to the Orinoco; b) from northern Peru to Ecuador to Colombia to Venezuela; c) descent of the Amazon to its mouth and up the coast. Of these possibilities, Crucent believes the first two to be the more probable, with a) leading to Barrancas and b) leading to a site known as La Cabrera, also in Venezuela. Both sites exhibit cultures of Andean characteristics and belong to the first cultural current into the Antilles described above. Whether or not the bearers of these cultures could have been the introducers of *Anadenanthera peregrina* into the West Indies can only be guessed. The data compiled on the following pages for uses of *A. peregrina* among the Indians of South America suggest that, if any of these peoples used *Anadenanthera* substances, it might have been those associated with route a). *Anadenanthera* is not represented in northern Peru, Ecuador nor western Colombia; nor is it found at the mouth of the Amazon and up the coast, either in a wild state or cultivated.

CULTURE AREA COLOMBIAN

CHIBCHA CULTURE: the most advanced culture in aboriginal Colombia.

TRIBES: Chibcha or Muisca nation.

LANGUAGE: Chibchan stock.

NAME: *Yopa*.

REFERS TO: leaves or powdered leaves.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the Indian carries a calabash containing the powder and leaves, a piece of mirror mounted on a small stick, a little brush, and a highly painted bone split obliquely in half to function as a spoon.

MANNER OF ADMINISTRATION: the bone is used to fling the powder into the nostrils; the mirror is employed to reflect the flow of nasal discharge down the upper lip, which is kept shaved for the purpose; the brush is used to wipe away the discharge, the extra powder on the face, and to comb the hair afterwards.

PHYSICAL EFFECTS: nasal discharge.

CULTURAL SIGNIFICANCE: divinatory, a discharge which runs straight down the lip signifying good; one which runs crookedly, portending the opposite.

USED BY: *mohanes*; widely used.

SOURCES: Cooper in Steward, 1949; Simon in Restrepo, 1895; Uscátegui in a letter, October 26, 1956.

BOTANICAL IDENTITY: this region is west of the general distribution of *Anadenanthera* in northern South America; furthermore, the snuff above reportedly was made from leaves, rather than seeds; finally, the Andean Chibcha do not use *Anadenanthera* materials today. The possibility that some of the Chibcha may use *Anadenanthera* snuff at the present time is, however, suggested by the fact that their neighbors, the Tunebo, have acquired the habit and that specimens of *A. peregrina* var. *peregrina* from Colombia are named *Yopo* or *Yoto* (Overton 0-56-79, 0-56-81).

TUNEBO CULTURE: peripheral to Chibcha culture proper.

TRIBES: Guane, Lache, Morcote, Tecua and Tunebo (Tama).

LANGUAGE: Chibchan stock.

NAME: *Akua*, *Yopo*.

REFERS TO: strong alkaline powder.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the material is toasted and ground. It is absorbed from a special wooden tray by means of the tarsus of the birds *pajuil* or *paujil* (*Crax alberti* Fraser or *Mitu tomentosa* Spix), or an *hocco* (currasow) bone. The magic powder is kept in the beak of a *ciéntaro* or *tucán*

(*Ramphastos swainsoni* Gould or *Aulacorhynchus prasinus* Gould or other species). This beak is closed with a piece of cotton and hung from a cross-belt by means of a liana.

MANNER OF ADMINISTRATION: a little powder is flung into the wooden plate, and each person inhales some of it with the aid of the bone employed as a tube.

PHYSICAL EFFECTS: protection against the cold of the mountains; highly stimulating in small doses and powerfully narcotic in larger amounts.

CULTURAL SIGNIFICANCE: hygienic. The use of *Yopo* formerly was common to the whole male population but today is disappearing due to the prohibitions of missionaries and due to the great distances which must be traversed in order to obtain the source material. Actually, it is the *kareka* or medicine man, who uses *Akúa* (*Yopo*) today among the Tunebo, who are rapidly becoming extinct, numbering perhaps fewer than five thousand persons in a mostly mountainous area.

USED BY: men only, shamans.

SOURCES: Cooper in Steward, 1949; Rocheraux, 1919; Uscátegui, 1959 and in a letter, no date but written in January, 1961.

BOTANICAL IDENTITY: this region is west of the general distribution of *Anadenanthera* in northern South America as represented by specimens examined; but Uscátegui (1959) maintains that the Tunebo, who have wandered around from southern Venezuela to northwestern Colombia, do use snuff made of *Anadenanthera* materials today and that they acquired it probably from their Arawak neighbors in Venezuela and Colombia. According to my information, the Arawak peoples referred to must be either the Achagua, who use *Anadenanthera* snuff, or the Guayupe, for whom the botanical sources are as yet uncertain. (The Baniwa appear to use only *Virola* substances). Botanical specimens of *Anadenanthera peregrina* var. *peregrina* from Colombia bear the common names *Yopo* and *Yoto* (See Chibcha). Uscátegui reports (in the letter cited above) that voucher specimens of this species obtained from the Tunebo themselves are at the Instituto de Ciencias Naturales, in Bogotá.

CULTURE AREA CAQUETÁ

ACHAGUA CULTURE:

TRIBES: Achagua, Caberre (Cabre), Cocaima and Piapoco.

LANGUAGE: Arawakan stock.

NAME: *Niopa*, *Yopa*, *Yopo*, *Yuuba*.

REFERS TO: snuff powder; botanical source of powder.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the small fruits or seeds of certain trees are toasted and pulverized; or some kind of leaf is utilized to make the powder, which looks like ground coffee. Two crossed bird bones are used for absorption or a bifurcated tube made of leg bones of various herons.

MANNER OF ADMINISTRATION: two persons simultaneously blow snuff into each other's nostrils with the crossed bird bones; or the powder is inhaled in a one-man operation through the bifurcated tube.

PHYSICAL EFFECTS: violently intoxicating; in a moment the person is deprived of reason; then mucous runs from the nose. With repeated successive doses, the Indians shout crazily, shake, make hideous gestures. Anger may be aroused.

CULTURAL SIGNIFICANCE: divinatory and an excitant to battle. When the Indians wish to know the outcome of an undertaking, they get together and take *Yopa*; if the right nostril runs, success is indicated; if the left, failure; if both -- which is usual -- nothing is indicated, and the snuffing must go on all day if necessary, until the Indians get an answer. As an excitant, *Yopa* makes the Achagua, who are cowardly by nature, fearless in battle.

USED BY: shamans, but not monopolized by them.

SOURCES: Alvarado, 1945; Cooper in Steward, 1949; Hernández de Alba in Steward, 1948; Reichel-Dolmatoff, 1943-44; Rivero, 1883 ed.; Uscátegui, 1959; Wurdack, 1958.

BOTANICAL IDENTITY: the region occupied by the Achagua culture falls, in part at least, within the general distribution of *Anadenanthera peregrina* var. *peregrina*. Wurdack (1958) reports that snuff made from it is used today by the Piapoco.

NOTE: the Guayabero tribe is reported by Uscátegui (1959) to use or to have been acquainted with *Yopo* made from the toasted and pulverized seeds of *Anadenanthera peregrina* var. *peregrina*, especially for purposes of magic. The tribe is located within the Achagua region as here considered. The language has not yet been classified.

NOTE: the Amarizano tribe in D'Orbigny (1866) is not included in Murdoek's *Outline* (1951), but the Amarizano are given in Steward's *Handbook* (1946-50) as belonging to the Achagua culture. D'Orbigny reported that the Amarizano (as well as the Otomac) entertained a bizarre and deadly passion for the powder of *Niopo*, which came from a species of *Mimosa*. (*Anadenanthera peregrina* var. *peregrina* was placed originally in that genus). He stated that, when the grains began to turn black, the Indians kneaded them into a paste and mixed them with *manioc* flour and with lime from fired snail shells. The paste is hardened into small cakes over a lively fire. The Indians take the powder with pleasure anywhere and everywhere. It is placed on a plate five or six inches long held with one hand, while the other applies to the nostrils the forked end of a bone tube of a *gallinazo* (turkey buzzard), through which the Indian inhales the powder.

BANIWA CULTURE:

TRIBES: Arekana, Avane, Baniwa, Bare, Carutana, Catapolitani, Caua, Huhuteni, Ipeca, Maipure, Siusi and Tariana.

LANGUAGE: Arawakan stock.

NAME: *Nopo*, *Yopo*.

REFERS TO: bark exudate.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: bifurcated tube prepared from the leg bone of various herons.

MANNER OF ADMINISTRATION: absorbed as snuff in a one-man operation.

PHYSICAL EFFECTS: semi-narcotizing, hallucinogenic.

CULTURAL SIGNIFICANCE: curative in a magical sense as part of a method for dispelling sickness caused by witchcraft.

USED BY: shamans only.

SOURCES: Alvarado, 1945; Schultes in conversation, 1960; Uscátegui, 1959; Wurdack, 1958.

BOTANICAL IDENTITY: the Baniwa appear to live marginal to the area of general distribution of *Anadenanthera* in northern South America; no specimens are known to me from their culture region. Uscátegui and Wurdack state that the snuff is made from *Virola* substances; Schultes reports in conversation that these people would know of both *Anadenanthera* and *Virola* spp. today but that they probably use only *Virola*, which is employed, unlike *Anadenanthera*, only by shamans.

NOTE: Murdock's *Outline* (1951) does not mention the Kuripako tribe, which is found, today at least, on the Rio Guainía, an extension of the Rio Negro, in Colombia. These Indians speak Arawakan, as do the Baniwa, and fall within the region Murdock designated as that of the Baniwa. The Kuripako use *Virola* bark exudate to make a snuff called *Yatoo* or *Yá-to* (or *Paricá*). This snuff is restricted in use to shamans and is inhaled in a one-man operation through a bifurcated tube prepared from the leg bones of various herons. Wurdack maintains that materials of *Anadenanthera* are not used. Schultes has seen *Virola* powder prepared by the Kuripako.

SOURCES: Schultes, 1954 and in conversation, 1960; Uscátegui, 1959; Wurdack, 1958.

BETOI CULTURE:

TRIBES: Airico, Betoí, Jirara (Girara), Lucalia and Situfa (Cituja).

LANGUAGE: Chibchan stock.

NAME: *Yopa*, *Yopo*.

REFERS TO: powder.

MANNER OF ADMINISTRATION: the powder is blown over the body; it is probably also self-administered.

CULTURAL SIGNIFICANCE: divinatory and for magical cures.

USED BY: shamans.

SOURCES: Cooper in Steward, 1949; Hernández de Alba in Steward, 1948; Rivero, 1883 ed.; Steward in Steward, 1948.

BOTANICAL IDENTITY: this region is just west of the general distribution of *Anadenanthera* in northern South America. Schultes suggested in conversation (1960) that *Anadenanthera* materials may well be obtained by the Betoí Indians through trade, if they do not manufacture the snuff themselves from local trees.

CARIJONA CULTURE:

TRIBES: Carijona, or Umaua.

LANGUAGE: Cariban stock.

NAME: *Niopo*.

REFERS TO: white snuff or tobacco.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: possibly a pipe.

MANNER OF ADMINISTRATION: inhaled or smoked.

PHYSICAL EFFECTS: sternutatory and laxative.

CULTURAL SIGNIFICANCE: religious; associated with annual expiatory feasts.

USED BY: men of the tribe.

SOURCES: Saint-Cricq, 1873-74 ed.; Schultes, 1954; Whiffen, 1915.

BOTANICAL IDENTITY: probably not made from *Anadenanthera* because this region is outside the distribution of the species. Furthermore, the powder referred to here is white. People who speak Cariban languages are not known to use *Anadenanthera*, and such materials are usually not associated with pipes.

GUAYUPE CULTURE:

TRIBES: Choque, Eperigua, Guayupe (Guaypi) and Sae.

LANGUAGE: Arawakan.

NAME: *Yopa*, *Yopo*.

REFERS TO: seed or pip of a tree.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: a broad-leaved, pubescent tobacco appears to be employed with it, or used alone; possibly, the tree material is not used at all.

MANNER OF ADMINISTRATION: inhaled as smoke, through the mouth or nose to the point of unconsciousness.

PHYSICAL EFFECTS: intoxication and loss of judgement; unconsciousness accompanied by dreams.

CULTURAL SIGNIFICANCE: divinatory.

USED BY: people in a group, probably in a general ceremony.

SOURCES: Aguado, 1906; Reichel-Dolmatoff, 1943-44; Schultes in conversation, 1960.

BOTANICAL IDENTITY: this region is west of the distribution of *Anadenanthera* in northern South America. I have been unable to locate any other information on the practices of these Indians than the above data extracted from an early missionary report in Aguado.

TUCANO CULTURE:

TRIBES: Arapaso, Bara, (Barasana, according to Schultes in conversation), Buhagana, Carapana, Cubeo, Cueretu, Desana, Hobacana, Macuna, Pamoá (Tatuyo), Piratapuyo, Tucano, Tuyuca, Uaiana, Uasona, Yahuna and Yapua (Japua).

LANGUAGE: Tucanoan or Betoyan stock.

The genus *Anadenanthera* is not, to my knowledge, represented in this region. Schultes, as well as Uscátegui, indicate that the snuff used by the Tucano, called by them *Pa-ree-ká*, is derived from *Virola*.

SOURCES: Allen, 1947; Reichel-Dolmatoff, 1943-44; Schultes, 1954; Uscátegui, 1959; Whiffen 1915.

NOTE: the Barasana tribe is not mentioned in Murdock's *Outline* (1951). Uscátegui has located it within the Tucano culture region; he also indicates that the Barasana speak the Tucanoan language. *Virola* snuff is used by this tribe. (Schultes reports in conversation that the Barasana live on the Río Piraparana and that their language is only a dialect of the Macuna).

SOURCES: Schultes, 1954; Uscátegui, 1959.

NOTE: the Taiwano tribe, also, lies within the Tucano culture region and speaks a Tucanoan language, although it is not referred to in Murdock's *Outline* (1951). *Virola* snuff is employed. Uscátegui claims that the Taiwano are or were formerly acquainted with *Yopo*, especially for magical purposes. I doubt that this is so, unless *Yopo* made from *Anadenanthera* were obtained by trade, as *Anadenanthera* does not grow in the region of the Tucano. Perhaps *Yopo* refers, among the Taiwano, as apparently among some peoples, to substances other than those derived from *Anadenanthera* trees. (Schultes has indicated in conversation that he has similar doubts; he has been with the Taiwano and suggests that their *Yopo* might be tobacco).

SOURCES: Schultes, 1954; Uscátegui, 1959.

Lovén (1935) stated that *coca*-snuff is used in the Cayarí-Uaupés territory, where it is preserved in snail shells and absorbed through reeds into the nose. He suspected that often where so-called *Yopo* powder is used the powder may actually be *coca*. This would account for the sometimes reportedly mild effects, which are not associated with *Anadenanthera* materials. Schultes, however, in conversation doubts Lovén's statement. The only area where

Schultes has seen *coca* snuffed -- and has done it himself -- is amongst the Arawak tribe, Yukuna, on the Rio Miritiparaná, an affluent of the Rio Caquetá, in Colombia.

TUCUNA CULTURE:

TRIBES: only the Tucuna (Ticuna).

LANGUAGE: an isolated stock. (Arawak, according to Uscátegui).

The genus *Anadenanthera* is not known, it seems, from this region; their *Paricá* snuff is made probably from *Viola*, tobacco or some other plant.

SOURCES: Allen, 1947; Bates, 1892; Nimuendajú, 1952; Orton, 1870; Reichel-Dolmatoff, 1943-44; Schultes, 1954; Spruce, 1908; Tesson, 1930; Uscátegui, 1959.

WITOTO CULTURE:

TRIBES: Andoke, Bora (Miranya), Coeruna, Meunane, Nonoya, Ocaina, Orejón, Resigero and Witoto (Uitoto).

LANGUAGE: Witotan stock.

Anadenanthera is not represented in this region to the best of my knowledge. The snuff used by the Witoto is white and is not described as especially stimulating. Orton and Schultes have suggested that it is tobacco snuff. Recently in conversation, Schultes has asked whether or not the snuff perhaps may be a greyish mixture of *coca* and ashes.

SOURCES: Allen, 1947; Crevaux, 1882; Orton, 1870; Schultes, 1954; Steward in Steward, 1948; Whiffen, 1915.

CULTURE AREA ORINOCO

OTOMAC CULTURE: river people but also intensive agriculturists.

TRIBES: Otomac, Pao and Saruro.

LANGUAGE: isolated Otomacan stock.

NAME: *Curuba, Curupa, Curuva, Niopo, Ñope, Ñopo, Yopo, Yupa.*

REFERS TO: powder as used by the Indians after final preparation; powder derived from plant source; the tree itself.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the pods of a mimosaceous plant are gathered, broken into pieces, moistened and fermented; the softened seeds, turning black, are kneaded into a paste, mixed with equal quantities of lime or with *cassava* flour and lime. (The lime is obtained by firing the shells of large snails which the Indians eat and which they collect on river flood-banks). Perhaps another ingredient is added, as Gumilla stated that the intoxication and fury are caused by something added to the mixture by the devil. The paste is placed on a wooden grid over a brisk fire and hardened into small loaves. The trees from which the seeds are obtained do not grow in all the areas where the Otomac live; hence, some of these Indians trade snails and other articles for the loaves from other Otomac who manufacture enough both for their own uses and those of their neighbors. Also, the Otomac on the left bank of the Orinoco supply the Yaruro with snail shells in return for *Yopo*. When used, the individual loaf is finely pulverized, and the powder, which smells like strong tobacco, is placed on a dish 5-6 inches wide which has a handle. A forked, 7 inch long bird bone, probably from a large plover or *gallinazo* (turkey buzzard), is employed in administration.

MANNER OF ADMINISTRATION: the Indian holds the dish in his right hand while inhaling the powder into his nostrils through the two extremities of the bone tube. It is reported also that the fumes of the powder are inhaled or that the powder is sprinkled in the eyes and ears.

PHYSICAL EFFECTS: intoxication, deprivation of reason, infuriation, but first a seizure of violent sneezing. The Indians take enough of the snuff to produce intoxication which lasts some hours, during which they often injure themselves and others by their violence. A sense of languor sets in later, persisting some days.

CULTURAL SIGNIFICANCE: preparatory to battle, especially against the Carib, the snuff has been used to incite blood-thirstiness; but it is also employed as a common vice, taken anywhere or any time at pleasure. Another of its uses is for divination and sacred invocation. The Indians are said to believe they cannot take the powder without the bird bone, although Gumilla referred to the use of the fingers for snuffing.

USED BY: men of the tribe as well as shamans and *mohanes*.

SOURCES: Alvarado, 1945; Bueno, 1933 ed.; Cooper in Steward, 1949; D'Orbigny, 1866; Gilij, 1780-84; Granier-Doyeux, 1956; Gumilla, 1745 ed.; Humboldt, 1852-53 ed.; Kirchhoff in Steward, 1948; Reichel-Dolmatoff, 1943-44; Rivero, 1883 ed.; Safford, 1916a; Schomburgk, 1841 ed.; Southey, 1819; Wurdack, 1958.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* is probably used (perhaps with other materials), as it is found in this general region, where it is known as *Yopo* and *Cojoba* (or *Cajoba*, *Coabo*), according to herbarium labels (*Aristeguieta 1612; Pittier 8380; L. Williams 11965, 12327, 12651; Wurdack & Guppy 115, 194; Wurdack & Monachino 41117; all from Venezuela*). Schomburgk (1841 ed.) believed the powder of the Otomac to be made from *Acacia Niopo*, which is a synonym of *Anadenanthera peregrina* var. *peregrina*. Humboldt (1842-53 ed.) said that *Acacia Niopo* was identical with *Curupa*, referring to the work of Gilij (1780-84).

SALIVA CULTURE: river people who also cultivate.

TRIBES: Ature, Macú, Piaroa and Sáliva.

LANGUAGE: independent Sáliva stock.

NAME: *Curuba, Niopo, Ñopo, Yopa, Yopo, Yu'a', Yupa.*

REFERS TO: the final product; the pulverized plant substance; the plant itself.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: during the dry months of January and February, hordes of Piaroa roam the savannas in search of the long pods. The seeds are removed, moistened, ground into a fine paste and roasted. The bark of a lecythidaceous tree called *coco de mono* is burned and the ashes are added to the pulverized seeds. The vegetative parts of an unidentified shrub appear also to be included. The Piaroa sometimes obtain *Yopo* from the Guahibo in return for *curare*. According to Gheerbrant, *Niopo* is the product of the slow burning of a small bunch of hanging herbs which forms a long white ash; the ash is subjected to fire, treated with water and mixed with many other substances, forming a deep brown mixture. When desired, a small quantity of the hardened substance is pounded in a mortar or on a small board or in a wooden dish with raised edges. The cinnamon-brown powder is snuffed through the bifurcated leg bone from various herons or other long-shanked birds. The apparatus for snuff-taking is called *nioé niabacá*. The instrument has also been described as comprising several parts, in which case the upper tubes are joined with thread which is covered with resin from the *peramán* tree (*Symphonia* sp.); the upper ends are tipped with perforated knobs which are usually palm fruits. Between uses, a pair of stiff feathers is inserted in the tubes to keep them clean.

MANNER OF ADMINISTRATION: the Piaroa holds the dish in his right hand and puts the knobs of the upper tubes to his nostrils, while constantly moving the lower end of the instrument over the dish, at the same time inhaling the powder. The operation takes less than a minute.

PHYSICAL EFFECTS: violent sneezing is the immediate reaction, even among those long accustomed to using the powder. The eyes become bloodshot; and a type of hypnotic, stupefied or intoxicated state endures a few minutes, followed by a soothing influence, which lasts longer. Gheerbrant has said that the Piaroa go temporarily, but not seriously, insane.

CULTURAL SIGNIFICANCE: divinatory, for sacred invocation, excitatory to war and as a vice. Gheerbrant stated that the ritual of making *Niopo* goes on all night in a semi-dark hut 10 feet across and housing all the sacred objects of the Piaroa, who are unusually devout, he said, even for Indians; several men squat silently while the hanging herbs burn and the snuff is made and employed. This procedure is undertaken during the month of celebrations and is taboo for women, who are not allowed in the hut under penalty of death.

USED BY: shamans, men of the tribe, elders. It is also in general use today among the males of some groups, who are avid *Yopo*-inhalers.

SOURCES: Alvarado, 1945; Cooper in Steward, 1949; Cruxent, 1947; Fabo, 1919-20; Gheerbrant, 1954; Gumilla, 1745 ed.; Bassett Maguire in a letter, October 28, 1955; Reichel-Dolmatoff, 1943-44; Rivero, 1883 ed.; Tercera Conferencia. . . , 1945; Uscátegui, 1959; Williams, 1945b; Wurdack, 1958.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* is used at least as one of the ingredients of Sáliva snuff. The late Heber W. Youngken, Sr., of the Massachusetts College of Pharmacy identified *Anadenanthera* seeds in a sample of snuff which he obtained from Maguire who also suspected that this genus is involved. A Venezuelan specimen of *A. peregrina* var. *peregrina* (Wurdack & Monachino 41117) which I examined was labelled *Yopo*, and its seeds were said to be the source of a narcotic snuff of the Piaroa. Johannes Wilbert reaffirmed in a letter (January 10, 1961) that the Piaroa use a snuff called *Yopo*. William H. Phelps stated (in

a letter, December 27, 1955) that he had seen *Yopo* being taken in Venezuela on the Cua River, not far from Puerto Ayacucho, which is in the general area of the Sáliva. The quotation from Gallegos' *Canaima* concerning *Yopo* in the Introduction is believed to refer to the *Piaroa*.

YARURO CULTURE: mostly fishers and hunters of river animals.

TRIBES: only the Yaruro, which means "snail".

LANGUAGE: an isolated linguistic stock.

NAME: *Curuba*, *Ñopo*, *Yopo*.

REFERS TO: powder.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the powder is derived from the fruit of a tree and is kept in a snail shell which is found on river flood-banks and which the Yaruro obtain from the Otomac of the left bank of the Orinoco in return for *Yopo*. The powder is inhaled through two small tubes made from the bones of a *gallinazo* (turkey buzzard).

MANNER OF ADMINISTRATION: snuffed.

PHYSICAL EFFECTS: a grayish mucous flows from the nostrils.

CULTURAL SIGNIFICANCE: for sacred invocation, for incitement to battle and also used as a vice.

USED BY: probably the shamans and other men, as among the Otomac, Sáliva and Guahibo, as implied by the reports.

SOURCES: Alvarado, 1945; Bueno, 1933 ed.; Cooper in Steward, 1949; Crevaux, 1883; Granier-Doyeux, 1953 and in a letter, February 20, 1961; Rivero, 1857.

BOTANICAL IDENTITY: the region occupied by the Yaruro lies within the area of general distribution of representatives of *Anadenanthera*. What evidence exists does not suggest that the snuff can be made from anything else.

CULTURE AREA SAVANNA

GUAHIBO CULTURE: no agriculture; hunting and gathering only.

TRIBES: Chiricoa and Guahibo.

LANGUAGE: Guahibo stock.

NAME: *Dópa, Niopo, Ñopo, Yopo, Yópo* (and also *Curuba, Parica, Paricá* and *Yupa*).

REFERS TO: snuff powder; the cake form in which it is sometimes stored; the plant source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the fruits are gathered by wandering Indians in savanna country. The seeds are roasted and then powdered on a wooden platter shaped like a watch-glass, about 9 by 8 inches, with a broad thin handle which is grasped in the left hand, while the fingers of the right hold the small spatula or pestle of the hard wood of *palo de arco* (*Tecoma* sp.) which is used to crush the seeds. The resultant powder is used as is or is stored; or it may be mixed with lime or calcined snail shells, then used or stored. More complicated methods of preparation involve grinding the seeds, mixing them with pulverized snail shells and with *cassava* flour; some claim that plantain meal is preferable to *cassava*, and others that oil extracted from the snails serves equally well. In any event, the mixture is then baked into small cakes which are stored and later, as desired, pulverized. The powder ground from cakes is reddish brown; that obtained by the simpler methods is very fine, blackish brown, like ground coffee, resembling snuffing tobacco in color and odor.

If the snuff is stored as powder, it is carried around in a jaguar leg bone closed at one end with black wax or pitch and at the other end with a *marima* bark cork and adorned with feathers. The container hangs around the neck, and from it are suspended a few odoriferous rhizomes of a sedge (*Kyllinga* sp.). *Caapi* (*Banisteriopsis* spp.) may also hang from the neck. The snuff may also be carried in a large snail shell, as the only provision on long journeys. Sometimes baked clay vessels or small, spherical calabashes are used as containers.

When the drug is employed by a shaman for curing, the instruments for taking *Yopo* are contained in a rectangular pouch of jaguar skin which hangs from the shoulder and also contains rock crystals, fibres or hairs, and stones; face painting is essential, and *caapi* is chewed while large quantities of *Yopo* are absorbed. Other items associated with magical cures are necklaces and *maracas*. To determine the cause of death, *Yopo* is taken after three days' fasting and vigil; plumed *maracas* and talismans are employed, and the source of evil is extracted from the cadaver.

At the beginning of the dry season, or summer, the Indians may burn the bones of the year's dead, fling the ashes into the air, into water and over their houses. During the ceremony, a drink called *yaraque* is imbibed, composed of burned *cassava*, a strong *chicha* and *Yopo*.

The snuff may be taken through a special instrument called a *siripo*, which is a bifurcated tube made of the leg bones of various herons or other long-shanked birds. The bones are put together in the form of a Y or tuning fork, whose single end is placed in a clay vessel, calabash, snuff-box of jaguar bone or just in the palm of the hand, to absorb the powder. The upper tubes are tipped each with a small black perforated knob which is a palm endocarp and are united by wax to the lower bone.

If the snuff powder must be ground from a small cake, the cake is pulverized on a special oval wooden plate with elevated edges which is about 4½ inches long and 3½ wide with a broad handle. The pestle is made of two acuminate blocks joined at their points and is about 2 inches long. The instrument for inhaling is bifurcated and made of the bones of a long-shanked wading bird; at the level of bifurcation, it is reinforced with waxed cord; the inferior end is bevelled, and the superior extremities each have a small, perforated, ball-like fruit. A bird plume is used to keep the tubes clean. The whole apparatus is carried in a small basket of woven palm leaves.

MANNER OF ADMINISTRATION: the upper branches of the tubes, bearing the small fruits, are inserted in or placed against the nostrils to breathe in the powder from the clay vessel, calabash, snuff-box of jaguar bone or from the palm of the hand. A strip of *caapi* torn from the neck is sometimes chewed as the *Yopo* is being made from seeds and inhaled.

Where the snuff must be ground from cakes, the lower end of the instrument is placed on the special wooden plate on which the cake is ground.

Yopo may be imbibed in the drink called *yaraque*.

PHYSICAL EFFECTS: the Guahibo use *Yopo* excessively and are never without it. The effects are narcotizing to the novice or even to one used to it when taken in sufficient quantity. As taken in everyday life, the irritating powder first causes sneezing and an abundant flow of mucous from the nose; an intoxication or stupefaction follows, lasting, however, only a few minutes and followed by a soothing influence which is of greater duration. The Spanish-speaking non-Indians have coined the word 'enlopadado' for the drunken and evidently happy state in which the Indians find themselves. As commonly used, with a chew of *caapi*, *Yopo* not only produces a feeling of well being but reduces hunger, thirst and fatigue. It therefore is used on long excursions to augment physical endurance, much as *coca* is used in the Andean regions. When employed for magical purposes, *Yopo* is absorbed in great quantities, with *caapi* and is accompanied by a tremendous intoxication, spasms and delirium, followed by a lethargic sleep filled with pleasant dreams or visions.

CULTURAL SIGNIFICANCE: *Yopo* is a common vice, serving both for pleasure and stamina; it is also of great importance in magic and is always taken before and during the celebration of rites, including divination and sacred invocation; the powder is also used as an excitant preparatory to war. It is drunk in *yaraque* at the annual cremation of the dead, which is followed by the celebration of marriages.

As the Guahibo do not know how to prepare *curare*, they obtain it from the Piaroa in exchange for *Yopo*.

USED BY: men of the tribe and shamans.

SOURCES: Alvarado, 1945; Cooper in Steward, 1949; Daniel, 1953; Dugand, 1946; Fabo, 1919-20; Granier-Doyeux, 1956; Kirchhoff in Steward, 1948; Reichel-Dolmatoff, 1943-44; Rivero, 1883 ed.; Roth, 1924; Schomburgk, 1841 ed.; Schultes, 1954; Spruce, 1908; Uscátegui, 1959; Wurdack, 1958.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* no doubt is and/or has been used by the Guahibo, who live within the area of general distribution of that tree in northern South America. A specimen examined from Colombia (*Overton 9-56-79*) was labelled *Yopo*, and its seeds were said to be used in the preparation of *Yopo* snuff by the Guahibo Indians. In all the literary sources examined, *A. peregrina* was the only species referred to as the source of *Yopo* among these Indians.

NOTE: although the Sikuni tribe is not mentioned in Murdock's *Outline* (1951), the location assigned it by Uscátegui falls within the Guahibo culture region; Uscátegui also gives their language as that of the Guahibo. The Sikuni make or used to make *Yopo* especially for magical purposes; their particular brand of *Yopo* prepared from toasted and pulverized *Anadenanthera* seeds, was a most desired trade item by the neighboring Piaroa, who sold *curare* to these Guahibo in return for the snuff.

SOURCES: Reichel-Dolmatoff, 1943-44; Uscátegui, 1959.

NOTE: the Kuiva and Amorua tribes, not included in Murdock (1951), are located in the Guahibo culture region, too; they speak the Guahibo language as well. Both these tribes use or were formerly acquainted with *Yopo* for purposes of magic; the snuff was prepared as above.

SOURCES: Uscátegui, 1959.

PUINAVE CULTURE: agricultural only where influenced by Arawakan neighbors.

TRIBES: related ones which are known collectively as Puinave, Guaipunavo or Macú. (The last name has been applied to various other tribes as well).

LANGUAGE: Puinavean stock.

NAME: *Noopa* (also *Yopo*).

REFERS TO: snuff made from seeds of a legume.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are toasted and pulverized; leg bones of various herons are used for administration.

MANNER OF ADMINISTRATION: the powder is inhaled through the bones.

CULTURAL SIGNIFICANCE: magical.

SOURCES: Schultes, 1954; Uscátegui, 1959; Wurdack, 1958.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* is evidently known to the Puinave, who are familiar with Venezuelan *Yopo* and distinguish it from *Virola* snuff, which they call *Yakee* or *Yá-kee* (Schultes, 1954). I have examined material of *A. peregrina* var. *peregrina* from a region adjacent to that of the Puinave; and Wurdack (1958) reports that Schultes has personal knowledge of the use of the species by this people.

Uscátegui (1959) has given a general description of the *Anadenanthera*-derived *Yopo* snuff of the Colombian Indians. I would like to review it here with reference to the cultures for which the present study more or less has confirmed *Anadenanthera* uses (the Achagua, Betoí?, Chibcha?, Guahibo, Puinave and Tunebo): the powder is made from the seeds, which are roasted over a fire and ground in a wooden mortar with a pestle. It is kept in a case made of the leg bone of a jaguar, partly closed with wax and adorned with feathers. Sometimes an alkaline material is added. The powder, which looks like ground coffee, is snuffed with a variety of instruments, the most generally used of which is a Y-shaped tube of bird bones soldered together with pitch and ending in two hollowed palm-nuts. The nuts are held to the nostrils and the powder inhaled from the palm of the hand. Another instrument is the long V-shaped tube, one leg of which is inserted into a nostril, the other into the mouth, so that the person may snuff himself. Other types of snuffing tubes include some of bone and some of small bamboo-like grasses. A primitive type is made of a palm leaf. The snuff is normally taken only by men, except among the more acculturated peoples. The foregoing data may fill in the gaps of some of the culture outlines, in which only data pertaining specifically to the culture or one or more of its tribes was included.

SHIRIANA CULTURE: forest nomads without agriculture.

TRIBES: Guaharibo, Shirianá and Waica.

LANGUAGE: an isolated stock.

NAME: *Yopo* (and *Ebānā*, *Ebena*, *Yacoana*).

REFERS TO: snuff, the plant source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the Indians grow the ingredients of *Yopo*; various kinds of *Yopo* of distinct strengths are prepared from leaves, bark and ashes of bark, and/or seeds of a

legume. The snuff called *Ebānā* occurs in at least three different strengths in differing localities; one of the weaker kinds is derived from a tree bark and a small plant which grows in agricultural clearings. The snuff called *Yacoana*, grey-brown in color, is made mainly from the ashes of the bark of a wild tree, and from a plant called *masho hara*, a species of *Justicia*. The powder is taken by means of a single reed or bamboo tube about 20 inches long.

MANNER OF ADMINISTRATION: a two-man operation in which the recipient fills the part of the tube that will go in his partner's mouth with the amount of snuff he wants to absorb. The other end of the tube goes into one nostril. A strong blow forces the powder up the nose. Both partners receive and blow the snuff. *Yopo*-taking during the *pijiguo* (*Guilielma speciosa*) festival involves a sitting posture exclusive in South America to the Shirianá and, among them, to this festival; the two partners, each from a different village, sit opposite and very close to one another with their legs extended openly around the body of the opposite partner. About two dozen pairs like this are engaged in snuff-taking simultaneously.

PHYSICAL EFFECTS: when taken on an everyday basis, *Yopo* absorbed in the afternoon to induce communication with spirits causes some recipients, because of repeated inhalation, to walk around inebriated; the effects last about two hours, except in the instance of a few enthusiasts who take large amounts and remain under the effects until evening each day. When employed for divination, the effects are apparently hallucinogenic. *Yopo* intoxication is similar to that of alcohol, but the results wear off more quickly. It enlarges the pupil to the point where the iris may no longer be seen. During the *pijiguo* festival, under the influence of *Yopo* the men swing their weapons wildly, slap each other, do deep knee bends, crawl, roll on the ground, twisting and turning, perspiring and foaming at the mouth. They are unable to get up or to resist what is wanted of them, and they are soon exhausted.

CULTURAL SIGNIFICANCE: *Yopo* is important to religion and witchcraft and everyday life, as well. In shamanism, it is used to locate the cause of illness and to establish contact with the *hekula*, spirits of rocks and waterfalls, in order to induce them to bring mishap and sickness to the enemies of the village. *Yopo* is associated with the annual harvest festival of the *pijiguo* palm in January or February, when neighboring villages visit one another for several days and share the fruits. Mock battles are waged among the men and boys amid jubilation and singing; and the *Yopo*-taking described above occurs. The women drag away those who become unconscious. This festival is thought to have fertility rite origins, as do similar ceremonies among the Arawak and Tucano.

USED BY: males, both boys and men, although there are a few abstainers. Shamans use *Yopo*, but shamanism is practiced by most of the men of the tribe.

SOURCES: Barker, 1953; Dupouy, 1953; Schultes in conversation, 1960; Wurdack, 1958; Zerries, 1954, 1955a, 1955b and in a letter. April 10, 1957.

BOTANICAL IDENTITY: this region is possibly outside the distribution of *Anadenanthera*, being on the fringe of the northwest Amazon area where the genus is not represented and where it probably is not used. There appear to be various substances employed in Shirianá snuff. Zerries (1954) has said that *Anadenanthera* seeds appear to be used, because the snuff is grey-brown and not the brown of *Virola* snuff, but Schultes (in conversation, 1960) believes that the Shirianá probably do not use *Anadenanthera* materials as a major source. The fact that bark is, sometimes at least, involved in snuff-making suggests that *Virola* sources might be used. On the other hand, trees of *A. peregrina* var. *peregrina* have been examined from an adjacent region to the east of the Shirianá; and their not too distant neighbors to the north, the Yecuana, it now appears, do use *Anadenanthera* snuff. If *A. peregrina* var. *peregrina* is employed by the Shirianá today, it may be one of a group of snuff sources which are used, each perhaps for a purpose of different cultural significance and each of a different historical origin. A detailed study of this aspect of the Shirianá is needed because of the apparent elaborateness of the preparations and uses of their snuffs. Such a study would shed light on the identities of the source botanical materials. It would also help to unravel the history of snuffing in a critical region, bordering on northwest Amazonas, which seems to mark the dividing line between *Anadenanthera* and *Virola* snuffing among South American Indians.

In a letter (January 10, 1961), Johannes Wilbert informed me that he saw the Guaharibo use a snuff which they make from the young leaves of a palm-like plant. They dry the leaves and powder them before they consume the residue as a stimulant during the feast of burning the bones of a defunct member of the tribe, very much in the same way as Zerries (1955b) describes the snuffing among the Waica. The word which Wilbert uses for the snuff of both these tribes is *Yopo*.

Ghilleen T. Prance has stated (in a letter, 1970) that the Waica Indians whom he has been amongst appear not to use *Anadenanthera* but, rather, *Virola*.

Schultes & Homstedt (1968) discussed in detail problems in identifying the narcotic plants of these peoples. They report that Seitz photographed and collected specimens of *Anadenanthera peregrina* from Waica country; the tree must have been introduced and is being cultivated today – for what purposes? – by the Rio Marauia Waica.

CULTURE AREA GUIANA

YECUANA CULTURE: scattered settlements in deep forest.

TRIBES: Arebato, Arigua, Cunuana, Curasicana, Decuana, Ihuruana, Makaritare, Mayoncong, Panare, Quiriquiripa, Taparito, Waruwadu, Wociare, Yabarana and Yecuana.

LANGUAGE: Cariban stock.

NAME: *Hakúdufha*, *Acuja*.

REFERS TO: snuff.

METHODS OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the bark of a tree is pounded and boiled in a small earthenware pot until all the water has evaporated and a sediment remains at the bottom of the pot; this sediment is toasted in the pot over a slight fire and then is powdered finely with the blade of a knife. A reed (*kuratá*) or bifurcated tube made from the leg bones of various herons is used for inhaling.

MANNER OF ADMINISTRATION: a little powder is blown through the reed into the air; next, the person snuffs with the same reed some powder into each of his nostrils, successively. The bifurcated tube is also reportedly used in a one-man operation.

PHYSICAL EFFECTS: strongly stimulating, for immediately the recipient begins singing and yelling wildly, at the same time that the upper part of his body pitches backwards and forwards.

CULTURAL SIGNIFICANCE: magically curative.

USED BY: restricted to shamans even today.

SOURCES: Koch-Grünberg, 1923; Schultes, 1954; Wurdack, 1958.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* is represented from this region among the specimens which I examined, and it would appear from the literature that the Yeeuana are familiar with snuffs from both *Anadenanthera* and *Virola*. The above information refers probably for the most part to the utilization of *Virola*, while Wurdack (1953) said that *Yopo* powder made from *Anadenanthera* is called *Acuja* by the Yecuana and is taken with the bifurcated tube. Schultes & Holmstedt (1968) have suggested that perhaps the bark, as well as seeds, of *Anadenanthera* may be employed in making *Hakúdufha*.

CULTURE AREA AMAZON

COCAMA CULTURE: along the large rivers.

TRIBES: Cocama (Ucayali) with a branch called Cocamilla.

LANGUAGE: Tupí-Guaraní.

NAME: *Curupá*.

REFERS TO: plant source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the leaves are powdered and taken through Y-shaped tubes, or the material is administered with small syringes as clysters.

MANNER OF ADMINISTRATION: the snuff is blown into the nostrils through the tube described, and the clyster is injected anally.

PHYSICAL EFFECTS: greatly therapeutic; also provoking agreeable visions.

SOURCES: La Condamine, 1778 ed.; Métraux in Steward, 1948; Veigl, 1785.

BOTANICAL IDENTITY: *Anadenanthera* is not known from this region, which lies closer to the range of *A. colubrina* in the Peruvian valleys than it does to the more northeasterly distributed *A. peregrina*. It is doubtful that the material would be traded over such a distance as would be required, as none of the neighbors of the Cocama appear to use *Anadenanthera* snuff. That the leaves of the plant are reportedly employed also suggests that it may not be a species of *Anadenanthera* which is employed here.

MANAO CULTURE:

TRIBES: Cayuishaua, Jurí, Manao, Pasé and Uainumá.

LANGUAGE: Arawakan.

NAME: *Paricá*.

REFERS TO: a powder.

MANNER OF ADMINISTRATION: the powder is blown into the nose or taken as a clyster.

SOURCES: Métraux in Steward, 1943; Ducke, 1939.

BOTANICAL IDENTITY: *Anadenanthera* is not represented among the specimens examined from this region. Ducke (1939) stated that, although Martius and other writers attributed to *A. peregrina* var. *peregrina* the source of the *Paricá* snuff of certain Amazonian Indians, he himself obtained information from natives in two localities in the upper Rio Negro to the effect that *Paricá* powder comes from the leaves of *Virola* spp. Schultes (1954) said that in 12 years devoted to the flora of the northwest Amazon he had never seen *A. peregrina* either cultivated or wild in the area. This information suggests it is not likely that the Manao use *Anadenanthera* unless they obtain it from downstream along the Amazon, from the region of the Mura, for instance.

OMAGUA CULTURE: riverside agriculture for hundreds of miles along the Amazon River.

TRIBES: Omagua (Agua, Compeba, Umaua), just one.

LANGUAGE: Tupi-Guarani stock.

NAME: *Curupa*, *Curupá* (and *Paricá*, *Yopa*).

REFERS TO: the plant source (and the snuff).

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the leaves of *Curupa* are powdered for snuff; a purgative is also made from the plant. The snuff called *Paricá* is supposed to be made from the seeds. *Curupa* snuff is stored in pots in the houses of the Omagua, and it is inhaled through a Y-shaped tube of canes or reeds. The purgative made from *Curupa* is administered as a clyster by small rubber syringes (*cahuchu*), each of which is formed like a hollowed-out pear, pierced at one end by a wooden tube. The Indians paint themselves and carry their weapons in connection with the taking of this enema.

MANNER OF ADMINISTRATION: the snuff is inhaled with the forked end of the instrument in the nostrils. The clyster is administered mutually, at a gathering of people.

PHYSICAL EFFECTS: the immediate effects of *Curupa* snuffing are violent inspiration and grimacing. Supposedly therapeutic and evoking agreeable visions, *Curupa* deprives the Indians of their senses and allows them to carry out any deed without compunction. The powder of *Paricá* puts them in a trance. When used in a clyster, *Curupa* is hallucinogenic, producing pleasant and strange visions; it is also purgative and intoxicates for a period of 24 hours; it may be significant to the effects that the enema is taken before an important meal (before which the Indians may have fasted).

CULTURAL SIGNIFICANCE: magical power of a divinatory nature is ascribed to *Curupa* snuff. The enema is taken *en masse* by the participants at festive gatherings at which the host never fails to present, out of courtesy, a syringe to each of his guests; this enema is administered before meals of ceremony, and it is much used.

USED BY: members of the tribe (probably only males, since that is customary and since women and children are not mentioned).

SOURCES: Fritz, 1922 ed.; La Condamine, 1778 ed.; Martius, 1867; Métraux in Steward, 1948; Nordenskiöld, 1930; Ortega Ricaurte, 1941; Orton, 1870; Reichel-Dolmatoff, 1943-44; Rivero, 1883 ed.; Safford, 1916a; Schultes, 1954; Southey, 1819; Spix & Martius in Métraux, 1928; Veigl, 1785.

BOTANICAL IDENTITY: *Anadenanthera* species have never, to my knowledge, been described, nor their representatives collected, from anywhere near where the Omagua live, in western Amazonas and northeast Peru. Martius (1867) attributed the source of the *Paricá* snuff of the Peruvian Omagua to a species of *Anadenanthera*; and Métraux (in Steward, 1948) has ascribed the source of the *Curupá* and enemas of the Omagua (and Cocama) of the upper Amazon to the same genus. However, I cannot substantiate their reports. As mentioned earlier (see Manao), Schultes (1954) never encountered the genus during many years in northwest Amazonas.

CULTURE AREA PERUVIAN

INCA CULTURE:

TRIBES: many.

LANGUAGE: Quechuan stock.

NAME: *Huilca*, *Huillca*, *Tara Huillca*, *Vilca*, *Vilcas*, *Vilca*, *Wil'ka*, *Willka*.

REFERS TO: the tree or plant source; fruits or seeds; medicine; a common purge.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds or their juice may be mixed with chicha, or boiled to make a tea, or mixed, two or three, with the root of *Polypodium*; the seeds may be cooked and placed in honey, or six seeds ground and mixed with a liquid.

MANNER OF ADMINISTRATION: as a drink or enema; a monthly enema.

PHYSICAL EFFECTS: intoxicating, hallucinogenic, purgative, dispelling phlegm and cholera without pain or nausea, and said to be good for people tired by work. The liquid with six seeds, half of which is drunk and half of which is used as an enema, is believed to result in strength to fight and to augment health. It is also said to aid in extending the life span to 200 years, during which one supposedly may indulge himself in the pleasures of eating with impunity. The purge which includes *Polypodium* is taken for digestive ailments. The *chicha* beverage cures fevers, *cámaras de sangre* and *mal del valle*, acting as a laxative and evacuating cholera by inducing vomiting; it also is thought to cure melancholia. The honeyed liquid, when drunk, clears the chest, stimulates urination and is said to make women fecund.

CULTURAL SIGNIFICANCE: divinatory and medicinal; shamans, probably in the way of amateur diviners and fortune-tellers, speak with the devil by drinking the juice of the seeds in tea, accompanied by ceremonies and sacrifices. Divination being a large part of Inca medicine, diagnoses are made magically and secretly by intoxication with *Vilca* juice.

USED BY: shamans, old women; men and boys trade it.

SOURCES: Acosta, 1584; Cobo, 1890-93 ed.; D'Harcourt, 1939; Falcón, 1946 ed.; Fornée, 1885 ed.; Garcilaso de la Vega, 1688 ed., 1941-44 ed.; González Holguin, 1607; Herrera, 1934, 1940; Lastres, 1951; Polo de Ondegardo, 1916 ed.; Poma de Ayala, 1936 ed.; Rowe in Steward, 1946; Safford, 1916a; Saint-Cricq, 1873-74 ed.; Santa Cruz Pachacuti, 1927 ed.; Vázquez de Espinosa, 1942 ed.; Yacovleff & Herrera, 1935.

BOTANICAL IDENTITY: although other substances may have passed under the same name, it is likely that *Anadenanthera colubrina* var. *Cebil* was the main source of the *Vilca* of the Inca and their neighbors at the time of the conquest. I have examined specimens of that species from Peru, of which one (*Weberbauer 6505*) was labelled *Vilca*; it came from the anciently settled department of Huancavelica, called Huancavilca in the Indian language. Safford (1916a) said that the source of *Huillca* was identified when specimens were secured in 1915 from an Indian drug vender in southern Peru. Herrera reported (1940) that the seeds are a narcotic-cathartic element in the indigenous Peruvian pharmacopoeia.

Narcotics, according to Rowe (in Steward, 1946), were not important to Inca culture, the civilization encountered by the Spaniards and with which their early writings about Peru are chiefly concerned; the strongest substances used were *coca*, tobacco and *Vilca*. Tobacco was employed medicinally (Mason, 1922-24). Garcilaso de la Vega (1688 ed.) stated that the Peruvians did not know anything more about curing than bloodletting, purging with *Vilca*, and the taking of tobacco snuff. Fornée (1885 ed.) added that *chicha*, *Vilca* and tobacco were the main curatives of the Indians at the time of the conquest. Medicine, according to Lavereria (1902), was based primarily on the treatment

of symptoms, common among which were intestinal upsets such as diarrhea. Tschudi (in Santesson & Wassén, 1936) travelled in Peru in the 19th Century; he stated that *Wil'ka*, to the Aymara and Quechua speaking Indians, was a plant which, though utilized mostly as a laxative, served also to locate stolen property.

The origin of the term *Vilca* and its variants is of great interest, as many forms of it, compounded with other words, appear in the literature of the conquest and in later writings. The following list, in which I have standardized the spellings into Spanish forms, is a sampling taken mainly from descriptive narratives of some of the better known early chroniclers of Peru:

Chumbivilcas: a people (Cobo, 1890-93 ed.; Garcilaso de la Vega, 1688 ed., 1941-44 ed.).

Huacavilca: 'sacred idol' (Lastres, 1941).

Huacavilcacona orcona: 'Sacred gods of the cliffs or peaks' (Lastres, 1941).

Huanca Vilca, Huancavilca (the modern *Huancavelica*), *Marca Vilca, Marcavilca* or *Maricavilca*: one of the three tribes of the Huanca (Cieza de León, 1864 ed.); a nation; a province; one of the three provinces into which the conquering Inca separated the Huanca nation; a province near Tumbíz on the seacoast, to be distinguished from the far inland *Huanca Vilca* identically named by the Spaniards and comprising the ancient province of Huanca (Garcilaso de la Vega, 1688 ed., 1941-44 ed.); 'original or principal cliff or rock'; a place (Lastres, 1941); one of the three provinces into which the Inca Pachacutec divided the land of the Huanca (Means, 1931).

Huarivilca: a temple in the Valley of Xauxa where the Huanca lived (Cieza de León, 1864 ed.); a fountain from which a man and woman came forth whose progeny was the Huanca, who built a commemorative temple on the site (Means, 1931).

Pativilca: a valley with a grim fortress, which the Inca conquered (Means, 1931).

Surivilca: 'ostrich (ostrich-like bird) chief' (Lastres, 1941).

Vilca or *Vilcas*: a province with temples and palaces (Cieza de León, 1864 ed.); a province whose fortresses, palaces and temples were built centuries before the Inca monarchy and were much superior in art and grandeur to those which the Inca constructed in emulation thereof; a sierra; a town through which ran the two royal roads of the Inca; a village; one of the two names (the other is *Guaca*) by which the Indians called their sacred gods and which was used in a general way to refer to any sacred place of adoration such as temples, tombs, etc. (Cobo, 1890-93 ed.); a purgative fruit (D'Harcourt, 1939); 'eminent, grand, great, sacred'; a river; one of the nations of Chanca, all of which claimed descent from different and distant originals. These nations conquered many provinces on the way to the country of Antahuaylla which they subdued by force, expelling the ancient inhabitants and afterwards gaining much land from the Quechua. The famous achievements of the *Vilca*, in particular, made the Inca Roca decide to conquer the Chanca in return. His subjugations included that of the *Vilca*. Later, the Chanca rebelled, including the *Vilca*, causing the Inca some concern. However, the Quechua, who were the nearest neighbors of the *Vilca* and bore an ancient hatred for them, helped put down the revolution. The Inca, too, regarded the Chanca with disgust, especially for what was termed their ancient abominations, and their detestable sacrifices of men, women and children, with other inhuman and unnatural actions (Garcilaso de la Vega, 1688 ed., 1941-44 ed.); an enema made from a tree whose fruit, like that of *Lupinus* spp., is purgative; the tree just mentioned (González Holguín, 1607); 'idol' (González Holguín, 1607; Mossi, 1860); 'sun, principal' (Lastres, 1941).

Vilca or *Vilcay*: grandson(s) or granddaughter(s) (González Holguín, 1607; Mossi, 1857, 1860).

Vilca Pampa, Vilcapampa or *Vilcabamba*: a province where there is a temple to the sun, and to which the Inca retreated (Cobo, 1890-93 ed.); a place which is or is in a wild, mountainous region with great rivers that empty

into the River of Plate (Garcilaso de la Vega, 1688 ed., 1941-44 ed.); part of the Urubamba Valley, which was part of the Chanca Confederacy region, where the Inca later built Machu Picchu (Means, 1931).

Vilca ronco: small baskets filled with *coca* which were thrown into the fire at sacrifices of animals, as part of the ceremony, at Cuzco (González Holguín, 1607).

Vilca Tarvi or *Vilcatauri*: an enema, of which three pairs were taken monthly by the Indians; 'sacred or principal' 'Lupinus' (Lastres, 1941); although *Vilca* refers to *Anadenanthera* and *Tarvi* to *Lupinus* spp., the combination of the two words has come to mean just 'Lupinus' (Lastres, 1951).

Vilca-Cama: 'doctor-surgeon' (Velasco, 1840 ed.).

Vilca-cocha: a lake which passes into *Vilca-Mayo* (Saint-Cricq, 1873-74 ed.).

Vilca-Mayo or *Vilca-mayu*: a valley called the Paradise of Peru, which was a favorite residence of the Inca (Cieza de León, 1864 ed.); a river which flows into Urubamba (Saint-Cricq, 1873-74 ed.).

Vilcacamayos: deputies which the Inca ruler maintained in charge of subjugated districts and tribute therefrom (Cobo, 1890-93 ed.).

Vilcachima: 'enema' (Lastres, 1951).

Vilcachina: small stick introduced into the anus to clean the rectum, commonly used in the Cuzco area (Lastres, 1951).

Vilcaconga: a peak or hill (Cobo, 1890-93 ed.).

Vilcana: 'clyster' (González Holguín, 1607; Lavereria, 1902; Mossi, 1860); 'syringe' (Mossi, 1860).

Vilcani: 'to reject a purge' (D'Harcourt, 1939); 'to give an enema or to inject' (González Holguín, 1607); 'to inject' (Mossi, 1860); the act of applying a clyster (Lavereria, 1902).

Vilcanota or *Vilcanuta*: a sierra (Cobo, 1890-93 ed.); a peak permanently snow-covered and visible from Cuzco balconies and so named because it was greatly admired as a wonderful or sacred thing; a desert outside Cuzco (Garcilaso de la Vega, 1688 ed., 1941-44 ed.).

Vilcaparu: 'yellow maize' (González Holguín, 1607). However, Alexander Grobman indicated in conversation (1961) that *Vilcaparu*, as he knows it, is a brown and blue race of *Zea Mays* L. from the Valley of Cochabamba in Bolivia.

Vilcas, *Vilcas Huamán* or *Vilcashuamán*: a junction point of the two main highways of the Inca, who built their roads to commemorate their conquests; the place was regarded as the geographical centre of the Inca Empire and has some Inca edifices although there is at least one pre-Inca construction (Means, 1931).

Villac: 'priest, informer' (Lastres, 1951).

Vilques: large earthenware jugs of gold and silver with which the Indians toasted their dead, after which the *chicha* contained in them was poured out over a round stone they had for an idol in the middle of a plaza (Cobo, 1890-93 ed.).

Yupa: this word pertained to the value or valuableness of a thing (González Holguín, 1607). It is included here because the same word is the name for snuff of the Otomac, Salíva and Guahibo!

Among the ancient inns (*tambos*) still extant in Cobo's time was that at *Vilcas*, which was described as among the roomiest and finest by Cobo (1890-93 ed.).

The Christians commanded, among other things, that the Peruvians stop worshipping the sun, moon, and so on, ". . . ni tengays villcas, ni guacas, ni figura de hombre, . . ." (Acosta, 1584, folio 104). It is worth noting that *villcas* heads the list of objects forbidden to the Indians by the Spanish Christians.

The word *Vilca*, as spelled by the Spanish, or *Huillka*, which is closer to the Quechua term, seems to have been associated, among the Inca at the time of the conquest, with a common medicine whose divinatory aspects were of relatively minor importance. *Vilca* materials were employed at an amateur level not associated with the priesthood nor with rites of great significance. What is very interesting, in reading the early chronicles, is that, at the same time that *Vilca* is mentioned in the medicinal sense, the same word, or root, appears alone or incorporated in other words in very different contexts, as demonstrated in the list above. There seems to have been no consciousness on the part of the Inca (as their beliefs and words are related by the writers of the period) of any inter-relationships among all these words. Such a circumstance might be interpreted as indicating the antiquity of the word *Vilca*, as well as the materials and meanings associated with it. This possibility may be strengthened by the fact that, in the other than medicinal contexts in which the word appears above, *Vilca* is consistently associated with things which are sacred, principal, first, original, and with the people of that name. The people named *Vilca* had a more primitive culture than the Inca; they had descended upon and conquered many of the Quechua-speaking peoples prior to the rise of the Inca as they were found at the time of conquest. I believe that the origin of the word *Vilca* and its uses may be found in the history of the people of that name, who were united with other tribes of diverse origins in a protective political union, called the Chanca Confederacy, against the rising power of the Inca.

An Inca version of the origin of the medicinal *Vilca* was given by Santa Cruz Pachacuti (1927 ed.) the young *Inca*, *Yupangui*, was on his way to fight the *Hancoallo* and the *Chanca* when, on the *Aporima* road he met his enemies above the river. Here the *Chanca* felled a captain of *Yupangui* named *Villcaquire* by hurling rocks down at him. The captain said to the young ruler, "Is it possible that, without a struggle, I must die without having left any fruits? And *Villcaquire* then asked that he be buried where he lay dying and that his body be interred in the trunk of a nearby tree. This tree, he then foretold, would produce seeds that would become a medicine called *Vilca*, which would dispel all bad humors and choler. (This story also appears, in a shorter form, in Yacovleff & Herrera, 1935). (I have examined *Anadenanthera colubrina* var. *Cebil* [West 3679, 3845] from the Departamento de Apurimac).

My own feeling is that the story may be of relatively recent folk-origin in the Inca tradition. It may represent the adoption by the Inca of a material and practice belonging originally to a more primitive people. The setting seems too modern for the early origin which the other data (referred to on the foregoing pages) imply for the use of *Vilca*. This account could be described as a substitute-myth or, to use psychoanalytical terminology, a folk screen-memory, which hides the real origin of the culture-element and suggests that the particular invention was made by the people who tell the story. The captain appears to be identified with the Inca tradition by being with the Inca ruler, but the captain's name is *Vilca*, which appears to be a very old word. The presence of the Chanca may hint at the real origin of the material in question, that *Vilca* was made known to the Inca at the time of culture contact with the nations of the Chanca Confederacy, among whom were the people named *Vilca*. Also, the primitiveness of the story itself—a man's becoming a seed—might be said to be more easily identified with a culture less advanced than that of the Inca. It resembles the stage of cultural development associated with the *Cohoba* myths of the Taino, as well as with the tree worship of the Diaguita (which see) and the animistic concepts of the Mataco (which see) and Vilela (which see) with regard to the taking of *Cebil* powder. The stones play an interesting part in the myth, too, as certain stones were used as idols in Peru in connection with the toasting of the dead with *chicha* (containing *Vilca* seeds?), as stated earlier. The stone *cemis* of the Taino have been suggested as being possibly related to tree worship and *Cohoba* ceremonies, which are in turn part of ancestor-worship. Stones were also associated with ancestor- and tree-worship among the Diaguita (which see). *Vilka* is a family name of Quechua or Calchaquí origin, in Salta today (see Diaguita). Finally, the round stones associated with worship of the dead in Peru may or may not be related to the use of *Vilca*. The only other peoples known to me for whom idols are a culture-item and who also are

believed to use or to have used *Anadenanthera* materials for intoxicating effects are the Island Arawak of the West Indies and the Omaguaca (which see) of northern Argentina. The finest archaeological remains of the Omaguaca include some carved wooden and stone idols, as well as tubes and tablets of hard wood. I do not mean to suggest by this enumeration of characteristics found in several cultures that there is any special historical relationship among them. Similar traits found on the periphery of a centre of cultural dissemination are sometimes thought to indicate great age and a common origin. I suggest only that the form of use of *Anadenanthera* materials and its relationship to other elements of a culture may be determined largely by the stage of development of that culture, subject to historical factors.

According to D'Harcourt (1939), one of the most prominent diseases in ancient Peru was *la verruga*, or *La maladie du Carrion*, which was manifested by the body's becoming covered with wart-like knobs. This illness, now known to be caused by a parasite, is contracted only in certain valleys between 1000 and 3000m. altitude. *Anadenanthera colubrina* var. *Cebil* grows in Peru in river valleys at altitudes up to 2100 m. There is no evidence, according to David H. French (in conversation, 1961) for the general use of a formalized Doctrine of Signatures concept among Indians of the New World. However, the coincidence of the wartiness of *Anadenanthera* bark with the symptoms of *la verruga*, plus the similar distributions of the trees and the disease, are mentioned in passing. The use of *Anadenanthera* bark derivatives in folk-medicine is discussed under the section on phytochemical and pharmacological studies.

The word *Algarobo* appears on one specimen of *Anadenanthera colubrina* var. *Cebil* from Peru (West 3679 from the Departamento de Apurimac). Saint-Cricq (1873-74 ed.) stated that *Vilca* is a tree of the legume family and is known in the Argentine provinces as *Algaroba*. He maintained that it is rare in Peru, found only on the Pacific coast in hot valleys. On the other hand, Vázquez de Espinosa (1942 ed.) indicated that the Indians distinguished between *Vilca* and the tree or trees called *Algaroba*. In this matter, Saint-Cricq probably was confused, because *Cebil* and its variants is the usual name applied to *Anadenanthera colubrina* var. *Cebil* and because this tree is not found on the coast of Peru. In all the literature that I have seen, the word *Algarobo*, or variants of it, has been associated with *A. colubrina* perhaps only in these two instances. The word does not appear to be of Indian derivation but, rather, Spanish. Most likely, it has been applied to various leguminous plants since the time of early contact. (See also Diaguita).

The word *Coro* has caused some confusion in the interpretation of tobacco and *Anadenanthera* materials. Cobo (1890-93 ed.), who mentioned both *Vilca* and *Coro*, stated that *Coro* was the word of the Peruvian Indians for the root of their wild tobacco. It was, he said, much used for sickness. For detention of urine, two *garbanzos* (the size of chick peas?) of its powder were mixed in a drink with hot water and taken while fasting for three or four days. The powdered root was also taken in moderate quantities through the nostrils for headache and to clear the vision (Cobo, 1890-93 ed.). Uhle (1893) believed that the word 'root' was a mistake and that *Coro* is the same as *Curupa*, or *Niopo*, powder. He stated that probably both tobacco and *Curupa*, or *Coro*, powders were known in ancient Peru and that the former milder powder was prevalent in Peru, while the latter was chosen by the "wild" tribes of eastern South America. He said that he could see no other explanation for the great range, from north to south along the Andes, of the word *Curupa*.

It is possible, I believe, that *Coro* may have been made from *Anadenanthera colubrina* var. *Cebil*. The use of a powder which was taken, like *Coro*, to clear the vision is found also among the Piro (which see) and the Catukina (which see). Among the Piro, this powder appears to have been *Anadenanthera*-derived, but, unfortunately, I do not know the name of the powder. Among the Catukina, the powder is called *Paricá* and is doubtfully derived from *Anadenanthera*. Uhle (1898), in the same article mentioned *Khuru*, or *Q'uru*, a plant employed as a sedative in Peru against rheumatism, which he believed to be the same as *Curupa*. Devoto & Rothkugel (1942) stated, without reference to Uhle's paper, that the word *Curú* or *Kurú* in the Quechua or Araucanian language means 'dark black', which is one way to describe the seeds of *Anadenanthera*. If *Coro* did refer to *Anadenanthera* materials, then one would have to ask why two words were used for the same substance. The fact that the Peruvian highlands were occupied by diverse groups of peoples might account for these circumstances. I hesitate to take a strong stand on the identity of *Coro* one way or other, because I feel that the evidence here is insufficient.

While *Coro* has sometimes been identified with tobacco, the word *Saire* or *Sayri* (Garcilaso de la Vega, 1688 ed.), generally is agreed to have referred to that plant among the Inca. *Saire* was the name of the last reigning Inca, and the plant, called *Topasaire* ('Royal Tobacco'), evidently was regarded with some pride by the rulers. The use of the name of tobacco in the name of royalty and the adding of a royal prefix to the epithet of the plant itself strengthens the suggestion made earlier that *Vilca* was not closely nor importantly associated with Incaic tradition; it was among the predecessors of the Inca that *Anadenanthera* may have played a sacred role. *Anadenanthera* substances were relatively unimportant, as were many other narcotics, to the Inca. Whether this circumstance was due to the Inca personality or to the relatively advanced cultural level of the Inca among peoples of South America, probably cannot be determined. It is also possible that the Inca may have come originally from a region where *Anadenanthera* trees were unknown, such as coastal Peru, northern Peru, Ecuador, western Colombia or parts of Amazonas; *Anadenanthera* substances then would not have been included in important phases of Inca tradition.

As for the recent uses of *Anadenanthera colubrina*, the Quechua Indians and mestizos (or Mojos, in northwest Bolivia) practice the burial of various articles under houses in the process of construction for magical protection. At the market in La Paz, these goods may be purchased for the purpose: small pots for chicha, still-born llamas, llama grease, bundles filled with mica, glass beads, antimony, seeds of *A. colubrina* and *Ormosia* spp., and small figures cast in tin or pewter which are made by the Indians from the district of the Oruro mines (Nordenskiöld, 1907; Parda, 1937).

Archaeological materials from Peru indicate that enemas were used at the time of Chimú culture (800-1500 A.D., after Willey, in lectures). A vase exists which shows three people engaged in the administration of a clyster, the material being blown in by the mouth through a curved tube (Vélez-López, 1930) or a straight tube (Heizer, 1944). The Chimú culture, however, was developed by small groups of Indians from the north who settled on the coast of Peru, where *Anadenanthera* trees do not occur and therefore probably were not used (Means, 1931). Nordenskiöld discovered two enema syringes with skin bladders in a man's grave in the Ollachea Valley in eastern Peru (Nordenskiöld, 1930). A Quechua Indian thereupon informed Nordenskiöld that his tribe had always used syringes like these (von Rosen, 1924). Heizer (1944) said that evidence suggests that the enema was more important and more widely used in ancient Peru than in recent times. Even by the 16th Century, their use was declining.

The site of Vilcas, or *Vilcashuamán*, in the Andes is considered critical to the study of early contacts between highland and coastal cultures. It contains one building which is pre-Inca. The site is believed to be contemporary with Tiahuanaco I of the mountain cultures (Means, 1931). Willey suggested (before 1961) in lectures that early Tiahuanaco was about 500 B.C.

The inland mountain cultures which arose in Peru are thought by some to have been developed entirely by tribes who arrived from the north via inter-Andean plateaus and Amazonia (Means, 1931). The origins of these tribes are really not known with certainty and may well be diverse. In connection with research for this paper, I have wondered whether there might be some relation between the Chanca of Peru and the Chango tribe of the now nearly extinct Atacama (which see) to the south. The Chango archaeological materials, discussed later, include artifacts from northern Chile which could be interpreted as having been used for either snuffing or enemas, possibly involving *Anadenanthera* substances. The oldest such artifacts are bone tubes which precede the construction of the classic Tiahuanaco II monuments to the north near Lake Titacaca in Bolivia (0 - 500 A.D., according to Willey, in lectures). *Vilca* has been reported as a word used at the time of early contact in the Atacama region. *Anadenanthera colubrina* var. *Cebil* is known there today as *Cevil*. The vague possibility that the Chanca of Peru, who included the people named *Vilca*, may have come from the Atacama region to the south might be worth investigating.

A Y-shaped snuff tube made of the engraved leg bone of a young llama-like animal was found at the site of Tiahuanaco I by Uhle (1898). This tube was later recognized as belonging to the Atacameña civilization derived from that of the classic Tiahuanaco, even though found at the site of the last civilization (Uhle, 1915).

Finally, the monuments of Tiahuanaco II include the famous monolithic structure of what is believed to be a creator-god, the 'weeping' Viracocha (Mason, 1957; Means, 1931). This monument is one of the archaeological

wonders of America, yet no one knows why the deity is represented with seemingly tear-streaked cheeks. What might be interpreted as grief could have been intended to depict an immediate reaction to a stimulant or narcotic associated intimately with the worship of and communication with the god. An irritating snuff or inhalation of burning materials could easily cause such a response. It is very interesting that the word *Hilca* meant one-eyed person to some Indians of Chile (see Atacama). The word appears to be close to *Huilca*, the Indian spelling for *Vilca*. Archaeologists generally seem to be agreed upon the existence of historical affinities between the ancient civilizations of southern Peru and Bolivia, and those of northern Chile and Argentina. One may wonder, too, whether there might be some close historical relationships among groups of Indians where words associated with ideas of sight, hallucination and divinity are similar over relatively large geographical distances.

While it is quite certain that *Anadenanthera* materials have been used by the Indians of Peru, it is also apparent that the variety of uses and their historical origins, as pertaining to particular cultural groups, have yet to be studied in large measure.

Since 1961, new thoughts have arisen as to archaeological dating (Wiley in a letter, December 3, 1966). Consequently, the cultural chronology used here may be becoming obsolete. As the time sequences of culture history in the New World continue to be better understood, a more coherent picture of the origin and dissemination of drug plants, including *Anadenanthera*, should emerge.

For a more recent treatment of Peruvian *Anadenanthera* by the author, see "Vilca and its use" (1967).

CULTURE AREA MONTAÑA

PIRO CULTURE:

TRIBES: Chontaquiro, Machiguenga and Piro (Simirinch).

LANGUAGE: Arawakan stock.

REFERS TO: seeds of a legume.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are pulverized, roasted. The snuffing apparatus is a V-shaped instrument made of two leg bones of a heron. The end of one bone is decorated so as to be distinguishable from the other. Both large and small instruments are used.

MANNER OF ADMINISTRATION: the snuff is placed in the decorated end through which an assistant blows the powder with a sharp puff into a nostril of the recipient. Sometimes the arms of the V are so short that one end may be placed in the mouth and the other in a nostril, permitting the recipient to do his own administering. The seeds are also reported to be eaten.

PHYSICAL EFFECTS: narcotic and stimulant; also increases alertness and clears the vision.

CULTURAL SIGNIFICANCE: the use of V-shaped snuffing tubes for tobacco is found apparently among various tribes of eastern Peru; but, to my knowledge, the use of such tubes for *Anadenanthera* snuff, as well as the eating of the seeds of that genus, is attributed only to the Piro, who snuff tobacco, too. The putative *Anadenanthera* substances seem to play a cultural role among the Piro which might be described as that of a common stimulant.

USED BY: hunters, who also administer it to their dogs to increase their perceptiveness, too.

SOURCES: Farabee, 1922; Steward & Métraux in Steward, 1948.

BOTANICAL IDENTITY: I have examined specimens of *Anadenanthera colubrina* var. *Cebil* from the margin of the small Piro culture area; the trees are probably used by these Indians as the source of a narcotic.

CULTURE AREA JURUÁ-PURÚS

AMAHUACA CULTURE:

TRIBES: Amahuaca, Capenawa, Comobo, Maspo, Mochobo, Nianagua, Nocoman, Pichobo, Puyumanawa, Rema, Ruanagua and Soboyo.

LANGUAGE: Panoan.

Zerries stated in 1955(b) that, in the Juruá-Purús region, both tobacco and *Yopo* powder are used by many tribes, particularly the Panoan and Cashinawa. By "Panoan", I assume that he meant the Amahuaca, Chama and Mayoruna, all of whom speak a Panoan language, according to Murdock (1951). Reichel-Dolmatoff (1943-44) maintained that instruments for inhaling narcotics of identical or similar form to those of the Guahibo are known among the Amahuaca of northeast Peru. However, he did not indicate whether or not the narcotics used by the Amahuaca were identical with those of the Guahibo. The Amahuaca tribe was included among the Panoan tribes of eastern Peru who, according to Steward & Métraux (in Steward, 1948), smoke tobacco in pipes or cigars, drink it in a beverage or inhale it as snuff through tubes. Among these tribes, tobacco powder is taken through a V-tube, one end of which is inserted in the nose while an assistant blows through the other end. I have examined no specimens of *Anadenanthera* from eastern Peru.

CASHINAWA CULTURE:

TRIBES: Ararawa (Arara), Canamari, Cashinawa, Catukina, Contanawa, Curina, Cuyanawa, Espino, Marinawa, Nawa, Nucuini, Pacanawa, Sacuya, Saninawa, Shanindawa, Shipinawa, Taminawa, Tushinawa, Yauavo and Yura.

LANGUAGE: Panoan stock.

Although Zerries (1955b) indicated that the Panoan tribes of the Juruá-Purús region use both tobacco and *Yopo* powder (see Amahuaca), I have not encountered any specimens of *Anadenanthera* from the Cashinawa region, which lies in the southern part of western Amazonas where the species are not known to occur.

CATUKINA CULTURE:

TRIBES: Bendiapa, Burue, Canamari, Catawishi, Catukina, Catukino, Mangeroma (Tucan-Dyapa), Parawa and Tawari.

LANGUAGE: the independent Catukinan stock.

NAME: *Paricá*.

REFERS TO: material taken as snuff or enema.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the powder is taken through a bent tube made of a bird shank bone cut in two and the pieces joined by wrapping at an angle. For an enema, a clyster pipe is made on the same principle, from the long shank bone of the *tuyuyú* (*Mycteria americana* L.).

MANNER OF ADMINISTRATION: a portion of snuff is put into the V-shaped snuff tube and blown with great force from the mouth into a nostril of the same person.

PHYSICAL EFFECTS: the snuff is a narcotic stimulant, speedily inducing a sort of intoxication resembling in its symptoms that produced by the fungus *Amanita muscaria* (L.) Pers. ex Fr. Taken as an enema, *Paricá* acts as a purge, more or less violently, according to the dose; a small injection is said to clear the vision and render one more alert.

CULTURAL SIGNIFICANCE: the Catawishi use *Paricá* snuff as do the Mura and other peoples of the Amazon, who call it by the same name. Prior to a hunt, a Catawishi Indian will take a small anal injection and administer another to his dog, to enhance both their perceptive faculties.

USED BY: hunters, and probably other men of the tribe.

SOURCES: Spruce, 1908.

BOTANICAL IDENTITY: *Anadenanthera* is not known from this region, and Spruce's account (1908), on which the above information is based, was taken from a story told him by a Brazilian trader who had visited the Catawishi and obtained from them a snuffing apparatus. However, the Mura, who adjoin the Catukina downstream, probably use *Anadenanthera* substances, and it seems possible, though not likely, that the Catukina may also employ them.

CHAMA CULTURE:

TRIBES: Carabacho, Cashibo, Conibo, Sensi, Setebo and Shipibo.

LANGUAGE: Panoan stock.

Zerries' statement (1955b) that the tribes of the Juruá-Purús region use *Yopo* powder (as well as tobacco) is strengthened with regard to the Chama by the fact that at least one specimen of *Anadenanthera colubrina* var. *Cebil* which I examined has been collected on the southwest border of the Chama culture region. Reichel-Dolmatoff (1943-44) indicated that instruments for inhaling narcotics of identical or similar form to those of the Guahibo are known among the Chama. The sorcerers or *yubués* of the Conibo were said by Saint-Cricq (1873-74 ed.) to hold secret conferences with their patron, *Yurima*, by means of a lethargy induced by some narcotic. The same author described the Conibo male as carrying a bag containing snuff apparatus used for powder made from green tobacco. When the Conibo has a cold, he, like the Anti and Chontaquiro, has a comrade blow the tobacco powder through a tube into his nose; his eyes bulge almost outside his head, he blows, snuffs and sneezes and then puts back his materials, exhibiting satisfaction. I do not know whether or not the bulging of the eyes referred to above is usual among reactions to tobacco snuff. Steward & Métraux (in Steward, 1948) stated, as mentioned earlier (see *Amahuaca*), that the Panoan tribes of eastern Peru smoke tobacco in pipes or cigars, drink it in a beverage or inhale it as snuff through tubes. Tobacco powder is taken through a V-tube, one end of which is inserted in the nose while an assistant blows through the other end.

IPURINA CULTURE: primarily fishers, with some agriculture.

TRIBES: Canamari, Casharari, Catiana, Cujigeneri, Cuniba, Ipurina (Kangiti) and Maniteneri.

LANGUAGE: Arawakan stock.

NAME: *Carica*, *Parica*.

REFERS TO: leaves said to contain some nicotine.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the leaves are powdered and stored in a snuff box which is usually a small snail shell (*Pomacea* spp.) furnished with a cockle shell and a small pouring tube. *Parica* is also taken in honey-like liquid form as a clyster, administered with a small rubber syringe and the shin bone of *jacamy*.

MANNER OF ADMINISTRATION: snuffed and used as an enema.

PHYSICAL EFFECTS: the clyster brings about narcotization as if by opiates; in five minutes after administration contorted movements, delirium and hallucinations of marvellous scenes or bloody battles are produced. A crisis is reached within fifteen to twenty minutes, after which the person awakens and is himself again.

CULTURAL SIGNIFICANCE: *Parica* enemas are taken during a festival for the purpose of divination; it seems that all the old men take enemas at that time; but it is the interpretation of the shaman, after analyzing the reports of the revelations which have appeared to the other Indians, which is of importance. As all the elders are addicted to this narcotic, they are never without a portion of the intoxicant nor clyster-equipment, so that they may partake of it whenever they so desire.

USED BY: old men and shamans.

SOURCES: Métraux in Steward, 1948; Masô, 1919.

BOTANICAL IDENTITY: the region occupied by the Ipurina is outside the general distribution of *Anadenanthera*, and the descriptions available do not give much indication as to the nature of the plant source. The Ipurina use tobacco snuff (Métraux in Steward, 1948).

MAYORUNA CULTURE:

TRIBES: Mayoruna.

LANGUAGE: Panoan.

Occupying a region in the northeast of Peru and southwest Amazonas, the Mayoruna are outside the geographic distribution of *Anadenanthera*. They are included here only because of Zerries' statement that in the Juruá-Purus region both tobacco and *Yopo* powder are used by many tribes, including the Panoan groups.

MURA CULTURE: primarily a river people.

TRIBES: Mura and Piraha.

LANGUAGE: isolated Muran stock.

ADDITIONAL TRIBE: Matanawi.

LANGUAGE: affiliations unknown.

NAME: *Parica*, *Paricá*.

REFERS TO: substance made from the *Parica* tree (*Parica* or *Parica-uva*) taken as snuff powder or dissolved in cold water as a clyster, in a paste or in cigarettes; a festival of the same name.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds or fruits or "lobes" (Saint-Cricq, 1873-74 ed., Vol. 4, pp. 453-55) are dried in the sun, roasted, bruised and pounded in mortars by old women to a fine, odorous powder which is kept in a large bamboo tube, from which doses are measured with a *caimán* tooth. The snuff is taken by means of an instrument like that used by the Anti and their neighbors (which I interpret to mean a V-shaped bone tube); the instrument is also described as a *taboca*, a hollow cane or reed or a tube about 1 foot long made of bamboo, or a long tapir bone or a bird bone. The liquid form or infusion is contained in a vat or large kettle; a syringe made from the latex of *Hevea* spp. in the shape of a pear with a rush tube at one end is employed for administering the enema. Apparently, the liquid form is made from the powder at the time of use.

MANNER OF ADMINISTRATION: the old women fill the tubes with snuff powder and pass them to the dancing men; the men then stand in pairs, while one partner blows snuff with great force first into one and then the other nostril of his partner, who then does the same for him. The old women also pass syringes to the dancers; in the middle of a dance, one of the participants will insert the beak of a syringe which has been handed to him into his companion, making all the liquid contained in it disappear. It is also said that the enema syringe may be passed around a circle of seated men, being refilled for each person from a vat in the centre.

PHYSICAL EFFECTS; the snuff reportedly induces a state of ferocious intoxication and exultation accompanied by auditory hallucinations, a condition of feverish and sometimes murderous activity which ends with prostration, unconsciousness or even death. *Parica* snuff may be taken during and after the consumption of fermented beverages (*caysuma* and *cashiri*, made from fruits and *manioc*) or rum (*cashaca*). The first effect is that of inducing the men to become exceedingly talkative, to sing, shout and wildly to leap about; this is followed by a stupor, from which more drinking is needed to rouse them, unless they have suffocated from the powder while dancing. The physical effects of the enema are weaker than those of the snuff, though similar; and both are described as equally horrible. The men dance and threaten each other with their weapons. Their stomachs become distended like drums and are said sometimes to burst; those who manage to disburden themselves can continue in the same state for 24 hours.

CULTURAL SIGNIFICANCE: great emphasis is placed on *Parica*, the tree source of which is regarded as the place into which departed souls transmigrate and has, therefore, supernatural power. *Parica* is considered as a means of purification and an antidote to evil. It is especially important to feasts, such as puberty initiations of young men and harvest celebrations. It is used in the annual festivals called *parané*, *parassé* or *quarentena*. When the seeds are ripe and the snuff-making season arrives, the men assemble and flog each other in pairs for about 8 days, during which they consume alcoholic drinks and take *Parica* as snuff and in enemas in a special house; this annual feast of the *Parica* lasts 16 days and is accompanied by the male dances and violent activity.

USED BY: men and boys, although the old women prepare the substances and serve them to the men.

SOURCES: Barbosa Rodrigues, 1875; Bates, 1892; Ernst, 1889; Gillin in Steward, 1948; Karsten, 1926; Nimuendajú in Steward, 1948; Ribeiro de Sampaio, 1825; Safford, 1916a; Saint-Cricq, 1873-74 ed.; Southey, 1819.

BOTANICAL IDENTITY: I have examined two specimens of *Anadenanthera peregrina* var. *peregrina* from the Mura culture region, one of which was labelled *Parica* and was said to be cultivated (*Krukoff's Expedition to the Brazilian Amazonia, the Basin of the Rio Madeira, 6046*). Although Ducke said in a letter (September 25, 1955) that he had never encountered *A. peregrina* cultivated by the Indians, Spruce (1908) reported that he had seen the species planted at Santarém, near the junction of the Rio Tapajoz and the Amazon (which is in the Maué culture region, downstream from the Mura). I have examined *Spruce 1786*, from the Amazon - Rio Negro district, as well as an unnumbered specimen of his from the vicinity of Santarém which, though it lacked flowers, seems certainly to represent *A. peregrina* var. *peregrina*. Ducke stated (in the letter cited above) that trees of *A. peregrina* var. *peregrina* are common in the Amazon country but only in savanna areas.

As for the common names of the tree, I have examined specimens labelled *Parica* (see under Maué) which were collected by Ducke, who also stated (1939) that *Parica* is one of the names by which *Anadenanthera peregrina* var. *peregrina* is known in Pará. Spruce (1908) used the words *Parica* (and *Niopo*) for *A. peregrina* var. *peregrina*. Schultes (1954) has said that it is quite definite that *Parica* in most part of the lower Amazon does refer to certain trees of the *Leguminosae* (although in northwest Amazonas it refers to *Virola* spp.). Among the plants to which the term *Parica* has been applied are species of *Piptadenia*, *Acacia*, *Pithecellobium*, *Schizolobium*, *Aeschynomene*, *Stryphnodendron* (Le Cointe, 1945); *Parkia* (Ducke, 1949; Sampaio, 1934); *Enterolobium* (Sampaio, 1934). These genera all belong to the *Leguminosae*. Ribeiro de Sampaio (1825) mentioned a place called *Paricatiba*, meaning a locality where *Parica* trees are abundant.

Is *Anadenanthera peregrina* var. *peregrina* used as a snuff or enema source by the Indians of this area? Ducke (in his letter, 1955) stated that he, like Schultes, had never found this species employed for snuff by Amazon

Indians, that only species of *Virola* had been found with this use. Bates (1892) believed that *Parica* was made probably from a species of *Inga*. And Spruce (1908) reported that he had not actually seen snuff prepared in the Amazon. However, Schultes (1954) stressed the fact that we are not at all sure that *Paricá* does not refer, at least in some parts of the Amazon Valley, to snuff made with the seeds of *Anadenanthera* or a related genus. Finally, Robert Schomburgk (1841 ed.) stated that certain Indians along the Amazon River and the Rio Negro, as well as the Uaupés, Purus, etc., used the seeds of *Parica* trees, which he said were a species of *Mimosa*. (It must be remembered, however, that Robert Schomburgk never had been in the Rios Vaupés, Amazon, Purus, or Negro areas; some of his information was probably hearsay). These Indians were said to use the *Parica* seeds in the same way as did the Otomac and Guahíbo the seeds of *Acacia Niopo*: they were rubbed to a powder and the fumes inhaled, or the powder was sprinkled in the eyes, nose and ears, to produce a frenzy lasting some hours, during which the Indians were masters of neither themselves nor their passions; a sense of general languor was said to set in later, lasting several days. In the same narrative, Schomburgk also referred to the *Parica* trees' being numerous in savannas and trimming the shores of the Rio Branco or one of its tributaries. In 1840, Bentham published *Mimosa? acacioides*, based on Robert Schomburgk 852 (fruiting) and 866 (flowering). This species was said to be found in woods, skirting savannas in British Guiana and also along the Rio Branco, where it was called *Black Parica* and *Paricarama*; the bark was used for tanning and to cure internal bleeding; some tribes were purported to intoxicate themselves with fumes of the burning seeds. I have examined Schomburgk's material and have found that both *Acacia Niopo* (Humboldt & Bonpland ex Willdenow) Humboldt and *Mimosa? acacioides* Bentham are synonyms of *Anadenanthera peregrina* var. *peregrina*.

Robert Schomburgk's brother, Richard, also an explorer, mentioned (1922 ed.) that *Anadenanthera peregrina* var. *peregrina* was utilized by the Indians of British Guiana in the same way as described above and with the same common name. I have not been able to identify the Indians. Another reference to the use of *Parica* snuff from this species among the Indians of British Guiana (as well as the region north of the Rio Negro, in Brazil) refers to the aborigines only as *Paravilhanas*; Schultes in conversation (1960) stated that this is a loose term from a report of Martius (1867) based wholly on hearsay.

According to Devoto & Rothkugel (1942), *Ra* or *Na* means "similar" in Guaraní. The fact that *Anadenanthera peregrina* var. *peregrina* is called *Paricarama* and *Black Parica* in British Guiana suggests that this plant is not regarded as the genuine or real *Parica*, as has already been suggested. I have seen the name also given sometimes as *Paricarana*, which means "false parica". Gillin (in Steward, 1948) stated that the use of *Parica* in snuff, paste or cigarettes appears to be one of several western traits which had barely reached the fringe of the Guiana area at the time of our earliest knowledge. He referred to its employment by the Mura, Maué and the Parima River tribes but did not give the botanical identity. The Parima River tribes are not listed in Murdock (1951), but, according to Zerries (1955b), they are connected with the Waica (see Shirianá) who, to my knowledge, do not use any materials under the name of *Parica*. I have examined from the Guianas only two specimens of *A. peregrina*, and they were from southwest British Guiana. I have not encountered any references other than the brief information given above as to the employment of possibly *Anadenanthera*-derived substances by any peoples of the Guianas.

Without indicating the exact people or location, d'Évreux (1864 ed.) stated that the shamans of northern Brazil have *Parica* as their most powerful "persuasion"; in a footnote, Denis added that the *Parica*, or *herbe aux sorciers*, was chewed and made into an ointment or unguent with which the shamans practiced their unctions. The description does not sound as though *Anadenanthera* materials were utilized. Spruce (1908) stated that the equipment of the medicine-men of the region lying adjacent to the upper Rio Negro and Orinoco and extending thence westward to the Andes was chiefly the following: the *maraca* or rattle; tobacco juice and smoke; *Niopo* (or *Parica*), powdered seeds in snuff; *Caapi* (or *Ayahuasca*) stems in infusion (*Banisteriopsis* spp.). He added that *Niopo* was the chief medicine of the shamans on the affluents of the Amazon and that, to his knowledge, none of these plants was taken in conjunction with any other. The region north of the Amazon River and into the Guianas is in need of ethnobotanical study with regard to the real identities of the materials referred to in the various reports cited above. This region has been one of apparently large-scale communication between peoples north and south of it and could have been a center for dissemination of numerous botanical species. I do not believe that *Anadenanthera peregrina*, however, was among these. I am aware of two instances of the tree's being cultivated in

Amazonas; but, if Ducke reported that he had never, in all his studies of the Amazon flora, seen it planted and that it was, furthermore, common only to the savanna areas of the region, I think that his word ought to be accepted as indicating the overall picture. I would guess that, if the Mura do use *A. peregrina* substances, they must obtain them from patches of savanna amid the rain-forest. Ducke, who had the greatest field knowledge of the Amazonian flora, especially the legumes, had collected *A. peregrina* var. *peregrina* and labelled it *Paricá*. It is, therefore, puzzling that he did not draw attention to the fact that the same word is used for the snuff of the Mura and their neighbors, the Maué and Mundurucú (see next), nor speak of the identity of that snuff.

Finally, in conversation with Dr. Souy, a Japanese physician from Brazil, I learned that the *caboclos* (a Portuguese word for half-breeds or *mestizos*), between Óbidos and Manaus along the Amazon River (which includes the culture regions of the Mura, Maué and Mundurucú), employ a substance called *Paricá* which they obtain from Indians upstream. It is cultivated and used as snuff. The *caboclos* are said to be on close terms with the Japanese shop-owners who sell jute and, although they do not utilize it themselves, will buy *Paricá*. The powder, whose use the Brazilian government supposedly prohibits by law, is described as "grass" or "little leaves" (Souy in conversation, around 1956). A handful of the minute leaflets of *Anadenanthera peregrina* var. *peregrina* might look like a grassy substance; but, if it is obtained from upstream, its source must be looked for among the plants of western Amazonas, where *Anadenanthera* is not known to occur. Koch-Grünberg (in Schultes, 1954) did, however, report a narcotic snuff from the northwest Amazon to be derived from a legume. Schultes recently in conversation inquired whether or not the "grass" or "little leaves" could be *Justicia* of the *Acanthaceae*, as *J. pectoralis* Jacquin var. *stenophylla* Leonard bears little leaves and is added to *Virola* snuff by some Waiká Indians. According to Holmstedt in conversation, this plant may contain N,N-dimethyltryptamine.

Whatever other – and they may be numerous – plant substances are used in the snuffs and enemas of the Mura, it seems likely that *Anadenanthera peregrina* var. *peregrina* may be included in their pharmacopoeia. The reports suggest that this is possible; the species occurs in the Mura culture region; and, even though rarely, the trees are cultivated there.

CULTURE AREA PARÁ

MAUÉ CULTURE:

TRIBES: Andira, Apanto, Arapium, Maragua, Maué and Tupinambarana.

LANGUAGE: Tupí-Guarani stock.

NAME: *Parica*, *Paricá*.

REFERS TO: substance derived from seeds or fruits of a tree, or from the seeds plus other botanical materials; the tree; the complete apparatus for snuff-taking.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are roasted and finely pulverized in a carefully made shallow basin of red wood; the powder is dried on a flat piece of wood or hard material. *Paricá* may also be composed of these seeds plus the ashes of a vine, and the leaves of a species of the menispermaceous *Abuta* Aubl. (or *Cocculus* DC). *Parica* is stored as pieces of hard paste kept in a shell until required, when a small quantity is dried, pulverized in a mortar or flat shell and the powder spread out with a brush made of *tamandua bandeira*. Another version holds that the dried fruits of the tree, *Parica*, are reduced to a powder by being crushed within a half of what appears to be the fruit case of a lecythidaceous tree (the case being referred to as a *marañon*) which serves as a mortar (*indua*); the brush (*tapixana*), made from the silky extremes of the tail of the *tamandua*, is used to clean the mortar and to spread the *Parica* in the concavity (*Paricá-redonda*) of a wooden tablet or table (*suican*); the table bears the figure of the owner's totem animal inlaid with mother-of-pearl or conch (*itaá*). If the *Parica* is to be stored, a snail (*japuruxita*) shell is used which is called a *Paricá-rerú* or *Parica*-container; a fragment of snail shell of the same species is used to stop the mouth, sealed with resin of *amany*. To empty the contents onto a table, the top of the spiral is opened and the material poured into a small gourd. For inhaling, the quills of the royal eagle (*gavião real*), vultures or herons may be employed, or two long tubular bones, joined in V-form or side by side, secured with cotton thread. A tube (*taboca*) made of the long bone of the tapir is also utilized. A banana leaf is sometimes used. The two wing bones of *tuyuyús*, *naguarys* or *ayayas* may be joined, the marrow having been removed, one to the other in parallel fashion with fine cotton thread; small ribs of *paxiuba* palm are interposed to adjust the position of the bones. Two *coquillos* of the *ju-hui* palm are glued to the superior extremities. *Parica* is also taken in enemas and cigarettes.

MANNER OF ADMINISTRATION: the snuff powder is violently inhaled into the nostrils through the tubes from the tablet, on which the desired amount of *Parica* has been spread out evenly with the brush, which looks like or is called a *catrabuja*. The person takes hold of the handle end of the tablet with his left hand and the tubes in the other, placing the superior extremities to his nostrils and the lower ones on the tablet; he inhales through both tubes at once. Reciprocal administration by two persons has also been described.

PHYSICAL EFFECTS: the eyes bulge, the mouth contracts, the lips tremble, and the recipient is obliged to sit down, intoxicated for about five minutes; he then becomes gayer and is refreshed. *Parica* snuff relieves fatigue and prevents fevers and disease. As used in the ceremonies described below and combined with wine, *Parica* produces violent reactions with occasional deaths from suffocation and, commonly, unconsciousness.

CULTURAL SIGNIFICANCE: *Parica* snuff is taken frequently and in an everyday fashion as a common ameliorant. The Indians are willing to part with the snuff apparatus when it is desired by strangers, which indicates that there is apparently little or no sacredness associated with snuffing. This may be a recent attitude; for *Parica* has also been described as part of an important tribal ceremony, in the great *bauhanaes* which take place in a large house called the house of *Parica*. The ceremony begins with a reciprocal flagellation and continues eight days, during which the men beat each other while the old women prepare *Parica*. The women also prepare wine from the fruits of the *bejú*. The drunkenness is maintained throughout the festival by repeated doses of *Parica* and wine.

USED BY: men in ceremonies; but it is also said to be given to children on an everyday basis, so that it may be in general usage.

SOURCES: Bates, 1892; Ernst, 1889; Gillin in Steward, 1948; Herndon & Gibbon, 1853; Martius in Ernst, 1889; Métraux, 1928; Nimuendajú in Steward, 1948; Ratzel, 1894 ed.; Rodrigues Ferreira in Serrano, 1941; Schultes, 1954; Spix & Martius, 1824 ed.; Spruce, 1908.

BOTANICAL IDENTITY: I have not examined any specimens of *Anadenanthera* from the region of the Maué culture, but trees have been found in that general area. Ducke (16519, 16581, 20186) collected and identified some of them as *A. peregrina* var. *peregrina* and gave their common name as *Parica*. I would expect that this species is used by the Maué, along with other plants including *Ohmedioperebea sclerophylla* Ducke, said to be a traditional snuff source of the neighboring Mundurucú.

The origin of the term *Parica* is unknown to me. Devoto & Rothkugel (1942) have given a list of Guaraní plant names with the meanings of various roots in that language. In Guaraní, *Parica* could be broken down into the following constituents: *Pa* (all, everything) or *Pará* (a fowl ovary), *I* (water), *Ca*, *Caa*, *Caá* (herb, medicinal plant). I hesitate to speculate on this matter, but it may be significant that the word *Parica* is reported only for plants from the area of the Amazon and its tributaries. Therefore, it may not be as old as the widespread term *Curupa* and its variants; and it may well have been applied, originally at least, only to certain plants found exclusively in the Amazon region, perhaps species of *Virola*. The word *Parica* could have become, subsequently, a term generally applied to snuffs or enemas or to their source plants.

The wooden tablets employed today by the Maué are similar to those of wood and stone found at archaeological sites in Bolivia, Argentina, and Chile; the similarities are not only in proportion and form, but also in ornamentation of the handle, which is like many from the Atacama culture region of Argentina and Chile (which see). The Maué tablets may have been derived from tablets used in the highlands of Bolivia after the classic period of Tiahuanaco. (During the classic period, the Tiahuanaco tablets were of stone and were without handles). The Maué tablets also could have been derived from those once utilized in northern Argentina and Chile. (The Atacameña tablets are of stone and wood and include many with handles; these tablets are presumed to be derived from those of the classic Tiahuanaco civilization) (Uhle, 1915). The earliest known tablets of the Maué are evidently not very different from those of recent use; they are described by Serrano (1941) as being rectangular, with a hollowed depository, and as having either a zoo- or anthropomorphic handle or just a spatular appendix. These tablets suggest the possibility of an ancient relationship between the forebears of the Maué and those of the Indians of Bolivia and/or northern Argentina and Chile.

There is also evidence of a probably less ancient commerce in Amazonas, Pará and Matto Grosso which was engaged in by Indians of the Amazon River. According to Porto Seguro (in Schultes, 1955), the Maué, Mundurucú and perhaps others maintained a kind of traffic with Quechua-speaking Indians; this trade, incidentally, expanded enormously when the Europeans arrived. Schultes (1955) has elaborated on the subject; *guaraná*, a caffeine-bearing stimulant made from *Paullinia* and produced in the limited region of the Mundurucú and Maué, had been traded since remote times all the way to the places known today as Diamantina and Cuyabá in Matto Grosso; the route was almost unbelievably long and difficult: all the way down the Rio Tapajoz, and then overland to the Rio Paraguay.

It may be worth noting that there is a Rio de Curupatuba about 40 leagues from the mouth of the Rio Tapajoz (Acuña, 1891 ed.). There is also a place called Curupachi at the junction of the Rio Tapajoz with the Rios Jurueña and São Manoel in Matto Grosso, along the general route referred to above. The word *Curupa* is apparently not used, today at least, by the Indians of the lower Amazon Valley as a name for plant substances; but it is one of the words (spelled variously) employed for such stuffs by the Otomac, Sáliva, Yaruro, Guahibo, Cocama, Omagua, Chiriguano and Guaraní. The wide geographical distribution of this term could imply, as suggested earlier, that it is one of the older words for plant stimulants in South America. Alternatively, or in addition, the Indians who first used the word may have migrated in many directions relatively recently. This is, I believe, commonly thought to be true of the

Tupí-Guaraní speaking peoples. The fact that the Chiriguano and Guaraní, who are located on either side of the southern terminus of the early trade route of the Amazon Indians, refer to *Anadenanthera* today as *Kurupái* and *Kurupá*, respectively, is indeed thought-provoking (see Chiriguano and Guaraní).

MUNDURUCÚ CULTURE:

TRIBES: one, the Mundurucú.

LANGUAGE: Tupí-Guaraní stock.

NAME: *Parica*, *Paricá*.

REFERS TO: snuff from the seeds of a legume or other plant source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: elegant wooden slabs, which these Indians have in common with those of southwestern South America, are used to grind the snuff.

CULTURAL SIGNIFICANCE: the Mundurucú borrowed the habit of *Parica* snuffing from their neighbors, the Mura and Maué.

SOURCES: Martius, 1867; Montell, 1926; Nordenskiöld, 1931; Schultes, 1954.

BOTANICAL IDENTITY: *Anadenanthera peregrina* var. *peregrina* is represented from the border of the region of the Mundurucú culture as well as from the areas northeast and west of that culture. The common name on herbarium specimens is *Paricá* (see Maué). Von Martius (1867) stated that the seeds of this species were used for *Parica* by the Mundurucú for snuff. However, Ricardo de L. Fróes said in a letter (February 2, 1957) that the seeds of *Olmedioperebea sclerophylla*, which is a gigantic forest tree with a fleshy fruit, used to be taken, traditionally at least, by the Mundurucú. More recently, Schultes (1963, 1970) reported that a psychotomimetic snuff known in Portuguese only as *rapé dos índios* has been discovered in the central part of the Brazilian Amazon, along the upper Rio Xingú; his source of information was the late George A. Black, who informed him that the snuff was derived from the fruit of *O. sclerophylla*. It may be that, as has been suggested for other peoples, several plants are utilized for making snuffs also by the Mundurucú.

CULTURE AREA BOLIVIAN

CHIRIGUANO CULTURE:

TRIBES: Chiriguano nation.

LANGUAGE: one of Tupí-Guaraní stock.

NAME: *Kurupái*, *Kurupáirái*.

REFERS TO: botanical source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the tannin contained in the bark of *Kurupái*, and the pressed or crushed leaves of *Kurupáirái* are employed.

MANNER OF ADMINISTRATION: the tannin is used to hasten healing of wounds, and the leaves are used as a lenitive compress on tumors.

SOURCES: Métraux, 1930.

BOTANICAL IDENTITY: I have not examined specimens from this area, but *Anadenanthera colubrina* is represented north, east and south of here. The nearest specimens come from northern Argentina, where, according to the labels, the common name is *Cebil*, *Cevil* or a variant (see Comechingón). Métraux (1930) gave *Petit Sébil* as synonymous with *Kurupáirái*; and specimens of *A. colubrina* var. *Cebil* which I have seen from north of the Chiriguano, but still in Bolivia, are labelled *Curupai* or *Curupaú*, followed by Spanish epithets (*Steinbach 6657, 7226*). Fiebrig (1932), Devoto & Rothkugel (1942) and Lindman (see Guaraní) have all indicated that *Kurupai* and variants of it are names for *A. colubrina* in Guaraní. Devoto & Rothkugel suggested that *Curupai* may be derived from one of two Guaraní combinations: 1) *Curú* (grain, seed) *Pa* (all, everything) *Ih* or *Y* (resin), because *A. colubrina* var. *Cebil* was one of the earliest tannin sources; 2) *Curú* (ibid.) *Pay* or *Paye* (witch-doctor), because the toxic seeds are valued by shamans. A combination which these authors did not suggest, but whose components are found in their list of Guaraní terms, might be: *Cu* (tongue, language) *Rupá* (bed, with reference to that of the Infant Jesus) *Á* (fruit); a pre-Christian interpretation of the word might then be 'fruit of the holy language', a source of communion with spirits. As will be remembered, Ernst (1889) suggested the derivation of the Taino word *Cohoba* from Guaraní stock (under Taino). It may as well be included here that Storni (1944) has interpreted *Curú* to mean "itch" or "wart"; the word has been applied to *Piptadenia rigida* in some parts of South America, because the bark of that species is irritating. According to Devoto & Rothkugel (1942), the root *Curnú* or *Kurú* in Quechua or Araucanian languages means "dark black", which is one way of describing the seeds of *Anadenanthera*. Whatever the original meaning of *Kurupai*, the facts at hand suggest that the materials reportedly used by the Chiriguano come probably from *Anadenanthera colubrina* var. *Cebil*. Some of the specimens which I examined from Paraguay appeared to be especially bush-like and small; they may be the *Petit Sébil* or *Kurupáirái*. It will be recalled that Devoto & Rothkugel (1942) give *Ra* as a suffix in Guaraní, meaning "similar to".

Chiriguano means "dirt people" and is a Quechua name given to these Indians by the Inca, who did not regard them very highly (von Rosen, 1924). The Chiriguano were influenced by Inca culture to some degree. In particular, the Chiriguano borrowed a curative enema and the corresponding instrument from their Andean neighbors. According to Métraux (1930), the practice and instrument came to the Chiriguano via Indians of northwestern Argentina, a theory based on archaeological tubes from that region. A traveller named Mingo appears to have recorded the use of curative enemas among the Chiriguano as late as the 18th Century. Métraux stated that, aside from the borrowed enema of the Chiriguano, no Tupí tribe, except the Omagua of the upper Amazon, has employed enemas for treatment of the sick. The information which I have on the Omagua suggests that not even their enemas are curative in intent. The Omagua enemas are administered primarily at large feasts and for intoxications (and they probably do not include *Anadenanthera* materials). The Cocama, neighbors of the Omagua, take enemas of *Curupa* (again,

probably not *Anadenanthera*-derived); these enemas are therapeutic and vision-inducing but are not described as being given specifically for curative purposes. The only peoples with whom my research has been concerned who use or did use enemas mainly for medicinal purposes appear to be the Quechua-speaking Indians of southern Peru (Nordenskiöld, 1930); these Indians are believed to have employed *Anadenanthera* in their enema decoctions. On the other hand the Chiriguano enema was made of urine and salt and was administered by means of a unique syringe: a small reed was stuck in one end of a calabash which also had a hole at the other end, through which the administrant could blow the liquid into the recipient (Heizer, 1944). The attempt to interpret one culture of Tupí-Guaraní speaking people relative to another is not easy. As Nordenskiöld (1930) said, these peoples have migrated since the time of the discovery more than any other groups and have few culture elements in common today. Whether or not the enemas of the Chiriguano could be connected in any way with the present putative uses of *Anadenanthera* materials for that nation is a matter for speculation, at least on the basis of the data here assembled.

MACURAP CULTURE:

TRIBES: Amniapa, Arua, Guarategaja, Macurap and Wayoro.

LANGUAGE: Tupí-Guaraní stock.

REFERS TO: a powdered mixture, made of tobacco and other strong products.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: a long tube and a table.

MANNER OF ADMINISTRATION: the chief shaman, or sorcerer, blows a certain quantity of the powder through the tube into the noses of the recipients who are seated around the table.

PHYSICAL EFFECTS: the participants fall into a trance and speak to spirits.

CULTURAL SIGNIFICANCE: the administration of this powder takes place during the seventh day of a ritual celebration dedicated to the invocation of good spirits. On this day, the ancestral spirits visit the *maloca* or great house in which the whole village lives. The final preparations are solemn and worthy of the respect held for the awaited guests. The initiated men, those who have been instructed in magic, sit down around the improvised table and receive the powder. While the recipients react as described, the old sorcerer leaps into the air with the cry of a jaguar and arrives outside the house, where the same ceremony is repeated out of doors, so that the magic can extend to the adjacent fields, paths, rivers, etc. This done, all turn toward the sun, and the sorcerer engages in a series of energetic physical exercises to attract the good spirits and to remove any evil ones from the vicinity, a performance which takes three hours. After that, comes a part of the ritual in which a long red parrot-plume is made to stand on end and to sway like a pendulum, these movements being dependent upon the power of the particular sorcerer. He and the tribal chief then return to the part of the *maloca* used for sacred purposes and, somehow inspired, trace on a palm mat with their hands a symmetrical design which they then copy with a red pimento. The sorcerer takes a double cane about a foot long and crouches by the table. All the initiated gather around, and, while they hold their breaths, the sorcerer puts one extremity of the double cane into his nostrils, pressing the other end on the surface of the table in long and circular movements. At the same time, a weird piercing melody is heard, which impresses the initiates as the voice of the spirits. The rites terminate here, and after a bath the initiates prepare to receive their ancestors' spirits, placing pots of 'chicha' and various foods on the palm mat altar. The ancestors visit their descendants in the *maloca* during that evening, whose passage is accompanied by the sound of someone grating against the mat, cries of the women and children, chants, and so on.

USED BY: only by shamans and initiated males.

SOURCES: Sekelj, 1955.

BOTANICAL IDENTITY: although I have not examined herbarium specimens from this region, Frans Caspar sent me a sample of *Anadenanthera* seeds (probably *A. colubrina* var. *Cebil*) used by the Yabutí, who nearly surround the small region of the Macurap (see Yabutí). Burkart (1952) stated that *Anadenanthera* materials are still used as excitants by the Indians of Matto Grosso along the Rio Guaporé. Lévi-Strauss (in Steward, 1948) said that the tribes (no names given) on the right bank of the Rio Guaporé employ a narcotic snuff of crushed *Angico*, tobacco leaves and the ashes of a bark; the material is carefully prepared in small mortars, with mixing brushes and pestles, and is kept in bamboo tubes until used by shamans at feasts or for curing. When employed in curing, the snuff is blown into the patient's nose through one or more tubes that terminate in a hollow nut shaped like a bird's head. Although Sampaio (1934) said that *Angico* is the common name also for species of *Cassia*, *Enterolobium*, *Parkia* and *Piptadenia*, it would not be surprising if one of the materials referred to here were derived from *Anadenanthera colubrina* var. *Cebil*. Frans Caspar (in a letter, September 7, 1956) stated that the seeds that he sent were from a tree called *Angico* by many writers. Ducke (1939) said that *Angico* is a common name among some colonists for *Anadenanthera peregrina*, *A. colubrina* var. *Cebil* and *A. colubrina* var. *colubrina*. I have examined specimens of both species of *Anadenanthera* and each of their varieties bearing that name or variants thereof, all from Brazil. The specimens are mostly from the coastal states, as one might expect, since *Angico* apparently is a name used by settlers rather than by Indians: *Capucho* 413; *Duarte* 3053; *Dusén* 11253; *Foster* 2846; *Hoehne* 1030; *Kuhlmann* 3226; *Löfgren* 955; *Macedo* 521, 1265, 1988; *Mexia* 4492, 5225; *Oliveira* s. n., 1949, Para; *Pickel* 2292, 3184; *Warming* s. n., 1 of Nov. 65, Lagôa Santa.

PACAGUARA CULTURE:

TRIBES: Capuibo, Caripuna, Chacobo, Jacaria, Pacaguara and Sinabo.

LANGUAGE: Panoan stock.

NAME: *Parica*.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: *Parica* is prepared as a clyster, which is taken with a rubber syringe provided with a bone tube.

MANNER OF ADMINISTRATION: the Caripuna administer the enemas one to another.

PHYSICAL EFFECTS: a state of trance is induced.

SOURCES: Burkart, 1952; Métraux in Steward, 1948.

BOTANICAL IDENTITY: although Métraux (in Steward, 1948) has attributed the source of *Parica* here to *Anadenanthera*, the genus is not represented among the specimens which I examined for this general area. Burkart (1952) reported that the Indians of Matto Grosso along the Rio Guaporé, into which region the northeast part of the Pacaguara culture-area extends, still take *Anadenanthera* as an excitant.

YABUTÍ CULTURE:

TRIBES: Aricapu, Aruashi, Cabishinana, Canoa, Huari (Massaca), Kepikiriwat, Mure, Palmella, Purubora, Sanamaica, Tupari and Yabutí (Japutí).

LANGUAGE: of unknown affiliation and possibly diverse.

NAME: *Aimpä* (in German pronunciation).

REFERS TO: botanical material used in snuff.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds (*Aimpä-kid*) of the tree (*Aimpä-köb*) are mixed with *Aimpä-nyang* (ashes of the bark of an unidentified tree that are also added to tobacco snuff).

MANNER OF ADMINISTRATION: snuffed.

CULTURAL SIGNIFICANCE: used ceremonially, by the Tupari. Several neighboring tribes have similar names for the materials cited here.

SOURCES: Caspar in a letter, September 7, 1956.

BOTANICAL IDENTITY: as mentioned under Macurap, Caspar sent me samples of the seeds called *Aimpä-kid* which were determined as belonging probably to *Anadenanthera colubrina* var. *Cebil*. Caspar related that the tree was said to grow in savannas and is called *Angico* by many writers. Although I have examined no other materials of *Anadenanthera* from this region, I believe that it must be accepted, on the basis of the seeds with Caspar's information, that at least some of the substances included in the snuff of the Yabuti are derived from *Anadenanthera colubrina* var. *Cebil*. (For a fuller discussion, see Macurap). More information on Yabuti snuff is available in Caspar's book, *Tupari* (1952, 1956 ed.).

CULTURAL AREA CHILEAN

ARAUCANIAN CULTURE:

TRIBES: numerous: Pehuenche of the Andean highlands, and (from north to south) the Picunche, Mapuche, Huilliche and Chilote of the Chilean coast.

LANGUAGE: Araucanian stock.

The region of the Araucanians is south of the distribution of *Anadenanthera*. Nevertheless, it may be noteworthy that the Araucanians have a flute known as a *pivillca* (Medina, 1882); the instrument is essentially the same in concept as the snuffing tube or enema tube. One might wonder at this point whether the *pivillca* could be related to the bird whistle symbolism with which putative *Anadenanthera* powders are associated among the Mataco (which see).

The Araucanians have persisted in the custom of making a mixture of tobacco plus the leaves or bark of certain trees or bushes; according to Oyarzún (1910), such a practice may indicate that in former times they had to use only native plants with properties similar to those of *Nicotiana*, which was introduced at a later date. Tobacco appears to have been in use here at least as early as the time of the conquest. Just what the precursors of tobacco might have been among the Araucanians is a fascinating enigma.

ATACAMA CULTURE:

TRIBES: Atacama, or Kunza, among whose members are sometimes included the coastal Chango, the inland Casavindo and Cochino.

LANGUAGE: Atacama, an independent stock.

The information is limited here to archaeological materials found at the sites of Chiuchiu, Chunehuri (at Calama), the Desierto de Atacama, La Paya (Ciudad Atacameña), Pisagua, Puna de Jujuy and San Pedro de Atacama. Atacama culture history may be divided into three main epochs; they are best illustrated, with regard to the artifacts of concern in this paper, by the finds at Pisagua described by Uhle (1915), from the northern part of the Atacama region.

The first period at Pisagua preceded that of the construction of the classic Tiahuanaco II monuments and was contemporary with Proto Nazca. (According to Willey, in lectures before 1961, Proto Nazca was about 330 - 0 B.C.). The inhabitants of Pisagua were the Chango; and only bone tubes, no tablets, are found in the burials here.

The second period at Pisagua corresponded with that of the classic period of Tiahuanaco II (according to Willey, 0 - 500 A.D.). Here the first tablets appear and are wooden. New tubes appear here which are reddish at one end from what seems to be *coca*-stained saliva; this suggests that two people must have been involved in their employment, one to blow and the other to receive.

The third period at Pisagua preceded that of the Inca empire by just a few decades. (Willey placed this period about 800 - 1000 A.D.). There is evidence that at this time the self-administration suggested in the first period persisted along with that requiring two persons, from the second period. There is an enormous variety of decorations figured on the tubes of this last period, as well as on all of the known tablets of the Atacama region, including those found south of Pisagua. The art is of high quality but very symbolic and not well understood. It is likely that the very finest of the tubes found at Pisagua were imported from the Diaguita (Uhle, 1915).

In general, the tablets of the Atacama culture may be described as flat, rectangular wooden artifacts which appear to have been used for grinding; they have a rectangular concavity on one face and are often, though not always, adorned at one end with one or more carved handles of the same piece of wood. Carved-figure handles are common, as well as surface incision and shell inlay. The incised designs are sometimes of pure classic Tiahuanaco style and correspond to the stone tablets found at Tiahuanaco, except that handles are lacking on the Tiahuanaco examples. The forms of the handles on the Atacama tablets are as variable as the character of the basin is stable (Bennett in Steward, 1946; Uhle, 1913, 1915).

The tubes which accompany the tablets are made of bone, wood, cane or combinations of these materials. All of them are slender and cylindrical, with conical nosepieces which are commonly carved of the same piece of wood as the tubes; the tubes are often ornamented with relief or overlaid with gold leaf (Bennett in Steward, 1946).

Contemporary with the third period of Pisagua was a find at the cemetery of Calama, which included a woven purse containing gray-brown powder made of pulverized leaves. The leaves could not be botanically identified but proved to be irritating when snuffed. With the powder in the purse were tubes (made of bone like those of the first period at Pisagua) and tablets. At Calama there were, out of a good sampling, about ten crania per one tablet-and-tube. Hence, the employment of these materials evidently was not for religious but medicinal purposes (Uhle, 1913, 1915).

The uses of the tablets and tubes discussed appears to have extended from the centre of the Atacama region all the way to the northern region of Chile. There, along with a developed agriculture, these Indians seem to have maintained in operation a nomadic system of commerce with their neighbors (Uhle, 1913). According to Serrano (1941), the tablets or trays passed from Tiahuanaco along the coast to the north of Chile and into Argentina, where they are found not only of stone but also of wood.

The tubes of the Atacama culture are older than the civilization of (classic?) Tiahuanaco and represent a type which was developed later at Tiahuanaco. However, it seems that the tablets of the Atacama must have been derived from Tiahuanaco for at least two reasons: 1) some of the early wooden Atacama tablets, like all the classic stone tablets of Tiahuanaco, are without handles; 2) the incised designs on some of the Atacama tablets are of classic Tiahuanaco style and correspond to the stone tablets at that site (Bennett in Steward, 1946; Uhle, 1913).

Von Rosen (1924) and Nordenskiöld (1930) believe that some of the tubes found in northern Argentina and northern Chile are the nozzles for enema syringes. A small and beautiful wooden tray described from Puna de Jujuy resembles closely, they say, those employed by the Maué along the Rio Tapajoz for grinding *Parica* snuff; they add that this tray may be related in use to the archaeological tubes commonly found with trays. According to von Rosen and Nordenskiöld, enema syringes may have been utilized for administering intoxicating clysters in Argentina as well as in the Maué region; these authors added that in Argentina there is a botanical species with properties like those of *Parica* and that the plant is taken as snuff, too, like *Parica*.

Various Argentine tubes exhibit the figure of a man seated with a tube in his mouth which looks like a trumpet. Numerous tablets show figures seated with their legs doubled. Many figures are on both knees; they differ from the kneeling figures in adoration on the sculptures of Tiahuanaco but resemble the position assumed by the Maué when approaching one another for reciprocally administering snuff, as described by Martius. The identical posture is assumed by a Yaruro for the same purpose, according to Rivero (Uhle, 1915).

In addition to the archaeological materials and the variety of speculations as to their uses given by the authors cited above, information related to the time of contact for this general region may be worth considering. Ogilby (1671) stated that in the Chilean language *Vilca* meant mother-in-law; *Hilca* meant a one-eyed person. Dobritzhofer (1784) indicated that *Cevil* produced bark for dressing hides, together with certain pods which the Indians, he said, had formerly been in the custom of burning, inhaling the smoke into their mouths, noses, and whole bodies; the practice was said to render the Indians drunk, mad and for some time furious. It is interesting and perhaps should not be overlooked that, not only among the Indians of Chile, as mentioned earlier, but also among those of British Guiana (see

Mura), it was reported that the seeds, or pods, were burned and the smoke inhaled. If this means of administration is not to be interpreted as a mistaken description of snuffing, then it may be necessary to question again whether or not this was also the method sometimes employed by the Taino, in the West Indies, as some of the earliest reports might be thought to suggest (see Taino).

BOTANICAL IDENTITY: Uhle (1915) pointed out that, while the snuff powder used in the Sierra de Córdoba (the region of the Comechingón) and by the Lule (see Vilela) is probably made from a legume, that of the Atacama was made from crushed leaves. However, Dobritzhofer's statement above indicates otherwise for the snuff of this general area. I have identified one specimen of *Anadenanthera colubrina* var. *Cebil* from the extreme eastern section of the Atacama culture region, bordering on the Omaguaca culture region (which see). The species is not known to me from the western side of the Andes; but, if the seeds or leaves were much esteemed, they could have been obtained through the trade routes of northern Chile. It seems possible that the archaeological trays or tablets may have been, at least in some instances, associated with the use of *Anadenanthera* substances. *Anadenanthera colubrina* var. *Cebil* was represented, among specimens examined from near Tiahuanaco, Bolivia, and from further south in that country near the northern border of Chile. Aided by leaflet studies which were carried out in the course of research on the taxonomy of *Anadenanthera* (Altschul, 1964), it might be possible to learn the identity of the snuff powder in the Calama purse mentioned above, if the material is well enough preserved.

COMECHINGÓN CULTURE:

TRIBES: Comechingón, Indama and Savaniron.

LANGUAGE: believed to constitute an independent stock.

I have examined no specimens of *Anadenanthera* from this region, which, like that of the Araucanians, appears to be farther south than the range of these trees. However, Pardal (1937) reported that Rodolfo Deering stated that the Comechingón keep some kind of snuff powder inside a conch shell (*Strophocheilus oblongus* Müller) or *chorrito*, a gasteropod common in the sierras and valleys of Córdoba. Furthermore, Sótelo Narvaez (1915 ed.) described the natives around Córdoba at the time of conquest as having few rites; they did not use *chicha* in the volume that the Peruvians did, but they took through their nostrils *Sebil*, a fruit like *Vilca*, which they pulverized and "drank" through the nose.

The common names used today for *Anadenanthera colubrina* var. *Cebil* in parts of Argentina to the north of the Comechingón culture region are *Cebil*, *Cevil* and variants followed by Spanish epithets (*Descole 34431; Peirano 68243; Venturi 67d, 1027, 2483, 5362, 9720, 9730*).

DIAGUITA CULTURE:

TRIBES: Diaguita nation, of whom the Calchaquí are the best known divisions.

LANGUAGE: an independent stock.

Diaguita information is largely archaeological. A few facts of interest of a non-archaeological nature include a statement by Ambrosetti (1917) that *Vilka* is a family name of Quechua or Calchaquí origin from the Calchaquí valleys of Salta. The most ancient form of worship of the Diaguita tribes, whose religion was similar to that of the Andean peoples further north, was the cult of trees and stones, of which the last was connected with ancestor-worship and survives to some extent today (Joyce, 1912). Although the worship of stones is by no means uncommon among primitive cultures, it may be significant that *vilque* was the Quechua word for the vases of *chicha* poured by the Peruvian Indians over a sacred stone as part of their ancestor worship. Bennett (in Steward, 1946) says that the Diaguita used tobacco and *Pariaca* snuff.

As for the archaeological materials in general, Lothrop (in Steward, 1946) has stated that typical are delicately carved articles of small size, among which are the trays, usually with a handle in human or animal form. Associated with the trays are carved tubes. Means (1931) stated that the archaeology of northwest Argentina makes it clear that the Diaguita culture was akin to that of the Inca.

BOTANICAL IDENTITY: I have examined specimens of *Anadenanthera colubrina* var. *Cebil* from the Diaguita culture area and consider it likely that such materials were used by the Indians living there, particularly in the east. The common names used today for *A. colubrina* var. *Cebil* in Argentina are *Cebil*, *Cevil* and variants thereof (see Comechingón). Ambrosetti (1917) stated that some of the wooden archaeological tablets from Calehaquí are made of *algarroba*, which, as mentioned earlier, is one of the common names sometimes applied to *A. colubrina* var. *Cebil*; it would, in fact, seem reasonable for such objects to be made from the same tree as the snuff associated with them. A study of all the wooden archaeological trays or tablets from Chile and Argentina as to their botanical identity might be illuminating.

HUARPE CULTURE: lake-shore dwellers.

TRIBES: Allentiac and Millcayac.

LANGUAGE: independent Huarpean or Allentiac stock.

NAME: *Cibil*.

REFERS TO: an herb.

MANNER OF ADMINISTRATION: it was kept in the mouth.

PHYSICAL EFFECTS: by "Pact with the Devil, or by natural Vertue" (p. 82), it afford them sustenance for several days; a white foam appears on the lips, a sight which was disagreeable to the author and made him sick.

SOURCES: Ovalle, 1703.

BOTANICAL IDENTITY: I have seen no specimens of *Anadenanthera* from as far south as the centre of the Huarpe culture region. Should they be found in this region, weight would be added to the possibility that *Anadenanthera* materials might be the source of the substance referred to and also to the possibility that they might be the source of several other substances in question: the *Sebil* of the Comechingón just to the northeast; an adulterant of the tobacco mixtures of the Araucanians; as well as an ingredient of whatever was used in the archaeological tablets of southeast Brazil (see Guarani). *Anadenanthera colubrina* var. *Cebil* occurs naturally as far south as 28 degrees latitude, which is at the very northern limit of the Huarpe culture region. Judging from the trees of that variety introduced into Orlando, Florida, at 28 degrees N. latitude, it could be that these trees may be able to subsist at slightly higher latitudes than 28 degrees. It is worth mentioning that Ovalle distinguished between *Cibil* and a tree whose pod was used by the Indians to make bread and which he said was called *Algaroba* in Spain.

OMAGUACA CULTURE:

TRIBES: Ocloya and Omaguaca (Humahuaca).

LANGUAGE: affiliations undetermined.

Among the Puna and Quebrada cultures of northwestern Argentina, Casanova (in Steward, 1946) has referred to the art of carving stone, wood and bone as not being greatly developed; the finest works are tablets and tubes of very hard wood expertly carved with human and animal figures, as well as some skillfully carved stone and wooden idols.

I have examined specimens of *Anadenanthera colubrina* var. *Cebil* from this region, including *Venturi* 5362, 9720, from Jujuy and labelled *Cebil*, followed by Spanish epithets.

CULTURE AREA CHACO

MATACO CULTURE: very little agriculture, mostly fishers.

TRIBES: Mataco (Mataguayo, Nocten).

LANGUAGE: Matacoan stock.

NAME: *Cebil, Cevil, Hatax, Jataj, Sébil.*

REFERS TO: powder snuffed; plant source whose seeds or grains are used in the powder; the drug.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are ground and partly dried, then stored in a jar. Items associated with its use are gourd rattles and bells, red headbands, feathers, red waistcoats, arrows, bird leg bone whistles or flutes.

MANNER OF ADMINISTRATION: the snuff is taken without the aid of instruments, simply by inhaling a pinch of the powder held between the fingers and applied to the nostrils.

PHYSICAL EFFECTS: torpor, light trance or mild state of trance probably accompanied by hallucinations or dreams; also over-excitement.

CULTURAL SIGNIFICANCE: habitually used in ceremonies of medical magic in which prevention of illness is effected by driving away hostile spirits. The Indians of the Chaco believe that when they become intoxicated by a substance from a tree, they are being possessed by the good spirit which inhabits it and brings about growth and fruit maturation. Since little agriculture is practiced, wild fruits are all the more appreciated. In the ceremony of expelling sickness, the Indians don red headbands with feathers, necklaces and red waistcoats and line up behind a row of arrows stuck in the ground. They begin a counter-offensive with songs accompanied by rattles and whistles or flutes. At intervals, the snuff is taken so that the soul may become a bird and fly to heaven to challenge the hostile spirits. This metamorphosis is facilitated by the blowing of the bird (*yulo*) whistles. Then everyone threatens the invisible enemies with rattles and feathers and marches against them, kicking the earth, picking up handfuls of soil and throwing it in front of them. Souls of dead shamans, as well, are invited to participate in this ceremony by the pouring of powder on the ground for them.

The Mataco obtain *Jataj* from tribes in the east of the province of Salta by sending youths to obtain it. The seeds may be obtained also from farther north than where the Mataco are and evidently at a high price in trade, as it is scarce; a burro may be exchanged for a small amount of *Cevil*.

USED BY: an old chief may grind the seeds the day before the ceremony, in which both sexes partake but in which, apparently, only shamans inhale the snuff powder.

SOURCES: Dijour, 1933; Karsten, 1926; Métraux in Steward, 1946; Métraux, 1939; Métraux, no date; Pardal, 1937.

BOTANICAL IDENTITY: I have examined specimens of *Anadenanthera colubrina* var. *Cebil* from this region and concur with Métraux (no date) in attributing to this species the snuff which the Mataco use. Specimens from northern Argentina are labelled *Cebil, Cevil* (see Comechingón).

WILELA CULTURE:

TRIBES: Atalala, Chunupe, Lule, Ocole, Omoampa (Umuampa), Pasain, Vacaa, Yecoanita, Yooc and several lesser ones.

LANGUAGE: Lule-Vilelan stock, presumably independent.

NAME: *Cebil*, *Hatax*, *Sébil*, *Sevil*.

REFERS TO: the tree source.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are pulverized; items associated with use are a bird leg bone whistle and, sometimes at least, a small tube through which the powder is taken.

MANNER OF ADMINISTRATION: the snuff powder is administered by means of a little tube or pipe and perhaps also as the Mataco take it, without an instrument.

PHYSICAL EFFECTS: mild state of trance or over-excitement, probably with some hallucinations or dreams; deprivation of judgement, jumping about, shouting and singing inharmoniously.

CULTURAL SIGNIFICANCE: medicinal magic and to induce rain for crops. The shamans search for the patient's soul, which they bring back by sending, through the use of snuff, their own souls in the form of birds to heaven. The elders take snuff through a tube in order to achieve a state in which they can call rain for the crops.

USED BY: shamans and elders.

SOURCES: Lozano, 1733; Métraux in Steward, 1946; Métraux, no date; Pardal, 1937.

BOTANICAL IDENTITY: I have examined material of *Anadenanthera colubrina* var. *Cebil* from this culture region; as mentioned under the Mataco culture, specimens of *Anadenanthera* from northern Argentina bear the common names of *Cebil*, *Cevil*, which suggest that the snuff of the Vilela is made from these trees (see Comechingón).

CULTURE AREA EASTERN LOWLAND

GUARANÍ CULTURE:

TRIBES: the group embraces the Guaraní (Caingua, Carijo) nation, among whose most important ancient and modern divisions are the Apapocuva, Arechane, Carima, Cayua, Cheiru, Chiripa, Guarambare, Guayana, Itatin, Ivapare, Moya, Oguauiva, Pan, Taioba, Tanygua, Tape, Taruma and Tobatin.

LANGUAGE: related languages of the Tupí-Guarani stock.

NAME: *Kurupá*.

REFERS TO: powder from a tree called *Kurupayara*.

METHOD OF PREPARATION AND ITEMS ASSOCIATED WITH USE: the seeds are semi-dried and pulverized.

PHYSICAL EFFECTS: stupefying, hallucinogenic.

CULTURAL SIGNIFICANCE: medical witchcraft.

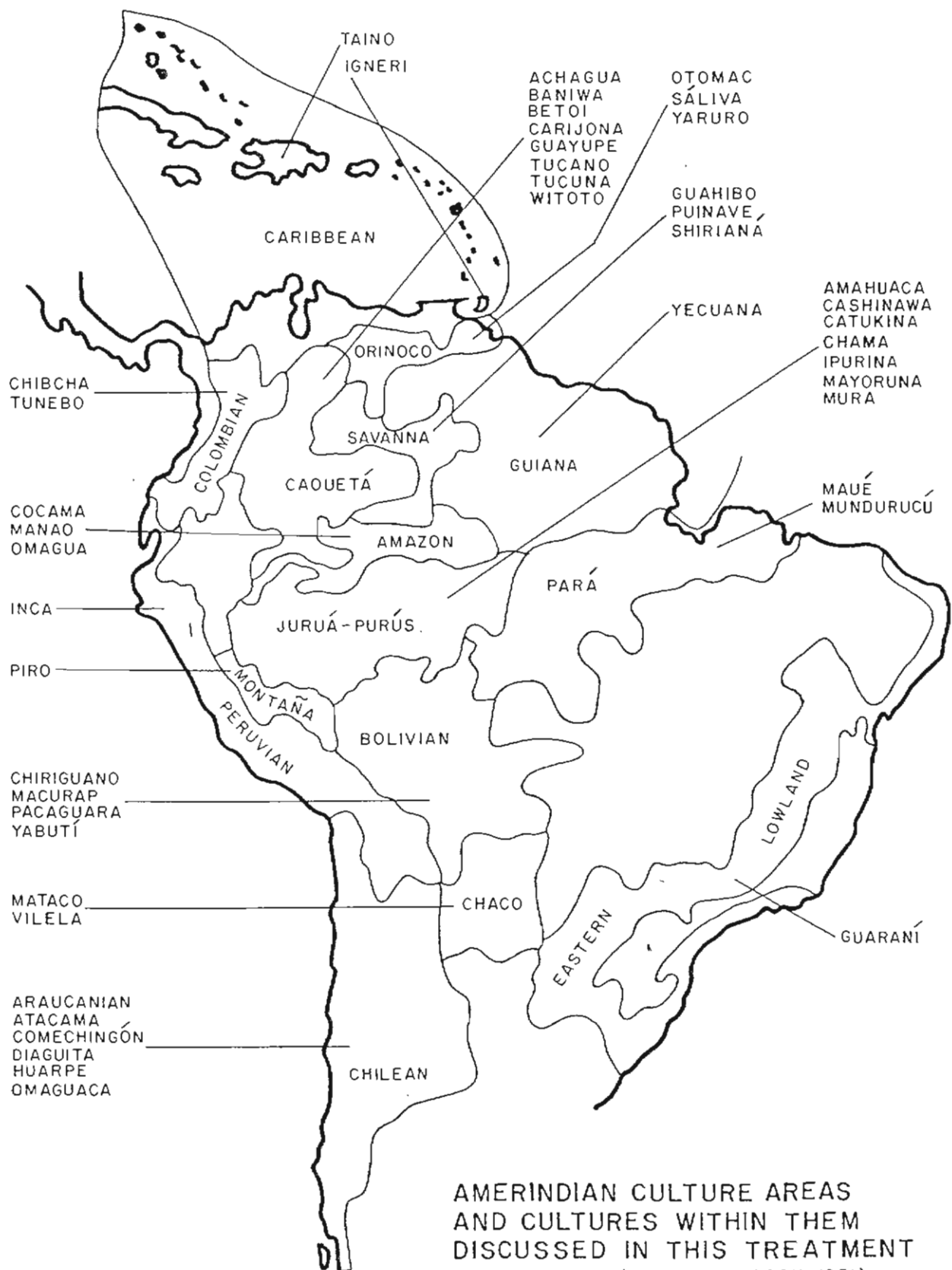
USED BY: shamans.

SOURCES: Fiebrig, 1932; Pardal, 1937.

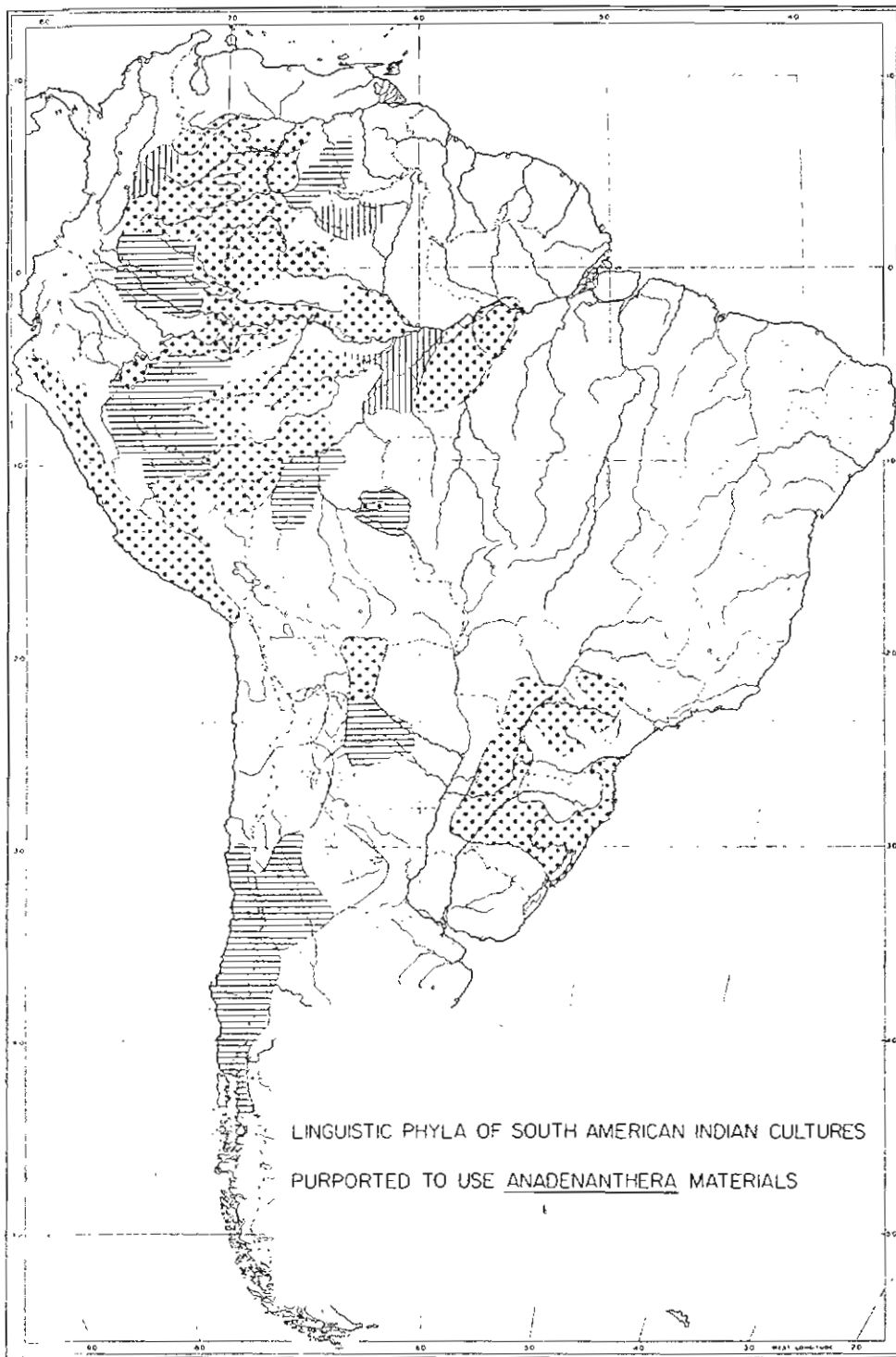
BOTANICAL IDENTITY: representatives of *Anadenanthera* are relatively numerous for this region, including material of *A. colubrina* var. *Cebil*, *A. colubrina* var. *colubrina* and *A. peregrina* var. *falcata*. Pardal (1937) suggested that *Anadenanthera* is used in this region for making snuff; and the common names of Indian origin which appear on specimens of *A. colubrina* var. *Cebil* are nearly identical with the names given by Pardal: *Curubuy*, *Curupai*, *Curupá*, *Curupay*, *Curupáy* (*Balansa 1419*; *Lindman A. 2057*; *Malme 1096*; all from Paraguay). Fiebrig has given *Kurupá* as the name for *A. colubrina* var. *Cebil* in Guaraní botanical nomenclature; the collection *Lindman A. 2057* indicates that the same is true of *Curupai* or *Curupay*. This need not mean that only *Anadenanthera* materials are used by the Guaraní for their intoxicating powder but that at least one source is almost certainly *Anadenanthera*.

Serrano (1941) described from the south of Brazil an archaeological culture notable for its careful and abundant stone work and characterized by stone tablets that are wholly zoo- or anthropomorphic (these tablets are unlike those of the Maué or the ancient Atacama or Diaguita, in which only the handle was so treated, the body being geometric). There are two main kinds of tablets or vessels from this Brazilian culture; both are found throughout the states of Santa Catharina, Rio Grande do Sul and the southern coast of São Paulo, parts of which today lie within the Guaraní culture region. The predominant artifact is tabuliform and similar to types which have turned up occasionally in Chile and in the provinces of Córdoba, San Juan and San Luis in Argentina. These provinces are south of the known distribution of *Anadenanthera* and overlap the southern borders of the Comechingón and Diaguita culture regions. One of the tabuliform artifacts turned up in Cuzco. A kind of transitional tablet appears to lead from the type just referred to to the second form, which is better described as a mortar, as it has a deep concavity; the mortar is made usually to represent a bird. Similar vessels have appeared in Catamarca (Cultura de los Barreales), Argentina; in Panamá; a few in the Antilles; and some questionable ones in Amazonas, Ecuador and Uruguay.

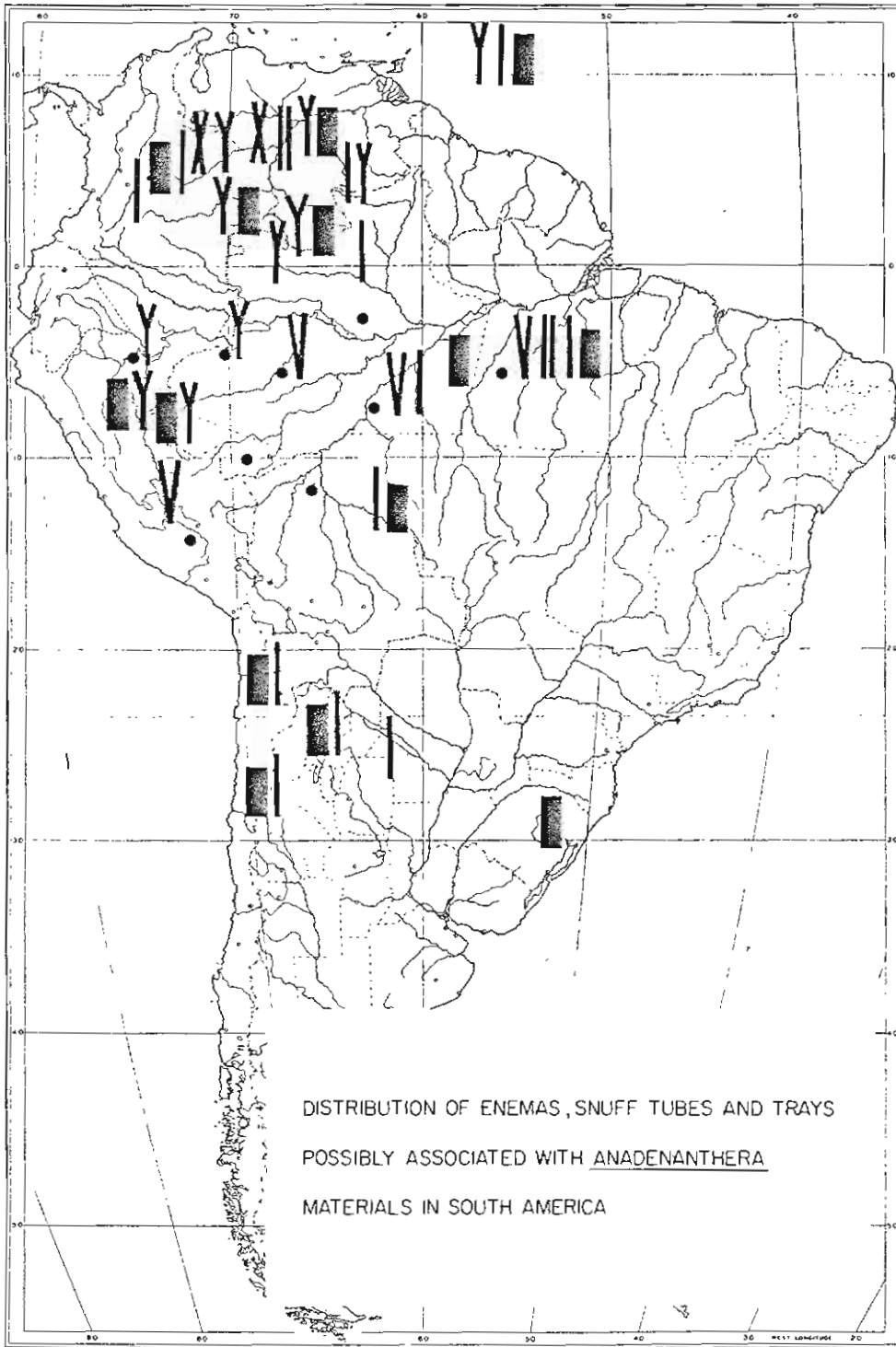
The existence in an Atlantic sector of South America of a stone culture as well defined as this and apparently isolated from the Pacific poses serious problems for the archaeologist and historian (Serrano, 1941) and a challenge to further researches in ethnobotany.



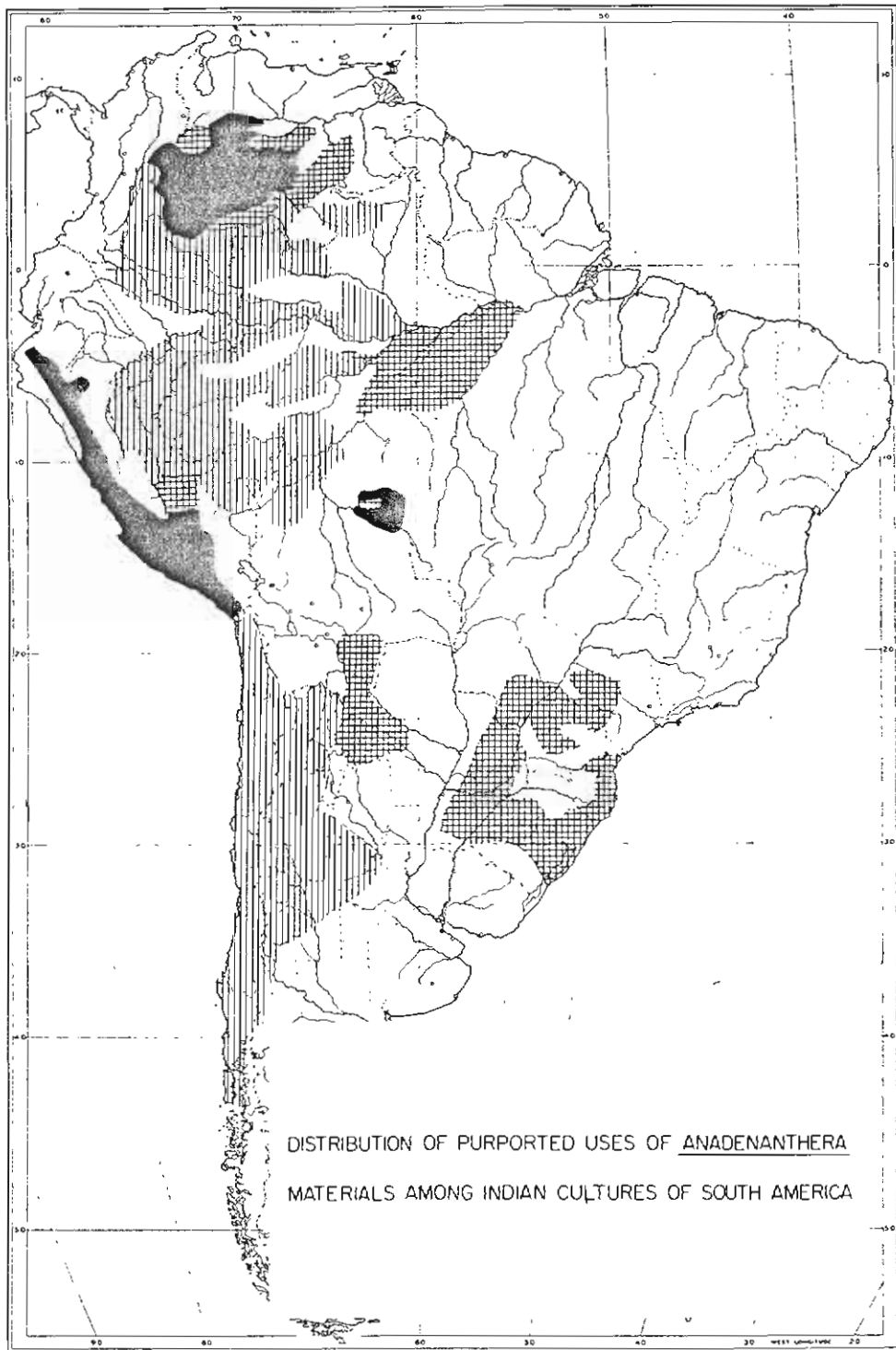
AMERINDIAN CULTURE AREAS
AND CULTURES WITHIN THEM
DISCUSSED IN THIS TREATMENT
(AFTER MURDOCK, 1951)



The dotted areas indicate Andean-Equatorial languages (Achagua, Baniwa, Betoí, Catukina, Chiriguano, Cocama, Guahibo, Guaraní, Guayupe, Igneri [and Taino], Inca, Ipurina, Macurap, Manao, Maué, Mundurucú, Omagua, Otomac, Piro, Puinave, Sáliva, Tucano, Tucuna, Yaruro); the horizontally lined areas indicate Ge-Pano-Carib languages (Amahuaca, Avaucanians, Cashinawa, Carijona, Chama, Huarpe, Mataco, Mayoruna, Pacaguara, Witoto, Yabutí, Yecuana); the vertically lined areas indicate Macro-Chibchan languages (Chibcha, Mura, Shirianá, Tunebo). The independent or unclassified stocks of the Atacama, Comchingón, Diaguita and Omaguaca are not represented. Classification after Greenberg & McQuown, 1960. See Steward & Faron, 1959.



Enemas are represented by solid dots; snuff tubes are represented by the I, II, V and Y symbols, indicating the form of the instrument; trays are represented by solid rectangles. The symbols are placed in the regions of the cultures employing the items or traits they represent. Archaeological materials are not distinguished from others.



The solid areas indicate uses confirmed (Achagua, Guahibo, Inca, Sáliva, Tunebo, Yabuti); the cross-hatched areas indicate uses reputed and probable (Betoj, Chiriguano, Guaraní, Igneri, Macurap, Mataco, Maué, Mundurucú, Mura, Otomac, Piro, Puinave, Vilela, Yaruro, Yecuana); the vertically lined areas indicate uses possible, though unlikely, or not well supported by evidence (all other cultures discussed in this paper).

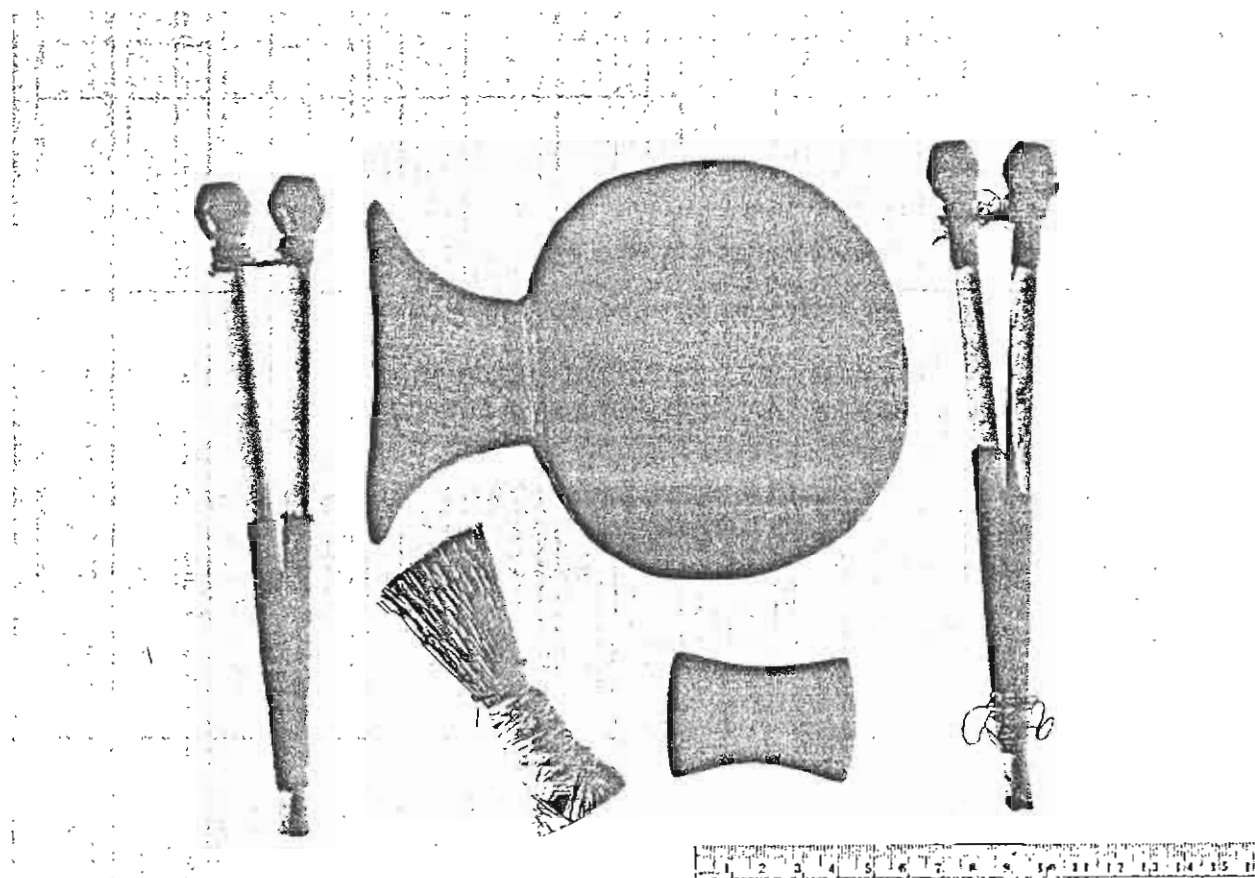
CROSS-CULTURAL CHART

SUMMARY OF DATA FROM PRECEDING CULTURE OUTLINES

Tubes are represented by I, II, V, Y, and X, indicating their general form; trays are represented by T.

CULTURE	NAME	FORM/USE	ITEMS	EFFECT	PURPOSE	USERS	MISC.
Taino	Cohoba	snuff	wood I Y T	halluc., intox.	divin.	caciques	
Igneri	Yopa	powder					related to Taino
Chibcha	Yopa	snuff	bone I	nasal dischg.	divin.		most adv. cult. in abor. Colombia
Tunebo	Yopo	snuff	bone I T	stim., narc.	hygien.		use probably recent
Achagua	Niopa, Yopo	snuff	birdbone X Y	violently intox.	divin.	shamans, 1-2 men	
Baniwa	Nopo, Yopo	snuff	birdbone Y	halluc.	magic, med.	only shamans	Virola?
Betoi	Yopo	powder			magic	shamans	
Carijona	Niopo	white snuff		stern., laxat.	relig.	men	
Guayupe	Yopa			halluc., intox.	divin., cerem.	people	
Tucano	Parica	snuff					Virola?
Ticuna	Parica						Virola?
Witoto		wh. powder					
Otomac	Curupa, Yopo	snuff	birdbone Y T	intox.	war, divin.	shamans, men	river but agric., trade with Omagua
Saliva	Curupa, Yopo	snuff	birdbone Y T	intox.	divin.	shamans, men	river but agric.
Yaruro	Curuba, Yopo	snuff	bone II	nasal dischg.	war, divin.	shamans, men	river, hunting and fishing
Guahibo	Yopo (Curupa, Parica)	snuff	birdbone Y T	stern., narc., intox.	war, divin.	shamans, men	hunting and gathering
Puinave	Noopa	snuff	birdbone		magic		agric. where influ. by Arawak
Shiriana	Yopo	snuff	bamboo, reed I	intox.	divin., cerem., vice	shamans, 2 men	forest nomads
Yecuana	Acuja, Hakudufha	snuff	birdbone, reed I Y	stim.	divin. med.	shamans, 1-2	forest settlements
Cocama	Curupa	snuff, enema	Y	therap.	therap.		large rivers
Manao	Parica	snuff, enema					
Omagua	Curupa (Yopo Parica)	snuff, enema	cane, reed Y	violent, halluc.	divin., cerem.	only men?	river agric.
Inca	Vilca	beverage, cnema		intox., purge	divin., hygien.	shamans, people	
Piro		snuff	birdbone V	stim. sight	hunting	dog, 1-2 hunters	

Amachuaca	Yopo	powder	birdbone Y T				
Cashinawa	Yopo	powder					
Catukina	Parica	snuff, enema	V	stim. sight, intox., purge	hunting	shamans, men	
Chama	Yopo	powder	birdbone Y T		magic		
Ipurina	Parica	snuff, enema		narc.	divin., cerem., vice		fishing, some agric.
Mayoruna	Yopo	powder					
Mura	Parica	snuff, enema	various I V	violently intox.	cerem.	men	rivers
Mauc	Parica	snuff, enema	various I II V T	intox.	cerem., now vice	men, people	
Mundurucu	Parica	snuff	T				
Chiriguano	Kurupai	balm		disinf., sooth.	cure		
Macurap		powder	tube, table I	trance	cerem., magic	shamans, men	
Pacaguara	Parica	enema	bone	trance, excit.			
Yabuti	Aimpa	snuff			cerem.		
Araucanian		leaves					
Atacama	Cevil	burning pods inhaled		intox.			
			arch.: bone, wood & cane tubes; wood T				
Comechingon	Cebil	powder is 'drunk'					
Diaguaita	Pariaca	snuff					
			arch.: tubes; wood T				
Huarpe	Cibil	oral		sustenance			lake shores
Omaguaca			arch.: wood tubes, wood T				
Mataco	Cebil, Hatax	snuff	fingers	trance, halluc.	cerem., magic	shamans	fishing, little agric.
Vilela	Cebil, Hatax	snuff	tube	trance	magic, med.	shamans, men	
Guarani	Curupa	powder		halluc., stupefact.	magic, med.	shamans	



Snuffing tubes of bird bones, tray, and mortar and pestle for grinding roasted seeds of *Anadenanthera peregrina* and for mixing lime to prepare *yopo* snuff. Guayabero Indians, Rio Orinoco, Venezuela.
Courtesy: Botanical Museum of Harvard University.

PHYTOCHEMICAL AND PHARMACOLOGICAL REVIEW

A brief review of the chemical constituents of the species of *Anadenanthera* and the pharmacology of the active principles is here offered as an adjunct to the foregoing ethnobotanical observations. This is followed by a review of reputed medicinal uses of the same species based on sources in the taxonomic and ethnobotanical literature. The information set forth here comprises data not easily included in the culture outline system employed throughout this book and, consequently, is here given in a kind of addendum.

As pointed out elsewhere, there are chemical as well as morphological reasons for recognizing *Anadenanthera* as a genus distinct from *Piptadenia*. In the species employed as the sources of hallucinogenic snuffs, some of the same tryptamine derivatives and β -carbolines have been found as in *Virola*, the myristicaceous genus also utilized in the preparation of narcotic snuffs in South America.

The chemistry of *Anadenanthera* has been summarized in Holmstedt & Lindgren, 1967; Agurell, Holmstedt, Lindgren & Schultes, 1968; and Schultes & Hofmann, in press.

In 1954, the isolation of 5-methoxy-N,N-dimethyltryptamine was reported by Stromberg from seeds of *Anadenanthera peregrina*. The same plant material and *A. colubrina* var. *Cebil* yielded N,N-dimethyltryptamine, 5-hydroxy-N,N-dimethyltryptamine, dimethyltryptamine-N-oxide and 5-hydroxy-N,N-dimethyltryptamine-N-oxide. The bark of *A. peregrina* was found to contain N-monomethyltryptamine, 5-methoxy-N,N-dimethyltryptamine and 5-methoxy-N-monomethyltryptamine.

The bark of *Anadenanthera peregrina* contains high concentrations of 5-methoxy-N,N-dimethyltryptamine, and the leaves contain almost equal parts of this compound and N,N-dimethyltryptamine. Two new β -carbolines were found in *A. peregrina*: 2-methyl-6-methoxy-1,2,3,4-tetrahydro- β -carboline and 1,2-dimethyl-6-methoxy-1,2,3,4-tetrahydro- β -carboline.

The seeds of *Anadenanthera colubrina* var. *Cebil* contain, in addition to the constituents found in those of *A. peregrina*, a 5-hydroxy indole base of unknown structure. When the same compounds are found in both species, they occur in similar concentrations (Altschul, 1964; Fish, Johnson & Horning, 1955; Horning in a letter, October 2, 1955).

The importance of the pharmacology of *Anadenanthera* is evident from Marazzi's simplified account (1957) of the so-called 'messengers' of the nervous system; the communications of the human body are mediated by chemicals as well as by nerve impulses. In vertebrates, synaptic transmission is controlled largely by two chemicals, adrenaline and acetylcholine. Acetylcholine incites transmission; adrenaline inhibits it. Among the substances chemically akin to adrenaline, which act in the same way but in varying degrees, are bufotenine and related plant-derived compounds; included in this group are lysergic acid (LSD-25) and the neurohormone serotonin, which is normally found in human beings. Interference with serotonin may disrupt normal brain operation. Restriction of communication in the brain, diminishing the normal control by the higher centres, may 'produce mental disease'.

Workers in this field have discovered what are believed to be a few of the physiological concomitants of 'schizophrenia'. The psychotomimetic drugs (mescaline, cannabinal, harmine, bufotenine, psilocybin, LSD-25, etc.) produce an imitation of psychotic behavior in otherwise normal subjects (Hofmann, 1959). By studying the effects of these drugs and by learning more about the physiological characteristics of psychoses as they occur naturally in psychotic persons, researchers hope eventually to understand the nature of psychic disorders.

The causes for the inception of psychic disorders in the individual must be many, varied, involving to a greater degree than once was suspected the interrelationship of hereditary constitution and environment. Whatever the predominant factors in the initial causes of such disorders, it might be said in a simplified way that at one end of a range of disturbances are those termed psychological: they may involve slight physiological mis-patterning, remediable by a re-orientation of emotional processes through psychoanalytical techniques. At the other end of the range might be those disturbances not responsive to a thought-process approach: they may involve physiological

departures (from normal) of a more extensive, more complex or even of another kind than the milder disturbances first referred to. It is in this last realm that the psychotomimetic drugs producing "model psychoses" appear to act. As Hofmann (1959) pointed out, understanding the chemical basis of psychic functions is still far from a realization. One importance of *Anadenanthera* to this work lies in its possessing a number of closely related compounds of this type.

From 1943, when Hofmann (1959) discovered LSD-25, to 1961, over five hundred publications appeared on the subject of LSD alone. I have here included only a few references which seemed of greatest interest relative to *Anadenanthera*. In a volume devoted to 5-hydroxytryptamine, an indolealkylamine closely related to bufotenine, Lewis (1958) stated that relatively little was known about bufotenine. Bumpus & Page (1955) noted that bufotenine, which occurs widely in plants, is a normal constituent of toad skin and that it appears in the urine of healthy humans. These investigators emphasized the wide distribution of indole derivatives in living systems. A year earlier, in 1954, Erspamer stated that bufotenine is found in the mushroom *Amanita mappa*. Hofmann indicated in 1959, however, that the amount of bufotenine found in at least *Amanita muscaria* was inadequate to account for the psychotomimetic properties associated with that species. Erspamer (1954) also reported that another indolealkylamine, enteramine, is found as a secretion of the enterochromaffin cell system of various animals. With respect to the last information, could it be that the enemas used by the Catukina, Cocama, Inca, Ipurina, Manao, Maué, Mundurucú, Mura, Omagua or Pacaguara, some of which probably include *Anadenanthera* materials, might act upon the human being as would an excessive secretion of enteramine? Marazzi & Hart (1955) have compared the similarities of some of the psychotomimetics with cerebral neurohumors. Evarts, Landau, Freygang & Marshall (1955) described some effects of LSD-25 and bufotenine on the electrical activity in the cat's visual system, showing that the drugs produced similar reactions.

A study by Evarts (1956) indicated that the reactions of monkeys to LSD-25 and to bufotenine, injected intravenously, also were similar; they both were characterized by a sensory disorder in the absence of a clear defect in muscular power but accompanied by a marked degree of tameness. In the first twenty minutes after drug administration, the monkeys assumed a prone position which they insisted upon maintaining, showing muscular vigor, despite attempts to place them in other positions. Later, they assumed sitting postures and began to move about ataxically, in circles. About an hour after injection, motor coordination had nearly returned; ten minutes later, reaction to painful stimuli returned, followed by visual reactions, while unusual tameness persisted. One and a half hours after injection, the monkeys were normal. Evarts suggested that the disturbance of locomotion and the prone posture might be looked upon as sensory in origin; transmission of sensory impulses appeared to have been altered. Hofmann (1959), however, said that, under the influence of LSD-25 at least, he felt an irresistible *urge* to lie down. Robert F. Raffaaf stated (in a letter, December 2, 1955) that dogs injected with bufotenine had presented what was described as a 'scared to death' syndrome. A letter from Alvares Pereira (April 10, 1958) mentioned that bufotenine iodide possesses curarimetic action, as evidenced in a rat phrenic nerve-diaphragm preparation and by injections administered to chicks (see Alvares Pereira, Marins & Moussatché, 1958; Moussatché, Alvares Pereira & Marins, 1958).

Raffaaf further stated that Fabing had reported in conversation that Evarts had given bufotenine to a human volunteer who suffered an alarming vascular collapse. Fabing & Hawkins (1958) reported, nevertheless, that intravenous injection of bufotenine in healthy young human males is feasible in doses as high as 16 mg.; that the drug is hallucinogenic; that there is a linear progression in symptoms as the dose increases; and that its effects are reminiscent of LSD-25 and mescaline but develop and disappear more rapidly. Nystagmus and mydriasis are exhibited, but there is little cardiovascular effect. Fabing & Hawkins added to their report that the faces of their subjects turned purplish; the authors suggested that this might be due to a serotonin-like bronchiolar constriction and consequent anoxemia. They indicated that the possible role of anoxemia in the production of the hallucinogenic effects of bufotenine requires clarification. Perhaps the death from suffocation described for Maué and Mura snuff-taking (of *Anadenanthera*?) might involve more than choking on the large amount of powder. One could also ask whether anoxemia might be involved as a cause of the unconsciousness following inhalation of tobacco-leaf smoke which Oviedo y Valdés (1851 ed.) described among the Taino (which see). Furthermore, what is the relationship, if any, between a possible curarimetic action of bufotenine, and anoxemia? St. Szara (1956) reported

that DMT produces in man visual hallucinations, illusions, distortion of spatial perception and body image, disturbances of thought and speech, and euphoria, as well as elevation of blood pressure. Unlike other model psychoses, he said, the symptoms of DMT appear three to five minutes after injection and pass away within an hour. The lack of unchanged DMT in the urine suggests a rapid breakdown process.

Granier-Doyeux (1956) described a study conducted with *Ñopo* powder (unanalyzed, but assumed to have been made from seeds of *Anadenanthera peregrina* var. *peregrina*). The powder had been obtained from Guahibo Indians, and its action on mice and rats was described as two-phased: 1) stimulation, with exultation and hallucinations which were dependent partly on the personality of the subject (compare Otomac with Guahibo); 2) a hypnotic state, with a kind of intoxication characterized by loss of reasoning faculties, followed by a loss of consciousness.

Albino mice responded to the snuff with excitement a few minutes after administration; they rubbed their snouts with their front legs, appearing to sense irritation in the respiratory mucosa. They ran around the cage and bit the gratings, although the author says that in neither of the experiments did the animals become hostilely aggressive. At five to six minutes after administration, respiration was rapid and uneven. At eight minutes, nasal itching appeared to be very intense. At nine to ten minutes, the animals suffered disturbances in walking, acting as though they were 'drunk', dragging their abdomens on the floor of the cage, opening and closing their eyelids until finally the upper lids closed. At this point, according to Granier-Doyeux, the animals exhibited all the symptoms of alcoholic intoxication. At about twenty minutes after administration, convulsive movements appeared, and the mice arose on their hind legs, shaking their bodies, as though suffering from spasmodic hiccoughs with diaphragmatic contractions (as Alvarez Pereira suggested above), and shaking their heads. About forty minutes after administration, these symptoms all disappeared, and only the 'drunkenness' remained. At sixty minutes, the animals were normal and tended to sleep.

The albino rats reacted to *Ñopo* snuff nearly as did the albino mice. The arrhythmic breathing may have been accentuated; it was, at least, more clearly visible. In addition to exhibiting the 'drunkenness' of the mice, the rats scratched their whole bodies, as though seized with generalized itch. At nine to ten minutes, they suffered contortions which made them adopt varied positions, and they did not respond to external stimuli. At fifteen minutes after administration they were totally stupefied and passed into a semi-lethargic state for about an hour.

Turner & Merlis (1959), using actual plant parts in their experiment, indicated, surprisingly, that they were unable to produce intoxication in human subjects by maximally tolerated doses prepared in a variety of ways duplicating Indian methods. Both normal and schizophrenic subjects were used. The snuff was made from seeds of *Anadenanthera peregrina* procured in Puerto Rico, dried, pulverized and mixed with a little lactose. A second sample, labelled *Yopo*, was in the form of a dark brown mass, which the experimenters pulverized for use. This sample supposedly came originally from Peru (!), sold by a *curandero*. A third sample was obtained from Zerries, who procured it from Indians at the headwaters of the Orinoco River. Turner & Merlis stated that they were convinced the Indians were able to tolerate 10 gm. of the snuff. This amount contains about 50 mg. of bufotenine and up to 10 mg. of dimethyltryptamine. The production of intoxication would require that at least 50% of the former and all of the latter be taken into the blood stream within a three- to five-minute period. Amines are inhaled with a large amount of 'inert' carrier. Even the pure compound administered nasally is ineffective. Hence, the authors decided that they had to reject bufotenine and dimethyltryptamine as capable of producing the acute phase of intoxication from *Anadenanthera* snuff. Bufotenine given intravenously in doses up to 20 mg. to schizophrenic subjects did not produce hallucinations, only profound electro-encephalogram changes, loss of consciousness and intense peripheral action of serotonin character. Dimethyltryptamine produced less intense physiological activity, but, when over 20 mg. were given intravenously or intramuscularly, preconscious ideations appeared.

Hofmann (1959) and Schultes & Hofmann (in press) state that true hallucinations do not always occur with psychotomimetic drugs; that, if they are present, it is usually with higher doses and dependent upon the individual and environment. This is, in fact, why Hofmann suggested the term *psychotomimetic* as preferable to *hallucinogen*. As one who experienced the effects of the synthetic, LSD-25, he describes the effects of psychotomimetic drugs as producing "... profound and acute changes in the sphere of experience, in the perception of reality, changes even

of space and time and in consciousness of self. Phenomena of depersonalization may also occur. Retaining full consciousness, the subject experiences of kind of dream-world, which in many respects seems to be more real than the customary normal world. Objects and colors, which generally become more brilliant, lose their symbolic character, they stand detached and assume an increased significance, having, as it were, their own more intense existence" (p. 241). This description brings to mind the employment by the Piro, Catukina and Inca of various powders for the purpose of clearing their vision and rendering them more alert. Could these be the effects of psychotomimetic drugs taken in small quantity?

To continue, Turner & Merlis stated that the effects of neither of the amines bufotenine and dimethyltryptamine are long-lasting enough to suggest their participation in acute intoxication from *Anadenanthera* snuff. When administered by injection, both compounds acted very rapidly in onset and very briefly in duration. The authors suggested that there might be constituents other than *Anadenanthera* materials in the snuffs used by the Indians which could be responsible for the reputed effects. Finally, they said that the freshness of the material also might influence its potency. The work of Turner & Merlis introduces unexpected questions in the reasoning which has generally been held, however tentatively, with regard to the chemicals responsible for the putative hallucinogenic effects of *Anadenanthera*. It might be worthwhile to check, as well, into the reports of the inhalation of burning substances of *Anadenanthera*, as suggested by the information under Atacama.

Some possibly thought-provoking applications of *Anadenanthera*, not included in the culture outlines, are the following: The gum of *Anadenanthera* is used in medicines (Allemão, 1867). It exudes from the bark, like gum-arabic, and has the same properties (Le Cointe, 1945; Rebouças & Eugenheiros, 1877). The gum and bark are used as a tonic, a pectoral and an anti-gonorrhoea agent (Soares de Cunha, 1941). In general, the bark is astringent and bitter and is used therapeutically (Rebouças & Eugenheiros, 1877).

The gum of *Anadenanthera peregrina* var. *peregrina* looks like gum-arabic and is a powerful counteractant to chills, bronchitis, pneumonia and bronchial-pulmonary infections in general (Le Cointe, 1947; Meira Penna, 1946); it is also hemostatic (Meira Penna, 1946). The bark, which is astringent, is used for dysentery, uterine hemorrhages and gonorrhoea (Le Cointe, 1947; Szyzlo, 1955). It is administered as an infusion for gonorrhoea (Le Cointe, 1947). A decoction of the leaflets is used to relieve dysentery; the root is aromatic and the source of a pectoral (Meira Penna, 1946).

Anadenanthera peregrina var. *falcata* is said to counteract pulmonary infections (Meira Penna, 1946). The pulverized bark has styptic properties and therefore is used for washing the female genitals, as well as for inhibiting hemoptysis (Hoehne, 1939).

Anadenanthera colubrina var. *Cebil* is employed as an abortifacient; it impedes the development of the egg in hens and causes it to be expelled before termination (Schickendantz in Hieronymus, 1882). The leaflets, which fall in the winter and dry in the sun, make good fodder, especially for cattle (Hieronymus, 1882).

The gum of *Anadenanthera colubrina* var. *colubrina* is used as gum-arabic; it is employed as an analeptic and is taken orally for general respiratory troubles (Almeida Pinto, 1873; Barbosa Rodrigues, 1894). As a pectoral, it is said to be very good for coughs (Barbosa Rodrigues, 1881). Both the gum and the bark are employed in pharmaceuticals for pulmonary and bronchial infections (Meira Penna, 1946). The bark is bitter and astringent, for bathing ulcers, etc. (Barbosa Rodrigues, 1894; Almeida Pinto, 1873). It is used also as a bath against leucorrhoea and for swellings of the legs (Almeida Pinto, 1873). A tincture of the leaves is said to be a good remedy for contusions, cuts and brain disturbances or shocks (Almeida Pinto, 1873). Finally, the seeds of this variety, dried in the sun, and ground, are taken as snuff to cure constipation, upsets, chronic gripe and headaches consequent to chills (Hoehne, 1939).

Since these reports are from the literature, there may occasionally be a question as to the exact species or variety, but they undoubtedly all refer to genus *Anadenanthera*. The fact that the common uses attributed here to this genus do not include any indication of psychotomimetic qualities suggests that if, in fact, such qualities are attributable to it under some conditions, they may, as Turner & Merlis say, be related to the freshness of the material or to the

presence of adulterants, with which *Anadenanthera* constituents may interact. Numerous plants could be involved, as is indicated under the discussions of individual cultures: for instance, the Mura refer to more than one legume as *Paricá*. Relatively recently, N,N-dimethyltryptamine was identified as the important alkaloid in *Mimosa hostilis* Benth., used by the Pancararú Indians of Pernambuco for an intoxicating beverage called *Jurema* and associated with magico-religious ceremonies (Pachter, Zacharias & Ribeiro, 1959; Schultes, 1970). One also might wonder what compounds are found in *Cecropia* spp., a moraceous genus whose leaves are used as a fine ash mixed in *coca* powder that is packed and held in the mouths of some Amazon Indians (Schultes, in conversation). The use of lime, so often reportedly used with snuffs, is assumed to release the *coca* constituents producing the desired physiological effects.

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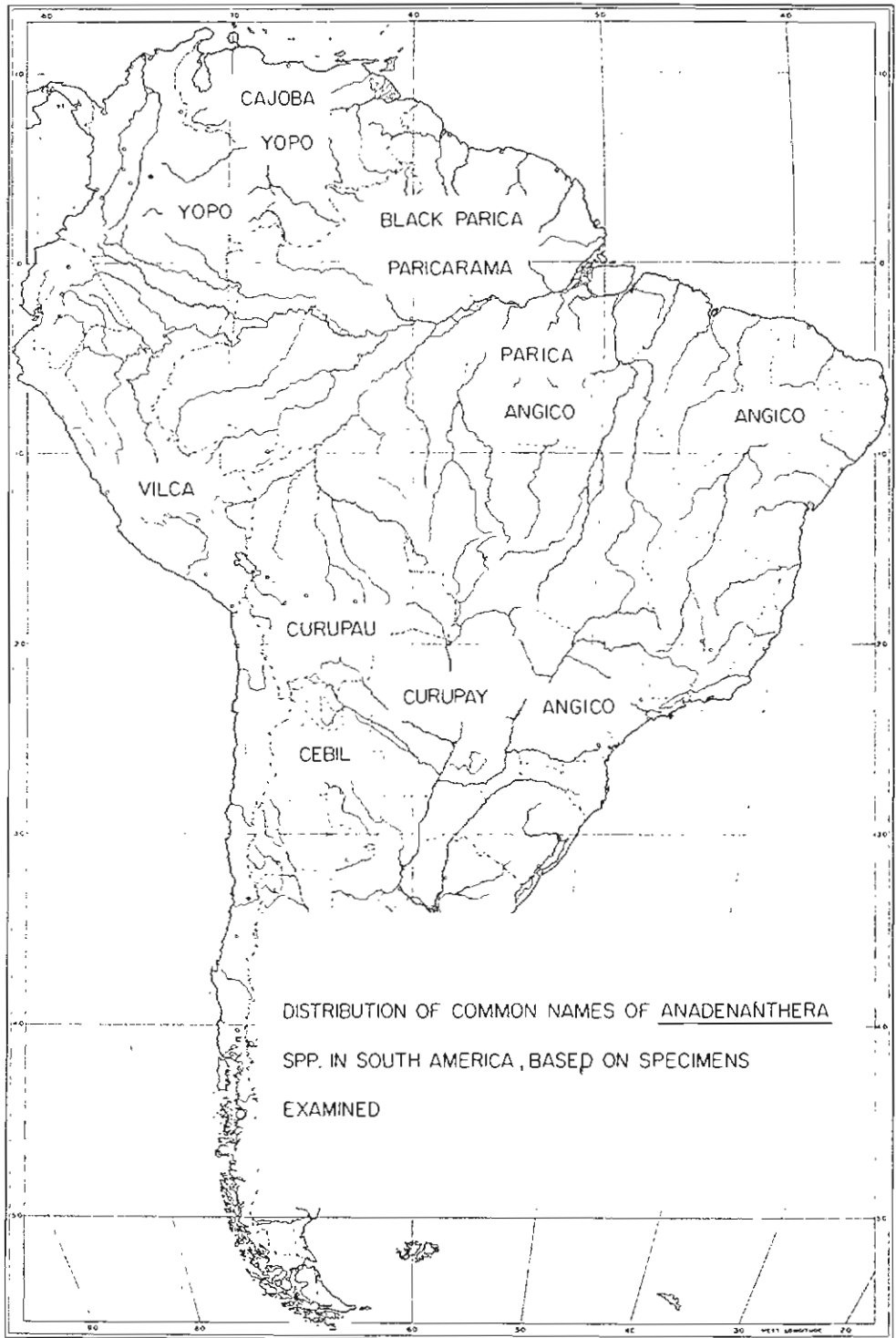
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COMMON NAMES OF ANADENANTHERA SPP.

The following common names have been attributed to the species of *Anadenanthera* in taxonomic and ethnobotanical sources and in notations on herbarium specimens examined in the course of study. These names are given in addition to those found under the individual culture areas in this paper.

NAMES FROM ALL SOURCES

Aculpa, Acuja, Aimpä, Algaroba, Algarrobo, Angicá, Angical, Angico, Angico branco, Angico de brejo, Angico do campo, Angico do cerrado, Angico rosa, Angico verdadeiro, Angico vermelhão, Angico vermelho, Angicos, Anjico branco, Arapiraka.

Barbatimão do Paraná, Bastard Tamarind, Bilca, Black Paricá, Bohoba, Bois de tendre à Caillou, Bois ecorce, Bois galle, Bois l'écorce, Bois rouge.

Cabuim, Cahoba, Cajoba, Cambuí ferro, Cambuí, Cambuy, Cambuy ferro, Cambuy vermelho, Candelon, Caoba, Caobo, Carica, Cebil, Cebil blanco, Cebil colorado, Cebil moro, Cebil negro, Cebil rouge, Cehobba, Cehobbâ, Cevil, Cevil blanco, Cevil colorado, Chóhobba, Cibil, Coboba, Cogiabo, Cogiba, Cogioba, Cohaba, Cohiba, Cohibba, Cohoba, Cohóbana, Cohobba, Cohobbâ, Cohot, Cojiba, Cojoba, Cojobana, Cojóbana, Cojobilla, Cojobillo, Cojobo, Cooba, Coxoba, Coyoba, Cozobba, Cunepá, Curupa, Curuba, Curúba, Curùba, Curubuy, Curupa, Curupá, Curupai, Curupaí, Curupau, Curupaú barcino, Curupaú blanca, Cūrūpaū bareino (barcino?), Cūrūpaū barcino, Curupay, Curupaý, Curupaÿ, Curupay-curu, Curupay-curú, Curuva, Cypay.

Dopa, Dópa.

Ebãñã

Flowers of Entada.

Gioia.

Hakúdufha(?), Hatax, Horco cebil, Horko-cebil, Huayo, Huilca, Huillca, Huillca romana.

Iopo.

Jataj, Jop.

Kohobba, Kurupa, Kurupá, Kurupâi, Kurupaï, Kurupâiraî, Kurupayara.

Niopa, Niopo, Niopó, Niupo, Noopa, Nopa, Nopo, Nupa, Ñiopo, Ñopa, Ñope, Ñopo, Ñupa.

Oeuf de Poule.

Palo de hierro, Páo-de-boaz, Pariaca, Parica, Paricá, Paricá de terra firme, Paricá de cortume, Paricá de curtume, Parica de tierra firme, Parica do campo, Parica grande de cortume, Parica rana, Parica-uva, Paricachí, Paricarama, Paricarana, Paricaraná, Paricatuba, Parika, Petit sébil.

Quebracho.

Savannah Yoke, Sebil, Sébil, Sevil.

Tamarindo de teta, Tan Bark, Tara Huillca.

Uillca.

Vilca, Vilcas, Vilka, Villca.

Wil'ka, Willka.

Yacoana, Yarupi, Yoco, Yoke, Yop, Yopa, Yopo, Yópo, Yoto, Yu'ā, Yu'a', Yupa, Yuuba.

Zumaque.

NAMES FROM HERBARIUM SPECIMENS ONLY

Anadenanthera colubrina var. *Cebil*. Argentina. Jujuy: *Cevil Blanco*, *Cevil Colorado*. Tucumán: *Cebil*, *Cebil Blanco*, *Cevil Colorado*. Bolivia: *Curupaú Blanca*, *Curupaú Barcino* or *Cūrūpaú barcino*. Brazil. Minas Geraes: *Angico*, *Angico do Cerrado*. Pernambuco: *Angico*. Rio de Janeiro: *Cabuim*. São Paulo: *Angico*. Paraguay: *Curubuy*, *Curupai*, *Curupai*, *Curupai-curú*, *Curupay*. Peru: *Algarobo*, *Vilca*.

Anadenanthera colubrina var. *colubrina*. Brazil. Rio de Janeiro: *Cabuim*. São Paulo: *Angico*. No state given: *Cambui Ferro*.

Anadenanthera peregrina var. *peregrina*. South America. Brazil. Amazonas: *Angico*, along the Rio Branco; *Parica*, along the Rio Madeira. Minas Geraes: *Angico*, *Angico Vermelho*, *Anjico*. Pará: *Angico*, *Paricá*. British Guiana: *Black Parica*, *Paricarama*, *Tan Bark*. Colombia: *Yopo*, *Yoto*. Venezuela: *Cajoba*, *Caobo*, *Cohoba*, *Yopo*. West Indies. Dominican Republic: *Candelón*. Haiti: *Bois Ecorce*, *Bois Rouge*. Puerto Rico: *Cojobilla*. Trinidad: *Savannah Yoke*.

Anadenanthera peregrina var. *falcata*. Brazil. Minas Geraes: *Angico Vermelhão*. No state given: *Angico*.

The critical specimens have been cited earlier by collection numbers under the appropriate culture headings. Although the specimens from which the above names were obtained are not very comprehensive, they do suggest that differences between the species (and varieties) of *Anadenanthera* are not commonly distinguished in colloquial usage. This is not surprising, in view of the similarities of these elements. The names appear to vary, rather, with geographical distribution as a reflection of the particular cultures or groups of cultures associated with given areas. The geographical distribution of the various common names given on herbarium sheets coincides with that of the most frequently used vernacular names found in the taxonomic literature; the names are predominantly Indian in origin.