Hallucinogenic Plants: Their Earliest Botanical Descriptions

RICHARD EVANS SCHULTES, PH.D.*

The list of plants of hallucinogenic (plus possible or suspected hallucinogenic) use is fast growing. This extension of our knowledge is due to several factors: in part, to the interest of botanists in ethnopharmacology; and in part, to the attention of research scholars in phytochemistry and pharmacology. Furthermore, more intensive and critical study of data in the literature and in our herbaria has materially contributed.

Basic to any scientific investigation of hallucinogenic plants is an exact identification and understanding of the species involved. The truth of this statement is attested by recent studies of many poorly known hallucinogens, but perhaps it is nowhere better illustrated than in the problems surrounding speciation in *Cannabis*.

It is sometimes of general interest, oftentimes of very practical value, to consult the technical botanical literature in the interdisciplinary investigation of plant hallucinogens. On occasion, it may be of help – sometimes it may be imperative – to go back to the original botanical description of the plant, when the concept received its Latin binomial. Rarely, if ever, did the original description make mention of the psychotropic activity of the plant. It is not this aspect that is important in presenting the following bibliographic list. The fact that the non-botanist can, if need be, consult the original description of the plant in question underlies the presentation of the ensuing data. It is obviously the botanist who usually carries out this phase of study and, while the place and date of first publication of a species-concept is generally available to the botanist, they may not easily be located by specialists in other fields. The following notes, then, are offered in an effort to assemble this sometimes obscure bibliographic information in one place and to make it generally available.

Many plants we know were or are being used as hallucinogens in primitive societies. It is sometimes difficult or impossible to ascertain from the literature or from limited field notes whether a plant is employed definitely for hallucinogenic purposes or because of more generalized narcotic effects. The two categories have been separated in the following list: plants known definitely to be used as hallucinogens or reliably reported to induce visions or other hallucinations are indicated with an asterisk; those the use of which is presumed or suspected of having hallucinogenic implications have been indicated with a dagger.

It should be borne in mind that only those hallucinogens employed usually in a magico-religious context in aboriginal or primitive societies – or which, through archeological evidence, are known to have been used – are listed. Plants which, in certain fringes of our sophisticated Western society, are said to be taken to induce hallucinogenic experiences are not enumerated in the list which follows.

Since plant hallucinogens are concentrated in two of the major divisions of the Plant Kingdom – the Fungi and the Angiosperms – they have been arranged

*Paul C. Mangelsdorf Professor of Natural Science and Director, Botanical Museum, Harvard University, Oxford Street, Cambridge, Massachusetts 01238.

Habitat in Peru. ⊙
Differt *a secunda* Caule *teneriore, altiore, paniculato.* Corollis *angustioribus; limbo brevissimo, obtusissimo, tubo longo clavato*; calycibus capsulisque *acutis.*

4. NICOTIANA foliis cordatis, corollis racemosis subringentibus, calycibus inæqualibus. *glutinosa.*
Habitat in Peru. *D. B. Jussieu.* ⊙
Folia *magis cordata, glutinosa.* Flores *in racemos paucos, longos.* Corollæ *ferme specici primæ, sed magis inæquales & fere ringentes fauce hiantes.* Stamina *ad latus superius inflexa.* Calycis *una lacinia reliquis duplo major.*

MANDRAGORA.

1. MANDRAGORA *Hort. cliff.* 51. *Roy. lugdb.* 423. *officinarum, Mat. med.* 88.
Mandragora fructu rotundo. *Bauh. pin.* 169.
Mandragoras. *Dod. pempt.* 457.
Habitat in Hispaniæ, Italiæ, Cretæ, Cycladum *apricis.*

ATROPA.

1. ATROPA caule herbaceo, foliis ovatis integris. *Bella donna.*
Atropa. *Hort. cliff.* 57. *Hort. upsf.* 45. *Roy. lugdb.* 423.
Solanum melanocerasus. *Bauh. pin.* 166.
Solanum lethale. *Clus. hist.* 2. *p.* 86.
Habitat in Austriæ, Angliæ *montibus sylvosis.* ♃

2. ATROPA foliis sinuato-angulatis, calycibus clausis acutangulis. *physalodes.*
Alkekengi amplo flore violaceo. *Few. peruv.* 724. *t.* 16.
Habitat in Peru. *D. B. Jussieu.* ⊙
Radix *fibrosa, annua.* Caulis *bipedalis, patulus, erectus, ramis angulatis.* Folia *alterna, glabra, oblonga, per petiolum decurrentia, obtuse sinuata* (Daturæ). Pedunculi *ad latus petiolorum solitarii, nudi, uniflori.* Calyx *ovatus, basi excisus, angulis quinque compressis, profunde 5 partitus: foliolis sagittato-ovatis.* Corolla *campanulata, parum quinqueloba, obtusa, Limbo erecto, subplicato, cærulescente.* Stamina 5, *subulata, basi dilatata, subvillosa, corolla longe breviora, superne divergentia.* Antheræ *erectæ.* Germen *intra basin staminum.* Stylus *filiformis, longitudine staminum.* Stigma *ca-*

The original description of *Mandragora officinarum* and of *Atropa Belladonna*. From Linnaeus, *Sp. Pl.* (1753) 181.

ensis and *B. guianensis. B. macrocarpa* differs in having flowers which are twice as large and violet, not white, at anthesis. It is further distinguished by the large, accrescent calyx.

Brunfelsia Chiricaspi *Plowman sp. nov.*

Frutex vel arbor parva 1–3 m. alta, cortice tenui, longitudinaliter fisso, ruguloso. Rami pauci, laxi, patentes, nudi. Ramuli glabri, nitidi, epidermide in fragmentis longitudinaliter solubili. Folia breve petiolata, oblonga vel lanceolata, plerumque obovata, apice acuminata vel obtusa, acumine subfalcato, basi cuneata vel obtusa, glabra, subcoriacea, subtus siccitate ochracea, nervis lateralibus 8–10, subtus prominentibus; petiolo crasso. Inflorescentia corymbiformis, terminalis vel axillaris, pauciflora, floribus 4–7 (raro 20), puberula vel glabra, bracteata, bracteis lanceolatis, concavis. Pedicellus erectus, glaber. Calyx tubuloso-campanulatus, vix inflatus, glaber, dentibus brevis, late triangularibus, acutis vel obtusis apice acumine breve glanduliferis; calyx in fructu lenticellis obtectus, nervis striatis. Corollae tubus quam calyx duplo longior, crassus, rectus, apice parum dilatatus, vix curvatus, glaber, limbo caeruleo vel violaceo demum albo, ad orificium parum incrassato, quinquangulari, albo, lobis subaequalibus, rotundatis, sub anthesi valde deflexis. Stamina et stigma in tubi parte superiori inclusa. Capsula subglobosa, maturitate sicca. Semina pauca, ellipsoideo-reniformia.

A *Brunfelsia Mire* foliis oblongo-lanceolatis, cyma pauciflora et corolla minori et a *B. grandiflora* foliis majoribus, cyma corymbiformi et lobis corollae deflexis differt.

TYPE: *G. Klug 1810*, Colombia, Comisaría del Putumayo, Umbria, 0°54′ N., 76°10′ W., alt. 325 m.; forest. Oct.–Nov. 1930. Shrub 1.5 m. Fls. sky blue. "Zanango". Medicinal. (Holotype, A; isotypes, F, S, US 1456539.)

[255]

The original description of *Brunfelsia Chiricaspi*. From *Botanical Museum Leaflets* Harvard University 23(1973) 255.

alphabetically by genus in these two categories. Illustrations of the original descriptions of several of the piants are, for historical reasons, herein reproduced.

FUNGI

* *Amanita muscaria* (Fr.) S.F. Gray, *Nat. Arr. Brit. Pl.* 1(1821): 600. Amanitaceae.
† *Boletus flammeus* Heim in Cah. Pacif. 9(1966): 68, t. 1. Boletaceae.
† *Boletus kumeus* Heim in Rev. Mycol. 28(1963): 279. Boletaceae.
† *Boletus manicus* Heim in Rev. Mycol. 28(1963): 280. Boletaceae.
† *Boletus nigerrimus* Heim in Rev. Mycol. 28(1963): 281. Boletaceae.
† *Boletus nigroviolaceus* Heim in Rev. Mycol. 28(1963): 282. Boletaceae.
† *Boletus Reayi* Heim in Rev. Mycol. 28(1963): 278. Boletaceae.
* *Claviceps purpurea* (Fr.) Tulasne Ann. Sci. Nat. 20(1853): t. 3. Hypocreaceae.
* *Conocybe siligineoides* Heim in Comptes Rend. 242(1956): 1390. Coprinaceae.
† *Copelandia cyanescens* (Berk. et Br.) Singer in Lilloa 22(1949): 473. Agaricaceae.
† *Cordyceps capitata* (Fr.) Link, *Handb.* 3(1833): 347. Hypocreaceae.
† *Cordyceps ophioglosoides* (Fr.) Link, *Handb.* 3(1833): 347. Hypocreaceae.
† *Dictyophora phalloidea* Desvaux in Journ. Bot. Paris 2(1809): 88. Phallaceae.
† *Heimiella anguiformis* Heim in Rev. Mycol. 27(1963): 283. Boletaceae.
† *Heimiella retispora* (Pat. et Baker) Boedijn in Sydowia 5(1951): 217. Boletaceae.
* *Lycoperdon marginatum* Vittadini, *Monogr. Lycoperd.* (1843): pl. 1, fig. 11. Lycoperdaceae.
* *Lycoperdon mixtecorum* Heim in Comptes Rend. 254(1962): 789. Lycoperdaceae.
† *Panaeolus fimicola* (Fr. ex Weinn.) Saccardo, *Syl. Fung.* 5(1887): 1124. Agaricaceae. [Coprinaceae; Strophariaceae.]
* *Panaeolus sphinctrinus* (Fr.). Quélet, *Les Champignons du Jura et des Vosges*. pt. 1(1872): 151. Agaricaceae. [Coprinaceae; Strophariaceae.]
† *Psathyrella sepulchralis* Singer, Smith et Guzmán in Lloydia 21(1958): 26. Coprinaceae.
* *Psilocybe acutissima* Heim in Heim et Wasson, *Les Champignons Hallucinogènes du Mexique* (1958): 166. Strophariaceae.
* *Psilocybe aztecorum* Heim in Comptes Rend. 244(1957): 699. Strophariaceae.
* *Psilocybe caerulescens* Murrill in Mycologia 15(1923): 20. Strophariaceae.
* *Psilocybe caerulescens* Murrill var. *albida* Heim, *Nouvelles Investigations sur les Champignons Hallucinogènes* (1967): 170. Strophariaceae.
* *Psilocybe caerulescens* Murrill var. *mazatecorum* Heim in Comptes Rend. 242(1956): 1391. Strophariaceae.
* *Psilocybe caerulescens* Murrill var. *nigripes* Heim in Comptes Rend. 244(1957): 698. Strophariaceae.
* *Psilocybe caerulescens* Murrill var. *ombrophila* Heim, *Nouvelles Investigations sur les Champignons Hallucinogènes* (1967): 171. Strophariaceae.
† *Psilocybe caerulipes* (Peck) Saccardo var. *Gastonii* Singer in Sydowia 12(1958): 236. Strophariaceae.
* *Psilocybe cordispora* Heim in Comptes Rend. 242(1956): 1390. Strophariaceae.
* *Psilocybe fagicola* Heim et Cailleux in Rev. Mycol. 24(1959): 438. Strophariaceae.
* *Psilocybe Hoogshagenii* Heim in Heim et Wasson, *Les Champignons Hallucinogènes du Mexique* (1958): 167. Strophariaceae.
* *Psilocybe Isauri* Singer in Sydowia 12(1958): 237. Strophariaceae.
* *Psilocybe mexicana* Heim in Comptes Rend. 242(1956): 967. Strophariaceae.
* *Psilocybe mixaeensis* Heim in Heim et Wasson, *Les Champignons Hallucinogènes du Mexique* (1958): 169. Strophariaceae.
* *Psilocybe semperviva* Heim et Cailleux in Comptes Rend. 245(1957): 1764. Strophariaceae.
* *Psilocybe Wassonii* Heim in Comptes Rend. 245(1957): 1761. Strophariaceae.
* *Psilocybe yungensis* Singer et Smith in Mycologia 50(1958): 142. Strophariaceae.
* *Psilocybe zapotecorum* Heim in Comptes Rend. 242(1956): 1393. Strophariaceae.
† *Russula agglutinata* Heim in Cah. Pacif. 7(1965): 52, *nomen nud.* Russulaceae.
† *Russula maenadum* Heim in Cah. Pacif. 7(1965): 49, *nomen nud.* Russulaceae.
† *Russula Nondorbingii* Singer in Mycopathologia et Mycologia Applicata 9, pt. 4(1958): 275. Russulaceae.
* *Stropharia cubensis* Earle, Informe Ann. Est. Central Agron. Cuba. 1(1906): 240. Strophariaceae. This plant is sometimes considered to represent *Psilocybe cubensis* (Earle) Singer in Sydowia 2(1948): 37.

ANGIOSPERMAE

† *Acorus Calamus* Linnaeus *Sp. Pl.* (1753): 324. Araceae.
* *Alchornea floribunda* Mueller-Argoviensis in Journ.

16. Jahrgang. № 33. 13. August 1858.

BOTANISCHE ZEITUNG.

Redaction: *Hugo von Mohl.* — *D. F. L. von Schlechtendal.*

Latua Ph., ein neues Genus der Solanaceen.

Von

Prof. Dr. **R. A. Philippi** in Santjago.

Bereits vor sechs Jahren erfuhr ich in der Provinz Valdivia, dass die dortigen Indianer das Geheimniss besässen, vermittelst eines vegetabilischen Giftes die Menschen verrückt zu machen, und zwar auf längere oder kürzere Zeit, je nach der Stärke der Gabe dieses Giftes, dass sie die Sache aber als ein grosses Geheimniss behandelten. Dem Pater **Romualdo**, Missionär in Daglipulli, gelang es zu erfahren, dass die Pflanze ein hoher Strauch sei, *Latue* heisse, hie und da im Urwalde des Küstengebirges wachse, und endlich auch einen Zweig zu erhalten. Dieser war jedoch ohne Blätter, indem der Indier, welcher ihn brachte, unstreitig glaubte, der Pater wollte denselben haben, um seine giftigen Eigenschaften, welche hauptsächlich in der Rinde sitzen, zu erforschen. Später erfuhr ich von Herrn **Juan Renous** Näheres über den *Latue*. Der Strauch sei dem *Tayu* oder *Palo Santo*, *Flotowia diacanthoides*, im Wuchse, in den Dornen und Blättern überaus ähnlich, die Blüthe sei aber wie von der Gestalt und Grösse der von *Sarmienta repens* R. et P. (einer Gesneriacee, welche zwischen den Moosen und Farrnkräutern der Stämme und grösseren Aeste kriechend und durch ihre scharlachrothen Blumen damit lebhaft contrastirend zu den schönsten Zierden der Wälder des südlichen Chiles gehört). Von der Frucht wusste mir Herr **Renous** nichts zu sagen, wohl aber theilte mir derselbe mehrere Fälle von absichtlichen und unfreiwilligen Vergiftungen mit. Letztere sind um so leichter, als der Strauch, wie eben gesagt, dem *Tayu* so sehr ähnlich ist, dessen Rinde äusserlich und innerlich in Gestalt eines Dekoktes für ein vortreffliches Mittel gegen Quetschungen, Erschütterungen durch Fall, Hufschläge u. s. w. gilt. So theilte er mir unter andern folgenden Fall mit, der kürzlich passirt war. Einer seiner Holzarbeiter hatte einen heftigen Schlag mit dem stumpfen Ende einer Axt erhalten, und ging in den Wald, um sich dagegen Rinde von *Tayu* zu holen, ergriff aber statt dessen *Latue* und trank die Abkochung von diesem Gift. Fast unmittelbar darauf wurde er verrückt und lief in die Wälder, wo er erst nach Ablauf von drei Tagen in bewusstlosem Zustande gefunden wurde. Einige Tage genügten zwar, ihn wieder herzustellen, allein er behielt Monate lang heftige Kopfschmerzen. Eben so giftig wie die Rinde sind die Früchte, welche durch ihre Farbe und Grösse einige Aehnlichkeit mit jungen Aepfeln haben. Ein Paar Leute, welche auf dem Wege von Osorno nach Moullin, wo demnach die *Latue* auch wachsen muss, sich verleiten liessen, ein Paar Früchte zu essen, kamen fast ohne Bewusstsein und ganz verstört an letzterem Orte an. Leider habe ich nichts Näheres über die Symptome erfahren, welche der Genuss der *Latue* hervorbringt, und über die Gegenmittel, welche die Indianer anwenden, um die übeln Folgen der Vergiftung zu beseitigen.

Meine Begierde, eine so merkwürdige Pflanze kennen zu lernen, war natürlich sehr gross, und ich sparte keine Mühe, mir Exemplare derselben mit Blüthen und Frucht zu verschaffen, aber lange waren meine Anstrengungen vergebens. Im Jahre 1854 fand Herr **C. Ocsenius** am Ufer des Riobueno oder Trumao zwischen den Orten los Juntas und Trinidad einen ihm unbekannten Strauch in Blüthe, brach

The original description of the genus *Latua*. From *Botanische Zeitung* 16, No. 33(1858) 33.

1953, we were able finally to introduce the tree into cultivation in easily accessible gardens. Now, with plentiful material and after more than a decade of cautious consideration, I still hold that we have at hand an undescribed genus, the diagnosis of which is presented herewith.

Methysticodendron *R. E. Schultes gen. nov. Sollanacearum.*

Arbor. Folia ligulata. Flores solitarii, maximi, penduli. Calyx longe tubulosus, herbaceus, spathaceus. Corolla profundissime quinquedivisa, lobis spathulatis, acuminatis. Stamina tubi apicem versus affixa, filamentis robustioribus, apicem versus attenuatis et valde contortis; antherae lineares, loculis parallelis introrsum longitudinaliter dehiscentibus. Ovula in quoque loculo numerosa, in placentis axillaria. Styli tres, liberi (sed aspectu singulares, mucilagine (?) cohaerentes, valde tortiles), crassiore filiformi-ligulati sed in sectione concavo-complanati, stigmate indiviso, clavellato-tumescenti; ex ovarii parte centrali duo vel tres appendices, una filiformis, stylo subsimilis sed multo brevior atque una vel duae ad subulas brevissimas vel bullas reductae. Fructus non est praesto.

Genus apparenter *Datura* sectione *Brugmansia* satis affine est.

Generis nomen Graece "arbor somnifica," inter indigenas usum perstringens, significat.

Generis species typica: *Methysticodendron Amesianum.*

Methysticodendron Amesianum *R. E. Schultes spec. nov.*

Arbor usque ad viginti quinque pedes alta, ramulis brevibus, dense foliatis. Folia membranacea, atroviridia, anguste lineari-ligulata, apice acuminata, basi sensim attenuata (saepissime sine petiolo distincto), margine vulgo

The original description of the genus *Methysticodendron*. From *Botanical Museum Leaflets* Harvard University 17(1955) 2.

Bot. 1(1863): 336. Euphorbiaceae.

* *Anadenanthera colubrina* (Vell.) Brenan in Kew Bull. 2(1955): 182. Leguminosae.
* *Anadenanthera colubrina* (Vell.) Brennan var. *Cebil* (Griseb.) Altschul in Contrib. Gray Herb. Harvard Univ. 193(1964): 53. Leguminosae.
* *Anadenanthera peregrina* (L.) Spegazzini in Physis 6(1923): 313. Leguminosae. This plant is better known in the literature as *Piptadenia peregrina* (L.) Bentham in Journ. Bot. 4(1841): 340.
* *Anadenanthera peregrina* (L.) Spegazzini var. *falcata* (Benth.) Altschul in Contrib. Gray Herb. Harvard Univ. 193(1964): 50. Leguminosae.
† *Alstonia venenata* R. Brown in Mem. Wern. Soc. 1(1809): 77. Apocynaceae.
* *Ariocarpus fissuratus* (Engelm.) K. Schumann in Engler et Prantl, *Nat. Pflanzenf.* 3, Abt. 6a(1894): 195. Cactaceae.
† *Ariocarpus retusus* Scheidweiler in Bull. Acad. Brux. 5(1838): 492. Cactaceae.
* *Atropa Belladonna* Linneaus, *Sp. Pl.* (1753): 181. Solanaceae.
* *Banisteriopsis Caapi*(Spr. ex Griseb.) Morton in Journ. Wash. Acad. Sci. 21(1931): 485. Malpighiaceae.
* *Banisteriopsis Cabrerana* Cuatrecasas in Webbia 13(1958): 493. Malpighiaceae.
* *Banisteriopsis inebrians* Morton in Journ. Wash. Acad. Sci. 21(1931): 485. Malpighiaceae.
* *Banisteriopsis Rusbyana* (Ndz.) Morton in Journ. Wash. Acad. Sci. 21(1931): 487. Malpighiaceae.
* *Brugmansia aurea* (L.) Lagerheim in Bot. Jahrb. 20(1895): 664. Solanaceae. This plant is known also as *Datura aurea* Linnaeus, *Sp. Pl.* (1753): 179.
* *Brugmansia X candida* Persoon (*Sym. Pl.* 1(1805): 216). Solanaceae. This plant is known also as *Datura candida* Pasq., *Cat. Ort. Bot. Nap.* (1867): 36, *nomen illegit.*
* *Brugmansia* X *dolichocarpa* Lagerheim in Bot. Jahrb. 20(1895): 665. Solanaceae.
* *Brugmansia* X *insignis* (Barb.-Rodr.) Lockwood ex. R.E. Schultes in Bot. Mus. Leafl., Harvard Univ. 25(1977): 124. Solanaceae.
* *Brugmansia sanguinea* (R. et P.) D. Don in Sweet, *Brit. Fl. Gard.* 2(1835): 272. Solanaceae. This plant is known also as *Datura sanguinea* Ruíz et Pavón, *Fl. Peruv.* 2(1799): 15.
* *Brugmansia suaveolens* (H. et B. ex Willd.) Berchtold et Presl, *Rostl.* 1, *Solaneac.* (1823): 45. Solanaceae. This plant is known also as *Datura suaveolens* Humboldt et Bonpland ex Willdenow, *Enum. Hort. Berol.* (1809): 227.
* *Brugmansia versicolor* Lagerheim in Bot. Jahrb. 20(1895): 666. Solanaceae.
* *Brugmansia vulcanicola* (A.S. Barclay) R.E. Schultes in Bot. Mus. Leafl., Harvard Univ. 25(1977): 154. Solanaceae.
* *Brunfelsia Chiricaspi* Plowman in Bot. Mus. Leafl., Harvard Univ. 23(1973): 255. Solanaceae.
* *Brunfelsia grandiflora* D. Don in Edinb. New Phil. Journ. (April-October, 1829): 86. Solanaceae.
* *Brunfelsia grandiflora* D. Don subsp. *Schultesii* Plowman in Bot. Mus. Leafl., Harvard Univ. 23(1973): 259. Solanaceae.
† *Cacalia cordifolia* Linnaeus fil., *Suppl.* (1781): 351. Compositae.
* *Caesalpinia sepiaria* Roxburgh, *Hort. Bengal* (1814): 32. Leguminosae.
* *Calea Zacatechichi* Schlechtendal in Linneae 9(1834): 589. Compositae.
† *Canavalia maritima* Petit-Thouars in Desvaux, Journ. Bot. 1(1813): 80. Leguminosae.
* *Cannabis indica* Lamarck, *Encycl. Méth.* 1(1785): 695. Cannabaceae.
* *Cannabis sativa* Linnaeus, *Sp. Pl.* (1753): 1027. Cannabaceae.
* *Cestrum laevigatum* Schlechtendal in Linnaea 7(1832): 59. Solanaceae.
† *Coleus Blumei* Bentham, *Lab. Gen. et Sp.* (1832): 56. Labiatae.
† *Coleus pumilus* Blanco, *Fl. Philip.* Ed. 1(1837): 482. Labiatae.
* *Coriaria thymifolia* Humboldt et Bonpland ex Willdenow, *Sp. Pl.* 4, pt. 2(1806): 819. Coriariaceae.
* *Coryphantha compacta* (Engelm.) Britton et Rose, *Cactaceae* 4(1923): 36. Cactaceae.
* *Coryphantha macromeris* (Engelm.) Lemaire, *Cactées* (1868): 35. Cactaceae.
* *Coryphantha Palmerii* Britton et Rose, *Cactaceae* 4(1923): 39. Cactaceae.
* *Cymbopogon densiflorus* Stapf. in Prain, *Fl. Trop. Afr.* 9(1918): 289. Gramineae.
* *Cytisus canariensis* (L.) O. Kuntze, *Rev. Gen. Pl.* 1(1891): 177. Leguminosae.
* *Datura ceratocaula* Ortega, *Decas.* 1(1797): 11. Solanaceae.
* *Datura discolor* Bernhardi ex Trommsdorf in N. Journ. Pharm. 26(1833): 149. Solanaceae.
* *Datura ferox* Linnaeus, *Amoen. Acad.* 3(1756): 403. Solanaceae.
* *Datura inoxia* Miller, *Gard, Dict.*, Ed. 8(1768) *Datura* No. 5. Solanaceae. This plant is known also as *Datura meteloides* DeCandolle ex Dunal in Decandolle, *Prodr.* 13, pt. 1(1852): 544.
* *Datura kymatocarpa* A.S. Barclay in Bot. Mus. Leafl.,

Sur les caractères physionomiques de ce champigon, il est difficile d'apporter des précisions. On peut seulement dire que, sec, le chapeau offre une couleur ocre roux orangé (proche de K. 108), que les lamelles sont peu larges mais non étroites (ce qui sépare déjà l'espèce de *yungensis*), que le pied, grêle, est de couleur plus sombre. Le seul indice spécifique notable qui permettait sur place de caractériser alors ce Psilocybe s'appliquait à la présence au centre du chapeau de la longue papille aiguë, spiniforme-acérée, mais on sait aujourd'hui que d'autres Psilocybes de cette stirpe la révèlent aussi. Les carpophores, non lignicoles, poussent isolés ou agrégés par deux, dans la terre humique.

La papille est donc le critère physionomique qui rapproche visiblement ce champignon, recueilli et utilisé par les Indiens mazatèques, de l'espèce mixe, que Searle HOOGSHAGEN nous a fait parvenir de Coatlán, en août 1958, et qui a pu faire l'objet de la description suivante grâce à la qualité des exemplaires transmis par le collecteur auquel il nous est agréable de dédier l'espèce. Nous aurions réuni ces deux Psilocybes si leurs particularités en cultures issues des spores ne différaient nettement; l'existence de nombreuses spores doubles chez le *Hoogshageni* appuie cette séparation.

Psilocybe Hoogshageni HEIM, nov. sp.

(Pl. XXIII, fig. 1, 2; fig. texte 24 H, 33 I)

DESCRIPTION

CARACTÈRES MACROSCOPIQUES.

CHAPEAU de 1 à 1,6 cm de largeur en général, de périmètre orbiculaire, en cloche aiguë de 8 à 14 mm de haut, régulièrement *relevée sur le bord*, à laquelle une *longue papille* de plusieurs millimètres de haut, *parfois crochue*, généralement aiguë, voire cylindrique, donne un profil très caractéristique, élevant le piléus jusqu'à une hauteur de 17 mm; rarement conique-étalé, atteignant alors 3 cm de large, à marge ondulée-relevée, le mucron acéré se réduisant dans ces conditions à un mamelon pustuliforme; de couleur brun ocre, plus sombre çà et là, *longuement et régulièrement marqué de stries distantes* s'achevant presque à la base du prolongement papilleux, et correspondant aux lamelles, avec intercalation très nette de stries beaucoup plus courtes propres aux lamellules; à revêtement non visqueux ni tomenteux, mais marqué de fines et multiples granulations adhérentes, visibles à la loupe, et de petites bosses moins circonscrites; très difficilement séparable.

PIED *long et grêle*, de 3,5 à 6 cm de hauteur, atteignant 7 cm sur les carpophores à large chapeau, mince en haut, puis *s'épaississant*, en général régulièrement, *vers la base*, où celle-ci se renfle parfois assez brusquement (p. ex. : 0,7 à 2 mm, 1,8 à 5 mm, et, sur les gros échantillons, 1,6 à 2,2 mm); fibreux, dur, un peu corné, onduleux ou raide, tordu, parfois longitudinalement *sillonné*, voire côtelé, glabre, dépourvu de tout indice de voile; crème en haut, puis brun roux au milieu, brun noirâtre à la partie inférieure, et brunissant sur la crête des côtes; largement fistuleux.

LAMELLES nettement *distantes* (une quarantaine), ondulées, assez épaisses, peu larges et ascendantes (± 2 mm sur les petits spécimens, au maximum 5 mm sur les grands

carpophores), adnexées, à surface un peu gaufrée-ondulée; accompagnées de deux séries de lamellules inégales, à arête subtilement crénelée; fauve brunâtre.

CHAIR pelliculaire et translucide dans le chapeau sauf au sommet où, blanchâtre, elle devient épaisse par suite de la présence de la papille ou du mamelon, jaune dans le stipe; à saveur âcrescente, à très forte odeur (de farine?) (1).

CARACTÈRES MICROSCOPIQUES.

SPORES *extrêmement polymorphes*, de 6-8 (-10) × (4-) 4,5-6 (-6,5) × (3-) 4-4,5 (-5,5) μ; quand elles sont *normales : lenticulaires-trigones, subcordiformes*, utriformes-piriformes ou subcitriformes et symétriques par rapport à un axe en profil frontal, voire plus ou moins amygdaliformes en ce profil; accompagnées de nombreuses spores *anormales, soit exceptionnellement étroites, soit doubles :* les premières amygdaliformes-subcylindracées, subisodiamétriques en profil transverse, de 7,5-9,5 × 2,8-4 μ, régulières ou bosselées, les secondes offrant tous les profils, depuis celui « en pistolet » jusqu'à la silhouette cordiforme à deux éléments ovoïdes identiques, plus ou moins nettement séparés (fig. 24); pore germinatif large (de 1,2 μ environ), parfois double mais le plus souvent unique dans les spores jumelées; à membrane au moins quadruple; de couleur ocré clair.

BASIDES de 22-28 × ± 7 μ, cylindracées, très brièvement pédicellées, nettement étranglées dans le tiers supérieur, à (2-) 4 stérigmates longs, aigus, étroits. Arête stérile et hétéromorphe à POILS CHEILOCYSTIDIFORMES, de 30-40 μ sur 6-7 μ de large, longuement étirés en un bec étroit atteignant 16 μ de hauteur. POILS PLEUROCYSTIDIFORMES rares, de 26-32 × ± 11 μ, piriformes-allongés, soit à contenu huileux homogène prenant le bleu coton C_4 B, soit à membrane réfringente épaisse (1,2 μ environ). ÉPICUTIS de 50 μ d'épaisseur, à éléments serrés, parallèles, de 3 μ environ de diamètre, s'élargissant de plus en plus vers le DERME, brunâtre, puis l'HYPOPHYLLE.

HABITAT ET RÉPARTITION GÉOGRAPHIQUE.

Fasciculé le plus souvent, sur le sol, au long des chemins forestiers, dans la sylve hygrophile à chênes et à pins, parmi la végétation graminéenne, vers 1900 mètres d'altitude, mont du Tabac (Nu Uyk Yuak), près de Coatlán, 14 juillet 1958 (Searle HOOGSHAGEN et Alejandro CABRERO leg.) *(type)*.

NOM VERNACULAIRE.

atka:t (= champignon de l'alcade, en mixe).

OBSERVATIONS

Ce n'est pas sans hésitation que nous séparons cette espèce des deux précédentes. Cependant, l'étude comparée des matériaux en notre possession ne nous autorise pas à assimiler ces formes : le *cordispora* possède un port bien différent; le chapeau est plus petit, non papilleux,

(1) Rappelons que les Mixe attribuent au *pi:tpa (Ps. mexicana)*, à l'*atka:t (Ps. Hoogshageni)* et au *kongk (Ps. mixaeensis)* « une odeur agréable de fleurs et un goût qui ne ressemble à rien d'autre ».

The original description of *Psilocybe Hoogshagenii*. From Heim & Wasson *Les Champignons Hallucinogènes du Mexique* (1958) 169.

Harvard Univ. 18(1959): 256. Solanaceae.

* *Datura Metel* Linnaeus, *Sp. Pl.* (1753): 179. Solanaceae.
† *Datura pruinosa* Greenman in Proc. Am. Acad. 33(1898): 486. Solanaceae.
† *Datura quercifolia* Humboldt, Bonpland et Kunth, *Nov. Gen. et Sp.* 3(1818): 6. Solanaceae.
* *Datura reburra* A.S. Barclay in Bot. Mus. Leafl., Harvard Univ. 18(1959): 258. Solanaceae.
* *Datura Stramonium* Linnaeus, *Sp. Pl.* (1753): 179. Solanaceae.
* *Datura Wrightii* Regel, Gartenfl. 8(1859): 193. Solanaceae.
* *Desfontainia spinosa* Ruíz et Pavón, *Fl. Peru.* 2(1799): 47. Desfontainiaceae.
† *Echinocereus Salm-Dyckianus* Scheer in Seemann, *Bot. Voy. Herald* (1856): 291. Cactaceae.
† *Echinocereus triglochidiatus* Engelmann in Wislizenus, *Mem. Tour N. Mex.* (1848): 93. Cactaceae.
* *Elaeophorbia drupifera* (Thonn) Stapf in Hooker, Icon. Pl. (1906): t. 2823. Euphorbiaceae.
* *Epithelantha micromeris* (Engelm.) Weber ex Britton et Rose, *Cactaceae* 3(1922): 93. Cactaceae.
† *Erythrina coralloides* Mociño et Sessé ex DeCandolle, *Prodr.* 2(1825): 413. Leguminosae.
† *Erythrina flabelliformis* Kearney in Trans. N.Y. Acad. Sci. 14(1894): 32. Leguminosae.
* *Galbulimima Belgraveana* (F. Muell.) Sprague in Journ. Bot. 60(1922): 138. Himantandraceae.
† *Gaultheria* sp. Ericaceae.
† *Gomortega Keule* (Mol.) I.M. Johnston in Contrib. Gray Herb., n.s. 3, No. 70(1924): 92. Gomortegaceae.
† *Heimia salicifolia* (HBK.) Link, Enum. Pl. 2(1822): 3. Lythraceae.
† *Helichrysum foetidum* (L.) Moench, *Meth.* (1794): 575. Compositae.
† *Helichrysum stenopterum* DeCandolle, *Prodr.* 6(1838): 201. Compositae.
* *Helicostylis pedunculata* Benoist in Bull. Mus. Hist. Nat. Paris 25(1919): 298. Moraceae.
* *Helicostylis tomentosa* (Poepp. et Endl.) Rusby in Mem. Torr. Bot. Club 6(1896): 120. Moraceae.
* *Homalomena* sp. Araceae.
* *Hyoscyamus niger* Linnaeus, *Sp. Pl.* (1753): 179. Solanaceae.
* *Iochroma fuchsioides* Miers in Hooker, Lond. Journ. Bot. 7(1848): 347. Solanaceae.
* *Ipomoea violacea* Linnaeus, *Sp. Pl.* (1753): 161. Convolvulaceae.
* *Iryanthera macrophylla* (Benth.) Warburg in Nov. Act. Acad. Leop.-Carol. 68(1897): 155. Myristicaceae.
† *Juanulloa ochracea* Cuatrecasas in Brittonia 10(1958): 148. Solanaceae.
* *Justicia pectoralis* Jacquin var. *stenophylla* Leonard in Contrib. U.S. Nat. Herb. 31(1958): 615. Acanthaceae.
† *Kaempferia Galanga* Linnaeus, *Sp. Pl.* (1753): 3. Zingiberaceae.
† *Lagochilus inebrians* Bunge in Mém. Sav. Etr. Petersb. 7(1847): 438. Labiatae.
* *Latua pubiflora* (Griseb.) Baillon, *Hist. Plant.* 9(1888): 334. Solanaceae.
† *Lobelia Tupa* Linnaeus, *Sp. Pl.*, Ed. 2(1763): 1318. Campanulaceae.
* *Lophophora diffusa* (Croiz.) H. Bravo in Cact. Suc. Mex. 12(1967): 13. Cactaceae.
* *Lophophora Williamsii* (Lem.) Coulter in Contrib. U.S. Nat. Herb. 3(1894): 131. Cactaceae.
* *Mammillaria Craigii* G. Lindsay in Cact. Succ. Journ. Am. 14(1942): 107. Cactaceae.
* *Mammillaria Grahamii* Engelmann var. *Oliviae* (Orcutt) L. Benson, *Cacti of Arizona* (1969): 22. Cactaceae.
* *Mammillaria senilis* Loddiges ex Scheer in Seemann, *Bot. Voy. Herald* (1856): 286. Cactaceae.
* *Mandragora officinarum* Linnaeus, *Sp. Pl.* (1753): 181. Solanaceae.
† *Maquira sclerophylla* (Ducke) C.C. Berg in Acta Bot. Néerl. 18(1969): 463. Moraceae. This plant is known also in the literature as *Olmedioperebea sclerophylla* Ducke in Arch. Jard. Bot. Rio Jan. 3(1922): 23.
† *Markea formicarium* Dammer in Bot. Jahrb. 37(1905): 170. Solanaceae.
* *Mascagnia glandulifera* Cuatrecasas in Webbia 13(1958): 502. Malpighiaceae.
† *Mascagnia psilophylla* (Juss.) Griesbach var. *antifebrilis* (R. et P.) Niedenzus. Malpighiaceae.
† *Mesembryanthemum expansum* Linnaeus, *Syst.*, Ed. 10(1759): 1059. Aizoaceae.
† *Mesembryanthemum tortuosum* Linnaeus, *Sp. Pl.* (1753): 487. Aizoaceae.
* *Methysticodendron Amesianum* R.E. Schultes in Bot. Mus. Leafl., Harvard Univ. 17(1955): 2. Solanaceae.
* *Mimosa hostilis* (Mart.) Bentham in Trans. Linn. Soc. 30(1875): 415. Leguminosae.
† *Mimosa verrucosa* Bentham in Hooker, Journ. Bot. 4(1842): 390. Leguminosae.
† *Mucuna pruriens* (L.) DeCandolle, *Prodr.* 2(1825): 405. Leguminosae.
† *Myristica fragrans* Houttuyn, *Handleid* 2(1774): 333. Myristicaceae.
* *Nephelium Topengii* (Merr.) H.S. Lo, *Fl. Hainanica* 3(1974): 85. Sapindaceae.
* *Nicotiana rustica* Linnaeus, *Sp. Pl.* (1753): 180. Solanaceae.

BOTANICAL MUSEUM LEAFLETS
HARVARD UNIVERSITY

CAMBRIDGE, MASSACHUSETTS, DECEMBER 28, 1962 VOL. 20, NO. 3

A NEW SPECIES OF SALVIA FROM MEXICO

BY

CARL EPLING[1] AND CARLOS D. JÁTIVA-M.[1]

IN the course of his studies of narcotic plants in southern Mexico, Mr. R. Gordon Wasson became interested in a member of the Labiatae which is employed by the Mazatec Indians of Oaxaca as a psychotropic drug.

An examination of material from the Mazatec country indicates that the plant in question is an undescribed species of Salvia:

Salvia divinorum (Dusenostachys) *Epling & Játiva sp. nov.*

Herba perennis altitudine 1 m. et ultra, caulibus pilis plus minusve articulatis pubescentibus; foliorum laminis plus minusve ovatis, 12–15 cm. longis, in apice acuminatis, in basi plus minusve rotundatis et ad petiolos 2–3 cm. longis attenuatis, ad margines crenato-serratis et in sinibus hirtellis, paginis ambabus glabratis nisi inferiore ad venas hirtella; floribus in verticillastris sat distantibus ut videtur in paniculis amplis, ramis 30–40 cm. longis cyaneo-puberulis; pedicellis gracilibus 8–9 mm. longis; calycum cyaneorum glabrorum tubo in maturitate 15 mm. longorum labia superiore 1.5 mm. longa, imprimis 3-venia; corollarum cyanearum sigmoidearum tubo 22 mm. longo, intus nudo, labia superiore 6 mm. alta, inferiore ut videtur breviore et incurva; staminibus ad fauces positis, inclusis, gubernaculo integro; stylo hirtello, ramo postico paulo longiore obtuso plano, antico ut videtur carinato.

MEXICO. Estado de Oaxaco. San José Tenango, in the Sierra Mazateca; in ravines with black soil marginal to the wet forest. September 8, 1962, *A. Hofmann & R. G. Wasson s.n.* (TYPE in Herb. Univ. Cal., Los Angeles; DUPLICATE TYPE in Econ. Herb. Oakes Ames).

Salvia divinorum is allied to *S. cyanea* Lamb. ex Benth., which is found in central Mexico. The former differs from the latter principally in respect to leaf shape (the attenuation of the blade) and the flattened upper style branch. The bracts of *Salvia divinorum* appear to be tardily deciduous. The species is doubtless striking in its habitat and might possibly be valuable if introduced into horticulture.

The specific name, which means "of the seers," refers to the curious use to which the plant is put by the Mazatec Indians and which Mr. Wasson describes in the following pages.

[1] Herbarium, Department of Botany, University of California, Los Angeles, California.

The original description of *Salvia divinorum*. From *Botanical Museum Leaflets* Harvard University 20(1962) 75.

* *Nicotiana Tabacum* Linnaeus, *Sp. Pl.* (1753): 180. Solanaceae.
† *Nymphaea ampla* (Salisb.) DeCandolle, *Syst.* 2(1821): 54. Nymphaeaceae.
† *Nymphaea caerulea* Savigny in Ann. Mus. Paris 1(1802): 366. Nymphaeaceae.
† *Oncidium Cebolleta* (Jacq.) Swartz in Vet. Akad. Handl. Stockh. 21(1800): 240. Orchidaceae. A frequently employed synonym is *O. longifolium* Lindley in Bot. Reg. (1841): Misc. 22.
* *Pachycereus pecten-aboriginum* (Engelm.) Britton et Rose in Contrib. U.S. Nat. Herb. 12(1909): 422. Cactaceae.
* *Pancratium trianthum* Herbert in Ann. Nat. Hist., ser. 1, 4(1840): 28. Amaryllidaceae.
* *Pandanus* sp. Pandanaceae.
† *Peganum Harmala* Linnaeus, *Sp. Pl.* (1753): 444. Zygophyllaceae.
† *Pelecyphora aselliformis* Ehrenberg in Bot. Zeit. 1(1843): 737. Cactaceae.
† *Pernettya furens* (Hook ex D.C.) Klotsch in Linnaea 24(1851): 83. Ericaceae.
† *Pernettya parvifolia* Bentham, *Pl. Hartweg.* (1846): 219. Ericaceae.
† *Petunia* sp. Solanaceae.
* *Peucedanum japonicum* Thunberg, *Fl. Jap.* (1784): 117. Umbelliferae.
* *Phytolacca acinosa* Roxburgh, *Hort. Bengal* (1814): 85. Phytolaccaceae.
* *Psychotria carthaginensis* Jacq., *Enum. Pl. Carib.* (1760): 16. Rubiaceae.
* *Psychotria viridis* Ruíz et Pavón, *Fl. Peruv.* 2(1799): 61. Rubiaceae.
* *Ranunculus acris* Linnaeus, *Sp. Pl.* (1753): 554. Ranunculaceae.
† *Rhynchosia longeracemosa* Martens et Galeotti in Bull. Acad. Brux. 10, pt. 2(1843): 198. Leguminosae.
† *Rhynchosia pyramidalis* (Lam.) Urban in Fedde, *Rep.* 15(1918): 318. Leguminosae.
* *Salvia divinorum* Epling et Játiva-M. in Bot. Mus. Leafl., Harvard Univ. 20(1962): 75. Labiatae.
* *Scirpus* sp. Cyperaceae.
† *Senecio cardiophyllus* Hemsley, *Bio. Centr. Am. Bot.* 2(1881-2): 237. Compositae.
† *Senecio cervariaefolius* Schulz-Bipontinus in Flora 28(1845): 498. Compositae.
† *Senecio Grayanus* Hemsley, *Bio. Centr. Am. Bot.* 2(1881-2): 241.Compositae.
† *Senecio Hartwegii* Bentham, *Pl. Hartweg.* (1839): 18. Compositae.
† *Senecio praecox* DeCandolle, *Prodr.* 6(1838): 431. Compositae.
† *Senecio toluccanus* DeCandolle, *Prodr.* 6(1838): 428. Compositae.
† *Sida acuta* Burman fil, *Fl. Ind.* (1768): 147. Malvaceae.
† *Sida rhombifolia* Linnaeus, *Sp. Pl.* (1753): 684. Malvaceae.
* *Solandra brevicalyx* Standley in Field Mus. Pub. Bot. 22(1940): 102. Solanaceae.
* *Solandra guerrerensis* Martínez in An. Inst. Bio. Univ. Mex. 37(1967): 101. Solanaceae.
* *Sophora secundiflora* (Ort.) Lagasca ex DeCandolle, *Cat. Hort. Monsp.* (1813): 148. Leguminosae.
* *Tabernanthe Iboga* Baillon in Bull. Soc. Linn. Paris 1(1889): 783. Apocynaceae.
† *Tagetes lucida* Cavanilles, *Icones* 3(1795): 33, t. 264. Compositae.
† *Tanaecium nocturnum* (Barb.-Rodr.) Bureau et K. Schumann in Martius, *Fl. Bras.*. 8, Pt. 2(1896): 186. Bignoniaceae.
* *Teliostachya lanceolata* Nees var. *crispa* Nees in Martius, *Fl. Bras.* 9(1847): 72. Acanthaceae.
* *Tetrapteris methystica* R.E. Schultes in Bot. Mus. Leafl., Harvard Univ. 16(1954): 202. Malpighiaceae.
* *Tetrapteris mucronata* Cavanilles, *Diss.* 9(1790): 434, t. 262. Malpighiaceae.
* *Trichocereus Pachanoi* Britton et Rose, *Cactaceae* 2(1920): 134. Cactaceae.
* *Turbina corymbosa* (L.) Rafinesque, *Fl. Tellur.* 4(1836): 81. Convolvulaceae. This hallucinogen is better known in the literature as *Rivea corymbosa* (L.) Hallier fil. in Engler, *Bot. Jahrb.* 8(1893): 157.
* *Ungnadia speciosa* Endlicher, *Atakt. Bot.* (1833): t. 36. Sapindaceae.
* *Virola calophylla* Warburg in Nova Acta Acad. Leop.-Carol. 68(1897): 231. Myristicaceae.
* *Virola calophylloidea* Markgraf in Repert. Sp. Nov. 19(1923): 24. Myristicaceae.
* *Virola elongata* (Spr. ex Benth.) Warburg in Ber. Deutsch. Bot. Ges. 13(1895): 89. Myristicaceae.
* *Virola loretensis* A.C. Smith in Bull. Torrey Bot. Club 60(1933): 95. Myristicaceae.
* *Virola Pavonis* (DC.) A.C. Smith in Brittonia 2(1939): 504. Myristicaceae.
* *Virola surinamensis* (Rol.) Warburg in Nov. Acta Acad. Leop.-Carol. 68(1897): 208. Myristicaceae.
* *Virola theiodora* (Spr. ex Benth.) Warburg in Nova Acta Acad. Leop.-Carol. 68(1897): 187. Myristicaceae.
† *Zornia latifolia* DeCandolle, *Prodr.* 2(1825): 317. Leguminosae.

Figure 191 is from a photograph taken by Dr. Rose near Comanche, Bolivia, in 1914; figure 193 shows a flower and figure 194 a fruit collected by Dr. Shafer near Andalgala, Argentina, in 1916.

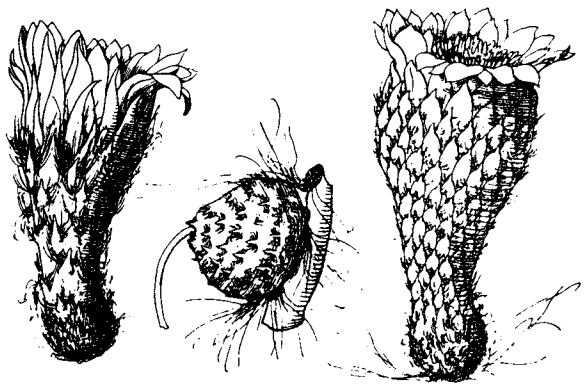

FIG. 193.—Flower of T. pasacana. ×0.6. FIG. 194.—Fruit of T. pasacana. ×0.6. FIG. 195.—Flower of T. candicans. ×0.6.

6. Trichocereus bridgesii (Salm-Dyck).

Cereus bridgesii Salm-Dyck, Cact. Hort. Dyck. 1849. 208. 1850.
Cereus lagenaeformis Förster, Hamb. Gartenz. **17**: 164. 1861.
Cereus bridgesii brevispinus Schumann, Gesamtb. Kakteen 108. 1897.
Cereus bridgesii lageniformis Schumann, Gesamtb. Kakteen 108. 1897.
Cereus bridgesii longispinus Maass, Monatsschr. Kakteenk. **15**: 119. 1905.
Cereus lasianthus Schumann in Rusby, Bull. N. Y. Bot. Gard. **4**: 365. 1907, as hyponym.

Tall, 2 to 5 meters high, more or less branching, pale green, a little glaucous; branches 1 to 1.5 dm. in diameter, 4 to 8-ribbed; ribs obtuse, separated by broad but shallow intervals; areoles large, about 2 cm. apart; spines 2 to 6, yellowish, acicular to subulate, very unequal, sometimes 10 cm. long, not swollen at base; flowers large, 18 cm. long; flower-tube 5 to 6 cm. long; throat broad; inner perianth-segments oblong, perhaps white, 5 to 6 cm. long; scales on ovary and flower-tube small, sometimes only 3 to 4 mm. long, scattered, bearing numerous hairs in their axils; fruit scaly, long-hairy, 5 to 6 cm. long.

Type locality: Not cited.

Distribution: About La Paz, Bolivia, where it is frequently grown as a hedge plant or placed on the tops of walls for the protection of gardens.

Mr. Juan Söhrens reports a similar plant from northern Chile which may belong here, or it may be the little-known *Cereus arequipensis*.

The origin of this species is unknown, but since it was named for Bridges, who collected in Bolivia, it is probable that it came from that country. Dr. Rose's specimens from Bolivia (No. 18842) closely resemble living plants so named from European collections, now represented in the New York Botanical Garden, so that we have no hesitancy in referring them here.

7. Trichocereus pachanoi sp. nov.

Plants tall, 3 to 6 meters high, with numerous strict branches, slightly glaucous when young, dark green in age; ribs 6 to 8, broad at base, obtuse, with a deep horizontal depression above the areole; spines often wanting, when present few, 3 to 7, unequal, the longest 1 to 2 cm. long, dark

yellow to brown; flower-buds pointed; flowers very large, 19 to 23 cm. long, borne near the top of branches, night-blooming, very fragrant; outer perianth-segments brownish red; inner perianth-segments oblong, white; filaments long, weak, greenish; style greenish below, white above; stigma-lobes linear, yellowish; ovary covered with black curled hairs; axils of scales on flower-tube and fruit bearing long black hairs.

Collected by J. N. Rose, A. Pachano, and George Rose at Cuenca, Ecuador, September 17 to 24, 1918 (No. 22806, type).

This species is widely cultivated throughout the Andean region of Ecuador, where it is grown both as an ornamental and as a hedge plant. In some of the lateral valleys on the western slope of the Andes it appears to be native, as for instance above Alausí, but as it has doubtless long been cultivated it is impossible to be sure of its natural habitat.

It is known to the Ecuadoreans as agua-colla or giganton and has been passing in Ecuador under the names of *Cereus peruvianus* and *Cereus giganteus*. It is named for Professor Abelardo Pachano of the Quinta Normal at Ambato, Ecuador, who accompanied Dr. Rose in 1918 on his travels in the high Andes of Ecuador.

FIG. 196.—Trichocereus pachanoi.

This species belongs to the high Andes, ranging from 2,000 to 3,000 meters in altitude. In the Chanchan Valley it certainly comes down to about 2,000 meters and overlaps the upper range of *Lemaireocereus godingianus*, which differs from it greatly in habit and flowers. Different as the two plants are, Richard Spruce, keen botanist as he was, confused them, as the following quotation will show; the part in italics refers to the *Lemaireocereus:*

"The brown hill-sides began to be diversified by an arborescent Cactus, with polygonal stems and white dahlia-like flowers, *which, Briareus-like, threw wide into the air its hundred rude arms. Lower down, at about 6,000 feet, I saw specimens full 30 feet high and 18 inches in diameter.*"

Figure 196 shows the top of a large plant growing on the sides of a cliff on the outskirts of Cuenca, Ecuador, photographed by George Rose in September 1918.

The original description of *Trichocereus Pachanoi*. From Britton & Rose *The Cactaceae* 2(1920) 134.

REFERENCES

Agurell, S.; Holmstedt, B. & Lindgren, J.-E. 1968. Alkaloid content of *Banisteriopsis Rusbyana* (Ndz.) Morton, *American Journal of Pharmacy* Vol. 140: 148-151.

Altschul, S. von R. 1972. *The Genus Anadenanthera in Amerindian Cultures*. Cambridge, Massachusetts: Harvard Botanical Museum.

Altschul, S. von R. 1967. Vilca and its uses. In: Efron, D. (Ed.). *Ethnopharmacologic Search for Psychoactive Drugs*. Public Health Service Publication No. 1645: 307-314. Washington, D.C.: Government Printing Office.

Biocca, E. 1966. *Viaggi tra gli indi alto Rio Negro – alto Orinoco*. Volume 2. Rome: Consiglio Nazionale delle Richerche.

Brewer-Carais, C. & Steyermark, J.A. 1976. Hallucinogenic snuff drugs of the Yanomamo Caburi e-Teri in the Cauaburí River, Brazil. *Economic Botany* Vol. 30: 57-66.

Califano, M. 1975. El chamanismo mataco. *Scripta Ethnologia* Vol. 3(2): 30-37.

Câmara, A. 1873. Diccionario de Botânica de Brasil . . . Rio de Janeiro.

Cooper, J.M. 1949. Stimulants and narcotics. In: Steward, J.H. (Ed.). Handbook of South American Indians. *Bureau of American Ethnology Bulletin No. 143* Vol. 5: 525-558. Washington, D.C.: Government Printing Office.

Cuatrecasas, J. 1958. Prima flora Colombiana 2 – Malpighiaceae. *Webbia* Vol. 13: 343-364.

der Marderosian, A.; Kensinger, K.M.; Chao, J.-M. & Goldstein, F.J. 1977. The use of hallucinatory principles of a psychoactive beverage of the Cashinahua tribe (Amazon basin). *Drug Dependence* No. 5: 7-14.

der Marderosian, A.; Pinkley, H.V. & Dobbins, M.F. 1968. Native use and occurrence of N,N-dimethyltryptamine in the leaves of *Banisteriopsis Rusbyana*. *American Journal of Pharmacy* Vol. 140: 137-147.

Ducke, A. 1939. As leguminosas da Amazônia brasileira. Rio de Janeiro: Servicio de Publicidade Agricola.

Ducke, A. 1938. Plantes nouvelles . . . *Arch. Inst. Biol. Veg.* Vol. 4(1): 3.

Friedberg, C. 1965. Des Banisteriopsis utilisés comme drogue en Amerique du Sud. *Journal d'Agriculture Tropicale et de Botanique Appliquée* Vol. 12: 403-437, 555-594 & 729-780.

García-Barriga, H. 1958. El yajé, caapi o ayahuasca: un alucinógeno amazónico. *Revista Universitaria* Vol. 23: 59-76.

Gonçalves de Lima, O. 1946. Observações sobre o vinho da jurema utilizado pelos indios Pancarú de Tacaratú (Pernambuco). *Arqu. Inst. Pesquisas Agron.* Vol. 4: 45-80.

Gumilla, J. 1741. *El Orinoco Ilustrado*. Madrid: Manuel Fernández.

Koch-Grünberg, T. 1923. *Vom Roroima zum Orinoco*. Stuttgart: Verlag Strecker und Schröder.

Kunth, K.S. 1825. *Synopsis Plantarum quas in Itinere ad Plagam Aequinoctialem Orbis Novi Collegerum Al. de Humboldt et Am. Bonpland*. Paris: F.G. Leverault.

Lanning, E.P. 1967. *Peru before the Incas*. Englewood Cliffs, New Jersey: Prentice-Hall.

Lathrap, D.W. 1975. *Ancient Ecuador: Culture, Clay and Creativity, 3000-300 B.C.* Chicago: Field Museum of Natural History.

Mello Morais, A.J. 1881. *Phytographia on Botânica Brasileria*. Rio de Janeiro: Livraria de B.L. Garnier.

Monardes de Sevilla. 1596. *Joyfull Newes out of the Newfound Worlde* . . . Frampton, J. (Trans.). London: E. Allde.

Monteira-Baena, A.L. 1843. Das observações ou notas ilustrativas dos primeiros tres capitulos da parte 2a do Thesouro Descoberto no Rio Amazonas. *Revista Trimensal do Instiuto Historico e Geographico Brazileiro* Vol. 19(5).

Morton, C.V. 1931. Notes on Yajé, a drug plant of southeastern Colombia. *Journal of the Washington Academy of Sciences* Vol. 21: 485-488.

Naranjo, P. 1970. *Ayahuasca: Religion y Medicina*. Quito: Editorial Universitaria.

Noronha, J.M. 1768. *Roteiro de Viagem da Cidade des Pará, até as Ultimas Colonia de Sertão da Provincia* Pará, Brazil: Tip. Santos and Irmãos.

Philippi, R.A. 1858. *Latua* Ph., ein neues Genus aus Solanaceen. *Bot. Zeit.* Vol. 16(33): 241-242.

Plowman, T.C. 1976. Orthography of Erythroxylum (Erythroxylaceae). *Taxonomy* Vol. 25: 141-144.

Plowman, T.C.; Gyllenhaal, L.O. & Lindgren, J.-E. 1971. *Latua pubiflora*: Magic plant from southern Chile. *Botanical Museum Leaflets*, Harvard University Vol. 23: 61-92.

Poisson, J. 1965. Note sur le "natem," boisson toxique Péruvienne et ses alcoloides. *Annales Pharmaceutiques Francaises* Vol. 23: 241-244.

Prance, G.T. 1977. The ethnobotany of the Paumarí Indians. *Economic Botany* Vol. 31: 129-139.

Prance, G.T. 1970. Notes on the use of plant hallucinogens in Amazonian Brazil. *Economic Botany* Vol. 24: 62-68.

Reinberg, P. 1921. Contribution à l'étude des boissons toxiques des Indians du nord-ouest de l'Amazone, l'ayahuasca, le yajé, le huanto. *Journ. Soc. Am. Paris* Vol. 13: 25-54 & 197-216.

Rivier, L. & Lindgren, J.-E. 1972. Ayahuasca: South American hallucinogenic drink – ethnobotanical and chemical investigations. *Economic Botany* Vol. 26: 101-129.

Rouhier, A. 1924. Le yagé: Plante télépathique. *Paris Médical* Vol. 52: 341.

Rusby, H.H. 1923. The aboriginal use of caapi. *Journal of the American Pharmaceutical Association* Vol. 12: 1123.

Safford, W.E. 1916. Identity of cohoba, the narcotic snuff of ancient Haiti. *Journal of the Washington Academy of Science* Vol. 6: 548-562.

Schultes, R.E. 1975. De plantis toxicariis e Mundo Novo tropicale commentationes XIII. Notes on poisonous or medicinal malpighiaceous species of the Amazon. *Botanical Museum Leaflets*, Harvard University Vol. 24: 121-131.

Schultes, R.E. 1972. De plantis toxicariis e Mundo Novo tropicale commentationes XI. The ethnotoxicological significance of additives to New World hallucinogens. *Plant Science Bulletin* Vol. 18: 34-41.

Schultes, R.E. 1969. De plantis toxicariis e Mundo Novo tropicale commentationes IV. Virola as an orally administered hallucinogen. *Botanical Museum Leaflets*, Harvard University Vol. 22: 133-164.

Schultes, R.E. 1957. The identity of the malpighiaceous narcotics of South America. *Botanical Museum Leaflets*, Harvard University Vol. 18: 1-56.

Schultes, R.E. 1954a. A new narcotic snuff from the northwest Amazon. *Botanical Museum Leaflets*, Harvard University Vol. 16: 241-260.

Schultes, R.E. 1954b. Un nouveau tabac à priser de l'Amazone

du Nord-ouest. *Journal d'Agriculture Tropicale et de Botanique Appliquée* Vol. 1(7-9): 298 311.

Schultes, R.E. 1954c. Plantae Austro-Americanae IX. Plantarum novarum vel notabilium notae diversae. *Botanical Museum Leaflets*, Harvard University Vol. 16: 202-205.

Schultes, R.E. & Hoffmann, A. 1973. *The Botany and Chemistry of Hallucinogens*. Springfield, Illinois: Charles C. Thomas.

Schultes, R.E. & Holmstedt, B. 1968. De plantis toxicariis e Mundo Novo tropicale commentationes II. The vegetal ingredients of the myristicaceous snuffs of the northwest Amazon. *Rhodora* Vol. 70: 113-160.

Schultes, R.E.; Holmstedt, B. & Lindgren, J.-E. 1969. De plantis toxicariis e Mundo Novo tropicale commentationes III. Phytochemical examination of Spruce's original collection of *Banisteriopsis Caapi*. *Botanical Museum Leaflets*, Harvard University Vol. 22: 121-132.

Schultes, R.E.; Holmstedt, B.; Lindgren, J.-E. & Rivier, L. 1977. De plantis toxicariis e Mundo Novo tropicale commentationes. XVIII. Phytochemical examination of Spruce's ethnobotanical collection of *Anadenanthera peregrina*. *Botanical Museum Leaflets*, Harvard University Vol. 25: 273-287.

Schultes, R.E. & Raffauf, R.F. 1960. *Prestonia*: An Amazon narcotic or not? *Botanical Museum Leaflets*, Harvard University Vol. 19: 109-122.

Schultes, R.E. & Swain, T. 1976. De plantis toxicariis e Mundo Novo tropicale commentationes XIIIa. Further notes on Virola as an orally administered hallucinogen. *Journal of Psychedelic Drugs* Vol. 8: 317-324.

Schultes, R.E.; Swain, T. & Plowman, T. 1977. De plantis toxicariis e Mundo Novo tropicale commentationes XVII. Virola as an oral hallucinogen among the Boras of Peru. *Botanical Museum Leaflets*, Harvard University Vol. 25: 259-272.

Spruce, R. 1908. *Notes of a Botanist on the Amazon and Andes*. Wallace, A.R. (Ed.). London: Macmillan.

Spruce, R. 1874. On some remarkable narcotics of the Amazon Valley and Orinoco. *Geography Magazine* Vol. 1: 184-193.

Villavicencio, M. *Geografía de la República del Ecuador*. New York: R. Craighead.

von Humboldt, A. 1819. *Voyage aux Régions Equinoxiales du Nouveau Continent*. Paris: F. Schoell.