

Peruvian and Chilean Psychoactive Plants Mentioned in Ruiz's *Relación* (1777-1788)

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Between 1777 and 1788, the Spanish botanist Hipólito Ruiz directed a plant collecting expedition to Peru and Chile. Ruiz is commonly regarded — and quite correctly so — as a systematic and floristic botanist, yet his writings indicate that he should also be considered a major ethnobotanist of his period.

Ruiz was deeply interested in the use of plants and in the classification of economic plants. In these early days of scientific botany, for example, he devoted special attention to Cinchona, source of quinine, and wrote extensively on this genus. He published monographic studies on specific native medicinal plants. Indigenous uses of plants are often noted in his descriptions of new species.

In Ruiz's *Relación Histórica del Viage que Hizo a los Reynos del Perú y Chile el Botánico Hipólito Ruiz en al Año de 1777 hasta el de 1788, en Cuya Epoca Regresó a Madrid*, a kind of diary, one finds the greatest wealth of his ethnobotanical data. In 1940, the Field Museum of Natural History in Chicago published an English translation of the Spanish edition of Ruiz's *Relación*, edited by Padre Agustín Jesús Barreiro in 1931 (Ruiz 1940). This edition represents only a part of the *Relación*, a preliminary and incomplete draft.

During the Second World War, while he was serving as Colombian Ambassador to the Court of St. James, the late Dr. Jaime Jaramillo-Arango discovered in the British Museum (Natural History) the manuscript of the entire

Relación of Ruiz. This complete document was edited by Dr. Jaramillo and elegantly published in Spain in 1952 (Ruiz 1952). At the request of Dr. Jaramillo, this author translated the Spanish text into English with the help of his wife, Doña María José de Jaramillo. This translation is now ready for publication. It is from this original and complete edition that the following notes on several psychoactive plants of Peru and Chile have been culled.

In 1964, a most interesting and historically critical volume on Ruiz's expedition was published by Arthur Robert Steele. It is a work incorporating material from Barreiro's and Jaramillo-Arango's editions of the *Relación* that cannot be too highly praised as a meticulous study of this outstanding epoch in the botany of Hispano-America.

Although Ruiz apparently never had direct contact with unacculturated Indians, his ethnobotanical reports should be unusually significant to modern students of ethnopharmacology. They are the result of direct observation in the field; they were gathered by a botanist and are based on voucher specimens; and they outline plant uses of 200 years ago by people in a relatively primitive society long since passed from existence.

Ruiz mentioned a number of psychoactive plants, but usually with no reference to their purposeful employment as narcotics or intoxicants. Several of these plants have only recently been reported as hallucinogenic or otherwise narcotic, and it is not surprising that he did not record these aboriginal uses of those species. His mere mention of them as components of the flora of

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Peru and Chile at such an early date before widespread destruction of the flora had begun is in itself interesting.

In an earlier paper, this author (Schultes 1980) has enumerated Ruiz's notes on ethnopharmacologically important plants that he encountered in his travels. This paper dealt primarily with plants used as medicines. In the following pages, the usually sparse information that Ruiz offered on plants with psychoactive properties is reproduced from the translation of the complete *Relación*.

POLYPODIACEAE

Polypodium incapcocam Ruiz et Pavón, nom. nud.

"Common names: cucacuca incapcocam, coca del Inca ('Inca's coca'). The Incas used this fern, according to the Indians, in place of coca and powdered, instead of tobacco, to clear the head."

GOMORTEGACEAE

Gomortega keule (Mol.) I.M. Johnston in Contrib. Gray Herb, n.s., 3, no. 70 (1924) 92.

Under the name *Gomortega nitida* R. et P., Ruiz mentioned the biodynamic effects of this large tree of Chile, known locally as *keule* and *bualbual*. The Mapuche Indians are said formerly to have valued this species as a psychoactive drug. The intoxicating effects may possibly be hallucinogenic. It is known that the fruits, especially in the fresh state, are inebriating. The active principle is still not known, but it may be the essential oils, which are abundant in this plant.

Gomortega nitida Common name: keule. This tree is the tallest and most splendidly frondose tree in Chile, excepting only the pino de chile. It stands out from the other trees at a great distance because of its rich green colour and the lustre of its leaves. The trunks yield an exquisite dark red wood which polishes up brilliantly. The leaves have an acid-astringent taste, and they stick to the teeth when they are chewed, because of their resin content. If crushed between the fingers, they give off a fragrance suggestive of rosemary and spirits of turpentine; judging from its aromatic qualities, we might infer that the plant possesses healing properties. The leaves burn freely, even when green. The beautiful fruits are as large as small hens' eggs, and they are lustrous and of a yellow colour that invites one to eat them. When eaten in excess, however, they bring on headaches. Although not very juicy, the pulp of the fruit is sweet and pleasant. The nut or pit is as hard as stone, with a very thick husk enclosing two or three small seeds in as many chambers. This tree is

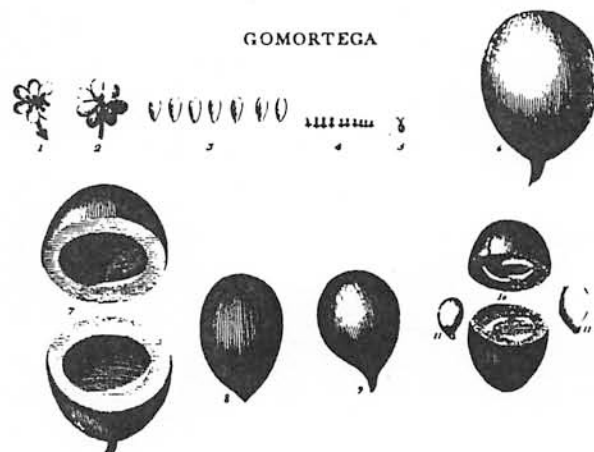


Figure 1. *Gomortega keule*, illustrated as *Gormortega nitida* in Ruiz et Pavón, Fl. Peruv. et Chil. Prodr. (1794) t. 10.

evergreen and is either in flower or in fruit all year round, sending out its new blossoms when the fruits are ripe or shortly thereafter.

According to the natives, another species of *keule* grows in the forests from Arauco to Valdivia, but I have seen only pits of the fruit, which are more pointed at one end and smaller than those of our species.

ERYTHROXYLACEAE

Erythroxylon coca Lam., Encycl. 2 (1786) 393.

The coca plant is so well known as a psychoactive substance of daily use in the Andes of Peru, Bolivia, northern Argentina, Chile and in the western Amazon that it needs no detailed discussion. The notes of a botanist working in the Andes two centuries ago, however deserve attention.

Common name: coca. This same name is applied to the leaves of the plant. Some call the bush cocal, but this name is more properly given to the plot or farm where the shrubs are grown. Thus, one speaks of so-and-so's cocal or of the cocal of such and such a locality.

The Coca Plant. Coca is a small bush, two to four yards tall at the most, with many slender twigs spreading horizontally. It is grown in Peru in the sheltered Quebrada de Chinchao, Chacahuassi, Pozuzo and in other provinces contiguous with the forests of the Andean Range. It is cultivated for its leaves which are gathered and sold.

Properties of Coca and the Method of Using It. The Indians of Peru say that these leaves possess the properties of restoring strength to the

body after it has been spent in long treks, in the work of the mines and in other physical exercise. They also assert that the gluten and juice that these leaves set free during the slow mastication that the coca chewers practice serves as food and nourishment, and, finally, they agree that they rest and are happy with the coca during the time that they are engaged in the process which they term *chaccar* or *aculliar*. This process consists in placing the leaves in the mouth and of preparing them for use. To carry out this operation, the Indian seats himself comfortably, takes the *chuspa* or coca-pouch (which he always carries hanging from his shoulder under one arm, as the shepherd carries his bag or as the school boy his school bag), places it between his thighs, opens it slowly and extracts the coca from it, leaf by leaf, stretching each leaf and plucking from it the stalk, nerve and any foreign matter that it might have, and places it in his mouth. Here, the leaves gradually become moist, whilst the Indian, in the same slow and absent-minded manner cleans the second batch of leaves and puts it in his mouth. Thus he continues with each successive batch. In order that the leaves set free the gluten and other principles that they contain more efficiently, he partially chews them and adds to them from time to time a little powdered lime, which he carries for this purpose in small calabashes known as *iscopurus*. Ground up lime is kept in these calabashes from which it is extracted with a small stick, moistened with saliva at the top; it is then mixed with the soft, moistened mass of leaves in the mouth. Some employ sugar and still others a fixed alkali, especially the ashes of quinoa, of sugar cane or of other plants, kneaded and made into little balls known as *lipta*. When the Indian has put enough leaves in his mouth to make a little ball the size of a small nut, he rolls this ball repeatedly from one cheek to the other in order to soften the leaves and to free them of the green colouring matter which comes out in the first saliva. He usually spits this out and does not swallow any of the juices, until that particular aromatic and pleasing flavour that he is waiting for appears. With the ball in his mouth, prepared as we have explained, he returns happy and refreshed to carry on his work and his tasks, swallowing from that time on all juices and substances that the saliva extracts from the coca. This goes on until the coca is left tasteless and weak, which usually takes two or three hours.

Coca is such a necessity for the Indians who work in the mines that without it they are completely unable and too faint to continue their labours. Because of this, the owners of the mines are very careful that their peasants never feel the want of this stimulant.

For a long time, I was convinced that coca was, like tobacco, a habit-forming plant used to keep the Indian happy. But experience has made me change that groundless belief. I have seen positive proof of the wonderful effects of these leaves, which seemingly are without taste, aroma and effect. From another point of view, coca is a remedy with proven medicinal properties. As a decoction or infusion, it cures dysenteries, checks diarrhoea, stimulates delayed menstruation after childbirth; as a powder, mixed with sugar, it corrects acidity and strengthens the teeth.

The Cultivation of Coca. To plant coca, those dedicated to the harvest of this leaf make a number of holes about a cubic foot in size. In each hole, they throw about one hundred seeds and half fill them again with earth, leaving them without any care for a year. By this time, the young plants have grown about a foot and a half. They are transplanted when they sprout, which happens three or four times a year. The small plants are put into holes a foot and a half deep, placing in each hole two stalks crossed a little above the root. They are then half covered with soil rather firmly packed in. The transplanting is done to lines three spaces apart with the holes a little more than a foot from one another.

For the transplanting, done in November and December, one must wait until it rains. And if many young plants have been pulled up and there has been no chance to set them out because of a dry spell, and if no watering system be available, these plants are tied up into various bundles and placed with their roots in running water. Taken care of in this way, they will last for ten or twelve days, usually taking root more easily after the treatment than those recently pulled from the ground. If the plants are large, as sometimes happens when they are two or three years old, the tips of the roots and stem are cut off before transplanting. After the transplanting, no more care is given the coca except weeding, removing other plant intruders that arise spontaneously in the plots, using for this work a type of spade or hoe with which they scratch the surface of the soil of the paths and which cuts or pulls out the

weeds.

Although the coca bush usually flowers and fruits most of the year, its main flowering period comes in October and November. It is then so covered with flowers and fruits that it has hardly any leaves. Therefore, the coca harvest at this period of the year is sparse as compared with the yields of leaves during the other three seasons. When the bushes are old, they are cut one yard above the ground, so that they will sprout new and more vigorous shoots. The coca bush cannot be stripped of its leaves for one and a half to two years after being transplanted, depending on the soil and the strength of the plant. For if the leaves are gathered before this time, the bushes die as a result of the loss of strength and resistance.

Preparation of Coca Leaves. Little care must be given coca leaves after they are removed from the bushes by the handpuls. They are put in the sun and stirred constantly with bundles of dry branchlets, in order that they be well ventilated in a short time and dry equally. This seldom is accomplished in one day, in spite of the strong heat of the sun in these regions; for clouds and short rain storms often interrupt the process. When the leaves are crisp and almost completely dried, they are gathered up and wrapped in large sheets or blankets so that they may "ferment," as the natives say, during the night. In this way, they become leathery and supple, so that they do not shatter, no matter how much they be crushed; this process alone gives them a better aroma, a more pleasant taste and a brighter colour. All the coca-gatherers try to avoid the leaves' bulging, that is, rotting, which happens when drying has not been carried out on time or when the leaves are allowed to become too wet, bringing on a strong and fetid fermentation. Once well prepared, coca is kept in bags of coarse cloth, squeezed in as tightly as possible with hands and feet. In Huánuco, five and twenty pounds of coca leaves fetches from three to seven duros.

ERICACEAE

Pernettya parvifolia (R. et P.) Benth. Pl. Hartweg. (1864) 210.

Under the name *Arbutus parvifolius* R. et P., Ruiz reported that this plant has intoxicating properties. Known in Ecuador as *taglli*, the plant has toxic fruits that, when ingested, induce hallucinations and other psychic and motor alterations. It is not known if this species has ever been purposely used as a hallucinogen,

although it has recently been suggested that it was. The fruits contain andromedotoxin.

In Chile, the fruits of *Pernettya furens* (Hook. ex DC.) Klotzsch, known as *bued-bued* or *bierba loca*, produce mental confusion, madness and permanent insanity. They cause an intoxication similar to that induced by *Datura*.

"*Arbutus parvifolius*. Common name: macha ('intoxicates'). This vernacular epithet refers to the properties of the ripened fruits which, though tasty and sweet, are intoxicating when eaten in excessive amounts."

Thibaudia(?) sp. "Common name: macha-macha ('intoxicates-intoxicates'). The fruits of this plant bring on drunkenness, if too many of them be eaten. It acts as an especially strong inebriant for children."

Chemical studies have not disclosed any intoxicating principles in the fruits of *Thibaudia*, but Ruiz's identification to genus is open to question and the species is not known. Since other ericaceous plants of South America are known to have inebriating fruits, it is possible that a species of *Thibaudia* might likewise possess bioactive principles.

DESFONTAINIACEAE

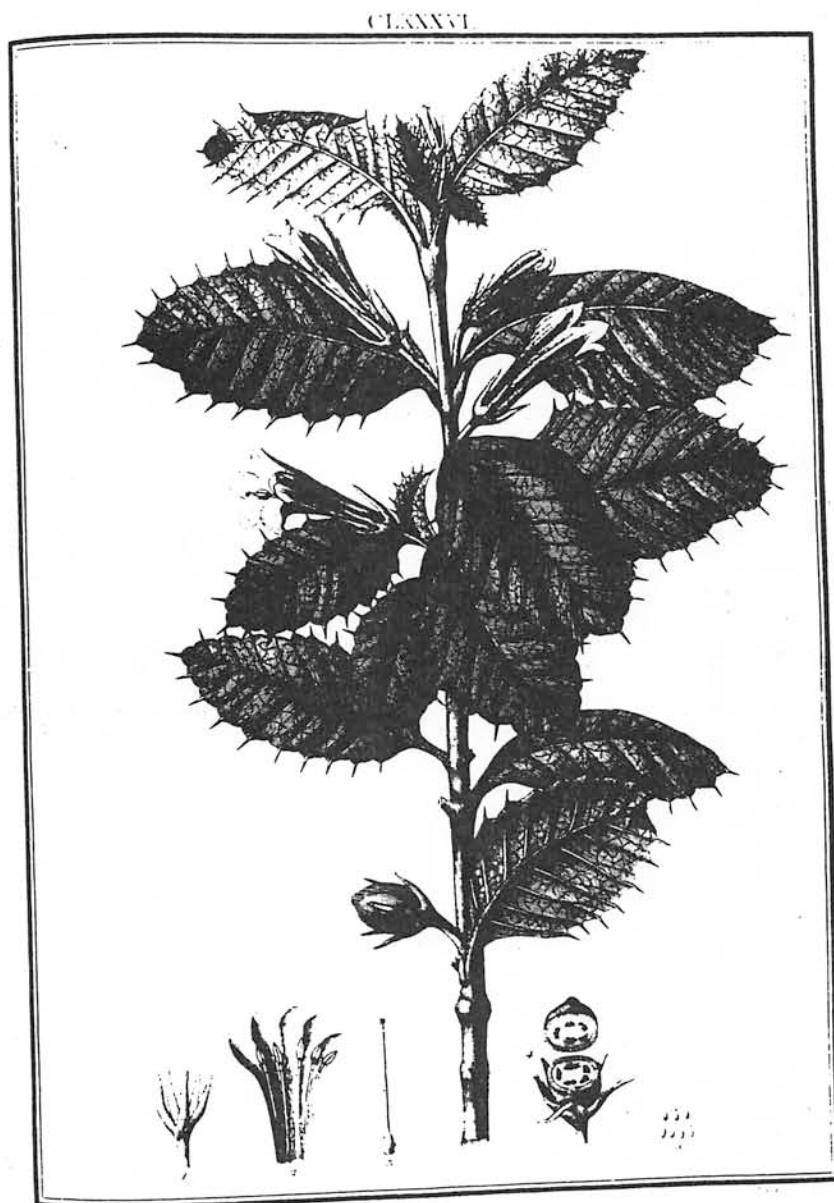
Desfontainia spinosa Ruiz et Pavón, Fl. Peruv. Chile 2 (1799) 47.

All that Ruiz mentioned about this plant is that it "is a showy shrub on account of its leaves and beautiful red flowers." It has only recently been discovered that the leaves of this shrub are employed by the Mapuche Indians in southern Chile as a psychoactive substance and in folk medicine. The leaves are made into a tea by Indians of the southern Andes of Colombia, where medicine men take the drink "when they want to dream" or "see visions and diagnose disease." The tea is reported to be so potent that it makes the medicine men "go crazy," the reason why it is infrequently used. Its vernacular name in Chile is *taique*, *chapico*, *micai planco*, *trau-trau*, and in Colombia, *borrachero de páramo*. Chemical studies have not yet been carried out on the anomalous genus *Desfontainia*.

SOLANACEAE

Brugmansia arborea (L.) Lagerheim in Bot. Jahrb. 10 (1895) 663.

Throughout the Andes, the several species of tree-Daturas or *Brugmansia* are assiduously cultivated and from time immemorial have been employed as medicines and hallucinogens. *Brugmansia arborea* is not the commonest species nor the most widespread, but it occupied Ruiz's attention. He mentioned its medicinal use, but failed to note that it has a major hallucinogenic use



DESFONTAINIA *spinosa*

Figure 2. The earliest complete illustration of *Desfontainia spinosa* published in Ruiz et Pavón, Fl. Peruv. et Chil. 2 (1799) t. 186.

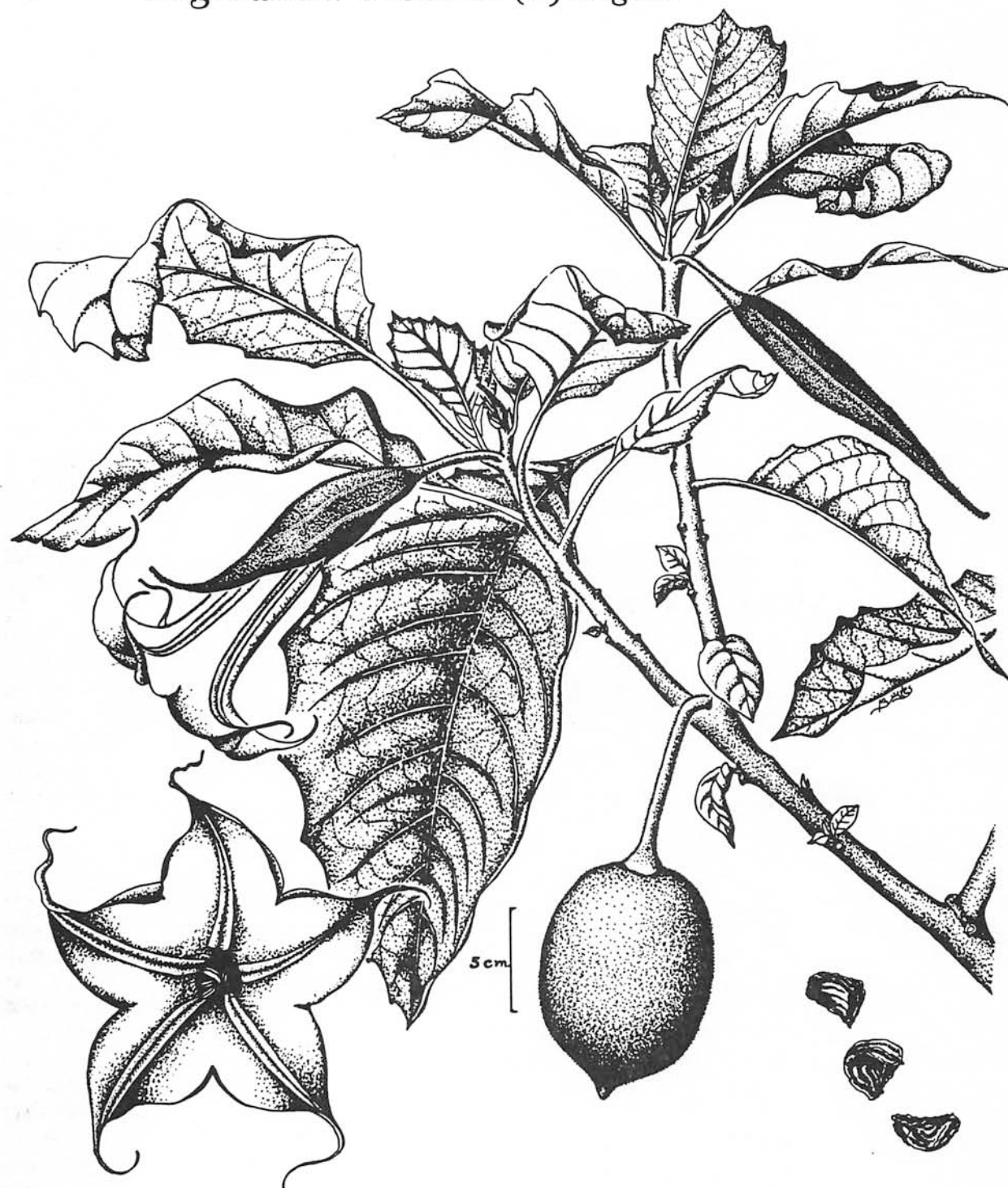
Brugmansia arborea (L.) Lagerh.

Figure 3. *Brugmansia arborea*, illustrated by Lynda Bates in T.E. Lockwood's *A Taxonomic Revision of Brugmansia (Solanaecae)*, Doctoral thesis, Harvard University (1973).

among the natives.

Under the name *Datura arborea* L., Ruiz wrote: "Common names: floripondio, campanillas. The flowers of this plant exhale by night the smell of musk, for which reason it is sometimes called almizclillo. Its leaves when crushed with pork fat are excellent as a suppurative and anodyne for tumours."

Brugmansia sanguinea (R. et P.) D. Don in Sweet, Brit. Fl. Gard. 2 (1835) 272.

Brugmansia sanguinea has been a sacred hallucinogen throughout its Andean range from earliest times. It was a plant of the priests of the Temple of the Sun at Sogamoza in Colombia during the Chibcha Empire. A report dated in 1589 stated that a "dead chief was accompanied to the tomb by his women and slaves, who were buried in different layers of earth... of which none was without gold. And so that the women and poor slaves should not fear their death before they saw

the awful tomb, the nobles gave them things to drink of inebriating tobacco and other leaves of the tree we call borrachero [*B. sanguinea*]... so that of their senses none is left to foresee the harm soon to befall them."

Among the Jivaro of Ecuador, recalcitrant children are given a drink of *Brugmansia sanguinea* with maize so that the spirits of the ancestors may admonish them. Indians in Peru still refer to *Brugmansia sanguinea* as *huaca* or *huacachaca* ("plant of the tomb") from their belief that it reveals ancient treasures buried in tombs.

Under the name *Datura sanguinea* Ruiz et Pavón, Ruiz reported: "Common names: puca-campanilla and floripondio encarnado ('red floripondio'). When this tree is in bloom, it is extremely beautiful because of the abundance of large, red flowers, always hanging like bells, and its round, leafy crown. The leaves are used as emollients and anodynes, either in the form of cataplasms or when applied single and entire. The seeds are narcotic, dulling the senses and understanding, and they are sometimes administered with evil intent as a powder in food. Some of the natives say that there are people who have gone mad merely by lying down to sleep in the shade of these trees, which are found exclusively in the vicinity of towns at high altitudes."

Datura stramonium L., Sp. Pl. (1753) 179.

Common names: tonco-tonco; chamico. This plant is known as chamico all over Peru, on account of the criminal use that the Indians are accustomed to make of it: to intoxicate each other, when they feel that they have been wronged or when they are overtaken by jealousy in their love affairs. This practice has given use to the common Peruvian adage: "Esta chamicado o chamicado fulano o fulano" [So-and-so is under the influence of *chamico*], applied whenever a person is either pensive, taciturn, absent-minded or else too tipsy from drinking or from other causes.

Whilst we were in Huáncó, it happened that a boy of ten gave a schoolmate of his own age powdered seeds of chamico in a piece of bread. Within a few hours, it began to exercise its narcotic effects, as though the boy had taken wine. Dombey¹ was called in by the boy's parents to administer some remedy; but, notwithstanding the emetics and other medicines that Dombey prescribed, the boy was rendered permanently stupid and silly. Before the poisoning, he had been intelligent, keen, mischievous and full of fun in boyhood games, but his former personality was lost forever.



Figure 4. The earliest illustration of *Brugmansia sanguinea*, figured in color in R. Sweet, Br. Fl. Gard., ser. 2, 3 (1835) t. 272.

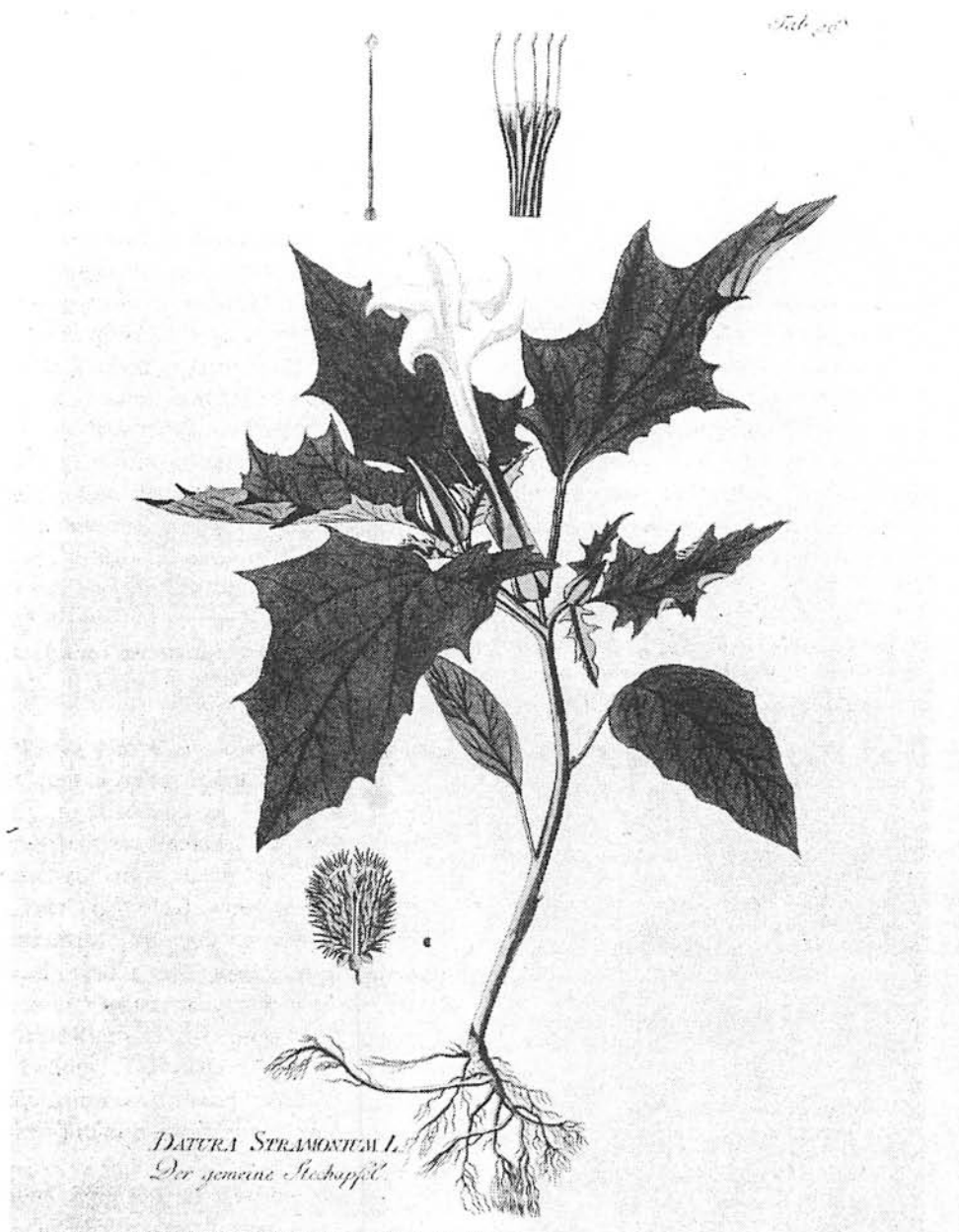


Figure 5. *Datura stramonium*, illustrated in Plenk, Ic. Pl. Med. 1 (1788) t. 96.

This plant grows in the streets of Huánuco in such abundance that, after this happening, the Chief Magistrate ordered it all pulled up by the roots and burned. And this order was carried out at that time; but when we returned to Huánuco the second time, we found the streets and outskirts of the city just as full of chamico as before.

The natives apply the crushed leaves and

seeds in a poultice in treating piles, and the effects are excellent. Some people are accustomed to drink an infusion of a few leaves to relieve pains in urinating and irritations of the skin caused by bitter or strong purgatives. The use of the crushed leaves, mixed with vinegar, is frequently made as a poultice for the spine or kidneys, in order to reduce fevers and to lessen rheumatic pains and bring down the swelling of hernias.

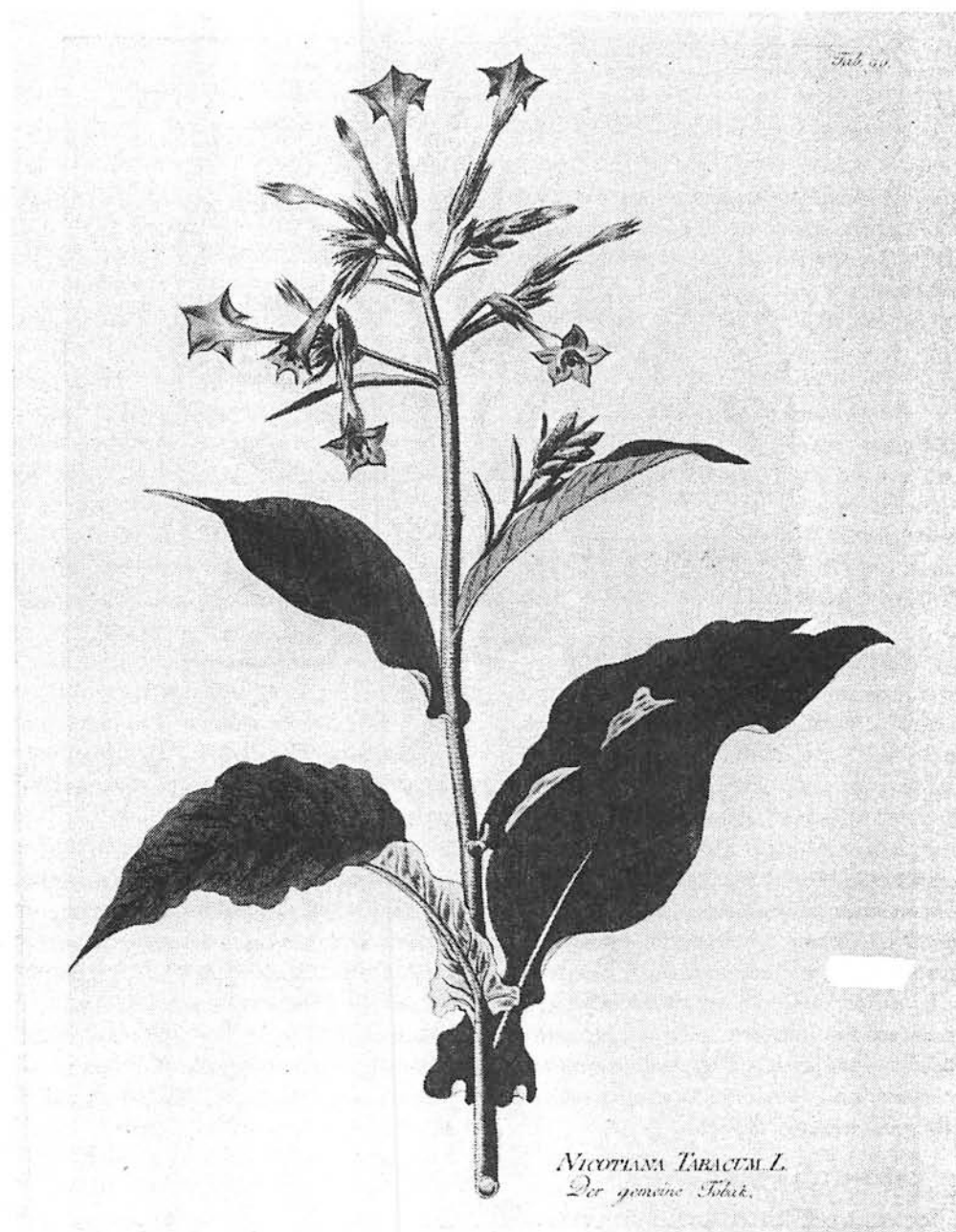


Figure 6. *Nicotiana tabacum*, illustrated in Plenck, Ic. Pl. Med. 1 (1788) t. 99.



Figure 7. *Lobelia tupa*, illustrated in Bot. Mag. 52 (1825) t. 2250.

Nicotiana tabacum L., Sp. Pl. (1753) 180.

"Common name: tabaco verdadero ('real tobacco'). Although this plant is cultivated in various provinces of Peru, where they make abundant harvests to fabricate long cigars and bunches which are called tabaco de Andullo, it grows wild in all the valleys and warm forests." It is hard to understand why Ruiz would not have given more attention to such a commonly used and well-known biodynamic plant as tobacco.

CAMPANULACEAE

Lobelia tupa L., Sp. Pl., Ed. 2 (1763) 1318.

"Common name: tuppa." These words are all that Ruiz notes concerning such a magnificent six-foot,

red-flowered *Lobelia*. This tall, polymorphic herb of the southern Andes is widely recognized as a toxic plant. Known in southern Peru and northern Chile as *tupa* or *tabaco del diablo* ("devil's tobacco"), it is reputedly valued in Chile as a narcotic and medicine. Chilean peasants utilize the juice to relieve toothache, and the Mapuche Indians smoke the leaves as an intoxicant. Further ethnobotanical field work and chemical studies should be carried out on this plant.

NOTES

1. Joseph Dombey, M.D. was a French botanist who accompanied the Spanish group on the Royal Botanical Expedition to Peru and Chile.

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