

COCA IN THE NORTHWEST AMAZON

RICHARD EVANS SCHULTES

I.

The perspicacity in knowledge of psychotropic plants amongst the Indians of the northwest Amazon is uncanny. Even taking into account the millenia of living in intimate association with his ambient vegetation and his thousands of opportunities to learn through trial and error — even considering these circumstances, his achievements at bending the properties of plants to his use are astonishing.

There is little, however, that can compare with his use of the *coca* plant and its permeation into all of society and tribal customs. For throughout the northwestern Amazon, most Indian groups employ coca and have exalted it to a level never attained in the highland parts of the Andes, where its use has persisted from ancient times.

Coca is widely cultivated in the western Amazon, especially in Colombia, Ecuador and Peru. The type of coca cultivated in this vast region has been considered to represent a distinct variety: *Erythroxylon Coca* var. *Ipadu*.^{*} Some investigators believe that the coca plant and the use of the leaves as a narcotic are recent introductions to the western Amazon from the Andean highlands. The existence of a distinct variety of *E. Coca* and the deep magico-religious role played by this plant and its product in the northwest Amazon, however, would seem to indicate an appreciable age of the plant in the region as well as an antiquity for its use as a sacred narcotic.

^{*}According to the International Rules of Botanical Nomenclature, the correct orthography of the generic name should be *Erythroxylum*, even though the word is Greek and not Latin. This has been pointed out by Plowman in *Taxon* 25 (1976) 141-144 and in *Botanical Museum Leaflets, Harvard University* 27 (1979) 45-68. In this paper, nevertheless, I prefer to use the much more familiar and widely employed spelling *Erythroxylon*.

II.

The Tukanoan Indians of the Colombian Vaupés, for example, put the coca plant back into the very origin myths of the tribes. The Sun Father was a *payé*, a medicine-man, who originated the knowledge and power of modern *payés*. He had in his navel the powder of *vihó*, a narcotic snuff prepared from the bark-resin of trees of the myristicaceous genus *Virola*. A daughter of the Master of Game Animals owned *caapi*, the narcotic plant *Banisteriopsis Caapi*. Pregnant and in great pain, she lay down. An old Indian woman, in an attempt to help, took hold of her hand. The pregnant young woman broke her finger, but the elderly woman kept it and guarded it in the *maloca* or great round house. A youth, however, stole it and planted it. The *caapi* vine grew from this finger. Another daughter of the Master of Game Animals, also pregnant and in intense pain, lay down. An old woman came to help, but this time the woman seized the girl's hand and broke off a finger. She buried it. The finger took root and grew into the first coca plant.

Similar legends from many of the tribes of the northwest Amazon concerning the supernatural and ancient origin of *Erythroxylon Coca* might be repeated. All bespeak great antiquity.

III.

Erythroxylon Coca var. *Ipadu* is not known in the wild. It is cultivated, almost always in plots devoted exclusively to coca. The five- to eight-foot shrub is always vegetatively propagated: small pieces of the stem being inserted in the wet soil. Planted at the beginning of the rainy season, the shrub grows sparsely — the stems becoming often completely covered with lichens — and does not yield a harvest of leaves for 18 months. From then on, however, an individual shrub may yield for 20 to 30 years. The coca plant is cultivated exclusively by men, as are other sacred plants such as *caapi* and tobacco, and only men usually harvest the leaves. It is interesting to note this difference in agricultural practices in the northwest Amazon: cassava — which is rarely if ever planted together with coca — is cultivated, cared for and harvested always by women; coca, never. Further-

more, coca is almost never planted near the maloca and in the proximity of cassava and other food plants; it is cultivated in small plots, usually quite removed from the maloca.

IV.

Preparation of coca for use in the Amazon regions is very different from that commonly practiced through the South American highlands. The primary reason stems from the lack of easily available sources of lime in most parts of the Amazon.

The leaves are collected with great care by men from the coca-plantings and brought back daily to the maloca. Here they are toasted on a flat clay cassava-oven. This work, done by either a man or woman, consists of gently and constantly turning the leaves over, until all are dry and crisp. They are then put into a large mortar — a hollowed out log of some hard wood, frequently a species of *Tabebuia* or *Swietenia Mahogani*, but occasionally of the lower part of the trunk of the *chontaduro* or *pupunha* palm, *Guilielma speciosa*. Pounding is done with a pestle of hardwood, until the leaves are reduced to a fine powder. The mortar measures four or five feet in height; it must be long in order to impede the escape of the impalpable coca powder during the operation. The work of pulverization is done only by men who carry it out rigorously in a standing position. It may occupy up to an hour of pounding. The dull, rhythmic thumping which begins when darkness falls and may continue until nine o'clock is one of the hauntingly agreeable sounds that remains uppermost in my memory of many years of residence in the great malocas or round houses of the Indians of the northwest Amazon.

Whilst one man is pulverizing the leaves, another places a pile of dried leaves — usually of *yarumo* or *imbaúba* — on the floor in the middle of the maloca. He sets fire to these leaves, reducing them to ashes which are gently swept, when cool, into a small pile. The leaves of *Cecropia sciadophylla* are preferred. This tall tree is frequently left standing when the forest is felled for agriculture, since it is highly valued as the very best source of ashes for coca. Other species of *Cecropia* — *C. peltata* and *C. palmata* — are occasionally used, although they are much less

esteemed. The tree of second choice for this purpose is the cultivated fruit tree known as *uva de monte*, *curúra* or *mapatí* (*Pourouma cecropiaefolia*) which, as its specific epithet indicates, has a leaf resembling those of some species of *Cecropia*. Other plants may locally be employed in the preparation of ashes for coca. The Yukunas of the Río Miritiparaná of southeastern Colombia burn the bark of a species of *Styrax* (possibly an undescribed species) and add the ashes to coca powder for special festive occasions (*Schultes et Cabrera, 16708*). In the uppermost Río Negro, for example, the leaves of the *paxiúba* palm (*Iriartea exorrhiza*) are valued; the Witotos of the Río Igaraparaná in Colombia esteem the leaves of another palm, the *ruí-re'-gö* or *Astrocaryum Munbaca* (*Schultes 3885*); the Taiwanos of the Río Kananarí may occasionally — apparently for certain festivals — use the leaves of *Costus amazonicus*, which they call *ñá'-ka*. These same Indians dry the leaves of *C. amazonicus* and *C. erythrocorone* and use the powder to staunch nose-bleeds. They similarly employ the leaves of *Ocotea simulans* and the fruits of *Ocotea opifera*, which they assert makes the coca powder "stronger" for use in special dances. The leaves and twigs of the former species are slightly alkaloid-positive with Dragendorff reagent (*Schultes, Raffauf et Soejarto 24174*); the leaves of the latter species (*Schultes, Raffauf et Soejarto 24421*) are alkaloid-negative. The Kubeo Indians, who call the plant *ko'-ma-ma*, formerly employed the leaves of *Diploptropis Martiusii* to prepare an ash for mixing with coca powder (*Schultes, Raffauf et Soejarto 24389*). The Witotos of the Río Putumayo, the border area between Colombia and Peru, call *Stylogyne amplifolia* (*Klug 2148; Schultes 3989*), a member of the Myrsinaceae, *jipina coca*, *coca silvestre*, *taife jipina*, *taife diablo* and *taife heepeena*. These names suggest that this plant possibly served as an additive to or substitute of *Erythroxylon Coca* var. *Ipadu*.

Eventually, equal quantities of the green coca-powder and the grey ashes are thoroughly mixed. The mixture is then put into a small bag made of the pounded bark of a tree called *tururí* (species of either *Ficus* or of *Eschweilera*). A long stick is inserted into the bag as a handle and the mouth of the bag is

tightly bound around the stick. This sieve is then lowered into the mortar or, when it is available, into a five-gallon gasoline tin with a hole in the top and beaten, until the successive blows release all of the fine powder from the bag. The finely sifted powder, then ready for use, is put into a special calabash made of half of the hard rind of the fruit of *Crescentia Cujete*, known locally as a *cuya*.

Finely pulverized cassava-flour or *farina* (*Manihot esculenta*) may occasionally be added to the coca ash powder.

V.

The use of coca in the northwest Amazon is restricted to the male sector of the indigenous population. Intensity of use varies from individual to individual and from tribe to tribe. Although it appears to have an essential and semi-sacred role in sundry ceremonies, it is employed hedonistically in daily life. Some Indians will take coca only in the afternoon or evening, but many keep the powder in the mouth throughout their waking hours and consume large amounts. During my long period of field work, I encountered its heaviest employment amongst the Yukunas of the Río Miritiparaná, where it was not uncommon to find men who daily used up to one pound of the powder.

In regions where acculturation has not progressed significantly — the Río Piraparaná of Colombia, for example — a visitor or stranger is made welcome with an offer of coca on the part of the head of the *maloca*.

A spatula made from the leg bone of the jaguar or a folded piece of the banana leaf are aboriginally used for transferring coca powder to the mouth, but now metal spoons may be employed.

A spoonful or two of the powder is put into the mouth. Conversation is impossible, until the powder has slowly been moistened and packed with the tongue between the gums and the cheeks. It is not chewed but is allowed gradually to mix with saliva and pass into the stomach. When the amount of the powder is thus diminished, it is replenished with an additional supply. Normally, a "quid" is kept in the mouth throughout the day.

There is here a very significant difference between the use of dried and entire coca leaves with an alkaline admixture in the highlands and the powdered product in the lowlands. In the highlands, the quid cannot be totally swallowed, but, in the lowland method of taking coca powder, most and occasionally all of the powder passes to the stomach. A recent study has shown how many nutritionally valuable elements are supplied by coca in the Andes. Since highland coca users eventually eject the quid from the mouth, the nutritionally valuable elements in the coca-alkaline preparation must be more available in a method of use in which the total leaf-alkaline preparation can pass through the whole alimentary canal. Unfortunately, nutritional studies parallel to those done for the highland use of coca leaves have not been carried out in the Amazon, but I have been convinced for many years that the use of coca as it is carried on in the Amazon plays a vital role in human nutrition. This aspect of *Erythroxylon* studies is in urgent need of investigation.

Coca powder has an initial bitter taste which puckers up the mouth. The first noticeable effect is a slight anaesthetizing of the tongue and mouth; this is followed by a general stimulation. Its value in some of the energetic dance festivals of the numerous tribes, requiring the expenditure of enormous amounts of energy, is obviously important. Furthermore, this stimulating effect makes its use, often in place of food, on long hunting or canoe trips away from the home maloca of the greatest physical help. The stimulation and capacity for performance and endurance which coca affords the individual and its ability to suppress hunger pangs gives the drug the role of an indispensable *vade-me-cum* in the more or less itinerant life of deprivation which many Indians of the northwest Amazon must undergo.

The use of coca is frequently referred to as "coca-chewing." No chewing is, however, ever involved in the northwest Amazon. The greyish green coca-ash powder is merely conveniently placed with the tongue, once the powder is wetted, between the cheek and the gums and slowly allowed to trickle down the esophagus. There is no word for this operation in English: the nearest, I presume, would be "to chew." Yet in South American Spanish, appropriate words exist: the verb *masticar* is never

employed for coca; in Colombia, there is a verb *mambear*, and in Peru, the equivalent term is *cacchar*.

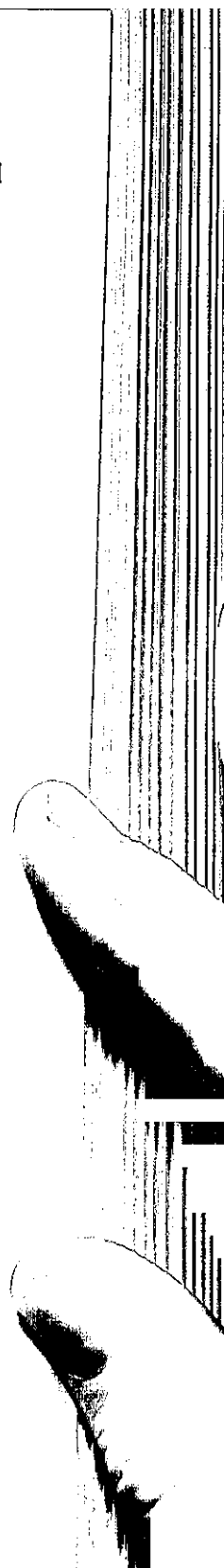
I have used coca myself in my Amazon work with the Indians over a period of eight years and have never found it to be noticeably harmful. It is most certainly not addictive. Opinions amongst the field workers, however, may differ. The English plant explorer of the Amazon Richard Spruce — one hundred and twenty-five years ago — wrote: "I could never make out that the habitual use of *ipadú* had any ill results on the Rio Negro; but in Peru its excessive use is said to seriously injure the coats of the stomach, an effect probably owing to the lime taken along with it." The German ethnologist Theodor Koch-Grünberg, the only other scientifically oriented researcher to have spent long periods of time in the northwesternmost Amazon until the last few years, wrote simply that: "When used excessively, coca may be harmful to the nervous system."

Several other methods of coca use in the Amazon are to be noted. In both instances, however, much more field observation is necessary for clarification and understanding of these variants.

Koch-Grünberg reports that the Tukanoan Indians of the Río Papurí take an aromatic decoction of coca. Whether or not this usage is medicinal or merely a novel manner of utilizing the leaves for narcotic purposes he did not specify. The Panobos of Amazonian Peru drink coca on special occasions "to lighten the body."

There are vague reports from reliable scientific sources that, in certain annual ceremonies, the Yukuna and Tanimuka Indians of the Río Miritiparaná utilize the coca-ash powder as a snuff. There is no pharmacological reason to presume that a snuff of coca powder might not be biologically active. This report, though very significant, must be the subject of further investigation.

The preparation and use of coca in the Amazonian parts of Colombia vary little from tribe to tribe. My many years with the Indians of this region have uncovered only one significant variant. This discovery was made amongst an isolated group of Tanimukas who now live on a small affluent of the Río



Apaporis, the Igarapé Peritomé, which empties into the Apaporis slightly downstream from the great Cachivera de Yayacopi. These people have apparently long lived detached from the main body of the tribe, who live on the Río Popeyacá. In 1951, this isolated group numbered hardly more than 75 individuals. They appear to have fled into their jungle fastness some 50 years ago, rather than submit to enforced labour in the balata-forests.

Whether or not this novel method of preparing coca is an innovation of these Tanimukas or represents a vestige of a once more widespread culture trait surviving only in this small band cannot now be determined. But in my 14 years of living amongst the natives of the northwest Amazon, I never encountered this or any similar method of preparing the narcotic powder. It is noteworthy, nevertheless, that the Tanimukas of the Popeyacá, as well as Yukunas, Makunas and other neighbouring peoples, occasionally journey to the Peritomé Tanimukas, especially immediately before important dances or festivals, to purchase large supplies of the Peritomé coca. And this has continued apparently for many years, notwithstanding the fact that the necessary plant ingredients are to be found abundantly throughout the whole area.

The refinement, if it may be so termed, to which I refer lies in the use of the resin of a tree, *Protium heptaphyllum* (Schultes et Cabrera 15681), in preparing the usual coca-ash mixture.

Long and slender tubes or "cigarettes" of rolled and partly dried leaves of *Ischnosiphon* are tamped half full with small lumps of the brittle, whitish resin. The tip of that part of the "cigarette" containing the resin is lighted and brought to a glow by a gentle blowing through the tube.

In the meantime, several armfuls of dried leaves of *Cecropia* are set afire on the earthen floor of the house and reduced to ashes. The ashes are then scraped together into a small, more or less conical pile. Before the ashes are completely cooled, several men with resin tubes insert the glowing ends of the tubes into sundry places in the ash pile and blow vigorously. This process, which fills the house with a pleasant myrrh-like aroma, continues for seven or eight minutes or until most of the resin in the tubes is spent.

The ashes are then collected, sifted and added to an equal amount of sifted coca powder; the product is then ready for use.

The addition of the incense from *Protium*-resin alters appreciably the usual characteristic taste of the coca, giving it a balsamic savour. There is no evidence that the incense either heightens or lessens the normal narcotic effects of coca prepared in the usual manner as a powder. It seems obvious that the only reason underlying this process is to effect a change in taste.

Thoroughly accustomed though I was at the time to the use of coca, I found that this resin-treated product usually caused irritation of the mouth and throat the first day of its use. This irritation, due undoubtedly to the balsamic smoke absorbed by the ash particles, disappeared upon continued use of the coca.

Inquiry indicated that the resin of *Protium heptaphyllum* is the only one of the many balsamic exudations of plants of the Amazon forest considered to be suitable for flavouring coca. The Indians insist that resin for this purpose must be gathered exclusively from old trees, but why younger trees must be avoided could not be explained. Incisions are made in the bark, and the resin is allowed to dry on the trunk before being gathered and wrapped up in leaves in small packets which are hung under the rafters of the house to "age" for four or five months before using.

The genus *Protium*, a member of the Myrrh Family or Burseraceae, is the source of several commercially and medicinally valuable resins. Resins from related genera have likewise enjoyed economic importance. The resin of *Protium heptaphyllum*, usually called *brea* or *pergamín* in Colombia, is commercially known as *taca-mahaca gum*. These vernacular names may occasionally be applied, however, to other burseraceous resins. *Protium heptaphyllum*, which in the Tanimuka language is referred to as *hitamaká*, yields a hard, translucent whitish resin that easily fractures; it is distinctly pungent, even when old and dried. Its properties are similar to those of other terebinthines. It is chemically made up of 30% protamyrene, 25% protelemnic acid, 37.5% proteleresin, as well as several minor constituents.

VI.

There are sundry substitutes for coca in the northwest Amazon. Probably a relatively large number of plants are involved, but only a few are known and have definitely been identified.

Amongst the Witotos and Boras of the Río Ampiyacu of Amazonian Peru, for example, at least two wild species of *Erythroxylon* are employed when, as the natives say, "there is no coca available." These two species are *E. fimbriatum* (Plowman, Schultes et Tovar 6878) and *E. macrophyllum* (Plowman, Schultes et Tovar 6879). Amongst the Kubeos of the Río Vaupés of Colombia, *E. cataractarum* (Schultes, pers. obs., no voucher specimen) may be used in lieu of real coca, even though there is no evidence of cocaine in this species.

According to Zarucchi (Zarucchi 1383), *E. cataractarum* is known in the Río Kuduyarí area of the Vaupés as *coca de pescado*, undoubtedly because the fruit is eaten by fish as it drops in the river from the trees along the edge of the rapids. It is "almost as strong as 'cocaina' and is used by people who do not have a coca patch." It is said to be a "very strong wild coca, one of the wild cocas used prior to the introduction of cultivated varieties; presently, the cultivated is preferred, because it is not so strong." Another collector, Davis (Davis 151), reports that the Barasana Indians of the Río Piraparaná maintain that "this coca can be eaten" and that "it was the coca of our fathers."

Curiously, three apocynaceous plants were found to be so employed amongst the Witotos and Boras of the Río Ampiyacu. The leaves of the large and well known tree *Couma macrocarpa* (Plowman, Schultes et Tovar, pers. obs.; no voucher specimen), source of a latex valuable as gum and known in Brazil as *sorva*, in Colombia as *juansoco*, are so employed. Two species of *Lacmellea*—*L. cf. peruviana* (Plowman, Schultes et Tovar 6653) and *L. lactescens* (Plowman, Schultes et Tovar 6889): the former is used primarily when Indians are working in the forests and their supply of coca runs out: branches of the latter are tied up over the fire to dry and smoke, and the leaves are then powdered like coca and mixed with *Cecropia* ashes.

VII.

Several plants are medicinally involved in treating problems thought to be concerned with use or overuse of coca. The Indians living near Mitú on the Río Vaupés of Colombia powder the bark of *Tachigalia cavipes* (*García-Barriga, Schultes et Blohm 16061*) and employ it to "dry up" cancers of the mucous membrane of the mouth, caused presumably by excessive use of coca.

The Barasanas of the Río Piraparaná of Colombia are heavily habituated to coca. Aged men of this tribe frequently suffer from stomach or intestinal bleeding, a condition which, although it might have sundry causes, they attribute to long and excessive use of coca powder. In an effort to alleviate this trouble, they recommend a hot tea of the leaves and bark of *Pagamea macrophylla* (*Schultes et Cabrera 17581*). The leaves of *P. macrophylla* are also pulverized and aspirated by the medicine men during ceremonies of divination.

Coca leaves enter into medicinal preparations with other plants in several localities. They are boiled with the leaves of *Vochysia laxiflora* (*Schultes et Cabrera 16676*) to prepare a tea when urination is painful or difficult.

Amongst the Witotos of the Río Karaparaná of Colombia, the dried and powdered root of *Chelonanthus alatus* (*Schultes 3805*) is added in very small amounts to the coca-ash powder "to give it a bitter taste." It appears that this practice is followed infrequently and may be associated with certain ceremonies, when a special kind of coca is desired. A tea of the root is also employed as a wash for infected wounds. This gentianaceous species, known in Witoto as *ho-ko-só-gö-nö*, has, like so many in the family, bitter principles.

VIII.

There is obviously much that remains to be investigated along interdisciplinary lines on the use and significance of coca in the

northwestern Amazon. It is an area where coca retains its traditional cultural significances and where a number of variations in its use and in the plants which may serve as surrogates or with which it may be employed have persisted. Furthermore, it enters very materially into native medicinal practices. All of these special characteristics of its utilization and the discovery that in this region a distinct variety of *Erythroxylon Coca* exists, would seem to bespeak great antiquity of use and make an intensive study of the plant in the northwest Amazon an investigation of high priority.

IX.

Binomials in order of their mention in foregoing discussions.

- Erythroxylon Coca* Lamarck, Encycl. 2(1786)393.
Erythroxylon Coca Lamarck var. *Ipadu* Plowman in Bot. Mus. Leaf., Harvard Univ. 27(1979)49.
Banisteriopsis Caapi (Spr. ex Griseb.) Morton in Journ. Wash. Acad. Sci. 21(1931)485.
Swietenia Mahogani Jacquin, Enum. Pl. Carib. (1760)20.
Guilielma speciosa Martius, Hist. Nat. Palm. 2(1824)82, tt. 66-67.
Cecropia sciadophylla Martius in Flora 24(1841)II Beibl. 93.
Cecropia peltata Linnaeus, Syst., ed. 10(1759)1286.
Cecropia palmata Willdenow, Sp. Pl. 4(1806)652.
Pourouma cecropiaefolia Martius in Spix et Martius, Reise Bras. 3(1831)1130.
Iriartea exorrhiza Martius, Hist. Nat. Palm. 2(1824)36, tt. 33-34.
Astrocaryum Mumbaca Martius, Hist. Nat. Palm. 2(1824)74.
Costus amazonicus (Loes.) Macbride in Field Mus. Publ. Bot. 11(1931)13.
Costus erythrocoryne K. Schumann in Engler, Pflanzenr. Zingib. (1904)410.
Ocotea simulans C. K. Allen in Mem. N. Y. Bot. Gard. 10(1964)99.
Ocotea opifera Martius in Spix et Martius, Reise Bras. 3(1831)1128.
Crescentia Cujete Linnaeus, Sp. Pl. (1753)626.
Manihot esculenta Crantz, Inst. Herb. 1(1766)167.
Protium heptaphyllum (Aubl.) Marchal in Martius, Fl. Bras. 12, pt. 2(1874) 263..
Erythroxylon fimbriatum Peyritsch in Martius, Fl. Bras. 12, pt. 1 (1878)162.
Erythroxylon macrophyllum Cavanilles, Diss. 8(1789)401, t. 227.
Erythroxylon cataractarum Spruce ex Peyritsch in Martius, Fl. Bras. 12, pt. 1(1878)149.
Diploporis Martiusii Benthham in Ann. Wien. Mus. 2(1838)88.
Stylogyne amplifolia Macbride in Field Mus. Publ. Bot. 11(1931)33.
Couma macrocarpa Barbosa-Rodrigues in Vellozia, ed. 2, 1(1891)32, pl. 1, fig. b.

Lacmellea peruviana (van Heurck et Muell.-Arg.) Markgraf in Notizbl. 15 (1941)627.

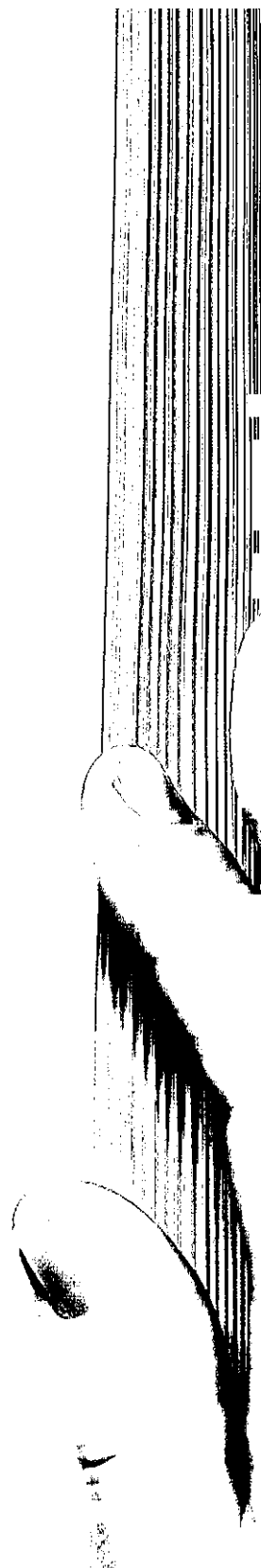
Lacmellea lactescens (Kuhlm.) Markgraf in Notizbl. 15(1941)621.

Tachigalia cavipes (Spr. ex Bth. in Mart.) Macbride in Field Mus. Publ. Bot. 13, pt. 3(1943)127.

Pagamea macrophylla Spruce ex Bentham in Journ. Linn. Soc. 1(1857)110.

Vochysia laxiflora Stafleu in Acta Bot. Néerl. 3(1954)407.

Chelonanthus alatus (Willd. ex Griseb.) Pulle, Enum. Vasc. Pl. Surinam (1906)376.



ERYTHROXYLUM Coca Lam.

var. *Ipadu*

Plowman

