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NOTES ON BROMELIACEAE, XXI

Lyman B. Smith

PITCAIRNIA

The following synopsis of Pitcairnia is long overdue, especially as there is little hope of publishing it as part of a monograph in the near future. The last complete treatment was that of Mez in the "Pflanzenreich" in 1935 with some 183 species. Since then, over 40 species either have been transferred to Puya or reduced outright and more than 100 new species have been added.

In preparing the key, I have not tried to make it taxonomic, although it approaches that state in places. Rather I have tried to produce something that would give accurate and rapid identifications. This is not easy with the best material and involves mounting the sepals to show their shape when unrolled and dissecting the ovary to ascertain the type of appendage on the ovule. The worst material, which unfortunately involves several unicate types, must have each species entered in several places in the key in order to cover all contingencies.

On the other hand, geographic correlations have proved quite helpful. For instance primitive types with compound inflorescences are not found in Mexico, while advanced types with deciduous leaves predominate there in response to a strong dry season but are absent in the West Indies. Subgenus Pitcairnia centers in the northern Andes while in the Amazon and Orinoco drainages it is almost wholly replaced by subgenus Pepinia.

The species in the text are in roughly taxonomic order by subgenera, but ignorance of the type of ovule-appendage makes the position of several conjectural. I believe that this is the basic division of the genus and that the broadly alate ovule is the more primitive, though this last is difficult to prove.

The line between Puya and Pitcairnia subgenus Pepinia is sometimes difficult to draw, so I am retaining P. ferruginea and P. nana in Pitcairnia on the basis of their slightly inferior ovaries and P. mirabilis on account of its somewhat zygomorphic flowers. They might equally well go in Puya on account of their strongly twisted petals in age, but there is no point in changing the status quo unless a definite improvement is gained thereby.

1. Inflorescence compound (sometimes normally simple inflorescences develop 1 or 2 lateral branches and such should be sought below if not found here).....Subkey I
1. Inflorescence simple.
2. Floral bracts ample, covering most or all of the flower just before anthesis (unknown in P. quesnelioides); leaves persistent, usually petiolate; pedicels mostly short and stout
Subkey II

2. Floral bracts narrow or small, exposing most or all of the flower.
3. Larger leaf-blades deciduous along a straight transverse line, grass-like, almost never petiolate; plants evidently of a strongly xerophytic habitat.....Subkey III
3. Larger leaf-blades (and all others) persistent, often petiolate; plants of a more mesophytic habitat.
4. Leaf-blades narrowed at base to a definite petiole. Subkey IV
4. Leaf-blades little if at all narrowed at base, not definitely petiolate.
5. Leaf-blades serrate at least in part.....Subkey V
5. Leaf-blades entire throughout.....Subkey VI

SUBKEY I

1. Leaf-blades (or the larger if dimorphic) uniformly spinose-serrate or serrulate (unknown in P. platystemon), persistent
2. Ovules and seeds alate with the appendage not produced at base or apex (not known in P. viridis), species of the Amazon and Orinoco drainages and two (P. ferruginea and P. viridis) of the central Andes. Pl. I, fig. 1.
3. Leaf-blades 90 mm wide; flowers reflexed. Venezuela. 1. P. agavifolia
3. Leaf-blades not over 75 mm wide.
4. Sepals densely ferruginous- or brown-lepidote, obtuse.
5. Sepals ferruginous-lepidote, 12-45 mm long; inflorescence usually ample. Ecuador, Peru, Bolivia. 34. P. ferruginea
5. Sepals brown-lepidote, 12 mm long; inflorescence pseudo-simple with branch-buds in the axils of the lower bracts. Peru.....35. P. viridis
4. Sepals whitish-lepidote or glabrous.
6. Sepals 40-50 mm long; petals naked.
7. Floral bracts minute, much shorter than the 20-30 mm pedicels; flowers pendent-secund. British Guiana, Surinam.....2. P. nuda
7. Floral bracts exceeding the 5-12 mm pedicels; flowers suberect.
8. Leaf-blades covered beneath with cinereous scales. Venezuela.....3. P. wurdackii
8. Leaf-blades glabrous on both sides. Colombia. 4. P. mituensis
6. Sepals 13-35 mm long.
9. Primary bracts equaling or exceeding the sterile bases of the branches.
10. Flowers strict; branches 5-6 cm long, simple; sepals 14 mm long. Venezuela.....5. P. kunhardtiana
10. Flowers spreading; branches 10-35 cm long.
11. Inflorescence bipinnate; sepals acute, 35 mm long. Venezuela, Colombia.....6. P. bulbosa

11. Inflorescence tripinnate; sepals obtuse, 20 mm long.
Colombia.....7. P. heliophila
9. Primary bracts shorter than the sterile bases of the branches.
12. Flowers sessile; sepals acute, 15-18 mm long.
Venezuela.....8. P. armata
12. Flowers distinctly pedicellate.
13. Flowers pendent-secund.
14. Floral bracts 8 mm long, exceeding the short pedicels; leaf-blades wholly glabrous. Venezuela.
9. P. breweri
14. Floral bracts 4 mm long, much shorter than the pedicels; leaf-blades cinereous-lepidote beneath.
Surinam.....10. P. geyskesii
13. Flowers ascending to spreading, not at all secund.
15. Pedicels ascending; sepals abruptly acute. Venezuela
11. P. pruinosa
15. Pedicels stiffly spreading; sepals acuminate.
Venezuela, Colombia, Brazil.....12. P. patentiflora
2. Ovules and seeds bicaudate or subulate with the appendage more extended at the ends than at the side. Chiefly Andean South America and West Indies. Pl. I, figs. 2, 3.
16. Sepals echinate or tuberculate, 27-45 mm long.
17. Floral bracts acuminate, nearly equaling to exceeding the 10-30 mm pedicels; sepals 35-45 mm long. Colombia.
44. P. echinata
17. Floral bracts apiculate, 5 mm long; pedicels 10 mm long; sepals 27 mm long. Venezuela.....45. P. tuberculata
16. Sepals not more than lepidote.
18. Inflorescence pseudo-simple with branch-buds in the lower bracts, few-flowered; sepals 12 mm long, brown-lepidote.
Peru.....35. P. viridis
18. Inflorescence obviously branched.
19. Petals yellow, cream or green.
20. Pedicels 10 mm long; petals appendaged. Hispaniola.
232. P. samuelssonii
20. Pedicels 15-23 mm long; petals naked.
21. Sepals 8 mm wide, asymmetric; floral bracts about half as long as the pedicels. Peru.....46. P. puyoides
21. Sepals 4.5 mm wide; floral bracts much more than half as long as the pedicels. Bolivia..47. P. platystemon
19. Petals red, appendaged.
22. Pedicels 20-25 mm long, not exceeding the lower floral bracts. Jamaica.....233. P. bromeliifolia
22. Pedicels not over 15 mm long.
23. Leaf-blades homomorphic, 10-20 mm wide, the spines to 3 mm long; sepals abruptly acute or obtuse. Puerto Rico, Lesser Antilles.....234. P. angustifolia
23. Leaf-blades dimorphic, mostly more than 20 mm wide.
24. Leaf-blades 10 mm wide; inflorescence few-branched.
Dominican Republic.....235. P. fuertesii
24. Leaf-blades 25-40 mm wide.

25. Sepals 25 mm long; larger leaf-blades scarcely narrowed at base. Lesser Antilles....236. P. gracilis
25. Sepals 15-18 mm long; larger leaf-blades more or less petiolate.
26. Sepals densely and persistently pale-lepidote. Peru.
48. P. pulverulenta
26. Sepals soon glabrous. Peru, Bolivia.
49. P. paniculata
1. Leaf-blades only partially spinose-serrate or serrulate or else entire.
27. Sepals obtuse or rounded and apiculate; ovules or seeds mostly with an apical appendage (broadly winged in P. killipiana and unknown in P. lechleri and P. verrucosa).
28. Leaves wholly entire, the blades all persistent.
29. Pedicels 40 mm long; leaves petiolate; sepals verrucose. Colombia.....50. P. verrucosa
29. Pedicels 5-19 mm long.
30. Lateral branches only 2 cm long; inflorescence narrowly thyrsoid. Peru.....51. P. ruiziana
30. Lateral branches much longer.
31. Racemes much longer than their peduncles, lax; sepals 33 mm long. Colombia.....36. P. killipiana
31. Racemes no longer than their peduncles; sepals 15-20 mm long.
32. Plant 2 m high; leaf-blades 40 mm wide. Colombia, Ecuador.....52. P. dendroidea
32. Plant 7 dm high; leaf-blades 18 mm wide. Dominican Republic.....237. P. jimenezii
28. Leaves partially spinose-serrate or serrulate.
33. Leaf-blades (the larger ones) deciduous along a straight transverse line; pedicels 5-7 mm long; petals appendaged
34. Floral bracts exceeding at least the lower pedicels; sepals 12 mm long. Peru.
35. Leaves all alike; blades to 9 mm wide.....53. P. rigida
35. Leaves dimorphic; blades to 20 mm wide...54. P. lechleri
34. Floral bracts all much shorter than the pedicels.
36. Leaves all alike; sepals 11-15 mm long. Peru, Bolivia.
55. P. inermis
36. Leaves dimorphic; sepals 22 mm long. Colombia.
56. P. arenicola
33. Leaf-blades all persistent; pedicels 4-30 mm long.
37. Leaf-blades long-spreading-spinose at base, 30-40 mm wide; inflorescence amply bipinnate. Colombia, Ecuador
38. Pedicels 15 mm long.....57. P. commixta
38. Pedicels not over 7 mm long.....58. P. lehmannii
37. Leaf-blades (larger) not prominently spinose at base (or not over 22 mm wide), 8-32 mm wide; inflorescence depauperate-compound.
39. Pedicels 15-30 mm long; sepals 20-30 mm long.
40. Leaves all alike. Jamaica.....238. P. platyphylla
40. Leaves dimorphic.
41. Petals naked. Argentina.....59. P. oranensis

41. Petals appendaged. Peru, Bolivia, Brazil.
60. P. subpetiolata
39. Pedicels 4-14 mm long.
42. Leaf-blades 20-35 mm wide, petiolate or subpetiolate.
43. Sepals 27 mm long; scape-bracts nearly all remote.
Argentina.....59. P. oranensis
43. Sepals 10-18 mm long.
44. Leaves spreading-spinose at base. Peru.
61. P. truncata
44. Leaves finely serrulate at most. Argentina.
62. P. chiriguana
42. Leaf-blades 8-18 mm wide, slightly if at all narrowed
at base.
45. Petals yellow or cream; sepals 21 mm long; flowers
finally recurved. Hispaniola...232. P. samuelssonii
45. Petals red; sepals 12-20 mm long.
46. Petals naked or with 2 minute oblique calli; sepals
12 mm long. Peru.....63. P. tarapotensis
46. Petals bearing a large scale at base; sepals 14-20 mm
long.
47. Sepals 20 mm long. Dominican Republic.
237. P. jimenezii
47. Sepals 14-16 mm long. Cuba.....239. P. cubensis
27. Sepals acute or acuminate.
48. The sepals 30-50 mm long.
49. Sepals echinate with stipitate-stellate trichomes.
Colombia.....44. P. echinata
49. Sepals not more than lepidote or verruculose.
50. Leaf-blades petiolate, persistent, 50-55 mm wide;
pedicels 20 mm long. Colombia.
51. Sepals 38 mm long; pedicels biangulate, exceeding the
persistent floral bracts.....64. P. choconensis
51. Sepals 50 mm long; pedicels terete, shorter than the
deciduous floral bracts.....65. P. haughtii
50. Leaf-blades only slightly narrowed toward base, 15-30 mm
wide.
52. Racemes dense; floral bracts narrowly lanceolate;
larger leaf-blades deciduous. Colombia.
66. P. megasepala
52. Racemes lax; floral bracts broad.
53. Leaf-blades trimorphic, the largest deciduous, entire.
Colombia.....67. P. trimorpha
53. Leaf-blades apparently all alike, persistent, serrulate
especially toward base; sepals verruculose.
Colombia, Ecuador.....68. P. poortmanii
48. The sepals 9-25 mm long.
54. Floral bracts equaling or exceeding the lower pedicels.
55. Petals white, yellow or green; sepals 12-22 mm long.
56. Sepals 12-15 mm long; floral bracts ample, imbricate
before anthesis, then deciduous. Colombia.
69. P. kniphofioides
56. Sepals 21-22 mm long; floral bracts persistent.

57. Lower floral bracts lanceolate, about equaling the sepals. Colombia.....70. P. tolimensis
57. Lower floral bracts broadly ovate, at most equaling the pedicels. Bolivia.....47. P. platystemon
55. Petals red (uncertain in P. ulei, but the lower floral bracts narrow and about equaling the pedicels).
58. Leaves all alike or nearly so.
59. Sepals 10-16 mm long.
60. Panicle ample; leaf-blades 13-19 mm wide. Venezuela, Trinidad.....71. P. integrifolia
60. Panicle depauperate; leaf-blades 10 mm wide. Cuba.
239. P. cubensis
59. Sepals 18-25 mm long.
61. Ovary only 1/3 superior; panicle depauperate, subdense with ascending branches; sepals 25 mm long. Brazil.
248. P. ulei
61. Ovary 1/2-3/4 superior.
62. Pedicels 20-25 mm long. Jamaica.
233. P. bromeliifolia
62. Pedicels 10-15 mm long.
63. Floral bracts elliptic, apiculate. Peru.
72. P. cassapensis
63. Floral bracts narrow, acuminate.
64. Inflorescence amply paniculate; floral bracts mostly shorter than the pedicels. Brazil.
249. P. anthericoides
64. Inflorescence few-branched; floral bracts mostly exceeding the pedicels.
65. Leaves dilated above the sheath; sepals 19 mm long. Venezuela.....73. P. moritziana
65. Leaves not dilated above the sheath; sepals 25 mm long. Puerto Rico (?), Lesser Antilles.
240. P. latifolia
58. Leaves strongly dimorphic.
66. Primary bracts about half as long as the axillary branches and much exceeding their short sterile bases. Peru.....74. P. cuzcoensis
66. Primary bracts several times shorter than the axillary branches and usually shorter than their sterile bases
67. Scape 2-3 mm in diameter; foliaceous leaves not over 5 dm long; plant to 5 dm high. Colombia.
75. P. schultzei
67. Scape stouter; foliaceous leaves to 7 dm long or more; plant over 1 m high.
68. Larger leaf-blades deciduous. Peru.
76. P. vargasiana
68. Larger leaf-blades persistent.
69. Smaller leaf-blades spiniform. Panama.
186. P. chiriquensis
69. Smaller leaf-blades with an entire filiform flexuous apical half. Venezuela, Trinidad.
71. P. integrifolia

54. Floral bracts all shorter than the pedicels.
70. Petals yellow, green or cream; pedicels to 25 mm long; ovary over 1/2 superior.
71. Floral bracts broadly ovate. Bolivia.
71. Floral bracts narrowly triangular. Costa Rica. 47. P. platystemon
70. Petals red or rarely blue (uncertain in P. ulei, but the pedicels only 8 mm long and the ovary only 1/3 superior). 77. P. halophila
72. Panicle depauperate, few-branched.
73. Pedicels to 8 mm long; ovary 1/3 superior. Brazil. 248. P. ulei
73. Pedicels 15-30 mm long; ovary 1/2-2/3 superior.
74. Leaves all alike, the blades 18-32 mm wide. Jamaica. 238. P. platyphylla
74. Leaves dimorphic, the larger blades only 11 mm wide. Guatemala.....187. P. flagellaris
72. Panicle ample, much branched.
75. Sepals and ovary echinate; stamens exserted. Colombia. 78. P. exserta
75. Sepals and ovary not more than lepidote.
76. Ovules and seeds winged; pedicels straight, spreading, 3-4 times longer than the floral bracts. Colombia, Venezuela, Brazil.....12. P. patentiflora
76. Ovules and seeds caudate to apiculate; pedicels mostly curved.
77. Sepals 9-17 mm long.
78. Inflorescence amply 3-pinnate; pedicels 5-7 mm long; leaves all alike; sepals 9-12 mm long. Costa Rica 188. P. valerii
78. Inflorescence not more than 2-pinnate or the pedicels 10-15 mm long; leaves mostly dimorphic.
79. Floral bracts nearly equaling the pedicels, lanceolate; leaves alike with blades 13-19 mm wide or the reduced ones with soft entire filiform apices Venezuela, Trinidad.....71. P. integrifolia
79. Floral bracts not much more than half as long as the pedicels or less.
80. Larger leaf-blades 25-35 mm wide.
81. Sepals densely and persistently pale-lepidote. Peru.....48. P. pulverulenta
81. Sepals soon glabrous. Peru, Bolivia. 49. P. paniculata
80. Larger leaf-blades to 15 mm wide.
82. Branches suberect; petals bearing a scale at base Ecuador.....79. P. devansayana
82. Branches spreading; petals naked or with 2 oblique calli. Peru.....63. P. tarapotensis
77. Sepals 18-25 mm long.
83. Leaf-blades 80 mm wide; inflorescence 4-pinnate; sepals green. Colombia.....80. P. diffusa

83. Leaf-blades 12-35 mm wide; inflorescence 2-3-pinnate
 84. Largest pedicels 15-18 mm long; leaf-blades to 35 mm wide. Bolivia.....81. P. multiramosa
 84. Largest pedicels 9-13 mm long.
 85. Ovary 3/4 to almost wholly superior; leaf-blades 22-35 mm wide.
 86. Leaf-blades furfuraceous beneath; petals naked. Bolivia.....82. P. odontopoda
 86. Leaf-blades not conspicuously furfuraceous beneath; petals appendaged. Peru, Bolivia. 49. P. paniculata
 85. Ovary only about 1/2 superior; leaf-blades 12-30 mm wide.
 87. Leaf-blades to 12 mm wide; ovules very short-caudate. Brazil.....249. P. anthericoides
 87. Leaf-blades 20-30 mm wide.
 88. Leaves petiolate; petals naked. Bolivia. 83. P. divaricata
 88. Leaves not petiolate; petals appendaged. Lesser Antilles.....236. P. gracilis

SUBKEY II

1. Scape very short or none; inflorescence short.
 2. Sepals carinate, 35-40 mm long; leaf-blades linear-triangular Bolivia.....37. P. nana
 2. Sepals ecarinate, 15-20 mm long.
 3. Plant caulescent; leaf-blades linear, 5-10 mm wide. Panama, Peru.....84. P. apelandriflora
 3. Plant stemless; leaf-blades oblong-spatulate, 30 mm wide. Mexico.....189. P. tabuliformis
 1. Scape well developed (unknown in P. poeppigiana, but the inflorescence elongate).
 4. Sepals not over 15 mm long. Colombia.
 5. Leaves dimorphic; floral bracts quickly deciduous; scape-bracts shorter than the upper internodes. 69. P. kniphofioides
 5. Leaves uniform, entire; floral bracts persistent; scape-bracts all longer than the internodes.
 6. Floral bracts concolorous, straight; seeds long-caudate. 85. P. capitata
 6. Floral bracts bicolorous, the upper part strongly reflexed; ovules obtuse.....86. P. guzmanoides
 4. Sepals 18-75 mm long.
 7. Ovary 3/4 inferior, subsessile; capsule indehiscent; ovules winged; floral bracts deciduous, unknown. Colombia. 13. P. quesnelioides
 7. Ovary 1/2 inferior or less.
 8. Sepals exceeding at least the upper floral bracts.
 9. Floral bracts rounded, obtuse or mucronulate, persistent.
 10. Flowers slenderly pedicellate; sepals obtuse, 40 mm long; leaf-blades entire. Colombia.....87. P. archeri

10. Flowers sessile; sepals acute, 25 mm long; leaf-blades serrate. Peru.....88. P. poeppigiana
9. Floral bracts acute or acuminate, deciduous in some species.
11. Sepals 60 mm long, linear-lanceolate, uncinata. Colombia.....89. P. macranthera
11. Sepals 20-37 mm long.
12. Inflorescence lax toward base.
13. Sepals oblong, rounded and apiculate; floral bracts even, coriaceous. British Honduras, Guatemala, Mexico.....190. P. recurvata
13. Sepals elliptic, obtuse, asymmetric; floral bracts nerved, subchartaceous. Central America, Guiana, Venezuela, Colombia.....90. P. maidifolia
12. Inflorescence dense throughout.
14. Posterior sepals broadly alate-carinate; flowers subsessile; inflorescence ellipsoid, 8 cm long; leaf-blades 20 mm wide. Peru.....91. P. sandemanii
14. Posterior sepals not alate or if somewhat so (? P. sceptriformis) then the flowers slenderly pedicellate.
15. Floral bracts subcoriaceous, persistent.
16. Sepals 20-22 mm long, pale-lepidote; leaf-blades 20-35 mm wide. Lesser Antilles....241. P. spicata
16. Sepals 37 mm long, brown-lanate; leaf-blades 90 mm wide. Colombia.....92. P. maritima
15. Floral bracts membranaceous, more or less deciduous.
17. Flowers subsessile; inflorescence 7 cm long. Peru. 93. P. ferreyrae
17. Flowers slenderly pedicellate for 3-8 mm; inflorescence 20-60 cm long.
18. Sepals carinate; inflorescence glabrous. Peru. 94. P. sceptriformis
18. Sepals ecarinate; inflorescence flocculose, often secund-flowered. Costa Rica to British Guiana and Bolivia.....95. P. brittoniana
8. Sepals completely covered by the floral bracts.
19. Floral bracts with divergent to spreading apices.
20. Leaf-blades elliptic to obovate-lanceolate, only 3-4 times as long as wide; sepals acuminate.
21. Leaf-blades 10-14 cm wide, apiculate. Colombia, Ecuador.....96. P. nigra
21. Leaf-blades 5 cm wide, acuminate. Ecuador. 97. P. pulchella
20. Leaf-blades lanceolate to linear, much more than 4 times as long as broad.
22. Flowers reflexed and the triangular acuminate floral bracts deciduous after anthesis; pedicels 8-10 mm long. Colombia.....98. P. brongniartiana
22. Flowers remaining erect and floral bracts imbricate after anthesis.
-

23. Pedicels 10 mm long, slender, ferruginous-tomentulose. "Guatemala". (Cultivation)...191. P. longibracteata
23. Pedicels very short to almost none, though often slender.
24. Floral bracts serrate, 10 cm long; sepals narrowly triangular, 40 mm long. Colombia, Ecuador. 99. P. brunnescens
24. Floral bracts entire.
25. Petals puberulent outside, orange; remainder of the inflorescence densely ferruginous-lepidote. Colombia.....100. P. barrigae
25. Petals glabrous.
26. Floral bracts membranaceous, bladeless; inflorescence obtuse. Mexico.....192. P. matudae
26. Floral bracts subcoriaceous or chartaceous.
27. Petioles entire.
28. Leaf-blades entire; inflorescence subcylindric; floral bracts with a distinct apical blade. Central America.....193. P. wendlandii
28. Leaf-blades serrulate; inflorescence clavate; floral bracts without a distinct apical blade. Peru.....101. P. clavata
27. Petioles spinose-serrate.
29. Sepals linear-lanceolate, acute, 32-39 mm long. Colombia.....102. P. squarrosa
29. Sepals oblong, truncate or broadly acute and apiculate, 25-30 mm long.
30. Floral bracts with a narrowly triangular divergent blade, red-purple, red or yellowish. Costa Rica to Colombia.....103. P. atrorubens
30. Floral bracts acute without a distinct blade, only slightly divergent, pale green. Ecuador. 104. P. campii
19. Floral bracts straight toward apex, usually strict and closely imbricate but lax in P. elongata and spreading in P. maidifolia.
31. Sepals 75 mm long; flowers not imbricate nor concealing the rachis but the apical sterile bracts doing so. Colombia, Ecuador.....105. P. elongata
31. Sepals 18-50 mm long.
32. Leaves spinose-serrate either along the petiole or the blade.
33. Floral bracts corrugated, soon disintegrating to a fine mesh of fibers; sepals broad, rounded, 40 mm long. Colombia, Ecuador.....106. P. bakeri
33. Floral bracts even or finely nerved but not corrugated
34. Leaf-blades 75-125 mm wide.
35. Sepals 25 mm long, oblong, abruptly acute. Peru. 88. P. poeppigiana
35. Sepals 45-50 mm long.
-

36. Leaf-blades oblanceolate, to 125 mm wide; sepals broadly acute and apiculate. Colombia, Panama, Costa Rica.....107. P. oblanceolata
36. Leaf-blades lanceolate or linear-lanceolate, 75-100 mm wide; sepals acuminate. Colombia.
37. Pedicels very stout; leaves all alike. 108. P. arcuata
37. Pedicels slender; leaves dimorphic. 109. P. fosteriana
34. Leaf-blades 30-55 mm wide.
38. Petiole entire; leaf-blade serrate toward apex. Guatemala.....194. P. macrochlamys
38. Petiole serrate; blade entire.
39. Flowers slenderly pedicellate.
40. Sepals oblong, obtuse and apiculate. Guatemala.....195. P. hemsleyana
40. Sepals narrowly triangular. Peru. 110. P. umbratilis
39. Flowers subsessile.
41. Leaf-blades dimorphic. Ecuador.....104. P. campii
41. Leaf-blades all alike.
42. Petals naked. Mexico.....196. P. imbricata
42. Petals appendaged. Guatemala, British Honduras. 197. P. petiolata
32. Leaves entire throughout.
43. Sepals 40 mm long, acuminate, membranaceous, floccose; floral bracts acuminate. Guatemala. 198. P. carioana
43. Sepals 18-30 mm long.
44. Sepals vestite; leaf-blades petiolate.
45. Leaf-blades 25 mm wide; sepals 19 mm long, the posterior alate-carinate. Ecuador. 111. P. hitchcockiana
45. Leaf-blades 50-63 mm wide; sepals 25-28 mm long.
46. Ovary almost wholly superior; petals naked, yellow. Ecuador.....112. P. scepstrigera
46. Ovary about 1/2 superior; petals appendaged, red. Peru.....113. P. asplundii
44. Sepals glabrous or nearly so.
47. Leaves all ending in a stout pungent black subulus; sepals narrowly triangular. Peru. 114. P. subulifera
47. Leaves not modified at apex.
48. Leaf-blades merely narrowed toward base, not petiolate.
49. Floral bracts ovate, acute, the upper ones 37 mm long; inflorescence racemose, lax at base, sepals obtuse. Costa Rica. 199. P. membranifolia
49. Floral bracts foliaceous, 60-80 mm long; inflorescence subcorymbose; sepals acuminate. "Guatemala". (Cultivation).

191. P. longibracteata
 48. Leaf-blades distinctly petiolate.
 50. Floral bracts broadly acute or rounded and apiculate.
 51. Sepals 18 mm long; floral bracts bright purple. Venezuela.....115. P. altensteinii
 51. Sepals 24 mm long; floral bracts reddish yellow. Mexico.....200. P. densiflora
 50. Floral bracts acuminate.
 52. Petals naked; leaf-blades 45 mm wide. Central America or Mexico?.....201. P. ochroleuca
 52. Petals appendaged; leaf-blades 50-85 mm wide. Central America.....193. P. wendlandii

SUBKEY III

1. Petals bearing a scale on the inner side at base. Northern Andes and Brazil, except for P. heterophylla extending to Mexico and P. theae in Costa Rica.
 2. Scape and inflorescence very short. Mexico to Venezuela and Peru.....116. P. heterophylla
 2. Scape (unknown in P. crassa) and inflorescence elongate.
 3. Sepals 30-42 mm long; petals mostly yellow or white (color unknown in P. crassa and P. theae, sometimes red in P. megasepala).
 4. Posterior sepals alate.
 5. Inflorescence dense; plant with a long erect stem. Peru. 117. P. augustii
 5. Inflorescence lax; plant stemless. Colombia. 66. P. megasepala
 4. Posterior sepals not more than carinate.
 6. Floral bracts triangular or lanceolate, acuminate.
 7. Inflorescence cinereous-furfuraceous; scape-bracts much exceeding the internodes, the upper ones 5 cm long. Costa Rica.....202. P. theae
 7. Inflorescence glabrous; scape-bracts slightly shorter than the upper internodes. Ecuador. 118. P. aequatorialis
 6. Floral bracts broadly lanceolate or elliptic, acute or apiculate.
 8. Pedicels slender, 11 mm long, all but the lowest exceeding the floral bracts. Colombia.....67. P. trimorpha
 8. Pedicels 2 mm in diameter, 25 mm long, all shorter than the floral bracts; leaves unknown, species doubtfully belonging in this subkey. Bolivia.....119. P. crassa
 3. Sepals 12-25 mm long.
 9. Pedicels obconic, alate, very short. Colombia. 70. P. tolimensis
 9. Pedicels slenderly cylindrical, not alate.
 10. Sepals emarginate, 12 mm long; pedicels 5 mm long. Peru. 53. P. rigida

10. Sepals acute or acuminate, 14-25 mm long; pedicels 3-20 mm long.
11. Leaf-blades all alike and deciduous, 10 mm wide; plant caulescent, branched; presence of petal-appendage uncertain. Colombia.....120. P. lignosa
11. Leaf-blades dimorphic or at least the inner persistent.
12. Pedicels 10-20 mm long. Brazil.
13. Sepals alate, 16-20 mm long.....30. P. ensifolia
13. Sepals ecarinate, 14 mm long.....250. P. torresiana
12. Pedicels 3-10 mm long. Northern Andes.
14. Inflorescence sparsely flocculose, soon glabrous; leaf-blades 5-10 dm long, 5-12 mm wide. Colombia.
121. P. stenophylla
14. Inflorescence densely and persistently tomentose-lepidote; leaf-blades 3-4 dm long, 15-30 mm wide.
15. Leaf-blades 30 mm wide, narrowly lanceolate, constricted at base. Ecuador.....122. P. pavonii
15. Leaf-blades 15 mm wide, linear, scarcely constricted at base. Colombia to Peru.....123. P. pungens
1. Petals naked.
16. Pedicels not over 2 mm long.
17. Sepals 40-50 mm long.
18. Leaf-blades 35 mm wide; inflorescence corymbiform. Peru.
124. P. billbergioides
18. Leaf-blades 15 mm wide; inflorescence slenderly sub-ellipsoid. Guatemala, Mexico. 203. P. saxicola
17. Sepals not over 30 mm long.
19. Inflorescence lax, at least toward the base.
20. Sepals oblong, rounded and apiculate, 7 mm long. Peru.
125. P. melanopoda
20. Sepals lanceolate, acute or acuminate, 25-28 mm long.
21. Flowers subdistichous; sepals acute; inflorescence lax throughout. Mexico.....204. P. purpusii
21. Flowers many-ranked; sepals acuminate; inflorescence dense toward apex. Honduras, Salvador, Guatemala.
205. P. calderonii
19. Inflorescence dense throughout. Mexico.
22. Blades of the lower scape-bracts equaling the inflorescence; floral bracts covered with a membrane of coalesced scales.....206. P. roseana
22. Blades of the scape-bracts much shorter than the inflorescence; indument of the floral bracts of distinct scales.
23. Scape-bracts lance-triangular, exposing much of the scape.....207. P. micheliana
23. Scape-bracts broadly ovate, ample, concealing the scape.
208. P. cylindrostachya
16. Pedicels 4-30 mm long.
24. Petals 80-100 mm long.
25. Sepals densely vestite; flowers secund, spreading to reflexed. Mexico.
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26. Floral bracts about equaling the pedicels; sepals covered with appressed whitish scales.....209. P. leprosa
26. Floral bracts about 4 times as long as the pedicels; sepals ferruginous-lanate.....210. P. modesta
25. Sepals glabrous.
27. Sepals acuminate. Andes.
28. Petals yellow; pedicels 5-12 mm long. Peru.
29. Scape 8 mm in diameter; scape-bracts exceeding the internodes; flowers divergent, not secund.
126. P. lopezii
29. Scape 5 mm in diameter; scape-bracts shorter than the internodes; flowers spreading to decurved, secund.
127. P. decurvata
28. Petals brownish violet; pedicels 20 mm long. Ecuador.
128. P. violascens
27. Sepals acute or broadly acute. North America.
30. Petals glabrous, red; scape-bracts entire. Guatemala.
211. P. tuerckheimii
30. Petals tomentose-lepidote at apex, white; lower scape-bracts serrate. Mexico.....212. P. hintoniana
24. Petals 34-70 mm long.
31. Floral bracts distinctly shorter than some of the pedicels
32. Floral bracts broadly ovate.
33. Pedicels to 23 mm long; flowers rather dense; petals 34 mm long, yellow or green. Bolivia..47. P. platystemon
33. Pedicels not over 15 mm long; flowers lax; petals 70 mm long, reddish green. Mexico.....213. P. mooreana
32. Floral bracts narrow, acuminate.
34. Pedicels suberect, 10-15 mm long; axis flexuous. Mexico.
214. P. flexuosa
34. Pedicels spreading to reflexed.
35. Pedicels not over 15 mm long; flowers secund. Mexico.
215. P. palmeri
35. Pedicels 20 mm long; flowers not secund. Peru.
129. P. fractifolia
31. Floral bracts equaling or exceeding the pedicels.
36. Lower floral bracts subfoliaceous, much exceeding the flowers. Guatemala.....216. P. puberula
36. Lower floral bracts vaginiform, shorter than the flowers.
37. Lower floral bracts serrulate; sepals oblong, rounded and apiculate. Brazil.....31. P. limae
37. Lower floral bracts entire.
38. Leaves all entire or some very obscurely serrulate (P. tillandsioides).
39. Inflorescence few-flowered, lax; scape-bracts longer or shorter than the internodes; posterior sepals subulate. Mexico.....217. P. tillandsioides
39. Inflorescence many-flowered.
40. Scape-bracts shorter than the upper internodes.
41. Leaf-blades 2 mm wide, vestite with linear scales. Bolivia.....130. P. cardenasii
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41. Leaf-blades 20 mm wide, densely lepidote beneath.
Peru.....131. P. straminea
40. Scape-bracts all longer than the internodes.
42. Petals red; floral bracts about equaling the pedicels. Brazil.....251. P. decidua
42. Petals white; lowest floral bracts exceeding the sepals. Mexico.....218. P. schiedeana
38. Leaves at least partially spinose-serrate, either on the spiniform blades or on the persistent bases of the foliaceous blades or both together.
43. Pedicels strongly biangulate or alate.
44. Sepals acuminate, 15-18 mm long; flowers strongly secund. Mexico.....219. P. pteropoda
44. Sepals obtuse or truncate, to 40 mm long. Ecuador.
132. P. alata
43. Pedicels terete or faintly angled.
45. Scape very short, exceeded by the persistent leaf-bases; inflorescence elongate, sublux. Mexico.
220. P. micropoda
45. Scape evident, much exceeding the leaf-bases.
46. Scape-bracts distinctly shorter than the upper internodes.
47. Inflorescence dense; floral bracts acute, equaling or slightly exceeding the pedicels; flowers not secund. Brazil.....252. P. glaziovii
47. Inflorescence lax; floral bracts acuminate, about twice the pedicels; flowers secund. Peru.
133. P. scandens
46. Scape-bracts all longer than the internodes.
48. Leaves all alike; plant long-caulescent. Colombia.
120. P. lignosa
48. Leaves dimorphic; plant generally stemless.
49. Posterior sepals alate. Mexico.
50. Sepals acuminate, glabrous; scape-bracts entire.
221. P. karwinskyana
50. Sepals broadly acute or obtuse, lanate; lowest scape-bracts spinose.....222. P. militaris
49. Posterior sepals not more than carinate.
51. Petals yellow; floral bracts exceeding the 5 mm long pedicels. Ecuador.....134. P. lutescens
51. Petals red.
52. Scape-bracts foliaceous, equaling the leaves. Mexico.....223. P. foliacea
52. Scape-bracts short, not at all foliaceous.
53. Sepals densely and persistently lepidote. Mexico.....224. P. sordida
53. Sepals sparsely lepidote or apically barbellate, soon glabrous.
54. Pedicels 5-6 mm long. Andes.
55. Inflorescence dense; sepals 33 mm long; petals 65-70 mm long. Ecuador.
135. P. erratica

55. Inflorescence lax; sepals 22 mm long; petals 40 mm long. Peru.....136. P. acicularis
54. Pedicels 8-15 mm long.
56. Plants caulescent, stoloniferous. Peru.
137. P. riparia
56. Plants stemless, without stolons. Mexico.
57. Flowers strongly spreading-secund; pedicels 15 mm long.....215. P. palmeri
57. Flowers polystichous, scarcely if at all secund, pedicels 8-10 mm long.
58. Floral bracts exceeding all but the uppermost sepals.....225. P. monticola
58. Floral bracts all much shorter than the sepals.....226. P. ringens

SUBKEY IV

1. Floral bracts shorter than the upper pedicels.
2. Sepals 42-60 mm long; pedicels 40-70 mm long; leaves entire. Colombia.
3. Sepals verrucose, obtuse.....50. P. verrucosa
3. Sepals even or nerved, acute or acuminate.
4. Leaf-blades 65-90 mm wide; pedicels 50-70 mm long.
138. P. spectabilis
4. Leaf-blades not over 30 mm wide; pedicels 50-60 mm long.
5. Sepals densely ferruginous-tomentose.....139. P. laxissima
5. Sepals glabrous.....140. P. longipes
2. Sepals not over 35 mm long; pedicels 5-40 mm long.
6. Sepals rounded or blunt or apiculate.
7. Pedicels only 5 mm long; leaf-blades to 95 mm wide. Ecuador.....141. P. elliptica
7. Pedicels 10-40 mm long; leaf-blades 16-70 mm wide.
8. Leaves spinose-serrate on the petioles or the bases of the blades.
9. Scape-bracts all exceeding the internodes; pedicels not over 10 mm long; leaf-blades 35 mm wide; sepals 12-18 mm long. Argentina.....62. P. chiriguana
9. Scape-bracts shorter than the upper internodes; pedicels to 25 mm long; leaf-blades 16-24 mm wide; sepals 20-30 mm long.
10. Floral bracts to 5 mm long; petals naked. Argentina.
59. P. oranensis
10. Floral bracts 10-20 mm long; petals appendaged. Peru, Bolivia, Brazil.....60. P. subpetiolata
8. Leaves wholly entire.
11. Leaf-blades 60-70 mm wide.
12. Pedicels 10-15 mm long; flowers spreading-secund. Mexico.....227. P. chiapensis
12. Pedicels to 40 mm long; flowers ascending, not secund. Colombia.....142. P. tumulicola
11. Leaf-blades 20-30 mm wide.
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13. Pedicels 10-20 mm long; ovary 2/3 superior; ovules caudate. Peru.....143. P. biflora
13. Pedicels 25-35 mm long; ovary 1/4 superior; seeds winged. Colombia.....38. P. alborubra
6. Sepals acute or acuminate.
14. Sepals uncinately recurved; petals yellow or green, naked; flowers erect. Bolivia.....47. P. platystemon
14. Sepals straight or nearly so.
15. Leaf-blades 140 mm wide, broadly oblanceolate; flowers spreading to reflexed, many-ranked, dense; petals white. Colombia.....144. P. multiflora
15. Leaf-blades 17-70 mm wide.
16. Leaves at least partially serrate.
17. Ovary only 1/5 or 1/4 inferior; ovules or seeds caudate. Colombia.
18. Plant stemless; scape-bracts spinose-serrate. 145. P. kalbreyeri
18. Plant caulescent for over 1 m; scape-bracts entire. 146. P. volubilis
17. Ovary 1/2 to 3/4 inferior; ovules or seeds alate.
19. Larger leaf-blades evenly serrulate throughout; inflorescence ferruginous-lepidote. Ecuador. 14. P. harlingii
19. Larger leaf-blades serrate only toward apex.
20. Plant stemless; ovary 3/4 inferior. Colombia, French Guiana, Brazil.....15. P. rubiginosa
20. Plant caulescent; ovary 1/2 inferior. Venezuela. 16. P. epiphytica
16. Leaves all entire.
21. Sepals alate-carinate. Venezuela.....147. P. nubigena
21. Sepals ecarinate.
22. Leaf-blades not over 20 mm wide, linear-lanceolate, long-acuminate.
23. Pedicels reflexed, then curved-ascending; petals appendaged; leaves distichous. Venezuela. 148. P. meridensis
23. Pedicels erect; petals naked; leaves not noticeably distichous. Brazil.....253. P. lancifolia
22. Leaf-blades 30-60 mm wide.
24. Pedicels 9 mm long; flowers strongly secund; leaf-blades linear-lanceolate, soon glabrous. Mexico. 228. P. oaxacana
24. Pedicels 15-25 mm long; flowers scarcely secund; leaf-blades densely brown-flocculose beneath. Colombia.....149. P. bella
1. Floral bracts all equaling or exceeding the pedicels.
25. Sepals 45-75 mm long; leaf-blades 25-200 mm wide.
26. Pedicels 20-60 mm long; leaves entire. Colombia.
27. Leaf-blades oblanceolate, 140 mm wide...150. P. calophylla
27. Leaf-blades linear-lanceolate, 25-50 mm wide.
28. Pedicels to 60 mm long.....139. P. laxissima
28. Pedicels not over 20 mm long.....65. P. haughtii

- . 26. Pedicels not more than 10 mm long; leaves serrate on the petioles.
29. Floral bracts 150 mm long, exceeding the sepals, the upper ones imbricate. Colombia, Ecuador.....105. P. elongata
29. Floral bracts 40-50 mm long, exceeded by the sepals. Colombia.
30. Sepals densely papillose at base; leaf-blade obovate, nearly 200 mm wide.....151. P. sylvestris
30. Sepals even or nerved; leaf-blade elliptic or lance-elliptic, 90-160 mm wide.....152. P. dolichopetala
25. Sepals 10-35 mm long; leaf-blades 16-180 mm wide.
31. Pedicels 4-8 mm long at most.
32. Sepals 10-12 mm long.
33. Scape-bracts densely imbricate; pedicels reflexed after anthesis. Ecuador.....153. P. reflexiflora
33. Scape-bracts shorter than the upper internodes.
34. Leaf-blades broadly elliptic, 95 mm wide. Ecuador. 141. P. elliptica
34. Leaf-blades linear-lanceolate, about 40 mm wide. Colombia.....154. P. semaphora
32. Sepals 15-34 mm long.
35. Ovary 3/4 inferior; ovules or seeds alate; floral bracts deciduous. Colombia.....13. P. quesnelioides
35. Ovary not more than 1/2 inferior.
36. Floral bracts much exceeding the lower flowers; leaves unknown, but probably not petiolate. Guatemala. 216. P. puberula
36. Floral bracts all exceeded by the flowers.
37. Leaves wholly entire.
38. Leaf-blades 30-40 mm wide; scape-bracts imbricate. Colombia.
39. Posterior sepals strongly carinate, 28 mm long. 155. P. macarenensis
39. Posterior and anterior sepals ecarinate, 20 mm long. 156. P. guaritermae
38. Leaf-blades 150-180 mm wide.
40. Flowers spreading at anthesis; leaf-blades densely white-lepidote beneath. Brazil....246. P. undulata
40. Flowers erect or divergent at anthesis; leaf-blades glabrous. Peru.....157. P. calatheoides
37. Leaves spinose-serrate on the petioles or on the bladeless sheaths (P. nobilis).
41. Scape-bracts mostly or all spinose-serrate.
42. Blades lanceolate, 80 mm wide. Colombia. 39. P. pectinata
42. Blades linear-lanceolate, 22 mm wide. Ecuador. 158. P. sodiroi
41. Scape-bracts entire.
43. Petioles entire; blades 23 mm wide. Ecuador. 159. P. nobilis
43. Petioles serrate; blades 60-80 mm wide. Colombia.
44. Floral bracts broadly elliptic, apiculate.

160. P. adscendens
 44. Floral bracts linear-lanceolate, acuminate.
 161. P. sneidernii
31. Pedicels 9-30 mm long.
45. Ovary more than 1/2 inferior; ovules or seeds alate
 (unknown in P. leprieurii).
46. Sepals to 35 mm long.
47. Sepals oblong, broadly acute; inflorescence dense.
 Colombia.....17. P. cuatrecasana
47. Sepals triangular-ovate, acuminate; inflorescence lax.
 Ecuador.....14. P. harlingii
46. Sepals not more than 24 mm long.
48. Blades brown-lepidote beneath; sepals ecarinate.
 Colombia, French Guiana, Brazil.....15. P. rubiginosa
48. Blades whitish-lepidote beneath; sepals carinate.
 French Guiana.....18. P. leprieurii
45. Ovary not more than 1/2 inferior; ovules or seeds alate or
 caudate.
49. Leaves entire or minutely serrulate toward apex (P.
cyanopetala).
50. Blades 80-180 mm wide.
51. Scape-bracts much shorter than the internodes; blades
 180 mm wide, densely white-lepidote beneath. Brazil.
 246. P. undulata
51. Scape-bracts exceeding the internodes; blades 80 mm
 wide, subglabrous. Peru.....162. P. cyanopetala
50. Blades 20-50 mm wide.
52. Flowers all secund; sepals alate-carinate; plant 2 dm
 high. Mexico.....229. P. secundiflora
52. Flowers not secund; sepals not alate; plants 4-15 dm
 high.
53. Floral bracts coriaceous; petals yellowish white;
 leaf-blades white-furfuraceous beneath. Mexico,
 Guatemala, British Honduras.....190. P. recurvata
53. Floral bracts thin; petals red or purple; leaf-blades
 soon glabrous. Colombia.....163. P. brachysperma
49. Leaves serrate on the petioles or bases of the blades.
54. Leaf-blades 16-22 mm wide, weakly petiolate; sepals
 obtuse; ovary only 1/6 inferior. Peru, Bolivia,
 Brazil.....60. P. subpetiolata
54. Leaf-blades 30-130 mm wide, distinctly petiolate; sepals
 acute or acuminate, rarely rounded (sometimes in P.
sprucei).
55. Ovary about 1/2 inferior; ovules or seeds alate.
56. Inflorescence prostrate on the ground with the flowers
 upwardly secund; leaf-blades entire; pedicels to 10
 mm long. Colombia, Peru.....19. P. corallina
56. Inflorescence erect, the flowers scarcely secund;
 leaf-blades serrulate toward apex; pedicels 10-30 mm
 long.
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57. Leaf-blades lanceolate or oblanceolate, 30-90 mm wide, soon glabrous; sepals oblong, broadly acute or rounded; pedicels 10-18 mm long. Colombia, Peru, Brazil.....20. P. sprucei
57. Leaf-blades linear-lanceolate, 35 mm wide, densely white-lepidote beneath; sepals linear-lanceolate, acute; pedicels to 30 mm long. Venezuela.
16. P. epiphytica
55. Ovary only 1/4-1/5 inferior; ovules or seeds caudate.
58. Sepals 12 mm long; leaf-blades 90 mm wide, covered beneath with a brown membrane of scales; scape-bracts entire. Colombia.....164. P. similis
58. Sepals 20-25 mm long.
59. Leaf-blades linear-lanceolate, attenuate, 40-70 mm wide; petals 65 mm long. Panama, Colombia.
145. P. kalbreyeri
59. Leaf-blades elliptic or obovate, abruptly acute, 130 mm wide; petals 100 mm long. Ecuador.
165. P. palmoides

SUBKEY V

1. Ovary distinctly more than half inferior; ovules or seeds alate.
2. Petals lepidote, naked; pedicels 3-5 mm long. Colombia.
21. P. turbinella
2. Petals glabrous.
3. Sepals 40 mm long; petals naked; flowers subsessile. Venezuela.....22. P. maguirei
3. Sepals 15-35 mm long; petals appendaged.
4. Flowers subsessile.
5. Inflorescence lax; flowers spreading; ovary wholly inferior. Brazil.....23. P. anomala
5. Inflorescence dense; flowers curved ascending; ovary 3/4 inferior. Colombia.....13. P. quesnelioides
4. Flowers distinctly pedicellate for 5-25 mm.
6. Sepals 35 mm long; pedicels 25 mm long. Ecuador.
14. P. harlingii
6. Sepals 15-27 mm long; pedicels 5-10 mm long.
7. Leaf-blades sublinear, 6-13 mm wide; sepals acute. Colombia, Venezuela, Guiana, Brazil..24. P. caricifolia
7. Leaf-blades linear-lanceolate, 20 mm wide; sepals rounded. Guiana.....25. P. incarnata
1. Ovary 1/2 inferior to almost completely superior.
8. Sepals 30-60 mm long.
9. Posterior sepals alate-carinate. Peru.
10. Inflorescence dense; flowers subsessile; sepals 30 mm long
91. P. sandemanii
10. Inflorescence lax at base or throughout; flowers pedicellate for 10 mm; sepals 46 mm long.....166. P. eximia
9. Posterior (and anterior) sepals not more than angled-carinate.

- 11. Ovules or seeds alate.
 - 12. Floral bracts laciniate-spinose; sepals 60 mm long.
Bolivia, Argentina.....40. P. mirabilis
 - 12. Floral bracts entire; sepals 33-40 mm long.
 - 13. Petals red, appendaged; leaf-blades spinose-serrate only toward base. Colombia, Brazil.....26. P. uaupensis
 - 13. Petals pale green, naked; leaf-blades spinose throughout Venezuela.....3. P. wurdackii
- 11. Ovules or seeds caudate.
 - 14. Sepals obtuse, 20-30 mm long; leaves subpetiolate. Peru, Bolivia, Brazil.....60. P. subpetiolata
 - 14. Sepals acute or acuminate.
 - 15. Petals naked; inflorescence lax; flowers secund-spreading; leaves incompletely known. Mexico.
209. P. leprosa
 - 15. Petals appendaged.
 - 16. Flowers spreading or reflexed; floral bracts broadly lanceolate, acute, 35 mm long, exceeding the pedicels; axis 1 cm in diameter. Bolivia..119. P. crassa
 - 16. Flowers erect or suberect.
 - 17. Floral bracts to 18 mm long, equaling or exceeding the pedicels; inflorescence lax. Panama..230. P. carnea
 - 17. Floral bracts to 70 mm long, shorter than to exceeding the sepals; inflorescence dense. Lesser Antilles.
242. P. albucifolia
- 8. Sepals 8-29 mm long.
 - 18. Petals naked.
 - 19. Sepals rounded, 8-12 mm long; petals green to pale yellow or white.
 - 20. Inflorescence 5-flowered; flowers secund; sepals densely brown-lepidote. Peru.....35. P. viridis
 - 20. Inflorescence densely many-flowered; flowers not secund; sepals glabrous. Colombia, Ecuador, Bolivia.
167. P. trianae
 - 19. Sepals acute or acuminate, 13-27 mm long.
 - 21. Floral bracts much exceeding the lower flowers; leaf-blades unknown but probably not persistent.
Guatemala.....216. P. puberula
 - 21. Floral bracts all exceeded by the flowers.
 - 22. Leaf-blades serrate throughout; ovules or seeds alate. Venezuela.
 - 23. Pedicels stout, 6 mm long; leaf-blades 90 mm wide.
1. P. agavifolia
 - 23. Pedicels slender, 25 mm long; leaf-blades 12 mm wide.
27. P. ctenophylla
 - 22. Leaf-blades only partially serrate (unknown in P. platystemon) or the ovules or seeds caudate (unknown in P. cuzcoensis) or usually both characters combined.
 - 24. Petals yellow, green, or cream; floral bracts shorter than the pedicels.
 - 25. Sepals uncinately recurved; floral bracts 15-20 mm long. Bolivia.....47. P. platystemon

25. Sepals straight; floral bracts to 12 mm long. Costa Rica.....77. P. halophila
24. Petals red or violet.
26. Scape-bracts all exceeding the internodes; petals light brownish violet. Ecuador...128. P. violascens
26. Scape-bracts shorter than the upper internodes.
27. Leaf-blades oblong, acute; inflorescence glabrous; sepals 21 mm long. Ecuador....168. P. oblongifolia
27. Leaf-blades lanceolate or linear-lanceolate, acuminate; inflorescence more or less vestite; sepals 13-17 mm long.
28. Leaves trimorphic, some reduced to dark broad entire sheaths. Peru.....74. P. cuzcoensis
28. Leaves dimorphic or all alike, none reduced to conspicuous sheaths. Colombia.....75. P. schultzei
18. Petals appendaged.
29. Leaf-blades (or the spiniform ones if dimorphic) spinose-serrate throughout or entire only at the extreme apex (P. lanuginosa).
30. Leaf-blades 90 mm wide; pedicels stout, 6 mm long; flowers recurved. Venezuela.....1. P. agavifolia
30. Leaf-blades 4-32 mm wide.
31. Pedicels 15-30 mm long; leaf-blades 10-32 mm wide.
32. Ovules or seeds with annular appendages, alate.
33. Sepals to 28 mm long; plant stemless; floral bracts about equaling the pedicels. Venezuela.
28. P. filispina
33. Sepals not over 15 mm long; plant with an erect 15 cm high stem; floral bracts much shorter than the upper pedicels. Mexico, Guatemala.....42. P. punicea
32. Ovules or seeds with caudate appendages though the apical part sometimes broad (P. platyphylla).
34. Petals pale yellow; sepals 15-20 mm long. Mexico.
231. P. xanthocalyx
34. Petals red or violet; sepals to 25 mm long.
35. Floral bracts equaling or exceeding the pedicels; petals pale violet; leaf-blades dimorphic. Peru.
169. P. lanuginosa
35. Floral bracts much shorter than the upper pedicels; petals red; leaf-blades usually all alike. Jamaica.
36. Leaf-blades 10-15 mm wide.....233. P. bromeliifolia
36. Leaf-blades to 32 mm wide.....238. P. platyphylla
31. Pedicels 3-11 mm long.
37. Sepals subulate-carinate; pedicels 8 mm long; leaf-blades 8 mm wide. West Indies?.....243. P. glymiana
37. Sepals not at all alate.
38. Petals bright yellow to cream.
39. Floral bracts much exceeding the pedicels; leaf-blades to 24 mm wide. Paraguay.
170. P. paraguayensis
39. Floral bracts shorter than the pedicels; leaf-blades 8-18 mm wide. Hispaniola.....232. P. samuelssonii

38. Petals red.
40. Leaves all alike.
41. Leaf-blades 10-20 mm wide; flowering plant 1-2 m high. Puerto Rico, Lesser Antilles.
234. P. angustifolia
41. Leaf-blades 4 mm wide; flowering plant 55 cm high. Dominican Republic.....244. P. elizabethae
40. Leaves of the fertile rosette dimorphic.
235. P. fuertesii
29. Leaf-blades spinose only at extreme base or apex, or the sheaths only.
42. Petal-appendages a pair of small auricles. West Africa.
261. P. feliciana
42. Petal-appendage a single scale the width of the petal.
43. Scape-bracts equaling or exceeding all of the internodes
44. Lower floral bracts nearly equaling to exceeding the sepals; inflorescence dense. Lesser Antilles.
45. Floral bracts broadly ovate.....241. P. spicata
45. Floral bracts lanceolate.....242. P. albucifolia
44. Lower floral bracts much shorter than the sepals; inflorescence subdense to lax.
46. Petals pale yellow; pedicels 15-20 mm long. Mexico.
231. P. xanthocalyx
46. Petals red; pedicels 4-15 mm long.
47. Leaves dilated above the sheath, all alike. Venezuela.....73. P. moritziana
47. Leaves not dilated above the sheath.
48. Leaf-blades covered beneath with a membrane of white scales. Puerto Rico (?), Lesser Antilles.
240. P. latifolia
48. Leaf-blades sparsely lepidote or glabrous beneath.
49. Inflorescence subdense, many-flowered. Colombia.
171. P. macrobotrys
49. Inflorescence lax, few-flowered. Venezuela.
172. P. orchidifolia
43. Scape-bracts distinctly shorter than the upper internodes.
50. Pedicels 15-30 mm long; sepals abruptly acute or rounded.
51. Sepals 13 mm long, oblong; leaf-blades sparsely lepidote toward base. Brazil.....247. P. egleri
51. Sepals 20-30 mm long, narrowly triangular; leaf-blades densely white-lepidote beneath.
52. Ovary 1/2 superior; leaves all alike. Jamaica.
238. P. platyphylla
52. Ovary 5/6 superior; leaves dimorphic. Peru, Bolivia, Brazil.....60. P. subpetiolata
50. Pedicels 4-10 mm long.
53. Leaf-blades not more than 11 mm wide.
54. Sepals 14-16 mm long. Cuba.....239. P. cubensis
54. Sepals 24 mm long. Brazil.....32. P. platypetala
53. Leaf-blades 15-30 mm wide.

55. Inflorescence densely white-tomentose; leaf-blades imperfectly known, probably not persistent. Peru.
122. P. pavonii
55. Inflorescence sparsely flocculose to glabrous.
56. Leaf-blades lanceolate, 25-50 cm long, 15-25 mm wide
57. Floral bracts elliptic, much shorter than the pedicels; leaf-blades densely appressed-lepidote beneath. Venezuela.....173. P. fendleri
57. Floral bracts lanceolate, acuminate, from shorter to longer than the pedicels; leaf-blades sparsely lepidote to glabrous beneath. Colombia.
75. P. schultzei
56. Leaf-blades linear, 50-100 cm long, 15-20 mm wide. Dominican Republic.
58. Leaves all alike.....237. P. jimenezii
58. Leaves dimorphic.....245. P. domingensis

SUBKEY VI

1. Ovary distinctly more than 1/2 inferior.
2. Seeds or ovules alate; inflorescence minutely white-lepidote; ovary almost wholly inferior. Colombia, Venezuela, Guiana, Brazil.....24. P. caricifolia
2. Seeds or ovules caudate; inflorescence densely pale-flocculose or arachnoid; ovary not more than 2/3 inferior.
3. Sepals 18 mm long, carinate toward base. Ecuador.
174. P. unilateralis
3. Sepals 25 mm long, ecarinate. Brazil.....248. P. ulei
1. Ovary not more than 1/2 inferior.
4. Sepals 34-45 mm long; petals appendaged.
5. Pedicels 50-60 mm long; leaf-blades 30 mm wide. Colombia.
6. Sepals densely ferruginous-tomentose.....139. P. laxissima
6. Sepals glabrous.....140. P. longipes
5. Pedicels 6-25 mm long.
7. Axis of the inflorescence 1 cm in diameter; flowers spreading or reflexed. Bolivia.....120. P. crassa
7. Axis of the inflorescence relatively slender; flowers erect to divergent.
8. Petals greenish white; floral bracts broadly ovate; sepals transversely ridged at junction with ovary. Colombia.
41. P. costata
8. Petals red.
9. Floral bracts broadly ovate, slightly exceeding the pedicels; petals lepidote. Colombia.
175. P. lepidopetalon
9. Floral bracts lanceolate; petals glabrous.
10. Inflorescence dense toward apex; floral bracts to 70 mm long. Lesser Antilles.....242. P. albucifolia
10. Inflorescence lax throughout; floral bracts to 18 mm long. Panama.....230. P. carnea
4. Sepals 9-30 mm long or more (P. albucifolia).
11. Petals naked.

12. Sepals rounded at apex, blunt or apiculate.
13. Leaf-blades 4-20 mm wide.
14. Scape-bracts exceeding the internodes.
15. Lower floral bracts serrulate; sepals oblong, 21 mm long. Brazil.....31. P. lima
15. Lower floral bracts entire; sepals 9 mm long. French Guiana.....176. P. pusilla
14. Scape-bracts distinctly shorter than the upper internodes.
16. Floral bracts exceeding the 5 mm long pedicels. Peru. 131. P. straminea
16. Floral bracts much shorter than the 20 mm long pedicels. Venezuela.....29. P. juncoides
13. Leaf-blades 30-60 mm wide.
17. Floral bracts exceeding the pedicels.
18. Sepals broadly elliptic, 26 mm long; leaf-blades 60 mm wide. Guiana, Venezuela, Colombia, Central America. 90. P. maidifolia
18. Sepals oblong; leaf-blades not over 35 mm wide.
19. Inflorescence dense, many-flowered; floral bracts very narrowly triangular. Venezuela.....177. P. tympani
19. Inflorescence lax, few-flowered; floral bracts ovate. Colombia.....178. P. occidentalis
17. Floral bracts at most equaling the 8-9 mm long pedicels.
20. Flowers erect; floral bracts ligulate, shorter than the pedicels, flaccid. Peru, Venezuela. 179. P. brevicealycina
20. Flowers spreading; floral bracts narrowly triangular, about equaling the lower pedicels. Colombia. 180. P. petraea
12. Sepals acute or acuminate.
21. Floral bracts 4-8 cm long, exceeding the lower flowers.
22. Pedicels slender, 10 mm long. Guatemala (?). 191. P. longebracteata
22. Pedicels stout, 3-5 mm long.
23. Sepals ecarinate; leaf-blades unknown but probably not persistent. Guatemala.....216. P. puberula
23. Sepals obtusely carinate. Brazil. 254. P. encholirioides
21. Floral bracts all exceeded by the flowers.
24. Sepals alate-carinate. Brazil.....255. P. carinata
24. Sepals not at all alate.
25. Floral bracts equaling or exceeding the pedicels.
26. Petals sparsely floccose at apex; sepals 30 mm long; inflorescence densely lepidote. Mexico. 209. P. leprosa
26. Petals glabrous; sepals 22-28 mm long.
27. Flowering shoot about equaling to exceeding the leaves. Brazil.....256. P. flammea
27. Flowering shoot little more than half as high as the leaves. Colombia.....181. P. andreana
25. Floral bracts all distinctly shorter than the pedicels.

28. Sepals uncinately recurved; petals yellow or green.
Bolivia.....47. P. platystemon
28. Sepals straight. Brazil.
29. Petals regular, spirally recurving at anthesis.
30. Rhachis of the inflorescence glabrous; sepals 15-18 mm long; petals white to yellow...257. P. albiflos
30. Rhachis of the inflorescence furfuraceous; sepals 19-22 mm long; petals red.....258. P. staminea
29. Petals zygomorphic at least by position, not spirally recurving at anthesis.
31. Base of the rosette not thickened; leaves not over 15 cm long.....259. P. beycalema
31. Base of the rosette bulbous-thickened; leaves usually much more than 15 cm long..256. P. flammea
11. Petals appendaged.
32. Sepals rounded at apex, blunt or apiculate.
33. Scape-bracts equaling or exceeding the internodes.
34. Inflorescence dense, especially toward apex; floral bracts broadly ovate. Lesser Antilles.
241. P. spicata
34. Inflorescence wholly lax; floral bracts linear-lanceolate. Mexico.....231. P. xanthocalyx
33. Scape-bracts distinctly shorter than the upper internodes
35. Petals red.
36. Pedicels 20 mm long, much exceeding all the floral bracts. Colombia.....182. P. grubbiana
36. Pedicels only 5 mm long, exceeding only the upper floral bracts. Dominican Republic..237. P. jimenezii
35. Petals yellow or white.
37. Sepals 9 mm long, elliptic; ovary over 3/4 superior; petal-appendage of 2 vertically attached auricles. Venezuela (?).....183. P. caulescens
37. Sepals 15 mm long, linear; ovary ca. 1/2 superior. Brazil.....33. P. bradei
32. Sepals acute or acuminate.
38. Scape-bracts equaling or exceeding the internodes.
39. Scape very short or none; inflorescence globose. Mexico.....189. P. tabuliformis
39. Scape well developed.
40. Floral bracts 6-8 cm long, from nearly equaling to much exceeding the narrowly triangular sepals.
41. Inflorescence subcorymbose, few-flowered. Guatemala (?).....191. P. longibracteata
41. Inflorescence elongate, many-flowered. Lesser Antilles.....242. P. albucifolia
40. Floral bracts smaller, mostly shorter than the sepals.
42. Petals red. Puerto Rico, Lesser Antilles.
240. P. latifolia
42. Petals yellow or white.
43. Ovary more than 3/4 superior; ovules or seeds caudate. Brazil.....260. P. suaveolens
43. Ovary 1/2 superior. Mexico.

44. Ovules alate; scape-bracts equaling the upper internodes.....43. P. amblyosperma
44. Ovules caudate; scape-bracts exceeding all the internodes.....231. P. xanthocalyx
38. Scape-bracts distinctly shorter than the upper internodes
45. Sepals 16 mm long; inflorescence dense, many-flowered. Venezuela.....184. P. microcalyx
45. Sepals 23-30 mm long.
46. Posterior sepals broadly alate-carinate; floral bracts broadly ovate; flowers subsessile. Peru. 91. P. sandemani
46. Posterior (and anterior) sepals not at all alate, at most obtusely carinate.
47. Floral bracts exceeding the pedicels, narrowly triangular or linear-lanceolate, acuminate.
48. Ovules subalate; ovary more than 1/2 superior. Brazil.....32. P. platypetala
48. Ovules long-caudate; ovary more than 4/5 superior; leaves doubtfully persistent. Ecuador. 122. P. pavonii
47. Floral bracts shorter than the pedicels.
49. Petals red; floral bracts ovate, acuminate. Mexico. 228. P. oaxacana
49. Petals white; floral bracts elliptic, acute. Colombia.....185. P. johannis

Subgenus PEPINIA
(including subgenus Schweideleria)

Amazon-Orinoco Basin

1. P. AGAVIFOLIA L. B. Smith, Mem. New York Bot. Gard. 9:287, fig. 18. 1957. Venezuela.
2. P. NUDA Baker, Journ. Bot. 19:269. 1881. British Guiana, Surinam.
3. P. WURDACKII L. B. Smith, Mem. New York Bot. Gard. 10, no. 2:17, fig. 4. 1960. Venezuela.
4. P. MITUENSIS L. B. Smith in R. E. Schultes, Pl. Austro-Am. XI, Rhodora 65:7, fig. 7. 1963. Colombia.
5. P. KUNHARDTIANA L. B. Smith, Mem. New York Bot. Gard. 9: 289, fig. 21. 1957. Venezuela.
6. P. BULBOSA L. B. Smith, Phytologia 5:178, pl. 1, figs. 7-10. 1955. Venezuela, Colombia.
7. P. HELIOPHILA L. B. Smith, Caldasia [1], no. 5:8, fig. 1942. Colombia.
8. P. ARMATA Maury, Journ. de Bot. 3:270, fig. 13. 1889. P. cinerea L. B. Smith, Fieldiana Bot. 28, no. 1:149, fig. 23 d-f. 1951. Venezuela.
9. P. BREWERI L. B. Smith, Phytologia 9:246, pl. 2, figs. 1, 2. 1963. Venezuela.
10. P. GEYSKESII L. B. Smith, Act. Bot. Neerlandica 5:90, fig.

1. 1956. Surinam.
 11. P. PRUINOSA H.B.K. Nov. Gen. & Sp. 1:295. 1816. Venezuela.
 12. P. PATENTIFLORA L. B. Smith, Contr. Gray Herb. 127:18, pl. 1, fig. 4. 1939.
 Var. a. PATENTIFLORA. Plant 5-10 dm high; leaf-blades scarcely or not at all narrowed toward base, 3-15 mm wide, serrate for most of their length; sepals 15-20 mm long. Venezuela, Brazil.
 Var. b. SUBINTEGRA L. B. Smith, Bot. Mus. Leaflet. Harvard 17: 68. 1955. Leaf-blades distinctly narrowed toward base, to 20 mm wide, serrate only at extreme base; sepals 13-18 mm long. Colombia.
 Var. c. MACRANTHA L. B. Smith, Bot. Mus. Leaflet. Harvard 17:68. 1955. Plant 2 m high; leaf-blades distinctly narrowed toward base, to 25 mm wide, serrate only at extreme base; sepals 25 mm long. Colombia.
 Var. d. ARMATA L. B. Smith, Mem. New York Bot. Gard. 10, no. 5:37. 1964. Flowering 2 m high; leaves 14 dm long; blades 4 cm wide, slightly narrowed toward base, serrulate throughout; sepals to 27 mm long. Venezuela.
 13. P. QUESNELIOIDES L. B. Smith, Contr. U. S. Nat. Herb. 29: 313, fig. 33. 1949. Colombia.
 14. P. HARLINGII L. B. Smith, Phytologia 8:11, pl. 1, figs. 18-20. 1961. Ecuador.
 15. P. RUBIGINOSA (Brongn. ex E. Morr.) Baker, Handb. Bromel. 116. 1889.
 Var. a. RUBIGINOSA. Melinonia rubiginosa Brongn. ex E. Morr. Cat. Bromel. Jard. Liège 11. 1873. Leaves serrulate, at least toward apex; floral bracts exceeding the pedicels. Colombia, French Guiana.
 Var. b. AMAZONICA (Baker) L. B. Smith, Phytologia 7:109. 1960. P. amazonica Baker, Handb. Bromel. 117. 1889. Leaves serrulate, at least toward apex; floral bracts shorter than the pedicels. Brazil.
 Var. c. INTEGRAL L. B. Smith, Phytologia 7:110. 1960. Leaves entire; floral bracts exceeding the lower pedicels, shorter than the upper. Brazil.
 16. P. EPIPHYTICA L. B. Smith, Mem. New York Bot. Gard. 9:289, fig. 20. 1957. Venezuela.
 17. P. CUATRECASANA L. B. Smith, Caldasia [1], no. 4:16, fig. 1942. Colombia.
 18. P. (subgenus ?) LEPRIEURII Baker, Handb. Bromel. 117. 1889. French Guiana.
 19. P. CORALLINA Linden & André, Belg. Horticult. 23:112. 1873.
 Var. a. CORALLINA. Leaves to 10 cm wide; inflorescence coral-red. Colombia, Peru.
 Var. b. VIRIDIS L. B. Smith, Bot. Mus. Leaflet. Harvard 17:67. 1955. Leaves only 3 cm wide; inflorescence yellow-green. Colombia.
 20. P. SPRUCEI Baker, Journ. Bot. 19:303. 1881. Colombia, Peru, Brazil.
 21. P. TURBINELLA L. B. Smith, Caldasia [1], no. 4:17, fig. 5. 1942. Colombia.

22. *P. MAGUIREI* L. B. Smith, Mem. New York Bot. Gard. 10, no. 2:17, fig. 5. 1960. Venezuela.
23. *P. ANOMALA* Hoehne, Comm. Linh. Telegr. Estrat. Matto Grosso Publ. [47], Anexo 5, Bot. pt. 9:9, pl. 161. 1919. Brazil.
24. *P. CARICIFOLIA* Mart. ex Schult. f. in R. & S. Syst. 7, pt. 2:1242. 1830.
- Var. a. *CARICIFOLIA*. *P. kageliana* Schlecht. Linnaea 24:664. 1851. *P. pauciflora* Baker, Journ. Bot. 19:230. 1881. *P. sub-juncta* Baker, Handb. Bromel. 116. 1889. Floral bracts exceeding the lower pedicels, sometimes equaling the ovaries; sepals 15 mm long, green. Guiana, Venezuela, Colombia, Brazil.
- Var. b. *MACRANTHA* L. B. Smith, Mem. New York Bot. Gard. 10, no. 5:37. 1964. Floral bracts equaling the lowest pedicels, shorter than the remainder; sepals acute, 27 mm long, orange-red. Venezuela.
25. *P. INCARNATA* (Brongn. ex E. Morr.) Baker, Handb. Bromel. 116. 1889. *Melinonia incarnata* Brongn. ex E. Morr. Cat. Bromel. Jard. Liège for 1873:11. 1873. *Pepinia incarnata* E. Morr. ex Baker, Handb. Bromel. 116. 1889, nomen. *Pitcairnia semi-juncta* Baker, Handb. Bromel. 117. 1889. Guiana.
26. *P. UAUPENSIS* Baker, Handb. Bromel. 93. 1889. Colombia, Brazil.
27. *P. CTENOPHYLLA* L. B. Smith in Gleason & Killip, Brittonia 3:161, fig. e-i. 1939. Venezuela.
28. *P. FILISPINA* L. B. Smith, Mem. New York Bot. Gard. 9:289, fig. 19. 1957. Venezuela.
29. *P. JUNCOIDES* L. B. Smith, Contr. Gray Herb. 161:33, pl. 4, figs. 2, 3. 1946. Venezuela.

Planalto of Brazil

30. *P. ENSIFOLIA* Mez in Mart. Fl. Bras. 3, pt. 3:436, pl. 82. 1894.
31. *P. LIMAE* L. B. Smith, Phytologia 7:254, pl. 1, figs. 9, 10. 1960.
32. *P. PLATYPETALA* Mez in Mart. Fl. Bras. 3, pt. 3:438. 1894.
33. *P. BRADEI* Markgraf, Notizblatt 15:215. 1940.

Andean South America

34. *P. FERRUGINEA* R. & P. Fl. Peruv. 3:36. 1802. *Pourretia ferruginea* Spreng. Syst. Veg. 2:23. 1825. *Pitcairnia asterotricha* Poepp. & Endl. Nov. Gen. 2:42, pl. 158. 1838. *Puya grandiflora* Hook. Bot. Mag. 87:pl. 5234. 1861. *Pitcairnia consimilis* Baker, Journ. Bot. 19:226, 266. 1881. *Puya echinotricha* André, Rev. Hortic. 60:565. 1888. *Pitcairnia echinotricha* Baker, Handb. Bromel. 119. 1889. *P. weberbaueri* Mez, Bull. Herb. Boiss. ser. 2, 4:627. 1904. *P. cotahuasiana* Harms, Notizblatt 10:788. 1929. *P. latibracteata* Harms, l. c. *P. herrerae* Harms, op. c. 789. *P. imperialis* Harms, op. c. 790. *P. laresiana* Harms, op. c. 11:58. 1930. Ecuador, Peru, Bolivia.
35. *P. VIRIDIS* Mez, Fedde Rep. Spec. Nov. 16:8. 1919. Peru.

36. *P. KILLIPIANA* L. B. Smith, Contr. U. S. Nat. Herb. 29:308, fig. 29. 1949. Colombia.
37. *P. NANA* (Wittm.) L. B. Smith, Phytologia 7:5. 1959. *Puya nana* Wittm. Mededeel Rijks Herb. 29:85. 1916. Bolivia.
38. *P. ALBORUBRA* Baker, Handb. Bromel. 102. 1889. Colombia.
39. *P. PECTINATA* L. B. Smith, Contr. Gray Herb. 98:9, pl. 3, figs. 6, 7. 1932. Colombia.
40. *P. MIRABILIS* Mez, Fedde Rep. Nov. Spec. 3:6. 1906.
- Var. a. *MIRABILIS*. Leaf-blades 60 cm long, 15 mm wide, subtire to spinose; flowering shoot to 15 dm high; inflorescence 30 cm long. Bolivia, Argentina.
- Var. b. *TUCUMANA* Castellanos, Anal. Mus. Nac. Hist. Nat. Buenos Aires 36:53, pl. 5. 1929. Leaf-blades 22 cm long, 8 mm wide, strongly spinose; flowering shoot 3-4 dm high; inflorescence 8-10 cm long. Argentina.
41. *P. COSTATA* L. B. Smith, Caldasia 5:7, fig. 1948. Colombia.

Mexico, Central America

42. *P. PUNICEA* Scheidw. Bull. Acad. Brux. 9, pt. 1:25. 1842. *P. jacksoni* Hook. Bot. Mag. 76:pl. 4540. 1850. *Pepinia punicea* Brongn. ex André, Ill. Hort. 17:33. 1870. *Lamproconus jacksoni* Lem. ex Hemsl. Biol. Centr. Am. 3:316. 1884. Mexico, Guatemala.
43. *P. AMBLYOSPERMA* L. B. Smith, Contr. Gray Herb. 117:23, pl. 2, figs. 4-7. 1937. Mexico.

Subgenus PITCAIRNIA

Andean South America

44. *P. ECHINATA* Hook. Bot. Mag. 79:pl. 4709. 1853. Colombia.
- Var. a. *ECHINATA*. Sepals and base of ovary densely and coarsely echinate with processes 1-2 mm long; petals white.
- Var. b. *SUBLAEVIS* L. B. Smith, Contr. U. S. Nat. Herb. 29:304. 1949. Sepals and base of ovary minutely and sparsely stellate, nearly even.
- Var. c. *VALLENSIS* L. B. Smith, Phytologia 4:378. 1953. Petals rose-orange; stamens exserted.
45. *P. TUBERCULATA* L. B. Smith, Fieldiana Bot. 28, no. 1:149, fig. 22 c. 1951. Venezuela.
46. *P. PUYOIDES* L. B. Smith, Field Mus. Bot. 11:147. 1936; Contr. Gray Herb. 114:7, pl. 1, figs. 4, 5. 1936. Peru.
47. *P. PLATYSTEMON* Mez in DC. Mon. Phan. 9:421. 1896. Bolivia.
48. *P. PULVERULENTA* R. & P. Fl. Peruv. 3:36, pl. 259. 1802. *Orthopetalum pulverulentum* Beer, Brom. 71. 1857. Peru.
49. *P. PANICULATA* (R. & P.) R. & P. Fl. Peruv. 3:36, pl. 260. 1802. *Pourretia paniculata* R. & P. Syst. Veg. 1:81. 1798. *Pitcairnia longifolia* Hook. Bot. Mag. 80:pl. 4775. 1854. *P. excelsa* E. Morr. Belg. Hort. 25:381. 1875. *P. fruticetorum* Mez, Fedde Rep. Nov. Spec. 3:4. 1906. *P. biattenuata* Rusby, Bull. New York Bot. Gard. 4:457. 1907. Peru, Bolivia.
50. *P.* (subgenus ?) *VERRUCOSA* L. B. Smith, Phytologia 4:380,

- pl. 2, figs. 1-4. 1953. Colombia.
51. *P. RUIZIANA* Mez in DC. Mon. Phan. 9:420. 1896. Peru.
52. *P. DENDROIDEA* André, Enum. Bromel. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. Colombia, Ecuador.
53. *P. RIGIDA* Mez, Bull. Herb. Boiss. ser. 2, 4:625. 1904. Peru.
54. *P.* (subgenus ?) *LECHLERI* Baker, Journ. Bot. 19:269. 1881. Peru.
55. *P. INERMIS* (Meyer) Meyer ex Schult. f. in R. & S. Syst. Veg. 7:1238. 1830. Peru.
- Var. a. *INERMIS*. *Pourretia inermis* Meyer in Presl, Rel. Henk. 1:123, pl. 23. 1827. *Orthopetalum inerme* Beer, Bromel. 72. 1857. Flowering to 5 dm high; leaves serrulate above the base; petals scarlet, appendaged.
- Var. b. *FLAVA* L. B. Smith, Phytologia 5:46. 1954. Flowering to 8 dm high; leaves serrulate below the abscission line; petals yellow, naked.
56. *P. ARENICOLA* L. B. Smith, Contr. U. S. Nat. Herb. 29:299, fig. 21. 1949. Colombia.
57. *P. COMMIXTA* L. B. Smith, Contr. U. S. Nat. Herb. 29:303. 1949. *P. orgyalis* sensu André, Enum. Bromel. 4. Dec. 13, 1888, nomen; Rev. Hortic. 60:564. Dec. 16, 1888, nomen; André ex Mez in DC. Mon. Phan. 9:412. 1896, non Baker, 1881. Colombia, Ecuador.
58. *P. LEHMANNII* Baker, Journ. Bot. 19:273. 1881. *P. orgyalis* Baker, l. c. *P. auriculata* Mez, Bull. Herb. Boiss. ser. 2, 3:134. 1903. Colombia, Ecuador.
59. *P.* (subgenus ?) *ORANENSIS* L. B. Smith, Phytologia 8:228, pl. 2, figs. 15-17. 1962. Argentina.
60. *P. SUBPETIOLATA* Baker, Journ. Bot. 19:267. 1881. *P. latifolia* sensu Baker, Handb. Bromel. 92. 1889, in part, as to *Burchell* 8116. *P. caldasiana* Baker, op. c. 100. *P. burchellii* Mez Mart. Fl. Bras. 3, pt. 3:436. 1894. *P. sessiliflora* Rusby, Bull. New York Bot. Gard. 4:457. 1907. Peru, Bolivia, Brazil.
61. *P. TRUNCATA* L. B. Smith, Contr. Gray Herb. 98:10, pl. 3, figs. 8, 9. 1932. Peru.
62. *P. CHIRIGUANA* Castellanos, An. Mus. Nac. Hist. Nat. Buenos Aires 36:52, pl. 4. 1929. Argentina.
63. *P. TARAPOTENSIS* Baker, Handb. Bromel. 102. 1889. Peru.
64. *P.* (subgenus ?) *CHOCOENSIS* L. B. Smith, Contr. U. S. Nat. Herb. 29:302, fig. 24. 1949. Colombia.
65. *P.* (subgenus ?) *HAUGHTII* L. B. Smith, Contr. U. S. Nat. Herb. 29:307, fig. 28. 1949. Colombia.
66. *P. MEGASEPALA* Baker, Journ. Bot. 19:229. 1881. *P. araneosa* Baker, op. c. 231. *P. goudotiana* André, Enum. Bromel. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. *P. camptocalyx* André, l. c. *P. camptocalyx* var. *lutea*, var. *robusta*, l. c. Colombia.
67. *P. TRIMORPHA* L. B. Smith, Phytologia 5:179, pl. 2, figs. 1-3. 1955. Colombia.
68. *P. POORTMANII* André, Enum. Bromel. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. Colombia, Ecuador.
69. *P. KNIPHOFIODES* L. B. Smith, Proc. Am. Acad. Sci. 70:153,

pl. 1, fig. 18, 1935. Colombia.

70. *P. TOLIMENSIS* L. B. Smith, *Caldasia* [1], no. 4:17, fig. 4 1942. Colombia.

71. *P. INTEGRIFOLIA* Ker-Gawl. Bot. Mag. 36:pl. 1462. 1812. *P. graminifolia* hort. ex Schrad. Comm. Blumenb. 46. 1827. *P. decora* A. Dietr. Allg. Gartenzeit. 15:353. 1847. *P. alta* Hassk. Verh. Naturk. Ver. Ned. Ind. 1, pt. 7:5. 1856. *P. graminea* Beer, Bromel. 198. 1857, nomen. ? *P. integrifolia* var. *major* Regel, Ind. Sem. Hort. Petrop. for 1869:24. 1869. *P. tenuis* Mez in DC. Mon. Phan. 9:421. 1896. *P. hartmannii* Mez, Fedde Rep. Spec. Nov. 16: 8. 1919. Venezuela, Trinidad.

72. *P.* (subgenus ?) *CASSAPENSIS* Mez, Fedde Rep. Spec. Nov. 16: 8. 1919. Peru.

73. *P. MORITZIANA* K. Koch & Bouché, Ind. Sem. Hort. Berol. for 1856, App.:4. 1857. *P. klotzschiana* Baker, Handb. Bromel. 106. 1889. *P. moritziana* Kl. ex Baker, l. c., nomen. Venezuela.

74. *P.* (subgenus ?) *CUZCOENSIS* L. B. Smith, Contr. Gray Herb. 98:9, pl. 3, figs. 3-5. 1932. Peru.

75. *P. SCHULTZEI* Harms, Notizblatt 10:212. 1928. Colombia.

76. *P. VARGASIANA* L. B. Smith, sp. nov. *P. cuzcoensis* L. B. Smith in *systema meae proxima* sed foliorum laminis majoribus deciduis, bracteis primariis quam ramis multo brevioribus differt.

Causcescent, incomplete and immature but undoubtedly flowering 1 m or higher; stem erect, 15 cm high; leaf-sheaths densely imbricate, broadly ovate, ca. 3 cm long, entire or pectinate-serrate only near apex, dark castaneous, lustrous, covered with appressed whitish scales toward base; blades polymorphic, some greatly reduced and spiniform, castaneous, either entire or pectinate-serrate, others foliaceous and deciduous, either wholly entire or serrate below the line of abscission, linear-lanceolate, acuminate, slightly narrowed toward base, 25 cm long, 15 mm wide, glabrous except for marginal scales near base; scape erect, ca. 8 mm in diameter; lower scape-bracts densely imbricate, subfoliaceous with deciduous blades; inflorescence laxly compound, sparsely white-flocculose; primary bracts narrowly triangular, 3 cm long; lateral branches to 18 cm long including the naked 7 cm sterile base, laxly flowered, terminal branch 27 cm long; floral bracts to 25 mm long, much exceeding the pedicels; flowers secund, spreading to recurved at anthesis, red; pedicels 8 mm long; sepals lance-oblong, subacute, 20 mm long, ecarinate or nearly so, soon glabrous; petals naked; ovary over 1/2 superior; ovules caudate. Pl. I, fig. 4: Flower x 1/2; fig. 5: Sepal x 1.

PERU: Cuzco: Prov. Paucartambo: Rocky open places, K. 134, alt. 2000 m, July 20, 1963, C. Vargas C. no. 14716 (US, type).

77. *P. HALOPHILA* L. B. Smith, sp. nov. *P. platystemon* Mez in *systema meae proxima* sed bracteis florigeris anguste triangularibus, petalis lacteis differt.

Stemless (?), flowering 75 cm high; leaves apparently all persistent; sheaths broadly ovate, the outer 2 cm long, entire except near apex, dark castaneous, at first covered toward apex with appressed cinereous scales; blades polymorphic, some reduced to spinose-serrate spines, some much reduced but foliaceous and

entire, the central ones foliaceous, linear, acuminate, scarcely narrowed at base, about equaling the inflorescence, 12 mm wide, entire, covered beneath with pale subappressed scales, glabrous above; scape slender, erect, pale-lepidote; scape-bracts apparently exceeding the internodes (the highest damaged and uncertain), linear-triangular; inflorescence 34 cm long with a single short lateral branch, lax, pale-flocculose; primary bract linear, attenuate, about equaling the naked sterile base of the branch; floral bracts linear-triangular, to 15 mm long; flowers divergent not secund; pedicels straight, slender, to 25 mm long; sepals linear, acute, 23 mm long, scarcely carinate, soon glabrous; petals naked, over 5 cm long, cream (! Foster); ovary over 2/3 superior; ovules short-caudate. Pl. I, fig. 6: Flower x 1/2; fig. 7: Sepal x 1.

COSTA RICA: Puntarenas; Base of cliffs at high-tide level, Quepos, December 12, 1948, M. B. Foster no. 2669 (US, type).

78. P. EXSERTA L. B. Smith, Caldasia 5:10, fig. 1948. Colombia.

79. P. DEVANSAYANA André ex Baker, Handb. Bromel. 93. 1889. P. roezlii André, Enum. Bromél. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888, non E. Morr. 1885. Ecuador.

80. P. DIFFUSA L. B. Smith, Caldasia 5:8, fig. 1948. Colombia.

81. P. (subgenus ?) MULTIRAMOSA Mez in DC. Mon. Phan. 9:419. 1896. Bolivia.

82. P. ODONTOPODA Baker, Handb. Bromel. 93. 1889. Bolivia.

83. P. DIVARICATA Wittm. Mededeel. Rijks Herb. 29:81. 1916. Bolivia.

84. P. (subgenus ?) APHELANDRIFLORA Lem. Ill. Hortic. 16: Misc. 90. 1869. Pepinia aphelandriflora André, Ill. Hortic. 17: 32, pl. 5. 1870. Peru, Panama.

85. P. CAPITATA L. B. Smith, Contr. U. S. Nat. Herb. 29:301, fig. 23. 1949. Colombia.

86. P. (subgenus ?) GUZMANIOIDES L. B. Smith, Contr. U. S. Nat. Herb. 29:306, fig. 27. 1949. Colombia.

87. P. ARCHERI L. B. Smith, Contr. Gray Herb. 104:79, pl. 3, figs. 20, 21. 1934. Colombia.

88. P. (subgenus ?) POEPPIGIANA Mez in Mart. Fl. Bras. 3, pt. 3:461. 1894. Peru.

89. P. MACRANTHERA André, Enum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888; emend. L. B. Smith, Contr. U. S. Nat. Herb. 29:310. 1949. Colombia.

90. P. MAIDIFOLIA (C. Morr.) Dcne. ex Planch. Fl. Serres 9: 151, pl. 915. 1854. Puya maidifolia C. Morr. Ann. Soc. Agr. Bot. Gand 5:453, pl. 1849. P. funkiana Linden, Cat. 5:2. 1850. Pitcairnia funkiana A. Dietr. Allgem. Gartenzeit. 19:337. 1851. P. maydifolia Dcne. ex Naudin, Rev. Hortic. ser. 3, 5:347. 1851. P. macrocalyx Hook. Bot. Mag. 79:pl. 4705. 1853. ? P. polyanthoides Brongn. ex Dcne. Rev. Hortic. 27:244. 1855 (! Mez). P. zeifolia Koch & Sello ex K. Koch, Ind. Sem. Hort. Berol. for 1854: App. 11. 1855. P. maizaifolia hort. ex Beer, Bromel. 46. 1857, nomen. Phlomostachys funkiana Beer, Bromel. 47. 1857. Neumannia maidifolia K. Koch, Ind. Sem. Hort. Berol. for 1856: App. 2. 1857.

Pitcairnia funkii Wawra, It. Princ. S. Coburgi 1:174. 1883. Lamproconus maidifolius Lem. ex Baker, Handb. Bromel. 109. 1889, nomen. Vriesia tricolor hort. ex Baker, l. c., nomen. Pitcairnia oerstediana Mez in DC. Mon. Phan. 9:448. 1896. Guiana, Venezuela, Colombia, Central America.

91. P. SANDEMANII L. B. Smith, Contr. U. S. Nat. Herb. 29:531, fig. 87. 1954. Peru.

92. P. (subgenus ?) MARITIMA L. B. Smith, Contr. U. S. Nat. Herb. 29:311, fig. 31. 1949. Colombia.

93. P. (subgenus ?) FERREYRAE L. B. Smith, Phytologia 4:215, pl. 1, figs. 10-12. 1953. Peru.

94. P. SCEPTRIFORMIS Mez, Bull. Herb. Boiss. ser. 2, 4:628. 1904; Ule, Verhandl. Bot. Ver. Brandenb. 48:139. 1907. Peru.

95. P. BRITTONIANA Mez in DC. Mon. Phan. 9:451. 1896. P. werckleana Mez, Bull. Herb. Boiss. ser. 2, 4:622. 1904. P. flaviflora Standley, Journ. Wash. Acad. Sci. 17:247. 1927. Costa Rica to British Guiana and Bolivia.

96. P. NIGRA (Carr.) André, Énum. Bromél. 5. Dec. 13, 1888, incorrectly attributed to Carr.; Rev. Hortic. 60:565. Dec. 16, 1888. Neumannia nigra Carr. Rev. Hortic. 53:390, pl. 1881. Pitcairnia gravisiana Wittm. Bot. Jahrb. 11:56. 1889. Colombia, Ecuador.

97. P. PULCHELLA Mez in DC. Mon. Phan. 9:459. 1896. Ecuador.

98. P. BRONGNIARTIANA André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888.

Var. a. BRONGNIARTIANA. P. klabochorum hort. ex Baker, Handb. Bromel. 107. 1889, nomen. P. klabochiana C. Morr. ex Mez in DC. Mon. Phan. 9:414. 1896. Leaf-blades narrowly lanceolate, acuminate, 80 mm wide. Colombia.

Var. b. LATIFOLIA L. B. Smith, Phytologia 6:438. 1959. Leaf-blades oblanceolate, broadly acute and apiculate, 135-145 mm wide. Ecuador.

99. P. BRUNNESCENS L. B. Smith, Contr. U. S. Nat. Herb. 29:300, fig. 22. 1949. Colombia, Ecuador.

100. P. BARRIGAE L. B. Smith, Caldasia 5:5, fig. 1948. Colombia.

101. P. (subgenus ?) CLAVATA L. B. Smith, Phytologia 9:248, pl. 2, figs. 9, 10. 1963. Peru.

102. P. SQUARROSA L. B. Smith, Caldasia 5:11, fig. 1948. Colombia.

Var. a. SQUARROSA. Floral bracts castaneous with acuminate green apices; petals white.

Var. b. COLORATA L. B. Smith, Caldasia 5:12. 1948. Floral bracts bright red; petals dark purple.

Var. c. AURANTIACA L. B. Smith, Phytologia 5:396. 1956. Inflorescence 10 cm long; floral bracts with short broadly acute apices; sepals 25 mm long; petals orange.

103. P. ATRORUBENS (Beer) Baker, Journ. Bot. 19:307. 1881. Phlomostachys atrorubens Beer, Bromel. 48. 1857. Puya warszewiczii H. Wendl. ex Hook. Bot. Mag. 87:pl. 5225. 1861. Pitcairnia lamarcheana E. Morr. ex Baker, Handb. Bromel. 111. 1889. P. lindeni Baker, op. c. 112. Neumannia lindeni E. Morr. ex Baker,

- l. c., nomen. N. atrorubens K. Koch ex Baker, l. c., nomen.
Lamproconus warszewiczii Lem. ex Baker, l. c., nomen. P. atro-
rubens β . lamarcheana Mez in DC. Mon. Phan. 9:457. 1896.
 Colombia, Panama, Costa Rica, Mexico (?).
 104. P. CAMPII L. B. Smith, Mem. New York Bot. Gard. 8:28,
 fig. 1, j-k. 1952. Ecuador.
 105. P. ELONGATA L. B. Smith, Contr. U. S. Nat. Herb. 29:304,
 fig. 25. 1949. Colombia, Ecuador.
 106. P. (subgenus ?) BAKERI (André) André ex Mez in DC. Mon.
 Phan. 9:460. 1896; emend. L. B. Smith, Caldasia 5:4, fig. 1948.
Quesnelia bakeri André, Enum. Bromél. 4. Dec. 13, 1888; Rev.
 Hortic. 60:564. Dec. 16, 1888. Colombia, Ecuador.
 107. P. (subgenus ?) OBLANCEOLATA L. B. Smith, Contr. Gray
 Herb. 117:26, pl. 2, fig. 18. 1937. Colombia, Panama, Costa Rica
 108. P. ARCUATA (André) André, Enum. Bromél. 5. Dec. 13, 1888;
 Rev. Hortic. 60:565. Dec. 16, 1888. Neumannia arcuata André,
 Rev. Hortic. 58:108, pl. 1886. Colombia.
 109. P. FOSTERIANA L. B. Smith, Contr. U. S. Nat. Herb. 29:
 305, fig. 26. 1949. Colombia.
 110. P. UMBRATILIS L. B. Smith, Phytologia 4:216, pl. 1, figs.
 15-17. 1953. Peru.
 111. P. HITCHCOCKIANA L. B. Smith, Phytologia 5:44, pl. 6,
 figs. 1-3. 1954. Ecuador.
 112. P. (subgenus ?) SCEPTRIGERA Mez, Fedde Rep. Nov. Spec. 3:
 7. 1906. Ecuador.
 113. P. ASPLUNDII L. B. Smith, Phytologia 4:214, pl. 1, figs.
 6-9. 1953. Peru.
 114. P. SUBULIFERA L. B. Smith, Phytologia 4:215, pl. 1, figs.
 13, 14. 1953. Peru.
 115. P. ALTENSTEINII (Lk., Kl. & Otto) Lem. Fl. des Serres ser
 1, 2:pl. 162. 1846. Venezuela.
 Var. a. ALTENSTEINII. Puya altensteinii Lk., Kl. & Otto, Pl.
 rar. Hort. Berol. 1:1, pl. 1. 1840. Pitcairnia undulatifolia
 Hook. Bot. Mag. 72:pl. 424l. 1846, non hort. 1846. Lamproconus
altensteinii Lem. Jard. Fleur. 2:sub pl. 127. 1852. ? Pitcairnia
rhodostachys Hassk. Verh. Nat. Ver. Ned. Ind. 1, pt. 7:8. 1856;
 cf. Mez in Pflanzenreich 4, Fam. 32:275. 1935. Phlomostachys al-
tensteinii Beer, Bromel. 45. 1857. Neumannia altensteinii Griseb
 Goett. Nachr. for 1864:14. 1865. Flowering about 1 m high or
 less; leaves less than 12; inflorescence ca. 12 cm long.
 Var. b. GIGANTEA (Hook.) Baker, Handb. Bromel. 111. 1889.
Puya altensteinii var. gigantea Hook. Bot. Mag. 73:pl. 4309.
 1847. P. macrostachys A. Dietr. Allg. Gartenzeit. 16:145. 1848.
P. macrostachya Schomb. Fl. & Fauna Guyana 1068. 1848, nomen.
Lamproconus giganteus Lem. Jard. Fleur. 2:sub pl. 127. 1852.
Phlomostachys gigantea Beer, Bromel. 47. 1857. Neumannia gigan-
tea Brongn. ex Beer, Bromel. 47. 1857, nomen. Flowering over 2 m
 high; leaves many; inflorescence ca. 30 cm long.
 116. P. HETEROPHYLLA (Lindl.) Beer, Bromel. 68. 1857.
 Var. a. HETEROPHYLLA. Leaves dimorphic. Peru and Venezuela
 to Panama and Mexico.
 Forma a. HETEROPHYLLA. Puya heterophylla Lindl. Bot. Reg. 26:

pl. 71. 1840. *P. longifolia* C. Morr. Ann. Soc. Agr. Bot. Gand 2: 483, pl. 101. 1846. *Pitcairnia exscapa* Liebm. Ind. Sem. Hort. Haun. for 1848:12. 1848. *P. lindleyana* Lem. Jard. Fleur. 2: sub pl. 151. 1852. *P. morrenii* Lem. op. c. 3:pl. 291. 1852. *P. longifolia* Beer, Bromel. 67. 1857. *P. liebmanni* K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 7. 1858. Petals some shade of red.

Forma b. ALBIFLORA Standley & L. B. Smith, Lilloa 6:383. 1941. Petals white.

Var. b. EXSCAPA Mez in DC. Mon. Phan. 9:375. 1896. *Pitcairnia cernua* Kunth & Bouché, Ind. Sem. Hort. Berol. for 1848:12. 1848. *P. exscapa* Hook. Bot. Mag. 77:pl. 4591. 1851, non Liebm. 1848. Colombia, Ecuador.

117. *P.* (subgenus ?) AUGUSTII Harms, Notizblatt 10:211. 1928. Peru.

118. *P. AEQUATORIALIS* L. B. Smith, Contr. Gray Herb. 114:6. pl. 1, fig. 3. 1936. Ecuador.

119. *P. CRASSA* L. B. Smith, Lilloa 14:94, fig. 5. 1948. Bolivia.

120. *P. LIGNOSA* L. B. Smith, Contr. U. S. Nat. Herb. 29:309, fig. 30. 1949. Colombia.

121. *P. STENOPHYLLA* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hort. 60:564. Dec. 16, 1888. Colombia.

122. *P. PAVONII* Mez in DC. Mon. Phan. 9:386. 1896. Ecuador.

123. *P. PUNGENS* H.B.K. Nov. Gen. & Sp. 1:294. 1816. *P. laevis* Willd. ex Schult. in R. & S. Syst. 7, pt. 2:1249. 1830, nomen. *P. concolor* Baker, Journ. Bot. 19:269. 1881. Colombia to Peru.

124. *P. BILLBERGII* L. B. Smith, Publ. Mus. Hist. Nat. "Javier Prado" Univ. Nac. Mayor San Marcos ser. B, no. 13:4, fig. 6-8. 1963. Peru.

125. *P.* (subgenus ?) MELANOPODA L. B. Smith, Phytologia 9:249, pl. 2, figs. 11-13. 1963. Peru.

126. *P. LOPEZII* L. B. Smith, Phytologia 5:46, pl. 6, figs. 4-6. 1954. Peru.

127. *P. DECURVATA* L. B. Smith, sp. nov. *P. lopezii* L. B. Smith in systema mea proxima sed scapo gracili, scapi bracteis quam internodiis brevioribus, floribus patentibus vel decurvatis secundis differt.

Stemless, flowering over 6 dm high; leaves subbulbous-rosulate; blades dimorphic, some reduced to slender pectinate-serrate dark spines, others foliaceous, deciduous, linear, acuminate, 32 cm long, 18 mm wide, entire above the line of abscission, pale-lepidote beneath, soon glabrous; scape erect, 5 mm in diameter, soon glabrous; scape-bracts linear-lanceolate, acuminate, much shorter than the upper internodes; inflorescence simple, lax, white-flocculose, becoming glabrous; floral bracts ovate, acuminate, to 23 mm long, exceeding all the pedicels; flowers secund, spreading to decurved at anthesis; pedicels slender, to 14 mm long, somewhat biangulate; sepals narrowly triangular, acuminate, 30 mm long, glabrous at anthesis, the posterior ones sublate-carinate toward base; petals over 8 cm long, naked, yellow; ovary 7/8 superior; ovules caudate. Pl. I, fig. 8: Flower x 1/2; fig. 9: Sepal x 1.

PERU: Lambeyeque: Prov. Lambeyeque: Rocky slope, between Beata de Humay and Km. 38 on the Olmos-Marañon Highway, alt. 150 m, May 21, 1963, A. López, A. Sagástegui & V. Collantes, no. 4047 (TRP, type).

128. *P. VIOLASCENS* L. B. Smith, *Phytologia* 6:439, pl. 2, figs. 12, 13. 1959. Ecuador.

129. *P. FRACTIFOLIA* L. B. Smith, sp. nov. *P. palmeri* S. Watson in *systema mea proxima sed pedicellis brevioribus*, floribus haud secundis differt.

Stemless (?), flowering 75 cm high; leaves bulbous-rosulate, entire; sheaths very broadly ovate, centrally castaneous, densely pale-lepidote, becoming glabrous; blades dimorphic, some much reduced, subulate, persistent, green, others foliaceous, linear, acuminate, over 55 cm long (incomplete), 12 mm wide, covered with appressed cinereous scales beneath, glabrous above, channeled; scape erect, slender, sparsely pale-lepidote; scape-bracts narrowly triangular, acuminate, much shorter than the upper internodes; inflorescence simple, lax, 19 cm long, subglabrous; floral bracts narrowly triangular, acuminate, to 10 mm long; flowers polystichous, not secund; pedicels spreading, slender, to 20 mm long, much exceeding all the floral bracts; sepals oblong, acute, 16 mm long, short-carinate above the tumid base; petals (immature) barely exceeding the sepals, red, naked; ovary 4/5 superior; ovules caudate. Pl. I, fig. 10: Flower x 1/2; fig. 11: Sepal x 1.

PERU: Amazonas: Prov. Chachapoyas: On rocks, Tialango, between Bagua and Ingenio, alt. 800 m, May 27, 1963, A. López, A. Sagástegui & V. Collantes, no. 4242 (TRP, type).

130. *P. CARDENASII* L. B. Smith, *Phytologia* 8:505, pl. 3, figs. 5-7. 1963. Bolivia.

131. *P. STRAMINEA* Poeppig ex Mez in DC. *Mon. Phan.* 9:427. 1896. Peru.

132. *P. ALATA* L. B. Smith, *Lloydia* 11:304, fig. 2. 1948. Ecuador.

133. *P.* (subgenus ?) *SCANDENS* Ule, *Verhandl. Bot. Ver. Brandenb.* 48:140. 1907. Peru.

134. *P. LUTESCENS* Mez & Sodiro, *Bull. Herb. Boiss. ser. 2*, 4: 626. 1904. Ecuador.

135. *P. ERRATICA* L. B. Smith, *Lloydia* 11:305, fig. 3. 1948. Ecuador.

136. *P. ACICULARIS* L. B. Smith, *Publ. Mus. Hist. Nat. "Javier Prado" Univ. Mayor San Marcos ser. B*, no. 13:3, figs. 4, 5. 1963. Peru.

137. *P. RIPARIA* Mez, *Fedde Rep. Spec. Nov.* 12:416. 1913. Peru.

138. *P. SPECTABILIS* Mez in DC. *Mon. Phan.* 9:421. 1896.

Colombia.

139. *P. LAXISSIMA* Baker, *Handb. Bromel.* 101. 1889. Colombia.

140. *P. LONGIPES* Mez, *Fedde Rep. Spec. Nov.* 12:416. 1913.

Colombia.

141. *P. ELLIPTICA* Mez & Sodiro, *Bull. Herb. Boiss. ser. 2*, 4: 624. 1904. Ecuador.

142. *P. TUMULICOLA* L. B. Smith, *Contr. U. S. Nat. Herb.* 29:

314, fig. 34. 1949. Colombia.

143. *P. BIFLORA* L. B. Smith, Contr. Gray Herb. 127:17, pl. 1, figs. 1-3. 1939. Peru.

144. *P. MULTIFLORA* L. B. Smith, Contr. U. S. Nat. Herb. 29:312, fig. 32. 1949. Colombia.

145. *P. KALBREYERI* Baker, Journ. Bot. 19:273. 1881. Colombia, Panama.

146. *P. VOLUBILIS* L. B. Smith, Phytologia 5:33, pl. 1, figs. 1-4. 1954. Colombia.

147. *P. NUBIGENA* Planch. Fl. des Serres ser. 1, 8:265, pl. 847. 1852-53. Venezuela.

148. *P. MERIDENSIS* Kl. ex Mez in DC. Mon. Phan. 9:385. 1896. *P. integrifolia* var. "P." meridensis Kl. ex Baker, Handb. Bromel. 97. 1889. Venezuela.

149. *P. BELLA* L. B. Smith, Caldasia 3:240, fig. 1945. Colombia
Var. a. *BELLA*. Upper scape-bracts shorter than the internodes; sepals 24 mm long.

Var. b. *DENSIOR* L. B. Smith, Contr. U. S. Nat. Herb. 29:300. 1949. Scape-bracts exceeding the internodes; sepals not over 17 mm long.

150. *P.* (subgenus ?) *CALOPHYLLA* L. B. Smith, Contr. U. S. Nat. Herb. 29:432, fig. 38. 1951. Colombia.

151. *P. SYLVESTRIS* L. B. Smith, Contr. Gray Herb. 117:29, pl. 2, fig. 27. 1937. Colombia.

152. *P. DOLICHOPETALA* Harms, Notizblatt 12:530. 1935. Colombia.

153. *P. REFLEXIFLORA* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. Ecuador.

154. *P. SEMAPHORA* L. B. Smith, Caldasia 3:242. 1945. Colombia

155. *P. MACARENENSIS* L. B. Smith, Bot. Mus. Leaflet. Harvard 16:192, pl. 25, figs. 1-4. 1954. Colombia.

156. *P. GUARITERMAE* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. Colombia.

157. *P.* (subgenus ?) *CALATHEOIDES* L. B. Smith, Contr. Gray Herb. 117:24, pl. 2, figs. 8-11. 1937. Peru.

158. *P. SODIROI* Mez, Bull. Herb. Boiss. ser. 2, 4:622. 1904. Ecuador.

159. *P. NOBILIS* Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4:623. 1904. Ecuador.

160. *P.* (subgenus ?) *ADSCENDENS* L. B. Smith, Contr. U. S. Nat. Herb. 29:298, fig. 20. 1949. Colombia.

161. *P. SNEIDERNII* L. B. Smith, Phytologia 6:434, pl. 1, figs. 5-7. 1959. Colombia.

162. *P.* (subgenus ?) *CYANOPETALA* Ule, Verhandl. Bot. Ver. Brandenburg. 48:139. 1907. Peru.

163. *P. BRACHYSPERMA* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hortic. 60:564. Dec. 16, 1888. Colombia.

164. *P. SIMILIS* L. B. Smith, Contr. U. S. Nat. Herb. 29:434, fig. 40. 1951. Colombia.

165. *P. PALMOIDES* Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4:626. 1904. Ecuador.

166. *P.* (subgenus ?) *EXIMIA* Mez, Fedde Rep. Nov. Spec. 3:5.

1906. Peru.

167. *P. TRIANAE* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hort. 60:564. Dec. 16, 1888.

Var. a. *TRIANAE*. Sepals obtuse; petals 35-45 mm long. Colombia, Bolivia.

Var. b. *RETUSA* L. B. Smith, Lloydia 11:305. 1948. Sepals re-tuse; petals not over 25 mm long. Ecuador.

168. *P. OBLONGIFOLIA* L. B. Smith, Phytologia 6:438, pl. 2, figs. 9-11. 1959. Ecuador.

169. *P. LANUGINOSA* R. & P. Fl. Peruv. 3:35, pl. 258. 1802. *Puya ruiziana* Mez in DC. Mon. Phan. 9:491. 1896, as to synonymy, not as to specimen. Peru.

170. *P. PARAGUAYENSIS* L. B. Smith, Rev. Argentina Agron. 7: 163, figs. 4-6. 1940. Paraguay.

171. *P. MACROBOTRYS* André, Énum. Bromél. 4. Dec. 13, 1888; Rev. Hort. 60:564. Dec. 16, 1888. Colombia.

172. *P. ORCHIDIFOLIA* Mez, Fedde Rep. Spec. Nov. 17:114. 1921. Venezuela.

173. *P. FENDLERI* Mez in DC. Mon. Phan. 9:387. 1896. Venezuela

174. *P. UNILATERALIS* L. B. Smith, Phytologia 8:11, pl. 1, figs. 21-23. 1961. Ecuador.

175. *P. LEPIDOPETALON* L. B. Smith, Caldasia 5, no. 21:10, fig. 1948. Colombia.

176. *P. PUSILLA* Mez in DC. Mon. Phan. 9:429. 1896. French Guiana.

177. *P. TYMPANI* L. B. Smith, Phytologia 5:177, pl. 1, figs. 4-6. 1955. Venezuela.

178. *P.* (subgenus ?) *OCCIDENTALIS* L. B. Smith, Phytologia 4: 380, pl. 1, figs. 4-6. 1953. Colombia.

179. *P.* (subgenus ?) *BREVICALYCINA* Mez, Fedde Rep. Spec. Nov. 16:9. 1919. Peru, Venezuela.

180. *P. PETRAEA* L. B. Smith, Contr. U. S. Nat. Herb. 29:433, fig. 39. 1951. Colombia.

181. *P.* (subgenus ?) *ANDREANA* Linden Cat. 1873; Ill. Hort. 20:146, pl. 139. 1873. *P. lepidota* Regel, Act. Hort. Petrop. 2: 435. 1873; Gartenfl. 22:389, pl. 772. 1873. Colombia.

182. *P. GRUBBIANA* L. B. Smith, sp. nov. *P. jimenezii* in sistema mea proxima sed pedicellis majoribus bracteis florigeras omnias superantibus differt.

Stemless (?), flowering 45 cm high; leaves fasciculate, persistent, nearly equaling the inflorescence, entire; sheaths ovate, ca. 2 cm long, dark castaneous, at first covered with a membrane of pale coalesced scales; blades dimorphic, some much reduced, subulate, green, others foliaceous, linear, caudate-acuminate, slightly narrowed toward base but not petiolate, 14 mm wide, glabrous; scape erect, slender, sparsely pale-lepidote; lower scape-bracts foliaceous, large, the highest ovate, caudate, shorter than the internode; inflorescence simple, lax, the axis 9 cm long, sparsely pale-lepidote; floral bracts ovate, acuminate, to 19 mm long, thin; flowers suberect, not secund; pedicels slender, to 22 mm long, all exceeding the floral bracts; sepals oblong, obtuse, 16 mm long, obscurely carinate; petals 4 cm long,

bearing a crenate scale at base, red; stamens included; ovary 3/4 superior; ovules caudate. Pl. I, fig. 12: Flower x 1/2; fig. 13: Sepal x 1.

COLOMBIA: Boyacá: Hill sabana on path from Báchira to Bócota soon after it climbs up out of valley bottom, Sierra Nevada de Cocuy, alt. ca. 2150 m, August 21, 1957, P. J. Grubb, B. A. B. Curry & A. Fernández-Pérez, no. 649 (US, type).

183. *P.* (subgenus ?) *CAULESCENS* K. Koch ex Mez in DC. Mon. Phan. 9:425. 1896. Venezuela (?).

184. *P. MICROCALYX* Baker, Journ. Bot. 19:228. 1881. Venezuela
Var. a. *MICROCALYX*. *P. lutea* hort. Linden ex Baker, Handb. Bromel. 104. 1889. Floral bracts lanceolate, acuminate; sepals triangular, acuminate; petals yellow.

Var. b. *SCHLIMII* (Baker) L. B. Smith, Phytologia 7:106. 1960. *P. schlimii* Baker, Handb. Bromel. 100. 1889. *P. caracasana* Baker, op. c. 103. Floral bracts lanceolate, acuminate; sepals triangular, acuminate; petals red.

Var. c. *ELLIPTICA* L. B. Smith, Phytologia 7:107. 1960. Floral bracts elliptic, apiculate; sepals oblong, subacute; petals red.

185. *P. JOHANNIS* L. B. Smith, Phytologia 5:179, pl. 1, figs. 11-13. 1955. Colombia.

Mexico, Central America

(cf. nos. 77 (out of order), 84, 90, 95, 103, 107, 116)

186. *P. CHIRIQUENSIS* L. B. Smith, Contr. U. S. Nat. Herb. 29: 281, fig. 6, 1949. Panama.

187. *P. FLAGELLARIS* L. B. Smith, Contr. U. S. Nat. Herb. 29: 280, fig. 5. 1949. Guatemala.

188. *P. VALERII* Standley, Journ. Wash. Acad. Sci. 17:246. 1927. Costa Rica.

189. *P. TABULIFORMIS* Linden Cat. 17:5. 1862. Mexico.

190. *P. RECURVATA* (Scheidw.) K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 4. 1858. *Puya recurvata* Scheidw. Allgem. Gartenzeit. 10:275. 1842. *Pepinia recurvata* E. Morr. ex Baker, Handb. Bromel. 110. 1889, nomen. *Pitcairnia taenipetala* Mez in DC. Mon. Phan. 9:382. 1896. Guatemala, British Honduras, Mexico.

191. *P.* (subgenus ?) *LONGEBRACTEATA* Bouché ex Mez in DC. Mon. Phan. 9:428. 1896. Guatemala (?).

192. *P. MATUDAE* L. B. Smith, Phytologia 8:220, pl. 1, figs. 5, 6, 1962. Mexico.

193. *P. WENDLANDII* Baker, Journ. Bot. 19:306. 1881. *Puya sulphurea* Hook. Bot. Mag. 79:pl. 4696. 1853. *Neumannia sulphurea* K. Koch, Ind. Sem. Hort. Berol. for 1856:App. 2. 1857. *Phlomostachys sulphurea* Beer, Bromel. 46. 1857. *Pitcairnia altensteinii* sensu J. Donnell Smith, Enum. Pl. Guatemal. 3:79. 1889-1907. *P. sulfurea* Mez in DC. Mon. Phan. 9:456. 1896, non Andr. 1802. Costa Rica, Guatemala, Mexico.

194. *P. MACROCHLAMYS* Mez, Fedde Rep. Nov. Spec. 3:6. 1906. Guatemala.

195. *P. HEMSLEYANA* Mez in DC. Mon. Phan. 9:455. 1896, as to type only. *P. ochroleuca* Baker, Journ. Bot. 19:306. 1881; Baker

- in Hems. Biol. Centr.-Am. Bot. 3:317, pl. 85. 1884, as to material cited, not as to basionym. P. petiolata Baker, Handb. Bromel. 112. 1889, in part, as to Salvin & Godman. Guatemala.
196. P. IMBRICATA (Brongn.) Regel, Gartenfl. 17:135. 1868. Neumannia imbricata Brongn. Ann. Sci. Nat. ser. 2, 15:369. 1841. Phlomostachys imbricata Beer, Bromel. 47. 1857. Pitcairnia imbricata Brongn. ex K. Koch, Ind. Sem. Hort. Berol. for 1856: App. 2. 1857, nomen. Mexico.
197. P. PETIOLATA (Koch & Bouché) Baker, Journ. Bot. 19:307. 1881. Neumannia petiolata Koch & Bouché ex K. Koch, Ind. Sem. Hort. Berol. for 1856: App. 2. 1857. Guatemala, British Honduras.
198. P. CARIOANA Wittm. Bot. Jahrb. 14, Beibl. 32:4. 1891. P. cariovana Mez in DC. Mon. Phan. 9:461. 1896. Guatemala.
199. P. MEMBRANIFOLIA Baker, Handb. Bromel. 109. 1889. Costa Rica.
200. P. DENSIFLORA Brongn. ex Lem. Hortic. Univ. 6:228. 1845. P. aurantiaca Tenore, Ann. Sci. Nat. ser. 4, 2:378. 1854. Phlomostachys densiflora Beer, Bromel. 46. 1857. Lamproconus aurantiacus E. Morr. ex Baker, Handb. Bromel. 114. 1889, nomen. Mexico.
201. P. OCHROLEUCA (Koch & Bouché) Baker, Journ. Bot. 19:306. 1881. Neumannia ochroleuca Koch & Bouché in K. Koch, Ind. Sem. Hort. Berol. for 1856: App. 2. 1857. Central America or Mexico?
202. P. THEAE Mez in DC. Mon. Phan. 9:376. 1896. Costa Rica.
203. P. SAXICOLA L. B. Smith, Contr. Gray Herb. 117:29. 1937. P. fulgens A. Dietr. Allgem. Gartenzeit. 19:137. May 3, 1851, non Dietr. 1837, nec Dene. Jan. 1851. P. splendens Warsc. ex A. Dietr. Allgem. Gartenzeit. 19:176. May 31, 1851, non Poir. 1836. P. ovandensis Matuda, An. Inst. Biol. Mexico 23, nos. 1 & 2:90. 1953. P. lymanii Matuda, op. c. 99. Guatemala, Mexico.
204. P. PURPUSII L. B. Smith, Contr. Gray Herb. 117:27, pl. 2, figs. 20, 21. 1937. Mexico.
205. P. CALDERONII Standley & Smith in L. B. Smith, Contr. Gray Herb. 98:8, pl. 3, figs. 1, 2. 1932. Honduras, Salvador, Guatemala.
206. P. ROSEANA L. B. Smith, Contr. Gray Herb. 117:27, pl. 2, figs. 22, 23. 1937. Mexico.
207. P. MICHELIANA André, Rev. Hortic. 73:576, pl. 1901. Mexico.
208. P. CYLINDROSTACHYA L. B. Smith, Contr. Gray Herb. 117:25, pl. 2, figs. 14, 15. 1937. Mexico.
209. P. LEPROSA L. B. Smith, Contr. Gray Herb. 161:33, pl. 4, fig. 4. 1946. Mexico.
210. P. MODESTA L. B. Smith, Phytologia 7:417, pl. 1, figs. 1, 2. 1961. Mexico.
211. P. TUERCKHEIMII Donn. Smith, Bot. Gaz. 13:190. 1888. Guatemala.
- Var. a. TUERCKHEIMII. Leaf-blades 10 mm wide; axis of the inflorescence slender, sparsely floccose; floral bracts exceeding the pedicels; sepals 25-30 mm long, obscurely carinate toward base.
- Var. b. MACROLEPIS L. B. Smith, Lilloa 6:383, pl. 1, figs.

5, 6. 1941. Leaf-blades to 22 mm wide; axis of the inflorescence stout, densely white-floccose; floral bracts much exceeding the pedicels; sepals to 33 mm long, alate-carinate at base.

212. *P. HINTONIANA* L. B. Smith, Contr. Gray Herb. 114:7, pl. 1, figs. 8, 9. 1936. Mexico.

213. *P. MOOREANA* L. B. Smith, Contr. U. S. Nat. Herb. 29:523, fig. 79. 1954. Mexico.

214. *P. FLEXUOSA* L. B. Smith, Contr. Gray Herb. 114:6, pl. 1, fig. 7. 1936. Mexico.

215. *P. PALMERI* S. Watson, Proc. Am. Acad. 22:456. 1887. Mexico.

Var. a. *PALMERI*. *Tillandsia secunda* Sessé & Moc. Fl. Mex. ed. 2, 81. 1894. Floral bracts about half as long as all but the lowest pedicels.

Var. b. *LONGEBRACTEATA* L. B. Smith, Wrightia 2:64. 1960. Floral bracts elongate, equaling or exceeding all of the pedicels

216. *P. PUBERULA* Mez & Smith ex Donn. Smith, Bot. Gaz. 19:264. 1894. Guatemala.

217. *P. TILLANDSIOIDES* L. B. Smith, Contr. Gray Herb. 161:35, pl. 4, fig. 7. 1946. Mexico.

218. *P. SCHIEDEANA* Baker, Handb. Bromel. 95. 1889. Mexico.

219. *P. PTEROPODA* L. B. Smith, Contr. Gray Herb. 117:26, pl. 2, fig. 19. 1937. Mexico.

220. *P. MICROPODA* L. B. Smith, sp. nov. Ab omnibus speciebus adhuc cognitis foliis majoribus deciduis, scapo brevissimo sed inflorescentia elongata differt.

Stemless, flowering 16 cm high; leaves bulbous-rusulate, evidently all alike; sheaths ovate, ca. 3 cm long, dark castaneous at least toward apex, entire; blades deciduous, unknown above the abscission line, the base 7 mm wide, pale-lepidote beneath, spinose-serrate; scape very short, hidden by the leaf-bases; scape-bracts densely imbricate, lanceolate, acuminate; inflorescence simple, subax, glabrous; axis slender; floral bracts ovate, acuminate, to 28 mm long, much exceeding all the pedicels, entire, thin; flowers secund, subspreading at anthesis; pedicels slender, subterete, to 6 mm long; sepals linear-lanceolate, acuminate, 24 mm long, alate-carinate; petals 35 mm long, naked, red; ovary more than 1/2 superior. Pl. I, fig. 14: Flower x 1/2; fig. 15: Sepal x 1.

MEXICO: México: Dist. Temascaltepec: On cliffs, Puerto Salitre, alt. 1300 m, February 7, 1932, G. B. Hinton, no. 936 (US, type).

221. *P. KARWINSKYANA* Schult. in R. & S. Syst. 7, pt. 2:1239. 1830. *P. jaliscana* S. Watson, Proc. Am. Acad. 22:456. 1887. Mexico.

222. *P. MILITARIS* L. B. Smith, Contr. Gray Herb. 161:34, pl. 4, fig. 5. 1946. Mexico.

223. *P.* (subgenus ?) *FOLIACEA* L. B. Smith, sp. nov. *P. sordida* L. B. Smith in systema mea proxima sed scapi bracteis inferioribus foliaceis perelongatis differt.

Short-caulescent, flowering 4 dm high; leaves subbulbous-rusulate; sheaths broadly ovate, ca. 2 cm long, dark castaneous;

blades dimorphic, some reduced to dark pectinate-serrate spines, others foliaceous, deciduous, linear, acuminate, slightly narrowed toward base, about equaling the inflorescence, 14 mm wide, sparsely white-flocculose at base, entire above the line of abscission; scape erect, slender, white-flocculose; scape-bracts erect, all exceeding the internodes, the lower foliaceous and equaling the leaves, the upper ovate, acuminate, scarcely larger than the floral bracts; inflorescence simple, laxly few-flowered, white-flocculose, the slender axis 7 cm long; floral bracts ovate, acuminate, to 22 mm long, much exceeding the slender terete 7 mm pedicels, entire; flowers suberect at anthesis, not secund; sepals linear-lanceolate, acuminate, 23 mm long, the posterior ones carinate at base; petals 5 cm long, naked, red; ovary $3/4$ superior. Pl. I, fig. 16: Flower x 1/2; fig. 17: Sepal x 1.

MEXICO: Michoacan: Dist. Coalcoman: On tree, Naranjillo, alt. 1250 m, February 8, 1941, G. B. Hinton no. 15941 (US, type).

224. *P. SORDIDA* L. B. Smith, Contr. Gray Herb. 161:34, pl. 4, fig. 6. 1946. Mexico.

225. *P. MONTICOLA* Brandege, Zoe 5:197. 1905. Mexico.

226. *P. RINGENS* Kl. ex Lk., Kl. & Otto, Ic. Pl. Rar. 63, pl. 25. 1842. *P. latifolia* Wendl. Hort. Herrenh. 1:5, pl. 3. 1798, non Ait. 1789, cf. Mez in Pflanzenreich 4, Fam. 32:266. 1935.

P. montalbensis hort. Linden ex Otto & Dietr. Allgem. Gartenzeit. 19:138. 1851. *P. warszewitziana* Kl. ex Beer, Bromel. 66. 1857.

P. karwinskyana Beer, Bromel. 161. 1857. *P. fulgens* hort. ex Baker, Handb. Bromel. 101. 1889, nomen. Mexico.

227. *P. CHIAPENSIS* Miranda, An. Inst. Biol. Mexico 24: [69], fig. 1. 1953. Mexico.

228. *P. OAXACANA* L. B. Smith, Contr. Gray Herb. 117:25, pl. 2, figs. 16, 17. 1937. Mexico.

229. *P. SECUNDIFLORA* L. B. Smith, Contr. Gray Herb. 114:7, pl. 1, figs. 1, 2. 1936. Mexico.

230. *P. CARNEA* Beer, Oesterr. Bot. Zeitschr. 8:182. 1858. *Puya carnea* Regel, Cat. Pl. Hort. Aksak. 117. 1860. Panama.

231. *P. XANTHOCALYX* Mart. Hort. Monac. Sem. for 1848:4. 1848; Linnaea 24:195. 1851. *P. sulphurea* sensu K. Koch, Ind. Sem. Hort. Bercl. for 1857:App. 5. 1858, non Andr. 1802. *P. flavescens* Baker, Bot. Mag. 103:pl. 6318. 1877, non K. Koch, 1858. Mexico.

West Indies
(cf. no. 71)

232. *P. SAMUELSSONII* L. B. Smith, Contr. Gray Herb. 117:28, pl. 2, figs. 24-26. 1937. *P. xanthocalyx* sensu Mez in Urb. Symb. Ant. 8:87. 1920, non Mart. 1848. Hispaniola.

233. *P. BROMELIIFOLIA* L'Hérit. Sert. Angl. 7. 1789. *Hepetis angustifolia* Sw. Prodr. 56. 1788, non *Pitcairnia angustifolia* Ait. 1789. *H. bromeliifolia* Salisb. Prodr. 247. 1796. *Pitcairnia redoutiana* Beer, Bromel. 57. 1857, non Schult. 1830. Jamaica

234. *P. ANGUSTIFOLIA* [Soland. in] Ait. Hort. Kew. 1:401. 1789. *P. angustifolia* Redouté, Lil. 2:pl. 76. 1804, non Ait. 1789. *P.*

furfuracea sensu Jacq. f. Eclog. Pl. 1:117. 1815, non Willd. 1809
P. ramosa Jacq. f. Eclog. Pl. 1:154. 1816. P. tomentosa Dietr.
 Lex. Nachtr. 6:305. 1820, nomen; Dietr. ex Beer, Bromel. 64. 1857
P. redouteana Schult. in R. & S. Syst. 7, pt. 2:1243. 1830. P.
angustifolia Ryan ex Schult. l. c., nomen. P. ramosa K. Koch,
 Ind. Sem. Hort. Berol. for 1857:App. 5. 1858, non Jacq. 1816. P.
intermedia hort. ex K. Koch, l. c. P. skinneri hort. ex K. Koch,
 l. c. P. alta sensu Mez in DC. Mon. Phan. 9:406. 1896, non
 Hassk. 1856. Hepetis angustifolia sensu Mez, op. c. 973, non Sw.
 1788. Puerto Rico, Lesser Antilles.

235. P. FUERTESII Mez, Fedde Rep. Spec. Nov. 12:415. 1913. P.
tomentosa sensu Mez in DC. Mon. Phan. 9:389. 1896, non Dietr. ex
 Beer 1857. P. fulgens Mez in Urb. Symb. Ant. 8:87. 1920,
 non Dcne. ex Dietr. 1851. Dominican Republic.

236. P. GRACILIS Mez in DC. Mon. Phan. 9:407. 1896. Lesser
 Antilles.

237. P. JIMENEZII L. B. Smith, Phytologia 7:1, pl. 1, figs.
 3-5. 1959. Dominican Republic.

238. P. PLATYPHYLLA Schrad. Blumenb. 26. 1827. P. bromelii-
folia sensu Ait. Hort. Kew. 1:401. 1789, non L'Hérit. 1789. P.
latifolia Andr. Bot. Repos. 5:pl. 322. 1803, non Ait. 1789.
 Jamaica.

239. P. CUBENSIS (Mez) L. B. Smith, Contr. Gray Herb. 117:24,
 pl. 2, figs. 12, 13. 1937. P. latifolia var. cubensis Mez in DC.
 Mon. 9:396. 1896. Cuba.

240. P. LATIFOLIA Ait. Hort. Kew. 1:401. 1789. Hepetis lati-
folia Raeuschel ex Schult. in R. & S. Syst. 7, pt. 2:1247. 1830,
 nomen. Billbergia latifolia hort. Belg. ex Heynh. Nom. 2:69.
 1846, nomen. Pitcairnia furfuracea Beer, Bromel. 59. 1857. P.
latifolia Jacq. ex Beer, op. c. 61. P. alta sensu Baker, Bot.
 Mag. 108:pl. 6606. 1882, non Hassk. 1856. Hepetis pyramidata
 Rich. ex Baker, Handb. Bromel. 92. 1889, nomen. Puerto Rico (?),
 Lesser Antilles.

241. P. SPICATA (Lam.) Mez in DC. Mon. Phan. 9:392. 1896.
 Lesser Antilles.

Var. a. SPICATA. Bromelia spicata Lam. Encycl. 1:146. 1783.
Pitcairnia latifolia Redouté, Lil. pl. 74. 1804, non Ait. 1789.
P. bracteata α. Ait. Hort. Kew. ed. 2, 2:202. 1811. P. racemosa
 Woodf. ex Schult. in R. & S. Syst. 7, pt. 2:1245. 1830, nomen.
P. fulgens Dcne. ex A. Dietr. Allgem. Gartenzeit. 19:25. 1851.
P. gireoudiana A. Dietr. Allgem. Gartenzeit. 21:105. Ap. 1853.
P. bracteata var. fulgens Regel, Gartenfl. 2:163. 1853. ?Bill-
bergia bifrons Lindl. Journ. Hort. Soc. London 8:54. June 1853.
P. bracteata var. gireaudiana Beer, Bromel. 51. 1857. Billbergia
pyramidata Beer, op. c. 123. Pitcairnia commutata Regel, Garten-
 fl. 16:289. 1867. P. bracteata var. commutata Regel, op. c. 17:
 8. 1868. Petals red.

Var. b. SULPHUREA (Andr.) Mez in DC. Mon. Phan. 9:393. 1896.
P. sulphurea Andr. Bot. Repos. 4:pl. 249. 1802. P. bracteata β.
 Ait. Hort. Kew. ed. 2, 2:202. 1811. P. bracteata β. sulphurea
 Ker-Gawl. Bot. Mag. 34:pl. 1416. 1811. Tillandsia vincentiense
 E. H. L. Krause, Beih. Bot. Centr. 32, pt. 2:337. 1914. Petals

yellow.

242. *P. ALBUCIFOLIA* Schrad. Blumenb. 24. 1827. ? *P. spec. fol. lineari-lanc.* etc. Voigt, Pl. Rar. Hort. Belved. in Sylloge 2:52. 1812 (?); cf. R. & S. Syst. 7, pt. 2:1250. 1830. *P. furfuracea* Sims, Bot. Mag. 53:pl. 2657. 1826, non Willd. 1809. *P. intermedia* hort. ex Sims, l. c. nomen. *P. ringens* sensu Beer, Bromel. 55. 1857, non Kl. 1842. *P. affinis* K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 5. 1858. *P. angustifolia* E. Morr. ex Baker, Handb. Bromel. 92. 1889, nomen. Lesser Antilles.

243. *P.* (subgenus ?) *GLYMIANA* K. Koch, Wochenschr. Gärtn. 11: 89. 1868. *Hechtia glymiana* K. Koch, op. c. 90, nomen. *Puya glymiana* K. Koch, l. c. nomen. *Pitcairnia firma* Baker, Journ. Bot. 19:268. 1881. *P. jacksoni* K. Koch ex Baker, l. c. nomen. West Indies (?).

244. *P. ELIZABETHAE* L. B. Smith, Bromel. Soc. Bull. 8:21, figs. 1958. Dominican Republic.

245. *P. DOMINGENSIS* L. B. Smith, sp. nov. *P. jimenezii* L. B. Smith in systema mea proxima sed foliorum laminis dimorphis differt.

Nearly stemless, flowering 6 dm high; leaves many in a fasciculate rosette, the larger ones to over 8 dm long; sheaths ovate, 3-5 cm long, dark castaneous, entire; blades dimorphic, some reduced to subulate entire dark spines, others foliaceous linear, long-acuminate, slightly narrowed toward base, 15-20 mm wide, glabrous, sparsely serrate toward base; scape erect, slender, sparsely white-flocculose; scape-bracts erect, the lower foliaceous and exceeding the internodes, the upper narrowly triangular, caudate-acuminate, shorter than the internodes; inflorescence simple, subdense at anthesis, sparsely white-flocculose, the axis 7 cm long; floral bracts like the upper scape-bracts, the lower much exceeding the pedicels, the upper shorter; pedicels slender, to 8 mm long; sepals linear, obtuse, 19 mm long, ecarinate; petals linear, obtuse, 4 cm long, red, bearing an oblong subtruncate 5 mm long scale at base; stamens included; ovary 5/8 superior; ovules caudate (?). Pl. I, fig. 18: Flower x 1/2; fig. 19: Sepal x 1.

DOMINICAN REPUBLIC: Samaná: Bahía de San Lorenzo, Bahía de Samaná, cultivated and flowered by L. Ariza Julia in 1961, J. J. Jiménez no. 4444 (US, type; hb. Jiménez, isotype).

Amazon-Orinoco Basin

246. *P. UNDULATA* Scheidw. Allgem. Gartenzeit. 10:275. 1842. *P. undulatifolia* hort. ex Lem. Fl. des Serres 2:sub pl. 162. 1846, nomen. *P. speciosissima* hort. ex Regel, Gartenfl. 23:1. 1874, nomen. *Lamproconus undulatus* Lem. Jard. Fleur. 2:sub pl. 127. 1852. Amazonian Brazil (?).

247. *P. EGLERI* L. B. Smith, Phytologia 8:228, pl. 2. figs. 11-14. 1962. Brazil: Pará.

Planalto of Brazil

248. *P. ULEI* L. B. Smith, Bol. Mus. Nac. Rio de Janeiro n. sér. no. 15:5, pl. 1, figs. h-j. 1952.
249. *P.* (subgenus ?) *ANTHERICOIDES* Mez in Mart. Fl. Bras. 3, pt. 3:441. 1894.
250. *P. TORRESIANA* L. B. Smith, Bol. Mus. Nac. Rio de Janeiro n. sér. no. 15:4, pl. 1, figs. f, g. 1952.
251. *P. DECIDUA* L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:110, pl. 114. 1943.
252. *P. GLAZIOVII* Baker, Handb. Bromel. 92. 1889.
253. *P. LANCIFOLIA* Mez in Mart. Fl. Bras. 3, pt. 3:447. 1894.
 Var. a. *LANCIFOLIA*. Sepals 35 mm long.
 Var. b. *MINOR*. L. B. Smith, Bol. Mus. Nac. Rio de Janeiro n. sér. no. 15:4. 1952. Sepals 24 mm long.
254. *P. ENCHOLIRIOIDES* L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10:146, fig. 6. 1950.
255. *P. CARINATA* Mez in Mart. Fl. Bras. 3, pt. 3:448. 1894.
P. morelii sensu Baker, Handb. Bromel. 103. 1889, in part, non Lem. 1846.
256. *P. FLAMMEA* Lindl. Bot. Reg. 13:pl. 1092. 1827.
 Var. a. *FLAMMEA*. ? *Tillandsia laevis* Vell. Fl. Flum. 133. 1825; Icon. 3:pl. 126. 1835, non *Pitcairnia laevis* Willd. 1830.
P. olfersii Link, Verh. Gartenbauver. Berlin 7:363, pl. 3. 1831.
 ? *P. fulgens* Poit. Rev. Hort. 3:157. Jan. 1836; Mez in DC. Mon. Phan. 9:430. 1896. *P. morelii* Lem. Hort. Univ. 7:231, pl. 1846. *P. fulgens* Dcne. in Cat. Linden 18. 1850; Dcne. ex A. Dietr. Allgem. Gartenzeit. 19:137. 1851. ? *P. rubicunda* K. Koch & Bouché, Ind. Sem. Hort. Berol. for 1856:App. 3. 1857. ? *P. moreliana* hort. ex K. Koch & Bouché, l. c., nomen. ? *P. laevis* Beer, Bromel. 60. 1857. *P. decaisnei* K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 5. 1858. ? *P. l'herminieri* hort. Paris ex K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 8. 1858. *P. roezlii* sensu Baker, Bot. Mag. 117:pl. 7175. 1891, non E. Morr. 1885. ? *P. amaryllidiflora* hort. ex Gentil, Pl. Cult. Serres Brux. 153. 1907, nomen, cf. Mez in Pflanzenreich 4, Fam. 32:260. 1935. ? *P. mordii* hort. ex Gentil, l. c. Leaf-blades mostly 20-36 mm wide, covered beneath with spreading scales; axis of the inflorescence glabrous, usually turning black on drying.
 Var. b. *ROEZLII* (E. Morr.) L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:111. 1943. *P. roezlii* E. Morr. Belg. Hort. 35:285, pls. 18, 19. 1885. *P. hypoleuca* Mez in Mart. Fl. Bras. 3, pt. 3:458. 1894. Leaf-blades mostly 20-36 mm wide, covered beneath with spreading scales; axis of the inflorescence lepidote, usually remaining pale.
 Var. c. *CORCOVAENSIS* (Wawra) L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:112. 1943. *P. corcovadensis* Wawra, Oesterr. Bot. Zeitschr. 12:384. 1862. Leaf-blades glabrous; inflorescence lax, few-flowered, remaining pale; axis glabrous.
 Var. d. *GLABRIOR* L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:112. 1943. ? *P. cinnabarina* A. Dietr. Allgem. Gartenzeit. 18:202. 1850. ? *P. australis* K. Koch, Ind. Sem. Hort. Berol. for

1856:App. 4. 1857. Leaves glabrous; inflorescence dense at least toward apex, many-flowered, remaining pale; axis glabrous; petals red.

Var. e. PALLIDA L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:112, pl. 115. 1943. Leaves glabrous; inflorescence dense at least toward apex, many-flowered, remaining pale; axis glabrous; petals yellowish white.

Var. f. FLOCCOSA L. B. Smith, Arquiv. Bot. Estado São Paulo n. ser. 1:112. 1943. P. muscosa Mart. in R. & S. Syst. 7, pt. 2: 1240. 1830. P. selloana Baker, Handb. Bromel. 100. 1889. P. dietrichiana Wittm. Bot. Jahrb. 13, Beibl. 29:15. 1891. P. pruinosa Mez in Mart. Fl. Bras. 3, pt. 3:454. 1894, non H.B.K. 1816. P. clausenii Mez, l. c. P. selloviana Mez in DC. Mon. Phan. 9: 433. 1896. P. weddelliana Mez in DC. Mon. Phan. 9:434. 1896, non Baker 1889. P. minarum Mez in Pflanzenreich 4, Fam. 32:636. 1935. Leaf-blades less than 20 mm wide, lepidote; inflorescence remaining pale; axis lepidote.

257. P. ALBIFLOS Herb. Bot. Mag. 53:pl. 2642. 1826. Tillandsia schuechii Beer & Fenzl, Allg. Gartenzeit. 14:265. 1846. P. odorata hort. ex Beer & Fenzl, op. c. 266, nomen. P. elata Liebm. Ind. Sem. Hort. Haun. 14. 1849. Cochliopetalum albiflos Beer, Bromel. 68. 1857. C. flavescens Beer, op. c. 69. C. schuechii Beer, l. c. Pitcairnia flavescens hort. ex Beer, l. c., nomen; K. Koch, Ind. Sem. Hort. Berol. for 1857:App. 9. 1858. Cochliopetalum odoratum Hemsl. Biol. Centr.-Am. Bot. 3:317. 1884, nomen, erroneously attributed to Beer. P. xanthocalyx sensu Baker, Handb. Bromel. 107. 1889, in part, as to Cochliopetalum flavescens Beer.

258. P. STAMINEA Lodd. Bot. Cab. 8:pl. 722. 1823. P. speciosa hort. Lovan ex Schult. in R. & S. Syst. 7, pt. 2:1250. 1830, nomen; cf. Mez in Pflanzenreich 4, Fam. 32:262. 1935. Cochliopetalum stamineum Beer, Bromel. 70. 1857. Orthopetalum stamineum Baker, Handb. Bromel. 97. 1889, nomen attributed to Beer. Pitcairnia canaliculata Baker, op. c. 99. P. longicauda Hornem. ex Mez in Mart. Fl. Bras. 3, pt. 3:445. 1894. P. staminea var. longicauda Mez in DC. Mon. Phan. 9:439. 1896, attributed to Hornem.

259. P. BEYCALEMA Beer, Bromel. 63. 1857. P. muscosa sensu Hook. Bot. Mag. 80:pl. 4770. 1854, non Mart. 1830. P. leiocoma hort. ex Beer, Bromel. 62. 1857, nomen.

260. P. SUAVEOLENS Lindl. Bot. Reg. 13:pl. 1069. 1827. P. odorata Wawra, It. Sax.-Cob. 174. 1883.

West Africa

261. P. FELICIANA (Aug. Chevalier) Harms & Mildbr. Notizblatt 14:118. 1938. Willrussellia feliciana Aug. Chevalier, Bull. Soc. Bot. France 84:503, fig. 1. 1937. (French Guinea).

EXCLUDED AND DOUBTFUL TAXA

262. P. alpestris (Poepp. & Endl.) L. H. Bailey, Cyclop. Am. Hort. 1359. 1901 = PUYA ALPESTRIS Poepp. & Endl.

263. *P. bangii* Baker, Mem. Torrey Bot. Club 6:124. 1896 = *PUYA STENOTHYRSA* (Baker) Mez.
264. *P. brachiata* Cham. in Link, Jahrb. 1, pt. 2:192. 1820, nomen, Unknown.
265. *P. brachystachya* Baker, Handb. Bromel. 118. 1889 = *PUYA BRACHYSTACHYA* (Baker) Mez.
266. *P. brevifolia* (Griseb.) R. E. Fries, Nov. Act. Reg. Soc. Sci. Upsal. ser. 4, 1, pt. 1:73. 1905 = *ABROMEITIELLA BREVIFOLIA* (Griseb.) Castellanos.
267. *P. brocchinia* D. Dietr. Syn. Pl. 2:1062. 1840 = *BROCCHINIA PANICULATA* Schult. f.
268. *P. bromeliifolia* var. *graminifolia* Griseb. Fl. Brit. W. Ind. 594. 1864. Unknown. No species known from Jamaica has entire leaves 4 lines (ca. 8 mm) wide.
269. *P. caerulea* - cf. *coerulea*.
270. *P. chilensis* Lodd. Cat. ex Loudon, Hort. Brit. 118. 1830, nomen = *PUYA CHILENSIS* Mol.
271. *P. chlorantha* (Spegazz.) Castellanos, Com. Mus. Nac. Buenos Aires 2:142. 1925 = *ABROMEITIELLA BREVIFOLIA* (Griseb.) Castellanos.
272. *P. chrysantha* Phil. Fl. Atacam. 50. 1860 = *DEUTEROCOHNIA CHRYSANTHA* (Phil.) Mez.
273. *P. ciliaris* hort. ex Pasq. Cat. Ort. Bot. Nap. 81. 1867, nomen. Unknown.
274. *P. coarctata* Pers. Syn. 1:344. 1805 = *PUYA CHILENSIS* Mol.
275. *P. coerulea* Benth. ex Baker, Handb. Bromel. 121. 1889 (first valid combination) = *PUYA COERULEA* Lindl.
276. *P. coerulea* sensu Baker, Handb. Bromel. 121. 1889, in part, as to *PUYA ALPESTRIS* (Poepp. & Endl.) Gay and its synonym, *P. whytei* Hook. f.
277. *P. crystalina* Pers. Syn. Pl. 1:344. 1805 = *PUYA LANUGINOSA* (R. & P.) Schult. f.
278. *P. darblayana* André, Rev. Hortic. 62:33, fig. 1890 = *P. CORALLINA* X *PANICULATA*.
279. *P. decora* hort. Linden ex Beer, Bromel. 108. 1857, nomen = *BILLBERGIA AMOENA* var. *MINOR* (Antoine & Beer ex Beer) L. B. Smith ?
280. *P. discolor* Loisel. Herb. Gen. Amat. 5:pl. 345. 1821 = *BILLBERGIA AMOENA* (Lodd.) Lindl. var. *AMOENA*.
281. *P. distacata* Beer, Bromel. 58. 1857 = *BILLBERGIA DISTACHIA* (Vell.) Mez var. *DISTACHIA*.
282. *P. dyckioides* Baker, Handb. Bromel. 118. 1889 = *PUYA DYCKIODES* (Baker) Mez
283. *P. elegans* Regel, Cat. Hort. Aksak. 112. 1860, nomen. Unknown.
284. *P. fastuosa* C. Morr. Ann. de Gand. 3:411, pl. 161. 1847 = *BILLBERGIA PYRAMIDALIS* (Sims) Lindl. var. *PYRAMIDALIS*.
285. *P. flabelliformis* hort. ex Gentil, Pl. Cult. Serres Jard. Bot. Brux. 153. 1907, nomen. Unknown.
286. *P. floccosa* Regel, Gartenfl. 23:307. 1874; Act. Hort. Petrop. 3:124. 1875 = *PUYA FLOCCOSA* (Linden) E. Morr.
287. *P. formosa* Mez in Pflanzenreich 4, Fam. 32:296, 654.

1935, erroneously attributed to Spegazzini = PUYA SPATHACEA (Griseb.) Mez.

288. P. furfuracea Willd. Enum. 1:346. 1809 = PUYA FURFURACEA (Willd.) L. B. Smith.

289. P. grandiflora Mez, Fedde Rep. Nov. Spec. 3:5. 1906, non Hook. 1861 = PUYA PITCAIRNIOIDES L. B. Smith.

290. P. guyanensis Baker, Handb. Bromel. 120. 1889 = PUYA FLOCCOSA (Linden) E. Morr.

291. P. humilis hort. ex Sweet, Hort. Brit. ed. 1, 425. 1827, nomen. Unknown.

292. P. iridiflora Beer, Bromel. 51. 1857. Description inadequate.

293. P. lanata F. G. Dietr. Lexicogr. Nachtr. 6:303. 1820 = PUYA LANATA (H.B.K.) Schult. f.

294. P. lorentziana Mez in DC. Mon. Phan. 9:373. 1896 = ABRO-METIPELLA LORENTZIANA (Mez) Castellanos.

295. P. macrophylla Willd. ex R. & S. Syst. 7, pt. 2:1283. 1830 = AECHMEA LATIFOLIA (Willd. ex Schult.) Kl. ex Baker.

296. P. maronii André, Rev. Hort. 56:222. 1884; 57:108, fig. 1885 = P. CORALLINA X ALTENSTEINII.

297. P. media hort. ex Sweet, Hort. Brit. ed. 1, 425. 1827, nomen. Unknown.

298. P. megastachya Baker, Handb. Bromel. 120. 1889 = PUYA ROEZLII E. Morr.

299. P. meridensis hort. ex Baker, Handb. Bromel. 121. 1889, nomen = PUYA FLOCCOSA (Linden) E. Morr.

300. P. micrantha Lindl. Bot. Reg. 29:Misc. 44. 1843 = FOSTERELLA MICRANTHA (Lindl.) L. B. Smith.

301. P. monstrosa Beer, Bromel. 68. 1857. Description inadequate.

302. P. olivacea (Wittm.) Mez in Pflanzenreich 4, Fam. 32:247. 1935 = PUYA OLIVACEA Wittm.

303. P. pastoensis Baker, Handb. Bromel. 122. 1889 = PUYA LEHMANNIANA L. B. Smith.

304. P. pearcei Baker, Handb. Bromel. 120. 1889 = PUYA PEARCEI (Baker) Mez

305. P. penduliflora Mez in DC. Mon. Phan. 9:463. 1896 = GLO-MEROPITCAIRNIA PENDULIFLORA (Griseb.) Mez.

306. P. penduliflora A. Rich. in Sagra Hist. Cuba 11:262. 1850 = HOHENBERGIA PENDULIFLORA (A. Rich.) Mez.

307. P. philippii Baker, Handb. Bromel. 122. 1889 = PUYA VIOLACEA (Brongn.) Mez.

308. P. plumieri Baker, Handb. Bromel. 107. 1889 = GUZMANIA PLUMIERI (Griseb.) Mez.

309. P. pyramidata Link, Enum. 1:308. 1821, as to material, not as to basonym = PUYA FURFURACEA (Willd.) L. B. Smith.

310. P. pyramidata (R. & P.) Pers. Syn. Pl. 1:344. 1805 = PUYA PYRAMIDATA (R. & P.) Schult. f.

311. P. quetameensis Baker, Handb. Bromel. 121. 1889 = PUYA FLOCCOSA (Linden) E. Morr.

312. P. regia Witte, Tijdschr. Tuinb. Ed. Bos. 5:pl. 3, fig. 34. 1900; Gentil, Pl. Cult. Serres Jard. Bot. Brux. 152. 1907 =

P. CORALLINA X SPICATA.

313. *P. robusta* Rusby, Bull. New York Bot. Gard. 6:488. 1910 = PUYA SANCTAE-CRUCIS (Baker) L. B. Smith.

314. *P. rusbyi* Baker, Handb. Bromel. 122. 1889 = PUYA RUSBYI (Baker) Mez.

315. *P. sanctae-crucis* Baker, Handb. Bromel. 120. 1889 = PUYA SANCTAE-CRUCIS (Baker) L. B. Smith.

316. *P. secunda* F. G. Dietr. Lexicon. Nachtr. 6:301. 1820 = TILLANDSIA SECUNDA H.B.K.

317. *P. spathacea* Griseb. Goett. Abh. 24:329. 1879 = PUYA SPATHACEA (Griseb.) Mez.

318. *P. spathulata* hort. ex Lem. Fl. des Serres 3:pl. 227. 1847 = AECHMEA BASI-LATERALIS (Lem.) L. B. Smith

319. *P. sphaerocephala* Baker, Handb. Bromel. 123. 1889 = PUYA VENUSTA Phil.

320. *P. spinosa* Gill. ex Baker, Handb. Bromel. 136. 1889, nomen = DYCKIA FLORIBUNDA Griseb.

321. *P. splendens* Poir. in Rev. Hort. sér. 1, 3:157. 1836. Not understood. May equal PITCAIRNIA FLAMMEA var. GLABRIOR L. B. Smith.

322. *P. stenothyrsa* Baker, Handb. Bromel. 122. 1889 = PUYA STENOTHYRSA (Baker) Mez.

323. *P. stricta* André, Bromel. Andr. 31. 1889. Sterile, description inadequate.

324. *P. vallesoletana* Lexarza in La Llave & Lexarza, Nov. Veg. Descr. fasc. 1:19. 1824. Description inadequate. Probably related to *P. RINGENS* Kl.

325. *P. venusta* Baker, Handb. Bromel. 123. 1889 = PUYA VENUSTA Phil.

326. *P. violacea* Brongn. Ann. Fl. & Pom. ser. 3, 1:116. 1847; Allgem. Gartenzeit. 15:299. 1847 = PUYA VIOLACEA (Brongn.) Mez.

327. *P. virescens* K. Koch, Ind. Sem. Hort. Berol. for 1857: App. 4. 1858 = GUZMANIA VIRESCENS (Hook. f.) Mez.

328. *P. viridiflora* Regel, Ind. Sem. Hort. Petrop. for 1866: 81. 1867 = VRIESEA VIRIDIFLORA (Regel) Wittm. ex Mez.

329. *P. weddelliana* Baker, Handb. Bromel. 122. 1889 = PUYA WEDDELLIANA (Baker) Mez.

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TILLANDSIA laevis 256; schuechii 257; secunda 317; vincenti-ensis 241b.

VRIESEA tricolor 90, viridiflora 328.

WILLRUSSELLIA felicitiana 261.

Plate I

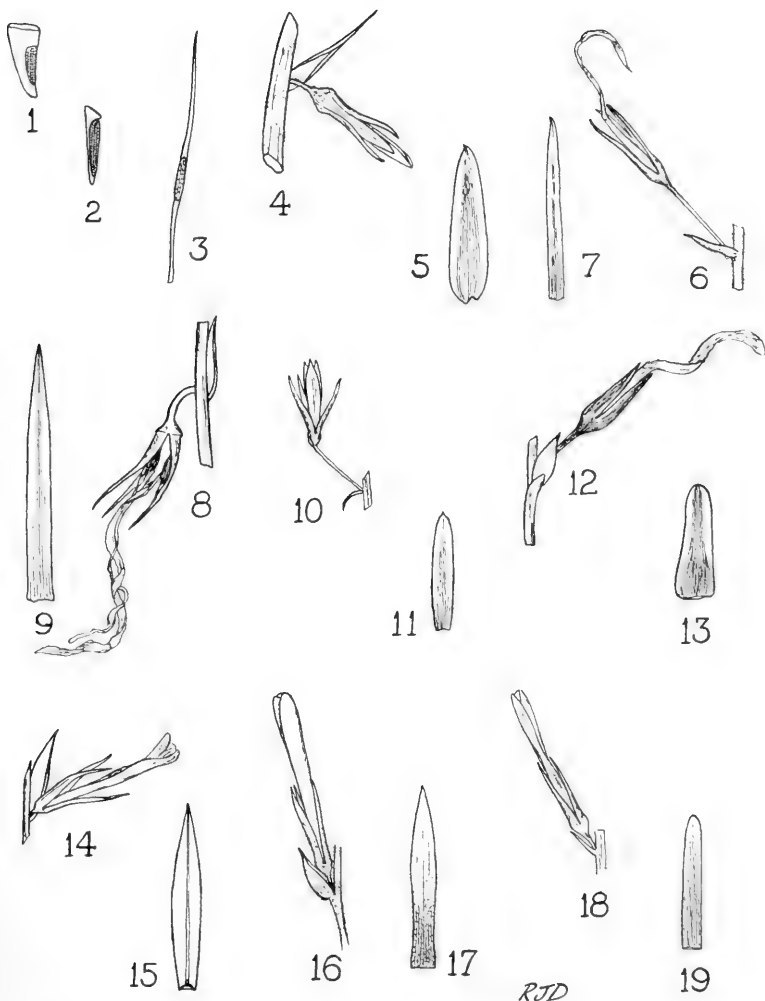


Fig. 1: *Pitcairnia caricifolia* (Holt & Blake 425); fig. 2: *P. angustifolia* (Cook & Collins 267); fig. 3: *P. paniculata* (Killip & Smith 25074); fig. 4-5: *P. vargasiana*; fig. 6-7: *P. halophila*; fig. 8-9: *P. decurvata*; fig. 10-11: *P. fractifolia*; fig. 12-13: *P. grubbiana*; fig. 14-15: *P. micropoda*; fig. 16-17: *P. foliacea*; fig. 18-19: *P. domingensis*.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XVII

Harold N. Moldenke

VERBENA LITORALIS H.B.K.

Additional bibliography: F. A. Barkley, *Determin. Ejemp. Herb. Fac. Nac. Agron. Medellin* 1 (1): 2 & 4 (1949) and 5: 48 & 49. 1949; Boelcke & Echeverria, *Lilloa* 18: 250, cuadro 17 & 26. 1949; Matuda, *Am. Midl. Nat.* 44: 576. 1950; Moldenke, *Phytologia* 3: 284, 286, 289, & 290 (1950) and 3: 467. 1951; Stellfeld, *Trib. Farmac.* 19 (10): 166 & 172. 1951; Moldenke in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 4: 2209 & 2211. 1951; Acevedo de Vargas, *Bol. Mus. Nac. Hist. Nat. Chile* 25: 57--58. 1951; Moldenke, *Phytologia* 4: 66 & 74 (1952) and 4: 267 & 451. 1953; C. Skottsberg, *Veg. Juan Fern.* 922 & 942. 1953; Rambo, *Sellowia* 6: 60, 84, & 153. 1954; Moldenke, *Phytologia* 5: 24, 72, & 96. 1954; Thorne, *Am. Midl. Nat.* 52: 313. 1954; Moldenke, *Inform. Mold. Set* 48 *Spec. [4]* (1954) and 49 *Spec. 3.* 1954; Moldenke, *Mem. N. Y. Bot. Gard.* 9: 177. 1955; Soukup, *Biota* 1: 181. 1956; Rambo, *Sellowia* 7: 260. 1956; Moldenke, *Inform. Mold. Set* 51 *Soec. 4.* 1956; Moldenke in Humbert, *Fl. Madag.* 174: 9. 1956; Angely, *Fl. Paran.* 7: 13. 1957; Moldenke, *Am. Midl. Nat.* 59: 334, 342, & 346. 1958; Reitz, *Sellowia* 11: 45 & 134. 1959; Swanholm, *St. John, & Scheuer, Pac. Sci.* 13: 303. 1959; Moldenke, *Résumé* 11, 22, 23, 29, 32, 33, 39, 43--45, 47, 48, 69, 74, 80, 81, 85, 110, 115, 118, 119, 122, 127, 154, 203, 210, 212, 223, 314, 357, 359, 365, 368, 369, 371, 425, & 472. 1959; Moldenke, *Résumé Suppl. 1:* 2, 6, & 8 (1959) and 2: 4, 7, 10, & 12. 1960; O. Degener, *Fl. Hawaii.* 315: *Verbena: Litoralis.* 1960; Rennó, *Levant. Herb. Inst. Agron. Minas* 151. 1960; Angely, *Fl. Paran.* 16: 78 (1960) and 17: 46. 1961; Reitz, *Sellowia* 13: (13): 110. 1961; Lewis & Oliv., *Am. Journ. Bot.* 48: 641 & 642. 1961; Moldenke, *Phytologia* 8: 120, 124, 127, & 148 (1961) and 8: 200--202, 246, 247, 253, 255--257, 280, 310, 313--318, 405, & 412. 1962; Moldenke, *Résumé Suppl. 3:* 10, 11, 13, 15, 25, 27, 36, 39, & 40 (1962), 4: 5 & 17 (1962), 5: 5 (1962), and 6: 4, 6, 7, & 11. 1963; Moldenke, *Phytologia* 8: 460, 463, 487, 490, & 491 (1963) and 9: 66, 67, 113, 124, 126, 151, 154, 155, 165, 206, 213, 220, 296, 380, & 382. 1963.

Illustrations: H.B.K., *Nov. Gen. & Sp. Pl.* 2: pl. 137. 1818; Sanzin, *Anal. Soc. Cient. Argent. Buenos Aires* 88: 114. 1919; I. C. Verdoorn, *Union of S. Afr. Dept. Agr. & Forest. Bull.* 185: fig. 90 [as *V. officinalis*]. 1938; Augusto, *Fl. Rio Grande do Sul* fig. 102. 1946; Troncoso & Burkart, *Darwiniana* 7: 211, fig. 2b. 1946; O. Degener, *Fl. Hawaii.* 315: *Verbena: Litoralis.* 1960.

Quick-growing erect or suberect perennial herb, sometimes a suffrutescent shrub or undershrub, 0.2--2 m. tall, strict, shiny, sometimes large and robust, woody-based, fastigiately few- to many-branched above, glabrous or sparingly strigillose; stems to

12 mm. thick, tetragonal or subquadrangular in cross-section, with the whole internode deeply sulcate above the insertion of the leaves and faintly many-sulcate between, antrorsely scabridulous (on the angles) when young, green, with white pith, slightly contracted at the nodes; leaves decussate-opposite, lanceolate to oblong or oblanceolate, 3--10 cm. long, 1--1.5 cm. wide, acute at the apex, tapering into a very short petiole or else sessile or subsessile, acuminate and somewhat clasping or subamplexicaul at the very base, antrorsely scabridulous throughout or scabrous and somewhat rugose only above, the upper 2/3 more or less sharply and coarsely serrate with commonly 3--5 somewhat mucronate teeth per side, sparsely strigillose on both surfaces, the venation impressed above and prominent beneath; spikes terminal, several to many, pedunculate, cymose or corymbose-paniculate, slender or filiform, pilosulous, at first congested and about 4 mm. in diameter, dense or interrupted, later loosely flowered and elongate, in fruit becoming 2--8 cm. long, the fruits usually not contiguous; bractlets ovate-lanceolate, marcescent, rigid, acuminate or subulate at the apex, 1--3 mm. long, usually subequaling or somewhat shorter than the calyx, abruptly upcurved, glabrate; calyx often purple, 2--2.5 mm. long, pubescent or finely strigillose outside, the rim subtruncate, the 5 teeth unequal, minute, and subulate; corolla about 3 mm. long, varying from dark-blue, blue, bluish, light-blue, pale-blue, lilac-blue, lavender-blue, bright lavender-blue, violet-blue, or pinkish-blue to bluish-lavender, blue-violet, blue-purple, blue-lilac, lilac, clear-lilac, violet-lilac, dull-lilac, violet, pale-violet, pale rose-violet, lilac-violet, lavender, light- or pale-lavender, pink-lavender, purplish, purple, bright-purple, deep-purple, mauve, pink, or red, often described as "lilac with a violet tube", "lavender with a red tube", "lavender with white center", or "throat pale-lavender or white, lobes lavender", puberulent on the outer surface, its tube greenish toward the base, variable in length, always somewhat longer than the calyx, the limb inconspicuous, usually pale-lavender, 2.5--3 mm. wide, puberulent on the inner surface, the lobes subequal, obtuse at the apex, glabrous; stamens 4; anthers greenish-yellow; style about 1 mm. long, green, glabrous; stigma 2-lobed, the larger lobe stigmatiferous; ovary almost 1 mm. long, green, glabrous; cocci trigonous, dark-stramineous, linear-oblong, 1 mm. to hardly 2 mm. long, glabrous and smoothish, striate, somewhat reticulate at the apex, the commissural face about as long as the coccus, muricate-scabrous; chromosome number: $x = 7$, $2n = 28$.

An extremely widely distributed and polymorphic subtropical and tropical weed ranging from Arkansas, Louisiana, and Texas throughout Central and South America; introduced in Oregon, California, South Africa, Hawaii, Australia, and parts of Oceanica. It has been collected in open and waste places, grassy places and fields, along roadsides and fencerows, in grassy swales and wet meadows, thickets, wet thickets, and pastures, savannas and llanos, in cultivated and wet open ground, along moist roadsides, on roadside banks, at the edge of coffee plantations, in clearings

of temperate forests and "mata", on dunes and sand bars, in grassy pasturelands and ditches, in volcano craters, on moist riverbanks and stream edges, in wet campos and lawns, in marshes and barren ground along streams, in rocky calcareous fields at the margins of woods, in dry sandy soil on sunny roadsides, in open ground on lake margins, among bushes, on hillsides, in cafetals, potreros, and vacant lots, on "reddish clayish-loam in luxuriant tropical forests" and "on rich clayish-loam along lake shores", at the edges of cemeteries, along city streets, in dry barren scrubland and sunny sand, at the edge of thickets, on rocky limestone slopes, in Panicum maximum fields, on creek banks and bottoms, along grassy roadsides, in low and sandy areas, low marshy areas, on grassy hillsides, in springy areas and water-filled depressions, at the borders of cultivated fields, in valley land, on low ridges, and among low grasses in open spots, from sea-level to 3550 meters altitude, flowering and fruiting in every month of the year.

Reiche (1910) says "Planta americana, desde Méjico a las rejiones templadas de Sud-América; en Chile tanto en la zona litoral como en el interior; tambien en J. F. (Masatierra). Florece casi todo el año.

The species was found in Amador County, California, in 1896, and in San Joaquin County in 1902. King describes it as an uncommon roadside weed, growing in open sun, in San Luis Potosí, Mexico.

The type of the species was originally described by Bonpland as "crescit in salsis maritimis Oceanis Pacifici prope Truxillo, Santa et Lima", Peru; that of V. affinis was collected by Henri Guillaume Galeotti (no. 781) at an altitude of 6000 feet at Morelia, Michoacán, Mexico; that of V. arborea is Herb. Hort. Bot. Bogor. XV.K.A.XLV.17, cultivated at Buitenzorg, Java; that of V. littoralis var. pycnostachys f. montana was collected by Cornelius Osten (no. 10615) at Villa Nougues, at an altitude of 1100 meters, Tucumán, Argentina, on May 17, 1917, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo; and that of V. lanceolata is Herb. Willdenow 11134, deposited in the Willdenow Herbarium at the Botanisches Museum in Berlin.

As to V. nudiflora, Degener (1960) says "Thomas Nuttall collected this plant on 'Wahoo' [=Oahu] in 1835. Thinking it new, he proposed to name it Verbena nudiflora, writing this name upon his herbarium sheet. Nuttall died in 1859 and Nicolaus Turczaninow, a year before his own death, took up Nuttall's binomial from the herbarium label and published it for him. Thanks to the kindness of Bayard Long of the Academy of Natural Sciences in Philadelphia who compared Nuttall's historic specimen deposited at the Academy with a specimen of Verbena littoralis mailed him from Waialua, Oahu, in 1960, we know we must relegate Nuttall's name to synonymy."

The V. littoralis var. pycnostachya Schau. sometimes included in the synonymy of V. littoralis is regarded by me as V. brasil-

iensis Vell., while V. caracasana H.B.K. and V. littoralis var. caracasana Briq., also sometimes placed here, are discussed by me under V. littoralis var. caracasana (H.B.K.) Briq., which see. V. nudiflora L. belongs in the synonymy of Phyla nudiflora (L.) Greene, V. parviflora Ruiz is V. gracilis Desf., V. arborea H.B.K. is Petrea arborea H.B.K., and Lippia littoralis R. A. Phil. is Phyla nudiflora var. rosea (D. Don) Moldenke.

Bentham's original description (1846) of his var.? glabrior is as follows: "Verbena littoralis var.? glabrior, folia hinc inde trifidis grosse et obtusiusculè inciso-dentatis. An species propria? Folia V. menthaefoliae, Benth. Pl. Hartw. p. 21, sed flores parvi V. littoralis. — Peita."

One known hybrid of V. littoralis is with V. hispida Ruiz & Pav. and is discussed by me under xV. bealei Moldenke. Undoubtedly many other hybrids occur in the wild, accounting for some of the anomalous intermediate specimens bandied about between this and related species by herbarium workers, but more experimental work is needed before these can be clearly isolated.

In his discussion of V. bonariensis L., Hooker [Bot. Misc. 1: 166. 1829] says "V. littoralis Humb. seems to be a variety of this with shorter spikes than usual." On the basis of this statement, Gay and other authors speak of a "V. bonariensis var. littoralis Hook."

Pellett (1923) reports that honey is yielded by V. littoralis "over an area of considerable extent from Baton Rouge to near New Orleans in Louisiana."

Degener 17852 has leaves which greatly resemble those of V. brasiliensis; Cuatrecasas 18654 has unusually large dark-green leaves. Peredo s.n. [29-I-1946, Cabezas, Cordillera] bears this description on its label: "20--40 cm. tall; petals pale-yellow and stamens purple", but this is probably erroneous.

Troncoso & Burkart (1946) say: "La difundida V. littoralis se diferencia por las espigas delgadas, de 3--4 mm. de diám..... flores de 4--5 mm. de long., cáliz de 2,3--2,8 mm. de long., cubierto de pelitos breves uniformemente repartidos sobre su superficie, brácteas también menores [than in V. tristachya Troncoso & Burkart], de 2--3 mm. de long. y pubescentes.... En V. littoralis las ramas superiores y los tallos jóvenes son macizos, observándose que los tallos más gruesos y los entrenudos inferiores son algo fistulosos, pero con una gruesa capa de médula.... El estudio anatómico del tallo de V. tristachya presenta como característica interesante, que la capa de parénquima clorofiloano es continua, es decir, que no se halla interrumpida en los ángulos por la columna esclerenquimática. Esta última estructura caracteriza a V. littoralis."

Herbarium material of V. littoralis has been misidentified abundantly and distributed under such names as V. angustifolia

Michx., V. bonariensis L., V. brasiliensis Vell., V. caracasana Humb. & Bonpl., V. caracasana H.B.K., "V. caracasana var.", "V. cf. caracasana HBK.", V. caracasana H.B.K., V. gracilescens (Cham.) Herter, V. halei Small, V. hastata L., V. hispida Ruiz & Pav., V. isabellei Briq., "V. litoralis Kth. vel aff.", V. litoralis f. pycnostachya Schau., V. litoralis var. brasiliensis Briq., V. litoralis var. pycnostachya Schau., V. officinalis L., V. officinalis var. gracilescens Cham., V. paniculata Lam., V. polystachya H.B.K., V. stricta Vent., V. urticaefolia L., V. urticifolia L., V. xutha Lohm., Lippia sp., Priva leptostachya A. L. Juss., Stachytarpheta dichotoma Pers., and even Cyathula achyranthoides (H.B.K.) Moq., Buddleia asiatica Lour., Hyptis pectinata Poit., and "an Spartium?"

Perry annotated Maltby 252 and P. B. Kennedy 7046 [whose label originally read "6046"] as "Aff. V. menthaefolia Bth." Herter s. n. [Herb. Osten 18497] was annotated by Osten as "Verbena litoralis Kth. ad V. bonariensem L. spectans", while Lindman A.3647 was annotated by Briquet as "Verbena litoralis Kunth v. brasiliensis Briq. f. aliq. ad var. caracasana vergens."

On the other hand, the Henschen I.326 and Regnell I.326, distributed as V. litoralis, are actually V. alata Sweet; Bruch s. n. [Las Juntas, XII/1896], Gunckel 16865, Harshberger s.n. [Pembroke's Swamp, June 21, 1905], Holway & Holway 1180 & 1454, and Venturi 2812 are V. bonariensis L.; M. Bang 136, Claude-Joseph 2616, Cook & Gilbert 271 & 1208, Dusén 8, Holway & Holway 1272, Killip & Smith 17340, Morong 128, Rose, Pachano, & Rose 22845 & 22846, and Sehnen 4470 are V. brasiliensis Vell.; Heyde & Lux 3019, Liebmann 11339, and Renson 175 are V. carolina L.; A. Stewart 3319 is V. galapagosensis Moldenke; Anthony & Tate 333, Killip & Smith 21197, Pittier 1428, A. Stewart 3317, and Ll. Williams 5911 are V. glabrata H.B.K.; M. Bang 1058 is V. gracilescens (Cham.) Herter; Jørgensen 1021 is V. hispida Ruiz & Pav.; Liebmann 11318, C. R. Orcutt 1371, Purpus 3406, and Seler & Seler 724 are V. longifolia Mart. & Gal.; Bourgeau 360 is V. menthaefolia Benth., as is also Arsène s.n. [Rincón, 25/7/1909]; Dusén 8546 is V. minutiflora Briq.; R. Alvarez 427, Arechavaletae 39 & 3139, Beetle 2025, Cabrera 861, 1710, 2108, 2159, & 2386, Collector undesignated s.n. [Dec. 1885], H. M. Curran s.n. [Oct. 19, 1913], Dusén 7827, Grtner 418, Herter 269 [Herb. Herter 81713], Kuntze s.n. [Montevideo, 7/XII/91], Legrand 254 & 2009, Nicora 377, Osten 3165 & 3335, Pastore 137, Pedersen 774, Rambo 45339, 46069, 49723, & 55075, Reiss 55 & 56, T. Rojas 448, Rosa-Mato 313, 399, & 400, Scala 10001, Sehnen 3519, Seiyo s.n. [16 Nov. de 1884], Smith & Klein 11797, Smith & Reitz 8988 & 9730,

Smith, Reitz, & Sufridini 9624, and Teisseire 4481 are all *V. montevidensis* Spreng.; A. H. Moore 2939a, Herb. Harvey s.n. [ex seminib. h. R. P. 1841], Herb. Hort. Matrit. 31, and Yuncker 10145 are *V. officinalis* L.; C. R. Orcutt 118, 521, & s.n. [Pinery, 7-27-1883] are *V. orcuttiana* Perry; Fiebrig 5645 is *V. ovata* Cham.; Kuntze s.n. [Bolivien, 600 m., 1/4 April 1892] is *V. parvula* Hayek; Venturi 5 is *V. rigida* Spreng.; Jørgensen 3773 is *V. stellarioides* Cham.; H. L. Mason 1612 and Patifo 7138 are *V. sphaerocarpa* Perry; A. Stewart 3320 is the type collection of *V. stewartii* Moldenke; Cory 45878 is *V. xutha* Lehm.; and Heriberto 388 is not verbenaceous. The A. A. Heller 15162, distributed as *V. hansenii*, is actually *V. bonariensis* L.

H. E. Seaton 27 and Sharp 441120 are insect-galled; Liebmann 11336 is also abnormal. Its spike is thickened like that of *Stachytarpheta cayennensis* (L. C. Rich.) Vahl and there are no developed flowers, only large bractlets -- it may possibly represent an intergeneric hybrid between the two taxa. Lutz 1185 is a mixture with *V. brasiliensis* Vell., Schultes & Reko 237 is a mixture with *V. carolina* L., and Hanbury-Tracy 256 is a mixture with something non-verbenaceous. The "*V. officinalis*" described and illustrated by I. C. Verdoorn, Union of S. Afr. Dept. Agr. & Forest. Bull. 185: 171, fig. 90 (1938) is actually *V. litoralis*.

The Hummel s.n. cited below from Caracas, Venezuela, is an especially dense-flowered plant and may actually represent var. *caracasana*; the same is true of Demaree 24649 from Arkansas. In fact, many specimens cited below by me as *V. litoralis* seem anomalous in that their spikes are much more dense than in what I regard as typical *V. litoralis* as exemplified by A. A. Heller 2046, P. Russell 52, C. N. Forbes 188.2, and Ll. Williams 452. Meagher s.n. [July 7, 1937] is in part typical and in part dense. The dense form is well represented by J. M. Wood 13132, A. Forbes 1083m & s.n. [Tantalus Rd., 7/18/30], F. E. Egler 37-83, D. W. Garber 339, F. R. Fosberg 8856 & 10276, and K. Hartley s.n. [Wai-anae, May 4, 1856]. Quayle 258 is rather dense but weak, while C. N. Forbes 2036m is very dense. C. S. Judd 11 and C. N. Forbes 465h look very much like *V. brasiliensis* Vell. Personal observation of the plant growing so abundantly in the Hawaiian Islands causes me to have misgivings about its correct determination. It does not appear to be the same as the common weed which I observed in so many places in South America. I would not be at all surprised if further study should reveal that this dense-spiked form belongs in var. *caracasana*. The Jørgensen 3767 [Herb. Osten 22248] (Ug), cited by me on page 322 of *Phytologia*, vol. 8, as *V. brasiliensis*, seems, rather, to be *V. litoralis*. It is very possible that much of the material cited as *V. litoralis* from south-

ern Brazil and northern Argentina is V. montevidensis.

Augusto (1946) says: "Comun no sul do Brasil (Sello). Muito comun nos campos e morros dos arredores do Porto Alegre. (Emrich, Irmão Augusto e Irmão Edésio.)" Rosengurtt (1946) says "Mala hierba perenne (a sufruticulosa?), de ciclo estival. Abunda en campos vírgenes y de rastrojo". He cites his PE.506, 563, 590, 696, 739, 859, and 1213.

Hallier D.589 was first identified as V. urticifolia L., then as V. officinalis L., then as V. angustifolia Michx., and finally as V. litoralis by various herbarium workers! The species is said to have been introduced into cultivation in 1875.

On Indefatigable Island it is described by R. G. Taylor as occurring "in a partially deserted clearing in the forest in moist zone of island" and being an "herb, 2--3 ft. high, fls. lilac, possibly an imported plant, not seen in untouched forest." Schulz & Schulz found it "eingeschleppt" in Berlin, Germany, in 1898. On Easter Island it was found by Chapin on the inside of a volcano crater, as also on Maui in the Hawaiian Islands. Fosberg found it to be a weed in yards in Cundinamarca, Colombia, while Mendes Magalhaes describes it as "ruderal" in Minas Gerais, Brazil. Morel says that it is a "common plant on campo" at Riacho Porteño, Formosa, Argentina, while Jørgensen describes it as abundant at Andalgalá. Goodspeed asserts that it is "common and perhaps introduced....in rather moist soil in irrigated fields" at Valparaiso, Chile. Stellfeld and Roth both describe it as "ruderal", Smyth says that it is the "common tall verbena of the valley, common in waste places", Tamayo avers that in his country the plant is "very common in abandoned cultivated fields", while Yuncker, Dawson, & Youse refer to it as "a weedy plant". Lutz encountered it "abundant by roadside", Steinbach in "tierra greda", and Sandeman as "frequent in full exposure". Herter describes it as "along Roadsides in dry sandy soil exposed to full sun" and "common in dry sandy soil along roadsides" at Montevideo. Jørgensen reports it "common on campo" in Paraguay, while Rimbach calls it a "weed in gardens and on walls" in Ecuador.

On Masatierra the Skottsbergs found V. litoralis in colonies along roads and frequent on the shore; Mandon claims that it is "everywhere in cultivated land, hedges, and thickets near Sorata" in La Paz, Bolivia; Macbride & Featherstone describe it as a "common pasture and wayside weed" in Junín, Peru; and Lindman found it "abundant in pastures" in Rio Grande do Sul, Brazil. Sampaio comments "nos terranos incultos, á beira de lugares húmidos". Hanbury-Tracy discovered it growing in grass meadows in foothills and fairly dry ground among spaced scrub with few trees. Steward affirms that in the Galapagos Islands it is abundant in open country around 9000 feet altitude, common in wet soil near springs at 1000 feet, and rare at 1550 feet. DeWolf found it to be "fairly common" along trails in Costa Rica. Ewan describes it as a "rather common perennial" with the "appearance of Statice in the field". Stanford, Retherford, & Northcraft

found it "in broad damp river-bed with varied vegetation of large shrubs, small trees, and herbs" and "on mountains with luxuriant vegetation". Standley (1938) says of it "frequent in waste places, often in cultivated fields, tierra caliente, ascending to the Meseta Central, mostly as 1,300 meters or less, but sometimes at somewhat higher elevations. Widely distributed in tropical America" and "weed in waste ground, dry brushy hillsides, and dry thickets". Northcraft says that they are "aquatic plants growing in canal next to road". In Honduras, according to Molina R., the species is a "weed in pine forests". Cook & Gilbert 2088 was "purchased in market" in Peru.

Degener (1960) records our plant from Maui and Hawaii and "on all the larger islands" of the Hawaiian group "from sea level to almost the tops of our highest mountains, preferably in pastures, pineapple fields, waste places and lava flows; never in dark forests. On Maui and Hawaii the Hawaiians have used it as a medicine for skin diseases." He also says "Mann in 1867 correctly judged this weed introduced, while Hillebrand in 1888 described it as 'a troublesome weed of early introduction which has taken root in many parts of the Islands, most so on the highlands of Waimea, Hawaii, where large extents of pasture land have been ruined by it.'" Miss Neal (1949) refers to it as a "weed at 3000 feet". A note on Herb. Oahu Coll. 56, however, says "once a troublesome weed, now nearly run out". In New South Wales, according to Kaspiew, it constitutes a "pest in pastures".

Common and vernacular names recorded for this plant in various parts of its range are "berbena", "erva de São Caetano", "erva do pai castano", "escoba dura", "false vervain", "hauoi", "ha'uoii", "herba do Pae-Caetano", "oi", "oi", "quininha", "seashore vervain", "titania", "verbena", "verbena amarga", "verbena del campo", "verbena del litoral", "verbena blanca", "verbena erguida", "verbena blanca serrana", "verbena cimarrona", "verbena negra", "verbena nigra", "verbena on parade" [meaning, the upright verbena], "verbena parada", "vervena", "weed verberna", "yerba de acero", "yerba del acero", "yerba de padre Caetano", and "yerbón".

Philippi (1870) comments concerning var. leptostachya "La traza es diferente de la forma comun por ser los frutitos muchas pequeños; pero los ejemplares, demasiado adelantados en la vegetacion, no dejan ver otras diferencias". Rosengurtt (1943) says "Hierba hemicriptófito a sufruticosa; florece de fines de primavera hasta principios de otoño. Habita en lugares muy variables de los campos, bosques, poblaciones, chacras, etc. Es común, y el ganado la mantiene recortada normalmente". He cites his PE.1269, 1335, 1447, 1576, 1783, 1908, 2059, A.1002, and OH. 18489 from Uruguay. Cabrera & Dawson (1944) describe the plant as "Hemicriptófito parecida a las anteriores, pero de sólo 40 a 90 cm de altura y con espigas más delgadas. Vegeta en casi toda América del Sur" and cite Dawson 946 and Cabrera 1710. Calderón & Standley (1941) report it as common in El Salvador.

Stellfeld (1951) states "Chamada na cidad e do Rio Negro (Par-

aná) de 'quininha' e 'erva de São Caetano' em outros lugares e em São Paulo, reputada como febrífuga, daí o seu nome. É bastante amarga". Reitz also reports the species as used medicinally in Brazil; the Hinckleys say that it is used as a purgative in Arequipá, while Archer reports it to be a "general remedy, also used for cough" in Paraguay. In Guatemala, according to Ruano, it is employed as a remedy for fevers, grippe, and smallpox. Garcia & Barriga report it as medicinal in Colombia; Duque avers that it is cultivated there for its "bitter and medicinal properties" and Niemeyer also reports that it is used against fevers. Standley (1938) makes this comment: "The plant is employed in domestic medicine as a remedy for fevers" in Costa Rica. In Colombia it is said by Fosberg to be employed as an antimalarial and as a remedy for typhoid fever, while on the Hawaiian islands of Hawaii and Maui he reports the juice commonly used for skin ailments. Fernandez refers to it as a "shrub" and maintains that it reduces fever very quickly -- the leaves macerated and boiled are taken internally as a vermifuge against hookworm. Assis also refers to the plant as a "shrub". Hegi (1927) says "gegen Scrofulose verwendet". Hinton states that the "very bitter juice from macerated plant [is] taken for malaria" in Mexico. Steinbach reports that in Bolivia the plant is "medicinal, used against contusions".

Martens & Galeotti (1844) describe their V. affinis as differing from V. bonariensis L. in "foliis brevioribus, spicis filiformibus elongatis laxis vix pilosis breve pedunculatis cauleque non hispido", which is a fairly accurate statement of the differences between V. litoralis and V. bonariensis. Schauer (1847) separates his two varieties as follows: "α pycnostachya - spicis virgineis densioribus subcylindricis; β leptostachya - spicis jam virgineis magis filiformibus, deinceps saepius valde elongatis". The former is apparently merely a new status and name for V. brasiliensis Vell. and must be reduced to the synonymy of that taxon. To the second of his varieties Schauer reduces V. caracasana Kunth, V. lanceolata Willd., and V. affinis Mart. & Gal. (which he says is a "forma umbrosa, plerumque magis glabrata, spicis pube appressa subcanescentibus"). He cites a Philippi collection from Chile; Schiede 135 & 1168 from Jalapa and Papantlam, Mexico, and C. Ehrenberg and Galeotti collections from "Tlocalulo alibique", Mexico; Humboldt & Bonpland s.n., Vargas and Moritz collections from Venezuela; Leschen s.n. from Guiana; and Sellow s.n. from Brazil, all deposited in the Berlin, Martius (Munich), and DeCandolle (Geneva) herbaria. In his 1851 publication he modifies the description of his variety leptostachya to "spicis jam virgineis magis filiformibus, dein saepius valde elongatis et relaxatis". He described V. bonariensis β litoralis as "forma campestris aprica, plerumque undique magis hispidula". He adds V. glabrata H.B.K. to the synonymy of his var. pycnostachya with the comment "Hujus

nil nisi modificatio monticola, magis compacta, glabrior est". He cites Harrison, Gardner, Lhotsky, Sellow, Ackermann, Guillemin, and Lund collections, as well as Martius 1033 and Vauthier 192, all from Rio de Janeiro, and Riedel s.n., Raben s.n., and Regnell 326 from Minas Gerais. He says: "forma α [V. brasiliensis] etiam provenit in Bonaria, Chile, Peruvia, Colombia, Venezuela" and "forma β [V. litoralis] in Mexico, Venezuela, Guiana."

Briquet (1904) claims that "V. litoralis Kunth....sensu stricto" is the same as V. brasiliensis Vell. and V. litoralis var. brasiliensis Briq. Of his own V. approximata (which I regard as conspecific with V. brasiliensis) he says: "Cette espèce est très voisine du V. litoralis et n'est pas facile à en distinguer quand les feuilles inférieures manquent. Le V. litoralis possède des feuilles inférieures moins oblongues, grossièrement et irrégulièrement incisée-dentées, tandis qu'elles sont régulièrement et finement crénelées-dentées dans le V. approximata. En outre, ce dernier a des tiges à angles plus aigus, presque subaillées grâce au sillonnement des faces, et des feuilles inférieures plus allongées étroitement lineaires, plus raides. L'inflorescence et les caractères floraux sont tout à fait ceux du V. litoralis var. brasiliensis". In his 1907 publication he compares it with V. carollata Briq. as follows: "Nous avons rapporté cette espèce en 1899.....au V. littoralis Kunth, concu à cette époque dans un sens très vaste. Une étude plus attentive de ce groupe, fait depuis lors, nous a amené à détacher du V. littoralis plusieurs types parfaitement distincts (V. Isabellei, V. cordobensis). Le V. carollata s'écarte à son tour du V. littoralis principalement par sa corolle à tube siphon longuement exsert (dépassant à peine les dents calicinales dans le V. littoralis), son calice oblong, plus grand, ses épis presque du double plus gros, etc."

It should be noted here that the Loud., Hort. Brit. Suppl. (1839) reference given in the bibliography above is sometimes erroneously credited to W. Baxter.

Raimondi (1943) says "Flores azules, ligeramente moradas", "morado azulino", or "morado claro", and cites his nos. 3948, 4414, 6533, 6727, and 6976 from Cajamarca, 9568, 9584, and 11139 from Puno, and 11418 from province undetermined, Peru.

Hayek (1908) cites two Wacket collections and a Wettstein & Schiffner collection from São Paulo, Brazil. Herrera (1941) cites his nos. 1505, 1664, and 3362 from Cuzco, Peru, and gives the range of the species as "El Salvador, Chile, Uruguay, and Argentina." Thorne (1954) cites it from Decatur and Glynn Counties, Georgia, but describes it as "rare" there. Chodat (1902) cites Hassler 4887 from Paraguay, which, however, I regard as V. brasiliensis Vell. Johnston (1931) cites Anthony 380, Berkeley 231, and Mason 1612 from Socorro Island, but these

are actually all *V. sphaerocarpa* Perry.

Rambo, in a letter to me dated August 14, 1955, is of the opinion that his no. 38055, which I identified as *V. montevidensis* Spreng., is actually *V. litoralis* because, he says, it was growing along a roadside (typical of *V. litoralis*) and not in a swamp (typical of *V. montevidensis*). The Dugand & Jaramillo 3030 collection cited below may have come from either Chocó or Valle del Cauca, Colombia. The name of the Venezuelan collector, Nicolas Funck, is misspelled "Funcke" in the Vienna herbarium. The original publication of Humboldt, Bonpland, and Kunth for this species is very often cited as "1817", but appears to be more correctly dated 1818.

Glaziov (1911) cites his no. 14162 from Rio de Janeiro, but I regard this as *V. brasiliensis*. Perry (1933) cites the following 37 additional specimens not as yet seen by me: CALIFORNIA: Amador Co.: *G. Hansen* 2025 (E). MEXICO: Jalisco: *Pringle* 11093 (E, F, G). Michoacán: *Arsène s.n.* [Coronilla, 8 Aug. 1909] (W); *Galeotti* 781 (K); *Gregg* 764 (E). Nayarit: *Edw. Palmer* 2014a (G, N). Oaxaca: *Pringle* 4877 (D, E, G); *C. L. Smith* 222 (E), 794 (G). San Luis Potosí: *Edw. Palmer* 141, in part (G); *Schaffner* 718 (G). Tabasco: *J. N. Rovirosa s.n.* [Mayito, 10 April 1889] (D, N, W). Vera Cruz: *Mohr s.n.* [Huatusco, April 1857] (W); *Seaton* 27 (F, G). GUATEMALA: Alta Verapaz: *Türckheim* 904 (D, F). HONDURAS: Comayagua: *P. C. Standley* 56082 (F). EL SALVADOR: La Libertad: *P. C. Standley* 23326 (G). San Salvador: *Calderón* 729 (G), 925 (G); *Renson* 291 (W); *P. C. Standley* 20617 (G); *Velasco* 8848 (G). San Vicente: *P. C. Standley* 21486 (G). COSTA RICA: Cartago: *Cooper* 5890 (E, F, G). Province undetermined: *Worthen s.n.* [April 1910] (E). She says "This is a widely distributed species with very distinctive habit and somewhat variable inflorescence. In some specimens the spikes appear to remain compact, in others they tend to elongate. Schauer used this difference to separate the forms *pycnostachya* and *leptostachya*, although he frankly admits the difficulty of distinguishing the two owing to the intermediate phases. *V. affinis* is characterized by a somewhat coarser floral pubescence; this, however, seems to be a variable feature, and, as such, does not appear to merit more than passing mention." Her key for distinguishing five related species is worth repeating here:

1. Leaves semiamplexicaul and subcordate.

2. Inflorescence glandular; bractlets conspicuously longer than the calyx; corolla-tube 2—3 times as long as the calyx.....*V. rigida*.

2a. Inflorescence not glandular; bractlets barely equaling or only slightly exceeding the calyx; corolla-tube scarcely twice as long as the calyx.....*V. bonariensis*.

1a. Leaves not semiamplexicaul nor subcordate, tapering into a

Ur, W—1821762), 12520 (Au, Mi, N, N, Rf, S, W—1890991), 12869 (Ca—741491, N, W—1977302); Northcraft III (La, N). Morelos: N. L. H. Krauss 70 (Ng—6575); E. Lyonnet 656 (W—1642948); Moldenke & Moldenke 19826 (Es, Lg, N); W. Trelease 224 (Ur). Nayarit: Edw. Palmer 2014 (N), 2019 (Cp, W—305272). Oaxaca: W. H. Camp 2433 (N); Pringle 4877 (Br, C, Ca—104841, Cm, Io—38756, Me, Me, Me, Mm—15390, N, Po—63890, S, Vt, W—251682); Schultes & Reko 237, in part (Oa—8209), 437 (Me); C. L. Smith 222 (Ca—975387, N, W—312570). Puebla: Arsène s.n. [near Puebla, 20/10/1908] (Br, W—464301); Chute M. 442 (Mi); Fröderström & Hultén 1051 (S); Nicolas s.n. [Rancho Posadas, 2/4/1909] (Br, Br, Br); F. Salazar s.n. [Pahuatlán, 14 June 1913] (Me, W—1013227); A. J. Sharp 441120 (N). San Luis Potosí: L. I. Davis 239 (N); R. M. King 4432 (Au—189783, N); C. L. Lundell 12165 (Ld); Urbina s.n. [Junio de 1892] (Me). Sonora: P. B. Kennedy 7046 (Ca—373581, W—1287217). Tabasco: J. N. Roviroza 448 (C, Pa, W—1323106). Tamaulipas: Kerber 311 (Br); Rozynski 550 (Du—226681); Stanford, Retherford, & Northcroft 913 (Du—288697, N, Tu—15152), 1024 (Du—286261, N, Tu—16243). Vera Cruz: Barkley, Rowell, & Webster 2536 (Au—123273, N); L. I. Davis 225 (N), 234 (N); Dressler & Jones 177 (Bm, Ca—48867, N, W—2328426); G. L. Fisher 168 (W—1315998), s.n. [Aug. 13, 1926] (Du—154566, Mg—42); Galeotti 773 (Br); F. W. Johnson s.n. [Cordoba, 9-26-06] (N); Kerber 311 (W—323103); Matuda 836 (Mh, Mi); C. T. Mohr 317 (W—771869); J. V. Santos 2461 (Mi); H. E. Seaton 27 (C, W—56168). State undetermined: Galeotti 783 [Meratitlan] (Br); Haenke 1575 (N); Hinton 1575 (N); Liebmann 11336 [Tepiscapa] (W—1315097). GUATEMALA: Alta Verapaz: Cook & Griggs 448 (W—407936); Türckheim 904 (C, G, Pa, W—56170, W—1323108). Amatitlan: Tonduz 487 (W—1080089). El Petén: Contreras 2635 (Ld), 3088 (Ld); C. L. Lundell 16386 (Ld). Guatemala: Bernoulli 128 (Br, C); J. F. Brenckle 47-257 (Gg—353583, N), 47-258 (N, S), 47-259 (N); C. C. Dean 6180 (G, Mi, Vt, W—579572); Degener & Degener 26476 (N, W); Moldenke & Moldenke 19818 (Lg, N); Ruano 332 (W—1168396), 403 (W—1168427); Tejada Aguirre 4 (W—691762); Tonduz 627 (W—1084723); E. Wall s.n. [Guatemala City, 20/4/28] (Ew). Izabal: P. C. Standley 24404 (W—1150046). Jutiapa: P. C. Standley 76018 (N). Quezaltenango: P. C. Standley 83196 (N). San Marcos: G. Salas 32 (W—1206750). Santa Rosa: Heyde & Lux 3019, in part (G), 4370 (C, G, W—200177, W—1323101). Totonicapán: P. C. Standley 84061 (N). Department undetermined: Heyde & Lux 610 (W—247494). BRITISH HONDURAS: Gentle 6481 (Ld), 7119 (Ld). HONDURAS: Comayagua: P. C. Standley 56082 (W—1409090); Yuncker, Dawson, & Youse 5624 (Dp, Mi, S, St). Morazán: S. F. Glassman 1606 (Ok), 1864 (N), 2011 (N, Ok, Ur); Molina R.

380 (Ca--792622), 960 (W--1975680); Williams & Molina R. 10159 (Mi). EL SALVADOR: Chalatenango: Tucker 990 (Ca--1000906, W--2088237). La Libertad: P. C. Standley 23326 (W--1139015). San Salvador: Calderón 729 (N, W--1151687), 925 (W--1151890); M. C. Carlson 407 (Ca--703555); Renson 291 (N, W--399584); P. C. Standley 20617 (W--1136452), 22842 (W--1138569); L. V. Velasco 8848 (W--829120, W--1323098). Santa Ana: Tucker 1308 (Ca--1000907, Rf, W--2088429). San Vicente: P. C. Standley 21486 (N, W--1137291). NICARAGUA: Managua: Garnier 301 (I), 642 (Mi); Maxon, Harvey, & Valentine 7356 (N, W--1181068), 7478 (W--1181185). COSTA RICA: Alajuela: Boscilla s.n. [San Ramon, 1935] (N); Brenes 11522 (N), 14648 (N); Chrysler 4966 (N, Ru). Cartago: J. J. Cooper 5890 (C, W--1323107); De Wolf 425 (Tl); Moldenke & Moldenke 19807 (N); Ørsted 11324 (W--1269919); Tonduz 4220 (Br), 4221 (Br); Torres Rojas 97 (Du--255758). Guanacaste: Standley & Valerio 45430 (W--1254108). Heredia: Brenes s.n. [Vol. Irazu, 1912] (N). Puntarenas: Maxon & Harvey 7951 (W--1181615); H. Pittier 3488 (Br); Stork & Morrison 8919 (Ca--648929, W--2216483). San José: Biology 1085 (Br); H. Pittier 227 (Br), 691x (Br); Skutch 2749 (Mi, N, S, W--1642645); P. C. Standley 32652 (W--1225858), 33293 (W--1226214); Tonduz 7978 (Br). Department undetermined: Kuntze 2109 (N, W--700762); Ørsted 11322 [Mt. Aguacote] (W--1269918); H. Pittier 2389 [Agua caliente] (Br). PANAMA: Chiriquí: P. H. Allen 1112 (N, W--1820068); Killip 3510 (W--1012167); Maurice 687 (W--1844117); Seibert 169 (N, N), 251 (I, N, N, N); Woodson, Allen, & Seibert 858 (N, N). COLOMBIA: Antioquia: Archer 307 (Fn--1662, Fn--2296, W--1541839), 415 (Fn--1661, W--1542010), 1235 (W--1542389); Barkley & Gutiérrez Villegas 1719 (Fn--3216, N); Barkley & Puccini B. 32 (Fn); Gaviria Neira & Barkley 17C236 (N); Gutiérrez Villegas & Barkley 17C522 (Fn--3389, N), 17C585 (Fn--3391, N); Gutiérrez Villegas, Barkley, & Correa Velásquez 12 (Fn), 13 (Fn), 15 (N, N); W. H. Hodge 6939 (Fn--2948, W--1950659); Killip, Barkley, & Daniel 39934 (N, W--1954195); D. Mesa Bernal s.n. (Fn--1658); Robledo & Astrálega R. 40 (N); Tomas 81 (N); Toro Toro 26 (N), 97a (Fn--1660, N), 439 (Fn--1659, N); R. Torres 311 (Fn). Boyacá: Cuatrecasas 1698 (W--1773106); Grubb, Curry, & Fernandez-Perez 601 (W--2322528). Caldas: Dryander 2751 (F--1293802); Pennell, Killip, & Hazen 8593 (N). Cauca: Asplund 10639 (S, W--2224287); Cuatrecasas 19333 (N); F. C. Lehmann 5776 (N, N, S, W--1420377); Sneidern 578 (S), 1479 (S, W--1705932), 2554 (S, W--2103830), 4336 (F--1273545). Chocó: Araque Molina & Barkley 19Ch103 (N); Dugand & Jaramillo 3030 (Hn). Cundinamarca: André 618, in part (N); Ariste-Joseph 1003 (W--1185559); Dugand & Jaramillo 3853 (W--1853761); Ewan 15582 (N, W--2105807); F. R. Fos-

berg 20564 (N, W--2108727), 21008 (N, W--2108896); Grant & Giovanni 9672 (N, W--2106891); Niemayer 149 (W--1421249); Pérez Arbeláez 1207 (W--1517802); Schiefer 636 (Du--372831); M. Schneider 128 (S); Tarragón, Araque Molina, & Barkley 18Cu101 (Es, N). Huila: F. R. Fosberg 19249 [U. S. Nat. Arb. 282405] (W--2165313); Rusby & Pennell 588 (N); Sneider 2555 (S). Magdalena: Angel 664 (N); Cuatrecasas & Castaneda 25296 (Fg). Norte de Santander: Cuatrecasas, Schultes, & Smith 12125 (Hn). Santander: Araque Molina & Barkley 18S211 (N); Barkley & Araque Molina 18S097 (N); Killip & Smith 16756 (N, W--1352453); Langenheim 3128 (Ca--78089). Tolima: F. W. Pennell 3211 (N), 3362 (N). Valle del Cauca: Cuatrecasas 14447 (N), 18052 (Vl), 18574 (Vl), 18654 (N), 20663 (N), 22877 (F--1341699); Duque 1605 (N, W--1744515); Garcia & Barriga 6443 (W--1744953); Holton 504 (T); Killip, Cuatrecasas, & Dryander 39207 (N, W--1856731); Moldenke & Moldenke 19791 (Es, N, Sm). Vaupés: Gutiérrez Villegas & Schultes 741, in part (Fn), 742 (N). Department undetermined: Apollinaire & Arthur 71 [Sabana] (W--603153); Funck & Schlim 637 (C). VENEZUELA: Aragua: Chardon 182 (W--1801129), 782 (Ve--12839); Fendler 852 (Br, Cb, N); E. G. Holt 376 (Ve), 377 (Cm), 380 (Cm), 443 (Cm); Moldenke & Moldenke 19550 (Es, Ig, N, Sm); Vogl 938 (N). Federal District: Bailey & Bailey 352 (Ba, W--1198320); Burkart 16016 (Ve); Collector undesignated 517 (S), s.n. (Ve--12846); Eggers 13053 (W--1234535), 13053a (W--1234536); D. Hummel s.n. [Caracas, 9/IV/1958] (Go, S); Kuntze 1263 (N); Lasser 725 (N); Linden 334 (Bm); H. Pittier 9732 (Ba, N, Ve, W--1069497); Potter 5100 (Ms); Tamayo s.n. [Herb. Est. Exp. Agric. 737] (W--1800661). Lará: Saer 329 (Ve). Mérida: Gehriger 219 (Ve, W--1499053), 533 (N, Ve); Gines 4685 (W--2167773); Hanbury-Tracy 24 (K), 256, in part (K); Jahm 535 (W--1120254); Lasser 415 (Ve--12838); E. Reed 610 (W--1618551). Miranda: Barrus s.n. [January 11, 1940] (It); E. G. Holt 441 (Ve); Moldenke & Moldenke 19562 (Es, Ig, N, Sm). Sucre: Funck 54 (Lu, V), 325 (Lu, V), 637 (Lu, V). Trujillo: Bellard s.n. [Aug. 1923] (W--1189293); Burkart 16815 (Ve); Gines 4312 (W--2167652). Zulia: Mocquerys 893 (W--2282493). State undetermined: Eggers 13453 [Los Lhorros] (W--1323147); Grosourdy s.n. [1862; Herb. Reichenb. f. 116382] (V); G. H. H. Tate 41 [Carapas] (W--1230834). ECUADOR: Azuay: Harling 625 (S); Rose, Pachano, & Rose 22845 (N), 22846 (N), 23805 (W--1023117). Cañar: W. H. Camp E.2495 (N, W--2056989). Chimborazo: Anthony & Tate 438 (W--1192501); Asplund 15501 (S); Penland & Summers 465 (N); Rimbach 671 (N, W--1742069); Rose & Rose 22538 (N, W--1022188). Cotopaxi: Harling 4867 (S). El Oro: Asplund 15820 (S). Guayas: Eggers 14372 (W--

1323014). Loja: R. Espinosa 58 (N); Harling 5774 (S). Los Ríos: Asplund 5577 (S, W—1930550). Napo-Pastaza: Asplund 18329 (S). Pichincha: Firmin 264 (W—1420227); I. Holmgren 564 (S, W—2059935); Moldenke & Moldenke 19785 (N). Santiago-Zamora: Harling 951 (S). Tunguragua: Pachano 11 (N, W—1044505). Province undetermined: André 618, in part [Facatativa] (N); Anthony & Tate 267 [Las Maquinas, West Andes] (W—1192346); Jameson s.n. [Republic of Ecuador; Herb. Reichenbach f. 125172 & 125205] (V, V). GALAPAGOS ISLANDS: Charles: N. J. Andersson 117 (Lu); A. Stewart 3321 (Gg—31372), 3322 (Gg—31371), 3323 (Gg—31377). Chatham: N. J. Andersson s.n. [1853] (Br, S), s.n. (S); Schimpff 132 (Gg—212448, S), 142 (Gg—212464, N, S); A. Stewart 3324 (Bi, Gg—31379, W—921600). Indefatigable: R. G. Taylor T.T.125 (N). PERU: Amazonas: Soukup 4119 (N). Ancash: R. Ferreyra 7451 (W—2049416). Arequipa: Cook & Gilbert 46 (W—60341); Hinckley & Hinckley 64 (Gg—31380, N, W—1197767). Cajamarca: Ochoa 1571 (N). Huánuco: H. A. Allard 20970 (N), 21013 (W—1999864); Asplund 13110 (S); Collector undesignated s.n. [Huancayo] (B); Ochoa 1059 (N), 1076 (N); Sandeman 3498 (K); C. Swingle 9 (W—2058172), 34 (N, W—2058190); Woytkowski 34175 (Ca—14296), 34503 (Ca—14186). Junín: Killip & Smith 21925 (W—1357031); Macbride & Featherstone 1705 (S); Sandeman 4566 (K). La Libertad: S. Castañeda 2906 (S); Ellenberg 1783 (Ut—115379b), 1921 (Ut—115382b); Eyerdam 8897 (Ca—655574); Née 87 (Q); E. G. Smyth 25 (W—1802244); J. West 8190 (Ca—565217). Lima: P. Aguilar F. 1079 [27 Feb.] (N), 1079 [20 July] (N); N. J. Andersson s.n. [S. Lorenzo, 1852] (S); Asplund 11096 (S); Collector undesignated s.n. [Lima] (B); Cook & Gilbert 2088 (W—703675); Ellenberg 28 (Ut—115396b), 2771 (Ut—115387b); R. Ferreyra 4087 (N, Ug), 4088 (N); Ochoa 1133 (N); F. W. Pennell 14770 (N, W—1340936); Rose & Rose 18548 (N, W—761230); Soukup 1778 (W—1830704); Stork & Vargas 9329 (Ca—655898); Wilkes s.n. [Callao] (W—71951). Loreto: Ducke s.n. [Herb. Jard. Bot. Rio Jan. 25594] (N); C. Swingle 89 (W—2058216); Tessmann 4205 (Hb, S); Ll. Williams 452 (Bi), 743 (W—1496857), 2588 (W—1496664), 2654 (La). San Martín: H. A. Allard 20400 (Ca—926311), 21805 (W—2025215); Spruce 4172 (Br, N). Piura: Ochoa 1757 (N). Tacna: H. H. Rusby 910 (C, Mi, Mi, Pa, Pr, W—71997), 913 (C, Pa). Department undetermined: L. Fernandez 16506 (Kr). BRAZIL: Federal District: Frazaõ s.n. [Herb. Jard. Bot. Rio Jan. 7463] (N); Occhioni 523 [Herb. Jard. Bot. Rio Jan. 55246] (N). Minas Gerais: Assis 239 (G, N, W—1932526); Mendes Magalhães 2219 (Be—13790), 3151 (Be—14816, W—2124321); Warming s.n. [Lagoa Santa] (N); L. O. Williams 5650 (G, N). Paraná: Braga & Lange 85 (Bm); Dusén 2490 (Ja—14846), 7827 (N), 10856 (I, Mi, N),

s.n. [Herb. Jard. Bot. Rio Jan 2490] (N), s.n. [Herb. Jard. Bot. Rio Jan. 14846] (N); Reiss 56 (I); Stellfeld 1109 (N), 1134 [Herb. Mus. Paran. 2145] (N), 1260 [Herb. Mus. Paran. 2371] (N), s.n. [Herb. Mus. Paran. 1634] (N). Rio de Janeiro: O. M. Barth 1.38 [Herb. Inst. O. Cruz 166] (W-2342932); Dias dos Santos & Frota Pessoa s.n. [Terezopolis, Feb. 25, 1942] (Ja-46795); Diogo 506/606 (Ja-46766); C. V. Freire s.n. [Herb. Mus. Nac. Rio Jan. 46522] (N); G. Gardner 233 (M); Glaziou 14162 (N); Góes & Constantino 297 [Herb. Jard. Bot. Rio Jan. 51881] (N); A. Lutz 430 (Hk); B. Lutz 1185, in part (N, N, N); Mello Filho s.n. [Terezopolis, Feb. 1942] (Ja-46789); J. T. Roig 14386 (Es); Rose & Lutz 6 (Gg-366822); Sampaio 1645 (Ja-46501), 4867 (Ja-46508), 7580 (Ja-46512), 7619 (Ja-46513), s.n. [Petropolis, Mar. 1, 1936] (Ja-46747); H. P. Velloso 10 (Ja-46536); J. Vidal II.5074 (Ca-169487). Rio Grande do Sul: Henz 32646 (N); Leite 249 (N); Lindman A.475 1/2 (S); Moldenke & Moldenke 19680 (Es, Lg, N); Rambo 436, in part (N), 436b (Ok), 45117 (Go), 46416 (W-1997405); Reineck & Czermak 63 (Ug); Reitz C.516 (N); Sehmem 1436 (N), 3519 (Gg-356385). Santa Catarina: Ule 1067 (W-1323100). São Paulo: Campos Novaes 114 (N, Sp-15719); C. A. Krug s.n. [Herb. Inst. Bot. S. Paulo 4000] (W-1775606); Moldenke & Moldenke 19633 (Es, Lg, N, Sm); Pickel 5301 (Sp-45703); L. Roth 866 (Sp-51477). State undetermined: Sellow s.n. [Brasilia] (Br). BOLIVIA: Cochabamba: Steinbach 5901 (Cb). El Beni: Buchtien 5889 (W-1159358), 5890 (W-1159363). La Paz: M. Bang 204 (Mi, Pa, W-71947); Buchtien 197 (N), 354 (W-1159362), 4497 (S); Mandon 524 [Macbride photos 24681] (Kr-photo, N, N-photo, S); H. H. Rusby 907 (Pa). Santa Cruz: Peredo s.n. [Cabezas, Cordillera, 29-I-1946] (N), s.n. [La Pampa de La Cruz, 23-IV-1946] (Gg-353261, N), s.n. [Las Juntas, 10-II-1947] (N); Steinbach 3137 (N), 6757 (Bm, Ca-368483, S, Ut-91359). PARAGUAY: W. A. Archer 4788 (N, W-1705542); Fiebrig 4432 (V), 4635 (Bm, V); Hassler 1242 (N), 2585 (N, V), 3135 (N), 5203 (Ca-935080, N), 11539 (Ca-930261, N); Jørgensen 3767, in part [Villarica, 10.I.1929; Herb. Osten 22248] (Du-197905, S, Ug, W-1483924); Lindman A.3647 (S, S), A.3651 (N, S); Lorentz 108 (B); T. Rojas 13556 (Go), 1889 [Herb. Hort. Parag. 10054; Herb. Osten 13556] (Ug), s.n. [Puerto Colonia Risso, Dec. 1916; Herb. Osten 13557] (S). URUGUAY: Castellanos s.n. [Bella Unión, Jan. 28, 1948; Herb. Inst. Miguel Lillo 15188] (N), s.n. [Playa Atlántida, Dec. 29, 1946; Herb. Inst. Miguel Lillo 15195] (N), s.n. [Punta del Este, Dec. 27, 1946; Herb. Inst. Miguel Lillo 11757] (N), s.n. [Valle Edén, Feb. 18, 1947; Herb. Inst. Miguel Lillo 15758] (N), s.n. [San Carlos, Jan. 16, 1947; Herb. Inst. Miguel Lillo 15760] (N); Gallinal, Aragone, Bergalli, Camp-

al, & Rosengurtt 1269 (N), PE.5483 (N); Herb. Herter 9661 (N), 95078 (N), 95525 (N); Herter 269 [Herb. Herter 81713] (B, Ca—314284, S, Sp—26634), 269b [Herb. Herter 78724] (He), s.n. [Herb. Osten 18489] (Ug), s.n. [Herb. Osten 18491] (Ug), s.n. [Herb. Osten 18497] (Ug), s.n. [Herb. Osten 19034] (Ug); Moldenke & Moldenke 19691 (N), 19697 (N); Osten 2830 (Ug), 3335 (Ug), 4646 (Ug); Rosengurtt A.1241 (N), B.507 (N). CHILE: Atacama: Morong 1204 (C). Colchagua: Barros Valenzuela 8046 (N). Concepción: Looser 3995 (N). Coquimbo: Barros Valenzuela 8041, in part [Terena] (N); Biese 2109 (N); Field s.n. [neighborhood of Coquimbo] (Br); Looser 5506 (N). Curicó: Barros Valenzuela 8040 (N); Herb. Mus. Nac. Chile 15 (N). Malleco: Kunkel 2500 (Cb). Santiago: Barros Valenzuela 8225 (N), 8226 (N). Valparaíso: N. J. Andersson s.n. [Valparaíso, 1853] (S, S, S); Buchtien s.n. [18/10/95] (B, B, S, W—1159370); Claude-Joseph 3550 (W—1283381); Garaventa 1661 [Herb. Looser 4026] (N); T. H. Goodspeed 23326 (Ca—657479); W. H. Harvey s.n. [Valparaíso, April-July 1856] (S); Killip & Pisano 39746 (N, W—1954028); Looser 1401 (N), 4033 (N); Moldenke & Moldenke 19769 (N); R. A. Philippi 1302 (W—1323097); Wilkes Exped. s.n. [Valparaíso] (T). Province undetermined: Barros Valenzuela 8041, in part [Cerro de la Virgen, Viuffa] (N); C. Gay 794 (Br, N); Petré s.n. [Emellan] (S). JUAN FERNANDEZ ISLANDS: Masatierra: G. T. Hastings 225 (W—530155); C. Ingram s.n. [1938] (Bm); C. Skottsberg 401 (Go, Lu, S); Skottsberg & Skottsberg 180 (Go, S). Island undetermined: D. Douglas 35 (Lu), 40 (Lu). ARGENTINA: Buenos Aires: R. Alvarez 183 (S), 311 (N); N. J. Andersson s.n. [Buenos Ayres, 1852] (S); Cabrera 1657 [Herb. Osten 22285] (Ug), 4317 (N); Chicchi 5 (N); Collector undesignated s.n. [La Boca, 29 June '82] (C); G. Dawson 946 (N); Moldenke & Moldenke 19710 (N), 19711 (N); Née 115, in part (Q); Nicora 574 (W—2196467); Venturi 68 (S), 93 [Herb. Inst. Miguel Lillo 31395] (N); Wall & Sparre s.n. [El Aroma, 27/10/46] (Ew, Ew, Ew). Catamarca: A. Brizuela 986 (N); J. Brizuela 130 (N); Cabrera 1186 (N); Jørgensen 1295 [Herb. Osten 11348] (Ug); Luna Risso 281 (N), 959 (Es, N), 1097 (N); T. Meyer 12546 (N); Venturi 7076 [Herb. Osten 20839] (Gg—160630, Ug, W—1591383). Chaco: R. M. Aguilar 803 (N). Córdoba: Balegno 893 (N); Bruch 2835 (N, N, Ug); Castellanos s.n. [Valle de los Reartes; Herb. Osten 15278] (Ug), s.n. [Herb. Mus. Argent. Cienc. Nat. 31201] (N), s.n. [Herb. Mus. Argent. Cienc. Nat. 31203] (N); J. Gutiérrez 113 (N); Kuntze s.n. [XII.1891] (N); Moldenke & Moldenke 19713 (N); Pierotti 5144 (Es, N); Rodrigo 2310 (N); Villafane 3351 (N). Corrientes: Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 34487] (N); Ruiz Huidobro 3684 (N), 3831 (N), 3882 (N), 4190 (N, We), 4275 (N), 4347 (N), 4358 (N), 4394 (N), 4625 (Es, N, We), 4710 (N, N). For-

mosa: I. Morel 676 (N), 806 (N), 1392 (N), 1460 (N), 1657 (N, Rf), 1695 (N), 1759 (N), 1831 (N), s.n. [Riacho Porteflo, IX/1946] (N); S. A. Pierotti 4200 (N, N). Jujuy: Moldenke & Moldenke 19749 (Lg, N), 19751 (Lg, N). Mendoza: Ruiz Leal 868 (Rl); Smitt s.n. [1890-91] (S). Misiones: Ekman 2017 (N, S), 2030 (Mi); Lillieskold s.n. [vic. Colonia Bonpland] (S); Medina 128 (N); T. Meyer 11594 (N); G. J. Schwarz 2280 (N), 3898 (Au--122318, N); Schwindt 7 (N). Salta: Garolera & Romero s.n. [15-I-1947] (N); Malvarez 137 (N); Moldenke & Moldenke 19737 (N), 19742 (Es, Lg, N, Sm); Venturi 5471 (V). Santa Fé: R. Alvarez 900 (N), 951 (N); Job 686 (N), 1042 (N); Ruiz Leal 14252 (Rl); Terribile 382 (N), 435 (N), 556 (N); Wall & Sparre s.n. [Rosario, 8/11/46] (Ew). Santiago del Estero: Pierotti h, in part [Herb. Inst. Miguel Lillo 100888] (Em). Tucumán: Moldenke & Moldenke 19725 (N), 19726 (N), 19727 (N); Monetti 185 [Herb. Osten 10871] (Ug), 1719 [Herb. Inst. Miguel Lillo 31400] (N); O'Donnell 68 [Herb. Inst. Miguel Lillo 36206] (N); Olea 198 (Ca); F. Ortiz s.n. [30/5/45] (Ca); Osten 10615 (Ug); Rocha 3830 (Vi, Vi); Ruiz Leal 12404 (Ss); Schreiter 967 [Herb. Osten 15045] (Ug), s.n. [Cadillal, Nov. 11, 1917; Herb. Osten 12178] (Ug); Terribile 106 (N), 252 (N), 357 (N); L. A. Varela s.n. [Macmita, 10-III-1944] (N); Venturi 50 (W--1591209); E. Villa 686 (N); Wall & Sparre s.n. [S. Javler, 11/11/46] (Ew), s.n. [Avenida de Lima, 11/11/46] (Ew, Ew), s.n. [Avenida de Lima, 12/11/46] (Ew), s.n. [La Famaila, 14/11/46] (Ew, Ew). GERMANY: Schulz & Schulz s.n. [Berlin, 3.10.1898] (B). REPUBLIC OF SOUTH AFRICA: Natal: Meebold 12826 (Mu); J. M. Wood 12122 (Ew), 13132 (Bi, Vi). Transvaal: Rodin 3917 (S, W--1991441). MIDWAY ISLAND: Meagher s.n. [July 7, 1933] (N), s.n. [July 7, 1937] (Bi). HAWAIIAN ISLANDS: Hawaii: M. Brown s.n. [Kilauea, July 10, 1931] (We, We); C. N. Forbes 465h (Bi); Hosaka 2122 (Bi); A. R. Moldenke 77 [H. N. Moldenke 21813] (Mi), 79 [H. N. Moldenke 21818] (Mi); Rubtakoff 2615 (Mi). Kauai: C. N. Forbes 272k (Bi); A. A. Heller 2046, in part (Bi, Bi, Bz--23740, C, Ca--504930, Gg--163104, Mi); Kusche 70 (Gg--31378); A. R. Moldenke 87 [H. N. Moldenke 21844] (Mi); H. N. Moldenke 21839 (Mi). Lanai: C. N. Forbes 188.2 (Bi); G. C. Munro 141 (Bi, N), 292 (Bi). Maui: C. N. Forbes 1083m (Bi, W--1579108), 2036m (Bi); H. N. Moldenke 21826 (Mi), 21827 (Mi). Molokai: O. Degener 17852 (N, S); A. S. Hitchcock 15161 (W--892415); H. N. Moldenke 21835 (Mi). Niihau: J. F. G. Stokes s.n. [Ponds on southern end, January 1912] (Bi), s.n. [South half of island, January 1912] (Bi, Bi), s.n. [January 1912] (Ba). Oahu: N. J. Andersson s.n. [Honolulu, 1852] (N, S, S); O. Degener 17854 (N); Eastwood s.n. [Honolulu, August 1--16, 1924] (Gg--34500); F. E. Egler 37-83 (Bi); C. N. Forbes s.n. [Valley above Country Club,

July 8, '08] (Bi), s.n. [Tantalus Rd., 7/18/30] (Bi); F. R. Fosberg 8856 (Bi, N), 10276 (Bi, Du—239417, N, Up); D. W. Garber 339 (Bi); H. W. Graham 3 (Cm); Grunow s.n. [Juli 1884] (V—5814); K. Harley s.n. [Waianae, May 4, 1956] (Bi); Hasegawa s.n. [Makaha Valley, April 3, 1932] (Bi); A. A. Heller 2046, in part (W—262858); Herb. Oahu Coll. 65 (Mi); A. S. Hitchcock 13726 (W—898819); C. H. Hitchcock s.n. [Honolulu] (Dt); Hosaka 1354 (W—1993415); E. P. Hume 123 (Bi); S. W. Hutchinson 6030 (Bl—13769); C. S. Judd 11 (Bi); Kelly 12 (Gg—31463); Riggs s.n. [Honolulu, July 1908] (Or—8850); J. F. C. Rock 3007 (Bi); P. Russell 52 (Bi). Island undetermined: Mann & Brigham 437 (Bi). AUSTRALIA: New South Wales: Kaspiew s.n. [Moss Vale, 4.6.51] (Ew); Valentin s.n. [6/11/1927] (S, S), s.n. [13 Mars 1928] (S). Queensland: Kingston K.83 (Ng—16847, Ng). AUSTRAL ISLANDS: Raivavae: Chapin 857 (N); Quayle 258 (Bi); Saint John & Fosberg 15869 (Bi). Rapa: Chapin 893 (Bi, N); C. C. Curtis 307 (Bi); Herb. Whitney Exped. 307 (W—1968131), 337 (Bi); Saint John & Fosberg 15235 (Bi); A. M. Stokes 195 (Bi). Tubuai: Saint John & Fosberg 16280 (Bi). GAMBIER ISLANDS: Aukena: H. Saint John 14632 (Bi). Mangareva: Agassiz 122 (W—1652126); H. Saint John 14570 (Bi). EASTER ISLAND: Agassiz 20 (Go); Chapin 1024 (N); Gusinde s.n. (Go); Herb. Exped. Franco-belge s.n. [Rano-Kao, 7/10/1934] (Br), s.n. [Rano-Aroi, 18/10/34] (Br). CULTIVATED: Belgium: M. Martens s.n. [h. b. lov. 1837] (Br); Van Heurck 32 (Cp). France: Herb. Decaisne s.n. [h. p.] (Br). Java: Hallier D.589 (Bz—23718, Bz—23719, Bz—23720), D.590 (Bz—23721, Bz—23722); Herb. Hort. Bot. Bogor. XV.K.A.XLV. 17 (Bz—26442, Bz—26443). New York: Eggleston s.n. [seed from Madrid, 1905; N. Y. Bot. Gard. Cult. Pl. 23202] (N). Spain: Herb. Hort. Reg. Matrit. 46 (Q). Sweden: Reuteran s.n. [12/9/1889] (Go). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 2933 (Vi); Herb. Mus. Bot. Stockholm s.n. (S).

VERBENA LITORALIS var. ALBIFLORA Moldenke, Phytologia 1: 432. 1940.

Bibliography: Moldenke, Suppl. List Common Names 23. 1940; Moldenke, Phytologia 1: 432 (1940) and 1: 511. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 101. 1942; Moldenke, Castanea 13: 115. 1948; Moldenke, Alph. List Cit. 2: 542. 1948; Moldenke, Phytologia 3: 133. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33, 61, & 198. 1949; Moldenke, Résumé 39, 69, & 472. 1959; Moldenke, Résumé Suppl. 6: 6. 1963.

This variety differs from the typical form of the species in having white corollas.

The type of the variety was collected by George B. Hinton (no. 13965) in a llano at an altitude of 1000 meters, at Coalcoman, district of Coalcoman, Michoacán, Mexico, on July 20, 1939, and is deposited in the herbarium of the University of California at

Los Angeles. The form ascends to 2700 meters altitude in Chocó. A vernacular name recorded for it is "verbena blanca", inaccurately given for the typical form of the species in my "Supplementary list of common and vernacular names...." in 1940.

In all, 6 herbarium specimens, including the type, and 2 mounted photographs have been examined.

Citations: MEXICO: Michoacán: Hinton 13965 (La—type, N—photo of type, Z—photo of type). COLOMBIA: Antioquia: F. A. Barkley 17C346 (Fn—3223, N). Chocó: Araque Molina & Barkley 19Ch010 (N, W—1999624). PERU: San Martín: H. A. Allard 20399 (W—1999720).

VERBENA LITORALIS var. CARACASANA (H.B.K.) Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904.

Synonymy: Verbena caracasana H.B.K., Nov. Gen. & Sp. Pl. 2: 275—276. 1818. Verbena caracasana Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825. Verbena caracasana H.B.K. ex Cham., Linnaea 7: 255. 1832. Verbena caracasana Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena caracasana Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 601. 1843. Verbena caracasana Kunth ex Schau. in A. DC., Prodr. 11: 542, in syn. 1847. Verbena litoralis var. caracasana Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904. Verbena litoralis var. caracasana (Kunth) Briq. ex Moldenke, Suppl. List Invalid Names 25, in syn. 1947. Verbena litoralis var. caracasana Briq. ex Moldenke, Résumé 369, in syn. 1959.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 275. 1818; Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Cham., Linnaea 7: 255. 1832; D. Dietr., Syn. Pl. 3: 601. 1843; Walp., Repert. Bot. Syst. 4: 19. 1845; Schau. in A. DC., Prodr. 11: 542. 1847; Schau. in Mart., Fl. Bras. 9: 189. 1851; Hook. f. & Jacks., Ind. Kew. 2: 1178. 1895; Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 292. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 481. 1904; Fedde in Just, Bot. Jahresber. 33 (1): 632. 1906; Moldenke, Prelim. Alph. List Invalid Names 45 & 47. 1940; Moldenke, Alph. List Invalid Names 46 & 48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Alph. List Invalid Names Suppl. 1: 23 & 25. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 61, 106, & 198. 1949; Moldenke, Alph. List Cit. 3: 808 (1949) and 4: 1074. 1949; Moldenke, Résumé 69, 127, 361, 368, 369, & 472. 1959; Moldenke, Résumé Suppl. 3: 12, 14, 37, & 40 (1962) and 4: 14. 1962; Moldenke, Phytologia 8: 314 & 317 (1962) and 9: 67 & 151. 1963; Moldenke, Résumé Suppl. 8: 5. 1964.

The original description of this taxon by Kunth (1818) is as follows: "V. caule erecto, ramoso, ramis quadrangularibus, glabris; foliis oblongis, acutis, grosse crenato-serratis, strigoso-scabris; spicis filiformibus, paniculatis. Crescit rarissime in sylvaticis prope Caracas, alt. 430 hex. 4 Floret Januario. CAULIS erectus, subquadripedalis, ramosus; ramis quadrangularibus, substriatis, glabris. FOLIA opposita, subsessilia, oblonga, superi-

ora lanceolata, acuta, basi cuneata, grosse serrata, serraturis rotundatis, apice acutis, alternis minoribus, rigida, reticulato-venosa, nervo medio venisque primariis subtus prominentibus, supra pilis minutis adpressis scabra, subtus in nervo medio venisque strigosa, quadri- aut quinquepollicaria, sesquipollicem et paulo latiora. SPICAE terminales, paniculatae (in specimine suppetente quinque oppositae, inferiores distantes, longissime pedunculatae), filiformes, pedunculatae. FLORES sessiles, bracteati, minuti. BRACTEAE lanceolatae acuminatae, glabriusculae, calycem subaequant. CALYX generis, hispidulus. COROLIA pallide violacea; tubus calyce longior; limbus quinquefidus, planus; laciniis rotundatis, submarginatis. STAMINA ET PISTILLUM generis. FRUCTUS calyce persistente inclusus, elliptico-tetragonus, quadrilocularis, quadripartibilis, sulcatus, fuscescens, glaber, magnitudine grani sinapis; loculis monospermis."

The type of this perplexing taxon was collected by Aimé Jacques Alexandre Bonpland at or near Caracas, Venezuela, and was probably deposited in the herbarium at Berlin now destroyed. It seems very possible — and probable — that this variety should be reduced to synonymy under typical V. littoralis H.B.K., even though Kunth, Chamisso, and Walpers considered the two taxa sufficiently distinct to warrant separate specific designation. Unfortunately, I have not yet been able to examine any of the original Bonpland material — if, indeed, this is still extant — nor even the Hassler material (nos. 1027 and 1027a from Paraguay) cited by Briquet when he reduced the species the varietal status. Briquet was of the opinion that V. caracasana was the same taxon as Schauer's V. littoralis ♀ leptostachya, which I regard as typical V. littoralis. Schauer also regarded the Bonpland plant as identical with his variety, apparently using the Herb. Willdenow 11134 specimen labeled V. lanceolata by Willdenow as typifying the H.B.K. name. Chamisso (1832) also gives Willdenow's name as a synonym of the H.B.K. name, commenting: "E Brasilia meridionali 'Campo, Rio-pardo' misit Sellowius. Diversa nostra ab Humboldtiana stirpe, ut planta campestris sitiens a sylvestri vel palustri. Folia illi pollice saepius breviora vix unquam bipollicaria (nec 4—5-pollicaria), superiora lineari-lanceolata integerrima, inferiora tantum serrata. Ramosior est, ramis gracillioribus striatis, angulis insignius nervosis, caeterum differentia nulla." Steudel (1841) likewise reduces V. lanceolata Willd. to V. caracasana H.B.K. Whether this course of action is justified or not, I cannot as yet say, not having seen the Willdenow specimen myself as yet. It is possible that Willdenow's plant was not part of the type collection of V. caracasana. Schauer's variety, moreover, was based on various other collections in addition to the Willdenow Herbarium specimen.

All things considered, therefore, it seems best to hold the variety apart tentatively until these matters can be settled definitely. In my publications prior to the year 1942 I reduced the variety to V. littoralis, but from 1942 onwards have kept it

separate.

If the specimens cited below really represent var. caracasana, then the corolla is said to be blue-violet, it flowers in July, and has been found at altitudes of 2300 to 2400 meters.

It should be noted here that the original publication is often cited as "1817".

It is possible that the Hummel s.n., cited by me under typical V. litoralis, from Caracas, is actually var. caracasana, since its spikes are abnormally dense; the same is true of Demaree 24649 from Arkansas.

Briquet's notes when he established the trinomial here employed are worth repeating: "Var. caracasana Briq. = V. caracasana Kunth in Humb. et Bonpl. Nov. gen. et sp. II, 275 (ann. 1817) = V. litoralis (sphalm. littoralis) var. leptostachya Schauer in DC. Prodr. XI, 542 (ann. 1847). Mbocaiati, près de Villa-Rica, champs en friche, février 1876, fleurs d'un bleu pâle (n. 1027a); plaine de Pirayu-Bi, 11 février 1876 (n. 1027). Nous avons rétabli les noms primitivement adoptés pour ces deux formes par Kunth et arbitrairement changés par Schauer souvent trop peu scrupuleux dans les questions de nomenclature."

The Kuntze 2109, distributed as V. caracasana, seems to be typical V. litoralis H.B.K. On the other hand, it seems very possible to me that many of the specimens cited under typical V. litoralis which have unusually dense spikes — as, for instance, most of those from the Hawaiian Islands — may represent var. caracasana.

Citations: COLOMBIA: El Cauca: Pérez Arbeláez & Cuatrecasas 5981 (W--1774215). ARGENTINA: Mendoza: Carette 3050 (N).

VERBENA LITORALIS var. MELANOPOTAMICA Hauman-Merck, Anal. Mus.

Argent. Hist. Nat. Buenos Aires 24: 413 [as "littoralis"]. 1913.

Bibliography: Hauman-Merck, Anal. Mus. Argent. Hist. Nat. Buenos Aires 24: 413--414. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101 (1942) and [ed. 2], 106 & 198. 1949; Moldenke, Résumé 127 & 472. 1959; Moldenke, Résumé Suppl. 3: 40. 1962.

This variety differs from the typical form of the species in its conspicuous corolla, which is hypocrateriform, pale-blue, 3--4 mm. long, with the limb equally as long as the conic tube.

The type of the variety was collected by Lucien Hauman-Merck (no. 345) under trees on the shores of the Río Negro and certain of its islands, Río Negro, Argentina, where he says that it is very abundant. He states that the variety may be recognized on sight by its pale-blue flowers which are larger than those of all other species and forms of this group (leading him to the question "An species distincta?"). He describes the plant as glabrous, hardly scabrous, with short spikes which are very thin, and the corolla-tube hardly longer than the calyx. He is of the

opinion that this plant is very closely related to V. litoralis, from which it differs on sight by the size and form of its flowers, by the larger and subcordiform bractlets, and by the enlarged conic corolla-tube.

The author's surname is sometimes misspelled "Haumann-Merck" in literature.

VERBENA LOBATA Vell., Fl. Flum. 18 (1825), Icon. 1: pl. 43. 1827.

Synonymy: Verbena buchnera Vell., Fl. Flum. 17 (1825), Icon. 1: pl. 42. 1827. Verbena corymbosa Cham., Linnaea 7: 255. 1832 [not V. corymbosa Hort., 1845, nor Ruiz & Pav., 1798]. Verbena lobata Arrab. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena corymbosa Relh. ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena lovata Vell. ex Moldenke, Alph. List Cit. 2: 367, sphalm. 1948.

Bibliography: Vell., Fl. Flum. 17--18 (1825), Icon. pl. 42 & 43. 1827; Cham., Linnaea 7: 255. 1832; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Walp., Repert. Bot. Syst. 4: 27. 1845; Schau. in A. DC., Prodr. 11: 540. 1847; Schau. in Mart., Fl. Bras. 9: 184--185. 1851; Hook. f. & Jacks., Ind. Kew. 2: 1178 & 1179. 1895; Stapf, Ind. Lond. 6: 429 & 430. 1931; Moldenke, Prelim. Alph. List Invalid Names 56. 1940; Moldenke, Alph. List Invalid Names 46. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 44, & 101. 1942; Sampaio & Peckolt, Arquiv. Mus. Nac. Rio Jan. 37: 392 & 393. 1943; Moldenke, Alph. List Cit. 1: 21, 255, & 290. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 362, 364, 366, 367, 369, 375, 444, 448, 534, 535, 621, & 624 (1948), 3: 670, 696, 751, 772, 824, 840, 862, 921, & 922 (1949), and 4: 984, 1075, 1081, 1094, 1248, 1249, 1251, & 1287. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 106, & 198. 1949; Moldenke, Phytologia 3: 75 (1949) and 3: 288 & 289. 1950; Stellfeld, Trib. Farmac. 19 (10): 166. 1951; Rambo, Sellowia 6: 153. 1954; Biol. Abstr. 27: 3735. 1955; Rambo, Sellowia 7: 260. 1956; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Résumé 110, 119, 127, 360, 362, & 472. 1959; Moldenke, Résumé Suppl. 2: 10--12. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Reitz, Sellowia 13 (13): 110. 1961; Moldenke, Phytologia 8: 247 (1962) and 9: 40, 44, & 292. 1963.

Illustrations: Vell., Fl. Flum. Icon. 1: pl. 42 & 43. 1827.

Low-growing rather weak herb, 0.5--1.3 m. tall, more or less hispid throughout; rhizome creeping; stems slender, tetragonal, rooting at the lower nodes, ascending at the tips, brachiate; branches often elongate, ascending, very wide-spreading, floriferous and ascending at the apex; leaves decussate-opposite; petioles about 1 cm. long; leaf-blades membranous, triangular-ovate, to about 4 cm. long and 2.5 cm. wide, below the middle rather deeply subtrilobed with 2 lateral incisions, acute at the apex, truncate or subcordate at the base and cuneately attenuate into the petiole, rugose, more or less strigose-hispid or

-hirtous and subcanescent above, the margins coarsely and irregularly incised-serrate, the teeth ovate, mucronate-acuminate; spikes very short, ternate, forming a wide-spreading panicle, compact and congested during anthesis, divaricate-cymose and somewhat patent in fruit, but even then scarcely longer than 1 cm.; peduncles filiform, 4-5 cm. long; flowers imbricate, short-pedicellate; bractlets ovate, about half as long as the calyx, acuminate at the apex, ciliate along the margins; calyx about 4 mm. long, pilose-hirtous or -hirtellous on the outer surface, eglandular, its rim short-dentate, the teeth ovate and acuminate; corolla small, varying from light-violet or violet to blue-lilac or purple (also described as "roxa" and "anil"), its tube infundibular, about one-fourth longer than the calyx, the throat villous; fruit about half as long as the calyx; cocci striate on the dorsal surface, subrugose-reticulate on the upper portion.

The type of this curious species was collected by José Mariano da Conceicao Velloso probably at or near Rio de Janeiro, Brazil, but is now lost. Schauer (1851) says: "Species omni nota perinsignis, *V. corymbosae* R. et P. cui adnumeravit Chamisso in Coll. pl. Sellow., sane quadammodo affinis, sed ab ea caule paniculaeque brachiatis, foliis petiolatis, floribus minoribus aliisque notis uberrime distincta." Walpers (1845) erroneously reduces it to synonymy under *V. corymbosa* Ruiz & Pav.

Leite refers to this plant on a herbarium label as "frutex", but as far as I am able to ascertain it is completely herbaceous. Irwin describes it as an "occasional" herb creeping beneath low shrubs and among rocks. It has also been collected in shrubby moist fields and grassy campos, in wet sunny places in riverbank thickets, at the edges of marshes, in hedges, at the margins of small woods, and at the edge of primeval forests, as well as in wet thickets, at altitudes of 60 to 3130 meters, flowering from August to May. Smith & Klein describe it as ruderal. Rambo found it growing in a region of 2-2.5 meters rainfall and 0-25° C. temperature. Dusén 313 shows extra large leaves, while Müller 92 exhibits very large (or especially well pressed?) corollas.

Herbarium material of this species has been misidentified and distributed as *V. corymbosa* Ruiz & Pav., *V. megapotamica* Spreng., and *V. strigosa* Cham. On the other hand, the Weir 319, distributed as "*Verbena* sp. near *V. lobata* Vell.", is *V. hirta* var. *gracilis* Dusén.

The type of *V. corymbosa* Relh. is Sellow s.n. [Brasilia] deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. *Verbena corymbosa* Hort. is a synonym of *V. bonariensis* L., while *V. corymbosa* Ruiz & Pav. is a valid species, which, as Schauer points out, somewhat resembles this one. Stellfeld (1951) cites Herb. Mus. Paran. 1504 & 3053 from Paraná, Brazil, not as yet seen by me.

In all, 126 herbarium specimens and 3 mounted photographs or illustrations have been examined by me.

Citations: BRAZIL: Espirito Santo: Irwin 2783 (Au-173707, N,

W--2281319); A. Lutz 1159 (Z). Minas Gerais: Brade 14672 [Herb. Jard. Bot. Rio Jan. 26211] (B); Campos Porto 1147 [Herb. Jard. Bot. Rio Jan. 22565] (N); Collector undesignated s.n. [Serra do Pied, Dec. 10, 1886] (Ja--46596); Dusén 242 (S), 313, in part (W--1199407), s.n. [Serra do Itatiaia, 17/5/1902] (S); Lobo s.n. [Planalto do Caparaó, Nov. 1922] (Ja--46521); Schwacke s.n. [Campos de Caparaó, 9/II/1890] (Ja--46586). Paraná: Curial s.n. [Hatschbach 403] (N); Dusén 2660 (Ja--46801, N, S), 6821 (Ca--501689, Lu, N, S, W--1481773), 8771 (S), 9287 (S), s.n. [Cubalôa, 27.12.1911] (S); Hatschbach 337 (N), 1622 (N), 2873 (N), 4156 (Ok), 4308 (Mm); Mattos & Moreira s.n. [11/1959] (Ih--5909); Tamandaré 107 (Mp--1140); Tessmann 3360 [Herb. Mus. Paran. 3360] (N), s.n. [Herb. Mus. Paran. 3033] (N). Rio de Janeiro: Brade 16778 [Herb. Jard. Bot. Rio Jan. 44872] (N); Dusén 242 (Ja--46562, Sp--20063), 313, in part (Ja--14844); Emygdio 34 (Ja--38710, N), 107 (Ja--38709, N); Herb. Mus. Paulista 498 (N, Sp--15722); Moldenke & Moldenke 19616 (Mg, Mr, N, No, Ot, Pn, S, Sm); Segadas-Vianna 670 (Ja), 2908 (Ja), 5035 [Herb. Brade 20319] (Ja); Ule 4341 (Ja--46528). Rio Grande do Sul: Bornmüller 602 (Ut--47123); Jürgens 469 (B, W--1482202); Leite 741 (N); Rambo 2293 (N), 4482 (Sp--50986), 35193 (Ig, N, S), 36418 (S), 51462 (N, W--2102042), 51505 (N), 51912 (N), 52084 (N, S, W--2102316); Sehnem 3497 (Gg--356200). Santa Catarina: Fritz Müller 92 (Ja--31555), 97 (Ja--35006); Rambo 49570 (S), 49605 (N, S), 60070 (S); Reitz 2170 (N), 5412 (N), C.1215 (N); Reitz & Klein 5150a (W--2252077), 5171 (Ok, W--2268964), 5226 (Ok, W--2268984), 5342 (W--2252081), 7691 [Herb. Barb. Rodr. 22666] (Mm, N, S), 7745 (Mm), 8018 (Mm); Smith & Klein 7942 (Ok), 10508 (N, Ok, W--2251688); Smith, Reitz, & Klein 7942 (W--2251328). São Paulo: Bailey & Bailey 861 (Ba, Ba); Campos Porto 2982, in part [Herb. Jard. Bot. Rio Jan. 32604] (N), 2984 [Herb. Jard. Bot. Rio Jan. 32606] (B, N); Frazão s.n. [Herb. Jard. Bot. Rio Jan. 16528] (N); Hammar s.n. [Horto Botânico, Serra da Cantareira, Sept. 30, 1901; Herb. Comm. Geogr. & Geol. 5848] (N, Sp--15717); C. A. Krug s.n. [Herb. Inst. Agron. Est. S. Paulo 3994] (N, W--1775604); M. Kuhlmann s.n. [Umuarama, Jan. 26, 1935] (K, Sp--32387, Sp); Leite 3428 (El), 1v (N); Lüfgren s.n. [São Francisco dos Campos, Dec. 21, 1896; Herb. Comm. Geogr. & Geol. 3496] (N, Sp--15726), s.n. [Altotieté, Oct. 19, 1901; Herb. Comm. Geogr. & Geol. 5847] (N, Sp--15712); Tamandaré & Brade s.n. [Serra da Cantareira, Jan. 11, 1914; Herb. Brade 6691] (N, Sp--6722); Usteri s.n. [Cantareira, Sept. 24, 1905] (Sp--15731); Viégas, Franco, & Lima s.n. [Ubatuba, March 9, 1940; Herb. Inst. Agron. Est. S. Paulo 5422] (N, Sp--44299). State undetermined: Sellow s.n. [Brasília; Macbride photos 34348] (Br, Kr--photo, N--photo).

URUGUAY: Herter 50885 (N). ARGENTINA: Misiones: Niederlein s.n. (Ra--23600). Salta: D. Rodriguez 55 [Herb. Inst. Miguel Lillo 31564] (N). MOUNTED ILLUSTRATIONS: Pohl, Icon. Plant. Brasil. 329 (V).

VERBENA LOBATA var. GLABRATA Moldenke, Phytologia 3: 118. 1949.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94 & 198. 1949; Moldenke, Phytologia 3: 118 & 134 (1949), 3: 289 (1950), and 3: 454. 1951; Moldenke, Résumé 110, 119, & 472. 1959.

This variety differs from the typical form of the species in being completely glabrous throughout.

The type of the variety was collected by Padre Balduino Rambo (no. 2816) at São Francisco de Paulo, Rio Grande do Sul, Brazil, on January 14, 1937, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant is said to inhabit thickets, stream margins, and river banks, flowering from December to February. In all, 4 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Rio de Janeiro: Ule 641 (Ja--46527). Rio Grande do Sul: Rambo 2816 (F--photo of type, N--type, N--photo of type, Rb--isotype, Sg--photo of type, Z--photo of type). URUGUAY: Arechavaleta 28 (Ug).

VERBENA LOBATA var. HIRSUTA Moldenke, Phytologia 2: 423--424. 1948.

Bibliography: Moldenke, Phytologia 2: 423--424. 1948; Moldenke, Castanea 13: 117. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94 & 198. 1949; Moldenke, Alph. List Cit. 3: 704 & 847. 1949; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 110 & 472. 1959; Moldenke, Résumé Suppl. 3: 14. 1962.

This variety differs from the typical form of the species in having the branches, branchlets, and twigs, as well as the petioles, lower leaf-surfaces, peduncles, bractlets, and calyxes very densely hirsute with widely spreading white or flavescent hairs. The upper leaf-surface is also more hirsute than in the typical form.

The type of the variety was collected by Gustaf Oskar Andersson Malme (no. 1260) in the grassy edges of a marsh at Pinhal, near Santa Maria, Rio Grande do Sul, Brazil, on January 27, 1902, and is deposited in the herbarium of the Naturhistoriska Riksmuseet at Stockholm. The plant is described by collectors as subprostrate, with blue or violet corollas. It has been found in fields and thickets, hedgerows and dry grassy places, at the edges of rivers, and on campos, from 800 to 900 meters altitude, flowering from November to February. Reitz records the vernacular names "camaradinha", "formosa sem dote", and "jurupeba" for this and all other members of the genus in that area. Herbarium material has been misidentified and distributed as V. megapotamica Spreng.

In all, 26 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Minas Gerais: A. Lutz 393 (Lz); Regnell III.1619 [28/12/1868] (N, S, S). Rio Grande do Sul: Malme 1260 (F—photo of type, N—iso-type, N—photo of type, S—type, Si—photo of type, Z—photo of type); Rambo 32302 (N), 38424 (N), 51405 (S), 51462 (S), 51505 (S), 51912 (S), 51949 (N, N, S, W—2102255), 53791 (S); Sehnem 3497 (N), 3776 (B). Santa Catarina: Reitz & Klein 5186 (N, Ok, W—2268971); Smith & Klein 8105 (W—2251345); Smith & Reitz 8105 (Z). PARAGUAY: Fiebrig 5884 (Bm, W—1159390).

VERBENA LOBATA var. SESSILIS Moldenke, Phytologia 4: 267 & 293. 1953.

Bibliography: Moldenke, Phytologia 4: 267 & 293. 1953; Moldenke, Biol. Abstr. 27: 3121. 1953; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Résumé 110 & 472. 1959; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Moldenke, Phytologia 9: 289. 1963.

This variety differs from the typical form of the species in having its leaves sessile, the blades 1—2 cm. long and 5—13 mm. wide. The corolla is described as purple.

The type of the variety was collected by Gert Hatschbach (no. 2876) at Varzea, São José dos Pinhães, Paraná, Brazil, on December 2, 1952, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has been found in bogs and pastures, on campos, and in ruderal situations, at altitudes of 750 to 1650 meters, flowering in December and January. Smith & Reitz 8916 is a mixture with V. hirta Spreng.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 2876 (N—type). Santa Catarina: Smith & Reitz 8696 (W—2249356), 8916 (W—2251466, Z), 10341 (Ok, W—2251672).

VERBENA LONGIFOLIA Mart. & Gal., Bull. Acad. Brux. 11 (2): 323. 1844 [not V. longifolia Lam., 1873].

Synonymy: Verbena carolina var. glabra Hultén ex Moldenke, Résumé 361, in syn. 1959.

Bibliography: Mart. & Gal., Bull. Acad. Brux. 11 (2): 323. 1844; Schau. in A. DC., Prodr. 11: 555. 1847; Walp., Repert. Bot. Syst. 6: 687. 1847; Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Ed. Rodrigues, Bull. Arboricult. Belg. 1902: 114. 1902; Perry, Ann. Mo. Bot. Gard. 20: 247, 259, 271, 272, & 355. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 101. 1942; Moldenke, Phytologia 2: 331. 1947; Moldenke, Alph. List Cit. 3: 919 (1949) and 4: 1161, 1295, & 1303. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33 & 198. 1949; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 39, 361, & 472. 1959; Moldenke, Résumé Suppl. 3: 10. 1962; Moldenke, Phytologia 8: 427 (1962) and

8: 487, 488, & 492. 1963; Moldenke, *Résumé Suppl.* 6: 4. 1963.

Stems erect, to 1.5 m. tall, obtusely 4-angled, glabrous; branches many, ascending; leaves decussate-opposite, short-petiole; leaf-blades lanceolate to elongate-elliptic, 10-12.5 cm. long or the upper ones somewhat smaller, acutely serrate from below the middle to the apex, appressed-pubescent or very short-strigillose on both surfaces, the venation prominent beneath; spikes paniculately disposed, slender, elongate, glabrous, open when in fruit; bractlets ovate, about half as long as the calyx, acute to acuminate at the apex, ciliate along the margins; calyx about 2 mm. long, practically glabrous; corolla pale-lavender or lilac, its tube scarcely protruding beyond the calyx, the limb inconspicuous; fruiting-calyx with its obtuse lobes connivent over the schizocarp; cocci trigonous, hardly 1.5 mm. long, smooth or faintly striate, the commissural faces smooth.

The type of this species was collected by Henri Guillaume Galeotti (no. 791) in fields at Ario, Michoacán, Mexico, at an altitude of 4000 feet, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The type of *V. carolina* var. *glabra* was gathered by Harald August Fröderström and Elsa Hultén (no. 82) at an altitude of 1700 meters in Morelos, Mexico, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm.

The species inhabits roadsides, brush, semixerix areas, low and low spiny matorral, the edges of arroyos, dry spots in general, and heavy red clay loam on steep slopes and hillsides in moist pine or fir forests, at altitudes of 700 to 2050 meters, and has been collected in flower and fruit in January, March, April, and August to November. McVaugh refers to it as an "abundant herb". Seler & Seler 4194 has galled spikes.

Herbarium material of this species has been misidentified and distributed under the names *V. litoralis* Kunth, *V. littoralis* H. B.K., and *V. littoralis* var. *b. leptostachya* Schau. The Gonzalez Ortega 60 & 226 collections, cited below, are labeled "Elota, La Cruz, El Roble" and apparently could have come from either Nayarit or Sinaloa. Seler & Seler 4194 was originally distributed as "*Verbena caroliniana* L. form. vel var. *polystachya* (Kunth) Loes." and 4347 as "*Verbena* spec. aff. *V. caroliniana* L.", while of C. R. Orcutt 1371 Perry says "Aff. *V. menthaefolia* Bth."

Martens & Galeotti (1844) affirm that the species is related to *V. paniculata* Lam. [= *V. hastata* L.], while Schauer (1847) points out that its leaves are similar to those seen on *Veronica longifolia* L. (*Scrophulariaceae*), with the inflorescence of *Verbena urticifolia* L. Perry (1933) describes it as "A rather singular species combining the foliar characters of *V. litoralis* with the inflorescence characters of *V. carolina*." She also says that Nelson 752, which she considers to be *V. carolina* L., "is almost glabrous, and the lobes of the corolla are emarginate, a

rather unusual feature in this series. The lack of pubescence suggests V. longifolia, but unfortunately none of the available material of the species is in sufficiently good condition to reveal the character of the corolla." She cites the following 9 additional specimens not as yet seen by me: MEXICO: Morelos: Seler & Seler 4194 (G), 4347 (G). Oaxaca: C. R. Orcutt 3321 (E). Puebla: Purpus 3406 (E, F, G, N). Vera Cruz: Seler & Seler 724 (G). See under V. carolina in these notes for her key for distinguishing this species from its nearest relatives. The V. longifolia Lam. referred to in the synonymy above, is a synonym of V. canadensis (L.) Britton.

In all, 27 herbarium specimens, including the type collections of both names involved, and 4 mounted photographs have been examined by me.

Citations: MEXICO: Coahuila: Aguirre & Reko 132 (N). México: Matuda 30538 (Ss), 31307 (Ss). Michoacán: Galeotti 791 (Br—type, F—photo of type, N—photo of type, Si—photo of type, Z—photo of type). Jalisco: R. McVaugh 13077 (Mi), 14061 (Mi), 16174 (Mi). Morelos: Fröderström & Hultén 82 (S), 428 (S); Moldenke & Moldenke 19827 (Es, Lg, N); Pipes 113 (Z); J. H. Hill 44 (Mi); Seler & Seler 4194 (W—1205687), 4347 (W—1205719). Nayarit: J. Gonzalez Ortega 60 (Me), 226 (Me). Oaxaca: C. R. Orcutt 3321 (W—567342). Puebla: Purpus 3406 (N, W—841139). Sinaloa: J. Gonzalez Ortega 5478 (Me). Sonora: C. R. Orcutt 1371 (W—1168064). Vera Cruz: Liebmann 11318 (W—1315092); Seler & Seler 724 (Me, Me, W—1323102).

VERBENA LONGIFOLIA f. ALBIFLORA Moldenke, Phytologia 7: 430. 1961.

Bibliography: Moldenke, Phytologia 7: 430. 1961; Moldenke, Résumé Suppl. 3: 10. 1962.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Boone Hallberg (no. 813) on moist clay banks of a drainage area from cleared cornfield among Persea cloudforests, on the east slopes near Patio de Arena, about 5 km. east of the summit, at about 2900 meters altitude, in the vicinity of Cerro Zampoaltepetl, Oaxaca, Mexico, on August 7, 1950, and is deposited in the herbarium of the University of Michigan at Ann Arbor. The plant is described as a perennial. It is known thus far only from the type specimen.

Citations: MEXICO: Oaxaca: B. Hallberg 813 (Mi—type).

VERBENA LUCANENSIS Moldenke, Phytologia 3: 279—280. 1950.

Bibliography: Moldenke, Phytologia 3: 279—280 & 286. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 85 & 472. 1959.

Herb, 30—50 cm. tall; stems and branches erect or ascending, slender, rather obtusely tetragonal, densely short-pubescent with

whitish spreading hairs; nodes not annulate; principal internodes 0.5--4.2 cm. long; leaves decussate-opposite, usually with a dense cluster of small ones on abbreviated twigs in their axils; petioles obsolete; leaf-blades chartaceous, rather uniformly bright-green on both surfaces, the immature ones more or less brunnescent in drying, ovate in outline, 1--4 cm. long and wide, deeply 3-parted, the divisions again deeply and rather irregularly parted or dissected, the lamina-segments 0.5--2.5 mm. wide, rather densely puberulent on both surfaces, obtuse or acute at the apex, subrevolute along the margins, the single vein in each segment impressed above, promimulous beneath; inflorescence terminal and in the upper leaf-axils, short-spicate or subcapitate, to 3.5 cm. long, densely many-flowered; peduncles very slender, 4--15 mm. long, densely spreading-pubescent like the branches; bractlets lanceolate, about 3 mm. long and 1 mm. wide, gradually attenuate to the apex, densely puberulent; calyx tubular, 3--4 mm. long, densely puberulent, its rim 5-toothed, the teeth narrow-attenuate; corolla hypocrateriform, varying from blue to violet or purple, its tube 6--7 mm. long, very lightly puberulous on the outside toward the apex, its limb about 6 mm. in diameter; fruiting-calyx not inflated, easily splitting into 5 similar segments; cocci 4, oblong, about 2 mm. long, glabrous, shiny, the dorsal surface uniformly scrobiculate-ridged, the commissural surface white-papillose for the lower two-thirds only.

The type of this distinct species was collected by Ramón Ferreyra (no. 5493) in stony habitats, at 1500 to 2000 meters altitude, between Nazca and Puquio, province of Lucanas, Ayacucho, Peru, on March 19, 1949, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found in the *Baccharis* and *Loxopterygium* zones, at altitudes of 2000 to 3600 meters, blooming in March, May, and August.

In all, 6 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Ayacucho: R. Ferreyra 5493 (N--type, Ug--isotype); Rauh & Hirsch P.407 (Hk). Cajamarca: R. Ferreyra 8482 (Ss). Huancavelica: Rauh & Hirsch P.383 (Z). La Libertad: R. Ferreyra 3028 (Ss).

VERBENA MACDOUGALII Heller, Bull. Torrey Bot. Club 26: 588. 1899.

Synonymy: Verbena maddougali Heller ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena maddougallii Heller ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena maddougali Heller ex Moldenke, Résumé 369, in syn. 1959. Verbena maddougali x hastata Lee ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena maddougali Wootton ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena maddougli Heller ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Verbena maddougali Wootton ex Moldenke, Résumé Suppl. 6: 11, in syn. 1963.

Bibliography: Heller, Bull. Torrey Bot. Club 26: 588. 1899; Cockerell, Am. Nat. 36: 809. 1902; Thiseit.-Dyer, Ind. Kew. Suppl.

2: 191. 1904; Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; A. B. Seymour, Host Ind. Fungi N. Am. 587. 1929; Perry, Ann. Mo. Bot. Gard. 20: 260, 288—290, & 355. 1933; Moldenke, Prelim. Alph. List Invalid Names 47. 1940; Moldenke, Suppl. List Invalid Names 9. 1941; Wyman & Harris, Navajo Ind. Ethno-Bot. 32 & 45. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 10, 11, 13, 14, 74, & 101. 1942; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 26. 1942; Moldenke, Am. Journ. Bot. 32: 610. 1945; G. L. Fisher, Am. Bot. Exchange List. 1946; Moldenke, Alph. List Cit. 1: 14, 24, 102, 126, 182, 191, 203, 245, 246, 255, 256, 258, 265, 281, & 283. 1946; Curtin, Healing Herbs Upper Rio Grande 75 & 272. 1947; Moldenke, Alph. List Cit. 2: 392, 393, 438, 452, 454, 455, 468, 471, 472, 474, 476, 477, 480, 482, 488, 489, 491, 492, 506, 519, 521, 532, 538, 539, 595, 597, 604, 618, & 640. 1948; Moldenke, Phytologia 2: 163. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 71. 1948; Moldenke, Wrightia 1: 225. 1948; Moldenke, Castanea 13: 112 & 113. 1948; Moldenke, Alph. List Cit. 3: 684, 697, 740, 747, 754, 779, 782, 831, 833, 839, 841, 853, 857, 883, 884, 890, 899, 904, 914, 952, & 966 (1949) and 4: 987, 1086, 1122, 1138, 1141, 1142, 1150, 1163, 1165, 1167, 1173—1175, 1207, 1225, 1228—1230, 1237, 1245, 1246, 1252, 1253, & 1289—1291. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 20, 24—26, 164, & 198. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 14. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; Moldenke, Résumé 24, 25, 29, 31, 32, 223, 369, & 472. 1959; Lewis & Oliv., Am. Journ. Bot. 48: 639—641. 1961; Moldenke, Résumé Suppl. 3: 8 & 40. 1962; Moldenke, Phytologia 8: 124 (1961) and 8: 213 & 435. 1962; Moldenke, Résumé Suppl. 5: 3, 4, & 7 (1962), 6: 11 (1963), and 7: 3. 1963; Moldenke, Phytologia 8: 487 (1963) and 9: 144. 1963.

Illustrations: Lewis & Oliv., Am. Journ. Bot. 48: 640. 1961.

Coarse perennial herb; stems stout, 0.3—1 m. tall, obtusely 4-angled, simple or occasionally branched, cinereous-green, whitish-hirsute or hirsute-pubescent; leaves decussate-opposite, short-petiolate or narrowed into a subpetiolar base, the blades oblong-elliptic or elongate-ovate, 6—10 cm. long, coarsely and irregularly serrate-dentate, hirtellous, rugose and minutely pustulate above, densely pilose-pubescent and prominently veined beneath; spikes solitary or sometimes several, short-pedunculate, thick, comparatively dense both during anthesis and in fruit; bractlets lanceolate-subulate, usually noticeably longer than the calyx, pubescent on the back, ciliate along the margins; calyx 4—5 mm. long, rather densely pubescent on the outside, glandular, its lobes very obtuse, terminating in short subulate teeth; corolla varying from purple or pink-purple to dark-purple or deep-purple, the throat white and hairy, its tube about 5 mm. long, scarcely protruding beyond the calyx, the limb 3.5—6 mm. wide; cocci trigonous, about 2.5 mm. long, convex on the dorsal surface, raised-reticulate toward the distal end, strongly or faintly striate below, the commissural face reaching the tip of

the coccus, muriculate or almost smooth; chromosome number: $n = 7$.

The type of this distinctive and handsome species was collected by Daniel Trembly MacDougal (no. 249) — in whose honor it is named — in the vicinity of Flagstaff, Coconino County, Arizona, on July 8, 1888, and is deposited in the Britton Herbarium at the New York Botanical Garden.

The species found on flats and open flats at high altitudes, as well as on dry slopes, lake shores, and prairies, along roadsides and weedy roadsides, in moist low places and open pinelands, in irrigated cultivated fields, in sandy and clayey soil, along drying streams, in open and dry open woods, in yellow pine forests and canyons, on river floodplains, and in volcanic soil, at altitudes of 2000 to 3165 meters, blooming and fruiting from June to October. It was introduced into cultivation in 1927. The specific name is often variously upper-cased.

Hanson found the plant "frequent in open places" and "in open pines", and Parker says "abundant on barren disturbed area around dump pile", but Schallert reports it as "not common". Waterfall describes it from "wet flat spots" and "pine woods in the mountains" in New Mexico, Weber calls it a "common roadside plant" in Colorado, and Demaree reports it "common" in rocky areas and "common in shade of pines" in Arizona. Goddard calls it a plant of the Upper Transition Zone.

This species is often infected by the fungus Erysiphe cichoracearum DC. and Ophiobolus collapsus Sacc. & Ellis. Common and vernacular names recorded for it are "dormilon", "dormilón", "New Mexican vervain", "sleepy-head", "verbena", "vervena", and the Navajo name "tááíí.n do. ʔ'is̄ n̄c̄á.gí". Renner says of it "common, wide distribution, no uses, poor forage value, grazed from June to October".

Herbarium material has been misidentified and distributed under the names V. bracteosa Michx., V. canescens neo-mexicana Gray, V. canescens neomexicana Gray, V. canescens var. neo-mexicana Gray, V. polystachya H.B.K., V. stricta Vent., and "V. stricta var." On the other hand, the G. Martin s.n. [April 12, 1960], distributed as V. macdougalii, is actually xV. perplexa Moldenke. Benson 9573 is a mixture with V. bipinnatifida Nutt. Riordan 1 and H. E. Lee s.n. [9-19-36] have short bractlets; the latter collection was identified by the collector as a hybrid between this species and V. hastata L., which is a possibility because both species occur in the county where it was found and members of this group are noted for their natural proclivity toward hybridization.

Baldwin states of the flowers of V. macdougalii that the corolla is mostly a delicate purple, but the throat is white and hairy. Wooton s.n. [Mts. west of Grant's Station, Aug. 2, 1892] bears a note by the collector "Near Verbena stricta but differing from that plant in the size and shape of leaves, length of internodes, &c. Dr. Rusby has also collected this plant in Arizona".



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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XVIII

Harold N. Moldenke

As of the present writing (March 4, 1964) 36,954 herbarium specimens and 804 mounted photographs and other descriptive or illustrative material have been examined and annotated by me in the preparation of these preliminary monographic notes.

VERBENA (Dorst.) L.

Additional synonymy: Verbena Tourn. ex Westm. in L., Philos. Bot. 150. 1751. Uwarovia Bocq., Adansonia 2: 126. 1861--1862. Shuttleworthia Bocq., Adansonia 2: 126. 1861--1862. Verbena Endl. ex Bocq., Adansonia 3: 181. 1862. Verbena [Tourn.] L. apud Robinson & Fern. in A. Gray, New Man. Bot., ed. 7, 688. 1908.

Additional & amended bibliography: F. Hernandez, Rer. Medic. Nov. Hisp. 399. 1628; F. Hernandez, Nov. Pl. 399. 1651; Dodart., Mem. Acad. Sci. Paris 4: 317, pl. 317. 1669; Zanoni, Hist. Bot. 203--204, fig. 77. 1675; Barrelier, Plant. Gall. Hisp. 30, pl. 853 & 1146. 1714; Westm. in L., Orat. Tellur. Habit. Incr. 64. 1744; L., Hort. Upsal. 8--9. 1748; L., Philos. Bot. 63, 66, 87, 122, 150, & 174. 1751; Gesn. & Camer. in Gesh., Op. Bot. 1: 116. 1751; Kniphof, Bot. Orig. Herb. Viv. cent. 2, pl. [284]. 1757; Rütling, Comm. Bot. 462. 1766; J. A. Murr. in L., Syst. Veg., ed. 13, 61--62 & 844. 1774; L'Hér., Stirp. Nov. 1: 21--24, pl. 11 & 12. 1786; A. L. Juss., Gen. Pl., ed. 1, 109 (1789) and ed. 2, 122 & 123. 1791; L. C. Rich. in Michx., Fl. Bor.-Am., ed. 1, 2: 13--15 & 340. 1803; Dum. Cours., Bot. Cult., ed. 2, 2: 622--627. 1811; Pursh, Fl. Am. Sept. 2: 415--417, 711, & 725. 1814; Dum. Cours., Bot. Cult., ed. 2, 7: 131. 1814; L. C. Rich. in Michx., Fl. Bor.-Am., ed. 2, "1" [-2]: 13--15 & 340. 1820; Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Hook., Bot. Misc. 1: 159--173, pl. 46--48. 1829; Lehm., Del. Sem. Hort. Hamb. 1832: 7 (1832) and 1834: 7--8. 1834; Benth. in Hook., Journ. Bot. 1: 59. 1834; Steud., Nom. Bot., ed. 2, 1: 205, 234, 584, & 687 (1840) and 2: 54, 201, 397, 575, 629, 749--751, & 797. 1841; Engelm. & Gray, Pl. Lindheim. 1: 21. 1845; Benth., Pl. Hartw. 245. 1846; Regel, Gartenfl. 4: 373, pl. 42, fig. 1. 1855; Planch. & Van Houtte, Fl. des Serres 11 [ser. 2, 1]: pl. 1129. 1856; J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1858; Munby, Cat. Pl. Alg. 25. 1859; Bocq., Adansonia 2: 86, 105--107, 111, 113, 115, 118, 123, 124, 126, 128, 130--133, 136, 139, 140, 142, 144, 146, 147, 149, 152--154, 157, & 158, pl. 11 (1861--1862) and 3: 180, 181, & 201--204. 1862; Bocq., Rev. Verbenac. 26, 27, 30, 31, 33, 35, 43, 44, 46--48, 50--53, 56, 59, 60, 62, 64, 66, 67, 69, 72, 73, 77, & 78. 1862; Bocq., Adansonia 2: 251. 1863; Griseb., Cat. Pl. Cub. 214. 1866; J. Ball, Journ. Linn. Soc. Lond. Bot. 16: 607. 1878; A. Gray, Syn. Fl. N. Am. 2 (1): 333 & 335--338. 1878; F. Phil., Cat. Pl. Vasc. Chil. 218--219. 1881; A. Gray, Proc. Am. Acad. Sci. 19: 95. 1883; Stapf,

Denkschr. Akad. Wiss. Wien 50: 34--35. 1885; Batt. & Trab., Fl. Alg. 1: 717. 1888; F. D. Bergen, Journ. Am. Folk-Lore 5: 102. 1892; Hitchc. & Norton, Kans. Agr. Exp. Sta. Bull. 50: 54, pl. 6, fig. 91 & 92. 1895; "Lo Spigolatore", Bull. Soc. Toscanaortic. 22: 77, fig. 14. 1897; Selby, Bull. Ohio Agric. Sta. 83: 329--330. 1897; Solered., Bull. Herb. Boiss., sér. 1, 6: 627 & 628. 1898; A. S. Hitchc., Fl. Kans. pl. 14 & 15. 1899; Wittmack, Gartenfl. 49: 585. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Ed. Rodigas, Bull. Arboricult. Belg. 1902: 113--114, fig. 4. 1902; Selby & Hicks, Bull. Ohio Agric. Sta. 142: 118, 121, & 123, pl. 4. 1903; Selby, Bull. Ohio Agric. Sta. 175: 350, pl. 4. 1906; J. W. Blankinship in Engelm. & Gray, Pl. Lindheim. 3: 186--187. 1907; L. H. Bailey, Botany 26 & 372, fig. 35. 1911; N. Taylor, Mem. N. Y. Bot. Gard. 5: [Fl. Vic. N. Y.] 525 & 526. 1915; Shreve, Carnegie Inst. Wash. Publ. 217: 19, 24, & 44. 1915; Gerth van Wijk, Dict. Plantnames 2: 228, 317, 478, 655, 893, 1492, & 1614. 1916; Rydb., Fl. Rocky Mts. 740. 1917; Druce, Rep. Bot. Exch. Club Brit. Isles 1918: 298. 1919; Urb. in Fedde, Repert. Beih. 5: 73. 1920; Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; Druce, Rep. Bot. Exch. Club Brit. Isles 1927: 452. 1928; Baeza, Nomb. Vulg. Pl. Silv. Chile, ed. 2, 49--50, 60--61, 65, 84, 100, 206, 212, 232, 233, & 269. 1930; Druce, Rep. Bot. Exch. Club Brit. Isles 1932: 348. 1933; Anon., Journ. Hort. Soc. Lond. 61: 401. 1935; H. S. Marshall, Kew Bull. 1936: 94. 1936; K. V. O. Dahlgren, Svensk. Bot. Tidsk. 32: 231. 1938; Moldenke, Saxiflora pl. 16. 1940; Offic. Org. Malayan Agri-Horticult. Assoc. Kuala Lumpur [MAHA Mag.] 10: 152. 1940; Cain, Found. Pl. Geogr. 335. 1944; C. N. Jones, Ohio Journ. Sci. 44: 190. 1944; Deam, Kriebel, Yuncker, & Friesner, Proc. Ind. Acad. Sci. 55: 56. 1946; Parodi, Rev. Argent. Agr. 14: 61--69. 1947; Martinez Crovetto & Piccinini, Revist. Investig. Agric. 4: 178, 180, 181, 225, & 226 (1950) and 4: 32, 33, & 77. 1951; Schnack & Covas, Revist. Argent. Agron. 18: 107--108, fig. 1. 1951; Datta, Caryologia 5: 359--370. 1952; Bally, Biol. Abstr. 30: 3351. 1956; Moldenke, Biol. Abstr. 30: 1092--1093 & 3551. 1956; Anon., Biol. Abstr. 30: 4360. 1958; Ahles & Radford, Journ. Elisha Mitchell Soc. 75: 144. 1959; Ratera, Not. Divulg. Inst. Munic. Bot. Carlos Thays 1: 43. 1961; Moldenke, Biol. Abstr. 38: 865 & 1535 (1962) and 39: 614 & 1942. 1962; Troncoso, Darwiniana 12: 527--531. 1962; Cuf., Bull. Jard. Bot. Brux. 32: Suppl. 787--788. 1962; Langman, Biol. Abstr. 42: 596. 1963; Moldenke, Biol. Abstr. 42: 1519 (1963) and 43: 643, 1278, B.110, B.114, & B.118. 1963; Soukup, Biota 4: 260, 279, & 302. 1963; Frei & Fairbrothers, Bull. Torret Bot. Club 90: 352. 1963; H. P. Riley, Fam. Flow. Pl. S. Afr. 128. 1963; J. D. Poindexter, Biol. Abstr. 43: 397. 1963; Van Steenis, Fl. Males. Bull. 18: 1069. 1963; Moldenke, Résumé Suppl. 7: 1--3 & 5--10 (1963) and 8: 1--6. 1964; Pearce Seeds & Plants, 1964 Gard. Aristocrats 20. 1964; R. A. Ludwig, Ind. Sem. Canada Dept. Agr. 1964: 31. 1964; Moldenke, Phytologia 9: 500--505. 1964.

It should be noted here that the Blairia Houst., Kaempfera Houst., and Sherardia Vail., given by Linnaeus (1751) as syno-

nyms of Verbena, are actually synonyms of Priva Adans., Ghinia Schreb., and Stachytarpheta Vahl, respectively.

The accreditation of the name Verbena to "[Tourn.] L." actually starts much earlier than the date of the reference given in the synonymy (above) of this genus in these notes. In A. L. Juss., Gen. Pl., ed. 1, 109 (1789) the genus is accredited to "T L", the "T" being an abbreviation for Tournefort and the "L" for Linnaeus. However, since this placement of the initials is somewhat ambiguous, it is not by me regarded as the de facto beginning of the accreditation used by Robinson & Fernald. Jussieu's symbols could just as well be interpreted as "Tourn. & L." or "Tourn. in L." or "Tourn. ex L."

According to Steudel (1841) the genus Verbena was classified in the Corytophyta by Necker, the Labiatae Verbeneae by Reichenbach, the Personatae by Linnaeus, the Ringentes Gymnospermae by Royen, the Ringentes Pediculares by Rttling, the Vitices by Jussieu, and, finally, in the Verbenaceae by Robert Brown. Rttling (1766) says of it: "Ringentes & Verticillates conjungit".

Soukup (1963) records "hualkajapaya" and "maycha" as vernacular names for members of the genus in Peru. The "verbena de tres esquinas" of Chile is Baccharis sagittalis P. DC. in the Carduaceae.

It is perhaps worth noting here that the reference Hook., Bot. Misc. 1: 159—173 (1829), given in the bibliography of the genus, is sometimes cited as "1830" in error; the page "66" reference in L., Syst. Veg., ed. 13 (1774) sometimes cited by authors is also erroneous.

Addenda to the list of excluded species:

Verbena capensis L. = Lippia javanica (Burm. f.) Spreng.

Verbena indica, myuros Barrel. = Elytraria imbricata (Vahl) Pers.,
Acanthaceae

Verbena odorata Pers. = Lippia alba (Mill.) N. E. Br.

VERBENA ABRAMSI Moldenke

Additional & emended bibliography: Moldenke, Biol. Abstr. 38: 865 (1962), 39: 1942 (1962), 42: 1519 (1963), and 43: 1278. 1963; Moldenke, Phytologia 9: 191. 1963.

xVERBENA ADULTERINA Hausskn.

Additional & emended bibliography: Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Phytologia 8: 120 & 145—146 (1961), 8: 378—379 (1962), and 9: 38. 1963.

VERBENA ALATA Sweet

Additional & emended bibliography: Steud., Nom. Bot., ed. 2, 2: 749. 1841; D. Dietr., Syn. Pl. 3: 602. 1843; Moldenke, Phytologia 8: 149 (1961) and 9: 113, 114, 191, & 295. 1963; Moldenke, Résumé Suppl. 7: 5. 1963.

VERBENA AMBROSIFOLIA Rydb.

Additional & emended bibliography: Rydb., Fl. Rocky Mts. 740. 1917; Moldenke, Phytologia 8: 123 (1961), 8: 181, 182, 212, 213, 231, 279, 401, 404, 407, & 435-437 (1962), and 9: 15-17, 24, 27, 28, 61, 63, 87, 117, 134, 135, 143, 191, & 215. 1963.

The Ehlers & Ehlers 6361 distributed as V. ambrosifolia is actually V. tenuisecta Briq.; Baker, Earle, & Tracy 531, F. Clark 460, M. K. Clemens s.n. [El Paso, Oct. 24, 1916], Collector undesignated L.1-3, Cory 31173, Heller & Heller 3536, G. J. Ikenberry 389, C. L. Lundell 5590, E. G. Marsh 707, E. J. Palmer 32195, Parks & Cory 9148, Sturgis s.n. [May 4, 1902], Tharp 51-22, Waterfall 15782, and Wooton s.n. [Devil's Park, Aug. 9, 1900] are all V. wrightii A. Gray; C. C. Ellis 17 appears to be a mixture with V. wrightii (the United States National Herbarium specimen is definitely that species!); and C. Wright 1503 is a mixture of V. tumidula Perry and V. bipinnatifida var. latilobata Perry. Wooton 364 in most herbaria is V. wrightii, but in the Britton and the United States National herbaria it is definitely V. ambrosifolia.

McBreen found V. ambrosifolia on the tops of mesas, in a pine-juniper association at the foot of mesas, and in similar habitats.

Additional citations: NEW MEXICO: Lincoln Co.: A. R. Moldenke 638 (B). Otero Co.: A. R. Moldenke 640 (B). San Miguel Co.: Mc Breen s.n. [June 15, 1963] (B), s.n. [near Rowe, October 1, 1963] (Z), s.n. [near Rowe, October 15, 1963] (Z). Santa Fe Co.: Mc Breen s.n. [June 22, 1963] (B). MEXICO: Coahuila: Wynd & Mueller 572 (Fs).

VERBENA AMBROSIFOLIA f. EGLANDULOSA Perry

Additional & emended bibliography: Moldenke, Phytologia 8: 120, 124, & 152 (1961), 8: 177, 397, 407, 436, & 437 (1962), and 9: 16, 17, 24, 27, 117, 135, & 191. 1963.

Additional citations: NEW MEXICO: Luna Co.: A. R. Moldenke 630 (B, Fg).

VERBENA AMOENA Paxt.

Additional bibliography: Moldenke, Phytologia 8: 183-186, 400, & 427 (1962) and 9: 315 & 329. 1963.

VERBENA ANDALGALENSIS Moldenke

Additional & emended bibliography: Moldenke, Biol. Abstr. 30: 3551. 1956; Moldenke, Phytologia 8: 186 & 400 (1962) and 9: 72. 1963.

VERBENA ANDRIEUXII Schau.

Additional & emended bibliography: Moldenke, Phytologia 8: 186-187 & 400 (1962), 8: 461 (1963), and 9: 16. 1963.

VERBENA ARAUCANA R. A. Phil.

Additional bibliography: F. Phil., Cat. Pl. Vasc. Chil. 219. 1881; Moldenke, Phytologia 9: 191. 1963.

xVERBENA ARGENTINA Moldenke

Additional & emended bibliography: Moldenke, Phytologia 8: 120 (1961) and 8: 379 & 419. 1962.

VERBENA ARISTIGERA S. Moore

Additional bibliography: Moldenke, Phytologia 9: 122, 192, 394, & 397. 1963.

The A. Robert 849 distributed as "TYPE SPECIMEN" of this species is not the type collection at all, nor does it even represent this species — it is V. tenuisecta Briq.

VERBENA ATACAMENSIS Reiche

Additional bibliography: Moldenke, Phytologia 9: 192 & 394. 1963.

VERBENA AURANTIACA Speg.

Additional bibliography: Moldenke, Phytologia 8: 187, 192—193, 379—380, & 400. 1962.

xVERBENA BAILEYANA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 120 (1961), 8: 380 & 400—401 (1962), and 9: 219—221. 1963.

VERBENA BALANSAE Briq.

Additional & emended bibliography: Moldenke, Phytologia 8: 380 & 401 (1962), 8: 461 (1963), and 9: 192. 1963.

The Dusén 8591 & 15177 distributed as this species are actually V. thymoides Cham.

VERBENA BANGIANA Moldenke

Additional & emended bibliography: Moldenke, Phytologia 8: 200 & 202 (1962) and 9: 51. 1963.

VERBENA BARBATA Grah.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 749. 1841; D. Dietr., Syn. Pl. 3: 605. 1843; Moldenke, Phytologia 8: 487 (1963) and 9: 60 & 192. 1963.

xVERBENA BEALEI Moldenke

Additional & emended bibliography: Moldenke, Phytologia 8: 120 (1961), 8: 200—202 & 401 (1962), and 9: 296. 1963.

VERBENA BERTERII (Meisn.) Schau.

Additional synonymy: Shuttelworthia berterii Meisn. ex Steud., Nom. Bot., ed. 2, 2: 575. 1841. Verbena berterii (Meisn.) Schau. ex Soukup, Biota 4: 279. 1963.

Additional & emended bibliography: Bocq., Adansonia 2: 126.

1861--1862; Bocq., Rev. Verbenac. 46. 1862; F. Phil., Cat. Pl. Vasc. Chil. 219. 1881; Moldenke, Phytologia 8: 417 & 420 (1962) and 9: 12, 14, 67, 70, 117, 192, 388, 393, 394, 397, 399, 401, & 403 (1963), and 9: 501. 1964; Moldenke, Résumé Suppl. 8: 5. 1964.

VERBENA BERTERII f. ALBIFLORA Moldenke

Additional synonymy: Verbena berterii f. albiflora Moldenke ex Soukup, Biota 4: 279. 1963.

Additional & emended bibliography: Moldenke, Phytologia 8: 381. 1962; Soukup, Biota 4: 279. 1963; Moldenke, Résumé Suppl. 8: 5. 1964.

xVERBENA BINGENENSIS Moldenke

Additional & emended bibliography: Moldenke, Phytologia 8: 120 (1961) and 8: 205--207 & 280. 1962.

VERBENA BIPINNATIFIDA Nutt.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 749. 1841; A. S. Hitchc., Fl. Kans. pl. 15. 1899; J. W. Blankinship in Engelm. & Gray, Pl. Lindheim. 3: 186. 1907; Moldenke, Phytologia 8: 121, 124, 149, 150, & 152 (1961) and 8: 177, 178, 182, 243, 279, 378, 397, 400, 435--437, & 440. 1962; Moldenke, Biol. Abstr. 38: 865 & 1535. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 409 & 419. 1962; Moldenke, Phytologia 9: 14--18, 24, 27, 61, 84, 87, 131, 133--136, 141, 143, 144, 165, 190, 192, 193, & 220. 1963; Moldenke, Résumé Suppl. 7: 2, 3, & 10. 1963.

The Aydell s.n. [Feb. 1932], H. J. Banker 3685 (in part), Cléonique-Joseph 4559, McAtee 3349, Miller & Maguire 1255, L. H. Pammel s.n. [Houston, 3-16-29], W. H. Rhoades s.n. [near Ataltala, July 1918], s.n. [near Tipton, September 1935], s.n. [Leesville, 8-1936], & s.n. [near Attala], U. Singh 163, Tharp, Turner, & Johnston 54746a, E. Wall s.n. [Nelspruit, 25/10/38], Webster & Wilbur 3282, and B. Williams s.n. [Ruston, March 28, 1950], distributed as this species, are all V. tenuisecta Briq.; Hinton 11914 is V. teucrifolia Mart. & Gal.; and Baker, Earle, & Tracy 531, Collector undesignated L.1-3, G. L. Fisher 36105, 36132, & s.n. [July 20, 1936], Goodman & Waterfall 4811, E. L. Greene s.n. [26 July 1880], Heller & Heller 3536, Herb. Univ. Texas s.n. [Marathon, 6/4/31], M. E. Jones s.n. [Rincon, 5-16-1890], R. B. Livingston 3131, Loughridge 461, Mearns 108 & 109, A. Nelson 10358, E. J. Palmer 32195, F. G. Plummer s.n. [Lincoln National Forest, 1903], H. H. Rusby 337, E. D. Schulz s.n. [near Alpine, Aug. 4, 1928], Snow s.n. [Santa Fe, Aug. '80], Tharp 8840, Whitehouse 19537, Wootton s.n. [Divide above Mescalero Agency, June 23, 1895] and s.n. [White Sands, Aug. 25, 1899], C. L. York 48064, and Zobel s.n. [Deer Creek Canyon, May 25, 1934] are all V. wrightii A. Gray.

The W. H. Over 2103 (W--582936) cited in Phytologia 8: 402

(1962) from "Washington Co., South Dakota", is actually from Washington County, Nebraska. Likewise, the Demaree 12003 (W-1683782) cited in *Phytologia* 8: 234 & 403 from "Lamar Co., Oklahoma" is from Lamar County, Texas, in spite of the fact that the labels are plainly marked "Plants of Oklahoma".

Additional citations: TEXAS: Dallas Co.: Lundell & Lundell 11315 (B).

VERBENA BIPINNATIFIDA var. LATILOBATA Perry

Additional bibliography: Moldenke, *Phytologia* 8: 177, 212--214, 231, & 397 (1962) and 9: 16, 24, 135, & 193. 1963.

xVERBENA BLANCHARDI Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961), 8: 465 (1963), and 9: 147, 193, 219, & 220. 1963.

VERBENA BONARIENSIS L.

Additional synonymy: Verbena quadrangularis Arrab. ex Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841.

Additional & emended bibliography: Kniphof, *Bot. Orig. Herb. Viv. cent.* 2: pl. [284]. 1757; J. A. Murr. in L., *Syst. Veg.*, ed. 13, 62. 1774; L'Hér., *Stirp. Nov.* 1: 22. 1786; Dum. Cours., *Bot. Cult.*, ed. 2, 2: 623. 1811; Hook., *Bot. Misc.* 1: 159 & 166. 1829; Steud., *Nom. Bot.*, ed. 2, 2: 750 & 751. 1841; D. Dietr., *Syn. Pl.* 3: 600. 1843; F. Phil., *Cat. Pl. Vasc. Chil.* 219. 1881; Hicken, *Chloris Plat. Argent.* 195--196. 1910; N. Taylor, *Mem. N. Y. Bot. Gard.* 5: [Fl. Vic. N. Y.] 526. 1915; Ratera, *Not. Divulg. Inst. Munic. Bot. Carlos Thays* 1: 43. 1961; Moldenke, *Phytologia* 8: 120, 121, & 124 (1961), 8: 267, 280, 313, 314, 316--318, 384, & 435 (1962), 8: 464, 477, & 490 (1963), and 9: 44, 66, 67, 190, 194--197, 214, 215, 293, 295, 296, 361, 374--376, 379, 381, & 382. 1963; Moldenke, *Résumé Suppl.* 7: 1, 2, & 6. 1963; Soukup, *Biota* 4: 279. 1963; Moldenke, *Phytologia* 9: 502. 1964.

Emended illustration: Kniphof, *Bot. Orig. Herb. Viv. cent.* 2: pl. [284] (in color). 1757.

Ratera (1961) records the common names "verbena" and "yerba de los hechiceros" and comments that "Se utilizan las hojas y ramitas jóvenes, generalmente para ciertas afecciones hepáticas y gástricas".

It should be noted here that the Kniphof, *Bot. Orig. Herb. Viv.* reference given above in the bibliography of this species is sometimes erroneously cited as "11" and the Hook., *Bot. Misc.* 1: 159 & 166 (1829) reference is often misdated "1830". The A. R. Moldenke 452 (Fg) cited in *Phytologia* 8: 406 (1962) from "Columbus Co., South Carolina" is actually from Columbia County, North Carolina.

Additional citations: TANGANYIKA: Drummond & Hemsley 2092 (B).

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional & emended bibliography: Moldenke, *Phytologia* 8: 256, 382, 383, & 407 (1962), 8: 463 (1963), and 9: 375 & 382. 1963.

VERBENA BRACTEATA Lag. & Rodr.

Additional & emended synonymy: Verbena bracteata Cav. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Zapania bracteosa Poir. ex Steud., Nom. Bot., ed. 2, 2: 750, in syn. 1841. Zappania bracteosa Poir. ex Steud., Nom. Bot., ed. 2, 2: 797. 1841.

Additional & emended bibliography: L'Hér., Stirp. Nov. 1: 22. 1786; Michx., Fl. Bor.-Am., ed. 1, 2: 13. 1803; Pursh, Fl. Am. Sept. 2: 416. 1814; Michx., Fl. Bor.-Am., ed. 2, "1" [=2]: 13. 1820; Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Hook., Comp. Bot. Mag. 1: 176. 1836; Steud., Nom. Bot., ed. 2, 2: 750 & 797. 1841; D. Dietr., Syn. Pl. 3: 604. 1843; J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1858; F. Phil., Cat. Pl. Vasc. Chil. 219. 1881; Hitchc. & Norton, Kans. Agr. Exp. Sta. Bull. 50: 54, pl. 6, fig. 92. 1895; Selby, Bull. Ohio Agric. Sta. 83: 329. 1897; A. S. Hitchc., Fl. Kans. pl. 15. 1899; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Selby, Bull. Ohio Agric. Sta. 175: 350. 1906; N. Taylor, Mem. N. Y. Bot. Gard. 5: [Fl. Vic. N. Y.] 526. 1915; Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; Moldenke, Phytologia 8: 120 & 121 (1961), 8: 177, 206, 212, 213, 257, 268, 316, 397—399, 401, 428, 435, 437, & 439 (1962), 8: 462, 469, 471, 472, & 477 (1963), and 9: 16, 24, 27, 53, 54, 144, 156, 195, 215, 219, 220, 358, & 404. 1963; Moldenke, Biol. Abstr. 38: 1535 (1962) and 39: 614. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 418. 1962; Moldenke, Résumé Suppl. 7: 1—3 & 9. 1963.

It is of interest to note that Steudel (1841) maintains V. bracteata Cav. and V. bracteosa Michx. as two separate species, placing V. repens Spreng. and V. squarrosa Roth in the synonymy of the former and Zapania bracteosa Poir. and Zappania bracteosa Poir. in the synonymy of the latter.

The Over 2389 (W—582964) cited in Phytologia 8: 408 (1962) from "Washington Co., South Dakota" is actually from Washington County, Nebraska, and the A. R. Moldenke 118 (Fg) cited on page 410 of the same volume from "Grady" County, Texas, is from Gray County in that state.

Hooker (1836) cites T. Drummond 253 ter in the Kew herbarium.

Additional citations: COLORADO: Boulder Co.: Ewan, Plant. Exsicc. Gray. 1090 (B, B).

VERBENA BRACTEATA f. ALBIFLORA (Cockerell) Moldenke

Additional & emended bibliography: Moldenke, Phytologia 8: 309. 1962; Moldenke, Biol. Abstr. 39: 614. 1962.

VERBENA BRASILIENSIS Vell.

Additional synonymy: Verbena brasiliensis Arrab. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; Moldenke, Phytologia 8: 124 & 148 (1961) and 8: 256, 257, & 405. 1962; Moldenke, Biol. Abstr. 39: 614 & 1942. 1962; Mol-

denke, *Phytologia* 8: 463 (1963) and 9: 66, 151, 194--197, 296, & 382. 1963; Moldenke, *Biol. Abstr.* 42: 1519. 1963; Moldenke, *Résumé Suppl.* 7: 1--3. 1963.

The A. R. Moldenke 457 (Fg) cited in *Phytologia* 8: 413 (1962) from "Columbus Co., South Carolina" is actually from Columbus County, North Carolina.

VERBENA CABRERAE Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961), 8: 189 & 419 (1962), and 9: 70. 1963.

The species has been found by Meyer & Sleumer at 180 meters altitude, blooming in December.

Additional citations: ARGENTINA: Santiago del Estero: Meyer & Sleumer s.n. [T. Meyer 15257] (B).

VERBENA CALLIANTHA Briq.

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1960), 8: 189, 202, & 416 (1962), and 9: 10, 12, 14, 67, 70, 72, 197, 388, & 393. 1963.

The Herb. Osten 7900 and T. Rojas 382 & 1382, distributed as this species, are actually V. tomophylla Briq.

VERBENA CAMERONENSIS L. I. Davis

Additional bibliography: Moldenke, *Phytologia* 8: 124 & 436 (1961) and 9: 62, 63, 84, & 197. 1963; Moldenke, *Résumé Suppl.* 7: 3. 1963.

The specimen of Galeotti 777 photographed by Macbride as his photograph no. 24699 is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva.

VERBENA CAMPESTRIS Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 425--426 (1962) and 8: 465. 1963.

Additional citations: BRAZIL: Santa Catarina: J. F. T. Müller s.n. (P).

VERBENA CANADENSIS (L.) Britton

Additional & emended synonymy: Verbena aubletia Juss. ex Hook., *Comp. Bot. Mag.* 1: 176. 1836. Billarderia explanata Moench apud Steud., *Nom. Bot.*, ed. 2, 1: 205, in syn. 1840. Verbena aubletia L. apud Steud., *Nom. Bot.*, ed. 2, 2: 749. 1841.

Additional & emended bibliography: L'Hér., *Stirp. Nov.* 1: 22. 1786; Michx., *Fl. Bor.-Am.*, ed. 1, 2: 13. 1803; Dum. Cours., *Bot. Cult.*, ed. 2, 2: 623--624. 1811; Pursh, *Fl. Am. Sept.* 2: 415--416. 1814; Michx., *Fl. Bor.-Am.*, ed. 2, "1" [=2]: 13. 1820; Hook., *Bot. Misc.* 1: 169. 1829; Lehmann, *Del. Sem. Hort. Hamb.* 1832: 7. 1832; Hook., *Comp. Bot. Mag.* 1: 176. 1836; Steud., *Nom. Bot.*, ed. 2, 1: 205, 234, & 687 (1840) and 2: 201, 749, & 750. 1841; D. Dietr., *Syn. Pl.* 3: 694. 1843; J. Torr. in Emory, *Rep. U. S. & Mex. Bound. Surv.* 2: 128. 1858; Bocq., *Adansonia* 2: 126. 1861--1862; Bocq., *Rev. Verbenac.* 46. 1862; A. Gray, *Syn. Fl. N.*

Am. 2 (1): 337. 1878; A. S. Hitchc., Fl. Kans. pl. 15. 1899; Ed. Rodigas, Bull. Arboricult. Belg. 1902: 113 & 114. 1902; L. H. Bailey, Botany 372. 1911; Fernald, Rhodora 38: 443. 1936; K. V. O. Dahlgren, Svensk. Bot. Tidsk. 32: 231. 1938; Cain, Found. Pl. Geogr. 335. 1944; Moldenke, Phytologia 8: 120, 121, 123, 124, & 151 (1961) and 8: 177, 182, 183, 187, 204, 210, 212--214, 231, 243, 279, 280, 401, 407, & 423. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 409 & 419. 1962; Moldenke, Phytologia 8: 462 & 477 (1963) and 9: 10, 16, 24, 27, 61, 62, 82--85, 87, 115--118, 135, 136, 143, 144, 193, 197--198, 308--315, 352, 376, 382, 394, 397, 400, & 404. 1963; Moldenke, Biol. Abstr. 42: 1519. 1963; Pearce, Seeds & Pl. 10. 1963; G. N. Jones, Fl. Ill., ed. 3, [Am. Midl. Nat. Monog. 7:] 213. 1963; Moldenke, Résumé Suppl. 7: 9 (1963) and 8: 5. 1964.

The Hook., Bot. Misc. 1: 169 (1829) reference given above is often erroneously cited as "1830", while J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128 is often referred to as "Torr. Bot. Mex. Bound. 128".

Fernald (1936) cites Fernald & Griscom 4496 from Princess Anne County, Virginia, and notes that "In Dr. Perry's Revision... recorded northward only to North Carolina but Small (Man.) extends the range to Virginia." Hooker (1836) cites T. Drummond s. n. [Jacksonville], s. n. [St. Louis], and s. n. [New Orleans, 1833] deposited in the Kew herbarium.

The A. D. Brubaker 22, Diener 835, S. F. Evans E.4270, Girvin s. n. [Indian Res., March 15, 1940], Grossman 7, Parks & Cory 22131, Rose-Innes & Warnock 21818, and Tharp 253 & s. n. [7/23/39], distributed as V. canadensis, are all V. tenuisecta Briq.; H. H. Bartlett 10030, Collector undesignated s. n. [Plains near Leon Spring, Sept. 7, 1852], and C. Wright 455 are V. tumidula Perry; C. Wright 1503 is a mixture of V. tumidula and V. bipinnatifida var. latilobata Perry; and Goodman & Waterfall 4811, G. J. Ikenberry 256, O. B. Metcalfe 1090, Mulford 37 & s. n. [near Albuquerque, Sept. '95], Parry, Bigelow, Wright, & Schott s. n. [Frontera, Mar. 22, 1852], Rehm & Viereck s. n. [April 16, 1902], and W. W. Robbins 8242 are all V. wrightii A. Gray.

VERBENA CANADENSIS f. CANDIDISSIMA (Haage & Schmidt) Palmer & Steyerl.

Additional bibliography: Moldenke, Phytologia 8: 437 (1962) and 8: 468--469. 1963.

VERBENA CANESCENS H.B.K.

Additional synonymy: Verbena canescens Humb. & Bonpl. ex Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826. Verbena canescens Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 604. 1843. Verbena neei Moldenke, Phytologia 2: 241. 1947.

Additional & emended bibliography: Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Hook., Bot. Misc. 1: 168. 1829; Lehm., Del.

Sem. Hort. Hamb. 1832: 7. 1832; Steud., Nom. Bot., ed. 2, 2: 201 & 750. 1841; D. Dietr., Syn. Pl. 3: 604. 1843; J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1858; A. Gray, Syn. Fl. N. Am. 2 (1): 336—337. 1878; J. W. Blankinship in Engelm. & Gray, Pl. Lindheim. 3: 187. 1907; Parodi, Rev. Argent. Agr. 14: 61—69. 1947; Moldenke, Phytologia 2: 241, 331, & 339. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 44 & 73. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 19, 23, 32, 106, 197, & 198. 1949; Moldenke, Alph. List Cit. 3: 753, 767, 771, 772, 784, 787, 799, 802, 807, 829, 844, 850, 898, 934, & 963. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 24, 28, 39, 127, 360, 361, 365, 373, 471, & 472. 1959; Moldenke, Phytologia 8: 141 (1961) and 8: 243, 268, & 279. 1962; Troncoso, Darwiniana 12: 529—530. 1962; Langman, Biol. Abstr. 42: 596. 1963; Moldenke, Phytologia 8: 477 (1963) and 9: 17, 87, 155, 156, 165, 198, 215, & 379. 1963; Moldenke, Résumé Suppl. 7: 3 (1963) and 8: 2, 5, & 6. 1964.

It should be noted here that the reference Hook., Bot. Misc. 1: 168 (1829), cited above, is often incorrectly cited as "1830"; and J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128 (1858) is often cited as "Torr. Bot. Mex. Bound. 128".

Troncoso (1962) says "El tipo de Verbena Neei Mold....se encuentra en el Herbario del Instituto Botánico A. J. Cavanilles de Madrid (MA) y lleva un rótulo que dice: 'Pampas de Buenos Aires, Née, Iter 108, Exped. Malaspina.' Examinado dicho tipo, pude comprobar que no es una planta argentina y que el origen indicado en la etiqueta es erróneo, como en tantos otros ejemplares de Née que sufrieron confusión de rótulos (ver Parodi, L. R., Rev. Arg. de Agr. 14: 61—69. 1947). Se trata, en verdad, de Verbena canescens H.B.K., originaria de México, como lo he podido verificar por la descripción y lámina originales. También coincide muy bien con los siguientes ejemplares de herbario del Darwinion: MEXICO: Oaxaca, Pringle 4784, VIII-1894 (Si). COLOMBIA: San Cristobal, Fr. Apollinaire, II-1908 (Si.3343). Verbena Neei desaparece, pues, del catálogo de la flora argentina y pasa a la sinonimia de V. canescens H.B.K." This, by the way, is the first record of the species from Colombia.

The N. C. Henderson 63-96 and E. G. Marsh 494, distributed as V. canescens, are actually var. roemeriana (Scheele) Perry; L. F. Ward s.n. [Hearne, Sept. 11, 1877] is in part V. halei Small and in part V. xutha Lehm.; Smith, Peterson, & Tejada 3907 is V. menthaefolia Benth., 3940 is the type collection of V. canescens f. albiflora Moldenke, and 3957 is V. neomexicana (A. Gray) Small.

Crutchfield & Johnston describe V. canescens as "infrequent perennials in short brush on shale hills".

Additional citations: MEXICO: Tamaulipas: Crutchfield & Johnston 5807a (Au—187642). State undetermined: Née 108 (F—photo, F—photo, N, N—photo, Q, Z—photo).

VERBENA CANESCENS f. ALBIFLORA Moldenke, *Phytologia* 9: 500—501. 1964.

Bibliography: Moldenke, *Phytologia* 9: 500—501. 1964.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by C. E. Smith, Jr., F. A. Peterson, and Narcisso Tejeda (no. 3940) in gray to whitish soils with thorn-scrub-cactus cover, among occasional calcareous outcrops along the Tehuacán-Orizaba highway just above Azumbilla, at 1500—1800 meters altitude, Puebla, Mexico, on July 18, 1961, and is deposited in the United States National Herbarium at Washington. The form is known thus far only from the type specimen.

Citations: MEXICO: Puebla: Smith, Peterson, & Tejeda 3940 (W—2397959—type).

VERBENA CANESCENS var. ROEMERIANA (Scheele) Perry

Additional bibliography: Moldenke, *Phytologia* 8: 124 (1961), 8: 464 & 471 (1963), and 9: 36, 165, & 198. 1963; Moldenke, *Résumé Suppl.* 7: 3 (1963) and 8: 1. 1964.

Additional citations: TEXAS: Shackelford Co.: N. C. Henderson 63—96 (Au—217646). MEXICO: Coahuila: E. G. Marsh 494 (Au—212482).

VERBENA CAROLINA L.

Additional & emended synonymy: Verbena biserrata Humb. & Bonpl. apud Steud., *Nom. Bot.*, ed. 2, 2: 749. 1841. Verbena polystachya Humb. & Bonpl. apud Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841. Verbena veronicaefolia Humb. & Bonpl. apud Steud., *Nom. Bot.*, ed. 2, 2: 751. 1841. Verbena veronicaefolia Humb. & Kunth apud D. Dietr., *Syn. Pl.* 3: 601. 1843.

Additional & emended bibliography: J. A. Murr. in L., *Syst. Veg.*, ed. 13, 62. 1774; L'Hér., *Stirp. Nov.* 1: 22. 1786; Dum. Cours., *Bot. Cult.*, ed. 2, 2: 623. 1811; Hook., *Comp. Bot. Mag.* 1: 176. 1836; Steud., *Nom. Bot.*, ed. 2, 2: 749—751. 1841; D. Dietr., *Syn. Pl.* 3: 601. 1843; N. J. Anderss., *Galap. Veg.* 199—200. 1854; N. J. Anderss., *Vet. Akad. Handl. Stockh.* 1853: 199—200. 1855; A. Gray, *Syn. Fl. N. Am.* 2 (1): 335. 1878; S. Wats., *Proc. Am. Acad. Sci.* 18: 135. 1883; H. H. Rusby, *Mem. Torrey Bot. Club* 6: 106. 1896; Moldenke, *Phytologia* 8: 121, 124, & 143 (1961), 8: 257, 317, & 417 (1962), 8: 496 (1963), and 9: 52, 81, 93, 126, 151, 165, 198—199, 214, 215, & 219. 1963; Moldenke, *Résumé Suppl.* 8: 6. 1964.

Stuedel (1841) notes that according to Sprengel V. polystachya is a synonym of V. urticifolia L. This, however, is not true, although the two species are certainly closely related. Watson (1883) was of the opinion that Palmer 2037 is "probably a hybrid between V. polystachya or V. urticaefolia and V. xutha", but I regard it as typical V. ehrenbergiana Schau.

The Smith, Peterson, & Tejeda 3701 distributed as V. carolina is actually f. albiflora Moldenke; Herb. Molliano s.n. [P.], O. Sanders 5, and S. M. Tracy 8037 are V. urticifolia L.; W. C. Co-

ker s.n. [July 8, 1909] is V. urticifolia var. leiocarpa Perry & Fernald; Herb. Hort. Bot. Genev. s.n. [18 Aug. 1826] is in part V. urticifolia var. leiocarpa and in part V. recta H.B.K.; and T. L. Andrews s.n. [Ascension, 13-1] and I. L. Forbes s.n. [Colfax, Aug. 20, 1927] are V. xutha Lehm.

Hooker (1836) cites T. Drummond 253 from New Orleans, Louisiana, presumably deposited in the Kew herbarium.

Additional citations: ARIZONA: Cochise Co.: A. R. Moldenke 781 (B, Fg).

VERBENA CAROLINA f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 7: 420 (1961), 8: 487 & 491 (1963), and 9: 199. 1963.

Smith, Peterson, & Tejada found this form growing in gravelly gray or brown soil at the edge of a field in thorn-scrub-cactus to mesic semi-evergreen forest formation, 100 to 1800 meters altitude.

Additional citations: MEXICO: Puebla: Smith, Peterson, & Tejada 3701 (W--2397743).

VERBENA CATHARINAE Moldenke

Additional bibliography: Moldenke, Phytologia 8: 496 (1963) and 9: 8. 1963; Moldenke, Biol. Abstr. 43: 1278. 1963.

VERBENA CHACENSIS Moldenke

Additional bibliography: Moldenke, Biol. Abstr. 30: 3551. 1956; Moldenke, Phytologia 9: 8--9. 1963.

VERBENA CHEITMANIANA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 419 (1962) and 9: 199. 1963.

VERBENA CHILENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 9: 122, 125, 126, & 199. 1963.

VERBENA CILIATA Benth.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 605. 1843; A. Gray, Syn. Fl. N. Am. 2 (1): 337. 1878; J. W. Blankinship in Engelm. & Gray, Pl. Lindheim. 3: 187. 1907; Shreve, Carnegie Inst. Wash. Publ. 217: 19 & 44. 1915; Moldenke, Phytologia 8: 124 & 152 (1961), 8: 177, 182, 202, 212, 213, 215, 231, 243, 279, 397, 399, 400, 417, 420, 423, 424, 435, & 436 (1962), 8: 473 & 487 (1963), and 9: 24--28, 61, 65, 67, 70, 84, 87, 134--137, 141, 144, 156, 199--200, 388, 393, & 397. 1963; Moldenke, Résumé Suppl. 7: 3 & 9. 1963.

Smith, Peterson, & Tejada describe the corollas of this plant as magenta and found the plant in black to gray soils, common on roadsides and in pastures, in a formation of oak forest above giving way to scrubby secondgrowth thickets below. Sonderstrom describes it as having corollas "pink, turning blue with age".

Shreve (1915) calls the species an ephemeral summer-active herbaceous plant.

The H. H. Rusby 124 distributed as *V. ciliata* is actually *V. teucrifolia* Mart. & Gal.; Schery 142 is in part *V. menthaefolia* Benth. and in part *V. teucrifolia*; Pringle 3551 is *V. teucrifolia* var. *corollulata* Perry; Parry & Palmer 719 is in part *V. ciliata* and in part *V. teucrifolia* var. *corollulata*; E. J. Palmer 13512 is the type collection of *V. tumidula* Perry; and Eastwood 15697, Ferril s.n. [May 11, 1906], Griffiths 5190, Herb. State Agric. Coll. 4184, Nelson & Nelson 4983 & 5017, & J. Skehan 5 are *V. wrightii* A. Gray.

Additional citations: MEXICO: Chihuahua: Sonderstrom 847 (W-2396145). Puebla: Smith, Peterson, & Tejada 3921 (W-2397939).

VERBENA CILIATA var. LONGIDENTATA Perry

Additional bibliography: Moldenke, *Phytologia* 8: 182, 212--214, 436, & 437 (1962) and 9: 16, 19, 22--27, 61, 64, 135, 193, 199, & 200. 1963.

The Waterfall 3922 distributed as this variety is actually *V. wrightii* A. Gray.

VERBENA CILIATA var. PUBERA (Greene) Perry

Additional bibliography: Moldenke, *Phytologia* 8: 212, 215, 397, 399, & 437 (1962) and 9: 16, 24, 26--29, 135, 136, & 200. 1963.

The Eastwood 15697, Mearns 109, Parks & Cory 18358, Sperry T. 126 & T.573, Thurber 143, and S. E. Wolff 1666 distributed as this variety are actually *V. wrightii* A. Gray.

VERBENA CLAVATA Ruiz & Pav.

Additional bibliography: Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841; D. Dietr., *Syn. Pl.* 3: 604. 1843; Bocq., *Adansonia* 2: 126. 1861--1862; Bocq., *Rev. Verbenac.* 46. 1862; Moldenke, *Phytologia* 9: 29--33, 117, & 200 (1963) and 9: 501. 1964.

VERBENA CLAVATA var. CASMENSIS Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 31--33 & 200. 1963.

xVERBENA CLEMENSORUM Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961) and 9: 33--34. 1963.

VERBENA CLOVERAE Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 124 (1961), 8: 477 (1963), and 9: 34--37, 64, 198, 200, & 201. 1963; Moldenke, *Résumé Suppl.* 7: 3 & 9. 1963.

VERBENA COCCINEA Raf.

Additional bibliography: Moldenke, *Phytologia* 9: 201. 1963; Mol-

denke, Résumé Suppl. 7: 3. 1963.

VERBENA COCHABAMBENSIS Moldenke

Additional bibliography: Moldenke, Phytologia 9: 37--38, 201, & 394. 1963; Moldenke, Résumé Suppl. 7: 9. 1963.

xVERBENA CONATA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 120 & 145 (1961) and 9: 38--39 & 166. 1963.

xVERBENA CORRUPTA Moldenke

Additional bibliography: Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Phytologia 8: 120 (1961) and 9: 40. 1963.

VERBENA CORYMBOSA Ruiz & Pav.

Additional & emended bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 602. 1843; F. Phil., Cat. Pl. Vasc. Chil. 220. 1881; Baeza, Nomb. Vulg. Pl. Silv. Chile, ed. 2, 60--61, 233, & 269. 1930; Moldenke, Phytologia 8: 247, 257, 280, & 316 (1962), 8: 463 (1963), and 9: 40--45, 201, & 296. 1963.

xVERBENA COVASII Moldenke

Additional bibliography: Moldenke, Phytologia 8: 120 (1961) and 9: 45--46 & 201. 1963.

VERBENA CRITHMIFOLIA Gill. & Hook.

Additional & emended bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 603. 1843; H. S. Marshall, Kew Bull. 1936: 94. 1936; Moldenke, Phytologia 8: 123 (1961) and 9: 46--49, 120, 201--202, & 299--302. 1963.

According to the original collectors, the flowers of this plant "yield a honey-like smell". They describe their β minor as foliis angustioribus". I regard this variety as V. hookeriana (Covas & Schnack) Moldenke, which see.

Additional citations: ARGENTINA: Mendoza: Sleumer 328 (B).

VERBENA CUNEIFOLIA Ruiz & Pav.

Additional synonymy: Verbena cuneifolia Pers. ex Steud., Nom. Bot., ed. 2, 2: 750, in syn. 1841.

Additional & emended bibliography: Hook., Bot. Misc. 1: 170. 1829; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 603 & 604. 1843; F. Phil., Cat. Pl. Vasc. Chil. 220. 1881; Moldenke, Phytologia 9: 50--52, 202, 286, 293, & 296. 1963.

It is worth noting here that the reference Hook., Bot. Misc. 1: 170 (1829) is often erroneously cited as "1830".

The F. L. Stevens 7 distributed as this species is actually V. villifolia Hayek.

VERBENA CURTISII Moldenke

Additional bibliography: Moldenke, Phytologia 8: 488 (1963) and 9: 52--53. 1963.

xVERBENA DEAMII Moldenke

Additional & emended bibliography: Moldenke, *Phytologia* 8: 120 (1961), 8: 268, 272, & 280 (1962), and 9: 53—54, 59, & 202. 1963; Moldenke, *Biol. Abstr.* 43: 643. 1963.

VERBENA DELICATULA Mart.

Additional bibliography: Moldenke, *Phytologia* 8: 201 (1962) and 9: 59—60. 1963.

VERBENA DELTICOLA Small

Additional & emended bibliography: Moldenke, *Phytologia* 8: 124 (1961), 8: 397, 423—425, 435, 436, & 439 (1962), 8: 460, 461, & 465 (1963), and 9: 16, 36, 60—64, 84, 87, 135, 144, & 202. 1963; Moldenke, *Résumé Suppl.* 7: 3. 1963;

The Collector undesignated s.n. [Plains near Leon Spring, Sept. 7, 1852], distributed as this species with a question, is actually V. tumidula Perry.

xVERBENA DERMENI Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961), 8: 463 (1963), and 9: 66—67 & 296. 1963.

VERBENA DISSECTA Willd.

Additional & emended bibliography: Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841; D. Dietr., *Syn. Pl.* 3: 605. 1843; F. Phil., *Cat. Pl. Vasc. Chil.* 220. 1881; Moldenke, *Phytologia* 8: 121 & 123 (1961), 8: 190, 202, 400, 401, 417, 419, & 420 (1962), 8: 461 (1963), and 9: 12, 14, 67—75, 128, 202—203, 388, 393—397, & 399—401. 1963.

The G. L. Fisher 200, R. M. Harper 25, N. Y. Bot. Gard. Cult. Pl. 22428, O'Neill 551 & s.n. [River Junction, April 9, 1925], Parodi 12233, R. C. Schneider s.n. [N. Y. Bot. Gard. Cult. Pl. 22428], Troncoso 291, and Valeur 448, distributed as this species, are all V. tenuisecta Briq.

xVERBENA DISSOLUTA Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961) and 9: 75—76. 1963.

VERBENA DUSENII Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 79—80, 120, & 203. 1963.

VERBENA EHRENBERGIANA Schau.

Additional bibliography: S. Wats., *Proc. Am. Acad. Sci.* 18: 135. 1883; Moldenke, *Phytologia* 8: 124 (1961), 8: 487 & 488 (1963), and 9: 80—82. 1963.

Watson (1883) says that Palmer 2037 is "probably a hybrid between V. polystachya or V. urticaefolia and V. xutha", but Miss Perry regards it as typical V. ehrenbergiana and I see no reason to doubt this disposition of it.

VERBENA ELEGANS H.B.K.

Additional & emended synonymy: Verbena elegans Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena lamberti Ker es Steud., Nom. Bot., ed. 2, 2: 750. 1841.

Additional & emended bibliography: Hook., Bot. Misc. 1: 169. 1829; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Moldenke, Phytologia 8: 213, 243, 423, 427, & 435 (1962), 8: 487 (1963), and 9: 16, 61, 82--87, 198, 203, 397, & 398. 1963.

It should be noted here that the reference Hook., Bot. Misc. 1: 168 (1829) is often erroneously cited as "1830".

The Arsène 59 distributed as V. elegans is V. teucriifolia Mart. & Gal.

VERBENA ELEGANS var. ASPERATA Perry

Additional & emended bibliography: Moldenke, Phytologia 8: 124 (1961) and 9: 16, 61, 63, 84, 86--89, 156, & 203. 1963.

xVERBENA ENGELMANNII Moldenke

Additional & emended bibliography: G. N. Jones, Fl. Ill. [Am. Midl. Nat. Monog. 2:] 216. 1945; Moldenke, Phytologia 8: 120 & 146 (1961) and 8: 246. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 410 & 417. 1962; Moldenke, Phytologia 9: 52, 89--97, 165, 203--204, 215, 219--221, 305, 315, 356, & 359. 1963; Anon., Biol. Abstr. 43 (2): B.112. 1963; J. D. Poindexter, Biol. Abstr. 43: 397. 1963; Moldenke, Résumé Suppl. 7: 1 & 9. 1963.

Shinners 1479 is said to have had "fls. pale bluish-white", but seems otherwise to be typical V. urticifolia L. and is therefore so cited by me. Fassett 20235 is also V. urticifolia and is said by the collector to have been growing in a pasture with V. hastata L. "and an apparent hybrid". J. Torrey 747-0 in the herbarium of the New York State Museum at Albany is inscribed "hybrid between V. urticifolia and V. hastata", but I am citing it hereinafter as typical V. urticifolia. Similarly, R. Bebb 2107 is inscribed as "probably a hybrid form", but I regard it as typical V. urticifolia.

Poindexter (1962) compares xV. engelmannii with its two parents as follows: Leaf index: V. hastata = 3.2--5 (average 4.3), xV. engelmannii = 2.5--3.7 (average 3), V. urticifolia = 1.9--2.6 (average 2.2); leaf-shape: V. hastata = lanceolate, xV. engelmannii = broadly lanceolate to lanceolate, V. urticifolia = broadly lanceolate to ovate; leaf-base: V. hastata = rounded and petiole-late, hastately lobed, xV. engelmannii = rounded, decurrent into the petiole, V. urticifolia = rounded, decurrent into the petiole; leaf-apex: V. hastata = gradually acuminate, xV. engelmannii = gradually acuminate, V. urticifolia = gradually acuminate; stem pubescence: V. hastata = strigose, xV. engelmannii = short-hirtellous to strigose, V. urticifolia = hirtellous; nutlet length: V. hastata = 1.5--2 (average 1.7), xV. engelmannii = 1.7--2.2 (aver-

age 1.9), V. urticifolia = 1.6--1.9 (average 1.7); markings on back of nutlet: V. hastata = smooth to faintly striate, xV. engelmannii = moderately ribbed to faintly ribbed or striate, V. urticifolia = moderately ribbed; pollen fertility: V. hastata = 30--99 percent (average 79.8 percent), xV. engelmannii = 25--41 percent (average 31.9 percent), V. urticifolia = 83--99 percent (average 94.2 percent); corolla-tube length: V. hastata = 2--3.9 (average 3.5), xV. engelmannii = 3.2--3.5 (average 3.3), V. urticifolia = 1.5--2.5 (average 2.1); calyx length: V. hastata = 2.4--3 (average 2.7), xV. engelmannii = 2.1--2.7 (average 2.5), V. urticifolia = 1.7--2.3 (average 2); petiole-lateral vein measurement: V. hastata = 12--25 (average 17.6), xV. engelmannii = 16--27 (average 21.5), V. urticifolia = 14--25 (average 19.6).

The G. N. Jones 22387 distributed as this hybrid is actually typical V. urticifolia L., while Eames & Wiegand 12796 distributed as "V. hastata x V. urticifolia" is cited by me hereinafter under V. urticifolia var. leiocarpa Perry & Fernald.

VERBENA EPHEROIDES Cham.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 602. 1843; Moldenke, Phytologia 8: 148 (1961), 8: 314 & 317 (1962), and 9: 97, 113--114, & 151. 1963; Moldenke, Biol. Abstr. 43: 643. 1963.

xVERBENA FABRICATA Moldenke

Additional bibliography: Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Phytologia 8: 120 (1961) and 9: 114 & 296. 1963.

VERBENA FASCICULATA Benth.

Additional bibliography: Moldenke, Phytologia 9: 114--117 & 394. 1963; Moldenke, Résumé Suppl. 7: 5 & 9. 1963.

xVERBENA FECUNDA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 120 (1961), 8: 182 & 437 (1962), and 9: 117--118. 1963.

xVERBENA FERAX Moldenke

Additional bibliography: Moldenke, Phytologia 8: 120 (1961), 8: 437 (1962), and 9: 118. 1963.

VERBENA FILICAULIS Schau.

Additional & emended bibliography: Moldenke, Phytologia 9: 47, 80, 119--121, 151, 204, & 300. 1963.

Additional citations: BRAZIL: Santa Catarina: J. F. T. Müller s.n. (P).

VERBENA FLAVA Gill. & Hook.

Additional & emended bibliography: Hook., Bot. Misc. 1: 170. 1829; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl.

3: 603. 1843; H. S. Marshall, Kew Bull. 1936: 94. 1936; Moldenke, Phytologia 8: 123 (1961) and 9: 11 & 121—123. 1963.

It should be noted here that the reference Hook., Bot. Misc. 1: 170 (1829) given above is often erroneously cited as "1830".

VERBENA GENTRYI Moldenke

Additional bibliography: Moldenke, Phytologia 8: 487 & 496 (1963) and 9: 124—125. 1963.

VERBENA GLABRATA H.B.K.

Additional synonymy: Verbena glabrata Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena glabrata Humb. & Kunth ex D. Dietr., Syn. Pl. 3: 601. 1843.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 601. 1843; Moldenke, Phytologia 8: 314 (1962), 8: 487 (1963), and 9: 11, 125—127, & 151. 1963; Moldenke, Résumé Suppl. 8: 5. 1964.

VERBENA GLANDULIFERA Moldenke

Additional bibliography: Moldenke, Phytologia 9: 127—129 & 397. 1963.

VERBENA GLUTINOSA Kuntze

Additional bibliography: Moldenke, Phytologia 9: 122 & 129—131. 1963.

xVERBENA GONZALEZI Moldenke

Additional & emended bibliography: Moldenke, Biol. Abstr. 39: 614. 1962; Moldenke, Phytologia 8: 274 & 378 (1962) and 9: 131. 1963.

VERBENA GOODDINGII Briq.

Additional & emended bibliography: Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; Moldenke, Phytologia 8: 152 (1961), 8: 177, 213, 378, 381, 397, 399, 436, & 437 (1962), 8: 465 (1963), and 9: 16, 17, 24, 28, 61, 85, 131—141, 143, 144, 155, & 204. 1963; Moldenke, Résumé Suppl. 8: 3. 1963.

Additional common names recorded for this plant are "verbena" and "vervain". The G. J. Ikenberry s.n. [May 1, 1937] and Nelson & Nelson 5025, distributed as this species, are actually V. wrightii A. Gray.

Additional citations: ARIZONA: Coconino Co.: Wiebe 27 (Z). Mohave Co.: C. L. Beach 24 (Z); J. T. Brewer 14 (Z); R. M. Bustamente 30 (Z), 34 (Z); P. Marcus 20 (Z). Yavapai Co.: C. L. Beach 41 (Z); R. M. Bustamente 64 (Z); Clow 18 (Z); L. R. Fitzgerald 44 (Z); R. L. Richards 19 (Z).

VERBENA GOODDINGII var. NEPETIFOLIA Tidestr.

Additional & emended bibliography: Tidestr., Contrib. U. S. Nat. Herb. 25: 469. 1925; Moldenke, Phytologia 8: 124 (1961), 8:

397, 436, & 440 (1962), 8: 464 (1963), and 9: 14, 17, 61, 62, 135-137, 141-146, 154, 155, & 204. 1963.

VERBENA GOODMANI Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 120 (1961) and 9: 147 & 166. 1963.

VERBENA GRACILESCENS (Cham.) Herter

Emended synonymy: Verbena officinalis var. ♀ Hook., Bot. Misc. 1: 160. 1829. Verbena gracilescens Cham. ex Hicken, *Chloris* Plat. Argent. 197, in syn. 1910.

Additional & emended bibliography: Moldenke, *Phytologia* 8: 317 (1962), 8: 487 (1963), and 9: 78, 126, 148-154, 204, & 382. 1963; Moldenke, *Résumé Suppl.* 8: 6. 1964.

VERBENA GRACILIS Desf.

Additional & emended bibliography: Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841; Tidestr., *Contrib. U. S. Nat. Herb.* 25: 469. 1925; Moldenke, *Phytologia* 8: 279 & 407 (1962), 8: 464 & 471-473 (1963), and 9: 16, 87, 135, 141, 143, 154-158, 195, 205, 296, 376, & 379. 1963.

Additional citations: ARIZONA: Cochise Co.: A. R. Moldenke 617 (B).

VERBENA GYNOBASIS var. STRIGOSA Wedd.

Additional bibliography: Moldenke, *Phytologia* 9: 159 & 160. 1963.

VERBENA HALEI Small

Additional & emended bibliography: Moldenke, *Phytologia* 8: 120, 121, 124, & 145 (1961), 8: 212, 231, & 435 (1962), 8: 472, 477, 478, 487, & 488 (1963), and 9: 38, 39, 78, 147, 160-175, 199, & 205, fig. 9. 1963; Moldenke, *Résumé Suppl.* 7: 1-3. 1963.

The Mrs. Cottrell 8743, Fitzgerald 296, Mrs. A. F. Nelson s.n. [11-2-41], Parks & Cory 10068, Tharp 667 & s.n. [Walnut Cr., 7/12/20], and S. E. Wolff 829 & 1016, distributed as this species, are actually V. xutha Lehm.

VERBENA HASSLERANA Briq.

Additional bibliography: Moldenke, *Phytologia* 9: 177-178, 367, & 368. 1963.

The Jürgensen 3769 collection is a mixture of this species and V. tomophylla Briq.

VERBENA HASTATA L.

Additional synonymy: Verbena hastata var. pinnatifida Pursh, *Fl. Am. Sept.* 2: 416. 1814.

Additional & emended bibliography: L., *Hort. Upsal.* 8-9. 1748; J. A. Murr. in L., *Syst. Veg.*, ed. 13, 62. 1774; Michx., *Fl. Bor.-Am.*, ed. 1, 2: 14. 1803; Dum. Cours., *Bot. Cult.*, ed. 2, 2: 623 &

626. 1811; Pursh, Fl. Am. Sept. 2: 416. 1814; Michx., Fl. Bor.-Am., ed. 2, "1" [=2]: 14. 1820; Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Hook., Comp. Bot. Mag. 1: 176. 1836; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 600 & 604. 1843; J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1858; Selby, Bull. Ohio Agric. Sta. 83: 329. 1897; L. H. Bailey, Botany 372. 1911; N. Taylor, Mem. N. Y. Bot. Gard. 5 [Fl. Vic. N. Y.] 525. 1915; K. V. O. Dahlgren, Svensk. Bot. Tidsk. 32: 231. 1938; Moldenke, Phytologia 8: 120, 121, & 124 (1961) and 8: 194, 195, 207, 244-246, 254, 257, 279, 280, 316, 317, 380, 382, & 397. 1962; J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 409, 410, & 412-419. 1962; Moldenke, Phytologia 8: 477 & 487-489 (1963) and 9: 54, 83, 85, 89-94, 156, 165, 179-181, 190, 203-238, 267-283, 296, 356, 358, & 359, fig. 10. 1963; Moldenke, Résumé Suppl. 7: 1 & 9. 1963; J. D. Poindexter, Biol. Abstr. 43: 397. 1963; Frei & Fairbrothers, Bull. Torrey Bot. Club 90: 352. 1963; G. N. Jones, Fl. Ill., ed. 3, [Am. Midl. Monog. 7:] 213. 1963; R. A. Ludwig, Ind. Sem. Canada Dept. Agr. 1964: 31. 1964.

It should be noted here that the reference J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128 (1858) is often cited as "Torr. Bot. Mex. Bound. 128". The Selby & Hicks, Bull. Ohio Agric. Sta. 175: pl. 4 (1906) reference is curious — the copy of this bulletin in the library of the New York Botanical Garden does not contain such a plate nor any illustration whatever of V. hastata, but the copy in the library of the Royal Botanic Gardens at Kew does contain this plate, which is identical with the one published in Bulletin 148 (1903).

Hooker (1836) cites a T. Drummond s.n. [New Orleans, 1833] and s.n. [St. Louis] and says "From this the V. paniculata is probably not distinct, and the V. urticaefolia seems too nearly allied! The former, of course, is now regarded as a synonym, but the latter is most abundantly distinct!

Poindexter (1962), in his comparison of V. hastata, V. urticifolia, xV. rydbergii, and xV. engelmannii, describes V. hastata as having a leaf-index of 3.2-5 (average 4.3); leaf-shape lanceolate; leaf-base rounded and petiolate, hastately lobed; leaf-apex gradually acuminate; stem pubescence strigose; nutlet length 1.5-2 (average 1.7); markings on back of nutlet smooth to faintly striate; pollen fertility 30-99 percent (average 79.8 percent); corolla-tube length 2-3.9 (average 3.5); calyx length 2.4-3 (average 2.7); and petiole lateral vein measurement 12-25 (average 17.6).

The Brubaker 59, Carleton s.n. [July 12, 1888], E. Drummond s.n. [October 1937], J. M. Fogg 18013, G. D. Fuller 5067, Herb. Univ. Okla. 10345, Herb. Univ. Vermont 9581-9, and Ripley s.n. [Sep. 10, 1902], distributed as V. hastata, are all V. urticifolia L.; Ashe s.n. [Roan Mtn., July 1893] is V. urticifolia var. leiocarpa Perry & Fernald; Havard s.n. [San Antonio] is V. wrightii A. Gray; and Ecology Class Univ. Texas s.n. [Palm Grove, 3.1.30], H. B.

Parks s.n. [White Creek, 9-7-47], and Tharp 667 are V. xutha Lehm.

VERBENA HASTATA f. ROSEA Cheney

Additional bibliography: Moldenke, *Phytologia* 9: 93, 214, 220, & 281--283. 1963.

VERBENA HASTATA var. SCABRA Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 213, 215, & 283--284. 1963.

VERBENA HAYEKII Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 285--286 & 296. 1963.

VERBENA HIRTA Spreng.

Additional bibliography: Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841; D. Dietr., *Syn. Pl.* 3: 604. 1843; Moldenke, *Phytologia* 9: 288--292. 1963.

The Regnell I.355 [Herb. Rio Jan. 14849], distributed as this species, is actually Lantana camara var. angustifolia Moldenke.

Additional citations: BRAZIL: Santa Catarina: J. F. T. Müller 145 (P).

VERBENA HIRTA var. GRACILIS Dusén

Additional bibliography: Moldenke, *Phytologia* 9: 289 & 291--292. 1963.

Additional citations: BRAZIL: Santa Catarina: J. F. T. Müller 154 (P).

VERBENA HISPIDA Ruiz & Pav.

Emended synonymy: Verbena glandulosa Morren ex Steud., *Nom. Bot.*, ed. 2, 2: 750, nom. nud. 1841.

Additional bibliography: Steud., *Nom. Bot.*, ed. 2, 2: 750. 1841; D. Dietr., *Syn. Pl.* 3: 604. 1843; F. Phil., *Cat. Pl. Vasc. Chil.* 220. 1881; Moldenke, *Phytologia* 8: 120, 121, & 124 (1961), 8: 200, 201, 254, 257, 317, & 405 (1962), and 9: 44, 50, 51, 66, 114, 219, 286, & 292--299. 1963; Moldenke, *Résumé Suppl.* 8: 2. 1964.

The Rose & Rose 19072, distributed as this species, is actually V. villifolia Hayek.

Additional citations: CHILE: Nuble: Junge 3181 (W--2404585).

VERBENA HOOKERIANA (Covas & Schnack) Moldenke

Emended synonymy: Verbena crithmifolia ♀ minor Gill. & Hook. in Hook., *Bot. Misc.* 1: 169. 1829. Verbena crithmifolia var. minor Gill. & Hook. ex Moldenke, *Résumé* 363, in syn. 1959.

Additional bibliography: Moldenke, *Phytologia* 8: 123 (1961) and 9: 47, 48, 71, 120, 202, & 299--303. 1963.

The original description of this plant, by Gillies & Hooker (1829) -- a reference, by the way, which is often inaccurately

cited as "1830" -- is "β. foliis angustioribus".

VERBENA HUMIFUSA Cham.

Additional bibliography: Steud., Nom. Bot., ed. 2, 2: 750. 1841; Moldenke, Phytologia 9: 303--305. 1963.

xVERBENA HYERIDA Voss

Additional bibliography: L. H. Bailey, Botany 26, fig. 35. 1911; Moldenke, Phytologia 8: 120, 121, 123, & 141 (1961), 8: 183, 257, 280, 316, 427, 435, & 442 (1962), and 9: 40, 87, 90, 160, 190, 305--336, 351--356, & 367--369. 1963; Moldenke, Résumé Suppl. 8: 5. 1964.

Additional illustrations: L. H. Bailey, Botany 26, fig. 35. 1911.

xVERBENA ILLICITA Moldenke

Additional bibliography: Moldenke, Phytologia 8: 121 (1961) and 9: 89, 91--94, 215, 220, & 356--360. 1963; G. N. Jones, Fl. Ill., ed. 3, [Am. Midl. Nat. Monog. 7:] 213. 1963.

VERBENA INAMOENA Briq.

Additional bibliography: Moldenke, Phytologia 8: 255 & 267 (1962) and 9: 360--361. 1963.

VERBENA INCISA Hook.

Additional synonymy: Glandularia incisa (Hook.) Mold. ex Troncoso, Darwiniana 12: 530. 1962.

Additional & emended bibliography: Steud., Nom. Bot., ed. 2, 2: 749 & 750. 1841; D. Dietr., Syn. Pl. 3: 604--605. 1843; Moldenke, Phytologia 8: 120 & 121. 1961; Troncoso, Darwiniana 12: 530--531. 1962; Moldenke, Phytologia 9: 70, 315, 330, 334, 352, & 361--371. 1963; Langman, Biol. Abstr. 42: 596. 1963; Moldenke, Résumé Suppl. 8: 4. 1964.

Troncoso (1962), in an interesting article entitled "El origen del tipo de Glandularia incisa (Hook.) Mold. (sin.: Verbena incisa Hook., en Bot. Mag. 65, pl. 3628. 1838)" says: "Al describir la especie señala su autor que fue coleccionada por Tweedie: 'at Santa Fe, in dry pastures in Porto Alegre Bay (Nos. 504 y 505) and on the shores of the Panama (No. 460)'. Estudiados los tres sintipos del Herbario de Kew, pude comprobar que la cita 'Panama' es un error de impresión. En la etiqueta original del ejemplar No. 460 dice 'this from the coast of the Parana, flower a soft pink colour'. Se trata, pues, de las costas del río Paraná y muy probablemente en la provincia de Entre Ríos. Glandularia incisa es una especie bastante difundida en nuestro litoral, principalmente en las barrancas del Paraná." She cites Burkart 23455 & 23456 in the Darwinion herbarium from Entre Ríos, Argentina; O. Boelcke 4968, Burkart 12764, Cabrera 7181, and C. M. Hicken s.n. [Puerto Nuevo, XII.1912] in the same herbarium from Buenos Aires.

VERBENA INCISA f. ALBIFLORA Osten & Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 366 & 371—372. 1963.

xVERBENA INHONESTA Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 121 (1961) and 9: 372. 1963.

VERBENA INTEGRIFOLIA Sessé & Moc.

Additional bibliography: Moldenke, *Phytologia* 8: 124 (1961) and 9: 372—374. 1963.

xVERBENA INTERCEDENS Briq.

Additional bibliography: Moldenke, *Phytologia* 8: 121 (1961), 8: 257 (1962), and 9: 374—376 & 404. 1963.

VERBENA INTERMEDIA Gill. & Hook.

Additional bibliography: Hook., *Bot. Misc.* 1: 166 & 167. 1829; Steud., *Nom. Bot.*, ed. 2, 2: 750 & 751. 1841; D. Dietr., *Syn. Pl.* 3: 602 & 603. 1843; F. Phil., *Cat. Pl. Vasc. Chil.* 220. 1881; H. S. Marshall, *Kew Bull.* 1936: 94. 1936; Moldenke, *Phytologia* 8: 247, 256, 257, 267, 316—318, 412, 427, & 441 (1962), 8: 463 & 477 (1963), and 9: 67, 151, 154—156, 296, & 375—384. 1963.

It should be noted here that the bibliographic reference Hook., *Bot. Misc.* 1: 166 & 167 (1829) is often erroneously cited as "1830". Steudel (1841) reduces V. gracilis Cham. to V. tenuis Steud., but it is V. gracilis Desf. which is conspecific with Steudel's plant.

xVERBENA KONDAI Moldenke

Additional bibliography: Moldenke, *Phytologia* 8: 181 (1961) and 9: 386—387. 1963.

VERBENA LACINIATA (L.) Briq.

Additional and emended bibliography: Hook., *Bot. Misc.* 1: 168—169. 1829; Steud., *Nom. Bot.*, ed. 2, 1: 584 (1840) and 2: 750. 1841; D. Dietr., *Syn. Pl.* 3: 604. 1843; F. Phil., *Cat. Pl. Vasc. Chil.* 220 & 221. 1881; Baeza, *Nomb. Vulg. Pl. Silv. Chile*, ed. 2, 100, 212, & 269. 1930; Moldenke, *Phytologia* 8: 123 (1961), 8: 188, 190, 192, 202, 204, 212, 379, 400, 416, 417, 419, 420, & 435 (1962), and 9: 12, 14, 16, 45, 46, 67, 69—72, 76, 87, 88, 117, 128, 130, 156, 197, 301, 302, 304, 386, & 388—404. 1963.

Hooker in his *Bot. Misc.* 1: 168—169 (1829) — a reference, incidentally, which is often erroneously cited as "1830" — says: "19. *Verbena erinoides*; caule ascendente ramoso hirta, foliis tripartito-laciniatis hirsutis, laciniis lineari-lanceolatis subdentatis, spicis axillaribus solitariis laxis, bracteis calycem aequantibus patulis. Spreng. *Verbena erinoides*. 'Willd. Enum. 686. 12'. Spreng. *Syst. Veget.* v. 2. p. 750. *Verbena multifida*. Ruiz et Pav. *Fl. Peruv.* v. 1. p. 21. t. 33. c. *Erinus laciniatus*. Linn. *Sp. Pl.* p. 879. *Lychnidea Verbenae tenuifoliae folio, vul-*

go Sandia-Laguen. Feillée Per. v. 3. t. 25. HAB. Frequens in provinciis Bonariae, Mendozae et Chile, usque ad alt. 8000 ped. Extremely variable in the relative length and breadth of the leaves: trifid or multifid, the segments narrow and linear, or sometimes ovate and more or less hairy or hispid. The following varieties may be enumerated: α . foliis ovato-lanceolatis incisoserratis vix trifidis. β . foliis profunde trifidis subtripartitisve, laciniis incisis, ultimis ovatis lanceolatisve. (V. multifida, Ruiz et Pavon, v. 1. p.22. t. 23. f. c.). γ . foliis tripartitis, laciniis inciso-pinnatifidis ultimis lineari-oblongis acutis. δ . foliis bipinnatifidis, segmentis paucis linearibus elongatis, vel etiam foliorum segmentis angusto-linearibus. [p. 169:] ϵ . foliis bipinnatifidis, segmentis linearibus brevibus, (bracteis plerumque calyce longioribus. An species propria?). ζ . foliis bipinnatifidis, segmentis brevibus oblongis, (caule prostrato foliis pubescenti-incanis. An sp. propr.?). The figures of Feillée, and of Ruiz and Pavon above quoted, are very characteristic of many specimens of our plant, but the former author says the flowers are scarlet, the latter that they are purplish flesh colour; whereas ours are blue. Again, we have specimens which only differ in the leaves being as little cut, or very nearly so, at the margin, as those of V. chamaedrifolia. Both these plants are taken into the genus Erinus by Linnaeus, both are called Melindres by the Spaniards of South America, (the present one M. azules). From all this it would appear that the colour of the flowers, and the more or less deeply incised leaves, are very variable circumstances. To these, again, is very closely allied V. Aubletia, and still more the V. Lamberti. May, Sir James Smith, has in Rees' Cyclopaedia given it as his decided opinion that Feillée's Lychnidea t. 25, (the only authority for the Erinus laciniatus of Linn.) should be referred to V. Aubletia: while Mr. Ker, in his Bot. Register, refers it to V. Lamberti, (his V. Aubletia)."

Baeza (1930) records the common names "sandialahuen" and "hierba del incordio", the latter name also applied to V. palmata Reiche.

VERBENA LACINIATA var. CONTRACTA (Lindl.) Moldenke

Additional bibliography: Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Moldenke, Phytologia 9: 395, 396, 399, & 401--403. 1963.

VERBENA LACINIATA var. SABINI (Sweet) Moldenke

Additional bibliography: Moldenke, Phytologia 9: 394, 396, & 402--403. 1963

VERBENA LANDBECKI R. A. Phil.

Additional bibliography: F. Phil., Cat. Pl. Vasc. Chil. 220. 1881; Moldenke, Phytologia 9: 375 & 403--404. 1963.

VERBENA LASIOTACHYS Link

Additional bibliography: Lehm., Del. Sem. Hort. Hamb. 1826: 16. 1826; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 602. 1843; J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1858; A. Gray, Syn. Fl. N. Am. 2 (1): 336. 1878; Moldenke, Phytologia 8: 121, 124, & 142—144 (1961), 8: 267, 268, 272, 279, 427, & 435 (1962), 9: 16, 83, 166, 215, 296, 372, & 404—407 (1963), and 9: 459—467. 1964.

It should be noted here that the bibliographic reference J. Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128 (1858) is often cited as "Torr. Bot. Mex. Bound. 128". Steudel (1841) affirms that Sprengel regarded V. lamberti Ker as a synonym of V. prostrata Ait.

VERBENA LILACINA Greene

Additional synonymy: Verbena harbisonii Moldenke, Phytologia 1: 438—439. 1940.

Additional bibliography: Moldenke, Phytologia 1: 438—439 (1940) and 1: 511. 1941; Moldenke, Alph. List Cit. 1: 256. 1946; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 63. 1948; Moldenke, Alph. List Cit. 2: 488 (1948) and 4: 1242. 1949; Moldenke, Résumé Suppl. 8: 1 & 5. 1964.

The type of V. harbisonii is C. F. Harbison s.n. from Agua del Refugio, Baja California, Mexico, collected on April 1, 1935, and deposited in the herbarium of the San Diego Society of Natural History at San Diego. Hitherto I have regarded this and V. lilacina as separate species, but recent material collected by Moran on Cedros Island and on the mainland seems to indicate that the two are conspecific. Moran describes the plant as a bushy herb or rounded shrub 1 meter tall. It has been found on silty flats, at altitudes of 10 to 1100 meters.

Additional citations: MEXICO: Baja California: C. F. Harbison s.n. [Agua del Refugio, April 1, 1935] (Du--244976, Gg--328000, N, N--photo, Sd--11808, Z--photo); R. V. Moran 8195 (Z). CEDROS ISLAND: R. V. Moran 10669 (Z).

VERBENA LITORALIS H.B.K.

Additional bibliography: Baeza, Nomb. Vulg. Pl. Silv. Chile, ed. 2, 233 & 269. 1930.

VERBENA MACDOUGALII Heller

The Richardson 26 and Hinckley s.n. [June 1936] collections, cited below, being from the White Mountains, may have been gathered in either Lincoln or Otero Counties. Arsène 18691 bears a printed label inscribed "PL. du MEXIQUE", which is certainly an error because beneath it is written "Las Vegas Jardin". V. M. Spalding's surname is erroneously written "Spaulding" in the University of Arizona herbarium.

Curtin (1947) says "The other two flowers that are called dormilon, meaning sleepy-head, are yellow, but this variety is purple, and is more often referred to as vervena. Children appar-

ently take the keenest pleasure in inflicting minor injuries upon their playmates; the New Mexican boys have found that one of the easiest methods of accomplishing this is by striking an unsuspecting companion on the bare legs with a whip of vervena. With this, it won't be long before he becomes sufficiently angry for all purposes of amusement. The plant evidently has some irritating hairs that penetrate the flesh aside from the actual impact of the blows, and is therefore particularly fine for arousing the fury of one's companions. As a diuretic, a tea of the vervena is drunk for nine mornings; and, at Mora, for toothache, the green leaves are mashed and placed inside the mouth on the gums and on the cheek. When not speaking of plants, the use of the name dormilon applies to a bat."

Perry (1933) cites the following 23 additional specimens not as yet seen by me: WYOMING: Laramie Co.: A. Nelson 8354 (E). UTAH: Juab Co.: M. E. Jones 6026 (E). COLORADO: Archuleta Co.: C. F. Baker 565 (E, F, G). NEW MEXICO: Bernalillo Co.: Ellis 258 (E). Lincoln Co.: Wooton 208 (E). San Miguel Co.: Anect 57 (G); Mulford 39 (E); P. C. Standley 4223 (E, F, G), 4927 (E, F, G). Santa Fe Co.: Brandegee s.n. [1889] (E); Greene 77 (N). County undetermined: Fendler 597, in part (E). ARIZONA: Apache Co.: H. C. Hanson A. 148 (E, F). Coconino Co.: MacDougal 249 (D--isotype, F--isotype, G--isotype). She says "This southwestern representative of V. stricta is readily distinguished by the short-petiolate elongated leaves, the compact spikes, and the floral bracts surpassing the calyx." Her "Greene 77" is probably what is cited by me hereinafter as "F. S. Earle 77".

In all, 251 herbarium specimens, including the type collections of most of the names involved, have been examined by me.

Citations: UTAH: Juab Co.: M. E. Jones 6026 (Ca--159625, N, Po--70877, W--249917). COLORADO: Alamosa Co.: Ramaley 15808 (Bl--42340). Archuleta Co.: C. F. Baker 565 (B, Ca--104838, N, Po--64521, W--369090); Bethel s.n. [Pagosa Springs, 7-1897] (Fc), s.n. [Pagosa Springs, Aug. 20, 1917] (Fc); Sohmoll 1376 (Bl--42333); Wooton 2837 (W--737205). Conejos Co.: Ramaley 12998 (Bl--42341); W. A. Weber 7865a (Ca--964646, Ok, St, W--2054906). El Paso Co.: Osterhout s.n. [Palmer Lake, July 22, 1895] (N). Huerfano Co.: Shear 3577 (N); Vreeland 636 (N, N). La Plata Co.: H. Hapeman s.n. [Durango, Aug. 29, 1918] (Hp). Las Animas Co.: Beckwith 138 (N), 160 (Du--123489), 166 (Gg--31383). Mineral Co.: Ramaley 16531 (Bl--42338). County undetermined: Herb. State Agr. Coll. Colo. 2027 (Fc). TEXAS: Culberson Co.: Grassl 175 (Fs, I, Mi). County undetermined: O. M. Clark 4410 [North Jemez Springs] (B). NEW MEXICO: Bernalillo Co.: C. C. Ellis 258 [Capelin Cañon] (W--890739), 258 [Las Huertas Cañon] (W--662673); Koelz s.n. [Sandia Mts., August 23, 1926] (Mi); Megard 7408 [23] (S). Catron Co.:

Eggleston 2-260 (W-1524448); A. R. Moldenke 154 (Fg), 156 (Fg), 629 (B, Fg, S). Chaves Co.: Moldenke & Woods 609 (S). Colfax Co.: Berg s.n. [Vermejo River, June 29, '97] (Fc-4875); P. C. Standley 14224 (N); Wooton s.n. [Vermejo Park, Aug. 31, 1913] (N, N, W-662229). Lincoln Co.: Cory 33289 (N); Eggleston 18879 (W-1533602); G. L. Fisher 36122 (Ew, W-1679367), s.n. [Ruidoso, Aug. 5, 1931] (Bt-35842, Gg-219620), s.n. [Alto, July 21, 1936] (St-17379, St); J. H. Grant s.n. [Capitan Mts., Aug. 11, 1903] (W-499576); Hinckley 747 (Au, N), s.n. [Ruidosa, June 1936] (Fs), s.n. [White Mts., June 1936] (Au, Au); Richardson 26 (Po-202231); Steiger 1189 (N); Tucker 3208 (Ok), 3209 (Z); Wooton 208 (Ca-104839, Ka, N, Po-70559, Po-267630, Ur, W-330433), s.n. [Divide, June 25, 1895] (W-562251), s.n. [vicinity of Gilmore's Ranch, July 27, 1901] (W-736878); Wooton & Standley 3497 (Du-24189, Fs, Mn-6894, Or-8867, Pl-36306, W-561430), 3597 (W-562148), 3651 (Du-24178, Hp, Or-8855, W-562149). Mora Co.: Arsène 19131 (N, Po-148790); Bacigalupi 585 (Ca-882663, Du-286384). Otero Co.: Hershey s.n. [Mayhill, 8/18/39] (Gg-310866); A. R. Moldenke 639 (S); Moldenke & Woods 607 (S); Orcutt s.n. [Cloudcroft, July 23-26, 1926] (Sd-23261); R. B. Randall s.n. [Cloudcroft, July 28, 1932] (Sd-6254); E. D. Schulz 255 (N), 549 (Wi); V. M. Spalding 111 (Tu-98880); E. Stearns 342 (W-691013), 358 (W-690992); Waterfall 12464 (Mi, St, W-2231211); C. B. Wolf 2778 (Ba, Du-192373, Gg-175412, Rs-9994); Wooton s.n. [Cloudcroft, June 30, 1899] (W-736879, We), s.n. [Fresnal, July 21, 1899] (Po-70881, Tu), s.n. [Toboggan, July 31, 1899] (W-736880), s.n. [Mescalero Reservation, July 21, 1905] (W-562250); M. S. Young s.n. [High Rolls, 7/31/16] (Au). Rio Arriba Co.: P. C. Standley 8239 (W-687157). Sandoval Co.: Hershey s.n. [Jemez Mts., 1937] (Bt-58319); A. Nelson 11556 (Ca-500724); A. D. Read 19 (W-890407); Rousseau 35026 (Um-237). San Juan Co.: Klinger & Flory 265 (Tu-111520). San Miguel Co.: Anect 211 (Gg-31382, N), 299 (Vi); H. S. Barber 152 (W-564809); Cockerell s.n. [Upper Pecos] (Bl-42327); Creasy s.n. [Sept. 27, 1951] (We); B. B. Harris s.n. [Las Vegas, 6-24-31] (Nt); G. T. Hastings s.n. [Las Vegas, July 4, 1927] (N); Lundell & Lundell 14485 (Ld); Mulford 39 (Io-33457, Ur); Ramaley 5217 (Bl-42328); Mrs. St. John s.n. [west of Las Vegas] (Po-70557); P. C. Standley 4223 (N, W-498589), 4927 (N, W-498950); Studhalter & Marr 1836 (Mi). Santa Fe Co.: Bertaud 163 (N); F. S. Earle 77 (N); Eastwood 15618 (Gg-161749); Edwards s.n. [Santa Fe, July 10th, 1847] (T); D. R. Goddard 855 (Ca-500921); McBreen s.n. [July 6, 1963] (B); A. Nelson 11556 (S, S); Osterhout 7028 (Po-183061); Pringle s.n. [near Glorieta, 26 Aug. 1886] (Vt); Renner 43459 (Ca-137931);

Rose, Fitch, & Parkhurst 17717 (W-760794); Sagalyn 8 (Ms). Socorro Co.: Clear s.n. [Los Alamos, July 16, 1947] (Gg). Taos Co.: C. C. Albers 47079 (Au); Eggleston 19277 (N, W-1533909); Waterfall 12250 (St); Whitehouse s.n. [Taos, 9.7.1929] (Au); Whiting 10012 (Dt). Union Co.: P. C. Standley 6065 (W-685100). Valencia Co.: Wooton s.n. [mts. west of Grant's Station, Aug. 1st, 1892] (W-241162), s.n. [west of Grant's Station, Aug. 2, 1892] (C, Ur, W-735991). County undetermined: T. S. Brandegee s.n. [1879] (Ca-169647); De Busk 7169 [Bonito Dam] (Tu-104394); Mize s.n. [Castilla Range, Aug. 16, 1899] (Gg-31384); Vasey s.n. [N. Mex.] (Pa). ARIZONA: Apache Co.: L. D. Benson 9573, in part (Po-267652); Eggleston 17106 (N, Vi); R. S. Ferris 1235 (Du-91468), 10158 (Ca-882665, Du-282088); Frisbie & Burk 3 (Fg-7399); S. W. Hutchinson 7334 (En); A. R. Moldenke 152 (Fg), 627 (B, S). Coconino Co.: Borell s.n. [Sept. 22, 1934] (Ca-526337); Collector undesignated s.n. [Flagstaff, 7-24-10] (Fg-8033); Collom 634 (Fg-111426), 729 (W-1729454); Deaver 4163 (Fg-7332); O. Degen 4475 (N), 4538 (N); Demaree 42850 (Gg), 46119 (S); Eastwood & Howell 6392 (Gg-261706, W-1733005); Eggleston 10201 (W-767199); Ellison 1098 (La); Goodding 1491 (Fg-8034); E. L. Greene s.n. [Flagstaff, 14 July 1889] (Ca, Ca-192903, Du-91134); H. C. Han son 148 (Ur), A. 148 (Au, Or-20490, Up-80667); M. E. Jones 6054w (Po-70876, W-249916), s.n. [Flagstaff, Aug. 29, 1884] (Po-71017); Kearney & Peebles 12195 (Gg-267623, To), 13757 (Gg-263282, N, To); H. E. Lee s.n. [2 miles west of Flagstaff, 9-19-36] (Ca-882664, Tu); Leiberg 5882 (W-410707); Logmis 3242 (To); MacDougal 249 (Ca-104837--isotype, Dp--isotype, Io--38757--isotype, N--type, Tu--isotype, W-334346--isotype); A. R. Moldenke 150 (B, Fg, S); Monachino s.n. [Oct. 10, 1950] (N, Qu); E. Moore s.n. [Ft. Valley, 8.7.29] (Au); Nickell s.n. [Aug. 26, 1956] (St); K. F. Parker 5934 (Ca-736881, N); Riordan 1 (Tu); H. H. Rusby 780, in part (Fs, La, Mi, Mi), 6121 (W-147588), s.n. [Clark's Valley, Aug. 1, 1883] (C, Ca-67978, Up-17118, W-56217, W-771846); P. O. Schallert s.n. [7/18/43] (Ur), s.n. [west of Bellemont, 7/22/43] (N); Strickland s.n. [Grand Canyon, July 31, 1951] (Fg-7359); W. R. Taylor s.n. [July 29, 1926] (Gg-145330); L. F. Ward 11 (W-404516). Navajo Co.: Pultz 1724 (Gg-326019). Pima Co.: Spalding 20 (Tu, Tu). Yavapai Co.: H. H. Rusby 780, in part (Pr). County undetermined: H. C. Hanson s.n. [North-eastern Arizona] (Bl-42388). CULTIVATED: New Mexico: Arsène 18691 (B, N). LOCALITY OF COLLECTION UNDETERMINED: Baldwin s.n. [June 10th, 1819] (T).

VERBENA MACDOUGALII f. ALBIFLORA Moldenke, Phytologia 2: 424. 1948.
Bibliography: Moldenke, Phytologia 2: 424. 1948; Moldenke, Cas-

tanea 13: 112. 1948; Moldenke, *Alph. List Cit.* 2: 506 (1948) and 3: 839. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 20 & 198. 1949; Moldenke, *Résumé* 25 & 472. 1959; Moldenke, *Résumé Suppl.* 3: 6 (1962) and 5: 3 & 4. 1962.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Francis Ramaley (no. 16847) at Alamosa Canyon, Alamosa County, Colorado, at an altitude of 8000 feet, on September 14, 1938, and is deposited in the herbarium of the University of Colorado at Boulder. The collector notes that the plant is "rare". It has been found at altitudes of 7800 to 8000 feet, flowering in September.

In all, 3 herbarium specimens have been examined by me.

Citations: COLORADO: Alamosa Co.: Ramaley 16847 [Alamosa, Sept. 14] (Bl--42339--type). Rio Grande Co.: Ramaley 16847 [Monte Vista, 15.IX.1938] (Ca--754136). NEW MEXICO: Otero Co.: Wooton s.n. [Fresnal, July 21, 1899] (W--736877).

VERBENA MACDOUGALII mut. ROSELLA Cockerell, *Am. Nat.* 36: 809. 1902.

Bibliography: Cockerell, *Am. Nat.* 36: 809. 1902; Perry, *Ann. Mo. Bot. Gard.* 20: 288 & 355. 1933; Moldenke, *Prelim. Alph. List Invalid Names* 47. 1940; Moldenke, *Alph. List Invalid Names* 48. 1942; Moldenke, *Résumé* 369. 1959; Moldenke, *Résumé Suppl.* 5: 4 & 7. 1962.

This mutant differs from the typical form of the species in having pink corollas.

The type of the mutant was collected by Mrs. O. Saint John at the foot of Baldy Mountain, near Elizabethtown, Colfax County, New Mexico, in October, 1898, and is deposited in the United States National Herbarium at Washington. The collector states that purple-flowered specimens were growing at the same locality.

As yet only the type specimen has been examined by me.

Citations: NEW MEXICO: Colfax Co.: Mrs. O. Saint John s.n. [Foot of Baldy Mt. near Elizabethtown, Oct. 1898] (W--404921--type).

VERBENA MACRODONTA Perry, *Ann. Mo. Bot. Gard.* 20: 289--290, pl. 13, fig. 1--4, & 14. 1933.

Bibliography: Perry, *Ann. Mo. Bot. Gard.* 20: 249, 250, 260, 289--290, 355, 358, & 360, pl. 13, fig. 1--4, & 14. 1933; A. W. Hill, *Ind. Kew. Suppl.* 9: 294. 1938; Worsdell, *Ind. Lond. Suppl.* 2: 486. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 19 & 101 (1942) and [ed. 2], 33 & 198. 1949; Moldenke, *Résumé* 39 & 472. 1959.

Illustrations: Perry, *Ann. Mo. Bot. Gard.* 20: pl. 13, fig. 1--4, & 14. 1933.

Coarse plant, with biennial or perennial base; stems 1--1.5 m. tall, erect, branching, hirsute-hispidulous; leaves large, thickish in texture, decussate-opposite; petioles short, 1--2 cm. long, margined; leaf-blades elongate-ovate, 10--14 cm. long, cuneate at the base and narrowed into the petiole, coarsely and sharply bi-

serrate-dentate with mucronate teeth, rugose with impressed veins and scabrous-hirsute with minutely pustulate hairs above, prominently veined and hirsute beneath; spikes paniced, subtended by leafy bracts, dense before anthesis, becoming elongated and open in fruit, glandular-hirsute; floral bractlets lanceolate-linear, approximately equaling the fruiting-calyx, subulate at the apex, ciliate along the margins; calyx 5 mm. long, glandular, somewhat viscid-pubescent, the teeth 1.5 mm. long, subulate; corolla deep-violet, its tube protruding a little beyond the calyx, glabrous or puberulent on the outer surface, the limb 5--6 mm. wide; cocci trigonous, 2 mm. long, shallowly scrobiculate on the upper half, tending to be sulcate toward the base, the commissural face muriculate.

The type of this little-known species was collected by Edward William Nelson and Edward Alphonso Goldman (no. 7425) on the road from Miraflores to San Bernardo Ranch in the Sierra La Laguna, at an altitude of about 750 meters, Baja California, Mexico, on January 20, 1906, and is deposited in the herbarium of the Missouri Botanical Garden at St. Louis. Perry cites also an isotype in the United States National Herbarium at Washington. She says "Verbena macrodonta is a coarse plant with large thickish leaves and open inflorescence, in a measure similar to V. MacDougalii, but differing in its less strict habit, somewhat remote fruits, more glandular calyxes, and shorter plumper nutlets."

Carter describes the plant as "occasional in dry northeast-facing slope in decomposed granite with Quercus idonea, Lysiloma microphylla, and Jatropha", at an altitude of 900 meters. It has been collected flowering and fruiting in April and October. Herbarium material has been misidentified and distributed under the name V. prostrata R. Br.

Only 4 herbarium specimens and 1 mounted photograph have been examined by me.

Citations: MEXICO: Baja California: T. S. Brandegees s.n. [Canon San Bernardo, Oct. 13, 1893] (Ca--104845); A. Carter 2676 (Ca-916208, Du--344053, W--2023100). MOUNTED CLIPPINGS: Perry, Ann. Mo. Bot. Gard. 20: 360, pl. 14. 1933 (W--photo of type).

VERBENA MACROSPERMA Speg., Rev. Argent. Bot. 1: 218--220. 1926.

Bibliography: Speg., Rev. Argent. Bot. 1: 218--220. 1926; A. W. Hill, Ind. Kew. Suppl. 8: 246. 1933; Fedde, Bot. Jahresber. 59 (2): 417. 1939; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101 (1942) and [ed. 2], 106 & 198. 1949; Moldenke, Résumé 127 & 472. 1959.

Nothing is known to me about this species except what is stated relative to it in Spegazzini's original description, which is repeated herewith: "Leptostachya, perennis; caudice gracili subterraneo, multicepe ramis gracilibus radiatim diffusis prostratisque, ramulis erectis v. adscendentibus, hispido-puberulis, foliis oppositis, subconfertis parvis petiolatis, limbo circumscriptione obovato, pinnatim 3--5-partito, pinnis 2--5-fidis, lob-

ulis obtusiusculis planis, margine non revolutis, totis minute densiusculeque puberulo-hirtis, e virescenti subcanescentibus; inflorescenti solitariis subsessilibus acrogenis v. alaribus, erectis, spiciformibus subcylindraceis densiusculis 10--20-floris, calycibus cylindraceo-subfusoides, 5-sulcato-costatis, viridipurpurascensibus dense patentiusculeque hispido-puberulis, sessilibus, bracteola lineari-lanceolata triplo brevioribus fultis, dentibus brevissimis obtuse callosocuspidatis, inaequalibus, anticis conspicue validioribus; corolla tubulosa ochroleuca, glabra, sat exserta; nuchulae pro ratione magnae, subcylindraceae, obtusiusculae, glabrae, dense irregulariterque ruguloso-reticulatae, castaneo-purpurascens nitidulae, e calycis dorso longitudinaliter fisso protrudentes.

"Hab. En los faldeos de las barrancas de los alrededores de Talagapa [Río Negro, Argentina].

"Obs. Especie que a primer vista recuerda ciertas formas de la Verbena crithmifolia Gll. & Hk., de la cual se aparta por las lacinias de las hojas no lineares y totalmente planas y por los dientes del cáliz, principalmente los posteriores, callosocuspidados y de la Verb. pinnatisecta Schr. por la pubescencia tupida y enderezada de todas sus partes.

"El rizoma debe hallarse plantado bastante profundamente en el suelo, siendo casi vertical y leñoso, produciendo a flor de tierra numerosas ramitas que se extienden radialmente sobre el suelo pero sin producir raíces adventicias; estas ramitas (50--100 mm lng. x 0.50--1.25 mm diám.) son casi cilíndricas todas revestidas de pubescencia fina enderezada, y en la parte apical se arquean y tienden algo a enderezarse, ofreciendo internodios bastante regulares (8--12 mm lng.) separados por nudos poco o nada hinchados y que suelen llevar ramitas enderezadas débiles (25--40 mm alt.) también ceniciento-pubescentes. Las hojas todas hispido-pubescentes, opuestas, tienen un peciolo (2,5--5 mm lng.) semicilíndrico al dorso, ligeramente cóncavo al vientre que lleva la lámina de circunscripción anchamente ovalada (6--7 mm lng. x 5--7 mm lat.) generalmente tripartida (rara vez pinado-5-partida) con los lóbulos cortamente peciolulados, los dos laterales exteriormente 1-dentados y el impar central trifido, siendo los dientes y la extremidad de los lóbulos cuneado-redondeada bastante obtusa; las inflorescencias son al principio apicales (y en muchos casos así permanecen), pero lo más a menudo se desarrolla en su base de inserción una ramita más o menos larga que las vuelven entonces pleurógenas y axillares, siendo desde la juventud espiciformes cilíndricas enderezadas (30 mm lng. x 8--10 mm diám.) llevadas por un corto pedicelo (5--15 mm lng.) robusto hispido pubescente y formadas por unas 10 a 20 flores recostadas contra el eje y muy poco divergentes, yendo cada flor sécil acompañada de una bracteita lanceolado-lineal (3,5--4 mm lng. x 0.75--1 mm lat.) aplicada contra el cáliz, plana y adelgazada en punta relativamente angosta, pero no muy aguda; el cáliz de color verde oscuro más o menos ceniciento por la pubescencia, es cilíndrico-subfusoides (7--9 mm lng. x 2 mm diám.) ligeramente cuneado-redondeado en la

base, ligera y suavemente enangostado en la mitad superior, para terminar en 5 dientecillos, algo diferentes de largo, muy cortos y pequeños, rematados por un callo obtuso que en los dos anteriores constituye mucrón largo bien saliente y visible; la superficie del cáliz está recorrida por 5 costillas obtusas (y otros tantos surcos) longitudinales que a la madurez suelen tomar color morado obscuro y se abre de arriba abajo a lo largo de la línea mediana dorsal y por allí expulsa las núculas que habían madurado en él; la corola es tubulosa (12 mm lng. x 0.75 mm diám.), superando durante el ántesis el cáliz por una tercera parte, ostentando color amarillanto pálido y 5 lóbulos oblongos bien extendidos y casi iguales; los estambres están pegados en la misma garganta cuyo ósculo obstruyen sin sobresalir, con filamentos muy cortos y anteras amarillas, de bolsas pilínicas poco desiguales y absolutamente sin glándulas apicales; el estilo es muy delgado-lampiño alcanzando los estambres para dividirse en dos costas ramitas estagnáticas; el ovario subcilíndrico es lampiño y verde. Las núculas son 4, formando columna cilíndrico-tetrágono y al henderse el cáliz, se sueltan y caen, siendo así cada una casi cilíndrica (3.5—4 mm lng. x 1 mm diám.) convexa al dorso, donde ofrece de 3 a 5 estrías longitudinales y algunas reticulaciones, algo lustrosas, y al vientre ostenta una angosta línea longitudinal hundida y lisa; la extremidad superior es redondeada obtusa, la basal cortada en bisel."

VERBENA MALMII Moldenke, *Phytologia* 2: 475—476. 1948.

Synonymy: Verbena malmiei Moldenke ex Angely, *Fl. Paran.* 16: 78. 1960.

Bibliography: Moldenke, *Phytologia* 2: 475—476. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 94 & 198. 1949; Moldenke, *Phytologia* 3: 454. 1951; E. J. Salisb., *Ind. Kew. Suppl.* 11: 263. 1953; Moldenke, *Inform. Mold. Set* 48 *Spec.* [4]. 1954; Angely, *Fl. Paran.* 7: 13. 1957; Moldenke, *Résumé* 110 & 472. 1959; Angely, *Fl. Paran.* 16: 78 (1960) and 17: 46. 1961; Moldenke, *Résumé Suppl.* 3: 40. 1962.

Shrubby perennial plants to 3 m. tall, much-branched; branches and branchlets green, acutely tetragonal, completely glabrous throughout, shiny, often sulcate between the angles; twigs numerous, ascending-erect, slender, acutely tetragonal, green and shiny, glabrous; principal internodes 2—5 cm. long; nodes not annulate; leaves very tiny and indistinct, giving the plant an aphyllous appearance, sessile, oblong or linear, rather firm-textured, uniformly bright-green on both surfaces, decussate-opposite, ascending, 3—8 mm. long, about 1 mm. wide, appressed-strigillose on both surfaces, acute at the apex, 1-veined, the midrib slightly elevated beneath and subimpressed above; inflorescence spicate, very abundant, usually in groups of 3 at the tip of each twig, often aggregated in paniculate fashion, the terminal spikes usually short-pedunculate, the lateral ones longer-pedunculate, the floriferous portion elongating to almost 3 cm. after anthesis; peduncles very slender, glabrous or minutely strigillose, 3—15 mm. long, tetragonal, green; rachis rather

densely strigillose-puberulent with whitish hairs especially visible after the calyxes have fallen off; bractlets lanceolate, very small and obscure, about 1 mm. long, strigose with subappressed antrorse whitish hairs, acute at the apex; calyx tubular, about 3 mm. long, densely white-strigose with appressed antrorse hairs, the rim 5-apiculate; corolla blue, its tube about 4 mm. long, glabrous except at the very apex where it is densely white-strigose like the calyx, its limb 3--4 mm. wide, puberulent in the throat within and strigose at the base outside, the lobes glabrous on both surfaces.

The type of this species was collected by Gustaf Oskar Andersson Malme (no. 1141) -- in whose honor it is named -- in a swamp at Villa Rica, Rio Grande do Sul, Brazil, on January 22, 1902, and is deposited in the herbarium of the Naturhistoriska Riksmuseum at Stockholm. The species is obviously closely related to V. alata Sweet and V. ephedroides Cham. and more intensive study is required of these taxa when more material is available. It appears to inhabit shrubby marshes, flowering in December and January. Herbarium material has been misidentified and distributed as V. isabellei Briq.

In all, 9 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Dusén 2788 [Herb. Mus. Nac. Rio Jan. 46569] (N); Hatschbach 2562 (N), 3761 (Z). Rio Grande do Sul: Malme 1141 (F--photo of type, N--isotype, N--photo of type, S--type, Si--photo of type, Z--photo of type); Rambo 38254 (N), 39352 (N), 50026 (L, S).

VERBENA MARITIMA Small, Bull. N. Y. Bot. Gard. 3: 436. 1905.

Synonymy: Glandularia maritima Small, Man. Southeast. Fl. 1138 & 1508. 1933. Glandularia maritima (Small) Small apud A. W. Hill, Ind. Kew. Suppl. 9: 124. 1938. Verbena aubletia var. maritima Curtiss ex Moldenke, Addisonia 21: 60, in syn. 1942. Grandularia maritima Small ex Moldenke, Alph. List Invalid Names Suppl. 1: 10, in syn. 1947.

Bibliography: Small, Bull. N. Y. Bot. Gard. 3: 436. 1905; Fedde in Just, Bot. Jahresber. 33 (1): 632. 1906; Prain, Ind. Kew. Suppl. 3: 187. 1908; Small, Fl. Miami 159. 1913; Small, Fl. Fla. Keys 128. 1913; Moldenke, List Spec. Mold. Southeast. Set 10. 1933; Small, Man. Southeast. Fl. 1138 & 1508. 1933; Perry, Ann. Mo. Bot. Gard. 20: 248, 311, 320--321, & 355. 1933; J. A. Harris, Physico-chem. Prop. Plant Saps 173. 1934; A. W. Hill, Ind. Kew. Suppl. 9: 124. 1938; Moldenke, Annot. & Classif. List 108. 1939; Moldenke, Prelim. Alph. List Invalid Names 26. 1940; Moldenke, Alph. List Invalid Names 25. 1942; Moldenke, Addisonia 21: 59--60, pl. 702. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 5 & 101. 1942; Schnack & Covas, Darwiniana 6: 475. 1944; Moldenke, Bot. Gaz. 106: 159. 1945; Moldenke, Am. Midl. Nat. 32: 576. 1945; Moldenke, Am. Journ. Bot. 32: 609. 1945; Moldenke, Alph. List Cit. 1: 22, 138, 139, 152, 155, 267, 279, 291, & 294.

1946; Moldenke, Alph. List Invalid Names Suppl. 1: 10 & 22. 1947; Moldenke, Phytologia 2: 238—240, fig. 2. 1947; Moldenke, Alph. List Cit. 2: 393, 400, 409, 469, 494, 510, 512, 513, 518, 523, & 574 (1948), 3: 660, 717, 720, 721, 741, 755, 777, 778, 800, 851, 852, 931, 941—944, & 948 (1949), and 4: 1112, 1117, 1118, 1138, 1177, 1188, 1192, 1193, 1216, 1243, & 1296. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 10 & 198. 1949; H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 14. 1949; Moldenke, *Am. Wild Fls.* 292 & 450. 1949; Moldenke, *Inform. Mold. Set 51 Spec.* 4. 1956; Moldenke, *Résumé* 13, 296, 297, 358, 424, & 472. 1959; Moldenke, *Résumé Suppl.* 1: 2 (1959), 3: 3 & 32 (1962), and 4: 3. 1962; Moldenke, *Phytologia* 8: 434 & 435 (1962) and 9: 194. 1963. Illustrations: Moldenke, *Addisonia* 21: pl. 702 (in color). 1942; Moldenke, *Phytologia* 2: 239, fig. 2. 1947.

Herbaceous perennial plants, decumbent or trailing; roots fibrous; stems several or numerous, slender, decumbent or prostrate, creeping or trailing, branched at the base, sparingly pubescent or glabrate; branches smooth or sparingly pubescent; leaves decussate-opposite, numerous, thick-textured; petioles 2—4 mm. long, smooth or sparingly pubescent; leaf-blades bright-green, cuneate to orbicular-ovate or obovate, 1—6 cm. long (usually 1—4), 1.2—2.5 cm. wide, tapering regularly in cuneate fashion to the margined petiole, incised-dentate or somewhat lobed, broadly obtuse or acute at the apex, sparsely pubescent or glabrate on both surfaces; inflorescence terminal, the spikes pedunculate, subcapitate or fascicle-like during anthesis, becoming elongated to as much as 7 cm. in fruit, densely many-flowered; flowers showy, blooming practically throughout the year in terminal flat-topped clusters; bractlets persistent, lanceolate or linear-lanceolate, green, about half as long as the calyx, acuminate at the apex, pubescent on the back, ciliate-margined; calyx slender, tubular, 10—12 mm. long, about 2 mm. in diameter, appressed-pubescent with often glandular hairs, conspicuously 5-ribbed, its rim 5-toothed, with short, slender, subulate, unequal teeth, 2 of which are about 2 mm. long, the 3 others about 1 mm. long; corolla hypocrateriform, varying from blue or blue-purple to purple, pinkish-purple, lilac-purple, rose-purple, or lavender, the lower surface much paler than the upper, its tube narrowly cylindrical, 1 1/2 to 3 times as long as the calyx, finely or densely pubescent on the outer surface, the limb wide-spreading, deeply 5-parted, 10—15 mm. wide, the lobes obovate, deeply notched at the apex; stamens 4, inserted in pairs at two levels near the mouth of the corolla-tube, entirely included; filaments slender, very short; anthers small, oblong, with or without glands; pistil single, compound; style slender, smooth, 1.6—1.8 cm. long, shortly 2-lobed at the apex, the posterior lobe smooth and non-stigmaticiferous, the anterior lobe broader, papillose, and stigmatic; ovary 4-sulcate, 4-celled; fruiting-calyx 10—13 mm. long, appressed-pubescent on the outside, often glandular, the teeth short, slender, subulate, enclosing the fruit; cocci 4, subcylindric, dark-brown, crustaceous, 1-seeded, about 4 mm. long, scrobiculate,

with a broadened base, the commissural surface narrow and minutely roughened.

The type of this handsome endemic species was collected by John Kunkel Small and Joel Jackson Carter (no. 1077) between Cutler and Longview Camp, Dade County, Florida, between November 9 and 12, 1903, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species is found chiefly in the coastal counties of Florida from Monroe north to Flagler and Saint Johns and on the west coast to Lee, with a record from Lake County in the interior. Typically it inhabits sandy ridges bordering the ocean, sand-dunes, and even the beaches themselves, but occurs also in coastal and dune hammocks, low pinelands, flatwoods, and kitchen-middens, preferring sandy or dry sandy soil. It has been collected in virgin glade soil, in the vicinity of hammocks, in pinelands, along roadsides and sandy roads, on sandy beach ridges, and on rocks in tropical pinelands, in anthesis from November to August, and in fruit in January, March, April, Ma, and July. The only recorded popular name is "beach vervain".

O'Neill found 32 plants of this species per acre in Flagler County in 1929. Atwater reports it "common" in pinewoods and glades in Dade County, while Ward & West say that it forms "mats on landward surface of coastal dunes 100 yards from the ocean" in Flagler County. Young found it growing "abundantly 200 feet from the ocean". The specific epithet is sometimes written with a capital initial letter for no valid reason.

Blazic describes the plant as "a native verben brightening the landscape at edge of woods even in winter". Sheehan says "it grows in prairies and pinelands, used as an antidote [by the Seminole Indians] for the bite of the water-moccasin; a tea is made from the flowers and drunk hot." Harris records the species from Lake [Eldorado] and Saint Johns Counties [Matanzas], as well as from Mosquito Inlet, Volusia County. The specimens used by him (1934) in his study of the physico-chemical properties of the sap came from a sandy ocean beach near the Inside Route Canal at Hallelendale, Broward County.

Herbarium material of this species has been misidentified and distributed under the names Verbena aubletia L., V. tampensis Nash, Glandularia tampensis (Nash) Small, and even Phlox amplifolia Britt. in the Polemoniaceae. The B. H. Patterson s.n. [Daytona, Nov. 28, 1917] cited below has its upper leaves much like those seen in V. tampensis or some forms of V. canadensis (L.) Britton.

The species is apparently closely related to the widespread and extremely polymorphic V. canadensis of inland portions of the United States, which occurs in the more northern counties of Florida. The ranges of the two species overlap in Brevard, Flagler, and Volusia Counties, where intermediate, probably hybrid, specimens have been found.

The species was apparently first collected and recognized as distinct by A. H. Curtiss, who gathered it on "sand ridges border-

ing the ocean [near Cape Canaveral], E. Florida, July [1879]" and distributed it under the name "Verbena Aubletia var. maritima". This name he published on the printed labels of his first distribution of North American plants (no. 1963) and in the advertising leaflet concerning it, but failed ever to validate it by a formal description. A note on Curtiss 1963* in the United States National Herbarium says "not V. aubletia (G. V. N[ash]), belongs to § Nobiles. Anther connective not appendaged; corolla lobes emarginate." Actually, Curtiss 1963 is a mixture -- the part from "sandy ridges bordering the ocean, eastern Florida" is V. maritima, but the part from "roadsides near Charleston" is V. bonariensis L., while the part from "low open woods, Indian River, June" is V. tampensis Nash.

Because of its showy inflorescences and long blooming season, it seems probable that this species would prove itself a valuable horticultural subject, especially in seaside gardens in subtropical and tropical regions, along the coasts of Florida and our other Gulf States, and southern California.

Perry (1933) records the following 8 additional specimens not as yet seen by me: FLORIDA: Brevard Co.: Curtiss 1963* (E, G), 5706 (E, G); O'Neill 6309 (E, W). Dade Co.: N. L. Britton 220 (F). Martin Co.: Randolph 52 (G). She says "This native of the sand dunes and the hammocks of Florida resembles V. canadensis in inflorescence, but is readily distinguished by the creeping habit and the cuneate or orbicular-ovate leaves."

In all, 177 herbarium specimens, including type material of all the names involved, and 1 mounted clipping have been examined by me.

Citations: FLORIDA: Brevard Co.: F. S. Blanton 6309 (I, N, S, W--1485467), 6479 (I); A. B. Burgess 638 (N); Curtiss 1963* [sandy ridges bordering the ocean, eastern Florida] (Bc, C, Cm, I, Pa, Up--17083, Vt, W--71940, W--1323048), 5706 (Al, Ca--104865, Dt, Fc, Fl--20986, Io--38761, N, Po--64649, Ur, Vt, W--280798); O. Degener s.n. [Tropic, Aug. 15, 1933] (Ba); Hotchkiss s.n. [Feb. 5, 1935] (N); McFarlin 3871 (Gg--237853), 6608 (N); O'Neill s.n. [June 11, 1929] (I), s.n. [July 8, 1929] (I), s.n. [south of Cocoa Beach, August 9, 1929] (Fl--20976, I, W--1488546); W. H. Rhoades s.n. [Cocoa, 12-8-27] (Fl--20993); P. O. Schallert 20869, in part [Cocoa Beach] (Hi--55688, S, Ur); U. C. Smith s.n. [Georgiana, Jany. 31, '91] (Up--17078). Broward Co.: C. C. Deam 60837 (Dm, N); J. P. Young 737 (W--1240563). Collier Co.: Hawkins s.n. [Royal Palm State Park, 1-25-28] (Fl--20990); Sheehan s.n. [Godden's Mission, March 7, 1919] (N), s.n. [Leaning Oak, 16 miles east of Immokalee] (N); J. K. Small 8123 (Ca--796994). Dade Co.: Atwater M.225 (Hi--167652); Bailey & Bailey 6278 (Ba, Ba), 6388 (Ba); Blazic s.n. [Miami, Jan. 1922] (Gg--31409); N. L.

Britton 220 (N), 296 (N); Buswell s.n. [April 3, 1942] (Bu); C. C. Deam 60417 (Dm, N), 60940 (Dm, N); A. A. Eaton 546 (Rf); A. P. Garber s.n. [Miami, May 1877] (Vt), s.n. [Miami, July 1877] (Pa); Henderson s.n. [Cape Florida] (T); Herb. Columbia Univ. s.n. [Cape Fla.] (C); Hunnewell 5835 (Ua--36988); B. McAllister 27 (H-44472); H. N. Moldenke 549 (E, Go, N, S, Up, Ur, W--1567364), 586 (E, Go, H--5474, N, N, Ob--83132, S, Up, Ur); Mulvania 12 (Hp); O'Neill 7596 (Bt--17155, Du--255707, En, Gg--237852, Gg--238205, Hp, Hp, I, N, N, St--9251, Um--23, Ur, W--1601781), s.n. [Jan. 30, 1933] (I); B. H. Patterson s.n. [Feb. 7, 1918] (Cm, Cm); Safford & Mosier 210 (W--1036050); J. K. Small 2100 (N), 8123 (N), 8594 (N), 8599 (N), 8636 (Gg--316099), s.n. [beach opposite Miami, November 1904] (Ur); Small & Carter 1077 (It--isotype, N--type), 2994 (N), s.n. [January 16, 1909] (We); Small, Carter, & Small 3311 (N), s.n. [February 1911] (H--43154, Pl--131514); Small & Small 5422 (Fl--27706, N, S, W--1737919), s.n. [July 9, 1915] (N); Small & Wilson 1961 (N), s.n. [May 6th to 9th, 1904] (Vi); Weber & Hawkins s.n. [Homestead, 3-1-28] (Fl). Flagler Co.: O'Neill s.n. [August 7, 1929] (I); J. K. Small 10372 (Hi--7424); Ward & West 1342 (Hi--182203); West & Arnold s.n. [Flagler Beach, 10/10/40] (Fl--32757). Indian River Co.: R. J. Lemaire 189 (Hi--120562); P. O. Schallert 20869, in part [Vero Beach] (B, Ur, Ws); Small, DeWinkeler, & Mosier 11123 (N), s.n. [April 3, 1924] (It, Mi). Lee Co.: J. K. Small 8347 (N). Palm Beach Co.: Bailey & Bailey 6523 (Ba, Ba); A. B. Burgess 783 (N); W. B. Fox s.n. [Delray Beach, Apr. 28, 1945] (No--15822, We); W. H. Rhoades 6 (W--1534806), s.n. [near Palm Beach] (Hs, Hs); J. K. Small 2124 (N), 8509 (Go, Io--145163, It, N); Small, Mosier, & DeWinkeler 10891 (S, Up); E. West s.n. [Jupiter, 5-12-33] (Fl--20979). Polk Co.: McFarlin 4186 (Mi). Saint Lucie Co.: Brass 20397 (W--2066056); A. B. Burgess 713 (N); H. N. Moldenke 21482 (Bs, Hk, Mm, Ok, Sm, Ss, Z). Seminole Co.: P. O. Schallert 1246 (Je--7022). Volusia Co.: H. C. Beardslee s.n. [New Smyrna, Feb. 1925] (Ob--97288); B. H. Patterson s.n. [Daytona, Nov. 28, 1917] (Cm); J. K. Small 8674 (N); Small & DeWinkeler 9856 (Mi). Biscayne Key: Lightfoot s.n. [Key Biscayne, Apr. 28, 1917] (Ba). Jupiter Island [Martin & Palm Beach Counties]: Cooley, West, & Daggy 4817 (Hi--193302); Small & DeWinkeler 9865 (W--1924334). Merritt's Island: Hotchkiss s.n. [Feb. 5, 1935] (W--1683053); McFarlin 3871 (Mi); H. N. Moldenke 219a (N, Up, Ur). County undetermined: Curtiss s.n. [Fla.] (C); Herb. LeRoy s.n. [Fla.] (C); C. H. Hitchcock s.n. [Oak Lodge] (Dt); "W. M. R." s.n. [Febr. 18, '53] (Pr). MOUNTED CLIPPINGS: Bull. N. Y. Bot. Gard. 3: 436. 1905 (W).

VERBENA MARRUBIOIDES Cham., *Linnaea* 7: 269. 1832.

Synonymy: *Verbena chamaedrifolia* var. *melindroides* Benth. ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 23, in syn. 1947 [not *V. chamaedrifolia* var. *melindroides* (Cham.) Schau., 1940, nor Schau., 1947]. *Verbena humifusa* var. *reticulata* Moldenke, *Phytologia* 2: 423. 1948. *Verbena humifusa* var. *verticillata* Moldenke ex Stellfeld, *Trib. Farmac.* 19 (10): 166. 1951.

Bibliography: Cham., *Linnaea* 7: 269. 1832; Steud., *Nom. Bot.*, ed. 2, 2: 750. 1811; D. Dietr., *Syn. Pl.* 3: 602. 1843; Walp., *Repert. Bot. Syst.* 4: 27. 1845; Schau. in A. DC., *Prodr.* 11: 538. 1847; Schau. in Mart., *Fl. Bras.* 9: 184. 1851; Briq. in Engl. & Prantl, *Nat. Pflanzenfam.* 4 (3a): 147. 1894; Jacks. in Hook. f. & Jacks., *Ind. Kew.* 2: 1179. 1895; Herter, *Florul. Urug.* 105. 1930; Herter, *Revist. Sudam. Bot.* 6: 97. 1939; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 35, 39, 41, 44, & 101. 1942; Augusto, *Fl. Rio Grande do Sul* 209 & 232. 1946; Moldenke, *Alph. List Cit.* 1: 83, 96, & 251 (1946) and 2: 358, 442, 458, 532, 533, 537, & 599. 1948; Moldenke, *Castanea* 13: 117--119. 1948; Moldenke, *Phytologia* 2: 423 (1948) and 3: 75. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 73, 94, 100, 106, & 198. 1949; Moldenke, *Alph. List Cit.* 3: 673, 676, 688, 745, 780, 837, 840, 873, 921, 922, & 923 (1949) and 4: 1010, 1090, & 1250. 1949; Stellfeld, *Trib. Farmac.* 19 (10): 166 & 167. 1951; Rambo, *Sellowia* 6: 60, 84, & 153. 1954; Angely, *Fl. Paran.* 7: 13. 1957; Moldenke, *Résumé* 85, 110, 119, 127, 361, 366, & 472. 1959; Angely, *Fl. Paran.* 16: 78 (1960) and 17: 46. 1961; Reitz, *Sellowia* 13 (13): 110. 1961; Moldenke, *Résumé Suppl.* 3: 15 & 38. 1962; Moldenke, *Phytologia* 9: 128, 289, 304, 305, 315, & 367. 1963.

Creeping herb; stems caespitose, tetragonal or rather terete, to about 43 cm. long, mostly simple, ascending, villous-hirsute; leaves subsessile or sessile, more or less approximate, variable in size, mostly longer than the internodes, with a subcanescent aspect; petioles, when present, very short and winged; leaf-blades chartaceous, cuneate-obovate or obovate to elliptic or suborbicular, 0.7--3 cm. long, 0.6--1.5 cm. wide, usually acute or subacute at the apex, obtuse or rounded on smaller leaves, coarsely dentate or crenate-serrate from the widest part to the apex with acute or obtuse rather regular teeth, not lobed, cuneate or subacuminate and entire toward the base, narrowed into a very short winged petiole or subsessile, subrevolute along the margins, lineate-rugose, pustulate-bullate and strigose-hirtous above with white appressed antrorse hairs, canescent-tomentose beneath, strigose to rather densely spreading-hirsutulous or subsericeous-hirsutulous on the venation beneath, the midrib, secondaries, and veinlet reticulation deeply impressed above and very uniformly prominent beneath; spikes terminal, solitary, often 10 or more per plant, 5--7.5 cm. long, finally elongate and to 30 cm. long; bractlets subulate-lanceolate, half as long as the calyx, ciliate-margined; flowers patulous, subopposite, paired but at least the lower ones alternately separated; calyx tubular, about 10 mm. long, venose, canescent-hirtous and sub-

glandulose, often colored, the veins broad and prominent, the teeth somewhat unequal, narrowly subulate, connivent but scarcely twisted after anthesis, the indument unequally dense, soft to the touch, almost shiny in aspect, with glanduliferous hairs interspersed; corolla violet or bluish-violet to magenta or rose-purple, pubescent or glabrous on the outer surface, villous within, barbate in the throat, its tube slightly and gradually amplify upwards, three times as long as the calyx, the limb broad, 5-fid, the lobes rounded, undulate, emarginate at the apex; stamens and style equaling or slightly surpassing the calyx; fruit as in V. platensis Spreng.

The species was based on a Sellow collection from Brazil, deposited in the herbarium of the Botanisches Museum in Berlin, where it was photographed by Macbride under his photograph no. 17429, but is now destroyed. Schauer (1851) says "in campis Brasiliae meridionalis; in campo d'Utra aliisque in locis legit. Sellow". The type of V. humifusa var. reticulata was collected by Per Karl Hjalmar Dusén (no. 15714) in a campo between Lago and Desiro Ribas, at an altitude of 800 meters, Paraná, Brazil, on October 22, 1914, and is deposited in the herbarium of the Naturhistoriska Riksmuseet at Stockholm. Briquet (1894) places the species in Section Verbenaca, Subsection Nobiles. The names V. chamaedrifolia var. melindroides Schau. and (Cham.) Schau. are synonyms of V. peruviana (L.) Britton.

Verbena marrubioides has been collected in campos, rocky sunny dry campos, and dry grassy campos, in fields, in pedregal, and in dry riverbeds, at altitudes of 50 to 800 meters, flowering from August to November and in January. Herbarium specimens have been misidentified and distributed under the names V. erinoides L., V. hirta Spreng., V. humifusa Cham., and V. melindroides Cham. On the other hand, the Herter 1000 [Herb. Herter 82763] distributed as V. marrubioides, is actually xV. osteni Moldenke. The records of V. marrubioides from Catamarca and Jujuy, Argentina, given by me in previous publications are based on misidentifications of specimens which prove to be V. incisa Hook. and V. peruviana (L.) Britton.

Schauer (1851) comments "Variat praeter magnitudinem foliorum etiam crenis serraturisve latioribus magisque rotundatis et angustioribus subacutis, dein indumento modo magis patente hirtoque, modo magis appresso molli subsericeo. Differt a V. scordioides, cui proxima: foliis basi triangulari cuneata integerrima sessilibus antice tantum serratis, spicis demum subdissitifloris patentibus, calyce dentibus tenuioribus longioribusque, corolla tube longe breviori."

The species differs from V. humifusa in having its leaf-blades varying from elliptic to obovate or suborbicular, 0.7—3 cm. long, 0.6—1.5 cm. wide, usually acute at the apex, cuneate or subacuminate at the base, coarsely dentate from the widest part to the apex with acute or obtuse rather regular teeth, not lobed, pustu-

late-bullate above and rather abundantly hairy with white appressed antrorse hairs, rather densely spreading-hirsutulous on the venation beneath, the midrib, secondaries, and veinlet reticulation deeply impressed above and very uniformly prominent beneath.

Henz collected the species in a region of 1.5 meters rainfall and 5--40° C. temperature range. Osten says for his no. 3133: "aff. teucroides sed fl. violaceis; cf. humifusa? differt a diagnosi in DC XI 538 caulibus tetragonis nec teretiusculis, calyce glanduloso (nec subglanduloso), corolla extus glabra nec pubescente." Beetle describes our plant as a "vine creeping on ground". The original publication of this species is given as page "266" in error by Jackson (1895).

In all, 44 herbarium specimens, including the type collections of all the names involved, and 11 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Ceccatto 237 [Herb. Mus. Paran. 3333] (N); Collector undesignated s.n. [Campos Gerais, 1874] (Ja--46604), s.n. [Campos Geraes] (Ja--46605), s.n. (Ja--46597); Dusén 15714 (Ca--533216, F--photo, N, N--photo, S, Si--photo, W--1481769, Z--photo); Gurgel s.n. [Herb. Jard. Bot. Rio Jan. 37539] (N); Hatschbach 1033 (N), 2010 (N), 2582 (N); Tessmann s.n. [Herb. Mus. Paran. 2525] (N). Rio Grande do Sul: Beetle 1943 (W--2143887); Collector undesignated s.n. [1874] (Ja--46600); Henz 32539 (S); Herter s.n. [Herb. Osten 20413] (Ug); C. Jürgens 20 (B, Ja--17763), 119 (B); Moldenke & Moldenke 19675 (Es, F, Lg, Mg, Mr, N, No, Ot, S, Sm, Ss); Rambo 27293 (N, S), 37698 (N), 43689 (Go), 57297 (S); Vianna 101 [Herb. Jard. Bot. Rio Jan. 46168] (N). São Paulo: Lund s.n. [Taubaté] (Cp). State undetermined: Raben 523, in part [Brasilia] (Br); Sellow s.n. [Bras. merid.; Macbride photos 17429] (Br--isotype, F--photo of isotype, Kr--photo of isotype, N--photo of type, N--photo of type, N--photo of isotype, Si--photo of isotype, Z--photo of isotype). URUGUAY: Arechavaleta 20 (Ug); Osten 3133 (Ug); Sellow 2800 (Vt). ARGENTINA: Córdoba: Hieronymus 7558 (Br).

xVERBENA MATRITENSIS Moldenke, Phytologia 2: 240. 1947.

Synonymy: Verbena carolina L. x V. hastata L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena hastata L. x V. carolina L. ex Moldenke, Alph. List Invalid Names Suppl. 1: 24, in syn. 1947.

Bibliography: Moldenke, Phytologia 2: 240 & 348. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 23 & 24. 1947; Moldenke, Alph. List Cit. 2: 360. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 164 & 198. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Am. Midl. Nat. 59: 354. 1958; Moldenke, Résumé 223, 361, 365, & 473. 1959; Moldenke, Phytologia 8: 121 (1961), 8: 489 (1963), and 9: 219. 1963.

Apparently a natural or artificial hybrid between V. carolina L. and V. hastata L., exhibiting more or less intermediate characters; stems tetragonal, rather densely hirsutulous with whitish and stiff spreading hairs; leaves lanceolate, thin-chartaceous, 4.5--7 cm. long, 1.4--2.4 cm. wide, sharply acute at the apex, cuneate-acuminate at the base, irregularly dentate or incised-dentate along the margins from almost the base to the apex, strigose-scabrous above, strigillose-scabrellous beneath; inflorescence paniculate, or 1 or 2 spikes terminating short lateral branches; spikes narrow, elongate, to about 7 cm. long, rather densely flowered, apparently not setting seed, the short peduncles and slender rachis puberulent with appressed gray hairs; bractlets lanceolate, about 2 mm. long, acuminate at the apex, glabrate on the back, sparsely ciliolate along the margins at the widest part; calyx strigillose, slightly exceeding the subtending bractlets; corolla-tube about 4 mm. long, its limb about 2 mm. wide.

The type of this hybrid, and the only specimen of it known to me, was collected from a presumably cultivated plant growing in the Royal Botanical Garden at Madrid, Spain, and deposited in the Britton Herbarium at the New York Botanical Garden. It very closely resembles xV. engelmannii Moldenke, but differs in having rather densely hirsutulous stems, with stiff, whitish, spreading hairs, whereas xV. engelmannii has its stems merely appressed-pilosulous or puberulent. Only the type specimen and 3 mounted photographs have been examined by me.

Citations: CULTIVATED: Spain: Herb. Hort. Reg. Matrit. s.n. (F--photo of type, N--type, N--photo of type, Z--photo of type).

VERBENA MEGAPOTAMICA Spreng., Syst. Veg., Cur. Post, 4 (2): 230--231. 1827.

Synonymy: Verbena phlogiflora var. α Cham., Linnaea 7: 266. 1832. Verbena phlogiflora α glabra Walp., Repert. Bot. Syst. 4: 26. 1845. Verbena phlogiflora β mucilenta Schau. in A. DC., Prodr. 11: 538. 1847. Verbena phlogiflora var. macilenta Schau. apud Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 288, in syn. 1904. Verbena phlogiflora var. mucilenta Schau. ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena megapotamica Spreng. ex Moldenke, Alph. List Invalid Names 58, in syn. 1942. Glandularia megapotamica (Spreng.) Cabrera & Dawson, Rev. Mus. La Plata, ser. 2, Bot. 5: 357. 1944. Glandularia megapotamica (Spreng.) Cabrera & Dawson, Rev. Mus. La Plata, ser. 2, Bot. 5: 381. 1944. Verbena megopotamica Spreng. ex Moldenke, Alph. List Cit. 3: 920, sphalm. 1949.

Bibliography: Spreng., Syst. Veg., Cur. Post, 4 (2): 230--231. 1827; Cham., Linnaea 7: 266. 1832; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 605. 1843; Walp., Repert. Bot. Syst. 4: 26 & 32. 1845; Schau. in A. DC., Prodr. 11: 538 & 555. 1847; Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 197. 1892; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Kunt-

ze, Rev. Gen. Pl. 3 (2): 256. 1898; Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 288-291 [Verb. Balans. Parag. 1-4]. 1904; Briq., Arkiv Bot. Stockh. 2 (10): 7. 1904; Briq. in Chod. & Hassler, Plant. Hassler. 10: 477. 1904; Herter, Revist. Sudam. Bot. 4: 186. 1937; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Alph. List Invalid Names 48, 49, & 58. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 41, 44, & 101. 1942; Cabrera & Dawson, Rev. Mus. La Plata, ser. 2, Bot. 5: 357 & 381. 1944; Cabrera, Bol. Soc. Argent. Bot. 1: 67. 1945; Schnack & Covas, Revist. Argent. Agron. 12: 222, 223, & 225-229, fig. 1 C, 2, & 3 E-G, pl. 12, A, B, E, & H. 1945; Moldenke, Holmbergia 4: 151. 1945; Schnack & Gonzalez, Rev. Argent. Agron. 12: 285, 286 (fig. 1 C-E & G), 287 (fig. 2 F-J), 288, & pl. 15 A & E. 1945; Moldenke, Alph. List Cit. 1: 26, 83-85, & 282. 1946; Augusto, Fl. Rio Grande do Sul 209, 210, & 232, fig. 95. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 10 & 25. 1947; Moldenke, Phytologia 2: 337. 1947; Moldenke, Castanea 13: 117. 1948; Moldenke, Alph. List Cit. 2: 368, 580, & 641 (1948), 3: 688, 798, 840, 920, 922, & 923 (1949), and 4: 1231. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 99, 100, 106, & 198. 1949; Cabrera, Lilloa 20: cuadro XVII. 1949; Moldenke, Phytologia 3: 289 (1950) and 3: 468. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 101. 1953; Moldenke, Phytologia 5: 133. 1955; Rambo, Sellowia 7: 260. 1956; Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Am. Midl. Nat. 59: 361-363 & 370. 1958; Moldenke, Résumé 110, 118, 119, 127, 223, 296, 369, 372, 420, 421, & 472. 1959; Moldenke, Résumé Suppl. 2: 12 & 13. 1960; Angely, Fl. Paran. 16: 78 (1960) and 17: 46. 1961; Moldenke, Phytologia 8: 121 (1961), 9: 178, 362, 365-367, 387, & 388. 1963.

Illustrations: Schnack & Covas, Revist. Argent. Agron. 12: 225, fig. 1 C, 226, fig. 2, 227, fig. 3 E-G, & pl. 12 A, B, E, & H. 1945; Augusto, Fl. Rio Grande do Sul fig. 95. 1946.

Rather tall, subshrubby, branching, perennial herb, 1 m. or more tall, almost smooth, the strigose pubescence very tenuous, short, and sparse, not at all or at least not conspicuously visible to the naked eye; stems herbaceous, erect, hollow, much branched, rather sharply tetragonal, inconspicuously pubescent to very shortly and obscurely retrorsely puberulent-strigillose or subglabrescent; branches similar but more slender, widely divergent; nodes plainly annulate; principal internodes 4.5-10 cm. long; leaves numerous, decussate-opposite; petioles slender, 5-15 mm. long, minutely and obscurely antrorsely strigillose to subglabrous or subglabrescent, margined; leaf-blades thin-chartaceous or submembranous, dark-green above, lighter beneath, lanceolate or oblong-lanceolate, 3-7.5 cm. long, 1-3 cm. wide, acute or subacute at the apex, cuneate or cuneately narrowed at the base into the petiole, rather irregularly serrate with broad rather rounded or slightly apiculate teeth along the margins from the widest part to the apex, rather sparsely and obscurely strigillose with brownish antrorse hairs on both surfaces or subglabrescent; inflorescence axillary and terminal at the tips of the branches, capitate, long-pedunculate, densely many-flowered, ap-

parently not elongating after anthesis, simple, ternate, or cymose-paniculate with 1 or 2 subsessile lateral ones at the base; peduncles slender, tetragonal, 2--6.5 cm. long, retrorsely strigillose; the lower pair of flowers separated from the rest; bractlets ovate-lanceolate, minute or very short, about 4 mm. long, very obscurely strigillose, acute at the apex, much shorter than or to 1/3 as long as the calyx, ciliate; calyx tubular, elongate, about 10 mm. long, glabrous or subglabrescent to very minutely and obscurely antrorsely strigillose with closely appressed brownish hairs, 5-apiculate at the apex, occasionally with rather numerous sessile blackish round glands; corolla hypocrateriform, blue or violet to lilac or rose, its tube slightly exerted, subglabrate on the outside, the limb about 10 mm. wide.

The type of this much misunderstood species was collected by Friedrich Sellow (no. 13), probably in Rio Grande do Sul, Brazil, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his photograph no. 17438 (in part), but is now destroyed. The type of Chamisso's V. phlogiflora var. α is an unnumbered Sellow collection from "Brasilia meridionali", also originally deposited in Berlin, photographed by Macbride under his photograph 17438 (in part), and now destroyed, as is also the type of Walpers' var. glabra. Schauer's var. mucilenta is merely a new name for Chamisso's unnamed variety. Schauer says of it "Hab. in Brasiliae prov. Rio Grande do Sul". Walpers (1845) placed Sprengel's V. megapotamica in his list of doubtful species, but unwittingly described the same taxon well as V. phlogiflora α glabra. Jackson (1895) reduced Sprengel's name to synonymy under V. phlogiflora Cham., while Cabrera & Dawson (1944) do just the reverse, reducing V. phlogiflora to synonymy under V. megapotamica. They describe the species as "Hierba perenne, erecta, con hojas lanceolado-ovadas, pecioladas, profundamente aserrado-crenadas, y flores azules disueltas en espigas cortas, capituliformes. Es una especie de inflorescencia llamativa que algunas veces se encuentra en cultivo. Habita en el sur del Brasil, Uruguay, Paraguay y nordeste de la República Argentina hasta el Río de la Plata. En Punta Lara es un elemento frecuente en las abras."

The species has been found in hedgerows and wet thickets, on campos, and along riverbanks, from 900 to 1650 meters altitude, flowering in October, November, and January to March. Rambo encountered it in a region of 2 meters rainfall and 0--25° C. temperature variation. Cabrera reports it from "sobre terreno mojado en un claro del bosque".

Herbarium specimens of this plant have been misidentified and distributed under the names V. megapotamica var. tweediana Kuntze, V. peruviana (L.) Britton, V. phlogiflora Cham., "V. aff. venosa Gill. & Hook.", and even Lantana sp. On the other hand, the Fiebrig 5699 distributed as V. megapotamica is actually V. kuntzeana Moldenke; Sehnm 3776 is V. lobata var. hirsuta Moldenke; Venturi

5397 is the type collection of V. moricolor Moldenke; and Cabrera & Corte 9610, Kuntze s.n. [Contendas, Dec. '92], and Vattuone & Bianchi 60 are V. phlogiflora Cham. Parodi 12250 closely resembles V. phlogiflora. Morong, Britton, & Vail (1892) cite Balansa 1024 as V. peruviana (L.) Britton, which it certainly is not!

Verbena megapotamica is in general extremely similar to V. phlogiflora. Sprengel's original description (1827) is merely "caule herbaceo erecto pubescente, foliis petiolatis oblongo-lanceolatis serratis basi cuneatis glabriusculis, capitulis terminalibus, bracteis minutis ciliatis, calyce elongato glabro." Walpers (1845) characterizes the taxon well when he describes it as "fere laevis, strigis tenuibus brevibus, oculo nudo vix conspicuis; spicis capitatis, unico florum pari inferiori remotiusculo; bracteolis nunc minimis, nunc tertiae circiter calycis longitudinis." Schauer (1847) also distinguishes it well from V. phlogiflora when he says "major, pube strigosâ tenuissimâ rarâque adpectu glabra, caulibus herbaceis fistulosis ramosissimis erectis, spicis ad apices ramorum saepe ternis longe pedunculatis simplicibus vel uno alterove pari ad basin primariae subsessilibus accedente cymoso-paniculatis." Arechavaleta 27 bears a notation "pistilos largos escotados en el extremidad".

The hybrid of V. megapotamica with V. peruviana (L.) Britton is xV. schnackii Moldenke, that with V. santiaguensis (Covas & Schnack) Moldenke is xV. vaga Moldenke, and that with V. tenuisecta Briq. is xV. transitoria Moldenke.

It should be noted here that V. megapotamica hybrida Osten is actually V. kuntzeana Moldenke; V. megapotamica f. truncatula Briq. and var. truncatula Briq. are V. incisa Hook.; V. megapotamica var. pinnatiloba Kuntze and var. tweediana f. pinnatiloba Kuntze are V. pinnatiloba (Kuntze) Moldenke; and V. megapotamica var. phlogiflora (Cham.) Kuntze, var. tweediana Kuntze, var. tweediana (Niven) Kuntze, and var. tweediana Kuntze are all V. phlogiflora Cham.

Kuntze (1898) says of V. megapotamica: "Schauer citirt zu dieser Art, von den ich Sprengel'sche und Chamisso'sche Originale verglichen konnte, noch V. cunha (err. cunea) Vell. [1825 descr. 17] aber Calyx 5-dentatus dentibus acutis passt nicht, weder nach der Beschreibung noch nach der Abbildung tab. 41, denn die Kelchzähne sind ungleich, davon zwei mindesten pfriemlich."

Briquet (1904) has a lot to say about this species, but unfortunately confuses it with V. incisa Hook. He says "Le V. megapotamica de doit pas être confondu avec diverses espèces voisines très souvent mêlées avec lui dans les herbiers. Il est caractérisé par ses tiges dressées, assez robustes, rameuses à rameaux ascendants, ses feuilles ovées-oblongues, oblongues ou oblongues-lancéolées, toutes très nettement pétiolées, à base du limbe atténuée ou même tronquée-subcordée, à marges assez fortement incisées-crênelées. Les fleurs sont groupées en épis très courts,

le plus souvent même réduits à dans capitules, a calices sessiles, rapprochés au sommet du pédoncule de façon à former un hémisphère. Le calice est longuement tubuleux, presque siphone, couvert d'un indument apprimé très dense, à glandes rares de dépassant pas ou dépassant de bien peu les poils courts (longueur moyenne 1,2--1,5 cm.): ses dents inégales sont brièvement acuminées-subulées, les postérieures longues de 0,5--0,8 mm. les antérieures atteignant 1--1,2 mm. La corolle, très grande possède un tube exsert et un limbe atteignant 1--1,8 cm. de diamètre. Les nos. 1024 et 1024b sont très typiques. Le no. 1024c appartient à une forme un peu différente (var. truncatula Briq. herb.), à limbe des feuilles plus obtus au sommet et tronqué-subcordé à la base, à nervation plus saillante, à épi un peu plus allongé, à calice légèrement plus court: la corolle possède un tube moins exsert et un limbe de plus faible diamètre. Malgré ces différences, cette forme peut rentrer dans le cycle des variations du V. megapotamica v. Tweediana. Nous avons longtemps hésité à reprendre pour cette espèce le nom de Sprengel, parce que cet auteur attribue au V. megapotamica un calice glabre, ce qui n'est le cas dans aucune des formes de notre espèce. Mais M. O. Kuntze, qui a pu comparer des originaux de Sprengel et du Chamisso, nous apprend (l.c.) qu'il s'agit d'une forme glabrescente et non pas glabre. Nous partageons d'ailleurs tout à fait l'opinion de M. Kuntze lorsqu'il exclut de la synonymie le V. cunha Vell.... attendu que cette plante doit posséder des dents calicinales simplement aigües. A notre avis, la figure grossière de Vellozo ne saurait sans imprudence être assimilée à l'une quelconque des nombreuses espèces affines de ce groupe."

Augusto (1946) cites an Isabelle collection from Rio Grande do Sul, Brazil. In all, 38 herbarium specimens and 6 mounted photographs, representing the type collections of all the names involved, have been examined by me.

Citations: BRAZIL: Paraná: Hatschbach 3365 (Z). Rio Grande do Sul: Rambo 34729 (N, S), 35729 (N); Sellow 13 [Macbride photos 17438, in part] (Kr--photo of type, N--photo of type, N--photo of type). Santa Catarina: Rambo 60153 (S); Reitz 2927 (N); Smith & Klein 7707 [Herb. Barb. Rodr. 22660] (Mm, N), 7765 (Ok), 10448 (Ok); Smith & Reitz 10448 (N, W--2251679); Smith, Reitz, & Klein 7765 (W--2251310). State undetermined: Sellow s.n. [Brasil meridionali; Macbride photos 17438, in part] (Br, Kr--photo, N--photo, N--photo). PARAGUAY: Balansa 1024 (N). URUGUAY: Arechavaleta 27 (Ug, Ug, Ug), 3128 (Ug); Collector undesignated s.n. (Ug); Mrs. O. C. James s.n. [Colonia, Jan. 1909] (Du--149772); Osten 5389 (N, Ug); Teisseire s.n. [Colonia, 1913] (Ug--4446). ARGENTINA: Buenos Aires: G. Atkinson 16063 (N); Burkart 3122 [Herb. Osten 20940] (Ug); Cabrera 1584 (N, Sp--24564), 1618 (N), 3401 (Bt--43217, N, Sp--38947), 5378 (Ca--882789, N, N); Lefebvre s.n. [Isla Santiago, 1893] (Br); Parodi 12250 (N); Pastore &

Troncoso 983 (Ug--8129).

VERBENA MENDOCINA R. A. Phil., Anal. Univ. Chil. 35: 191. 1870.

Synonymy: Glandularia mendocina (Phil.) Covas & Schnack, Rev. Argent. Agron. 11: 96. 1944.

Bibliography: R. A. Phil., Anal. Univ. Chil. 35: 191. 1870; R. A. Phil., Sert. Mendoc. Alt. 33. 1870; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; R. A. Phil., Anal. Univ. Chil. 90: 609. 1896; Durand & Jacks., Ind. Kew. Suppl. 1: 451. 1906; Reiche, Fl. Chile 5: 295 & 463. 1910; Sanzin, Anal. Soc. Cientif. Argent. 88: 129--131. 1919; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 41. 1942; Beetle, Bot. Review 9: 674. 1943; Covas & Schnack, Rev. Argent. Agron. 11: 96 & 97. 1944; Schnack & Covas, Darwiniana 7: 71, 72, 74, & 75, pl. 1B. 1945; Covas & Schnack, Darwiniana 7: 86. 1945; Moldenke, Phytologia 2: 348. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 10. 1947; Moldenke, Castanea 13: 119. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 106, 164, & 198. 1949; Moldenke, Alph. List Cit. 3: 688, 748, 770, & 813 (1949) and 4: 1162 & 1249. 1949; Moldenke, Phytologia 3: 141 (1949) and 3: 289 & 290. 1950; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 101. 1953; Moldenke, Am. Midl. Nat. 59: 356. 1958; Moldenke, Résumé 119, 127, 224, 296, & 472. 1959; Moldenke, Phytologia 8: 123 (1961) and 8: 396. 1962; Moldenke, Résumé Suppl. 5: 7 & 8. 1962; Moldenke, Phytologia 9: 394 & 400. 1963.

Illustrations: Schnack & Covas, Darwiniana 7: pl. 1B. 1945.

Annual herb, softly appressed-pilose or persistently whitish-strigose throughout; stems erect, sturdy, simple or branched, to 30 cm. long; leaves decussate-opposite, ovate-triangular in outline, about 4 cm. long and 2.4 cm. wide, variable in form, sometimes trifid or tripartite, sometimes pinnatifid or pinnatipartite with 5-parted lobules, cuneately narrowed at the base into the petiole, the lobules about 3 mm. wide; spikes pedunculate, subternate, finally greatly elongate; bractlets lanceolate, about 5 mm. long, subequaling the calyx; calyx about 6 mm. long, silky or sericeous-pubescent, not glanduliferous; corolla varying from blue or pale-blue to lilac, rose-lilac, or purple, equaling the calyx, its tube about 1 cm. long, glabrous, the limb about 5 mm. wide; anthers not appendaged; pollen 87.5 percent fertile; pistil about 7.8 mm. long; chromosome number: $2n = 10$.

The type of this puzzling species was collected by Rudolf Amandus Philippi at Mendoza, Argentina, in 1868, and is deposited in the herbarium of the Museo Nacional at Santiago, Chile; an isotype in the herbarium of the Botanisches Museum at Berlin was photographed by Macbride as his photograph no. 17430, but is now destroyed.

Covas & Schnack (1945) discuss the relation between the length of the pistil and the volume of the pollen-grains in this species. Beetle (1943), through some clerical error, places this species in the Cruciferae! It was apparently introduced into cultivation in or about 1841, although not described until

29 years later. It has been collected in fields and wet places in fields, at 250 meters altitude, flowering from October to February, April, and August. The only recorded common name is "Mendoza verbena". Herbarium specimens have been misidentified and distributed under the name V. erinoides Lam., but the H. N. Moldenke 18237 distributed as V. mendocina is actually V. tenuisecta Briq.

The species is very similar to V. tenuisecta, but differs in having its leaf-segments broader, oblong, not uniform in diameter, mostly 1 mm. or more wide, the corolla-tube 1 cm. long and its limb 5 mm. wide, the bractlets about 5 mm. long, and the whole plant usually more persistently whitish-strigose throughout. Philippi, in his original description (1870), says "Parece muy vecina a la V. incisa Schauer; que no he visto todavía; pero sus bracteas no son aovadas, i son mucho mayores; no haiglándulas en el cáliz; la corola es azul i no 'roseo purpurascens'; las hojas mucho mas partidas." If my interpretation of the species is correct, it has very little affinity with V. incisa Hook. Sanzin (1919) claims that V. mendocina is intermediate between what he calls V. erinoides and V. erinoides var. glandulifera Sanzin [= V. perakii (Covas & Schnack) Moldenke]. He says "Cerco de la ciudad de Mendoza, y precisamente del lado de la Cordillera a una altura de 1000 y 1200 metros, abunda una variedad (Herb. Sanzin nos. 139, 1700, 3099, 3129, 3130), que lleva glándulas en el cáliz y que tiene las hojas anchas, triangulares, de base cuneada y trifidas o tripartidas con los segmentos casi enteros o con unos lobulitos laterales:

"A typo differt caule, foliis, calicibusque hirsutis, pilis glanduliferis mixtis. Tubo calice subduplo longiore, appendicibus antherarum subexsertis clavatis violaceis. Laciniis foliarum lanceolatis (Osten, in litt.). Más al sur y a las mismas alturas indicadas existe otra variedad que se acerca más al tipo por sus hojas tripartido-pinatifidas con segmentos angostos, pero que se diferencia esencialmente por sus glándulas estaminales apenas salientes de la garganta del tubo corolar en vez de ser incluidas.

"La V. mendocina Phil. es intermediaria entre estas dos variedades, pues el examen de ejemplares auténticos de Philippi, del museo de Santiago, me permitió constatar que tiene hojas de dos clases, idénticas en la forma a las hojas de las dos variedades citadas. El carácter de los tallos erguidos de la V. mendocina, no es constante, pues en la variedad glandulifera huy individuos erguidos y otros semirastreros. Por todo esto me parece conveniente unir en una sola las dos especies, V. erinoides y V. mendocina."

Covas & Schnack (1944) suggest a possible hybrid between V. mendocina and V. parodii (Covas & Schnack) Moldenke: "Hemos hallado en la localidad del tipo una población formada, muy probablemente, por híbridos (y formas derivadas de éstos) entre esta especie y Glandularia mendocina..... Hemos podido estudiar un

trozo del ejemplar tipo de esta especie (ex Herb. Mus. Nac. Santiago de Chili, PHILIPPI 1868: Iter mendocinum), y evidentemente se trata de una buena especie, distinta a Glandularia laciniata.. y no sinónima como lo admite SANZIN.....Posee también cinco pares de cromosomas, observados en diacinesis.) La población híbrida presenta una amplia gama de variación que comprende formas intermedias y formas vecinas a ambos padres: en algunas de estas formas hemos podido observar flores con pequeños lóbulos petaloides en la base del limbo de la corola, carácter que nunca hemos observado anteriormente en el género Glandularia.....Además hemos observado, en individuos de la población híbrida mencionada, irregularidades en la meiosis (miembros de un par de cromosomas separados en diacinesis, lo cual indica falta de homología en parte del material cromosómica).....En la misma población híbrida hemos encontrado una forma con flores rosadas, color aparentemente debido a un derivado de cianidina." This natural hybrid is discussed hereinafter under the name xV. perturbata Moldenke.

For a key to distinguish V. mendocina from some of its close allies, see under V. laciniata in these notes.

Philippi apparently used the same specific epithet - "mendocina" - a second time (in 1896) for a different plant collected near Mendoza in October of 1870. He describes it as follows: "V. fruticosa, caule erecto, crasso (4 mm.); ramis virgatis puberulis; foliis glanduloso-puberulis, margine revolutis, laciniis indivisis vel bi-trifidis obtusiusculis; pedunculis longe nudis; spica oblonga; bracteis angustis linearibus, dimidium calycem aequantibus; calice glanduloso-puberulo; corollae glabrae tubo sesquies aequante, limbo parvo. Prope Mendozam Octobri 1870 lecta est. El ejemplar que tengo a la vista, tiene la altura de 34 centímetros, i su tallo en la base el grosor de 4 milímetros, está cubierto de una corteza blanquizca. Sus ramos tienen la longitud de 20 centímetros, i constan dolo de 5 a 6 internodios; el pedúnculo tiene 6 a 8 centímetros de largo. Las hojas miden 24 milímetros de largo, las espigas, que tal vez se alargarán mas tarde, tienen la longitud de 3 a 3 1/2 centímetros, el cáliz mide 10 milímetros, la corola 15 milímetros. -- Se parece bastante a la V. trachea, pero se distingue fácilmente por su porte, su vellosidad mui distinta; la corola mas pequeña." What this second species is -- not having seen any type material of it -- I do not as yet know.

In all, 21 herbarium specimens and 7 mounted photographs, including photographs of the type collection, have been examined by me.

Citations: URUGUAY: Berro 7478 (N). ARGENTINA: Buenos Aires: Dusén 6308 (N, S); Rodrigo V.721 (S); Ruiz Huidobro 1330 (Bm, S). Chaco: Venturi 9780 (N, S). Córdoba: Ruiz Leal 12217 (Rl). Formosa: I. Morel 530 (N, S). La Rioja: Ruiz Leal 16597 (Rl), 17162 (Rl). Mendoza: R. A. Philippi s.n. [1868; Macbride photos 17430] (Kr--photo of isotype, N--photo of isotype, N--photo of isotype);

Semper s.n. [Ruiz Leal 9539] (N). CULTIVATED: New York: Ahles s.n. [N. Y. Bot. Gard. Cult. Pl. 477/45] (N, N). Sweden: Alm s.n. [18.VIII.1947] (S); Herb. Mus. Bot. Stockholm s.n. [Holmiae, 1841] (S); E. Wall 15/742 (Ew, Ew, F--photo, N, N--photo, Sg--photo, Z--photo).

VERBENA MENTHAEFOLIA Benth., Pl. Hartw. 21. 1839.

Synonymy: Verbena setosa Mart. & Gal., Bull. Acad. Brux. 11 (2): 321. 1844. Verbena hintoni Moldenke, Phytologia 1: 439--440. 1940. Verbena setosa Mart. ex Moldenke, Prelim. Alph. List Invalid Names 48, in syn. 1940. Verbena menthifolia Benth. ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena officinalis Wats. ex Jepson, Fl. Calif. 3 (2): 380, in syn. 1943 [not V. officinalis L., 1753]. Verbena hintonii Moldenke, Alph. List Invalid Names Suppl. 1: 24, in syn. 1947. Verbena officinalis var. mediterranea Née ex Moldenke, Alph. List Invalid Names Suppl. 1: 26, in syn. 1947. Verbena magdalensis Moldenke, Résumé Suppl. 3: 40, in syn. 1962.

Bibliography: Benth., Pl. Hartw. 21. 1839; Steud., Nom. Bot., ed. 2, 2: 750. 1841; Mart. & Gal., Bull. Acad. Brux. 11 (2): 321. 1844; Walp., Repert. Bot. Syst. 4: 32 (1845) and 6: 687. 1847; Schau. in A. DC., Prodr. 11: 547 & 555. 1847; Coult., Contrib. U. S. Nat. Herb. 2: 327. 1894; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; J. K. Small, Fl. Southeast. U. S., ed. 1, 1008 (1903) and ed. 2, 1008. 1913; H. J. Lam, Verbenac. Malay. Arch. 10. 1919; Rydb., Fl. Prairies & Plains 677. 1932; J. K. Small, Man. Southeast. Fl. 1137. 1933; Perry, Ann. Mo. Bot. Gard. 20: 247, 259, 263--265, & 355. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 89. 1937; Moldenke, Prelim. Alph. List Invalid Names 48. 1940; Moldenke, Phytologia 1: 439--440 (1940) and 1: 511. 1941; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13--15, 18, 19, 44, & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 21. 1942; Moldenke, Alph. List Invalid Names 48 & 50. 1942; H. S. Gentry, Carnegie Inst. Wash. Publ. 527: 222 & 306. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Phytologia 2: 68, 88, & 115. 1945; Moldenke, Castanea 10: 40. 1945; Moldenke, Alph. List Cit. 1: 3, 14, 32, 57, 109, 143, 144, 169, 178, 220, 221, 232, 233, 246, & 261. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 24 & 26. 1947; Moldenke, Phytologia 2: 330 & 348. 1947; Hill & Salisb., Ind. Kew. Suppl. 10: 242. 1947; Moldenke, Castanea 13: 113. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44 & 64. 1948; Moldenke, Alph. List Cit. 2: 360, 465, 467, 471, 473, 474, 476, 479, 482, 483, 488, 489, 498, 542, 587, 596--598, 604, & 607 (1948), 3: 685, 697, 724, 740, 752, 775, 785, 786, 799, 800, 803, 804, 829, 830, 832, 833, 905, 933, 953, 977, & 978 (1949), and 4: 997, 1081, 1100, 1120, 1126, 1138, 1166, 1169--1172, 1180, 1191, 1199, 1200, 1207, 1208, 1211, 1224, 1225, 1227, 1231, 1236, 1239, 1241, 1243--1245, 1255,

1291, 1295, 1298, & 1303. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 14. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 24, 26, 27, 33, 108, 164, & 198. 1949; Moldenke, Phytologia 3: 73. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; Rzedowski, Anal. Esc. Nac. Cienc. Biol. 8: 105. 1954; Moldenke, Inform. Mold. Set 49 Spec. 3 (1954) and 51 Spec. 4. 1956; Moldenke, Résumé 29, 32, 33, 39, 130, 224, 366, 370, 371, 374, & 472. 1959; Moldenke, Phytologia 8: 143 & 144 (1961) and 8: 279 & 407. 1962; Moldenke, Résumé Suppl. 3: 8, 38, & 40 (1962) and 6: 4 & 11. 1963; Moldenke, Phytologia 8: 471, 487, 488, & 491 (1963) and 9: 39, 40, 78, 156, 165, & 167. 1963.

Annual or perennial herb, varying from nearly prostrate to erect and 1.5 m. tall, slender, branching, often with a spread of 60 cm., sometimes practically leafless; stems decumbent or ascending to erect, very slender, branched, acutely tetragonal, brownish, pilosulous or hispid to more or less short-hirsutulous, sparsely and minutely hispidulous; branches similar to the stems in all respects; nodes annulate; principal internodes 1.5--6 cm. long; leaves decussate-opposite, the upper ones sessile or subsessile, the lower ones tapering at the base into a margined petiole; petioles very short and obscure or obsolete; leaf-blades thin-chartaceous, uniformly green on both surfaces, narrowly lanceolate or elliptic in outline to ovate or obovate-cuneate, 2.5--6 cm. long (the upper ones 1.5--2 cm. long, 2--11 mm. wide) coarsely few-dentate along the margins, deeply cleft or subincised to incised-pinnatifid or else 3-laciniate or 3-lobed below the middle, acute at the apex, cuneate at the base, very rough, more or less short-hirsutulous or strigillose on both surfaces, especially on the venation beneath, somewhat pustulate above, the divisions or segments lanceolate, acute or subacute, entire or remotely serrate-dentate to coarsely dentate or incised; midrib and the 1 or 2 secondaries, very slender, impressed above, prominent beneath; veinlet reticulation indiscernible on both surfaces; inflorescence axillary and terminal, spicate; spikes terminal, paniced or fasciculate-paniculate, numerous, elongate, 7.5--23 cm. long, slender, many-flowered, dense or else compact only at the apex, scabrous, the flowers densely imbricate before and during anthesis, loosely scattered in fruit; rachis very slender, sparsely pilosulous; peduncles obsolete or extremely short; bractlets small, lanceolate or ovate-lanceolate, acuminate at the apex, variable in length, mostly 1.5--2 mm. long, subequaling or usually shorter than the calyx, ciliate along the margins and sparsely strigillose; flowers minute; calyx 2.5--3 mm. long, strigillose, sparsely (if at all) glandular, its teeth minute; corolla varying from purple, very faint purple, light-purple, deep blue-purple, or pale-pink to blue, pale-blue, light-blue, bright-blue, blue-lavender, lavender-blue, light lavender-blue, lavender, lilac, or whitish-lavender, about 7 mm. long or 3 times as long as the calyx, its tube only slightly longer than the calyx, the limb 4--6 mm. wide, the lobes more or less truncate; fruit remote; cocci trigonous, 2--2.5 mm. long, convex on the back, striate, raised-reticulate above, the commissural faces mur-

icate.

The type of this species was collected by Carl Theodor Hartweg (no. 175) at Leon, Guanajuato, Mexico, in 1839, and is deposited in the herbarium of the Royal Botanic Gardens at Kew. The type of V. setosa was collected by Henri Guillaume Galeotti (no. 778) in part in the forests of Moran, near Real del Monte, Hidalgo, Mexico, in 1840, and in part in the forests of Sabino, near Izmiquilpan, northern Mexico, at altitudes of 6000 to 7500 feet, probably deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels. The name, V. officinalis var. mediterranea, is apparently based on the Collector undesignated 48 [probably collected by Née] deposited in the Brussels herbarium, and V. magdalensis on Carter, Alexander, & Kellogg 2135 in the Dudley Herbarium. The type of V. hintoni was collected by George B. Hinton (no. 11991) -- in whose honor it was named -- on a grassy bank at Zitacuaro-Bosque, district of Zitacuaro, Michoacán, Mexico, on June 28, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden.

Verbena menthaefolia is a rather puzzling species, very similar to V. officinalis L., from which it may be distinguished by its leaves being densely strigillose on both surfaces and the stems and branches being sparsely and minutely hispidulous throughout. It is native to the southwestern United States and most of Mexico. Common names recorded for it are "bercul", "tel-rán", "verbena", "vervena", and "weyhooli".

Herbarium material of this species has been misidentified and distributed by various workers under the names V. affinis Mart. & Gal., V. bracteata Lag. & Rodr., V. canescens Kunth, V. carolina L., V. ehrenbergiana Schau., V. halei Small, V. littoralis H.B.K., V. littoralis var. affinis (Mart. & Gal.) Bourgeau, V. neomexicana (A. Gray) Small, V. officinale L., V. officinalis L., V. orcuttiana Perry, V. polystachya H.B.K., V. prostrata R. Br., V. recta H.B.K., V. scaberrima Cham., V. scabra Vahl, "V. spuria inedita" [Ruiz & Pavon], V. subuligera Greene, V. teucrifolia Mart. & Gal., V. trifida H.B.K., V. urticaefolia L., and V. xutha Lehm.

On the other hand, the Balls 10065, distributed as V. menthaefolia, is actually V. abramsi Moldenke; G. L. Fisher 44116 and Pringle s.n. [Valley Ortiz, Apr. 11, 1887] are V. halei Small; the Maltby 252 annotated by Perry as "Aff. V. menthaefolia Bth." is V. littoralis H.B.K.; the C. R. Orcutt 1371, similarly annotated by Perry, is V. longifolia Mart. & Gal.; Raven, Mathias, & Turner 12587 is V. neomexicana var. hirtella Perry; Edw. Palmer 1041 is V. neomexicana var. xylopoda Perry; and Edw. Palmer 356 is V. pinetorum Moldenke. Verbena setosa was reduced to synonymy under V. officinalis L. by Schauer (1847).

Verbena menthaefolia has been collected in canyons, rocky canyons, and ravines, along creeks, on hills and foothills, open pine

forests and open pine-oak woods, in beds of intermittent streams among rocks, banks of irrigation ditches, barrancas, mesas, and basaltic mesas, on fields and canyon margins, flats, dry flats, and adobe or grassy flats and banks, in wet meadows and river valley pastures, red clay soil of dense oak forests, in black clayish loam in scrubland, margins of dry pools, along waysides and arroyo margins, on dry ditch banks and steep rocky volcanic outcrops, heavy clay creek bottoms, on exposed vertical rocks, in sandy loam on grassy hillsides, in sandy or heavy alkaline soil, roadside bankings and moist depressions, in low growth and wet pinewoods, in rich moist soil in open woodlands, in marshy ground, arroyos and milpas, in thorn and mesquite forests, in grasslands with scattered pines, on playas and bottomlands, on sandy river banks and canal banks, in clay and limestone soil of mountainsides, in sand, along roadsides and ditches in cornland, moist adobe soil, the edges of fields, and in sandy arroyo margins, at altitudes of 3 to 2930 meters, flowering and fruiting from December to October.

Purer reports finding it "in open valley in partial shade of large shrubs". Gentry (1942) cites his no. 598, but this proves to be V. carolina L. He refers to V. menthaefolia as "A common, weed-like, small-flowered lowland Verbena" found in "arroyo-margins in Short-tree Forest." He also calls it an "annual, growing rather rankly in moist places, occurrence casual" and says that it grows "scattered in cienaga bottomland of grama grasslands". Carter, Alexander, & Kellogg encountered it "among mesquite in broad shallow arroyo bordered with Prosopis juliflora". Wolf describes it as a plant of the Lower Sonoran Zone. Powell & Edmondson that that it is "abundant in Sinaloa". Smith, Peterson, & Tejada found it growing in black to gray soils in oak forests giving way to scrubby secondgrowth thickets below. Steyermark avers that in Guatemala the leaves are mashed and drunk raw with water for curing chills and fevers.

Jepson (1943) records the species from Tulare County, California, and cites numerous specimens and literature references. Mueller says that it is "common in less dense oak woods of upper canyon". M. E. Jones s.n. [west of Uvalde, April 26, 1931] is a mixture with V. halei Small; the same collector's no. 28294 was gathered "between Kerrville and San Antonio", and so may have been from Kerr or Bexar Counties in Texas. Moore & Wood 4134 is a mixture with V. canescens H.B.K., while Schery 442 is a mixture with V. teucrifolia Mart. & Gal. The J. Let s.n. [San Diego, Nov. 9] was first identified as V. bracteata, then V. prostrata, while C. T. Mohr s.n. [Huatusca, 1857] was first determined as V. officinalis, then as V. recta, then V. scabra, and then V. canescens by various workers!

Jackson (1895) and Lam (1919) reduce V. menthaefolia to synonymy under V. officinalis L., as Jackson also does V. setosa, while Walpers (1845) lists it among his doubtful species. It is

discussed by Coulter (1894) and by Small (1903, 1913, 1933) under the name V. officinalis. This, however, is a case of misidentification. Cory (1937) cites V. officinalis from the Timber Belt, Coastal Prairies, Rio Grande Plains, and Blackland Prairies of Texas, while Rydberg (1932) also records it from Texas. It is probable that Cory's records, at least, are based partly on V. halei material and partly on material of V. menthaefolia. Wiggins notes for his no. 5508 that the inflorescence is not glandular.

Perry (1933) cites the following 50 additional specimens not as yet seen by me: CALIFORNIA: San Diego Co.: Abrams 3406 (E, G); Carlson s. n. [San Diego, 17 April 1918] (G); Macbride & Payson 781 (G); Edw. Palmer 308 (E); M. F. Spencer 971 (G), 1414 (G); Thurber 555 (G). MEXICO: Baja California: Bartram s. n. [Tia Juana, 1 Feb. 1920] (D); L. Schoenfeldt 2915 (G). Chihuahua: Pringle 1599 (E). Coahuila: Gregg 11 (E), 265 (E, G), 276 (E), 406 (E); Edw. Palmer 191 (E, G), 1042 (D, G). Durango: Nelson 4577 (E); Edw. Palmer 153 (E, F, G). Guanajuato: Duges s. n. [Sirena Mountain, 1894] (G); Hartweg 175 (K-type). Hidalgo: Galeotti 778, in part [Moran] (K); Rose, Painter, & Rose 8753 (G). México: Bourgeau 547 (W); Pringle 8534 (D, E, F, G); Rose, Painter, & Rose 8382 (G). Michoacán: Arsène 2798 (G); Gregg 823 (E). Morelos: Pringle 9529, in part (F). Oaxaca: Pringle 5715 (G); L. C. Smith 27 (G). Querétaro: Arsène & Agniel 10242 (E, F, G). San Luis Potosí: Edw. Palmer 141, in part (E, F, G, W); Parry & Palmer 717 (G). Vera Cruz: Seaton 7 (F, G). She notes that "In the specimens cited from California south including Sinaloa, the inflorescence is more densely strigillose than in the collections from the southern part of Mexico, the calyxes are about 1 mm. longer, with teeth strongly unequal and the subtending bracts often as long as the calyxes. Although this apparently indigenous species has been known generally as V. officinalis, it has somewhat harsher pubescence and is scarcely, if at all, glandular. The fruiting calyx tends to be connivent, concealing the apex of the schizocarp rather than open and disclosing it. Perhaps these are differences only of degree and may be merely variation of V. officinalis; nevertheless, for the present it seems preferable to retain the name V. menthaefolia for the American representative." Her Lyonnet s. n. [Lomas de Santa Fé, July 1928] is probably what is cited hereinafter as Lyonnet 334, and her Gregg 406, also from the New York herbarium, is probably what I cite below as Gregg s. n. [valley of Parras, April 11, '97]. The Edw. Palmer 356 which she cites is regarded by me as V. pinetorum Moldenke.

In all, 310 herbarium specimens, including type material of most of the names involved, and 4 mounted photographs have been examined by me.

Citations: TEXAS: Bexar Co.: M. E. Jones 28294 (Po--187971). Uvalde Co.: M. E. Jones s. n. [west of Uvalde, April 26, 1931]

(Po--187973). ARIZONA: Pinal Co.: Peebles 4224 (Gg--267622). Yuma Co.: M. E. Jones s.n. [north of Yuma, April 26, 1906] (Du--151770, Po--70890, Po--70891). CALIFORNIA: Calaveras Co.: J. T. Howell 30087 (Gg). Riverside Co.: T. S. Brandegee s.n. [Indian Wells, March 28, 1901] (Ca--104836). San Diego Co.: Abrams 3406 (Ca--407326, Dt, Du--24187, Gg--162154, N, Po--4007, Po--156399, W--613970); T. S. Brandegee s.n. [San Diego, June 1894] (Ca--104875); Carlson s.n. [San Diego, April 18, 1918] (Gg--31395); H. P. Chandler 5122 (Du--77580); D. Cleveland 1135 (Sd--6793), s.n. [March, April, May 1874] (Sd--6794), s.n. [San Diego, June 1874] (Sd--6782), s.n. [San Diego, April 21, 1881] (Sd--6795), s.n. [National Ranch, Jan. 20, 1884] (Sd--6784), s.n. [National City, Apr. 20, 1884] (Rs--14592), s.n. [Sweetwater Valley, May 9, 1884] (Rs--14311, Sd--6783); Collector undesignated s.n. (Sd--6791); G. W. Dunn s.n. [24 April 1891] (Ca--25151); Gander 141.3 (Sd--10614), 219.22 (Sd--11518), 222.6 (Sd--11620), 4972 (Sd--20435), 6084 (Sd--21880); H. M. Hall 3857 (Ca--56232); Herter s.n. [Balboa Park, May 18, 1937] (Sd--21049); F. W. Johnson 1347 (N); J. Let s.n. [San Diego, Nov. 9] (W--71924); Offord s.n. [La Jolla, 9.IV.1932] (La); C. R. Orcutt s.n. [Apr. 1889] (Ca--104834); Edw. Palmer 308 (Bc); Peirson 3379 (Po--17780); Purer 6515 (Du--254355); M. F. Spencer 971 (N, Po--47697), 1414 (Po--47191), s.n. [4.7.1915] (Ob--50820), s.n. [8/1/192-] (Ob--50819); S. G. Stokes s.n. [San Diego, June 1895] (Du--9540); Stover s.n. [Point Loma, April 28, 1937] (Sd--17067); Thurber 555 (T), s.n. [San Diego, May 1852] (N); E. Wall s.n. [San Diego, 16/5/31] (Ew); Wiggins 3257 (Du--181184, Du--366052); C. B. Wolf 2100 (Ca--527652, Du--230975, Gg--237849, Rs--1739). MEXICO: Aguascalientes: Rose & Painter 7799 (W--451414). Baja California: T. S. Brandegee s.n. [San Gregorio, Feb. 4, 1889] (Ca--169171), s.n. [Comondu Viejo, Feb. 17, 1889] (Ca--169736), s.n. [Canon Salado, June 1, 1893] (Ca--169127); W. E. Bryant s.n. [1888] (Gg--31400); Carter, Alexander, & Kellogg 2135 (Ca--916143, Du--349167, W--2022810); Gander 7356 (Sd--24864); H. S. Gentry 4448 (Du--264174, Ge); D. A. Johansen 600 (Du--206474); M. E. Jones s.n. [Tia Juana, April 13, 1925] (Po--114316); Lewis & Epling s.n. [Burn, 4/23/40] (Gg--380468); MacDougal 153 (N); Raven, Lewis, & Thompson 12180 (Ca--171726); L. Schoenfeldt 2915 (W--235268), s.n. [Mearns 2915] (N); Schoenfeldt & Mearns 2915 (Du--9557); Wiggins 5508 (Mi). Chihuahua: H. S. Gentry 1542 (Fs, Ge, I); Pringle s.n. [Apr. 11, 1887] (N). Coahuila: Gregg s.n. [valley of Parras, 11/47] (C); Edw. Palmer 191 (Ca--104854, N, W--336191), 1042 (Pa, W--56169, W--1323113). Durango: Correll & Johnston 20159 (Rf); H. S. Gentry 8576 (Mi, N, W--2022223); E. W. Nelson 4577 (W--332594); Edw.

Palmer 153 (Ca--104824, Me, N, W--304241); Patoni & Ochoterena 7138 (Me); Waterfall 12573 (Gg, Ok), 12648 (Gg, Ok); Waterfall & Wallis 13443 (Ok, W--2297159), 13677 (Mi). Federal District: Barkley & Rowell 7464 (Au--170049, Mi, N); Bourgeau 360 (Br, S, W--56182); L. I. Davis 207 (N); E. Lyonnet 334 (N); Matuda 18822 (N), 21190 (N), 26173 (Cb); Miranda & Barkley 16007 (Au, N), 16M946 (Au), 16M988 (Au, N, Si), 16M997 (Au, N, Si), 16M998 (Au, N, Si); Miranda, Barkley, & Rowell 7467 (Au--170114, Mi, N); Pringle 7141 (Me, Vt); Rutten & Rutten-Pekelharing 735 (Ut--59226a). Guanajuato: Hartweg 175 (Lu--isotype, N--isotype); Hernández Xolocotzi, Rupert, & Guevara X.2392 (N); Spivey 175 (Ca--916747); Waterfall & Wallis 13905 (Ok), 13921 (Ok). Hidalgo: F. A. Barkley 17M147 (Au--122307, Au--170082, N); L. I. Davis 208 (N), 220 (N), 230 (N); M. T. Edwards 889 (Au, Du--275502, Tu--34404); Fearing & Thompson 60 (Au); G. L. Fisher 46172 (W--1889832); Galeotti 778, in part [Moran] (Br, F--photo, N--photo, Si--photo, Z--photo); Gold & Eheberle 21766 (N); H. E. Moore 2810 (N); Moore & Wood 4134, in part (Ba), 4196 (Ba); Rose, Painter, & Rose 8753 (N, W--452241); F. Salazar s.n. [Nopala, Aug. 1, 1913] (W--1013228); Schnoberger 7983 (Mi). Jalisco: Bárcena 224 (Me); Barkley, Paxson, & Rowell 7664 (Au--167039, N). México: Barkley, Westlund, & Paxson 649 (Au--123259, N), 667 (Au); E. Lyonnet 334 (W--1034214); MacDaniels 553 (Ba); Matuda 19524 (N), 21415 (N), 21426 (N), 21872 (N), 21885 (N), 26444 (Cb), 26829 (Cb), 27176 (Cb), 28975 (Z), 29136 (Cb), 29220 (Cb), 29395 (Cb), 30913 (Ss); Moldenke & Moldenke 19852 (Es, N); Pringle 8534 (Ca--138820, Cm, Me, Me, Mi, N, Po--63878, S, Vt, W--396358); Rose, Painter, & Rose 8382 (W--451877); H. H. Rusby 181 (N); A. J. Sharp 44326 (N); Urbina s.n. [Junio de 1882] (Me); Waterfall & Wallis 44053 (Ok). Michoacán: Arsène 2798 (Br), s.n. [Rincón, 15/7/1909] (N, W--464303), s.n. [Rincón, 25/7/1909] (W--464302); Hinton 11991 (It, Mi, N, Rf); Schery 116 (Mi, W--1822728), 142, in part (Mi), 143 (Mi). Morelos: Moldenke & Moldenke 19854 (N); Pringle 9529, in part (W--462053). Nuevo León: L. I. Davis s.n. [Chipinque, March 8, 1946] (Au--171989); Heard, Webster, & Barkley 44511 (Au); C. H. Mueller 2010 (Mi); Mueller & Mueller 157 (Me); Edw. Palmer 1041 (Pa); M. Taylor 49 (N); S. S. White 1542 (Mi, Oa). Oaxaca: C. Conzatti 4207 (Me, W--1082270); E. W. Nelson 1943 (W--250225); Pringle 5715 (Me, Vt). Puebla: Kenoyer s.n. [Popocatepetl, 7-2-38] (Fs); Smith, Peterson, & Tejada 3907 (W--2397925). Querétaro: Agniel s.n. [Arsène 10242] (W--1001585); Arsène 9998 (W--1003638); Basile 99 (W--1268616). San Luis Potosí: Edw. Palmer 441, in part (Cm, Me, N, W--397685); Parry & Palmer 717 (Io, Pa); Urbina s.n. [Junio de 1892] (Me).

Sinaloa: H. S. Gentry 7027 (Ak—21738, Mi); J. Gonzalez Ortega 743 (Me), 4215 (W—1083502); Edw. Palmer 268 (W—315567); Powell & Edmondson 914 (Au—193267); J. N. Rose 1763 (W—300634); Rose, Standley, & Russell 13422 (N, W—636247), 13447 (N, W—636270).
 Sonora: T. S. Brandegees s.n. [Hermosillo, May 14, 1892] (Ca—104869); H. S. Gentry 219 (Du—263856, Fs, Mi), 1341 (Ak—19906, Ca—646322, Fs, Ge, I), 1493 (Fs, Ge, I, S, W—1689676), 7972 (N, W—1978766); D. D. Keck 4228 (Du—263793); Maltby 204 (N, W—314949); K. F. Parker 8204 (N, W—2130585); E. A. Phillips 329 (Mi); Rose, Standley, & Rose 12934 (N, W—635754); Rose, Standley, & Russell 12451 (N, W—635258), 13130 (N, W—635948); Shreve 6188 (Cm, Fs); Studhalter 1399 (W—1685700), 1487 (W—1685740), 1537 (W—1685757); S. S. White 654 (Mi), 2938 (Mi), 3790 (Mi), 4104 (Mi, N, W—2132318); Wiggins 6053 (Du—253440), 6458 (Ca—590444, Du—253342, Gg—263811, Mi, Po—253434, W—1739925). Tamaulipas: H. H. Bartlett 10021 (Mi, W—1491366); W. H. Lewis 5385 (Nb).
 Vera Cruz: Medellin 99 (Me); C. T. Mohr s.n. [Huatusca, 1857] (W—771859); H. E. Seaton 7 (W—56171). State undetermined: M. Halsted s.n. (T); Rufz & Pavon s.n. (Bm); Wolflin s.n. [1845] (M).
 GUATEMALA: Huehuetenango: Steyermark 51655 (W—1949994). SWITZERLAND: Probst s.n. [17.8.36] (Pb). CULTIVATED: Spain: Herb. Hort. Matrit. 58 (Q). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 48 (Q); C. T. Mohr 651 (W—771860).

xVERBENA MERETRIX Moldenke, *Phytologia* 5: 133. 1955.

Synonymy: *Verbena hispida* x *officinalis* Dermen, *Cytologia* 7: 170. 1936. *Verbena hispida* Rufz & Pav. x *V. officinalis* L. ex Moldenke, Résumé 366, in syn. 1959. *Verbena officinalis* L. ex *Verbena hispida* Rufz & Pav. ex Moldenke, Résumé 371, in syn. 1959.

Bibliography: Dermen, *Cytologia* 7: 170. 1936; Moldenke, *Phytologia* 3: 467 (1951) and 5: 133. 1955; Moldenke, *Biol. Abstr.* 30: 1093. 1956; Moldenke, *Am. Midl. Nat.* 59: 354—355. 1958; Moldenke, *Résumé* 224, 366, 371, & 472. 1959; Moldenke, *Phytologia* 8: 121 (1961) and 9: 296. 1963.

This is an artificially produced hybrid between *V. hispida* Rufz & Pav. and *V. officinalis* L., produced and described by Dermen from cultivated material in Massachusetts in 1936. The two parental species grow together in Cochabamba, Bolivia, and the hybrid may be expected there. They both grow also in Chile, but *V. officinalis* (a European species naturalized in Chile) is known thus far from only one province in which *V. hispida* also occurs. Both species, however, are weedy in character and spread rapidly. It is probably only a matter of time before they both grow widely in association with each other in that country. The hybrid probably has no horticultural merit other than serving as a curiosity in botanical or experimental gardens.

VERBENA MICROPHYLLA H.B.K., Nov. Gen. & Sp. Pl. 2: 272, pl. 133. 1818 [not V. microphylla R. A. Phil., 1857].

Synonymy: Verbena microphylla Mart. in Mart. & Spix, Reise Bras. 2: 792. 1823. Verbena microphylla Humb. ex Spreng. in L., Syst. Veg., ed. 16, 2: 749. 1825. Verbena microphylla Humb. & Bonpl. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena microphylla Humb. & Kunth ex Benth., Pl. Hartw. 245. 1846. Verbena microphylla Kunth apud Schau. in A. DC., Prodr. 11: 551. 1847. Lantana microphylla Mart. apud Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 29, sphalm. 1894. Glandularia microphylla (H.B.K.) Cabrera, Revist. Invest. Agric. 11: 332. 1957. Verbena laciniata f. purpurea Herter ex Moldenke, Résumé Suppl. 3: 39, in syn. 1962.

Bibliography: H.B.K., Nov. Gen. & Sp. Pl. 2: 272, pl. 133. 1818; Mart. & Spix, Reise Bras. 2: 792. 1823; Spreng. in L., Syst. Veg., ed. 16, 2: 749. 1825; Hook., Bot. Misc. 1: 170—171. 1829; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 603. 1843; Walp., Repert. Bot. Syst. 4: 24. 1845; Benth., Pl. Hartw. 245. 1846; Schau. in A. DC., Prodr. 11: 551 & 552. 1847; R. A. Phil., Linnaea 29: 21. 1857; Wedd., Chloris Andina [Castelnaud Exped. Bot.] 2: 156. 1860; Wedd., Chlor. And. 2: 156—157. 1861; Griseb., Abhand. Kaiser. Gesell. Wissen. Götting. 24: [Symb. Fl. Argent.] 276. 1879; F. Phil., Cat. Pl. Vasc. Chil. 221. 1881; Lillo, Fl. Tucumán 94. 1888; H. H. Rusby, Mem. Torrey Bot. Club 4: 244. 1895; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 29 (1894) and 2: 1179. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 256. 1898; R. E. Fries, Nov. Act. Soc. Sci. Upsal., ser. 4, 1 (1): 110. 1905; Hayek in Engl., Bot. Jahrb. 42: 164. 1908; Herzog, Bolivia 3: 43. 1916; Sanzin, Anal. Soc. Cient. Argent. 88: 98, 129, & 134. 1919; Stapf, Ind. Lond. 6: 430. 1931; R. Espinosa, Ökol. Stud. Kordillerenpfl. 37 & 38. 1932; Moldenke, Prelim. Alph. List Invalid Names 47. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 34, 35, 40, 44, & 101. 1942; Moldenke, Alph. List Invalid Names 48. 1942; Raimondi, Bol. Mus. Hist. Nat. Jav. Prado 7: 242. 1943; Moldenke, Holmbergia 4: 152. 1945; Moldenke, Bot. Gaz. 106: 162. 1945; Schnack & Covas, Darwiniana 7: 71, 72, & 74, pl. III. 1945; Moldenke, Alph. List Cit. 1: 10, 77, & 266. 1946; Moldenke, Phytologia 2: 335. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 25. 1947; Moldenke, Castanea 13: 116. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 375, 378, 379, 536, & 599 (1948), 3: 660, 663, 705, 735, 804, 807, 812, 893, 901, 909, 931, 951, 952, 956, 968, & 974 (1949), and 4: 1073, 1127, 1203, 1248, & 1293. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 70, 73, 98, 106, & 198. 1949; Moldenke, Phytologia 3: 286, 289, & 290 (1950) and 5: 96. 1954; Moldenke, Mem. N. Y. Bot. Gard. 9: 177. 1955; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Soukup, Biota 1: 181. 1956; Cabrera, Revist. Invest. Agric. 11: 332. 1957; Moldenke, Résumé 81, 85, 115, 119, 122, 127, 296, 306, 364, 370, & 472. 1959; Moldenke, Phytologia 8: 123. 1961; Moldenke, Résumé Suppl. 3: 13—15, 39, & 40 (1962), 4: 17 (1962),

and 6: 6. 1963; Moldenke, *Phytologia* 8: 472 (1963) and 9: 70, 128, & 397. 1963.

Illustrations: H.B.K., *Nov. Gen. & Sp. Pl.* 2: pl. 133. 1818; Sanzin, *Anal. Soc. Cient. Argent.* 88: 129. 1919; Schnack & Covas, *Darwiniana* 7: pl. III. 1945.

Dwarf prostrate perennial herb, often suffruticose at the base; stems prostrate, spreading, trailing or creeping, rooting at the nodes, forming low mats, 5--10 cm. tall, sometimes to 6.4 m. in diameter, much branched, strigose-hispidulous, with vigorous shoots sometimes 1 m. long; branches prostrate; branchlets pubescent-hirtous; leaves decussate-opposite, small, pale-green, 6--10 mm. long, to 8 mm. wide, deeply cut or tripartite, cuneate into a subpetiolar base, hairy, the segments obovate-oblong, obtuse at the apex, revolute along the margins, entire or the middle one trifid and the lateral ones bifid; spikes terminal and lateral, short, subsessile, capitate, many-flowered; bractlets lanceolate, half as long as the calyx; flowers very fragrant, with a delicate perfume; calyx about 6 mm. long, very hairy, the 5 teeth short, ovate, acute at the apex; corolla varying from blue, purple-blue, pale-blue, clear-blue, "blue and lavender", or "whitish-blue" to pale bluish-lilac, lavender, pale-lavender, lilac, pale-lilac, "lilac-white", violet, red-violet, violet-purple, purple, Parma violet-mauve, or very pale-mauve, or even pale carmine-pink or rose-pink, occasionally white or turning white in drying, sometimes described as "white to purple", glabrous, its tube scarcely twice as long as the calyx, the limb medium-large, about 6 mm. wide, pilose in the throat, the lobes emarginate; anther-appendages horn-shaped, equaling the mouth of the corolla-tube, becoming blackish; fruit half as long as the calyx; cocci lightly tuberculate on the back.

The type of this interesting high Andean species was collected by Friedrich Heinrich Alexander von Humboldt and Aimé Jacques Alexandre Bonpland "in frigidis Andium Quitensium alt. 1482 hex.", Ecuador, and was deposited in the Kunth Herbarium at Berlin. The original publication date is often given as "1817", but according to the late Dr. John H. Barnhart is actually 1818. The type of V. laciniata f. purpurea was collected by Wilhelm Gustav Herter (no. 1530) in Uruguay.

It is not at all certain to me that the Uruguayan specimens cited below are actually conspecific with the remainder of the material cited here. One would hardly expect such a high Andean species as this to be found also in Uruguay. More study of the material is required to settle this point. It should also be noted that the V. microphylla or R. A. Philippi is Junellia minutifolia (R. A. Phil.) Moldenke. Whether the V. microphylla of Martius is correctly placed here or not is also doubtful. The V. glandularia Jørgensen recorded by me in my 1959 publication as a synonym of V. microphylla is actually a synonym of V. laciniata (L.) Briq. It is possible that V. nivea Moldenke and its f. rosea Moldenke are not specifically distinct from V. microphylla.

Walpers (1845) places V. microphylla in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Micranthae, and Secondary Subgroup Schizophyllae with 9 other species. It has been found by collectors in gravel, rocky clay soil, rocky sandy soil, and dry soil in general, in stony habitats, on sandy hills, high or dry hillsides and pampas, in fields and dry open sandy campos, on puna and dry sandy open plains, in dry meadows and volcanic soil, in dry or sandy places, dry disturbed roadsides in large open grassy páramos, and in moist sheltered spots, at altitudes of 2135 to 4660 meters, blooming from October to August, fruiting in February, April, May, and October. The only common name recorded for it is "altamera".

Budin 6511 and 7492 are described as having white corollas and may be worthy of nomenclatural designation, but Mrs. R. S. Shepard says of her no. 12 collection "flowers white to purple" and Cárdenas affirms that the flowers are lilac, but "turning white in drying" -- his plant has almost the exact habit and appearance of V. nivea Moldenke. Fosberg & Giler found V. microphylla "on dry overgrazed gentle slope at foot of hill", Vargas "in clay and rocky places", and Brook "in bleak and almost desert area partly due to saline and mineral deposits, among cacti and a few small plants". West calls it a "perennial herb, prostrate rosettes to 30 cm. in diameter, on level open puna among short grasses", while Sandeman says that it "forms small mats in full exposure; flowers usually Parma violet mauve, a pale carmine pink form not infrequent; very frequent in a restricted locality." Schulz 6663 bears a notation on its label affirming that the flowers were purple-blue, but that some specimens have white flowers. Steyermark found the species with "stems hanging down clay banks"; Haught found it "abundant on roadside" and Parodi says it is common in cultivated ground at Lake Titicaca.

Herbarium material of this species has been misidentified and distributed under the names V. ciliata Benth., V. diffusa Willd., V. dissecta Willd., V. erinoides Lam., and V. multifida Ruiz & Pav. On the other hand, the Venturi 3180, distributed as V. microphylla, is actually V. dissecta Willd.; Jørgensen 1026 is V. glandulifera Moldenke; Asplund 6862, Hartweg 1351, A. S. Hitchcock 21739, I. Holmgren 967, Kuntze s.n. [Oruro, 11/3/92], Mille 40, Rimbach 175, Rose & Rose 22312, Spruce 5065, and Steyermark 54853 are V. laciniata (L.) Briq.; Jørgensen 1026, in part, is V. tenera Spreng.; McAtee 3349 is V. tenuisecta Briq.; Buchtien 1102 is V. weberbaueri Hayek; and Firmin 366, A. S. Hitchcock 21737, Pachano 144 & 156, Rimbach 176, and Rose & Rose 22400 & 23906 are Hierobotana inflata (H.B.K.) Briq. The Jørgensen 1737 cited by me in my Alph. List Cit. 2: 599 (1948) as V. microphylla is actually V. tenera Spreng.

Schauer (1847) says that V. radicans Gill. & Hook. is similar to V. microphylla in habit, but differs in its larger leaves

which are completely glabrous and more divided, becoming yellowish in drying.

The Linden 150 collection cited below bears a label reading "Mexico", but this is probably an error for Colombia. Haught 3242 has printed labels reading "Los Rios", but was actually collected "due west of Latacunga", which would place it in the province of Leon, as is indicated on the United States National Herbarium specimen which has "Los Rios" crossed out and "Leon" substituted in longhand. This collection was the basis of my record of the species from Los Rios in my Résumé (1959). Raimondi (1943) cites his no. 10516 from Santiago de Huanta, Peru, while Cabrera (1957) cites Keidel s.n., Krapovickas 3148, and Cabrera 7772, 8666, 8981, and 9174.

In all, 112 herbarium specimens have been examined by me.

Citations: COLOMBIA?: Department undetermined: Linden 150 (Br). ECUADOR: Azuay: Fosberg & Giler 23211 (N, W-2109897); Wiggins 19851 (Du-311615, Ug). Chimborazo: Hartweg 1351 (Br); Schimpff 720 (N). Cotopaxi: Barclay & Juajibioy 8020 (N). Leon: Haught 3242 (N, W-1708006); Hartweg 176 (Br). Tunguragua: W. H. Camp E.2425 (N, W-2056984). Province undetermined: Spruce 5065 (N, S, S). PERU: Ancash: Sandeman 4599 (K). Ayacucho: R. Ferreyra 5507 (N). Cuzco: Cook & Gilbert 549 (W-603752); F. L. Herrera s.n. [Cuzco, July 1923] (W-1190005); Hicken 56 (S); C. Vargas 9827 (Ca-649009). Lima: R. Ferreyra 3531 (N, Ug); Núñez 2717 (W-2120734). Puno: P. Aguilar s.n. (Ss); Ellenberg 261 (Ut-115392b); R. Ferreyra 2605 (N); Ochoa 2029 (W-2123542); F. W. Pennell 13359 (N, S, W-1340553); Sandeman 3927 (K); Sharpe 92 (K), 139 (K); Mrs. R. S. Shepard 12 (N, W-1197777); Soukup 70 (Ca-770036, N, W-1775348), s.n. [Nov. 24, 1938] (Ew); R. S. Williams 2510 (N). Province undetermined: Steir s.n. [Matucana] (Mi); C. Watkins s.n. [Tuapata, 1916] (W-1059580); Whiteley s.n. [Rio Casnipueta, 1869] (Bm). BOLIVIA: La Paz: Asplund 50 (S), 2268 (S, Us), 2145 (S, Us), 2415 (S, Us), 2800 (S, Us); M. Bang 161 (C, Pa, W-71984, W-1116740), 161a (C, Pa, W-1323109); Buchtien 433 (N), 758 (W-1134884), s.n. [La Paz, 1912] (La); Mandon 525 (Mi, N, S, T); Parodi 10098 [Herb. Osten 22533] (Ug). Oruro: Asplund 3222 (S, Us); W. M. A. Brooke 5233 (N); Kuntze s.n. [Oruro] (N); Troll 2919 (B). Potosi: Asplund 3001 (S, Us); Cárdenas 345 (W-1573325); Fiebrig 2613 [Herb. Osten 15218] (Ug, W-1177998); J. West 6353 (Ca-564990). Province undetermined: Balls 5934 [Villason, S. Bolivia] (K); R. S. Williams 2510 [Juliacá] (W-1134879). URUGUAY: Herter 1530 [Herb. Herter 87430] (Ca-505236); Osten 3522 (Ug). CHILE: Malleco: Ojiva 18 (Ca-664831). ARGENTINA: Buenos Aires: Carette s.n. [Monte Hermoso, Año 1916] (N). Catamarca: Peirano s.n. [Herb. Inst. Miguel Lillo

32844] (N), s.n. [Herb. Inst. Miguel Lillo 32933] (N). Jujuy: Budin 7492 [Herb. Inst. Miguel Lillo 32798] (N, Ug--4937); Claren 11309 (S), 11324 (S), 11468 (S); R. E. Fries 970 (S); T. Meyer s. n. [Quebrada de Salitro, Feb. 23, 1940; Herb. Inst. Miguel Lillo 34401] (N), s.n. [Herb. Inst. Miguel Lillo 34402] (Mv). Los Andes: Budin 6511 [Herb. Inst. Miguel Lillo 32797; Herb. Osten 23006] (Ca--165679, N, Ug, Ug--4936). Mendoza: Sanzin 132 [Herb. Osten 12818] (Ug). Tucumán: Bruch s.n. [Valle de Taffi, 1908] (N); Lillo 4231 [Herb. Osten 8472] (Ug), 5039 [Herb. Inst. Miguel Lillo 31474; Herb. Osten 8470] (N, Ug), 11152 [Herb. Osten 8473] (Ug); Schreiter 8714 [Herb. Inst. Miguel Lillo 32902; Herb. Osten 22994] (N, Ug), s.n. [Cumbre Alta del Chorro, Dec. 1917; Herb. Osten 12195] (Ug), s.n. [Infiernillo, Dec. 1, 1917; Herb. Osten 12197] (Ug); A. G. Schulz 6663 (Z). LOCALITY OF COLLECTION UNDESIGNATED: Herb. A. Gray s.n. (T).

VERBENA MINUTIFLORA Briq. ex Moldenke, Suppl. List Invalid Names 9, in syn. (1941), Phytologia 7: 84--85. 1959.

Bibliography: Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke, Lilloa 8: 432. 1942; Moldenke, Résumé 494 & 495. 1959; Moldenke, Résumé Suppl. 1: 7, 23, & 25. 1959; Moldenke, Phytologia 7: 84--85. 1959; Angely, Fl. Paran. 16: 79 (1960) and 17: 46. 1961.

Herb or shrub, to 3 m. tall, much branched; stems erect, stiff, very sharply tetragonal, glabrous or practically so, concave between the margins in drying; branches and twigs numerous, stiffly ascending, medium-stoutish, very sharply tetragonal, concave between the angles in drying, glabrous or practically so, brunnescent in drying, somewhat contracted at the nodes; nodes annulate; principal internodes 3--8.5 cm. long; leaves decussate-opposite, firmly chartaceous, uniformly green on both surfaces, divaricate or ascending, narrowly elliptic, 1.1--3.3 cm. long, 3--6 mm. wide, acute at the apex, somewhat narrowed to the sessile base, finely strigillose above and on the venation beneath, 3-veined; midrib and the two secondaries very slender, impressed above, slightly prominulous beneath, the secondaries subparallel to the midrib from above the base almost to the apex, not anastomosing; inflorescence terminating the branches and twigs, subpaniculate; individual spikes usually in 3's, sometimes solitary or paired, abbreviated, less than 1.5 cm. long, less than 1 cm. wide, many-flowered, pedunculate; peduncles very slender, slightly gray-strigillose, especially toward the apex, angulate, sulcate in drying; bracts paired under the branches of the inflorescence, resembling the leaves in all respects but smaller; bractlets linear-subulate or lanceolate, one pair subtending the group of 3 spikes and one subtending each flower in the spike, the latter 1.5--2 mm. long, acute at the apex, very minutely and obscurely grayish-strigillose, closely appressed to the calyx; calyx tubular, 2.5--3 mm. long, 1 mm. wide, densely and very

conspicuously white-strigose, the teeth somewhat unequal; corolla hypocrateriform, lilac or rose to violet, its tube very slender, about 4 mm. long, glabrous, its limb about 2 mm. wide, strigillose beneath, glabrous above.

The type of this interesting species was collected by Captain P. King, R. N. (no. 78) at Montevideo, Uruguay, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. The type specimen was annotated "Verbena minutiflora Briq." by Briquet before his death and was photographed by Macbride as his Type Photograph no. 24693, but a valid description of the plant does not appear to have been published before 1959. The species is related to V. montevidensis Spreng., but is easily distinguished in any series of specimens. It inhabits campos, hedges near streamlets, marshy or wet swampy campos, marshes, swamps, swampy places, and secondary woods on varzea land, at altitudes of 885 to 1550 meters, and has been collected in anthesis in October, December, January, and March, and in fruit in December and January. Herbarium material has been misidentified and distributed under the names V. isabellei Briq., V. litoralis L., and V. montevidensis Spreng. In my 1941 and 1942 publications I regarded V. minutiflora as a synonym of V. isabellei, while in my 1959 work I regarded it as a synonym of V. montevidensis. Rambo states that where V. minutiflora grows the temperature varies from 0° to 25° C., and there are two meters of rainfall per year, with rare snow.

In all, 35 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Dusén 6802 (S), 8546 (N, S, W—1481771), 9313 (S); Hatschbach 484 (N, N), 7284 (Ca); Jönsson 942a (Ca—501691, N, S, W—1481969); Mattos & Moreira s.n. [5/58; Herb. Inst. Hist. Nat. 5261] (Z). Rio Grande do Sul: Rambo 30979 (N), 34721 (N, N, S), 49374 (N, S), 51616 (W—2102102), 54985 (B). Santa Catarina: J. F. T. Müller s.n. (P); Rambo 51616 (Le, S); Reitz 3260 (N, S, Sm, W—2321355), 3403 (N, W—2141669); Reitz & Klein 7694 (Mm, S), 7864 (Mm); Smith & Reitz 9146 (Ok, W—2251198). URUGUAY: Capt. P. Smith 78 [Macbride photos 24693] (Kr—photo of type, N—photo of type).

xVERBENA MOECHINA Moldenke, Revist. Sudam. Bot. 4: 19, hyponym (1937); Moldenke in Gleason, New Britton & Br. Illustr. Fl. pr. 1, 3: 126, 131, & 132. 1952.

Synonymy: Verbena angustifolio-stricta Engelm., Am. Journ. Sci. 46: 101, hyponym. 1844. Verbena stricto-angustifolia Engelm., Am. Journ. Sci. 46: 101, hyponym. 1844. Verbena angustifolia x stricta Palmer, Ann. Mo. Bot. Gard. 3: 292, hyponym. 1916. Verbena simplex x stricta Palmer, Ann. Mo. Bot. Gard. 22: 629, hyponym. 1935. Verbena angustifolia x stricta Kellogg ex

Moldenke, *Revist. Sudam. Bot.* 4: 19, in syn. 1937. *Verbena angustifolia* x *stricta* Rydb. ex Moldenke, *Revist. Sudam. Bot.* 4: 19, in syn. 1937. *Verbena stricta* x *angustifolia* Eggert (in part) ex Moldenke, *Revist. Sudam. Bot.* 4: 19, in syn. 1937. *Verbena simplex* Lehm. x *V. stricta* Vent. ex Moldenke, *Prelim. Alph. List Invalid Names* 48, in syn. 1940. *Verbena simplex* x *stricta* Gates, *Fl. Kans.* 191, nom. nud. 1940. *Verbena stricta* x *angustifolia* Blankinship ex Moldenke, *Suppl. List Invalid Names* 10, in syn. 1941. *Verbena angustifolia* x *stricta* Bush ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. *Verbena stricta* x *has-tata* Gates (in part) ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947. *Verbena stricta* x *angustifolia* Gates ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947. *Veronica angustifolia* Michx. ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. 1958. *Verbena spicata* Pammel ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. 1958. *Verbena stricta* var. *angustifolia* Martens ex Moldenke, *Am. Midl. Nat.* 59: 355, in textu. 1958. *Verbena has-tata* x *bracteosa* Pammel ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. textu (1958), *Résumé* 365, in syn. 1959. *Verbena simplex* x *stricta* Hitchc. ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. textu (1958), *Résumé* 374, in syn. 1959. *Verbena stricta* x *angustifolia* Pammel ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. textu (1958), *Résumé* 375, in syn. 1959. *Verbena stricta* x *angustifolia* Popenoe ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. textu (1958), *Résumé* 375, in syn. 1959. *Verbena stricta* x *urticaefolia* Letterman ex Moldenke, *Am. Midl. Nat.* 59: 355, in syn. textu (1958), *Résumé* 375, in syn. 1959. *Verbena stricta* x *urticaefolia* Pammel ex Moldenke, *Am. Midl. Nat.* 59, 355, in syn. textu (1958), *Résumé* 375, in syn. 1959. *Verbena angustifolia* x *stricta* Eggert ex Moldenke, *Résumé* 357, in syn. 1959.

Bibliography: Engelm., *Am. Journ. Sci.* 46: 101. 1844; E. J. Palmer, *Ann. Mo. Bot. Gard.* 3: 292. 1916; Kanda, *Bot. Gaz.* 69: 54—71, pl. 6, fig. 2. 1920; E. J. Palmer, *Ann. Mo. Bot. Gard.* 22: 629. 1935; Moldenke, *Revist. Sudam. Bot.* 4: 19. 1937; Moldenke, *Prelim. Alph. List Invalid Names* 44 & 48. 1940; C. C. Deam, *Fl. Ind.* 797 & 1232. 1940; Moldenke, *Suppl. List Invalid Names* 10. 1941; Moldenke, *Alph. List Invalid Names* 45 & 50. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 6, 7, 9, 10, & 101. 1942; Moldenke, *Bot. Gaz.* 106: 160. 1945; Moldenke, *Cas-tanea* 10: 38 & 39. 1945; Moldenke, *Phytologia* 2: 74 & 115. 1945; Moldenke, *Alph. List Cit.* 1: 28, 45, 80, 81, 143, 148, 149, 159, 181, 193, 262, & 267. 1946; Hill & Salisb., *Ind. Kew. Suppl.* 10: 242. 1947; Moldenke, *Alph. List Invalid Names Suppl.* 1: 22 & 27. 1947; Moldenke, *Cas-tanea* 13: 112. 1948; Moldenke, *Phytologia* 2: 478. 1948; Moldenke, *Alph. List Cit.* 2: 354, 390, 391, 394, 395, 397, 405, 407, 438, 466, 481, 547, & 606 (1948), 3: 657, 720, 783, 790—793, 826, 828, 869, 887, & 973 (1949), and 4: 1137, 1255, & 1261. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*,

[ed. 2], 12--14, 16--18, & 198. 1949; Moldenke, *Phytologia* 3: 131 (1949), 3: 284 (1950), 3: 467 (1951), and 4: 67. 1952; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, pr. 1, 3: 126, 131, & 132. 1952; Moldenke, *Phytologia* 4: 185 & 186. 1933; R. F. Thorne, *Proc. Iowa Acad. Sci.* 62: 182. 1955; Moldenke, *Am. Midl. Nat.* 59: 355--356. 1958; Moldenke in Gleason, *New Britton & Br., Illustr. Fl.*, pr. 2, 3: 126, 131, & 132. 1958; Moldenke, *Résumé* 15--18, 21, 22, 26, 224, 357, 365, 374, 375, 379, & 472. 1959; Moldenke, *Résumé Suppl.* 2: 3. 1960; Moldenke, *Phytologia* 8: 121 & 146 (1961) and 8: 405. 1962; Moldenke, *Résumé Suppl.* 3: 4 & 5 (1962), 4: 14 & 18 (1962), 6: 2 (1963), and 7: 2 & 10. 1963; Gleason & Cronquist, *Man. Vasc. Pl.* 580. 1963; G. N. Jones, *Fl. Ill.*, ed. 3, [*Am. Midl. Nat. Monog.* 7:] 213. 1963; Moldenke, *Phytologia* 9: 147, 220, 356, & 359. 1963.

Illustrations: Kanda, *Bot. Gaz.* 69: pl. 6, fig. 2. 1920; Moldenke in Gleason, *New Britton & Br. Illustr. Fl.*, pr. 1, 3: 132 (1952) and pr. 2, 3: 132. 1958.

This is a natural hybrid (also produced artificially by Kanda) between V. simplex Lehm. and V. stricta Vent. It occurs abundantly where the ranges of the two parental species overlap in the central portions of the United States. It usually resembles V. simplex in habit, but has broader leaves, which are often elliptic or elliptic-ovate, more or less densely short-pubescent or velutinous nebeath, the stems and branches usually densely pubescent, and the spikes poorly and irregularly fruited. From V. stricta it differs in its more slender and poorly fruited spikes, smaller flowers, and narrower leaves.

The binomial name was proposed by me originally in 1937, based on V. angustifolio-stricta of Engelmann (1844), which, however, was published by him without description or reference to a specific collection. I am therefore designating as logotype the specimen collected by Charles Clemon Deam (no. 20357) one mile west of Palmyra, Harrison County, Indiana, on June 22, 1916, and deposited in the Britton Herbarium at the New York Botanical Garden. Deam reports that the plant was "Plentiful along roadside....very variable in width and pubescence of leaves, and I suspect some are hybrids with V. stricta Vent., varies also greatly according to quality of soil."

Engelmann's V. stricto-angustifolia was apparently based on his unnumbered collection from Saint Louis, Missouri, gathered in July, 1842, and deposited in the Torrey Herbarium at the New York Botanical Garden. V. angustifolia x stricta Eggert is based on Eggert's unnumbered collection of July 4, 1896, from Pacific, Franklin County, Missouri, deposited in the herbarium of Iowa State College at Ames. V. angustifolia x stricta Bush is based on Bush 15697, collected on barrens in Stone County, Missouri, and deposited in the herbarium of Kansas State College at Manhattan; V. angustifolia x stricta Rydb. is based on Rydberg & Imler 434, from roadsides in Montgomery County, Kansas, also deposited in the Kansas State College herbarium; V. hastata x

bracteosa Pammel is based on Pammel s.n. from Steam Boat Rock, Hardin County, Iowa, collected in September, 1912, and deposited at Iowa State College, Ames; V. stricta x angustifolia Blankinship is based on Blankinship s.n., collected in Greene County, Missouri, on July 17, 1919, and deposited at Pomona College, Claremont, California; V. stricta x angustifolia Popenoe is based on E. A. Popenoe s.n. from Topeka, Shawnee County, Kansas, collected on July 7, 1879, and deposited at Kansas State College; both V. stricta x angustifolia Pammel and V. stricta x urticaefolia Pammel are based on Pammel s.n. from Oxford Junction, Jones County, Iowa, collected on July 25, 1919, and deposited at Iowa State College.

Verbena simplex x stricta Hitchc. is based on A. S. Hitchcock s.n. from Montgomery County, Kansas, collected in August, 1896, and deposited at Kansas State College; V. stricta x urticaefolia Letterman is based on Letterman s.n. from Allenton, Saint Louis County, Missouri, collected on June 28, 1911, and deposited at Iowa State College; V. stricta var. angustifolia is based on M. Martens s.n., collected at Saint Louis, Missouri, and deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels; Veronica angustifolia Michx. is based on H. N. Andrews, Jr., s.n., collected at Herculaneum, Jefferson County, Missouri, on May 30, 1936, and deposited at the University of Massachusetts, Amherst; and V. spicata Pammel is based on L. H. Pammel s.n., collected on June 25, 1888, at Washington, Franklin County, Missouri, deposited at Iowa State College. The type of V. angustifolia x stricta Palmer is E. J. Palmer 2932 from Jasper County, Missouri, deposited at the Missouri Botanical Garden in St. Louis. V. stricta x angustifolia Eggert is actually in part this hybrid and in part xV. engelmannii Moldenke, while V. stricta x hastata Gates is in part this, in part xV. rydbergii Moldenke, and in part V. stricta Vent.

Engelmann (1844) comments as follows: "Hybrids of V. angustifolia with any but V. stricta, and of V. bracteosa with any but V. urticaefolia, or of V. aubletia, the only remaining species in this region, I have not yet found." The Bush s.n. [Oct. 9, 1936] collection, cited below, was annotated by Miss Perry as non-typical V. simplex Lehm.

Letterman s.n. [Allenton, June 1884 & June 28, 1911] have very large leaves resembling those of V. hastata L., but much firmer in texture, with the upper ones narrow like those seen in V. simplex. L. H. Pammel s.n. [Sandusky, June & July 1912] is narrow-leaved and much like true V. simplex in appearance, but the same form is found with the broad-leaved hybrid by genetic segregation. His s. n. [Oxford Junction, July 25, 1919] consists of two branches of the broad-leaved form and one dense branch of the narrow-leaved

form exactly similar to the Sandusky specimen. He apparently proposed two different hybrid designations for these parts of the same collection (see above). Somes 3301 is a mixture of xV. moechina and V. simplex.

E. J. Palmer records the hybrid from Jasper County, Missouri, but I have not as yet seen any substantiating specimens from that county.

Collectors have found xV. moechina on high ground along roadsides, open dry ground, sandy prairies, lime uplands, rocky or clay ridges, bluffs, and sand ridges, in rather sandy soil, pastures, overgrazed prairie pastures, prairie pastures with limestone rock surfacing, creek bottoms, and barrens, on sandy hills, along riversides, and in the vicinity of stockyards; also in upland sandy areas, open woods, rolling open pastured hillsides, and along roadsides in general, often closely associated with V. simplex and/or V. stricta. Fell actually says that it is "common in pastures" in Illinois. It has been collected an anthesis and fruit from May through September, at altitudes of 360 to 900 feet. Herbarium material has been misidentified and distributed under the names V. angustifolia Michx., xV. blanchardi Moldenke, V. hastata L., xV. rydbergii Moldenke, V. simplex Lehm., and V. stricta Vent. Collectors record the common names "hoary vervain" and "la sacrée verveine".

L. H. Pammel s.n. [Cedar Falls, Sept. 28, 1920], identified as V. angustifolia, bears a notation by the collector "perhaps a hybrid with stricta", while on his s.n. [Ames, 9-8-94] he says categorically "hybrid between stricta and bracteosa". C. R. Ball s.n. [June 30, 1898] was identified as V. angustifolia with the notation "hybrid possibly with stricta". The label on F. E. McDonald s.n. [Peoria, Jul. 1904] says "evidently a hybrid". Shimek s.n. [Oct. 14, 1919] from an upland sandy area in Muscatine County, Iowa, was identified as V. stricta x angustifolia, presumably by the collector, and is in part xV. moechina and in part typical V. stricta, while Ruth s.n., collected at Knoxville, Knox County, Tennessee, in July, 1897, was determined by the collector as V. angustifolia x stricta and is indeed this hybrid. Schopf comments that of this taxon there were "scattered plants, over rolling pastured hillside". Thorne (1955) cites two specimens from Johnson County, Iowa: "A presumable hybrid between this species [V. stricta] and V. simplex Lehm. was collected at Dwyer's Lake, Cedar Twp., R. P. Adams 1929, and in sandy prairie south of Iowa City, Shimek 1917". The R. Bebb 4376, distributed as V. stricta x simplex, is typical V. stricta Vent., while Demaree 30963 is apparently a mixture of this hybrid and V. stricta.

In all, 108 herbarium specimens, including the types of almost all the names involved, have been examined by me.

Citations: OHIO: Erie Co.: L. H. Pammel s.n. [Sandusky, June &

July 1912] (Io--54400). ILLINOIS: Adams Co.: Evers 1444 (Ur). Peoria Co.: F. E. McDonald s.n. [Peoria, Jul. 1904] (Ur). Pope Co.: Schopf 6 (Il--16010). Saint Clair Co.: Eggert s.n. [Ill. opposite St. Louis, Aug. 12, 1875; Herb. Geete 5710] (Go, W--1323130). Stephenson Co.: Eggert s.n. [stockyards; August 12, 1875] (I), s.n. [bluffs, 12 Aug. 1875] (I). Winnebago Co.: E. W. Fell 51307 (Il--38904), 51330 (Il--38610), 51331 (Il--38611). INDIANA: Daviess Co.: C. C. Deam 25586 (In). Harrison Co.: C. C. Deam 20357 (N--type, Pu--isotype, W--769168--isotype), 20357a (Dm). Marion Co.: C. C. Deam 6953 (Dm). Orange Co.: C. C. Deam 26226 (Dm). Washington Co.: C. C. Deam 20603 (Dm). IOWA: Black Hawk Co.: Burk 594 (Ur); L. H. Pammel s.n. [Cedar Falls, Sept. 28, 1920] (Io--98936); Pammel, Fisk, & Gilbert 272 (N). Cerro Gordo Co.: A. Hayden 1, in part (N, N, N, N, N, N, N, N, N), 3 (N, N, N, N, N, N, N, N, N). Hardin Co.: L. H. Pammel s.n. [Steam Boat Rock, 9-1912] (Io--51974). Jones Co.: L. H. Pammel s.n. [Oxford Junction, Jul. 25, 1919] (Io--97271, Io--97273). Muscatine Co.: Shimek s.n. [Oct. 14, 1919] (N). O'Brien Co.: Winge s.n. [Calumet, Maj 1911] (Cp). Story Co.: C. R. Ball s.n. [June 30, 1898] (Io--15309); L. H. Pammel s.n. [Ames, 9-8-94] (Io--15324). County undetermined: Somes 3301, in part [Blackstrap] (W--672170). KENTUCKY: Warren Co.: S. F. Price s.n. [Bowling Green] (N). TENNESSEE: Knox Co.: Ruth s.n. [Knoxville, July 1895] (Dt). KANSAS: Greenwood Co.: W. H. Horr s.n. [July 28, 1930] (Lw). Leavenworth Co.: Jahns s.n. [June 27, 1929] (Lw). Miami Co.: Oyster s.n. [Aug. 1885; Herb. Prager 18624] (Gg--31413). Montgomery Co.: A. S. Hitchcock s.n. [Montgomery Co., Aug. 1896] (Ka); Rydberg & Imler 434 (Ka--74585, Lw, N). Shawnee Co.: A. S. Hitchcock s.n. [Shawnee Co., July 1896] (Ka); E. A. Popenoe s.n. [Topeka, July 7, 1879] (Ka, W--1119628). Woodson Co.: E. W. Lathrop 369 (W--2235044), 488 (W--2235078). MISSOURI: Barry Co.: Bush 15613 (Ka--88950). Franklin Co.: Eggert s.n. [Pacific, 4 July 1896] (Au, Cm, Io--54422, Mn--6895, W--754958); L. H. Pammel s.n. [Washington, 6/25/88] (Io--22913). Greene Co.: Blankinship s.n. [July 17, 1919] (Po--63848). Jackson Co.: C. A. Ripley s.n. [July 1898] (Ob--50749). Jefferson Co.: H. N. Andrews Jr. s.n. [Herculanum, 5/30/36] (Ms). Phelps Co.: Kellogg s.n. [Jerome, June 20, 1912] (N), s.n. [Jerome, July 10, '12] (W--1325386). Pike Co.: J. Davis 3379 (Ur). Polk Co.: Steyermark 24049 (Ky). Saint Louis Co.: Letterman s.n. [Allenton, June 1884] (Io--75363), s.n. [Allenton, June 28, 1911] (Au, Io--76362, N, W--986430). Stone Co.: Bush 15697 (Ka--88956), s.n. [Oct. 9, 1936] (Md). Saint Louis: Eggert s.n. [St. Louis, 12 Aug. 1875] (Al, N); Engelmann s.n. [St. Louis, Sept. 1841] (W--71994), s.n. [St. Louis, July 1842] (Pr, T), s.n. [St. Louis] (Br); M. Martens s.n.

[St. Louis] (Br, Br). ARKANSAS: Baxter Co.: Demaree 29320 (N). Boone Co.: Demaree 3023 (We). Fulton Co.: Demaree 26322 (Au-122341, N). Izard Co.: Demaree 22745 (Bm). Lawrence Co.: Rolfs s.n. [8/91] (Io-4489). Newton Co.: Demaree 22244a (N, Z). Pope Co.: G. Merrill 571 (Au--122340). Pulaski Co.: Hasse s.n. [Little Rock, May 30] (N). Randolph Co.: Demaree 30963, in part (Au-122713). OKLAHOMA: Ottawa Co.: G. W. Stevens 2308 (Ok, Ok). CULTIVATED: Belgium: M. Martens s.n. [h. b. l.] (Br). LOCALITY OF COLLECTION UNDESIGNATED: Herb. Bothe s.n. (B, B).

VERBENA MONACENSIS Moldenke, Phytologia 2: 148--149. 1946.

Bibliography: Moldenke, Phytologia 2: 148--149. 1946; Moldenke, Alph. List Cit. 2: 413. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 164 & 198. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 224 & 472. 1959; Moldenke, Résumé Suppl. 3: 29 (1962) and 4: 10. 1962.

Herb; stems apparently prostrate, ascending toward the tips, branched, sharply tetragonal, brownish, lightly and irregularly pilose, less so in age; branches more sharply tetragonal (almost submargined) and more densely appressed-pubescent; nodes annulate; principal internodes 2--7 cm. long; leaves decussate-opposite, often bearing abbreviated and very leafy branches in their axils; petioles to 1 cm. long, usually much shorter, winged and almost indistinguishable from the rachis of the lamina, strigose on both surfaces; leaf-blades uniformly green on both surfaces, chartaceous, deeply trifid, the divisions again incised, the individual lobes mostly obtuse at the apex and elliptic or oblanceolate in outline rather than linear or oblong, strigose on both surfaces, the margins slightly revolute, the midrib and secondaries slender, obscure above, prominulous beneath; inflorescence solitary at the end of each stem and branch, at first condensed, later elongating to 4 cm. or more, densely many-flowered; peduncles slender, 1.5--6.5 cm. long, densely strigose or appressed-pubescent, conspicuously tetragonal like the branches; bractlets lanceolate, about 6 mm. long, 1 mm. wide at the base, densely short-pubescent with subappressed whitish hairs, densely white-ciliate along the margins, long-attenuate at the apex; calyx tubular, 8--9 mm. long (including the teeth), strigillose, 5-costate, its rim shortly 5-toothed, the teeth triangular and usually less than 1 mm. long; corolla large, showy, its tube projecting about 5 mm. beyond the calyx, glabrous outside, its limb about 1 cm. wide, the lobes shallowly bilobulate at the apex; anther-appendages not exerted.

The type of this curious species in a specimen from the Martius Herbarium deposited now in the herbarium of the Jardin Botanique de l'Etat at Brussels, said to have been collected from cultivated plants in the botanical garden at Munich, Germany, in 1823 [not "1843" as erroneously stated by me previously]. The Blom specimen cited below, cultivated in Sweden, was apparently grown from seed obtained from Rouen, so presumably the species is/was cultivated also in France. It has in the past been misiden-

tified and distributed under the names V. erinoides Lam. and V. tenera Spreng. In all, 3 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: CULTIVATED: Germany: Herb. Martius s.n. [h. Monac. 1823] (Br--type, N--isotype, N--photo of type, Z--photo of type). Sweden: Blom s.n. [from Rouen 1929] (Go).

VERBENA MONTEVIDENSIS Spreng. in L., Syst. Veg., ed. 16, 2: 747. 1825.

Synonymy: Verbena isabellei Briq., Ann. Conserv. & Jard. Bot. Genève. 4: 234. 1900.

Bibliography: Spreng. in L., Syst. Veg., ed. 16, 2: 747. 1825; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 600. 1843; Walp., Repert. Bot. Syst. 4: 20. 1845; Schau. in A. DC., Prodr. 11: 540. 1847; Schau. in Mart., Fl. Bras. 9: 187. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Kuntze, Rev. Gen. Pl. 3 (2): 257. 1898; Briq., Ann. Conserv. & Jard. Bot. Genève. 4: 234. 1900; K. Schum. in Just, Bot. Jahresber. 28 (1): 497. 1902; Thiselt.-Dyer, Ind. Kew. Suppl. 2: 191. 1904; Briq., Arkiv Bot. 2 (10): 12. 1904; Briq., Ann. Conserv. & Jard. Bot. Genève. 10: 101 & 102. 1907; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Lilloa 6: 333 (1941) and 8: 432. 1942; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 41, & 101. 1942; Rosengurtt, Estud. Prad. Nat. Urug. 3: 234 (1943) and 5: 394. 1946; Schnack & Covas, Bol. Soc. Argent. Bot. 1: 284. 1946; Augusto, Fl. Rio Grande do Sul 211 & 233. 1946; Troncoso & Burkart, Darwiniana 7: 214 & 215. 1946; Moldenke, Alph. List Cit. 1: 171 & 264. 1946; Schnack & Covas, Haumania 1: 5, [8], & 10, fig. 2h. 1947; Moldenke, Castanea 13: 117 & 119. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 65. 1948; Moldenke, Alph. List Cit. 2: 484, 577, 598, & 612 (1948), 3: 665, 688, 693, 703, 705, 745, 840, 845, 916, & 923 (1949), and 4: 1249, 1250, & 1257. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 99, 100, & 198. 1949; Moldenke, Phytologia 3: 136 (1949) and 3: 306. 1950; Stellfeld, Trib. Farmac. 19 (10): 166. 1951; Moldenke, Inform. Mold. Set 48 Spec. [4] (1954) and 49 Spec. 3. 1954; Rambo, Sellowia 7: 260. 1956; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Am. Midl. Nat. 59: 334. 1958; Reitz, Sellowia 11: 57 & 134. 1959; Moldenke, Résumé 110, 118, 119, 127, 367, 370, & 472. 1959; Moldenke, Résumé Suppl. 1: 23. 1959; Angely, Fl. Paran. 16: 78 & 79 (1960) and 17: 46. 1961; Moldenke, Résumé Suppl. 3: 6 (1962) and 4: 10. 1962; Moldenke, Phytologia 8: 267, 314, 317, & 382 (1962) and 9: 93. 1963; Moldenke, Résumé Suppl. 6: 7 (1963) and 7: 6. 1963; Moldenke, Phytologia 9: 367 & 380--382. 1963.

Illustrations: Schnack & Covas, Haumania 1: [8], fig. 2h. 1947.

Tall perennial herb, subshrub, or suffrutescent shrub, 0.5--3 m. tall, scoparious, very much branched; branches green, ascending, acutely tetragonal, almost leafless, smooth and glabrous, slender; principal internodes beneath the inflorescence to 17 cm.

long; leaves decussate-opposite; petioles short, 2--3 mm. long; lower leaf-blades rather small, lanceolate, green, membranous, 1 to 3 cm. long and 7 mm. wide, acute at the apex, regularly convex and entire or subentire along the margins, cuneately attenuate into the petiole at the base, glabrous on both surfaces, the venation simply pinnate, subprominent; upper leaves much reduced, the blades lanceolate-linear, 0.5--1.5 cm. long, the uppermost linear or setaceous, sessile; spikes short, 5--15 mm. long, slender-pedunculate, dense-flowered, about 4 mm. wide; bractlets lanceolate-setaceous, about 1.5 mm. long, shorter than the calyx; calyx ovoid-campanulate, 2--2.5 mm. long, 5-costate, short-pubescent with antrorse hairs on the outside, especially on the ribs, its tube 1.5--2 mm. long, the rim shortly 5-dentate, the teeth ovate at the base, short-mucronate at the apex, scarcely 0.5 mm. long; corolla varying from bluish, blue, or blue-violet to pale-violet, violet, pale-lilac [Saccardo 48X], dark-lilac, "white-lilac", purple, clear-purple, rose, or red, ["white to light-violet", according to Osten], about twice as long as the calyx or exceeding it by 2.5 mm., short-puberulent on the outside; stamens and pistil slightly exerted; cocci dark, oblong, about 1.5 mm. long; chromosome number: basic no. = 7, $2n = 21$ (and 42).

The type of this species was collected by Friedrich Sellow at Montevideo, Uruguay, and was deposited in the herbarium of the Botanisches Museum at Berlin, where it was photographed by Macbride as his photograph no. 17432, but is now destroyed. The type of V. isabellei was collected by Arsene Isabelle -- in whose honor it was named -- in Rio Grande do Sul, Brazil, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva.

The species was reduced to synonymy under V. stellarioides Cham. by Schauer (1847, 1851) and by Jackson (1895), but is certainly not at all closely related to that species, as was pointed out by Kuntze on a label on the type sheet. In my 1941 and 1942 publications V. minutiflora Briq. was regarded mistakenly as conspecific with V. isabellei (which I now regard as a synonym of V. montevidensis), but I now regard this as distinct.

Verbena montevidensis inhabits thickets, shrubby fields or campos, marshes and shrubby marshes, fields, open woods, pastures and dry sandy pastures, campos, meadows, parks, grassy plains, bogs, grassy places, dry stony meadows, cutover forest land, low wet places, and waste places in general. Collectors have found it along fencerows, roadsides, grassy roadsides, and rather wet roadsides, in woods, wet places, marshy ground, and sandy soil, at the edge of woods, along riversides and river banks, under trees at the edge of "monte" or in the interior of "monte", and in wet shrubby campos in a region of 2 meters rainfall and 0° -- 25° temperature variation. Dusén describes it as "ruderal" and Rambo reports it widespread in cultivated ground. Ewan found it in sandy soil of newly planted cane fields and in grassy pasture of bayou margin associated with Emelista tora (L.) Britton & Rose, Ditremexa occidentalis (L.) Britton & Rose, and Vernonia, in full

sun, in Louisiana.

It has been found at altitudes of 200 to 1650 meters, blooming in every month of the year, fruiting from November to March, in June, and September. Legrand states that it flowers from November to February in Uruguay. It is used medicinally in Brazil according to Reitz, and in Argentina according to Montes. Vernacular names reported for it are "anil", "camaradinha", "formosa sem dote", "jurupeba", and "quinanha". Osorio reports it as "rare in pradera" in Uruguay.

Herbarium material has been misidentified and distributed under the names V. alata Cham., V. approximata Briq., V. bonariensis L., "V. cf. caracasana H.B.K.", xV. engelmannii Moldenke, V. intermedia Gill. & Hook., V. litoralis H.B.K., V. litoralis Kunth, V. litoralis L., V. littoralis H.B.K., V. littoralis Kunth, V. littoralis var. brasiliensis Briq., and V. phlogiflora Cham.

On the other hand, the Jönsson 942a, Rambo 51616 & 54985, Reitz 3260 & 3403, and Smith & Reitz 9146, distributed as V. isabellei or V. montevidensis, are actually V. minutiflora Briq., while Smith & Klein 7787 is V. reitzii Moldenke. Malme s.n. has extra large leaves, while Malme 661 exhibits both large and small leaves on the same stem.

Schnack & Covas (1947) determined the basic chromosome number for this species as 7, $2n = 21$, from a specimen cultivated at Capital, Mendoza, originally from Lavallol, Buenos Aires. They comment "En Verbena montevidensis hemos observado 21 cromosomas somáticas en seis individuos distintos y sólo en uno $2n = 42$. Esto parece indicar que esta especie es apomítica, condición que estudiaremos oportunamente." Troncoso & Burkart (1946) say "Verbena montevidensis Sprengel es una especie hasta ahora dudosa, que Schauer.....coloca con interrogante entre los sinónimos de V. stellarioides. Gracias a las notas de O. Kuntze.....y a la fotografía del tipo (Montevideo, fotogr. 17432 de la serie del Museo de Chicago) se llega a la seguridad que no tiene nada que ver con esa especie. Parece que V. montevidensis es una buena especie, vecina de V. litoralis, pero distinta por se estatura menor, los tallos menos escabrosos, las brácteas pequeñas, etc. Es común en al Uruguay y las regiones vecinas de la Argentina." They describe the number of spikes as "infinitas" and say "V. intermedia y V. montevidensis tienen los tallos macizos."

Rambo, in a letter to me dated August 14, 1955, states that in his opinion his no. 38055 is V. litoralis, not V. montevidensis, since it grew along a roadside (typical of that species) and not in a swamp (which he thinks is typical of V. montevidensis). I believe, however, that he momentarily confused V. montevidensis with V. alata when he made this statement, since the latter species is more typical of swamps.

In all, 208 herbarium specimens and 7 mounted photographs, including phototypes of both the names involved, have been examined

by me.

Citations: LOUISIANA: Avoyelles Par.: Ewan 19083 (Tl). Evange-
line Par.: Ewan 19367 (Tl). BRAZIL: Minas Gerais: P. Clausen s.
n. [Aug.--April 1840] (Br, Br); Regnell I.326 (Ja--14845). Paraná:
Beetle 2025 (Ng--6574, W--2143908); Braga & Lange 85 (Gg, W--
2369344); Dusén 2490 (Ja--14846, N, S, W--1199436), 7827 (Ca--
501690, N, N, S, S, W--1481772), 10856 (N, S, W--1481774), 11169
(S); Imaguire 1847 (N, S); Mattos 4710 (S), s.n. [Herb. Mus. Par-
an. 4710] (N), s.n. [Herb. Mus. Paran. 4751] (N); Nogiri 4 (Gg);
Reiss 56 (N); Stellfeld s.n. [4/944; Herb. Fac. Farm. Odont.
1225] (N), s.n. [Herb. Mus. Paran. 1634] (N). Rio Grande do Sul:
Henz 35346 (N); Isabelle s.n. [Macbride photos 24690] (Kr--photo,
N--photo); Lindman A.475 (N, N, S); Malme 166 (N, S), 661 (N, S),
s.n. [Cruz Alta, 20/1/1902] (S); Moldenke & Moldenke 19681 (Es,
Lg, N, Sm); Rambo 9374 (Rb), 38055 (N), 45339 (Au, Go), 46069
(Au, W--2026996), 49723 (Go), 51449 (S, W--2102035), 52083 (S),
55075 (B); Saldanha 6327 (Ja--46579); Schwacke s.n. [Conceição
do Uruguai, IV. 1880] (Ja--46581); Schwarzer s.n. [Colonia Sito
Angelo, Oct. 1900] (S); Sehnen 3519 (B); J. Vidal s.n. [Boca do
Monte, March 1939] (Ja--34943). Santa Catarina: Dusén 17852 (S),
17880 (S); Klein 2133 [Herb. Barb. Rodr. 14209] (N, Sm, W--
2321339); F. Müller s.n. [1876] (Ja--31564), s.n. (Ja--46535);
Reitz 51358 (S), C.76 (Ja--51358, N, N), H.939 (S); Reitz & Klein
1120 [Herb. Barb. Rodr. 8374] (Cb, N, W--2220170), 2772 (Sm),
3758 (Sm), 3872 [Herb. Reitz 14211] (N, N, Sm), 5528 (W--2252083),
6840 (Mm), 7154 (Mm); Smith & Klein 7504 (Ok, W--2251285), 11797
(Ok, W--2251815); Smith & Reitz 8988 (Ok, W--2251478), 9730 (N,
Ok, W--2251595), 10175 (W--2249467), 10303 (W--2249370); Smith,
Reitz, & Sufridini 9463 (Ok, W--2251554), 9624 (Ok, W--2251575).
PARAGUAY: Grosse & Lindman 3651 (Ja--28230); Hassler 6685 (Cb,
N, N--photo, Z--photo), 7064 (N); T. Rojas 448 [Herb. Osten 7904]
(Ug); A. G. Schulz 7682 (Cb). URUGUAY: J. Anderson 78 (Bm); And-
erson & al. 78 [Herb. Reichenbach f. 131125] (V); Arechavaleta
39 (N, Ug--1133, Ug), 3139 (Ug); H. H. Bartlett 20689 (Mi, W--
2320141), 20751 (Mi), 21301 (Au--194909, Mi, W--2320284); Berro
5017 (N), 8148 (N), 8232 (N); Castellanos s.n. [Herb. Inst. Mig-
uel Lillo 15046] (N), s.n. [Herb. Inst. Miguel Lillo 15760] (N);
Collector undesignated s.n. [Montevideo, Dec. 1885] (Ug), s.n.
(Ug, Ug); Gibert 445 (Ug); Herter 269 [Herb. Herter 81713] (N, N,
W--1341849), s.n. [Sierra Aceguá; Herb. Osten 18499b] (Ug); Kun-
tze s.n. [Montevideo, 7/XII/91] (N); Legrand 254 (Ug), 1992 (Ug),
2009 (Ug), 3809 (Ug), 4019 (Ug), 4488 (Ug); Osorio 265 (Ug--
13321), 403 (Ug--13332), 662 (N, Ug--13234, Ug), 1009 (N, Ug, Ug--
13212), s.n. [Valle Eden, Feb. 18, 1947] (Ug--13487).

A NEGLECTED MEXICAN SPECIES OF ARUNDINARIA

F. A. McClure

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The studies on which this paper is based were supported by grant G-23142 from the National Science Foundation.

Numerous species of bamboo indigenous to areas of the Western Hemisphere outside of North America have been placed at one time or another in the genus Arundinaria. Without apparent exception, these pertain to other genera. However, a misplaced Mexican species, represented by a single known collection, Liebmann no. 132, apparently does belong here.

This collection consists of sterile leafy branch complements, each attached to a short section of the adjacent culm internode. A specimen from this collection, preserved at the U.S. National Herbarium, shows characters sufficiently critical in nature to warrant the allocation of this species in the genus Arundinaria.

ARUNDINARIA FLABELLATA (Fourn.) McClure, comb. nov.

Guadua flabellata Fournier, Mexicanas plantas 2: 131. 1881. "Otate Mexicanorum. . . In monte Orizabensi, inter praerupta, 9000'." Type: Liebmann no. 132 (HAN). Fournier (l.c.) inadvertently cited this specimen as "Liebmann 131." Liebmann 131 (L) is actually the type of Guadua aculeata Ruprecht, as verified by Hitchcock, who also examined Fournier's type of Guadua flabellata at Hannover. Hitchcock's notes (US) document the statement here published for the first time.

Fournier's brief diagnosis follows: "Ramis flabellatim divergentibus, foliis linearibus longis angustis cum vaginis glabris." The specimen examined by me (US 205711; Liebmann 132, ex C) shows additional features that are more distinctly diagnostic than those recorded by Fournier. The following statements supplement the original description:

Culm sheaths not deciduous (eroded away by weathering -- only a basal fragment remaining on the specimen). Culm internodes cylindrical, not strongly sulcate but marked by a distinct transverse ridge at the level of (but external to) the locus of insertion

of a branch complement; glabrous and lustrous; fistulous, the lumen filled (at least in part) with firm pith. Mid-culm branch complements pleioclade, the component axes unequal, the primary branch dominant. Leaf sheaths finely elevate-veined, minutely verrucose between the veins, otherwise glabrous dorsally, ciliate on one margin near the apex; the inner ligule well exerted, fragile, apically concave, asymmetrical, in some sheaths densely clothed dorsally with fugaceous antrorse hairs; the outer ligule linear, entire or erose on the margin; auricles and oral setae lacking. Leaf blades linear-lanceolate, attenuate-acuminate-caudate, gradually narrowed basally and decurrent on the slender, somewhat elongate, abaxially puberulent petiole; antrorsely scabrous near the outer edge, but elsewhere glabrous on the adaxial surface, villous throughout on the abaxial surface; the midrib strongly salient and glabrous on the abaxial surface, and flanked on each side by 4-3 secondary veins, these separated by 7-5 tertiary ones; the transverse venation plainly visible on both surfaces of young leaves, less clearly so (especially on the adaxial surface) in older ones.

The classic station for the collection of this bamboo is given as "among precipices at 9000 ft. on Mount Orizaba." This mountain is more popularly known today, and is shown on maps, as Citlaltepētł. The recorded altitude of its highest peak is 18,696 feet (Hammond's Ambassador World Atlas, 1956, p. 95). Anyone who has the opportunity to botanize on its slopes will render a useful service to Agrostology if he can find and collect ample specimens of this inadequately known bamboo. -- I shall be glad to supply directions for the selection of material of critical interest.

Flowering and fruiting material is essential to the completion of a description of the plant. Fuller representation of the vegetative structures is also needed, and sterile plants in good condition should not be by-passed. Most generally neglected are the rhizome (of importance for the confirmation of generic affinities) and the young culm shoot with persistent sheaths in good condition still attached. These latter are useful for the recognition of specific entities.

BOOK REVIEWS

Alma L. Moldenke

"Families of Flowering Plants of Southern Africa", by Herbert P. Riley, 269 pp., 144 colored illus., University of Kentucky Press, Lexington, Kentucky. 1963. \$14.00

This book covers quite accurately and very attractively a wonderfully and increasingly interesting part of our world — Africa south of Tanganyika and the Republic of the Congo. The author's two decades of floral studies in this area, his access to the floristic works of other botanists, and his recent field experience there give ample authority to his work. His camera loaded with color film, and those of Levyns and Jokl, give beauty alluring to the educated public the world over as well as to botanists. His writing style allows for easy reading of the pertinent data that the title proscribes.

Plants endemic, indigenous, and introduced are described in their family groups. Chromosome numbers, economic importance and special native usage are recorded. The maps, other introductory material, bibliography, and thorough index are very useful. The illustrations are the greatest asset of the book.

Any work that covers so much in topic and area can seldom escape some errors. Considering just the Verbenaceae and its allied groups, the following items are noted:

Avicennia officinalis does not occur in the region; A. marina does, and the whole genus is better isolated in its own family, the Avicenniaceae.

Lantana trifolia is probably not known from Nyasaland because it is an American species; L. mearnsii is the more correct name for the African plant.

Chascanum is not "equal to" Bouchea, but rather it is a segregate from that strictly American genus.

These names are preferred: Lippia javanica for L. asperifolia and Lantana galpiniana, Kalaharia uncinata for Clerodendrum uncinatum, Vitex doniana for both V. cuneata and V. cienkowskii, Duranta repens for D. plumieri, Lantana rugosa for L. salvifolia, and Phyla nodiflora var. reptans for Lippia reptans.

Angola has 3, not 1, species of Premna; 24, not 16, of Clerodendrum; 3, not 1, of Stachytarpheta. Duranta consists of 36, not 23, species, while Holmskioldia comprises 11, not just 3 or 4, species.

"Selected Botanical Papers", edited by Irving W. Knobloch, 311 pp., Prentice-Hall, Englewood Cliffs, New Jersey. 1963. \$3.95 paperback.

What a wonderful service Dr. Knobloch achieved in making readily available these gems of botanical literature! So many can profit from this work -- thousands upon thousands of high school, college, and university students and teachers, more thousands of the general public, and thousands of botanists and other scientists who would be intrigued to see what is included or omitted and who would appreciate rereading these short selections because they know the writers and/or they are interested in the specific subject matter.

How good it is to get to know some of the great minds in this scientific discipline through important brief excerpts of their own writings! Included among the 59 are people of today (Lederberg, Beadle, Sears), of yesterday (Humboldt, Ames, Camp), and of yester year (Ingen-Housz, Theophrastus, Aristotle whose authorship of the included article is debatable). There are people of many nations (Sinnott and Merrill of the United States, Erdtman of Sweden, Wallace of England), with the majority from America. There are selections from many fields of botany (general importance and development, ecology, phytogeography and exploration, systematics and taxonomy, anatomy and morphology, physiology, radiobiology, space biology, lower plants and pathology, horticulture, forestry, conservation, paleobotany, cytology, genetics and plant breeding, evolution, the nature of scientific method). The choices result in an emphasis on 20th century highlights.

An impressive note in the preface reveals that, according to a study by Dr. Barzan made in several of our midwestern colleges, 75 percent of the students taking the first course in biology and 82 percent of those taking the first course in botany went no further in those disciplines. Perhaps making use of material like this book might lead to better education along these important lines.

"The Plant Community", by Herbert C. Hanson and Ethan D. Churchill, 218 pp., Reinhold Publishing Corp., New York 22, New York. 1961. \$5.95

The formation and nature of the plant community is the central theme of this ecological approach to the study of vegetation through discussion of the properties of the isolated species, of populations of uniform species (autecology), and of the community of various organisms (synecology). The scope of the book covers:

1. the nature of the species in relation to the physical environment and in relation to other organisms,
2. the factors involved in the success of a species,

3. the formation of communities, their characteristics and their dynamics,
4. the nature of the climax community,
5. the classification of communities.

This is an excellent and simply written text. It is also a fine book for general reading. It is copiously illustrated in an effective manner with photographs provided mainly by the Soil Conservation and Forest Services of our government. There is a very good bibliography and a fairly good index. More cross-referencing would be helpful, as in the case of "kudzu" that does not appear under "K", but only under "P" as Pueraria thunbergiana (kudzu). Larrea is listed for p. 79, but actually occurs on p. 80. The authors did well to include scientific names as well as common ones, and well to avoid the fashion of using so many newly invented ecological terms that the basic concepts are muddled in all the verbiage.

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"Flora of Illinois", by George N. Jones, 402 pp., University of Notre Dame Press, Notre Dame, Indiana, third edition, The American Midland Naturalist Monograph No. 7. 1963. \$7.50

This book review appears under my name, but I found it almost all written for me on one of my husband's memos after he checked the book for the Verbenaceae. "This book certainly should get a GOOD review. It is an example of how state floras should be written. I am delighted that synonyms are given under which the taxon may be found in other manuals. I am very happy to see synonyms given even for family names, but would have preferred seeing the standard "-aceae" termination used for all family names.

"Lippia is not a straight synonym for Phyla as implied on p. 213. Since Phyla is a segregate from the still very large genus Lippia, it would have been better to write the synonym 'Lippia (Houst.) L., in part.'

"The author claims that Verbena simplex hybridizes with V. bracteata. MacDougal made the same claim in 1907. I have examined 36,000 specimens of this genus from 269 herbaria and have yet to see such a hybrid. Especially since neither author cites any substantiating specimens, I certainly would like to see one."

I can add that there is considerable revision in this new edition, that the keys are relatively easy to follow, that there is a suitable conspectus, index and glossary, and that it would be wise to keep the second edition handy for its 1375 distributional maps, fuller synonymy, and detailed bibliography.

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"Venomous and Poisonous Animals and Noxious Plants of the Pacific Region", edited by Hugh L. Keegan and W. V. Macfarlane, 456 pp., Pergamon Press, New York 11, New York. 1963. \$21.00

This is a collection of papers from the symposium of the Public Health and Medical Science Division of the Tenth Pacific Science Congress held in Hawaii in 1962. The bulk of the papers deal with the deleterious effects of coelenterates, certain mollusks, leeches, scorpions, spiders, centipedes, those few millipedes with irritating secretions, those caterpillars with irritating hairs, certain fish and especially venomous snakes. About 40 pages are devoted to the poisonous and urticating plants of Australia and the poisonous plants of Guam.

The book is well illustrated. The paper and print are very good. There is a useful index. Individual articles carry their own bibliographies. The price seems unusually high.

"Chromosome Botany and the Origin of Cultivated Plants", by C. D. Darlington, 231 pp., revised second edition, Hafner Publishing Company, New York 3, New York. \$5.50

To the first edition of 1956 much new material has been added, the most valuable being the radiocarbon¹⁴ studies facilitating chromosome counting in today's cultivated plants and those remains found with man's earliest evidences of civilization. Since the chromosomes have shown what the origins of cultivated plants were, it becomes possible to relate plant studies with the activities of man in particular as well as with the processes of evolution in general. "Man's greatest biological experiment has been the invention of agriculture, a process of understanding and controlling and improving certain flowering plants." So claims the author in his preface.

The book deals with the nature and function of chromosomes, then with effects of chromosomes on plants in their systematic groupings, and on plants in their ecological and geographical relationships and on plants throughout time with its evolutionary changes. Almost half of the book is devoted to these problems as they effect cultivated plants and man.

In an appendix Dr. E. B. Ford points out the bearing of the chromosome studies on the field of zoology.

Forty diagrams and maps make the book excellently illustrated. There is a valuable bibliography and a good index. Both the paper and the binding are of poor quality, especially in view of the high price.

"International Code of Nomenclature of Bacteria and Viruses", by

The Editorial Board of the International Committee on Bacteriological Nomenclature, 186 pp., Iowa State University Press, Ames, Iowa, reprinting 1959. \$4.50

This is the nomenclatural bible in this field and will remain so until possible changes of minor or drastic nature are made by the nomenclature committee of the next International Congress of Microbiology. Will Traub's new concept and terminology be followed? The Rules and Recommendations seem to be clearly stated in heavy print and they are followed by explanatory annotations. An important feature is the comparison here between the botanical and the zoological codes with each other and with the microbiological one.

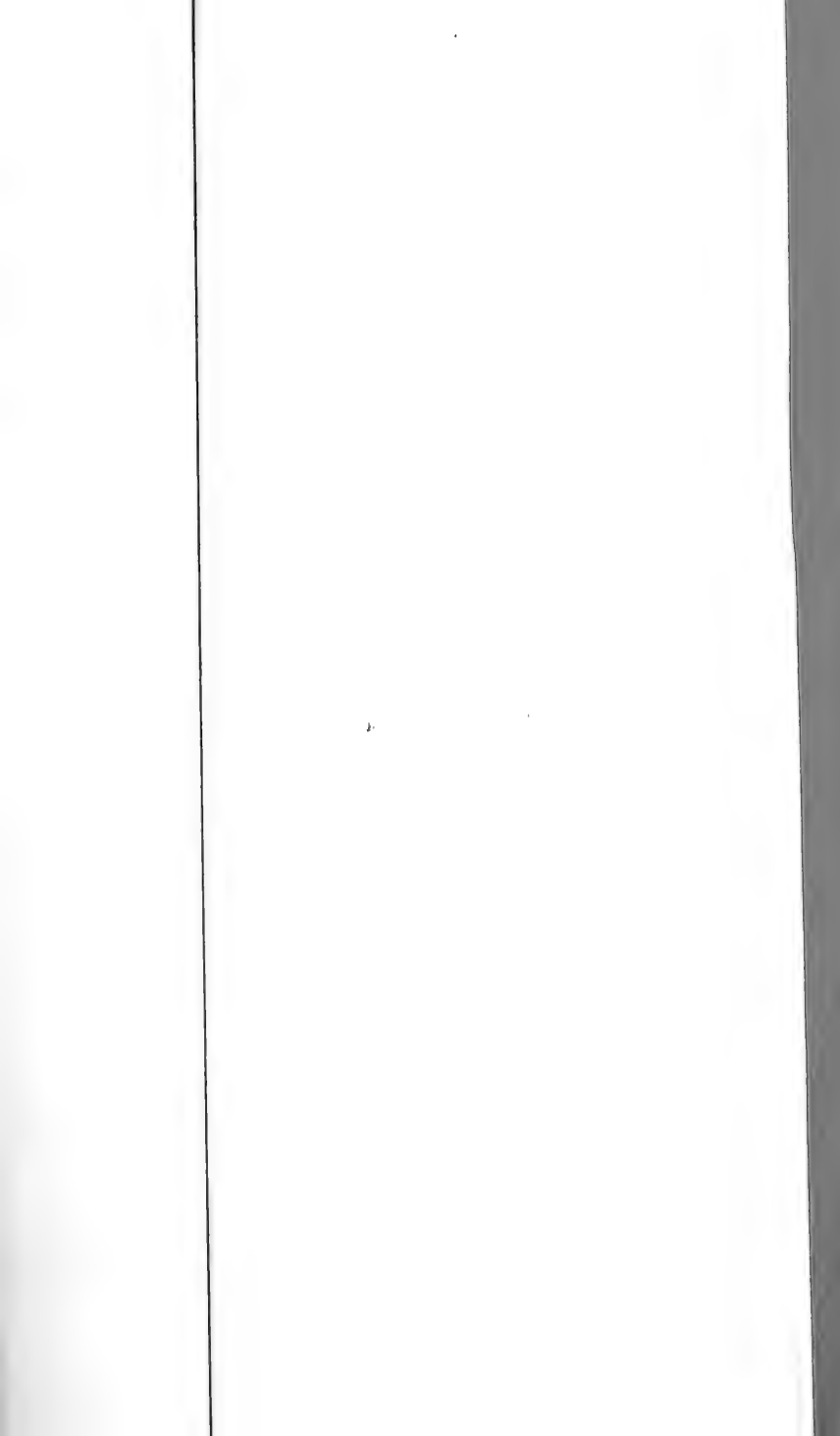
This is an exceedingly valuable book and is well printed on good materials.

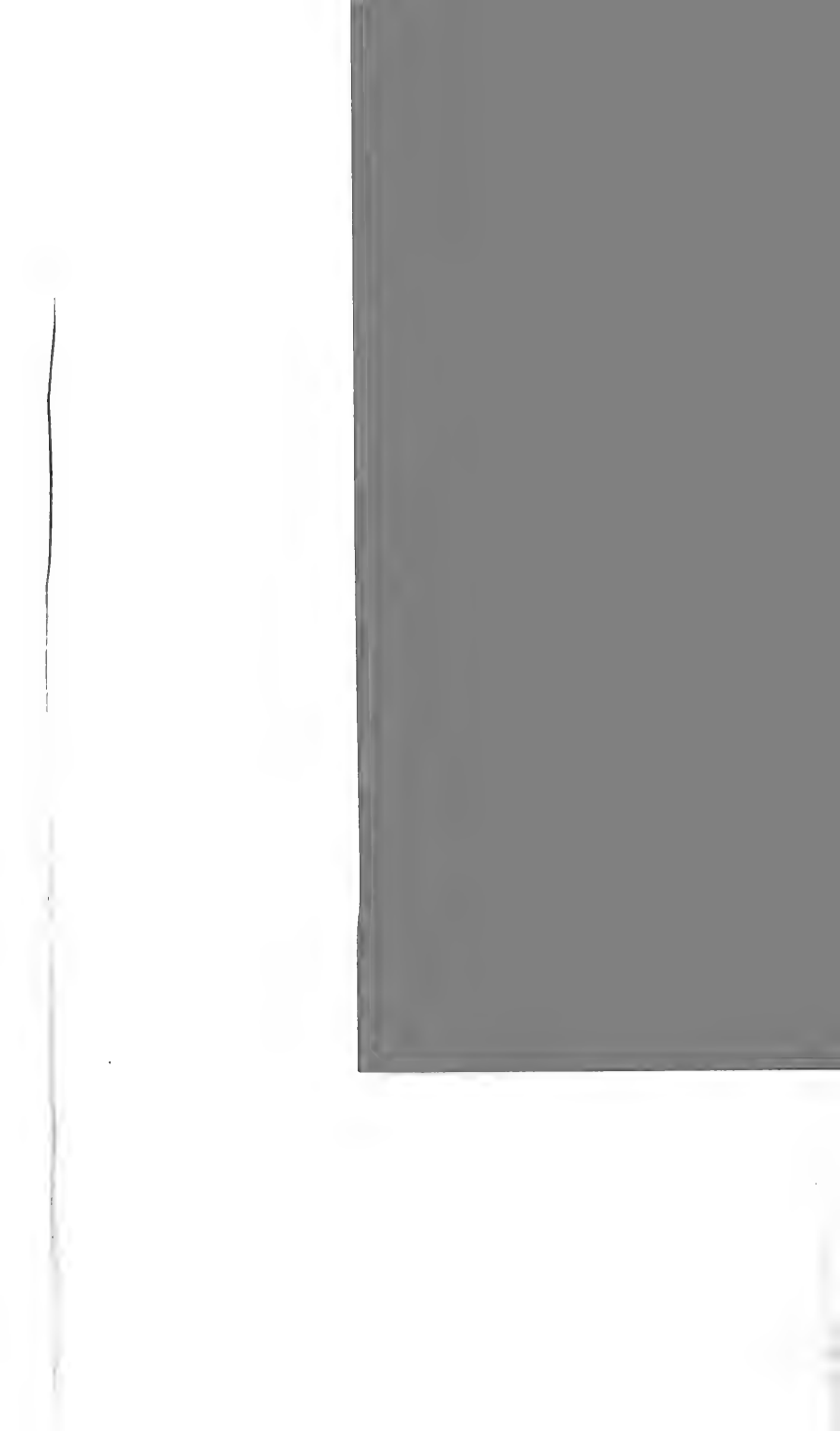
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"Form and Function in Plants", by John D. Dodd, 233 pp., Iowa State University Press, Ames, Iowa. 1962. \$6.50

This fine new introductory text on plant anatomy and physiology is the work of a seasoned and dedicated professor. Most basic information is introduced through laboratory study of freshwater algae and is then expanded to the other groups of plants. The main topics covered are: man in the world of plants, the green cell, reproduction, meiosis, inheritance, evolution, life on land, growth and differentiation, life without chlorophyll, and classification. An interesting and useful course could be taught from this text.

The book is effectively illustrated with many of the author's excellent photographs and with more than three hundred very attractive drawings by Mrs. K. T. O'Sullivan. There is a good index; the paper, printing, and binding are fine. A bibliography is missed.





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STEWARTIA MALACHODENDRON L. ON DELMARVA VIRGINIA

Clyde F. Reed

The Virginian stewartia, Stewartia malachodendron L. (Stewartia virginica Cav.), lives in moist woods on the coastal plain from eastern Virginia (Accomac County on the Delmarva Peninsula) south to western Florida and then westward to western Louisiana; thence northward to Tennessee and Arkansas.

Tatnall (1946, in Flora of Delaware and the Eastern Shore, p. 175) states that there is "one station, head of Messango Creek, Accomac County, Virginia, Ellis Mears in 1886 (at GH and Acad. Nat. Sci. Phila.); not found in recent years, although carefully searched for".

Last year, while botanizing in Accomac County, Virginia, the author came upon a Mr. L. Floyd Nock, Jr. of Accomac who had found Stewartia malachodendron L. in a woods two miles south of Wachapreague, Accomac County, about 1945 or 1946. At that time he transplanted small plants of this species to slopes (above saline line) along Folly Creek at his home (The Folly), 2 miles east of Accomac. The plants have flourished to be shrubs 10-15 feet tall. Except when the hurricanes forced salt water up on the land and killed those plants nearest the waterline, the rest of the plants have grown well. Some seedlings have come up and are growing fine. The plants in this area bloom about two weeks after dogwood has dropped its blossoms.

Wachapreague is in the southeast corner of Accomac County, whereas Messango Creek is in the northwestern corner, some 25 to 30 miles away. I have searched in the Messango Creek area and have not been able to find the plant, after several hunts over the years. The Gulf Stream Nursery, near Wachapreague, has been propagating this species from seed obtained from Mr. Nock.

Representative specimens from eastern Virginia: Accomac County: woods above saline line, at The Folly, on Folly Creek, 2 mi. east of Accomac. Sept. 11, 1963. Reed 65479-82 (Dupl. in US). Princess Anne County: near Pungo. July 22, 1939. Fernald & Long 10726 (US). Norfolk County: Yadin, Great Dismal Swamp. June 11, 1940. Fernald & Long 12131 (US).

Harold N. Moldenke

ALOYSIA SLEUMERI Moldenke, sp. nov.

Frutex 2 m. altus; ramulis gracilibus stramineis; foliis terniis subsessilibus lanceolatis 4--7 cm. longis 1--1.5 cm. latis supra minute pilosulis (pilis ad basin minute bulbosis), subtus minute resinoso-punctulatis; inflorescentiis axillaribus folia brevioribus laxe paucifloris.

Shrub, 2 m. tall; branchlets and twigs slender, stramineous, glabrous; leaves ternate, subsessile or very shortly petiolate; petioles, when present, filiform, 1--3 mm. long, very minutely appressed-strigillose; leaf-blades thinly chartaceous, dark-green above, lighter beneath, narrow-lanceolate, 4--7 cm. long, 1--1.5 cm. wide, acute at the apex, regularly sharp-serrate with appressed antrorse teeth except toward the base and apex, attenuate-acute at the base, minutely pilosulous and slightly scabrous above with short broadly bulbous-based hairs, the hairs eventually wearing off and the bases collapsing to form numerous disk-like markings, minutely resinous-punctulate beneath, the venation obscure or slightly subimpressed above, rather conspicuous but not prominent beneath, the filiform secondaries short, straight, subparallel, each ending in the apex of a tooth; inflorescence axillary, abundant, ternate, shorter than the subtending leaves, about 3 cm. long in all; peduncles filiform, 1--1.2 cm. long, antrorsely puberulent; spikes short, stout, rather few-flowered, about 1.5 cm. long, 1--1.5 cm. wide, the flowers rather distant, wide-spreading; bractlets minute, triangular, densely puberulent; calyx cylindric, about 3 mm. long, densely puberulent; corolla hypocrateriform, white, its tube about 6 mm. long, densely puberulent on the outside, the limb about 2 mm. wide.

The type of this distinctive species was collected by Dr. H. Sleumer -- in whose honor it is named -- and Federico B. Verveorst (no. 2370) at Pozo de Piedra and vicinity, at 1900 meters altitude, department of Belén, Catamarca, Argentina, between January 25 and 31, 1952, and is deposited in the United States National Herbarium at Washington. The species is obviously related to A. triphylla (L'Hér.) Britton, from which its toothed leaves and short congested spikes at once distinguish it.

LIPPIA BELLATULA Moldenke, nom. nov.

Lippia bicolor Mart. & Schau. ex Schau. in A. DC., Prodr. 11: 587. 1847 [not L. bicolor Kunth & Bouché, Ind. Sem. Hort. Berol. 1845: 10. 1845].

LIPPIA DUARTEI Moldenke, sp. nov.

Planta perennis ubique cinereo-pubescentis; ramis gracilibus obtuse subtetragonis dense cinereo-pubescentibus, pilis brevibus

adpressis; internodiis valde elongatis; foliis decussatis; petioliis maturis elongatis; laminis foliorum oblongis usque ad 7 cm. longis 2 cm. latis, supra rugosis breviter pubescentibus, subtus densiore pubescentibus; inflorescentiis axillaribus solitariis vel binis capitatis pedunculatis cinereo-pubescentibus.

Apparently a perennial plant with rather strict stems or branches, densely cinereous-pubescent throughout; stems or branches slender, obtusely subtetragonal, densely cinereous pubescent with short appressed antrorse hairs; nodes not annulate; principal internodes conspicuously elongated, 3.5--9 cm. long; leaves decussate-opposite, the lower ones often with abbreviated leafy non-floriferous twigs in their axils; petioles slender, conspicuously elongated on upper mature leaves and there about 1.5 cm. long, very densely cinereous-pubescent, canaliculate above, the hairs straight and antrorse; leaf-blades chartaceous, dark-green above, lighter beneath, oblong, to 7 cm. long when mature and 2 cm. wide, apparently only a few mature ones present during anthesis, attenuate-acute at the apex, rounded at the base, uniformly crenate along the margins, deeply rugose and scabridous-pubescent above, more densely cinereous-pubescent (especially on the larger venation) beneath; midrib and the numerous secondaries slender, deeply impressed above, prominent beneath; veinlet reticulation abundant, deeply impressed above on mature leaves; inflorescence axillary, much shorter than the subtending mature leaves, solitary or binary in each of the upper axils, 2--3 cm. long, capitata; peduncles very slender, 1.5--2.5 cm. long, very densely white-pubescent with straight antrorse subappressed hairs; heads hemispheric, many-flowered, 5--10 mm. wide; bractlets ovate, the outer ones about 2 mm. long and 1 mm. wide, acute at the apex, appressed-puberulent.

The type of this curious species was collected by Apparicio Pereira Duarte (no. 7851) — in whose honor it is named — at Varzea da Palma, Faz. Mãe d'Água, Minas Gerais, Brazil, on April 28, 1963, and is deposited in the Britton Herbarium at the New York Botanical Garden.

LIPPIA FELIPPEI Moldenke, sp. nov.

Fruticulus parvus; ramis gracilibus strictis dense glanduloso-hirtellis striatis; foliis decussatis; petioliis filiformibus brevibus; laminis foliorum cordato-ovatis parvis plerumque reflexis ad apicem acutis, marginibus regulariter grosso-serratis, ad basin cordatis vel subcordatis, utrinque glanduloso-pilosis; inflorescentiis axillaribus paucis folia superantibus; capitulis globosis 2 cm. latis longisque; bracteolis dense imbricatis herbaceis ovatis purpureis.

Small shrublet with a woody xylopodium; branches few, erect, simple or subsimple, about 60 cm. long, slender, stramineous, striate, rather densely hirtellous with soft gland-tipped hairs, less so toward the base; leaves decussate-opposite, petiolate, mostly drooping-reflexed; petioles slender, 3--7 mm. long, densely glandulose-hirtellous; leaf-blades thin-chartaceous, bright-green above, lighter beneath, cordate-ovate, 1.7--3.2 cm. long,

1.4--2.7 cm. wide, acute at the apex, regularly and coarsely serrate from the apex almost to the base with triangular somewhat antrorse but divergent teeth, cordate or subcordate at the base, glandulose-pilose with erect gland-tipped hairs on both surfaces, soft to touch, the larger venation slightly impressed above and prominulous beneath; inflorescence axillary in the uppermost leaf-axils, solitary, surpassing the subtending leaves, ascending; peduncles very slender, 1--2 cm. long, densely glandulose-hirtellous with soft spreading whitish hairs; heads globose, about 2 cm. long and wide, apparently rosy-purple, showy; bracts very numerous, herbaceous, densely imbricate, ovate, to 12 mm. long and 6 mm. wide, venose, acute or short-acuminate at the apex, slightly surpassing the corolla-tube, glandulose-pubescent; corolla hypocrateriform, rose, with a yellow central "eye", the tube about 10 mm. long, glandulose-pubescent on the outside, the limb about 9 mm. wide.

The type of this handsome species was collected by Gil M. Felipe (no. 140) -- in whose honor it is named -- in a cerrado along the road to the airport, municipality of Prata, Minas Gerais, Brazil, on March 20, 1963, and is deposited in the United States National Herbarium at Washington.

LIPPIA TURBINATA f. MAGNIFOLIA Moldenke, f. nov.

Haec forma a forma typica speciei laminis foliorum late ellipticis vel lanceolato-ovatis vel obovatis usque ad 7 cm. longis et 3.3 cm. latis recedit.

This form differs from the typical form of the species in having its leaf-blades regularly larger and wider when mature, more broadly elliptic to lanceolate-ovate or oblanceolate to obovate and to 7 cm. long and 3.3 cm. wide.

The type of this form was collected by Santiago Venturi (no. 8120) at Campo Quijaro, Rosario de Lerma, Salta, at an altitude of 1300 meters, Argentina, in January, 1929, and is deposited in the United States National Herbarium at Washington. The plant is described as a shrub 1.5 m. tall, with white flowers.

VERBENA SIMPLEX f. ALBIFLORA Moldenke, f. nov.

Haec forma a forma typica speciei corollia albis recedit.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Ronald Leighton McGregor (no. 13217) scattered in low places in shallow soil over limestone in a native bluestem prairie hay meadow two miles south of Elsmore, Allen County, Kansas, on July 22, 1957, and is deposited in the herbarium of the University of Kansas at Lawrence.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XIX

Harold N. Moldenke

VERBENA MONTEVIDENSIS Spreng.

Pedersen found this species in grasslands on malezal (low frequently flooded ground).

Additional citations: URUGUAY: Osten 3165 (Ug), 3335 (Ug), 3684 (N, Ug, Ug); Rosa-Mato 313 (Ug--9808), 399 (Ug--9810), 400 (Ug--9811); Seijo s.n. [Montevideo, 16 Nov. de 1884] (Ug); Sellow s.n. [Montevideo; Macbride photos 17432] (Kr--photo of type, N--photo of type, N--photo of type); Tesseire 4481 (Ug). ARGENTINA: Buenos Aires: A. Alvarez 453 (Bm, S); R. Alvarez 427 (S); Cabrera 861 (N), 1710 (N), 2108 (N, W--1574454), 2386 (N, N, N); Cannelle s.n. [Rio Parana Mini] (Mv); H. M. Curran s.n. [Oct. 19, 1913] (N); Krapovickas 2678 (Gg--353253, N), 2742 (N); Nicora 377 (W--2196464); Pastore 137 (N); Remiro s.n. [Mercedes, 20.IV.1943] (Mv); Scala 10001 (N); A. G. Schulz 5690 (Z); Sparre 268 (S). Corrientes: Pedersen 774 (W--2122544), 5074 (S); Ruiz Huidobro 2087 (S). Entre Ríos: Cabrera 10756 (W--2370638). Misiones: Ber-toni 3196 (N); Ekman 2018 (N, S), 2030 (N, S); Grüner 418 [Herb. Osten 23180] (Ug); Martinez Crovetto 3443 (N); Medina 128 (Gg--353260, N); T. Meyer 11297 (N); Montes 91 (Ca, Ca), 1237 (Es, Gg--352674, N), 9553 (Vi, Vi); G. J. Schwarz 624 (Ca), 821 (Ca), 1127 (Ca), 1128 (S), 1430 (N), 1472 (N), 1733 (N), 1976 (N), 3779 (N). Santiago Island: Cabrera 2159 (N, W--1574495).

VERBENA MORICOLOR Moldenke, *Phytologia* 2: 424--425. 1948.

Bibliography: Moldenke, *Phytologia* 2: 424--425 & 482. 1948; Moldenke, *Castanea* 13: 119. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 106 & 198. 1949; Moldenke, *Alph. List Cit.* 4: 1090. 1949; Moldenke, *Phytologia* 3: 290. 1950; Howell, *Wasmann Journ. Biol.* 10: 377. 1952; E. J. Salisb., *Ind. Kew. Suppl.* 11: 263. 1953; Moldenke, *Résumé* 127 & 472. 1959.

Herb, to 1 m. tall; stems and branches slender, more or less tetragonal, sparsely and irregularly pilose with whitish hairs of various lengths, the youngest parts rather densely hirsutulous with sharp-pointed hairs about 1 mm. long borne at right angles to the branch; nodes annulate; principal internodes elongated, 7.5--13 cm. long; leaves decussate-opposite; petioles slender, 1.5--2 cm. long, irregularly pilose with very short hairs and sparsely hirsutulous with long sharp-pointed hairs like on the younger branches; leaf-blades thin-chartaceous, somewhat lighter beneath, lanceolate, 4--3 cm. long, 1--2.3 cm. wide, attenuate-acute at the apex, obtuse or abruptly acute at the base, irregularly dentate from the base to the apex with rather broad sub-acute teeth, the larger irregularly interspersed with smaller ones

toward the base of the blade and often doubly dentate, rather densely strigose-pubescent above, densely pubescent beneath with hairs of various lengths; midrib slender, plane or slightly subimpressed above, slightly prominulous beneath; secondaries about 7 pairs, very slender, ascending, hardly arcuate, indiscernible above, rather obscure beneath; veinlet reticulation indiscernible; inflorescence terminal, spicate, the flowering portion apparently elongating to about 7 cm.; peduncles similar to the upper branches or stems in texture, shape, and pubescence, 1--7.5 cm. long; rachis densely pilose-pubescent with hairs of various lengths; bractlets lanceolate, about 4 mm. long, attenuate to the apex, sparsely puberulent on the back, the margins regularly ciliate; calyx cylindric, 6--7 mm. long, about 1 mm. in diameter, rather sparsely puberulent-pilosulous, the teeth 0.5 and 0.9 mm. long, subulate; corolla hypocrateriform, varying from blue-violet or violet to purple, rose, or mulberry-colored, its narrow-cylindric tube 13--14 mm. long, densely pilose-puberulent above the calyx, its limb 6--7 mm. wide, much darker in the throat, glabrous within, subglabrate on the outer surface.

The type of this handsome species was collected by Santiago Venturi (no. 5397) among spiny plants on a hillside at Sierra de Calilegua, at an altitude of 800 meters, in the department of Ladesma, Jujuy, Argentina, on October 11, 1927, and is deposited in the herbarium of the California Academy of Sciences at San Francisco. The species is obviously related to V. phlogiflora Cham. and V. incisa Hook., but differs conspicuously in its much smaller calyx and corolla. One collector describes the plant as a "shrub", but probably in error. It has been found at altitudes of 360 to 1600 meters, flowering in January, February, September, and October. Herbarium material has been misidentified and distributed as V. megapotamica Spreng. and V. scrobiculata Griseb. In all, 15 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: ARGENTINA: Catamarca: Wall & Sparre s.n. [La Estancia, 27/11/46] (Ew, N), s.n. [Alsaverade, 27/11/46] (Ew, Ew, N). Jujuy: Venturi 5397 [Herb. Osten 20800] (Em--isotype, F--photo of type, Gg--157893--type, N--isotype, N--photo of type, S--isotype, Si--photo of type, Ug--isotype, W--1440837--isotype, W--1591472--isotype, Z--photo of type). Salta: Lillo 18111 [Herb. Osten 3469] (Ug); Parodi 9179 [Herb. Osten 22534] (Ug); Schreiter 5037 [Herb. Osten 20774] (Ug).

VERBENA MULTICAULIS Raf., Herb. Raf. 65, nom. nud. 1833.

Bibliography: Raf., Herb. Raf. 65. 1833; E. D. Merr., Ind. Raf. 205 & 295. 1949; Moldenke, Résumé Suppl. 7: 3. 1963.

Nothing is known about this plant except that, according to Merrill, the name was proposed by Rafinesque and published by him in 1833, without description, based on a type from the "Appalachian Mountains". It is very probably a synonym of V. simplex var. eggerti Moldenke, but of this I cannot be sure without seeing the type material.

VERBENA NANA Moldenke, Phytologia 3: 119. 1949.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 105 & 198. 1949; Moldenke, Phytologia 3: 119 & 136 (1949) and 3: 289 & 290. 1950; Stellfeld, Trib. Farmac. 19 (10): 167. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Angely, Fl. Paran. 7: 13. 1957; Moldenke, Résumé 110, 118, 127, & 472. 1959; Angely, Fl. Paran. 16: 79 (1960) and 17: 46. 1961; Moldenke, Phytologia 9: 388. 1964.

Dwarf annual herb, 1 dm. or less in height, or sometimes suffrutescent and to 6 cm. tall; stems semi-prostrate or erect, usually with 2 ascending or erect branches at the base, obtusely tetragonal, deeply 4-sulcate in drying, densely hirsutulous with whitish mostly glanduliferous hairs of various lengths standing at right angles to the stem; principal internodes 0.5--2 cm. long; leaves decussate-opposite; petioles slender, 3--11 mm. long, densely hirsutulous like the stem and branches; leaf-blades chartaceous, rather uniformly green on both surfaces, ovate, 1.3--2.5 cm. long, 8--12 mm. wide, obtuse or subacute at the apex, acute at the base, appressed-serrulate with rather wide, flat, rounded teeth from the widest part to the apex, rather densely pubescent on both surfaces with whitish, stiff, straight, more or less glanduliferous hairs; midrib slender, plane above, subprominulous beneath; secondaries slender, 2--5 per side, ascending, subprominulous beneath; veinlet reticulation rather obscure on both surfaces; inflorescence terminal, dense, rather few-flowered, sessile or subsessile; bractlets lanceolate, 4--5 mm. long, glandular-pubescent; calyx tubular, about 11 mm. long, densely hirsutulous with short, whitish, often glanduliferous hairs standing at right angles to the surface, the rim irregularly 5-apiculate, the teeth about 1 mm. long; corolla hypocrateriform, varying from intensely red or rose to pink, rose-lilac, or lilac-tinged, its tube about 15 mm. long, glabrous on the outer surface, the limb 5--6 mm. wide, glabrous.

The type of this very distinct species was collected by Ishmael Morel (no. 117) at Pirané, in the department of Pirané, Formosa, Argentina, on October 23, 1945, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found on campos, in low wet soil, in Copernicia palm woods, and in Vachellia farinosa thorn-thickets, in flower in February, June, and October to December, and in fruit in October. It is said to be common in open ground in Paraguay, and rather abundant in the Argentine Chaco. A common name is "verbena de los palmares".

Herbarium material has been misidentified and distributed under the names "V. chamaedryfolia var. vel hybr." [by Osten], "V. aff. kuntzeana Moldenke" [by Troncoso], V. phlogiflora Cham., and V. scrobiculata Griseb. In all, 29 herbarium specimens, including the type, and 4 mounted photographs have been examined by me.

Citations: BRAZIL: Paraná: Stellfeld s.n. [Herb. Mus. Paran. 3140] (N). São Paulo: Brade 7002 [Herb. Inst. Bot. S. Paulo 6724]

(N); Edwall s.n. [Herb. Comm. Geogr. & Geol. 2958] (N, Sp--15729, Sp--15732). PARAGUAY: Fiebrig 1218 (S), 4371 (Bm, Cb, Cb); Pedersen 4069 (N, S, Ut--90219b, W--2283663); T. Rojas 254 (Bm, S), 256 (S), 1895 [Herb. Hort. Parag. 10055; Herb. Osten 13558] (N, N, Ug). ARGENTINA: Chaco: T. Meyer 680 [Herb. Osten 22944] (N, N, Ug), 2943 (N); A. G. Schulz 286 [Herb. Osten 23147] (N, Ug), 1466 (N). Formosa: I. Morel 117 (B--isotype, F--photo of type, N--type, N--photo of type, Sg--photo of type, Z--photo of type), 496 (Bm).

VERBENA NEOMEXICANA (A. Gray) Small, Fl. Southeast. U. S., ed. 1, 1010 & 1337 [as "neo-mexicana"]. 1903.

Synonymy: Verbena officinalis var. hirsuta Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1859. Verbena canescens var. neo-mexicana A. Gray, Syn. Fl. N. Am. 2 (1): 337. 1878. Verbena neo-mexicana Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148, hyponym. 1894. Verbena canescens x officinalis Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148, in syn. 1894. Verbena neomexicana Small ex Prain, Ind. Kew. Suppl. 3: 187. 1908. Verbena canescens neomexicana A. Gray ex Standl., Contrib. U. S. Nat. Herb. 13: 171 & 211. 1910. Verbena officinalis hirsuta Torr. ex Standl., Contrib. U. S. Nat. Herb. 13: 171 & 211, in syn. 1910. Verbena canescens var. neomexicana A. Gray apud Perry, Ann. Mo. Bot. Gard. 20: 296. 1933. Verbena neomecicana (Gray) Small ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena neo-mexicana Small ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena neomexicana (A. Gray) Small ex Moldenke, Alph. List Cit. 1: 200, sphalm. 1946. Verbena neomexicana (Gray) Small ex Moldenke, Résumé 237, in syn. 1959. Verbena canescens neo-mexicana Gray ex Moldenke, Résumé 360, in syn. 1959. Verbena neo-mexicana Gray ex Moldenke, Résumé 370, in syn. 1959.

Bibliography: Torr. in Emory, Rep. U. S. & Mex. Bound. Surv. 2: 128. 1859; A. Gray, Syn. Fl. N. Am. 2 (1): 337. 1878; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 148. 1894; J. K. Small, Fl. Southeast. U. S., ed. 1, 1010 & 1337. 1903; Prain, Ind. Kew. Suppl. 3: 187. 1908; Standl., Contrib. U. S. Nat. Herb. 13: 171 & 211. 1910; J. K. Small, Fl. Southeast. U. S., ed. 2, 1010. 1913; Perry, Ann. Mo. Bot. Gard. 20: 246, 248, 261, 296--298, 301, 302, 340, & 355. 1933; Dermen, Cytologia 7: 161 & 162. 1936; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Moldenke, Prelim. Alph. List Invalid Names 45 & 47. 1940; Moldenke, Suppl. List Invalid Names 8 & 9. 1941; Schnack, Anal. Inst. Fitotéc. Sta. Catalina 4: 18. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 17 & 29--30. 1942; Moldenke, Alph. List Invalid Names 46 & 49. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13, 14, 19, & 101. 1942; Schnack & Covas, Darwiniana 6: 470. 1944; Moldenke, Phytologia 2: 128. 1945; Darlington & Janaki Ammal, Chromosome Atlas 270. 1945;

Moldenke, Alph. List Cit. 1: 34, 116, 182, 199, & 200. 1946; W. C. Leavenworth, Am. Midl. Nat. 36: 187. 1946; L. C. Hinckley, Am. Midl. Nat. 37: 170. 1947; Moldenke, Phytologia 2: 331 (1947) and 2: 163--164. 1948; Moldenke, Wrightia 1: 225--227. 1948; Moldenke, Alph. List Cit. 2: 471, 538, & 539 (1948), 3: 708, 723, 729, 752, 789, 939, 953, & 954 (1949), and 4: 990, 1142, 1150, 1224, 1230, & 1290. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 24--26, 33, & 198. 1949; McDougall & Sperry, Pl. Big Bend 146. 1951; Moldenke, Phytologia 3: 467 & 468 (1951) and 5: 133. 1955; Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Am. Midl. Nat. 59: 356 & 362. 1958; Moldenke, Résumé 29, 31, 32, 39, 224, 237, 360, 361, 370, 371, & 472. 1959; Moldenke, Phytologia 8: 121 & 124 (1961) and 8: 279. 1962; Moldenke, Résumé Suppl. 3: 10 (1962), 4: 4, 14, & 17 (1962), 5: 4 (1962), and 6: 4. 1963; Gleason & Cronquist, Man. Vasc. Pl. 580. 1963; Moldenke, Phytologia 8: 471-473 & 477 (1963) and 9: 34, 36, 156, 165, & 166. 1963.

Short-hairy herb, to 1 m. tall, slender; stems upright, branched from the base, hirsute; branches 10--35 cm. long; leaves decussate-opposite, the blades 1--5 (usually less than 5) cm. long, rather narrow, entire or coarsely toothed, pinnately cleft, or almost parted, with the segments again incised or coarsely toothed, rugose, somewhat scabrous and finely pustulate above, the veins more or less prominent beneath, hirsute on both surfaces; inflorescence spicate, the spikes solitary or tending to be paniced, usually short-pedunculate, slender, open, hirsute; bractlets lanceolate-acuminate, commonly not longer than the calyx; flowers small or very small; calyx about 3 mm. long, hirsute-pubescent and very slightly glandular, its teeth short and subulate; corolla hypocrateriform, varying from blue, dark-blue, or blue-lavender to blue-purple, purple, or pink, its tube scarcely longer than the calyx, the limb approximately 4 mm. wide; cocci trigonous with a convex back, about 2 mm. long, very shallowly reticulate-scribbulate on the upper half, longitudinally striate below, the commissural faces extending to the tip of the coccus; chromosome number: $n(x) = 7$; $2n = 14$.

The type of this rather puzzling species was collected by Charles Wright (no. 1497) in the borders of thickets near Coppermines, at 1900 meters altitude, Grant County, New Mexico, in 1851, and is deposited in the Gray Herbarium of Harvard University. Gray's original discussion says "Borders of thickets near the Coppermines, New Mexico, Wright, Bigelow. Appears as if a hybrid between V. canescens and V. officinalis. S. Arizona, similar in foliage but with long bracts, Rothrock." Torrey's V. officinalis var. hirsuta was also described as from "near the copper mines" and was probably based on the same collection.

The species in its typical form has been found in wet ground, piñon pine-oak forests, grasslands and mesquite grasslands, along streams, at the base of hills, on hills along creeks, rocky slopes, gravel and sandbars of creeks, in granitic soil on foothills, and amongst rubble along the beds of small streams, at altitudes from 180 to 2665 meters, blooming in February and from April to Novem-

ber, in fruit in February and from July to November. Hinckley describes it as frequent at middle and upper elevations in canyons. Warnock found it "sparse in deep igneous soil". Smith, Peterson, & Tejada encountered it in gray to whitish soils with occasional calcareous outcrops and thorn-scrub-cactus cover in Puebla. It is reported as cultivated in Massachusetts.

Briquet (1894) mentions, without description, a "V. neomexicana" which he says is a hybrid between V. canescens H.B.K. and V. officinalis L. I have no doubt that he was referring to the plant here under discussion, found rather abundantly in western Texas, New Mexico, and adjacent Arizona and Mexico. I do not believe that it is of hybrid origin; certainly one of the putative parents, V. officinalis, occurs only very sparingly in this region. Wooton says of his unnumbered collection from Ruidosa Creek, July 3, 1895, "larger and of different habit from V. canescens. Probably a good sp." and with this statement I concur. Two rather ill-defined varieties are described hereinafter, but V. neomexicana var. grandiflora Moldenke is a synonym of V. cloverae Moldenke.

Verbena neomexicana has been crossed with V. halei Small, producing xV. notha Moldenke, and with V. urticifolia L., producing xV. torpa Moldenke. Herbarium specimens have been misidentified and distributed under the names V. canescens H.B.K., V. halei Small, V. neomexicana var. hirtella Perry, V. neomexicana var. xylopoda Perry, and V. xutha Lehm.

On the other hand, the G. L. Fisher 32238, H. C. Hanson 645, Herrick 715, LeSueur 53, E. G. Marsh 278, C. H. Mueller 2375 & 8139, Parks & Cory 7396, Sperry 478 & T.321, B. H. Warnock 46615 & W.168, and Wooton 3852, distributed as V. neomexicana, are all var. hirtella Perry; Blumer 1804, 2170, & N.159, Gooding 334 & 2246, Gould & Pultz 3164, E. H. Graham 3231, Griffiths 4122, G. J. Harrison 4778, Harrison & Kearney 5796 & 6689, Knobloch 1304, Mearns 1013 & 1887 [and maybe 1918], E. W. Nelson 6161 & 6271, Nelson & Nelson 2018, Peebles, Harrison, & Kearney 3790, W. W. Price s.n. [May 1, 1894], Thornber & Thornber s.n. [Total Wreck Mts., May 7, 1902], Toumey s.n. [Copper Basin, Aug. 24, 1894], Townsend & Barber 192, and Wooton s.n. [Santa Rita Range Reserve, May 12, 1912] are all var. xylopoda Perry; Kenoyer & Crum 2879 & 2951 and E. G. Marsh 278 are V. canescens H.B.K.; E. J. Palmer 10002, Tharp 352, 1361, s.n. [Austin, 5/27/20], s.n. [Langtry-Dryden, 6-11-1931], and s.n. [10/9/36], B. H. Warnock 11238, and Warnock & McBryde 14908 are V. canescens var. roemeriana (Scheele) Perry; E. W. Lathrop 2046 is V. halei Small; H. S. Gentry 1923 is V. pinetorum Moldenke; and Cory 53.475, V. L. Hams 1752, E. J. Palmer 12382, Tharp 43-804, and Warnock & Mullins 14405 are V. plicata Greene; Kammerer 33 is V. wrightii A. Gray;

O. B. Metcalfe 612 is a mixture with something not verbenaceous, while Warnock 21715 is definitely not verbenaceous. The Sixth Grade Brownsville 34 and s.n. [Nov. 1934] and Tharp 1201, cited by me in Lundell's Flora of Texas as V. neomexicana, are actually V. runyoni Moldenke. Sperry 583, distributed as "V. neomexicana var.?" is V. halei Small.

Perry cites Ferris & Duncan 2607 (E) and E. J. Palmer 30791 (E) as var. hirtella, but I think that they are better placed in the typical form of the species. Similarly, E. A. Phillips 753 and S. S. White 2202 and 3836 have been annotated by me as var. xylopoda, but the University of Michigan sheets of these collections show definitely very small flowers, and, I believe, represent the typical form. Likewise, S. S. White 1678 and Whitehead 1288 were annotated by me as var. hirtella in some herbaria, but the University of Michigan specimens show lobed or even very deeply lobed leaves and I feel that they had better be referred to the typical form of the species.

Perry (1933) cites the following 7 additional specimens not as yet seen by me: NEW MEXICO: Grant Co.: E. L. Greene s.n. [Pinos Altos Mts., 1880] (E, F); C. Wright 1497 (E--isotype, G--type, W-isotype). Socorro Co.: O. B. Metcalfe 612 (E, G). She comments that "The collections of Young 1703, Wooton 646, and Wooton (collection of July 3, 1895) are by no means typical of the species, but perhaps are better placed here than elsewhere. This species appears to be very closely related to V. canescens and V. gracilis. It differs from both, however, in the upright habit and the nutlets. In both V. canescens and V. gracilis the commissural face does not extend to the tip of the nutlet and the striae on the dorsal surface are less conspicuous." In all, 81 herbarium specimens, including the type collections of most of the names involved, have been examined by me.

Citations: TEXAS: Brewster Co.: C. H. Muller 8138 (Au, Ca--882854, Mi, N, N); Sperry 477 (Om); B. H. Warnock 9677 (Rf). Jeff Davis Co.: Ferris & Duncan 2606 (Du--124293), 2607 (Du--125418, Gg--31385, N); Hinckley 170 [9/15/34] (N), 170 [8/13/35] (N), s.n. [Mt. Livermore, 9/15/34] (Au, Au), s.n. [July 5, 1936] (N); E. J. Palmer 30791 (Au), 31867 (Au); Sperry T.811 (Om), T.812 (Om); Tharp 1493 (Au); M. S. Young 1703 (Au, W--1114647). Travis Co.: A. M. Ferguson s.n. [April 1901] (Au). Val Verde Co.: Collector undesignated s.n. [Del Rio, Aug. 19, 1932] (Dp); Parry, Bigelow, Wright, & Schott s.n. [valley of the Rio Grande below Doffana] (W--56197). NEW MEXICO: Catron Co.: Eggleston 20292 (W--1522846). Grant Co.: Chapline 609 [Herb. U. S. Forest Serv. 25064] (N); E. L. Greene s.n. [Pinos Altos Mts., Aug. 23, 1880] (Vt); Holzinger s.n. [G. O. S. Ranch, 27 Aug.--12 Sept. 1911] (W--660558), s.n. [East Canton] (W--660559); C. Wright 1497 (Ca--248344--isotype). Lincoln Co.: Goodman & Water-

fall 4967 (Ok); Wootton 646 (N, Ur), s.n. [Ruidosa Creek, July 3, 1895] (C, N, W--563952, W--736886). Sierra Co.: Beals s.n. [Lake Valley, July 1904] (Mi); O. B. Metcalfe 955 (W--497854). Socorro Co.: O. B. Metcalfe 612, in part (Ca--882628, N, Po--70886, W--495596). ARIZONA: Cochise Co.: Gould & Pultz 3164 (W--1893186); A. R. Moldenke 616 (B, S). Gila Co.: Collom 355 (W--1683306). Maricopa Co.: Whitehead 1288 (Mi, N). Pima Co.: S. B. Parish s.n. [Herb. Osten 13011] (Ug); Skjöt-Pedersen 946 (Cp). Yavapai Co.: Gould & Darrow 4180 (W--2008734). MEXICO: Baja California: Meling 3 (Du--225545, N, Po--209970, W--1635283). Chihuahua: S. S. White 2202 (Mi, Oa). Coahuila: S. S. White 1678 (Mi, Tu--35529). Guanajuato: Waterfall 16553 (Ca). México: Waterfall 16476 (Z). Nuevo León: Mueller & Mueller 157 (Au, Me); S. S. White 1577 (Mi, W--1822814). Sonora: E. A. Phillips 753 (Mi, Rf, Sm); S. S. White 2787 (Mi), 3099 (Mi), 3836 (Mi, N, W--2132273), 3836a (Mi), 3882 (Mi, W--2132284). LOCALITY OF COLLECTION UNDETERMINED: Herb. Torrey s.n. (T).

VERBENA NEOMEXICANA var. HIRTELLA Perry, Ann. Mo. Bot. Gard. 20: 298--299. 1933.

Synonymy: *Verbena neomexicana* var. *hirstella* Perry ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. *Verbena mexicana* Sperry ex Moldenke, Résumé Suppl. 4: 17, in syn. 1962 [not *V. mexicana* L., 1753, nor Pers., 1960].

Bibliography: Perry, Ann. Mo. Bot. Gard. 20: 260, 261, 298--299, & 355. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 88. 1937; Sperry, Sul Ross State Teach. Coll. Bull. 19: 68. 1938; Moldenke, Annot. & Classif. List 108. 1939; Sperry, Sul Ross State Teach. Coll. Bull. 22: 41. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 16, 17, & 30--31. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 3, 13, 14, 19, & 101. 1942; Moldenke, Phytologia 2: 128. 1945; Moldenke, Alph. List Cit. 1: 104, 176, & 224. 1946; Moldenke, Phytologia 2: 331. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 25. 1947; Moldenke, Wrightia 1: 227--228. 1948; Moldenke, Alph. List Cit. 2: 467, 475, 476, 498, 517, 522, 527, 538, 539, 596, & 640 (1948), 3: 656, 666, 679, 684, 698, 707, 748, 752, 753, 756, 790, 795, 797, 798, 807, 833, 873, 905, 953, 954, 963, & 966 (1949), and 4: 989--993, 1071, 1107--1110, 1121, 1122, 1126, 1142, 1149, 1150, 1240, 1241, 1244, & 1247. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 6, 24--26, 33, & 198. 1949; McDougall & Sperry, Fl. Big Bend 146, fig. 145. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 126, 131, & 132 (1952) and print. 2, 3: 126, 131, & 132. 1958; Moldenke, Résumé 8, 29, 31, 32, 39, 370, 424, & 472. 1959; Moldenke, Résumé Suppl. 1: 3. 1959; Lewis & Oliv., Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Phytologia 8: 124. 1961; Moldenke, Résumé Suppl. 3: 10 & 40 (1962), 4: 4 & 17 (1962), and 5: 4. 1962; Moldenke, Phytologia 8: 472, 477, & 478 (1963) and 9: 156, 165, & 199. 1963.

Illustrations: McDougall & Sperry, Pl. Big Bend fig. 145. 1951; Moldenke in Gleason, New Britton & Br. Illustr. Fl., print. 1, 3: 132 (1952) and print. 2, 3: 132. 1958; Lewis & Oliv., Am. Journ. Bot. 48: 640. 1961.

This variety differs from the typical form of the species in being densely canescent-hirtellous, the leaves more or less shallowly incised, the bractlets usually broadly ovate-acuminate, and the corolla-limb about 8 mm. wide.

It is described as an erect, slender, perennial herb; stems upright, branched, densely canescent-hirtellous; leaves 1--5 cm. long, more or less shallowly incised or lobed, sometimes entire, canescent-hirtellous on both surfaces, the veins more or less prominent beneath; spikes solitary or sometimes tending to be paniced, usually short-pedunculate, canescent-hirtellous and glandular throughout; bractlets usually broadly ovate-acuminate, commonly not longer than the calyx; flowers large; calyx about 3 mm. long, canescent-hirtellous and very slightly glandular, its teeth short and subulate; corolla varying from blue, bluish, or bluish-purple to blue-lavender, light bluish-lavender, lavender, purplish, purple, or deep-purple, its tube scarcely longer than the calyx, its limb about 8 mm. wide; nutlets trigonous, about 2 mm. long, with a convex back, very shallowly reticulate-scrobiculate on the upper half, longitudinally striate below; chromosome number: $n = 7$.

The type of this rather poorly defined variety was collected by Ernest Jesse Palmer (no. 34065) among dry arroyos, plains, and foothills of the Chisos Mountains, Brewster County, Texas, on May 22, 1928, and is deposited in the herbarium of the Missouri Botanical Garden at St. Louis. The variety has been collected in sandy, rocky, limestone, or granitic soil, in dry arroyos, desert scrub and washes, crevices of rocks above waterways, foothills, old lakebeds, on gravel knolls, in rocky fields, grasslands, and rolling grasslands, on low mountainsides, flats, rocky hillsides, rocky open hilltops, plains, gravelly mesas, limestone hillsides, and sandstone mountainsides, along small sandy draws, and along the banks of dry streams, at altitudes of 1260 to 8000 feet, flowering from January to November, fruiting from February to October. Warnock found it "scattered" or "infrequent" in Brewster County and "infrequent" or "frequent along highways" in Presidio County, Texas, and "frequent on limestone soil" in Presidio County; Young found it "common in open valley" in Brewster County; Hinckley & Warnock describe it as "infrequent and widespread along creek" in Presidio County; while Hanson reports it "common on mountainside". In Webb County it was encountered by Iltis, Koeppen, & Iltis "in fine sandy red clay soil on microphyll desert" with various species of Acacia and Opuntia, Prosopis, many spiny shrubs and weeds, Aristida, and Bouteloua. In Nuevo León it is said by Mueller to be "abundant in shaded situations" and "common in scrub oak and pinyon"; Mueller & Mueller describe it as "sparse"; while Stanford, Retherford, & Northcraft encountered it "in scrubby woodland association of pine, juniper, and oaks, heavily grazed by goats".

The name Verbena mexicana Sperry is based on Sperry 478, collected on flats in Brewster County, Texas, and deposited in the herbarium of Omer E. Sperry at Alpine, Texas. Verbena mexicana L. and V. mexicana Pers. are synonyms of Priva mexicana (L.) Pers.

The variety is recorded from Gila and Maricopa Counties, Arizona, in my 1949 and 1959 publications, apparently in error, unless the two collections cited hereinafter from that state prove to have originated in those counties. The Herb. Univ. Texas s.n. [Devine-Dilley, 3/1/30] and Tharp s.n. [Devine-Dilley, March 1, 1930] may have been collected in either Medina or Frio Counties, Texas, while Tharp 8744 may have come from either Duval or Jim Wells County. As to the LeRoy s.n. specimen cited below from Baltimore County, Maryland -- it bears a label inscribed "near Baltimore, Md., 1866", but Miss Perry says "surely not collected at Baltimore unless cultivated". There is also the possibility of it having been introduced accidentally as a weed there and the station now destroyed in the growth of the city. I am inclined to the latter theory.

Herbarium specimens of this variety have been misidentified and distributed under the names V. canescens H.B.K., V. gracilis Desf., V. halei Small, V. menthaefolia Benth., V. neomexicana (Gray) Small, V. neomexicana (A. Gray) Small, V. neomexicana var. xylopoda Perry, V. officinalis L., V. orcuttiana Perry, V. plicata Greene, V. polystachya H.B.K., V. urticaefolia L., and V. xutha Lehm.

On the other hand, the Meling 3 and S. S. White 3836a, distributed as V. neomexicana var. hirtella, at least in some herbaria, are typical V. neomexicana (A. Gray) Small (with the corollas only 4, not 8, mm. wide); Mexican Biol. Exped. Univ. Ill. 992 and R. A. Schneider 992 are var. xylopoda Perry; and Tharp s.n. [Austin, 11-17-39] and E. W. Lathrop 2075 are V. canescens var. roemeriana (Scheele) Perry. M. E. Jones 26224 is a mixture with V. canescens var. roemeriana, while B. H. Warnock and Wiggins 4360 are mixtures with V. plicata. S. S. White 2168 is annotated by me in some herbaria as var. xylopoda Perry, but the University of Michigan specimen shows leaves not at all lobed, so I think the collection had better be placed in var. hirtella. S. S. White 1678 and Whitehead 1288 were annotated as var. hirtella or var. xylopoda by me in some herbaria, but the University of Michigan specimens show lobed or even deeply lobed leaves and I now feel that these collections are better placed in typical V. neomexicana. The Tharp s.n. [6/19/31], R. H. Painter 249, and Ecology Class Univ. Texas s.n. [2.28.30] cited by me as var. hirtella in Lundell's "Flora of Texas" (1942) are now regarded by me as representing V. canescens var. roemeriana instead. H. C. Hanson 645 bears a label reading "Flora of Texas", but was collected 17 miles north of Ruidosa, New Mexico. Perry (1933) cites the following 10 additional specimens not as

yet seen by me: TEXAS: Brewster Co.: Moore & Steyermark 3277 (E); E. J. Palmer 34065 (E--type); M. S. Young 112 (E). Culberson Co.: Parry, Bigelow, Wright, & Schott s.n. [between Van Horn Wells and Muerte, 2 July 1852] (N, W). Presidio Co.: H. C. Hanson 645 (G); McKelvey 2046 (G). MEXICO: Coahuila: Purpus 1094 (E, F, G). The Ferris & Duncan 2607 and E. J. Palmer 30791, however, which she cites, I regard as typical V. neomexicana. She says "The pubescence of this variety is much finer and shorter than in the above [var. xylopoda]. The leaves are not so deeply incised and often tend to be elongated. The leaves of Purpus 1094 are so narrow and shallowly incised that it appears superficially like V. perennis; nevertheless the character of the pubescence allies it with this variety." I may add that Mueller & Mueller 506 also has the leaves so very narrow, only the basal ones with a pair of narrow lateral lobes, that it also greatly resembles V. perennis. The E. Wilkinson s.n. [Sta. Eulalia hills, 30 July 1885] cited below, is cited by her as var. xylopoda.

In all, 162 herbarium specimens, including type material of all the names involved, have been examined by me.

Citations: MARYLAND: Baltimore Co.: LeRoy s.n. [near Baltimore, Md., 1866] (C). TEXAS: Bexar Co.: O. M. Clark 7441 (Ok--18719). Brewster Co.: Lewis & Oliver 5457 (Nb); Moore & Steyermark 3277 (Ca--471230, Du--224476, Gg--194778, Mi, N); C. H. Mueller 8139 (Au, N, W--1651901); L. T. Murray s.n. [May 22, 1928] (It); E. J. Palmer 34065 (N--isotype); Parks & Cory 7034 (Tr), 7396 (Tr); Rose-Innes & Moon 1200 (Au); Rose-Innes & Warnock 537 (Au); O. E. Sperry 73 (W--1684173), 94 (Om, W--1684183), 477 (W--1684423), 478 (Om, W--1684424), 1536 (Om), 1704 (Om), T.761 (Om, W--1848966), T.821 (Om); Steiger 1373 (N); Tharp s.n. [Wilson Ranch, 6/19/31] (Au, Au, Au), s.n. [6-19-31] (Sm), s.n. [Wilson Ranch, June 1931] (Au, Au), s.n. [Wilson Ranch] (Au); B. H. Warnock 537 (N), 20436, in part (Au), C.801 (N), W.168 (N), s.n. [May 3, 1937] (Au, Mv); M. S. Young 101 (Ur), s.n. [8/12/15] (Au). Dimmit Co.: M. E. Jones 28993 (Po--187972). Frio Co.: C. H. Mueller 2612 (Ar--171042); Tharp s.n. [Devine-Dilley, March 1, 1930] (Au). Hudspeth Co.: Tharp 43-804 (N); Waterfall 5143 (N, Ok). Jeff Davis Co.: Hinckley s.n. [Limpia Canyon, July 1936] (Fs); D. C. Ingram 2522 [U. S. Dept. Agr. Forest Serv. 96187] (W--2344747); M. E. Jones 26224, in part (Po--178345); A. R. Moldenke 646 (S). Jim Hogg Co.: Parks & Cory 16905 (Tr); Tharp s.n. [June 15, 1928] (Au). Jim Wells Co.: Tharp 8744 (Au). La Salle Co.: C. Skottsberg s.n. [Millet, 4/6/1935] (Go). Live Oak Co.: Tharp s.n. [March 21, 1932] (Au). Medina Co.: Herb. Univ. Texas s.n. [Devine-Dilley, 3/1/30] (Au, Au). Presidio Co.: Correll & Rollins 23652 (Ld); Garner 50 (Au); H. C. Hanson 645 (N); Hinckley 1089 (Au, Au, N),

1971 (Au, N), 2428 (N), 3246 (N), s.n. [Marfa, April 1938] (Fs); Hinckley & Warnock 46942 (Au, N, S); D. C. Ingram 2607 [Herb. Forest. Serv. 96392] (S); J. R. Lundell 5 (Id); Lundell & Lundell 14340 (N, Rf, W--1927012); McKelvey 2046 (Ca--480042, W--1581386); Parks & Cory 26401 (Tr); B. H. Warnock 8908 (Rf), 14337 (Rf), 46615 (Au, Ca--731949, N, Ok, S); Warnock & McBryde 14555 (Rf). Travis Co.: C. L. York 46035 (Au, N). Val Verde Co.: G. L. Fisher 32238 (W--1624201); M. E. Jones 28296, in part (Du--239763); Parry, Bigelow, Wright, & Schott 827, in part (W--56198); Whitehouse 11479 (Sm). Webb Co.: H. J. Hamby 343 (Ar--206601), 792 (Ar--206289); Iltis, Koeppen, & Iltis 19 (Ws); Tharp 3687 (Au, W-1289911). County undetermined: Havard s.n. [Texas] (W--225359). NEW MEXICO: Dona Ana Co.: Parry, Bigelow, Wright, & Schott 827, in part (N, N). Lincoln Co.: H. C. Hanson 645 (W--982971). Socorro Co.: C. L. Herrick 715 (W--737262); Wootton 3852 (Ur, W--736224). ARIZONA: County undetermined: D. T. MacDougal 634 (Au, N); Purpus 8233 [Besner Creek] (Ca--139759). MEXICO: Baja California: T. S. Brandegee s.n. [San Enrique, May 2, 1889] (Ca--104853); G. Lindsay s.n. [July 11, 1937] (Du--259288); Raven, Mathias, & Turner 12587 (Ca--171728, Du--418149). Chihuahua: Correll & Johnston 21737 (Id); Knobloch 252 (Z), 935 (Sm); A. Lee 46 (Au, N); LeSueur 53 (Au, Ca--712702, Gg--319703, W--1887827), 231 (Au); F. W. Pennell 18691 (W--1641250); Shreve 9089 (W--1790741); S. S. White 2168 (Mi, Tu--35536), 2316 (Mi); E. Wilkinson 37 (W--1323066), s.n. [Sta. Eulalia hills, July 30, 1885] (Ob--50870, W--219413). Coahuila: E. G. Marsh 147 (Au, Au), 278 (Au--212149), 684 (Au--122335, Ok); Edw. Palmer 25 (Ca--104849); Purpus 1094 (Ca--139758, N, Po--63882), 1134 (Ca--139721); Stanford, Retherford, & Northcraft 234 (Ca--713322, Du--289331, N, Se--69590); Waterfall 16623 (Ca). Durango: Reko 5201 (W--1318979); Waterfall & Wallis 13342 (Ok). Nuevo León: C. H. Mueller 2375 (Au, Mi), 2391 (Au); Mueller & Lueller 465 (Au), 506 (Au, Mi); R. A. Schneider 992 (Mi, N). Oaxaca: Purpus 3408 (Ca--138826). Puebla: Purpus 3927 (Ca--138825).

VERBENA NEOMEXICANA var. XYLOPODA Perry, Ann. Mo. Bot. Gard. 20: 297--298. 1933.

Synonymy: Verbena canescens var. arizonica Gray ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena neomexicana xylopoda Perry ex Moldenke, Résumé 370, in syn. 1959. Verbenaceae neomexicana (Gray) Small ex Moldenke, Résumé Suppl. 4: 21, in syn. 1962.

Bibliography: Perry, Ann. Mo. Bot. Gard. 20: 261, 285, 297--298, & 355. 1933; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13--15, 19, & 101. 1942; Moldenke in Lundell, Fl. Texas 3 (1): 17 & 30. 1942; Moldenke, Phytologia 2: 128. 1945; Moldenke, Bot.

Gaz. 106: 161. 1945; Moldenke, Am. Journ. Bot. 32: 610. 1945; Moldenke, Alph. List Cit. 1: 46, 77, 182, 235, 242, 244, 260, & 274. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 23. 1947; Moldenke, Phytologia 2: 164. 1948; Moldenke, Wrightia 1: 228. 1948; Moldenke, Castanea 13: 113. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Alph. List Cit. 2: 370, 403, 409, 472, 473, 475, 476, 478—480, 494, 497, 498, 519, 523, 527, 597, & 598 (1948), 3: 656, 700, 723, 724, 731, 752, 755, 769, 771, 783, 803, 807, 809, 813, 828, 831, 881, 905, 933, 952, & 963 (1949), and 4: 996, 1003, 1068, 1071, 1121, 1125, 1126, 1129, 1148, 1166, 1171, 1174, 1192, 1199, 1210, 1217, 1224, 1225, 1229, 1231, 1240, 1242, 1243, & 1252. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 10, 24, 26, 27, 33, & 198. 1949; Moldenke, Phytologia 3: 375. 1950; Moldenke, Résumé 13, 29, 32, 33, 39, 361, 370, & 472. 1959; Moldenke, Résumé Suppl. 4: 21. 1962; Moldenke, Phytologia 8: 472 & 477 (1963) and 9: 36, 156, & 215. 1963.

This variety differs from the typical form of the species in having its stems somewhat coarser, the pubescence shorter, denser, and more glandular, the calyx about 4 mm. long and glandular-hirsute, with acuminate teeth, and the corolla-limb 6--10 mm. wide.

It is described as an herb to 30.5 cm. tall, the leaves deeply lobed, the bractlets 3--3.5 mm. long, the flowers large, the calyx 3.5--4 mm. long (including the teeth) and glandular or densely glandular, the corolla large or very large, varying from blue, blue-violet, or blue-lavender to dark-blue, lavender, lavender-pink, or purple, more or less 2-lipped, the tube 4--6 mm. long (including the throat), the limb 9--10 mm. wide, and the nutlets scabrellous on the commissure.

The type of this rather ill-defined variety was collected by Herbert Christian Hanson (no. A.1130) on rocky slopes in Sabino Canyon, Santa Catalina Mountains, Pima County, Arizona, on April 21, 1922, and is deposited in the herbarium of the Missouri Botanical Garden at St. Louis. Verbena canescens var. arizonica is apparently based on an unnumbered collection made by Cyrus Guernsey Pringle in the foothills of the Santa Rita Mountains, Pima or Santa Cruz County, Arizona, on May 11, 1884, and is deposited in the Gray Herbarium at Harvard University.

The variety has been collected among rocks, in granitic soil on foothills, in sandy or limestone soil, on gravelly slopes, rocky hills, open dry rocky slopes in chaparral, dry plains and gentle slopes, gravelly brush-covered plains, rocky limestone slopes, decomposed limestone, and stony slopes, along moist stream-sides, bordering streambeds, in pine woodlands, scrubland on limestone mountainsides, canyons, pinelands or pine woodlands, grasslands and oak-grasslands, dry rocky canyons, and calcareous deserts, at altitudes of 100 to 8000 feet, flowering and fruiting from February to October.

Maguire found the plant on "gravelly west slopes in mesquite and Opuntia cholla association", while Tucker found it in "pine-oak woodlands of Pinus chihuahuana, P. engelmannii, Quercus arizonica, Q. viminea, some shrubby Q. hypoleucoides, and Arbutus"; Wiegand,

Maguire, Richards, & Moeller encountered it on "gravelly slopes, west exposure, under Quercus and Rhus"; Stanford, Retherford, & Northcraft found it in a "mountain valley with much bare limestone present, partially covered with Agave and Yucca". Mueller says that it is "common in meadows" and "common on rocky slopes in open pine-oak forests"; Wiegand, Maguire, Richards, & Moeller describe it as "uncommon on gravelly slopes under Quercus and Arctostaphylos"; while Runyon avers that it is "widespread on hills in Starr Co. [Texas]". Benson collected it in the Lower Sonoran Zone of Arizona. Blumer, in a note on his collection no. 1804, says "may be introduced".

The Mearns 1918 collection from the Niggerhead Mountains, near Monument 82, is hereinafter cited from Sonora, Mexico, on the authority of Perry (1933).

T. H. Kearney comments in regard to Eastwood 18447 "approaches V. menthaefolia (nutlets scaberulous on the commissure)"; in regard to Harrison & Kearney 5796 he says "calyx glandular, 3.5 mm. long, nearly as long or slightly surpassing the calyx [sic]"; and in regard to Kearney & Peebles 10355 says "V. menthaefolia Benth. is very similar in appearance to V. neomexicana but has more slender spikes and more reduced bracts. It is questionable whether the two forms are specifically distinct."

Wynd & Mueller 525 was originally distributed as "Verbena xutha Lehm. vel aff.", while Edw. Palmer 1041 was annotated by Perry as "Aff. V. Halei or V. xutha".

Material of V. neomexicana var. xylopoda has been misidentified and distributed in herbaria under the names V. brevibracteata (A. Gray) Eggert, V. canescens H.B.K., V. canescens var. neo-mexicana A. Gray, V. canescens neo-mexicana Gray, V. halei Small, V. hastata L., V. neomexicana (A. Gray) Small, V. neo-mexicana (A. Gray) Small, V. neo-mexicana Gray, V. neomexicana var. hirtella Perry, V. officinalis L., V. prostrata A. Br., V. remota Benth., V. sororia D. Don, and V. xutha Lehm.

On the other hand, the Mueller & Mueller 506, distributed as var. xylopoda, is actually var. hirtella. E. A. Phillips 753 and S. S. White 2202 and 3826 were annotated by me as var. xylopoda in several herbaria, but the University of Michigan sheets show definitely very small flowers (less than 6 mm. wide), so I now regard these three collections as representing typical V. neomexicana, as I also do Collom 355 and Gould & Darrow 4180. The corolla also seems very small on Peebles, Harrison, & Kearney 1753, Tidestrom 872, and Peebles & Harrison 1649, but the pubescence on the stems in not that of typical V. neomexicana, so I think that in these cases the corollas were large when fresh and have merely shriveled up in the drying process.

Nelson & Nelson 5138, cited hereinafter as from Terrell County, Texas, was actually collected between Terrell and Webb Counties

("between Sanderson and Laredo") and is very anomalous in appearance, the fruiting-calyx and fruit being much larger than is normal for this taxon. It may represent an undescribed species. Griffiths 3431 is a mixture with something non-verbenaecous.

Annette Carter, Principal Herbarium Botanist at the University of California, in a letter to me dated February 18, 1955, states that she has checked through the University of California herbarium and the Jepson herbarium and finds no California specimens of this variety. Miss Perry (1933) cites the following 33 additional specimens not as yet seen by me: ARIZONA: Cochise Co.: Blumer 1804 (E, F, G), 2170 (F); Goodding 334 (G); Lemmon 2857 (G). Maricopa Co.: Coues & Palmer 571 (E). Pima Co.: H. C. Hanson A.1130 (E--type). Santa Cruz Co.: Pringle s.n. [Santa Rita Mts., May 11, 1884] (D, F, G). Yavapai Co.: M. E. Jones s.n. [Skull Valley, April 28, 1903] (E); W. W. Jones 344 (G), 346 (G). CALIFORNIA: County undetermined: Edw. Palmer s.n. [1876] (G). MEXICO: Baja California: Edw. Palmer 312 (E, F), s.n. [Big Canyon of Tantillas Mts., 10 Sept. 1875] (G). Chihuahua: Hartman 608 (G); Nelson 6161 (G), 6271 (G); Edw. Palmer 52 (E, F, G); Pringle 270 (D, F, G); Townsend & Barber 192 (E, F, G); Wislizenus 150 (E). Sonora: Thurber 446 (G, N). It is probable that the Thurber "446" which she cites from the New York Botanical Garden herbarium is the Thurber 336 cited by me hereinafter from the Torrey Herbarium. She comments that "This variety differs from the species in the denser and more glandular pubescence and the larger corolla. The nutlets also are slightly longer, with the reticulations somewhat deeper than in the species, and the commissural faces hardly extend to the tip of the nutlets. The specimens Nelson 6161, 6271, and Townsend & Barber 192 closely resemble the above variety [var. xylopoda] in inflorescence, but are more like V. neomexicana in the long and somewhat sparsely hirsute indument on the lower part of the stem; Pringle 270 and Wilkinson approach variety hirtella."

In all, 181 herbarium specimens, including the type of one of the names involved, have been examined by me.

Citations: FLORIDA: County undetermined: Collector undesignated s.n. [Florida] (Vt). TEXAS: Hidalgo Co.: R. Runyon 55 (Rr). Terrell Co.: Nelson & Nelson 5138 (Au). Victoria Co.: Owens 3125 (Au). Webb Co.: Perkins & Hall 2627 (Po--256897). ARIZONA: Catron Co.: Eggleston 20292 (N). Cochise Co.: Barneby 5151 (N); Benson 10299 (Po--267654); Blumer 1804 (Du--24179, Ka--60416, N, Tu, W--561956), 2170 (W--563573), N.157 (Tu), N.159 (Tu); J. I. Carlson s.n. [Warren, May 20, 1915] (Gg--31469, W--873378); Darrow s.n. [July 26, 1943] (Tu--14767); Goodding 334 (Fg--8032, N, Tu, Tu), 2246 (Ca--466879, Ca--130030, S); Gould & Pultz 3164 (Ca--705195, N); Harrison & Kearney 5796 (To, W--1435178); M. E. Jones s.n. [Sept. 3, 1903] (Po--248003); Kearney & Peebles 13847 (To); Mearns

1013 (Du--9555, N, W--229031); W. W. Price s.n. [May 1, 1894] (Du--97119, Po--88556); Wiegand, Maguire, Richards, & Moeller 11065 (Gg--295125, N, N, Pl--130554, Ua--47404); T. E. Wilcox s. n. [Ft. Huachuca, Aug. 1892] (C). Gila Co.: Nelson & Nelson 2018 (N); Wiegand, Maguire, Richards, & Moeller 11336 (Gg--295126, N, N, Pl--130553, Ua--47403). Mohave Co.: Eastwood 18447 (Gg--188947). Pima Co.: Benson 10224 (Po--267653); Burnham 479 (I); N. C. Cooper C.725 (Ak--12632); Eastwood 17921 (Gg--174989); Gilman 1120 (Po--172237); E. H. Graham 3231 (Cm, Du--246092); Griffiths 3431 (W--497009), 4122 (W--660150); G. J. Harrison 4778 (To, W--1367707); M. E. Jones s.n. [Aug. 31, 1903] (Du--151801, Po--183132); Kearney & Peebles 10355 (To), 10846 (To); King & Beckett 11402 (S); Munz 1149 (Po--98043); Peebles 6860, in part (Gg--192656); Peebles, Harrison, & Kearney 3790 (To, W--1367484); Spalding s.n. [March 21, 1906] (Tu, Tu); J. J. Thornber 8111 (Tu); Wooton s.n. [Santa Rita Range Reserve, May 12, 1912] (W--663954). Pinal Co.: J. Arnold s.n. [April 16, 1937] (N); G. J. Harrison 6689 (Po--173002); Harrison & Kearney 1488 (To), 6689 (N); C. B. Maguire 10884 (N, N, Ua--47402); Nichol s.n. [May 6, 1925] (Tu); Peebles 6860, in part (Gg--184987); Peebles & Harrison 1649 (To); Peebles, Harrison, & Kearney 1753 (To); Thornber & Thornber s.n. [Total Wreck Mts., May 7, 1902] (Ca--882627, Tu). Santa Cruz Co.: Kearney & Peebles 13863 (To); Pringle s.n. [Santa Rita Mts., May 11, 1884] (Bc, Br, Cm, Ll, Pa, Up--17121, Vt, W--56199); Tidestrom 872 (W--507749). Yavapai Co.: Crosswhite 718 (Hi--194682); M. E. Jones s.n. [Skull Valley, April 28, 1903] (Po--248001, W--856988), s.n. [Skull Valley, May 1, 1903] (Po--248002); Toumey s.n. [Copper Basin, Aug. 24, 1894] (W--619181). County undetermined: Herb. LeRoy s.n. [Ariz. '84] (C). CALIFORNIA: County undetermined: Edw. Palmer 339 1/2 [Cent. Cal. 1876] (W--56181). MEXICO: Baja California: D. R. Harvey 539 (W--1685982). Chihuahua: Correll & Johnston 21528 (Ld); M. E. Jones s.n. [Colonia Juarez] (Po--248004); Knobloch 1304 (Mi); LeSueur 875 (Au); C. H. Mueller 3427 (Ca--720115, Mi, Rf); E. W. Nelson 6161 (W--359874), 6271 (W--359988); Edw. Palmer 52 (N, W--57352); Pringle 270 [Herb. Osten 13018] (Br, Ll, Me, Me, Mi, N, Pa, Ug, Up--17097, Vt, W--56159); Shreve 9097 (Ca--731845, Fs); Townsenc & Barber 192 (Ca--138834, Me, Me, N, Po--71148, Ur, Vt, W--38324); J. M. Tucker 2508 (Ca--2791, Gg--415500, Z); Waterfall 16100 (Ca). Coahuila: Barkley, Webster, & Rowell 7189 (Mi, N); Herb. Inst. Biol. Univ. Nac. Mex. 7138, in part (Me); Stanford, Retherford, & Northcraft 426 (N, Se--70445); Wynd & Mueller 525 (Fs, I, N, Ok, S, Ur, W--1639936). Nuevo León: Barkley, Webster, & Rowell 7150 (Au--123253, N); Mexican Biol. Exped. Univ. Ill. 992 (Fs, N); C. H. Mueller 2305 (Fs, Mi), 2391 (Mi); Edw. Palmer 1041 (Pa, W--

56200); F. W. Pennell 16880 (Me); Schery 32 (Mi); R. A. Schneider 992 (Ur). San Luis Potosí: F. W. Pennell 17535 (D-733971, Me, W--1640627). Sonora: Mearns 1887 (W--232428), 1918 (Du--9549, W--232676); Merton 2042 (W--232685); Thurber 336 (T); S. S. White 3310 (Mi), 3985 (Mi), 4176 (Mi, W--2132336); Wiggins 6164 (Du--253441). Tamaulipas: Stanford, Lauber, & Taylor 2381 (N, N). State undetermined: E. Wilkinson s.n. [1885] (Mi).

xVERBENA NEQUAM Moldenke, Phytologia 5: 133. 1955.

Synonymy: Glandularia laciniata x dissecta Schnack & Covas, Darwiniana 7: 73, in textu. 1945. Verbena laciniata x dissecta Dermen ex Moldenke, Phytologia 3: 467. 1951. Verbena dissecta Spreng. x V. tenuisecta Briq. ex Moldenke, Résumé 363, in syn. 1959. Verbena tenuisecta Briq. x V. dissecta Spreng. ex Moldenke, Résumé 376, in syn. 1959. Verbena dissecta Willd. x V. tenuisecta Briq. ex Moldenke, Résumé Suppl. 2: 11, in syn. 1960.

Bibliography: Schnack & Covas, Darwiniana 7: 73. 1945; Schnack & Covas, Revist. Argent. Agronom. 12: 224. 1945; Moldenke, Phytologia 3: 467 (1951) and 5: 133. 1955; Moldenke, Biol. Abstr. 30: 1093. 1956; Moldenke, Am. Midl. Nat. 59: 356. 1958; Moldenke, Résumé 224, 296, 363, 376, & 473. 1959; Moldenke, Résumé Suppl. 2: 11 & 12. 1960; Moldenke, Phytologia 8: 121. 1961; Moldenke, Résumé Suppl. 4: 19. 1962; Moldenke, Phytologia 9: 69. 1963.

The name, xV. nequam, was proposed by me in 1955 for the hybrid between V. dissecta Willd. and V. tenuisecta Briq., produced artificially by Schnack & Covas from cultivated material in Argentina and described by them in 1945 under the designation "Glandularia laciniata x G. dissecta". Evidence seems to indicate that what they consistently identify as Glandularia laciniata is actually Verbena tenuisecta.

Verbena dissecta and V. tenuisecta grow together in at least two states of Brazil, in Uruguay, and in at least six provinces of Argentina. It is possible that they also occur together in parts of Bolivia and Chile. One might expect to find this hybrid in the wild where the ranges of the parent species overlap. It is very possible that some of the almost innumerable "forms", "races", "mutants", "ecotypes", "lusi", or "variants" now generally regarded as V. laciniata (L.) Briq., V. dissecta Willd., V. tenuisecta Briq., V. santiaguensis (Covas & Schnack) Moldenke, V. mendocina R. A. Phil., or other species in this complex may actually represent this hybrid. Much more intensive work is urgently needed in this group of the genus. xV. nequam should certainly have considerable horticultural merit.

xVERBENA NISA Moldenke, Résumé Suppl. 4: 10, 11, 18, & 19 (1962), nom. nov.

Synonymy: Glandularia perakii x laciniata Schnack & Covas, Darwiniana 7: 73, in textu. 1945. Verbena perakii (Covas &

Schnack) Moldenke x V. tenuisecta Briq. ex Moldenke, *Résumé Suppl.* 4: 18, in syn. 1962. Verbena tenuisecta Briq. x V. perakii (Covas & Schnack) Moldenke, *Résumé Suppl.* 4: 19, in syn. 1962.

Bibliography: Schnack & Covas, *Darwiniana* 7: 73. 1945; Moldenke, *Résumé Suppl.* 4: 10, 11, 18, & 19. 1962.

The name, xV. nisa, was first proposed by me in 1962 for the hybrid, artificial or natural, between Verbena perakii (Covas & Schnack) Moldenke and V. tenuisecta Briq. This hybrid was apparently first produced in 1944 by Schnack and Covas from cultivated material in Argentina and was referred to by them in their 1945 publication cited above under the designation "Glandularia perakii x G. laciniata". Evidence seems to indicate, however, that the plant which they consistently identify as Glandularia laciniata was actually Verbena tenuisecta. As far as known now, the two parental species do not occur together in the wild anywhere, so it is not probable that this hybrid will be found in the wild, unless the ranges of the parental species are much extended in the future either by natural distributional expansion or by more collecting on our part producing a more complete picture of the natural ranges of the species. The hybrid should have considerable horticultural merit.

VERBENA NIVEA Moldenke, *Phytologia* 1: 459. 1940.

Bibliography: Moldenke, *Phytologia* 1: 459. 1940; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 44 & 101. 1942; Hill & Salisb., *Ind. Kew. Suppl.* 10: 242. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 98, 106, & 198. 1949; Moldenke, *Résumé* 115, 127, & 473. 1959; Moldenke, *Résumé Suppl.* 4: 5. 1962.

Low procumbent or trailing herb, branched from the base; branches spreading in radial fashion, very slender, sometimes almost filiform, obtusely subtetragonal, rather densely puberulent with very short spreading cinereous hairs, more sparsely so or glabrescent in age, the youngest branchlets very densely short-pubescent with spreading cinereous hairs; nodes faintly annulate; principal internodes 0.5--2.5 cm. long, mostly greatly abbreviated; leaves decussate-opposite, numerous, usually with several much reduced ones in their axils; petioles slender, 1--4 mm. long, flattened, deeply canaliculate above, narrowly winged-margined, rather densely or sparsely strigose with appressed whitish hairs; leaf-blades chartaceous, uniformly gray-green on both surfaces, ovate in outline, 4--8 mm. long and wide, densel strigose with appressed whitish antrorse hairs on both surfaces, 3-lobed or -parted almost to the base, each division often again 2- or 3-lobed, the lobes all obtuse at the apex and revolute-margined; the very slender midrib and secondaries impressed above, slightly prominulous beneath; veinlet reticulation indiscernible on both surfaces; inflorescence terminal, capitate; heads small, many-flowered, dense, subsessile or very short-pedunculate; calyx tubular, 3--4 mm. long, often purplish, densely short-pubescent with whitish rather spreading hairs; corolla

white, bluish-white, or slightly purplish, its tube about 5 mm. long, the limb 2.5--3 mm. in diameter.

The type of this species was collected by Santiago Venturi (no. 10014) along the highway to San Antonio, Rosario de Lerma, at an altitude of 3000 meters, Salta, Argentina, in December, 1929, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found at altitudes of 3000 to 4200 meters (according to labels, but see Dr. Asplund's letter quoted hereinafter), flowering from December to March and in May, fruiting in March. Herbarium material has been misidentified and distributed as V. microphylla Kunth and it is actually possible that these two taxa are not distinct. More intensive study is required here.

In regard to the Asplund 5871 collection cited below, whose label reads "General Campero, 4200, 1921/6/III. 12366", Dr. Asplund, in a letter to me dated November 19, 1961, says "The railway station General Campero (that is the spelling on the station house) is in the province of Pacajes in the Department of La Paz, Bolivia. According to my annotations I collected there on March 6, 1921, only one number of Verbena, viz. Nr. 2800, which you determined in July 1954 as Verbena microphylla H.B.K. From where the number 12366 comes I do not know at all, but the change of 2800 to 5871 was most probably done by Dr. Otto Buchtien. He helped me in drying my plants in the rainy season during the first months of 1921, and as a compensation for his help I allowed him to take fragments for his own herbarium. When he inserted these fragments (which were sometimes rather large) into his herbarium he seems to have regarded them as a continuation of his 'Herbarium Bolivianum' and gave them new numbers, continuing his own number series. In copying my field labels he seems to have been sometimes not very careful. For Nr. 2800 I have annotated an altitude of 3900 m (= the altitude of the railway station house in the bottom of the valley), not 4200 m (= approximate altitude of the plateau above the station)."

In all, 10 herbarium specimens, including the type, have been examined by me.

Citations: BOLIVIA: La Paz: Asplund 5871 [12366] (W--1134873). Potosí: Fiebrig 2613 (S, S). ARGENTINA: Jujuy: T. Meyer 3167 (N), s.n. [Herb. Inst. Miguel Lillo 34401] (N); Venturi 8777 (Du--372486, E--962052, N, W--1591414). Salta: Venturi 10014 (N--type).

VERBENA NIVEA f. ROSEA Moldenke, Phytologia 8: 60. 1961.

Bibliography: Moldenke, Phytologia 8: 60. 1961; Moldenke, Résumé Suppl. 3: 15. 1962.

This form differs from the typical form of the species in having rose-colored corollas.

The type of the form was collected by Santiago Venturi (no. 10111) in waste land between pastures at an altitude of 3800 meters, Cumbre del Cajon, dept. Tafi, Tucumán, Argentina, on April 20, 1926, and is deposited in the United States National Herbarium at

Washington. At the time of its publication, I was under the impression that the corollas of V. nivea are always white. However, some collectors describe them as "bluish-white" or "o ligeramente morada", possibly due to fading with age. The present form seems to have the flowers always pink in color. It is known thus far, however, only from the type specimen.

Citations: ARGENTINA: Tucumán: Venturi 10111 (W--1591428--type).

xVERBENA NOACKI Moldenke, *Phytologia* 2: 149. 1946.

Synonymy: Verbena hispida x hastata Dermen, *Cytologia* 7: 170, in textu. 1936. Verbena noackii Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 221. 1951. Verbena hastata L. x V. hispida Ruiz & Pav. ex Moldenke, *Résumé* 366, in syn. 1959. Verbena hispida Ruiz & Pav. x V. hastata L. ex Moldenke, *Résumé* 366, in syn. 1959.

Bibliography: Dermen, *Cytologia* 7: 170. 1936; Moldenke, *Phytologia* 2: 149. 1946; Moldenke, *Alph. List Invalid Names Suppl.* 1: 24. 1947; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 164 & 198. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 221. 1951; Moldenke, *Am. Midl. Nat.* 59: 356--357. 1958; Moldenke, *Résumé* 224, 366, & 473. 1959; Moldenke, *Phytologia* 8: 121 (1961) and 9: 219 & 296. 1963.

The name, xV. noacki, was proposed by me in 1946 for the hybrid produced artificially by Dermen from cultivated material in Massachusetts between V. hastata L. and V. hispida Ruiz & Pav. and discussed by him in 1936. The two parental species do not normally grow together anywhere in the wild -- one being temperate North American and the other being temperate South American. It is not expected, therefore, that this hybrid will ever be found in the wild unless one or the other of the parents is introduced into the region of the other and becomes acclimated there. The hybrid might, however, have horticultural possibilities. Its characters are intermediate between those of the two parental species.

Adding a second "i" to the termination of the second part of this binomial name, and of various other similar binomials in my article on Verbena in the Royal Horticultural Society's *Dictionary of Gardening* (1951), seems to have been a policy of the editor. It was definitely not due to any intentional act on my part, since I do not approve of such so-called and wholly unnecessary and undesirable "corrections" of original spellings!

xVERBENA NOTHA Moldenke, *Phytologia* 5: 133. 1955.

Synonymy: Verbena halei x neomexicana Dermen, *Cytologia* 7: 170. 1936. Verbena halei Small x V. neomexicana (A. Gray) Small ex Moldenke, *Résumé* 365, in syn. 1959. Verbena neomexicana (A. Gray) Small x V. halei Small ex Moldenke, *Résumé* 370, in syn. 1959.

Bibliography: Dermen, *Cytologia* 7: 170. 1936; Moldenke, *Phytologia* 3: 467 (1951) and 5: 133. 1955; Moldenke, *Biol. Abstr.* 30: 1093. 1956; Moldenke, *Résumé* 224, 365, 370, & 473. 1959; Moldenke,

Phytologia 8: 121 (1961) and 9: 166. 1963.

The name, xV. notha, was proposed by me in 1955 for the hybrid between V. halei Small and V. neomexicana (A. Gray) Small produced artificially by Dermen from cultivated material in Massachusetts in 1936 and discussed by him in that year. The two parental species grow together in the wild in at least four counties of Texas and one county of Arizona, as well as in at least four states of Mexico, so it is very possible that this hybrid occurs in the wild. It may account for some of the many puzzling "intermediate" specimens hereinbefore cited under V. neomexicana and its two varieties.

VERBENA OCCULTA Moldenke, Phytologia 3: 280--281. 1950.

Bibliography: Moldenke, Phytologia 3: 280--281 & 286 (1950) and 3: 485. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 85 & 473. 1959; Moldenke, Phytologia 9: 395. 1963.

Herb; stems and branches erect or ascending, brunnescent, obtusely tetragonal, appressed-pilosulous on the older parts, short-pubescent with spreading hairs on the younger parts; nodes annulate; principal internodes 0.5--3 cm. long; leaves decussate-opposite, sessile, more or less clasping-based; petioles obsolete; leaf-blades deeply 3-parted to about the middle, uniformly dark-green on both surfaces, brunnescent in drying, thin-chartaceous, very fragile in drying, densely pubescent on both surfaces with subappressed hairs of irregular length, the divisions often few-toothed or short-lobed, the lobes subacute, somewhat revolute-margined, the single vein in each segment flat or obscure above, prominulous beneath; inflorescence terminal, spicate, abbreviated, 1.5--4 cm. long, densely many-flowered; peduncles obsolete or to 2 cm. long, spreading-pubescent; bracts few, foliaceous, oblong, to 12 mm. long and 2 mm. wide; bractlets large and conspicuous, surpassing and mostly hiding the calyx, 8--10 mm. long, lanceolate, attenuate at the apex, rather densely appressed-pubescent; calyx about 5 mm. long, irregular, densely pubescent, its rim 5-lobed; corolla varying from blue or violet to clear-lilac, purple, or rose, hypocrateriform, its tube 8--10 mm. long, the limb 4--5 mm. wide.

The type of this curious species was collected by Ramón Ferreyra (no. 1298) in a stony habitat, at an altitude of 3200 to 3500 meters, near Nevado Cajamarquilla, in the province of Bolívar, La Libertad, Peru, on September 12, 1946, and is deposited in the Britton Herbarium at the New York Botanical Garden. The species has been found in rocky places at altitudes of 2625 to 4000 meters, blooming in May, June, August, and November. The only common name recorded for it is "verbena".

In all, 10 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Cajamarca: R. Ferreyra 8522 (Z); Scolnik 867 (S), 1304 (Er, N). La Libertad: Angulo 1675 (Z); R. Ferreyra 1298 (N--type); López Miranda 1108 (W--2173745); López Miranda & Sag-

ástegui 2718 (S); Ochoa 1443 (N), 1468 (N).

VERBENA OCCULTA f. ALBA Moldenke, Bull. Torrey Bot. Club 77: 405. 1950.

Bibliography: Moldenke, Bull. Torrey Bot. Club 77: 405. 1950; Moldenke, Revist. Sudam. Bot. 8: 167. 1950; Moldenke, Phytologia 3: 376 (1950) and 4: 451. 1953; Moldenke, Résumé 85 & 473. 1959; Moldenke, Phytologia 9: 395. 1963.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Ramón Ferreyra (no. 6586) in a grassy steppe, at an altitude of 3800 to 3900 meters, between San Rafael and Cerro de Pasco, in the department of Pasco, Peru, on January 31, 1950, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has been collected at 3400 to 4000 meters altitude, flowering in April and June. Sandeman describes it as a "low-growing herb, the leaves very viscous, growing in full exposure on the mountain-side". His specimen is a perfect match for the illustration given by Ruiz & Pavon for their V. multifida, which, however, they state came from Concepcion, Chile. Their name, furthermore, seems to be only a new name for Erinus laciniatus of Linnaeus and so must go into the synonymy of V. laciniata (L.) Briq. regardless of the identity of the plant which they illustrated.

In all, 7 herbarium specimens of this form, including the type, have been examined by me.

Citations: PERU: Ancash: Cerrate 302 (N), 316 (N). Junin: Asplund 12009 (S, S); Sandeman 103 (K). Pasco: R. Ferreyra 6586 (N--type); Ochoa 333 (N).

VERBENA OFFICINALIS L., Sp. Pl., ed. 1, 20--21. 1753 [V. officinalis Auct., 1957, nor Wats., 1943].

Synonymy: Verbena Dorst., Botanicon 292. 1540. [umbina Dorst., Botanicon 292, in syn. 1540. Crista gallina Dorst., Botanicon 292, in syn. 1540. Peristericon Dorst., Botanicon 292, in syn. 1540. Verbenaca Dorst., Botanicon 292, in syn. 1540. Verbenaca recta Ruell., Ped. Dioscorid. Anazarb., vol. 1, 317. 1549. Verbenaca Matth., Comment. 466--467. 1554. Sacra herba Matth., Comment. 466--467. 1554. Communis Verbena sive sacra procerior recta L'Obel, Plant. Obs. 231. 1576. Verbena vulgò appellata Caesalp., De Plantis 450. 1583. Alterum genus, quod Mas apud Plinium intelligitur Caesalp., De Plantis 451. 1583. Verbena recta Dodon., Stirp. Hist. Pemptad. 150. 1583. Communis verbena & sacra recta L'Obel, Icon. Stirp. 534. 1591. Verbena communis Gerarde, Herbal 580. 1597. Verbena sacra Gerarde, Herbal 580. 1597. Verbena vulgaris Clus., Rar. Plant. Hist. 4: xlv. 1601. Verbena communis caeruleo flore C. Bauh., Pinax Theatr. Bot. 269. 1623. Verbena communis & sacra recta L'Obel ex C.

Bauh., Pinax Theatr. Bot., ed. 1, 269, in syn. 1623. Columbaris
Herm. ex C. Bauh., Pinax Theatr. Bot., ed. 1, 269, in syn. 1623.
Herba sacra Ang. Tur. ex C. Bauh., Pinax Theatr. Bot., ed. 1, 269,
in syn. 1623. Verbena sive verbenaca Guil. ex C. Bauh., Pinax
Theatr. Bot., ed. 1, 269, in syn. 1623. Hierobotane mas Brunf.
ex C. Bauh., Pinax Theatr. Bot., ed. 1, 269, in syn. 1623. Verbe-
na Gesn. ex C. Bauh., Pinax Theatr. Bot., ed. 1, 269, in syn.
1623. Verbena mascula Brunfels ex C. Bauh., Pinax Theatr. Bot.,
ed. 1, 269, in syn. 1623. Verbenaca vulgaris Lug. ex Matth.,
Opera Omnia Comment. 742, in syn. 1624. Sacra herba Tourn. ex
Matth., Opera Omnia Comment. 742, in syn. 1624. Verbena recta
Trag. ex Matth., Opera Omnia Comment. 742, in syn. 1624. Verbena-
ca recta Dodon. ex Matth., Opera Omnia Comment. 742, in syn. 1624.
Verbena communis C. Bauh. ex Matth., Opera Omnia Comment. 742, in
syn. 1624. Verbena vulgaris J. Bauh., Hist. Plant. Univ. 3: 443--
444. 1650. Verbena Matth., Apolog. 214. 1674. Verbena communis,
flore coeruleo C. Bauh. apud P. Herm., Hort. Acad. Lugd.-Bat. Cat.
619. 1687. Verbena communis flore caeruleo C. Bauh. apud P. Herm.,
Fl. Lugd.-Bat. 55. 1690. Verbena latifolia lusitanica procerior
Tourn. apud P. Herm., Fl. Lugd.-Bat. 55. 1690. Verbena off.
Eysenkraut Rivin., Introd. Gen. Remherb. [24] Icon. [56]. 1690.
Verbena communis, caeruleo flore C. Bauh. apud Tourn., Hist. Pl.
Paris 309. 1698. ?Verbena chalepensis major vulgaris facie R.
Morison, Plant. Hist. Univ. Oxon. 3: "408" [=418]. 1699. Herba
sacra R. Morison, Pl. Hist. Univ. Oxon. 3: "408" [=418], in syn.
1699. Hierobotana Brunfels ex R. Morison, Plant. Hist. Univ. Ox-
on. 3: "408" [=418], in syn. 1699. Verbena communis sive vulga-
ris Clus. ex R. Morison, Plant. Hist. Univ. Oxon. 3: "408"
[=418] & 419, sec. 11, pl. 25, fig. 1. 1699. ?Verbena chalepen-
sis major, vulgaris facie Moris. apud Ray, Hist. Plant. 3: Suppl.
287. 1704. Verbena lusitanica latifolia procerior Tourn. ex Ray,
Hist. Plant. 3: Suppl. 285. 1704. Verbena latifolia, lusitanica,
procerior Tourn. apud Boerh., Ind. Plant. Hort. Acad. Lugd., ed.
1, 75. 1710. Verbena; lusitanica; latifolia; procerior Tourn.
apud Boerh., Ind. Alt. Plant. Hort. Acad. Lugd., ed. 2, 1: 187.
1720. Verbena; communis; flore caeruleo C. Bauh. apud Boerh.,
Ind. Alt. Plant. Hort. Acad. Lugd., ed. 2, 1: 187. 1720. Verbena
foliis multifido-laciniatis, spicis filiformibus L., Hort. Cliff.
11. 1737. Verbena communis, flore caeruleo C. Bauh. ex L., Hort.
Cliff. 11, in syn. 1737. Verbena officinarum Dal. ex L., Hort.
Cliff. 11, in syn. 1737. Verbena Rivin. ex L., Hort. Cliff. 11,
in syn. 1737. Verbena humilior foliis incisis Clayt. ex J. F.
Gronov., Fl. Virg., ed. 1, 8. 1739. Verbena folio variegata
Breyn ex Haller, Enum. Meth. Stirp. Helvet. 1: 661. 1742. Verbe-
na communis coeruleo flore C. Bauh. ex Haller, Enum. Meth. Stirp.

Helvet. 1: 661, in syn. 1742. Verbena foliis laciniatis superi-
oribus, tripartitis, spicis angustis longissimis Haller, Enum.
 Meth. Stirp. Helvet. 1: 661. 1742. Verbena Ruell. ex Haller, E-
num. Meth. Stirp. Helvet. 1: 661, in syn. 1742. Verbena Caesalp.
ex Haller, Enum. Meth. Stirp. Helvet. 1: 661, in syn. 1742. Ver-
vena Rivin. t. 56 (sola summa planta) Blackw. t. 41 Haller, Enum.
 Meth. Stirp. Helvet. 1: 661, in syn. 1742. Verbena communis
caeruleo flore (Foliis dissectis) Tourn. apud Michel, Cat. Plant.
 Hort. Caes. Florent. 98. 1748. Verbena communis caeruleo flore
(foliis non, vel parum dissectis) Michel, Cat. Plant. Hort. Caes.
 Florent. 98. 1748. Verbena vrticaefolia canadensis, foliis in-
cisis, flore maiore Tourn. ex Michel, Cat. Plant. Hort. Caes.
 Florent. 98. 1748. Verbena spuria L., Hort. Upsal. 8. 1748; Sp.
 Pl., ed. 1, 20. 1753. Verbena (tetrandra), spicis filiformibus,
foliis multifido-laciniatis L., Mat. Med. 6. 1749. Verbena su-
pina Blackwell, Cur. Herbal 1: pl. 41. 1751. Verbena foliis
multifido laciniatis, spicis filiformibus L. apud Sauvages, Meth.
 Fol. Pl. Fl. Monspel. 279, sphalm. 1751. Verbena foliis lacini-
atis, summis tripartitis, spicis angustis longissimis Haller ex
 Sauvages, Meth. Fol. Pl. Fl. Monspel. 279, in syn. 1751. Verveine
 Sauvages, Meth. Fol. Pl. Fl. Monspel. 279, in syn. 1751. Verbena
tetrandra, spicis filiformibus paniculatis, foliis multifido-
laciniatis, caule solitario L., Sp. Pl., ed. 1, 20. 1753. Verbena
tetrandra, spicis filiformibus, foliis multifido-laciniatis caul-
ibus numerosis L., Sp. Pl., ed. 1, 1: 20. 1753. Veronica humili-
or, foliis incisis Clayt. ex L., Sp. Pl., ed. 1, 1: 20, in syn.
 1753. Verbena (officinalis) tetrandra spicis filiformibus panic-
ulatis, foliis multifido-laciniatis, caule solitario L., Fl.
 Svec., ed. 2, 10. 1755. Verbena tetrandra, spicis filiformibus,
foliis multifido laciniatis, caulibus numerosis L. apud J. F.
 Gronov., Fl. Virg., ed. 2, 4. 1762. Verbena urticae folio cana-
densis, foliis incisis, flore majore Tourn. apud J. F. Gronov.,
 Fl. Virg., ed. 2, 4, in syn. 1762. Verbena humilior foliis in-
cisis J. F. Gronov., Fl. Virg., ed. 2, 4. 1762. Verbena foliis
tripartitis, rugosis, spicis nudis gracillimis Haller, Hist.
 Stirp. Indig. Helvet. 1: [96]. 1768. Verbena tetrandra spiciis
filiformibus paniculatis, foliis multifido laciniatis, caule
solitario L. apud Haller, Hist. Stirp. Indig. Helvet. 1: [96],
 in syn. 1768. Verbena foliis vix dissectis Haller, Hist. Stirp.
 Indig. Helvet. 1: [96]. 1768. Verbena Rivin. t. 56. summa, ut
fere solet, planta Blakwell t. 41 Haller, Hist. Stirp. Indig.
 Helvet. 1: [96], in syn. 1768. Verbena officinalis tetrandra,
spicis filiformibus paniculatis, foliis multifido-laciniatis,
caule solitario L. apud Pollich, Hist. Plant. Palat. 1: 22. 1776.

Verbena officinalis, tetrandra spicis filiformibus paniculatis, foliis multifido-laciniatis, caule solitario L. apud O. F. Müller, Icon. Plant. Fl. Dan. 4: 5, in syn. 1777. Verbena spicata Gilib., Fl. Lithuan. 1: 92. 1735. Verbena foliis multifido-laciniatis: spicis filiformibus L. apud Lour., Fl. Cochinch., ed. 1, 1: 27, in syn. 1790. Verbena tetrandra, spicis filiformibus: foliis multifido-laciniatis. Caule solitario L., apud Lour., Fl. Cochinch., ed. 1, 1: 27, in syn. 1790. Verbena tetrandra; spicis filiformibus, paniculatis; foliis multifido-laciniatis; caule solitario L. apud Desf., Fl. Atlant. 1: 16. 1800. Verbena erecta sive mas Dodon. apud Desf., Fl. Atlant. 1: 16. 1800. Verbena foliis tripartitis, rugosis; spicis nudis, gracillimis Haller apud Desf., Fl. Atlant. 1: 16, in syn. 1800. Verbena tetrandra, spicis filiformibus, paniculatis, foliis multifido-laciniatis, caule solitario L. apud Poir. in Lam., Encycl. Méth. Bot. 8: 544--545. 1808. Verbena foliis rugosis, tripartitis; spicis nudis, strigosis Haller apud Poir. in Lam., Encycl. Méth. Bot. 8: 545, in syn. 1808. Verbena erecta, sive mas Dodon. apud Poir. in Lam., Encycl. Méth. Bot. 8: 545, in syn. 1808. Communis verbena & sacra, recta L'Obel apud Poir. in Lam., Encycl. Méth. Bot. 8: 545, in syn. 1808. Verbena tetrandra, spicis filiformibus, foliis multifido-laciniatis, caulibus numerosis L. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena spuria, caule decumbente, ramosissimo, divaricato; foliis ovalibus, incisis; spicis filiformibus, bracteis calices superantibus Michx. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena humilior, foliis incisis Clayt. apud Poir. in Lam., Encycl. Méth. Bot. 8: 547, in syn. 1808. Verbena communis Thornton, Brit. Fl. 1: 27. 1812. Verbena tetrandra, spicis filiformibus paniculatis; foliis multifidis, laciniatis; caule solitario L. apud Picot de Lapeyr., Hist. Abrég. Pl. Pyrén. 12, in syn. 1813. Verbena vulgaris Waller, New Brit. Domest. Herb. 1: 30. 1822. Verbena sororia D. Don, Prod. Fl. Nep. 104. 1825. Verbena officinalis var. α Hook., Bot. Misc. 1: 160. 1829. Verbena fol. multif.-lacin., spicis filif. L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena lusitanica latif. procerior Tourn. apud H. E. Richter, Cod. Bot. Linn. 35, in syn. 1835. Verbena lus. latif. proc. Tourn. apud H. E. Richter, Cod. Bot. Linn. 36, in syn. 1835. Verbena tetrandra, spicis filiformib., fol. multifido-laciniatis, caulibus numerosis L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena tetrandra, spicis filif. paniculatis, fol. multifido-laciniatis, caule solitario L. apud H. E. Richter, Cod. Bot. Linn. 35. 1835. Verbena urticae fol., canadens., fol. incisis, fl. majore Tourn. apud H. E. Richter,

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1918; Lindman, Svensk Fanerogamfl. 464. 1918; Fitch & Sm., Ill. Brit. Fl., ed. rev. 4, iss. 2, fig. 822 (1919) and ed. 5, fig. 822. 1924; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): pl. 222, fig. 5, 3174, & 3175 [in color]. 1927; Bonnier, Fl. Compl. France, Suisse, & Belg. 9: pl. 497 [in color]. 1927; Javorka & Csapody, Ic. Fl. Hungar. 418. 1932; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): fig. 1319. 1933; Korsmo, Ugressfrø pl. 17 [in color]. 1935; Dop in Le-comte, Fl. Gén. Indo-chine 4: 773, fig. 83, 4-7. 1935; Dermen, Cytologia 7: 163, fig. 15. 1936; Bedevian, Illustr. Polyglott. Dict. Pl. Name 610. 1936; F. C. Hoehne, Plant. Subst. Veg. Tox. fig. 204 II. 1939; H. N. & A. L. Moldenke, Pl. Life 2: 41, pl. 7. 1948; Blossom, N. Y. Herald Trib., sect. 5, p. 14, July 25. 1948; Hausman, Begin. Guide Wild Fls. 262. 1948; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 128. 1952; León & Alain, Fl. Cuba 4: 281. 1957; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 128. 1958; Strausbaugh & Core, Fl. W. Va. 3: 775. 1958; Rothmaler, Exkursionsfl. Atlas fig. 1943. 1959; Nair & Rehman, Bull. Nat. Bot. Gard. Lucknow 76: 3, fig. 3. 1962; Brit. Mus. (Nat. Hist.) Brit. Flow. Pl. card F.80 [in color]. n.d.

Annual or perennial herb, 0.1-2 m. tall, varying from erect to spreading or even low and sprawling, scented, often weedy, sometimes semi-woody, diffusely much-branched; stems 1 or several, ascending or spreading to erect, slender, mostly herbaceous, somewhat tetragonal and margined, branched above, striate, glabrous or almost so except on the muriculate or scabrid angles; leaves decussate-opposite, sessile or subsessile or sometimes narrowed into a short winged petiole, sheathing at the base; leaf-blades 1.5-10 cm. long, 0.7-2 cm. wide, the basal and lower ones more or less ovate, ovate-oblong, oblong, or oblong-lanceolate to lanceolate or oblanceolate or even rhomboid-ovate in general outline, varying from tripartite-laciniate or deeply incised to more or less deeply trifid, 5-cleft, or even 1- or 2-pinnatifid, narrowed toward the base or cuneate into a petiole, the upper ones similar but smaller and less divided, the uppermost entire, the various segments, lobes, or lacinations acute or obtuse at the apex, often again incised or crenate-serrate, strigose-scabrous or roughly pubescent to appressed puberulent or even subglabrous or glabrescent on both surfaces, sometimes sparsely strigillose on the larger venation only beneath; larger veins impressed above, prominulous beneath; inflorescence composed of long, slender, axillary and terminal spikes ("racemes" according to Verdoorn), 15-50 cm. long, forming a terminal much-branched panicle, wide and more or less leafy below; spikes few, very lax, slender or filiform, 15-23 cm. long, strict, open and remotely flowered or compact only during anthesis, greatly elongating after anthesis, paniculate or subpaniculate, bracteate; peduncles glabrous, smooth on the flat surfaces, roughened on the margins for their whole length; rachis hirtellous and glandular, the branches slender; bractlets ovate or lanceolate, not over 2 mm. long, shorter than (or the lower as long as) the calyx, acute or acuminate at the apex, pubescent or hirtellous beneath, glabrous above, glandular, with the midrib very prominent beneath

(i.e., on the back); flowers numerous, fragrant, small, loosely arranged on the narrow spikes, distant below, crowded above, usually only 4 or 5 blooming simultaneously on one spike, about 12 mm. long; calyx cylindric, about 2 mm. long, glabrous within, hirtellous or hispid on the ribs outside, glandular, the rim subtruncate, minutely toothed; corolla hypocrateriform, varying from red, peach-red, red-violet, rose, rose-purple, rose-lavender, lavender-rose, pale rose-purple, or pink to purple, pale-purple, bluish-purple, mauve, lilac, violet, lavender, deep-lavender, lavender-blue, light-blue, bluish, or blue ("albo-rufescentes" according to J. A. Murray, 1774), its tube delicate, cylindric, a little longer to about twice as long as the calyx, usually less than 3 mm. long, the limb 1--1.5 mm. wide, the lobes more or less rounded; stamens inserted at about the middle of the corolla-tube; anthers not appendaged; pollen-grains oblate-spheroidal, 26--30 μ x 29--35 μ , usually 29 μ x 32 μ , the endocolpium longitudinal, 3.5 μ x 12 μ ; ovary and style about 2 mm. long, glabrous; fruiting-calyx persistent, short-hairy, enclosing the fruit; fruit slightly larger than in V. gracilescens, composed of 4 nutlets, easily separating, the cocci broadly ellipsoid or shortly oblong, 1.5--2 mm. long, strongly striate, areolate-reticulate between the veins or striations toward the apex on the back; chromosome number: $n = 7$; $2n = 14$.

Cufodontis (1962) states that this species, the type of the genus, is based on "syntypes: ex Europae mediterraneae ruderatis!"

It should be noted here that V. officinalis Auct., referred to in the synonymy above, is a synonym of V. gracilescens (Cham.) Herter; V. officinalis Cuevas is Stachytarpheta jamaicensis (L.) Vahl; V. officinalis Wats. is V. menthaefolia Benth.; V. officinalis var. gracibras Lehm. is V. litoralis H.B.K.; V. officinalis var. gracilescens Cham., var. gracilescens Griseb., and var. gracilescens Haumann-Merck are all V. gracilescens (Cham.) Herter; V. officinalis var. hirsuta Torr. is V. neomexicana (A. Gray) Small; V. officinalis var. major Osten is V. gracilescens (Cham.) Herter; V. officinalis var. mediterranea Née is V. menthaefolia Benth.; V. officinalis var. tenuis Cham. is V. gracilescens (Cham.) Herter; V. officinalis f. roseiflora Benke is V. halei f. roseiflora (Benke) Moldenke, as is also V. officinalis f. rosa Blackwell.

The following hybrids are known: with V. halei Small (=xV. conata Moldenke); with V. hastata L. (=xV. baileyana Moldenke); with V. hispida Ruiz & Pav. (=xV. meretrix Moldenke); with V. lasiostachys var. septentrionalis Moldenke (=xV. suksdorfi Moldenke); with V. robusta Greene (=xV. clemensorum Moldenke); with V. supina L. (=xV. adulterina Hausskn.); and with Veronica maritima L. (=xVeronicena haartmani Moldenke). The supposed "Verbena officinalis x bracteosa Barnes" is xV. perriana Moldenke (actually V. bracteata Lag. & Rodr. x V. urticifolia L.), "Verbena offic-

inalis x prostrata Dermen" is xV. suksdorfi Moldenke (actually V. officinalis L. x V. lasiostachys var. septentrionalis Moldenke), and "Verbena officinalis x xutha Engelm." is V. halei Small.

The "V. officinalis L." of C. Berg, Anal. Soc. Cientif. Argent. 3: 199 (1877), which he found around Buenos Aires and describes as "Los ejemplares eran muy tiernos y ténues", is V. gracilescens (Cham.) Herter. The "Sacra herba Ruell." is a mint.

Hooker (1829) describes a var. α "caule erecto subhispidio, foliis lanceolatis, inciso-serratis trifidisque segmentis incisis scabris, spicis filiformibus subpaniculatis, floribus remotiusculis.....In Pampas ab urbe Bonaria usque ad Mendozam." He mentions also a var. β "foliis grosse serratis vix profunde incisis....Apud Rio Saladillo ad limites occidentalis planitiei Pampas dictae, et ad margines aquarum in Provinciae Mendozae.....Var. β differs from the α and the common European state of the plant, solely in the less deeply cut leaves." His second variety is certainly V. gracilescens (Cham.) Herter.

Linnaeus (1753) distinguishes his V. spuria by its "caulibus numerosis" from V. officinalis with its "caule solitario". He also uses the term "paniculatis" for the spikes of the latter and does not use it for those of the former. Poiret (1808) affirms that Michaux's "V. spuria, caule decumbente, ramisissimo, divaricato; foliis ovalibus, incisis; spicis filiformibus, bracteis calices superantibus" and Clayton's "V. humilior, foliis incisis" are the V. spuria form of the species, too. Hooker (1836) says "The V. spuria, Willd., which I possess from Pennsylvania and New Jersey, I agree with Mr. Nuttall in considering a mere var. of officinalis."

The type of Verbena humilior foliis incisis Gronov. (and variants of this pre-linnean name) is sometimes cited as "Clayton 8", but the figure here is the page number of Gronovius' work where the name appears. The "Verbena spuria inedito" of Ruiz & Pavon is V. menthaefolia Benth.

Verbena recta Caesalp. is given under the genus Lycopus by Haller in his Enum. Meth. Stirp. Helvet. 1: 660 (1742). This same author places Verbenaca supina s. femina Fuchs and Verbenaca supina Cord. under what is now known as Verbena officinalis on page 661 of the same work, but these names actually belong in the synonymy of V. supina L. On page 551 he places Verbena mas Fuchs and Verbena recta & mas Gesn. under what he calls Sisymbrium foliis pinnatis, extremo lobo triangulo, siliquis erectis, cauli adpressis, and which is what we now know as Erysimum officinale L. On page 624 he places Verbenaca recta Cord. in the synonymy of a species of Lycopus which he calls Alectorolophus calycibus glabris, foliis inter floris latioribus,

Michel (1748) regarded the Verbena of Caesalpinus as a "species" with dissected leaves, while the Verbenaca of Matthioli he

regarded as a "species" with not at all or only slightly dissected leaves. Under the former he says "Haec, & sequens promiscue usurpantur pro Verbena, Herba Sacra, Hierobotane, Herba S. Ioannis, & Berbena". C. Bauhin (1623) includes Verbenaca foemina Caesalp. and Verbenaca supina (& foemina) Fuchs in the synonymy of Verbena communis caeruleo flore (which is now V. officinalis), but these two names belong more properly in the synonymy of V. supina L.

Stearn (1961) notes that "although Linnaeus placed his genus Verbena in the class Diandria, having two stamens, he deliberately included within it species with two stamens and species with four, among the latter being V. officinalis, the historic type of the genus."

Of Verbena urticae folio canadensis, foliis incisis, flore majore Tourn. Ray, in his Hist. Plant. 3: Suppl. 285 (1704), says "Hujus speciei folia pinguntur à Jacobo Zannoni in eadem tabula cum Verbena con foglie d'ortica di Canada pag. 203. ubi plena habetur omnium partium descriptio." This appears to be V. urticifolia L.

Matthiolum (1624) regarded Verbenaca supina Fuchs and Verbena foemina Caesalp. as synonyms of V. officinalis, but these names actually belong in the synonymy of V. supina L.

Schauer (1847) included V. setosa Mart. & Gal. in the synonymy of V. officinalis, but it really belongs with V. menthaefolia Benth. In my Prelim. Alph. List Invalid Names 46 (1940) I regarded V. domingensis Urb. as a synonym of V. officinalis, but I now maintain it as distinct. Similarly, in my Alph. List Invalid Names Suppl. 1: 22 (1947) I reduced xV. adulterina Hausskn. to synonymy under V. officinalis, but now regard it as probably distinct.

Lam (1919) places V. macrostachya F. Muell. and V. menthaefolia Benth. in the synonymy of V. officinalis, but I regard the former as a valid variety and the latter as a valid species.

Verbena communis caeruleo flore C. Bauh. is accredited to "G. Bauh." by J. Bauhin (1689) and is given as a synonym of V. supina L. Actually, Caspar Bauhin's given name was sometimes written "Kaspar" or "Gaspard".

Dorsten (1540) says "Verbenae duo sunt genera, Altera floribus est albis, altera verò coeruleis". Haller (1742) recognized a variety "β" with white flowers (now known as f. albiflora Strobl) and a variety "γ" with variegated leaves ("Folio variegata Breyn Prodr. 11. p. 100"). I have not as yet seen any specimens with variegated leaves, but the form may well exist and may be worthy of nomenclatural recognition. On page [96] of his 1768 work, Haller regards the Hort. Florent. p. 98 plant as a variety "β Foliis vix dissectis". Ray (1704) and Linnaeus (1737) regarded Tournefort's "Verbena lusitanica latifolia procerior" as a variety -- designated as "α" by Linnaeus -- of V. officinalis.

No description is given of V. officinalis var. natalensis in the original place of publication, but the name is based on F. Krauss 151 "ad fluv. Umlaas, Natal, Dec."

"Koch & Almquist, Svenska Flora 1", "Hochst., Pl. Schimp. Abyss. I. 145", and "Poeppig, Coll. Pl. Chile 158" are sometimes cited as though they were literature references, but appear to be exsiccatae. L'Ecluse, Rar. Plant. Hist. XLV (1601) is sometimes cited as "2: 45, fig. 1", as "xiv", or as "Rar. Aliq. Stirp. Pannon. p. XLV.1.B.III.p.443. 1583" -- the last-mentioned may be a reference to Bejthe, Stirp. Nomencl. [14]. 1583. The Haartman (1756) reference is sometimes given as "pl. 11" [=II]. The date on the volume title-page is "1756", on the second title-page is "August 20, 1756", and at the head of the article itself is "November 23, 1751". On page 35 it is stated that "Floruit quidem haec planta omni anno felicissime, in annum que haec edimus 1755 & vivi." This is sometimes misquoted as "1775".

It is perhaps worth mentioning here that J. F. Gronovius, Fl. Virg., ed. 1, 8 (1739) is sometimes cited as "Clayt., Fl. Virg. 8. 1743". O. F. Müller, Icon. Plant. Fl. Dan. 4: pl. 628 (1775) is also cited as "1777"; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147 (1894) is often cited as "1895"; and Fiori & Paoletti, Icon. Fl. Ital. fig. 3218 (1902) is also cited as "1895". The L., Fl. Suec., ed. 1, 9 (1745) reference is sometimes referred to as page "26", which figure actually is the species number on page 9; L., Mat. Med. 6 (1749) is sometimes erroneously cited as page "38"; J. Bauh., Hist. Plant. Univ. 3: 443--444 (1650) is sometimes cited as "1651" or "1750"; Gerarde, Herbal 580 (1597) is sometimes erroneously cited as page "781"; Zetterstedt, Pl. Vasc. Pyren. 220 (1857) is sometimes incorrectly cited as page "1050", that figure being the species number on page 220. Roig y Mesa, in his Pl. Medic. Cuba 671 (1945), cites Robledo, Lecc. Bot. 2: 526 (1940), but the correct page is 497. Sabbat in Martelli, Hort. Roman. 3: 11, pl. 55 (1775) is sometimes cited as an illustration of V. officinalis, but it is pl. 56 which has the illustration of this plant. Zannich., Istor. Piante Venez. pl. 269 (1735) is sometimes cited as "pl. 289", but the latter is an illustration of a composite, there designated as Cyanus minor. Hofmeister, Jahrb. Wiss. Bot. 1: 82--190 (1858) is sometimes cited in the bibliography of V. officinalis, but the species is mentioned only on page 140, while the "M. Treub, Ann. Jard. Bot. Buitenz. 3: 77--87 (1883) reference is entirely incorrect, since the species is not mentioned anywhere on those pages. Hara (1948) cites fig. 1319 (1933) and fig. 563 (1940) in two books with Japanese titles not decipherable to me.

Eig, Zohary, & Feinbrunn (1931) state that the leaves of V. officinalis are "pinnate", but actually they are always simple! These authors probably meant to say "pinnately parted". They note that in Palestine the species is "found almost all year round" (i.e., in anthesis?). Zohary (1962) says that it comprises part of the Rubion sancti Alliance in the Inuletum viscosae Alliance among the ecologic formations there.

Common and vernacular names for this plant are numerous, including "akkoraragg", "Altarblume", "aristereon", "Aschlepius alceas", "ashthroat", "berbena", "berbina", "berbine", "berbena", "blue vervain", "camaradinha", "candelabra verbena", "chamarlycus", "chamaelygos", "chamelicos", "chamticos", "columbina", "columbine", "common veruaine", "common vervain", "cố roi ngua", "creisetta", "crista gallinacea", "crocetta", "curetis fersefomon", "cyparissos", "demetrius", "diose lacete", "Druidenkraut", "Druivenkruid", "echtes Eisenkraut", "Eisen-bart", "Eisen-bart kraut", "eisencraut", "Eisen-dek", "Eisenhart", "Eisen-hart", "Eisen-hart kraut", "eisenhendrik", "Eisenherz", "Eisen-herz", "Eisen-herz kraut", "eisenhindrik", "Eisenkraut", "Eisen-kraut", "eisen krokt", "Eisenreich", "Eisen-reich", "Eisenweich", "Eisen-weich", "eisener Heinrich", "eiserich", "eiserich kraut", "eisern", "eisernhart", "eisern-hart", "eisewich", "eisewig", "eisick", "enchanter's plant", "enchanter's-plant", "erba dé berména", "erba de San Giovanni", "erba trona", "erba turca", "erbo à touti li man", "European-verbena", "European vervain", "European vervein", "exupera", "eysencrut", "eysenhard", "eysenkruyd", "eyssenchrawtt", "eyssen-kraut", "Feldcypresse", "ferraria", "gebräuchliches Eisenkraut", "gemeine Eisenkraut", "gemeines Eisenkraut", "geweiht kraut", "geweiht-kraut", "geweiht kraut", "gtvercinotu", "Hahnenkampf", "Hahnen-kampf", "frog's-foot", "frossis-foot", "Hahnenkopf", "Hahnen-kopf", "hardijzer", "heiliges Kraut", "Heiligkraut", "Heilig-kraut", "herba columbariae", "herba santa", "herba S. Ionnis", "herba veneris", "herba verbenae", "herba verbenae officinalis", "herba verbenae sanguinalis", "herbe à tous les maux", "herbe a tous maux", "herbe aux enchantements", "herbe aux sorciers", "herbe aux sorcières", "herbe de foie", "herbe de sang", "herbe de vervaine", "herbe di San Giovanni", "herbe du foie", "herbe sacrée", "herbe-sacrée", "herb-grace", "herb of the cross", "herb-of-the-cross", "herb o' grace", "herb of grace", "herculania", "herva de ferro", "hierobotane", "hierobotane", "holie herbe", "holy herb", "holy-herb", "holy veruane", "holy vervain", "holy wort", "iezerkroet", "iherobotane", "iisercruyt", "ijsenkruyd", "ijserhard", "ijserhart", "ijserkruyd", "ijzerhard", "ijzerkruid", "irenhard", "iren Hendrek", "isarna", "isarna chrút", "isarnina", "isecruyt", "isekrut", "isena", "isearre", "isen-bart", "isen-brut", "isen-hard", "isenharde", "isen-kraut", "isenkrút", "iserbart", "isercruit", "isercruyt", "isere", "iseren-bart", "iserene Hendrek", "iseren-hard", "iserenkrut", "iserhark", "iserhart", "iserhert", "iserich", "iser-kraut", "isern", "isernehart", "isern Hendreck", "isern krut", "isinchlete", "isin-ina", "isin-un", "isirn", "isirn wurz", "isni", "issenkraut", "issernhar", "issinkraut", "Junos teares", "jagged-leaved vervain", "jernurt", "Juno's herb", "Juno's tears", "Juno's tears", "Junothränen", "Juno-tränen", "jururuba", "karáita", "Katzenblut", "Katzenblutkraut", "kau kau yeuk", "kau nga ts'o", "kerckkruyd", "kerkkruid", "Krauskraut", "kuma-tsuzura", "la verveine", "la verveine officinale", "lecheri", "licinia", "lightning plant", "lung nga ts'o", "lustam", "lustrago", "mà pién tsão", "ma pin tso", "ma pin t'so", "ma tien tháo", "matricalis",

"Mercurie's moist blood", "Mercuries moist bloude", "Mercury's moist blood", "Merkurblut", "militarem", "mine çiç", "mine çiç o!", "native vervain", "ngoh sat na", "officinal vervain", "Opferbraut", "Opfernblut", "pámúkh", "panchromos", "pancremon", "pempentar", "peristerian wort", "peristerion", "perstereona", "philtrodotes", "pigeon's grass", "pigeon's-grass", "pigeon's grasse", "pigeon weed", "pitagosas", "planta de sorte", "pushtu", "reichhard", "reich-hard", "reich-hart", "Richard-kraut", "rigi el khamám", "rigl el khamám", "ri'f el khamám", "sacra herba", "Sagenkraut", "Segen-kraut", "seruftit", "serruffit", "shamuki", "shop vervain", "sideritis", "simpler's joy", "simpler's-joy", "sirpina", "sister vervain", "ssirugtiät", "Stahlkraut", "Stahlkraut", "standing berbana", "Tauben-kraut", "Taubenlieb", "tialu", "tigrodion", "trygonium", "trygonum", "urgebäo", "varveino", "varveyn", "Venusader", "Venusblut", "verain", "verbena", "verbenaca", "verbena colombaria", "verbenam", "verbene colombaria", "verbene officinale", "verminacola", "verminacula", "vertiperdum", "veruaine", "veruayne", "veruana", "vervain", "vervaine masse", "vervayne", "vervein", "verveine", "verveine batarde", "verveine bâtarde", "verveine commune", "verveine d'Europe", "verveine officinale", "verveino", "verven", "vervena", "vervene", "verveyn", "vervin", "vrgebacm", "Weihsprossen", "Wieselblut", "wilder eisewig", "wild hyssop", "worogobá", "yik mo tso", "ysen-hard", "ysen-krúte", "ysercruit", "ysere", "yseren", "yseren-hard", "yseren-hart", "yser-hard", "yser-hart", "yserkruyd", "ysern", "ysernhard", "ysinina", and "yzerkruid".

Verbena officinalis has been collected in anthesis and in fruit in every month of the year, growing at altitudes from sea level to 11,000 feet. It is found along roadsides and ditches, in fields, wheatfields, pastures, roadside meadows, waste places, grassy ground, damp or moist places, vacant lots, railroad grounds, and very dry pastures, on dry gentle slopes, grassy hillsides, village commons, and mountainsides, along village streets, rocky paths, sandy roadsides, and canal-banks, at the borders of rice fields and the edges of barnyards, in moist or sandy soil, in damp, grassy, or cultivated ground, on old ballast in shipyards, in dry land under trees, lowlands, cleared areas, and the lawns of old houses.

Stewart & Corry (1888) report that it is casual in northeastern Ireland, adding the comment that "Templeton notes this species as about gardens.....not indigenous, and not naturalized", but MacKay (1836) says "roadsides and waste ground in a limestone soil. Plentiful near Cork, and Killarney, and at Kilmacannick, County of Wicklow." Mrs. Clemens says that it is "gay in paddocks when nothing else showed color except chenopods" and "pretty weed along road" in Queensland. Keogh found it "in densely timbered country" in New Guinea. Suvarnakoses found it scattered in mixed deciduous forests in Thailand, while Kasapligil (1956) reports it growing along ditches and in moist places in Jordan.

Domín (1928) gives its distribution as "temperierte und subtropische Gebiete der ganzen Erde. In Australien mit Ausschluss

von Nord-Australien und West Australia, dafr aber auf Tasmanien." He states that in Queensland it inhabits savanna woods, growing in sandy soil, and occurs as a weed on rainforest soil cleared for cultivation. Verdoorn (1938) says "Widely distributed from the Cape Peninsula through the south-eastern and eastern districts [of the Republic of South Africa] to Natal; also recorded from the Orange Free State and the Transvaal; appears to be rare in the dry central and north-western districts as there is only one record from Prieska....A native of Europe and naturalized at the Cape over 100 years ago. In some areas it is a troublesome weed in lands but plants may be destroyed by the usual methods of clean cultivation before the seeds ripen. In some parts of Griqualand East it is said to be a good winter feed for large and small stock."

Franchet (1882) records it from French Somaliland, while Loureiro (1790) records it as both wild and cultivated in China and Cochinchina. Hausman (1948) describes the flowers as purple and states that the species is found in the United States from "Maine south to Florida; west to Tennessee, Texas." All the Texan material so determined, however, has proved to be V. halei Small. Berg (1877) records it from Buenos Aires, saying "Encontré esta especie en muy pocas partes cerca de Buenos Aires. Los ejemplares eran muy tiernos & ténues". The material to which he refers here is actually V. gracilescens (Cham.) Herter. Bojer (1837) gives the temperate zones of Europe and Asia as the home of V. officinalis, and "Perou" as the original home of V. spuria (L).

Connor & Adams (1951) aver that V. officinalis is "occasional and sometimes locally abundant in waste places on both islands" of New Zealand; Bose calls it a weed of waste places in India; Fahrenholtz found it abundant at the edge of ditches in Germany; Bailey encountered it as a weed in parks in China; Sampson found it to be a "common weed of waste places, abundant on the city walls [of Canton]; flowers all the summer"; Rodin reports it from among cultivated valleys and hills with sparse vegetation in Pakistan; Clemens calls it a weed near houses in Luzon; Ching calls it "common" in Anhwei, China, but Lei found it "rare, among scattered shrubs in dry level land"; Collins reports it as common in Bermuda. Puchtler encountered it growing with Carduus nutans, Lappa officinalis, Persicaria hydropiper, P. lapathifolia, and Thymus serpyllum in Germany; Thedenius refers to it as "subspontaneous" in Sweden; Yuncker calls it a "roadside weed" on Okinawa and describes it as a "weed in waste areas and occasional along roadsides" and also as a "roadside weed" on Niue. Black (1926) describes it as rare or localized in temperate Australia; Watt (1893) reports it "common in the Himálaya from Kashmir to Bhután, at altitudes of 1,000 to 6,000 feet, and in the Bengal plain to the Sunderabands." Radford & Stewart found it growing along a wagon road at the edge of a saltmarsh in North Carolina, while Mackenzie reports it as uncommon along the streets of Cape May, New Jersey. Murrill (1945) calls it "rare in Alachua County, Florida", but the plant to which he refers

here is V. halei Small.

Gonçalves da Cunha & Gonçalves Sobrinho (1938) record V. officinalis from the island of Faial, in the Azores, where they say that it grows in association with Selaginella denticulata, Rubus rusticanus, Polygonum aviculare, Hypericum boeticum, Blechnum spicant, Asplenium hemionitis, and Scolopendrium vulgare. In their 1940 publication they aver that it is not very frequent and has about the same frequency as Ranunculus megaphyllus, Euphorbia stygiana, Rubus hochstetterorum, Ammi seubertianum, Vaccinium cylindraceum, Cymbalaria muralis, and Mentha piperita. Buchli (1936) calls it a field weed in northeastern Switzerland; W. Young (1936) records it from Scotland; Soest (1931) gives us a distribution map of its occurrence in the Netherlands and Lid (1952) does the same for Norway; Bojer (1837) records it as cultivated on the island of Mauritius, where he says that it rarely flowers. Koch & Almquist record it from Finland, while Fernald records it from Dinwiddie, Henrico, and Princess Anne Counties, Maryland. Hara (1956) gives its distribution as "Europe....Asia Minor, Caucasus, s.w. Asia, c. Asia, n. India, Siam, Indo-China, China, Korea, Honshu, south to Formosa, Australia, Polynesia. The plant is weedy, and the Japanese specimens agree well with the European." Deam (1940), on the other hand, excludes it from the flora of Indiana. C. & E. Reid (1907) report it in the fossil form from the Pliocene of England and Belgium.

The G. V. Nash s.n. [7 S. 1898], cited below, was cultivated in New York from seeds secured from Geneva, Switzerland, in 1898. The Herb. Calif. Acad. Sci. 31390, also cited below, does not bear any indication on its label that it originated from cultivated material, but I assume that this was the case. The species has been in cultivation as early as 1799 in England, according to Murray (1799).

Herbarium material of V. officinalis has been misidentified and distributed under the names V. littoralis H. & B., V. littoralis H.B.K., V. riparia Raf., V. supina L., V. supina Spreng., V. urticifolia riparia (Raf.) Britton, V. xanthi Gray, V. xutha Lehm., Bouchea sp., Buchnera sp., Stachytarpheta sp., and Veronica officinalis L. The Bornmüller s.n. [Gebirge Juda, Juli 1897] collection was originally distributed as V. tenuispicata Stapf, and no. 5516 as V. officinalis var. grandiflora Hausskn. Schimper 145, at least insofar as the United States National Herbarium specimen is concerned, seems to be var. prostrata Gren. & Godr. Paez 112 is V. bipinnatifida Nutt.

The E. F. Constable 11633, Pedley 377, and L. S. Smith 3045, distributed as V. officinalis, are actually var. gaudichaudii Briq.; Schlieben 7691 is V. brasiliensis Vell.; Chardon 34, J. T. Curtis Jr. s.n. [July 27, 1944], Eggers 1828, E. L. Leonard 3939, Questel 1686, and C. Wright 3658 are V. domingensis Urb.; Jameson 125/26 and Shepard 254 are V. gracilescens (Cham.) Herter; Beamer

s.n. [April 30, 1933], W. H. Duncan 20211, G. Een s.n. [29.3. 1951], R. K. Godfrey 53168, E. Hall 432, R. L. McGregor 15558, E. J. Palmer 33604, J. Skehan s.n. [Seymour & Earle 109], and B. L. Wagenknecht 2599, as well as almost all the Texan specimens so identified, are V. halei Small; Rodin 3917 and Türckheim 904 are V. litoralis H.B.K.; Abrams 3406, Lyonnet 334, C. T. Mohr s.n. [Huatusca, 1857], E. W. Nelson 1943 & 4577, C. R. Orcutt s.n. [Apr. 1889], J. G. Ortega 4215, Edw. Palmer 141, 153, 268, & 1042, Pringle 8534, and Salazar s.n. [Nopala, Aug. 1, 1913] are V. menthaefolia Benth.; Havard s.n. [Texas], Parry, Bigelow, Wright, & Schott 827, and Tharp s.n. [Wilson Ranch] & s.n. [Wilson Ranch, [June 1931] are V. neomexicana var. hirtella Perry; Mearns 1013, Edw. Palmer 339 1/2 & 1041, and F. W. Pennell 16880 are V. neomexicana var. xylopoda Perry; Gallegos 2342 is V. orcuttiana Perry; T. J. Hale s.n. [Baraboo, 1861] and T. A. Williams 119 are xv. perriana Moldenke; E. W. Nelson 6096 and Edw. Palmer 356 are V. pinetorum Moldenke; Sidey 1196 is V. rigida Spreng.; M. E. Jones s.n. [Crinnell, Aug. 1877] is V. stricta Vent.; C. C. Albers 34008 is V. tenuisecta Briq.; Gaubá 1698 is V. tenuispicata Stapf; Parry & Palmer 718 is the type collection of V. teucrifolia var. corollulata Perry; Ripley s.n. [Sep. 10, 1902] is V. urticifolia L.; Clover 1695, Eggert s.n. [along railroads, 10 June 1898], Harding 399, and W. H. Rhoades s.n. [Jackson, 1927] are V. xutha Lehm.; and Gorman 4005 is Cochranea anchusaefolia (Poir.) Gürke in the Heliotropiaceae, while Lapham s.n., distributed as "V. spura L.", is actually V. hastata L.

The Behn s.n. [7 Decbr. 1920] collection has extra large leaves. The Small & Heller s.n. [July 16--17, 1891] collection appears to be exactly like some specimens of V. riparia Raf., and may prove to be that species. Tanaka & Shimada 11032 and H. Smith 1536 exhibit pubescent foliage like that seen in V. menthaefolia Benth. Meissner 572 possibly represents var. prostrata Gren. & Godr. Baldacci 152 has spikes that are rather long and stiff, while T. Tanaka 11032 has them rather dense and long. Phares 1733 is described by the collector as "a form with deeply incised leaves". C. P. En 2022, from "a garden" in Fukien, may be from cultivated material, but the label does not plainly indicate this. Cowgill 1730 was cultivated in Maryland from seeds secured on Mt. Kaakerpu, at an altitude of 3000 meters. The McCann s.n. [9-15-36], cited below, was cultivated in Maryland from seeds secured from Brussels, Belgium. Liu L.831 was cultivated in Peking from seeds secured from Copenhagen, Denmark, while L. H. Bailey s.n. [Sept. 21, 1923] was cultivated at Ithaca, New York, from seeds secured from Vilmorin-Andrieux & Cie. (no. 49659), sown on April 27th. Bailey (1935) reports that the seeds of this species are

offered to the horticultural trade also by Floraire, Haage & Schmidt, Kew, and Taihoku. The species is known definitely to have been cultivated in Spain in 1814 and in France in 1819. Cultural directions given by Vilmorin-Andrieux are "Semer de mars en juillet, en pépinière; repiquer en pépinière; mettre en place en automne, de préférence, ou au printemps, en terrain sain. -- Fl. de juin en août."

The Haussknecht s.n. specimens from Greece, cited below, may actually represent the type collection of xV. adulterina Hausskn., but I see no differences between them and small specimens of typical V. officinalis. They are not at all hairy. Perhaps they represent one of the F₂ segregates reverting to ancestral type.

The "Verbena officinalis" of I. C. Verdoorn, Union of S. Afr. Dept. Agr. & Forest. Bull. 185: 171, fig. 90 (1938) is actually V. litoralis H.B.K. The Kausch s.n. [Rottstock, 1869] is a mixture with V. hastata L., while M. K. Clemens s.n. [Forest Hill, Jan. 1944] is a mixture with two species of Fabaceae and A. H. Kahn s.n. [8.7.25] is also a mixture with something non-verbenaecous.

Urban, in his discussion of V. domingensis, cites Eggers 2175 as V. officinalis. He maintains that it differs from V. domingensis in having subsimple stems, many times larger leaves, which are pinnatifid or the lower ones pinnately parted, and larger flowers. The length of pistil in relation to size of pollen grains is discussed by Covas & Schnack in Darwiniana 7: 86 (1945). According to Seymour (1929), V. officinalis is attacked by the fungus Erysiphe cichoracearum DC.

The two specimens of V. officinalis from Czechoslovakia preserved in the Stockholm herbarium from Linnaeus' herbarium are inscribed as follows: The first has on the obverse side in ink "4" and "Verbena officinalis Linn. 13", the first and third words in a later hand, the second word in an early hand, the number probably in Linnaeus' hand; on the reverse side in pencil "Linné herb." and in ink (in Linnaeus' handwriting) "Verbena communis Gerb. tanay 312" and in the same hand "Habitat in incultis Verania circa Lubnam", followed (in an unknown hand) by "von Linné sen. scripsit", and then "Herb. Alstroemerii", and finally (in Dahl's handwriting) "a Linné P." The second specimen has on its obverse side in pencil "Verb. 13 offic. L. sp. pl. 20" and in ink (perhaps in Linnaeus' hand) "13 officinalis"; on the reverse side in pencil "Linné herb." and in ink "Herb. Osbeckii" and "Verbena officinalis" and "Linn." (in a different hand), and finally "a Linné f." (in Dahl's handwriting).

Gerarde (1597) calls this plant "Common veruaine" and "Holy veruane". He says "Vervain is called....in Latin Verbena, & Verbenaca, Herculania, Ferraria, & Exupera, or some Matricalis, & Hierobotane, of others Veruena, & Sacra herba. Verbenae are herbs that were taken from the altar, or from some holie place, which because the Consul or Praetor did cut up, they were like-

wise called *Sagmina*, which oftentimes are mentioned in Liuiue to be grassie herbs cut up in the capitol. Plinie also witnesseth in his 22. book, II. chap. that *Verbenae* & *Sagmina* be all one, & this is manifest by that which we read in Andria in Terence: *Ex ara verbenas hinc sume*; Take herbs here from the altar, in which place Terence did not meane *Veruaine* to be taken from the altar, but some certain herbe: for in Menander, out of whom this Comedie was translated, is read $\mu\upsilon\upsilon\rho\acute{o}\nu\eta$, or Myrtle, as Donatus saith. In Spanish it is called *Vrgebaum*; in Italian *Verminacula*: in Dutch *Isercruit*; in French *Veruayne*: in English *Iunos teares*, *Mercuries moist bloude*, *Holie herbe*, and of some Pigeons *grasse*, or *Columbine*, because Pigeons are delighted to be amongst it, as also to eate thereof, as *Apuleius* writeth."

Mrs. William Starr Dana, in her "How to Know the Wild Flowers", says of the *verbena*: "It was believed to be the *herba sacra* of the ancients, until it was understood that the generic title *Verbena* was a word which was applied to branches of any description which were used in religious rites. It certainly seems however, to have been applied to some special plant in the time of Pliny, for he writes that no plant was more honored among the Romans than the sacred *Verbena*. In more modern times it has been regarded as an 'herb of grace' and has been gathered with various ceremonies and with the invocation of a blessing, which began as follows; 'Hallowed be thou, Vervain, As thou growest on the ground, For in the Mount of Calvary There thou wast first found!'" Mrs. Alice Earle Hyde writes in a letter dated October 29, 1940, that it is said to have grown at the foot of the cross on Calvary." In the book entitled "Poety of the Flowers" the rhyme quoted above is said to be an "old Cornish superstition".

Friend (1883) records that the plant is called "Holy Herb", and according to Pliny was one of the sacred plants of the Druids and was gathered by them with all manner of mystic ceremonies. An old rhyme is

"Hail to thee, Holy Herb!
Growing on the ground
On the Mount of Olivet
First wert thou found.

Thou art good for many an ill,
And healest many a wound;
In the name of sweet Jesus,
I lift thee from the ground."

William Coles, in his "Adam in Eden", says "It is known to such as have skill of nature, what wonderful care she hath of the smallest creatures, giving to them a knowledge of medicine to help themselves, if haply diseases are among them. The Swallow cureth her dim eyes with *Calandine*; the Wesell knoweth well the virtue of *Herb Grace*; the Dove the *Vervain*; the Dogge dischargeth his mame with a kind of grass; and too long it were to reckon up all the medicines which the beasts are known to use by nature's direction only."

Friend states also that "vervain is said to have the power to open locks and unshoe horses"...."vervain leaf is called 'Frog's-foot' from fancied resemblance to the foot of a frog. A cuplet reads 'Frossis-foot men call it, For his levys are like the frossys fet.'.....Witches are said to be fond of vervain and to use its juice with that of hemlock, nightshade, & St. Johnswort, to mix into their baleful draughts prepared for their enemies. But this is contradicted in St. Colne's charm, as sung by Meg Merrilies at the birth of Harry Bertram: 'Trefoil, Vervain, John's Wort, Dill, Hinder witches of their will'. It is also contradicted in the old rhyme given in the notes to the 'Demon Lover' in the 'Minstrelsy of the Scottish Border': 'Gin ye wud be leman mine, Lay aside St. John's Wort and Verveine'....Conway remarks that in France the Mandrake superstition seems occasionally to invest some other root. Thus the author of 'Secrets du Petit Albert' (Lyon, 1718) says that a peasant had a Bryonia root of human shape, which he received from a gipsy. He buried it 'at a lucky conjunction of the moon with Venus' in spring, and on a Monday, in a grave, and then sprinkled it with milk in which three field mice had been drowned. In a month it became more human-like than ever. Then he placed it in an oven with Vervain, wrapped it afterwards in a dead man's shroud, and so long as he kept it, he never failed in luck at games or work'.....Conway says 'In reading accounts of the witch trials, especially those of the south of England, one can hardly help remarking that in the antics by which so-called witches imposed upon their neighbours the plants used by them are almost always Rue and Vervain'....Brand quotes from Scot's 'Discover of Witchcraft', pp. 151--152, that 'To be delivered from witches (in England), they hang in their entries.....verven' and 8 or 10 other plants....Valerian and Vervain are famous plants, and are scarcely ever mentioned, especially the latter, without reference being made to their mystic character.....I have named the Vervain already on more than one occasion, and shall therefore say as little about it here as possible. Several suggestions have been made respecting the origin of the word, Professor Max Müller being of the opinion that it is connected with brahman, a word intimately associated with India. Although a favorite with witches, it was at the same time one of the plants which hindered them from carrying out their evil designs. Among other plants 'Vervain and Dill Hinder witches from their will'.....Among the ancients Vervain was sacred to the god of war, and was borne by ambassadors when they went to defy or challenge the enemy. It became associated with the god of war and thunder in Germany also, and was thus supposed to be capable of protecting houses from lightning and storm. Mr. Conway remarks that even yet, in some districts of England, children may be seen with Vervain twined about their necks, little knowing how nearly it has been related in times of witchcraft to a halter. Pliny tells us that the Druids made use of it in casting lots, in drawing omens, and in other pretended magical arts....But although it was once so famous, the plant has lost its glory. Among ourselves it has fallen into disuse, in spite of the fact that a

pamphlet was some years ago written expressly to recommend it, directing the root to be tied with a yard of white satin ribbon round the neck, and to be allowed to remain there till the patient recovered.....The poet Drayton in his 'Muses' Elysium' says

A wreath of Vervain heralds wear,
Amongst our garlands named;
Being sent that dreadful news to bear,
Offensive war proclaim'd.

.....The heads of Roman priests were sometimes garlanded with Vervain, the sacred and magic herb.....Wreaths of flowers have sometimes been worn around the neck as an amulet or charm....Vervain was one of the flowers so employed. By the Greeks and the French it was known as a sacred herb, and was used not only as an amulet, but also to cure venomous bites and various diseases. Its reputation was sufficient in the time of Ben Johnson for him to write: 'Bring your garlands, and with reverence place The Vervain on the altar'. An English writer has also recommended that the root be tied with a yard of white satin-riband around the neck, there to remain till the patient recovers; and Mr. Conway says children may still be seen in some places with the plant twined about their neck. The ancient Persian magi made great use of this plant in their worship of the sun, always carrying branches of it in their hands as they approached the altar. It was one of the plants dedicated to the goddess of beauty, while Venus wore a crown of Myrtle interwoven with Vervain. Roman ambassadors or heralds-at-arms also wore crowns of Vervain when they went out to proclaim war, or bid their enemies defiance; a custom to which Drayton refers in the lines already quoted. Vervain 'was sacred to the god of war', says Mr. Conway; but we fail to see the force of this. The Germans are said to have until quite recent times presented a wreath of Vervain to the newly-married bride, as if to put her under the protection of Venus the Victorious. The history of the plant, and of its name as well (if it be from the same root as brahman, as Professor Max Muller suggests), is full of interest..

Besides being indebted to Brand's 'Popular Antiquities' for sundry notes, quotations, and references, I ought to refer to the use I have made of 'Flora Historica' for Vervain and Mandrake."

Ingram (1887) says that this plant is symbolic of magic and inspiration in the "language of flowers". Ranson (1940) says "The name 'verbena' has come to us from the latin, and means sacred branch. Crowns of berbena, or vervain, the family name, were used in Roman public rites. Both the Greeks and Romans regarded the verbena as a peacemaker, and diplomats wore it often in their efforts to make peace with others. It was used also in marriage ceremonies, just as the orange blossom is now....In the Far East the verbena was considered a symbol of enchantment, and was thought to be strong enough to open a locked door.

"Verbena

These dainty round bouquets were made by fairies:

Their tiny fingers, deft and very strong,
Arranged the lovely fragrant purple blossoms
In beautiful rosettes the whole day long.

I think the busy, sprightly little fairies
 Must know a thousand happy things to do —
 Perhaps if we were diligent and patient
 Our minds and fingers would be skillful, too.

"Vervain

This is a wayside altar --
 This quiet country place --
 The vervain candelabra
 Lends dignity and grace.

To services of gratitude:
 Their blue-tipped candles flame,
 And all the flowers genuflect
 And praise their Maker's name.

"The vervain was a sacred plant to the Druids, and of Thor, Scandinavian god of thunder. It was used by witches in their brews, and also was employed to hinder their spells. During the time of Shakespeare vervain was hung, with dill and a horseshoe, over the door to keep our evil spirits. It was considered by the ancient herb doctors, or 'simplers', as a cure for almost every disease known. Anxious mothers hung bits of it about their children's necks as a charm against sickness and evil. Christians attributed its miraculous healing qualities to the fact that it was found growing on Mount Calvary, when Jesus was crucified. For hundreds of years it was woven into bridal wreathes and was thought to bring luck to the bride and to help in regaining lost affections.

"With so many powers ascribed to it, it is no wonder that through the centuries it has merited such names as herb of the cross, holy herb, enchanter's plant, lightning plant, simpler's joy and many others. Even today this plant is gathered by French peasants, 'when the moon is right', for important cures. Bees delight in the dainty little lavender refreshment stands the vervain keeps in the sun for their entertainment, and feast on the nectar and pollen." Skinner (1911) says that boiling gun-flints with rue and vervain was supposed to ensure that the shot would reach the intended victim, no matter how poor the aim.

Hegi (1927) says: "Verbena officinalis ist ein alter Kulturbegleiter, dessen ursprüngliche Heimat unsicher ist, aber mit grosser Wahrscheinlichkeit im Mittelmeergebiete liegt. Die pflanze genoss vermutlich bei den antiker Völker eine grosse Verehrung. Nach Plinius war kein Kraut im Altertum berühmter. Im alten Aegypten hiess die Pflanze die 'Träne der Isis'. Sie wurde bei feierlichen Gelegenheiten verbrannt (Herba sancta) und galt als das beste Wundkraut bei Verwundungen durch eiserne Waffen. Die Hippokratiker empfahlen sie gegen Unfruchtbarkeit. Auch wurde sie gegen Blasensteine, sowie auch als allgemeines Volksmittel benutzt. In Griechenland gilt sie noch gegenwärtig als Glückspflanze. Wann sie nach Mitteleuropa gelangt ist, ist unbekannt. Sie soll aber schon bei den Kelten und Germanen in hohem Rufe gestanden haben. Der heiligen Hildegard war sie als Heilpflanze

bekannt. Von Thal wird sie in der Harzflora (1577) aufgeführt, von Jungermann für Franken (1615). In dem in Lund aufbewahrten Herbar von Rostius (1610) liegt sie unter dem Namen Sideritis. Früher wurde sie viel in Gärten zu medizinischen Zwecken gebaut und die *Hérba Verbénæ s. H. Columbáriæ s. H. sanguinalis* als schleimhaltiges, zusammenziehendes, bitteres Mittel, ferner bei Wechselfieber, Steinleiden und Augenentzündungen angewendet. Ferner dienen sie mit Zimmt, Nelken, Vanille und bitteren Mandeln gemischt als Ersatz für chinesischen Tee, ferner als Aufgruss (3 g. auf 1/4 Liter Wasser) gegen Kopfschmerzen, Migräne, allgemeine Schwäche usw. Kneipp empfiehlt diesen Tee auch gegen Keuchhusten, Nieren- und Leberleiden, Wasser- und Gelbsucht. Ein früher viel benutzter Haustee wurde aus 100 g Eisenkraut, 10 g Pfefferminze, 2 g Thymian, 2 g Majoran, 5 g Zimmt und 1 g Muskatblüte gemischt. Die Homöopathie bereitet aus der blühenden Pflanze eine Essenz. Gurken sollen beim Einmachen durch Zusatz von Eisenkrautwurzel schmackhafter werden. Chemisch wurde neben Gerbstoffen, Bitterstoff, Invertin, Emulsin usw. das nicht giftige Glykosid Verbenalin nachgewiesen, das sich in der frischen Pflanze in Form von Kristallnadeln findet, beim Trocknen aber zum Teil verschwindet. — Die *Verbena* (*verbenaca*, hierobotane) spielte im antiken Aberglauben eine grosse Rolle. Nach Plinius (Nat. hist. 25, 105 ff.) behaupteten die Magier, dass man, wenn man sich mit der Pflanze salbe, alles erlange, was man wolle, dass sie das Fieber vertreibe, Freundschaft erwerbe und alle möglichen Krankheiten heile, dass man sie beim Aufgang des Sirius sammeln müsse und zwar so, dass es weder der Mond noch die Sonne sehe usw. Ob allerdings unter der antiken *verbena* unsere *Verbena officinalis* zu verstehen ist, bleibt recht zweifelhaft. Unter '*verbenæ*' verstanden die Römer ganz allgemein die Kräuter und Baumzweige, deren man sich bei Opfern und anderen Kulthandlungen bediente. Fussend auf den antiken Berichten Quellen erscheint die *verbena* auch im Aberglauben des deutschen Mittelalters. So sagt der Regensburger Domheer Konrad von Megenberg in seinem 'Buch der Natur' (Mitte des 14. Jahrhunderts), dass das Eisenkraut 'den zaubraeren gar nützz' sein. Auch Bock bemerkt in seinem Kräuterbuch (1551): 'Das Kraut *Verbena* würt noch heuttigs tags mehr zu der Zauberei dann zu der Artzney gesammelt.' In mittelalterlichen Handschriften sind uns verschiedene Beschwörungen der *Verbena* erhalten. Im heutigen Aberglauben ist das Eisenkraut so gut wie vergessen. Im Anhaltischen gehört es noch vor einigen Jahrzehnten zu den Pflanzen, die das Gewitter abwehren sollten. Man warf es zusammen mit Hartenau (*Hypericum perforatum*) bei einem aufziehenden Gewitter in das Feuer und sprach: 'Eisenhart und Hartenau -- Brennt an, dass sich das Wetter stau.' Im deutschen Volksaberglauben war das Eisenkraut wohl nie wirklich volkstümlich. Durch die Kleriker und Aerzte des Mittelalters war zwar zeitweise manches über die geheimnisvollen Eigenschaften des Eisenkrauts ins Volk gedrungen, aber es blieb dort nicht haften. "*Verbena officinalis* ist ziemlich wärmebedürftig und fehlt infolgedessen im Norden von Deutschland und in den subalpinen Tälern der Alpen fast ganz. Hingegen ist sie gegen Beschädig-

ungen, vor allem gegen den Tritt von Weidevieh und Menschen sehr unempfindlich und findet sich meist gruppenweise in den Beständen von Lolium perenne und Polygonum aviculare, auf mageren, schwach gedüngten Weiden vom Festuca rubra -- oder Brachypodium pinnatum -- Sieglingia decumbens -- Typus. Nicht selten erscheint sie auch an Wegrändern mit Hordeum murinum und Sisymbrium officinale und S. sophia. Auch auf stärker gedüngten Böden pflegt sie nicht auszubleiben und ist dann mit Chenopodium-Arten, Lepidium draba, Potentilla supina, Ballota nigra, Aethusa cynapium, Dipsacus silvestris, Chrysanthemum parthenium usw. anzutreffen. In Rotkleeäckern ist diese Pflanze in Mitteleuropa selten zu finden, obgleich ihre Samen mit französischen Rotkleeasamen häufig eingeführt werden. -- Die kleinen von Apiden, Tagfaltern, Fliegen usw. besuchten Blüten bergen im Grunde den von der Unterlage des Fruchtknotens abgeschiedenen Nektar und besitzen einen Ring von nach vorn zusammenneigender Haare. Steckt das besuchende Insekt den Rüssel in die Kronenröhre, so streift dieser zunächst zwischen den Staubbeuteln vorbei und trifft erst dann auf die papillöse Fläche der tiefer stehenden Narbe. Da aber die Risse der Staubbeutel nach abwärts gerichtet sind, so wird er sich zunächst nicht mit Pollen behaften. Dies tritt vielmehr in der Regel erst beim zurückziehen des Rüssels ein, weil dann eine Drehung der Staubbeutel bewirkt wird. In der Regel erfolgt also Fremdbestäubung. Doch stehen die beiden unteren Staubbeutel der Narbe so nahe, dass auch mit einer selbsttätigen Selbstbestäubung zu rechnen ist, die anscheinend von vollem Erfolge begleitet ist. Gegendlich treten Blüten auf, in denen nur 2 Staubblätter vorhanden sind. Zur Fruchtzeit ist der Kelch schräg aufwärts gerichtet und gestattet dadurch ein Ausschütteln durch den Wind. Auch vorbeistreichende Tiere können dadurch, das sich die etwas einwärts gekrümmten Kelchblattspitzen an ihrem Felle reiben, zur Ausstreuung beitragen. Als Schmarotzer treten Didymella effusa Niessl und D. rehmi (Kze.), Erysibe cichoriacearum DC., Mollisia verbenae (Opiz), Ophiobolus cesatianus (Mont.) usw. auf.

"Der Name Eisenkraut (althochdeutsch isarna [ergänze chrit] mittelhochdeutsch isenkrüt) ist zunächst eine Uebersetzung des griechischen sideritis (Pflanzennamen bei Dioskuridis; griech. sideros = Eisen). Er ist in vielen Gegenden dem Volk wohlbekannt und dürfte hauptsächlich durch Fachkundige (Aerzte, Apotheker) bzw. durch Bücher dahin gelangt sein. Iserhark [Eisenhart] (Mecklenburg), Eisenhindrik, iserene Hendrek, iren Hendrek [=eiserner Heinrich, vgl. Pflanzennamen wie guter Heinrich, stolzer Heinrich usw.] (Göttingen), Eisick (Nahagebiet)."

Pulteney (1790) says: "In the meantime, in tracing the origin and progress of botanical science in Britain, a survey of its state in the druidical times, ought to claim first attention; but in fact, the little information transmitted to us from the antients relating to this extraordinary sect, being almost wholly confined to Caesar and Pliny, precludes any enlarged view respecting my particular object. It is from Pliny we learn that the

mistletoe, the vervain, the selago and the samolus, these antient fathers of druidism attributed efficacies almost divine; and ordained the collection, and administration of them, with rites and ceremonies, not short of religious strictness, and such as countenanced the grossest superstition....The vervain, after previous libations of honey, was to be gathered at the rising of the dog-star; when neither sun nor moon shone; with the left hand only; after describing a circle around the plant &c; and thus prepared, it banished fevers, and other distempers; was an antidote to the bite of serpents, and a charm to conciliate friendship (from Pliny, Lib. xxv. c. 9)....With respect to this herb, the hierobotane, the sacra herba of Dioscorides, although the modern botanists have not agreed to confine the term to verbena, which Pliny has described, as having narrower and smaller leaves than the oak, it may be remarked, that there has been a diversity of opinions among the commentators, relating to the plant and it is acknowledged that verbena or verbenacea, was also applied, as a general term for all plants used about the altar in sacrifices. To this day the Tuscans apply the word vervena to slips, shoots, suckers or bundles of plants of any kind."

Webster (1942) says "Why this pale-flowered weedy herb ever became so imbued with magical virtues is a mystery. The Druids revered it. Perhaps the styptic tannic principle found in its stems and leaves bears out the legend, cited by Mrs. Grieves in her Herbal, that the herb was found on the Mount of Calvary and used to staunch the wounds of the Saviour. At any rate, as a very sacred and old-world herb, tuck it away in some corner of your mediaeval garden, the only place where it belongs."

As to its supposed medicinal properties, Haller (1768) has this to say: "Inodora planta, & fere insipida: destillantem.... dat ad agnem spiritum acidum, oleum empyreumaticum, & salem aliquem colatilem: in cinere fixus & salsus sal est, non alcalinus. Febres intermittentes succi spissati drachmam bis de die sumtam sanare....., aut certe peruviani corticis potestatem eo remedio adjuvari lego. Balsamum, cum oleo paratum, arcanum est antarthriticum Fulvii Testi....Decoctum cum spittu vini mistum glutem oculos connectens....dissipare dicitur. Ad narium haemorrhagiam veteres....adhibebant. In cataplasmate, cum rhodia radice tritam....dolores capitis sanare, & solam, amuleti modo....., eos dolores sedure, inque pleuritide fotum prodesse....Mihi non videtur ferio in medicinam recipi....Ad Verbenam n. 219. in convulsionibus infantum saepe appensum nihil praestitisse Rosen. Kinder Krankh. p. 79."

Vilmorin-Andrieux report that "Les feuilles entrent dans certaines préparations." Watt (1893) states that "In the Panjab the fresh leaves are considered febrifuge and tonic, and is said to be used as a rubefacient in rheumatism and diseases of the joints. The root is believed to be a remedy for scrofula and snake-bite. At one time it was worn in Europe as a charm against evil, and for good luck. In Tuscany it is said to be still employed as a poultice for liver complaints, and taken internally for the same

disease, and for dropsy."

MacKay (1836) speaks of the name, Verbena, with an origin in "ferfaen in Celtis, derived from fer to drive away and faen, a stone, from having been supposed to cure the complaint so called Theis." He continues: "The genus Verbena is placed by Sir James Edward Smith in the first order of the class Didynamia, but as Doctor Hooker remarks, it does not naturally rank there, being considerably different in the structure of its germen and fruit. This herb has scarcely any aromatic or other sensible quality. The root worn about the neck with a string, is an old superstitious remedy, or charm for the King's Evil [=scrofula]."

Ichekama tells us that the species is regarded as medicinal in Japan, too, while McClure says that on Hainan Island it is used in the treatment of dog bites. Roig y Mesa (1945) avers that it is the leaves and floriferous tips of the stems that are used medicinally in Cuba. According to Pamo "La Verbena oficinal fué considerada como astringente, resolutive, diaforética, antiespasmódica, vulneraria, etc. En la actualidad no se usa." In Eritrea "Las hojas se usan contra la inflamación de los glándulas del cuello." Paris (1963) states that it contains "verbenalin". Robledo is quoted as stating that the plant contains "verbenalina", which "tiene sabor amargo y se emplea como vulnerario." Caffas reports that in Cuba "Las hojas y sumidades de sabor amargo y astringente, se aplican sobre la piel, machacadas y en cataplasmas como vulnerarias. La infusión de las flores (45 gramos por litro de agua), se emplea para los dolores de cabeza."

Pliny, who died in Pompeii in 79 A.D., tells us that no plant was as highly esteemed by the Romans as this one; it was used to decorate Jupiter's altars, to cleanse houses, to guard against bad luck, and (according to Marzell [1930]) "mit der unsere Gesandten nach den Feinden gehen." P'ei (1947) says that in China it is "used by natives as a remedy for inflammation of the intestines." He records it from Sikang. Jyh Ho Chen, in a letter to me dated August 16, 1948, reports that Chinese doctors use V. officinalis in the treatment of malaria, and that the very bitter juice proves "very effective and successful." Perez Arbelaez (1937) states that the dosage is 10--20 grams in 200 grams of water in the treatment of fevers associated with amoebic dysentery and typhoid, administered as a decoction in enemas and tea, and that it is used with efficiency in this way at Bogotá, Colombia.

Loureiro (1790) says: "Virtus. Nervina, Deobstruens. Decoctum prodest in hydrope, cataplasma in tumore scroti." Connor & Adams (1951) report that "Vervain has been suspected of poisoning cattle in Australia on one occasion, but no poisonings have been reported in New Zealand....Vervain contains a glycoside, verbenalin, which appears to be very mildly toxic." Kuwajima (1939) describes a new glycoside, verbenin, but, according to Winde, Echaust, & Hansel (1961) "Das von Kuwajima.....als ein neue Glykosid der Verbena officinalis beschriebene Verbenin konnte in der Droge nicht nachgewiesen werden. Die Vermutung Breitwiesers (1942) wurde nunmehr experimentell belegt, dass Verbenin eine Kristallmodifikation des Verbenalins

darstellt." Hocking (1955) states that it contains a bitter glucoside called verbenalin, a neutral bitter principle tannin, and is used medicinally as a bitter tonic, astringent, and vulnerary in asthma and kidney disturbances; the root being extremely useful for liver and gallbladder disturbances, and the leaves used as a tea substitute.

Coon (1963) says "The constituent which brings Verbena into the medical field is a bitter glucoside and tannin, a simple infusion (2 teaspoons to 1 pint) being employed as a diaphoretic, tonic, and expectorant. There are, in herbal literature, no strong claims made for its efficacy.....An exploration of the story of vervain leads us down some ancient avenues and provides an explanation for belief in the efficacy of the plant in herbal medicine. This plant was first used by the Romans. They gave us the name 'verbena', which to them meant any one of a number of plants used in sacrifices, purgation and supplications. Finally the name was attached to one particular plant and the virtues ascribed to Verbena by the Romans were passed along through the centuries until, in the Middle Ages, it was said to have been a plant which, growing on the Mount of Calvary, staunched the wounds of the Savior. The transferral of virtues from pagan to Christian (it has happened in our Christmas celebrations) was not unusual and verbena early became one of the holy herbs associated with St. John. Pliny said 'if the dining chamber be sprinkled in water in which the herb Verbena has been steeped, the guests will be merrier.' Such a story led to the belief in its efficacy as a cure against the plague, and as a remedy for almost anything. It even had supernatural powers. Several Welsh names have meanings such as 'devils' hate' and 'enchantment herb.'"

Jaeger (1961) reports that it produces pollen abundantly from 7 to 11:30 a.m. and in small quantities to 2 p.m. only.

Of very great interest in any discussion of Verbena officinalis is the problem of a possible hybrid between it and the scrophulariaceous Veronica maritima L. This hybrid is now known as xVeronica haartmani Moldenke. Roberts (1929) sums up the situation as follows: "On November 23, 1751, appeared a discussion, included in the Amoenitates Academicæ (vol. 3, pp. 28--52, 1764) by another of Linnaeus' pupils, Johannes Haartman, entitled Plantae Hybridæ. This discussion upon hybrid plants is to be noted, insofar as it reflects the views of Linnaeus and his school on the subject..... Veronica maritima (♀) x Verbena officinalis (♂) is described in the greatest detail (p. 35), and is illustrated. (8b, pl. 11). This natural hybrid is reported as having been produced in the Botanical garden at Upsala in 1750. The statement is made 'neque longe ab his lecta est haec nostra planta [♂], quae antea nulli Botanica visa est' (p. 35). The vegetative and flower characters are described in some detail. The hybrid was perennial, bloomed annually, and was multiplied easily by the roots, but had no fruit ('nullos vero fructus maturat') (p. 36).....The description of the plant is as follows: In height, hoary color of the stem and leaves, smoothness of the stem, structure of the spike, and color

of the corolla, the plant is stated to resemble the Veronica female parent. If the flowers and their color and the roundness of the stem were omitted, 'the most vacuate botanist would have considered it to be Verbena itself' (p. 35); the leaves of the hybrid are said to have had 'exactly the same singular division, with deeply furrowed lobes' (p. 35). The flowers are stated to have been smaller than those of the female parent, and not larger than the flowers of Verbena; the leaves 'sometimes in threes, as in the ♀ but more often opposite, as in the ♂'. Although the plant flowered annually, it was sterile, and bore no fruit, but was perennial and multiplied by the roots. 'Floruit quidem haec planta omni anno felicissime, in annum quo haec edimus, 1755, et vivis radicibus facillime immutata multiplicatur, nullos vero fructus maturavit' (p. 35). It thus appears that Linnaeus' hybrid Veronica, originating in 1750, was still alive in 1755."

Hooker (1836) cites T. Drummond 252 from New Orleans, Orleans Parish, Louisiana, for the typical form of V. officinalis and T. Drummond s.n. [New Orleans, 1833] as his var. spuria, deposited in the herbarium of the Royal Botanic Gardens at Kew.

Schauer (1847) cites Wallich 1825 and Edgeworth s.n. from Nepal; R. Brown s.n. and Lhotsky s.n. from eastern Australia; Bové s.n. from "Africae ora septentr."; Herb. De Candolle s.n. from the Canary Islands; Bergius s.n. from the Cape of Good Hope; Rafinesque s.n. from "America septentr."; Beyrich s.n. from Georgia; Humboldt & Bonpland s.n., Schiede 1167, and Berlandier 159 from Mexico; Sagra s.n. from Havana, Cuba; Sellow s.n. from "Brasilia merid."; and Sellow s.n. from Buenos Aires, Argentina. He notes that Schimper 145 differs in being "demissa, ramis procumbentibus, spica subglandulosa". I suspect that the last-mentioned is var. prostrata Gren. & Godr.

Richard (1851) cites Quartin-Dillon s.n. [Chiré, Aug.] and Schimper s.n. [Adoua, Mai] from Abyssinia. Ascherson (1867) cites Cienkowsky s.n. [Roseres, Senaar, 9 Mai 1848] and Schimper s.n. [Dehli-Dikeno, 23 Oct. 1854], while Engler (1892) cites Hildebrandt 445, Schimper I. 145, 7, & 284, and Rohlf & Stecker s.n. from Abyssinia. Bentham (1870) records the species from Victoria, Australia.

Baker & Stapf (1900) cite the following: ERITREA: Hildebrandt 445; Schweinfurth & Riva 1116; Stuedner 1304. ABYSSINIA: Schimper 7, 145, & 284; Quartin-Dillon s.n. [Shire]; Rohlf & Stecker s.n. [Godofelassi]. SUDAN: Senner: Cienkowsky s.n. KENYA: Scott-Elliott 7800. BRITISH SOMALILAND: Revoil s.n. Pearson (1901) cites the following: REPUBLIC OF SOUTH AFRICA: Cape Province: Burchell 503; Pappe s.n. [near Rondebosch]; Wolley Dod 492. Natal: Drège s.n. [Bashee River]; Gerrard 1249; Haygarth 473 [Herb. Wood 1964]; Krauss 151; Sanderson 92; Tyson 2105. Transvaal: Burke 59 Holub s.n. [Linokana]; Wilms 1175 & 1175a. Province undetermined:

Harvey h05; Miller s.n.; Zeyher 1364.

Domin (1928) cites A. Dietrich 1500 and Domin s.n. [II.1910] & s.n. [III.1910] from Queensland. Dop (1935) cites the following: INDO-CHINA: Annam: Chevalier s.n. [Lang-bian]; Couderc s.n. [Hué]; Evrard s.n. [Dalat]. Laos: Spire s.n.; Thorel s.n. Tonkin: Balansa s.n. [Haiphong]; Bois s.n. [Dong-dang]; Chevalier s.n. [Nam-dinh], s.n. [Phu-tho]; Clemens s.n. [Haiphong]; Couderc s.n. [Hanoi]; Demange s.n. [Hanoi]; Duport s.n. [Cho-ganh]; Eberhardt s.n. [Thuyen-quang]; Hautefeuille s.n. [Chapa]; Mouret s.n. [Nam-dinh]; Pételot s.n. [Cho-ganh]; Simond s.n. [vers Long-tcheou].

Rozeira (1944) cites the following: PORTUGAL: Coul. s.n. [Bragança]; Ferreira s.n. [Murça]; Henriq. s.n. [Sedeilos]; M. Lopes s.n. [Vimioso]; Mariz s.n. [Santulhão]; Rozeira s.n. [Amedo], s. n. [Covas-do-Douro].

The pollen-grain description given by Nair & Rehman (1962) is on the basis of a specimen collected at Hastanapur, India -- "N[ational] B[otanic] G[arden] 44559; Sl[ide] 2725."

Perry (1933) reduces V. domingensis Urb. to synonymy under V. officinalis, noting that "On the whole, the specimens from Santo Domingo and Cuba differ from the typical V. officinalis in their slender and more elongate habit; the inflorescence is scarcely as glandular, the flowers are smaller, and the nutlets often do not exceed 1.5 mm. in length. Nevertheless, the Cuban specimens vary greatly in size, and Curtiss 677 is hardly separable from typical V. officinalis. Since many of the specimens are rather poor, it appears probable that they may very well represent an impoverished condition. Urban himself was somewhat uncertain of the status of his species as he appended the following note in a later publication: 'An re vera a forma V. officinalis L. separanda?' " She cites, in addition to 15 specimens of Cuban and Hispaniolan collections cited hereinbefore by me under V. domingensis, the following 42 specimens not as yet seen by me: MASSACHUSETTS: Essex Co.: Oakes s.n. [Rowley] (G). RHODE ISLAND: Kent Co.: Thurber s. n. [Warwick Neck, 1848] (G). NEW YORK: Kings Co.: Schrenk s.n. [Brooklyn, 13 Sept. 1879] (E). NEW JERSEY: Camden Co.: Parker s. n. [ballast, Camden, 30 Aug. 1874] (G), s.n. [Longacoming, 23 July 1867] (G). Cape May Co.: Gershoy 583 (G). PENNSYLVANIA: Dauphin Co.: Porter s.n. [banks of the Susquehanna, Harrisburg, Oct. 1852] (G). Lancaster Co.: Porter s.n. [Lancaster, 21 Aug. 1861] (G). Philadelphia Co.: Lea s.n. [Philadelphia, 1844] (E). York Co.: MacElwee 873 (E). DELAWARE: New Castle Co.: Tatnall s. n. [Wilmington, 1845] (G). DISTRICT OF COLUMBIA: Ward s.n. [vicinity of Washington, 23 June 1878] (E). VIRGINIA: Accomac Co.: Norton s.n. [Parksley, 11 Sept. 1902] (E). Bedford Co.: Curtiss s.n. [30 June 1870] (E). Smyth Co.: J. K. Small s.n. [Marion, 1892] (E). NORTH CAROLINA: Avery Co.: Wislizenus 1214 (E). Bladen Co.: Biltmore Herb. 4762 (G, N). Currituck Co.: Randolph 587 (G).

Washington Co.: Randolph 645 (G). County undetermined: Curtis s. n. (E). SOUTH CAROLINA: Aiken Co.: Eggert s.n. [streets of Graniteville, 23 May 1899] (E). GEORGIA: Floyd Co.: Chapman s.n. [Rome] (E). FLORIDA: County undetermined: Rugel 121 (E, F). ALABAMA: DeKalb Co.: Eggert s.n. [Collinsville, 29 July 1897] (E). Etowah Co.: Eggert s.n. [Attala, 9 July 1898] (E). TENNESSEE: Carroll Co.: Eggert s.n. [Hollow Rock, 5 Aug. 1897] (E, F). Carter Co.: Small & Heller 484 (E, G). Knox Co.: Ruth s.n. [Knoxville, July 1893] (E). LOUISIANA: Plaquemines Par.: Tracy & Lloyd s.n. [Port Eads, 22 Aug. 1900] (E, G, N). BERLUDA ISLANDS: Main: S. Brown 492 (D, G); Brown & Britton 28 (D, G); F. S. Collins 267 (G); A. H. Moore 2939a (G). St. Georges: Robinson 113 (G).

In all, 1142 herbarium specimens, including the types of several of the names involved, and 27 mounted photographs and illustrations have been examined by me.

Citations: MASSACHUSETTS: Martha's Vineyard: E. P. Bicknell 7353 (N). CONNECTICUT: Fairfield Co.: H. C. Beardslee s.n. [Huntington] (Ob--50814). Hartford Co.: M. Brandegee s.n. [Berlin] (Ca--468123). Middlesex Co.: M. Brandegee s.n. [Middletown] (Ca--468123). New Haven Co.: W. W. Denslow s.n. [Sept. 1863] (Ms). NEW YORK: Bronx Co.: A. Brown s.n. [Hunter's Point, Aug. 10, 1879] (Tc); H. N. Moldenke 20562 (B, F, Fy, Hw, Le, Lm, N, Rs, S, Ss, Ug); J. Schrenk s.n. [Hunter's Point, Aug. 2, 1879] (C). Herkimer Co.: Collector undesignated s.n. [July 2, 1852] (N). Schenectady Co.: Tuckerman 748 (Al). Suffolk Co.: Leggett s.n. [Miller Place, Aug. 1861] (Tc, Tc); E. S. Miller s.n. [Mt. Sinai, Aug. 29, 1873] (N). Ulster Co.: Halsey s.n. [Kingston, 1820] (C). County undetermined: Miller s.n. [Long Island] (Ka); C. H. Peck s.n. (Al); J. Torrey s.n. (C, Pa). NEW JERSEY: Atlantic Co.: Rau 3 (In--10425). Camden Co.: Beringer s.n. [Camden, Aug. 1889] (Mi); Martindale s.n. [Camden, Sep. 1876] (Pu); M. W. Twaddell s. n. [August 8, 1878] (Up). Cape May Co.: K. K. Mackenzie s.n. [Cape May, Sept. 25, 1920] (H--51908, N); W. Stone 15810 (Up), 16317 (Up). Gloucester Co.: Brinton s.n. [Williamstown, June 25, 1889] (Ca--25186). Hudson Co.: Billberg s.n. [Hoboken, 1826] (S); J. Schrenk s.n. [Jersey City, July 9, 1879] (Tc). County undetermined: E. Durand s.n. [New Jersey] (Ky); R. E. Griffith s.n. [New Jersey, Julio] (Ky); Herb. Torrey s.n. (T); J. Torrey s.n. [1835] (Br). PENNSYLVANIA: Delaware Co.: Fogg 5695 (Up). Philadelphia Co.: R. C. Alexander s.n. [Philadelphia] (Ca--379997); I. Burk s.n. [Raighs Point] (Up--17111); Meredith s.n. [Oct. 9, 1920] (N); A. H. Smith s.n. [Navy Yard, July 1866] (Up--17112). York Co.: MacElwee 753 (Um--24), s.n. [York Furnace, June 1896] (Ka--71184); W. Stone 2166 (Up). County undetermined: A. P. Garber s.n. [August 1868] (S). DELAWARE: New Castle Co.: W. M. Can-

by 1960 (Dt); Morong s.n. [Wilmington, Sept. 2, 1873] (Bc). Sussex Co.: Commons 7 (N). MARYLAND: Baltimore Co.: Boldo 92 (Q); LeRoy s.n. [Baltimore, 1866] (C, Du—123488, Gg—31403, Ms, N); K. A. Taylor s.n. [July 9, '91] (Ur). Cecil Co.: Brinton s.n. [North East, July 20, 1890] (Up—17114). Dorchester Co.: C. P. Smith 2935 (I, I). Saint Mary's Co.: O'Neill s.n. [June 13, 1930] (I). Somerset Co.: J. H. Holmes 76 (W). Worcester Co.: C. E. Moldenke s.n. [H. N. Moldenke 6648] (N); H. H. Rusby s.n. [Stockton, Aug. 1889] (C, R); True 13 (Gu—10452, Up). County undetermined: Collector undetermined s.n. [W. D., Maryland] (Lu). DISTRICT OF COLUMBIA: M. S. Bebb s.n. [1862] (N); J. W. Chickering s.n. [6-24-1873] (N); Kearney s.n. [June 20, 1897] (N, Z—drawing); B. H. Patterson s.n. [July 9, '76] (Cm); Peck s.n. (Mi); E. S. Steele s.n. [July 21, 1896] (Ka—82507, Ob—50818, Um—12). VIRGINIA: Accomac Co.: Wilkins 5372 (Up). Montgomery Co.: Murrill s.n. [Blacksburg, 24 June 1895] (N). Norfolk Co.: Meredith s.n. [Norfolk, June 25, 1924] (H—26197), s.n. [Ghent, June 28, 1924; Herb. Dreisbach 3503] (Mi, Mi). Princess Anne Co.: Fernald & Long 4152 (Up); K. K. Mackenzie 1679 (Po—267668). Smyth Co.: J. K. Small s.n. [Marion, June 29, 1892] (Ca—104825), s.n. [Middle Fork, Holston River, Marion, July 6, 1892] (Ca—25185, Fc, Ob—50816, Up—17116, W). Southampton Co.: A. A. Heller 964 (C, Up—17117, W). County undetermined: Collector undesignated s.n. [In Canada, Virginia] (Lu, S); Herb. U. S. Dept. Agr. s.n. (Fc). Chincoteague Island: H. A. Gleason 8548 (N). WEST VIRGINIA: Jefferson Co.: Guttenberg s.n. [Harper's Ferry, Aug. 24, 1878] (N), s.n. [Harper's Ferry, Aug. 28, 1878] (Vt), s.n. [Harper's Ferry, July 22nd] (Cm). NORTH CAROLINA: Bladen Co.: Biltmore Herb. 4762 (N, W—332105). Buncombe Co.: R. H. Ward s.n. [Asheville, Aug. 21, '77] (Ur). Carteret Co.: Blomquist 10360 (H—49850). Currituck Co.: Randolph & Randolph 587 (Ba). Hyde Co.: D. S. Correll 1771 (H—40242); Radford & Stewart 786 (Hi—21562). Iredell Co.: M. E. Hyams s.n. [Statesville, July 1878] (W—147583). Jones Co.: A. E. Radford 37228 (Hi—104887). Madison Co.: G. B. Grant 2926 (Po—267635); J. D. Smith s.n. [Warm Springs, July 27, 1880] (W—1323114). Mitchell Co.: Collector undesignated s.n. [Aug. 9] (Hi—59469). Polk Co.: E. C. Townsend 92 (Pl—87180), s.n. [Columbus, May 31, 1897] (W—341769). Stokes Co.: Small & Heller 484, in part (Ca—25187, Up—17115, W), s.n. [near Hall's Store, Piedmont Springs, July 2, 1891] (Fc). County undetermined: Ashe s.n. [Roan Mtn., July '93] (Hi—59478); McCarthy s.n. [No. Carolina, Aug. 1885] (Ba), s.n. [E. N. Carolina, Aug. 1887] (W—218877). SOUTH CAROLINA: Anderson Co.: J. Davis 8493 (W—1204694). Darlington Co.: Collector undesignated s.n. [June 14, '11] (Hi—59464). County undetermin-

ed: G. McCarthy s.n. [Sept. 1888] (Ka); Short s.n. (Pr). GEORGIA: Rabun Co.: Cuthbert s.n. [Tallulah Falls, Aug. 5, 1899] (Fl—21115). County undetermined: Beyrich s.n. (Br). FLORIDA: Escambia Co.: Curtiss s.n. [Pensacola, summer 1885] (N). County undetermined: Rugel 121 (N, W—511942). ALABAMA: DeKalb Co.: Eggert s.n. [Collinsville, 29 July 1897] (Cm, N, W—754256). Mobile Co.: C. T. Mohr s.n. [waste & cult. lands, Mobile, May 10, 1876] (W—771863), s.n. [Mobile, July 1883] (Mi), s.n. [July—Sept. 1884] (C), s.n. [ballast ground, Mobile, 5/30/1887] (W—771862). County undetermined: Buckley s.n. [Aug. 1840] (Br, T). MISSISSIPPI: Wilkinson Co.: Phares 1733 (W). TENNESSEE: Carroll Co.: Eggert s.n. [Hollow Rock, 5 August 1897] (N). Carter Co.: Small & Heller 106 (Ob—50817), 484, in part (Ka), s.n. [along banks of the Doe River, July 16—17, 1891] (Ba, Dt, Io—20754, Ok, W—298655). Knox Co.: Ruth s.n. [June 1893] (Se—95716), s.n. [Knoxville, July 1893] (Dt, Ob—50815). LOUISIANA: Livingston Par.: Herb. Torrey s.n. [Albany] (T). Orleans Par.: Gates s.n. [near New Orleans, 1829] (T). Plaquemines Par.: Tracy & Lloyd 17 (Cm, N, Tr, Up—50898, W—383530). NEW MEXICO: Taos Co.: D. A. Johansen 600 (Gg—194251). OREGON: Multnomah Co.: J. C. Nelson 835 (Du—77653), 4841 (Or—17459); Suksdorf 1894 (Pl—138402). CALIFORNIA: Amador Co.: Belshaw 2454 (Ca—124400); G. Hansen 477 (Du—24213). San Diego Co.: H. P. Chandler 5122 (N); F. W. Johnson 1665 (N); Orcutt & Bowne s.n. [San Diego, 1884] (C). MEXICO: Nuevo León: F. W. Pennell 16880 (D—733979, Me, W—1640298). BERMUDA ISLANDS: Main: S. Brown 492 (N, W—848354); Brown & Britton 28 (N, Up—45621, W—524781); F. S. Collins 267 (Cm, N, W—717561); O. Degener s.n. [Hungry Bay, July 26, 1921] (Ba); A. H. Moore 2939a (Gg—155395, Mi, N). Island undetermined: Bailey, Bailey, Whetzel, Degener, & McCallan s.n. [July 26, 1921] (I); O. Degener 1306 (N); Marble 791 (N). BRAZIL: Rio de Janeiro: O. M. Barth 16 [Herb. Inst. O. Cruz 233] (W—2342992). BOLIVIA: Cochabamba: Buchtien 2414 (N). CHILE: Arica: Buchtien 4380 (W—1159367). Valdivia: Claude-Joseph 5408 (W—1470520); Hollermayer s.n. [Werdermann 1916] (W—1541196); Kunkel 397 (Sm); Sparre 2262 (S). Valparaíso: Behn s.n. [7 Decbr. 1920] (Ca—498614). Teja Island: Hollermayer s.n. [Werdermann 1916] (E—999029, N, N, S). TRISTAN DA CUNHA: Mejland 341 (Bm, Go). AZORES ISLANDS: Faial: C. S. Brown 213 (W—262279). MADEIRA: N. J. Andersson s.n. [Madeira, 1851] (S); Gonçalves da Costa s.n. [Alegria, Maio 1928] (Go); Hornbeck s.n. [Madeira] (Cp). CANARY ISLANDS: Gran Canaria: A. C. Cook 35 (N, W—536157), 569 (Ca—202072, Cm, Du—81264, Gg—31407, Go, Mi, N, Ob—14870, Or—14239, Po—220439, Ur, W—536746); Kuntze s.n. [31/XII/87] (N). Gomera: W. M. A. Brooke 427 (Bm). Lanzarote: R. T. Lowe s.n. (Bm). Tenerife: Asplund 1148 (S);

C. B. Clarke 2018 (Br); Tullgren 194 (S). GREAT BRITAIN: England: J. Ball s.n. [South-West part of Herefordshire, Aug. 1848] (W--682455); Beeby s.n. [29.7.1888] (Go, S); A. J. Berggren s.n. [11.7.1920] (S); Britton & Britton s.n. [Brighton, July 22, 1888] (C), s.n. [Canterbury, Aug. 5, 1888] (C); R. Campbell s.n. [Hampton Courts, July 10, 1890] (Mm--20479); Collector undesignated s.n. [Freshwater Church, Sept. 1866] (Mi); M. Dehn 1 (N, N); Doubleday s.n. [Eppius] (C); Gentil s.n. [Teddington] (Br); P. J. Greenway 340 (N); R. A. Harper s.n. [Chisham, 9/21/1889] (Cm); Haworth s.n. (T); Herb. Lemmon s.n. [Clifton, August 8th, 1831] (Ca--329283, Ca--329284); Herb. Lond. Univ. s.n. (W--71960); Herb. Marie-Victorin s.n. [Croyden, 13 Oct. 1831] (Vi); Hooker s.n. [Aug. 1823] (Vi); Horwood s.n. [23/8/36] (Go); J. H. Lewis s.n. [22. VIII.1877] (LL); O. Lindblom s.n. [Aug. 1929] (S); Linton s.n. [18.VII.1885] (S); Lomax s.n. [16 Augusti 1891] (Du--90897, Ob--14871); R. M. Middleton Jr. s.n. [Oct. 1859] (Mm--15386); W. H. Painter s.n. [July 1883] (S); Pease 8280 (Gg--31501); Roekentz 1217 (Br); C. Skottsberg s.n. [11 Juli 1920] (Go); Tracke s.n. [Cornwall, 1832] (Vi), s.n. [near Helston, 1836] (M); Turrill s.n. [Keston, July 2, 1921] (Ba), s.n. [Oxford, 15.VIII.1933] (S); T. Twining s.n. [near Kingston, 1842] (Ca--330213); L. F. Ward s.n. [Corfe Castle, Aug. 18, 1894] (W--229639); H. C. Watson s.n. (La); B. Welch 5217 (Go); J. W. White s.n. [Bank of Avon, July 30, 1883] (Bl--42349), s.n. [July 20, 1883] (Go); J. W. Wood s.n. [July 1841] (Ms). Scotland: B. James s.n. [1852] (Mm--15387). Wales: A. E. Wade s.n. [July 1935] (Ms), s.n. [Aug. 1950] (Vi). EIRE: S. A. Stewart 5843 (Pr). SCILLY ISLANDS: Buller s.n. [Scilly Is.] (Wp). CHANNEL ISLANDS: Guernsey: R. Harvey s.n. [11th July 1863] (Bl--42351). Jersey: L. Arsène 454 (Vi). SWEDEN: Agardh s.n. [Klågerup] (S); N. J. Andersson s.n. [Skane, 1846] (S); Björding s.n. [Lund, Augusti 1880] (N); C. Blom s.n. [14/8/1936] (Go, S), s.n. [7/7/1948] (S), s.n. [12/10/1952] (S); Cöster s.n. [18/8/74] (S), s.n. [Aug. 1874] (Go, S), s.n. [1875] (S); Falck s.n. [Raflunda, 7 Sept. 1861] (Go); Hallberg s.n. [Göteborg] (Go); Herb. Hort. Bot. Gothenburg s.n. [1840-talet] (Go); Herb. Linnaeus s.n. (F--photo, F--photo, N--photo, N--photo, S, Sg--photo, Sg--photo, Z--photo, Z--photo); Herb. Mus. Bot. Stockholm s.n. [1841] (S); Hjorth s.n. [August 1862] (Go); Kohler s.n. [1.IX.1921] (Go), s.n. [IX.1921] (Ew); Leche s.n. (S); Lilja s.n. [1855] (Go); Lindeberg s.n. [Aug. 1862] (Go); Mortensen s.n. [11 Aug. 1883] (Bl--42350); Nordquist s.n. [Skane, 1850] (S); Rasch s.n. [13/7/87] (Go); Ringirg s.n. (S); Ringstrand s.n. [Raflunda] (Go), s.n. (S); Sjöberg s.n. [1/7/1928] (S); Sjövall s.n. [September 1884] (Go); Sondén s.n. [Tyckland, 1908] (S); C. G. H. Thedenius s.n. [Sept. 1898] (Ca--206308, Go);

K. F. Thedenius s.n. [29/7/1874] (S); Visbig s.n. (Go); Westerberg s.n. [17/8/1872] (S); Winslow s.n. [Göteborg, 1872] (Go).
 BORNHOLM ISLAND: M. Engstedt s.n. [4/8/1908] (S); Klörker s.n. [25 Juli '83] (S); Krok s.n. [Juli 1865] (S, S); E. O. F. Nyman s.n. [3/9/86] (S). POLAND: Anderberg s.n. [14/7/1929] (Go); Dybowski 64 (S); Jungner s.n. [14/10/1906] (S); Nilsson & Degelius s.n. [14/7/1929] (S); Stendfinski s.n. [6.8.1872] (W--2156791).
 DENMARK: Andersen s.n. [19/8/1895] (S, S); Christensen s.n. [2/7/96] (S), s.n. [28.VIII.1896] (Go); Cøster s.n. [Juli 1868] (S); M. Engstedt s.n. [4/8/1908] (Go, S); Ernstsen s.n. [1/7/68] (S, S); A. Hansen s.n. [31/8/98] (Go), s.n. (S); O. Hansen s.n. [10/8/96] (S), s.n. [10/10/97] (S); T. Holm s.n. [7/1881] (S); Johanson s.n. [4 Juli 1883] (S); Lorenzen s.n. [27/VII/1911] (S); Mortensen s.n. [21/7/1880] (S), s.n. [11 Aug. 1883] (S); H. F. Poulsen s.n. [8.1919] (S); Rosenberg s.n. [Kjörup, 9/8/1849] (S); A. E. Thomsen s.n. [5/8/1873] (S), s.n. [Aug. 1873] (S), s.n. [27/7/1908] (Hi--188874); Troiel s.n. [Haverup ved sø, 2/8/1862] (S); Virliz s.n. (N); Visby s.n. [6/1853] (S); Vogel & Jørgensen s.n. [Fredensborg, 3/9/1876] (S). NETHERLANDS: Collector undesignated s.n. (I); De Mol s.n. (Bz--23784); Goester s.n. [Schalkwijk] (Ba); Henrard & Tap s.n. [20 Juni 1917] (La); Jonker & Kramer 210 (We); Oudemans 5014 (Br); Reclaire s.n. [Rotterdam, Juli 1898] (W--1750319); Tap s.n. [Aug. 1913] (La). LUXEMBURG: Lundberg s.n. [23/9/1925] (Go). BELGIUM: Bamps s.n. [Hasselt, Aout 1874] (Br); Bommer s.n. (Br); Busschodts s.n. [7 Juin 1886] (Br); Coemans s.n. (Br); Collector undesignated 3787 (Ca--95544); Coemans & Coemans s.n. [31 Juillet 1863] (Br), s.n. [14-7-79] (Br), s.n. [Août 1896] (Br); Crépin 165 (Br), s.n. [22/7/66] (Br); De Wilde-man s.n. [Laeken, 1881] (Br); De Witte s.n. [26 Juillet 1923] (Br); Evrard s.n. [25 juillet 1884] (Br); Guns s.n. [Juillet 1903] (Br), s.n. [16 juillet 1924] (Br); Hector 103 (Br); Henry s.n. [Namur, août 1882] (Br); Herb. Hort. Brux. s.n. [16 juillet 1924] (Ca--314048), s.n. [2 août 1927] (Ca--406664); Herb. Jard. Bot. Brux. s.n. [Blegny, 3 Juillet 1913] (Br), s.n. (Br, Br, Br); Lamabréé 3787 (W--2091277, W--2319331); Laurent 109 (Br); Lejeune s.n. (Br, Br); Lejeune & Coart 165 (Br); Libertae s.n. (Br); Lom-rabréé 3787 (Vi); Lundberg s.n. [8/IX/1927] (Go); Martinis s.n. [Juillet 1855] (Br); Mathieu s.n. [18-8-1907] (Br, Br); Michiels s.n. [11/8/1938] (Vi); Nyst s.n. [Env. de Brux.] (Br), s.n. (Br); Piré s.n. [Août 1873] (Br); Serclaes 9 (Br); Theux s.n. [Août 1908] (Br); Troch s.n. [Août 1883] (Br), s.n. [Juillet '90] (Br); Vandenbroeck s.n. [31 Juillet 1878] (Br); Van Haesendonck s.n. (Br); Van Heurck 4 (Br); Vermoesen s.n. [Curango-Hasselt, 7-8-1920] (Br, Br), s.n. [27 Juillet 1922] (Br); Wathelet s.n. [15

Août 1909] (Br). FRANCE: J. Ball s.n. [Paris, Oct. '39] (W--682442); Beger s.n. [12.VII.1916] (B); Billiet 1907 (Um--15); Bonne s.n. [fin juillet 1932] (It); Chamberet 2514 (Vi); S. L. Clarke s.n. [Mt. Revard, Aug. 8, 1898] (Lh); Coomans & Coomans s.n. [Nancy] (Br); Copineau s.n. [Douellens, 7 Jul. '90] (W--202597); Corbière s.n. [Cherbourg, 17/8/1886] (W--71990); Deize s.n. [Août 1896] (Du); L. Dempster 2402 (Ca--179923); Dongé s.n. [Juillet 1927] (Br, Br); G. Een s.n. [Clermont, 2.7.1955] (S); L. Engstedt s.n. [12/7/1937] (S); Erdmann s.n. [14/7/10] (S, S), s.n. [15/7/10] (S); Francaville s.n. [Alnalit, Pyrenees] (S); Gautier s.n. [12 Juin 1880] (Du); Gombault s.n. [Pouan, 18 juillet 1917] (S); Grapengiesser s.n. [12/8/1926] (S); Hård av Seyerstad s.n. [10/9/1947] (Go); Herb. W. H. Harvey s.n. [Liancourt] (Du--166463); Herb. Saldanha 2773 (Ja); Lassimonne 529 (W--274236); Lemée s.n. [Auch, 1922] (Bt--33828); S. Lindman s.n. [23 Juli 1925] (S); Mougeau s.n. [Août 1860] (Du); Nyman s.n. [7 Aug. 1860] (S); Östrand s.n. [25.6.1899] (S); Peyron s.n. [Juli 1891] (S, S); Puget s.n. [Annuy, Juillet 1853] (Vt); Segeström s.n. [17/6/1924] (S); Tidestrom 12985 (N, W--1554891), 13037 (I, W--1554904), 13282 (I, N), 13786 (N); E. Wall 5, in part [29/725] (Ew); Zetterstedt s.n. [16/7/1856] (Go), s.n. [6/10/1856] (S). PORTUGAL: J. J. Barros s.n. [V.26] (B), s.n. [VI.26] (B); Lemos 157 (Hi--202055); Linderoth s.n. [1858] (S), s.n. [Buzaco] (S); Rainha 2079 (W--2189943); Sjögren 453 (S). SPAIN: Albo s.n. [Alrededores de Santa Elena, 26.V.1933] (W--2213384); H. Delessert s.n. [Valence, 1850] (Du--166448); Knoche C.39 (Du); Kretzhmer 568 (S); Roivainen s.n. [17/6/1950] (S), s.n. [1950] (S), s.n. [11/4/1952] (Ca--97085); Zetterstedt s.n. [Barcugnas, 16/7/1856] (N, S). BALEARIC ISLANDS: Majorca: Knoche 2496 (Du--398343); Sjöberg s.n. [Mallorca, 27/10/1930] (S), s.n. [Mallorca, 7.XI.1930] (S). GERMANY: Benedicks s.n. [Gernrode] (S); C. Billot 67 (S); Bornmüller s.n. [Leipzig, 1878] (B), s.n. [Berka, IX.1897] (B), s.n. [12.VIII.1911] (B), s.n. [Ettersberg] (B); Chalmot s.n. [Göttingen] (W--368144); Collector undesignated 167 (Go), 172 (Ms), 226 (Du), s.n. (B); Degener & Degener 23405 (Ur); Dietrich 740 (Br); Döll s.n. [1843] (Br); Emmert s.n. (Vi); Erdmann s.n. [14 Juni 1914] (S, S), s.n. [14 Juli 1914] (Go); Erichsen s.n. [4/7/86] (Go); Fahrenholtz s.n. [Anfang Septbr. 1900] (Po--63918, Vt, W--980946); Felsmann s.n. [2/8/86] (Go); Grapengiesser s.n. [16/8/1929] (S, S); Gross s.n. [Brandenburg, 24/6/1920] (Sp--25790); Grossman s.n. [Leipzig, 1896] (Ml); Guyot s.n. [Berlin, 7/33] (Pr); Hafström & Hafström s.n. [Wiesbaden, 1888] (S); Hase s.n. [Thüringen, 1906] (B); Harle 252 (Bt--46379); Heiland 6 (La); Helledal s.n. [2 Juli 1886] (S, S); Herb. Calif. Acad. Sci. 31391 (Gg); Herb. Coll. Pharmacy s.n. (Pa); Herb. Landwirt. Hochsch. Berlin s.n. (B, B).

A CORRECTION

L. T. Eiten

In my article, "Egleria, a new genus of Cyperaceae from Brazil" (Phytologia, vol. 9, no. 8), I inadvertently used the words "holotype" and "isotype" when referring to the paratype collection (page 482, below). These words, of course, should be used only for the type collection. What was meant was that duplicates of the paratype collection would be sent to the University of Brasilia and other herbaria throughout the world.

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BOOK REVIEWS

Alma L. Moldenke

"An Introduction to Plant Biology", by Dale C. Braungart and Ross H. Arnett, Jr., 411 pp. C. V. Mosby Company, St. Louis, Missouri. 1962. \$7.00

The main advantages of this text are (a) an attractive and phylogenetic arrangement of 22 plant life cycles in a central separate section on green tinted paper and well illustrated by B. Melloni, (b) sound ecological and taxonomic approaches, (c) clear textual exposition, (d) effective use of photographs, especially those from the United States Department of Agriculture, and (e) useful bibliography (which is given after each chapter), glossary and index.

The main disadvantage is the conspicuous neglect of proper proofreading of galley and/or page proof resulting in the perpetuation of authors' and/or printer's slips which might mislead the uninformed student and distress the critical one. On page 40 we read that the "cell produces energy through respiration" instead of "releases"; page 42 has "required a catalytic agent by a specific enzyme" when the word "action" should have been substituted for "agent". On page 48 it is stated that "Fat is the most common plant food stored" and that maltose splits into 2 molecules of fructose only. Pages 229, 230 and part of 231 list taxonomic orders in ordinary type, while from there on they are given in bold-face type. In this whole section none of the family names are given in distinctive type as is to be expected in scientific literature. The following terms are misspelled: nucleus on page 40, Chlamydomonadaceae, Euglenales, Euglenidae, Metazoa on page 79, Violales on page 226, Avicennia on page 321, luxuriant on page

337, and Vaccinium on page 359.

Other disadvantages are: insufficient explanation of anaerobic vs. aerobic respiration for many beginning students with poor secondary school chemistry backgrounds, absence of an electron microphotograph of a cell, no mention in late mitotic prophase of the replication of chromosomes, use of archaic mitosis diagrams, considering a reduction division a mitotic one on page 343 while giving its correct interpretation on page 353, and preferring "desoxyribonucleic" for DNA.

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"Flowering Plants and Ferns of the Texas Coastal Bend Counties", by Fred B. Jones, Chester M. Rowell, Jr., and Marshall C. Johnston, 165 pp. Welder Series B-1, Welder Wildlife Foundation, Sinton, Texas. 1961. \$2.35

This fine botanical survey from this distinctive and little studied section of a huge state lists by scientific and common names almost all of the members of the rich floral composition to be found there. The flower colors, habitats and blooming times are added for each species.

The covers are attractively illustrated, but the size of the book is awkwardly and unnecessarily large and the spiral binding is frail and also awkward. A map of the area covered would have been helpful. The specific epithet in Verbena cloverae is misspelled on page 144; several specific and varietal names have been capitalized contrary to present day usage and the recommendations of the International Rules of Botanic Nomenclature.

The avowed purpose of the Welder Wildlife Foundation for wildlife research and education is to be saluted enthusiastically!

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"Woody Flora of Taiwan", by Hui-Lin Li, 992 pp., 371 illustrations. A Morris Arboretum Monograph, Livingston Publishing Company, Narberth, Pennsylvania. 1963. \$18.75

This is an unusually fine and comprehensive flora with keys, descriptions, literature citations, synonymy, and annotations on distribution, habitats and uses of 1030 species and many varieties in 411 genera and 105 families. Original line drawings represent most of the genera with such artistic skill that the plants as a whole could easily be recognized from them, and with such scientific attention to detail that almost all the structures of gross external anatomy are shown. This work is monumental both in quantity and quality.

It is, of course, virtually impossible to produce such an exhaustive work as this without some minor errors. The following comments on the treatment of the Verbenaceae are perhaps in order, but are not to be taken as any significant criticism of the work. The genus Avicennia is now usually segregated as a separate family, Avicenniaceae, and contains 15 accepted species and 5 varieties instead of only "3 species". Callicarpa has 142 valid species and 47 named forms and varieties instead of only "about 40"; C. kotoensis Hayata and C. japonica var. kotoensis (Hayata) Masamune belong in the synonymy of C. japonica var. luxurians Rehd. instead of in that of C. longifolia Lam. The name, C. dichotoma, according to the International Rules must be credited to K. Koch rather than to Rauschel. Caryopteris consists of 15 valid species, 1 hybrid, and 3 forms and varieties rather than "about 8 species". Clerodendrum Burm., incorrectly written Clerodendron L., contains 413 valid species and 146 named varieties and forms instead of only "about 100 species"; C. canescens Wall. is a species distinct from C. viscosum Vent., and is not a synonym of it. The latter species is not known from Formosa or Japan. Premna has 198 valid species and 47 accepted varieties and forms; Vitex has 268 valid specific taxa and 105 forms and varieties, rather than "about 150 species".

Nepeta is misspelled on page 824, Dr. P'ei's name on page 830, and Cornutia on page 834.

The following taxa have also been recorded from Formosa by H. N. Moldenke in his monographic studies, but are not accounted for by Li: Callicarpa pedunculata R. Br., Clerodendrum fragrans var. pleniflorum Schau., C. intermedium Cham., C. kaempferi (Jacq.) Sieb., C. ohwii Kanehira & Hatusima, C. trichotomum var. ferrugineum Nakai, Duranta repens L., D. repens var. alba (Masters) L. H. Bailey, Lantana camara var. aculeata (L.) Moldenke, Premna foetida Reinw., Sphenodesme involucrata (Presl) B. L. Robinson, Vitex negundo var. intermedia (P'ei) Moldenke, V. quinata var. puberula (H. J. Lam) Moldenke, and V. urceolata C. B. Clarke.

- - - - -

"Biochemical Systematics", by Ralph E. Alston and B. L. Turner, 416 pp., illustr. Prentice-Hall, Englewood Cliffs, New Jersey. 1963. \$13.25

This welcome book culls those chemically natural relationships that exist among the organisms studied from the many dissociated experimental works in this broad field, and the authors' extensive study of the literature and their own experimental work mainly on Baptisia by electrophoretic analysis

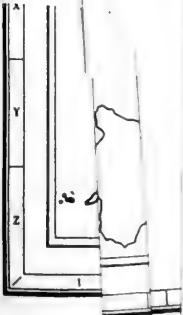
of certain non-essential and limitedly distributed metabolites found in the natural species, in natural and induced hybrids, and in taxonomically related genera. These compounds are many in number and from the following main groups: non-protein amino acid derivatives, certain organic acids, fatty acids, such phenols as anthocyanins and anthoxanthins and flavonoids, beta-cyanins, tannins, lignins, terpenoids, isothiocyanates, certain carotenoids, quinones, and sugars other than the ubiquitously essential glucose and fructose. After a few introductory chapters clearly and simply explaining plant taxonomy, the bulk of the book is devoted to the nature, presence and work of these chemicals. The book continues with a survey of other chemicals as they have been traced from differing parents to hybrid offspring, and then sorted out, often in Mendelian pattern, to their offspring — as in the case of the inheritance of oil characteristics in the hybrids of Eucalyptus macarthurii x E. cinerea. The book closes with a general evaluation of physiological or chemical races, variations in development and with the mature plants, and methods of presenting comparative biochemical data for systematic purposes. As for evaluating specific biochemical data and for projecting the present situation into the future, the authors "conclude that there is in the final analysis a much better chance of expressing specific biochemical differences in precise genetical terms (including characterization of the enzyme involved). Therefore, although the art of assessing the phylogenetic value of morphological data is farther advanced than the art of assessing the phylogenetic value of biochemical data, and we know far less at this time about variation in the chemistry of the plant, it is probable that in fifty years the situation will be reversed. Form is so subtly, delicately, and especially so indirectly regulated that its underlying genetics and biochemistry are likely to remain among the most intractable problems in biology for a long time."

The text is lucid and comprehensive. The print is clear and clean, paper and binding serviceable, index useful, bibliography excellent for content but unfortunately arranged by chapter topics, and the illustrative material valuable. In the bibliography many of J. B. McNair's works are included, but not his fine paper entitled "Energy and Evolution" published in volume 2, Number 2, of the present journal in December 1941. The generic name, Cycas, does not have its initial letter upper-cased, as it should, on page 366.

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A CHECKLIST OF THE CULTIVATED WOODY PLANTS OF THE
ROCHESTER PARKS.

Part II

Bernard Harkness,
Plant Taxonomist, Monroe Co. Dept. of Parks

PICEA, con.		
rubens	Biltmore Nur.	1902
Schrenkiana	Arnold Arboretum	1912
Wilsonii	Arnold Arboretum	1915
PIERIS - Ericaceae		
floribunda	J. Dawson	1907
japonica		
j. 'Variegata'	Holden Arboretum	1957
PINUS - Pinaceae		
aristata	Hicks Nur.	1917
Armandii	Arnold Arboretum	1905
Bungeana	Meehan Nur.	1900
Cembra	Ellwanger & Barry	1898
cembroides edulis	H. Ullrich	1953
c. monophylla (L)		
contorta latifolia	Biltmore Nur.	1902
densiflora	Arnold Arboretum	1902
d. 'Globosa'	Andorra Nur.	1916
d. 'Oculis-draconis'	Holden Arboretum	1957
flexilis	Veitch Nur.	1898
f. 'Glenmore Pyramid'	R. More	1956
Jeffreyi	Veitch Nur.	1898
Hunnellii	V. McNitt	1954
koraiensis	Veitch Nur.	1899
monticola	Arnold Arboretum	1902
Mugo	Arnold Arboretum	1920
M. 'Compacta'	D. Hill Nur.	1922
M. Mughus		
M. rostrata	Arnold Arboretum	1902
M. rotundata	Ellwanger & Barry	1897
M. 'Slavin'	Rochester seedling	
nigra	Arnold Arboretum	1905
n. austriaca	Ellwanger & Barry	1898
n. caramanica	Ellwanger & Barry	1897
n. cebennensis	Veitch Nur.	1903
n. 'Hornibrook'	Rochester origin	
n. 'Monstrosa'	Rochester seedling	
n. Poirétiana	Veitch Nur.	1898
n. 'Pyramidalis'	Rochester seedling	
parviflora	Veitch Nur.	1898
p. pentaphylla	Arnold Arboretum	1911
Peuce	Arnold Arboretum	1896
ponderosa	Veitch Nur.	1898
p. 'Pendula'	Arnold Arboretum	1913

PINUS, con.

ponderosa scopulorum	Arnold Arboretum	1913
resinosa	Douglas Nur.	1898
rigida	e side, Irondequoit Bay	1902
Sabiniana	Schumacher	1957
Strobus	Ellwanger & Barry	1896
S. 'Contorta'	Rochester origin	
S. 'Densa'		
S. 'Fastigiata'	Hicks Nur.	1920
S. 'Ontario'	Rochester origin	
sylvestris	Ellwanger & Barry	1898
s. 'Argentea'	Veitch Nur.	1903
s. 'Fastigiata'	Hicks Nur.	1920
s. 'Nana'	Veitch Nur.	1903
s. 'Pumila'		
tabulaeformis	Arnold Arboretum	1911
Thunbergii	Arnold Arboretum	1902
Wallichiana	Little Nur.	1898

PLATANUS - Platanaceae

acerifolia
occidentalis

POFULUS - Salicaceae

alba		
a. 'Richard'	Arnold Arboretum	1916
berolinensis	Arnold Arboretum	1907
canadensis 'Eugene'	Barbier Nur.	1907
c. 'Regenerata'		
c. 'Serotina'		
canescens		
cathayana		
deltoides	BHS, Rose Hill, Canada	
Fremontii	Spaeth Nur.	1908
gileadensis	Horsey, Ironton, Ohio	
grandidentata		
Maximowiczii	W. A. Smith	1952
nigra	Spaeth Nur.	
n. 'Betulifolia'	Arnold Arboretum	1907
n. 'Elegans'	Arnold Arboretum	1907
n. 'Italica'		
n. 'Volga'	Teas Nur.	1907
robusta	Spaeth Nur.	
Sieboldii	Arnold Arboretum	1952
Simonii	Arnold Arboretum	1907
S. 'Fastigiata'	Arnold Arboretum	1917
tremuloides		

POTENTILLA - Rosaceae

arbuscula albicans	Arnold Arboretum	
fruticosa	Meehan Nur.	1915
f. 'Longacre' (N)	U. S. D. A.	1962
f. 'Moonlight'	Holden Arboretum	1956

POTENTILLA, con.

fruticosa 'Rigida'	Mayfair Nur.	1958
f. 'Tenuiloba'	Mayfair Nur.	1958

PRINSEPIA - Rosaceae

sinensis	Arnold Arboretum	1915
uniflora serrata	Morton Arboretum	1946

PRUNUS - Rosaceae

allegheniensis	Arnold Arboretum	1902
americana	Arnold Arboretum	1913
angustifolia	Arnold Arboretum	1912
apetala	Arnold Arboretum	1916
Armeniaca		
avium	Arnold Arboretum	1912
Besseyi		
cerasifera	Arnold Arboretum	1916
Davidiana	Arnold Arboretum	1919
D. 'Alba'		
domestica 'Plantier'		
Dunbarii	Rochester seedling	
Gravesii	N. Y. Bot. Gard.	1952
Grayana	Arnold Arboretum	1913
'Hally Jolivette'	Arnold Arboretum	1951
incisa	Arnold Arboretum	1919
i. Yamadei	Arnold Arboretum	1917
institia	Spaeth Nur.	1902
lanata (N.)	Morton Arboretum	1959
Laurocerasus 'Mischeana' (N.)	Brimfield Gard.	1958
L. 'Schlipkaensis'	Ellwanger garden	1948
Maackii	Spaeth Nur.	1902
mandshurica	Arnold Arboretum	1931
maritima	Dunbar, Long Island	1912
Maximowiczii	Nikko Bot. Gard.	1956
mexicana	Arnold Arboretum	1911
nigra	Arnold Arboretum	1902
nipponica	Nikko Bot. Gard.	1956
Padus	Arnold Arboretum	1912
P. commutata	Arnold Arboretum	1912
Sargentii	Arnold Arboretum	1902
serotina	Arnold Arboretum	1902
serrulata		
s. 'Amonogawa' (N.)	Weston Nur.	1962
s. 'Asagi'	Arnold Arboretum	1917
s. 'Hata-zakuri'	Arnold Arboretum	1917
s. 'Hosokawa-odora'		
s. 'Jo-Nioi'	Arnold Arboretum	1917
s. 'Kikushidare'	Arnold Arboretum	1917
s. 'Kuramayama'	Arnold Arboretum	1917
s. 'Kwanzan'	Arnold Arboretum	1917
s. 'Okina'	Arnold Arboretum	1917
s. 'Sakon'	Arnold Arboretum	1917

PRUNUS, con.

serrulata 'Shirofugen'	Arnold Arboretum	1917
s. 'Shirotae'	Arnold Arboretum	1917
subhirtella	Arnold Arboretum	1912
s. ascendens (N.)	Holden Arboretum	1960
s. pendula	Arnold Arboretum	1907
tomentosa	Arnold Arboretum	1892
t. 'Geneva'	N. Y. State Exp. Sta.	1931
t. 'Leucocarpa'	N. Y. State Exp. Sta.	1931
virginiana	Arnold Arboretum	1902
v. demissa	Spaeth Nur.	1902
v. melanocarpa	Arnold Arboretum	1915
yedoensis	Arnold Arboretum	1917
y. 'Perpendens'	Arnold Arboretum	1919

PSEUDOLARIX - Pinaceae

amabilis	Veitch Nur.	1905
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PSEUDOSASA - Gramineae

japonica	Ellwanger garden	1954
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PSEUDOTSUGA - Pinaceae

Menziesii glauca		
M. g. 'Big Flats'	Seedling in Big Flats Nur.	1955
M. g. 'Densa'	Arnold Arboretum	1896
M. g. 'Fastigiata'	Rochester seedling	1913

PTELEA - Rutaceae

lutescens		
trifoliata		
t. mollis		

PTEROCARYA - Juglandaceae

fraxinifolia	Arnold Arboretum	1902
rhoifolia (N.)	Smith College	1960
stenocarpa	Arnold Arboretum	1919

PTEROSTYRAX - Styracaceae

hispida	Arnold Arboretum	1902
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PYRULARIA - Santalaceae

pubera	BH, Kentucky	1960
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PYRUS - Rosaceae

betulaefolia	Arnold Arboretum	1912
Bretschneideri	Arnold Arboretum	1918
Calleryana	Arnold Arboretum	1915
C. dimorphophylla	Arnold Arboretum	1922
C. Fauriei	Arnold Arboretum	1920
C. tomentella	Arnold Arboretum	1918
canescens	Spaeth Nur.	1902
communis	Arnold Arboretum	1914
elaegrifolia	Spaeth Nur.	1902
Lindleyi	Arnold Arboretum	1919

PYRUS, con.

<i>Michauxii</i>	Arnold Arboretum	1915
<i>nivalis</i>	Spaeth Nur.	1902
<i>phaeocarpa</i>	Arnold Arboretum	1918
<i>pyrifolia</i>	Arnold Arboretum	1918
p. 'Culta'		
<i>salicifolia</i> (N.)	Vienna	1952
<i>serrulata</i>	Arnold Arboretum	1915
<i>ussuriensis</i>	Arnold Arboretum	1919
u. <i>hondoensis</i>	Arnold Arboretum	1921
u. <i>ovoidea</i>	Arnold Arboretum	1915

QUERCUS - Fagaceae

<i>acutissima</i>	Biltmore Nur.	1902
<i>alba</i>		
a. <i>latiloba</i>		
<i>aliena</i>	Arnold Arboretum	1909
a. <i>acuteserrata</i>	Arnold Arboretum	1907
<i>arkansana</i>	Arnold Arboretum	1916
<i>Bebbiana</i>	Arnold Arboretum	1902
<i>bicolor</i>		
<i>castaneaefolia</i>		
<i>Cerris</i>	Biltmore Nur.	1914
<i>coccinea</i>	Arnold Arboretum	1921
<i>dentata</i>	Biltmore Nur.	1902
d. 'Pinnatifida'	A. J. Malefy	1953
<i>ellipsoides</i>	Arnold Arboretum	1907
<i>Fernowii</i>	Arnold Arboretum	1921
<i>Frainetto</i>	Veitch Nur.	1907
<i>glandulifera</i>	Arnold Arboretum	1907
<i>Haas</i> (N.)	U. S. D. A.	1960
<i>ilicifolia</i>		
<i>imbricaria</i>		
<i>Jackiana</i>		
<i>liaotungensis</i>	Arnold Arboretum	1929
<i>macrocarpa</i>		
<i>marilandica</i>	Dunbar, Bayville	1908
<i>Michauxii</i>		
<i>Muehlenbergii</i>		
<i>palustris</i>	Horsey, Bowling Green	
<i>petraea</i>		
p. 'Mespilifolia'	Ellwanger & Barry	
<i>Phellos</i>	Teas Nur.	1923
<i>prinoides</i>	Meehan Nur.	1892
<i>Prinus</i>	Dunbar, Bayville	1908
<i>pubescens</i>	Arnold Arboretum	1906
<i>Robur</i>	Arnold Arboretum	1906
R. 'Fastigiata'		
R. 'Filicifolia'	Ellwanger & Barry	
<i>rubra</i>		
r. <i>borealis</i>	Arnold Arboretum	
<i>runcinata</i>	Arnold Arboretum	1921
<i>Sargentii</i>	Arnold Arboretum	1902

QUERCUS, con.

Saulii		
Schuettei		
Shumardii	Arnold Arboretum	1918
S. Schneekii	Arnold Arboretum	1907
stellata		
s. Margaretta	B.H.Slavin, Oklahoma City	
texana	Arnold Arboretum	1902
variabilis	Arnold Arboretum	1907
velutina	Arnold Arboretum	1907
v. missouriensis	Arnold Arboretum	1907

RHAMNUS - Rhamnaceae

alpina	Spaeth Nur.	1892
cathartica	Spaeth Nur.	1892
davurica	Arnold Arboretum	1902
d. nipponica	Arnold Arboretum	1916
dolichophylla (N.)	Alma-Ata	1960
Frangula	J. Dawson	1892
infectoria	Spaeth Nur.	1902
japonica	Arnold Arboretum	1906
koralensis	Kohankie Nur.	1945
Pallasii (N.)	Morton Arboretum	1956
Purshiana	Spaeth Nur.	1902
rubra (N.)		
Schneideri manshurica	Arnold Arboretum	1919
utilis	Spaeth Nur.	1892
Wilsonii (N.)	Mt. Airy Arboretum	1960

RHODODENDRON - Ericaceae

albicans	A. Waterer	1904
arborescens	J. Dawson	1892
atlanticum		
Augustini	U. of Wash. Arboretum	1952
brachycarpum	Regel & Kesselring	1910
calendulaceum	Kelsey Nur.	1899
calophytum	Dr. Irving	1960
concinnum lepidanthum	Wisley	1953
canadense albiflorum	D. Leach	1958
carolinianum	Robbins Nur.	1922
cuneatum	Edinburgh	1955
decorum	U. of Wash. Arboretum	1954
Fauriei	Edinburgh	1952
flavum		
haematodes	Schumacher	1955
hippohaecoides	Bremen	1953
Houlstonii	U. of Wash. Arboretum	1952
japonicum	Arnold Arboretum	1914
keleticum		
laetivirens	Bobbink & Atkins	1917
leucapsis	Schumacher	1956
Makinoid	Bremen	1952
maximum	J. Dawson	1892

RHODODENDRON, con.

micranthum	Arnold Arboretum	1922
minus	LaBar Nur.	1921
mucronulatum	Arnold Arboretum	1902
mucronatum		
m. ripense		
obtusum Kaempferi		
praecox	Dickson Nur.	1892
reticulatum	Nikko Bot. Gard.	1950
rubignosum	U. of Wash. Arboretum	1954
rupicola	Wisley	1955
russatum	Bremen	1953
Smirnowii	Edinburgh	1932
sutchuenense Giraldii	U. of Wash. Arboretum	1951
Vaseyi	Kelsey Nur.	1892
viscosepalum	A. Waterer	1904
Weyrichii		
yakusimanum	D. Leach	1958
yedoense		

RHODODENDRON - (Cultivars)

'Album Elegans'	Ellwanger & Barry	1892
'Album Grandiflorum'	Ellwanger & Barry	1892
'Altaclarensis' Az.	A. Waterer	1904
'Amphion'	A. Waterer	1900
'Appelles' Az.	van Heiningen	1914
'Ariadne' Az.	van Heiningen	1914
'Astreans' Az.	Veitch Nur.	1907
'Auguste Mechelynych' Az.	van Heiningen	1914
'Aurore de Roosighem' Az.	Veitch Nur.	1907
'Beaufort'	D. Leach	1958
'Beaute Celeste' Az.		
'Belle Vermeille' Az.	Veitch Nur.	1907
'Bijou des Amateurs' Az.	van Heiningen	1914
'Blue Tit'	Brimfield Gard.	1955
'Boule de Neige'	A. Waterer	1900
'Boule de Rose'	D. Leach	1958
'Bouquet de Flore' Az.	Veitch Nur.	1907
'Caractacus'	A. Waterer	1904
'Cardinal' Az.	A. Waterer	1904
'Caroline'	D. Leach	1958
'Charles Bagley'	Cottage Gard.	1937
'Charles Dickens'	A. Waterer	1904
'Charles Rogier' Az.	van Heiningen	1914
'Comte de Gomer' Az.	A. Waterer	1904
'Comte de Papadopoli' Az.	van Heiningen	1914
'Comte de Quincy' Az.	A. Waterer	1904
'Cunninghams White'		
'Cymodocee' Az.	A. Waterer	1904
'Davies' Az.	A. Waterer	1900
'Delicatissimum'	Cottage Gard.	1918
'Domenico Scassi' Az.	A. Waterer	1904
'Dr. M. Oosthoek' Az.	Grootendorst	1951

RHODODENDRON (cv), con.

'Dr. Streiter' Az.	Veitch Nur.	1907
'Duc de Provence' Az.	Veitch Nur.	1907
'Edison' Az.	A. Waterer	1904
'Elizabeth' Az.	A. Waterer	1904
'Esmeralda' Az.	van Heiningen	1914
'Everestianum'	Ellwanger & Barry	1892
'Fama' Az.	A. Waterer	1904
'Fanfare'	D. Leach	1958
'Frere Orban' Az.	A. Waterer	1904
'General Brialmont' Az.	A. Waterer	1904
'General Goffinet' Az.	van Heiningen	1914
'Gloire de la Belgique' Az.	van Heiningen	1914
'Gloria Mundi' Az.	A. Waterer	1900
'Goldsworth Yellow'		1958
'Grandeur Triomphant' Az.	A. Waterer	1904
'Henri Conscience' Az.	van Heiningen	1914
'H. H. Hunnewell'	A. Waterer	1904
'H. W. Sargent'	Cottage Gard.	1918
'Ignatius Sargent'	van Heiningen	1914
'Il Tasso' Az.	van Heiningen	1914
'Imperator' Az.	A. Waterer	1904
'Josephine Klinger' Az.	Veitch Nur.	1907
'Julda Schupp' Az.	A. Waterer	1904
'Lady Armstrong'	A. Waterer	1904
'Lady Grey Egerton'	A. Waterer	1900
'Liberty' Az.	Grootendorst	1951
'Mabel Parsons'		
'Madame Carvalho' Az.	A. Waterer	1904
'Mme. Gustave Guillemot' Az.		
'Mme. Joseph Baumann' Az.	A. Waterer	1904
'Marie Ardent' Az.	A. Waterer	1904
'Marie Verschaffelt' Az.	A. Waterer	1904
'Mecene' Az.	van Heiningen	1914
'Memoir'	A. Waterer	1909
'Mignon' Az.	A. Waterer	1904
'Monsieur des Bois' Az.	van Heiningen	1914
'Mrs. C. S. Sargent'	A. Waterer	1904
'Nancy Waterer' Az.	A. Waterer	1904
'Pallas' Az.	A. Waterer	1904
'Parsons Gloriosum'	Cottage Gard.	1937
'Parsons Grandiflorum'	Cottage Gard.	1918
'Phoebe' Az.	van Heiningen	1914
'Phidias' Az.	van Heiningen	1914
'Prince Albert' Az.	A. Waterer	1904
'Pucelle' Az.		
'Purpureum Crispum'		
'Purpureum Elegans'		
'Purpureum Grandiflorum'	Cottage Gard.	1937
'Queen Emma' Az.	Grootendorst	1951
'Ramapo'	D. Leach	1958
'Rembrant' Az.	Veitch Nur.	1907
'Roi des Feux' Az.	van Heiningen	1914

RHODODENDRON (cv.), con.

'Rosebud' Az.		1914
'Rosetta' Az.	van Heiningen	1892
'Roseum Elegans'	Ellwanger & Barry	1892
'Russel Harmon'	D. Leach	1958
'Scintillation'	D. Leach	1958
'Unique' Az.	A. Waterer	1904
'Windbeam'	Baldsiefsen Nur.	1960

RHODOTYPOS - Rosaceae
scandens

Parsons Nur. 1892

RHUS - Anacardaceae

aromatica	Ellwanger & Barry	1892
a. flabelliformis	Arnold Arboretum	1906
chinensis	W. A. Smith	1958
copallina	Meehan Nur.	1915
glabra 'Laciniata'	Ellwanger & Barry	1892
punjabensis sinica	Arnold Arboretum	
typhina	Arnold Arboretum	

RIBES - Saxifragaceae

alpinum	Spaeth Nur.	1892
americanum	Spaeth Nur.	1892
aureum	Arnold Arboretum	
Carrierei	Spaeth Nur.	1892
diacanthum	Spaeth Nur.	1892
futurum		
Gordonianum	Ellwanger & Barry	1892
holosericeum		
niveum	Arnold Arboretum	1907
odoratum	Slavin, Muskogee, Okla.	
tenuis	Arnold Arboretum	1914
urceolatum		
Warscewiczii (N.)	Kornick	1959

ROBINIA - Leguminosae

fertilis		
hispida	J. Dawson	1892
Holdtii 'Britzensis'		
Kelseyi	Kelsey Nur.	1919
luxurians	Arnold Arboretum	1920
Pseudoacacia		
P. 'Decaisne'		
P. 'Dependens'		
P. 'Rehder'		
Slavinii	Rochester Seedling	
viscosa	Robbins Nur	1922

ROSA - Rosaceae

acicularis Bourgeauiana (N.)	Andrews Nur.	1915
adenosepala (N.)	Morton Arboretum	1926
Albertii (N.)	T. Smith Nur.	1916
arvensis ayreshirea (N.)	Arnold Arboretum	1916

ROSA, con.

bella (N.)	Griefswald	1960
blanda alba (N.)	Arnold Arboretum	1916
centifolia muscosa (N.)		
cinnamomea plena (N.)	Morton Arboretum	1926
consanguinea (N.)	Arnold Arboretum	1917
corymbifera (N.)	Arnold Arboretum	1907
damascena (N.)	Morton Arboretum	1926
d. tringintipetala (N.)	Arnold Arboretum	1917
davurica (N.)	Arnold Arboretum	1907
Fedtschenkoana (N.)	T. Smith Nur.	1899
filipes (N.)	U. of Wash. Arboretum	1954
fujisanensis (N.)	Schumacher	1955
Helena (N.)	Arnold Arboretum	1911
Hemsleyana (N.)	U. of Wash. Arboretum	1954
Lheritieriana 'Amadis' (N.)	Morton Arboretum	1926
macrophylla (N.)	Griefswald	1960
Malyi (N.)	T. Smith Nur.	1899
manca (N.)	Auderghem	1962
marginata (N.)	Arnold Arboretum	1917
Maximowicziana (N.)	U. of Wash. Arboretum	1957
montana (N.)	Kew	1960
Moyesii (N.)		
multiflora catheyensis (N.)	Arnold Arboretum	1915
m. 'Mrs. F. W. Flight' (N.)	V. Gibbs	1914
m. 'Platyphylla' (N.)	Arnold Arboretum	1920
Onoei (N.)	U. S. D. A.	1957
palustris Nuttalliana (N.)	T. Smith Nur.	1899
pendulina (N.)	Backhouse Nur.	1892
Primula (N.)	Arnold Arboretum	1917
rugosa 'Alba' (N.)	Toronto	1960
sertata (N.)	Edinburgh	1960
spinossissima altaica (N.)	Arnold Arboretum	1917
Webbiana (N.)	T. Smith Nur.	1899
Wichuriana X Soulieana (VanFleet #18) (N.)	U. S. D. A.	1920
Woodsii Fendleri (N.)	J. Dawson	1892

ROSA, Cultivars

'Amy Robsart' (N.)	Ellwanger & Barry	1901
'Apple Blossom' (N.)	Arnold Arboretum	1918
'Bradwardine' (N.)		
'Burnet Brightness' (N.)	T. Smith Nur.	1916
'Heart of Gold' (VanFleet #5) (N.)		
'Jeannie Deans' (N.)	Ellwanger & Barry	1901
'William C. Egan' (N.)	J. Dawson	1896
'Zuccariniana' (N.)	V. Gibbs	1914

RUBUS - Rosaceae

Cockburnianus	Willowood Arboretum	1950
phoenicolasius		

SAGERETIA - Rhamnaceae
pyncnophylla

SALIX - Salicaceae

acutifolia	Arnold Arboretum	1917
alba 'Calva'	Arnold Arboretum	1911
a. 'Chermesina'	Ellwanger & Barry	1918
a. 'Sericea'	Arnold Arboretum	1917
a. 'Vitellina'	Arnold Arboretum	1919
amygdalina (N.)	Morton Arboretum	1960
babylonica 'Crispa' (N.)	Holden Arboretum	1960
blanda	Arnold Arboretum	1916
cinerea (N.)	Morton Arboretum	1960
Elaeagnos		
holosericea	Arnold Arboretum	1906
Hookeriana	Arnold Arboretum	1917
jessoensis	Arnold Arboretum	1917
koreensis (N.)	Morton Arboretum	1960
Matsudana	U. S. D. A.	
M. 'Pendula'	Morton Arboretum	1933
Meyeriana (N.)	Morton Arboretum	1960
Miyabeana (N.)	Morton Arboretum	1960
nigra	native at Mendon Park	
Pierotii	Spaeth Nur.	
purpurea 'Glaucescens'	Arnold Arboretum	1906
p. 'Pendula' (N.)	Holden Arboretum	1960
rubens	Ellwanger & Barry	1892
sepulcralis	Arnold Arboretum	1917
smithiana	Notcutt Nur.	1959
stipularis	Spaeth Nur.	1892

SAMBUCUS - Caprifoliaceae

canadensis acutiloba	W. A. Smith	1955
nigra	Spaeth Nur.	1892
n. 'Albo-variegata'	Horton Nur.	1958

SAPINDUS - Sapindaceae

Drummondii	Slavin, Okla.	1914
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SARCOCOCCA - Buxaceae

Hookeriana humilis	Hicks Nur.	
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SASSAFRAS - Lauraceae

albidum	Arnold Arboretum	1913
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SCHIZOPHRAGMA - Saxifragaceae

hydrangeoides	Arnold Arboretum	1916
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SCIADOPITYS - Pinaceae

verticillata	Yokahama Nur.	1922
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SECURINEGA - Euphorbiaceae

suffruticosa	Morton Arboretum	1950
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SHEPHERDIA - Elaeagnaceae		
argentea	Kohankie Nur.	1945
SMILAX - Liliaceae		
glauca	Slavin, Asheville	1911
rotundifolia	J. Dawson	1892
SOPHORA - Leguminosae		
japonica	Meehan Nur.	1899
SORBARIA - Rosaceae		
arborea	Arnold Arboretum	1913
a. glabrata	Arnold Arboretum	1913
a. subtomentosa		
assurgens	Barbier Nur.	1907
sorbifolia	Ellwanger & Barry	1892
s. stellipila	Arnold Arboretum	1911
SORBOPYRUS - Rosaceae		
auricularis bulbiformis	Arnold Arboretum	1912
SORBUS - Rosaceae		
alnifolia	Arnold Arboretum	1920
americana	Arnold Arboretum	1913
Aria	Dickson Nur.	1907
A. longifolia	Dickson Nur.	1907
A. 'Lutescens'	Grootendorst Nur.	1957
arnoldiana		
Aucuparia	Arnold Arboretum	1907
A. lanuginosa		
'Carpet of Gold' (N.)	Weston Nur.	1962
commixta	U. S. D. A.	1960
decora		
discolor	Spaeth Nur.	1908
Folgneri	Arnold Arboretum	1919
hybrida	Arnold Arboretum	1906
h. 'Meinich'		
intermedia minima		
japonica calocarpa	Arnold Arboretum	1920
latifolia		1932
Mougeotii		
randaiensis (N.)	U. of Wash. Arboretum	1952
rufo-ferruginea	Arnold Arboretum	1918
serotina	Royal Bot. Gard., Hamilton	1961
SPIRÆA - Rosaceae		
alba	Ellwanger & Barry	1892
Billiardii	Spaeth Nur.	1892
blanda	Arnold Arboretum	1902
Blumei	Arnold Arboretum	1919
brachybotrys	Ellwanger & Barry	1892
Bunalda		
B. 'Anthony Waterer'		

SPIRAEA, con.

Bumalda 'Norman'	Willowwood Arboretum	1952
B. 'Pruhonica'		
chamaedryfolia	Arnold Arboretum	1906
c. ulmifolia	Arnold Arboretum	1919
cinerea	Spaeth Nur.	1892
conspicua	Ellwanger & Barry	1892
Douglasii		
Henryi	Arnold Arboretum	1909
hypericifolia	Ellwanger & Barry	1892
latifolia		
longigemmis (N.)	Kew	1958
Margaritae	Spaeth Nur.	1892
media	LeRoy Nur.	1892
m. sericea (N.)	Leningrad	1958
Menziesii	V. Gibbs	1914
Miyabei glabrata	Lemoine Nur.	1914
mollifolia (N.)	Kew	1954
nipponica	Arnold Arboretum	1909
n. rotundifolia	Ellwanger & Barry	1892
nudiflora	V. Gibbs	1914
oxyodon		
prunifolia	Ellwanger & Barry	1892
p. simplicifolia	Spaeth Nur.	1892
pyramidata	Arnold Arboretum	1919
salicifolia	Nikko Bot. Gard.	1950
Thunbergii		
trichocarpa	Arnold Arboretum	1919
trilobata	Ellwanger & Barry	1892
Van Houttei		
Watsoniana	Dickson Nur.	1892

STACHYRUS - Stachyuraceae

chinensis	Willowwood Arboretum	1957
praecox	G. Landis Arboretum	1954

STAPHYLEA - Staphyleaceae

colchica	Ellwanger & Barry	1892
pinnata	J. Dawson	1892
trifolia		

STEPHANANDRA - Rosaceae

incisa	Meehan Nur.	1919
i. 'Crispa'	Gulf Stream Nur.	1958
sp. aff. chinensis		
Tanakae	T. Smith Nur.	1899

STEWARTIA - Theaceae

koreana	Arnold Arboretum	1952
Malacodendron		
Pseudo-Camellia	Parson Nur.	1892

STYRAX - Styracaceae

dasyantha	T. H. Everett	1952
japonica	Veitch Nur.	1899
Obassia	Saul Nur.	1892

SYMPHORICARPOS - Caprifoliaceae

albus	Spaeth Nur.	1892
a. laevigatus	Slavin, Milwaukee	1918
Chenaultii	E. O. Orpet	1914
orbiculatus	LeRoy Nur.	1892

SYMPLOCOS - Symplocaceae

paniculata	Parsons Nur.	1892
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SYRINGA - Oleaceae

amurensis	Arnold Arboretum	1919
a. japonica	Ellwanger & Barry	1892
chinensis	Ellwanger & Barry	1892
c. 'Alba'	Ellwanger & Barry	1892
c. 'Bicolor'	Lemoine Nur.	1905
c. 'Le Troyes'		
c. 'Metensis'	Kohankie Nur.	1940
c. 'Orchid Beauty' (N.)	Arnold Arboretum	1956
c. 'President Hayes'	Barbier Nur.	1902
c. 'Saugeana'	Transon Nur.	1892
c. 'Steencreysii'	Parsons Nur.	1892
diversifolia (N.)	Elan Mem. Park	1958
emodi	Spaeth Nur.	1892
e. 'Aurea'		
Henryi 'Alba' (N.)	Arnold Arboretum	1956
H. 'Charles Hepburn'	Bobbink & Atkins	1942
H. X tomentella - 'Prairial'	Morton Arboretum	1944
hyacinthiflora 'Alice Eastwood'		
	Swarthmore	1947
h. 'Assessippi'	Swarthmore	1941
h. 'Berryer'	Lemoine Nur.	1914
h. 'Blue Hyacinth'	Swarthmore	1947
h. 'Bountiful' (N.)	Swarthmore	1957
h. 'Buffon'	Col. Plum	1925
h. 'Catinat'	Morton Arboretum	1927
h. 'Charles Nordine' (N.)	Swarthmore	1957
h. 'Clarkes Giant' (N.)	Ruliffson	1953
h. 'Claude Bernard'	Lemoine Nur.	1916
h. 'Descartes'	Lemoine Nur.	1917
h. 'Dr. Chadwick' (N.)	Morton Arboretum	1962
h. 'Esther Staley'	Wayside Gard.	1949
h. 'Evangeline'	Arnold Arboretum	1942
h. 'Excel'	Swarthmore	1941
h. 'Fantasy' (N.)	Weston Nur.	1962
h. 'Fenelon'	Morton Arboretum	1944
h. 'Gertrude Leslie' (N.)	Swarthmore	1957
h. 'Grace' (N.)	Swarthmore	1957
h. 'Hazel Opper' (N.)	Dr. Rankin	1955

SYRINGA, con.

hyacinthiflora 'Jewel' (N.)	Upton Nur.	1958
h. 'Kate Sessions'	Wayside Gard.	1948
h. 'Lamartine'	Lemoine Nur.	1912
h. 'Louvois'	Cottage Gard.	1938
h. 'Minnehaha'	Arnold Arboretum	1942
h. 'Montesquieu'	Swarthmore	1941
h. 'Necker' (N.)	Arnold Arboretum	1948
h. 'Nokomis'	Arnold Arboretum	1948
h. 'Norah' (N.)	Morton Arboretum	1961
h. 'Pascal'	Lemoine Nur.	1917
h. 'Peggy'	Morton Arboretum	1948
h. 'Pink Cloud'	Swarthmore	1957
h. 'Pink Spray' (N.)	Swarthmore	1957
h. 'Flena'	de Messemaker	1914
h. 'Pocahontas' (N.)	Strawberry Hill	1963
h. 'Purple Glory' (N.)	Swarthmore	1957
h. 'Scotia'	Swarthmore	1947
h. 'Splendor'	C. W. Burr Nur.	1952
h. 'Summer Skies'	Swarthmore	1957
h. 'Sunset' (N.)	Weston Nur.	1962
h. 'Swarthmore' (N.)	Strawberry Hill	1963
h. 'Turgot'	Arnold Arboretum	1948
h. 'Vauban'	Lemoine Nur.	1914
josiflexa 'Anna Amhoff' (N.)	Colprit Nur.	1959
j. 'Bellicent'	Bobbink & Atkins	1942
j. 'Guinevere'	Arnold Arboretum	1942
j. 'Nellie Bean' (N.)	Colprit Nur.	1959
j. 'Royalty'	Kelsey Nursery Serv.	1955
j. 'Rubra' (N.)	Elan Mem. Park	1958
Josikea	Ellwanger & Barry	1892
J. 'Eximia'	Barbier Nur.	1902
J. 'Pallida'	Arnold Arboretum	1915
J. 'Rubra'	Transon Nur.	1892
J. 'Zabel'	Ellwanger & Barry	1917
J. X ? - 'Kim' (N.)	Boerner Bot. Gard.	1958
Julianae	Upton Nur.	1945
J. 'Hers Var.' (N.)	Elan Mem. Park	1959
Komarowii	Arnold Arboretum	1912
laciniata	Spaeth Nur.	1908
l. X pinnatifida	Upton Nur.	1958
Meyeri	Arnold Arboretum	1914
microphylla	Arnold Arboretum	1915
m. 'Superba'	Wayside Gard.	1948
nanceiana 'Floreal'		1933
n. 'Rutilant'	Arnold Arboretum	1943
oblata	Upton Nur.	1943
o. dilutata	Arnold Arboretum	1919
o. Giraldii (N.)	Arnold Arboretum	1948
o. G. 'Nana' (N.)	Upton Nur.	1954
pekinensis	Arnold Arboretum	1913
p. 'Pendula'	Elan Mem. Park	1954
persica	Lemoine Nur.	1902
p. 'Alba'	Ellwanger & Barry	1892

SYRINGA, con.

pinnatifolia	Arnold Arboretum	1911
Potaninii (N.)	Hart & Vick	1943
Prestoniae 'Alice'	Brand Nur.	1947
P. 'Calpurnia'	Morton Arboretum	1948
P. 'Charmian'	Morton Arboretum	1948
P. 'Coral' (N.)	Upton Nur.	1955
P. 'Desdemona'	Swarthmore	1947
P. 'Donald Wyman'	Gardner Nur.	1950
P. 'Elinor' (N.)	Morton Arboretum	1961
P. 'Enid' (N.)	Elan Mem. Park	1958
P. 'Ethel M. Webster' (N.)	Swarthmore	1957
P. 'Francisca'	Morton Arboretum	1948
P. 'Handel'	Arnold Arboretum	1942
P. 'Hecla'	Arnold Arboretum	1942
P. 'Horace' (N.)	Elan Mem. Park	1958
P. 'Isabella'	Bobbink & Atkins	1942
P. 'Jessica'	Bobbink & Atkins	1942
P. 'Lucetta'	Brand Nur.	1941
P. 'Miranda'	Snyder Bros. Nur.	1947
P. 'Nerissa'	Arnold Arboretum	1942
P. 'Nocturne'	Kelsey Nur. Service	1955
P. 'Oberon'	Bobbink & Atkins	1942
P. 'Paulina'	Arnold Arboretum	1942
P. 'Puck'	Morton Arboretum	1948
P. 'Red Wine' (N.)	Elan Mem. Park	1959
P. 'Romeo'	Arnold Arboretum	1948
P. 'Ursula'	Arnold Arboretum	1948
P. 'Valeria' (N.)	Morton Arboretum	1961
P. 'Viola'	Morton Arboretum	1948
pubescens	Lemoine Nur.	1902
reflexa	Arnold Arboretum	1912
r. 'Alba'	Upton Nur.	1943
rhodopea	Arnold Arboretum	1948
Skinneri (N.)	Swarthmore	1957
swegiflexa	Arnold Arboretum	1942
Sweginzowii	Arnold Arboretum	1912
S. 'Albida'	Jackson & Perkins	1939
S. 'Densiflora' (N.)	Morton Arboretum	1961
S. 'Superba'	Lemoine Nur.	1916
Tigerstedtii (N.)	Wageningen	1956
tomentella	Arnold Arboretum	1913
velutina	Arnold Arboretum	1919
villosa	Ellwanger & Barry	1892
v. 'Aurea'	Morton Arboretum	1948
v. Bretschneideri	Col. Flum	1925
v. 'Rosea'	Morton Arboretum	1944
v. X Sweginzowii - 'Hedin'	Swarthmore	1941
v. X S. 'Hunting Tower' (N.)	Arnold Arboretum	1956

SYRINGA, con.

vulgaris	Arnold Arboretum	1909
v. 'Abel Carriere'	Lemoine Nur.	1900
v. 'A. B. Lambertson'	Dunbar seedling	1917
v. 'Adelaide Dunbar'	Dunbar seedling	1916
v. 'Admiral Farragut'	Dunbar seedling	1923
v. 'Alba'		
v. 'Alba Grandiflora'	Ellwanger & Barry	1892
v. 'Alba Virginalis'	Ellwanger & Barry	1892
v. 'Albert The Good'	Ellwanger & Barry	1892
v. 'Alexander Hamilton'	Dunbar seedling	1923
v. 'Alice Harding'	Swarthmore	1947
v. 'Aline Mocqueris'	Spaeth Nur.	1892
v. 'Allison Gray' (N.)	Morton Arboretum	1958
v. 'Alphonse Lavallee'	Ellwanger & Barry	1892
v. 'Ambassadeur'	Wayside Gard.	1948
v. 'Ambroise Verschaffelt'	Morton Arboretum	1925
v. 'Amethyst'	Spaeth Nur.	1892
v. 'Ami Schott'	Clarke Nur.	1938
v. 'Amoena'	Spaeth Nur.	1892
v. 'Anna Elizabeth Jacquet'	Morton Arboretum	1948
v. 'Anne Schiach' (N.)	Gardner Nur.	1950
v. 'Anne Tighe' (N.)	Swarthmore	1957
v. 'Archeveque'	Arnold Arboretum	1948
v. 'Arthur William Paul'	Lemoine Nur.	1902
v. 'Astra'	Swarthmore	1947
v. 'Aucubaefolia'	Col. Plum	1925
v. 'Aurea'	Spaeth Nur.	1892
v. 'Azurea Plena'	Spaeth Nur.	1892
v. 'Banquise'	Lemoine Nur.	1907
v. 'Belle de Nancy'	Lemoine Nur.	1908
v. 'Beranger'	Ellwanger & Barry	1892
v. 'Bicolor'		
v. 'Bleuatre'	de Messemaeker	1914
v. 'Blue Angel' (N.)	M. Eaton	1960
v. 'Boule Azuree'	Col. Plum	1925
v. 'Boussingault'	Lemoine Nur.	1902
v. 'Calvin C. Laney'	Dunbar seedling	1923
v. 'Candeur'	Lemoine Nur.	1950
v. 'Capitaine Baltet'	Col. Plum	1925
v. 'Capitaine Perrault'	Cottage Gard,	1938
v. 'Carmen'	Lemoine Nur.	1919
v. 'Carmine' (N.)	Elan Mem. Park	1959
v. 'Caroli'	Lemoine Nur.	1900
v. 'Cavour'	de Messemaeker	1914
v. 'C. B. Van Nes'	Lemoine Nur.	1905
v. 'Champlain'	Swarthmore	1947
v. 'Charlemagne'	Ellwanger & Barry	1892
v. 'Charles Baltet'	Morton Arboretum	1954
v. 'Charles Joly'	Lemoine Nur.	1900
v. 'Charles Sargent'	Lemoine Nur.	1907
v. 'Charles X'	Spaeth Nur.	1902
v. 'Charlotte Morgan' (N.)	Elan Mem. Park	1958

SYRINGA, con.

v. 'Charm'	Swarthmore	1947
v. 'Christophe Colomb'	Lemoine Nur.	1907
v. 'City of Gresham'	Arnold Arboretum	1948
v. 'City of Longview'	Arnold Arboretum	1948
v. 'Clara'	Morton Arboretum	1944
v. 'Clara Cochet'	de Messemaeker	1914
v. 'Clarence D. VanZandt'	Dunbar seedling	1923
v. 'Claude Le Lorrain'	de Messemaeker	1914
v. 'Coerulea Superba'	Ellwanger & Barry	1892
v. 'Colbert'	Lemoine Nur.	1900
v. 'Colmariensis'	Ellwanger & Barry	1892
v. 'Col. Wm. R. Plum'	Brand Nur.	1947
v. 'Comte Adrian de Montebello'	Lemoine Nur.	1912
v. 'Comte de Kerchove'	Lemoine Nur.	1902
v. 'Comte Horace de Choiseul'	Lemoine Nur.	1900
v. 'Comtesse Horace de Choiseul'	Dickson Nur.	1892
v. 'Condorcet'	Lemoine Nur.	1902
v. 'Congo'	Lemoine Nur.	1900
v. 'Corinne'	Lemoine Nur.	1900
v. 'Crampel'	Lemoine Nur.	1900
v. 'Crepuscule' (N.)	Swarthmore	1957
v. 'Croix de Brahy'	Ellwanger & Barry	1892
v. 'Dame Blanche'	Lemoine Nur.	1903
v. 'Dawn'	Gardner Nur.	1950
v. 'Decaisne'	Lemoine Nur.	1914
v. 'De Croncels'	Farquhar Nur.	1917
v. 'De Humboldt'	Lemoine Nur.	1900
v. 'De Jussieu'	Lemoine Nur.	1900
v. 'De Louvain'	de Messemaeker	1914
v. 'De Miribel'	Lemoine Nur.	1905
v. 'De Saussure'	Lemoine Nur.	1905
v. 'Desfontaines'	Morton Arboretum	1954
v. 'Deuil d'Emile Galle'	Lemoine Nur.	1905
v. 'Diane' (N.)	A. McKean	1958
v. 'Diderot'	Lemoine Nur.	1916
v. 'Dillia'	Morton Arboretum	1948
v. 'Diplomate'	Ruliffson	1953
v. 'Downfield' (N.)	M. Eaton	1960
v. 'Doyen Keteleer'	Lemoine Nur.	1900
v. 'Dr. Charles Jacobs'	de Messemaeker	1914
v. 'Dr. Lindley'	Ellwanger & Barry	1892
v. 'Dr. Mallot'	Lemoine Nur.	1902
v. 'Dr. Masters'	Lemoine Nur.	1902
v. 'Dr. Nobbe'	Dickson Nur.	1892
v. 'Dr. Trojanowsky'	Lemoine Nur.	1904
v. 'Dr. von Regel'	Transon Nur.	1892
v. 'Dresden China'	Morton Arboretum	1954
v. 'Duc de Massa'	Lemoine Nur.	1907
v. 'Eaton Red' (N.)	M. Eaton	1960
v. 'Eden'	Clarke Nur.	1940
v. 'Edith Cavell'	Lemoine Nur.	1917
v. 'Edmond About'	Lemoine Nur.	1900

SYRINGA, con.

v. 'Edmond Boissier'	Lemoine Nur.	1907
v. 'Edna Dunham' (N.)	Dr. Rankin	1955
v. 'Edouard Andre'	Lemoine Nur.	1902
v. 'Edward J. Gardner'	Gardner Nur.	1950
v. 'Ekenholm'	Spaeth Nur.	1892
v. 'Elihu Root'	Dunbar seedling	1923
v. 'Ellen Willmott'	Lemoine Nur.	1905
v. 'Ellie-Marie' (N.)	Swarthmore	1957
v. 'Emil Liebig'	Spaeth Nur.	1892
v. 'Emile Gentile'	Lemoine Nur.	1916
v. 'Emile Lemoine'	Lemoine Nur.	1902
v. 'Erzherzog Johann'	Spaeth Nur.	1892
v. 'Etna'	Swarthmore	1941
v. 'Etoile de Mai'	Lemoine Nur.	1907
v. 'Farrionensis'	Spaeth Nur.	1892
v. 'Firmament'	Clarke Nur.	1938
v. 'Fraicheur'	Lemoine Nur.	1950
v. 'Francisque Morel'	Lemoine Nur.	1900
v. 'Frank Klager'	Arnold Arboretum	1948
v. 'Frank Patterson' (N.)	Ellesmere Nur.	1962
v. 'Frau Bertha Dammann'	Ellwanger & Barry	1892
v. 'Frau Wilhelm Pfitzer'	de Messemaeker	1912
v. 'Fred Payne' (N.)	Dr. Rankin	1958
v. 'Fritz'	Morton Arboretum	1954
v. 'Fuerst Bleucher' (N.)	Timm Nur.	1951
v. 'Fuerst Buelow' (N.)	Morton Arboretum	1952
v. 'Fuerst Liechtenstein'	Spaeth Nur.	1908
v. 'Gaudichaud'	Lemoine Nur.	1905
v. 'Geant des Batailles'	Spaeth Nur.	1902
v. 'Geheimrat Heyder'	Transon Nur.	1892
v. 'Geheimrat Singelmann'	Spaeth Nur.	1892
v. 'General Drouot'	de Messemaeker	1914
v. 'General Elwell S. Otis'	Dunbar seedling	1923
v. 'General Grant'	Dunbar seedling	1917
v. 'General John Pershing'	Dunbar seedling	1917
v. 'General Kitchener'	Dunbar seedling	1917
v. 'General Pershing'	Clarke Nur.	1940
v. 'General Sheridan'	Dunbar seedling	1917
v. 'General Sherman'	Dunbar seedling	1917
v. 'George W. Aldridge'	Dunbar seedling	1923
v. 'Georges Bellair'	Lemoine Nur.	1902
v. 'Georges Claude'	Swarthmore	1947
v. 'Germinal' (N.)	Elan Mem. Park	1958
v. 'Gigantea'	Ellwanger & Barry	1892
v. 'Gilbert'	Lemoine Nur.	1912
v. 'Gismonda' (N.)	Lemoine Nur.	1950
v. 'Gloire de Lorraine'	Ellwanger & Barry	1892
v. 'Gloire de la Rochelle'	Transon Nur.	1892
v. 'Gloire de Moulins'	Ellwanger & Barry	1892
v. 'Glory'	Rulifson	1950
v. 'Godron'	Lemoine Nur.	1910
v. 'Goliath'	Spaeth Nur.	1902
v. 'Grace Orthwaite'	Brand Nur.	1940

SYRINGA, con.

v. 'Grand Duc Constantin'	Lemoine Nur.	1900
v. 'Guizot'	Lemoine Nur.	1900
v. 'Hallelujah' (N.)	M. Eaton	1960
v. 'Hazel Opper' (N.)	Dr. Rankin	1955
v. 'Heather' (N.)	M. Eaton	1960
v. 'Helen Schoen' (N.)	Ellesmere Nur.	1962
v. 'Henri Martin'	Lemoine Nur.	1914
v. 'Henri Robert' (N.)	Swartmore	1947
v. 'Henry Clay'	Dunbar seedling	1933
v. 'Henry Wadsworth Longfellow'	Dunbar seedling	1930
v. 'Henry Ward Beecher'	Dunbar seedling	1923
v. 'Herman Eilers'	Kohankie Nur.	1938
v. 'Hippolyte Maringer'	Lemoine Nur.	1910
v. 'Hiram H. Edgerton'	Dunbar seedling	1919
v. 'Hugo de Vries'	Clarke Nur.	1940
v. 'Hugo Koster'	Kallen & Lunneman	1914
v. 'Hyazinthenfleider'	Barbier Nur.	1908
v. 'J. de Messemaeker'	de Messemaeker	1914
v. 'Jacques Callot'	Ellwanger & Barry	1892
v. 'James Booth'	Col. Plum	1925
v. 'James Stuart'	Arnold Arboretum	1948
v. 'Jane Day' (N.)	Dr. Rankin	1958
v. 'Jan van Tol'	Cole Nur.	1934
v. 'Jean Bart'	de Messemaeker	1908
v. 'Jean Mace'	Lemoine Nur.	1916
v. 'Jeanne d'Arc'	Lemoine Nur.	1904
v. 'Jessie Gardner' (N.)	Boerner Bot. Gard.	1958
v. 'Joan Dunbar'	Dunbar seedling	1923
v. 'Jules Ferry'	Ellwanger & Barry	1917
v. 'Jules Simon'	de Messemaeker	1914
v. 'Julien Gerardin'	Lemoine Nur.	1917
v. 'Justi'	Arnold Arboretum	1919
v. 'Kate Harlin'	de Messemaeker	1914
v. 'Katherine Havemeyer'	Col. Plum	1925
v. 'Konigin Luise' (N.)	Morton Arboretum	1961
v. 'Lady Lindsay' (N.)	Arnold Arboretum	1956
v. 'Lamarck'	Ellwanger & Barry	1892
v. 'La Mauve'	Lemoine Nur.	1900
v. 'Languis'	Ellwanger & Barry	1892
v. 'Laplace'	Lemoine Nur.	1914
v. 'La Tour d'Auvergne'	Transon Nur.	1892
v. 'Laura L. Barnes' (N.)	Boerner Bot. Gard.	1958
v. 'Lavoisier'	Lemoine Nur.	1914
v. 'Le Gaulois'	Ellwanger & Barry	1892
v. 'Lemoinei'	Ellwanger & Barry	1892
v. 'Le Notre'	Col. Plum	1925
v. 'Leon Gambetta'	Lemoine Nur.	1908
v. 'Leon Mathieu'	de Messemaeker	1914
v. 'Leon Simon'	Transon Nur.	1892
v. 'Leopold II'	de Messemaeker	1914
v. 'Le Printemps'	Lemoine Nur.	1902
v. 'Lilarosa'	Spaeth Nur.	1892

SYRINGA, con.

v. 'Linne'	Lemoine Nur.	1902
v. 'L'Oncle Tom'	Lemoine Nur.	1904
v. 'Louis Henry'	Lemoine Nur.	1900
v. 'Lucie Baltet'	de Messemaeker	1914
v. 'Ludwig Spaeth'	Heards Nur.	1955
v. 'Macrostachya'	Lemoine Nur.	1900
v. 'Madeleine Lemaire'	Jackson & Perkins	1939
v. 'Magellan'	Lemoine Nur.	1919
v. 'Marceau'	Lemoine Nur.	1914
v. 'Marc Micheli'	Lemoine Nur.	1902
v. 'Marechal de Bassompierre'	Lemoine Nur.	1900
v. 'Marechal Foch'	Cottage Gard.	1938
v. 'Marechal Lannes'	de Messemaeker	1914
v. 'Marengo' (N.)	Upton Nur.	1958
v. 'Marie Finon'	Cottage Gard.	1938
v. 'Marie Legraye'	Ellwanger & Barry	1892
v. 'Marleyensis'	Ellwanger & Barry	1892
v. 'Marleyensis Pallida'	Spaeth Nur.	1902
v. 'Martha Kounze' (N.)	M. Eaton	1960
v. 'Massena'	Morton Arboretum	1927
v. 'Mathieu de Dombasle'	Barbier Nur.	1902
v. 'Maud Notcutt' (N.)	Notcutt Nur.	1958
v. 'Maurice Barres'	Lemoine Nur.	1919
v. 'Maurice de Vilmorin'	Lemoine Nur.	1902
v. 'Mauve Mist' (N.)	M. Eaton	1960
v. 'Maxime Cornu'	Arnold Arboretum	1948
v. 'Maximowicz'	Lemoine Nur.	1907
v. 'Michel Buchner'	Ellwanger & Barry	1892
v. 'Midwest Gem'	Morton Arboretum	1954
v. 'Milton'	de Messemaeker	1914
v. 'Mirabeau'	Lemoine Nur.	1912
v. 'Mireille'	Lemoine Nur.	1905
v. 'Missimo'	Wayside Gard.	1948
v. 'Mlle. Fernande Viger'	Barbier Nur.	1902
v. 'Mlle. Melide Laurent'	Lemoine Nur.	1900
v. 'Mme. Abel Chatenay'	Lemoine Nur.	1900
v. 'Mme. A. J. Klettenberg'	Morton Arboretum	1954
v. 'Mme. Amelie Duprat'	Gouchault & Turbat	1907
v. 'Mme. Antoine Buchner'	Lemoine Nur.	1910
v. 'Mme. Auguste Gouchault' (N.)	M. Eaton	1960
v. 'Mme Briot'	Lemoine Nur.	1900
v. 'Mme. Casimir Perier'	Lemoine Nur.	1910
v. 'Mme. Catherine Bruchet'	de Messemaeker	1914
v. 'Mme. Charles Souchet' (N.)	Lemoine Nur.	1950
v. 'Mme. de Miller'	Lemoine Nur.	1905
v. 'Mme. Fallieres'	Morton Arboretum	1948
v. 'Mme Felix'	Cottage Gard.	1938
v. 'Mme. Florent Stepmann'	de Messemaeker	1914
v. 'Mme. F. Morel'	Lemoine Nur.	1902
v. 'Mme. Henri Guillard'	Kohankie Nur.	1938
v. 'Mme. Jules Finger'	Dickson Nur.	1892
v. 'Mme. Krouter'	Spaeth Nur.	1892
v. 'Mme. Lemoine'	Lemoine Nur.	1900

SYRINGA, con.

v. 'Mme. Leon Simon'	Lemoine Nur.	1905
v. 'Mme. Moser'	Ellwanger & Barry	1892
v. 'Mme. R. Foyer'	Maarse	1953
v. 'Monge'	Lemoine Nur.	1914
v. 'Monique Lemoine'	Swarthmore	1947
v. 'Mons. LePage'	Barbier Nur.	1902
v. 'Montaigne'	Lemoine Nur.	1908
v. 'Mont Blanc'	Lemoine Nur.	1916
v. 'Montgolfier'	Morton Arboretum	1954
v. 'Monument'	Clarke Nur.	1938
v. 'Monument Carnot' (N.)	Brooklyn Bot. Gard.	1943
v. 'Mood Indigo' (N.)	Swarthmore	1957
v. 'Moonlight' (N.)	Swarthmore	1947
v. 'Mountain Haze' (N.)	Morton Arboretum	1958
v. 'Mrs. Calvin Coolidge'	M. Franklin	1950
v. 'Mrs. Edward Harding'	Clarke Nur.	1940
v. 'Mrs. Flanders' (N.)	Arnold Arboretum	1956
v. 'Mrs. John S. Williams'	Swarthmore	1947
v. 'Mrs. Watson Webb'	Swarthmore	1947
v. 'Mrs. W. E. Marshall'	Col. Flum	1927
v. 'Murillo'	Lemoine Nur.	1902
v. 'My Favorite'	Arnold Arboretum	1948
v. 'Nana'	Ellwanger & Barry	1892
v. 'Nancy Frick'	Swarthmore	1947
v. 'Naudin'	Lemoine Nur.	1914
v. 'Negro'	Lemoine Nur.	1902
v. 'Night'	Swarthmore	1941
v. 'Nigricans'	Transon Nur.	1892
v. 'Noisettiana Alba'	Ellwanger & Barry	1892
v. 'Obelisque'	Lemoine Nur.	1900
v. 'Olivier de Serres'	Lemoine Nur.	1910
v. 'Ostrander'	Merrill	1930
v. 'Othello'	Lemoine Nur.	1905
v. 'Pasteur'	Lemoine Nur.	1905
v. 'Patrick Henry'	Dunbar seedling	1923
v. 'Paul Deschanel'	Cottage Gard.	1938
v. 'Paul Hariot'	Lemoine Nur.	1905
v. 'Paul Thirion'	Lemoine Nur.	1916
v. 'Peau de Chamois'	Swarthmore	1947
v. 'Perle von Stuttgart'	de Messemaeker	1914
v. 'Perle von Teltow'	Kallen & Lunneman	1914
v. 'Philemon'	Lemoine Nur.	1900
v. 'Pierre Joigneux'	Lemoine Nur.	1902
v. 'Pinkle' (N.)	Dr. Rankin	
v. 'Pink Mist' (N.)	M. Eaton	1960
v. 'Planchon'	Lemoine Nur.	1910
v. 'President Carnot'	Lemoine Nur.	1900
v. 'President Fallieres'	Lemoine Nur.	1912
v. 'President Grevy'	Ellwanger & Barry	1892
v. 'President Harding'	Dunbar seedling	1922
v. 'President John Adams' (N.)	Dunbar seedling	1923
v. 'President Lambeau'	de Messemaeker	1914

SYRINGA, con.

v. 'President LeBrun' (N.)	Arnold Arboretum	1956
v. 'President Lincoln'	Dunbar seedling	1916
v. 'President Loubet'	Lemoine Nur.	1905
v. 'President Massart'	Ellwanger & Barry	1892
v. 'President Monroe'	Dunbar seedling	1923
v. 'President Poincare'	Lemoine Nur.	1914
v. 'President Roosevelt'	Dunbar seedling	1919
v. 'President Viger'	Lemoine Nur.	1902
v. 'Primrose' (N.)	Wayside Gard.	1957
v. 'Prince de Beauveau'	Lemoine Nur.	1900
v. 'Prince Imperial'	Morton Arboretum	1924
v. 'Prince Notger'	Ellwanger & Barry	1892
v. 'Prince of Wales'	Ellwanger & Barry	1892
v. 'Princess Alexandra'	Ellwanger & Barry	1892
v. 'Princesse Camille de Rohan'	Parsons Nur.	1892
v. 'Princesse Clementine'	de Messemaeker	1914
v. 'Princesse Marie'	Lemoine Nur.	1900
v. 'Prinzessin Klotilde' (N.)	Tima Nur.	1951
v. 'Priscilla'	Swarthmore	1947
v. 'Prodige'	Clarke Nur.	1938
v. 'Prof. E. H. Wilson'	Arnold Arboretum	1948
v. 'Prof. E. Stoekhardt'	Ellwanger & Barry	1892
v. 'Prof. Sargent'	Spaeth Nur.	1902
v. 'Pyramidalis'		
v. 'Pyramidalis Alba'	Ellwanger & Barry	1892
v. 'Quadricolor'	Spaeth Nur.	1892
v. 'Rabelais' (N.)	Morton Arboretum	1958
v. 'Reaumur'	Lemoine Nur.	1905
v. 'Red Feather'	Ruliffson	1953
v. 'Reine Elizabeth'	de Messemaeker	1914
v. 'Reine Marguerite'	Arnold Arboretum	1948
v. 'Rene Jarry Desloges'	Lemoine Nur.	1907
v. 'Renoncule'	Moon Nur.	1913
v. 'Rochambeau' (N.)	Morton Arboretum	1927
v. 'Roi Albert'	de Messemaeker	1914
v. 'Romance' (N.)	M. Eaton	1960
v. 'Ronsard'	Lemoine Nur.	1914
v. 'Rosea Grandiflora'	Transon Nur.	1892
v. 'Rose a Grand Fleur'	de Messemaeker	1914
v. 'Rouge de Trianon'	de Messemaeker	1914
v. 'Rubella Flena'	Ellwanger & Barry	1892
v. 'Rubra Insignis'	Ellwanger & Barry	1892
v. 'Ruhm von Horstenstein'	Ruliffson	1937
v. 'Rustica'	Lemoine Nur.	1950
v. 'Sarah Sands'	Swarthmore	1941
v. 'Saturnale'	Lemoine Nur.	1917
v. 'Schermerhorn'	Parsons Nur.	1892
v. 'Scipion Cochet'	Ellwanger & Barry	1892
v. 'Senateur Volland'	Dickson Nur.	1892
v. 'Sensation'	Kluis Nur.	1952
v. 'Serene' (N.)	M. Eaton	1960
v. 'Siebold'	Lemoine Nur.	1907

SYRINGA, con.

v. 'Silver King' (N.)	Heards Nur.	1955
v. 'Snowflake' (N.)	M. Eaton	1960
v. 'Souv. de Claudius Graindorge'	Maarse	1953
v. 'Souv. de Georges Truffaut' (N.)	Weston Nur.	1962
v. 'Souv. de Henri Simon	Col. Plum	1925
v. 'Souv. de Louis Chasset' (N.)	Weston Nur.	1962
v. 'Souv. de Louis Thibaut'	Ellwanger & Barry	1899
v. 'Souv. de Simone'	Morton Arboretum	1948
v. 'Spectabilis'	Parsons Nur.	1892
v. 'Stadtgartner Rothpletz'	Barbier Nur.	1908
v. 'Susan B. Anthony'	Dunbar seedling	1923
v. 'Sweetheart' (N.)	Weston Nur.	1962
v. 'Taglioni'	Lemoine Nur.	1907
v. 'Thomas A. Edison'	Dunbar seedling	1922
v. 'Thomas Jefferson'	Dunbar seedling	1922
v. 'Thunberg'	Lemoine Nur.	1914
v. 'Todmorden'	Swarthmore	1947
v. 'Tournefort'		
v. 'Toussaint L'Ouverture'	Lemoine Nur.	1900
v. 'Triomphe de Moulins'	Transon Nur.	1892
v. 'Triomphe d'Orleans'	Spaeth Nur.	1908
v. 'Triste Barbaro' (N.)	Morton Arboretum	1958
v. 'Turenne'	Lemoine Nur.	1917
v. 'Valetteana'		
v. 'Van Aerschott'	de Messemaeker	1914
v. 'Vergissmeinnicht'	Spaeth Nur.	1892
v. 'Versaliensis'	Spaeth Nur.	1892
v. 'Verschaffelti'	Ellwanger & Barry	1892
v. 'Vestale'	Lemoine Nur.	1914
v. 'Vesuve'	Lemoine Nur.	1917
v. 'Victor Lemoine'	Lemoine Nur.	1907
v. 'Ville de Limoges'	Parsons Nur.	1892
v. 'Ville de Troyes'	Ellwanger & Barry	1892
v. 'Violacea'	Transon Nur.	1892
v. 'Violetta'	Lemoine Nur.	1917
v. 'Virginia Becker'	Upton Nur.	1954
v. 'Virginite' (N.)	Morton Arboretum	1958
v. 'Vivland Morel'	Lemoine Nur.	1905
v. 'Vivian Evans'	Heard Nur.	1955
v. 'Volcan'	Lemoine Nur.	1900
v. 'Waldeck-Rousseau'	Lemoine Nur.	1905
v. 'Weddle'	Morton Arboretum	1944
v. 'White Swan'	Arnold Arboretum	1948
v. 'William C. Barry'	Dunbar seedling	1917
v. 'William Robinson'	Lemoine Nur.	1900
v. 'William S. Riley'	Dunbar seedling	1922
v. 'W. T. Lee' (N.)	Ellsmere Nur.	1962
v. 'Zukunft' (N.)	Boerner Bot. Gard.	1958
v. 'Zulu' (N.)	M. Eaton	1960
Wolfii	Arnold Arboretum	1913
W. hirsuta	Arnold Arboretum	1920
yunnanensis	Upton Nur.	1943

SYRINGA, con.

junnanensis 'Rosea' Morton Arboretum 1947

TAMARIX - Tamaricaceae

juniperina Ellwanger & Barry 1892

parviflora Ellwanger & Barry 1892

pentandra Ellwanger & Barry 1892

TAXODIUM - Pinaceae

distichum Ellwanger & Barry 1897

d. 'Pendens' Ellwanger & Barry 1898

TAXUS - Taxaceae

baccata Ellwanger & Barry 1897

b. 'Adpressa Stricta' Arnold Arboretum 1906

b. 'Aurea' Ellwanger & Barry 1897

b. 'Balkans' (N.) Missouri Bot. Gard. 1954

b. 'Cheshuntensis' Dickson Nur. 1907

b. 'Compacta' (N.) Secret Arboretum 1958

b. 'Dovastoniana' Dickson Nur. 1907

b. 'Erecta' Ellwanger & Barry 1897

b. 'Ericoides' Barbier Nur. 1911

b. 'Fastigiata Variegata' Ellwanger & Barry 1897

b. 'Glauca' Barbier Nur. 1911

b. 'Jackson' Barbier Nur. 1911

b. 'Nedpath Castle' Barbier Nur. 1911

b. 'Pendula' Arnold Arboretum 1905

b. 'Repandens' Barbier Nur. 1911

b. 'Variegata' Barbier Nur. 1911

b. 'Washington' Ellwanger & Barry 1897

brevifolia R. Fillmore 1958

canadensis Arnold Arboretum 1901

cuspidata Ellwanger & Barry 1897

c. 'Adams' (N.) Secret Arboretum 1958

c. 'Densa' (N.) Secret Arboretum 1958

c. 'Minima' Rochester seedling

c. 'Nana' Arnold Arboretum 1896

c. 'Prostrata' (N.) Secret Arboretum 1958

c. 'Thayer' Arnold Arboretum 1930

Hunnelliana Arnold Arboretum 1930

media Arnold Arboretum 1930

m. 'Amherst' (N.) Mitiska Nur. 1957

m. 'Andorra' (N.) Secret Arboretum 1958

m. 'Bobbink' (N.) Secret Arboretum 1958

m. 'Cole' (N.) Secret Arboretum 1958

m. 'Dutweiler' (N.) Secret Arboretum 1958

m. 'Flemer' (N.) Secret Arboretum 1958

m. 'Hatfield' Arnold Arboretum 1930

m. 'Hatfield #23' (N.) Secret Arboretum 1958

m. 'Hicks' Hicks Nur. 1920

m. 'Sebian' (N.) Secret Arboretum 1958

m. 'Slavin' B. H. Slavin sel. 1958

m. 'Ward' (N.) Secret Arboretum 1958

THUJA - Pinaceae

koraiensis	Arnold Arboretum	1930
occidentalis	D. Hill Nur.	1904
o. 'Bodmer' (N.)	Morton Arboretum	1951
o. 'Booth'	Barbier Nur.	1911
o. 'Buchanan'	Arnold Arboretum	1921
o. 'Columbia'	Bobbink & Atkins	1927
o. 'Compacta'		
o. 'Cristata'	Barbier Nur.	1911
o. 'Douglas Aurea'	D. Hill Nur.	1927
o. 'Douglas Pyramidalis'	Ellwanger & Barry	1897
o. 'Ellwanger'	Ellwanger & Barry	1897
o. 'Fastigiata'	Ellwanger & Barry	1897
o. 'Globosa'		
o. 'Gracilis' (N.)	U. S. D. A.	1962
o. 'Hetz Midget'	Arnold Arboretum	1958
o. 'Hoopes'	Biltmore Nur.	1902
o. 'Hovey'	Little Nur.	1897
o. 'Hudsonica'	Biltmore Nur.	1902
o. 'Leptoclada' (N.)	Morton Arboretum	1951
o. 'Lutea'	Arnold Arboretum	1896
o. 'Masters'	Arnold Arboretum	
o. 'Nigra' (N.)		
o. 'Ohlendorff' (N.)	Secret Arboretum	1958
o. 'Pendula'	Arnold Arboretum	1907
o. 'Pumila' (N.)		
o. 'Recurva Nana' (N.)	N. Y. Bot. Gard.	1951
o. 'Reeves'		
o. 'Reid'		
o. 'Rivers'	Bobbink & Atkins	1923
o. 'Robusta'	Arnold Arboretum	1896
o. 'Rosenthal'		
o. 'Spiralis'	Bobbink & Atkins	1923
o. 'Umbraculifera' (N.)	Morton Arboretum	1951
o. 'Vervaeana'	Ellwanger & Barry	1897
o. 'Wagneriana'	Barbier Nur.	1911
o. 'Woodward'	D. Hill Nur.	1927
orientalis	Arnold Arboretum	1902
o. 'Aurea'	D. Hill Nur.	1927
o. 'Aurea Nana'	Princeton Nur.	1927
o. 'Bonita'	D. Hill Nur.	1927
plicata	Arnold Arboretum	1896
p. 'Atrovirens' (N.)	N. Y. Bot. Gard.	1951
p. 'Hillier' (N.)		
Standishii	Arnold Arboretum	1902

THUJOPSIS - Pinaceae

dolobrata	Veitch Nur.	1903
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TILIA - Tiliaceae

americana	Horsey, Metamora, Ohio	
a. 'Fastigiata'	Slavin selection	
caroliniana rhoophila	Arnold Arboretum	1919

TILIA, con.		
cordata	Veitch Nur.	1907
euchlora	Ellwanger & Barry	1906
europea	Veitch Nur.	1907
e. 'Koningslinde'	Grootendorst Nur.	1952
floridana	Arnold Arboretum	1921
heterophylla	Horsey, Steubenville, Ohio	1916
h. Michauxii	Arnold Arboretum	1920
japonica		
mandshurica	Ellwanger & Barry	1906
Maximowicziana (N.)	Kornik	1959
Miqueliana		
Moltkei		
mongolica	Ellwanger & Barry	1906
monticola		
neglecta		
Oliveri	Arnold Arboretum	1913
orbicularis	Barbier Nur.	1907
petiolaris		
platyphyllos	Arnold Arboretum	1911
p. 'Fastigiata'	Ellwanger & Barry	1919
p. 'Laciniata'		
p. 'Rubra'	Grootendorst Nur.	1956
p. 'Tortuosa'	Arnold Arboretum	1915
p. 'Vitifolia'	Ellwanger & Barry	1906
Tuan	Arnold Arboretum	1914
TORREYA - Taxaceae		
nucifera	Veitch Nur.	1907
TRIPETALEIA - Ericaceae		
bracteata	Edinburgh	1952
TSUGA - Pinaceae		
canadensis	Robbins Nur.	1922
c. 'Atrovirens'	Hicks Nur.	1917
c. 'Gracilis'	Bobbink & Atkins	1923
c. 'Pendula'	Arnold Arboretum	1901
c. 'Pumila'		
caroliniana	Kelsey Nur.	1899
diversifolia	Barbier Nur.	1903
Sieboldii	Veitch Nur.	1899
ULMUS - Ulmaceae		
americana	Brown Bros. Nur.	1919
a. 'Ascendens'	B. H. Slavin sel.	1919
carpinifolia		
c. cornubiensis	Spaeth Nur.	1908
c. 'Suberosa'	Arnold Arboretum	
c. umbraculifera	Klehms Nur.	1914
c. 'Variegata'		
c. 'Webbiana'	Spaeth Nur.	1908
c. 'Wrede'	Ellwanger & Barry	1924

ULMUS, con.

glabra		
g. 'Dovae'	Ellwanger & Barry	1907
g. 'Exoniensis'		
g. 'Nana'	Arnold Arboretum	1907
g. 'Pendula'	Arnold Arboretum	1923
hollandica major	Spaeth Nur.	1908
h. 'Fitteurs'		
h. 'Superba'	Arnold Arboretum	1923
h. 'Vegeta'	Ellwanger & Barry	1907
japonica	Arnold Arboretum	1907
laevis	Spaeth Nur.	1908
macrocarpa	Arnold Arboretum	1914
parvifolia	Arnold Arboretum	1906
procera	Mr. Ellwanger planted	1843
p. 'Viminalis'	Spaeth Nur.	1908
pumila	U. S. D..A.	1918
p. arborea	Arnold Arboretum	1905
rubra		
serotina	Riverview Nur.	1915
Thomasii	Forest Nur.	1919
Wilsoniana	Arnold Arboretum	1914

VACCINEUM - Ericaceae

stamineum	Kelsey Nur.	1892
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VIBURNUM - Caprifoliaceae

acerifolium		
a. ovatum		
betulifolium (N.)		
bracteatum (N.)	Morton Arboretum	1951
buddleifolium	Veitch Nur.	1914
burejaticum (N.)	Morton Arboretum	1949
Burkwoodii	Clarke Nur.	1940
B. 'Chenault'	Grootendorst Nur.	1951
carlcephalum	Wayside Gard.	1952
Carlesii	Lemoine Nur.	1907
cassinoides		
cotinifolia (N.)	Dr. Egolf	1959
dentatum	J. Dawson	1892
d. pubescens	Spaeth Nur.	1892
dilitatum	Lemoine Nur.	1902
d. 'Xanthocarpum' (N.)	Arnold Arboretum	1954
erubescens gracilipes	Arnold Arboretum	1915
fragrans	Arnold Arboretum	1913
f. 'Nanum'		
Juddii	Grootendorst Nur.	1951
Lantana	Ellwanger & Barry	1893
L. 'Rugosum'		
Lentago	J. Dawson	1892
L. sphaerocarpum	Arnold Arboretum	1921
lobophyllum	Arnold Arboretum	1920
macrocephalum 'Sterile'	Transon Nur.	1892

VIBURNUM, con.

molle (N.)	Dr. Egolf	1959
mongolicum (N.)	Morton Arboretum	1951
Opulus	Ellwanger & Barry	1892
O. 'Compactum'	Wayside Gard.	1957
O. 'Notcutts Var.' (N.)	Dr. Egolf	1960
O. 'Roseum'	Ellwanger & Barry	1892
O. 'Xanthocarpum'	Arnold Arboretum	1915
orientale (N.)	Dr. Egolf	1960
plicatum 'Plicatum'	Ellwanger & Barry	1892
p. 'Maries' (N.)	Dr. Egolf	1959
p. 'Pink Surprise' (N.)	Holden Arboretum	1961
p. tomentosum	Arnold Arboretum	1913
prunifolium	Spaeth Nur.	1892
Rafinesquianum		
rhytidophylloides	Rochester seedling	
rhytidophyllum	Veitch Nur.	1907
Sargentii	Arnold Arboretum	1902
S. 'Flavum'	Arnold Arboretum	1907
schensianum (N.)	Dr. Egolf	1959
setigerum	Arnold Arboretum	1915
Sieboldii	Veitch Nur.	1907
trilobum	Ellwanger & Barry	1918
t. 'Compactum' (N.)	Dr. Egolf	1959
urceolatum (N.)	Dr. Egolf	1959
Wrightii	Arnold Arboretum	1902

VITEX - Verbenaceae

Agnus-castus	Meehan Nur.	1893
A. 'Alba'		
A. latifolia	Brown Bros. Nur.	1943
Negundo		
N. heterophylla	Spaeth Nur.	1892
N. h. 'Multifida'		

VITIS - Vitaceae

acerifolia (N.)	Arnold Arboretum	1904
amurensis (N.)	Arnold Arboretum	1907
Andersonii (N.)	Arnold Arboretum	1920
argentifolia (N.)		
arizonica (N.)	Arnold Arboretum	1906
Baileyana (N.)	Arnold Arboretum	1915
californica (N.)	Arnold Arboretum	1914
cinerea (N.)	Arnold Arboretum	1915
Coignetiae (N.)		
Doaniana (N.)	Arnold Arboretum	1907
Labrusca (N.)		
monticola (N.)		
Romanetii (N.)	Lemoine Nur.	1905
Slavovii (N.)	Rochester native	1919

WEIGELA - Caprifoliaceae

'Biformis'	Spaeth Nur.	1892
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WEIGELA, con.

coraensis 'Lavalle'	LeRoy Nur.	1892
c. 'Styriaca'	Lemoine Nur.	1917
decora (N.)	U. S. D. A.	1961
'Fleur de Mai'	Lemoine Nur.	1905
floribunda		
f. 'Abel Carriere'	Ellwanger & Barry	1892
florida	Ellwanger & Barry	1892
f. 'Stelzner'	Ellwanger & Barry	1892
f. 'Van Houtte'	Dickson Nur.	1907
f. 'Variegata'	Ellwanger & Barry	1892
f. venusta	Arnold Arboretum	1915
hortensis 'Desbois'	Ellwanger & Barry	1892
japonica	Arnold Arboretum	1915
'Messenger'	Lemoine Nur.	1912
Middendorffiana	Grootendorst Nur.	1951
'Mme. Tellier'	Ellwanger & Barry	1892
praecox 'Floreal'	Lemoine Nur.	1905

WISTERIA - Leguminosae

floribunda		1904
f. 'Alba'	Lemoine Nur.	1902
f. 'Macrobotrys'	Ellwanger & Barry	1892
f. 'Naga Noda'	Brown Bros. Nur.	1943
f. 'Rosea'	Brown Bros. Nur.	1943
f. 'Shiro Noda'	Brown Bros. Nur.	1943
f. 'Violacea-plena'	Ellwanger & Barry	1892
macrostachys (N.)	D. J. O'Connor	1960
sinensis 'Alba'	Ellwanger & Barry	1892
venusta	Arnold Arboretum	1919

XANTHOCERAS - Sapindaceae

sorbifolia	Transon Nur.	1892
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XANTHORHIZA - Ranunculaceae

simplicissima	Smith College	1951
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YUCCA - Liliaceae

filamentosa	Transon Nur.	1892
flaccida		
glauca	Arnold Arboretum	1922

ZANTHOXYLUM - Rutaceae

americanum	Zohankie Nur.	1946
schinifolium	Arnold Arboretum	1906
simulans	Arnold Arboretum	1906

ZELKOVIA - Ulmaceae

carpinifolia	Arnold Arboretum	1906
serrata	Meehan Nur.	1899

ZENOBIA - Ericaceae

pulverulenta	G. Landis Arboretum	1962
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ZIZYPHUS - Rhamnaceae

Jujuba	Arnold Arboretum	1916
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MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XX

Harold N. Moldenke

VERBENA OFFICINALIS L.

Additional citations: GERMANY: Herb. Martius s.n. (Br); Herb. Monac. s.n. [München, VII.1901] (Ca--404334); Herb. Mus. Bot. Stockholm s.n. [29/7/1889] (S), s.n. [Berlin] (S), s.n. [Breslau] (S), s.n. [Germania] (S); Herrenkohl s.n. (La); Hisinger s.n. [Charlottenburg] (S); Holzinger s.n. [Kunzelau, 1884] (W--245962), s.n. [Wurtemberg] (N); G. Jensen s.n. [30/8/1870] (S); Kausch s.n. [Rottstock, 1869] (La); Kellerman s.n. [Göttingen, 4 Aug. 1879] (Ka); E. H. L. Krause 16821 (B); Kretzer s.n. [Braunschweig, 23/7/83] (Io--92222), s.n. [23/7/83] (Go, Pl--76949); Kretzmer s.n. [7.VIII.25] (S); Lademann s.n. [Brandenburg, 25.8.1933] (N); Ljungström s.n. [21/7/1879] (Go, S); Lundberg s.n. [8/7/1954] (Go); Martius s.n. (Br); Meister s.n. [Aug. '08] (Go, S), s.n. [Pommelsbrunn] (Gg); Metzbach s.n. [August 1870] (Gg--31392); Mohlins s.n. [Lindau, 13/7/1937] (S); Moll s.n. [Marlofstein, 1781] (Br); Ohl s.n. [Kiel, IX.07] (Go); Olin s.n. [Juli 1892] (Gg, Go, S); Ploser s.n. [Falkenburg, 6.72] (S); A. Prager s.n. (Cm); Prechtelsbauer s.n. [Aug. 1901] (S); Puchtler 1244 (Ca--180756, Ca--988783, Gg, Go); Reineck s.n. [Arnstadt, VII.1914] (Oa); Schemmann s.n. [22/8/1907] (Go); Scheppegg s.n. [1889] (Go); Schiede s.n. [München, Aug. 20] (Br); R. Schulz s.n. [August 1913] (B); Schulz s.n. [Immenhausen, 7 August 1907] (B); Schulz & Schulz s.n. [Chorin, 1892] (B), s.n. [Chorin, 25.7.1896] (B); Schwöder s.n. [Mähren, Juli 1882] (Io--92221); Simmons s.n. [29 Juli 1893] (Go, S); Starcs 7565 (S); Vestergren s.n. [29/7/1907] (S); H. Wagner 172 (Ca--444775); Wahlberg s.n. [Schöneberg] (S); Wibbe s.n. [Stromberg, 1862] (I), s.n. [Stromberg, Juli 1863] (I); T. Wolf s.n. [28 Aug. 1893] (La); Zetterstedt s.n. [Hamburg, 1852] (S). RÜGEN ISLAND: Herb. Mus. Bot. Stockholm s.n. [Insula Rugia, 1819] (S). AUSTRIA: Battes s.n. [Tyrol, 1876] (Mi); Blanchy s.n. [1876] (Ca--25184); Gander s.n. [25/8/1870] (W--447579); Gibbe s.n. [Tirol, 26.6.1940] (B); Hayek 701 (Go), 4280 (Go), s.n. [20 Juli 1902] (Go), s.n. [22 Juni 1903] (Go), s.n. [17.VII.1921] (S); Heimerl s.n. [Aug. 21, 1923] (Se--4462); Herb. Mus. Bot. Stockholm s.n. [15 Aug. 1853] (S); M. Johnson s.n. [20/8/1931] (S); K. Keck s.n. (Pa, Po--70671); Leffler s.n. [Sept. 1867] (Go); D. K. Rechinger s.n. [21 Septemb. 1922] (Go); Söderlund s.n. [16.8.1922] (S); M. F. Spencer s.n. [Aachensee, 9/1887] (Ob--6729); Stearn s.n. [Moldenke & Moldenke 9159] (N). CZECHOSLOVAKIA:

Bohemia: Anderberg s.n. [28/6/1936] (S); Herb. Linnaeus s.n. (S); Lindell s.n. [Prag, 1906] (Ew); Sommer s.n. [15.VII.1910] (Vi).
 Moravia: Suza 260 (Br, Du--181627, Gg--267617, Go, I, S, S, W--1373931), s.n. [VII.1925] (Um--13). State undetermined: Enander s.n. [20/8/1925] (S); Frisendahl s.n. [28/6/36] (Go); H. Lam s.n. (N); Petrak 665 (S, S); Schwüder s.n. [Juli 1882] (Go), s.n. [August 1887] (S); Sommer s.n. [22.VII.1913] (S); Sterner s.n. [9/7/1923] (S); Vestergren s.n. [25.VII.1922] (S). HUNGARY: Heinitz s.n. (S); Herb. F. Philippí s.n. [Hungaria] (Sg--25564); János s.n. [VIII.1906] (Go); Porutin s.n. [7/IX/1874] (Pu); Steinitz 1278 (Cm); Sztehlo 16892 (Bz--23785), s.n. [3/9/1874] (N). SWITZERLAND: Ayasse 4995 (Du, Um--16); Beger s.n. [Zurich, 28.6.12] (B); Bernet s.n. [Geneve] (N); R. Campbell s.n. (Mn--20480); Dahlsted s.n. [12/8/1893] (S); Ekman s.n. [26.7.1912] (S); Frymann s.n. [VII.99] (Go, S); Herb. Mus. Bot. Stockholm s.n. [8/8/72] (S); Hülphers s.n. [3.VIII.07] (S); Lindman s.n. [17/10/1884] (S); Macfarlane, Bechtel, & Harvey s.n. [Chur, July 23rd 1906] (Hp); Meissner 572 (Go); Raas s.n. [Tessin, Sept. 1929] (S); Schneck s.n. [July 28, 1903] (Ur); Segerström s.n. [30/10/1924] (S); Söderlund s.n. [Juli 1906] (S); Tiselino s.n. [4.8.1883] (S), s.n. [7.8.1883] (Hi--194850); Wijk s.n. [8/1892] (Go); Wulff s.n. [Lugano, Juni 1895] (Go, S). GREECE: Hausknecht s.n. [Kardiza, 1885] (B), s.n. [Thessalia superior] (Lu), s.n. (Br, F--photo, N--photo, Si--photo, Z--photo). IONIAN ISLANDS: Cephalonia: Borrmüller 1328 (B). Corfu: D. Hummel s.n. [22/9/1957] (S). ITALY: Ahlfvengren s.n. [26/7/1921] (S); Alstroemer s.n. [Calabria] (S); J. Ball s.n. [Lido, Oct. 1847] (W--682456); Cacciato s.n. [10/7/1956] (S); Collector undesignated 765 (S), 1217 bis (Br); Commons s.n. [Florence] (Cm); De Toni s.n. [Modena, Auglio 1903] (N); Engelhardt s.n. [2/6/1934] (B); Errera & Errera s.n. [12 Sept. 1875] (Br); Gavioli s.n. [VII.1938] (N); Gresino s.n. [29.VII.1938] (N); Hayek s.n. [Isturian, 19 Juli 1900] (Go); Herb. Mus. Bot. Stockholm s.n. [Bagnoli] (S), s.n. [Syracuse] (S); Herb. Mus. Florentini s.n. [Sept. 1812] (Pa); Herb. W. H. Harvey s.n. [Bellovaco, Julio 1817] (Du--166449); Landerer & Sartori s.n. [Nauplia, 1834] (Br); Lenander s.n. [July 21, 1931] (S); Savi s.n. [9bre 1845] (S); Söderlund s.n. (S); Vignolo-Lutati s.n. [VII.1938] (N, N); E. Wall 5, in part [18/621] (Ew); L. F. Ward s.n. [Leaning Tower, Pisa, Aug. 1894] (W--229752); Zoolola s.n. [Ceppo, Augusto 1952] (Hi--177242). SICILY: Babington s.n. [Messina, 1845--1851] (C); Eric Hultén s.n. [4.4.1960] (S); Todaro 697 (Du, S), s.n. [Palermo, 1850] (S), s.n. [1000 m. alt.] (S). CRETE: R. Lauche 2337 (B). JUGOSLAVIA: Bosnia: Lenander s.n. [Juni 30, 1938] (S). Dalmatia: Lenander s.n. [June 19, 1938] (S); Novak s.n. [Lesina] (Lu). Istria: Frumda s.n.

[10.IX.1913] (S). Macedonia: Bornmüller 1601 (B); Seheen s.n. [Alsar, 25.6.18] (B). Montenegro: Lenander s.n. [Juni 10, 1938] (S); Pejovic s.n. [IX.935] (S). Serbia: Nicic s.n. [27.VII.1896] (Go). Slovenia: Lenander s.n. [Bled, Juni 3, 1934] (S). Trieste: Collector undesignated s.n. [Sta. Anne] (Lu); Lenander s.n. [Maj 24, 1934] (S); Verouvé s.n. [26.5.1886] (B). Province undetermined: E. Wall 5, in part [25/123] (Ew). ALBANIA: Alston & Sandwith 2786 (S); Baldacci 152 (Br). ROMANIA: Lohler s.n. [Transsilv.] (S). BULGARIA: Bornmüller s.n. [VIII.1886] (B). UNION OF SOCIALIST SOVIET REPUBLICS: Adzharia: Massaloky s.n. [Batum, 3/VI] (Br). Azerbaijan: Heideman & Heideman s.n. [13.VIII.1934] (S). Turkman-skaya: Sintenis 932 (B). Uzbek: Herb. Hort. Bot. Univ. Asiae Med. s.n. [Taschkent] (Se--44023); Vvedenny s.n. [Taschkent, 1919] (S). Republic undetermined: Kikodse s.n. [Kutars, Ozurgety] (S); Pavlov 517 [Karatau Mts. & Talas Alatau] (B), 1218 [Karatau Mts. & Talas Alatau] (B). MOROCCO: Boitel s.n. [17 juillet 1918] (Ca--882671); Cosson s.n. [Mardochee, 1875] (Pa); Faure s.n. [30.5.1931] (B); Quer 504 (Ca--370001). ALGERIA: Bové s.n. [Août 1837] (B). TUNISIA: Murbeck s.n. [16/6/1896] (S). TRIPOLITANIA: Dickson s.n. [circa Tripolium, 1827] (Du--166447). EGYPT: Hedenborg s.n. [Bujukdene] (S, S), s.n. (S, S); Sabet s.n. [22/4/1927] (Ka-77987); Shabetad 460.1136 (Ka--72820); Täckholm s.n. [24/10/1926] (S). MAURITANIA: Bové s.n. [Août 1837] (Br, Br). ERITREA: Pappi 4331 (Ca--902362, N, S), 4414 (S). ABYSSINIA: Curli 184 (Bm); Hildebrandt 445 (B); Schimper 7 (W--945770). BRITISH SOMALILAND: Collennette 409 (B); Glover & Gilliland 920 (Bm). CAPE VERDE ISLANDS: Santiago: Brunner s.n. (C). CONGO LEOPOLDVILLE: Bequaert 5537 (Br), 5976 (Br); De Witte 156 (Br, Br); Hendrickx 201 (Br, Br); Humbert 7566 bis (Br); Quarré 4622 (Br). UGANDA: Edel 2 (N), 324 (N). TANGANYIKA: J. W. Gregory s.n. [E. of falls, Han-nington River, 18 Apl.] (Bm), s.n. [West of Inkuyuni] (Bm); A. Peter 422b [O.I.17] (B), 1780 [O. I.43] (N), 1852 [O.I.44b] (B), 42460 [V.287] (B), 43726 [V.318] (B). KENYA: P. Chandler 2214 (B); Mearns 82 (N, W--630082), 1165 (W--631208), 1974 (W--631933), 1998 (W--631958). SOUTHERN RHODESIA: R. B. Drummond 4858 (S); C. E. Godman 221 (Bm); Rattray 397 (Rh); Wild 82 (N). REPUBLIC OF SOUTH AFRICA: Cape Province: Brueckner 467 (N); Hap-tröm 1006 (S, S); W. H. Harvey 405 (Bm); Zeyher 1365 (S). Natal: I. C. Verdoorn s.n. [8/12/20] (Ew). Transvaal: E. E. Galpin 9061 (Br); Obermeyer 30315 (Gg); Repton 1298 (Z); E. Wall s.n. [2/10/1938] (S); R. G. N. Young s.n. [22/5/27] (Hk). Province undetermined: W. H. Harvey 405 (T). MASCARENE ISLANDS: Mauritius: F. L. Hill M.1 (Bm). ARABIA: Yemen: Kuntz s.n. [11 Feb. '51] (W--1994907). TURKEY: Bornmüller 812 (B), 5516 (B); Fidao s.n. [En-

viron de Smyrne, Août 1904] (Ca--548204, N); Frivoldssky s.n. (W-264613); Kasapligil s.n. [8-7-1945] (Ca--938375); Tengwall 37 (S); Wiedemann s.n. [Anatolia] (Ob--14872). ISRAEL: R. Aaronsohn 359 (S); Jouannet-Marie 509 (Du); Kneucker 459 (B), 546 (B); Meyers & Dinsmore B.4441 [J.1588] (S), B.8141 [Cat. no. 1588] (S). JORDAN: Bornmüller s.n. [Gebirge Juda, Juli 1897] (B); Kasapligil 1679 (Ca--85086). SYRIA: Blanche 1541 (B, Br, Du, S, S), s.n. (Du); M. Martens s.n. (Br); Post 200 (W--805056); E. Wall s.n. [2/14/1932] (S). IRAQ: Bornmüller 1654 (B), s.n. [Basra, 23.III.1893] (B); Field & Lazar 516 (N), 806 (N), 967 (N); Lazar 486 (N), 3442 (S). IRAN: Bornmüller 5127 (B); Bruns s.n. [Teheran, 1909] (B); Field & Lazar 1125 (N); Pravitz 77 (S), 100 (S); K. H. Reehinger 1805 (W--2061437). PAKISTAN: Northwest Provinces: Duthie s.n. [Thinkiari, 29-8-99] (Gg--127009), s.n. [Hazara, 1.9.99] (Ca--294805); A. H. Kahn s.n. [Hazara district, 8.7.25] (W--1239955). Swat: Rodin 5424 (Ca--36600, W--2242319). NEPAL: Wallich s.n. (Cp). INDIA: Assam: Chand 3259 (Mi); Chatterjee s.n. [April 1902] (Br, Po--63870); T. L. Jenkins s.n. [Assam] (Bz--23770); Koelz 22817 (Mi). Chamba: Koelz 8806 (N). East Punjab: J. R. Drummond 26707 (Ca--244645); Koelz 1623 (Mi, N), 3046 (N), 4190 (Mi, W--1608020), 4769 (Mi, N, N, W--1608363), 7497 (Mi, W--1609748); Parmanand 337 (Mi); Ram 1740 (N); Schlagintweit 10233 (S); R. R. Stewart 19374a (N); T. Thomson s.n. [Lucknow, April 1858] (Br), s.n. [Panjab] (Br, M, S). Jammur & Kashmir: C. B. Clarke 22896 [603a] (W--802856); Collector undesignated 2227 (Xa); Gammie s.n. [Sunagar, 4.7.1891] (Ca--269794); Schlagintweit 4496 (S, W--804521). Uttar Pradesh: Blinckworth s.n. [In Kamoan] (M); Duthie 4282 (W--804935); N. Gill 77 (B); U. Singh 212 (Ca--361108, La, N); Strachey & Winterbottom s.n. [Kumaon] (Br); Vaid s.n. [30.6.49] (N); Wallich 1825/4 (Lu, S). State undetermined: Duthie s.n. (Ca--269794); Voigt s.n. (Cp, Cp, Cp). BURMA: Southern Shan States: Malaise 282 (S). Upper Burma: R. E. Cooper 6019 (Ca--170238). TIBET: Monbeig s.n. [1908] (S); Soulié 1075 (Bz--72846), s.n. [Tsekou] (B). CHINA: Anhwei: R. C. Ching 4123 [Herb. Univ. Nanking 8514] (Ca--261521, W--1370433). Chekiang: Barchet 553 (W--596114). Fukien: T. C. Chang 4447 (La); Chang & Metcalf 90 (Du--250191); J. H. Chen s.n. [Aug. 16, 1948] (N); Cheng 1821 (Bz--23783); Chung 3441 (Bz--23782); C. P. En 2022 (Du--250193), 2689 (Du--200936); Ging 7229 (Mi); Metcalf 997 (Um--61142); Metcalf & Chang 90 (Vi--128); Pi 6002 (Du--200935, Um--14); Po 12344 (Ur), 12491 (Ur); L. Y. Tai 11412 (Ur). Honan: L. H. Bailey s.n. [Sin-tien, June 15, 1917] (Ba). Hupeh: L. H. Bailey s.n. [Hankow, June 10, 1917] (Ba); Cheo 83 [Herb. Univ. Nanking 18146] (Bz--23780); Chow 598 (N). Kiangsi: S. K. Lau

4280 (S, W-1752972), 4758 (S); W. T. Tsiang 9873 (N). Kiangsu: H. T. Chang 369 (Du-200934); E. Deschamps s.n. [Shanghai, Sept. 14, 1907] (W-595698); Tsu 658 (Ca-230126, Vi, W-1346009), 658a (Bi). Kwangsi: R. C. Ching 3272 (W-1508402), 5272 (Ca-409675, N); Steward & Cheo 513 (N, S), 929 (N); W. T. Tsiang 27635 (W-1757080). Kwangtung: N. J. Andersson s.n. [Whampoa, Dec. 1852] (S); Dahlström 254 (S); G. W. Groff 163 [Herb. Canton Chr. Coll. 11004] (Ca-288069); May 112 (Bz-23781); F. A. McClure 2595 [Herb. Canton Chr. Coll. 9153] (Oa); Pent, Tak, & Kin 680 [Herb. Canton Chr. Coll. 12679] (Ca-275057, S, W-1247932), 942 [Herb. Canton Chr. Coll. 12941] (Ca-274511, W-1248149); Ping 10622 (Bz-23779); T. Sampson s.n. [Canton, April 1884] (Bm); Tsang 20228 (N); S. W. Williams s.n. [Canton] (N); Wong 24 (Ba). Kweichow: Stewart, Chiao, & Cheo 52 (N); Tsiang 5059 (N), 5399 (N, S, W-1575158). Sikang: Chiao 1126 (S). Szechuan: C. L. Chow 7208 (W-1990615); Fang 3661 (N, W-1525366), 5201 (W-1671744), 5588 (W-1525367), 10222 (Du-289053), 12327 (Bm), 12438 (Bm). Yunnan: Enander s.n. [21/9/1926] (S), s.n. [24/9/1926] (S); Forrest 8036 (S); A. Henry s.n. [Szemao] (N); Maire 1561 (Ca-222894), 6181 (Ca-386801, S); Schoch 75 (W-1235269); H. Smith 1536 (Go, S); Tsai 53593 (S); Yu 10518 (Bm). Province undetermined: Dunn s.n. (Cp); F. B. Forbes s.n. [lawn, June 1, '79] (Bm); Hugh s.n. [Mt. Mias-Wang-san, north central China] (Bm); Osbeck s.n. [ca. 1750] (Lu), s.n. [China] (S). CHINESE COASTAL ISLANDS: Amoy: H. H. Chung 470 (Ca-420275); A. N. Steward 3059 (Ca-44778). Hainan: Chun & Tso 43471 (N); C. Ford s.n. [31.3. 93] (W-456231); Lau 1685 (N); C. I. Lei 231 (B, Ba, Bz-23777, Ca-611648, N), 942 (B, Ba, Bz-23778, Ca-612242, N, W-1754428); Liang 64870 (N); F. A. McClure 7590 [Herb. Canton Chr. Coll. 9153] (Vi), 9153 [Herb. Canton Chr. Coll. 9153] (Ca-248680, Gg-127945), s.n. [Herb. Canton Chr. Coll. 9153] (Bi); Tak 134 [Herb. Lingnan Univ. 15633] (Ca-315734), 753 [Herb. Canton Chr. Coll. 17502] (Du-250192); Tsang 134 [Herb. Lingnan Univ. 15633] (N), 753 [Herb. Lingnan Univ. 17502] (Mi); Tsang, Tang, & Fung 200 [Herb. Lingnan Univ. 17731] (Bi), s.n. [Herb. Lingnan Univ. 17831] (Bi); Wu 1088 (Du-250190). Honam: C. O. Levine 488 (W-778811); E. D. Merrill 9906 (Ca-291698, Gg-31406). HONGKONG: C. Wright s.n. (W-71987). THAILAND: Smitinand 1689 (Ss); Suvarnakoses 1184 [Royal Forest Dept. 15131] (Sm). INDOCHINA: Annam: Eberhardt 4040 (B). Tonkin: Clemens & Clemens 3591 (Ca-339828); Pételot 1374 (N, W-1525838). KOREAN COASTAL ISLANDS: Quelpart: Kitamura s.n. [16 Jul. 1930] (Mi). WESTERN PACIFIC ISLANDS: JAPAN: Honshiu: Baker & Baker s.n. [Kobe, May 18, 1915] (Gg-31398); Collector undetermined 360 (W-71988); Dorsett & Morse 886 (N, W-

1553469); Herb. Mus. Bot. Stockholm s.n. [Tokyo, 30/10/14] (S); Ichikawa 200678 (Ca--882672, S, W--1347459); J. Matsumura s.n. [Tokyo, June 11, 1879] (W--147580). Ikishina: Hiroe 7336 (Ca--961561). Kiushiu: Ichikawa 200131 [Tanaka 47] (Ca--243938); Oldham 619 (Br, S, T); Takenouchi 1724 (W--1271674). Shikoku: Collector undesignated s.n. [Shimura, June 19, 1893] (W--206019), s.n. [Mosashi, 24 Juni 1910] (W--1178284); Herb. Sci. Coll. Imp. Univ. s.n. [June, Musashi] (Vt). Island undetermined: Burzes s.n. (S); Herb. Ames s.n. [June 19, 1893] (Oa); Herb. Lugd.-Bat. s.n. [1865] (M), s.n. (T); Noda s.n. (Po--128708); J. Petersen s.n. [Japan] (S); Thunberg s.n. [1777] (S). RYUKYU ISLAND ARCHIPELAGO: OKINAWAN ISLANDS: Okinawa: Boehmer 117 (N); Field & Loew 21t (Ca-745242, Mi), 96e (Bi); R. V. Moran 5066 (Bi, Ca--78420); Walker, Tawada, & Amano 5720 (N). FORMOSA: Baker & Baker s.n. [Keelung, Dec. 4, 1914] (Gg--31396); Faurie 372 (V--8193); Kuntz 33 (W--2336836); Sasaki 21397 (Ca--344389, Ia); Simada 885 (Ca--345123); T. Tanaka 11032 (Br, Ia, S); Tanaka & Shimada 11032 (B, Go, Mi, N, W--1577527). PHILIPPINE ISLANDS: Luzon: J. Clemens 17532 (N); M. S. Clemens 19003 (Bz--23767, Ca--295747); E. D. Merrill 305 (Bz--23768); M. Ramos s.n. [Herb. Philip. Bur. Sci. 7789] (N, W--629315), s.n. [Herb. Philip. Forest Bur. 7976] (Bz--23769); Ramos & Edaffo s.n. [Herb. Philip. Bur. Sci. 46562] (Br, Bz--23766, Ca--308974); Ramos & Ramos s.n. [Herb. Philip. Bur. Sci. 46562] (N). INDONESIA: GREATER SUNDA ISLANDS: Java: C. A. Baker 1909 (Bz--23765); Herb. Hort. Bot. Bogor. Ph.19 (Bz--26505). MELANESIA: NEW GUINEA: Northeastern New Guinea: Keogh s.n. [Mt. Wilhelm] (Ng--6576). AUSTRALIAN REGION: AUSTRALIA: New South Wales: Boorman s.n. [Cambewarra, 2.1910] (Bi); R. Brown s.n. [Port Jackson] (Em); Collector undesignated 62 [Herb. Prager 18628] (Gg--31393); Hagman s.n. [1887--89] (Go); A. A. Hamilton s.n. [Menangle, 8-4-1912] (Ew); S. Helms 544 (W--1271320); B. Linder s.n. [15/10/1936] (S); F. Mueller s.n. [Darling River] (Bz--23775), s.n. [Junction of Murray & Darling Rivers] (Bz--23776, W--147581). Queensland: M. K. Clemens s.n. [Forest Hill, Jan. 1944] (Or--50745, Or--50746), s.n. [Oct.-Nov. 1945] (Or--53494, Or--53495, Or--53496); Michael 688 (Bz--23773); F. Mueller s.n. [Barcoo] (Bz--23774). South Australia: F. Mueller s.n. (Br). State undetermined: Herb. Martius s.n. [Austral. felix] (Br). NEW ZEALAND: North Island: Wilkes s.n. [Bay of Islands] (W--71985). POLYNESIA: NIUE: H. F. Moore 393 (W--653393); Yuncker 9645 (Bi, Bi, Ca--744061, Ca--948727, Dp-29046, W--1967969), 10145 (Bi, Dp--29047, W--2156478). CULTIVATED: Belgium: M. Martens s.n. (Br). California: Walther s.n. [June 1925] (Gg--128725). Canada: A. Blain s.n. [L. H. Bailey access. 6174-39] (Ba); Jard. Bot. Montreal Cult. Pl. 6174-39 [seed Yt 10518] (Mv). Chile: Looser 3996 (N). China: Liu L.831 (Ba),

L.2063 (Ba). Denmark: Herb. Liebmann s.n. (Cp); Herb. Mus. Bot. Stockholm s.n. [ex horto Havn.] (S); Herb. Schumacher s.n. (Cp); Herb. Vahl s.n. (Cp); Herb. Hort. Bot. Hafn. s.n. [Sept. 1860] (Cp). England: Herb. Linnaeus G.35, S.15 (N—photo of type, Z—photo of type), s.n. [Hort. Cliff. G.834, S.6; Hort. Bailey neg. 6407] (N—photo of type). France: Herb. W. H. Harvey s.n. [1819] (Du—166434). Germany: Herb. Calif. Acad. Sci. 31390 (Gg); Herb. Lemmon s.n. [22.8.1834] (Ca—366874). Italy: Herb. Harvey s.n. [ex seminib. h. R. P. 1841] (Du—166473). Java: Herb. Hort. Bot. Bogor. XV.K.A.XLIV.4 (Bz—26424), XV.K.A.XLV.9 (Bz, Bz—26436). Maryland: W. H. Cowgill 1730 [U. S. Plant Introd. 130416; seed YU 10518] (Oa—9235); McCann s.n. [9-15-36] (Md, Md, Md). New York: L. H. Bailey s.n. [Sept. 21, 1923] (Ba); G. V. Nash s.n. [17 S. 1898] (N). Spain: Herb. Hort. Matrit. 31 (Q), 47 (Q). LOCALITY OF COLLECTION UNDETERMINED: Bower s.n. [Sept.] (Ms); Capus s.n. (Ca—38875); Collector undesignated 376 (Br), K.11 (W—369584), s.n. [fin Août 1834] (Pr), s.n. (S); Freed s.n. [N. Am.] (S); Garrigues s.n. (Mi); Herb. J. Angström s.n. [Dragerum, P. Sever] (S); Herb. H. R. Bassler s.n. [Graigns Point, Aug. 29, '79] (Ka); Herb. Bot. Bogor. 23771 (Bz); Herb. Coll. Pharmacy s.n. [9-47] (Pa), s.n. (Pa); Herb. Columbia Univ. s.n. [1841] (C); Herb. Linhaeus s.n. (S); Herb. Marie-Victorin s.n. [Monde] (Vi); Herb. Mus. Bot. Stockholm 13 (S), s.n. [Majo 1849] (S), s.n. [Niulam] (S); Herb. Rafinesque s.n. [13.1.41] (N); Herb. Saldanha 2766 [Herb. Mus. Nac. Rio Jan. ref. V] (Ja); Herb. Schleicher s.n. (Ca—73654); Herb. U. S. Dept. Agr. s.n. (W); Knudsen XIV.2 [Schwirsen] (B); Matveeva 214 [Iter Lencoranicum] (N); C. T. Mohr 228 (W—771861); Née 80, in part (Q); Poeppig s.n. [N. Am.] (S); L. Schaeffer s.n. [Waldhof, 1886] (N); Simoda s.n. (W); A. Smith s.n. [Canavus] (Cp); Stewart s.n. [Campellpore] (Bz—23772); Trolander s.n. [5/7/1920] (Ew), s.n. [15 Aug. 1922] (Ew). MOUNTED ILLUSTRATIONS: Anon., fig. 625 (N); F. Bauer, Icon. Nov. Holl. 963 (V), 963a (V), s.n. (V); Brut. Mus. (Nat. Hist.) Brit. Flow. Pl. card F.80 (N); Bulliard, Plant. Médic. France pl. 215. 1780—1793 (N); H. N. & A. L. Moldenke, Pl. Life 2: pl. 5. 1948 (Z—negative), pl. 7. 1948 (Z—negative); Schubert, Naturg. Pflanzenreich, ed. 2, fig. 7. 1865 (N); Thornton, Brit. Fl. 1: 27. 1812 (N); Zannich., Istor. Piante Venez. pl. 269. 1735 (N).

VERBENA OFFICINALIS var. *ALBIFLORA* Strobl, Flora van Admont, Programme des Melker Gymnasium. 1882; Strobl, Oesterr. Bot. Zeitschr. 33: 406. 1883.

Synonymy: *Verbena floribus albidis* Vaill. apud Haller, Emm. Meth. Stirp. Helvet. 1: 661. 1742. *Verbena communis, floribus albidis* C. Bauh. apud Tourn., Inst. Rei Herb. 200. 1700. *Verbena communis floribus albidis* C. Bauh. apud Sabbat in Martelli, Hort.

Roman. 3: ll. 1775. Verbena officinalis f. albiflora Strobl ex Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 224l. 1927. Verbena officinalis f. albiflora Krause ex Moldenke, Résumé 371, in syn. 1959.

Bibliography: Dorsten, Botanicon 292. 1540; C. Bauh., Pinax Theatr. Bot., ed. 1, 269 (1623) and ed. 2, 269. 1671; Tourn., Inst. Rei Herb. 200. 1700; Haller, Enum. Meth. Stirp. Helvet. 1: 661. 1742; Dalibard, Fl. Paris. 9. 1749; Sabbat in Martelli, Hort. Roman. 3: ll. 1775; Strobl, Flora van Admont, Programme des Melker Gymnasium. 1882; Strobl, Oesterr. Bot. Zeitschr. 33: 406. 1883; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 224l. 1927; Moldenke, Résumé 130, 371, & 473. 1959; Moldenke, Résumé Suppl. 4: 15 (1962) and 6: 7 & ll. 1963.

This variety differs from the typical form of the species in having white corollas.

Strobl's original publication of this variety has not as yet been seen by me, nor do I know whether Krause ever validly published his f. albiflora. The type of Krause's trinomial, however, appears to have been collected by Ernst Hans Ludwig Krause (no. 28270) at Herrenstein, Germany, on August 11, 1907, and is deposited in the herbarium of the Botanisches Museum at Berlin. In his 1883 work Strobl says "Um Mascalucia [Etna] (Herb. Guss.) Blüht fast das ganze Jahr. 4."

This color form is first mentioned by Dorsten (1540), who says "Verbenae duo sunt genera, altera floribus est albis, altera verò coeruleis". Later it is referred to again by C. Bauhin (1623 & 1671), Tournefort (1700), Haller (1742), Sabbat (1775), and Dalibard (1749). Bauhin (1623) says "Genera ejus duo sunt Plinio l. c. foliosa, quam foeminam putant: mas rarioribus foliis, &c. folia minima quam quercus colos glaucus, &c. quidam unum omnino genus faciunt, quoniam utraq eodem effectus habeat, &c." Under his first species, "I. Verbena communis caeruleo flore", he makes the comment "Floribus est caeruleis, quandoque albidis."

Only a single specimen has been seen by me.

Citations: GERMANY: E. H. L. Krause 28270 (B).

VERBENA OFFICINALIS var. ANARRHINOIDES Murr, Allg. Bot. Zeitschr. 14: 19. 1908.

Bibliography: Murr, Allg. Bot. Zeitschr. 14: 19. 1908; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 224l. 1927; Moldenke, Known Geogr. Distrib. Verbenac., ed. 2, 108 & 199. 1949; Moldenke, Résumé 130 & 473. 1959.

This variety differs from the typical form of the species in having 15--25 flowers blooming simultaneously on a single spike, the corollas somewhat paler and somewhat larger than in the typical form.

Murr's original description of this variety is "Verbena officinalis L. nov. var. anarrhinoides Mh. Corollis pallidioribus et paulo maioribus, floribus 15--25 (in typo 4--5) in una spica simul evolutis; forma lepida et habitu insignis. In mehreren Exemplaren an Ardetzenberg neben dem Typus." It comprises part of an article on the flora of the Tiroh, Vorarlberg, and Liechtenstein.

The type locality, according to Dr. Karl Rechinger, is in Levis, Vorarlberg, Austria. Hegi describes the plant as "Blütten zu 15 bis 25 in einem einzigen Blütenstand vereinigt, etwas bleicher und etwas grösser als beim Typus."

It is known to me only from the literature.

VERBENA OFFICINALIS var. *BRACHYANTHA* Murr, Allg. Bot. Zeitschr. 16: 187. 1910.

Bibliography: Murr, Allg. Bot. Zeitschr. 16: 187. 1910; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 2241. 1927; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 108 & 199. 1949; Moldenke, Résumé 130 & 473. 1959.

This variety differs from the typical form of the species in having all its flowers much smaller and the corolla-lip shorter.

Murr's original description of the variety is "Floribus omnibus multo minoribus limbo brevioribus. Ziemlich zahlreich unter dem Typus am Fuss des Ardetzenberges in Levis." This locality, according to Dr. Karl Rechinger, is in Vorarlberg, Austria. Hegi says "Blüten alle viel kleiner als beim Typus, Lippe kürzer."

It is known to me only from the literature.

VERBENA OFFICINALIS var. *GAUDICHAUDII* Briq., Ann. Conserv. & Jard. Bot. Genève. 10: 105. 1907.

Synonymy: *Verbena officinalis gaudichaudii* Briq. ex Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 6: 2209. 1951.

Bibliography: Briq., Ann. Conserv. & Jard. Bot. Genève. 10: 105. 1907; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 70 & 101. 1942; Moldenke, Alph. List Cit. 1: 226 (1946) and 2: 481. 1948; Moldenke, Castanea 13: 121. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 60. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 154, 164, & 199. 1949; Moldenke, Alph. List Cit. 3: 750. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; Moldenke, Résumé 210, 224, & 473. 1959; Moldenke, Résumé Suppl. 3: 26 & 40 (1962) and 5: 6. 1962.

This variety differs from the typical form of the species in having the body of even the lower leaves linear-oblong and narrower.

An erect annual or "apparently perennial" herb, to 1 m. tall; stems several, erect, branched, from a "woolly" [=woody?] rootstock; leaves dull-green, paler beneath, the stem leaves elongate-lanceolate, narrow, to 7 cm. long and 8 mm. wide, deeply incised-dentate, the segments 2—5 mm. long, the upper leaves linear-lanceolate, sparsely and superficially dentate, the uppermost linear and subentire; corolla deep-blue, bluish, or lilac.

The type of this variety was collected by Charles Gaudichaud-Beaupré (no. 114) at Port Jackson, New South Wales, Australia, and is deposited in the herbarium of the Conservatoire et Jardin Botaniques at Geneva. Briquet (1907) says of it "Planta habitu a typo valde aliena, tamen vix segreganda."

The plant has been found on gray-brown clay in cleared brigalow scrub, on riverbanks, on granite formations, and growing as a weed of cultivated and fallow land, at 240 meters altitude, flowering

in January, April, September, and October, and fruiting in October. It has been misidentified and distributed under the names V. caroliniana L. and V. officinalis L. A common name for it in New South Wales is said to be "native tobacco". Everist found it to be a "weed around shed in pale-brown loam".

In all, 9 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: AUSTRALIA: New South Wales: E. F. Constable 11633 (W--1994884); Goode 92 (Em); A. B. Oldfield s.n. (W--206864). Queensland: Everist 6101 (N); Pedley 377 (N); L. S. Smith 3045 (N). Victoria: A. Morrison s.n. [banks of Yarra River, Kew, 1/16/85] (Mi, N--photo, Z--photo). State undetermined: Herb. Coll. Pharmacy s.n. [Austral. felix] (Pa). CULTIVATED: Germany: Herb. Prager 18633 (Gg--31460).

VERBENA OFFICINALIS var. GRACILIS G. Cta. ex Moldenke, Résumé Suppl. 3: 15, nom. nud. 1962.

Bibliography: Moldenke, Résumé Suppl. 3: 15. 1962.

As yet I do not know where or when — or if ever — Gonçalves da Costa described this variety. Possibly the specimen cited below may represent the type collection, because on its label he has written "Sera-t-il une espèce nouvelle?" The variety is known to me only from this single specimen.

Citations: MADEIRA: Gonçalves da Costa s.n. [Porto Santo, Maio 1939] (Go).

VERBENA OFFICINALIS var. GRANDIFLORA Hausskn., Mittheil. Thüring. Bot. Ver., new ser., 10: 65. 1897.

Bibliography: Hausskn., Mittheil. Thüring. Bot. Ver., new ser., 10: 65. 1897; Moldenke, Résumé 131 & 473. 1959.

This variety differs from the typical form of the species in having its flowers almost twice as large, very remote on greatly elongated spikes, the calyx longer, and the corolla deep-blue.

The type of the variety was collected by Heinrich Carl Haussknecht along roadsides near Mount Korona, Greece. The plant is known to me only from the original description.

VERBENA OFFICINALIS var. MACROSTACHYA (F. Muell.) Benth. in Benth. & Muell., Fl. Austr. 5: 36. 1870.

Synonymy: Verbena macrostachya F. Muell., Fragm. 1: 60. 1858. Verbena officinalis var. macrostachya Benth. ex F. M. Bailey, Compreh. Cat. Queensl. Pl. 382. 1913. Verbena officinalis macrostachya Benth. ex Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209. 1951.

Bibliography: F. Muell., Fragm. 1: 60. 1858; Benth. & Muell., Fl. Austr. 5: 36. 1870; F. Muell., Syst. Cens. Austr. Pl. 102. 1882; F. M. Bailey, Cat. Indig. Nat. Pl. Queensl. 35. 1890; F. M. Bailey, Compreh. Cat. Queensl. Pl. 382. 1913; H. J. Lam, Verbenac. Malay. Arch. 10. 1919; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 74 & 101. 1942; Moldenke, Phytologia 2: 339.

1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 109, 164, & 199. 1949; Moldenke, Alph. List Cit. 3: 667 (1949) and 4: 1248. 1949; Moldenke in Chittenden, Roy. Hort. Soc. Dict. Gard. 4: 2209 & 2211. 1951; Moldenke, Résumé 132, 224, 369, & 473. 1959; Moldenke, Résumé Suppl. 3: 40 (1962) and 5: 6 & 7. 1962.

This variety differs from the typical form of the species in having its spikes uniformly elongated to 45.5 cm. and very coarsely glandular-puberulent or hirsute and the flowers rather larger. It is said to be a spreading herb, to 66 cm. tall, with pink corollas.

The type of the variety was collected by Ferdinand Jacob Heinrich von Mueller at Peak Downs, Queensland, Australia, in or before 1858. Bentham (1870) cites also a Bowman s.n. from Rockhampton, Queensland.

The Liu collection cited below was cultivated in Chihli, China, from seeds secured from Copenhagen, Denmark, where one may assume that the plant was also cultivated -- the original source of the seeds is not known. It has been collected in flower and fruit in October. Herbarium material has been misidentified and distributed under the name V. officinalis L.

In all, 2 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: ALGERIA: Dukerly s.n. [Setif] (Br). CULTIVATED: China: Liu L.2063 (Ba, N--photo, Z--photo).

VERBENA OFFICINALIS f. MONTANA Goiran ex Moldenke, Known Geogr.

Distrib. Verbenac., [ed. 1], 45 & 101, nom. nud. 1942.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 45 & 101. 1942; Moldenke, Alph. List Cit. 1: 229. 1946; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 108 & 199. 1949; Moldenke, Résumé 131 & 473. 1959.

Where or when -- if ever -- Goiran described this form is not as yet known to me, nor do I know where, when, and by whom the type collection was made. It is known to me only from the single specimen cited below.

Citations: ITALY: Gavioli s.n. [19.VI.1927] (N).

VERBENA OFFICINALIS var. PROSTRATA Gren. & Godr., Fl. Franç. 2: 718. 1852.

Bibliography: Gren. & Godr., Fl. Franç. 2: 718. 1852; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 2241. 1927; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 44 & 101. 1942; Moldenke, Phytologia 2: 339. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 107, 108, & 199. 1949; Moldenke, Alph. List Cit. 3: 832 (1949) and 4: 1210. 1949; Moldenke, Résumé 129, 130, & 473. 1959; Moldenke, Résumé Suppl. 6: 7. 1963.

This variety differs from the typical form of the species in having prostrate stems.

The original description of the variety is "Verbena officinalis var. prostrata. Tige étalée-couchée.....sables des environs de Bayonne [France]." It is not known to me when or by whom the type was collected. It is possible that the Meissner 572 cited

by me hereinbefore under V. officinalis may actually represent this variety. Hegi (1927) describes it as "Stengel niederliegend." A common name is said to be "seruffit". Herbarium material has been misidentified and distributed under the names V. officinalis L. and V. supina L. The variety is known to me only from the following 7 specimens.

Citations: FRANCE: Collector undesignated s.n. (Du, Du). SWITZERLAND: Probst s.n. [13.9.36] (Pb). ERITREA: Pappi 2981 (W--1969120). ABYSSINIA: Schimper 145 (S, S, W--945092).

VERBENA OFFICINALIS var. RESEDIFOLIA Murr, Deutsch. Bot. Monatschr. 20: 52. 1902.

Bibliography: Murr, Deutsch. Bot. Monatschr. 20: 52. 1902; Hegi, Illustr. Fl. Mittel-Eur. 5 (3): 2241--2242. 1927; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 108 & 199. 1949; Moldenke, Alph. List Cit. 4: 1099. 1949; Moldenke, Résumé 130, 132, & 473. 1959; Moldenke, Résumé Suppl. 6: 7. 1963.

This variety differs from the typical form of the species in having its stem-leaves twice pinnately parted, with blunt rounded tips.

Murr's original description of the variety is "Stengelblätter doppelt fiederspaltig mit stumpfen gerundeten Zipfeln. Am Damme der Valsuganabahn bei S. Christoforo. Die Form, welche mir einen fremdartigen Eindruck machte, dürfte aus den vielbesprochenen griechischen Sämereien stammen." Dr. Rechinger states that this locality is now in the province of Alto Adige, in northern Italy (before World War I it was in Bozen, Bezirkshauptmannschaft Trient, Südtirol, Austria).

It is known to me only from the description and the single following specimen.

Citations: MOROCCO: E. Wall 7538 (Go).

xVERBENA OKLAHOMENSIS Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 78--79. 1942.

Synonymy: Verbena bipinnatifida Nutt. x V. canadensis (L.) Britton ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947. Verbena canadensis (L.) Britton x V. bipinnatifida Nutt. ex Moldenke, Alph. List Invalid Names Suppl. 1: 22, in syn. 1947.

Bibliography: Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 11, 76, 78--79, & 101. 1942; Moldenke, Known Geogr. Distrib. Verbenac. Suppl. 1: 2. 1943; Moldenke, Alph. List Cit. 1: 157. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 22. 1947; Moldenke, Alph. List Cit. 2: 515 & 517 (1948), 3: 822 (1949), and 4: 1085. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 21 & 199. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Am. Midl. Nat. 59: 357. 1958; Moldenke, Résumé 22, 26, 358, 360, & 473. 1959; Moldenke, Phytologia 8: 121 (1961) and 8: 210, 213, 214, 437, & 440. 1962; Moldenke, Résumé Suppl. 3: 6 & 7. 1962.

This hybrid has characters more or less intermediate between

those of V. canadensis (L.) Britton and those of V. bipinnatifida Nutt., with those of the latter predominating. The leaves are deeply bipinnatifid and the corollas are small and densely pubescent outside as in V. bipinnatifida, but the calyx and bractlets are finely appressed-pubescent or puberulent as in V. canadensis. The lower bractlets have their lower margins more or less strongly ciliate, but these marginal cilia are only dense and conspicuous on the lower portions of the lower bractlets and are very sparse or absent from the upper ones.

The type of the hybrid was collected by Dona Pitts sixteen miles east of Norman, Cleveland County, Oklahoma, on April 19, 1915, and is deposited in the herbarium of the University of Oklahoma. It was distributed as V. bipinnatifida Nutt. by the collector. Duplicate specimens of the type collection and other collections of the same taxon are mounted on the same sheets with V. canadensis and V. bipinnatifida under one label, indicating that the plant apparently grows in close association with the two parental species. This fact leads me to believe that it is an interspecific hybrid, rather than a mere form or variety of V. bipinnatifida. The two parent species grow together in at least 9 counties of Kansas, 2 of Arkansas, 19 of Oklahoma, 19 of Texas, one county each of Missouri, Indiana, and Nebraska, and 3 parishes of Louisiana, so it is very possible that this hybrid will be found more often. It may even account for some of the tremendous "variability" noted in herbarium material now usually regarded as one or the other of its parental species. The Pitts collection is a mixture of the hybrid with specimens of V. bipinnatifida, while the Van Vleet collection consists of a mixture with stems of V. canadensis, indicating, apparently, the very close proximity of at least one of the parental species in each case. The Demaree collection was originally identified as V. ciliata var. longidentata Perry, and was collected on sandy hills.

The hybrid has also been found in open or scrubby prairies and glades, on outcroppings of Cretaceous Annona Chalk, along roadsides and gravelly roadsides, in rocky railroad fill, on the top of limestone hills, in gravelly limestone, on rolling limestone prairies, along streams, in rich cork elm-hickory-oak woods on the Woodford Chert formation, in rocky xeric limestone gullies, and on outcrops of Arbuckle Lime formation, flowering and fruiting from April to June and in September.

The Stratton 4302, cited by me under V. bipinnatifida, looks a bit like xV. oklahomensis. Verbena demareei Moldenke, regarded by me hereinbefore as a synonym of V. bipinnatifida, seems to combine the ordinary leaf-characters of V. bipinnatifida with the large flowers of V. canadensis, and may possibly also prove to be a natural hybrid between these two species, perhaps in reverse form. Its flower-characters, however, are not the same as those seen in xV. oklahomensis. Even if it should prove to be the same hybrid, perhaps in reverse form, its name would not, in my opinion,

replace xV. oklahomensis, because it was originally proposed by me as a true species — not as a hybrid. My understanding of the International Rules of Botanic Nomenclature is that the oldest valid epithet must be used only if proposed in the same category of classification. My good friend, Conrad V. Morton, however, in a letter to me dated March 5, 1962, disagrees. He maintains that "There is nothing in the Code that would make this true. On the contrary, if V. demareei is prior then it would displace V. x oklahomensis, if the two are considered the same; whether one, or both, or neither was first proposed as a hybrid or a species is irrelevant." The plant should have considerable horticultural merit.

In all, 14 herbarium specimens and 2 mounted photographs have been examined by me.

Citations: ARKANSAS: Little River Co.: Moore & Iltis s.n. [April 5, 1953] (Ok). OKLAHOMA: Carter Co.: M. Hopkins 6094 (Ca--882575). Cleveland Co.: Pitts s.n. [4/19/15] (N--photo of type, Ok--20477--isotype, Ok--20479--type, Z--photo of type). Comanche Co.: Van Vleet s.n. [Mt. Sheridan, 7/4/03] (Ok--10269). Murray Co.: Hopkins, Nelson, & Nelson 667 (St). Payne Co.: E. W. Michael 74 (St). Pontotoc Co.: Duffer 28 (St); D. McCoy 584 (St), 2479 (St), 2522 (St), 2539 (St). Tillman Co.: Demaree 12188 (Ok--20470). TEXAS: Lampasas Co.: Mahler 1241 (St).

VERBENA ORCUTTIANA Perry, Ann. Mo. Bot. Gard. 20: 284--285. 1933.

Bibliography: Perry, Ann. Mo. Bot. Gard. 20: 247, 249, 250, 260, 284--285, & 355. 1933; A. W. Hill, Ind. Kew. Suppl. 9: 295. 1938; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 101. 1942; H. N. & A. L. Moldenke, Pl. Life 2: 74. 1948; Moldenke, Alph. List Cit. 2: 519 (1948), 3: 779 (1949), and 4: 1126, 1127, 1243, 1244, & 1295. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 33 & 199. 1949; H. N. & A. L. Moldenke, Anal. Inst. Biol. Mex. 20: 14. 1949; Moldenke, Résumé 39 & 473. 1959; Moldenke, Phytologia 10: 140. 1964.

Stems several from a common base, tetragonal in cross-section, branching, glabrous or very sparsely hirtellous, the hairs short; leaves decussate-opposite; petioles 1--2 cm. long, margined; leaf-blades lanceolate-elliptic to spatulate, 4--6 cm. long, tapering at the base into the petiole, coarsely serrate, rugose and appressed-pubescent above, more densely spreading-pubescent or hirtellous beneath and prominently veined; spikes pedunculate, solitary or somewhat paniced, strict, elongate, mostly dense-flowered, finely glandular, closely appressed-pubescent, the rachis more or less angulate; bractlets lanceolate-acuminate, shorter than the calyx, sparsely ciliate, the midrib and margins more or less decurrent along the rachis; calyx 4 mm. long, appressed-pubescent and finely glandular, the teeth short-subulate or acuminate, more or less connivent above the schizocarp after anthesis; corolla hypocrateriform, blue, its tube about as long as the calyx, the limb 3--4 mm. wide; cocci trigonous, 2 mm. long,

raised-reticulate at the apex, striate toward the base, the commissural faces extending to the tip of the nutlet, muriculate-scabrous.

The type of this endemic species was collected by Charles Russell Orcutt (no. 909) -- in whose honor it is named -- on tablelands at Hanson's Ranch, Baja California, Mexico, on July 30, 1883, and is deposited in the Gray Herbarium of Harvard University at Cambridge. The species has been collected on dry flats, tablelands, and mountains, at the margins of dry pools, and in mountain meadows, at altitudes of 4650 to 6000 feet, in flower and fruit in April, July, September, and October. The common name "verbena azul" is recorded for it. It has been misidentified and distributed in herbaria under the names V. littoralis H.B.K., V. officinalis L., and V. scabra Vahl. On the other hand, the Wiggins 4360, distributed as V. orcuttiana, is actually V. neomexicana var. hirtella Perry (or V. plicata Greene), and Carter, Alexander, & Kellogg 2135 is V. menthaefolia Benth.

The Gallegos 2342 specimens cited below have a photograph mounted on the same sheet with the specimen. A note on the United States National Herbarium specimen of Wiggins 5508 states that the inflorescence is not glandular.

In Plant Life (1948) it was stated that this species was named in honor of Heman Chandler Orcutt (1825--1892), but apparently this is not the case. There is no evidence that Perry did not intend the name to honor the collector of the type specimen, Charles Russell Orcutt (1864--1929).

Perry (1933) cites the following 3 additional specimens not as yet seen by me: MEXICO: Baja California: C. R. Orcutt 909 (G--type), s.n. [Hanson's Ranch, 29 July 1883] (G, N). She notes that "This species, which has been passing as V. littoralis, is much like V. neomexicana var. xylopoda in the finely glandular spike and the angle of insertion of the flowers. It differs, however, in the shorter nutlets, the smaller corollas, and the type of pubescence. In V. orcuttiana, the trichomes are short and somewhat hirtellous, and the pubescence of the inflorescence is closely appressed. In gross habit, it is scarcely to be distinguished from V. simplex, but the latter has somewhat harsher pubescence and larger non-glandular flowers." The C. R. Orcutt 118 cited hereinafter is what Perry cites as "Orcutt s.n. [Hanson's Ranch, 29 July 1883]" and his 521 is her s.n. from "mountains, northern Lower California, 8 July 1885".

In all, 20 herbarium specimens, including material of the type collection, and one mounted photograph have been examined by me.

Citations: MEXICO: Baja California: Gallegos 2342 (Ne, W--1209871); C. R. Orcutt 118 (W--1323104), 521 (W--1323105), 909 (Cm--isotype, Pa--isotype), s.n. [Pinery, 7-27-1883] (Mi, W--56176), s.n. [Santa Catalina Mts., July 27, 1883] (Ca--104840), s.n. [7-31-1883] (Vt), s.n. [July 1883] (C), s.n. [7-8-1885] (I, Up-

17110, Vt); Wiggins 5508 (Du--265866, W--1824143), 9157 (Du--258545, W--1747513), 11258 (Du--321768, W--1976620).

VERBENA ORIGENES R. A. Phil., Linnaea 29: 20. 1857.

Synonymy: Verbena deserticola R. A. Phil., Fl. Atac. 40. 1860. Verbena palmata Reiche, Fl. Chile 5: 285 & 287. 1910. Glandularia origenes (Phil.) Schnack & Covas, Darwiniana 6: 475. 1944.

Bibliography: R. A. Phil., Linnaea 29: 20. 1857; R. A. Phil., Fl. Atac. 40. 1860; F. Phil., Cat. Pl. Vasc. Chil. 220 & 221. 1881; Hook. f. & Jacks., Ind. Kew. 1: 1178 & 1179. 1895; Reiche, Fl. Chile 5: 285, 287, & 289--291. 1910; Prain, Ind. Kew. Suppl. 4: 245. 1913; Sanzin, Anal. Soc. Cient. Argent. 88: 98, 127--129, & 134. 1919; Baeza, Nomb. Vulg. Pl. Silv. Chile, ed. 2, 100, 206, & 269. 1930; Stapf, Ind. Lond. 6: 430. 1931; R. Espinosa, Ökolog. Stud. Kordillerenpfl. 36 & 38. 1932; M. R. Espinosa Bustos, Rivadavia 327. 1938; Moldenke, Suppl. List Common Names 9 & 18. 1940; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 42 & 102. 1942; Moldenke, Alph. List Invalid Names 46 & 49. 1942; Schnack & Covas, Darwiniana 6: 475 (1944) and 7: 72. 1945; Moldenke, Phytologia 2: 116. 1945; Cabrera, Bol. Arg. Soc. Bot. 1: 67. 1945; Moldenke, Alph. List Cit. 1: 84. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 10. 1947; Moldenke, Alph. List Cit. 3: 688 & 813 (1949) and 4: 1115 & 1116. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 102 & 199. 1949; Acevedo de Vargas, Bol. Mus. Nac. Hist. Nat. Chile 25: 58--59. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 101. 1953; Moldenke, Résumé 122, 296, 363, 371, & 473. 1959; Moldenke, Phytologia 8: 204 (1962) and 10: 113. 1964.

Illustrations: Sanzin, Anal. Soc. Cient. Argent. 88: 128. 1919.

Perennial herb, to 40 cm. tall, robust, glandular-hispid or densely short-hairy, sometimes almost tomentose, yellowish-green; stems several, loosely tufted, from a matted caudex, upright, 15--60 cm. long, stout, trichotomously branched, leafless at the apex; leaves sessile, the uppermost smaller and forming a many-parted involucre beneath the inflorescence; leaf-blades trapezoid in outline, 3--4 cm. long and wide at the middle of the stems, usually broader than long, cuneate and somewhat clasping at the base, 3-parted to the middle or trifid, the segments ovate-triangular, acute at the apex, entire or 1--3-dentate, the margins sinuate; venation impressed above, prominent beneath; inflorescence terminal, consisting of a cluster of usually 3 many-flowered heads; flowers numerous; bractlets linear to awl-shaped, almost as long as the calyx, ciliate; calyx prismatic, about 8 mm. long, hispid, membranous between the 5 green ribs which terminate in short triangular teeth; corolla white or white-lilac to pink, lavender, or lilac, its tube about 10 mm. long, hairy on both surfaces, the limb often rose or blue, about 7 mm. wide, the 5 lobes obovate-cuneate, emarginate; cocci about 3.5 mm. long, red-brown, smooth on the back, the lateral angles narrowly alate.

The type of this distinctive species was collected by Claude Gay (no. 1906) in Coquimbo, Chile, a clastotype being preserved in the herbarium of the Museo Nacional de Historia Natural at Santiago, Chile. The type of V. deserticola was collected by Rudolph Amandus Philippi (no. "1293") at Pogonal, Atacama, Chile, in February, 1854, and is no. 54764 in the herbarium of the same institution -- Macbride's type photograph 17434 being of an isotype in the herbarium of the Botanisches Museum at Berlin, now destroyed. Verbena palmata is based, apparently, on Peralta s.n. from Doña Ana, Reiche s.n. from Baños del Toro, collected in January, 1904, and on Volckmann s.n. from Río Turbio, collected in the summer of 1860--1861, all these localities being in Coquimbo, Chile, and all the specimens deposited at Santiago.

Morrison reports the species as "very common on rocky screes above the baños, Baños del Toro", Coquimbo. Johnston found it on dry benches at the foot of talus slopes in quebradas and "on talus slopes in gorge above baños" in Atacama. He distributed his no. 6102 as "V. deserticola var." Common names reported for the plant are "hierba del incordio", "rica-rica", "ricarrica", and "yerba del incordio", the first of which is also applied to V. laciniata (L.) Briq. The species has been found at altitudes of 3200 to 3800 meters, flowering from December to February, fruiting in February.

Reiche says of his V. palmata: "Difiere de V. cuneifolia R. & P. por el tallo mas corto, las hojas mas anchas que largas, las espigas mas costas e involucradas. La V. cuneifolia es del Perú, pero segun Gay V páj. 23 se observó tambien en las cordilleras entre Santiago i Mendoza." For the type of his species he seems to cite only one collection: "Cordilleras de Coquimbo (Doña Ana, valle superior del Río Turbio)", but Acevedo de Vargas regards the three collections cited above as cotypes. She cites (1951) the following 12 specimens not as yet seen by me: CHILE: Atacama: Borchers s.n. [Baños de Inca, I.1886] (Sg--54762); F. Philippi s.n. [Quebr. de Paipote, 4-1-1885] (Sg--42465, Sg--54763, Sg--68387); R. A. Philippi s.n. [Pajonal, II.1854; Macbride photos 17434] (Sg--54764, Sg--photo). Coquimbo: Alamos s.n. [Cordillera de Los Patos, Aestate 1884] (Sg--42461); C. Gay 1906 (Sg--54769--clastotype); Peralta s.n. [Doña Ana] (Sg--54768); Reiche s.n. [Baños del Toro, I.1904] (Sg--54765, Sg--54767); Volckmann s.n. [Río Turbio, Aestate 1860--61] (Sg--54766).

In all, 22 herbarium specimens, including photographs of the type collection, and 4 mounted photographs have been examined by me.

Citations: CHILE: Atacama: I. M. Johnston 4844 (W--1497721), 5958 (W--1496088), 6102 (W--1495938); R. A. Philippi 1293 (W--1323079), s.n. [Pogonal, Feb. 1854; Herb. Mus. Nac. Hist. Nat. Chile 54764; Macbride photos 17434] (Kr--photo, N--photo, N--photo, N--photo); Werdermann 959 (Ca--314836, Gg--147374, N, S).

Coquimbo: Cabrera 3528 (N, N, S); M. R. Espinosa 24 (N); J. L. Morrison 17271 (Ca--630205, S); Wagenknecht s.n. [Baños del Toro, IX.1947] (Ew); Werdermann 225 (Ca--238314, Gg--34514, S, S, W--1233138). Ovalle: Tribarren s.n. [T. Meyer 4001] (N). Province undetermined: Herb. Mus. Nac. Hist. Nat. Santiago 6 (N).

VERBENA ORIGENES var. SEMPERI Moldenke, Phytologia 3: 44--45. 1948.

Bibliography: Moldenke, Phytologia 3: 44--45 (1948) and 3: 76. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 106 & 199. 1949; Moldenke, Inform. Mold. Set 51 Spec. 4. 1956; Moldenke, Résumé 127 & 473. 1959.

This variety differs from the typical form of the species in having broadly ovate 3-parted leaves about 3 cm. long and 2.5 cm. wide, each division deeply lobed with rounded incised lobes, densely spreading-hirsutulous or scabrid-hirsute on both surfaces, the margins conspicuously revolute. The leaves are very similar to those of V. crithmifolia Gill. & Hook., but the inflorescence is that of V. origenes R. A. Phil.

The type of the variety was collected by Juan Semper -- in whose honor it is named -- at Quebrada de la Vacas, at an altitude of 2400 meters, in the department of Las Heras, Mendoza, Argentina, between March 2 and 20, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden. It was distributed by Rufiz Leal, who describes the plant as "common", as his no. 4937. The plant has been collected in flower and fruit in February and March. The Miers 448, cited below, bears a notation "G. macrocephala", but to what genus the initial refers is not clear.

In all, 5 herbarium specimens, including the type, have been examined by me.

Citations: ARGENTINA: Mendoza: Miers 448 (Bm); Rufiz Leal 14629 (Z); Semper s.n. [Rufiz Leal 4937] (N--type). San Juan: Castellanos 15207 (W--2198245); F. A. Roig s.n. [Rufiz Leal 13010] (Ss).

xVERBENA OSTENI Moldenke, Phytologia 2: 323--324. 1947.

Synonymy: Verbena peruviana (L.) Britton x V. platensis Spreng. ex Moldenke, Alph. List Invalid Names Suppl. 1: 26, in syn. 1947. Verbena platensis Spreng. x V. peruviana (L.) Britton ex Moldenke, Alph. List Invalid Names Suppl. 1: 26, in syn. 1947. Verbena teucroides x chamaedryfolia Osten ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena melindres x teucroides Osten ex Moldenke, Résumé 369, in syn. 1959.

Bibliography: Moldenke, Phytologia 2: 323--324 & 337. 1947; Moldenke, Alph. List Invalid Names Suppl. 1: 26 & 27. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100 & 199. 1949; Moldenke, Alph. List Cit. 3: 780. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Am. Midl. Nat. 59: 357. 1958; Moldenke, Résumé 120, 369, 372, 376, & 473. 1959; Moldenke, Phytolo-

gia 8: 121 (1961) and 10: 128. 1964.

A natural hybrid between V. peruviana (L.) Britton and V. platensis Spreng., with intermediate characters; stems slender, more or less densely short-pubescent, the younger parts spreading-pubescent or hirtellous; petioles about 1 mm. long, hirtellous; leaf-blades small, ovate, 1--1.5 cm. long, 4--9 mm. wide, coarsely dentate, pustulate-scabrous and very sparsely or more densely strigose-hirsutulous above, scattered-pubescent or hirsutulous beneath, especially on the larger venation; peduncles about 1.5 cm. long or almost obsolete, densely spreading-hirtellous with hair of several lengths; heads densely rather few-flowered; bractlets lanceolate, 5--6 mm. long, long-attenuate, densely short-pubescent, long-ciliate on the margins; calyx about 1 cm. long, densely hirsutulous, irregularly apiculate; corolla light-red, orange, or violet, its tube glabrous, about 15 mm. long, its limb about 15 mm. wide.

This natural hybrid apparently occurs sporadically where the ranges of the two parents overlap in Uruguay. The type was collected by Cornelius Osten (no. 3177, in part) -- in whose honor it is named -- at Coquimbo, growing with the two parental species, in the department of Soriano, Uruguay, on November 16, 1894, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo. Osten, in a note written at Montevideo in January, 1931, says that "Der letztere [xV. uruguayensis Moldenke] ist ubrigens, wie der spontane Bastard chamaedryf. (Melindres) x teucrioides Gill. sehr selten, was eigentlich Wunder nimmt bei der Häufigkeit der Eltern, die Leichtigkeit mit der sich die Verbenen künstlich kreuzen lassen." Osten describes its corollas as orange, but Herter calls them violet.

The plant inhabits dry sunny sandy fields, dry sandy soil, campos, serranias, and arroyos, at altitudes of 100 to 200 meters, blossoming in September, November, and January. Herbarium material has been misidentified and distributed under the names V. humifusa Cham., V. incisa Hook., and V. marrubioides Cham.

In all, 14 herbarium specimens, including the type, have been examined by me

Citations: URUGUAY: Castellanos s.n. [Herb. Inst. Miguel Lillo 15048] (N); Herter 1000 [Herb. Herter 82763; Herb. Osten 22625] (B, Ca--348972, N, S, Ug, W--1422050), 1000a [Herb. Herter 83913] (Ca--360220, N), s.n. [Valle Eden, IX.1928; Herb. Osten 20444] (Ug); Legrand 3491 (Ug); Osten 2977 (Ug), 3177, in part (N--isotype, Ug--type).

VERBENA OVATA Cham., Linnaea 7: 263--264. 1832.

Bibliography: Cham., Linnaea 7: 263--264. 1832; Steud., Nom. Bot., ed. 2, 2: 750. 1841; D. Dietr., Syn. Pl. 3: 602. 1843; Walp., Repert. 4: 19. 1845; Schau. in A. DC., Prodr. 11: 541. 1847; Schau. in Mart., Fl. Bras. 9: 187. 1851; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895; Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1058. 1904; Briq. in Chod. & Hassler,

Plant. Hassler. 10: 479. 1904; Molfino, Physis 7: 103. 1923; Herter, Florula 105. 1930; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 39, 44, & 102. 1942; Schnack, Anal. Inst. Fitotéc. Sta. Catalina 4: 19. 1942; Schnack & Covas, Darwiniana 6: 470. 1944; Darlington & Janaki Ammal, Chromos. Atl. 270. 1945; Augusto, Fl. Rio Grande do Sul 232. 1946; Moldenke, Alph. List Cit. 2: 375 & 441 (1948), 3: 688, 863, 865, 921, & 922 (1949), and 4: 1257. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 94, 106, & 199. 1949; Moldenke, Phytologia 3: 377. 1950; Moldenke, Am. Midl. Nat. 59: 353 & 354. 1958; Moldenke, Résumé 110, 118, 127, & 473. 1959; Lewis & Oliv., Am. Journ. Bot. 48: 641-642. 1961; Moldenke, Phytologia 8: 121, 126, & 127 (1961) and 9: 374 & 375. 1963.

Perennial herb, 1-1.6 m. tall; stems strict, mostly simple, 1 m. or more tall, tetragonal, scabrous on the angles, densely leafy to about the middle, subaphyllous above, issuing from perennial nodose roots, deeply canaliculate-sulcate, especially on the side alternate with the plane of the leaves, the margins obtuse or rounded; nodes annulate; lower internodes 3.5-8.5 cm. long, upper ones greatly elongate, to 28 cm. long; leaves decussate-opposite or approximate, sessile, coriaceous, very stiff, reticulate-veined and very rugose, shiny above and much roughened by bulbous-based hairs, subcanescent-hirtellous beneath and hispidulous on the venation, the lower ones broad for the genus, often 1/3 or 1/2 longer than the succeeding internode, broadly ovate or subrotund-ovate, 5.5-9 cm. long, 3-5.5 cm. wide, cordate at the base, semiamplexicaul and adnate, acute at the apex, unequally and coarsely dentate-serrate except at the very base, the teeth irregular, large and small ones interspersed, the larger ones often incised, acuminate; upper leaves (between the greatly elongate internodes) much reduced or even scale-like, triangular-acuminate or elliptic-lanceolate, 1-4 cm. long, 2-12 mm. wide, similar to the lower ones in texture and pubescence; venation deeply impressed above and very sharply prominent beneath, even to the tertiary veinlet reticulation; panicle terminal, cymose, compact, spreading-hirtous on its branches and peduncles, the spikes cylindric, 2-2.5 cm. long, usually ternate at the apex of the short branches of the panicle, the central one sessile, the lateral ones short-pedunculate; bractlets membranous, lanceolate, about 6 mm. long, 1-nerved, concave, slender, attenuate-acute, glabrous except for the ciliate margins, imbricate, about twice as long as the calyx, shiny, tinted with lilac when fresh, hiding the calyx; calyx during anthesis membranous, tubular, very slightly incurved, lightly 5-nerved, puberulent, the teeth very short, rounded, apiculate, ciliate, in fruit oblong, split, 3 times as long as the fruit, contracted above; corolla clear-blue or violet, twice as long as the calyx, its tube slightly surpassing the bractlets, subvillous-lanuginous outside, its limb exiguous; style slightly longer than the calyx, with a little terminal horn adjacent to the stigma; fruit regularly 6-seeded; cocci 2 mm. long, bright-fuscous on the back, striate-ribbed, rather shiny, the commissural surface obtusely

angled, white-leathery; chromosome number: $2n = 72$.

The type of this very distinct and unmistakable species was collected by Friedrich Sellow (no. 3671) somewhere in "Brasiliae meridionali" and was deposited in the herbarium of the Botanisches Museum in Berlin, where it was photographed by Macbride as his type photograph no. 17435, but is now destroyed. Augusto (1946) states that Herter collected the species somewhere in southern Uruguay, but I have seen no Uruguayan material of it thus far. Noack (1937) reports that the chromosome number is $2n = 72$, the highest number known for the genus. Walpers (1845) places it in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Holophyllae, along with 22 other species. A natural hybrid of V. ovata with V. bonariensis L. is known as xV. intercedens Briq.

Verbena ovata has been found in bogs, swamps, and shrubby marshes, at altitudes of 850 meters, blooming in September and from November to February, fruiting in February.

Lewis & Oliver (1961), in discussing the probable genetic history of the genus, say that "It seems logical that the 2 sections are monophyletic and consequently that their basic chromosome numbers of 5 and 7 are derived from a common number of $x = 6$. Such a base number is known in the modern Verbenaceae, e.g., Priva. Not yet considered because of its debatable origin is V. ovata Cham. with its $2n = 72$ chromosomes (Noack, 1937). This species, found in east-central South America, might have arisen as an amphidiploid in a cross between an $n = 5$ and $n = 7$ species followed by genomic doubling to reach this polyploid level. Dermen's (1936) inability to produce an intersectional hybrid, the rare occurrence of 1 parent in South America, and the unquestioned classification of V. ovata in the section Verbenaca (the taxon is not morphologically intermediate) are all evidences against such an origin. Alternately, V. ovata may be a terminal dodecaploid of an extant $x = 6$ series which was morphologically more closely related to Verbenaca than to Glandularia. Additional cytological studies might reveal other 'relic' taxa in South America, but the very existence of V. ovata supports the hypothesis of an ancestral $x = 6$ stock."

Herbarium material of V. ovata has been misidentified and distributed as V. litoralis H.B.K.

In all, 17 herbarium specimens, including the type collection, and 7 mounted photographs have been examined by me.

Citations: BRAZIL: Rio Grande do Sul: Jürgens 442 (B); Rambo 9674 (Rb). Santa Catarina: Smith & Klein 1115 (N, W--2251752, Z). State undetermined: Sellow 3671 [Macbride photos 17435] (Br--isotype, F--photo of isotype, Kr--photo of type, N--photo of type, N--photo of type, N--photo of isotype, Si--photo of isotype, Z--photo of isotype). PARAGUAY: Fiebrig 5645 (W--1159391); Hassler 4695 (N). ARGENTINA: Misiones: Ekman 2032 (N, S); D. Rodriguez 596 [Herb. Inst. Miguel Lillo 3145] (Ca--3488, N), s.

n. [Herb. Mus. Argent. Cienc. Nat. 23779] (N); A. G. Schulz 6986 (Sz); G. J. Schwarz 1513 (N, S), 3673 (N).

VERBENA PARAGUARIENSIS Moldenke, *Phytologia* 1: 483--484. 1940.

Bibliography: Moldenke, *Phytologia* 1: 483--484 (1940) and 1: 511. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 41 & 102. 1942; Moldenke, *Alph. List Cit.* 1: 264 (1946) and 3: 869. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 99 & 199. 1949; E. J. Salisb., *Ind. Kew. Suppl.* 11: 263. 1953; Moldenke, *Résumé* 118 & 473. 1959.

Herb, to 60 cm. tall; stems usually simple and erect, strigose with closely appressed whitish antrorse hairs; leaves decussate-opposite, numerous, sessile, appressed to the stem; leaf-blades lanceolate, 6--23 mm. long, 1--3 mm. wide, attenuate above the rather sharply acute apex, rounded or obtuse at the base, entire and usually subrevolute along the margins, strigose on both surfaces like the stems; inflorescence terminal, spicate, terminating the stems, solitary, 10--20 cm. long, about 1 cm. wide throughout, many-flowered, the flowers alternate, imbricate, somewhat spreading; rachis slender, more or less flexuous, strigose like the stems; prophylla 2--3 mm. long, closely appressed to the calyx, strigose.

The type of this most distinctive species was collected by Teodoro Rojas (Hassler 9751) on a high plateau and in declivities in the Sierra de Amambay, Paraguay, in December, 1907, and is deposited in the Delessert Herbarium at the Conservatoire et Jardin Botaniques at Geneva. It is known only from the type collection, of which 7 herbarium specimens and 5 mounted photographs have been examined by me.

Citations: PARAGUAY: T. Rojas s.n. [Hassler 9751] (B--isotype, Bm--isotype, Cb--type, N--isotype, N--isotype, N--photo of type, N--photo of isotype, S--isotype, S--photo of type, V--isotype, Z--photo of type, Z--photo of isotype).

VERBENA PARANENSIS Moldenke, *Phytologia* 6: 331. 1958.

Bibliography: Moldenke, *Phytologia* 6: 331. 1958; Moldenke, *Résumé* 473 & 494. 1959; Moldenke, *Résumé Suppl.* 1: 7. 1959; Angely, *Fl. Paran.* 16: 79 (1960) and 17: 46. 1961.

Herb; stem apparently procumbent or decumbent and rooting, tetragonal, densely hirsute with fulvous-brown hairs; branches tetragonal, densely hirsute with fulvous-brown hairs; principal internodes 1--7 cm. long, elongated on the side branches; leaves decussate-opposite; petioles 1--3 mm. long, obscure, very densely hirsute like the branches; leaf-blades chartaceous, rounded-ovate, somewhat lighter beneath, 1--2.3 cm. long, 8--25 mm. wide, rounded in outline at the apex, more or less subcuneate or acute at the base, coarsely but regularly dentate along the margins with acute or subacute teeth, densely villous on both surfaces with long, brownish, more or less appressed hairs, the pubescence somewhat more grayish beneath; midrib very slender, impressed above, prominent beneath; secondaries slender, 3--5 per side, ascending,

hardly arcuate, impressed above, prominulous beneath; veinlet reticulation sparse, obscure on both surfaces; inflorescence terminal, subcapitate, densely villosulous throughout, many-flowered, the heads about 1.5 cm. long and wide; peduncles very slender, 1.5—3 cm. long, densely hirsutulous with fulvous-brown hair; calyx tubular, straight, about 3 mm. long, densely villosulous or hirsutulous on the outside, its rim 5-toothed, the teeth about 0.7 mm. long; corolla hypocrateriform, violet, its tube about 5 mm. long, densely barbato-tomentose in the throat, the limb 5-parted, about 2.5—3 mm. wide, the lobes obovate; stamens 4, included, didynamous, 2 inserted at about the middle and the other 2 above the middle of the corolla-tube; style glabrous, about 4 mm. long, included; stigma 2-lobed, only one lobe papillose.

The type of this remarkable species was collected by my good friend, Gert Hatschbach (no. 4214) in the campo along the road to Palmeirinho, in the municipality of Guarapuava, Paraná, Brazil, on November 15, 1957, and is deposited in the H. N. Moldenke herbarium at Yonkers, New York. The species is very distinct because of its capitate inflorescences and very small flowers.

My good friend, Dr. Angely, is of the opinion that the specific name of this plant should be written "paranaënsis". However, I see no valid reason for adding another syllable to names like this or "canadensis" or "virginiensis" simply because the state name from which they are derived terminates in an "-a" (Paraná, Canada, Virginia).

The species is known to me only from the type specimen.

Citations: BRAZIL: Paraná: Hatschbach 4214 (Z-type).

VERBENA PARODII (Covas & Schnack) Moldenke, *Phytologia* 2: 149. 1946.

Synonymy: Glandularia parodii Covas & Schnack, *Revist. Argent. Agron.* 11: 94—97, fig. 3. 1944.

Bibliography: Covas & Schnack, *Revist. Argent. Agron.* 11: 94—97, fig. 3. 1944; Covas & Schnack, *Darwiniana* 7: 86. 1945; Schnack & Covas, *Darwiniana* 7: 71, 72, 74, & 75, pl. 2 A & D. 1945; Moldenke, *Phytologia* 2: 149. 1946; Moldenke, *Alph. List Invalid Names Suppl.* 1: 10. 1947; H. N. & A. L. Moldenke, *Pl. Life* 2: 75. 1948; Moldenke, *Phytologia* 2: 482. 1948; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 106 & 199. 1949; E. J. Salisb., *Ind. Kew. Suppl.* 11: 101 & 263. 1953; Moldenke, *Inform. Mold. Set* 51 Spec. 4. 1956; Moldenke, *Résumé* 128, 296, & 473. 1959; Moldenke, *Phytologia* 8: 123 (1961) and 8: 396. 1962; Moldenke, *Résumé Suppl.* 3: 15 (1962), 5: 7 & 8 (1962), and 6: 7. 1963; Moldenke, *Phytologia* 9: 400 (1963) and 10: 136. 1964.

Illustrations: Covas & Schnack, *Revist. Argent. Agron.* 11: 95, fig. 3. 1944; Schnack & Covas, *Darwiniana* 7: pl. 2 A & D. 1945.

Annual or perennial prostrate herb, 5—15 cm. tall, forming small mats; stems creeping, rooting below, ascending at the apex, cylindrical-quadrangular, densely pubescent, the hairs simple, rather rigid, erect or oblique, not appressed; leaves decussate-opposite; petioles 3—8 mm. long; leaf-blades triangular in out-

line, 1.5--2.8 cm. long, 1.2--2.5 cm. wide, laciniate, attenuate into the petiole at the base, the segments linear-lanceolate, 0.5--1.5 mm. wide, obtuse or subacute at the apex, not revolute along the margins, pubescent above and on the margins and on the venation beneath, the hairs simple, rigid, to 0.6 mm. long, oblique to subappressed; inflorescence terminal, spicate, often solitary, abbreviated during anthesis but elongating after anthesis; bractlets linear-lanceolate, more than half as long as the calyx, ciliate along the margins, subappressed-pilose on both surfaces; flowers very fragrant; calyx tubular, 7--8 mm. long, densely pubescent, the hairs simple, erect or oblique, not appressed; corolla hypocrateriform, varying from lilac, pale-lilac, rose, violet, or blue-violet to bluish, cream, or white, sometimes described as "yellow and violet", "rose and white", "white and bluish", "white and pink", or "white with patches of lilac", completely pubescent on the outer surface except for the portion covered by the calyx, pubescent also at the base of the lobes within; stamens typical for Glandularia, the two upper ones with a glandular appendage about 1 mm. long and 0.5 mm. wide, flattened, rounded at the apex, longer than the theca, exerted; gynoecium typical; ovary about 1 mm. long; style about 9 mm. long; cocci subcylindric, about 3.5 mm. long, obtuse at the apex, truncate at the base, the upper third reticulate on the dorsal surface; chromosome number: $n = 5$.

The type of this species was collected by Guillermo Covas and Benno Julian Christian Schnack (no. 2112) between Anchoris and Zapata, in the department of Tupungato, Mendoza, Argentina, on March 5, 1944. It is named in honor of Lorenzo Raimundo Parodi, distinguished Argentine educator and botanist.

The species has been collected along roadsides, on plains, in arroyos, at the edges of ditches, and on "paramillas", at altitudes of 850 to 3500 meters, flowering from October to May and in August, in fruit in December. Eyerdam, Beetle, & Grondona report it as "not common, in sandy loam, full sun, in a small garden, associated with Chenopodium." It has been misidentified and distributed in herbaria under the name V. erinoides Lam. The length of pistil related to size of pollen-grains is discussed by Covas & Schnack (1945). These authors state that the species is related to V. laciniata (L.) Briq. They give the following interesting notes: "Hemos hallado en la localidad del tipo una población formada, muy probablemente, por híbridos (y formas derivadas de éstos) entre esta especie y Glandularia mendocina....La población híbrida presenta una amplia gama de variación que comprende formas intermedias y formas vecinas a ambos padres; en algunas de estas formas hemos podido observar flores con pequeños lóbulos petaloideos en la base del limbo de la corola, carácter que nunca hemos observado anteriormente en el género Glandularia...El polen de esta especie (observado en el ejemplar tipo) presenta cierto porcentaje de granos estériles. Además hemos observado, en individuos de la población híbrida mencionada, irregularidades en la meiosis (miembros de un par de cromosomas separados en diacinesis,

lo cual indica falta de homología en parte del material cromosómico).....En el misma población híbrida hemos encontrado una forma con flores rosadas, color aparentemente debido a un derivado de cianidina." This hybrid is discussed by me hereinafter under xV. perturbata Moldenke.

Schnack & Covas (1944) give the following key for the differentiation of V. parodii from its immediate allies:

1. Stems erect or suberect, not creeping.
2. Entire plant covered with a dense pubescence of mixed simple and glandulose hairs; leaves tripartite-pinnatifid.....
V. perakii.
- 2a. Entire plant covered with a sparse pubescence of only simple hairs; leaves pinnatisect.....V. mendocina.
- 1a. Stems procumbent, rooting at the base, ascending at the tips.
3. Cocci 2 mm. long.
 4. Bractlets one-third as long as the calyx; spikes not elongating after anthesis.....V. dissecta.
 - 4a. Bractlets more than half the length of the calyx; spikes elongating after anthesis.....V. santiaguensis.
- 3a. Cocci more than 3 mm. long.
 5. Corolla externally glabrous; glandular appendages of the anther connective subcylindric, scarcely visible from outside or included; pubescence appressed..V. laciniata.
 - 5a. Corolla externally pubescent; glandular appendages of the anther connective much compressed, clearly exerted; pubescence composed or erect or oblique hairs.....
V. parodii.

Herbarium material of V. parodii has also been misidentified and distributed as V. laciniata (L.) Briq. In all, 45 herbarium specimens have been examined by me.

Citations: ARGENTINA: Catamarca: Peirano s.n. [Cerillos; Herb. Inst. Miguel Lillo 32849] (N, Ug--4947). Chubut: Eyerdam, Beetle, & Grondona 24560 (Ca--656120). Mendoza: Araque Molina & Barkley 19Ar762 (N); Araque Molina & Paci 261 (N, S); Cáceres 4 (N); Carette s.n. [Ruiz Leal 2565] (N); Carette & Ruiz Leal s.n. [Ruiz Leal 7838] (N); Covas, Schnack, & Ruiz Leal s.n. [Ruiz Leal 9421] (N); Lourteig 772 [Herb. Inst. Miguel Lillo 113935] (Ca--166000, N); Melis & Barkley 20M2012 (N); O'Donnell 1152 (N); Ruiz Leal 1167 (N), 1208 (N), 1507 (N), 2235 (N), 4373 (N), 4390 (R1), 4825 (N), 6165 (N), 6650 (N), 6888 (N), 5108 (N), 8465 (N), 8556 (N), 8700 (N), 9412 (N), 10488 (N), 11457 (Z), 13408 (Ss); Sanzin 632 [Herb. Osten 12814] (N, Ug), 800 [Herb. Osten 12809] (Ug), 3099 [Herb. Osten 14638] (Ug); Semper s.n. [Ruiz Leal 4345] (N), s.n. [Ruiz Leal 10212] (N), s.n. [Ruiz Leal 10302] (N, Ss). Salta: Venturi 6937 (W--1591503). Tucumán: Wall & Sparre s.n. [29/11/46] (Ew), s.n. [10/12/46] (Ew, Ew, N).

VERBENA PARVULA Hayek in Engl., Bot. Jahrb. 42: 162—163. 1908.

Synonymy: *Verbena hirsuta* Ruiz & Pav. ex Moldenke, Résume' Suppl. 6: 10, in syn. 1963 [not *V. hirsuta* Mart. & Gal., 1844].

Bibliography: Hayek in Engl., Bot. Jahrb. 42: 162—163. 1908; Prain, Ind. Kew. Suppl. 4: 245. 1913; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 40 & 102. 1942; Moldenke, Alph. List Cit. 1: 201 (1946), 2: 602 (1948), 3: 688 & 968 (1949), and 4: 1079. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 73, 98, & 199. 1949; Moldenke, Phytologia 3: 74 & 75 (1949) and 5: 96. 1954; Moldenke, Résumé 81, 85, & 473. 1959; Moldenke, Résumé Suppl. 3: 13. 1962; Moldenke, Phytologia 8: 317, 321, & 412 (1962) and 9: 51, 151, & 296. 1963; Moldenke, Résumé Suppl. 6: 10. 1963.

Perennial herb to 38 cm. tall or decumbent, with straggling spreading habit to 45 cm. wide; roots thick, many-branched; stems woody, wiry, erect or arcuate-ascending, decumbent at the base, 6—10 cm. tall, sulcate-tetragonal, subsimple or branched, scabrous with appressed hairs; branches prostrate or appressed to the ground; leaves decussate-opposite, short-petiolate; leaf-blades oval or obovate, 1—1.4 cm. long, rather obtuse at the apex, contracted into the petiole at the base, irregularly incised-crenate or -serrate to almost pinnately lobed, appressed-setulose on both surfaces, linear-nervose on the lower surfaces; spikes terminal, simple or few-branched, at first narrowly conic, pointed, and head-like, later elongating as the seed forms; flowers small, sessile; bractlets ovate, subequaling the calyx, acute at the apex, setose-ciliate on the margins; calyx about 1.5 mm. long, very minutely setulose; corolla hypocrateriform, varying from blue, pale-blue, light-blue, or deep-blue to lilac, pale-purple, or purple, or even "pinkish-blue, white at base", 3 mm. long, subpuberulent on the outer surface.

The type of this species was collected by Karl Fiebrig-Gertz (no. 3415) in Tarija, Bolivia, in 1903 or 1904, and is probably deposited in the herbarium of the Naturhistorisches Museum in Vienna. Hayek says of it "Ein zierliches kleines Pflänzchen vom Habitus einer zwerghaften *V. officinalis*, aber schon durch die ganz anders gestalteten Blätter verschieden."

The species has been found on open or open rocky hillsides, in usually very dry waste or cultivated ground, and creeping in grass steppes. West found it near shrubs on the floor of rocky canyons, Asplund encountered it among weedy vegetation and in hard gravelly ground, and Ellenberg collected it in moist meadows with *Festuca dolichophylla*. The only common name recorded for it is "verbena". It has been found at altitudes of 600 to 4000 meters, flowering from February to May and in September & November, fruiting in February and March. It has been misidentified in herbaria and distributed under the names *V. brasiliensis* Vell., *V. braziliensis* Vell., *V. cuneifolia* Ruiz & Pav., *V. hispida* Ruiz & Pav., and *V. litoralis* H.B.K. West 8281 is a mixture with *V. gracilescens* (Cham.) Herter. A. S. Kalenborn 160 is erroneously

cited by me in my Alph. List Cit. 2: 602 (1948) as V. brasiliensis, as was Kalenborn & Kalenborn 160 in Phytologia 8: 321 (1962).

In all, 39 herbarium specimens, as well as 2 mounted photographs of the type, have been examined by me.

Citations: ECUADOR: Azuay: Asplund 17804 (S). Chimborazo: Asplund 20443 (S). PERU: Cuzco: Balls 6784 (Ca--683072, W--1777846); Cook & Gilbert 373 (W--603603); F. L. Herrera s.n. [Cuzco, July 1923] (W--1190015); F. W. Pennell 14184 (N). Junín: A. S. Kalenborn 160 (W--1044398); Kalenborn & Kalenborn 160 (N); Killip & Smith 21855 (N, W--1356976), 22142 (N, W--1357187); Kunkel 384 (Z), 386 (M1), 387 (M1), 390 (M1); Ledig 33 (W--1444172). Lima: Diers 982 (Ko); Killip & Smith 21541 (N, W--1356719). Puno: Ellenberg 250 (Ut--115394b). Tacna: H. H. Rusby 912 (C, Pa). Department undetermined: Hrdlicka s.n. [vicinity of Huarochiri, February 1913] (W--602735). BOLIVIA: Cochabamba: Steinbach 8729 (N, S), 8729a (W--1857441). El Beni: Buchtien 5887 (W--1134883); H. H. Rusby 908 (C, Pa). La Paz: Asplund 2303 (S, Us); Buchtien 135 (W--1177981); Hammarlund 167 (N), 196 (N). Tarija: J. West 8281, in part (Ca--565124); Fiebrig 3415 [Macbride photos 17436] (Kr--photo of type, N--photo of type). State undetermined: Kuntze s.n. [Bolivien, 600 m., 1/4 April 1892] (N, W--702210).

VERBENA PARVULA var. GIGAS Moldenke, Phytologia 7: 85. 1959.

Bibliography: Moldenke, Phytologia 7: 85. 1959; Moldenke, Résumé 425 & 473. 1959; Moldenke, Résumé Suppl. 1: 6. 1959; Soukup, Biota 3: 30. 1960; Moldenke, Résumé Suppl. 3: 13. 1962; Moldenke, Phytologia 8: 321 & 412. 1962.

This variety differs from the typical form of the species in having its stems erect, to 90 cm. tall, the internodes greatly elongated, and the leaves elliptic-oblongate, to 7.5 cm. long and 2.5 cm. wide. The corolla is described as pinkish-white.

The type of the variety was collected by Albert Charles Smith and Ellsworth Paine Killip (no. 21925) on an open hillside at an altitude of 3000 to 3200 meters, at Tarma, Junín, Peru, between April 20 and 22, 1929, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has much of the aspect of V. litoralis H.B.K., but the inflorescence characters are those of V. parvula Hayek. It has been found in anthesis in April and June, and has been misidentified in herbaria as V. litoralis. Hammarlund 631 was incorrectly cited in Phytologia 8: 321 (1962) as V. brasiliensis Vell.

In all, 3 herbarium specimens, including the type, have been examined by me.

Citations: PERU: Cuzco: Hammarlund 631 (S). Junín: Killip & Smith 21925 (N--type); Kunkel 389 (Z).

VERBENA PAULENSIS Moldenke, Phytologia 3: 426--427. 1951.

Bibliography: Moldenke, *Phytologia* 3: 426--427 & 454. 1951; Moldenke, *Biol. Abstr.* 25: 3051. 1951; G. Taylor, *Ind. Kew. Suppl.* 12: 149. 1959; Moldenke, *Résumé* 110 & 473. 1959.

Herb; stems slender, obtusely tetragonal, densely hirsute-pubescent with sordid-grayish hairs; nodes not annulate; principal internodes 0.8--2.5 cm. long; leaves decussate-opposite, sessile or practically so, ovate, 1.5--2.5 cm. long, 1.2--2.2 cm. wide, subacute at the apex, rounded or truncate at the base, coarsely and irregularly dentate along the margins, the lowest teeth almost lobe-like, rather densely hirsutulous-pubescent on both surfaces, especially beneath; midrib slender, impressed above, prominulous beneath; secondaries filiform, 4--7 per side, the lower ones issuing palmately from the base of the blade, impressed above, prominulous beneath, ascending, hardly arcuate; veinlet reticulation rather abundant, impressed above, prominulous beneath; inflorescence terminal, the spikes subcapitate, densely many-flowered, about 2 cm. long and wide during anthesis, sometimes with 2 or a few flowers slightly separate from the main head; peduncles abbreviated, mostly 1--1.5 cm. long, densely hirsutulous-pubescent; bractlets narrowly lanceolate, 7--8 mm. long, 1--1.5 mm. wide at the base, densely pubescent, attenuate at the apex; calyx cylindric, about 9 mm. long, strongly 5-costate, densely hirsutulous-pubescent or hirsutulous on the outside, its rim irregularly 5-subulate-toothed; corolla hypocrateriform, showy, its tube about 1 cm. long, very sparsely pilosulous on the outside, the limb almost 1 cm. wide.

The type of this species was collected by Edwin Friedrichs (no. 27901) in thickets at Campo do Jordão, São Paulo, Brazil, in January, 1944, and is deposited in the herbarium of the Colegio Anchieta at Porto Alegre, Brazil. In all, 3 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: BRAZIL: São Paulo: Friedrichs 27901 (N--isotype, N-photo of type, Rb--type, Z--photo of type); Lanstyack s.n. [*Herb. Rio de Janeiro* 33107] (B).

VERBENA PAULSENI R. A. Phil., *Anal. Univ. Chile* 90: 607. 1896.

Synonymy: Verbena porrigens var. paulseni (R. A. Phil.) Acevedo de Vargas, *Bol. Mus. Nac. Hist. Nat. Chile* 25: 59. 1951.

Bibliography: R. A. Phil., *Anal. Univ. Chile* 90: 607. 1896; Durand & Jacks., *Ind. Kew. Suppl.* 1: 451. 1906; Reiche, *Fl. Chile* 5: 291. 1910; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 42 & 102 (1942) and [ed. 2], 102 & 199. 1949; Moldenke, *Phytologia* 3: 75. 1949; Acevedo de Vargas, *Bol. Mus. Nac. Hist. Nat. Chile* 25: 59. 1951; *Biol. Abstr.* 28: 904. 1954; Moldenke, *Résumé* 122, 372, & 473. 1959; Moldenke, *Résumé Suppl.* 4: 5 (1962) and 5: 6. 1962.

Suffruticose, procumbent, hirtous; stems ascending or erect; leaves 3-parted, rarely 5-parted-pinnatifid, about 2 cm. long and 1 cm. wide, the segments narrowly linear, revolute-margined, or almost filiform like the rachis of the blade, hardly 1 mm. wide,

obtuse at the apex, strigose; peduncles about 12 cm. long; spikes long-pedunculate, many-flowered, capitate; bractlets about 4 mm. long, half as long as the calyx, lanceolate, long-ciliate at the base; calyx hispid, 8 mm. long; corolla-tube glabrous, 11 mm. long, about 1 1/2 times the length of the calyx, dark-violet, pilose in the throat, becoming brownish in drying; anther appendages exerted, black.

The type of this little-known species was collected by the ornithologist, Ferdinand Paulsen — in whose honor it is named — near Quillota, Valparaíso, Chile, in September, 1885, and is deposited in the herbarium of the Museo Nacional de Historia Natural at Santiago, Chile. Philippi states that the plant has the habit of V. sulphurea D. Don, but Acevedo de Vargas (1951) is of the opinion that it is a mere variety of V. porrigens R. A. Phil., in which opinion she may be correct. She says "Difiere del tipo por sus hojas más angostas y largas y por sus flores violáceas." She follows Durand & Jackson (1906) in dating Philippi's original work as "1895". She cites Médanos s.n. [Concan, 2.X.1884] (Sg—68378), not as yet seen by me. The photograph of the type specimen, in the Britton Herbarium, seems to have "1835" written on the label as the year of collection, rather than "1885" as stated by Acevedo de Vargas. Judging from this photograph, it is possible that the species is conspecific with V. cumingii Moldenke.

The species is said to have been collected by Grandjot at 1200 meters altitude near Santiago, Chile, where it had dark-red flowers and bloomed in November. It is known to me thus far only from the type photograph.

Citations: CHILE: Valparaíso: F. Paulsen s.n. [Quillota, Sept. 1885; Herb. Mus. Nac. Hist. Nat. Chile 54728] (N—photo of type).

VERBENA PERAKII (Covas & Schnack) Moldenke, Phytologia 2: 149—150. 1946.

Synonymy: Verbena erinoides var. glandulifera Sanzin, Anal. Soc. Cientif. Argent. 88: 129—133, fig. 34b. 1919. Glandularia perakii Covas & Schnack, Revist. Argent. Agron. 11: 89—91, fig. 1. 1944. Verbena dissecta f. glandulifera (Sanzin) Moldenke, Phytologia 2: 148. 1946.

Bibliography: Sanzin, Anal. Soc. Cientif. Argent. 88: 129—131, fig. 34b. 1919; Stapf, Ind. Lond. 6: 429. 1931; Covas & Schnack, Revist. Argent. Agron. 11: 89—91, 96, & 97, fig. 1. 1944; Schnack & Cowas, Darwiniana 7: 71—75, pl. 1 C & 2 B. 1945; Covas & Schnack, Darwiniana 7: 86. 1945; Moldenke, Phytologia 2: 148—150. 1946; Moldenke, Alph. List Invalid Names Suppl. 1: 10 & 24. 1947; H. N. & A. L. Moldenke, Pl. Life 2: 75. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 106, 197, & 199. 1949; E. J. Salisb., Ind. Kew. Suppl. 11: 101 & 263. 1953; Moldenke, Résumé 127, 128, 296, 364, 471, & 473. 1959; Moldenke, Phytologia 8: 123 (1961) and 8: 378. 1962; Moldenke, Résumé Suppl. 4: 17—19 (1962) and 5: 6 & 7. 1962; Moldenke, Phytologia 9: 70, 131, 394,

& 400 (1963) and 10: 136. 1964.

Illustrations: Sanzin, Anal. Soc. Cientif. Argent. 88: 170, fig. 34b. 1919; Covas & Schnack, Revist. Argent. Agron. 11: 90, fig. 1. 1944; Schnack & Covas, Darwiniana 7: pl. 1 C & 2 B. 1945.

Perennial herb; stems erect or suberect, cylindrical-quadrangular, pubescent with two kinds of hairs, the one type simple, to 1.5 mm. long, and erect, the other type to 0.5 mm. long and glanduliferous; leaves decussate-opposite; petioles 4--6 mm. long; leaf-blades ovate, tripartite-pinnatilobed, 2.4--3.8 cm. long, 1.5--2.2 cm. wide, attenuate into the petiole at the base, with obtuse lobes, pubescent especially above and on the venation beneath, the pubescence composed of simple hairs 0.2--1 mm. long and glanduliferous ones almost 0.3 mm. long; inflorescence spicate, often solitary, abbreviated during anthesis, elongate after anthesis; bractlets lanceolate, more than half the length of the calyx, slightly pubescent on the veins, loosely ciliate on the margins; calyx tubular, almost 6 mm. long, composed of both suberect and glanduliferous hairs; corolla hypocrateriform, varying from purple, lilac, pinkish-lilac, lilac-rose, or rose, to violet or blue, sometimes described as "rose, drying violet", pubescent on the outer surface at and near the apex of the tube, glabrous on the upper part of the limb; stamens typical of Glandularia, the two upper ones with subcylindric glandular appendages, the thecae small, included; pistil typical; ovary 1 mm. long; style 8 mm. long; cocci subcylindric, almost 3 mm. long, obtuse at the apex, truncate at the base, reticulate on the upper central portion of the back; chromosome number: $n = 5$.

The type of this species was collected by Guillermo Covas (no. 2110) at Dique Papagallos, in the department of Las Heras, Mendoza, Argentina, on December 3, 1943, and is deposited in the herbarium of the Instituto de Botánica Darwinion at San Isidro, Argentina. The species is named in honor of Juan Tomás Perak (1916--1943), ill-starred Argentinian geneticist, who did noteworthy experimentation on the effects of colchicine on diploid species of cultivated plants and on the duplication of chromosomes, who obtained tetraploid maize, experimented on mutations induced by short-wave radiation, x-rays, and ultraviolet rays, and who died of radiation poisoning at the age of 27. The relation of the pistil length to pollen-grain size is discussed by Covas & Schnack (1945).

The species has been found in dry riverbeds, under pine trees on arid hillsides, and growing as a weed in cultivated soil, at altitudes of 820 to 1200 meters, blooming from August to February and in May, fruiting in December.

Verbena erinoides var. glandulifera was apparently based by Sanzin on his nos. 139, 1700, 3099, 3129, and 3130, collected about the city of Mendoza and exactly at the edge of the Cordillera at altitudes of 1000 to 1200 meters. He says of it: "Cerca de la ciudad de Mendoza, y precisamente del lado de la Cordillera a una altura de 1000 y 1200 metros, abunda una variedad (Herb. Sanzin 139, 1700, 3099, 3129, 3130), que lleva glándulas en el

cáliz y que tiene las hojas anchas, triangulares, de base cuneada y trifidas o tripartidas con los segmentos casi enteros o con unos lobulitos laterales: A typo differt caule, foliis, calicibusque hirsutis, pilis glanduliferis mixtis. Tubo calice subduplo longiore, appendicibus antherarum subexsertis clavatis violaceis. Laciniis foliarum lanceolatis (Osten, in litt.). Más al sur y a las mismas alturas indicadas existe otra variedad que se acerca más al tipo por sus hojas tripartido-pinatifidas con segmentos angostos, pero que se diferencia esencialmente por sus glándulas estaminales apenas salientes de la garganta del tubo corolar en vez de ser inclusas. La V. mendocina Phil. es intermediaria entre estas dos variedades, pues el examen de ejemplares auténticos de Philippi, del museo de Santiago, me permitió constatar que tiene hojas de dos clases, idénticas en la forma a las hojas de las dos variedades citadas. El carácter de los tallos erguidos de la V. mendocina, no es constante, pues en la variedad glandulifera hay individuos erguidos y otros semirastreros. Por todo esto me parece conveniente unir en una sola las dos especies, V. erinoides y V. mendocina." The Gray Herbarium's Card Index to New Species states erroneously that Sanzin's plant is from Peru and Brazil.

Covas & Schnack (1944) say "Esta especie fué descripta por Osten (ex Sanzin, en Anal. Soc. Cient. Argent. 88: 131, 1919) como Verbena erinoides var. glandulifera, pero evidentemente se trata de una buena especie que nada tiene que ver con Glandularia laciniata (L.) Schnack et Covas (= Verbena erinoides Lam.). En la clava que figura al final de esta trabajo se podrán apreciar los principales caracteres diferenciales.....El polen de esta especie es normal. Consignamos esta observación porque en varias especies de Glandularia el polen es irregular, con granos normales y abortivos en porcentaje variable, pudiéndose también encontrar granos de polen con más de tres poros germinativos...G. Perakii posee flores relativamente grandes y de un atractivo color violáceo, por lo que merece ser introducida al cultivo."

Hybrids are known between V. perakii and V. peruviana (L.) Britton (=xV. tentamenta Moldenke), with V. santiaguensis (Covas & Schnack) Moldenke (=xV. gonzalezi Moldenke), and with V. tenuisecta Briq. (=xV. nisa Moldenke).

In all, 20 herbarium specimens have been examined by me.

Citations: ARGENTINA: La Rioja: Rufz Leal 16293 (Z). Mendoza: H. H. Bartlett 19354 (M1); D. O. King 139 (Bm); Mexia 4372 (Ca-560623); Rufz Leal 922 (N), 3330 (N), 3390 (N), 4477 (N), 6314 (N), 8453 (N), 9378 (N), 9503 (R1), 9504 (N); Sanzin s.n. [Rufz Leal 1525] (N); Semper s.n. [Rufz Leal 4158] (N), s.n. [Rufz Leal 9538] (N), s.n. [Rufz Leal 9849] (N). San Juan: Rufz Leal 16388 (R1); Rufz Leal & Roig 18956 (Ok). CULTIVATED: New York: H. N. Moldenke 18238 (N).

Synonymy: Verbena perenna Wooton ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena perrenis Wooton ex Moldenke, Résumé Suppl. 3: 40, in syn. 1962. Bouchea perennis Wooton ex Moldenke, Résumé Suppl. 5: 6, in syn. 1962. Verbena perennis Woot. & Standl. ex Moldenke, Résumé Suppl. 5: 8, in syn. 1962.

Bibliography: Wooton, Bull. Torr. Bot. Club 25: 262. 1898; Thiselton-Dyer, Ind. Kew. Suppl. 2: 191. 1904; P. C. Standl., Contrib. U. S. Nat. Herb. 13: 161, 173, & 211. 1910; Glaz., Mém. Soc. Bot. France 3: 544. 1911; Perry, Ann. Mo. Bot. Gard. 20: 248, 260, 299--300, & 356. 1933; Steyermark & Moore, Ann. Mo. Bot. Gard. 20: 805. 1933; Cory, Texas Agr. Exp. Sta. Bull. 550: 89. 1937; Sperry, Sul Ross State Teach. Coll. Bull. 22: 41. 1941; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke in Lundell, Fl. Texas 3 (1): 16 & 31. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 13--15, 19, & 102. 1942; Moldenke, Alph. List Invalid Names 49. 1942; Moldenke, Bot. Gaz. 106: 161. 1945; Moldenke, Alph. List Cit. 1: 126, 127, 154, 175, 182, 203, & 283. 1946; Moldenke, Phytologia 2: 328. 1947; Moldenke, Wrightia 1: 228. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 65. 1948; Moldenke, Alph. List Cit. 2: 401, 467, 469, 471, 477, 493, 506, 523, 525, 526, 532, 549, & 595 (1948), 3: 708, 729, 752, 768, 797, 843, 914, 939, 954, 965, 966, & 990 (1949), and 4: 1107--1110, 1121, 1122, 1141, 1150, 1240, & 1243. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 24--26, 33, & 199. 1949; Moldenke, Résumé 29, 31, 32, 39, 372, & 473. 1959; Moldenke, Phytologia 8: 124. 1961; Lewis & Oliv., Am. Journ. Bot. 48: 639--641. 1961; Moldenke, Résumé Suppl. 3: 7, 8, & 40 (1962) and 5: 4, 6, & 8. 1962; Moldenke, Phytologia 8: 472 (1963) and 9: 113. 1963; Moldenke in Shreve & Wiggins, Veg. & Fl. Son. Des. 2: 1239--1240. 1964.

Illustrations: Lewis & Oliv., Am. Journ. Bot. 48: 640. 1961.

Suffruticose perennial herb, 3--4 dm. tall; roots perennial; rootstock woody, heavy, perennial; stems several or numerous, from a woody base, varying from erect to ascending or divaricately ascending-erect, more or less strictly branched, glabrate or often finely glandular and slightly hispidulous with short stiff antrorse hairs, striate-angled; leaves predominately linear, 1--4 cm. long, entire or the lower ones 3-lobed to pinnately few-lobed, erect-ascending, sparsely hispidulous with short sharp stiff antrorse hairs, the margins revolute; spikes terminal, terminating the stems and branches, pedunculate, slender-filiform, elongate, loosely many-flowered; bractlets ovate, persistent, 1.5--3 mm. long, acute at the apex, hispidulous (or glabrate above), ciliate; flowers small, sessile, 7--8 mm. long; calyx tubular, 4--5 mm. long, herbaceous-ribbed, more abundantly pubescent along the ribs, hyaline and glabrous between the ribs, the teeth short-triangular, equal or subequal, acute; corolla hypocrateriform, varying from blue, deep-blue, or blue-lavender to purplish-blue, purplish-lavender, lavender, pink-lavender, or purple, its tube slightly longer than the calyx, pubescent, expanded just below the throat, forming a ring in which the almost

sessile anthers lie, the throat filled with hairs, the limb 5-parted, bilabiate, 5—7 mm. wide, the lobes elliptic, repand, the lower lip particularly undulate-margined; style short, included; stigma unequally 2-lobed, clavate; fruits more or less remote, 5-7 mm. apart on the rachis; schizocarp about 3 mm. long, strongly constricted along the lines of cleavage; cocci 4, cylindrical or subcylindric, reticulate-scrubulate except at the base, glabrous, brownish, minutely retrorsely scabrous on the commissure, enclosed in the persistent fruiting-calyx, the commissural faces smooth or slightly scabrous and not extending to the tip of the nutlet; chromosome number: $n = 7$.

The type of this species was collected by Elmer Ottis Wooton (no. 187), growing in crevices of rocks at 1800 meters altitude along the road about two miles west of the Mescalero Agency in the White Mountains, Lincoln County, New Mexico, on July 21, 1897, and is deposited in the Britton Herbarium at the New York Botanical Garden. Standley (1910) states that the type locality is in Otero County, but Wooton's labels definitely are inscribed "Lincoln County". Wooton (1898) says that "This species is most nearly related to V. canescens H.B.K. var. neo-mexicana Gray, but may be easily separated from that variety (?) by the linear, generally simple revolute leaves and the peculiar pubescence."

The species has been found in limestone or calcareous stony soil, on rough grassy slopes and the slopes of canyons, on hills, flats, gravelly hills and hillsides, rocky slopes and ledges, low rocky ridges, banks, rocky hillsides, rocky limestone hills in the thorn-shrub-grassland community, calcareous ledges, and roadside prairies, on arid rocky hills, foothills, limestone hills, in juniper woodland and the juniper belt, and on calcareous gravel among scrub oaks, at altitudes from 3200 to 8000 feet, flowering from March to November, and fruiting from April to August and in October. Waterfall found it growing with Quercus, Juniperus, and Pinus in Culberson County, Texas; Janszen found it "in buff silt, alluvial cover, hilly topography"; and Mueller describes it as "sparse on grassy limestone slopes" in the same county and "infrequent" in Pecos County. Warnock avers that it is "infrequent" or "scattered" and also "abundant on hills" in Brewster County, and "frequent along highway in lower limestone slopes". Mueller found it "scattered on limestone on brow of canyon" in Hudspeth County, while McVaugh encountered it in "rocky limestone hills, abundant in thorn-shrub-grassland community" in Pecos County. Mueller found it "sparse on rocky arroyo banks" in Coahuila. In Shreve & Wiggins (1964) it is said to be found "On rough grassy slopes, gravelly or rocky hillsides, flats, canyons, and low rocky ridges, Sonoran to Transition Zones, western Texas to Pima County, Arizona, and to Coahuila."

The M. S. Young collection cited hereinafter appears to represent a form with very large corollas, and is so noted also by the collector. It is perhaps worthy of nomenclatural recognition, but evidence from many other specimens indicates that the flowers vary in size and apparently shrivel quickly after being picked and

before being pressed. Tharp 3682 exhibits corollas that are intermediate in size.

Glaziou (1911) cites his no. 17716a from São Paulo, Brazil, as "V. perennis Woot." with a question, and describes it as an herb with white flowers, blooming in August and September. What his plant really is, I cannot as yet say, since I have not as yet seen any material of the collection; his 17716 is cited by him as V. ephedroides Cham.

Herbarium material of V. perennis has been misidentified and distributed in herbaria as V. canescens H.B.K., V. halei Small, V. menthaefolia Benth., V. neomexicana (A. Gray) Small, V. neomexicana var. hirtella Perry, V. xutha Lem., Bouchea linifolia A. Gray, Buchnera elongata Sw., and Lobelia sp.

Perry (1933) cites the following 17 additional specimens not as yet seen by me: TEXAS: Culberson Co.: Clarke 4250 (E); Havard 197 (G); Moore & Steyermark 3611 (E); M. S. Young s.n. [Guadalupe Mts., 8/13/16] (E). Martin Co.: G. E. Seler s.n. [Loyola, 5 Nov. 1902] (G). NEW MEXICO: Eddy Co.: Wooton s.n. [Queen, Aug. 1909] (E). Lincoln Co.: F. S. Earle 387 (E); J. Skehan 20 (E, F, G); Wooton 187 (E--isotype, G--isotype), s.n. [Ruidosa Creek, Aug. 5, 1901] (E). Otero Co.: P. C. Standley s.n. [17 Aug. 1899] (W). Sierra Co.: O. B. Metcalfe 1568 (E, F, G). She makes the following comments: "The relationship of this species is somewhat anomalous. The lobing of the leaves and the character of the nutlets seem to ally it with V. canescens and its relatives; whereas the pubescence and the predominance of practically entire linear-oblong leaves recall V. simplex. It could scarcely be confused with either, since the character combination of an open spike, very narrow leaves, and sparsely short-strigillose hairs is not found elsewhere in the group under consideration."

In all, 144 herbarium specimens and 1 mounted clipping have been examined by me, including the types of all the names involved.

Citations: TEXAS: Brewster Co.: Cory 30082 (N); G. L. Fisher s.n. [Alpine, Aug. 24, 1932] (Hp, Wi); D. C. Ingram 2736 (Ar--14794, Mi, W--1489829); Parks & Cory 18504 (Tr--16173); O. E. Sperry T.125 (Om, W--1679248), T.563 (Fs, Om, W--1766437), T.564 (Om), T.813 (Om); Steiger 20 (N), 1066 (N), 1248 (N); Tharp 3682 (Au, W--1289910); B. H. Warnock 287 (Au), 4650/5982 (Au--122395), 21090 (Au), 21205 (Au), 21279 (Au), 21827 (Al, Ca--882787, Du--327912, N, N, Ok, S, Ur), W.169 (N), W.282 (N), W.287 (N); Warnock & Hinckley 3926 (N); Whitehouse 18633 (Mi). Culberson Co.: Correll & Johnston 22006 (Ld); Correll & Rollins 23897 (Ld); Hinckley 4441 (N, W--2005460); Janszen 424 (Au--122401); C. H. Muller 8253 (Rf, Sm); Ripley & Barneby 11151 (Gg--382617, N); Smith & Robertson 217 (Ar--305860); Waterfall 3795 (N, St, Tu--128570), 4510 (Au, N), 5209 (Gg--316101, N, Ok, Sm, St, St);

Whitehouse 8742 (Au), 15968 (Sm), 17019 (Mi, N), s.n. [Signal Peak, 7.5.31] (Au); M. S. Young s.n. [Guadalupe Mts., 8/13/16] (Au, Au). Hudspeth Co.: C. H. Muller 8214 (Rf, Sm, St); Turner, Tharp, & Warnock 3233 (Au--122397). Jeff Davis Co.: E. D. Schulz s.n. [Davis Mts., 8/2/1928] (Wi). Pecos Co.: Hinckley 4839 (W--2095622); R. McVaugh 7935 (Ar--233930, Au--178252, Du--355386, Mi); B. H. Warnock 13448a (Au--123222, Rf). NEW MEXICO: Chaves Co.: G. J. Ikenberry 376 (St). Eddy Co.: V. Bailey s.n. [Carlsbad Cave, April 1934] (W--1220145); Cory s.n. [Carlsbad, 4-24-1924] (Tr), s.n. [Carlsbad, 4-23-1925] (Tr); O. Degener 5038 (Ms, N); Havard s.n. [Guadalupe Mts., Oct. 1881] (W--147569, W--218869); Hershey s.n. [Guadalupe Mts., 5/12/39] (Bt--59779); A. Nelson 11406 (Ca--500718, Du--218829, S, Um--17, Up); P. C. Standley 40686 (W--122072); Wilkins 1568 (En); Wooton s.n. [Queen, Aug. 2, 1909] (W--564654), s.n. [Queen, Aug. 3, 1909] (W--564653). Guadalupe Co.: Arsène & Benedict 16656 (W--1033519). Lincoln Co.: F. S. Earle 619 (N); Earle & Earle 387 (N, Po--63866, W--382530), s. n. [Lincoln, 7/31/1900] (N); Eggleston 18910 (N); Goodman & Waterfall 4967 (Ok); Hitchcock, Rethke, & Raadshooven 4202 (Ca--603911, Du--256977, En, Gg--308138, Io--146632, La, Pl--90851, Se--18241, Se--44887, Ua--28658); E. L. Reed 3655 (Bl--42331, I); J. Skehan 20 (Ca--25153, Cm, Ka, N, N, Po--64646, W--350138), 1316 (Ca--882788); Wooton 187 (Ca--124666--isotype, Ka--isotype, N--type, Po--70679--isotype, W--736221--isotype), s.n. [Ruidoso Creek, Aug. 5, 1901] (S, W--736874). Otero Co.: W. V. Fisher s.n. [August 20, 1950] (St); Wooton s.n. [Tularosa Creek, Aug. 19, 1899] (W--563953, W--736875). Sierra Co.: O. B. Metcalfe 1568 (Gg--31386, N, Vi, W--890290). ARIZONA: Pima Co.: M. E. Jones 24994 (Po--192935). MEXICO: Coahuila: E. G. Marsh 859 (Au), 1378 (Au--213159, St); C. H. Muller 3045 (Ca--720147, Mi, Rf). MOUNTED CLIPPINGS: Bull. Torr. Bot. Club 25: 262. 1898 (W).

VERBENA PERENNIS var. JOHNSTONI Moldenke, *Phytologia* 2: 150. 1946.

Synonymy: Verbena shrevei Johnston ex Moldenke, *Phytologia* 2: 150, in syn. 1946.

Bibliography: Moldenke, *Phytologia* 2: 150 (1946) and 2: 331 & 384. 1947; H. N. & A. L. Moldenke, *Pl. Life* 2: 65 & 83. 1948; Moldenke, *Alph. List Cit.* 2: 370 & 497 (1948), 3: 963 (1949), and 4: 1246. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 33 & 199. 1949; Moldenke, *Résumé* 39, 374, & 473. 1959; Moldenke, *Phytologia* 8: 473. 1963.

This variety differs from the typical form of the species in having its stems, leaves, and rachis densely spreading hirtellous, the leaves to 5 cm. long, the lowermost often with several linear lobes. The corolla is described as blue-purple.

The type of the variety was collected by L. R. Stanford, Ken-

neth Lynn Retherford, and R. D. Northcraft (no. 915) among varied vegetation of large shrubs, small trees, and herbs, in a broad damp riverbed, at an altitude of 1950 meters, 12 kilometers northwest of Palmillas on the road to Miquihuana, Tamaulipas, Mexico, on August 14, 1941, and is deposited in the Britton Herbarium at the New York Botanical Garden. It was originally distributed as V. shrevei by Ivan Murray Johnston (1898--1960), expert on the Boraginaceae and temperate South American plants, in whose honor it is named. By his specific epithet, Dr. Johnston meant to honor Forrest Shreve (1878--1950), distinguished American ecologist and plant collector in northern Mexico and southwestern United States.

The variety has been found at altitudes of 1950 to 2500 meters, flowering in August. It has been misidentified and distributed in herbaria as V. neomexicana (A. Gray) Small, V. neomexicana var. hirtella Perry, and V. neomexicana var. xylopoda Perry. Stanford, Retherford, & Northcraft 486 is a mixture with V. canescens H.B.K. and (perhaps) with V. neomexicana var. hirtella Perry. Their no. 507 may actually have been collected in Coahuila, since the label is not definite. Shreve & Tinkham 9728 was distributed as "Verbena n. sp." and was collected "in the pinyons" at 6900 feet altitude, flowering and fruiting in August.

In all, 8 herbarium specimens, including the types of both names involved, have been examined by me.

Citations: MEXICO: Coahuila: Stanford, Retherford, & Northcraft 486, in part (Du--288703, N). Nuevo León: Herb. Inst. Biol. Univ. Nac. Mex. 2375 (Me), 7138 (Me); Shreve & Tinkham 9728 (Tu--125740). Tamaulipas: Stanford, Retherford, & Northcraft 915 (N--type, Tu--15150--isotype). Zacatecas: Stanford, Retherford, & Northcraft 507 (Tu--10909).

xVERBENA PERPLEXA Moldenke, Résumé Suppl. 4: 4, 14, & 16, hyponym (1962); hybr. nov.

Synonymy: Verbena gooddingii Briq, x V. bipinnatifida Nutt. ex Moldenke, Résumé Suppl. 4: 16, in syn. 1962. Verbena bipinnatifida Nutt. x V. gooddingii Briq. ex Moldenke, Résumé Suppl. 4: 14, in syn. 1962.

Bibliography: Moldenke, Résumé Suppl. 4: 4, 14, & 16. 1962; Moldenke, Phytologia 8: 378 & 381. 1962.

Planta hybrida aspectu V. bipinnatifida et V. gooddingii intermedia; foliis inciso-pinnatifidis utrinque hispidis; inflorescentiis terminalibus multifloris congestis dense albo-hirsutis; bracteolis calycem excedentibus albo-hirsutis.

Herb, apparently a natural hybrid between V. bipinnatifida Nutt. and V. gooddingii Briq., with intermediate characters; stems rather slender, tetragonal, white-hirsute throughout, less densely so in age; principal internodes 1.5--4.5 cm. long; leaves decussate-opposite, usually with abbreviated leafy shoots in their axils; pet-

ioles about 1 cm. long, winged, white-hirsute; leaf-blades incised-pinnatifid, rather densely white-villous on both surfaces; inflorescence terminating the branches, erect, many-flowered, congested, at least during anthesis, conspicuously and densely white-villous; peduncles 2--5 cm. long, densely white- and spreading-villous; bractlets elongate, narrow, lanceolate, equaling or surpassing the calyx, mostly 10--12 mm. long, densely white-villous on both surfaces; calyx tubular, 8--10 mm. long, densely white-villous, the rim subulate-toothed, the teeth unequally elongate; corolla-tube equaling or somewhat exserted from the calyx, densely white-pubescent outside above the calyx-tube, the limb about 5 mm. wide.

The type of this hybrid was collected by Robert A. Darrow five miles south of Patagonia, Santa Cruz County, Arizona, on March 20, 1938, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has been collected at an altitude of 5200 feet, flowering in March and April. It has been misidentified and distributed in herbaria as V. bipinnatifida Nutt., V. gooddingii Briq., and V. macdougalii Heller. Only 2 herbarium specimens, including the type, have been examined by me.

Citations: ARIZONA: Cochise Co.: G. Martin s.n. [April 12, 1960] (Hi--194950). Santa Cruz Co.: Darrow s.n. [March 20, 1938] (N--type).

xVERBENA PERRIANA Moldenke, Revist. Sudam. Bot. 4: 19. 1937.

Synonymy: ?Verbena laciniata Raf., Herb. Raf. 61, nom. nud. 1833 [not V. laciniata Briq., 1960, nor Kuntze, 1941, nor (L.) Briq., 1904, nor (Lam.) Briq., 1939, nor Sessé & Moc., 1940]. Verbena bracteoso-urticaefolia Engelm., Am. Journ. Sci. 46: 101. 1844. Verbena urticaefolio-bracteosa Engelm., Am. Journ. Sci. 46: 101. 1844. Verbena bracteosa x hastata Webber, Trans. Acad. St. Louis 6: 40. 1892. Verbena bracteosa x hastata Rydb., Fl. Rocky Mts. 740. 1917. Verbena bracteosa x urticifolia Rydb., Fl. Cent. N. Am. 678. 1932. Verbena bracteosa x hastata Mackenzie ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena bracteosa x stricta Britton ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena bracteosa x urticaefolia Mackenzie ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena bracteosa x urticifolia Eggert ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena bracteoso-stricta Engelm. ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena hastata x bracteosa Rydb. ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena officinalis x bracteosa Barnes ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena stricta x bracteosa A. S. Hitchc. ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena stricta x urticifolia Stevens (in part) ex Moldenke, Revist. Sudam. Bot. 4: 19, in syn. 1937. Verbena stricto-bracteosa

Engelm. ex Moldenke, *Revist. Sudam. Bot.* 4: 19, in syn. 1937. *Verbena urticifolia* x *bracteosa* Eggert ex Moldenke, *Revist. Sudam. Bot.* 4: 19, in syn. 1937. *Verbena bracteata* Lag. & Rodr. x *V. urticifolia* L. ex Moldenke, *Prelim. Alph. List Invalid Names* 45, in syn. 1940. *Verbena bracteata* x *hastata* Gates, *Fl. Kans.* 190. 1940. *Verbena bracteata* x *urticifolia* Gates, *Fl. Kans.* 190. 1940. *Verbena bracteata* x *stricta* Schneck ex Moldenke, *Suppl. List Invalid Names* 8, in syn. 1941. *Verbena bracteosa* x *stricta* Palmer ex Moldenke, *Suppl. List Invalid Names* 8, in syn. 1941. *Verbena bracteosa* x *stricta* Schneck ex Moldenke, *Suppl. List Invalid Names* 8, in syn. 1941. *Verbena hastata* x *bracteosa* Schneck ex Moldenke, *Suppl. List Invalid Names* 8, in syn. 1941. *Verbena bracteosa* x *stricta* Clothier ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. *Verbena bracteosa* x *urticaefolia* Carleton ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. *Verbena bracteosa* x *urticaefolia* Deam ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. *Verbena bracteosa* x *urticifolia* Stevens ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 22, in syn. 1947. *Verbena urticifolia* x *bracteata* Gates ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947. *Verbena urticifolia* L. x *V. bracteata* Lag. & Rodr. ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947. *Verbena urticifolia* x *bracteosa* Patterson ex Moldenke, *Alph. List Invalid Names Suppl.* 1: 27, in syn. 1947. *Verbena bracteo-hastata* Hall ex Moldenke, *Résumé* 359, in syn. 1959. *Verbena urticifolio-bracteosa* Engelm. ex Moldenke, *Résumé* 378, in syn. 1959. *Verbena brachiata* Nieuwl. ex Moldenke, *Résumé Suppl.* 6: 10, in syn. 1963.

Bibliography: Raf., *Herb. Raf.* 61. 1833; Engelm., *Am. Journ. Sci.* 46: 101. 1844; Webber, *Trans. Acad. St. Louis* 6: 40. 1892; E. J. Palmer, *Ann. Mo. Bot. Gard.* 3: 292. 1916; Rydb., *Fl. Rocky Mts.* 740. 1917; Wolden, *Proc. Io. Acad. Sci.* 39: 123. 1932; Rydb., *Fl. Cent. N. Am.* 678. 1932; Moldenke, *Revist. Sudam. Bot.* 4: 19. 1937; Gates, *Fl. Kans.* 190. 1940; Moldenke, *Prelim. Alph. List Invalid Names* 45—48. 1940; C. C. Deam, *Fl. Indiana* 798 & 1232. 1940; Moldenke, *Suppl. List Invalid Names* 8. 1941; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 1, 6—11, & 102. 1942; Moldenke, *Alph. List Invalid Names* 45, 47, & 49—51. 1942; G. N. Jones, *Fl. Ill.* [Am. Midl. Nat. Monog. 2:] 216. 1945; Moldenke, *Castanea* 10: 37. 1945; Moldenke, *Am. Journ. Bot.* 32: 610. 1945; Deam, *Kriebel, Yuncker, & Friesner, Proc. Ind. Acad. Sci.* 55: 56. 1946; Moldenke, *Alph. List Cit.* 1: 9, 31, 94, 110, 113, 149—151, 163, 181, 193, & 234. 1946; Hill & Salisb., *Ind. Kew. Suppl.* 10: 242. 1947; Moldenke, *Alph. List Invalid Names Suppl.* 1: 22 & 27. 1947; Moldenke, *Phytologia* 2: 327 (1947) and 2: 478. 1948; H. N. & A. L. Moldenke, *Pl. Life* 2: 75. 1948; Moldenke, *Alph. List Cit.* 2: 390—392, 394, 396—400, 451, 472, 544, 549, & 596 (1948), 3: 653, 699, 706, 723, 788, 790, 793, 800, 822, 852, 887, 904, 926, 927, 932, &

970 (1949), and 4: 981, 1138, 1139, 1199, 1208, 1221, 1226, 1227, 1255, 1261, & 1298. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 2, 12-15, 17, 18, 20, 21, 26, & 199. 1949; E. D. Merr., Ind. Raf. 205 & 295. 1949; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 127, 131, & 134. 1952; Moldenke, Phytologia 4: 185. 1953; Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 2, 3: 127, 131, & 134. 1958; Moldenke, Am. Midl. Nat. 59: 345 & 357--359. 1958; Moldenke, Résumé 5, 16--19, 21, 22, 25, 26, 32, 359, 360, 365, 371, 375, 377, 378, & 473. 1959; Moldenke, Résumé Suppl. 2: 2. 1960; Moldenke, Phytologia 8: 121 (1961) and 8: 268, 272, 279, 280, & 435. 1962; Moldenke, Résumé Suppl. 3: 6 (1962), 4: 3 (1962), 5: 7 (1962), 6: 1, 2, & 10 (1963), and 7: 9. 1963; Steyerl., Fl. Mo. 1260 & 1261, map 1844. 1963; G. N. Jones, Fl. Ill., ed. 3 [Am. Midl. Nat. Monog. 7:] 213. 1963; Gleason & Cronquist, Man. Vasc. Pl. 581. 1963; Moldenke, Phytologia 8: 464 (1963), 9: 53, 54, 215, & 220 (1963), and 9: 356 & 359. 1963; Moldenke, Résumé Suppl. 10: 1. 1964.

Illustrations: Moldenke in Gleason, New Britton & Br. Illustr. Fl., pr. 1, 3: 134 (1952) and pr. 2, 3: 134. 1958.

This is the natural hybrid between V. bracteata Lag. & Rodr. and V. urticifolia L. with more or less intermediate characters. It resembles V. bracteata in habit, being a large diffuse plant, stouter and more erect when young, but sprawling, procumbent, or half-prostrate when mature, the stems assurgent or ascending, the branches many, large, and diffuse, the leaves broad and lacinate, rather than dissected, the spikes long and slender, and the bractlets smaller, usually only slightly surpassing the calyx, usually not conspicuous nor foliaceous, and mostly only 3-4 (rarely 7) mm. long. The flowers are blue, pinkish-blue, or white with a lavender tint. It is found rather commonly where the ranges of the two parental species overlap in central North America. It is based on the Verbena urticaefolio-bracteosa of Engelmann, of which cotypes were collected by Carl Andreas Geyer at Beardtown, Cass County, Illinois, in July and August, 1842, and by George Engelmann — in whose honor it is named — in Saint Louis, Missouri, in July (and perhaps at other times), 1842, the originals being deposited in the Torrey Herbarium at the New York Botanical Garden.

Synonymous designations are typified as follows: V. brachiata Nieuwl. is based on Nieuwland s.n., collected at Saint Mary's, Saint Joseph County, Indiana, in October 1926, and deposited in the United States National Herbarium at Washington; V. bracteata x stricta Schneck is based on J. Schneck s.n., collected in dry clayey soil along streets of Mount Carmel, Wabash County, Illinois, on June 25, 1879, deposited in the herbarium of the University of Illinois; V. bracteata x urticifolia Gates is based on J. L. Sheldon s.n., collected at Lincoln, Lancaster County, Nebraska, on July 16, 1898, deposited in the herbarium of West Virginia University; V. bracteosa x hastata Mackenzie is based on K. K. Mackenzie s.n., collected in a barnyard at Little Blue Tank, Jackson County,

Missouri, on August 2, 1896, deposited in the herbarium of the University of Illinois; V. bracteosa x stricta Clothier is based on G. L. Clothier s.n., collected at Saint George, Pottawatomie County, Kansas, on July 4, 1896, and deposited in the herbarium of Kansas State College; V. bracteosa x stricta Palmer is based on E. J. Palmer 4025, collected in waste places at Webb City, Jasper County, Missouri, on August 7, 1913, and deposited in the herbarium of the University of Illinois; V. bracteosa x stricta Schneck is based on J. Schneck s.n., collected on G. M. Kneippe's place, Mount Carmel, Wabash County, Illinois, on July 8, 1880, and deposited in the herbarium of the University of Illinois; V. bracteosa x urticaefolia Deam is based on C. C. Deam 39228, collected in Fulton County, Indiana, and deposited in the Deam Herbarium; V. bracteosa x urticifolia Eggert is based on H. K. D. Eggert s.n., collected at Glencoe on the Meramer River, Saint Louis County, Missouri, on July 28, 1879, and deposited in the herbarium of the Carnegie Museum; Verbena bracteoso-stricta Engelm. is based on C. A. Geyer s.n., collected at Beardstown, Cass County, Illinois, in August, 1842, and deposited in the herbarium of Dartmouth College; V. hastata x bracteosa Schneck is based on J. Schneck s.n., collected at Mount Carmel, Wabash County, Illinois, on June 15, 1888, and deposited in the herbarium of the University of Illinois; V. stricta x bracteosa Hitchc. is based on A. S. Hitchcock 972, collected in Pottawatomie County, Kansas, and deposited in the herbarium of Kansas State College; V. stricta x urticifolia Stevens is based on G. W. Stevens 1703, collected in woods near Alva, Woods County, Oklahoma, on July 14, 1913, and deposited in the herbarium of the University of Illinois; V. stricto-bracteosa Engelm. is based on G. Englemann s.n., collected at Saint Louis, Missouri, in August, 1845, and deposited in the herbarium of Dartmouth College; V. urticifolia x bracteata Gates is based on G. L. Clothier s.n., collected at Saint George, Pottawatomie County, Kansas, on July 4, 1896, and deposited in the herbarium of Kansas State College; V. urticifolia x bracteosa Eggert is based on H. K. D. Eggert s.n., collected at Glencoe, Saint Louis County, Missouri, on July 28, 1879, and deposited in the herbarium of the New York State Museum; and V. urticifolia x bracteosa Patterson is based on H. N. Patterson s.n., collected in Henderson County, Illinois, in July, and deposited in the herbarium of the New York State Museum. It should be noted here that the designation, V. stricta x urticifolia Stevens applies also, in part, to xV. illicita Moldenke.

The name, Verbena laciniata Raf., is placed here provisionally. Merrill (1949) states that it was published by Rafinesque without description, with the type from "Kentucky or Illinois". Whether or not this disposition of the name is correct depends on an ultimate examination of the type, not available as yet to me. The V.

laciniata of Briquet ["(L.) Briq." and "(Lam.) Briq."] is a valid species from South America, that of Kuntze is V. dissecta Willd., while that of Sessé & Mocino is Bouchea prismatica var. laciniata Grenz.

Collectors have found xV. perriana in very sandy soil, clayey or dry clayey soil, dry or open ground, sandy open ground, waste places, and barnyards, along sandy roadsides, roadsides, and streets, near houses, in woods and grassy woods, in bottomlands, and on or near riverbanks, to 1200 feet altitude, flowering and fruiting from June to September. Schneck reports that it blooms when V. hastata is not yet in flower and that "the flowers when fresh are very much like [those of V.] hastata in shape and color, [but the] whole plant [is] procumbent." A specimen in the Columbia University herbarium, with no collector designated, bears the note "Erect or half prostrate.....I find it assuming the erect position while young only. My best specimens are from those which are half prostrate. This species is plentiful here. Brendel thinks it is only one of the many hybrids." Dodge reports it as "plentiful" at Point Edwards, Ontario. Patterson says that it is "the most common hybrid Verbena here". Shacklette calls it "a weed of meadows and pastures" in Kentucky. Deam describes it as a large diffuse plant or sprawling, with assurgent stems and many diffuse branches. Hitchcock, on the label of his Iowa City collection, says "grassy woods near river bank; same as found at Hamburg which Watson calls a hybrid." The W. H. Rhoades s.n. from Edinberg, Johnson County, Indiana, is the finest specimen I have as yet seen. Nieuwland describes it as a "plant perfectly prostrate in mats a yard wide". Popenoe says "flowers larger than in V. bracteosa and white with a lavender tint."

Gates (1940) reports the hybrid from McPherson County, Kansas. Herbarium material has been misidentified and distributed in herbaria under the names V. bracteata Lag. & Rodr., V. bracteosa Michx., V. bracteosa brevibracteata Gray, V. bracteosa var. brevibracteata Gray, V. canadensis (L.) Britton, V. hastata L., V. hybrida Bicknell, V. officinalis L., xV. deamii Moldenke, V. spuria L., V. hastata x urticaefolia Pammel, and "Verbena hybrid". Rhoades records the common names "pidgeon grass", "holy-herb", "enchanter's plant", "European vervain", and "Juno's-tears" for this plant, but these are all names applied to the European V. officinalis with which he misidentified his collection. Palmer (1916) cites his no. 601. The E. Hall s.n. [1861], distributed as "V. bracteosa x urticifolia" in the United States National Herbarium, is actually V. canadensis (L.) Britton.

In all, 112 herbarium specimens, including the types of most of the names involved, and 4 mounted photographs have been examined by me.

Citations: ONTARIO: Lambton Co.: C. K. Dodge s.n. [Point Edward, July 27, 1902] (Mi, Mi, Mi). GEORGIA: County undetermined:

A. W. Chapman 69 [Mts. of Georgia] (W--1323060), s.n. [Northern Georgia] (W--1323061). ILLINOIS: Adams Co.: Seymour s.n. [Fall Creek, July 29, 1879] (Ur). Cass Co.: Geyer s.n. [Beardstown, July 1842] (Pr--cotype, T--cotype, T--cotype), s.n. [Beardstown, Aug. 1842] (Dt--cotype). Coles Co.: Ahles & Gilpin 7455 (Ur). Fulton Co.: J. Wolf s.n. [Canton, 1881] (W--56221); L. Wolf s.n. [Canton, 1874] (Al). Hancock Co.: S. B. Mead s.n. [Augusta, 1842] (Pr), s.n. [Augusta, June 1844] (C). Henderson Co.: H. N. Patterson s.n. [vicinity of Oquawka] (W--1323064, W--1323094, W--1323-137), s.n. [July] (Al). Menard Co.: E. Hall s.n. [Athens, Aug. 1866] (Ms). Monroe Co.: Winterringer 3814 (Il--29272). Wabash Co.: Schneck s.n. [June 25, 1879] (Ur), s.n. [July 8, 1880] (Ur), s.n. [Mt. Carmel, June 15/88] (Ur). Woodford Co.: V. H. Chase 11473 (Ur). County undetermined: F. Brendel s.n. [Illinois, 1873] (W--719681). INDIANA: Fulton Co.: C. C. Deam 39228 (Al, Dm). Jennings Co.: C. R. Barnes 28 (N). Johnson Co.: W. H. Rhoades s.n. [Edinberg] (Hs). Kosciusko Co.: C. C. Deam 55323 (Dm). Lagrange Co.: C. C. Deam 36661 (Dm). Lawrence Co.: C. C. Deam 17287 (Dm). Saint Joseph Co.: Nieuwland s.n. [St. Mary's, Oct. 1924] (W--1244514). IOWA: Black Hawk Co.: Carver s.n. [Cedar Falls, July 5, 1895] (Io--22919). Clarke Co.: Pammel & Pammel s.n. [Osceola, Sept. 27, 1924] (Io--114682). Decatur Co.: J. P. Anderson s.n. [July 23, 1903] (Io--52109). Emmet Co.: Wol- den s.n. [Estherville, Aug. 5, 1922] (Io--105155), s.n. [Esther- ville, Jul. 12, 1927] (Io--130461). Fremont Co.: A. S. Hitchcock s.n. [Hamburg] (Io--15300, Ka). Hardin Co.: M. E. Jones s.n. [Iowa Falls, Aug. 1876] (Po--71002). Johnson Co.: A. S. Hitch- cock s.n. [Iowa City] (Io--15301). Story Co.: Carver s.n. [Ames, July 14, 1896] (Io--15326); L. Leonard s.n. [Collins, Aug. 8, 1929] (Io--134217). KENTUCKY: Union Co.: Shacklette 499 (Ky). County undetermined: Short s.n. [Barrens of Ky., 1840] (Pr). WIS- CONSIN: Dane Co.: T. J. Hale s.n. [Madison] (Ws); Lapham s.n. [M. Spear, 1858] (Ws). LaCrosse Co.: L. H. Pammel s.n. [LaCrosse, 7- 20-1887] (Io--95114). Lafayette Co.: Manning s.n. [Shulesburg, July 19, 1883] (N). Milwaukee Co.: J. S. Douglas s.n. [Wis.] (Je). Sauk Co.: T. J. Hale s.n. [Baraboo, 1861] (Ws, Ws). KANSAS: Doniphan Co.: Agrelius, Hall, Lovejoy, & Maroney s.n. [8-18-18] (Lw). Pottawatomie Co.: Clothier s.n. [St. George, 7-4-96] (Ka); A. S. Hitchcock 972 (Ka, N, W--353769). Sedgewick Co.: M. A. Carlton 276 (Du--90890, W--71932). Shawnee Co.: E. A. Popenoe 23 (W--56202), s.n. [Topeka, July 17, '79] (W--1119629). MISSOURI: Jackson Co.: K. K. Mackenzie s.n. [July 19, 1896] (Dt, N), s.n. [Little Blue Tank, Aug. 2, 1896] (Dt, N, Ur). Jasper Co.: E. J. Palmer 4025 (Ur). Saint Louis Co.: Eggert s.n. [4 Aug. 1875] (Cm),

s.n. [Eureka, July 28, 1879] (Vt), s.n. [Glencoe, 28 July 1879] (Al, Cm, Cm, N). Saint Louis: Eggert 5318 (N); Engelmann s.n. [St. Louis, Sept. 1841] (W—71928), s.n. [St. Louis, July 1842] (Au—122814—cotype, Dt—cotype, T—cotype), s.n. [St. Louis, 1842] (Br—cotype), s.n. [St. Louis, Aug. 1843] (T), s.n. [St. Louis, Aug. 1845] (Dt), s.n. [St. Louis, Aug. 1859] (Br, T), s.n. [St. Louis] (F—photo of cotype, N—photo of cotype, S—cotype, S—cotype, Si—photo of cotype, Z—photo of cotype); Geyer s.n. [St. Louis, Sept. 1841] (Dt). ARKANSAS: Benton Co.: Plank s.n. (N). NEBRASKA: Cass Co.: J. L. Sheldon s.n. [Weeping Water, Aug. 17, 1898] (We); T. A. Williams 119 (W—71931). Lancaster Co.: J. L. Sheldon s.n. [Lincoln, July 16, 1898] (We). Otoe Co.: Thornber s.n. [Nebr. City, Aug. 1900] (Tu—98878). Saunders Co.: Rydberg 153 (N), s.n. [Mead, June 1890] (C, W—518124). OKLAHOMA: Lincoln Co.: J. W. Blankinship s.n. [Baker, 25 Aug. 1895] (W—313602). Woods Co.: G. W. Stevens 1703 (Du—65779, N, Ok, Ok, St—9270, St—9279, Ur, W—589635). WASHINGTON: Klickitat Co.: Suksdorf s.n. [July 9, 1898] (N). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 27 (C), 103 (Q); Engelmann s.n. [Amer. bor.] (Br, S, Sg—16096).

xVERBENA PERTURBATA Moldenke, Résumé Suppl. 5: 6—8, hyponym (1962), nom. nov.

Synonymy: Glandularia parodii x mendocina Covas & Schnack, Revist. Argent. Agron. 11: 96. 1944.

Bibliography: Covas & Schnack, Revist. Argent. Agron. 11: 96. 1944; Moldenke, Résumé Suppl. 5: 6—8. 1962; Moldenke, Phytologia 8: 396 (1962) and 10: 137. 1964.

This is the natural hybrid between Verbena parodii (Covas & Schnack) Moldenke and V. mendocina R. A. Phil., with more or less intermediate characters. It is known only from the area in Mendoza where the ranges of the two parental species overlap. It is described by Covas & Schnack (1944) as follows: "Hemos hallado en la localidad del tipo [i.e., the type locality of V. parodii] una población formada, muy probablemente, por híbridos (y formas derivadas de éstos) entre esta especie y Glandularia mendocina....La población híbrida presenta una amplia gama de variación que comprende formas intermedias y formas vecinas a ambos padres; en algunas de estas formas hemos podido observar flores con pequeños lóbulos petaloideos en la base del limbo de la corola, carácter que nunca hemos observado anteriormente en el género Glandularia."

Planta hybrida aspectu Verbena parodii et V. mendocina intermedia; limbo corollae interdum lobulis parvis petaloideis ad basin ornato.

VERBENA PERUVIANA (L.) Britton in Morong, Britton, & Vail, Ann. N. Y. Acad. Sci. 7: 197. 1892.

Synonymy: Lychnidaea, veronicae folio, flore coccineo Feuill.,

Journ. Obs. Phys. C8tes Orient. [3]: 36--37. 1725. Lychnidaea, veronicae folio, floré coccineo Feuill., Journ. Obs. Phys. C8tes Orient. [3]: pl. 25, [fig. 3]. 1725. Erimus peruvianus L., Sp. Pl., ed. 1, 1: 630. 1753. Lychnidea veronicae folio, flore coccineo Feuill. apud L., Sp. Pl., ed. 1, 1: 630, in syn. 1753. Verbena chamaedryfolia A. L. Juss., Ann. Mus. Nat. Hist. Paris 7: 73. 1806. Verbena veronicifolia J. Sm. in Rees, Cycl. 36: no. 28. 1817. Verbena chamaedrifolia A. L. Juss. ex Steud., Nom. Bot., ed. 1, 873. 1821 [not V. chamaedrifolia Briq., 1904]. Verbena melindres Gill. ex Lindl. in Edwards, Bot. Reg. 14: pl. 1184. 1828. Lychnidaea veronicae folio flore coccineo Feuill. apud Sweet, Brit. Fl. Gard., ser. 2, 1: pl. 9, in syn. 1829. Verbena coccinea Hort. ex Reider, Ann. Blumisterei 7: 288--289 & 298, pl. [24]. 1831. Verbena melindroides Cham., Linnaea 7: 270--271. 1832. Verbena melissoides Sweet ex Cham., Linnaea 7: 270, in syn. 1832. Verbena chamaedrifolia var. elfordiana Benth. in Maund & Henslow, Botanist 3: pl. 129, in part. 1839. Verbena picta Marnock, Floricult. Mag. 5: 87. 1840. Verbena veronicaefolia J. Sm. apud Steud., Nom. Bot., ed. 2, 2: 750, in syn. 1841 [not V. veronicaefolia Humb., 1825, nor Humb. & Bonpl., 1841, nor Humb. & Kunth, 1846, nor H.B.K., 1818, nor Kunth, 1847]. Verbena chamaedryoides Hoffmgg., Preis. Verz. Orchid. 28. 1842; Linnaea 16: Litt. 282. 1842. Verbena chamaedryfolia var. latifolia Aut. ex Hoffmgg., Preis. Verz. Orchid. 28, in syn. 1842; Linnaea 16: Litt. 282, in syn. 1842. Verbena chamaedrifolia α melindres (Gill.) Schau. in A. DC., Prodr. 11: 537. 1847. Verbena chamaedrifolia β melindroides (Cham.) Schau. in A. DC., Prodr. 11: 537. 1847. Verbena chamaedryfolia α melindres (Gill.) Schau. in Mart., Fl. Bras. 9: 182. 1851. Verbena chamaedryfolia β melindroides (Cham.) Schau. in Mart., Fl. Bras. 9: 182. 1851. Verbena chamaedrifolia L. ex Lorentz, Veg. Nordeste Proc. Entre Ríos, ed. 1, 150. 1878. Verbena peruviana Kuntze ex Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 290, in syn. 1904. Verbena peruviana Druce ex Lindman, Vi och Vara Blomm. pl. 42. 1911--1913. Verbena peruviana (L.) Druce, Rep. Bot. Exch. Club Brit. Isles 1913 (3): 425. 1914. Verbena sanguinea Larraff., Escritos D. A. Larraffaga 2: 9. 1923. Verbena chamaedryfolia elfordiana Maund ex Stapf, Ind. Lond. 6: 429. 1931. Glandularia peruviana (L.) Small, Man. Southeast. Fl. 1139 & 1508. 1933. Verbena peruviana Juss. ex Gallinal, Bergalli, Campal, Aragone, & Rosengurtt, Stud. Nat. Mead. Urug. 81. 1938. Verbena chamaedrifolia var. melindres (Gill.) Schau. ex Moldenke, Prelim. Alph. List Invalid Names 56, in syn. 1940. Verbena chamaedrifolia var. melindroides (Cham.) Schau. ex Moldenke, Prelim. Alph. List Invalid Names 56, in syn. 1940. Verbena

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Low procumbent half-hardy perennial herb, with loose spreading habit; stems prostrate or creeping, rooting at the nodes, very slender or filiform, forked, to 45 cm. long, hirtous, the tips and branches ascending; leaves small, decussate-opposite, gray or slightly grayish, oblong or oblong-lanceolate to ovate, broadly cuneate at the base and narrowed into the extremely short petiole, crenate or doubly crenate-serrate to unequally incised-serrate or almost incised-dentate, strigose above, more or less short-hirtous especially on the venation beneath; inflorescence spicate; spikes solitary, long-pedunculate, ascending, densely corymbose-flowered, flattened-capitate when young, to 6.5 cm. wide during anthesis; bractlets less than half the length of the calyx, ciliate-margined; flowers odorless, very showy; calyx canescent-hirtellous; corolla hypocrateriform, very showy, varying from red, brilliant-red, cinnabar-red, fire-red, spectrum-red, or dark-red to scarlet, vivid-scarlet, brilliant-scarlet, red-scarlet, or purple-cinnabar, its tube somewhat surpassing the calyx, the limb to 1 cm. wide; chromosome number: $2n = 10$.

Linnaeus (1753) based his Erinus peruvianus on Feuillée's Lychnidaea, veronicae folio, flore coccineo, of which the type was collected by Louis Feuillée in Paraguay (not in Peru as implied by Linnaeus and as stated by Schauer in 1851), who says of it "Je trouvai cette plante dans les campagnes qui sont sur le bord septentrional de la riviere de la Plata, dans le Paraguay." There seems to be no actual specimen in the Linnean Herbarium, and Linnaeus seems simply to have supplied the brief descriptive sentence "ERINUS foliis lanceolato-ovatis". I therefore regard Feuillée's collection as the type of the species.

BOOK REVIEW

Alma L. Moldenke

"Flora of Missouri", by Julian A. Steyermark, 1808 pp., 2300
illustr. Iowa State University Press, Ames, Iowa. 1963.
\$18.50

This work is superb and monumental. Seldom can an active sci-

entist with considerable other interests and responsibilities -- as has the author -- manage to publish so accurate and thorough a work as this. Dr. Steyermark deserves kudos of congratulations; so do the fellow scientists who collaborated on some of this work; so does the National Science Foundation for wisely choosing to assist in the publication.

Taxa to the total of 3351, comprising 799 genera, 2438 species, 517 subspecies and varieties, and 297 forms of wild Pteridophyta and Spermatophyta are treated. After a historical introduction and a general description of the flora and vegetation, there is a 50-page key to families which is followed by family descriptions and keys to their genera and species with enough details so as not to require additional species descriptions. The first key has a built-in glossary which is an excellent time-saver. The following data are given for each species: scientific name with authorities, some commonly encountered synonyms, common name or names, period of flowering and fruiting, habitat within the state, pertinent ecological data, nature of local variations and intergradations. The following data are added where significant: medicinal usage, food and forage value, industrial applications here and abroad. This compendium is a culmination of 30 years of field work and associated taxonomic studies.

There are many other special features: county distribution maps with about 3 for each page of text, over 2000 clear line drawings conveniently placed near the related text and often sensibly taken from fine earlier works, a keyed map that makes the locating of counties easy, an alternate key for the tracing of completely sterile ferns, a list with location and dimensions of the "champion" trees of the state, two-columned format in the text and three-columned format in the index to allow for most efficient use of printing space on the paper, abbreviations to indicate differences in the author's choice of accepted names over those in the widely used Gray's Manual, the new Britton & Brown and the Annotated Catalogue of the Flowering Plants of Missouri.

The author claims that he uses the system of repeating the specific epithet for the typical variety of a species to achieve precision as do an increasing number of modern taxonomic botanists and zoologists. But no precision need be lost if the concept is inferred and the nomenclature left uncluttered; on page 1599 we find Achillea Millefolium L. subsp. Millefolium var. Millefolium f. Millefolium.

The fact that Dr. Steyermark has been the guiding impetus in the founding of several nature preserves for education in and appreciation of natural beauty indicates that he has the heart of the true naturalist as well as the fine mind of the skilled scientist. Many more states in our country need to have such Steyermarkian work done for them.

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A FLORA OF THE CHROME AND MANGANESE ORE PILES AT CANTON,
IN THE PORT OF BALTIMORE, MARYLAND AND AT
NEWPORT NEWS, VIRGINIA, WITH DESCRIPTIONS
OF GENERA AND SPECIES NEW TO THE FLORA OF
EASTERN UNITED STATES

Clyde F. Reed

Seaports and industrial areas along our seacoasts have always been welcome havens for the plant waifs that reach our shores by ship. Wool-wastes, ballast piles, ore piles, coal piles, lumber yards and just docks all afforded good conditions for foreign plants to get their start here in a new home. One only needs to check the Eighth Edition of Gray's Manual for the species naturalized to be well aware of the large number of weeds which are common with us today, which were introduced usually innocently 50 to 100 years ago.

The Port of Newport News, Virginia and the Port of Baltimore, Maryland, have been the sites for ships for a long time. Recently both ports have been the unloading stations for ores of various kinds, as well as for coal, oyster-shells, gypsum, and oil. With the huge steel mills at Sparrows Point not far from the Port of Baltimore, Canton soon became the unloading ground for chrome ore, manganese ore and even iron ore. For at least twenty years Canton has been a temporary unloading ground for ores on the move.

As early as the 1890's ballast was dumped at Canton and other areas along the Port of Baltimore. Dr. C.C.Plitt of Baltimore made many collections of the adventive weeds in Canton from 1900 to 1906. Some of these plants have been recorded in the "Extracts from the Journal of C.C.Plitt".* Most of the herbarium specimens mentioned here and many others collected by Dr. Plitt at Canton are in the Reed Herbarium.

Other areas in the Port of Baltimore where ballast has been dumped in the past are Port Covington, Dundalk, Curtis Bay, Brooklyn, Westport, Locust Point, and Fairfield. The present study is mainly concerned with the plants that have been found growing on the ore piles in the Canton area, although some species from the other areas will be included.

The areas studied in Virginia have been in the Port of Newport News, the coal piles and wastes immediately adjacent to the docks and the chrome, manganese, and iron ore piles about seven miles inland along the C. & O. Railroad, where an ore refining company has stocked huge piles of these ores.

* Fessenden, G.R. Plants of Baltimore Ballast Grounds. Wild Flower, 32(3): 44-47. 1956.



Views of chrome ore piles at Canton, Maryland

Nearly 550 species of flowering plants have been collected on these mineral ore piles in Maryland and Virginia, about 80 per cent of which are new to either the Eighth Edition of Gray's Manual or Gleason's Illustrated Flora. Many of these species have been collected in these areas year after year since 1953 when this study started. As these ores lie in piles awaiting to be shipped elsewhere, the seeds germinate and the plants most often reach maturity in our region and set seed. Some of these plants have continued to seed themselves here and may be found every year on undisturbed piles. Some have been carried various distances and already have become pests.

Those genera and species which are entirely new to our flora will be listed and described below. Other species which are extensions of known ranges will be mentioned. Finally, other known species which are found in these regions will be merely mentioned. A few species found in other areas in Maryland and Virginia will mentioned also. All specimens are in the Reed Herbarium, unless otherwise noted. Some species have been deposited in the herbarium of the United States National Museum in Washington, D.C.

ACANTHACEAE

1. Andrographis echinoides Nees. Tropical India, in the drier districts from the Punjab and Chota Nagpore to Ceylon. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45902 (US). Det. by E.C. Leonard. Description of genus and species, see Reed, Castanea, 26: 128. 1961.

AIZOACEAE

2. Mollugo gracillima Ands. Maryland: Canton. Oct. 1954. Reed 35232; Oct. 1958. Reed 41349. Native of Galapagos Isl. (Many sheets in US); also from Uganda, Africa, marked (on US sheets), "Introduced, roadsides, Dümmer 2712". This species resembles M. verticillata, to which it has been reduced by Hook. fil. and Jackson (Index Kew, 2: 253), from which it differs by having smaller flowers, a shorter capsule relative to the blunter sepals, and in its minute black, tessellated, not ribbed seeds.
3. Mollugo nudicaulis Lam. Maryland: Canton. July 1958. Reed 40892. Native of the Old World Tropics; also in the West Indies. A glabrous herb, 7-30 cm. high; leaves all basal, in an erect-spreading tuft, spatulate or obovate, 1.5-5 cm. long, 6-16 mm. broad, rounded at the apex, tapering at the base into the petiole; cymes long-peduncled, the peduncles slender, somewhat angled and grooved; flowers slender-pedicelled; calyx-lobes elliptic, about 2 mm. long, 0.8-1 mm. broad; capsule ellipsoid, 2-2.5 mm. long; seeds reniform, 0.5-0.6 mm. long, black, granulate.
4. Mollugo verticillata L. Maryland: Canton, a common weed on the chrome ore piles.
5. Trianthema portulacastrum L. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32722.

ALISMATACEAE

6. Sagittaria latifolia Willd. Maryland: Canton, in ditches near the oyster shell piles. July 1958. Reed 40879.

AMARANTHACEAE

The following new species and new genera of this family which have been found in these regions have been discussed by the author in Castanea 26: 123-127. 1961. Records and specimens are cited there

7. Achyranthes aspera L.
8. Alternanthera ficoidea (L.) R.Br.
9. Alternanthera repens (L.) Kuntze
10. Alternanthera sessilis R.Br.
11. Guilleminea densa (Willd.) Moq.
12. Hermbstaedia elegans Moq.
13. Amaranthus palmeri Wats.
14. Amaranthus cruentus L.
15. Celosia argentea L.
16. Froelichia gracilis (Hook.) Moq. Also see Reed, Castanea, 27: 59-61. 1962. Additional records: Maryland, Canton, on manganese ore piles, Newkirk Street. Aug. 9, 1961. Reed 52145; June 10, 1963. Reed 62407; Aug. 20, 1963. Reed 65410 (US).
17. Gomphrena celosioides Mart.
18. Gomphrena dispersa Standl. From ore piles, Newport News,
19. Gomphrena globosa L. /also.
20. Alternanthera achyrantha R.Br. Newport News only.
21. Amaranthus spinosus L.
22. Amaranthus albus L.
23. Amaranthus graecizans L.
24. Amaranthus retroflexus L.
25. Amaranthus deflexus L.
26. Amaranthus lividus L. Adventive from the Tropics; from Mass. and New York south to Maryland and the District of Columbia. In Maryland this has become a genuine pesty weed, especially in spinach fields. Maryland: Baltimore Co., from Sparrows Point to Essex, Chase, Loreley and White Marsh, and then to the Harford Co. line. In the District of Columbia the author collected it in the outdoor flower beds near the foot of the Capitol. Sept. 25, 1961. Reed 53271 (US).

ANACARDIACEAE

27. Rhus copallina L. Maryland: Canton, common in thickets and along railroad tracks. Oct. 4, 1957. Reed 39558.
28. Rhus radicans L. Maryland: Canton. Oct. 4, 1957. (obs.); April 24, 1958. Reed 40703. Common in thickets and in wastes on ground.

29. Rhus typhina L. Maryland: Canton, along Newkirk St., several very large trees, about 25 ft. tall, with trunks 4-6 in. in diameter.

APOCYNACEAE

30. Apocynum cannabinum L. Maryland: Canton, a common weed throughout the area. Sept. 27, 1953. Reed 32725.

ARISTOLOCHIACEAE

31. Aristolochia clematitis L. Introduced from Europe; local from New York to Ohio and Maryland. Maryland: Canton. May 22, 1900; May 16, 1903; July 6, 1906. All collected by C.C.Plitt. (Colony entirely destroyed after the last date).

ASCLEPIDACEAE

32. Asclepias incarnata L. var. pulchra (Ehrh.) Pers. Common on wastes between the chrome ore piles. July 30, 1959. Reed 43842. Canton, Maryland.

33. Asclepias syriaca L. Common throughout the area. Canton, wastes along Newkirk St. Aug. 18, 1959. Reed 44388.

BERBERIDACEAE

34. Podophyllum peltatum L. In several patches along ditches in Canton near the gypsum piles along Newkirk St. April 24, 1958. Reed 40707.

BORAGINACEAE

Several new species in this family have been found in the Canton area. Most of these have survived the winters and have been found every year since 1953. Some have persisted since 1901, when they were collected by C.C.Plitt.

35. Anchusa italica Retz. Native of the Mediterranean region and the Near East; N. Africa, France, Corsica, Europe meridionale et centrale. Maryland: Canton, Newkirk St., chrome ore piles. June 29, 1956. Reed 38824. Plant 30-80 cm. tall, branched; leaves oblong, lanceolate to ovato-lanceolate, entire, the lower ones petiolate, the upper ones sessile; raceme paniculate; flowers blue or rose, lobes of calyx divided near the base, acute, shorter than the tube of the corolla, spreading in fruit; corolla 10-13 mm. long, in a tube; nutlets oblong, wrinkled, granulate.

36. Echium italicum L. Native of Turkestan, Asia Minor, and the Mediterranean region. Maryland: Canton, Newkirk St., on chrome ore piles. June 29, 1955. Reed 38818. Plant biennial, 30-80 cm. tall, stem robust, branched to form a pyramidal panicle; leaves hispid, the radical ones forming a rosette, elliptical-lanceolate, one-nerved, the cauline leaves sessile; flowers red or rose, quite small; calyx very hispid, the lobes lanceolate; corolla 10-14 mm. long, the tube long, the limbs spreading and quite regular; the

stamens as long as the nearly regular corolla; flowers in lateral spikes; nutlets strongly tuberculate, slightly ridged.

37. Echium vulgare L. Maryland: Canton, along Clinton St. in wastes. Oct. 18, 1957. Reed 39416. Common in between the chrome ore piles.

38. Heliotropium curassavicum L. Washington south to southern California and Mexico, east to Delaware and Florida; casually on ballast northward; widely distributed on all continents. Maryland: Canton, Newkirk St., chrome ore piles. June 22, 1954. Reed 33451.

39. Heliotropium europeum L. Naturalized from Europe; from Florida and Alabama north to New Jersey, and locally to Massachusetts. Maryland: common on ballast and on the chrome ore piles of Canton since 1901. Ballast Grounds. June 19, 1901. C.C. Plitt (Not mentioned in Plitt's Journal for this date, acc. to Fessenden, see Wild Flower 32: 45. 1956), in Reed Herb. No. 26612; same locality. June 18, 1905. Plitt, in Reed Herb. No. 26611; Canton, on chrome ore piles near Newkirk St. Sept. 27, 1953. Reed 32673, 32812 and 32668; Oct. 12, 1953. Reed 32883; June 22, 1954. Reed 33449; July 22, 1954. Reed 34032; Sept. 1, 1954. Reed 34393; Sept. 30, 1955. Reed 38240; June 29, 1956. Reed 38825; Oct. 17, 1956. Reed 38243; Sept. 20, 1957. Reed 39317; Clinton St. on wastes. Oct. 4, 1957. Reed 39592; on manganese piles, Newkirk St. July 15, 1960. Reed 46738; on pumice piles (from Italy). Aug. 20, 1963. Reed 65424 (US).

40. Heliotropium indicum L. Widely distributed in the Tropics of both hemispheres, probably of American origin. Maryland: Canton, Newkirk St., on chrome ore piles. July 17, 1958. Reed 41008 and 40889; Sept. 24, 1958. Reed 41238; July 9, 1959 (frequent). Reed 43618.

41. Heliotropium procumbens Mill. Native of tropical and subtropical America, Costa Rica. Maryland: Canton, Sept. 19, 1958. Reed 41327. Annual, sparsely or densely appressed-pilose, usually grayish, the stems erect or decumbent, 10-50 cm. long, much-branched; leaves elliptic, obovate, or broadly oblanceolate, 1-4 cm long, obtuse or rounded at the apex, petiolate; flowers small, white, in slender, scorpioid, mostly geminate or ternate, bractless racemes; corolla 5 mm. long or less; fruit depressed-globose, 4-lobate, strigose, the nutlets 0.5-1 mm. long.

42. Lithospermum arvense L. Naturalized from Europe; a common weed from Nova Scotia to British Columbia, south to Florida, Louisiana and California. Maryland: Canton, on wastes. April 24, 1958. Reed 40699. Throughout Maryland in waste places and fields.

CANNABINACEAE

43. Cannabis sativa L. Adventive from Asia; Quebec to British Columbia and southward. Maryland: Canton. May 1903. Plitt, in Reed Herb.; Sept. 1905. Plitt, in Reed Herb.

44. Humulus japonica Sieb. & Zucc. Introduced and naturalized from Asia; New England to Michigan, south to Virginia and Missouri. Maryland: Canton, just south of Highlandtown. Sept. 1957. Reed 39387; Canton, near chrome ore piles. Oct. 1957. Reed 39415.

45. Humulus lupulus L. Native from New Brunswick to Montana, south to New England, northern Pennsylvania, West Virginia, eastern Kentucky, Ohio, Indiana, Illinois, Missouri, Kansas and New Mexico; also introduced from Europe; Maryland and Delaware. Maryland: Canton, plentiful. April 1958. Reed 40692; Sept. 1958. Reed 41316 (fr.).

CAPPARIDACEAE

46. Cleome viscosa L. Naturalized from the Old World Tropics; Bermuda and West Indies. Maryland: Canton, Newkirk St., on chrome ore piles. July 17, 1958. Reed 41010; July 19, 1958. Reed 40887; Sept. 6, 1958. Reed 41303; Sept. 19, 1958. Reed 41319; July 30, 1959. Reed 43834. Virginia: Newport News, on chrome ore piles. Aug. 7, 1959. Reed 44049; Nov. 15, 1959. Reed 45887. An erect viscid-glandular annual, 3-9 dm. tall; leaves digitately 3- or 5-foliate; leaflets obovate, oblanceolate or elliptic, 10-17 cm. long, 0.7-3 cm. broad, acute to acuminate, rarely obtuse at the apex, often inequilateral at the base, the margin glandular-ciliate; flowers solitary in the axils of the upper leaves; sepals oblong-lanceolate or lanceolate, 6.5-8 mm. long; petals yellow, obovate, about 1 cm. long; stamens 12-20, free; capsule cylindrical, 5.5-10 cm. long, 4-4.5 mm. thick, tapering to the apex, striate, viscid-glandular; seeds about 1.8 mm. in diameter, flattened, transversely ridged.

CAPRIFOLIACEAE

47. Sambucus canadensis L. Rather common in wet ditches in Canton, forming thickets. Oct. 4, 1957. Reed 39579.

48. Viburnum prunifolium L. Forming fencerows in wastes along Clinton St., Canton. Oct. 4, 1957. Reed 39553.

49. Lonicera japonica Thunb. Naturalized from Asia. Canton, common throughout the wastes, forming thickets over trees and bushes. Some patches appear to be var. chinensis (P.W.Wats.) Baker, with the branchlets and leaves purple and glabrous, and with a carmine corolla.

CARYOPHYLLACEAE

50. Agrostemma githago L. Maryland: Canton, Newkirk St., on chrome ore piles. May 24, 1954. Reed 33348 (flowers lavender).

HERNIARIA L. Burstwort. Sepals 5; staminoides small or none; stamens 2-5; style short, deeply bifid; capsule enclosed in the calyx and containing one seed. -- Small procumbent herbs, with small green flowers; stipules minute, scarious.

51. Herniaria cinerea DC. Introduced from southern Europe; also known from southern Arizona and California. Maryland: Canton, on chrome ore piles. June 10, 1957. Reed 38808. Small erect annual herbs, 2.5-7 cm. tall, sometimes forming mats 7-30 cm. in diameter; branches bearing 2-ranked branchlets; leaves opposite with minute papery stipules, the blades oblong and about 0.5 cm. long; flowers very small, green, crowned in clusters in all the leaf axils; 4-5 sepals, united at the base, usually no petals; 2-5 stamens, inserted on the calyx base, and a short 2-cleft or 2-parted style; fruit an achene, enclosed by the calyx; seeds shining black, minute double-convex lens-shaped, rimmed by a thin margin.

52. Herniaria glabra L. Native of central and southern Europe. Maryland: Canton, on chrome ore piles. Oct. 28, 1958. Reed 41348. Stems very branching, slender, prostrate, 5-10 cm. long, forming mats on the ground, glabrous or clothed with short and somewhat deflexed hairs; root perennial; leaves very glabrous or ciliate at the base, the inferior ones opposite, the upper one alternate and opposite the floral branches, oblong to elliptic, obtuse, entire, attenuate at the base; stipules ciliate; flowers in axillary clusters, coalescing on the lateral branches into a somewhat leafy spike; calyx nearly hairless, the divisions obtuse; seeds black, lustrous.

53. Saponaria vaccaria L. (Vaccaria segetalis (Neck.) Garcke). Adventive from Europe. Maryland: Canton, Newkirk St., on chrome ore piles. June 22, 1954. Reed 33371; Oct. 28, 1958. Reed 41346; Nov. 23, 1958. Reed 41728; July 9, 1959. Reed 43629; on manganese ore piles. July 9, 1959. Reed 43653; July 15, 1960. Reed 46732.

54. Saponaria porrigens L. Native of Armenia and The Levant. Maryland: Canton, on chrome ore piles. June 1954. Reed 33357 (US). Stem erect; branches divaricating, hairy, viscid; flowers axillary, on long stalks; peduncles filiform; calyx terete; fruit egg-shaped, drooping; leaves lanceolate, connate; petals flesh-colored; stamens white.

55. Silene cserei Baumb. Native of Europe. Maryland: Canton, on chrome ore piles. May 24, 1960. Reed 46327. Leaves broader (2-4 cm. wide) than in S. cucubalus Wibel (1-3 cm. wide); calyx but little inflated and the veins not conspicuously reticulate.

Also found on the chrome ore piles in the Canton area are the following species which are fairly common.

- 56. Cerastium viscosum L.
- 57. Cerastium vulgatum L.
- 58. Silene antirrhina L.
- 59. Silene noctiflora L.
- 60. Stellaria media (L.) Cyrillo

CELASTRACEAE

61. Celastrus scandens L. Maryland: Canton, frequent climbing over thickets. Oct. 4, 1957. Reed 39559.

CHENOPODIACEAE

Atriplex patula L. is represented by the following varieties in the Canton area, on chrome ore piles, in wastes and along the railroads.

62. Atriplex patula L. var. hastata (L.) Gray. Native of Eurasia; nat. from Newfoundland to British Columbia, and south to New England, South Carolina, Ohio, Indiana, Illinois and Missouri. Many collections from Canton, Dundalk and Newport News areas.

63. Atriplex patula L. var. littoralis (L.) Gray. Prince Edwards Island to Ontario, south to New Jersey, Pennsylvania, Indiana and Wisconsin. Maryland: Canton. Oct. 1957. Reed 39568.

64. Atriplex patula L. var. japonica Levl. Native of Japan and the Orient. Maryland: Canton, on chrome ore piles, forming huge mats up to 10 ft. in diameter; Oct. 28, 1958. Reed 41344; Nov. 4, 1958. Reed 41361. This variety has linear to broadly linear leaves, similar to those of var. littoralis; but the fruits are bracteate, the bracts being from 1-1.5 cm. broad and long, similar to var. bracteata Westlund. Plants very large, woody and very branched, the bark reddish, striated with green; the leaves up straight, glabrous, entire, without widening at the base, obtuse, petiolate, the petioles winged; fruits with valve-like bracts, 1-1.5 cm. long, disposed in glomerules of 3-4, forming terminal spikes and axillary ones as well.

65. Atriplex nitens Schkuhr. Native of central Europe. Maryland: Canton, Newkirk St., on chrome ore piles. Sept. 19, 1958. Reed 41322; Baltimore County, Cub Hill in fields. May 28, 1959. Reed 43122; Aug. 3, 1959. Reed 45591. Stems herbaceous to nearly woody, up to 1.5 m. tall, erect branched; the leaves triangular, acuminate, greenish shining above, glaucous beneath, up to 12 cm. wide and 10 cm. long, margins dentate, the lower ones cordate-hastate, the upper ones deltoid and somewhat auricled, the uppermost ones lanceolate; perianth of fruit ovate-acuminate, entire, smooth on the back, thin and finely reticulate.

66. Atriplex rosea L. Adventive from Eurasia; New York to Wisconsin and southward; California. Maryland: Canton. Sept. 1907. Plitt, in Reed Herb. (No. 17628).

67. Atriplex thornberi (Jones) Standl. Native of southern Arizona. Maryland: Canton, collected many times on the chrome ore piles. Sept. 1953. Reed 32754, 32842, 32770, 32715 and 32661; Oct. 12, 1953. Reed 32881; June 22, 1954. Reed 33437. (A. elegans var. thornberi Jones). Annual or perennial, 2-5 dm. tall, much-branched, the branches slender or stout, obtusely angled, erect or ascending, coarsely furfuraceous or glabrate in age; the leaves numerous, alternate, sessile or subsessile, the blades oblong to narrowly oblong or lanceolate, 7-20 mm. long, 2.5-6 mm. wide, obtuse or acute at the apex, the upper ones mucronate, crenate or attenuate at base, the lower ones remotely repand-dentate, the upper entire, rather thin and whitish-furfuraceous below, furfuraceous or glabrate above; flowers monoecious, disposed in small axillary clusters; the fruiting bracts short-pedicellate, orbicular, 3 mm. long, the margins deeply lacinate-dentate nearly to the base, the sides each having 2 lacinate crests; the seeds 1 mm. long, pale brown; the radicle superior.

Chenopodium L. is represented by several species which have been collected many times since 1953 on the chrome ore piles and in the nearby wastes. Most common are the following three species.

68. Chenopodium ambrosioides L.

69. Chenopodium botrys L.

70. Chenopodium album L.

71. Chenopodium viride L. Native of Russia, northern and western Asia (Kashmir to Nepal); and Europe. Maryland: Canton, on manganese ore piles. July 17, 1958. Reed 41004 and 41006; Sept. 6, 1958. Reed 41300; Sept. 19, 1958. Reed 41342; July 9, 1959. Reed 43650 and 43656. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44063 and 44042. Entire plant usually mealy; leaves long stalked, broadly triangular, upper ones lobed, about 3 cm. each way, margins sinuate or irregularly lobed; utricle only partially covered by the persistent teeth; seeds minutely dotted.

72. Chenopodium vulvaria L. Adventive from Europe; local from Quebec, Ontario and Wisconsin, south to Maryland and Indiana. Maryland: Canton, on chrome ore piles, collected many times from 1953 to 1958. The plant possesses a fetid odor which is distinctive. Sept. 27, 1953. Reed 32817; Oct. 2, 1953. Reed 32684; Sept. 30, 1955. Reed 39239 and 39227; Aug. 23, 1956. Reed 37967; Sept. 19, 1958. Reed 41324.
73. Chenopodium pagaram Reichenb. Naturalized from Europe; Quebec to Alaska and southward. Maryland: Canton, on chrome ore piles, Newkirk St. Sept. 27, 1953. Reed 32815; Sept. 30, 1955. Reed 38235.
74. Chenopodium carnosulum DC. Native of Mexico. Maryland: Canton, on chrome ore piles. Sept. 1955. Reed 38214, 38216.
75. Chenopodium farinosum (S.Wats.) Standl. (Ch. macrospermum Hook. fil. var. halophilum (Phil.) Standl.; Ch. macrospermum ssp. halophilum (Phil.) Aellen forma farinosum (Wats.) Aellen). Native of South America (Argentina north to Bolivia, Mexico); California and North Carolina. Maryland: Canton, on chrome ore piles. Sept. 30, 1955. Reed 38242 and 38217; Nov. 10, 1953. Reed 33036; Oct. 25, 1954. Reed 35189. North Carolina: Wilmington, on ballast. (US-43945). See Aellen & Just, Amer. Midland Nat., 30: 58. 1943.
76. Chenopodium glaucum L. (incl. Ch. salinum Standl.). Adventive from Europe; Alaska to North Dakota, south to Missouri, New Mexico, Arizona and Oregon. Maryland: Canton, on chrome ore piles. July 9, 1959. Reed 43626; on manganese ore piles. July 30, 1959. Reed 43839. Annual, succulent and glabrous, or nearly so, except the densely white-mealy under-surface of the leaves; stems freely branching, decumbent or prostrate, 4-20 cm. long; leaves usually oblong, varying from lanceolate to narrowly ovate, 2-5 cm. long, sinuate-dentate, or the uppermost sometimes entire, narrowed to a short petiole; flowers in short axillary, often branched spikes; calyx lobes narrowly oblong, thin, not keeled, concealing only a small portion of the fruit; utricle dark brown; pericarp free; seed vertical in the lateral flowers, often horizontal in the terminal ones, sharp-edged, 0.6 mm. broad.
77. Polycnemum majus A.Br. Adventive from Europe; also known in Ontario. Maryland: Canton, on manganese ore piles. Aug. 1959. Reed 44376.
78. Salsola kali L. Newfoundland to Louisiana; also in Eurasia. Maryland: Canton, frequently collected on the chrome and manganese ore piles since 1953.
79. Salsola kali var. tenuifolia G.F.W.Meyer. Native of central Asia; a troublesome weed, Michigan to Missouri and westward, southward to Indiana, West Virginia and North Carolina. Maryland: Canton, on chrome ore piles, frequent. June 22, 1954. Reed 33444 and 33446; June 29, 1956. Reed 38827; Sept. 19, 1958. Reed 41326.

COMMELINACEAE

80. Commelina communis L. Common in the wastes throughout the Canton area.
81. Commelina diffusa Burm. fil. Native in pantropic and warm-temperate regions in American tropics; northward to eastern Virginia and Maryland; a casual weed north to Massachusetts, Ohio, Indiana, Illinois and eastern Kansas. Maryland: Canton, on chrome ore piles, Newkirk St. Sept. 24, 1958. Reed 41231; Oct. 14, 1958. Reed 41156; Oct. 28, 1958. Reed 41352; Nov. 4, 1958. Reed 41364; Oct. 6, 1959. Reed 45716 (seems to be spreading to many other piles).

COMPOSITAE

Many new genera and species of this family have been found on the various ore piles in the Canton area. I am indebted to the late Dr. S.F.Blake for identifying or verifying the identification of most of the species listed below.

82. Achillea millefolium L. Naturalized from Europe. A common weed throughout the wastes of Canton. Aug. 18, 1959. Reed 44352.
83. Ageratum conyzoides L. Old World tropics and subtropics; West Indies and tropical continental America. Maryland: Canton, on chrome ore piles. Sept. and Oct. 1958. Reed 41226 and 41164. Annual more or less pubescent, branched, 9 dm. high or less, the stem terete, the branches widely ascending; leaves thin, ovate, 2-8 cm. long, mostly obtuse at the apex, cuneate to subcordate at the base, crenate or crenate-dentate, the slender hirsute petioles 3 cm. long or less; corymbs compound, convex, the head several to numerous, about 6 mm. broad, many-flowered; involucre campanulate, its bracts oblong, glabrous or slightly pubescent, green with scarious margins acuminate; receptacle naked; corolla blue or white; achenes black, shining; pappus of 1-5 lanceolate scales, attenuate at the apex, sometimes very unequal in length and the shorter ones bluntish.
84. Ambrosia artemisiifolia L. A common weed throughout the wastes of Canton.
85. Ambrosia trifida L. A common weed throughout the wastes of Canton.
86. Anaphalis margaritacea (L.) C.B.Clarke var. intercedens Hara Native of Japan; also from Newfoundland to Alaska, south to North Carolina, West Virginia, Ohio, Michigan, Wisconsin, Missouri, South Dakota and New Mexico. Maryland: Canton, common in waste areas.
87. Anthemis arvensis L. Naturalized from Europe; Maine to western New York and south to Georgia. Maryland: Canton, frequent on chrome and manganese ore piles.
88. Anthemis cotula L. Naturalized from Europe; Newfoundland to Alaska and southward. Maryland: Canton, Oct. 1900. Flitt.

89. Arctium minus (Hill) Bernh. Naturalized from Europe; Newfoundland to British Columbia, south to Virginia, West Virginia, Missouri, Kansas and California. Maryland: Canton, on chrome ore piles; Port Covington on wastes.
90. Artemisia annua L. Naturalized from Eurasia; Prince Edwards Island to Ontario, south to Long Island, Virginia, Alabama, Tennessee and Arkansas. Maryland: Locust Point, along RR tracks, rather frequent.
91. Artemisia ludoviciana Nutt. var. gnaphalodes (Nutt.) Torr. & Gray Native on the prairies from southern Ontario and Michigan to southern British Columbia, south to Arkansas, Oklahoma and Texas; naturalized eastward to Quebec, New England, New Jersey, Delaware and Maryland. Maryland: Canton, in large patches along RR., collected from 1958 to 1963. Virginia: Newport News, RR wastes at port. Aug. 1959. Reed 44082.
92. Artemisia scoparia W. & K. Native of central Europe (Bohemia, Austria). Maryland: Canton, on wastes. Aug. 1956. Reed 37971. Stem simple, erect; leaf bi-tripinnatifid, ovate in outline; segments of the lowest leaves linear-lanceolate, of the rest, linear; upper leaves sessile, simply pinnatifid; uppermost undivided or with a tooth at the base; outer florets with anthers; receptacle naked; auricle at base of leaf-stalk about the middle of the flowering-stem; flower broadly ovoid or subglobose, hairless.
93. Artemisia abrotanum L. Introduced from southern Europe. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45888.
94. Aster simplex Willd. var. ramosissimus (T. & G.) Cronq. Frequent on the wastes at Canton, Oct. 4, 1957. Reed 39565 and 39572.
95. Aster subulatus Michx. Natural range from southern Maine to Delaware and Maryland, and southern Michigan. Maryland: Canton, on chrome ore piles, Sept. 27, 1953. Reed 32662.
96. Baccharis halimifolia L. Native from Mexico and Texas to Florida, north along the coast to Massachusetts. Maryland: Canton, on wastes on chrome ore piles and gypsum piles. Oct. 25, 1954. Reed 35222; Sept. 20, 1957. Reed 39320; Oct. 4, 1957. Reed 39564 and 39586.

BAHIA Lag. Ray flowers pistillate and fertile, rays from inconspicuous to definite, or in 1 species lacking, yellow; disk flowers perfect and fertile, yellow; anthers united, not caudate at the base; achenes narrow, 4-angled; pappus of several paleae, these sometimes with the thickened midrib excurrent as an awn, or without pappus; annual or perennial herbaceous plants, with alternate or opposite leaves, these entire to variously divided or dissected; heads corymbose; involucre campanulate, hemispheric, turbinate or obconic, bracts in 2 or 3 series, herbaceous to scarious

or colored in part; receptacles mostly flat, naked or alveolate.

97. Bahia schaffneri Wats. Native of Mexico. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32787. Annual; stem decumbent and branched at base, strigose; leaves mostly opposite, 2-3 cm. long, ternately 3 or 4 times dissected, with narrow linear divisions, strigose; heads terminating the branches; peduncles 2-4 cm. long; involucre hemispheric, 4-5 mm. high, about 8 mm. broad; bracts strigose, oblanceolate or obovate, acute, somewhat yellowish towards the tip; ligule yellow, oval, 3 mm. long; tube of disk-corollas slender, glandular, 2 mm. long, throat campanulate, 1.5 mm. long; achenes narrowly obpyramidal, 3 mm. long, hispidulous on the angles; pappus of 8 obovate squamellae, 1 mm. long, with a short ovate thickening at the base.

98. Bidens frondosa L. A common weed from Newfoundland to Washington and southward. Maryland: Canton, on wastes between the chrome ore piles. Oct. 4, 1957. Reed 39588; Nov. 28, 1958. Reed 41748.

99. Bidens pilosa L. Adventive from tropical America, northward to Massachusetts. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32780; Oct. 12, 1953. Reed 32873, 32878 and 32882; Nov. 2, 1953. Reed 33001. Weedy square-stemmed annual, with simple ovate or 3-5-parted leaves, white to pale yellow or purplish ligules and linear-tetragonal achenes, 5-9 mm. long.

100. Bidens polylepis Blake. Native in the Mid-west from Illinois to Iowa, Kansas and Colorado, south to Tennessee, Missouri, Oklahoma and Texas; naturalized east to the Atlantic States. Maryland: Canton, on chrome ore piles. Sept. 6, 1958. Reed 41289.

101. Bidens tenuisecta Gray. Native from Idaho to Colorado, Texas and Arizona, south to Mexico. Maryland: Canton, on chrome ore piles. Oct. 1959. Reed 45691. Annuals, with stems up to 6 dm. tall, branched from the base, glabrous; leaves twice or thrice ternately or pinnately divided into linear lobes; heads about 1 cm. high and broad; bracts linear, hirsute, the outer usually slightly longer than the inner; achenes glabrous, the outer 6-8 mm. long, the inner 10-12 mm. long; awns fully 3 mm. long, those of the outer achenes shorter.

102. Carduus nutans L. Adventive from Europe; naturalized from St. P. et Miq. to Iowa, south to Nova Scotia, New England, Maryland, District of Columbia and Missouri. Maryland: Canton, on wastes, 1901 and 1904. Plitt.

103. Cnicus benedictus L. (Carthamus tinctorius L.). Native of southern Europe and Asia Minor; sparingly established from New Brunswick and Illinois and southward. Maryland: Canton, plentiful on wastes. June 1955. Reed 36552 (US).

104. Centaurea depressa Bieb. Native of Persia and Caucasus. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33372. Perennial, almost prostrate, white-pubescent; lower leaves oblong, entire or lyrate, the upper ones linear-lanceolate; heads blue, up to 3 cm. across, the marginal flowers enlarged; bracts of involucre with black or white margins.
105. Centaurea calcitrapa L. Naturalized from the Mediterranean region in the southeastern states, north to New York and southern Ontario. Maryland: Canton, on chrome ore piles. May 24, 1954. Reed 33347; Aug. 23, 1956. Reed 37974 and 37966; June 29, 1956. Reed 38826.
106. Cichorium intybus L. Common as a weed throughout the Canton area. Flowers varying from blue to pink or white.
107. Cirsium arvense (L.) Scop. Naturalized from Europe. Maryland: Canton, July 6, 1904. Plitt.
108. Cirsium arvense var. horridum Wimmer & Grab. Naturalized from Europe; the more common variety in eastern United States. Maryland: Canton, on wastes near the chrome ore piles. June 12, 1959. Reed 42977. Plant very spiny; leaves deeply pinnatifid.
109. Cirsium discolor (Muhl.) Spreng. Frequent on the chrome ore piles and wastes in Canton. Sept. 24, 1957. Reed 39549.
110. Cosmos sulphureus Cav. Introduced from Mexico; New Jersey and Pennsylvania, southward; spread from cultivation. Maryland: Canton, on chrome ore piles. Nov. 5, 1953. Reed 32976 (US).
111. Cosmos parviflorus (Jacq.) HBK. Native from Colorado south to Texas, Arizona and Mexico; adventive on wool wastes in Maine and Massachusetts. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32916 (US); Nov. 2, 1953. Reed 32988. Stems 3-8 dm. tall, glabrous; leaves bi- or tripinnatifid into filiform divisions; involucre 6-7 mm. long; rays 7-12 mm. long; achenes 7-10 mm. long including the beak which is about one-third to one-half as long as the body; pappus awns about 2 mm. long.
112. Conyza bonariensis (L.) Cronq. Native of Venequela and Paraguay. Virginia: Newport News, in RR yard at port. Aug. 1959. Reed 44038.
113. Dyssodia papposa (Vent.) Hitchc. Native from Louisiana to Mexico and Arizona, north to southern Ontario, Minnesota, North Dakota and Montana; adventive east to New England. Maryland: Canton, on chrome ore piles. Nov. 2, 1953. Reed 32998; Nov. 10, 1953. Reed 33028.

114. Eclipta alba (L.) Hassk. A common weed which grows luxuriantly on the chrome ore piles, as well as in wastes areas of Canton. Sept. 27, 1953. Reed 32737; Oct. 4, 1957. Reed 39589; Nov. 23, 1958. Reed 41734.

115. Eclipta erecta L. Native of Lower California and Mexico, south to Guatemala, Honduras, Colombia and the Galapagos Islands. Maryland: Canton, on chrome ore piles. Aug. and Oct. 1959. Reed 44356 and 45703. This species is sometimes considered as a variety of E. alba, having long-peduncled heads.

Eupatorium is represented in the Canton, Dundalk and other wastes areas by three species, the last species forming huge plants on the chrome ore piles.

116. Eupatorium hyssopifolium L. July 6, 1904. Flitt.

117. Eupatorium purpureum L.

118. Eupatorium serotinum Michx. Maryland: Canton, on chrome ore piles. Aug. 23, 1956. Reed 37972; Clinton St. Oct. 4, 1957. Reed 39584; Dundalk. Sept. 24, 1957. Reed 39534.

119. Flaveria trinervia (Spreng.) Mohr. Florida and Alabama to southern Arizona, southward to South America; Cuba; introduced at Westford, Massachusetts. Maryland: Canton, on chrome and manganese ore piles. Sept. 27, 1953. Reed 32840; Nov. 2, 1953. Reed 32984 and 32997; Nov. 23, 1958. Reed 41731; on manganese ore piles. Oct. 6, 1959. Reed 45699. Virginia: Newport News, on manganese ore piles. Nov. 15, 1959. Reed 45866. Annual, dichotomously and divaricately branched; stem erect, 3-12 dm. high, sometimes tinged with red, glabrate; leaves connate, lanceolate, 3-nerved, serrate, 3-9 cm. long, the lower short-petioled; cymes congested and head-like, 2-2.5 cm. broad, axillary, subtended by 3 pairs of leaves; heads small, usually 1-flowered, the flower either subligulate and pistillate or regular and hermaphroditic; involucre bracts concave, 1 or 2, if the latter, the outer shorter; corolla of the pistillate flowers 1.5 mm. long, the ligule oblique, 3-dentate; corolla of the hermaphroditic flower 2 mm. long; tube villous; throat campanulate; achene 2 mm. long, somewhat clavate; pappus wanting.

120. Guizotia abyssinica (L. fil.) Cass. Adventive from tropical Africa, from Connecticut to Michigan and Pennsylvania. Maryland: Canton, on chrome ore piles. Nov. 4, 1958. Reed 41371.

121. Helianthus annuus L. Native from Manitoba and Minnesota to Texas and westward; cultivated and spreading eastward to Quebec, New Brunswick, Nova Scotia and the Atlantic States. Maryland: Canton, whole areas have been taken over by this sunflower. The flowers range from 2 to 6 inches in diameter, and most of the plants have many-headed stalks, up to 10 ft. tall. Some plants have been collected on the chrome ore piles which are only 2 ft. tall and are similar to Helianthus lenticularis Dougl. (July 1959. Reed 43657). Oct. 2, 1953. Reed 32688; Sept.

20, 1957. Reed 39386; Nov. 4, 1958. Reed 41358; Nov. 23, 1958. Reed 41738; Port Covington. Nov. 8, 1957. Reed 38485.

122. Helianthus tuberosus L. Common in the wastes just south of Highlandtown. Sept. 20, 1957. Reed 39389.

123. Helianthus laetiflorus Pers. Common in the wastes about Port Covington. Nov. 8, 1957. Reed 39483.

HETEROSPERMA Cav. (Icon. III, p. 34, t. 267. 1794 (1795), preface on p. V says 10 Jan. 1795; also in 1802). (Willdenow in 1804, without due cause changed it to Heterospermum -- vide Blake, Journ. Bot. 53: 322. 1915).

124. Heterosperma pinnatum Cav. Native of Mexico. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32918; Nov. 2, 1953. Reed 32989; Nov. 5, 1953. Reed 32978. Stems herbaceous, branches opposite; leaves opposite, very glabrous, connate, pinnate with unequal acute-linear pinnules; flowers terminal, peduncled, single-flowered; calyx very deeply lacinate, acute-linear, longer than the flower, ciliate at the base; corolla yellow; anthers fuscous; paleae ovate, striate; florets barely 16, distinguished by the violaceous-fuscous of the rays and the yellow of the hermaphroditic ones.

125. Helenium tenuifolium Nutt. (H. amarum (Raf.) Rock). Common in RR yards in port of Newport News, Va. Aug. 1959. Reed 44036.

126. Hypochoeris radicata L. Naturalized from Europe; Newfoundland to Ontario, south to North Carolina, West Virginia, Ohio, Indiana and Illinois. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45890.

127. Iva frutescens L. Frequent in the wastes in Canton. Sept. 1957. Reed 39533.

128. Inula helenium L. Naturalized from Europe; from eastern Ontario to southern Quebec, and southward. Maryland: Canton. Sept. 12, 1900 and Oct. 18, 1900. C.C.Plitt.

MELAMPODIUM L. Ray flowers pistillate and fertile, rays white, yellow to sometimes pink, spreading, conspicuous; disk flowers perfect but sterile, with undivided style; anthers united, entire at base; achenes broadening upward and more or less incurved; pappus wanting. -- Perennial herbaceous plants with taproots and caudex; stems leafy, the leaves opposite, entire to sinuately lobed; heads terminal on the stem and branches; involucre campanulate, bracts in 2 sets, the outer 4 or 5 herbaceous, broad, flat and partially united, the inner hooded, each embracing a ray achene and deciduous with it; receptacle convex or conical, chaffy.

129. Melampodium hispidum HBK. Native of S. Arizona and Mexico. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32739 and 32746. Rays yellow, inconspicuous; usually not more than 2 mm.

long; plants annual, strictly herbaceous; heads 2-6 mm. wide, usually sessile or subsessile; fruit not hooded or beaked at apex. Kearney, Peebles et al, Arizona Flora, p. 890. 1960.

130. Onopordum acanthium L. Naturalized from Europe (and eastern Asia); from New Brunswick to Ontario, south to Alabama and south-eastern Missouri. Scotch thistle. Maryland: Canton, forming large patches. 1901-1904. C.C.Plitt.

131. Parthenium hysterophorus L. Adventive from tropical America, from Florida to Texas, locally north to Massachusetts, Pennsylvania, Ohio, Michigan, Illinois, Missouri and Kansas. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32806; Oct. 25, 1954. Reed 33363.

132. Pulicaria dysenterica (L.) Gaertn. Naturalized from Europe; otherwise only recorded from the shores of the Potomac River, Charles Co., Maryland. Also Maryland: Canton, on chrome ore piles. Oct. 17, 1956. Reed 38249.

SANVITALIA Lam. Heads heterogamous, radiate; rays pistillate, fertile, ligulate, persistent on the achene; disk flowers perfect, fertile, tubular; involucre depressed hemispheric, of herbaceous bracts imbricated in 2-3 series; receptacle convex to conic, chaffy; scales enfolding the disk flowers, persistent on the receptacle; achenes heteromorphous, ray achenes triangular, dorsally compressed, 3-awned, the disk achenes laterally compressed, winged or wingless, 2-awned or awnless; annual herbs with rather showy heads of yellow rays and dark purple disks.

133. Sanvitalia angustifolia Engelm. Native of Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32775; June 22, 1954. Reed 33418. Stem diffused; leaves lanceolate, strigose-hispid; ligules small, aristate, with shorter acute setulae, 3-5 barbate-apiculate; achenes or outer disk exalate subclavate, the inner short winged, bi-ari-stellate.

134. Sanvitalia procumbens Lam. Native of Mexico, Yucatan. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32735 and 32785; June 22, 1954. Reed 33416. Annual, diffuse and procumbent, with subangles stems and branches; leaves opposite, petioled, lanceolate-ovate, strigose; inflorescence of solitary heads terminating the slender hirsute branches, the heads 7-8 mm. high, 12-15 mm. broad, subtended by 2-3 foliaceous, hirsute bracts; rays 8, disk flowers numerous; involucre bracts orbicular, appressed, with foliaceous spreading ciliate tips, pubescent, the inner little exceeding the outer; rays yellow, turning white in fruit, ovate, 5-6 mm. long, minutely bidentate; disk corollas dark purple, 5-lobed; receptacle convex to conic; scales lanceolate, conduplicate, exceeding and partly enfolding the disk flowers; achene of ray flowers cineraceous black when mature, 1.2 by 3 mm., oblong cuneate, in section triangular, tuberculate, hirsute at the base; awns 3, divergent, 2 mm. long; achenes of disk flowers dull brown, .85 by 2 mm., obovoid, in section plano-convex to rhomboidal biconvex,

with one or a pair of loosely cellular, ciliate-fimbriate wings, 5-7 mm. wide, or wingless; the winged with 1 or 2 awns, 1.2 mm. long or awnless, faintly tuberculate; the wingless achenes awnless and covered with tubercules each tipped by a short stiff hair or its stub.

SCHKUHRIA Roth. Annuals, rarely perennials, with slender, branching, erect or decumbent stems; stems glabrate to hispid; lowermost leaves opposite, upper alternate, pinnately or bipinnately divided into linear-filiform lobes, rarely simple, often impressed-punctate; heads discoid or radiate with one to few rays; involucre obconic to turbinate; bracts of the involucre 4-18, obovate to oblanceolate, rather narrow, scarious and frequently colored on the margins, occasionally one or more smaller bracts present; ray flowers 1-3, rarely more, yellow to white, minute; disk flowers few to numerous, yellow, rarely red-tipped, lobes 5, extending about half the length of the throat, glandular tube equal to or less than the length of the throat; style branched with short acute appendages; achenes elongate; obpyramidal, generally 4-angled, villous or hispid on the angles, particularly at the base; pappus of 8, rarely more, scarious squamellae, calloused at the base or with prominent mid-rib becoming an awn in some of the species.

135. *Schkuhria wislizeni* A.Gray. (= *S. anthemoides* var *wislizenii* (Gray) Heiser, Ann. Missouri Bot. Gard., 32: 273. 1945). Native of Arizona and Mexico. Maryland: Canton, on chrome ore piles. Oct. 25, 1954. Reed 35198. Erect annual; stems glabrate, striate, 20-50 cm. in height; leaves glabrate, pinnately or bipinnately dissected into linear-filiform segments, 10-40 mm. long, 0.5-2 mm. wide, or the upper and lower ones entire, conspicuously glandular-punctate; involucre bracts yellow to purple at the apex; ligules seldom over 1 mm. long, almost as wide; squamellae lanceolate to ovate-lanceolate, those of the angles awn-tipped, the intermediate ones shorter, muticous.

SIMSIA Pers. Coarse annual or perennial herbs; leaves alternate or the lower ones usually opposite; heads rather large, radiate or discoid, the flowers yellow or purple; phyllaries 3-4-seriate, subequal or slightly graduated, narrow; receptacle slightly convex, paleaceous; rays usually yellow; disk achenes flat, obovate or oblong, glabrous or sericeous, the edges thin, not marginate; pappus none or of 2 awns.

136. *Simsia lagascaeformis* DC. (*Encelia lagascaeformis* A.Gr. in litt.) Native of Mexico. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32915; Nov. 2, 1953. Reed 32985 and 33000; Nov. 5, 1953. Reed 32980.

137. *Solidago altissima* L. Common on wastes along Clinton Street, Canton. Oct. 4, 1957. Reed 39585; along creek near Dundalk. Sept. 24, 1957. Reed 39532.

138. Solidago sempervirens L. Common along creek near Dundalk. Sept. 24, 1957. Reed 39430.

139. Sonchus arvensis L. var. glabrescens Guenth., Graebn. & Wimm. Naturalized from Europe; from eastern Quebec to Minnesota, south to Nova Scotia, Connecticut and Indiana. Maryland: Canton, on oyster shell piles. Oct. 31, 1957. Reed 39445; Nov. 23, 1958. Reed 41729.

140. Sonchus oleraceus L. A frequent weed on the oyster shell piles and the chrome ore piles in Canton. On chrome ore piles, Sept. 27, 1953. Reed 32790; June 22, 1954. Reed 33427; on oyster shell piles. Oct. 31, 1957. Reed 39446; July 17, 1958. Reed 40995; Oct. 4, 1957. Reed 39569; Nov. 23, 1958. Reed 41737.

141. Tagetes erecta L. Native of Mexico; cultivated and escaped in various areas of the West Indies and North America. Maryland: Canton, on chrome ore piles. Nov. 2, 1953. Reed 32983. Glabrous, often much-branched, up to 8 dm. tall, or less; leaves pinnately divided, somewhat petioled, the lower 10-15 cm. long; leaf-segments narrowly oblong to oblong-lanceolate, gland-dotted, sharply serrate, acute, 1.5-2.5 cm. long, or the lower ones much smaller; heads solitary at the ends of the branches, 2.5-4.5 cm. broad; peduncles 4-10 cm. long, swollen below the heads; involucre 1.5-2 cm. high, its bracts united to near the summit; rays 10-20 cm. long or longer, yellow.

142. Tagetes minuta L. Introduced from South America; South Carolina to eastern Virginia, north to Massachusetts. Maryland: Canton on chrome ore piles. Nov. 23, 1958. Reed 41730.

143. Tagetes pusilla HBK. Native from Guatemala and Costa Rica to Ecuador and Bolivia. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32890 (US); Oct. 25, 1954. Reed 35200. Annual, diffuse; stem rarely more than 1 dm. tall, branched at the base, angled, striate, sometimes minutely scabrous above; leaves opposite or the upper alternate, pinnatifid, or bipinnatifid with linear-filiform divisions; heads sessile or short-peduncled; peduncles rarely 1 cm. long, angled, sulcate; involucre turbinate-clavate, 6-7 mm. long, 2-2.5 mm. broad, decidedly angled at the base; bracts about 5, with rounded, mucronate, membranous-margined tips, and with 3 rows of many minute glands; ray-flowers 1-3, ligulae glabrous, elliptic, white, sometimes wanting; disk-flowers 8-10, corollas glabrous, 3 mm. long; tube shorter than the trumpet-shaped throat; achenes 5-6 mm. long, strongly striate; 2 or 3 of the squamellae bristle-like, hispidulous, about 4 mm. long, fully twice as long as the other 3 or 4 which are linear or oblong, truncate, often unequal in length.

TRIDAX L. Disk-flowers perfect and fertile, the ray-flowers pistillate, the rays often 3-lobed; involucre ovoid to hemispheric, its nearly equal bracts in few series, or the outer smaller than the inner; receptacle flat or convex, the chaff subtending the

disk-flowers; anthers auricled at the base or sagittate; style-branches of the disk-flowers subulate-appendaged; achenes silky-villous; pappus of many aristate plumose scales, perennial herbs with opposite, dentate or incised leaves, and long-peduncled heads of tubular and radiate flowers.

144. Tridax accendens Blake. Native of Mexico. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32899. Stems 5 dm. tall, with numerous erectish branches above, green, purplish-tinged, subterete, somewhat sulcate below, sparsely spreading pilose with several-celled hairs 1-1.5 mm. long, mostly tipped with brownish glands, the branches and pedicels puberulent with minute several-celled mostly incurved glandless hairs; leaves opposite, shorter than the internodes, petioles 2-8 cm. long, pilose with gland-tipped hairs, blades of larger leaves 5 cm. long, 4 cm. wide, subtruncate at the base and then shortly cuneate-decurrent with the petiole, remotely repand-serrate with 5-8 pairs of low bluntish teeth, herbaceous, green on both sides, above sparsely hirsute-pilose with subtuberculated-based hairs, beneath more sparsely hirsute-pilose, chiefly along the veins, triplinerved about 4 mm. above the base; panicle about 30 cm. long, 19 cm. wide, nearly naked, its lowest branches subtended by reduced leaves, the remaining bracts linear-lanceolate or narrowly triangular, 3-10 mm. long, pedicels mostly 13-15 cm. long; heads campanulate, about 22-flowered, about 5 mm. high, 7 mm. thick; phyllaries 5, 1-seriate, all subtending flowers, greenish with narrow whitish scarious margin, usually browning at apex, 6-8-vittate, obscurely ciliolate above, glabrous on back; receptacle low-conical, the palae readily deciduous; corollas white, densely hirsutulous on tube, sparsely so on some of the nerves and on teeth, 3.5-3.8 mm. long (tube 1 mm., throat cylindrical-oblong, about 1.5 mm. in outer corollas, 1.8 mm. long in central flowers; teeth 5, broadly triangular, 1.2 mm. long in outer corollas, 0.8 mm. in central flowers); achenes of outer flowers obovoid, somewhat compressed, densely and shortly silky-pilose, 5-ribbed, 2 mm. long, their pappus persistent, of about 20 lanceolate lacerate-fimbriate squamellae, united at the base, about 0.4 mm. long; central achenes obpyramidal with 5 black glabrous ribs, densely short-pilose, 1.8 mm. long, their pappus of about 20 alternately, somewhat unequal oblong obtuse fimbriate squamellae, 0.8-1 mm. long, united at the base in a thick ring; intermediate fruits with intermediate characters.

145. Verbesina encelioides (Cav.) B. & H. Native from Montana to Arizona, east to Kansas and Texas; adventive to Missouri and eastward to New England. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32660; Oct. 12, 1953. Reed 32892; June 22, 1954. Reed 33415; Oct. 25, 1954. Reed 35207.



Weeds on chrome ore at Canton, Maryland



Amaranthus, grasses on chrome ore at Canton, Maryland

146. Xanthium chinense Mill. Maryland: Canton, common in wastes. Sept. 27, 1953. Reed 32829.

147. Xanthium spinosa L. Maryland: Canton, common in several waste places and on chrome ore piles. Sept. 27, 1953. Reed 32708, 32781, 32849; Oct. 12, 1953. Reed 32875; Nov. 2, 1953. Reed 32987; Oct. 25, 1954. Reed 35234; Sept. 30, 1955. Reed 38241; Oct. 17, 1956. Reed 38246.

CONVOLVULACEAE

148. Convolvulus arvensis L. Naturalized from Eurasia, from southern Quebec, southward and westward. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32658; July 17, 1958. Reed 40993; wastes, Clinton and Holabird Streets, Canton. May 22, 1958. Reed 40415.

149. Cuscuta gronovii Willd. Not uncommon on plants in wastes in Canton. July 6, 1904. Plitt.

150. Evolvulus filipes Mart. Central and tropical and subtropical South America. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32846. Herb with slender, erect or ascending stems, appressed hairy; leaves oblong- or linear-lanceolate, acute or acuminate, 4-10 mm. long, 1-2 mm. broad, appressed hairy or nearly glabrous, very shortly petioled; inflorescences axillary, 1- or rarely 2-3-flowered; the pedicels 1-4 mm. long; bracts minute, persistent, linear-lanceolate; sepals lanceolate, acute, 2 mm. long; corolla rotate with short tube, white or lilac; capsule globose, 2-3 mm. in diameter, 4-valved, 4-1-seeded; seeds glabrous.

151. Ipomaea aff. angustifolia Jacq. Native of Africa; also known from Australia and Puerto Rico. Virginia: Newport News, on chrome ore piles, marked from India. Nov. 1959. Reed 45901.

152. Ipomaea nil (L.) Roth. Old World Tropics; Hawaii; continental tropical America; West Indies; Florida. Maryland: Canton, on chrome ore piles. Oct. 1959. Reed 45814.

CRUCIFERAE

153. Arabidopsis thaliana (L.) Herzh. Naturalized from Europe; Massachusetts to Michigan and Illinois, and southward. Frequent on the wastes in Canton. April 24, 1958. Reed 40701.

154. Brassica kaber (DC.) L.C.Wheeler, var. pinnatifida (Stokes) L.C.Wheeler. (B. arvensis (L.) Rabenh., non L.; Sinapis arvensis L.) Naturalized from Eurasia. Maryland: Canton, on wastes. May 16, 1903. Plitt.

155. Brassica hirta Moench. (B. alba of Amer. auth., non Gilib.; Sinapis alba L.). Maryland: Canton, on wastes. May 1903. Plitt. (Reed Herb.).

156. Brassica juncea (L.) Coss. Maryland: Canton, on wastes and on chrome ore piles. June 10, 1957. Reed 38800.
157. Brassica nigra (L.) Koch. Maryland: Canton, on chrome ore piles. Oct. 25, 1954. Reed, Herb. No. 9166.
158. Brassica rapa L. (B. campestris L.) Naturalized from Eurasia; throughout eastern North America as a weed. Maryland: Canton, May 1903. Plitt; on chrome ore piles, June 22, 1954. Reed 33359; Oct. 25, 1954. Reed 35243; also fields near Fork, Baltimore Co. May 10, 1959. Reed 38879.
159. Cakile maritima Scop. Adventive from Europe; sporadic on rubbish piles along coast, eastern United States. Maryland: Canton, along shore near Newkirk Street. Sept. 27, 1953. Reed 32704; May 24, 1954. Reed 33346; on chrome ore piles. July 17, 1958. Reed 40994.
160. Capsella bursa-pastoris (L.) Medic. Naturalized from Europe, throughout North America and beyond. Common in the wastes in Canton. April 24, 1958. Reed 40706.
161. Cardaria draba (L.) Desv. (Lepidium draba L.) Naturalized from Europe; from Nova Scotia to District of Columbia and westward. Maryland: Canton in wastes. May 1903. Plitt.
162. Coronopus didymus (L.) Sm. Naturalized from Europe, from Florida to Texas, north to Newfoundland. Maryland: Canton, on chrome ore piles. July 17, 1958. Reed 41000.
163. Diplotaxis tenuifolia (L.) DC. Naturalized from Europe, from New Brunswick to Ontario, south to Nova Scotia, New England, Virginia and Michigan. Maryland: Canton, on ballast lot. Oct. 17, 1900. C.C.Plitt. (Reed Herb.); May 16, 1903. C.C.Plitt.
164. Diplotaxis siifolia Kunze. Maryland: Canton, on chrome ore piles. Oct. 2, 1953. Reed 32682.
165. Erysimum repandum L. Adventive from Eurasia, from Massachusetts to Oregon, south to Alabama, Arkansas and Texas. Maryland: Canton, on chrome ore piles. June 23, 1955. Reed 36550.
166. Lepidium campestre (L.) R.Br. Common in wastes areas throughout the Canton area. Canton, on the chrome ore piles. April 24, 1958. Reed 40697.
167. Lepidium virginicum L. Common in wastes areas throughout the Canton area. June 23, 1955. Reed 36551.
168. Lepidium graminifolium L. Native of Europe and the Mediterranean region; waif in New Jersey and Pennsylvania. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33424, 33364; May 24, 1954. Reed 33346; June 23, 1955. Reed 36549; May 24, 1960. Reed 46326.

169. Lepidium hyssopifolium Desv. Native of New Holland. Maryland: Canton, on chrome ore piles. Sept. 24, 1958. Reed 41218. (vel L. sativum ?) Annual herb, winged, branched, the branches divaricate, pubescent to glabrous; leaves linear-lanceolate, acute, minutely dentate toward the apex, glabrous; silicle oval, apex obtuse, emarginate; stigma sessile, capitate.
170. Raphanus raphanistrum L. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33429.
171. Raphanus sativus L. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33360.
172. Rorippa islandica (Oeder) Borbas. Native of Greenland and Eurasia; adventive from Europe; Anticosti Isl., Quebec to Michigan, south to Nova Scotia, New England, New Jersey and Pennsylvania. Maryland: Canton, on ballast. July 6, 1904. C.C.Plitt.
173. Rorippa simata (Nutt.) A.S.Hitchc. Native from western Ontario to Washington, south to Michigan, Illinois, Missouri, Oklahoma, Texas, New Mexico, Arizona and California. Maryland: Canton, on chrome ore piles. June 10, 1957. Reed 38809.
174. Rorippa sylvestris (L.) Bess. Naturalized from Europe; Newfoundland to Ontario, south to New Brunswick, New England, Virginia, Kentucky and Missouri. Maryland: Canton, July 6, 1904. C.C.Plitt.
175. Sisymbrium altissimum L. (Norta Britt.) Naturalized from Europe, throughout eastern North America and beyond. Maryland: Canton, common on the oyster shell piles. May 22, 1958. Reed 40411; on chrome ore piles. July 22, 1954. Reed 34034; wastes, Clinton and Holabird Streets. May 22, 1958. Reed 40418.
176. Descurainia sophia (L.) Webb. (Sisymbrium L.). Naturalized from Europe; Quebec to Washington, south to Delaware, Pennsylvania, Illinois, Kansas, Colorado, Utah and California. Maryland: Canton. June 1900. C.C.Plitt.
177. Thlaspi arvense L. Naturalized from Europe; Labrador to Alaska, and southward. Maryland: Canton, on chrome ore piles, frequent. Oct. 25, 1954. Reed 35195.

CUCURBITACEAE

BLASTANIA Kotschy & Peyr. Slender twiner; stems slightly scabrid, ribbed; leaves digitately 3-5-partite, up to 7 cm. long, thin, lobes sharply toothed, scabrid-pubescent; petiole pubescent; bract foliaceous and resembling a stipule at base of inflorescence, ovate-orbicular, narrowed to the base, fimbriate, about 1 cm. long; male flowers few and very small on a common axillary peduncle up to 2 cm. long, female solitary, subsessile or short pedicellate; fruit about 2-seeded, globose, smooth, 1-1.5 cm. in diameter.

178. Blastania fimbristipula Kotschy & Peyr. Native of Togoland, West Africa to eastern Sudan, Abyssinia, Angola, east and south Africa; Arabia and India. Maryland: Canton, on chrome ore piles. Sept. 24, 1958. Reed 41236. Flowers creamy-white; fruit scarlet, cherry-like.

179. Citrullus vulgaris Schrad. (Watermelon). Many varieties of these have been collected on various chrome ore piles, in Canton, between 1953 and 1960.

CYPERACEAE

180. Cyperus fuscus L. Adventive from Europe; Massachusetts to western New York and Virginia. Maryland: Canton, June 19, 1900; July 20, 1901; Aug. 19, 1902. Oct. 1, 1902. All collected by Plitt.

181. Cyperus globulosus Aubl. Native of tropical America; Florida to Texas, north to Virginia, New Jersey, Pennsylvania, Missouri and Oklahoma. Maryland: Canton, on chrome ore piles. Sept. 19, 1958. Reed 41325.

182. Cyperus iria L. Native of the warmer parts of Eurasia; Florida to Texas, north to southeastern Virginia and Maryland. Maryland: Canton, on chrome ore piles. Aug. 1959. Reed 44366; Oct. 1959. Reed 45705. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45882.

183. Cyperus rotundus L. Naturalized from Eurasia; Florida to Texas and Mexico, north to Virginia and southern New York. Maryland: Canton, Sept. 27, 1953. Reed 32723 and 32758; July 17, 1958. Reed 41019; Sept. 6, 1958. Reed 41292; Sept. 19, 1958. Reed 41339. Manganese ore piles, Aug. 18, 1959. Reed 44381; July 15, 1960. Reed 46737. Virginia: C&O RR at Port of Newport News. Aug. 7, 1959. Reed 44040 and 44077.

184. Cyperus strigosus L. Florida to Texas and New Mexico, California, north to New England, southwestern Quebec, Michigan, Wisconsin, Minnesota, Nebraska and Washington. Maryland: Canton, on chrome ore piles. Sept. 1, 1954. Reed 34382; Sept. 19, 1958. Reed 41323 and 41333.

185. Cyperus polystachyos Rottb. var. texensis (Torr.) Fern. Tropical America to Argentina; Florida to Texas and Mexico, north on the coastal plain to Cape Cod, Massachusetts and inland north to se Missouri. Maryland: Canton, on manganese ore piles. Aug. 1959. Reed 44380; Oct. 1959. Reed 45698.

186. Cyperus compressus L. Widely distributed in Old World; through tropical America to Brazil; Florida to Texas, near the coast, north to Delaware and Maryland, inland to Missouri. Maryland: Canton, on manganese ore piles. Aug. 1959. Reed 44377; Oct. 1959. Reed 45695.

KYLLINGIA ROTTB. Annual or perennial sedges, with slender triangular culms, leafy below and with 2 or more leaves at the summit forming an involucre to the strictly sessile, simple or compound dense head of spikelets; spikelets numerous, compressed, falling away from the axis of the head at maturity, consisting of only 3 or 4 scales, the 1 or 2 lower ones small and empty, the middle one fertile, the upper empty or staminate; joints of the rachis wingless or narrowly winged; scales 2-ranked, keeled; perianth none; stamens 1-3; style 2-cleft, deciduous from the summit of the achene.

187. Kyllingia brevifolia Rottb. West Indies, southern United States, tropical continental America and Old World Tropics; common on Pacific Islands; this similar to specimens from Pitcairn Isl. in US. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41119; Nov. 23, 1958. Reed 41743.

188. Scirpus americanus Pers. Native of Eurasia; Florida to Texas, south to South America, west to Pacific, north to Newfoundland. Maryland: Canton, in ditches near oyster shell piles. July 19, 1958. Reed 40877.

189. Scirpus hystrix Thunb. Native of South Africa, Natal. Virginia, Newport News, on chrome and iron ore piles. Aug. 1959. Reed 44059 (US); Nov. 1959. Reed 45864. Tufted annual, 8 cm. high or less; leaves as long as the flowering stems, flat above, rounded below; spikelets few to several in a cluster, the bract at base of cluster leaf-like; spikelets bristly with the green somewhat reflexed tips of the bracts; bracts widely ovate, green, sometimes with a reddish tinge, cuspidate; stamens 2, the anthers small, at maturity many times shorter than the filament; style branches 3, divided almost to the base; fruit sharply 3-angled, greenish-black, the posterior face largest.

DICHONDRACEAE

DICHONDRA Forst. Small prostrate or creeping herbs, rooting at the nodes, with stalked rounded or reniform leaves, and axillary 5-partite flowers; carpels 2, free, each 1- or 2-celled, with 1 or 2 ovules to each cell, the 2 styles arising between the carpels; fruits of fruitlets, usually 1-seeded. This genus is sometimes placed in the Colvolvulaceae.

190. Dichondra repens Forst. Native of Australasia and almost cosmopolitan to the warm regions of the world. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 41726. A small perennial prostrate, slender creeping herb, with small roundish, silky leaves, 1-2 cm. broad; flowers small, pale white or yellow, with 5 calyx and 5 corolla parts; sepals oblong, 2-4 mm. long, the corolla hardly longer, with 5 oblong lobes twice as long as the tube; fruitlets 2, each with 1 obovoid seed, or only 1 developing; fruit a capsule.

DYSPHANIACEAE

DYSPHANIA R.Br. Herbs, low, glabrous, with small alternate leaves without stipules; flowers small, in axillary or terminal clusters, with the inner ones often female; perianth of 1-3 white segments, stalked, with a broad limb; stamens 1-3; styles 1-2, short and thin; fruit 1-seeded, the pericarp closely adherent to the seed. This genus is related to *Scleranthus*, which has opposite leaves and typical sepals and is placed by Pax next to that genus in the Caryophyllaceae; it is more closely related to *Chenopodium* and thus links the families together. The genus has 4 or 5 species in Australia.

191. *Dysphania plantaginella* F. v. M. Native of western Australia. Maryland: Canton, on manganese ore piles. July 1959. Reed 43843. (Det. by L.B. Smith).

EQUISETACEAE

192. *Equisetum arvense* L. Eurasia; North America, south to Virginia, Missouri, Nebraska, Colorado and northern California. In Canton, between the chrome ore piles. June 1957. Reed 38797; in wastes in Canton. Oct. 1957. Reed 39418 and May 1958. Reed 40416.

EUPHORBIACEAE

193. *Acalypha virginica* L. Georgia to Texas, north to Massachusetts, etc. Weeds throughout the Canton area. Some have green bracts (Reed 35208), others have red bracts (Reed 35210).

CHROZOPHORA Neck. Plants monoecious; Male flowers: calyx 5-partite, densely stellately hairy, lobes ovate, petals 5, membranous, equalling or shorter than the sepals; disc inconspicuous, of 5 glands or connate into a ring; stamens 5-15, more or less in 1-3 series; filaments connate into a minutely pubescent tube; anthers of outer series subsessile; pistil none. Female flowers: calyx segments narrow linear; petals narrow, sometimes small or setaceous, or none; disc glandular, alternating with the petals or disc somewhat tumid; ovary 3-chambered, with a single ovule in each chamber, stellately hairy; styles 2-fid, covered with distinct papillae; capsule somewhat fleshy, splitting into 3 cocci, stellately hairy; seed subglobose, with a woody testa, sometimes rough; endosperm fleshy, copious; embryo straight; cotyledons subquadrate. Branching herbs, often spreading, covered with stellate hairs or hispid; leaves alternate, petioled, ovate, often with undulate margins; stipules small, setaceous; inflorescences a short dense sessile axillary raceme.

194. Chrozophora tinctoria (L.) Juss. Native of the Mediterranean region, Spain, Italy, Greece, France, Syria, Egypt and Algeria. Maryland: Canton, on chrome ore piles. July 1959. Reed 43620; Aug. 1959. Reed 44359.
195. Croton glandulosus L. var. septentrionalis Muell. Florida to Texas, north to Delaware; adventive to New Jersey and Pennsylvania. Virginia: Port of Newport News, weedy. Aug. 7, 1959. Reed 44037 and 44080. Also known as far north in Maryland as Anne Arundel Co. July 22, 1956. Reed 38425 and July 18, 1960. Reed 47047; and Caroline Co., on wastes near Denton. Sept. 9, 1956. Reed 38496. Also collected in railroad yards at Portsmouth, Scioto Co., Ohio where some of the ores from the east have been taken.
196. Croton bomplandianus Baill. Native of Argentina. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32742; July 19, 1958. Reed 40888; July 17, 1958. Reed 41003; July 1959. Reed 43628; Aug. 1959. Reed 44364; Oct. 1959. Reed 45702 and 45822; Sept. 1959. Reed 45677; on pile from Turkey. Oct. 14, 1958. Reed 41118; Sept. 6, 1958. Reed 41302. Some of these piles miles apart. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45897.
197. Euphorbia chamaesyce L. (E. prostrata Ait.). Naturalized from tropical America; Florida to Texas and Mexico, north to southeastern Virginia, Maryland and Missouri. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32729 and 32848; Oct. 1953. Reed 32896; June 1954. Reed 33433; Sept. 1957. Reed 39324; Oct. 1959. Reed 45816.
198. Euphorbia dentata Michx. New York to Virginia, west to Minnesota, South Dakota and Wyoming, south to Louisiana, Texas and Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32811; Locust Point, wastes along Railroad. July 1959. Reed 43828 (US) and 43829 (leaves linear). Virginia: Newport News, common in the railroad yards in the port. Aug. 1959. Reed 44069 and 44035.
199. Euphorbia esula L. Naturalized from Europe; Quebec to Alberta, south to Nova Scotia, New England, Pennsylvania, Indiana, Illinois, Iowa, Nebraska, etc. Maryland: Canton. May 1903. C.C.Plitt; July 1904. C.C.Plitt. (Reed Herb.).
200. Euphorbia falcata L. Naturalized from Europe; Pennsylvania and Ohio, south to Virginia and West Virginia. Maryland: Canton, on chrome ore piles. June 1956. Reed 38816.
201. Euphorbia glomerifera Millsp. (E. hypericifolia L.). Florida to Texas and Mexico, West Indies, Bermuda. Maryland: Canton, on chrome ore piles. June 1954. Reed 33440.

202. Euphorbia hernariaefolia Willd. Native of Crete, Mt. Olympus, Asia Minor (US). Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32669.
203. Euphorbia hirta L. Widely distributed in tropical and subtropical lands, including southeastern United States. Maryland: Canton, on chrome ore piles. Nov. 2, 1953. Reed 32990; July 1959. Reed 43631; Oct. 1959. Reed 45704.
204. Euphorbia hyssopifolia (L.) Small. Native of Florida, the West Indies and tropical continental America. Maryland: Canton, on chrome ore piles. Sept. 1954. Reed 34392.
205. Euphorbia maculata L. (E. preslii Guss.) Florida to Texas and Mexico, north to New England, New York, etc. Frequent on the chrome ore piles in Canton. Sept. 1, 1954. Reed 34379 and 34381.
206. Euphorbia marginata Pursh. Minnesota to Colorado and Texas; introduced in wastes in the central and Atlantic States. Virginia: Newport News, common in wastes about the port in railroad yards. Aug. 1959. Reed 44072.
207. Euphorbia supina Raf. Southern Canada to North Dakota, and southward. A common weed in railroad wastes, on chrome ore piles, roadsides, in both Canton and Newport News.
208. Euphorbia vermiculata Raf. Gaspé Peninsula to northern Michigan, south to Maryland, Ohio, Indiana and southern Wisconsin; New Mexico and Arizona. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32744; Oct. 1959. Reed 45794.
209. Mercurialis annua L. Local on wastes and ballast-ground, Quebec to Ohio, and southward. Maryland: Canton, on ballast. July 1904. C.C.Plitt. (Reed Herb.).

FAGACEAE

210. Quercus phellos L. Northern Florida to eastern Texas, north to Long Island, New Jersey, southeastern Pennsylvania, etc. In Canton this oak has been collected, Aug. 1880. Geo. L. Smith. (Reed Herb. No. 18308).

GERANIACEAE

211. Erodium cicutarium (L.) L'Her. Naturalized from Europe; Quebec to Michigan and Illinois, south to Nova Scotia, New England, Virginia, Tennessee, Arkansas, Texas and Mexico. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33362.

212. Geranium rotundifolium L. Native of Europe, Russia, Asia, Britain and Ireland. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33366. Annual with wide spreading branches, with small orbicular or reniform leaves, with soft hairs; the peduncles rather short, the blades shortly divided into broad lobes; the flowers small with entire obovate petals, scarcely extending the slightly pointed sepals; carpels hairy, without wrinkles; the seeds dotted.

GRAMINEAE

I wish to thank Dr. Jason Swallen and am indebted to Mrs. Agnes Chase of the United States National Herbarium for verifying or identifying the grasses collected in the Canton and Newport News areas. Many new genera and species have been found in these areas, some of which have already been published in Rhodora (Reed, 1954, 56: 178-181).

213. Aegilops triuncialis L. Introduced from Europe; a weed in California; adventive in Pennsylvania. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33379; June 1956. Reed 38819; June 1957. Reed 38805. Culms branching and spreading at the base, 20-40 cm. tall; blades rather rigid, sharp-pointed, spreading; spike 3 to 4 cm. long, 2 or 3 of the lower spikelets often reduced, the fertile spikelets 3 to 5; glumes with 3 strong scabrous somewhat spreading awns, 4 to 8 cm. long; lemmas with three rigid unequal awns.

214. Agrostis alba L. Native of Eurasia; Newfoundland to Yukon, south to Georgia, etc. Maryland: Canton, on chrome ore piles. June 1957. Reed 38802; on manganese ore piles. Aug. 9, 1961. Reed 52150.

215. Agrostis capillaris L. Native of Europe. (Related to A. tenuis Sibth.). Maryland: Canton, on chrome ore piles. Aug. 1959. Reed 44362.

216. Agrostis palustris Huds. Eurasia; Maine to Virginia, west to Wisconsin and Illinois, British Columbia, Washington and Idaho, California and Texas. Maryland: Canton, on pumice piles, from Islands off Italy. Aug. 20, 1963. Reed 65421.

217. Alopecurus myosuroides Huds. Adventive from Europe; Massachusetts to Michigan, south to North Carolina and Kansas. Maryland: Canton, on chrome ore piles. June 1954. Reed 33381 and 33397.

218. Andropogon pertusus (L.) Willd. Introduced from the Old World; West Indies; Mississippi. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 41889 (US).

219. Andropogon virginicus L. A common weed from Massachusetts to Florida; common between the chrome ore piles at Canton. Oct. 25, 1954. Reed 35220; Oct. 4, 1957. Reed 39563.

APLUUDA L. Tall slender perennial leafy grasses; stems geniculate, base creeping or decumbent, branched above; leaves narrow petioled, upper ones spathe-like, mucronate; spikes numerous, very small, solitary, simple, on the ends of the branches, each enclosed in a membranous peduncled spathe, of one joint; spikelets 3, one sessile 2-flowered, bisexual, one pedicelled imperfect and one terminal male; sessile spikelets on the bulbous base of the rachis; glumes 4; stamens 3; anthers short; stigmas plumed, free.

220. Apluda mutica L. (A. aristata L.) Native of China, East Indies, and South Africa, India and Malaya to Hawaii. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41138; Oct. 28, 1958. Reed 41350 (US). (Description in Collett, Flora Simlensis, p. 598 sub Apluda aristata Hack. 1902; in Hook., Fl. Brit. India, 7: 150, sub A. varia, 1897).

221. Aristida adscensionis L. Originally described from Ascension Island; a common weed in the American tropics from Argentina northward to southern California and Nevada, eastward to Texas, southern Kansas and Missouri. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32752 and 32826.

222. Arthraxon hispidus (Thunb.) Makino. Introduced from the Orient; Pennsylvania and Maryland to Florida, west to Missouri and Louisiana. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41128; Cub Hill, Baltimore, in fields. Oct. 1953. Reed 33143; Nov. 16, 1961. Reed 53750.

223. Avena fatua L. Introduced from Europe; rare in eastern United States, Maine to Pennsylvania, Maryland, Missouri and westward; a common weed on the Pacific Coast. Maryland: Canton, on chrome ore piles. June 1954. Reed 33426.

224. Avena sativa L. Commonly cultivated and escaped. Maryland, Canton, on chrome ore piles. June 1954. Reed 33425 and Nov. 1958. Reed 41719.

225. Bouteloua aristidoides (HBK) Griseb. Native of Texas to Nevada, southern California and northern Mexico; Argentina. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32727. Annual, erect or spreading, branching; culms slender, 10-30 cm. tall; blades small and few, in vigorous plants as much as 15 cm. long; spikes mostly 8-14 on a slender axis, reflexed, readily falling, the base of the rachis forming a sharp, bearded point; spikelets 2-4, narrow, appressed; rudiment of 3 scabrous awns about 5 mm. long, exceeding the fertile floret.

226. Bouteloua barbata Lag. Native from Texas and Colorado to Nevada and southeastern California and Mexico. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32824. Annual, tufted, branching, erect to prostrate, often forming mats with ascending ends, the culms as much as 30 cm. long; foliage scant; blades 1-4 cm. long, 1-1.5 mm. wide; spikes 4-7, 1-2 cm. long; spikelets 25-40, 2.4-4 mm. long, nearly as broad; fertile lemma densely pilose at least along the sides, usually throughout, the awns from minute to as long as the body, the intermediate lobes subacute to obtuse; rudiment from obscurely to conspicuously bearded at summit of rachilla joint, cleft nearly to the base, the intermediate lobes broad, subcucullate, the awns of rudiment and fertile lemma reaching about the same height, a second rudiment, broad and awnless, often developed.

227. Brachiaria distichophylla (Trin.) Stapf. Native of West Tropical Africa, where it is a common wayside grass, loosely tufted, occasionally half-creeping and forming a carpet. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44062 (US); on iron ore piles. Nov. 1959. Reed 45863. Annual, 12-30 cm. tall, culms very slender, terete, geniculate, usually ascending from a decumbent or prostrate stem, rooting at base, often much branched below, 5- to many-times noded, the uppermost internode usually very long, pubescent, rarely glabrous; leaf-sheaths more or less herbaceous, rather tight, those supporting a branch slipping off the internode and rolling round the branch, finely striate, more or less pubescent, sometimes densely so, or finely hirsute, rarely glabrous; ligules reduced to a narrow ciliate rim; blades lanceolate or linear-lanceolate from a suddenly contracted rounded base, gradually tapering from very low down to an acute point, 2.5-4 cm. long, rarely longer, rather stiff and somewhat succulent, green, glabrous or more or less pubescent, margins markedly cartilaginous and usually cuspid downwards, spinulosely ciliolate to serrulate, primary lateral nerves 3-4 on each side, very fine and differentiated from the numerous and close secondary nerves only below, midrib very slender; panicle at length long-exserted, secund, 3.5-7 cm. long, of 4-8 obliquely spreading or almost horizontal distant solitary slender spike-like mostly single racemes; common axis very slender, terete, terminating with a spikelet; racemes straight or slightly curved, the lowest 1-3 cm. long, gradually decussing upwards, simple or very rarely slightly compounded at base with very short and scanty secondary racemes; lower florets neuter; upper floret male and female, slightly shorter than the lower, or equalling it; glumes very unequal.

228. Brachiaria erucaeformis (J.E.Smith) Griseb. in Ledeb. Native of Old World, occasionally cultivated in grass gardens. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32763; Sept. 1958. Reed 41216; Oct. 14, 1958. Reed 41141 (US). Spreading annual, with rather delicate erect racemes and pubescent spikelets 2.5 mm. long.

229. Brachiaria subquadripara (Trin.) Hitchc. Asia; Mariana Islands; occasionally planted in southern Florida. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41296; Sept. 1948. Reed 41318 (US); Nov. 1958. Reed 41900; on many chrome ore piles in Aug. 1959. Reed 44367. Creeping leafy perennial; culms 25-60 cm. long; blades flat, 5-10 cm. long, 4-8 mm. wide; racemes mostly 3-5, spreading, rather distinct; spikelets 3.5 to 4 mm. long, elliptic, glabrous.
230. Bromus commutatus Schrad. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33423.
231. Bromus rigidus Roth. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33376 and 33378.
232. Bromus tectorum L. Maryland: Canton. May 22, 1958. Reed 40407.
233. Cenchrus echinatus L. Common weed in tropical America; South Carolina to southern California; sparingly introduced to Hawaii and Malaysia. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35205. Annual; culms compressed usually geniculate, branching at base, 25-60 cm. long; blades 3-8 mm. wide, pilose on the upper surface near the base; raceme 3-10 cm. long, the burs larger, fewer and less crowded than in C. brownii; bur 4-7 mm. high, as broad or broader, pubescent, the lobes of the involucre erect or bent inward but not interlocking; spikelets usually 4 in each bur.
234. Cenchrus incertus M.A.Curtis. Native on the Coastal Plain, from southeastern Virginia and North Carolina, west to California, and south to Mexico, Central and South America, and in West Indies; South Africa (weed). Maryland: Canton, on chrome ore piles. Sept. 19, 1958. Reed 41332. Det. D.G.DeLisle (See Iowa State Journ. Sci. 37(3): 308-316, fig. 15. 1963).
235. Cenchrus longispinus (Hack.) Fern. Ontario, southward throughout United States to Mexico, Central America and West Indies; Bermuda; locally naturalized in western Europe, South Africa and Australia. Common in the wastes of Port of Newport News, in RR yards, Virginia. Reed 44079 and 44083. Det. D.G.DeLisle (See Iowa State Journ. Sci. 37(3): 294-301, fig. 10. 1963).
236. Chloris virgata Swartz. Native from Nebraska to Louisiana, Texas and southern California; also Ohio, Indiana, Maryland to Florida; tropical America. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32714; Oct. 25, 1954. Reed 35239; Oct. 31, 1957. Reed 39442.

237. Cinna arundinacea L. Maine and Ontario to Minnesota and South Dakota, south to Georgia and Texas. Maryland: Canton, on chrome ore piles. July 15, 1960. Reed 46730.

CORIDOCHLOA Nees Spikelets flattened, ovate, in 2's or 3's, subsessile along a slender rachis; glumes and sterile lemma papery, the second glume stiffly ciliate; fruit stipitate, concavo-convex, awned; annual, with several digitate racemes, naked at the base.

238. Coridochloa cimicina (L.) Nees ex Jacks. Native of southern Asia; sparingly introduced in Florida. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41139. Culms 20-60 cm. tall; sheaths hispid; blades 3-8 cm. long, 1.5-2.5 cm. wide, subcordate; racemes mostly 4-8, digitate, sometimes a second whorl below; spikelets about 3 mm. long, the awn of the fruit curved, about 1 mm. long.

239. Cynodon dactylon (L.) Pers. Naturalized from Europe; St. P. et Miq., Massachusetts to Michigan, Iowa and eastern Kansas, southward, where abundant. Maryland: occasional in Canton on chrome ore piles. Sept. 1953. Reed 32784; Oct. 1953. Reed 32914; Sept. 19, 1958. Reed 41328 and 41321; Nov. 23, 1958. Reed 41742; on manganese ore piles. Aug. 9, 1961. Reed 52151.

240. Dactyloctenium aegyptium (L.) Beauv. (1812; Richter made same combination in 1890, using the same basynym). Introduced from the Old World Tropics, from North Carolina to Florida and Texas; occasional north to Maine, New Jersey, Illinois, Colorado, Arizona, California; tropical America. Maryland: Canton, common on chrome ore piles since 1953, collected every year, becoming weedy. Sept. 1953. Reed 32718 and 32720; Sept. 1958. Reed 41335 (US) and 41343 (US); July 1959. Reed 43634 and 43837; on manganese ore piles. Oct. 1959. Reed, many collections; Sept. 1960. Reed 48058; Oct. 1961. Reed 53668. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45913, 43892 and 45883.

241. Dactyloctenium geminatum Hook. Native in sandy soils on the coast of Zululand, in brackish soils in eastern Transvaal. (Chipindall, The Grasses and Pastures of South Africa, p. 131. 1955). Maryland: Canton, on chrome ore piles. Sept. 19, 1958. Reed 41336 and 41337; Nov. 23, 1958. Reed 41901 (US). A stoloniferous perennial with culms up to 70 cm. high; spikes 2-3, more rarely 1, 2.5-6 cm. long; spikelets 3-4 mm. long, 3-5-flowered; keel of the lemma and the rachis smooth; lemmas usually awnless; leaves glabrous or with a few tubercle-based hairs.

242. Digitaria longifolia (Retz.) Pers. Tropical regions of the Old World; introduced from Tropical America into southern Florida. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 44134.

243. Digitaria ischaemum (Schreb.) Schreb. ex Muhl. Virginia: Newport News. Common on chrome ore piles. Aug. 1959. Reed 44059; on iron ore piles. Nov. 1959. Reed 45858.

244. Digitaria sanguinalis (L.) Scop. Maryland: Canton, common on chrome ore piles, many collections between 1953 and 1960; on manganese ore piles. Oct. 1959. Reed 45693.

245. Digitaria adscendens Henr. Native of tropical regions of the World. Maryland: Canton, on manganese ore from the Yamatogo Maru from India, Clinton Street. Aug. 20, 1963. Reed 65409 (US).

DINEBRA Jacq. Inflorescence of 2 to many one-sided spikes, or spike-like racemes, much reduced so that the spikelets are in small cludters on the central axis; glume acuminate or tapering into awns, as long as or longer than the rest of the spikelet; rachis of all or of the spikes short and greatly reduced; ligule a membrane.

246. Dinebra retroflexa (Vahl) Panzer. Native of Bechuanaland and the Transvaal. (Chippindall, l.c., pp. 185-186, f. 160. 1955). Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 44155. Annual, with culms up to 80 cm. tall; leaf-blades expanded, glabrous or loosely hairy; ligule a membrane; inflorescence 8-30 cm. long, of numerous short spikes on a central axis; the flattened rachis of the spikes often short or greatly reduced, especially upwards, so that the spikelets are more or less clustered on the central axis and the inflorescence is narrow, dense and spike-like; spikelets 5-8 mm. long, 2-3-flowered, glabrous; glumes about equal, usually much longer than the rest of the spikelet, acuminate or tapering into short awns; lemmas 3-nerved, awnless.

247. Echinochloa colonum (L.) Link. Adventive and naturalized from the Old World; Florida to Texas and Mexico; locally north to New England, Ohio, Pennsylvania and Illinois. Maryland: Canton, rather common on chrome ore piles, collected many times up to 1960; on manganese ore piles. Aug. 1959. Reed 44351. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44055 and Nov. 1959. Reed 45896; on iron ore piles. Nov. 1959. Reed 45860.

248. Echinochloa crus-galli (L.) Beauv. New Brunswick to Washington, south to Florida and California; Eastern Hemisphere. Maryland: Canton, common on wastes between chrome ore piles. Aug. 1959. Reed 44385.

249. Echinochloa crus-galli var. mitis (Pursh) Peterm. Distributed over the same area as the typical form, and nearly as common. Maryland: Canton, on chrome ore piles. July 19, 1958. Reed 40886; Sept. 6, 1958. Reed 41290; Aug. 1959. Reed 44386; Locust Point. July 1959. Reed 43827. Racemes dense, mostly somewhat spreading-flexuous; spikelets awnless or nearly, the awns less than 3 mm. long; basal sheaths occasionally hirsute.
250. Echinochloa crus-galli var. zelayensis (HBK) Hitchc. Mexico to Argentina; Oklahoma to Oregon, south to Texas and California. Maryland: Canton, on chrome ore piles. Oct. 25, 1954. Reed 35237. Differs from var. mitis in having less succulent culms, mostly simple, more or less appressed racemes, the spikelets less strongly hispid but papillose, usually green.
251. Eleusine indica (L.) Gaertn. Naturalized from the Old World; Quebec to Minnesota and South Dakota, and southward. Maryland: Canton, on chrome ore piles. Sept 27, 1953. Reed 32718 and 32720; Oct. 1954. Reed 35192 and 35195; Sept. 1958. Reed 41293; Nov. 1958. Reed 41724 (depauperate form); on pumice piles, from Island off Italy. Aug. 20, 1963. Reed 65415.
- ENNEAPOGON Desv. ex Beauv. Spikelets 3-flowered, the first floret fertile, the second smaller, sterile, the third rudimentary; glumes strongly 7-nerved; lemmas rounded on the back, firm, the truncate summit bearing 9 plumose equal awns; palea a little longer than the body of the lemma, the keels near the margin; slender tufted perennials, with narrow feathery panicles.
252. Enneapogon desvauxii Beauv. Utah and Texas to Arizona, south to Mexico (Oaxaca), Peru, Bolivia and Argentina. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32907; Nov. 1953. Reed 33002. Culms numerous, slender, decumbent-spreading, 20-40 cm. tall, the nodes pubescent; blades flat to subinvolute, about 1 mm. wide; panicle spike-like, gray green or drab, mostly 2-5 cm. long, sometimes interrupted below; glumes longer than the body of the lemmas, 7-nerved, acuminate, pubescent; lemma of first floret (incl. awns) 4-5 mm. long, the body about 1.5 mm. long, villous, 9-nerved, the awns plumose, except at the apex.
253. Eragrostis atherstonii Stapf. Native of South Africa and south Tropical Africa (n. Cape, Orange Free State, Transvaal, SW Africa). (Chippindall, l.c., p. 150, fig. 116. 1955). Maryland: Canton, on manganese ore piles. Sept. 1958. Reed 41334; Aug. 1959. Reed 44383; Oct. 1959. Reed 45694. Perennial, tufted, erect or stoloniferous, forming dense stands; culms up to 70 cm. tall, simple or branched, straight or repeatedly geniculate or prostrate and rooting at nodes, few to many noded, usually glabrous, very occasionally with a few hairs; leaf-sheaths pallid or purplish, more or less papery, nerves with small

glandular dots above the node, and below the collar; collar pallid, smooth, or often with a few purplish glandular dots; leaf-blade loosely rolled or expanded, some nerves much finer than others, seen from below, usually with glandular dots especially above the collar; inflorescence 5-20 cm. long and 2-7 cm. wide, usually narrowly ovate in outline, lower branches, and often branches higher up, whorled, whorls with a tuft of spreading hairs; spikelets about 5 mm. long, 1-1.5 mm. wide, usually 3-5-flowered, silvery-gray to greenish-gray in color; lower glume equal or subequal to the lower floret, silvery-gray, thinly membranous, acute to acuminate, often wrinkled on the back; lemmas acute, dark gray with white, thin, membranous tips; anthers about 0.7 mm. long; grains about 0.7 mm. long, oblong, slightly grooved on the back, embryo very dark green to blackish.

255. Eragrostis barrelieri Daveau. Introduced from southern Europe; Colorado and Kansas to Texas and California and Mexico. Maryland: Canton, on manganese ore piles. July 1959. Reed 43639 and 43644 (US); July 1960. Reed 46736; Aug. 9, 1961. Reed 52147. Annual; culms erect or decumbent at base, 20-50 cm. tall, branching at base, sometimes with a glandular band below the nodes; sheaths pilose at the summit; blades flat, rather short, 2-4 mm. wide; panicle erect, open but narrow, 8-15 cm. long, the branches ascending or stiffly spreading, few-flowered, spikelet-bearing nearly to base, the axils glabrous; spikelets linear, usually 12- to 15-flowered, mostly about 1 cm. long and 1.5 mm. wide; lemmas 2 mm. long or slightly longer.

256. Eragrostis horizontalis Peter. Native of South Tropical Africa, to N. Transvaal, SW Africa and Bechuanaland. Maryland: Canton, Newkirk Street, on manganese ore piles. Aug. 9, 1961. Reed 52149. Agreeing in most respects with E. atherstonei Stapf, but not a distinct perennial and with slender culms; the sheaths usually somewhat keeled and conspicuously glandular (usually more so than in E. atherstonei), while the basal branches of the inflorescence have a tuft of hair in the axils of, or between the branches, but not in a ring right round. (Chippindall, l.c., p. 150, fig. 117. 1955).

257. Eragrostis cilianensis (All.) Lutati. Introduced from the Old World; Maine to Washington, south throughout United States and West Indies, south to Argentina. (E. megastachya (Koel.) Link, in Fernald, 8th Ed., p. 124). Maryland: Canton, frequent on chrome ore piles. Sept. 1953. Reed 32711; Oct. 1953. Reed 32893; Oct. 1954. Reed 35201 and 35214; Nov. 1958. Reed 41725; Locust Point. July 1959. Reed 43821.

258. Eragrostis curvula (Schrad.) Nees. Widespread in South Africa; introduced by cultivation, spontaneous in Florida, Texas and Arizona; useful in erosion control and revegetation of grasslands in SE United States. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41341. Culms 60-120 cm. tall, densely tufted,

erect, simple or sometimes branching at the lower nodes; sheaths narrow, keeled, glabrous or sparsely hispid, the lower densely hairy toward the base; blades elongate, involute, attenuate to a fine point, arcuate spreading, scabrous; panicles 20-30 cm. long, the branches solitary or in pairs, ascending, naked at the base, at least the lower densely pilose in the axils; spikelets 7- to 11-flowered, 8-10 mm. long, gray green; lemmas about 2.5 mm. long, obtuse or subacute, the nerves prominent.

259. Eragrostis diffusa Buckl. Wyoming, Idaho, Oklahoma and Texas to Nevada, California and Mexico; introduced occasionally in eastern United States. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32750, 32770 and 32785; Oct. 1953. Reed 32908 (panicle fewer-flowered than typical plants); Oct. 1954. Reed 35206, 35224, 35245 A and B, and 35236. More robust than E. pectinacea, usually 30-50 cm. tall, sometimes taller; panicle larger, the primary branches bearing appressed secondary branchlets with few to several spikelets, the main panicle branches thus more densely flowered.

260. Eragrostis pectinacea (Michx.) Nees. Maryland: Canton, on chrome ore piles, on manganese ore piles; in wastes at Locust Point; common and frequently collected in this area. Virginia: Newport News, on chrome ore piles.

261. Eragrostis pilosa (L.) Beauv. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 41360; on pumice piles, from Island off Italy. Aug. 20, 1963. Reed 65416. Virginia: Newport News, on ore piles. Aug. 1959. Reed 44061 and 44057.

262. Eragrostis poaeoides Beauv. ex Roem. & Schult. Maryland: Canton, on chrome ore piles. Sept. 1953. Reed 32713 and 32792. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45916.

263. Eragrostis unioloides (Retz.) Nees in Steud. Introduced from southern Asia; Georgia and Florida. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41130; Nov. 1958. Reed 41746. Annual; culms erect or ascending, 20-40 cm. tall; blades flat, 2-4 mm. wide; panicle elliptic, open, 10-50 cm. long, about half as wide, the branches ascending; spikelets ovate-oblong, strongly compressed, truncate at base, obtuse, 15- to 30-flowered, 5-10 mm. long, 3 mm. wide, often pink or purplish; lemmas closely imbricate, nearly horizontally spreading, strongly keeled, acute, 2 mm. long, the lateral nerves prominent; palea falling with the lemma or soon thereafter; grain about 0.7 mm. long.

264. Eriochloa gracilis (Fourn.) Hitchc. Oklahoma and western Texas to southern California, south through the highlands to Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953.

Reed 32728. Annual; culms erect or decumbent at base, 40-100 cm. tall; blades flat, glabrous, mostly 5-10 mm. wide; racemes several to numerous, approximate, ascending to slightly spreading, 2-4 cm. long, the axis and rachis softly pubescent, the pedicels short-pilose; spikelets 4-5 mm. long, rather sparsely appressed-pubescent, acuminate, or the glume sometimes tapering into an awn-point as much as 1 mm. long; sterile lemma empty; fruit about 3 mm. long, apiculate.

265. Eriochloa punctata (L.) Desv. Southwestern Louisiana to southern Texas; American Tropics. Maryland: Canton, on chrome ore piles. Aug. 1959. Reed 44369 and 44368; on manganese ore piles. Oct. 1959. Reed 45701. Perennial; culms in tufts, usually 50-100 cm. tall; blades flat, mostly 5-10 mm. wide, glabrous; racemes several, ascending, overlapping, 3-5 cm. long, the axis rachises and pedicels scabrous only; spikelets 4-5 mm. long, lanceolate, rather sparsely appressed-pilose; glume tapering to an awn-point about 1 mm. long; sterile lemma a little shorter than the glume, empty; fruit about half as long as the glume, with an awn 1 mm. long or more.

HACKELOCHLOA Kuntze Spikelets awnless, in pairs, the rachis joint and pedicel grown together, the two clasped between the edges of the globose alveolate first glume of the sessile spikelet; pedicellate spikelet conspicuous, staminate; freely branching annual with flat blades, the numerous racemes solitary and more or less enclosed in the spathes, these usually fascicled in the axils of the leaves.

266. Hackelochloa granularis (L.) Kuntze. Native of East Indies and West Africa; in tropics of both hemispheres; introduced in North America, Georgia and Florida to Louisiana; New Mexico to Arizona. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41122. Culms 30-100 cm. tall; sheaths papillose-hispid; blades flat, 5-15 cm. long, 3-15 mm. wide, papillose-hispid, ciliate; racemes 1-2 cm. long; sessile spikelets about 1 mm. thick; pedicellate spikelets about 2 mm. long.

267. Holcus lanatus L. Introduced from Europe. In Canton, on chrome ore piles. June 1954. Reed 33393.

268. Hordeum hystrix Roth. Introduced from Europe; Utah to British Columbia, Arizona and California; adventive in Massachusetts, New Jersey and Pennsylvania. Maryland: Canton, on chrome ore piles. June 1954. Reed 33396; June 1957. Reed 38806. Annual; culms freely branching and spreading or geniculate at base, 15-40 cm. tall; sheaths and blades, especially the lower, more or less pubescent, the auricle wanting; spike erect, 1.5-3 cm. long, 10-15 mm. wide, the axis usually not readily breaking; glumes setaceous, rigid, nearly glabrous to scabrous, about 12 mm. long; lemma of central spikelet 5 mm. long, the awn somewhat longer than the glumes; floret of lateral spikelets reduced, short-awned.

269. Hordeum leporinum Link. Introduced from southern Europe; Massachusetts to Georgia; Vancouver Island and Washington to California, Utah and Texas. Maryland: Canton, on chrome ore piles. June 1954. Reed 33380, 33403, 33404 and 33409. Annual; branching at base, spreading; sheaths glabrous, blades pilose to glabrous; auricle at base of blade well-developed; spike 5-9 cm. long, often partly enclosed by the inflated uppermost sheath, the rachis internodes mostly 3 mm. long; glumes of the central spikelet lanceolate, 3-nerved, long-ciliate on both margins, the nerves scabrous, the awn 2-2.5 cm. long; floret 1-1.2 cm. long, raised on a rachilla segment 1 mm. long, the awn 3-4 cm. long; lateral spikelets usually staminate, the glumes much shorter, unlike, the inner similar to those of the central one, the outer setaceous, not ciliate, the lemma broad, 10-20 mm. long, the awn 2-4 cm. long.

270. Hordeum vulgare L. Barley, adventive from grain fields. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32825.

ISCHAEMUM L. Sessile spikelets perfect, awned; pedicellate spikelets perfect but not always fruitful; rachis disjointing; raceme 2 to several, digitate or aggregate on a short axis; culms branching with flat blades and digitate or flabellate inflorescences with prominent awns.

271. Ischaemum ciliare Retz. Introduced from Old World; Panama; British Guiana. Maryland: Canton, on chrome ore piles. Nov. 23, 1958. Reed 43130. Slender much-branched perennial, with creeping rooting bases; fertile culms 30-60 cm. tall; blades flat, 3-10 cm. long, 4-8 mm. wide; racemes usually 2, 3-5 cm. long, green, finally spreading; spikelets about 4 mm. long; first glume broadly winged at the summit, smooth across the back, longitudinally striate above; awn 5-8 mm. long.

272. Ischaemum rugosum Salis. Introduced from Old World; Panama, Cuba and Jamaica. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41133, 41126, 41162; Nov. 4, 1958. Reed 41363; Nov. 23, 1958. Reed 43131 and 43132. Branching annual; culms 0.5-1 m. tall; geniculate below; nodes bearded; blades flat, 8-12 mm. wide, sparsely pilose; racemes 5-10 cm. long, erect, so closely appressed to each other as often to appear like a single spike; spikelets 3-4 mm. long, obtuse, the awn about 1.5 cm. long; first glume strongly rugose across the back.

273. Koeleria phleoides (Vill.) Pers. Introduced from Europe; Pensacola, Florida; Mobile, Alabama; Cameron Co., Texas; Portland, Oregon; several places in California; cultivated in nursery plots in Beltsville, Maryland; and Tucson, Arizona. Maryland: Canton, on chrome ore piles. June 10, 1957. Reed 38798. Annual; culms 15-30 cm. tall, smooth throughout; sheaths and blades sparsely pilose; panicle dense, spike-like, 2-7 cm. long, obtuse; spikelets

2-4 mm. long; glumes acute; lemmas short-awned from a bifid apex; glumes and lemmas in the typical form papillose-hirsute on the back, but commonly papillose only.

274. Leptochloa dubia (H.B.K.) Nees. Southern Florida; Oklahoma and Texas to Arizona, south through Mexico; Argentina. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32751. Perennial; culms wiry, erect, 50-100 cm. tall; sheaths glabrous; blades flat or sometimes folded or loosely involute, scabrous, as much as 1 cm. wide, usually narrower; panicle of few to many spreading or ascending racemes, 3-12 cm. long, approximate or somewhat distant on an axis as much as 15 cm. long; spikelets 5- to 80-flowered (or in reduced specimens only 2-flowered), 5-10 mm. long; lemmas broad, glabrous on the internerves, obtuse or emarginate, the midnerve sometimes extending into a short point, the florets at maturity widely spreading, very different in appearance from their early phase.

275. Leptochloa uninervia (Presl) Hitchc. & Chase. Mississippi to Texas; Colorado and New Mexico to Oregon and California, south to Mexico; Peru to Argentina; North Carolina and introduced in Maine, Massachusetts and New Jersey. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44052 (US); on manganese ore piles. Nov. 1959. Reed 45867.

276. Lolium multiflorum Lam. Naturalized from Europe; Newfoundland to Alaska, south to Virginia and California and southward. Italian rye-grass. Maryland: Canton, on chrome ore piles, Oct. 1958. Reed 44174. Probably the same, though identified and labelled as L. multiflorum var. italicum (A.Br.) Beck. June 1954. Reed 33412-14, from same area.

277. Lolium perenne L. Newfoundland to Alaska, south to Virginia and California, and southward. Maryland: Canton, on chrome ore piles. June 1954. Reed 33377, 33385 and 33402; Oct. 1958. Reed 44176.

278. Lolium temulentum L. Adventive from Europe; Quebec and New England to Minnesota, Missouri and Kansas, south to Gulf; Pacific States. Maryland, Canton, on chrome ore piles. June 1954. Reed 33383.

279. Microstegium vimineum (Trin.) A.Camus. Native of Asia. Maryland: Cub Hill, Baltimore Co., in rock garden and fields, persistent since 1961. Oct. 19, 1961. Reed 53670 (US); Nov. 16, 1961. Reed 53749; Nov. 1962. Reed 59912; Oct. 20, 1963. Reed 64721 (SABC). Although Hitchcock and Chase (1951, Man. Grasses of U.S., p. 748) list this species from Virginia, North Carolina, Kentucky, Ohio, Tennessee and Alabama, and the var. imberbe (Nees) Honda from Berks Co., Pennsylvania and Greenville, Virginia, neither Fernald, in the 8th Edition of Gray's Manual, nor Gleason, in the New Britton & Brown, Illustrated Flora mention this genus or species. A description and illustration are provided in Hitchcock and Chase, fig. 1137, p. 748. 1951.

280. Muhlenbergia asperifolia (Nees & Mey.) Parodi. Indiana and Alberta to British Columbia, south to Texas, California and Mexico; southern South America; New York. Maryland: Frederick, in RR yards, Frederick Co. Sept. 12, 1959. Reed 45642 and 45645.
281. Oryzopsis miliacea (L.) Benth. Native of Mediterranean region; introduction in California; ballast, Camden, New Jersey; Philadelphia, Pennsylvania. Maryland: Canton, on pumice piles, from Islands off Italy. Aug. 20, 1963. Reed 65422.
282. Panicum adspersum Trin. Native of West Indies; introduced on ballast at Philadelphia, Pennsylvania; Camden, New Jersey; Mobile, Alabama. (Hitchc. & Chase, l.c., p. 682. 1951). Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44046 (US); Nov. 1959. Reed 45871.
283. Panicum dichotomiflorum Michx. Nova Scotia and Maine to Minnesota, south to Florida, Texas, California and Mexico; West Indies. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32748; Oct. 1954. Reed 35219; Sept. 1958. Reed 41340; Oct. 1958. Reed 41178.
284. Panicum capillare L. Maine to Montana, south to Florida and Texas, and westward. Witch-grass. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35216; Sept. 1957. Reed 39333; Oct. 1958. Reed 41182; Locust Point, wastes. July 1959. Reed 43824.
285. Panicum capillare var. occidentale Rydb. P.E.I. and Quebec to British Columbia, south to New Jersey, Maryland, Missouri, Texas and California. Maryland: Canton, on chrome ore piles. Oct. 1957. Reed 35246.
286. Panicum paludosum Roxb. (As Panicum proliferum Lam. in Hooker, Fl. Brit. India, 7: 50. 1897). Native of Pacific Islands; Okinawa; India, Ceylon, Assam. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 43133. Perennial; stem 6-9 dm. or more; lower nodes spongy, about 1 cm. in diameter; leaves 15-30 cm. long, 1-2 cm. wide, base broad but hardly cordate; sheaths loose; ligule a ridge of hairs; panicle 15-25 cm. long, often nearly as broad, lower branches whorled and fascicles, trigonous, scaberulous; spikelets green, variable in size, terete, palea of glume III absent, or minute, or linear, neuter or male, rarely bisexual.
287. Panicum psilopodium Trin. Native of China, Sikkim, Macao, India and Ceylon. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 46012. Annual; stems rather slender, simple or branched, 30-60 cm. tall, leafy to the panicle; leaves narrow, acuminate,

glabrous, 7-20 cm. long, 0.5-0.8 cm. wide; sheaths glabrous or hairy; panicle 5-10 (20) cm., rather compact or loose, pedicels slender, as long as the spikelets; spikelets about 3 mm. long, green or purplish; glume I ovate, broader than long, one-half length of III or shorter, 3-5-nerved, II ovate acuminate, 9-11-nerved, III as long, IV oblong or rounded, obtuse, shining dark brown.

288. Panicum reptans L. Tropical regions of both hemispheres; Florida to Texas. Maryland: Canton, on chrome ore piles. Sept. 1959. Reed 45680; Oct. 1959. Reed 45805 and 45811. Culms ascending 10-30 cm. above the creeping base; blades 1.5-6 cm. long, 4-12 mm. wide, cordate, usually glabrous, ciliate on the undulate margin at base; panicle 2-6 cm. long, the 3-12 ascending or spreading racemes 2-3 cm. long, aggregate, the rachis usually pilose with long weak hairs; spikelets secund, about 2 mm. long, glabrous, on pubescent or pilose pedicels about 1 mm. long; first glume very short, truncate or rounded.

289. Panicum purpurascens Raddi. Throughout tropical America at low altitudes; probably in Brazil at an early date from Africa; Florida, Alabama, Texas; Oregon. Para Grass. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 41741. Culms decumbent and rooting at base, 2-5 m. long, the nodes densely villous; sheaths villous or the upper glabrous, densely pubescent on the collar; blades 10-30 cm. long, 10-15 mm. wide, flat, glabrous; panicle 12-20 cm. long, the rather distant subracemose densely flowered branches ascending or spreading; spikelets sessile, 3 mm. long, elliptic, 5-nerved, glabrous; fruit minutely transversely rugose.

290. Panicum ramosum L. Tropical Asia; cultivated as a bird feed; North Carolina to Florida, Arkansas and Louisiana. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41223. Pedicels bristly; spikelets glabrous to finely pubescent, about 3 mm. long, tawny or dull brown; otherwise resembling P. fasciculatum var. reticulatum (Torr.) Beal. (New Mexico and Arizona; Mexico).

291. Panicum scoparium Lam. Native from Massachusetts to Florida, west to Kentucky and Missouri, Oklahoma and Texas; Cuba. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44048; Nov. 1959. Reed 45877.

292. Panicum verrucosum Muhl. Native from Massachusetts to Florida, west to Michigan, Kentucky, Arkansas and Texas. Virginia: Newport News, on iron ore piles. Nov. 1959. Reed 45858.

293. Parapholis incurva (L.) C.E.Hubb. Adventive from Europe; New Jersey and Pennsylvania to Virginia; California and Oregon. (Pholiurus incurvus (L.) Schinz & Thell., in Fernald, 8th ed., p. 133). Sickle-grass. Maryland: Canton, on chrome ore piles. June 1954. Reed 33407.

294. Paspalum convexum Humb. & Bomp. ex Willd. Texas (Jasper Co.); northern Mexico to Brazil; Cuba; Trinidad. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32810. (Originally reported as P. circulare Nash, see Reed, Rhodora 56: 179. 1954).
295. Paspalum dilatatum Poir. in Lam. Dallas-grass. Introduced and naturalized from the tropics; Florida to California, north to Virginia, Maryland and Tennessee. Maryland: Canton, on chrome ore piles. Sept. 6, 1958. Reed 41291 and Sept. 19, 1958. Reed 41317; Nov. 23, 1958. Reed 41723.
296. Paspalum distichum L. West Indies; Mexico south to Argentina; Florida to California, north to southeastern Virginia, Maryland, Tennessee, Arkansas, Oklahoma, Utah and Washington. Knot-grass. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32749.
297. Paspalum floridanum Michx. var. glabratum Engelm. ex Vasey. Southern New Jersey to central Florida, west to Kentucky, Illinois, southeastern Kansas and Texas. Maryland: Canton, on chrome ore piles. Sept. 24, 1957. Reed 39552.
298. Paspalum orbiculatum Forst. Southern Mexico and the West Indies to Paraguay. Maryland: Canton, on chrome ore piles Oct. 14, 1958. Reed 41295; Nov. 4, 1958. Reed 41359. Perennial, low creeping, with long leafy stolons and ascending flowering branches 5-20 cm. tall, often forming dense mats; blades flat 1-6 cm. long, 2-7 mm. wide; racemes usually 3 or 4, 1-2 cm. long; spikelets solitary, about 1 mm. long, depressed-hemispheric, mostly glabrous.
299. Paspalum scrobiculatum L. Native of Asia; cultivated in India; on ballast, Camden, New Jersey and Abilene, Texas. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41167. Annual; erect or base very shortly decumbent, 3-18 dm. tall, leafy, glabrous, rarely hairy; leaves acuminate, ligule short, membranous; peduncle rather slender; spikes 2-8, 2.5-8 cm. long, alternate, erect or spreading, rachis 1.5-2.5 mm. broad, margins ciliate or serrulate; spikelets in 2, rarely 3 or 4, rows, imbricate, glabrous or sparsely pubescent, sometimes geminate on a common pedicel, about as broad as the flat rachis, glume I convex, 3-nerved, glume II flat with two submarginal strong nerves, 5-nerved, along the inner margins of which the glume is sometimes marked with shallow transverse pits, glume III with inflexed auricled margins.
300. Pennisetum glaucum (L.) R.Br. Native of Eastern Hemisphere; cultivated in Southern States for forage. Pearl Millet. Maryland: Canton, on chrome ore piles. Nov. 23, 1958. Reed 41722 (US); Brooklyn Park, Anne Arundel Co., wastes along roadsides, frequent. Sept. 1960. Reed 48145. Annual; culms robust, as much as 2 m. tall, densely villous below the panicle; blades flat, cordate, sometimes as much as 1 m. long and 5 cm. wide; panicle cylindric,

stiff, very dense, as much as 40-50 cm. long, 2-2.5 cm. thick, pale, bluish-tinged, or sometimes tawny, the stout axis densely villous; fascicles peduncled, spikelets short-pedicelled, 2 in a fascicle, 3.5-4.5 mm. long, obovate, turgid, the grain at maturity protruding from the hairy-margined lemma and palea.

301. Phalaris canariensis L. Introduced from the western Mediterranean region; Nova Scotia to Alaska, south to Virginia, Kansas, Wyoming, Arizona and California. Canary grass. Maryland: Canton, on chrome ore piles. Oct. 12, 1953. Reed 32887.

302. Phalaris paradoxa L. Introduced from the Mediterranean region; in grain fields from California to Arizona; ballast, Philadelphia, Pa.; New Orleans, La.; Baltimore, Md. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33395. Annual, tufted, more or less spreading at base; culms 30-60 cm. tall; panicle dense, oblong, narrowed at base, 2-6 cm. long, often enclosed at base in the uppermost enlarged sheath; spikelets finally falling from the axis in groups of 6 or 7, those of the upper part of the panicle slender-pedicelled, the central spikelet fertile, the subulate-acuminate glumes with a prominent toothlike wing near the middle of the keel, the others sterile, with smaller pointed glumes with toothlike keels; fertile lemma 3 mm. long, with a few hairs toward the summit, the sterile lemmas obsolete; spikelets of lower part of panicle short-pedicelled, the glumes of the outer 4 spikelets deformed, cuneate-clavate.

303. Phleum subulatum (Savi) Aschers. & Graebn. Introduced from the Mediterranean region; on ballast, Philadelphia, Pa.; near Portland, Oregon. Maryland: Canton, on chrome ore piles. June 22, 1954. Reed 33399 and 33401 (US). Annual; culms 10-20 cm. tall; blades 2-5 cm. long; panicle linear-oblong, mostly 3-8 cm. long, 4-5 mm. thick; glumes 2 mm. long, scabrous, subacute, the tips approaching.

304. Phragmites communis Trin. Eurasia, Africa and Australia; Nova Scotia to British Columbia, south to Maryland, North Carolina, Illinois, Louisiana and California; Florida; Mexico; West Indies to Chile and Argentina. (Phr. communis var. berlandieri (Fourn.) Fern., in the 8th Ed., p. 132, for the North American plants). Maryland: Canton, common in wastes about the chrome ore piles. Nov. 1953. Reed 33034; Oct. 1957. Reed 39578.

305. Poa trivialis L. Introduced from Europe; Newfoundland and Ontario to Minnesota, South Dakota and Colorado; on Pacific Coast from Alaska to northern California; on ballast, Louisiana. Maryland: Canton, on chrome ore piles. June 10, 1957. Reed 38794 and 38795.

306. Polypogon monspeliensis (L.) Desv. Maryland: Talbot Co., edge of marsh, 1 mi. N of Tilghman. June 21, 1960. Reed 46631. These specimens extend the known range of this grass northward and westward from Dorchester Co., Maryland. (See Reed, Rhodora, 56: 180. 1954).
307. Rhynchelytrum roseum (Nees) Stapf & Hubb ex Bews. Naturalized from South Africa; Florida along the Gulf Coast to Texas, and Arizona. Natal grass. Maryland: Canton, on chrome ore piles. Sept. 6, 1958. Reed 41297; Sept. 24, 1958. Reed 41219; Oct. 14, 1958. Reed 41169; Oct. 1959. Reed 45795 and 45798; on manganese ore piles. Oct. 1959. Reed 45696. Short-lived perennial, sometimes apparently annual; culms slender, about 1 m. tall; blades flat, 2-5 mm. wide; panicle rosy, purple, fading to pink, silvery in age, 10-15 cm. long, the branches slender, ascending; spikelets about 5 mm. long, the capillary pedicels flexuous or recurved.
308. Setaria faberii Herrm. Naturalized from China and eastern Asia; eastern Massachusetts to Nebraska, south to North Carolina, Tennessee and Missouri. Maryland: Canton, on chrome ore piles. Sept. 25, 1957. Reed 39551; Oct. 14, 1958. Reed 41125; on manganese ore piles. Aug. 9, 1961. Reed 52144.
309. Setaria italica (L.) Beauv. Introduced from Eurasia; cultivated in warmer parts of United States, especially from Nebraska to Texas. Maryland: Canton, wastes near Patapsco River and Baltimore Harbor Tunnel expressway, off Clinton Street. Sept 24, 1958. Reed 41209.
310. Setaria viridis (L.) Beauv. Green Bristle-grass. Naturalized from Eurasia; throughout the cooler parts of United States, Newfoundland to British Columbia, south to Florida and California and Mexico. Maryland: Canton, on chrome ore piles. Oct. 25, 1954. Reed 35217 and 35218; June 22, 1954. Reed 33388 and 33439. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44056.
311. Setaria verticillata (L.) Beauv. Naturalized from Eurasia; Massachusetts to North Dakota, south to Alabama, Louisiana and Missouri, west to California; tropical America at medium altitudes. Bur Bristle-grass. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32674.
312. Setaria lutescens (Weigel) Hubb. Introduced from Europe; New Brunswick to North Dakota, south to northern Florida and Texas; British Columbia to California, New Mexico and Arizona; Jamaica, at high altitudes. Yellow Bristle-grass. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32799. According to Fernald, 8th ed., p. 226. 1950) S. lutescens (Weigel) Hubb is based on the invalid Panicum lutescens Weigel, 1772; according to Hitchcock & Chase, l.c., p. 719. 1951, S. lutescens has been erroneously referred to Setaria glauca (L.) Beauv., which is the specific epithet used by Fernald, in lit. cit. above.

313. Setaria pallidifusca (Schumach.) Stapf & Hubb. Native of South Africa (Cape, Natal, Basutoland, Orange Free State, Transvaal), Bechuanaland, Otjiwarongo and Grootfontein Dist. in South-West Africa. Chippindall, l.c., pp. 353-355, fig. 305. 1955. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41168 and 41172; Nov. 4, 1958. Reed 41369 (US). Annual, loosely tufted, usually 20-60 cm. high; culms often rooting from the lower nodes, usually with several flowering branches; culm nodes usually dark purple or brown; leaves glabrous, or hairy towards the ligule, the blades usually not exceeding 15 cm. in length, up to 9 mm. wide, expanded, soft and thin; panicle 1.5-8 cm. long, rarely more, spike-like, dense, bristly, usually bright orange variegated with light green and sometimes purple; spikelets 2-2.8 mm. long, solitary or in pairs of which one is reduced and sterile, each spikelet or pair subtended by 6-10 slender, slightly scabrid bristles, these up to 9 mm. long, usually bright orange, more rarely light green, yellow or purple; upper glume one-third to one-half as long as the spikelet; lower floret male or sterile, the palea slightly shorter than the lemma; upper floret finely transversely ridged.

314. Setaria grisebachii Fourn. Native of Mexico; Texas and Arizona. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32731; Oct. 12, 1953. Reed 32909. Annual, branching below, 1.5-8 dm. tall, slender, glabrous; leaf-sheaths loose, compressed, sparingly strigose, the margins ciliate; blades lanceolate, slightly narrowed at the cordate base, 5-10 cm. long, 5-10 mm. wide, rough and sparingly short-pubescent; bristles single or in pairs, widely spreading, purple or sometimes green, 5-15 mm. long; spikelets ovoid, 2 mm. long, acute, the flowering scale nearly 2 mm. long, ovoid, acute, very finely transversely rugose below.

315. Setaria magna Griseb. A Coastal Plain species ranging from New Jersey along the Atlantic Outer and Inner Coastal Plain to Florida, and then west to Texas, and north in the Mississippi Valley to Arkansas. Maryland: Baltimore Co., Cub Hill, in fields and wastes. Oct. 19, 1961. Reed 53671; Nov. 16, 1961. Reed 53748. Also known from the Delmarva Peninsula and Southern Maryland (St. Marys Co.). The area in Baltimore County is on the edge of the Piedmont Plateau, where there are many Coastal Plain spurs having coastal soils and plant habitats fingering in or on the Piedmont formations.

316. Sorghum vulgare Pers. Native of India; cultivated in United States as sorghum. (Sorghum Adans, acc. to Fernald, in Gray's Man., 8th. ed., p. 234). Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32761; Nov. 1958. Reed 41721.

317. Sorghum vulgare var. technicum (Koern.) Jav. Broom-corn. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32753

318. Sorghum halepense (L.) Pers. Introduced and naturalized from Eurasia; Syria; in tropical and warmer regions of both hemispheres; Massachusetts to Iowa and Kansas, south to Florida and Texas; west to southern California. Johnson grass. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32741; Oct. 1953. Reed 32683; Oct. 1954. Reed 35221; June 1956. Reed 38822.

319. Spartina alterniflora Loisel. var. glabra (Muhl.) Fernald. Southeastern New York to Florida and Texas. Maryland: Canton. Aug. 1893. C.C.Plitt. (Reed Herb.).

320. Spartina patens (Ait.) Muhl. Southwestern Newfoundland to lower St. Lawrence River, Quebec, south to Virginia; inland to western New York and southeastern Michigan. Maryland: Canton. Aug. 1893. C.C.Plitt. (Reed Herb.).

321. Sporobolus coromandelianus (Retz.) Kunth. Plains of India (Punjab eastward to Burma) and southward to Ceylon; Afghanistan, North and South Africa; introduced in Texas and Mexico. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41121. Annual; leaves lanceolate, flat, spinulosely serrulate; panicle open, effuse, pyramidal, branches whorled, capillary, spikelets 0.2-0.25 mm.; glume I minute, oblong or lanceolate, glume II and III both ovate-lanceolate, acuminate.

322. Sporobolus pyramidatus (Lam.) Hitchc. Native of tropical America; West Indies, Colorado and Kansas to Texas and Louisiana; southern Florida; Missouri to southeastern New York. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32766.

323. Sporobolus virginicus (L.) Kunth. Coastal from Mexico and Texas to Florida, north to North Carolina, Virginia and Maryland. Maryland: Canton, on manganese ore piles. July 1959. Reed 43840; Aug. 1959. Reed 44374 and 45692.

THEMEDA Forsk. Inflorescences a flabellate cluster of several short racemes, each subtended by a spathe, the entire cluster subtended by a larger spathe; racemes consisting of 2 approximate pairs of sessile awnless staminate or neuter spikelets and a single fertile awned spikelet with a pair of sterile pedicellate ones, the rachis disjointing above the pairs of sessile staminate spikelets and forming a pointed callus below the fertile one; annuals and perennials.

324. Themeda frondosa (R.Br.) Merr. (Anthistina frondosa R.Br.). North Australia, and the islands off the north coast. Maryland: Canton, on chrome ore piles. Oct. 14, 1958. Reed 41152 (US). Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45891. Stems erect and branching, from 60-90 cm. tall, to twice that height, frequently flattened under the lower nodes; leaves

glabrous or the upper sheaths ciliate; leafy panicle dense, often nodding, the leafy bracts narrow, ciliate on the back with long spreading hairs, the outer ones 5-7.5 cm. long; the 4 involucreal spikelets sessile, the outer glume of the fertile spikelet very rigid, scarcely nerved, obtuse, pubescent at the top with short rigid hairs; bracts sprinkled with long spreading hairs; awn very long and rigid; many of the spikes reduced to the 4-involucreal barren spikelets surrounding a rudimentary one.

TRAGUS Hall. Spikelets 1-flowered, in small spikes of 2 to 5, the spikes subsessile, falling entire, the spikelets sessile on a very short zigzag rachis, the first glumes small, thin, or wanting, appressed to the rachis, the second glumes of the 2 lower spikelets strongly convex with 3 thick nerves bearing a row of squarrose, stout hooked prickles along each side, the 2 second glumes forming the halves of a little bur, the upper 1 to 3 spikelets reduced and sterile; lemma and palea thin, the lemma flat, the palea strongly convex; low annuals, with flat blades and terminal inflorescences, the burs or spikes rather closely arranged along an elongate, slender axis.

325. Tragus racemosus (L.) All. Adventive from the Old World; South Africa; wastes and ballast from Maine to North Carolina; Texas to Arizona. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32800; Nov. 1958. Reed 46013; large mats on chrome ore piles. Aug. 1959. Reed 44365; Oct. 1959. Reed 45714 and 45826. Spikelets 4-4.5 mm. long, the acuminate apex projecting beyond the spines; the bur pedicelled.

326. Tragus berteronianus Scult. Probably introduced, Texas to Arizona, south to Argentina; also in warmer parts of Old World; on ballast at Boston, Massachusetts and on wool waste in Maine. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44053 (US). Culms branched at base, spreading, 10-40 cm. long; blades firm, mostly less than 5 cm. long, 2-4 mm. wide, the cartilaginous margin bearing stiff white hairs or short slender teeth; raceme dense, 4-10 cm. long, 4-5 mm. wide; burs 2-3 mm. long, nearly sessile, the apex scarcely exceeding the spines. Hitchc. & Chase, l.c., p. 483, fig. 712. 1951.

327. Tridens pulchellus (H.B.K.) Hitchc. Texas to Nevada, and southern California to southern Mexico. Fluff-grass. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32827. Hitchc. & Chase, l.c., pp. 208-210, fig. 275, map. 1951.

328. Tridens flavus (L.) Hitchc. (Triodia flava (L.) Smyth; Triodia flava forma cuprea (Jacq.) Fosberg; Triodia cuprea Jacq.) New Hampshire to Nebraska, south to Florida and Texas. Maryland: Canton. Aug. 1893. C.C.Plitt. (Reed Herb.). Red-top, Purple-top.

329. Tripsacum dactyloides (L.) L. Southern New England to southern Michigan, Illinois, Iowa and Nebraska, south to Florida, eastern Texas and Mexico; West Indies. Maryland: Canton, along shore near chrome ore piles. Sept. 27, 1953. Reed 32692. Eastern Gama-grass.

330. Triticum aestivum L. Commonly cultivated and escaped. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32672; July 1958. Reed 40895.

UROCHLOA Beauv. Annual and perennials; leaf-blades expanded; ligule a hairy membrane or a fringe of hairs; inflorescence of 2 to many racemes, usually solitary or in pairs, more rarely in whorls on a central axis, the racemes usually spike-like, one-sided and dense; rachis 3-angled or flattened, with the midrib raised on one side and the short pedicelled or almost sessile spikelets solitary or in pairs, more often in clusters of 3 or 4, on alternate sides of it, often forming 2 regular rows, when not solitary, sometimes with only one of the pairs or group well-developed and perfect; pedicels often reduced to stumps, disc-shaped at the apex; spikelets slightly or distinctly rounded on the back, flattened in front; glume unequal or almost equal, the lower much shorter than or almost as long as the spikelet, 3-7-nerved, upper as long as the spikelet, 3-11-nerved; lower floret male or sterile, the lemma like the upper glume, 3-7-nerved, palea almost as long; upper floret bisexual, indurated, usually conspicuously ridged, at least towards the margins, the lemma rounded or broadly obtuse at the apex of the spikelets, rigid awn that does not extend beyond the apex of the spikelet. Chippindall, l.c., pp. 380-381. 1955.

331. Urochloa panicoides Beauv. (Panicum helopus Trin.). A widely distributed species in South Africa (Cape, Bechuanaland, Transvaal, Zululand, Natal, Basutoland and the Orange Free State). Maryland: Canton, on chrome ore piles. Sept. 24, 1958. Reed 41215, 41232 and 41232A (spikelets pubescent); Oct. 11, 1958. Reed 41131 and 41119; Sept. 1959. Reed 45679 (glumes densely pubescent); Aug. 1959. Reed 44350 (US) (glumes densely pubescent). Annual, tufted; culms 6-60 cm. high, sometimes decumbent and rooting from the lower nodes, usually with flowering branches from several of them; leaves usually loosely to densely hairy with tubercle-based hairs, rarely almost glabrous, the blades up to 12 mm. wide, expanded, rounded or almost cordate at the base, soft, light green, the margins thickened and crinkled; inflorescence up to 8 cm. long, of 2-7 racemes up to 6 cm. long; spikelets 4-5 mm. long, acute, glabrous or hairy, solitary and almost sessile, forming 2 regular rows; glumes unequal, the lower one-quarter to one-third as long as the spikelet, usually 5-nerved, the side nerves curving inwards and joining below the apex, or connected by transverse veins; upper glumes prominently 7-11-nerved, with several transverse veins towards the apex; lower floret male or sterile, the lemma 5-7-nerved; upper floret bisexual, finely transversely ridged.

HAMMAMELIDACEAE

332. Liquidambar styraciflua L. A native tree found in ditches in Canton. Oct. 1959. Reed 45804.

HYDROPHYLLACEAE

NAMA L. Herbaceous annuals; leaves alternate and entire; flowers borne singly in the axils or in lateral or terminal cymes; calyx divided nearly to base; corolla tubular to narrowly campanulate, pubescent outside; filaments glabrous, stamens included; styles 2, united, less pubescent; capsules usually loculicidal; seeds many.

333. Nama hispidum Gray. (Merilaunidium hispidum (Gray) Kuntze). Native from Oklahoma and Colorado, south to Texas and Mexico. Maryland: Canton, on chrome ore piles. Oct. 2, 1953. Reed 32677; Oct. 12, 1953. Reed 32885. Annual, hispid or hirsute; stems branched at the base; branches spreading or prostrate, 0.5-2 dm. long; leaf-blades spatulate or linear-spatulate, 1-4 cm. long, obtuse, the lower short-petioled, the upper sessile; pedicels 1-2 mm. long; calyx bristly, the lobes narrowly linear, 4-6 mm. long, often slightly broadened upward; corolla about 8 mm. long, the tube surpassing the calyx; capsules narrowly oblong, shorter than the calyx, wrinkled; seeds not pitted, but may be minutely reticulated.

HYPERICACEAE

334. Hypericum gentianoides (L.) BSP. Southern Maine, southern Ontario to Wisconsin, south to Florida and Texas. Virginia: Newport News, at foot of Chrome ore piles. Nov. 1959. Reed 45878.

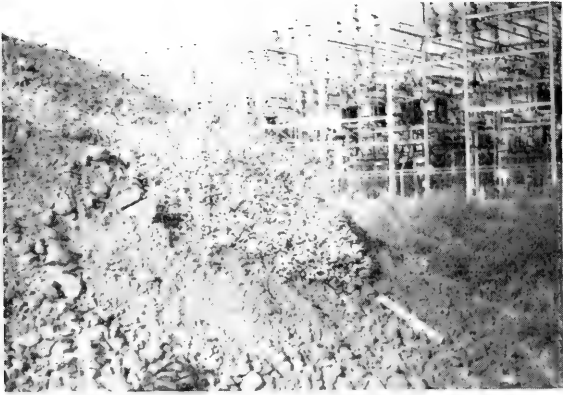
335. Hypericum gymnanthum Engelm. & Gray. Florida to Texas, north locally to Long Island, Pennsylvania, Ohio, Illinois, Missouri and eastern Kansas. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45893.

LABIATAE

336. Ballota nigra L. Adventive from Europe; southern New England and New York, south to New Jersey, Pennsylvania and Maryland. Black Horehound. Maryland: Canton. June 1899. C.C.Plitt. (Reed Herb.)

337. Lamium amplexicaule L. Naturalized from Europe; Newfoundland and southeastern Labrador, south to New Brunswick and west to Minnesota and southward becoming more common. Henbit. Maryland: Canton, common on wastes. April 1958. Reed 40709; May 24, 1960. Reed 46319 and 46322.

338. Lamium purpureum L. Naturalized from Europe; Newfoundland, Nova Scotia, west to Minnesota, south to South Carolina, West Virginia, Ohio, Indiana, Illinois and Missouri. Purple dead-nettle. Maryland: Canton, common on wastes. April 1958. Reed 40696.
339. Mentha rotundifolia (L.) Huds. Introduced from Europe; Maine to Michigan, south to Florida, Louisiana and Texas; Mexico. Maryland: Canton, July 1904. C.C. Plitt. (Reed Herb.); Sept. 1905. C.C. Plitt. (Reed Herb.); June 1955. Reed 36547; Oct. 1957. Reed 39587 (about one acre patch); iron ore piles. July 1962. Reed 57702.
340. Mentha arvensis L. Labrador to Alaska, south to Virginia, Kentucky, Missouri, and in the west south to California; Eurasia. Maryland: Canton, on chrome ore piles. July 1959. Reed 43637-38.
341. Mentha silvestris L. Native of temperate and southern Europe, Russian and central Asia; Britain (cult.). Horse-mint. Maryland: Canton, between chrome ore piles, and on some piles. Sept. 1955. Reed 38222; Aug. 1956. Reed 37975; Sept. 1957. Reed 39538; July 1959. Reed 43830 (US). Rootstock more or less creeping, the stems 3-6 dm. tall, erect, slightly branched, and, as well as the whole plant, more or less hoary with a short close down; leaves closely sessile, broadly lanceolate or narrow-ovate; flowers small and numerous, in dense cylindrical spikes, 2.5-5 cm. long, usually several together, forming an oblong terminal panicle.
342. Nepeta cataria L. Native of Old World; naturalized as a weed. Catnip. Maryland: Canton, on chrome ore piles. Oct. 1959. Reed 45706.
343. Salvia reflexa Hornem. (S. lanceolata of manuals; S. lanceifolia of Gray's Man., 7th ed., non Poir.) Mexico and Texas, north to Montana and Wisconsin; adventive east to Michigan, Ohio, West Virginia and New Jersey. Maryland: Canton, on chrome ore piles. June 1957. Reed 33374; Nov. 1953. Reed 32986; Oct. 1953. Reed 32870 and 32913; Sept. 1953. Reed 32832, 32772 and 32776.
344. Satureja calamintha (L.) Scheele var. nepeta (L.) Briq. Naturalized from Europe; North Carolina to Arkansas, north to Maryland and Kentucky. Basil-thyme. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32679.
345. Stachys longispicata Boiss. Native of Mesopotamia. Maryland: Canton, on chrome ore piles. Sept. 1955. Reed 38231; Oct. 1956. Reed 38248.
346. Teucrium laciniatum Torr. Oklahoma to Colorado, south to Texas and New Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32793. Plants from caespitose caudices and



Heliotropium europaeum on chrome ore at Canton, Maryland



Phytolacca icosandra on chrome ore at Canton, Maryland

rather woody roots; stems 7-20 cm. tall, branching from base, usually unbranched above, glabrous or sparsely hairy; leaves pinnately parted nearly to the midrib into usually entire linear lobes, these sometimes lobed again, the whole leaf varying from 1.5-5 cm. long, glabrous or nearly so; calyx 8-13 mm. long in flower, the teeth equal or nearly so; corolla 12-20 mm. long, white or possibly pale blue to lilac. Harrington, Man. Plants Colorado, p. 476. 1954.

LAURACEAE

347. Sassafras albidum (Nutt.) Nees. Southwestern Maine to Michigan and Illinois, south to Virginia and Arkansas. White sassafras. Maryland: Canton, common along wastes, thickets and ditches. Oct. 1957. Reed 39560.

LEGUMINOSAE

I wish to thank Dr. Bernice Schubert, Harvard Univ., and Dr. Velma Rudd, United States National Herbarium, for assisting in the identifications in this family.

348. Acacia constricta Benth. vel aff. Native of western Texas and Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32808; Oct. 1953. Reed 32902; Sept. 1957. Reed 39321 and Nov. 1958. Reed 41714. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44047; Nov. 1959. Reed 45876.

349. Aeschynomene americana L. var. americana. (Det. Dr. Rudd). West Indies (Jamaica, Cuba, to St. Kitts, to Tobago); continental tropical America. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32847. Herbaceous or slightly woody; stem erect, 3-20 dm. tall, glabrous, or more or less villous, and sometimes glandular; stipules half-sagittate, triangular-lanceolate, striate, long-acuminate, 12 mm. long or less; leaves 3-7 cm. long, very short-petioled; leaflets 10-30 pairs, linear, glabrous or ciliate, 4-6-nerved, mucronate and sometimes denticulate at the apex, obliquely rounded at the base, 7-10 mm. long, about 2 mm. wide; racemes few-flowered; calyx 2-lipped, about 4 mm. long; corolla yellow, sometimes brownish-striped or nearly white, 6-8 mm. long; pods short-stipitate, straight or a little curved, 4 cm. long or less, glabrous or pubescent, 2-8-jointed, the upper margin continuous and nearly straight, the lower deeply crenate, the joints nearly semicircular, 2-3 mm. long. -- Britton & Wilson, l.c., 5(3): 397. 1924.

ALYSICARPUS Neck. Herbs, some with 1-foliolate leaves and small purplish or blue flowers in short terminal racemes, the scarious bracts deciduous; calyx narrow, deeply cleft, the lobes lanceolate-acuminate, chartaceous, striate, the two upper ones partly united; standard suborbicular, clawed; wings obliquely oblong,

adnate to the blunt incurved keel; stamens diadelphous (9 and 1); ovary nearly sessile, several-ovuled; style filiform, its apex incurved; stigma terminal, capitate; loment nearly terete, several jointed, the joints indehiscent.

350. Alysicarpus vaginalis DC. Native of Hainan, Annam, Tonkin, Cochinchina, India, Punjab, Formosa, and northwestern Himalaya, Hongkong; Africa (French Sudan, Nigeria, Senegal); Philippine Islands. Virginia: Newport News, on chrome ore piles. Nov 1959. Reed 45907 and 45899.

351. Alysicarpus sp. Similar to species from Burma in US. Maryland: Canton, on chrome ore piles. Nov. 1958. Reed 41715.

352. Arachis hypogaea L. Introduced originally from South America; widely cultivated in many areas in the world. Peanut. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45911.

353. Astragalus hamosus L. vel aff. Native of southern Europe. Maryland: Canton, on chrome ore piles. June 1954. Reed 33398. Plants 2-6 dm. tall, pale green; stems erect, ascending or diffuse; annual; leaves with 8-12 pairs of leaflets, oval or oblong, truncated or emarginate, covered on the underside with hairs; stipules more or less completely united, opposite-leaved, the lobes ovate pointed, not attached to leaf stalk; stalks about 6-flowered, shorter than the leaves, the yellowish flowers 3-12, erect, in a globose cluster, at first compact, later more loose and elongating a little at maturity; bracts scarioso, linear, pointed, longer than the pedicels; calyx covered with little white hairs intermixed with black hairs, tubular, with linear-subulate teeth, equalling the tube; standard to the limb oval-oblong, emarginate, apiculate, projecting outward; the wings linear, obtuse, entire; legume much curved, terete, furrowed on the back, subulate at the top; seeds reddish, reniform-quadrangular, compressed, smooth.

CAJANUS DC. Perennial, a stiff, slightly woody herb, finely puberulent or pubescent, with pinnately 3-foliate leaves and showy yellow flowers in stalked axillary racemes; calyx narrowly campanulate, its lobes acute, the 2 upper ones partly united; standard nearly orbicular, reflexed; wings obliquely obovate; keel with a blunt incurved tip; ovary many-ovuled; style thickened above, the stigma oblique; pod linear, flattened, acute and long-tipped, its valves impressed between the seeds.

354. Cajanus cajan (L.) Millsp. West Indies; Bermuda; continental tropical America and Old World tropics. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41716. Bushy, branched, 2 m. tall or less; leaves petioled; leaflets oblong or oblong-lanceolate, 2.5-8 cm. long, acute at both ends or obtuse at the

base, velvety on both sides, dark green above, pale beneath; racemes few-flowered, as long as the leaves or longer; pedicels, rachis and calyx brown-pubescent; flowers 12-16 mm. broad; pods 5-8 cm. long, 10-12 mm. wide, 4-7-seeded; seed whitish, somewhat flattened, about 4 mm. thick. -- Britton & Wilson, l.c., 5(3): 414. 1924.

CANTHAROSPERMUM Wight & Arn. (Atylosia Wight & Arn.). Slender twiner; stems softly pubescent; leaves trifoliate; leaflets obovate, rounded at the apex, 2-3 cm. long, 1-2 cm. broad, softly tomentose on both surfaces; flowers in axillary pairs, shortly pedicellate; fruits 3-6-seeded, oblong, 2-2.5 cm. long, septate between the seeds, softly tomentellous, apiculate.

355. Cantharospermum scarabaeoides (L.) Benth. Widely spread in tropical Asia; Mascarene Isl.; Sierra Leone. Maryland: Canton, on chrome ore piles, so common as to cover some piles. Nov. 1958. Reed 41368; Oct. 1959. Reed 45801 and 45809. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45884.

356. Cassia bauhinoides A.Gray. Western Texas, Arizona and northern Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32844. Herbaceous, puberulent, 10-30 cm. tall; leaflets oblong, 1-4 cm. long, obtuse, pubescent on both surfaces; petals 18 mm. long, much surpassing the sepals; pod curved, compressed, 2-3 cm. long, pubescent; flowers mostly axillary; leaflets usually 2, very unequal at the base.

357. Cassia nictitans L. A weed from Massachusetts and southern Vermont to Illinois, Missouri, Kansas, south to Georgia and Texas. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35199.

358. Cassia tora L. Old World tropics; continental tropical America; West Indies; Florida to Texas and Mexico, north to Pennsylvania, Indiana, Michigan, Illinois, Missouri and eastern Kansas. Sickle-pod. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32809; Oct. 1953. Reed 32886; Sept. 1958. Reed 41224; Oct. 1958. Reed 41137, 41153 and 41159; Oct. 1959. Reed 45818.

359. Cassia obovata Collad. Native of Old World tropics; Venezuela; West Indies. Maryland: Canton, on chrome ore piles. Sept. 1957. Reed 39309. Glabrous, glaucous, erect, 0.5-1.2 m. high; stipules lanceolate, 4-6 mm. long, acuminate; leaves 8-15 cm. long; petioles slender, 2-5 cm. long; leaflets 3-7 pairs, obovate or oblong-obovate, 1-4 cm. long, nearly sessile, the apex rounded and mucronulate, the base narrowed; racemes mostly as long as the leaves or longer, several-many-flowered, slender-peduncled; bracts 4-7 mm. long; petals bright yellow, nearly

alike, about twice as long as the sepals; pod oblong, very flat, rounded at both ends, 3-6 cm. long, about 1.5 cm. wide. -- Britton & Wilson, l.c., 5(3): 373. 1924.

CICER L. Erect or ascending, often glandular-pubescent herbs, with alternate, pinnate leaves, the estipulate leaflets dentate, the stipules foliaceous, the white, blue or purple flowers solitary or few together in the axils on slender peduncles; calyx oblique, or gibbose at base, deeply 5-cleft; standard suborbicular, clawed; wings obliquely obovate; keel broad, incurved; stamens diadelphous (9 and 1); anthers all alike; ovary sessile, 2-several-ovuled; style filiform, glabrous, incurved; stigma terminal; pod ovoid to oblong, swollen, 2-valved; seeds subglobose.

360. *Cicer arietinum* L. Native of the Mediterranean region; introduced from southwestern Asia; Bolivia; West Indies; waif in eastern North America. Maryland: Canton, on chrome ore piles. June 1958. Reed 40605; July 1958. Reed 41013 (US); Sept. 1958. Reed 41229. Annual, glandular-pubescent, erect or ascending, branched, 3-6 dm. high, the branches angled; leaves 5-10 cm. long; stipules 3-5 mm. long, dentate, acute; petioles slender, 1-3 cm. long; leaflets 9-17, oblong or obovate, sessile, 8-16 mm. long, serrate above, mostly obtuse; flowers white to purple, nodding, solitary on peduncles much shorter than the leaves; calyx-lobes linear-lanceolate, acute, 6-8 mm. long; corolla somewhat longer than the calyx; pod oblong, erect, 2-3 cm. long, densely pubescent. -- Britton & Wilson, l.c., 5(3): 210. 1924.

361. *Coronilla varia* L. Introduced and naturalized from Europe; Maine and New England to South Dakota, south to Virginia, North Carolina, West Virginia, Kentucky and Missouri; native of Europe, southwestern Asia and north Africa. Maryland: Canton. June 1900 and 1901. C.C.Plitt; abundant in wastes in Canton off Clinton Street. Oct. 1957. Reed 39419.

362. *Coronilla cretica* L. Native of central Europe; Crete; Italy; Rumania. Maryland: Canton, on chrome ore piles. June 1954. Reed 33375. Annual, or biennial, glabrous or sparsely covered with setae; leaflets obovate or obtriangular, the anterior part retuse or emarginate, 5-8 pairs; peduncles 3-5-flowered, the florets 5-7 mm. long, purple or white, variegated with purple; legume erect, narrowly linear, up to 1 mm. wide and 4-8 cm. long, quadrangular, ending in an incurved beak; seed sparsely hairy. Asia Minor, Caucasus

363. *Crotalaria biflora* L. Native of plains of Peninsular India and Ceylon. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45914. Silky trailing annual, with stems 30-45 cm. long; leaves close, sessile, densely silky, ovate or roundish, 12-25 mm. long, obtuse, mucronate; stipules minute, usually none; pedicels 2-4 times the leaves, 1- or closely 2-flowered; calyx 6 mm., densely silky, teeth long, the upper lanceolate, the lower linear; corolla yellow, scarcely exerted;

pod compressible, 6-8 mm. long, short-stalked, glabrous or downy; racemes all lateral, leaf-opposed. Hooker, Flora Brit. India, 2: 66. 1879.

364. Crotalaria pumila Ortega. Peninsular Florida and the Keys; West Indies; tropical America. Maryland: Canton, on chrome ore piles. Sept. 1957. Reed 39305; Oct. 1957. Reed 39444; Oct. 1958. Reed 41180 and 41345. Perennial, minutely pubescent or glabrate; stems several together, often branched throughout, 1-9 dm. long, decumbent; leaves numerous; leaflets 3, the blades cuneate to oblong-cuneate, 0.5-1.5 cm. long, mostly emarginate, the terminal one longer than the petiole; calyx becoming 4 or 5 mm. long; corolla yellowish; standard less than 10 mm. long; pods 1-1.5 cm. long.

GALEGA L. Calyx campanulate, not bilabiate, with 5 subulate teeth; keel almost acute; ovary sessile, upright, exerted, linear, many-seeded, bivalve, obliquely striated on the surface.

365. Galega officinalis L. Native of the Mediterranean region, Europe and Africa. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32659, 32798 and 32801; June 1954. Reed 33445; July 1954. Reed 34035; Nov. 1954. Reed 33032; Oct. 1954. Reed 32680 and 35227. Plants 6-10 cm. tall, glabrous; stems erect, fistulate, striated; leaves unevenly paired, with 5-8 pairs of oblong-lanceolate, glabrous leaflets, terminated by a subulate point; the terminal leaflet ordinarily tapering; stipules large, semi-sagittate to broadly lanceolate, pointed; flowers bluish, or rarely white, in oblongated clusters, axillary, long-peduncled, surpassing the floral leaf; pedicels pock-marked, equal to the tube of the calyx; bracts elongated, subulate; calyx glabrous, with long subulate divisions; standard at limb orbicular, upright, covered with parallel veins convergent toward the middle of the surface and forming acute angles at the summit directed toward the styles; seeds oblong, brown.

366. Glycine max (L.) Merr. Introduced from eastern Asia; cultivated southward, north to Delaware, Michigan, Illinois; escaped from cultivation. Soybean. Maryland: Canton, on chrome ore piles. Oct. 1959. Reed 46717.

367. Indigofera trifoliata L. Native of the East Indies, Asia, tropical Australia, and throughout India. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41234; Oct. 1958. Reed 41144 and 41148. Perennial, pubescent or hairy; branches numerous, long, spreading from the base, procumbent or ascending; leaflets 3, sessile, oblong, 1.5-2.5 cm. long, gland-dotted; flowers small, red, crowded in short, sessile racemes; calyx-teeth long, bristle-like; pod pubescent, about 1.5 cm. long.

368. Lathyrus aphaca L. Native of central and southern Europe. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32681; June 1954. Reed 33356 and 33410. Plant glabrous, or slightly glaucous; stems flexuous, decumbent or climbing, branched; annual; no true leaves, the stipules large and leaf-like, sagittate-cordate, simulating two opposite sessile leaves; petiole filiform, terminating in a simple or branching tendril, deprived of leaflets; stalks 1-flowered, or rarely 2, on peduncles longer than the petioles, the flowers yellow, with black veins on the standard; calyx a tube with 5 veins, its teeth linear-lanceolate, very acute, all nearly equal, much longer than the tube; limb of the standard rounded-emarginate, erect; seed ovoid, smooth, brown marbled with green; hilum oval, very short.
369. Lathyrus inconspicuus L. Native of Europe. Maryland: Canton, on chrome ore piles. June 1954. Reed 33387. Plant glabrous, 1-3 dm. tall; stems angular, not winged, filiform, erect; annual; leaves with 1 pair of linear or linear-lanceolate leaflets, attenuate at both ends; petiole not winged, terminated by a short tip and never a tendril; stipules semi-sagittate, very erect, subulate when asleep; stalks very short, 1-flowered with a minute bracteole; corolla very small, flat, venoso-striate; legume linear, downy; seeds 8-15, ovoid or spherical, truncate at both ends, brown, marbled, smooth; hilum orbicular.
370. Lathyrus sativus L. Native of Europe. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41237; Oct. 1958. Reed 41142. Plants glabrous, 3-5 dm. tall; stems narrowly winged, decumbent or climbing; annual; leaves with petioles narrowly winged, terminating in a simple or branched tendril, with one pair of lanceolate or linear acuminate leaflets; stipules semi-sagittate, shorter than the petiole; stalks 1-flowered, longer than the petioles; calyx with teeth quite acute, lanceolate-acuminate, twice as long as the tube; legume ovate, winged and arched on the back, about twice as long as broad; seeds 4-5, large, angular, smooth, whitish-green; hilum oval-oblong.
371. Lens culinaris Medic. Introduced from the Old World; occasional in wastes but scarcely persistent. Lentil. Maryland: Canton, on chrome ore piles. June 1959. Reed 42976; July 1959. Reed 43621 (US).
372. Lotus corniculatus L. Adventive from Europe; Newfoundland to Minnesota, south to Virginia and Ohio. Maryland: Canton, May 1900 and July 1904. C.C.Plitt; wastes near oyster shell piles, along wharf. June 1959. Reed 42978.
373. Medicago lupulina L. Naturalized from Europe; throughout eastern North America. Black medik or nonesuch. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32797; May 1958. Reed 40410.

374. Medicago minima (L.) Desr. Adventive from Europe; local, Connecticut to Virginia. Bur-clover. Maryland: Canton, on chrome ore piles. June 1954. Reed 33405.

375. Medicago sativa L. Introduced and naturalized from the Old World; throughout eastern North America. Alfalfa. Maryland: Canton, on chrome ore piles. June 1954. Reed 33431; May 1958. Reed 40408; Port Covington. July 1959. Reed 43815. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44043.

376. Medicago orbicularis (L.) Bartal. (Some authors give M. orbicularis All.). Native of France, Corsica and southern Europe. Maryland: Canton, on chrome ore piles. June 1954. Reed 33394 and 33406. Plant 2-6 dm. tall, nearly glabrous; stems inclined, angular; leaves obovate-cuneiform or the upper ones rhomboidal, dentate at their upper half; stipules laciniate; peduncle 2-3-flowered, aristate, shorter than the leaf; pedicels longer than the tube of the calyx; teeth of the calyx lanceolate-subulate, once longer than the tube; standard longer than the keel; the latter going beyond the wings; ovary glabrous, or a little hairy and ciliate, lenticular, 15-18 mm. large, becoming yellowish at maturity, spreading to the right, forming 3-5 uneven revolutions; the surfaces furnished with radiating veins, ramifying and anastomosing, the edge membranaceous leafy, flat or undulating; flowers small and yellow; legume at first crooked, afterwards forming a very compressed lentiform helix of 5-7 turns, of which the middle one is the largest; seeds many, oval-triangular, punctulate-rugose or tuberculate.

377. Medicago scutellata All. Native of central Europe. Maryland: Canton. June 1954. Reed 33367 and 33392. Plants 2-4 dm. tall, hairy-glandulose; stems erect or diffuse, angled, branching; leaves obovate or oblong, dentate in their upper half; stipules lanceolate, dentate; peduncle 1-3-flowered, long-aristate, often shorter than the leaf; pedicels shorter than the tube of the calyx; teeth of the calyx lanceolate, sharp, longer than the tube; the standard longer than the keel; the latter going beyond the wings a little; ovary at first hairy-glandulose, later being glabrous, almost hemispherical at the end, 12-15 mm. large, spiraling to the right, forming 5-6 revolutions, of which the upper ones are set within the lower ones; the surface oblique and strongly reticulate veined; the edges slender at the base, thickened at the summit; flowers large, yellow orange; legume convex below, presenting its spiral edge on the upper surface of the helix; seeds large, reniform, hollowed out on one side, smooth, brown.

378. Melilotus alba Desr. Naturalized from Europe; throughout eastern North America. White melilot. Maryland: Canton, common on wastes. Oct. 1957. Reed 39571.

379. Melilotus officinalis (L.) Desr. Naturalized from Europe; Quebec to British Columbia and southward. Yellow melilot. Maryland: Canton, common on wastes. Oct. 1957. Reed 39570.

MIMOSA L. Herbs, shrubs or rarely trees, mostly with 2-pinnate, often sensitive leaves, the small, regular, mostly 4-5-parted, perfect or sometimes polygamous flowers in axillary, peduncled heads or spikes; calyx small, its teeth short; petals valvate, connate below, hypogynous; stamens as many as the petals or twice as many, distinct, exserted; filaments mostly filiform; anthers small, eglandular; ovary 2-many-ovuled; style slender or filiform; stigma terminal, small; pod linear or oblong, usually flat, often transversely jointed, 2-valved with the continuous margins persistent; seeds compressed. -- Britton & Wilson, l.c., 5(3): 357. 1924.

380. Mimosa pudica L. Continental tropical America; West Indies; naturalized in tropical Asia and in Australasia. Maryland: Canton, frequent on chrome ore piles. Oct. 1958. Reed 41158; Nov. 1958. Reed 41370; Oct. 1959. Reed 45797. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45915. Herbaceous, or a little woody, loosely pubescent with long hairs or glabrate, branched, 5 dm. high or less, the stems and branches armed with rather stout, somewhat curved prickles 2-4 mm. long; stipules lanceolate, striate, acuminate, 3-6 mm. long; petioles slender, with a pulvinus at base, 2-6 cm. long, deflexed when touched; pinnae 1 pair or 2 approximate pairs, also with a pulvinus at base, 2-6 cm. long; leaflets 15-25 pairs, thin, linear, 6-10 mm. long, 1.5-2 mm. wide, folding when touched, acutish at the apex, obliquely rounded at the base; heads ovoid, axillary; peduncles 1-2 cm. long; calyx minute; petals and stamens 4; stamens pink, fading white; pods linear-oblong, 2-5-jointed, 1-1.5 cm. long, 3 mm. wide, constricted at joints, the margins armed with slender straight prickles, otherwise glabrous. -- Britton & Wilson, l.c., p. 357. 1924.

381. Mimosa sp. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44047. An immature another species.

382. Ononis spinosa L. Adventive from Europe; occasional in waste places near eastern United States cities. Maryland: Canton, on ballast. Sept. 1900 and 1904. C.C.Plitt. (Reed Herb.). Also known as Ononis repens. Named for onos, an ass, because the plant is eaten by that animal, acc. to Hook. & Arn., Brit. Fl., p. 96. 1850. Descr. in Gleason, l.c., p. 397. 1952.

383. (Dalea) Parosela floridana Rydb. Native of the Florida Keys. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32774. Pubescent shrub; branches puberulent, brown, rather densely glandular-dotted; leaves 3-6 cm. long; stipules small, subulate, gland-like; rachis puberulent, slightly winged; leaflets 9-17,

oval or obovate, often retuse, 5-10 mm. long, puberulent; spikes short-peduncled in the axils of the leaves; bracts ovate-lanceolate, acute, shorter than the calyx, finely pubescent, with a few glands; calyx-tube villous, campanulate, 2.5 mm. long; lobes filiform, with a broader base, the lowest 4 mm., the rest 3 mm. long; corolla white, or ochroleucous, or pink, turning dark brownish rose-purple; blade of the banner rounded cordate, with a single gland at the apex and a few near the base, 2.5 mm. long; blades of the wings 3 mm. long, those of the keel 4 mm. long and with a gland near the apex. -- Rydb., in No. Amer. Fl., 24(2): 114. 1920.

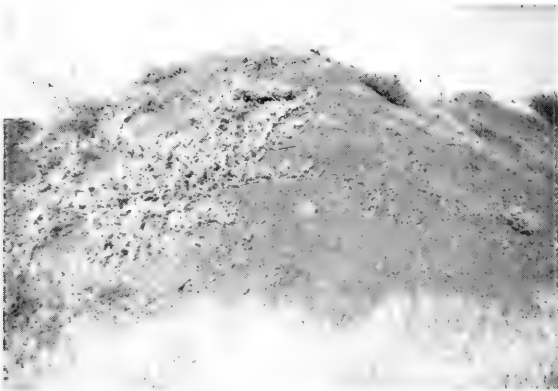
384. Dalea lemmoni Parry Native of Mexico, northward and Native of southern Arizona. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32755. (Rydb. in No. Amer. Fl., 24(2): 77. 1920, says, "Parosela lemmoni (Parry) Heller, based on Dalea lemmoni Parry in Gray, 1882."). Slender annual or perennial, branched at the base; stems 1-3 dm. tall, branched, glabrous; leaves 1-3 cm. long; stipules minute, subulate; petiole 1-3 mm. long; rachis glabrous, conspicuously glandular-dotted, margined; leaflets 5-11, linear to oblong-cuneate, 4-10 mm. long, acutish to retuse, glabrous on both sides, conspicuously glandular-dotted beneath; peduncles terminal or opposite the leaves, 2-6 cm. long; spikes globose or ovoid, about 1 cm. long; bracts lanceolate, acuminate, conspicuously glandular-dotted and glabrous on the back, ciliate on the margins; calyx-tube turbinate, 10-ribbed, silky-hirsute, 2 mm. long; lobes subulate-attenuate, longer than the tube; corolla rose-colored; blade of the banner deltoid-cordate, 2 mm. long, the claw 3 mm. long; blades of wings obliquely elliptic or obovate, with a rounded basal lobe, 3-3.5 mm. long, those of the keel-petals broadly obovate, with a smaller basal lobe, 3.5-4 mm. long, the claws of both 2 mm. long; pod silky-villous.

385. Phaseolus mungo L. Native and cultivated in India. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41298; Oct. 1958. Reed 41145 and 41151. Stems scandent or subscandent, up to 60 cm. tall; whole plant hoary with a reddish-brown pubescence, which gives the foliage a light tint; branches usually not twining; leaves yellowish-green, the leaflets 5-13 cm. long, the stipules inserted above their bases; pods hairy, ascending or suberect; seeds dark-brown to dull greenish-gray in color, sometimes black.

386. Fisum fulvum L. & B. Native of Syria and Palestine. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41233. Petioles terete; stipules rounded below and acutely toothed; peduncles 2-flowered; legumes short; flowers fulvous, marked with deep or almost scarlet veins; legume semi-elliptic, 2.5 cm. long; leaflets 2 or 4.



Various weeds on chrome ore, Canton, Maryland



Melons and sorghum of chrome ore, Canton, Md.

387. Sesbania exaltata (Raf.) Rydb. Tropical America; Florida to Louisiana, north to Missouri; southwestern states; adventive along the Atlantic seaboard to southeastern New York. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41146. Virginia: Newport News, on chrome ore piles, frequent. Aug. 1959. Reed 414045; Nov. 1959. Reed 45872. See Reed, *Phytologia*, 9(8): 496. 1964.

388. Tephrosia purpurea Pers. Widespread in India, tropical Africa and throughout the tropics. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41136 and 41154; Nov. 1958. Reed 41713; Oct. 1959. Reed 45713. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45910. Perennial, pubescent herb; stems erect, 2-5 dm. tall, woody; leaves odd-pinnate, 5-12 cm. long; leaflets 9-21, oblong-lanceolate, 1-2 cm. long, 0.5-1 cm. wide, entire, obtuse, bristle-tipped, the upper surface nearly glabrous, the lower silky, the veins straight, parallel; flowers red, 0.5-0.8 cm. long, in leaf-opposed racemes; calyx silky, bell-shaped, the 3 lower teeth about as long as the tube, the 2 upper longer; standard orbicular, silky outside; keel incurved, obtuse; upper stamen free, others united; style strongly curved, glabrous; stigma capitate; pod sessile, pubescent, flat, 4-5 cm. long, 0.5 cm. wide; seeds 6-10.

TRIGONELLA L. Annual or rarely perennial herbs, with erect or spreading stems; leaves alternate; blades pinnately 3-foliolate; leaflets broadened upward, toothed, commonly sharply so; flowers perfect, in short racemes or panicles, or clustered; calyx short-pedicelled, lobes nearly equal, narrow; corolla yellow, blue or white, the standard with an obovate or cuneate sessile blade, the wings oblong or ovate, longer than the rounded keel; stamens 10, diadelphous, the anthers all alike; ovary sessile or short-stalked, the style very stout or subulate, the stigma oblique; ovules several or many; pod curved, narrow, indehiscent or nearly so.

389. Trigonella monspeliaca L. Naturalized from Europe; central Alabama. Maryland: Canton, on chrome ore piles. June 1954. Reed 33400. Plants finely pubescent; stem simple or branched, 0.5-4 dm. long; leaflets 3, the blades cuneate or obovate, 3-11 mm. long, sharply toothed above the middle; flowers clustered, the calyx 2-2.5 mm. long, the lobes subulate, slightly shorter than the tube; corolla yellow, about one-third longer than the calyx, the standard cuneate, 3-3.5 mm. long, emarginate; pods linear, curved, 11-15 mm. long, reticulated, finely pubescent.

390. Trigonella foenum-graecum L. Native of eastern Europe and Abyssinia; cultivated from Mediterranean to India, Sahara. Maryland: Canton, on chrome ore piles. June 1954. Reed 33369. Plants

2-4 dm. tall, simple, green, glabrous or very lightly hairy; stems erect, branching; leaves short-petioled, the leaflets oblong or obovate, obtuse or truncate and toothed at the summit; stipules lanceolate-acuminate, entire; flowers whitish or yellowish, axillary, sessile, solitary or in pairs; calyx a little hairy, with linear-lanceolate teeth, shorter than the tube; standard longer than the wings; the keel very short, rounded; ovary glabrous, linear-compressed, curved outward, provided on the surface with longitudinal anastomosing veins; the beak elongated one-third to one-fourth that of the receptacle; legume falcate, twice as long as the beak; seeds about 20, oval, compressed, often truncate at both ends, finely tuberculate.

391. Trigonella caerulea (L.) Ser. Native of Europe, central and southeastern. Maryland: Canton, on chrome ore piles. Nov. 1953. Reed 33039. Stem erect, simple or a little branched, 15-60 cm. tall; leaves oblong-lanceolate, dentate, mucronate-acuminate; stipules half-ovate, dentate, long-acuminate; floral peduncles axillary, erect, longer or shorter than their bracts; inflorescence dense, in a globose cluster, pedicels of flowers shorter than the calyx and the bract; corolla bright blue, the wings shorter than the standard and reaching beyond the keel; fruit ascending, provided with longitudinal projecting veins, the beak recurved.

392. Trigonella polycarpa Boiss. & Heldr. Native of Turkey (Pamphylia and Adalia, 1845, Cotype in US, 137204). Maryland: Canton, on chrome ore piles. June 1954. Reed 33365. Adpressly hairy; branching, procumbent; stipules semi-sagittate, denticulate; leaflets minute, obovate-orbiculate, denticulate; flowers 10-20, subsessile, in a dense head, 5-6 mm. long; legume appressed hairy, narrowly linear-rounded at the base, becoming attenuate at the apex, 2-2.5 cm. long. -- Boissier, Flora Orientalis, 2: 74. 1872.

393. Vicia villosa Roth. Introduced and naturalized from Europe; cultivated as forage crop throughout eastern United States; Nova Scotia to British Columbia, south to Georgia, Texas and California. Hairy or winter vetch. Maryland: Canton, on chrome ore piles. June 1954. Reed 33370.

394. Vicia angustifolia Reichard. Naturalized from Europe; eastern Canada to Michigan. Common Vetch. Maryland: Canton, on chrome ore piles. June 1954. Reed 33368.

395. Vicia peregrina L. Native of Asia Minor and Europe. Maryland: Canton, on chrome ore piles. June 1954. Reed 33358. Plant 3-6 dm. tall, provided with some hairs; stems slender, erect or decumbent; annual; leaves terminating in a branching tendril, with 3-6 pairs of linear leaflets, which are truncate and hairless; stipules not spotted, small, semi-sagittate, entire; flowers purplish, solitary, short-pedicelled; calyx with lanceolate-acuminate teeth, all nearly equal, longest equal to the tube, incurved; standard glabrous, the keel very short; style bearded; anthers oval; legume lanceolate, somewhat pubescent.

LEMNACEAE

396. Lemma minor L. Throughout North America, except the extreme south; widely distributed in the Old World. Maryland: Canton, plentiful in wet ditches. July 30, 1959. Reed 43846.

LILIACEAE

397. Asparagus officinalis L. Canton, on chrome ore piles. June 10, 1963. Reed 62405.

LINACEAE

398. Linum usitatissimum L. Introduced from Europe; a casual weed in eastern United States. Common flax. Maryland: Canton, on chrome ore piles. Oct. 1957. Reed 39443; June 1958. Reed 40604; July 1958. Reed 40997; Oct. 1958. Reed 41354; June 1959. Reed 42974.

LYTHRACEAE

399. Lythrum salicaria L. Naturalized from Europe; Newfoundland and Quebec to Minnesota, south to Nova Scotia, New England, Virginia, West Virginia, Ohio, Indiana and Missouri. Spiked loosestrife. Maryland: Canton, in ditches near oyster shell piles. July 1958. Reed 40880.

MALVACEAE

400. Abutilon theophrasti Medic. Naturalized from India; New England, westward and southward. Maryland: Canton, common in wastes between and on chrome ore piles. Oct. 1953. Reed 32687; still common in 1960 and 1963.

401. Gossypium herbaceum L. Cultivated cotton, of southern states, north to southeastern Virginia, and casual on wastes north to New England. Maryland: Canton, on chrome ore piles, and between piles. Sept. 20, 1957. Reed 39310.

402. Hibiscus moscheutos L. Florida and Alabama, north to eastern Maryland, Virginia, West Virginia, southern Ohio and southern Indiana. Maryland: Canton, wastes along ditches. Sept. 1957. Reed 39548.

403. Malva parviflora L. Naturalized from Europe; Quebec to New Jersey and Maryland; North Dakota to British Columbia, south to Missouri, Texas, New Mexico and Mexico. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32917; June 1954. Reed 33442 and 33422.

404. Malva rotundifolia L. Naturalized from Europe; Michigan and Indiana to the Pacific Coast and southward; Florida to Texas, north to North Carolina and Maryland. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32911; Nov. 1953. Reed 32977.
405. Sida angustifolia Lam. Tropical America, north to Mexico, Texas and Arizona. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32719 and 32721. See Small, Flora of SE United States, p. 771. 1913.
406. Sida rhombifolia L. Adventive from the Tropics; Florida to Texas, north to southeastern Virginia, formerly to New Jersey. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45870.
407. Sida humilis Willd. var. veronicaefolia Lam. Native of East Indies, India, tropical Africa and America. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32730. Very variable; stem usually procumbent, branching, covered, like the leaves with a few scattered radiating hairs; petiole rather shorter than the blade; peduncles jointed in the middle, distant or arranged in a loose raceme; flowers axillary, solitary or twin; calyx-segments triangular, very acute; corolla straw-colored, scarcely exceeding the calyx; carpels 5, muticous or shortly bicuspidate; in this var. the carpels with two longish awns.
408. Sphaeralcea angustifolia Spach. Utah and Colorado, south to Texas, Arizona and Mexico. Maryland: Canton, on chrome ore piles. June 1954. Reed 33411. Perennial, with a somewhat woody base; stem 5-15 dm. tall, subcanescent; leaves 5-12 cm. long, lanceolate or linear-oblong, crenate, the lower ones sometimes hastately lobed; flowers clustered in axils; sepals lanceolate or ovate-lanceolate, acute or short-acuminate; petals pink, 8-10 mm. long; carpels 5-6 mm. long, only the lower fourth or less rugose, rounded at the apex; fruit ellipsoid to ovate.

MORACEAE

409. Broussonetia papyrifera (L.) Vent. Introduced and naturalized from Asia; southern New England and Missouri, southward. Paper-mulberry. Maryland: Canton, common in thickets on wastes. Oct. 1957. Reed 39567 (male flowers).
410. Morus rubra L. Florida to Texas, north to southwestern Vermont, New York, southern Ontario, Minnesota and South Dakota. Maryland: Canton, wastes. Oct. 1957. Reed obs.; Aug. 1959. Reed 44394.

NYCTAGINACEAE

411. Boerhaavia coccinea Mill. Northern South America through Central America to Mexico; West Indies; Florida; tropical Africa. Maryland: Canton, on chrome ore piles. Sept. 1958. Reed 41214; Oct. 1958. Reed 41143 and 41355. Virginia: Newport News, on manganese ore piles. Nov. 1959. Reed 45869. Perennial, procumbent or ascending, 3-12 dm. tall, often pubescent, at least below, the branches glabrous or puberulent; leaves rhombic-ovate to oblong or nearly orbicular, 2-6 cm. long, 0.8-5 cm. broad, rounded or subcordate at the base, slender-petioled, entire or undulate; panicle slender, often 3 dm. long, its branches nearly filiform, glabrous or puberulent; flowers reddish, 2 mm. broad; fruit ob-ovoid, 2.5-4 mm. long, 5-grooved, glandular. -- Britton & Wilson, l.c., 5(2): 285. 1924.
412. Boerhaavia erecta L. South America through Central America to Mexico; West Indies; southern United States; Bermuda. Maryland: Canton, on chrome ore piles. Sept. 1955. Reed 38218. Annual, erect or ascending, branched, 2-10 dm. tall; leaves ovate to deltoid-ovate, sometimes inequilateral, 2-7 cm. long, 1-4.5 cm. broad, apiculate, repand or undulate, acute to cordate at the base, minutely brown-dotted on the lower whitish surface, the petioles usually about one-half as long as the blades or longer; peduncles filiform; flowers 2-6 in a cluster; calyx white to purple, its tube glabrous, the limb campanulate, 1-1.5 mm. long, sparingly pubescent; stamens exserted; fruit obpyramidal, 3-3.5 mm. long, 1-1.5 mm. broad at the truncate apex, 5-angled, glabrous. -- Britton & Wilson, l.c., 5(2): 286. 1924.
413. Mirabilis nyctaginea (Michx.) MacM. Wisconsin and Manitoba to Montana, south to Alabama, Louisiana and Texas; adventive eastward to Atlantic states. Kentucky: Rowan Co., along C&O RR at Morehead. July 1948. Reed 13238; Mason Co., wastes along C&O RR, at Maysville. Aug. 1959. Reed 44577; Marion Co., roadsides, 4 mi. N of Lebanon. Aug. 1959. Reed 45163 and 45167. Maryland: Queen Anne Co., wastes just S of Queen Anne. July 1957. Reed 38918 and Oct. 1957. Reed 39927; Talbot Co., wastes near swamp, 2 mi. sw of Queen Anne. July 1957. Reed 38992; Montgomery Co., along B&O RR., Chevy Chase. May 1941. B. Winkler. (US); railway embankment, Chevy Chase Lake. May 1916. Maxon & Standley. (GH, US); Prince Georges Co., along B&O RR, near Branchville. Sept. 1943. S.H. Newcomer. (US); Frederick Co., abundant along B&O RR, 2 mi. down Potomac R. from Point of Rocks. June 1948. O.M. Freeman. (US). New Jersey: Atlantic Co., common in fields south of Hammonton. June 1954. Reed 33517. Ohio: Scioto Co., common in RR yards at Portsmouth. Aug. 1959. Reed 44508. Pennsylvania: Franklin Co., along RR tracks, frequent, Greencastle. May 1960. Reed 46419. West Virginia: Jefferson Co., edge of woods along Shenandoah River near Harpers Ferry. Aug. 1952. Reed 29901.

ONOCRAGEAE

414. Epilobium hirsutum L. Naturalized from Europe; southern Quebec and southern Ontario, south to southern New England, New York, Ohio, Michigan and northern Illinois. Maryland: Canton, large patch in wastes. Oct. 1957. Reed 39575; on chrome ore piles. Oct. 1959. Reed 45712.

415. Oenothera biennis L. Newfoundland to southeastern Alberta, south to Florida, Tennessee, Arkansas, North Dakota and Idaho. Maryland: Canton, common on wastes. Oct. 1957. Reed 39566.

PALMAE

416. Phoenix dactylifera L. Native of Old World tropics. Maryland: Canton, on chrome ore piles. Seedlings, not persistent. Nov. 1958. Reed 41362.

PAPAVERACEAE

417. Argemone alba Lestib. f. Florida to Texas and Missouri. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32710, 32767 and 32850; June 1954. Reed 33421. Foliage pale or somewhat glaucous, spine-armed; stems rather stout, 3-5 dm. tall, not pubescent; leaves 3-15 cm. long, the blades pinnately lobed or pinnatifid, sometimes whitish along the veins, the midrib slightly prickly; flowers pedicelled, the sepals 1.5-2 cm. long, the horns erect or nearly so, the terminal spine 1-1.5 mm. long, distinctly flattened, the corolla white, 7-10 cm. broad; capsules oval or oblong, 2.5-4 cm. long. -- Small, l.c., p. 462.

418. Argemone mexicana L. Naturalized from tropical America; Texas to Florida, north to New Jersey and Pennsylvania. Maryland: Canton, on chrome ore piles. July 1958. Reed 41005; June 1959. Reed 42972; Aug. 1959. Reed 44347; Oct. 1959. Reed 45812. Virginia: Newport News, on iron ore piles. Aug. 1959. Reed 44044; on chrome ore piles. Nov. 1959. Reed 45881. Foliage glaucous; stems 3-9 dm. tall, more or less spiny; leaves 10-25 cm. long, the blades runcinate-pinnatifid, blotched, spiny-toothed and commonly spiny along the midrib, sessile and clasping; flowers sessile or nearly so, the sepals acuminate and bristle-tipped, the corolla yellow, orange or creamy, 2.5-7 cm. broad; capsules oblong, 2.5-3 cm. long, spine-armed. -- Small, l.c., p. 462.

419. Hypocoum pendulum L. Native of southern Europe and the Orient; North Africa. Maryland: Canton, on chrome ore piles. June 1956. Reed 38820. Stems about 10 cm. tall, erect, dichotomous with one or two flowers in each dichotomy, surpassing in length the radicle leaves; the radicle leaves standing erect,

soft, 4-7 cm. tall, divided into long filiform segments; flowers small, yellow and peduncled; the external petals ovate-oblong, the internal trilobed, the median lobe dentate-ciliate or rarely entire; silique cylindrical, not articulated, entirely pendant.

PASSIFLORACEAE

420. Passiflora foetida L. var. isthmia Killip. (Det. E.C.Leonard). Native from Panama to Ecuador and Colombia. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41171. Stem, petiole and peduncles densely hirsute, with spreading yellow-brown hairs, averaging 2 mm. long, petiole sparingly glandular-ciliate; leaves suborbicular in general outline, 3.5-7 cm. long, 4-9 cm. wide (lateral lobes usually reduced to a short tooth, the middle lobe ovate-deltoid), hirsute; bracts densely pilose when young, the segments closely interwoven; ovary glabrous; fruit 2-2.5 cm. in diameter, yellowish. This variety has the characteristic bracts and indument of var. hispida, but the lateral lobes of the leaves are greatly reduced and the bracts are densely long-pilose, though occasionally they become glabrescent with age.

PHYTOLACCACEAE

421. Phytolacca americana L. Florida to Texas, north to New England, southern Quebec, New York and southern Ontario. Pokeweed. Maryland: Canton, on wastes between chrome ore piles and in other wastes. July 1959. Reed 43841.

422. Phytolacca bogotensis HBK. Native of Colombia to Peru and Chile. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32897 and 32898. Smooth, green, tree-like shrub, branches stout, scarcely or little angled; petioles to 4 cm. long, grooved and angled; leaf-blades oblong-elliptic or broadly lanceolate, acute at both ends or acuminate, the base decurrent, to about 16 cm. long and 4 cm. broad; racemes suberect, many-flowered, to only 4.5 cm. long and 13 mm. thick, the peduncles to 1 cm. long; flowers perfect, the pedicels 3 mm. long; stamens (8-12) and sepals subequal; ovary 8-10 carpellate, the carpels completely joined; fruit baccate.

423. Phytolacca icosandra L. Continental tropical America, from Peru and Brazil, north to Mexico; West Indies. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32777; Oct. 1953. Reed 32676 and 32884. Stems erect, glabrous, or puberulent above, branched, somewhat succulent, 1-3 m. tall; leaves elliptic to ovate-lanceolate, membranous, 8-20 cm. long, acute or acuminate at the apex, narrowed at the base, the rather stout petioles 1-5 cm. long; racemes erect, densely many-flowered, 1-3 dm. long; pedicels 2-4 mm. long; flowers greenish-white or yellowish, the sepals reddish-white, rounded, the stamens 8-20, the carpels 8-20; berry black, depressed-globose, about 8 mm. in diameter. -- Britton & Wilson, l.c., 5(2): 293. 1924.

PLANTAGINACEAE

424. Plantago lanceolata L. Naturalized from Europe; a troublesome weed throughout eastern United States. Maryland: Canton, on chrome ore piles. May 1958. Reed 40409; on pumice piles, from Italy. Aug. 20, 1963. Reed 65423.

425. Plantago major L. Naturalized from Europe; a semi-cosmopolitan weed. Maryland: Canton, on and between chrome ore piles. Nov. 1953. Reed 33030 and 33033; Nov. 1958. Reed 41740.

PLATANACEAE

426. Platanus occidentalis L. A native tree, found in wastes in Canton. Oct. 1957. Reed obs. Sycamore.

POLEMONIACEAE

427. Leptodactylon pungens (Torr.) Rydb. Montana to Washington, south to California and Mexico. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32876. Suffruticose plants, with stem rather woody above the base; stems several to many branches, densely leafy, glabrate to viscid-puberulent; leaves alternate or subopposite above, the lower ones sometimes opposite, with 3-7 acerose-linear subulate divisions 3-9 mm. long, glabrate to glandular-puberulent; calyx about 7-15 mm. long, tubular, glabrate to glandular-puberulent, the teeth acerose, much shorter than the tube, this membranous below sinuses and ciliate at apex; corolla 15-20 mm. long, white or cream-colored, sometimes purplish in the throat, lobes about 6-8 mm. long. -- Harrington, Man. Plants Colorado, p. 449. 1954.

POLYGONACEAE

428. Rumex pulcher L. Naturalized from Europe; Florida to Mexico and California, north to Maryland, and locally to Long Island, Arkansas and Oklahoma. Maryland: Canton, wastes near chrome ore piles. Sept. 1955. Reed 38236.

429. Polygonum aviculare L. Naturalized from Europe; an ubiquitous weed in eastern United States. (Incl. P. neglectum Besser). Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32857; Sept. 1954. Reed 34385; July 1958. Reed 41002; Aug. 1959. Reed 44363.

430. Polygonum cilinode Michx. Newfoundland to Saskatchewan, south to Nova Scotia, New England, northern New Jersey, Pennsylvania, West Virginia, upland to North Carolina, Tennessee, Michigan, Wisconsin and Minnesota. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35226; July 1959. Reed 45838.

431. Polygonum lapathifolium L. Native of Europe; Newfoundland to British Columbia, and southward. Maryland: Canton, on chrome ore piles. Sept. 1954. Reed 34383; Sept. 1957. Reed 39316; July 1958.

Reed 40882 and 40893; Sept. 1958. Reed 41208; Aug. 1959. Reed 44387; Sept. 1960. Reed 48060.

432. Polygonum persicaria L. Naturalized from Europe; a weed throughout eastern United States. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32805; Sept. 1954. Reed 34378; Sept. 1957. Reed 39315; Aug. 1959. Reed 44370.

433. Polygonum scandens L. Florida to Texas, north to Nova Scotia, southern Quebec and Manitoba. Maryland: Canton, on wastes. Oct. 1957. Reed 39414; Port Covington. Nov. 1957. Reed 39486.

434. Polygonum prolificum (Small) Robins. Southern Maine, south to Virginia; Minnesota to Saskatchewan and Washington, south to Arkansas, Oklahoma and eastern Texas. Maryland: Canton, on chrome ore piles. July 1958. Reed 41011; Sept. 1955. Reed 38212.

435. Polygonum prolificum var. autumnale forma laterale Brenckle. Montana and South Dakota. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35209.

436. Polygonum bellardi All. Native of Eurasia; Maryland and District of Columbia. (Dr. Geo. Vasey, 1889, in US, Agr. Grounds, D.C.). Maryland: Canton, on chrome ore piles. June 1954. Reed 33441. Descr. in Gleason, l.c., 2: 75. 1952.

437. Polygonum ramosissimum Michx. Ontario to Saskatchewan and Washington, south to Indiana, Oklahoma and New Mexico, and eastward to the Atlantic Coast. Maryland: Canton, on chrome ore piles. June 1954. Reed 33448.

438. Polygonum ramosissimum forma atlanticum Robins. Maine to Delaware and Maryland, west to Minnesota and Iowa. Maryland: Canton, on chrome ore piles. Oct. 1956. Reed 38245; Sept. 1957. Reed 39536.

439. Polygonum douglasii Greene. Quebec to British Columbia, south to New England, northern New York, northern Michigan, Minnesota, Oklahoma, New Mexico and California. Maryland: Canton, on chrome ore piles. July 1959. Reed 43625.

440. Polygonum hydropiperoides Michx. Florida to Texas, north to Nova Scotia, southern Quebec, southern Ontario, Michigan, Wisconsin, Minnesota and Nebraska. Maryland: Canton, wastes near chrome ore piles. Aug. 1959. Reed 44371.

441. Polygonum pensylvanicum L. Florida to Texas, north to western Nova Scotia, Massachusetts, southern Ontario, southern Michigan, southern Minnesota and Oklahoma. Virginia: Newport News, on chrome ore piles. Nov. 1959. Reed 45873.

PORTULACACEAE

442. Portulaca oleracea L. Naturalized from Europe; a common weed in southern United States, north to southern Canada. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32816 and 32733 (leaves very small); Sept. 1955. Reed 38213. Virginia: Newport News, on chrome ore piles. Aug. 1959. Reed 44064.

443. Portulaca parvula Gray. Western Missouri to Colorado, south to Oklahoma, Texas, New Mexico and Mexico. Virginia: Newport News, wastes along C&O RR, at port. Aug. 1959. Reed 44076.

PRIMULACEAE

444. Anagallis arvensis L. Naturalized from Europe; a common weed in cultivated places. Maryland: Canton. July 1904. C.C.Plitt; on chrome ore piles. Sept. 27, 1953. Reed 32794; on pumice piles. Aug. 20, 1963. Reed 65417.

445. Anagallis arvensis L. forma caerulea (Schreb.) Baumb. Flowers bright blue. Maryland: Canton, on chrome ore piles. June 1954. Reed 33447; Oct. 1954. Reed 35233. Maryland: Washington Co., in limestone fields, Round the Knob, near Dargon. July 1956. Reed 37943.

RANUNCULACEAE

446. Ranunculus sceleratus L. Eurasia; Newfoundland to Alaska, south to Nova Scotia, New England, Florida, Louisiana, Arkansas, New Mexico and California. Maryland: Canton, wet ditches near oyster shall piles. May 1958. Reed 40412; on chrome ore piles. July 1959. Reed 43622.

447. Ranunculus bulbosus L. Native of Europe; Naturalized in fields, meadows and lawns. Maryland: Canton, edge of chrome ore piles, Newkirk St. May 24, 1960. Reed 46318.

RESEDACEAE

448. Reseda luteola L. Introduced from Europe; New England to Illinois, Delaware and Maryland. Maryland: Canton. May 1900. C.C.Plitt; on chrome ore piles. Nov. 1953. Reed 32999.

449. Reseda lutea L. Adventive from Europe; Maine to Michigan, south to Iowa, Pennsylvania and Maryland. Maryland: Canton, on ballast lot. May 1900. C.C.Plitt; Oct. 1900. C.C.Plitt. (Reed Herb.) May 1903. C.C.Plitt. (Reed Herb.); July 1904 and Aug. 1902. C.C.Plitt; on chrome ore piles. June 1956. Reed 38814. Maryland: Carroll Co., along roadside near Westminster. May 1960. Reed 46447.

ROSACEAE

450. Fragaria virginiana Duchesne. Newfoundland to Alberta, south to Nova Scotia, New England, Georgia, Tennessee and Oklahoma. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32764.
451. Potentilla novejica L. Europe; Greenland and Labrador to Alaska, south through the United States. Maryland: Canton, on chrome ore piles. June 1954. Reed 33428.
452. Potentilla recta L. Naturalized from Europe; Newfoundland to Ontario and Minnesota, south to Nova Scotia, New England, Virginia, Tennessee, Arkansas and southeastern Kansas. Maryland: Port Covington, on wastes. Nov. 1957. Reed 39480.
453. Prunus serotina Ehrh. Florida to Texas and Mexico, north to Nova Scotia, southern Quebec, southern Ontario, Minnesota and South Dakota. Maryland: Canton, on wastes. Oct. 1957. Reed 39557.
454. Pyrus coronaria L. Central New York and southern Ontario, south to Wisconsin, Delaware, upland to North Carolina, Tennessee and Missouri. Maryland: Canton, in thickets. Oct. 1957. Reed obs.
455. Pyrus malus L. Introduced and naturalized from Eurasia. Maryland: Canton, on wastes. Oct. 1957. Reed obs.
456. Rubus laciniatus Willd. Cultivated and naturalized from the Old World; Massachusetts to Michigan and southward. Maryland: Canton, on wastes near coast and oyster shell piles, large acreage. Nov. 1953. Reed 32981; Sept. 1957. Reed 39542; Oct. 1959. Reed 45803.
457. Sanguisorba minor Scop. Adventive from Eurasia; Nova Scotia to Ontario, south to Virginia and Tennessee. Maryland: Canton, on chrome ore piles. Oct. 1953. Reed 32877; Baltimore Co.; near Cub Hill, in fields. May 1959. Reed 43120; Baltimore City, Druid Hill Park. June 1907. W.R.Jones. (Reed Herb.).

RUBIACEAE

458. Galium aparine L. Eurasia; Newfoundland to Alaska, south to Nova Scotia, New England, Florida and Texas; both native and introduced. Maryland: Canton, wastes near chrome ore piles. April 1958. Reed 40700.
459. Galium tricornis Stokes. Adventive from Europe; sporadic and infrequent in eastern United States. Maryland: Canton, on wastes. June 1954. Reed 33389.

460. Spermacoce glabra Michx. Florida to Texas, north to southern Ohio, southern Indiana, southern Illinois, Missouri and southeastern Kansas. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32852; Oct. 1953. Reed 32901; Oct. 1954. Reed 35196.

461. Diodia radula Cham. & Schlecht. (Spermacoce radula Willd. in Roem. & Schultes). Native of Brazil. Virginia: Newport News, on chrome ore piles, from India. Nov. 1959. Reed 45917. Stems herbaceous, weak, tetragonal, smoothish; leaves ovate-lanceolate, acute, lined, scabrous above and downy on the nerves beneath; stipules downy, ciliated; whorls of 6-10 flowers; calyx unequal, 5-10 toothed, ciliated; fruit didymous.

SALICACEAE

462. Populus alba L. Introduced and naturalized from Europe; a frequent weedy tree. Maryland: Canton, wastes. Oct. 1957. Reed 39574; Aug. 1959. Reed 44396.

463. Populus deltoides Marsh. Southwestern Quebec to Manitoba, south to western New England and southward in United States. Maryland: Canton. July 1958. Reed 41014; Port Covington. Nov. 1957. Reed 39481.

464. Salix babylonica L. Introduced from Eurasia; Quebec and Ontario, southward. Maryland: Canton, common in wastes. Aug. 1959. Reed 44390.

465. Salix nigra Marsh. New Brunswick to North Dakota, south to southern New England, Long Island, North Carolina, locally to Alabama, Tennessee and Arkansas. Maryland: Canton, common in wastes. Aug. 1959. Reed 44393.

SCROPHULARIACEAE

466. Kickxia elatine (L.) Dumort. Naturalized from Europe; Massachusetts to Indiana, south to Florida, Alabama and Missouri. Maryland: Canton, on ballast. July 1904. C.C. Plitt. (Reed Herb.); on chrome ore piles. Oct. 1953. Reed 32686; June 1954. Reed 33450; Oct. 1954. Reed 35225; Sept. 1955. Reed 38225; June 1955. Reed 38817; Aug. 1956. Reed 37970.

467. Linaria vulgaris Hill. Naturalized from Europe; throughout eastern United States. Maryland: Canton, common on wastes and along RR tracks. Oct. 1900. C.C. Plitt; Oct. 1954. Reed 35186; Sept. 1957. Reed 39541.

468. Maurandya antirrhiniflora H. & B. Texas to Arizona and Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32853. Description in Small, Fl. SE United States, p. 1056, under Antirrhinum antirrhiniflorum (Poir.) Small.
469. Gerardia purpurea L. Florida to eastern Texas, north to southern New England. Virginia: Newport News, at foot of chrome ore piles. Nov. 1959. Reed 45880.
470. Verbascum blattaria L. Naturalized from Europe New England to Ontario, and southward. Maryland: Canton. July 1904. C.C.Plitt; common on wastes near chrome ore piles. Reed obs.
471. Verbascum thapsus L. Naturalized from Europe; throughout eastern United States. Maryland: Canton, July 1904. C.C.Plitt; common on wastes near chrome ore piles. Aug. 1959. Reed 44353.
472. Verbascum sinuatum L. Native of Mediterranean North Africa, Algeria, etc. Maryland: Canton. July 1904. C.C.Plitt. (Reed Herb.); frequent on wastes in various parts of Canton. Sept. 1955. Reed 38223; Aug. 1956. Reed 37969; June 1956. Reed 38810 and 38812; June 1957. Reed 38793; Oct. 1957. Reed 39413; Aug. 1959. Reed 44342; on chrome ore piles. July 1959. Reed 43630 and 43831. Plants 5-20 dm. tall, branched, the branches standing erect; leaves briefly tomentose, sinuously pinnatifid, the lobes undulated, toothed or incised, the blades 3-5 dm. long, 10-18 cm. broad; flowers yellow, medium-sized, in fascicles forming a large panicle, interrupted above; the filaments covered with violet hairs, the anthers alike; capsules small, extending a little beyond the calyx; the peduncles short.
473. Veronica arvensis L. Naturalized from Europe; Newfoundland to Minnesota, and southward. Maryland: Canton, on chrome ore piles. April 1958. Reed 40705; May 1958. Reed 40413; May 24, 1960. Reed 46321.
474. Veronica peregrina L. Naturalized from Europe; Quebec to Minnesota, south to New England, Florida, Louisiana and eastern Texas; Alaska to Oregon. Maryland: Canton, wastes. Apr. 1958. Reed 40695.

SIMARUBACEAE

475. Ailanthus altissima (Mill.) Swingle. Introduced and naturalized from Asia; Massachusetts to southern Ontario and Iowa, and southward. Maryland: Canton, common on wastes. Oct. 1957. Reed 39561.

SOLANACEAE

476. Capsicum frutescens L. Old World tropics; continental tropical America, West Indies, Bermuda, SE United States. Cultivated peppers. Maryland: Canton, on chrome ore piles. Nov. 1953. Reed 32995.
477. Datura meteloides DC. Native of Colorado to California, south to Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32762, 32664 and 32804; Oct. 1953. Reed 32879; Sept. 1955. Reed 38237; Oct. 1959. Reed 45813.
478. Datura quercifolia HBK. Native of Mexico, north to Arizona and Texas. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32665, 32712, 32738, 32773, 32833; Oct. 1954. Reed 35250 and 35184; Sept. 1957. Reed 39312; Oct. 1958. Reed 41347. Stems purple, erect, 0.5-1.5 m. tall; stem and leaves slightly downy or pubescent; leaves deeply pinnately lobed; flowers with corolla pale lavender, 4-7 cm. long, 2 cm. wide; calyx one-half as long as the 5-toothed corolla; anthers purple; capsule ovoid, 6-7 cm. wide, including the spines; spines very unequal in size, larger at the top of capsule.
479. Datura stramonium L. Naturalized from Asia; southern Canada, southward through United States. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32675; Oct. 1954. Reed 35188; Sept. 1957. Reed 39312; Locust Point. July 1959. Reed 43822 and 43817.
480. Datura stramonium L. var. tatula (L.) Torr. Naturalized from Asia; common in southern United States, north into the northern states. Maryland: Locust Point, wastes along B&O RR. July 1959. Reed 43818 (flowers purplish).
481. Lycium halimifolium Mill. Introduced from Europe; southern Canada, southward. Maryland: Canton, wastes near chrome ore piles. Sept. 27, 1953 Reed 32690; Port Covington. Nov. 1957. Reed 39477.
482. Nicandra physalodes (L.) Pers. Introduced from Peru; Nova Scotia to Indiana and Missouri, south to Louisiana. Maryland: Canton, on chrome ore piles. Oct. 1954. Reed 35185.
483. Nicotiana glauca Graham. Native of Argentina; tropical America; Bermuda; seaports along Gulf Coast and California; on ballast northward. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32834. Descr. in Small, l.c., p. 995.
484. Nicotiana trigonophylla Dunal. Texas to California and Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32786 and 32845; Oct. 1953. Reed 32685.

485. Nicotiana plumbaginifolia Viv. Native of South America from SW Argentina to SW Brazil, north to Peru and Ecuador; Guatemala and Mexico; Trinidad, Isle of Pines and Cuba; Florida Keys. Early introduced in India. Maryland: Canton, on manganese ore piles. Oct. 1959. Reed 45700. Descr. in Goodspeed, Chron. Bot. 16(1-6): 403-404. 1954.

486. Petunia parviflora Juss. Naturalized from tropical America; Florida to southern California, north to Virginia and Maryland, and casually to southern New York. Maryland: Canton, on chrome ore piles and between RR tracks, common. Sept. 27, 1953. Reed 32663 and 32747; Nov. 1953. Reed 33037; June 1954. Reed 33361; Oct. 1954. Reed 35204; June 1955. Reed 36548; Sept. 1955. Reed 38217; Sept. 1957. Reed 39308; Sept. 1958. Reed 41212; June 1959. Reed 42971; July 1959. Reed 43648; Aug. 1959. Reed 44341; Sept. 1960. Reed 48059; on manganese ore piles, Newkirk St. Aug. 1961. Reed 52152.

487. Petunia violacea Lindl. Introduced from South America; escaped from gardens and persistent, from eastern Pennsylvania, southward. Maryland: Canton, on wastes near chrome ore piles. Sept. 20, 1957. Reed 39322.

SARACHA R. & P. (Flora Peruviana, 2: 43, t. 180b; char. emend., Miers, Ill. S. Amer. Pl. II: 15. 1849-57). Calyx short, submembraneous, 5-angled, 5-toothed, 5-nerved, the teeth acute and short, persistent; corolla rotate, the edge sinuate, 5-angulate, very often 15-nerved, the lobes reflexed; stamens 5, affixed to the tube of the corolla near the basal margin; filament filiform, erect, dilated triangular at the base; anthers approximate, oblong or subrotund, basifixed, 2-lobed, the lobes tightly connate and dehiscent longitudinally forward; ovary ovate, 2-locular, the placentae crowded, adnate to the septa, multiovulate; style simple, length of the stamens; stigma bilobed capitate; berry globose, the membranous calyx suffused but very little; seeds many, imbedded in pulp, small, reniform; testa scrobiculate, the hilum in a lateral sinus; embryo semicircled within the albumen, rounded, the cotyledons semiterete, uncinata; radicle a little reflexed beneath the hilum.

488. Saracha procumbens R. & P. Native of Peru. Maryland: Canton, Newkirk St., on chrome ore piles. Sept. 27, 1953. Reed 32771; Oct. 12, 1953. Reed 32871. Herb procumbent-ascending, laxly dichotomously branched, lightly pubescent; stems sulcate; petioles margined by the decurrent leaves, 1-2 cm. long; leaves solitary below, geminate above, subobtusate or acute, the larger often 5-8 cm. long, 3-5 cm. wide, early pubescent beneath, finally lustrous and glabrous both sides, entire or undulate; solitary axillary peduncles 2-4-(6)-flowered, 8-10 mm. long; pedicels to twice as long and nutant in fruit, pilose or glabrate as the calyces; corolla ochroleucous, green-centered, early ovate, plicate, soon rotate-campanulate, marginally sublanate; filaments glabrous

and equal; berry lustrous, black, edible. -- Machride, Flora of Peru, Field Mus. Nat. Hist., Publ. 951, Bot. Ser. 13: 36. 1962.

489. Solanum carolinense L. Native of southeastern United States, north to Virginia and Kentucky, and as a weed northward to Vermont, Ontario, Michigan and Minnesota, and west to Idaho and Washington. Maryland: Canton, on chrome ore piles. Sept. 1957. Reed 39542.

490. Solanum carolinense L. forma albiflorum Blake. Maryland: Canton, on wastes. Sept. 1957. Reed 39539. A white-flowered form, found with the typical purple-flowered form.

491. Solanum elaeagnifolium Cav. Native of Mexico and southwestern United States, northeast to Missouri, adventive to Indiana, Ohio, Maryland and Florida. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32854; June 1954. Reed 33435.

492. Solanum nigrum L. Naturalized from Europe; Nova Scotia to Florida, and locally westward. (Incl. S. interius Rydb.). Maryland: Canton. Aug. 1902. C.C.Plitt; on chrome ore piles. Sept. 27, 1953. Reed 32789.

493. Solanum nigrum var. villosum Mill. Adventive from Eurasia; Massachusetts, southward. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32667 and 32796; Oct. 1953. Reed 32880.

494. Solanum rostratum Dunal. Native from North Dakota to Wyoming, south to Mexico; introduced eastward to most of the eastern and northern states. Maryland: Canton. July 1901. C.C.Plitt. (Reed Herb.); Aug. 1902. C.C.Plitt; on chrome ore piles. Sept. 27, 1953. Reed 32855 and 32768; Oct. 1953. Reed 32872; Nov. 1953. Reed 33026.

495. Solanum surattense Burm. Native of Punjab (US). Maryland: Canton, on chrome ore piles, forming huge mats, 6 ft. in diameter. Aug. 1959. Reed 44345 and 44349; Oct. 1959. Reed 45820.

496. Solanum torvum Sw. Native of Old World Tropics; continental tropical America; West Indies; Florida. Maryland: Canton, on chrome ore piles. Oct. 1958. Reed 41166 (Plants 5-8 ft. tall). Descr. in Britton & Wilson, l.c., 6(2): 170. 1925.

497. Solanum nodiflorum Jacq. (Fl. Puerto Rico, non S. nodiflorum Dunal = S. nigrum; Fl. Bermuda says S. nodiflorum Jacq. = S. nigrum). Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32791; Oct. 1953. Reed 32906. Our plants look different than those of S. nigrum L.

498. Solanum deflexum Greenm. Native of Arizona. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32736.

STERCULIACEAE

499. Melochia corchorifolia L. Native from South Carolina to Florida, west to Louisiana and Texas; Africa (Senegal, Nigeria, Sierra Leone, Fr. Sudan); Canton, China. Maryland: Canton, on chrome ore piles. Aug. 1959. Reed 44360; Oct. 1959. Reed 45697. Herb, more or less woody at base, 4-11 dm. tall, glabrous or sparingly hispidulous; leaf-blades ovate or ovate-lanceolate, 2-6 cm. long, acute, serrate or dentate-serrate, rounded or truncate at the base; petioles 1-3 cm. long; flower clusters chiefly in dense terminal heads accompanied by leaf-like bracts; sepals linear, 5-6 mm. long; petals pale purple above the yellow claws, 4-6 mm. long; capsules about 4 mm. high, globose, loculicidal and septicidal. (Riedlea Vent.)

500. A form concatenata (L.) has the branches of the cyme lengthened and spike-like with the flowers on one side only. Plants are more decumbent also. (M. concatenata L., or M. supina L., Sp. Pl., 944). Virginia: Newport News, on chrome ore piles., from India. Nov. 1959. Reed 45898. Native of East Indies and West Africa.

TYPHACEAE

501. Typha angustifolia L. Eurasia; Nova Scotia and southern Quebec, south to South Carolina, West Virginia, Kentucky, Missouri and Nebraska; California. Maryland: Canton, in wet places. Oct. 1957. Reed 39573.

502. Typha latifolia L. Eurasia; North Africa; Newfoundland to Alaska, southward throughout most of the United States into Mexico. Maryland: Canton, wet wastes between chrome ore piles. July 1959. Reed 43646.

ULMACEAE

503. Celtis occidentalis L. Massachusetts to Idaho, south to northern Florida, Tennessee, Arkansas and Oklahoma. Maryland: Canton, on wastes and in thickets, common. Oct. 1957. Reed 39555 and 39577.

UMBELLIFERAE

BIFORA Hoffm. Calyx entire; petals obovate, emarginate, with one lobe bent inwards; achene globose to subglobose, with 10 ridges, the primary ones represented by 5 faint ridges, the secondary one large, tuberculate, projecting a little; 2 orifices on the commissure; the seed distinctly concave on the side of the commissure.

504. Bifora testiculata DC. Native of south-central Europe (France, Italy). Maryland: Canton, on chrome ore piles. June 1954. Reed 33382. Plants 2-3 dm. tall, glabrous, grayish-green, fetid odor; stems erect, angular, striated, branched; raceme slender; umbels of 2-3 striated rays; umbelles of 2-3 always fertile flowers; involucre and involucl of a short linear leaflet; petals white, nearly alike; styles bent outward, equalling the stylopodium; fruit very rugose, sloping at the base, prolonged at the summit into a short conical, obtuse tip; radicle leaves petiolate, pinnate, the segments tripartite, the lobes cuneiform, incised or dentate; the cauline leaves bipinnate, the segments linear, acute; the uppermost leaves sessile.

505. Bupleurum odontites L. Native of southern Europe. Maryland: Canton, on chrome ore piles. June 1954. Reed 33408. Annual, with linear-setaceous, 3-nerved leaves; fruit oblong, with acute ribs, the furrows on the fruit with a single stripe; partial bracts 5, far exceeding the flowers, aristate-cuspidate, pellucid and veinless beyond the lateral nerves.

506. Bupleurum protractum Link & Hoffm. Native of southern Europe; France and Corsica. Maryland: Canton, on chrome ore piles. June 1954. Reed 33386. Annual, with perfoliate leaves; the stem-leaves ovate-oblong, acuminate; partial bracts 5, mucronate; umbel about 3-rayed; fruit tubercled. Distinguished from B. rotundifolium L. by the umbels being 2-3 rays or more; by the involucre being very elongated at maturity; by the styles being longer; by the fruits being larger, more oval, strongly wrinkle-tuberculate; and by the branches being more erect.

CYCLOSPERMUM Lag. Herbs, with decompound or dissected leaves and compound umbels of small white flowers, mostly opposite the leaves; involucre and involucl wanting in this genus; calyx-teeth very small or obsolete; petals entire, stylopodium depressed; style short; fruit ovate or oblong, laterally compressed; carpels with 5 filiform ribs, the oil-tubes solitary in the intervals, 2 on the side of the commissure.

507. Cyclospermum leptophyllum (Pers.) Sprague. (Pimpinella leptophylla Pers.). Introduced as a weed from the Old World and Australia; West Indies; Bermuda; Mexico to Paraguay; southern United States. Maryland: Canton, on chrome ore piles. July 1958. Reed 41007 (fl.); Oct. 1958. Reed 41160 (fr.). Plants slender, glabrous, much-branched, 0.7-6 dm. tall; leaves ternately pinnatisect, the ultimate segments narrow, often incised; umbels 1-4 cm. broad, opposite the leaves, sessile, the umbellets filiform-stalked; fruit ovate, glabrous, about 2 mm. long, the ribs equal and prominent.

508. Daucus carota L. Naturalized from Europe; a weed from Quebec westward and southward. Queen Anne's-lace. Maryland: Canton, common on wastes. July 1959. Reed 40878.

509. Eryngium campestre L. Native of central and southern Europe, eastward to the Caucasus and Urals, northward to Denmark; introduced in England; on ballast in Ireland. Maryland: Canton. June and July 1901; July 1902. C.C.Plitt. Radical leaves subternate, the lobes pinnatifid, with lanceolate lobes, waved and coarsely toothed, bordered and terminated by strong prickles; heads of flowers numerous and small; the involucre leaves more or less pinnately toothed; the scales or bracts within the heads narrow and mostly entire.

510. Foeniculum vulgare Mill. Introduced and naturalized from Europe; Connecticut to Michigan, Nebraska and southward. Maryland: Canton. July 20, 1901. C.C.Plitt. Virginia: Newport News, along C&O RR. Aug. 1959. Reed 44084.

511. Pastinaca sativa L. Introduced and naturalized from Europe; a weed throughout eastern United States. Maryland: Canton, wastes. frequent. June 1959. Reed 42970.

512. Torilis japonica (Houtt.) DC. Naturalized from Eurasia; New York to Iowa, south to Florida and Texas. Maryland: Canton, on chrome ore piles. June 1954. Reed 33390.

URTICACEAE

513. Boehmeria cylindrica (L.) Sw. Florida to Texas, north to Maine, southern Quebec, southern Ontario and Minnesota; West Indies. Maryland: Canton, wastes in ditches. Aug. 1959. Reed 44391.

514. Urtica dioica L. Naturalized from Eurasia; Newfoundland to Manitoba, south to Nova Scotia, New England, Virginia and Illinois. Maryland: Canton, common in ditches. Oct. 1957. Reed 39583.

515. Urtica ballotifolia Wedd. Native of Peru, Bolivia, Colombia, Ecuador and Venezuela. Maryland: Locust Point, large patches in wastes along RR embankment. July 28, 1959. Reed 43820.

VERBENACEAE

516. Lippia nodiflora (L.) Michx. Florida to Texas and Mexico, north to southeastern Virginia, southeastern Missouri and Oklahoma. Maryland: Canton, on chrome ore piles and in ditches. July 1959. Reed 43623 and 43833; Aug. 1959. Reed 44358.

517. Verbena bipinnatifida Nutt. Alabama to Arizona and Mexico, north to Missouri and South Dakota. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32732; Oct. 1953. Reed 32910.

518. Verbena hastata L. Throughout most of United States. Maryland: Canton, common on wastes. Sept. 1957. Reed 39550.

519. Verbena officinalis L. Naturalized from Europe; Florida to Louisiana, north to New England, West Virginia and Tennessee. Maryland: Canton, on chrome ore piles. Sept. 1955. Reed 38232; June 1956. Reed 38823; Aug. 1956. Reed 37973; Sept. 1957. Reed 39535.

520. Verbena scabra Vahl. Native from southeastern Virginia to Florida and the Greater Antilles, west to Arizona, California and northern Mexico. Maryland: Canton, on chrome ore piles. July 1958. Reed 40998.

521. Verbena urticifolia L. Northern Florida to Texas, north to southeastern Quebec, southern Ontario and South Dakota. Maryland: Canton, common on wastes. Aug. 1959. Reed 44354.

VIOLACEAE

522. Viola arvensis Murr. Naturalized from Europe; throughout eastern United States. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32795.

VITACEAE

523. Parthenocissus quinquefolia (L.) Planch. Florida to Texas and Mexico, north to southeastern Maine, New Hampshire, Vermont, southwestern Quebec, New York, Indiana, Illinois and Minnesota. Maryland: Canton. Oct. 1880. Geo. L. Smith. (Reed Herb.); common on wastes. Oct. 1957. Reed 39554.

524. Vitis vulpina L. Florida to Texas, north to southeastern New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Missouri and eastern Kansas. Maryland: Canton, wastes on trees. Oct. 1957. Reed 39556.

ZYGOPHYLLACEAE

525. Kallstroemia intermedia Rydb. Illinois to Colorado, south to Missouri, Texas and Mexico. Maryland: Canton, on chrome ore piles. Sept. 27, 1953. Reed 32745.

526. Tribulus terrestris L. Naturalized from the Old World; Florida to Texas, north to southern New York, Ohio, Michigan, Illinois, Iowa and South Dakota. Maryland: Canton, on ballast. Sept. 1900, Oct. 1900 and Oct. 1902. C.C. Plitt. (Reed Herb.); on chrome ore piles. Sept. 27, 1953. Reed 32779 and 32814; Oct. 1953. Reed 32874; June 1954. Reed 33436; July 1954. Reed 34033; Sept. 1954. Reed 34394; Oct. 1954. Reed 35241; Sept. 1955. Reed 38221.

Additional species

JUNCAEAE

527. Juncus marginatus Rostk. Florida to eastern Texas, north to western Nova Scotia, Maine, New Hampshire, Vermont, New York, Ontario, Ohio, Michigan, Missouri and Kansas. Virginia: Newport News, on chrome ore piles. Nov. 15, 1959. Reed 45875, 45875A and 45879.

LEGUMINOSAE

528. Cytisus scoparius (L.) Link. Native of Europe; naturalized from Nova Scotia to Virginia and southward; on Pacific Coast. Maryland: Canton, on pumice piles, from island off Italy. Aug. 20, 1963. Reed 65412.

CYPERACEAE

I wish to thank Dr. Alfred E. Schuyler, of the Academy of Natural Sciences of Philadelphia, for the identification of the following species.

529. Bulbostylis hirta (Thunb. in Hoffm.) Svensen. Native in Africa and Madagascar; occasional in Bahamas, Cuba and Venezuela. Maryland: Canton, on manganese ore piles. Aug. 18, 1959. Reed 44378. Annual, strigose-pubescent throughout; culms thicker and less wiry, 1.5-3 dm. high; leaves one-half length of the culms; inflorescences umbellate, the spikelets single, 5-9 mm. long, on long erect or horizontal rays; scales acute, hispid; achenes trigonous, obovate, 1.0-1.3 mm. long, 1 mm. wide, truncate at apex and with obtuse outer angle dull yellowish-gray, the surface prominently undulate; tubercle conic, borne on a slight elevation and usually deciduous; style very short, 0.75 mm. below the branches; stamens 3; anthers 0.75-1.0 mm. long. Svensen, Contrib. Ocas. Mus. Hist. Nat. Col. "de La Salle", 4: 11. 1946.

530. Cyperus ovularis (Michx.) Torr. Florida to Texas, north to SE New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Missouri and Kansas. Virginia: Newport News, on chrome ore piles. Nov. 15, 1959. Reed 45874.

531. Cyperus virens Michx. Florida to Texas, north to southern New Jersey, southern Indiana, southern Illinois, Missouri and SE Kansas. Virginia: Newport News, on chrome ore piles. Nov. 15, 1959. Reed 45894.

532. Eleocharis atropurpurea (Retz.) J.&C.Presl. Florida to Texas and Mexico, north to Georgia, Iowa, Nebraska and Colorado. Virginia: Newport News, on chrome ore piles in wet areas. Aug. 7, 1959. Reed 44067.

533. Fuirena coerulea Steud. Native of Africa, Natal, Cape. Virginia: Newport News, on chrome ore piles, in wet areas. Aug. 7, 1959. Reed 44066 (dupl. in ANSP). Stems 20-40 cm. high, 3-angled; leaves glabrous; spikelets few to several, in a cluster; bracts and awns very shortly hairy or rough; perianth of 3 swollen scales, awn-tipped, alternating with 3 bristles, occasionally reduced or wanting; fruit net-veined, brown.

534. Fimbristylis autumnalis (L.) R. & S. Virginia: Newport News, on chrome ore piles. Aug. 7, 1959. Reed 44050.

535. Fimbristylis baldwiniana (Schultes) Torr. Virginia: Newport News, on iron ore piles. Nov. 15, 1959. Reed 45861.

536. Rhynchospora inexpana (Michx.) Vahl. Coastal Plain, Florida to eastern Texas, north to southeastern Virginia and Arkansas. Virginia: Newport News, on chrome ore piles. Nov. 15, 1959. Reed 45895.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS VERBENA. XXI

Harold N. Moldenke

VERBENA PERUVIANA (L.) Britton

Certain phrases in Linnaeus' original description point to V. incisa Hook., and it may well be that if/when his original specimen is examined it may reveal that the epithet "peruviana" actually belongs to what is now passing as V. incisa, while our present plant resumes its name of V. chamaedryfolia. Feuillée's description is as follows: "La racine de cette espece a environ deux pouces de longueur, sur trois lignes de largeur, elle se divise dès de collet en deux bras chargés de quelques fibres. La tige s'éleve jusques à neuf pouces, elle est épaisse environ de deux lignes, droite, parsemée d'un petit velu blanchâtre, qui rend sa couleur d'un verd blanchâtre. Les feuilles naissent deux à deux, opposées le long de la tige, elles ont quinze lignes de longueur, sur cinq lignes de largeur, terminées en pointes, dentelées dans leur contour, traversées dans leur longueur d'une côte arrondie au-dessous & sillonnée au-dessus; cette côte donne de chaque côte des nervûres, qui s'étendent jusques à l'angle rentrant de la dentelure du contour des fetilles. Ces nervûres sont subdivisées en plusieurs autres plus petites, qui s'étendent sur le plan des fetilles, qui est parsemé d'nn petit velu blanc, ce qui represente les fetilles d'un verd blanchâtre. Les fleurs qui forment un bouquet à l'extrémité de la tige, sont des rosettes d'un beau rouge de sang, à quatre quartiers, chacun desquels a un angle rentrant dans le milieu de sa partie superieure; au centre de cette rosette, il y a un trou par où cette fleur reçoit le pis-

tile, qui s'éleve du milieu d'un calice long de six lignes, sur une ligne d'épaisseur découpé en quatre parties, verd-blanchâtre, du centre duquel part quatre étamines blanches à sommets jaunes; lorsque la fleur est passée, ce pistile devient un fruit un peu oblong, qui renferme plusieurs petites graines." Jussieu (1806) based his V. chamaedryfolia on Erinus peruvianus L., so the type of his name is the same Feuillée specimen, and is not Commerson 71 and s.n. as indicated by Macbride. It is interesting to note that Linnaeus later (1781) suggests that Erinus peruvianus may be a variety of what he calls Verbena aubletia [now known as V. canadensis (L.) Britton].

Verbena melindroides Cham. was based on collections made by Friedrich Sellow somewhere in Brazil, originally deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed, but represented by Macbride's photographs 17407 & 34352. Chamisso says: "Ad fretum Stae. Catharinae Brasiliae legimus ipsi, e Brasilia calidiori pluribus locis lectam misit Sellowius. Cognata Verbenae chamaedryfoliae species, a qua simillima, foliorum forma et uberiori hirsutie, nullius fere momenti notis, at constanter differt. Maxima in hoc specierum distinguendarum fides quod illa exsiccata pallidum laete viridem servat colorem, nostra contra obscuriori griseo-subnigrescente colore lugere videtur." For what he regards as V. chamaedryfolia he cites only "'Pavon-cufre, campo', pluribus locis copiose lectam e Brasilia austral. misit Sellowius."

Verbena chamaedryfolia f. camporum was based on a collection made by Cornelius Osten (no. 3187) between Rapan and Mercedes, in the department of Soriano, Uruguay, on October 8, 1895, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo.

Schauer (1847) says of this plant: "Planta floribus magnis splendide scarlatinis, hortorum europaeorum nunc vulgare tamen eximium decus. Praeter stirpem primitivam autem coluntur permultae hybridae ex ea et affinibus arte prognatae, eleganti colorum et foliorum varietate excellentes." He distinguishes (1851) his two wild varieties as follows and cites a number of specimens: α melindres — "foliis oblongis vel oblongo-lanceolatis inaequaliter inciso-serratis minus hirtis. — Haec gracilior est et siccata optime jam annotante Chamisso, colorem pallidum laete viridem conservat." He cites Sellow s.n. [ad Pavon-cufre aliisque locis, campis Brasiliae meridionalis] from Brazil; Sellow s.n., Bacle s.n., Arsene s.n., and Isabelle s.n. from Uruguay; and Feuillée s.n. from Peru. melindroides — "foliis ovatis subaequaliter v. duplicato-serrato-crenatis magisque hirtis." He cites Chamisso s.n. [ad fretum S. Catharinae], Raben s.n. [loco non indicato in Brasiliae prov. Sebastianopilitana (cultura?)]; Riedel s.n. [ad Baroso de Toledo, S. Pauli], and Lund s.n. [in humidis prope Taubaté, S. Pauli].

Hoffmannsegg (1842) says of his V. chamaedryoides that it dif-

fers only in its leaves being generally somewhat more numerous and with less deep teeth. He states that some workers have called it "var. latifolia", but on no valid basis, for its leaves do not differ in size at all from those of V. chamaedryfolia A. L. Juss.

In this connection Briquet's discussion (1904) is worth repeating: "Nous saisissons cette occasion pour donner quelques notes sur une espèce critique, fréquemment confondue avec le V. megapotamica, le V. chamaedryfolia Juss.

"V. chamaedryfolia Juss. in Ann. du Mus. VII, 73 (ann. 1806); Cham. in Linnaea VII, 270; Schauer in DC. Prodr. XI, 537 = Erinus peruvianus Linn. Sp. pl. ed. 1, 630 (ann. 1753) = V. veronicaefolia Sm. in Rees Cycl. XXXVI, n. 28 (ann. 1802--1820) = V. Melindres Gill. in Lindl. Bot. Reg., tab. 1184 (ann. 1828) = V. melissoides Sweet Brit. fl. gard., ser. 2, I, tab. 9 (ann. 1831) = V. peruviana O. Kuntze Rev. gen. pl. III 2, 257 (ann. 1898); non Britt. (ann. 1892).

"Le V. chamaedryfolia Juss. a déjà été indiqué trois fois au Paraguay, par M. Britton (in Morong et Britton Enum. pl. coll. in Paraguay, p. 197), par M. O. Kuntze (op. cit.) et par M. Chodat (in Bull. Herb. Boiss., ser. 2, II, 818). Les indications de M. Britton et de M. Chodat sont dues à des erreurs de détermination. Quant à M. O. Kuntze, il signale notre espèce dans le sud de Paraguay sous une variété subbipinnatisecta O. Kuntze, qui ne peut être exactement identifiée d'après la diagnose rudimentaire et tout à fait insuffisante donnée par l'auteur ('Folia subbipinnatisecta'). Nous avons cependant de bonnes raisons de croire, d'après les abondants matériaux que nous avons vus du Paraguay, que cette plante d'appartient pas au V. chamaedryfolia, car nous ne connaissons de visu le V. chamaedryfolia que de l'Uruguay et de l'Argentine.

"M. O. Kuntze a cru devoir reprendre (op. cit.) le nom spécifique linnéen peruvianus et appeler cette espèce Verbena peruviana en citant cette combinaison sous l'autorité de M. Britton. Cette nomenclature est doublement erronée et son rejet exige quelques explications.

"Linné (Sp. pl. ed. 1, 630, ann. 1753) a basé son Erinus peruvianus sur une plante de Feuillée (Journ. des observ. phys. etc., III, p. 36, fig. 25, No. 3, ann. 1725) qui est incontestablement le V. chamaedryfolia Juss. Mais il lui donne comme patrie de Perou (!) alors que Feuillée dit textuellement: 'Je trouve cette plante dans les campagnes qui sont sur le bord septentrional de la rivière de la Plata, dans le Paraguay'* [*c'est-à-dire dans le nord de l'Argentine, sinon dans le Paraguay] actuel. Le chamaedryfolia est totalement étranger à la flore du Perou. Le nom spécifique peruvianus implique donc une grossière erreur géographique et ne peut être conservé aux termes des Lois de la nomenclature (art. 60, 3^o). Par surcroît, le Verbena peruviana Britton n'est pas l'Erinus peruvianus L. (Verb. chamaedryfolia Juss.). La plante

signalée sous ce nom par M. Britton (Morong, Pl. Parag. exsicc. n. 51) est une forme de V. megapotamica Spreng. v. truncatula Briq. On conservera donc, pour ces deux raisons, au V. chamaedrifolia sa désignation traditionnelle.

"Le V. chamaedrifolia Juss. se distingue facilement du V. megapotamica Spreng. par son port réduit, des feuilles subsessiles, son calice au moins d'un tiers plus court et sa corolle plus petite. Nous serions disposé, dans l'état actuel de nos connaissances à envisager le V. melindroides Cham. (in Linnaea VII, 270, ann. 1832) comme une espèce distincte, plutôt que comme une variété du V. chamaedrifolia, ainsi que l'a fait Schauer (in DC. Prodr. XI, 537). Ce V. melindroides est une plante à aire un peu différentes (états brésiliens de Rio Grande do Sul, Saint-Paul et Sainte-Catherine) qui doit être étudiée sur des matériaux spontanés, plus abondants que ceux dont nous disposons. Il importe, en particulier, pour juger de la valeur de ces espèces de ne pas se baser sur les plantes cultivées chez lesquelles l'hybridité a produit une foule de formes de filiation douteuse."

Herter (1928) is probably quite correct in identifying Larraflaga's V. sanguinea with V. peruviana. Morong, Britton, & Vail (1892) say of V. peruviana: "This scarlet-flowered, trailing Verbena seems to grow all over Paraguay, and nearly all the year round. I found it not only in copses about Asuncion, but also in the streets of the city, and far up on the Pilcomayo River. It was equally common a hundred miles east of Asuncion. The stems sometimes climb up among bushes for 6 dm." As indicated already by Briquet, this description seems to apply mostly to V. incisa Hook., which is the common Paraguayan species with red flowers and often climbing stems. Of the two collections cited by Morong, Britton, & Vail, Balansa 1024 proves to be V. megapotamica Spreng., while Morong 51 is V. incisa Hook.

The plant is said to have been introduced into cultivation in 1827; it is known from cultivation in Nürnberg in 1831, from England in 1828, from France in 1832, from Belgium in 1833, and from Switzerland in 1834. Parodi reports it cultivated in Argentina in 1934 and Troncoso in 1937, while Questel found it in gardens on St. Bartholomew in 1941. It is often recommended for rock-gardens, but is tender. Plants offered in the horticultural trade as var. melindres have oblong to oblong-lanceolate unequally incised-serrate leaves and are less hairy (illustrated in Bot. Mag. 14: pl. 1184 and Lodd., Bot. Cab. 16: pl. 1514); var. melindroides has ovate double crenate-serrate more densely hairy leaves; and the strain called V. chamaedryoides has somewhat more numerous and more shallow teeth; var. glabriuscula has almost smooth leaves; and f. rosea has pink corollas. In the Florists Exchange (1937) among notes on the New York Botanical Garden we read "especially showy is Verbena peruviana. Although not hardy it still has to be proved that there is any other plant which bears such a profusion of flowers of so blazing a red shade. The color defies descrip-

tion. Low growing and spreading rapidly this might well be termed a million dollar plant for rock gardens and since it needs greenhouse propagation there is no fear of its becoming a peddler's plant. It spreads rapidly and blooms continuously." In the New York Times (1939) it is described as "The brightest red verbenas known to botanists, which the New York Botanical Garden first introduced into this country a few years ago, make brilliant spots of color in her rock gardens." Mattoon (1958) states that it is offered to the horticultural trade by Louis Lens, Vander Vis, Winkfield Manor Nurseries, Barrington Greenhouses (Barrington, N. J.), John Forbes (Hawick), and Hillier & Sons (Winchester).

Cabrera (1945) describes it as "Hierba perenne, con tallos rastreros y hojas lanceoladas, aserradas. Flores de color carmín intenso, dispuestas en espigas terminales cortas. Común en la América cálida y templado-cálida. En el partido de Pellegrini es frecuente en la estepa climax, destacándose entre los pastos por sus flores de color sangre." Rosengurt (1943) says of it "Estolonífera de floración muy dilatada, pero más intensa de octubre a noviembre; la semilla madura por enero. Habita praderas muy variables, prefiriendo las de tapiz bajo y ralo, donde llega a ser abundante. Es una planta inútil, pero de las más decorativas que pueblan los pastoreos." In his 1946 publication he says "Mala hierba perenne, estolonífera achatada contra el suelo, de ciclo indefinido. Abunda en campos vírgenes y rastrojos, interviniendo en las estructuras degeneradas como accesoria." Martínez Crovetto & Piccinini (1951) describe the plant as "Hemicriptófito con ramas rastreras y flores rojas, común en praderas en el nordeste del país. Florece en verano." Safford says of it in Uruguay "forming large patches of scarlet in fields". Everett (1960) says "One of the most brilliant of all garden flowers is the scarlet Verbena peruviana. It is winter hardy in mild climates and is very suitable for growing in rock gardens....In effect this kind is like a smaller edition of the regular garden Verbenas. It may be rooted from cuttings and should be wintered in a greenhouse or cold frame that is protected from severe frost where winters are harsh. It may be used in drifts in flower borders and as a permanent ground cover in places where winters are decidedly mild."

Walpers (1845) classifies this species in his Section Verbenaca, Subsection Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Melindres, with nine other species. He includes in its synonymy a Verbena montevidensis Spreng. "in Herb. Reg. Berol., vix Syst. Veg. 2. 747", but he keeps V. melindroides Cham. as a distinct species. The relative length of the pistil to the size of the pollen-grains is discussed by Covas & Schnack (1945), while Schnack & Covas (1945) produced tetraploid plants through treatment with colchicine. They comment that "Esta es el primer caso de poliploidía producida experimentalmente en el género Glandularia. La obtención de poliploides dentro de este género reviste interés desde los puntos de vista práctico y teórico. El aumento del tamaño de las flores es un ob-

jetivo interesante desde el punto de vista fitotécnico. La transformación de un híbrido estéril en un anfidiplóide fértil reviste interés práctico desde que nos permitirá mediante hibridación continuar la combinación de caracteres interesantes de varias especies distintas. Por otra parte es posible obtener sintéticamente especies nuevas mediante ese proceso, y esto será particularmente cierto dentro del género Glandularia, que posee un número relativamente elevado de especies que pueden cruzarse entre sí. Ultimamente hemos localizado un híbrido natural originado con toda probabilidad por hibridación entre G. glutinosa y G. megapotamica. El hecho de tenerlas juntas en nuestra colección ha permitido la hibridación de estas dos especies, cuya distancia más cercana entre sus áreas de dispersión dentro de nuestro país es cuando menos de 800 km; difieren ampliamente desde el punto de vista de su afinidad sistemática parecerían pertenecer a grupos extremos dentro de las especies diploides del género. Considerando que en conjunto existen por lo menos 20 especies con 5 pares de cromosomas en Glandularia, puede tenerse una idea de las posibilidades teóricas y prácticas de la poliploidía experimental dentro de este género."

Common names recorded for this plant include "brennende Liebe", "camaradinha", "feuer Verbene", "Feuerverbene", "flame verbena", "garden verbena", "margarita", "margarita colorada", "margarita del campo", "margarita punzó", "margarita punzo", "melindre", "roode verbena", "sangre de Cristo", "sangre del Señor", "scarlet-flowered verbena", "scarlet-flowered vervain", "scarlet verbenen", "scarlet vervain", "scharlachrothe Verbena", "speedwell-leaved vervain", "verbena", "verbena melindre", "verbena roja", "verbenas", and "veronica-leaved verbena". The name "sangre de Cristo" is also applied to V. bonariensis L. and V. litoralis H.B.K. according to Alvarez (1919). The species is offered as "Peruvian Flame" Verbena by Barrington Greenhouses, Barrington, New Jersey.

The species has been found along roadsides, in campos and dry sandy campos, grassy fields and grassy places, pasture fields, pampas and stony places, fields and dry rocky pastures, rocky hills and grassy plains, sandy places, limestone country, and dry meadows, on riverbanks, in barren ground at the edge of streamlets, in high-plain grasslands, on barren hilltops with flat outcrops, and in dry and sunny sandy soil on river shores, usually exposed to the full sun, at altitudes of 15 to 6600 feet, blooming in every month of the year, fruiting in March. Rambo calls it frequent in grassy fields at Froão and frequent about São Leopoldo, but very rare about Porto Alegre. Rosengurtt says that it is common in fields in Uruguay, but Osorio calls it "rare" in that country; Arechavaleta found it "very abundant in campos" there. Osten avers that it is "everywhere common" in Buenos Aires, and Cabrera refers to it as "campestre frecuente". Balls found it "growing by roadsides and in fields in parched grass and thin turf in rather heavy poor clayey soil in Tarija and among turf and herbage along railway embankments usually in somewhat sunny exposures in fairly dry stony loam in Jujuy. Eyerdam,

Beetle, & Grondona encountered it "in sandy soil on exposed coastal bluffs in reach of salt spray, full sun....corolla dark red, other plants have violet corolla; common associated with Oxalis, Hydrocotyle, Amaranthus, Lolium, Bromus, etc." What his violet-flowered plants were, I do not know. Rufiz Leal 16292 is said to have had purple flowers. Stearn reports the species as "not quite hardy out-of-doors" in England. Specimens have been misidentified and distributed in herbaria under the names V. erinoides Lam., V. hortensis L. H. Bailey, V. marrubioides Cham., V. phlogiflora var. vulgaris Schau., V. platensis Spreng., V. scrobiculata Griseb., V. sororia D. Don, and V. teucrioides Gill.

On the other hand, the Pedersen 355, distributed as V. peruviana, seems to be var. glabriuscula Kuntze; Collector undesignated s.n. [June 30, 1891] is V. canadensis (L.) Britton; Paul 39, J. K. Small 8745, and Van Hermann 867 are xV. hybrida Voss; Dusén 13564, Hassler 12335, Morong 51, Edw. Palmer s.n. [Capt. Page Exped. 1854] & s.n. [Pilcomayo, Capt. Page La Plata Exped.], Rocha 3693, and Venturi 33, 378, 378b [except the Britton Herbarium specimen, which is Phyla nodiflora var. reptans (H.B.K.) Moldenke], 5270, & 7360 are V. incisa Hook., as is also Herter 1057 [Herb. Herter 82941] distributed as "V. chamaedrifolia var. nov."; and Schwacke II.262 is V. tenera Spreng.

For a time, some twenty years ago, I considered V. scrobiculata as the proper name for plants now regarded as V. incisa and V. peruviana. This accounts for my misidentification of the splendid color plate of V. peruviana in Descole's Icones (1944). The Archer 4666, Boffa 1090, R. Fischer s.n. [Herb. Inst. Bot. S. Paulo 3679], Herter 84432, F. C. Hoehne s.n. [Herb. Inst. Bot. S. Paulo 8712], Job 1071, Jørgensen 3772, Mexia 7832, T. Meyer 2673, Rodrigo 705 & 855, A. G. Schulz 1475, and Venturi 2433, all previously determined as V. peruviana, are actually V. incisa Hook., while Cabrera 1584 [Herb. Inst. Bot. S. Paulo 24564] is V. phlogiflora Cham., Hassler 11052 is V. platensis Spreng., and Herb. Comm. Geogr. & Geol. 2958 is V. scrobiculata Griseb.

It is worthy of note here that V. chamaedrifolia Briq. is actually V. humifusa Cham.; V. chamaedrifolia var. hybrida Mill. is xV. hybrida Voss.; V. chamaedrifolia var. melindroides Benth. is V. marrubioides Cham.; V. chamaedrifolia x erinoides Osten is V. dissecta Willd.; V. chamaedryfolia f. foliosae Chod. is V. platensis Spreng.; V. chamaedryfolia f. strigosa Chod. is V. platensis var. stenodes Briq.; V. chamaedryfolia var. bipinnatisecta Kuntze is V. calliantha Briq.; V. chamaedryfolia var. melindres f. siccanea lus. roseiflora Osten is V. peruviana f. rosea Moldenke; V. chamaedryfolia var. rosea Osten is V. peruviana f. rosea Moldenke; V. chamaedryfolia var. subbipinnatisecta Kuntze is V. peruviana

var. subbipinnatisecta Kuntze; V. chamaedryfolia α melindres rosiflora Osten is V. peruviana f. rosea Moldenke; V. chamaedryfolia α melindres f. siccanea Osten is V. incisa Hook.; V. chamaedryfolia hybrida Osten is xV. hybrida Voss; V. chamaedryfolia x erinoides Osten is V. dissecta Willd.; V. chamaedryfolia x tenuisecta Briq. is V. calliantha Briq.; V. melindres latifolia Bohn is xV. hybrida Voss; V. melindres var. latifolia Bohn is xV. hybrida Voss; V. melindres x tenera Osten is xV. uruguayensis Moldenke; V. melindres x teucroides Osten is xV. osteni Moldenke; V. melindroides f. briquetiana Osten is V. incisa Hook.; V. melindroides f. silvatica Osten is V. incisa Hook.; V. melindroides x tenuisecta Osten is V. calliantha Briq.; V. sanguinea Mart. is Stachytarpheta sanguinea Mart.; and V. veronicaefolia H.B.K. is V. carolina L.

The following hybrids of V. peruviana are known: with V. megapotamica Spreng. (= xV. schnackii Moldenke), with V. perakii (Covas & Schnack) Moldenke (= xV. tentamenta Moldenke), with V. phlogiflora Cham. (= xV. corrupta Moldenke), with V. platensis Spreng. (= xV. osteni Moldenke), with V. tenera Spreng. (= xV. uruguayensis Moldenke), and with V. tenuisecta Briq. (= xV. solbrigii Moldenke).

Osten 3523 is a mixture with V. pulchella Sweet. Archer 4625 looks very much like V. incisa Hook., while E. Fielding s.n. [Cordova] is so densely hairy throughout as to suggest hybridity with V. incisa.

Numerous bibliographic errors occur in the literature of this plant. Erinus peruvianus is often cited to "L. Sp. pl. 879", but the correct citation is L., Sp. Pl., ed. 1, 1: 630 (1753). Larrafaga, Atlas Bot. pl. 42 (1927) is sometimes cited as "Escritos D. A. Larrafi. 2: pl. 41. 1923". Feuillée's Journ. Obs. Phys. Côtes Orient. [3]: 36--37, pl. 25, fig. 3 is often referred to as "Fev. Peruv. 3. p. 25. f. 3" or "Feuill. Hist. Peruv. 3. p. 25. f. 3" or as "Feuill. Peruv. 3, 25. f. 3". Verbena melissoides Sweet is often cited to Sweet, Brit. Flow. Gard., ser. 2, 1: pl. 9 (1829), but the name does not occur there! Hooker & Jackson (1895) cite it to Steud., Nom. Bot., ed. 2, 2: 750 (1841), but actually it seems to appear first in Cham., Linnaea 7: 270 (1832).

Augusto (1946) cites Sellow s.n. from southern Brazil, Bade s.n. and Isabelle s.n. from Uruguay, Lindman s.n., Kadletz s.n., Emrich s.n., Augusto s.n., and Edésio s.n. from Rio Grande do Sul. Cabrera cites his nos. 7110, 7968, and B.5151; Ragonese cites his R.2042, 2397, 2606, 2845, & 3274 from Santa Fé, Argentina; Rosengurtt cites his PE.1428 from Uruguay, and Maria (1962) cites his no. 179/lb from Cochabamba, Bolivia. These collections have not as yet been seen by me.

In all, 245 herbarium specimens and 16 mounted photographs and illustrations have been examined by me.

Citations: ILLINOIS: Kane Co.: W. Lloyd s.n. [1869] (Ur). PERU: Department undetermined: Haenke 1839 (N). BRAZIL: Rio Grande do Sul: Jürgens 190 (B, W--1482184); Luis 6 (Vi); Maria 6 (W--1953743); Rambo 46335 (M1, N), 51348 (W--2102006); Reitz 4445 (Le); A. R. Schultz 464 (N); Sehnm 3882 (B), 7256 (B); Smith & Reitz 5831 (W--2120182); Stellfeld s.n. [R.20, no. 2; 28-9-56] (Sm); J. Vidal s.n. [Herb. Mus. Nac. Rio 46545] (N). Santa Catarina: Reitz C.882 (Rd), C.1281 (N); Smith & Reitz 5960 (W--2120183). State undetermined: Raben 523, in part (Br); Sellow 35 (N), 1516 (N), s.n. [Macbride photos 17407] (Kr--photo, N--photo, N--photo), s.n. [Macbride photos 34352] (Kr--photo, N--photo, Ug-photo), s.n. [Brasilia] (Br). BOLIVIA: Tarija: Balls 6088 (W--1777798); Cardenas 4939 (W--2103994). PARAGUAY: Hassler 2585 (V); Ponder s.n. [in or near Asuncion] (Je--7616); T. Rojas 3395 [Herb. Osten 17905] (N). URUGUAY: J. Anderson 35 (Bm); N. J. Andersson s.n. [Monte Video, 1852] (S); Apleri s.n. [S. Elena] (Bm); Archer 4454 (W--1705456); Arechavaleta 26 [setiembre 1877] (Ug, Ug), 26 [octubre 1887] (Ug); H. H. Bartlett 21096 (Mi), 21157 (Ca--772083, Ca--772324, Mi, W--1930207); Berro 2361 (N), 4749 (N); Castellanos s.n. [Herb. Inst. Miguel Lillo 11769] (N), s.n. [Herb. Inst. Miguel Lillo 15771] (N, N), s.n. [Herb. Inst. Miguel Lillo 15775] (N, N); Collector undesignated 95 (W--1742782), s.n. [Montevideo, Nov. 24, 1884] (Ug, Ug), s.n. (Ug); Commerson 72 [Herb. Jussieu 5141, in part; Macbride photos 39503, in part] (Kr--photo, N, N--photo), s.n. [Montevideo, Mai 1767] (B), s.n. [Monte Video] (N); Gallinal, Aragone, Bergalli, Campal, & Rosengurt 1009 (N), PE.4800 (N); C. Gay s.n. [Montevideo] (N, N); Herter 19 [Herb. Herter 71313] (Ba, Ca--278422, I, S), 19a [Herb. Herter 32160] (B, N), 19b [Herb. Herter 71313] (N), s.n. [Herb. Osten 16986] (Ug), s.n. [Herb. Osten 18483] (Ug); Mrs. O. C. James s.n. [Colonia, Jan. 1901] (Du--149788); Legrand 251 (Ug), 568 (Ug), 3488 (Ug); A. Lutz 1654 (Lz); Miers 5 (Bm), 212 (Bm); Moldenke & Legrand 2790 (Ug); Moldenke & Moldenke 19693 (Es, Mg, Mr, N, No, Ot, S, S, Sm); Née 19 (Q), 117 (Q); Osorio 256 (Ug--13182), s.n. [Tranqueras, Rivera, Feb. 22, 1947] (Ug--14119); Osten 3177, in part (Ug), 3189 (Ug), 3224 (Ug), 3523, in part (Ug), 3523b (Ug), 3776 (Ug), 4195, in part (Ug, Ug), 5173 (Ug), 6387 (Ug, W--1159393), 7792 (Ug), 8711 (S, Ug); Rosa-Mato 193 (Ug--9813); Rosengurt B.549 (N), B.749 (N), B.914 (N); Rosengurt & Gallinal 5694 (Ug--14236, W--2121000); Safford s.n. [La Paz, Oct. 24, 1886] (W--922262, W--922263); A. Saint-Hilaire C²: 2069 bis (N), s.n. [Bresil? Montevideo?] (N). ARGENTINA: Buenos Aires: Alboff 3840 (N, S); Boffa 1 (S), 36 (N), 3112 (N); Cabrera

1477 (N, Sp--24914), 1790 (S), 3388 (N); Commerson 71 [Herb. Jus-
 sieu 5141, in part; Macbride photos 39503, in part] (Kr--photo,
 N--photo), s.n. [Buenos Ayres] (N); Dusén 6314 (N, S); Eyerdam,
Beetle, & Grondona 23602 (Ca--623554); Floyer 35 (C); Goodspeed
23204 (Ca--636583); Gosselman s.n. [1 December 1836] (S); Mansel
s.n. [Bahia Blanca, 1884] (Bm); Molfino s.n. [Sierra de la Venta-
 na] (Sp--25789); Osten 2778 (Ug); Reutzell 1102 (Ca--3313), 4102
 (W--1858378); Rodrigo 2340 (N); Rufz Huidobro 1307 (S); A. G.
Schulz 5673 (Sz); Sparre 188 (S); J. Tweedie s.n. [13 Apr.] (Bm),
s.n. [Banda Oriental] (Bm). Catamarca: H. H. Bartlett 19593 (Mi);
Castellanos s.n. [Herb. Mus. Argent. Cienc. Nat. 33875] (N); Jör-
gensen 1028 [Herb. Inst. Miguel Lillo 31350] (Ca--202219, N, W--
 921716); E. S. Riggs 102 (W--1495164); Wall & Sparre s.n. [La Neg-
 rillo, 28/11/46] (Ew, Ew). Chaco: T. Meyer 2943 (N); A. G.
Schulz 1466 (N), 1476 (N), 1476a (N), 1479 (N). Córdoba: H. H.
Bartlett 20194 (Mi); Bruch 8520 (N); Castellanos s.n. [Herb. Mus.
 Argent. Cienc. Nat. 31194] (N); G. Dawson 133 (N); E. Fielding s.
n. [Cordova] (Bm); Kuntze s.n. [Cordoba, XII.1891] (N); Lorentz B
(Vt); Lossen 10 (Ba, Um--30); Maldonado Bustos 98 (N); O'Donnell &
Rodriguez 524 (Ut--115406b); Pierotti s.n. [27/I/94] (W--1931711);
Rodrigo 246 (N); Rose & Russell 21052 (N, W--762894); Troncoso
318 (N); J. J. Valencia s.n. [Herb. Inst. Bot. Darwinion 16065]
 (N, N); Villafañe 538 (N); Wall & Sparre s.n. [La Falda, 15/12/
 46] (Ew), s.n. [El Quadrado, 16/12/46] (Ew, Ew). Corrientes:
Pedersen 80 (W--2122215). Entre Ríos: Burkart 17961 (N);
Schwacke s.n. [Concepcion do Uruguai, IV/1880] (Ja--46582). Jujuy:
Balls 5947 (W--1777765); Rufz Leal 14367 (Rl), 14382 (Rl). La
 Pampa: Burkart 9944 (Ca--3308, W--1858303); Fortuna 21 (Ca). La
 Rioja: T. Meyer 3927 (W--1909104); Rufz Leal 16292 (Rl). Misiones:
Archer 4625 (N, W--1705479); G. J. Schwarz 504 (W--1933972), 2861
 (Gg--352676, N). San Juan: Miers s.n. [Barranquitos] (Bm), s.n.
 [Zanjon] (Bm). San Luis: Miers s.n. [San Luiz] (Bm); F. A. Roig
1330 [Herb. Rufz Leal 19075] (Z); Varela 614 (S). Santa Fé: R.
Alvarez 838 (N); Barrionuevo s.n. [Albarello, 4-II-47] (N); Fed-
dersen s.n. [Aurelia, near S. Fé] (Cp); Greco s.n. [Albarello, 4-
 II-1947] (N); Job 569 (N), 803 (N); Rufz Huidobro 3258 (N); Rufz
Leal 14246 (Rl). Santiago del Estero: Maldonado 312 (N). Tucumán:
Moldenke & Moldenke 19728 (N, N); Olea 278 (Ca--165037); C. C. Ol-
rog s.n. [P. Olrog 96] (Og); Peirano s.n. [Herb. Inst. Miguel Lil-
 lo 32193] (Mv); R. Rocha 3693 (Au--122406, Mv); Rufz Leal 12245
 (Rl); Sleumer s.n. [Taff del Valle, 24.1.50] (B); Wall & Sparre s.
n. [San Javier, 20/11/46] (Ew), s.n. [Taff del Valle, 10/12/46]
 (Ew). Province undetermined: Kuntze s.n. [Pampas Reise, Januar
 1892] (N). CULTIVATED: Belgium: Lejeune s.n. (Br, Br, Br); M.
Martens s.n. [h. b. Lov. 1833] (N). England: L. H. Bailey s.n.

[Kew, Aug. 8, 1919] (Ba); Nelmes 1073 (Ba); Stearn s.n. [Cambridge, 1930] (Ba). Germany: Herb. Prager 18644 (Gg--31451). Italy: Gresino s.n. [Varazza, 29.V.1938] (N); Herb. Harvey s.n. [hort. Bellovae, jun. 1842] (Du--166461), s.n. [h. R. P. 1843] (Du--166461), s.n. [hort. Aurelien 1843] (Du--166459). Maryland: L. P. McCann s.n. [H. N. Moldenke 10399] (N). New Jersey: Guyot s.n. (Pr). New York: Ahles s.n. [N. Y. Bot. Gard. Cult. Pl. 476/45] (N); McSweeney s.n. [N. Y. Bot. Gard. Cult. Pl. 274/34] (N); Moldenke & Moldenke 11885 (N); New York Bot. Gard. Cult. Pl. 9189 (N--photo); H. Schneider s.n. [N. Y. Bot. Gard. Cult. Pl. R.274/34] (Ba, N); A. Seaman s.n. [N. Y. Bot. Gard. Cult. Pl. 476/45] (N); M. Zimmerman 20 (Ba). Russia: Herb. Hort. Bot. Petrop. s.n. (W--71992). Scotland: Herb. Hort. Reg. Bot. Edinb. 349 (Ba). Switzerland: A. de Candolle s.n. [H. Genev.] (Lu); Herb. Meisner s.n. [cult. in Hort. Bot. Basil. 31 Jul. 1834] (M). Locality undetermined: Herb. Schwetzing s.n. (S). LOCALITY OF COLLECTION UNDETERMINED: Collector undesignated 35 (S), s.n. (Sg--16107); Herb. Mus. Nac. Rio ref. VII (Ja); Reinhardt s.n. [J. a Curral a El Rey., Sept. 1855] (Cp). MOUNTED ILLUSTRATIONS: Descole, Icon. pl. 165 (N); M. Roscoe, Fl. Illustr. Seasons pl. 31 (N); Sweet, Brit. Fl. Gard., ser. 2, 9: 74, no. 293 (N); color plate of Verbena chamaedrifolia (N); color plate of Verbena melindres (Scarlet Verbena) (N).

VERBENA PERUVIANA f. ALBA Moldenke, Phytologia 4: 451, nom. nud. (1953), 7: 258--259. 1960.

Bibliography: Moldenke, Phytologia 4: 451. 1953; Reitz, Sellowia 1: 57 & 134. 1959; Moldenke, Résumé 110 & 473. 1959; Moldenke, Phytologia 7: 258--259. 1960.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by my good friend, Padre Raulino Reitz (no. C.1280) in a cultivated field at Sambrio, at an altitude of 10 meters, Santa Catarina, Brazil, on October 9, 1945, and is deposited in the Britton Herbarium at the New York Botanical Garden. The collector describes the plant as "erva rastejante, flor branca". Common names recorded for it are "camaradinha", "formosa sem dote", and "jurupeba", names that are applied to almost all the other taxa of this genus in that area. The form is known thus far only from the type specimen.

Citations: BRAZIL: Santa Catarina: Reitz C.1280 (N--type).

VERBENA PERUVIANA var. GLABRIUSCULA Kuntze, Rev. Gen. Pl. 3 (2): 257. 1898.

Synonymy: Verbena splendens Hort. ex Moldenke, Résumé Suppl. 5: 8, in syn. 1962.

Bibliography: Kuntze, Rev. Gen. Pl. 3 (2): 257. 1898; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 106 & 199. 1949.

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THE TAXONOMIC STATUS OF *PINUS CHIAPENSIS*^{1/}

by

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Since the original description of *Pinus strobus* var. *chiapensis* Martínez (1940), this taxon has been the subject of great phytogeographic and taxonomic interest. Its assumed near-relationship with the eastern North American *Pinus strobus* L. has been used by some biogeographers (Braun 1950; Dressler 1954) as evidence of relatively recent widespread distribution of the latter taxon in North America. Sharp (1946) regarded *P. strobus* var. *chiapensis* as a weakly differentiated geographic form of *P. strobus* devoid of significant morphological or physiological differences. Others (Gausсен, 1960; Loock, 1950; Soto, Barrett, and Little, 1962; Standley and Steyermark, 1958) have suggested that the variety was not conspecific with *P. strobus*.

In concert with taxonomic studies in the Haploxyton pines, I have had the opportunity to examine the Mexican population in detail. A large body of biosystematical evidence assembled from progeny studies, anatomical and morphological data, and field observations of this taxon, *P. monticola*, and *P. strobus* strongly suggests that *P. strobus* var. *chiapensis* should be elevated to the rank of species. The biometric study will be published separately.

TAXONOMY

PINUS CHIAPENSIS (Martínez) Andresen *comb. et stat. nov.*
Pinus strobus var. *chiapensis* Martínez, An. Inst. Biol. Mex.
11:81. 1940.

Lectotype: MEXICO, Chiapas, Ocotepec, Junio 1939,

Martínez s. n. (MEXU: photo MSC!).

Pinus chiapensis (Martínez) Gausсен, Trav. Lab. Forestier
Toulouse, tome II, sect. 1, vol. 1, part. 2, cpt 11:
91, 198, 1960. *nomen nudum*.

Excurrent tree 25-30 m tall, 1-1.5 m dbh; bark dark brown, broken into irregular rectangles; forest-grown individuals free of branches up to 10-20 m, those open-grown with live branches to ground; young twigs puberulent but soon becoming smooth. Leaves quinquifasciculate, persistent for 2-3 years, yellow green with 2-6 conspicuous bands of ventral stomata, dorsal surface

^{1/} This study was supported in part by funds from National Science Foundation Grant No. G-15879.

devoid of stomata but marked by two longitudinal grooves; 8-12 cm long (mean 10.17), 0.67-0.99 mm wide (mean 0.75), margins finely serrulate with 10-20 serrations per 5 mm at leaf center, apices strongly spiculate; fibrovascular bundle solitary, surrounded by succulent mesophyll with numerous intercellular spaces, resin canals 2-3 (varying within a fascicle), external and at times contiguous with cuticle; fascicular sheaths light brown, 13-15 mm long and soon deciduous; cotyledons 6-10, 20-40 mm long, hypocotyl 20-70 mm long. Conelets upright, 2-3 per cluster with 10 mm peduncle, brownish gray, increments of female and male strobili several per year. Cones cylindrical when open, ovuliferous scales 60-80 (mean 77), total length 15-20 cm excluding peduncle of 17-20 mm; basal scales adnate with little or no reflexing, scales of central region 2 cm long, apophysis light brown, 10-15 mm wide, 8-10 mm long, tip of resinous umbo usually incurved, scale margins thin and undulating; seeds shed from mature cones from July to November in south Mexico and northern Guatemala; seed black to mottled brown, 5-6 mm long, 4 mm wide, 61,000 per kg (range 45,000-100,000), adnate wing yellow brown with dark brown longitudinal stripes, 25 mm long, 5 mm wide.

Distribution: Warm-temperate mountain slopes and ridges with frequent fogs and precipitation from 1500 to 5700 mm, between 800-2000 m elev., in States of Chiapas, Guerrero, Oaxaca, Puebla, and Veracruz, Mexico, and the Departments of El Quiche and Huehuetenango, Guatemala.

Specimens examined:

GUATEMALA: EL QUICHE: below cataracts along Rio Suchun below Nebaj, 4300-5000 ft. alt., 8 Feb. 1946, Sharp 4694 (F). HUEHUETENANGO: trailside slope about 5 miles from Barillas toward Rio Ibal, 5000 ft. alt. 1 Jan. 1946, Sharp 461 (F); pine woods of Cerro Jolomarc, above Finca San Rafael, Sierra de los Cuchumatanes, 900-1000 m alt., 24 Jul. 1942. Steyermark 49489 (F); Cerro Victoria, across river from Finca San Rafael, Sierra de los Cuchumatanes, near Barillas, 1800-2000 m alt., Steyermark 49729 (F).

MEXICO: CHIAPAS: Cintalapa (Copainala), Jun. 1939. Martínez 803 (A, 3 sheets, F, MEXU, with cone of *P. strobus*, US); Paraja El Pinal, Colonia Francisco I. Madero, Cintalapa, 1080 m alt., 3 Oct. 1960, Sánchez 654 (Inst. Nac. Invest. Forest. Mex.); Copainala, May 1939, Martínez s. n.(US); Puebla Nuevo Solistahuacan, 1780 m alt., Sánchez 655 (Inst. Nac. Invest. Forest. Mex.); OAXACA:

between San Juan Jautla and San Juan Tentila, Cuicatlan, 17° 58' N. Lat., 96° 38' W. Long., 850 m alt., Schultes 765 (A); Chiquihuitlan Dist., 17° 59' N. Lat., 96° 28' W. Long., 850-1050 m alt., 17 Sep. 1962, Hallberg Chiq-I (MSC); Yotao, Dist. Ixtlan, 17° 23' N. Lat., 96° 19' W. Long., 1400 m alt., 18 Sep. 1962, Hallberg Yot-I (MSC); Cerro Yahuitze, Lachirioag, Dist. Villa Alta, 17° 21' N. Lat., 96° 09' W. Long., 1200-1820 m alt., Hallberg Yah-I (MSC); Mexican Route 131, km 185 south of Sola de Vega, 16° 11' N. Lat., 97° 02' W. Long., 1720 m alt., 22 Dec. 1962, Andresen & Steinhoff 2014 (MSC); west slope Cerro Yahuitze, Lachirioag, Dist. Villa Alta, 17° 21' N. Lat., 96° 09' W. Long., 1400 m alt., 26 Dec. 1962, Andresen & Steinhoff 2023 (MSC); PUEBLA: Apulco, cerca de Zacapoaxtla, 1260 m alt., 27 Apr. 1960, Sanchez 653 (Inst. Nac. Invest. Forest. Mex.); Apulco, Mun. de Zacapoaxtla, 1314 m alt., 21 May 1960, Madrigal & Vela s. n. (MEXU).

In the original description of *Pinus strobus* var. *chiapensis*, Martínez (1940) did not designate a type specimen. He did, however, illustrate the paper with four figures: (1) a photographic reproduction of immature cones and mature foliage from Ocotepec, Copamala, Chiapas; (2) a photograph of an open and closed cone pair from Cintalapa; (3) a line drawing of details of the cone and foliage which is based on a composite or mixed gathering of materials collected in Chiapas (probably at Cintalapa); and (4) a line drawing of the transverse leaf anatomy of two leaves collected near Coapilla, Chiapas. He also cited specimens or reports of *P. strobus* var. *chiapensis* from Tapalapa and Santa Maria, Chiapas. No depositories of specimens nor collectors' names are contained in the protologue.

As a check on the materials discussed in Prof. Martínez (1940) paper, Biol. Xavier Madrigal Sánchez, Botanist of the Instituto Nacional de Investigaciones Forestales de México searched the Herbario Nacional del Instituto de Biología (MEXU) and questioned Prof. Martínez about the existence of type material of *Pinus strobus* var. *chiapensis* and the status of the two specimens illustrated by him (1940). Professor Martínez indicated that the original diagnosis of the variety was based upon a composite sample of several specimens collected from various locations (personal correspondence with Biol. Madrigal Sánchez).

Since the date of Martínez' Ocotepec collection (described below) predates the publication of variety, and since it was obviously available to him when he described the taxon, it is here designated as the lectotype of *Pinus chiapensis* (Martínez) Andresen.

The lectotype specimen now housed in the Herbario del Instituto de Biología, Universidad Nacional de México (MEXU num. 97, photo MSC!) bears a glued label reading "Pinus strobus chiapensis, Martínez

(Var. Nov.) Ocotepc y Coapilla [,] Determinó. M. Martínez Dic. 1939." In a different script the word "tipo" has been added. Two branches, each bearing leaves, and two mature, open cones are affixed to the herbarium sheet. The larger branch has a small label attached by string which reads (unquestionably in Martínez script), "Pinus strobus chiapensis Var. Nov. Ocotepc, Chis Junio 1939. Martínez." Except for this tagged branch it is not certain which portions of the remaining material were obtained from Ocotepc and which from Coapilla. These two villages are about 10 km apart.

In the United States National Herbarium (US) there is a specimen labeled "Pinus strobus chiapensis Martínez Sta Maria, 20 km. de Cintalapa, Chis Jul. 1939 M. Martínez Isotipo 34.19." Because the specimen from Ocotepc is the lectotype, however, the latter (Martínez 39.14) cannot be an isotype.

Two other specimens labeled "Pinus strobus var. chiapensis Martínez" in MEXU warrant comment. The label of one sheet, num. 803, printed with Prof. Martínez' name gives the locality "Copainala, Chis" and is dated "Junio 1939." The twig and foliage specimen on this sheet and *P. chiapensis* but the single cone on the sheet unquestionably is *P. strobus*. The other (recently mounted) specimen also with Prof. Martínez' name printed on the label, bears the note "Canje: Stockwell 2008," but similarly consists of two foliated branchlets of *P. chiapensis* and one cone of *P. strobus*.

Pinus chiapensis (Martínez) Gausson (1960) was not validly published because the basionym *Pinus strobus* var. *chiapensis* Martínez was not clearly indicated (it was not included at all) and no direct reference is given to the original publication, nor are any pages, plates, dates, or literature sources mentioned (cf. Lanjouw *et al.*, 1961: Art. 33).

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I am grateful to Dr. Nicholas T. Mirov for his suggestion and encouragement to undertake this study. The assistance of Dr. Jerzy Rzedowsky and Biol. Xavier Madrigal Sánchez has been invaluable. Dr. John H. Beaman has given many constructive comments. I am indebted to the curators of the following herbaria for the loan of specimens used in the study: A, F, Instituto Nacional de Investigaciones Forestales de Mexico, MEXU, MSC, and US.

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NOTES ON THE SOLANACEAE OF SOUTHERN BRAZIL

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and
Robert J. Downs
U. S. Department of Agriculture

In revising the Solanaceae of the state of Santa Catarina, Brazil, we find it desirable to place the resultant novelties on record as soon as possible. Later, we plan to publish the complete revision as a unit of the "Flora Catarinense" edited by Pe. Raulino Reitz, director of the Herbário "Barbosa Rodrigues."

We have been greatly aided by the cooperation of the Herbário "Barbosa Rodrigues" and by a grant to the senior author by the National Science Foundation for collecting in 1956-57. Our great thanks go to Mr. Conrad V. Morton of the Smithsonian Institution who has given unstintingly of his vast experience in the family and especially in the genus Solanum. He has placed at our disposal copious notes and many photographs of types, and since the project was begun has made special studies of the material that was the basis of Dunal's classic treatment of the family in DeCandolle's "Prodromus."

SOLANUM L.

For convenience of reference, the new species in Solanum are grouped here by sections as they now occur in the manuscript of the "Flora Catarinense." Since we find that no system exactly fits our ideas of the relationships involved, we have made certain alterations on the basic system of Dunal following later authors or our own findings. A translation of this part of the manuscript follows:

KEY

1. Anthers oblong, ellipsoid or obovoid, the pores large; plants always unarmed.....Subgenus 1 - Solanum
1. Anthers attenuate, the pores small; plants often spinose.
Subgenus 2 - Leptostemonum

Subgenus 1 - SOLANUM

1. Leaves pinnatisect, the leaflets petiolulate but the petioles sometimes alate; pedicels distinctly articulate; plants herbaceous, erect.....Section 1 - Tuberarium
1. Leaves usually not more than pinnatifid (when pinnatisect, the plants then scandent and woody); pedicels usually not articulate.
2. Calyx truncate or with 5 (4-9) divisions or points, never with 10 points.

3. Plants scandent, woody vines; inflorescences mostly terminal and corymbose.....Section 3 - Jasminosolanum

3. Plants erect, herbs, shrubs, or small trees.

4. Trichomes simple or absent.

5. Plants herbaceous or subherbaceous; inflorescences lateral, extra-axillary, umbelliform or short-racemose, usually simple; corolla not more than 12 mm in diameter.

Section 2 - Solanum

5. Plants woody, shrubs or small trees; inflorescences opposite the leaves, racemose.

Section 4 - Leiodendron

4. Trichomes at least in part stellate or dendritic.

6. Fertile flower single; inflorescences subumbellate, few-flowered, opposite the leaves or extra-axillary; trichomes dendritic.....Section 5 - Pseudocapsicum

6. Fertile flowers always more than one; trichomes dendritic or stellate.

7. Inflorescences opposite the leaves, simple and racemose in the species of Santa Catarina; trichomes stellate, never dendritic.....Section 6 - Indubitaria

7. Inflorescences terminal or extra-axillary, or when opposite the leaves, then the trichomes dendritic; trichomes either stellate or dendritic.

Section 7 - Anthoresis

2. Calyx with 10 points from a truncate apex in the species of Santa Catarina.....Section 8 - Lycianthes

Subgenus 2 - LEPTOSTEMONUM

1. Plants unarmed; inflorescences simple or bifurcate the flowers secund; pedicels articulate near the base.

Section 9 - Cyphomandropsis

1. Plants spinose or the inflorescences corymbosely branched or the pedicels not articulate.

2. Upper side of the leaf glabrous or with simple trichomes.

3. Spines all stout and curved; plants scandent or prostrate; leaves mostly lobed or pinnatisect.

Section 10 - Micracantha

3. Spines for the most part straight and slender or lacking; plants erect.....Section 11 - Simplicipilum

2. Upper side of the leaf with some stellate trichomes at least when young.

4. Lobes of the corolla narrow, as long as the tube or nearly so.....Section 12 - Torvaria

4. Lobes of the corolla very broad, much shorter than the tube.

5. Flowers uniform.....Section 13 - Asterotrichotum

5. Flowers dimorphic.....Section 14 - Andromonoecum

Subgenus 1. SOLANUM. Solanum section Pachystemonum Dunal in DC. Prodr. 13, pt. 1: 28, 31. 1852.

Section 1. TUBERARIUM (Dunal) Bitter, Fedde Rep. Spec. Nov.

10: 531. 1912; Correll, The Potato and its wild relatives, section Tuberarium of the Genus Solanum, i-xx, 1-606, figs. 1-212. 1962. Solanum subsection Tuberarium Dunal in DC. Prodr. 13, pt. 1: 28, 31. 1852.

Section 2. SOLANUM. Solanum subsection Morella Dunal in DC. Prodr. 13, pt. 1: 28, 44. 1852.

Section 3. JASMINOSOLANUM Bitter ex Seithe - v. Hoff, Bot. Jahrb. 81: 291. 1962. Solanum subsection Dulcamara Dunal in DC. Prodr. 13, pt. 1: 28, 68. 1852.

Section 4. LEIODENDRON (Dunal) Bitter, Bot. Jahrb. 54: 500. 1917. Solanum subsection Micranthes 2° Anthopleuris §1 Oppositifolia ***Leiodendra Dunal in DC. Prodr. 13, pt. 1: 29, 137. 1852.

Section 5. PSEUDOCAPSICUM (Med.) Bitter, Bot. Jahrb. 54: 497. 1917. Pseudocapsicum Med. Phil. Bot. 1: 122. 1789. Solanum subsection Micranthes 2° Anthopleuris §2 Pseudocapsicum Dunal in DC. Prodr. 13, pt. 1: 29, 150. 1852.

Section 6. INDUBITARIA (Dunal), comb. nov. Solanum subsection Micranthes 2° Anthopleuris §1 Oppositifolia *Indubitaria Dunal in DC. Prodr. 13, pt. 1: 29, 123. 1852.

Section 7. ANTHORESIS (Dunal) Bitter, Bot. Jahrb. 54: 489. 1917. Solanum subsection Micranthes 1° Anthoresis Dunal in DC. Prodr. 13, pt. 1: 29, 95. 1852.

Section 8. LYCIANTHES (Dunal) Wettstein in Engler & Prantl, Pflanzenfam. 4, Abt. 3b: 22. 1891. Solanum subsection Lycianthes Dunal in DC. Prodr. 13, pt. 1: 29, 156. 1852. Solanum subgenus Lycianthes (Dunal) Bitter, Bot. Jahrb. 55: 89. 1917. Lycianthes (Dunal) Hassler, Ann. Cons. & Jard. Bot. Genève 20: 173. 1917.

Subgenus 2. LEPTOSTEMONUM (Dunal) Bitter, Bot. Jahrb. 55: 69: 1917. Solanum section Leptostemonum Dunal in DC. Prodr. 13, pt. 1: 29, 183. 1852.

Section 9. CYPHOMANDROPSIS Bitter, Fedde Rep. Spec. Nov. 12: 461. 1913. Cyphomandra sensu Sendtn. in Mart. Fl. Bras. 10: 113. 1846; sensu Dunal in DC. Prodr. 13, pt. 1: 387. 1852, both in part, not as to the type species of Martius.

Section 10. MICRACANTHA (Dunal) Bitter ex Marz, in Hegi, Illustr. Fl. v. Mittel-Europa 5, pt. 4: 2584. 1927. Solanum section Leptostemonum subsection Euleptostemonum §2 Juripeba ***Micracantha Dunal in DC. Prodr. 13, pt. 1: 30, 216. 1852.

Section 11. SIMPLICIPILUM Bitter, Fedde Rep. Spec. Nov. Beiheft. 16: 147. 1923.

Section 12. TORVARIA (Dunal) Bitter, Bot. Jahrb. 57: 250. 1922. Solanum subsection Torvaria Dunal in DC. Prodr. 13, pt. 1: 30, 258. 1852.

Section 13. ASTEROTRICHOTUM (Dunal), comb. nov. Solanum subsection Asterotrichotum Dunal in DC. Prodr. 13, pt. 1: 30, 282. 1852.

Section 14. ANDROMONOECUM Bitter, Fedde Rep. Spec. Nov. 16: 157. 1923.

SOLANUM (Solanum) DELICATULUM, sp. nov.

S. americano Mill. proximum sed calyce majore corollam subae-

quante, inflorescentia 1-2-flora differt.

PLANTA herbacea vel suffruticosa, ad 1 m alta; ramis gracilibus, paulo flexuosis, laevibus, pallide viridibus, apicibus exceptis glabris; FOLIIS solitariis, breviter petiolatis, lanceolatis vel ellipticis, basi attenuatis, apice late acutis ad acuminatis, 10 cm longis, 3 cm latis, membranaceis, mox glabris; INFLORESCENTIIS lateralibus, extra-axillaribus, 1-2-floris; pedunculo 2-3 mm longo, gracillimo, fructifero paulo amplificato; PEDICELLIS per anthesin 2-5 mm longis, fructiferis ad 10 mm, minute pubescentibus; CALYCE 4 mm alto, glabro, profunde diviso, lobis anguste triangularibus; COROLLA calycem subaequante, alba, valde imperfecte cognita; ANTHERIS oblongis; BACCA globosa, 10 mm diametro. Pl. I, fig. 1: Branch x 1/2; fig. 2: Flower x 5; fig. 3: Stamen x 5.

BRAZIL: Santa Catarina: Itajaí: Cunhas, alt. 10 m, February 8, 1955, Klein 1131 (HBR, type; US photo). Same, March 10, 1955, Klein 1203 (HBR).

SOLANUM (Solanum) MAIORANTHUM, sp. nov.

S. americano Mill. proximum sed inflorescentiis plerumque breviter racemosis vel bifurcatis, antheris subduplo majoribus differt.

PLANTA herbacea vel suffruticosa, partibus juvenilibus pilis pallidis multicellularibus vestitis; ramis gracilibus, paulo flexuosis, pallide viridibus, in lineis decurrentibus persistente pilosis; FOLIIS solitariis binisque, vix petiolatis, lanceolatis vel raro ovatis, attenuatis praecipue ad basin versus, 5-13 cm longis, integris vel raro grosse dentatis, membranaceis, pubescentibus praecipue in nervis; INFLORESCENTIIS lateralibus, plerumque paulo infra folia positis, breviter racemosis, plerumque simplicibus, raro bifurcatis, paucifloris; pedunculo 12-26 mm longo; PEDICELLIS per anthesin 5 mm longis, fructiferis amplificatis; CALYCE 1.5 mm alto, lobis ovatis, inaequalibus; COROLLA 12 mm diametro, alba, plusquam 2/3 lobata, lobis acutis; STAMINIBUS aequalibus; filamentis intus pubescentibus; antheris oblongis, 2.5-3.2 mm longis, apice porosis dein longitudinaliter dehiscens; STYLO stamina valde superante; stigmatibus angusta, obtusa; BACCA globosa, 4 mm diametro. Pl. I, fig. 4: Leaf x 1/2; fig. 5: Flower x 1.

BRAZIL: Santa Catarina: Lauro Müller: Lower and middle slopes of Rio do Rastro, 20 km west of Lauro Müller, alt. 700-1000 m, April 3, 1957, Smith & Klein 12338 (US, type; HBR, R).

Araranguá: Serra do Pilão, alt. 800 m, Reitz 3423 (HBR).

Joinville: Roadside, Estrada Dona Francisca, alt. 550 m, August 23, 1957, Reitz & Klein 4654 (HBR, US). Same, October 4, 1957, Reitz & Klein 5029 (HBR, US). Same, woods, November 6, 1957, Reitz & Klein 5597 (HBR, US).

Lajes: Ruderal, Santo Antonio, near Passo de Socorro, Estrada de Rodagem Federal km 67-71, south of Lajes, alt. 800-900 m, January 14, 1957, Smith & Reitz 9966 (US). Fazenda Santa Ana, January 1961, H. Moreira & E. Moreira 239 (Univ. Paraná, US). Araucaria forest, Anita Garibaldi, alt. 700 m, April 13, 1963, Reitz

& Klein 14782 (HBR, US).

SOLANUM (Leiodendron) REITZII, sp. nov.

S. trachytrichio Bitter proximum sed foliis semper solitariis supra fere omnino glabris, staminibus valde inaequalibus differt.

ARBOR 8 m alta; ramis juvenilibus pilis brevibus subpatentibus citrinis vestitis; cortice pallido, rimoso; FOLIIS solitariis, 10-17 mm petiolatis, oblongis vel anguste ellipticis, basi apiceque acutis, 10 cm longis, 4 cm latis, tenue coriaceis, nervo mediano excepto supra glabris, subtus dense pubescentibus; INFLORESCENTIIS oppositifoliis, 15 mm pedunculatis, simplicibus, racemosis, paucifloris; PEDICELLIS gracillimis, 8 mm longis; CALYCE late campanulato, 2 mm alto, paulo lobato, lobis late rotundatis, apiculatis; COROLLA 14 mm diametro, apicibus exceptis glabra, ultra 2/3 divisa, lobis ellipticis, acutis; FILAMENTIS valde inaequalibus; antheris anguste obovoideis, in flore unica 2.5-3.5 mm longis; STYLO stamina subaequante, curvato. Pl. I, fig. 6: Leaf and inflorescence x 1/2; fig. 7: Young flower x 1; fig. 8: Adult flower x 1; fig. 9: Stamens x 2.

BRAZIL: Santa Catarina: Rio do Sul: Araucaria forest, Alto de Matador, alt. 800 m, December 30, 1958, Reitz 4092 (US, type; HBR).

SOLANUM (Leiodendron) DUSENII, sp. nov.

S. caavurana Vell. proximum sed foliis angustioribus, inflorescentiis paucifloris, pedicellis apice valde incrassatis differt.

PLANTA fruticosa (?), minute sparseque pallido-pilosa; ramis ultimis gracilibus, flexuosis, eorum cortice brunneo, parum rimoso; FOLIIS solitariis vel binis valde inaequalibusque, subsessilibus, ellipticis vel lanceolatis, basi apiceque attenuatis, 8 cm longis, 3 cm latis, submembranaceis, supra glabris, subtus in nervis sparse pallido-pilosis; INFLORESCENTIIS oppositifoliis, 3 mm pedunculatis, racemosis, brevissimis, 2-4-floris; PEDICELLIS 2 cm longis, gracilibus, apice valde incrassatis, basi articulatibus; CALYCE late campanulato, 3 mm alto, glabro, ca. 1/2 lobato, lobis late rotundatis apiculatisque; COROLLA 16 mm diametro, profunde divisa, lobis ellipticis; STAMINIBUS aequalibus; filamentis curtissimis; antheris oblongis, 4 mm longis; STYLO stamina valde superante; BACCA subglobosa, 7 mm diametro. Pl. I, fig. 10: Leaf and inflorescence x 1/2; fig. 11: Flower x 1; fig. 12: Stamen x 2

BRAZIL: Paraná: Without further locality, February 1, 1904, Dusén 3361 (US, type; R).

Santa Catarina: Without further locality, June 30, 1885, Schwacke (R, US, fruit only).

SOLANUM (Leiodendron) MICRORBITUM, sp. nov.

S. caavurana Vell. proximum sed foliis dimorphis minoribus suborbicularibus, inflorescentiis paucifloris differt.

ARBOR parva, ad 4 m alta; ramis ultimis rectis vel paulo flexuosis, gracillimis, lineis elevatis praeditis, pilis simplicibus multicellularibus sparsissime vestitis; FOLIIS fere omnibus binis

valde inaequalibusque, majoribus 15 mm petiolatis, lanceolatis, basi apiceque attenuatis, 75 mm longis, 25 mm latis, minoribus suborbicularibus, 30 mm diametro, ambo membranaceis, supra glabris, subtus in axillis nervorum majorum pubescentibus; INFLORESCENTIIS lateralibus, oppositifoliis, 9 mm pedunculatis, simplicibus, brevibus, paucifloris; PEDICELLIS 15 mm longis, gracillimis; CALYCE campanulato, 3 mm alto, lobis brevibus, rotundatis obtusoperculatisque; COROLLA 18 mm diametro, alba, lobis lanceolatis, acutis, ultra 7 mm longis; STAMINIBUS aequalibus; filamentis 1 mm longis, basi connatis; antheris oblongis, fere 4 mm longis; BACCA ignota. Pl. I, fig. 13: Branch x 1/2; fig. 14: Flower x 1; fig. 15: Stamens x 2.

BRAZIL: Santa Catarina: São Francisco do Sul: Forest, Três Barras, Garuva, alt. 200 m, February 28, 1958, Reitz & Klein 6506 (US, type; HBR).

SOLANUM (Leiodendron) PABSTII, sp. nov.

S. inaequale Vell. proximum sed inflorescentiis valde ramosis, staminibus aequalibus differt.

ARBOR 3-10 m alta, omnino glabra; ramis irregulariter angulatis; cortice pallido-cinereo; FOLIIS solitariis, 4-5 mm petiolatis, lanceolatis, basi cuneatis, apice attenuatis et plus minusve involuto-subulatis, 6 cm longis, 2 cm latis, tenue coriaceis; INFLORESCENTIIS terminalibus, 2 cm pedunculatis, late corymbosis, multiramosis, 6-8 cm latis; PEDICELLIS gracilibus, 10-16 mm longis, apice haud incrassatis; CALYCE late campanulato, 3 mm alto, 1/2 lobato, lobis late ovatis vel semiorbicularibus, apiculatis; COROLLA alba, 16 mm diametro, ultra 2/3 divisa, lobis ovato-lanceolatis, acutis; STAMINIBUS aequalibus; filamentis 1.5 mm longis; antheris anguste obovoideis, 4 mm longis; STYLO gracili, stamina bene superante; stigma anguste clavato, bilobato; BACCA ignota. Pl. I, fig. 16: Branch x 1/2; fig. 17: Young flower x 1; fig. 18: Adult flower x 1; fig. 19: Stamen x 2.

BRAZIL: Santa Catarina: Lajes - São Joaquim: Bank of the Rio Lavatudo, alt. 1050 m, October 22, 1961, Pabst 6200 & Pereira 6373 (US, type; HB).

Santa Cecilia: BR-2, near Santa Cecilia, alt. 1100 m, October 21, 1961, Pabst 6123 & Pereira 6296 (HB, US).

SOLANUM (Leiodendron) CATARACTAE, sp. nov.

S. inaequale Vell. proximum sed inflorescentiis ca. 5-floris, pedunculo compresso, staminibus aequalibus differt.

PLANTA fruticosa, humilis, glabra; ramis ultimis compressis; cortice persistente, juvenile atro fulgenteque; FOLIIS solitariis, breviter petiolatis, lanceolatis, acutis, basi attenuatis, 60 mm longis, 17 mm latis, subcoriaceis, concoloribus; INFLORESCENTIIS extra-axillaribus, simplicibus, corymbiformibus, paucifloris; pedunculo 8-10 mm longo, compresso; PEDICELLIS gracilibus, 12-14 mm longis; CALYCE 3 mm alto, crasso, profunde diviso, lobis late ovatis, obtusis; COROLLA fere 2 cm diametro, ultra 2/3 lobata, lobis ovatis, obtusis; STAMINIBUS aequalibus; filamentis brevissimis; antheris oblongis, basi abrupte angustatis, 5 mm

longis; STYLO stamina paulo superante; stigmatē clavato, bilobato; BACCA ignota. Pl. II, fig. 1: Branch x 1/2; fig. 2: Calyx x 1; fig. 3: Stamens x 2.

BRAZIL: Santa Catarina: Bom Retiro: By base of waterfall of the Rio Canoas, Campo dos Padres, alt. 1300-1400 m, November 22, 1956, Smith & Klein 7843 (US, type; HBR, R).

SOLANUM (Pseudocapsicum) PAVIMENTI, sp. nov.

S. difloro Vell. proximum sed axibus subglabris, foliis acuminatis, floribus glabris differt.

PLANTA herbacea (! Reitz & Klein), ramosa sed verisimiliter suffruticosa; ramis gracilibus, suffruticosis; cortice virescente, ex sicco minute rugoso, e pilis simplicibus dendriticisque pallido-pubescentibus; FOLIIS solitariis vel binis valde inaequalibus, majoribus 2-3 mm petiolatis, lanceolatis vel ellipticis, basi attenuatis et paulo asymmetricis, apice acutis, 60 mm longis, 23 mm latis, submembranaceis, subtus in nervis majoribus pilis dendriticis paucis praeditis, alibi glabris, subconcoloribus, foliis minoribus ca. 5 mm longis, late ellipticis; INFLORESCENTIIS sessilibus, 1-6-floris; floribus fasciculatis, flore unica fertili; PEDICELLIS suberectis, 5 mm longis, gracilibus sed apice incrassatis, minute pubescentibus; CALYCE 3 mm alto, minute sparseque pubescente, lobis anguste lanceolatis, late acutis, 2 mm longis, 0.5 mm latis; COROLLA alba, 8 mm diametro, profunde lobata; STAMINIBUS subaequalibus; filamentis curtissimis; antheris oblongis, 2.5 mm longis; STYLO stamina bene superante. Pl. II, fig. 4: Leaf pair; fig. 5: Branch x 1/2; fig. 6: Young flower x 2; fig. 7: Stamen x 2.

BRAZIL: Santa Catarina: Papanduva: Forest, Lajeado, alt. 800 m, January 3, 1962, Reitz & Klein 11438 (US, type; HBR).

SOLANUM (Indubitaria) SCHWACKEANUM, sp. nov.

S. gemello Mart. ex Sendtn. parum proximum sed foliis elongatis basi cuneatis, calyce subduplo minore fructifero vix amplificato differt.

PLANTA fruticosa; ramis gracilibus, ultimis ipsis lignosis; cortice cinereo, minute verruculoso-stellato; FOLIIS solitariis vel binis maxime inaequalibus, majoribus breviter petiolatis, lanceolatis, basi cuneatis, apice longe attenuatis, 9-15 cm longis, 2-5 cm latis, concoloribus, membranaceis, minute obscureque stellatis; INFLORESCENTIIS oppositifoliis, subumbellatis cum axibus obscuris, raro ramosis, simplicibus ca. 8-floris, minute stellatis; pedunculo brevissimo; PEDICELLIS patentibus, gracillimis, fructiferis 15 mm longis; CALYCE campanulato, 2.5 mm alto, ca. 1/2 diviso, lobis ovatis, acutis; COROLLA alba, 14 mm diametro; STAMINIBUS aequalibus; filamentis brevissimis; antheris linearibus, 4 mm longis; STYLO stamina bene superante; BACCA globosa, 7 mm diametro. Pl. II, fig. 8: Branch x 1/2; fig. 9: Trichome x 25; fig. 10: Calyx and fruit x 1; fig. 11: Stamen x 2.

BRAZIL: Santa Catarina: Blumenau: Near Blumenau, 1884, Schwacke 175 (US, type; R). Same, March 1888, Ule 698 and 700 (US).

Without municipio: April 1869, Fritz Mueller (K).

Ibirama: Horto Florestal I. N. P., alt. 450 m, April 12, 1956, Reitz & Klein 3086 (HBR, US); 3097 (HBR, US). Same, May 18, 1956, Klein 1984 (HBR, US).

Itajaí: Fritz Mueller 228 (R, US).

Rio do Sul: Serra do Matador, alt. 500 m, March 12, 1959, Reitz & Klein 8536 (HBR, US). Same, alt. 400 m, March 14, 1959, Reitz & Klein 8601 (HBR, US).

SOLANUM (Indubitaria) SUBSYLVESTRIS, sp. nov.

S. leontopodio Dunal proximum sed inflorescentia elongata quam pedunculo brevi multo longiore differt.

PLANTA fruticosa, 2 m alta; ramis gracilibus, flexuosis, juvenilibus pilis minutis stipitato-stellatis subdense vestitis; cortice virescente, ex sicco rugoso-striato; FOLIIS solitariis et binis, majoribus 6-12 mm petiolatis, ovato-lanceolatis, basi apiceque attenuatis, basi asymmetricis, ultra 16 cm longis et 6 cm latis, tenuibus, utrinque stellato-tomentosis, infra valde pallidioribus, foliis minoribus minus quam 1/4 majorum, late ellipticis, apice rotundatis; INFLORESCENTIIS oppositifoliis, simplicibus, racemosis, laxe multifloris, axi gracili, 3 cm longo, stellato-tomentosis; pedunculo 5-10 mm longo; PEDICELLIS patentibus, gracillimis, 15-20 mm longis; CALYCE campanulato, fructifero amplificato et 16 mm diametro, 1/2-2/3 lobato, lobis ovatis, acutis; COROLLA alba, 22 mm diametro, plusquam 1/2 lobata, lobis lanceolatis, acutis; STAMINIBUS aequalibus, filamentis ca. 1 mm longis, subliberis; antheris clavato-oblongis, 2.5 mm longis; STYLO stamina multo superante. Pl. II, fig. 12: Branch x 1/2; fig. 13: Trichome x 5; fig. 14: Flower x 1; fig. 15: Stamens x 2.

BRAZIL: Santa Catarina: Canoinhas: Border of woods, Salseiro, alt. 750 m, September 15, 1962, Klein 3006 (US, type; HBR).

Lebon Regis: Border of woods, Rio dos Patos, alt. 900 m, July 13, 1962, Reitz & Klein 13223 (HBR, US).

SOLANUM (Anthoresis) KLEINII, sp. nov.

E pilis dendriticis S. verbascifolio L. proximum sed statura humile, foliis multo minoribus subconcoloribus, inflorescentiis simplicibus valde differt.

PLANTA fruticosa, 3-5 dm alta, e basi ramosa, basi ipse valde incrassata; ramis e pilis dendriticis elongatis citrinis dense tomentosis; FOLIIS densis et haud distincte solitariis vel binis, breviter petiolatis, ellipticis, basi apiceque acutis, 5-6 cm longis, subcoriaceis, subconcoloribus, supra nervis majoribus impressis exceptis glabris, subtus omnino sparse tomentosis inter nervos prominentes; INFLORESCENTIIS axillaribus, sessilibus vel ad 13 mm pedunculatis, 1-2-floris, dense tomentosis; PEDICELLIS 10-15 mm longis; CALYCE late campanulato, 5 mm alto, ca. 1/2 lobato, lobis late ovatis; COROLLA 20 mm diametro, alba, 2/3 lobata, lobis lanceolatis, acutis; STAMINIBUS aequalibus; filamentis ca. 1 mm longis, basi breviter connatis; antheris oblongis, 5 mm longis; STYLO stamina bene superante. Pl. II, fig. 16: Branch x 1/2; fig. 17: Trichome x 25; fig. 18: Calyx x 1; fig. 19: Flower x 1; fig. 20: Stamen x 2.

BRAZIL: Santa Catarina: Campo Alegre: Campo and araucaria forest, 4 km south of Campo Alegre on the road to Jaraguá do Sul, alt. 900-1000 m, November 6, 1956, Smith & Klein 7321 (US, type; HBR, R).

SOLANUM (Anthoresis) CASSIOIDES, sp. nov.

S. kleinii Smith & Downs simulans sed pilis stellatis brevibus, axibus vetustis glabris, juvenilibus sparse vestitis, foliorum laminis glabris differt.

PLANTA herbacea (! Reitz); ramis vetustis glabris, juvenilibus sparse minuteque stellatis, parum lignosis; cortice persistente, atro, ex sicco rugoso; FOLIIS solitariis, 10 mm petiolatis, ellipticis, subacutis, basi attenuatis, 11 cm longis, 5 cm latis, petiolo stellato excepto adultis glabris, tenue coriaceis, concoloribus, supra subfulgentibus; INFLORESCENTIIS extra-axillaribus, 7-10 mm pedunculatis, paucifloris; PEDICELLIS fasciculatis, gracillimis, 10-15 mm longis, stellatis; CALYCE subcampanulato, 4 mm alto, 2/3 lobato, lobis ovatis, acutis; COROLLA alba, 28 mm diametro, 2/3 lobata, lobis ovatis, subacutis; STAMINIBUS aequalibus; filamentis 2.5 mm longis, alto-connatis; STYLO gracili, stamina superante, pubescente; BACCA ignota. Pl. III, fig. 1: Branch x 1/2; fig. 2: Trichome x 25; fig. 3: Calyx x 1; fig. 4: Corolla and stamens x 1.

BRAZIL: Santa Catarina: Lauro Müller - Urussanga: Araucaria forest, Pinhal da Companhia, alt. 300 m, September 20, 1958, Reitz & Klein 7202 (US, type; HBR).

Curitibanos: Border of thicket, Ponte Alta do Sul, alt. 900 m, October 24, 1962, Reitz & Klein 13357 (HBR, US).

Pôrto União: Campo, Matos Costa, alt. 1100 m, October 27, 1962, Reitz & Klein 13739 (HBR, US).

Santa Cecília: Crest of Serra do Espigão, near Campos do Areão, alt. 1200 m, October 21, 1961, Pabst 6112 & Pereira 6285 (HB, US). Bog, Campo Alto, alt. 1200 m, October 25, 1962, Reitz & Klein 13492 (HBR, US).

São José: Thicket, Serra da Boa Vista, alt. 800 m, October 14, 1960, Reitz & Klein 10204 (HBR, US).

SOLANUM (Anthoresis) COMPRESSUM, sp. nov.

E pilis dendriticis S. verbascifolio L. proximum sed ramis juvenilibus compressis, foliis multo minoribus concoloribus, inflorescentiis simplicibus differt.

ARBOR parva, ad 4 m alta; ramis juvenilibus compressis, acute angulatis, pilis dendriticis vestitis; cortice persistente, atro, subfulgente; FOLIIS solitariis, 10 mm petiolatis, lanceolatis, basi apiceque attenuatis, 12 cm longis, 3.5 cm latis, concoloribus, adultis subtus in nervorum majorum axillis pubescentibus, alibi glabris; INFLORESCENTIIS mox lateralibus et oppositifoliis, ramosis, laxe corymbosis; pedunculo 2 cm longo, valde compresso; PEDICELLIS gracilibus, 12-25 mm longis, paulo supra basin articulatis; CALYCE hemisphaerico, 3 mm alto, curto-lobato, lobis rotundatis breviter cuspidatisque; COROLLA alba, 20 mm diametro, ultra 2/3 divisa, lobis lanceolatis, acutis; STAMINIBUS aequali-

bus; filamentis 0.5 mm longis, parum connatis; antheris oblongis, 4 mm longis, dorso papillosis; STYLO stamina superante, glabro; STIGMATE clavata, bilobata; BACCA globosa, 17 mm diametro. Pl. III, fig. 5: Branch x 1/2; fig. 6: Young flower x 1; fig. 7: Adult flower x 1; fig. 8: Stamens x 2.

BRAZIL: Santa Catarina: São Joaquim: Araucaria forest, Fazenda da Laranja, Bom Jardim, alt. 1400 m, December 13, 1958, Reitz & Klein 7867 (US, type; HBR). Urupema, alt. 1200 m, December 24, 1962, Reitz & Klein 14584 (HBR, US). Riverbank forest, Rio Lavatudo, alt. 1000 m, July 15, 1963, Reitz & Klein 15947 (HBR, US).

SOLANUM (Anthoresis) XIPHOCEPHALUM, sp. nov.

S. verbascifolium L. simulans sed pilis vere stellatis, foliis supra sparse vestitis differt.

PLANTA fruticosa, 3 m alta, partibus juvenilibus pilis stipitato-stellatis aureis omnino vestitis; FOLIIS solitariis, 3 cm petiolatis, ellipticis, apice attenuatis, basi late acutis, 20 cm longis, 8 cm latis, submembranaceis, bicoloratis, supra sparse stellatis et cum nervis impressis, infra dense stellatis; INFLORESCENTIIS terminalibus, corymbosis, 5 cm diametro; pedunculo 4 cm longo; PEDICELLIS 4 mm longis; CALYCE 6 mm alto, dense stellato, ca. 1/2 diviso, lobis late subtriangularibus; COROLLA 20 mm diametro, alba, extus dense stellata, lobis oblongis, acutis, 7 mm longis; STAMINIBUS subaequalibus; filamentis brevibus; antheris oblongis, 4 mm longis; STYLO gracili, glabro, stamina bene superante; BACCA ignota. Pl. III, fig. 9: Branch x 1/2; fig. 10: Trichome x 5; fig. 11: Flower x 1; fig. 12: Stamen x 2.

BRAZIL: Santa Catarina: Blumenau: Forest, Morro Spitzkopf, alt. 750 m, September 18, 1959, Reitz & Klein 9138 (US, type; HBR).

SOLANUM (Cyphomandropsis) FUSIFORME, sp. nov.

In sectione, planta omnino glabra, pedunculo elongato, bacca anguste fusiforme satis distincta.

PLANTA fruticosa, omnino glabra; ramorum cortice pallide viridi, sublaeve; FOLIIS solitariis, 30 mm petiolatis, lanceolatis, acuminatis, basi inaequaliter rotundatis, 9 cm longis, 35 mm latis, plerumque simplicibus sed raro basi foliolis binis reductis praeditis; INFLORESCENTIIS axillaribus vel subaxillaribus, simplicibus, laxis, paucifloris; rhachi geniculata; pedunculo gracili, 3-5 cm longo; PEDICELLIS secundis, gracillimis, 14 mm longis; CALYCE patelliforme, 7 mm diametro, crenulato; COROLLA 22 mm diametro, purpurea, profunde divisa, lobis lanceolatis, acutis; STAMINIBUS aequalibus; antheris subsessilibus, anguste ovoideis, ad apicem versus attenuatis et poris minutis praeditis; BACCA anguste fusiforme, 30 mm longa, 6 mm diametro. Pl. III, fig. 13: Leaf x 1/2; fig. 14: Inflorescence x 1/2; fig. 15: Calyx x 1; fig. 16: Flower x 1; fig. 17: Stamen x 2.

BRAZIL: Santa Catarina: Dionísio Cerqueira: Araucaria forest and ruderal, near Dionísio Cerqueira, alt. 800-850 m, December 30, 1956, Smith & Reitz 9658 (US, type; HBR).

SOLANUM (Cyphomandropsis) SUBHASTATUM, sp. nov.

S. johannae Bitter proximum sed foliis elongatis supra glabris nonnunquam basi lobatis differt.

PLANTA herbacea; ramis ultimis ascendentibus, gracilibus, minute stellatis; FOLIIS solitariis, 20 mm petiolatis, lanceolatis vel anguste lanceolatis, basi apiceque attenuatis, 10-13 cm longis et 15-23 mm latis cum majoribus angustis, simplicibus vel nonnunquam basi bilobatis, subtus et nervo centrali supra e pilis simplicibus vel dendriticis sparse minuteque vestitis; INFLORESCENTIIS axillaribus, simplicibus, laxis, paucifloris; pedunculo gracillimo, 3 cm longo; PEDICELLIS secundis, 12 mm longis, gracillimis, minute pubescentibus; CALYCE hemisphaerico, 4 mm alto, sparse pubescente, 1/2 lobato, lobis anguste triangularibus; COROLLA 20 mm diametro, purpurea, ultra 2/3 divisa, lobis anguste triangularibus; STAMINIBUS aequalibus; filamentis 1.5 mm longis; antheris anguste ovoideis, ad apicem versus attenuatis, 6 mm longis; STYLO stamina vix superante; BACCA ignota. Pl. IV, fig. 1: Lobed leaf x 1/2; fig. 2: Leaf and inflorescence x 1/2; fig. 3: Calyx x 1; fig. 4: Corolla x 1; fig. 5: Stamen x 2.

BRAZIL: Santa Catarina: Lauro Müller - Urussanga: Araucaria forest, Pinhal da Companhia, alt. 300 m, August 23, 1958, Reitz & Klein 7053 (US, type; HBR).

SOLANUM (Simplicipilum) MATADORI, sp. nov.

In sectione, planta inerme floribus exceptis glabra, foliis haud lobatis, inflorescentiis ramosis satis distincta.

PLANTA fruticosa, 2 m alta, inermis, floribus exceptis glabra; ramis teretibus, subrectis; cortice persistente, laeve, pallidoviride; FOLIIS solitariis sed nonnunquam densis, 15 mm petiolatis, anguste lanceolatis, basi apiceque attenuatis, 16 cm longis, 25 mm latis, subcarnosis; INFLORESCENTIIS extra-axillaribus, laxe corymbosis, multifloris; pedunculo 2-6 cm longo, tereti; PEDICELLIS gracillimis, 10-25 mm longis; CALYCE hemisphaerico, crenato vel breviter lobato, lobis plus minusve triangulari-cuspidatis, minute ciliatis; COROLLA 24 mm diametro, purpurea, minute pubescente, profunde divisa, lobis lanceolatis, acutis; STAMINIBUS aequalibus; filamentis latis, brevissimis; antheris anguste ovoideis, ad apicem versus attenuatis; BACCA ignota. Pl. IV, fig. 6: Leaf and inflorescence x 1/2; fig. 7: Calyx x 1; fig. 8: Flower x 1; fig. 9: Stamen x 2.

BRAZIL: Santa Catarina: Rio do Sul: Araucaria forest, Alto Matador, alt. 800 m, October 16, 1958, Reitz & Klein 7254 (US, type; HBR).

Santa Cecilia: Crest of the Serra do Espigão, near Vale Campos do Areão, alt. 1200 m, October 20, 1961, Pabst 6086 & Pereira 6259 (HB, US).

SOLANUM (Torvaria) BISTELLATUM, sp. nov.

S. palinacantho Dunal proximum sed foliis profunde lobatis, calycis lobis anguste triangularibus differt.

PLANTA herbacea vel fruticosa, 1-3 m alta, plus minusve minute glandulosa et setoso-tomentosa; caulibus spinis rectis citrinis

glanduloso-pubescentibus armatis; FOLIIS binis inaequalibus, 10 cm petiolatis, late ovatis, basi subtruncatis vel late subcordatis, ad 27 cm longis, profunde 7-9-lobatis, lobis angustis, attenuatis, grosse dentatis, in petiolo et nervis majoribus spinosis, utrinque dense minuteque pallido-stellatis, parum bicoloratis; INFLORESCENTIIS extra-axillaribus, ramosis, multifloris; pedunculo per anthesin 15-40 mm longo, spinoso; PEDICELLIS secundis, gracilibus, per anthesin 9-14 mm longis, dense spinosis stipitato-glandulosisque; CALYCE 5-6 mm de altura, spinis gracillimis et glandulis stipitatis dense vestito, profunde diviso, lobis anguste triangularibus; COROLLA viride vel flavescens-alba, 25 mm diametro, profunde diviso, lobis lanceolatis, acutis; STAMINIBUS aequalibus; filamentis 2 mm longis; antheris ovoideis cum apice longo-attenuato, basi sagittatis, 6 mm longis; BACCA ignota. Pl. V, fig. 1: Branch section x 1/2; fig. 2: Spine x 2; fig. 3: Trichome x 25; fig. 4: Flower x 1; fig. 5: Stamen x 2.

BRAZIL: Santa Catarina: Caçador: Araucaria woods, 3 km west of Caçador, alt. 900-1000 m, February 6, 1957, Smith & Klein 10881 (US, type; HBR, R).

Campo Alegre: Slopes of Morro Iquererim above tree line, alt. 1500 m, December 10, 1956, Smith & Klein 8556 (HBR, R, US).

Curitiba: Campo, Ponte Alta do Sul, alt. 950 m, January 2, 1962, Reitz & Klein 11310-a (HBR, US).

Joinville: Thicket, Estrada Dona Francisca, alt. 600 m, November 6, 1957, Reitz & Klein 5587 (HBR, US).

Luis Alves: Woods, Braço Joaquim, alt. 300 m, January 7, 1956, Reitz & Klein 2332 (HBR).

Pôrto União: Ruderal, by the road to Matos Costa, 25 km south of Pôrto União, alt. 750-800 m, December 20, 1956, Smith & Reitz 8903 (HBR, R, US).

Rio do Sul: Thicket, Serra do Matador, alt. 400 m, December 30, 1958, Reitz 6119 (HBR, US).

SOLANUM (Torvaria) BRUSQUENSE, sp. nov.

S. palinacantho Dunal proximum sed calycis glandulis sessilibus, corolla alba, bacca valde minore differt.

PLANTA herbacea vel fruticosa, 1-2 m alta; caulibus spinis rectis brevibus latis glabris armatis; FOLIIS solitariis vel binis, 4-7 cm petiolatis, late ovatis, basi subcordatis, 18 cm longis, 7-lobatis, lobis late triangularibus, brevibus, acutis, in petiolo et nervis majoribus spinosis, utrinque dense minuteque pallido-stellatis, parum bicoloratis; INFLORESCENTIIS extra-axillaribus, simplicibus vel ramosis, multifloris; pedunculo per anthesin 15-20 mm longo, fructifero 45 mm; PEDICELLIS secundis, gracilibus, per anthesin 10 mm longis, fructiferis 20 mm longis, spinosis; CALYCE 11 mm alto, spinis et glandulis minutis sessilibus vestito, profunde diviso, lobis anguste triangularibus; COROLLA calycem paulo superante, alba, profunde divisa; ANTHERIS graciliter conicis; BACCA subglobosa, 12 mm diametro, alba, viride reticulata. Pl. VI, fig. 1: Branch section x 1/2; fig. 2: Trichome x 25; fig. 3: Calyx x 1; fig. 4: Stamen x 2; fig. 5: Fruit x 1/2.

BRAZIL: Santa Catarina: Brusque: Edge of woods, Mato de Malucher, alt. 40-50 m, February 23, 1952, L. B. Smith 5762 (US, type).

Itajaí: Woods, Morro da Fazenda, alt. 300 m, February 10, 1955, Klein 1163 (HBR).

Turvo - Araranguá: Abandoned clearing, alt. 30 m, November 24, 1943, Reitz C-227 (HBR).

CYPHOMANDRA MACROPHYLLA, sp. nov.

C. corymbiflora Sendtn. proxima sed foliis duplo majoribus apice haud rotundatis sed triangularibus, antherarum connectivo lateraliter extenso differt.

PLANTA herbacea, magna; axibus pilis patentibus dimorphis vestitis, pilis aliis simplicibus brevibus atro-glandulosis, aliis cellulis pluribus praeditis 3 mm longis eglandulosis; FOLIIS solitariis, ad 16 cm petiolatis, uniformibus, late ovatis, basi profunde cordatis, apice triangularibus et breviter acuminatis, 33 cm longis, 25 cm latis, membranaceis, subconcoloribus, utrinque pilis minutis pallidis sparse vestitis; INFLORESCENTIIS axillaribus, corymbosis, 9 cm diametro; pedunculo erecto, 5 cm longo; PEDICELLIS gracilibus, 10 mm longis, paulo supra basin articulatis; CALYCE 2 mm alto, profunde diviso, lobis anguste triangularibus, acutis; COROLLA rubro-purpurea, 10 mm diametro, profunde divisa, lobis lanceolatis, acutis; ANTHERIS oblongis, apice abrupte contractis, 3 mm longis, connectivo lateraliter extenso; STYLO graciliter cylindrico; BACCA fusiforme, dense pubescente. Pl. VII, fig. 1: Leaf x 1/2; fig. 2: Inflorescence x 1/2; fig. 3: Stem trichome x 25; fig. 4: Inflorescence trichomes x 25; fig. 5: Flower x 1; fig. 6: Stamens x 2.

BRAZIL: Santa Catarina: Lauro Müller - Urussanga: Araucaria forest, Pinhal da Companhia, alt. 300 m, August 23, 1958, Reitz & Klein 7044 (US, type; HBR). Lauro Müller: Novo Horizonte, alt. 400 m, October 24, 1958, Reitz & Klein 7517 (HBR, US).

CYPHOMANDRA MORTONIANA, sp. nov.

C. calycina Sendtn. proxima sed corolla pulcherrima calyce subduplo superante differt.

PLANTA fruticosa, 1-3 m alta, pilis brevibus uniformibus fere omnino vestita; ramis ultimis subherbaceis; FOLIIS solitariis vel binis, longo-petiolatis, uniformibus, late cordato-ovatis, abrupte acuminatis, 15-24 cm longis, 8-12 cm latis, integris, membranaceis, utrinque minute denseque pubescentibus, infra pallidioribus; INFLORESCENTIIS axillaribus, ramosis, corymbosis, multifloris; pedunculo plerumque erecto, 7-13 cm longo; PEDICELLIS 15-25 mm longis, prope basin articulatis; CALYCE 5-9 mm alto, corolla multo superato, dense glanduloso-pubescente, ad medium lobato, lobis late ovatis, apiculatis; COROLLA 30-50 mm diametro, fulgente purpurea, 2/3-3/4 lobata, lobis ellipticis, acutis; STAMINIBUS rectis, 7 mm longis, connectivo basi valde incrassato; OVARIO pallido-pubescente; stylo graciliter cylindrico. Pl. VIII, fig. 1: Branch section x 1/2; fig. 2: Trichome (large) x 25; fig. 3: Calyx x 1; fig. 4: Corolla x 1; fig. 5: Stamens x 2; fig. 6:

Pistil x 2.

CYPHOMANDRA PATRUM, sp. nov.

C. mortoniana Smith & Downs proxima sed axibus juvenilibus petiolisque e pilis multicellularibus patentibusque densissime vestitis differt.

PLANTA herbacea magna, pilis dimorfis fere omnino dense vestita, pilis aliis simplicibus brevibus glandularibusque, aliis multicellularibus ultra 2 mm longis eglandularibusque; FOLIIS solitariis, longe petiolatis, uniformibus, late cordato-ovatis, acuminatis, 11-17 cm longis, 6-11 cm latis, integris, membranaceis, infra paulo pallidioribus; INFLORESCENTIIS terminalibus, ramosis, corymbosis, subdense multifloris; pedunculo erecto, 10 cm longo; PEDICELLIS per anthesin 20 mm longis, fructiferis 30 mm, prope basin articulatis; CALYCE 9 mm alto, profunde lobato, lobis elliptico-oblongis, acutis; COROLLA 40 mm diametro, purpurea, 3/4 lobata, lobis subellipticis, acutis; STAMINIBUS rectis, 6 mm longis, connectivo basi incrassato; STYLO graciliter cylindrico.

Pl. IX, fig. 1: Section of stem x 2.

BRAZIL: Santa Catarina: Bom Retiro: In campo, Campo dos Padres alt. 2000 m, December 15, 1948, Reitz 2364 (US, type: HBR).

CYPHOMANDRA KLEINII, sp. nov.

C. mortoniana Smith & Downs proxima sed axibus omnibus pilis dimorphis dense vestitis, calycis lobis angustis, corolla minore differt.

PLANTA herbacea magna, axibus omnibus e pilis dimorphis dense vestitis, pilis aliis simplicibus brevibus atro-glandulosis, aliis multicellularibus 5 mm longis eglandulosisque; FOLIIS solitariis vel binis, longe petiolatis, uniformibus, late cordato-ovatis, acuminatis, 21 cm longis, 13 cm latis, membranaceis, supra subglabris, subtus breviter pubescentibus glandulosisque; INFLORESCENTIIS terminalibus axillaribusque, laxe ramosis, multifloris; pedunculo plerumque erecto, 2-7 cm longo; PEDICELLIS florigeris 13 mm longis, gracilibus, fere ad basin articulatis; CALYCE 4-5 mm alto, profunde lobato, lobis anguste triangularibus vel sublinearibus, acutis; COROLLA 18-30 mm diametro, purpurea, ca. 3/4 lobata, lobis oblongo-ellipticis, acutis; STAMINIBUS rectis, 3.5-5 mm longis, connectivo basi incrassato; OVARIO pubescente; stylo graciliter cylindrico; BACCA ellipsoidea, dense pubescente.

Pl. IX, fig. 2: Leaf x 1/2; fig. 3: Inflorescence x 1/2; fig. 4: Young flower x 1; fig. 5: Adult flower x 1; fig. 6: Stamen x 2.

BRAZIL: Santa Catarina: Curitibanos: Thicket, Ponte Alta do Sul, alt. 900 m, April 19, 1962, Reitz & Klein 12576 (US, type: HBR).

Abelardo Luz: Ruderal, 13 km south of Abelardo Luz, alt. 500-600 m, February 19, 1957, Smith & Klein 11513 (HBR, R, US).

Caçador: Araucaria forest, 20 km northeast of Caçador, alt. 950-1100 m, December 22, 1956, Smith & Reitz 9044 (HBR, R, US).

Canoinhas: Araucaria forest, Rio dos Poços, alt. 750 m, October 26, 1962, Reitz & Klein 13593 (HBR, US).

Curitibanos: Border of woods, alt. 850 m, September 8, 1957,

Reitz & Klein 4903 (HBR, US). Araucaria forest, alt. 900 m, October 30, 1962, Reitz & Klein 13912 (HBR, US).

Lajes: Araucaria forest, Morro do Pinheiro Sêco, alt. 950 m, December 18, 1962, Reitz & Klein 14101 (HBR, US).

Lebon Regis: Woods road, Rio dos Patos, alt. 900 m, April 23, 1962, Reitz & Klein 12873 (HBR, US).

Papanduva: Araucaria forest, Picada, km 181 of the Estrada de Rodagem Federal, alt. 750 m, October 25, 1962, Reitz & Klein 13533 (HBR, US).

Santa Cecilia: Araucaria forest, alt. 1000 m, December 18, 1962, Reitz & Klein 14138 (HBR, US).

CYPHOMANDRA MARITIMA, sp. nov.

Ab omnibus speciebus brasiliensibus foliis basi subcordatis subtus stellato-pubescentibus, inflorescentiis simplicibus differt.

PLANTA fruticosa, humilis, partibus juvenilibus stellato-pubescentibus; cortice cinereo, rugoso; FOLIIS solitariis, 15 mm petiolatis, plerumque simplicibus sed raro basi foliolo unico valde reducto praeditis, ovatis vel ellipticis, late subacutis, basi plus minusve cordatis, nonnunquam parum obliquis, 6.5 cm longis, 4 cm latis, valde bicoloratis, praecipue subtus stellato-pubescentibus; INFLORESCENTIIS axillaribus, simplicibus, submultifloris; pedunculo 15-20 mm longo, gracili, fructifero decurvato; PEDICELLIS 12 mm longis, gracilibus; CALYCE 3 mm alto, ca. 2/3 lobato, lobis ovatis; COROLLA et STAMINIBUS ignotis; BACCA late ovoidea, 15 mm longa, minute stellato-pubescente. Pl. IX, fig 7: Branch section x 1/2.

BRAZIL: Santa Catarina: Pôrto Belo: Strand, Bombas, alt. 1-5 m, March 31, 1957, Smith, Reitz & Klein 12322 (US, type; HBR, R).

Note: Without stamens it can not be certain that the above species is a Cyphomandra and not a Solanum. However, a decision must be made for floristic use and we feel that the probabilities favor the present position.

CYPHOMANDRA PINETORUM, sp. nov.

C. divaricata (Mart.) Sendtn. proxima sed foliis fere uniformibus basi plus minusve cordatis, pedunculo multo brevior, inflorescentia pauciflora, corolla minore, lobis lanceolatis differt.

PLANTA herbacea vel suffruticosa, partibus juvenilibus pilis dimorphis vestitis, pilis aliis longis, acutis, multicellularibus, aliis brevibus glandulosisque; cortice cinereo, parum rugoso; FOLIIS solitariis vel binis inaequalibusque, 25 mm petiolatis, subuniformibus, anguste ovatis, acuminatis, basi rotundatis vel paulo cordatis, 7 cm longis, 2.5 (-4) cm latis, utrinque pubescentibus praecipue infra; INFLORESCENTIIS axillaribus, simplicibus, paucifloris; pedunculo mox decurvato, 15 mm longo; PEDICELLIS gracillimis, 15 mm longis, paulo supra basin articulatis; CALYCE 3-4 mm alto, ca. 3/4 lobato, lobis anguste triangularibus; COROLLA 10-15 mm alta, profunde divisa, lobis lanceolatis; STAMINIBUS rectis, connectivo ad basin versus gradatim incrassato;

OVARIO ovoideo, glabro; stylo graciliter cylindrico; BACCA ignota. Pl. IX, fig. 8: Branch section x 1/2; fig. 9: Flower x 1; fig. 10: Stamens x 2.

BRAZIL: Santa Catarina: Campo Alegre: Campo and araucaria forest, 4 km south of Campo Alegre on the road to Jaraguá do Sul, alt. 900-1000 m, November 6, 1956, Smith & Klein 7339 (US, type; HBR).

Rio do Sul: Araucaria forest, Alto Matador, alt. 800 m, January 26, 1959, Reitz & Klein 8317 (HBR, US).

São José: Woods road, Serra da Boa Vista, alt. 900 m, January 25, 1961, Reitz & Klein 10743 (HBR, US).

CYPHOMANDRA REITZII, sp. nov.

C. diploconos (Mart.) Sendtn. proxima sed ovario baccaque dense pubescentibus differt.

PLANTA suffruticosa, ramosa, partibus juvenilibus pilis dimorphis vestitis, pilis aliis acutis, aliis atro-glandulosis; FOLIIS solitariis, 10-15 mm petiolatis, simplicibus, ellipticis vel late ovatis, acuminatis, basi late rotundatis et paulo cordatis, 5-9 cm longis, 25-40 mm latis, tenue coriaceis, parum bicoloratis, minute pubescentibus praecipue infra in nervis; INFLORESCENTIIS axillaribus vel subaxillaribus, simplicibus, 10-20-floris; pedunculo decurvato, 2 cm longo; PEDICELLIS 15 mm longis; CALYCE 3 mm alto, ca. 2/3 diviso, lobis ovatis, obtusis; COROLLA (juvenile) 8 mm alta; STAMINIBUS rectis; connectivo basi incrassato; OVARIO dense pubescente; stylo late obconico; BACCA ellipsoidea, acuta, juvenile 20 mm longa, dense pubescente. Pl. X, fig. 1: Branch section x 1/2; fig. 2: Flower x 1; fig. 3: Stamens x 2; fig. 4: Pistil x 2.

BRAZIL: Santa Catarina: Abelardo Luz: Ruderal, 17 km north of Abelardo Luz, alt. 500-600 m, December 25, 1956, Smith & Reitz 9216 (US, type; HBR, R).

CYPHOMANDRA HISPIDA, sp. nov.

C. oxyphylla Dunal proxima sed foliis basi plus minusve cordatis, floribus valde minoribus differt.

PLANTA fruticosa, partibus juvenilibus pilis patentibus dimorphis dense vestitis, pilis aliis longis multicellularibus acutisque, aliis brevibus glandulosisque; ramis ultimis subherbaceis; FOLIIS 20 mm petiolatis, solitariis vel binis alio angusto alio lato, acuminatis, basi plus minusve cordatis vel raro lobatis, 3-9 cm longis, 2-4 cm latis, submembranaceis, plus minusve bicoloratis, utrinque pubescentibus sed praecipue in nervis; INFLORESCENTIIS axillaribus, simplicibus, plerumque 1-3-floris; pedunculo gracillimo, 15 mm longo, mox decurvato; PEDICELLIS 6-12 mm longis CALYCE 2-3 mm alto, ca. 2/3 lobato, lobis ovatis, acutis; COROLLA purpurea, 16 mm diametro, profunde diviso, lobis rectis, lanceolatis, acutis; STAMINIBUS rectis, connectivo basi incrassato; OVARIO pubescente; stylo graciliter cylindrico. Pl. X, fig. 5: Branch section x 1/2; fig. 6: Young flower x 1; fig. 7: Stamens x 2.

BRAZIL: Santa Catarina: Vidal Ramos: Forest, Sabiá, alt. 750

m, December 31, 1957, Reitz & Klein 5982 (US, type; HBR).

Bom Retiro: Thicket, Riosinho, alt. 1100 m, December 15, 1948, Reitz 2363 (HBR, US). Forest, Figueiredo, alt. 1000 m, December 28, 1948, Reitz 2870 (HBR, US).

Pôrto União: Araucaria forest, Carazinho, alt. 1100 m, January 7, 1962, Reitz & Klein 11710 (HBR, US).

CYPHOMANDRA ANGUSTIFOLIA, sp. nov.

C. hispida Smith & Downs proxima sed pilis multicellularibus raris, foliis angustioribus differt.

PLANTA suffruticosa, ramosissima, partibus juvenilibus pilis dimorphis vestitis, pilis aliis raris multicellularibus acutisque, aliis densis atro-glandulosisque; FOLIIS 8-22 mm petiolatis, solitariis vel binis cum majoribus angustis, simplicibus, anguste ovatis, acuminatis, basi subcordatis, 4-7 cm longis, 15-20 mm latis, membranaceis, plus minusve bicoloratis, minute pallido-pubescentibus praecipue infra; INFLORESCENTIIS axillaribus vel paulo altioribus, simplicibus, 4-8-floris; pedunculo 10-20 mm longo; PEDICELLIS gracillimis, 10-15 mm longis; CALYCE 2-3 mm alto, ca. 2/3 diviso, lobis ovatis, subacutis; COROLLA purpurea, 20 mm diametro, profunde diviso, lobis anguste lanceolatis, acutis; STAMINIBUS rectis, connectivo basi incrassato; OVARIO dense pubescente. Pl. X, fig. 8: Branch section x 1/2; fig. 9: Calyx x 1; fig. 10: Stamens x 2.

BRAZIL: Santa Catarina: Pôrto União: Ruderal near Pôrto União on the road to Santa Rosa, alt. 750-800 m, December 18, 1956, Smith & Reitz 8736 (US, type; HBR, R).

Papanduva: Araucaria forest, km 136 on the Estrada de Rodagem Federal north of Papanduva, alt. 800 m, December 7, 1956, Smith & Klein 8416 (HBR, US).

Santa Cecilia: Forest, Campo do Arêão, alt. 1100 m, January 3, 1962, Reitz & Klein 11391 (HBR, US).

NICOTIANA AZAMBUJAE, sp. nov.

N. bonariense Lehmann proxima sed floribus minoribus, calycis lobis quam tubo subduplo majoribus, calyce tubo corollae subaequante, corolla rubro-purpurea differt.

PLANTA herbacea, plus minusve viscida; ramis elongatis, subrectis, gracilibus; FOLIIS basalibus ignotis, caulinis sessilibus, oblanceolatis, late acutis, aliquid auriculatis, haud decurrentibus, ad 18 cm longis et 6 cm latis; INFLORESCENTIIS racemiformibus, laxis, ad 36 cm longis; PEDICELLIS gracillimis, per anthesin ad 4 mm longis et fructiferis 6 mm; CALYCE anguste campanulato, 7 mm alto, profunde lobato, lobis linearibus, attenuatis, quam tubo subduplo majoribus; COROLLA rubro-purpurea, tubo anguste obconico, 9 mm longo, apice inflato, limbo 10 mm lato, lobis late ovatis, rotundatis; staminibus inaequalibus, inclusis. Pl. XI, fig. 1: Leaf x 1; fig. 2: Flower x 1; fig. 3: Stamen x 2; fig. 4: Fruit x 1.

BRAZIL: Santa Catarina: Brusque: In thicket, Azambuja, alt. 50 m, November 1, 1948, Reitz 2245 (US, type; HBR).

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PETUNIA REITZII, sp. nov.

P. inflata R. E. Fries proxima sed foliis angustis, corollae tubo majore amplioreque differt.

PLANTA herbacea, ramosa, patente, viscido-pilosa; caulibus prostratis vel adscendentibus, flexuosis vel geniculatis; FOLIIS sessilibus, patentibus, anguste lanceolatis, basi apiceque attenuatis, 25-40 mm longis, 7 mm latis, membranaceis; PEDICELLIS ad 28 mm longis, fructiferis patentibus, haud reflexis; CALYCE viscido-piloso, tubo 2 mm alto, lobis inaequalibus, angustissime linearibus, 15 mm longis, ca. 0.7 mm latis; COROLLA rubro-purpurea, 45 mm longa, tubo anguste infundibuliforme, lobis deltoideis, rotundatis; STAMINIBUS profunde inclusis; CAPSULA anguste ellipsoidea, acuta, 7 mm longa. Pl. XI, fig. 5: Leaf x 1/2; fig. 6: Flower x 1.

BRAZIL: Santa Catarina: Bom Retiro: In campo, Riosinho, alt. 1000 m, December 24, 1948, Reitz 2760 (US, type; HBR).

PETUNIA SAXICOLA, sp. nov.

P. occidentale R. E. Fries proxima sed caulibus foliisque subglabris, corolla subduplo majore, tubo angustiore differt.

PLANTA herbacea; caulibus erectis vel decumbentibus cum ramis erectis, sparse minuteque pubescentibus; FOLIIS 1 cm petiolatis, ellipticis, basi parum attenuatis, apice subacutis, 35 mm longis, 17 mm latis, submembranaceis, subglabris; PEDICELLIS flexuosis, 5 cm longis, post anthesin haud decurvatis; CALYCE 15 mm alto, fere ad basin diviso, lobis linearibus, apice rotundatis et paulo dilatatis; COROLLA rubra, tubo anguste obconico, 45 mm alto, 12 mm diametro, lobis late rotundatis, 10 mm longis; STAMINIBUS breviter inclusis; STIGMATE semiglobosa; CAPSULA ignota. Pl. XI, fig. 7: Flower x 1; fig. 8: Stigma x 2.

BRAZIL: Santa Catarina: Lajes: On rock, Alto da Serra, Encruzilhada, alt. 900 m, October 30, 1962, Reitz & Klein 13931 (US, type; HBR).

PETUNIA SCHEIDEANA, sp. nov.

P. inflata R. E. Fries proxima sed caulibus foliisque subglabris, corollae tubo majore amplioreque differt.

PLANTA herbacea; caulibus pluris e radice centrali divergentibus, erectis vel repentibus, simplicibus vel ramosis, gracillimis, ad 7 dm longis, basi sparse pallido-pubescentibus, dein glabris; FOLIIS 1 cm petiolatis, ovatis vel lanceolatis, basi apiceque attenuatis, 45 mm longis, 20 mm latis, membranaceis, marginibus petiolisque ciliatis exceptis glabris; PEDICELLIS 11 cm longis, post anthesin haud reflexis; CALYCE 10-17 mm alto, fere ad basin diviso, lobis linearibus, apice rotundatis et paulo dilatatis; COROLLA rubro-purpurea, intus stella centrali alba praedita, tubo late obconico, 20 mm alto et subaequaliter lato, lobis obovatis, late rotundatis, 25 mm longis; STAMINIBUS 18 mm longis; STIGMATE breviter bifurcata, apice rotundata; CAPSULA ignota. Pl. XI, fig. 9: Leaf x 1/2; fig. 10: Flower x 1.

BRAZIL: Santa Catarina: Campo Alegre: Border of woods, upper farm of Ernesto Scheide, alt. 900-1100 m, November 9, 1956, Smith

& Klein 7522 (US, type; HBR, R).

PETUNIA SERRULATA, sp. nov.

P. paranense Dusén et *P. rupestre* Dusén proxima sed foliis calycis lobisque serrulatis differt.

PLANTA suffruticosa, humilis, ramosa; ramis erectis repentibusque, apice dense foliosis; FOLIIS linearibus, basi apiceque attenuatis, 22 mm longis, 2 mm latis, crassis, glabris, margine incurvatis et dentibus minutis triangularibus albido-setosis laxe armatis; PEDICELLIS gracillimis, 10-20 mm longis, glabris; CALYCE plusquam medio diviso, sulcato, minute sparseque pubescente vel glabro, tubo anguste obconico, 4 mm alto, lobis linearibus, attenuatis, paulo inaequalibus, per anthesin ad 10 mm longis, serrulatis; COROLLA rubra vel rubro-purpurea, extus minute pubescente, tubo basi anguste cylindrico et 8 mm longo, apice anguste campanulato et 12 mm longo, lobis subtruncatis apiculatis que, 8 mm longis; STAMINIBUS profunde inclusis; STIGMATE globosa. Pl. XI, fig. 11: Branch section x 1/2; fig. 12: Leaf x 2; fig. 13: Flower x 1; fig. 14: Fruit x 2.

BRAZIL: Santa Catarina: São Joaquim: Mountain crest, Bom Jardim, alt. 1400 m, October 23, 1958, *Reitz & Klein 7446* (US, type; HBR).

PETUNIA SPATHULATA, sp. nov.

P. selloviana Sendtn. proxima sed foliis rectis spathulatis latioribus apice late rotundatis differt.

PLANTA suffruticosa, ramosa, prostrata, pilis brevibus rigidis glandulosis vestita; FOLIIS subdensis, rectis, dimorphis cum parvis in axillis magnarum fasciculatis, spathulatis, apice late rotundatis, basi longe attenuatis, majoribus 19 mm longis et 5 mm latis, tenuibus, ex sicco atris et supra anguste canaliculatis, alibi planis; PEDICELLIS per anthesin 8 mm longis, fructiferis patentibus vel reflexis et valde amplificatis; CALYCE obconico, tubo 3-3.5 mm alto, lobis inaequalibus, anguste triangularibus, obtusis, 4-6 mm longis; COROLLA anguste infundibuliforme, rubro-purpurea, 16-20 mm longa, lobis late rotundatis; STAMINIBUS 3 mm ad corollae tubum adnatis; STIGMATE disciforme-capitata. Pl. XII, fig. 1: Leaf x 1/2; fig. 2: Flower x 1.

BRAZIL: Santa Catarina: Pôrto União: Waste ground, by the road to Matos Costa, 35 km south of Pôrto União, alt. 1200 m, December 20, 1956, *Smith & Reitz 8907* (US, type; HBR).

PETUNIA ALPICOLA, sp. nov.

P. linooides Sendtn. proxima sed foliis dimorphis densis elongatis differt.

PLANTA herbacea vel suffruticosa, humilis, ramosa, subglabra vel pilis brevibus rigidis glandulosis dense vestita; caulibus erectis; FOLIIS dimorphis, fasciculatis, densis, patentibus, breviter petiolatis, anguste oblanceolatis, obtusis, basi attenuatis, majoribus 30 mm longis et 4 mm latis, planis; PEDICELLIS 8-11 mm longis, fructiferis patentibus vel reflexis; CALYCEIS tubo obconico, 3-4 mm alto, lobis inaequalibus, anguste triangularibus

obtusis, 5-8 mm longis; COROLLA infundibuliforme, 18-20 mm longa, rubro-purpurea, lobis late rotundatis; STAMINIBUS 3 mm ad corollae tubum adnatis; STIGMATE parva, disciforme. Pl. XII, fig. 3: Leaf x 1/2; fig. 4: Flower x 1.

BRAZIL: Santa Catarina: Bom Retiro: In campo, Campo dos Padres, alt. 1800 m, November 20, 1948, Reitz 2627 (US, type; HBR).

PETUNIA KLEINII, sp. nov.

P. linoides Sendtn. proxima sed foliis dimorphis subdensis elongatis, floribus minoribus differt.

PLANTA subherbacea, humilis, ramosa, pilis minutis glandularibus dense vestita; caulibus erectis; FOLIIS dimorphis, fasciculatis, subdensis, patentibus, anguste lanceolatis, apice rotundatis, basi attenuatis, breviter petiolatis, majoribus 25 mm longis et 5 mm latis, planis; PEDICELLIS gracillimis, 10 mm longis, fructiferis reflexis; CALYCIS tubo obconico, 3 mm alto, lobis inaequalibus, anguste triangularibus, obtusis, 4 mm longis; COROLLA infundibuliforme, 14 mm longa, rubro-purpurea, lobis late rotundatis; STAMINIBUS 2 mm ad corollae tubum adnatis; STIGMATE parva, disciforme. Pl. XII, fig. 5: Flower x 1; fig. 6: Style x 2.

BRAZIL: Santa Catarina: Mafra: Border of gallery forest, Campo Novo, alt. 750 m, December 11, 1962, Klein 3822 (US, type; HBR).

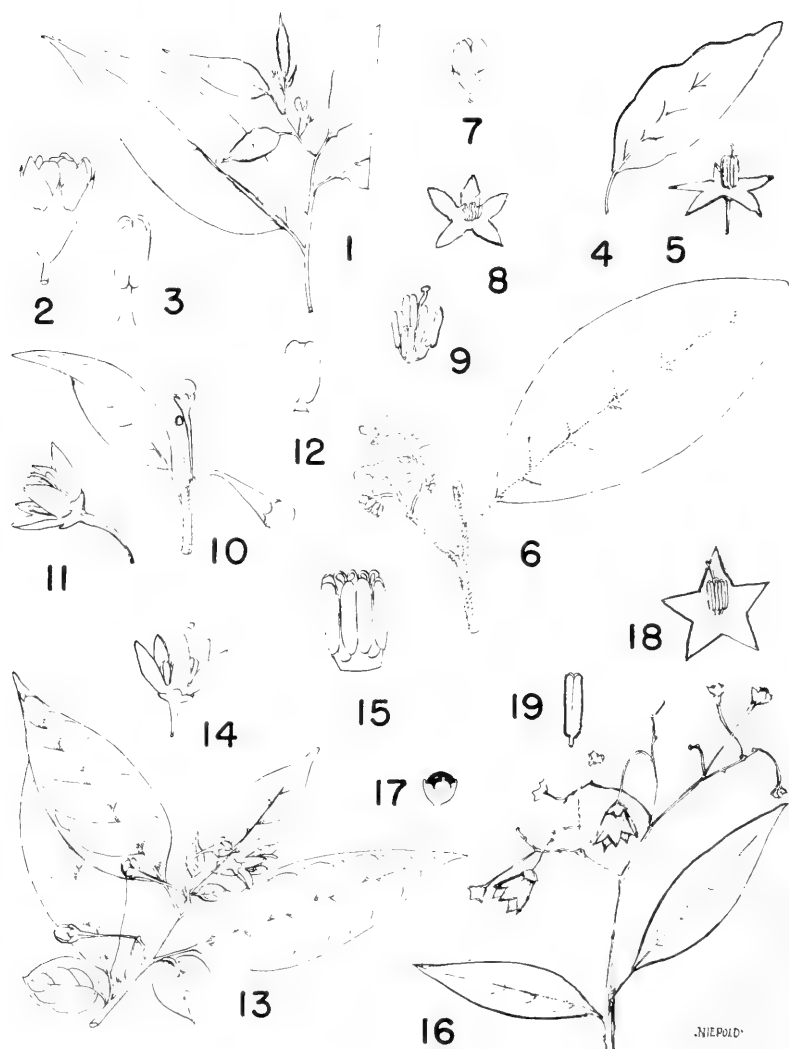
PETUNIA MACRODACTYLON, sp. nov.

P. variabilem R. E. Fries valde similans sed pilis brevibus, stigmatibus vix bifurcata differt.

PLANTA herbacea vel suffruticosa, humilis, ramosissima; caulibus flexuosis, pilis brevibus rigidis glandulosis vestitis; FOLIIS laxis, patentibus, subaequalibus, oblanceolatis vel spathulatis, apice rotundatis vel subacutis, basi attenuatis, 21 mm longis, 7 mm latis, planis; PEDICELLIS per anthesin 4 mm longis, dein reflexis et 10 mm longis; CALYCIS tubo late obconico, 2-3.5 mm alto, lobis inaequalibus, anguste triangularibus, obtusis, ad 7 mm longis, fructiferis amplificatis; COROLLA infundibuliforme, 18-20 mm longo, lobis brevibus, late rotundatis; STAMINIBUS profunde inclusis; STIGMATE disciforme, parva. Pl. XII, fig. 7: Leaf x 1/2; fig. 8: Flower x 1; fig. 9: Fruit x 1; fig. 10: Style x 2.

BRAZIL: Santa Catarina: Curitiba: In thicket, Ponte Alta do Sul, alt. 900 m, April 19, 1962, Reitz & Klein 12588 (US, type; HBR).

Plate I



.NIEPOLD.

Fig. 1-3: *Solanum delicatulum*; fig. 4, 5: *S. maioranthum*;
 fig. 6-9: *S. reitzii*; fig. 10-12: *S. dusenii*;
 fig. 13-15: *S. microrbitum*; fig. 16-19: *S. pabstii*.

Plate II

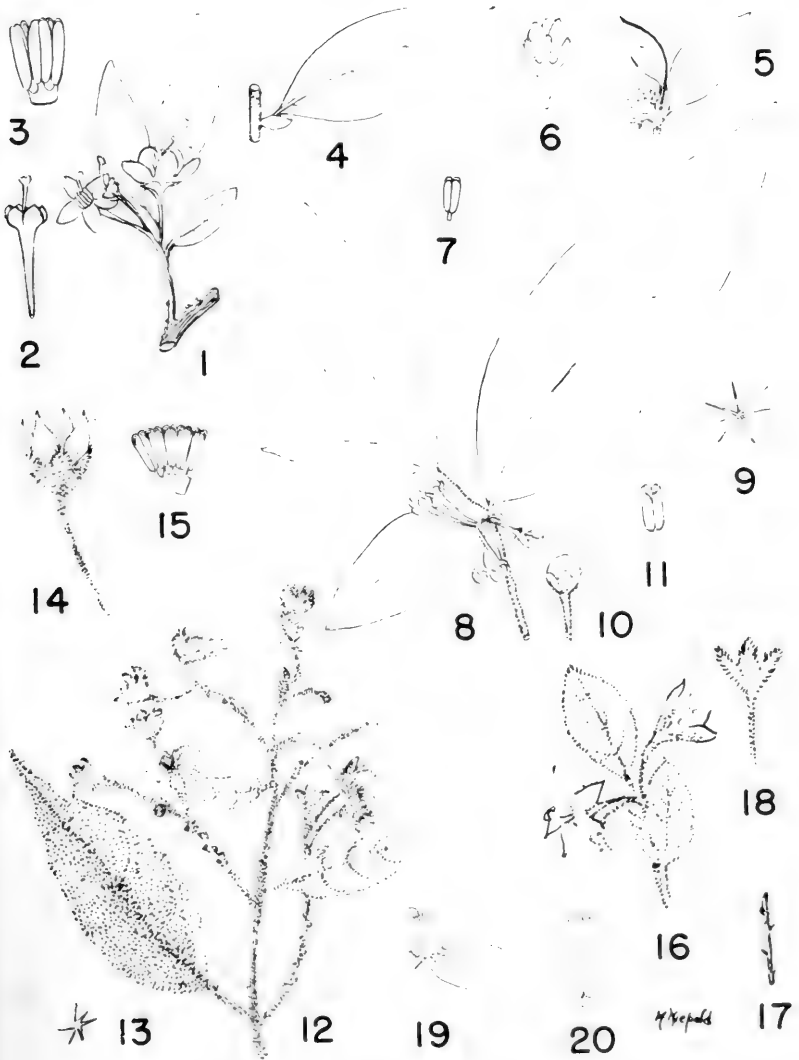


Fig. 1-3: *Solanum cataractae*; fig. 4-7: *S. pavimenti*;
 fig. 8-11: *S. schwackeanum*; fig. 12-15: *S. subsylvestris*;
 fig. 16-20: *S. kleinii*.

Plate III

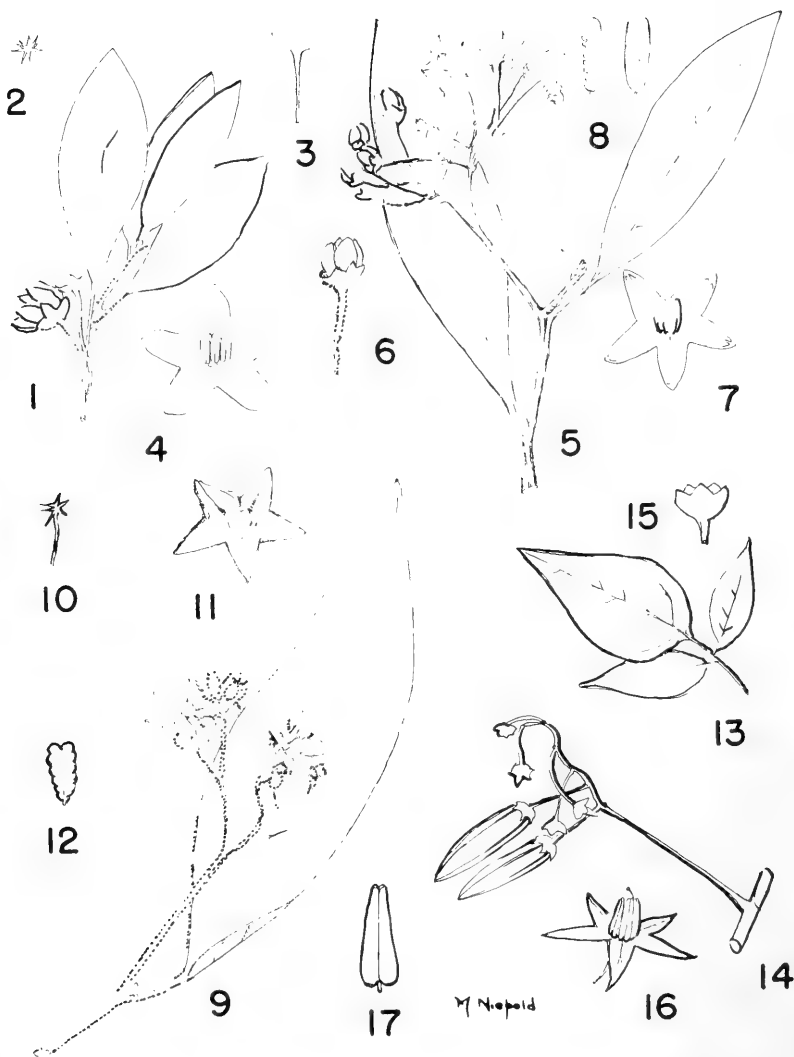


Fig. 1-4: *Solanum cassioides*; fig. 5-8: *S. compressum*; fig. 9-12: *S. xiphocephalum*; fig. 13-17: *S. fusiforme*.

Plate IV

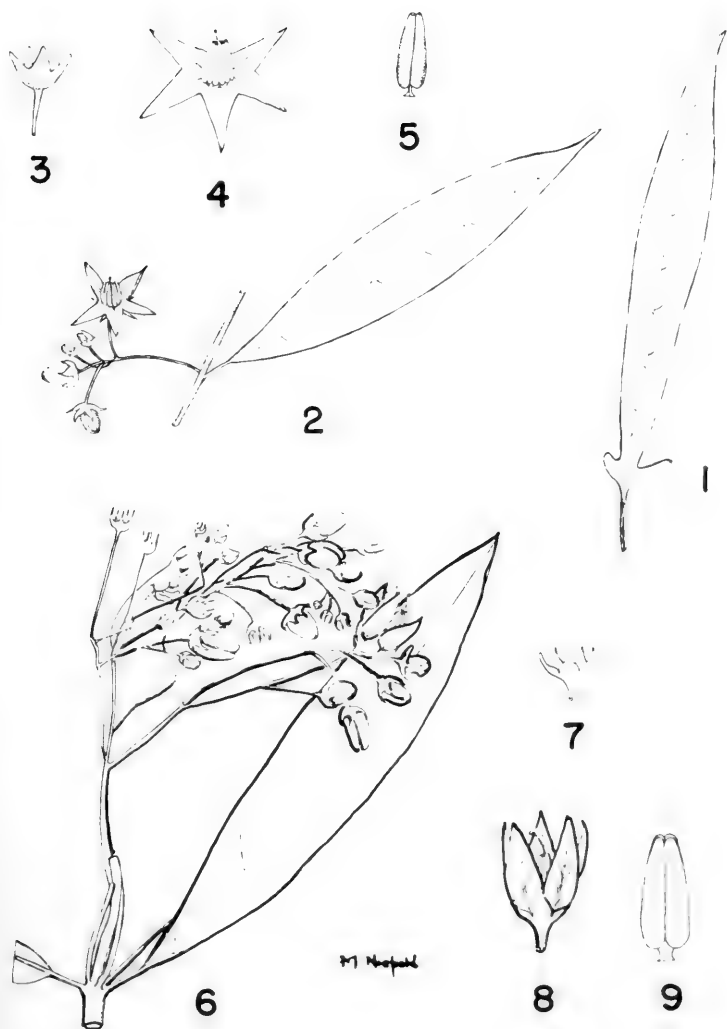


Fig. 1-5: *Solanum subastatum*; fig. 6-9: *S. matadori*.

Plate V

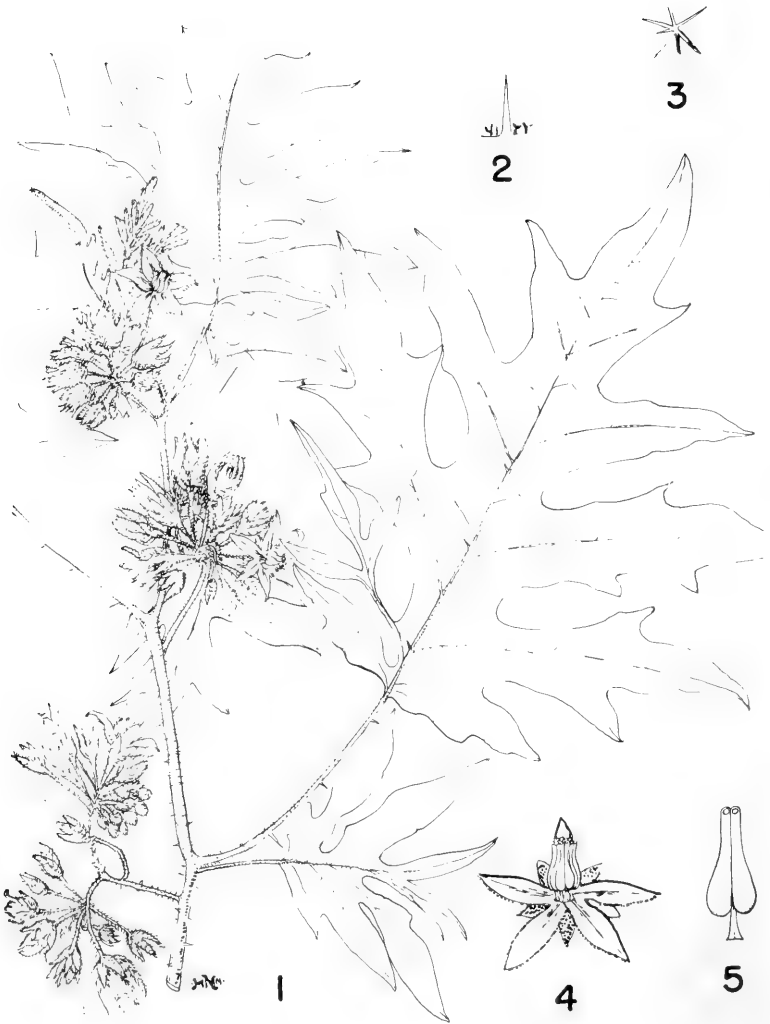


Fig. 1-5: Solanum bistellatum.

Plate VI

Fig. 1-5: *Solanum brusquense*.

Plate VII

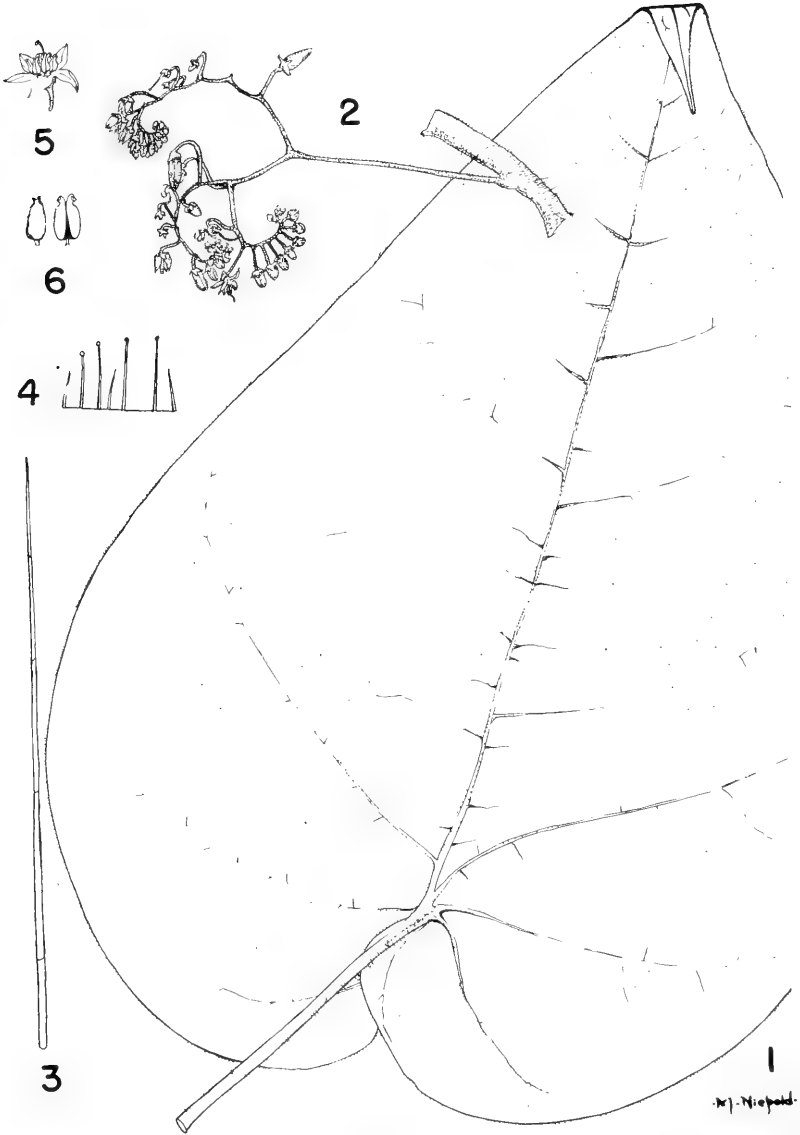


Fig. 1-6: *Cyphomandra macrophylla*.

Plate VIII

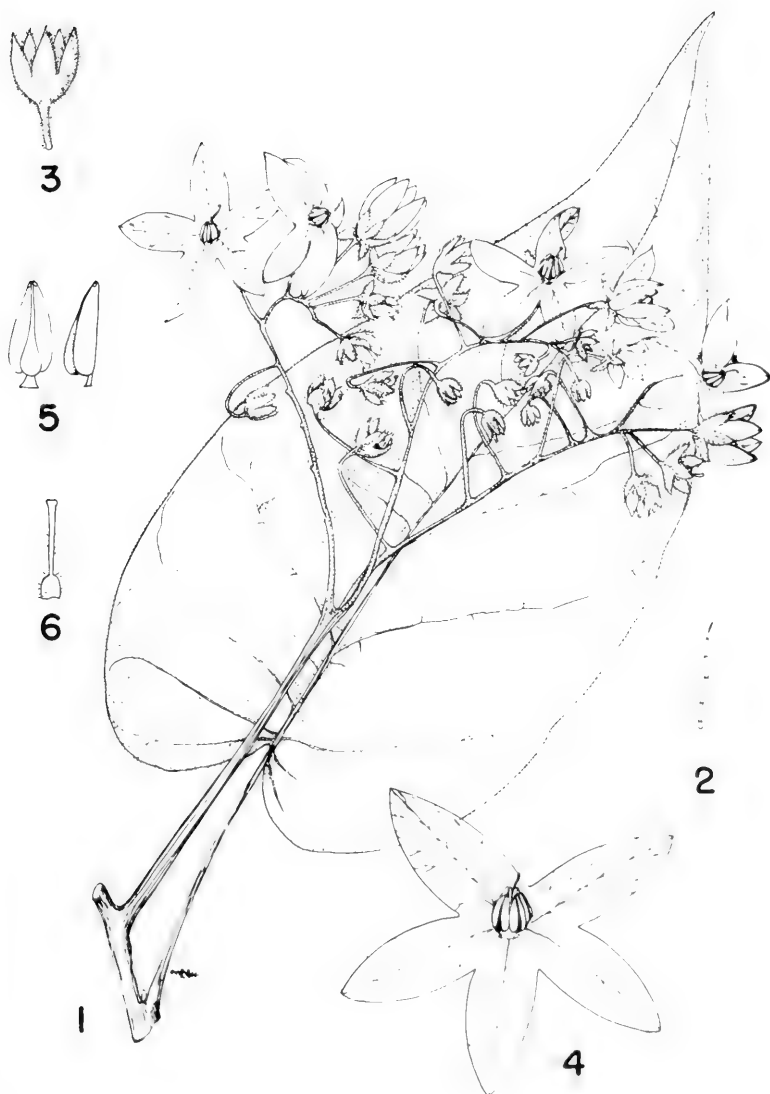
Fig. 1-6: *Cyphomandra mortoniana*.

Plate IX

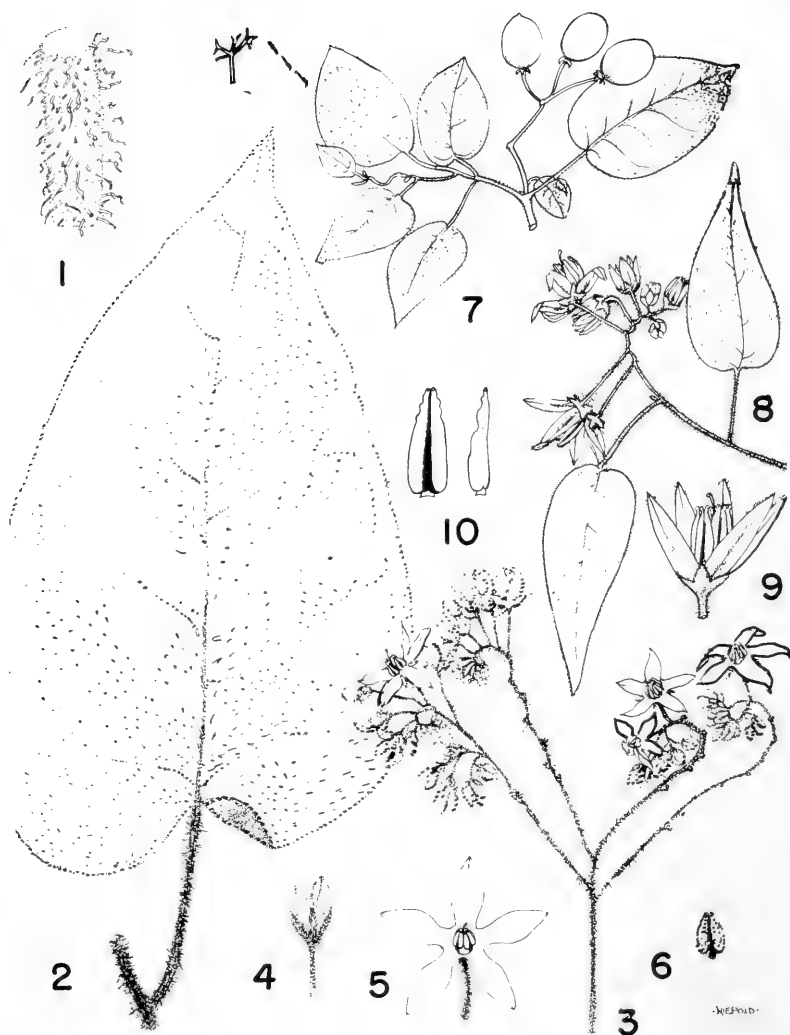


Fig. 1: *Cyphomandra patrum*; fig. 2-6: *C. kleinii*;
 fig. 7: *C. maritima*; fig. 8-10: *C. pinetorum*.

Plate X

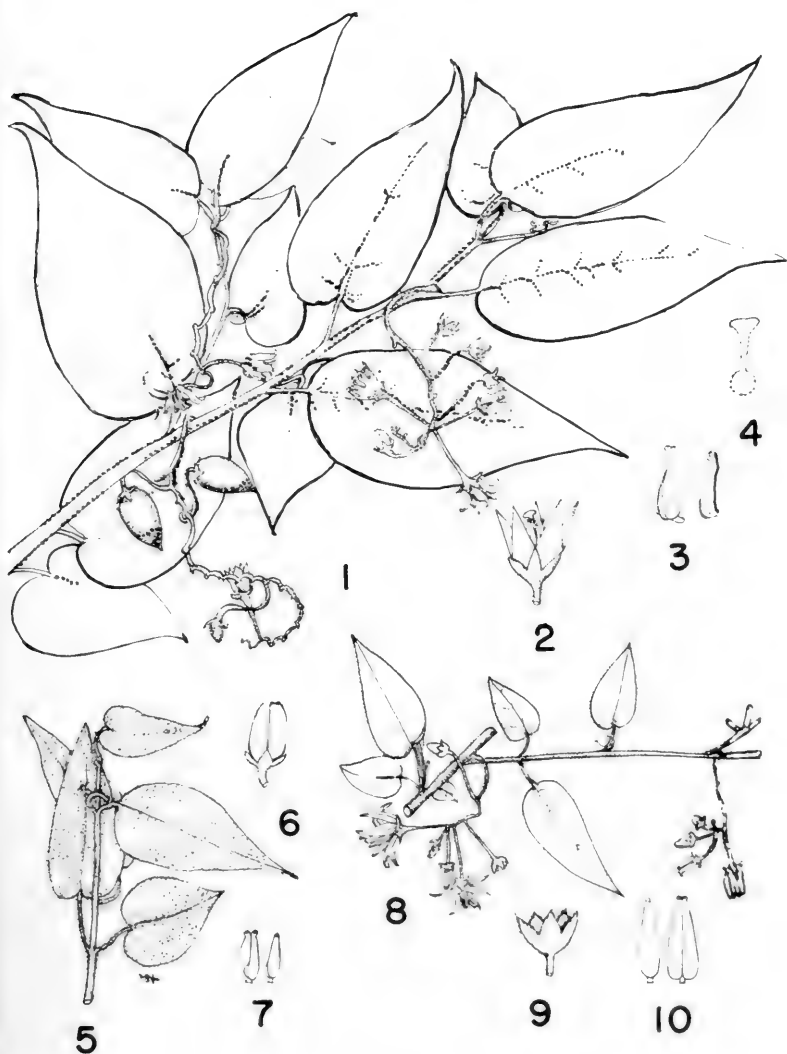


Fig. 1-4: *Cyphomandra reitzii*; fig. 5-7: *C. hispida*;
fig. 8-10: *C. angustifolia*.

Plate XI

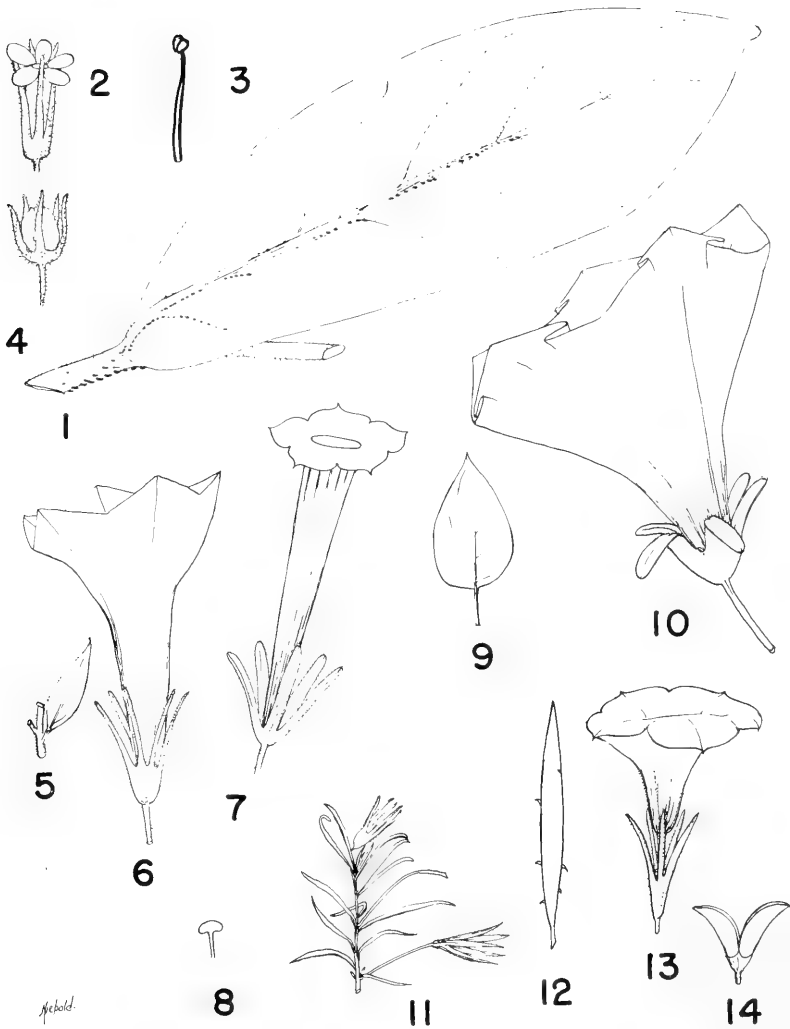


Fig. 1-4: *Nicotiana azambujae*; fig. 5, 6: *Petunia reitzii*;
 fig. 7, 8: *P. saxicola*; fig. 9, 10: *P. scheideana*;
 fig. 11-14: *P. serrulata*.

Plate XIII

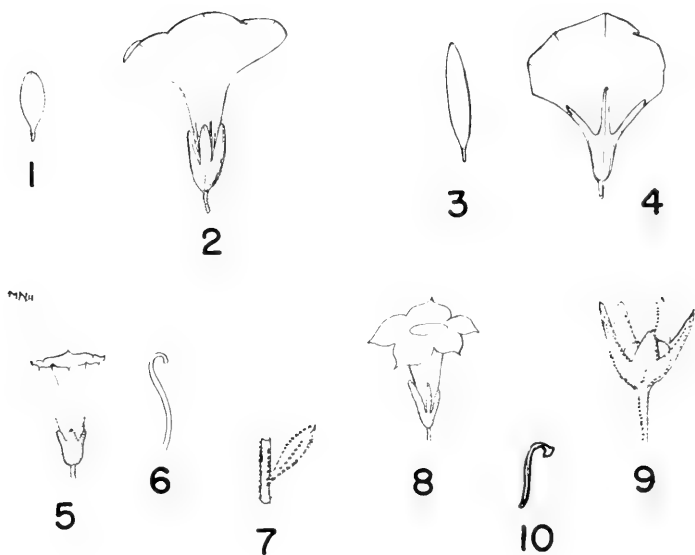


Fig. 1, 2: *Petunia spathulata*; fig. 3, 4: *P. alpicola*;
 fig. 5, 6: *P. kleinii*; fig. 7-10: *P. macrodactylon*.

NOTES ON BROMELIACEAE, XXII

Lyman B. Smith

PUYA

The present revision is the result of the use and consequent polishing of the rough manuscript key mentioned in "Notes on Bromeliaceae, XVI" in "Phytologia" 7: 426. 1961. Experience has shown that Puya is divisible into but two subgenera, of which Pitcairniopsis is the more primitive and includes most of the species, while Puya, the nomenclatorially typical subgenus, is a small specialized offshoot. Subgenus Chagualia, based on the character of appendaged petals, works well in Chile but breaks down in Bolivia and northern Argentina, and must be reduced to the synonymy of Pitcairniopsis.

The species of the subgenus Pitcairniopsis are arranged here on the idea that they have evolved from a lowland type with an open compound inflorescence, small bracts, narrow sepals, and scanty indument that give a minimum of protection to the flowers, to alpine types with compact simple inflorescences, large bracts, broad sepals, and dense woolly indument that give a maximum of protection. Puya floccosa of the first general type grows down to 600 meters elevation or less, while P. fosteriana of the second ascends to 4400 meters. The genus Espeletia in the Compositae is frequently associated with Puya in the high treeless páramos of the Andes and theories of its evolution make interesting comparison. See J. Cuatrecasas, "Distribution of the genus Espeletia" in "VIIIe Congrès International de Botanique 1954", section IV, p. 131.

A more effective key would result from making the primary divisions geographic, because with a few notable exceptions like Puya floccosa, P. raimondii, and a few Chilean species, all have very restricted ranges. However, to guard against publication of the same species more than once and to prove to my own satisfaction the validity of each species, the key has been made on traditional lines. Geographic locations have been added to the key so as not to lose the use of this helpful criterion entirely.

Some entries in the key are enclosed in parentheses to indicate that the combination of characters required for this position is to be expected, although not yet observed. For instance, a species with a depauperately compound inflorescence may be keyed out in the simple inflorescence part of the key but in parentheses.

1. Inflorescence and its branches fertile throughout or nearly so.....Subgenus PITCAIRNIOPSIS
2. Ultimate axes of the inflorescence more or less visible at anthesis; neither the inflorescence nor its branches strobilate.
3. Inflorescence compound.....Subkey I

- 3. Inflorescence simple.....Subkey II
- 2. Ultimate axes of the inflorescence completely covered; inflorescence or its branches strobilate (sometimes the flowers reflexed but the axis still covered).
- 4. Inflorescence obviously compound (at least by the lobed outline).....Subkey III
- 4. Inflorescence simple or pseudosimple with the short branches covered by the primary bracts.....Subkey IV
- 1. Inflorescence compound with branches sterile in large part toward apex.....Subgenus PUYA

Subgenus PITCAIRNIOPSIS

SUBKEY I

- 1. Branches of the inflorescence more than twice as long as the primary bracts, divergent to spreading; inflorescence usually broad.
- 2. Floral bracts coarsely pectinate-serrate.
- 3. Floral bracts shorter than the 20 mm long pedicels; sepals 40 mm long. Bolivia.....1. P. ultima
- 3. Floral bracts much exceeding the pedicels. Peru.
- 4. Pedicels 10 mm long; sepals 30 mm long....2. P. longisepala
- 4. Pedicels almost lacking; sepals 16-18 mm long. 3. P. roezlii
- 2. Floral bracts entire or obscurely and irregularly denticulate or serrulate.
- 5. Sepals sparsely lepidote or glabrous.
- 6. Pedicels curved-ascending or suberect, slender.
- 7. Sepals 8-14 mm long; inflorescence glabrous. Argentina.
- 8. Floral bracts shorter than the pedicels; sepals 8 mm long, obtuse.....4. P. micrantha
- 8. Floral bracts exceeding the pedicels; sepals 14 mm long, acute and mucronulate.....5. P. lilloi
- 7. Sepals 17-40 mm long.
- 9. Branches at least three times as long as the primary bracts.
- 10. Racemes lax throughout, the rhachis wholly visible.
- 11. Sepals alate-carinate throughout, even.
- 12. Pedicels densely ferruginous-lepidote; sepals 20 mm long. Argentina.....6. P. smithii
- 12. Pedicels sparsely white-lepidote; sepals 25 mm long. Bolivia.....7. P. alata
- 11. Sepals carinate or alate only at base, strongly sulcate when dry in most cases.
- 13. Pedicels soon glabrous.
- 14. Leaf-blades glabrous above; sepals 18-22 mm long.
- 15. Sepals acute. Argentina.....8. P. spathacea
- 15. Sepals rounded-mucronate. Chile.....9. P. violacea
- 14. Leaf-blades lepidote on both sides, though sometimes less so above. Bolivia.

16. Pedicels 15-18 mm long, about equaling the floral bracts.....10. P. hofstenii
16. Pedicels to 30 mm long, mostly twice as long as the floral bracts.....11. P. potosina
13. Pedicels persistently tomentose-lepidote.
17. Sepals alate at base, 20-32 mm long. Bolivia.
18. Leaf-blades densely lepidote on both sides when young; branches 20-30 cm long, many times exceeding the primary bracts.....12. P. rusbyi
18. Leaf-blades glabrous above; branches to 14 cm long, about three times as long as the primary bracts.
13. P. cristata
17. Sepals not more than carinate at base.
19. Leaf-blades tomentose beneath with coarse linear spreading scales; primary bracts only about half as long as the sterile bases of the branches; sepals 17 mm long. Bolivia.....14. P. laxa
19. Leaf-blades subspreading-lepidote to glabrous beneath but never tomentose.
20. Sepals rounded and apiculate; pedicels to 20 mm long. Peru?.....15. P. hortensis
20. Sepals acute.
21. Pedicels 15 mm long, mostly equaling or exceeding the floral bracts. Argentina....16. P. harmsii
21. Pedicels 5-10 mm long, much shorter than the floral bracts. Bolivia...17. P. sanctae-crucis
10. Racemes subdense; rhachis only partially exposed at anthesis.
22. Sepals 17 mm long, scarcely or not at all exceeding the floral bracts; pedicels glabrous. Bolivia.
18. P. fiebrigii
22. Sepals 28-40 mm long; pedicels tomentose-lepidote.
23. Floral bracts lanceolate, nearly flat.
Bolivia.....19. P. mezziana
23. Floral bracts ovate or elliptic, inflated.
24. Primary bracts much shorter than the long sterile bases of the branches; floral bracts much exceeded by the sepals. Bolivia.....20. P. secunda
24. Primary bracts far exceeding the short sterile bases of the branches; floral bracts nearly equaling to exceeding the sepals.
25. Floral bracts 20 mm long, exceeded by the sepals. Bolivia.....21. P. stenothyrsa
25. Floral bracts nearly 60 mm long, exceeding the sepals. Peru.....22. P. casmichensis
9. Branches little more than twice as long as the primary bracts. Bolivia.
26. Floral bracts lanceolate, acuminate.....23. P. glareosa
26. Floral bracts elliptic, ample, rounded and apiculate.
27. Pedicels to 25 mm long.....24. P. olivacea
27. Pedicels not over 10 mm long.....21. P. stenothyrsa
6. Pedicels straight and spreading, stout. Ecuador.

28. Floral bracts obtuse, about half as long as the pedicels; sepals 30 mm long.....25. P. obconica
28. Floral bracts acute or acuminate, exceeding the pedicels; sepals 20 mm long.....26. P. aequatorialis
5. Sepals densely and persistently lanate or tomentose-lepidote or stellate.
29. Pedicels over 15 mm long.
30. Pedicels stout; floral bracts drying dark.
31. Floral bracts about equaling the pedicels. Peru.
27. P. ramosa
31. Floral bracts much exceeding the pedicels. Bolivia.
28. P. riparia
30. Pedicels slender; floral bracts not drying dark.
32. Indument ferruginous-stellate. Ecuador, Peru, Bolivia.
(Immature specimens of Pitcairnia ferruginea might be sought here).
32. Indument white. Bolivia.
33. Primary bracts about 1/5 as long as the branches; sepals acute, 30 mm long.....29. P. alba
33. Primary bracts almost half as long as the branches; sepals obtuse and mucronulate, 35-40 mm long.
24. P. olivacea
29. Pedicels less than 15 mm long.
34. Sepals narrowly triangular or lanceolate, acute or acuminate with a narrow blunt apex.
35. Flowers distinctly pedicellate.
36. Pedicels 10-20 mm long.
37. Leaf-blades lepidote on both sides. Argentina.
16. P. harmsii
37. Leaf-blades soon glabrous above; flowers more or less secund. Bolivia.
38. Lateral branches over 30 cm long; floral bracts broadly elliptic.....30. P. pearcei
38. Lateral branches not over 9 cm long; floral bracts ovate.....31. P. penduliflora
36. Pedicels not over 5 mm long; flowers erect, not secund. British Guiana (Roraima), Venezuela, Colombia.
32. P. floccosa
35. Flowers subsessile. Colombia, Ecuador.
33. P. thomasiana
34. Sepals elliptic or oblong, broadly rounded or acute.
39. Flowers spreading-secund to nutant-secund.
40. Inflorescence ferruginous-stellate; primary bracts mostly shorter than the sterile bases of the branches Ecuador, Peru, Bolivia. (Immature specimens of Pitcairnia ferruginea might be sought here).
40. Inflorescence brown-tomentulose; primary bracts much exceeding the short sterile bases of the branches. Colombia.....34. P. bicolor
39. Flowers evenly polystichous or somewhat upwardly secund. (P. coerulea).
-

41. Sepals asymmetrically rounded; floral bracts reflexed.
Ecuador.....35. P. pichinchae
41. Sepals symmetrical; floral bracts spreading.
42. Floral bracts about equaling or shorter than the pedicels.
43. Branches 20-30 cm long, very lax throughout. Peru.
44. Floral bracts about half as long as the pedicels.
36. P. glaucovirens
44. Floral bracts about equaling the pedicels.
37. P. westii
43. Branches 15 cm long, dense except at base. Ecuador.
38. P. roseana
42. Floral bracts much exceeding the pedicels.
45. Sterile bases of the branches (or the second internode) exceeding the primary bracts; floral bracts broadly ovate, closely enfolding the base of the flower. Colombia.....39. P. lehmanniana
45. Sterile bases of the branches much shorter than the primary bracts.
46. Sepals coriaceous, the posterior ones carinate at base. Colombia.....40. P. furfuracea
46. Sepals thin, ecarinate.
47. Indument thin, not obscuring the outlines of the bracts and sepals; branches elongate, many times exceeding the primary bracts. Chile.
41. P. coerulea
47. Indument thick, lanate, obscuring the outlines of the bracts and sepals; branches little more than twice as long as the dark brown primary bracts.
Peru.....42. P. araneosa
1. Branches of the inflorescence not more than twice as long as the primary bracts; inflorescence narrow or capitate.
48. Sepals glabrous or with a fine appressed deciduous stellate or lepidote indument.
49. Leaf-blades 12-75 mm wide.
50. Branches subspreading to reflexed; inflorescence more or less open.
51. Sterile base as long as or longer than the fertile part of the lateral branch. Chile.....43. P. venusta
51. Sterile base much shorter than the fertile part of the lateral branch.
52. Inflorescence drying to dark castaneous, almost black; floral bracts very broadly elliptic, obtuse. Bolivia.
44. P. atra
52. Inflorescence pale; floral bracts ovate, acute, 12-25 mm long.
53. Floral bracts 12-16 mm long, exceeding the pedicels; inflorescence glabrous. Argentina.....5. P. lilloi
53. Floral bracts to 25 mm long, about equaling the sepals; inflorescence covered with fine white stellate trichomes. Peru.....45. P. tovariana
-

50. Branches erect or ascending; inflorescence compact.
54. Sepals 11-12 mm long.
55. Flowers secund; lateral branches subaborted; floral bracts much exceeded by the sepals. Venezuela.
46. P. phelpsiae
55. Flowers not secund; lateral branches well developed. Argentina.
56. Terminal branch of the inflorescence little larger than the many divergent laterals; floral bracts equaling the middle of the sepals at anthesis.
47. P. dyckioides
56. Terminal branch of the inflorescence much larger than the few strict laterals; floral bracts equaling the sepals at anthesis.....48. P. assurgens
54. Sepals 15-35 mm long.
57. Scape almost none; inflorescence capitate. Bolivia. (Immature specimens of Pitcairnia nana might be sought here).
57. Scape well developed; inflorescence elongate.
58. Scape-bracts and primary bracts thin, dark brown. disintegrating rapidly after anthesis; flowering plant 3-5 meters high.
59. Sepals lanceolate, broadly acute; flowering plant to 5 meters high. Colombia.....49. P. goudotiana
59. Sepals linear, rounded and apiculate; flowering plant to 3 meters high. Venezuela....50. P. aristeguietae
58. Scape-bracts and primary bracts firm, persistent; flowering plant somewhat over a meter high at most.
60. Pedicels 3 mm long; floral bracts pectinate-serrate; inflorescence cylindric, 2-3 cm in diameter. Peru.
51. P. medica
60. Pedicels 8-17 mm long.
61. Primary bracts much shorter than the branches and covering only a fraction of each one.
62. Lateral branches 14-15 cm long; floral bracts and sepals aristate. Bolivia.....23. P. glareosa
62. Lateral branches 4-10 cm long; floral bracts and sepals acuminate. Peru.....52. P. densiflora
61. Primary bracts large, covering most or all of each branch.
63. Sepals lance-ovate, acuminate, 35 mm long. Bolivia.
53. P. glabrescens
63. Sepals elliptic, obtuse, 15 mm long. Peru.
54. P. fulgens
49. Leaf-blades 2-10 mm wide, covered beneath with pale narrow spreading scales; lateral branches few-flowered. Bolivia.
64. Pedicels 4-7 mm long, longer or shorter than the floral bracts; leaf-blades 2-3.5 mm wide.....55. P. tuberosa
64. Pedicels 1 mm long, the floral bracts 15 mm long; leaf-blades 10 mm wide.....56. P. reducta
48. Sepals densely lanate or tomentose, the indument usually persistent.

65. Lateral branches of the inflorescence well developed, numerous.
66. Flowers nutant-secund.
67. Floral bracts broadly elliptic, apiculate, equaling or slightly exceeding the pedicels. Colombia. 34. P. bicolor
67. Floral bracts lanceolate, acuminate, exceeding the sepals Peru.....57. P. vargasiana
66. Flowers evenly polystichous.
68. Floral bracts thin.
69. Branches spreading; inflorescence open. Peru. 42. P. araneosa
69. Branches erect; inflorescence densely cylindrical. Colombia.....58. P. gigas
68. Floral bracts coriaceous or subcoriaceous.
70. Floral bracts about equaling the sepals, sublustrous. Ecuador.....59. P. parviflora
70. Floral bracts much exceeded by the sepals, dull.
71. Primary bracts serrate; floral bracts (especially the lower) reflexed. Ecuador.....60. P. sodiroana
71. Primary bracts entire except the obscurely serrulate apex; floral bracts straight. Bolivia..61. P. mollis
65. Lateral branches of the inflorescence basal, mere vestigial fascicles. Peru.....62. P. rauhii

SUBKEY II

1. Sepals glabrous or with a fine appressed deciduous stellate or lepidote indument.
2. Floral bracts strongly serrate.
3. Sepals nearly 60 mm long. Bolivia, Argentina. (Fruiting material of Pitcairnia mirabilis might be sought here).
3. Sepals 12-25 mm long.
4. Pedicels 10-15 mm long; flowers spreading to reflexed at anthesis; sepals 15-25 mm long. Peru.
5. Leaf-blades glabrous on both sides, 20-30 mm wide; sepals ovate, acute.....63. P. pyramidata
5. Leaf-blades covered on one side with white scales; sepals obtuse.
6. Leaf-blades lepidote beneath; sepals 25 mm long. 64. P. wurdackii
6. Leaf-blades lepidote above; sepals 15 mm long. 54. P. fulgens
4. Pedicels obscure; flowers subsessile, suberect; sepals 12 mm long. Ecuador.....65. P. eryngioides
2. Floral bracts entire or obscurely serrulate.
7. Sepals 16-40 mm long; leaf-blades 5-30 mm wide.
8. Leaf-blades entire, 5 mm wide. Peru.....66. P. mitis
8. Leaf-blades spinose-serrate, 10-30 mm wide.
9. Floral bracts lustrous, dark castaneous, coriaceous; leaf-blades densely lepidote above, glabrous beneath. Colombia.....67. P. killipii

9. Floral bracts dull, often thin; leaf-blades evenly lepidote or glabrous above.
10. Pedicels 5-10 mm long.
11. Sepals rounded, 40 mm long; floral bracts black and brittle when dry. Peru.....68. P. nigrescens
11. Sepals acute or acuminate.
12. Floral bracts thick, coriaceous, rugose when dry. Colombia.....69. P. grantii
12. Floral bracts membranaceous, finely and evenly nerved. Peru.....70. P. gracilis
10. Pedicels 12-20 mm long; sepals often rounded and mucronate or apiculate.
13. Inflorescence lax; floral bracts little if at all exceeding the pedicels. Chile.....9. P. violacea
13. Inflorescence subdense; floral bracts much exceeding the pedicels.
14. Floral bracts reflexed, 5 cm long, lanceolate; leaf-blades glabrous with age. Colombia.
71. P. sanctae-martae
14. Floral bracts erect to spreading, smaller or much broader.
15. Floral bracts thick, coriaceous; pedicels stout; inflorescence glabrous. Peru.
72. P. pitcairnioides
15. Floral bracts submembranaceous; pedicels rather slender. Bolivia.
16. Sepals 25 mm long; floral bracts uniform narrowly lanceolate.....73. P. kuntzeana
16. Sepals 30-40 mm long; lower floral bracts much larger and ampler than the others...19. P. meziana
7. Sepals 7-11 mm long.
17. Leaf-blades 16 mm wide, covered beneath with appressed cinereous scales. Venezuela.....(46. P. phelpsi)
17. Leaf-blades 2-6 mm wide. Bolivia.
18. Plant flowering 25-30 cm high; trichomes of the leaf-blade linear, spreading.....55. P. tuberosa
18. Plant flowering 9 cm high; trichomes of the leaf-blade broad, subspreading.....74. P. minima
1. Sepals densely lanate or tomentose, the indument mostly persistent after anthesis.
19. Upper floral bracts nearly equaling to exceeding the sepals.
20. Floral bracts narrowly triangular-ovate. Peru.
75. P. ferreyrae
20. Floral bracts elliptic or orbicular. Colombia.
21. Leaf-blades sparsely and obscurely lepidote, the spines spreading; floral bracts elliptic, acute, lustrous
76. P. nitida
21. Leaf-blades covered on both sides with appressed cinereous scales, the spines antrorse; floral bracts orbicular with a triangular blade.....77. P. barkleyana
19. Upper floral bracts much exceeded by the sepals.
22. Pedicels about equaling the floral bracts or longer. Peru.

23. Leaf-blades glabrous above; sepals narrowly lanceolate, 35 mm long.....78. P. macbridei
23. Leaf-blades covered on both sides with appressed scales; sepals oblong, 21 mm long.....79. P. argentea
22. Pedicels much shorter than the floral bracts.
24. Flowers erect or suberect at anthesis. Peru.
25. Pedicels slender, subcylindric, 20 mm long; leaf-blades soon glabrous above.....(62. P. rauhii)
25. Pedicels stout, obconic, 5-6 mm long; leaf-blades densely lepidote on both sides.
26. Sepals oblong, acute.....80. P. lopezii
26. Sepals linear-lanceolate.....81. P. sagasteguii
24. Flowers spreading to reflexed at anthesis.
27. Leaf-blades 37 mm wide; sepals narrowly ovate, 25-35 mm long. Peru.....82. P. reflexiflora
27. Leaf-blades 15 mm wide; sepals oblong, 20 mm long. Colombia.....83. P. grubbii

SUBKEY III

1. Sepals glabrous or with a fine appressed deciduous stellate or lepidote indument.
2. Lateral branches well developed; flowers not fasciculate.
3. Floral bracts much exceeded by the sepals.
4. Floral bracts dull, even, distinctly nerved.
5. Branches exceeding the primary bracts.
6. Floral bracts triangular-ovate, acuminate, not inflated; sepals 23 mm. long. Colombia.....40. P. furfuracea
6. Floral bracts ovate, acute, inflated; sepals 33 mm long. Bolivia.....21. P. stenothyrsa
5. Branches shorter than the broadly ovate densely laciniate primary bracts. Peru.....84. P. longistyla
4. Floral bracts lustrous, rugulose, nerveless. Peru. 85. P. ferox
3. Floral bracts nearly equaling to exceeding the sepals.
7. Sterile base as long as or longer than the fertile part of the lateral branch. Chile.....43. P. venusta
7. Sterile base much shorter than the fertile part of the lateral branch.
8. Floral bracts spinose-serrate. Peru.....86. P. grandidens
8. Floral bracts entire or sparsely and very minutely serrulate.
9. Floral bracts lustrous black; sepals 26 mm long. Bolivia.....44. P. atra
9. Floral bracts dull, paler.
10. Sepals ovate-elliptic, 17 mm long. Bolivia. 18. P. fiebrigii
10. Sepals narrowly lanceolate, 40 mm long. Peru. 22. P. casmichensis
2. Lateral branches very short with the flowers fasciculate, but the inflorescence interrupted at base and thus obviously compound.

11. Sepals 25 mm long; inflorescence dark purple. Peru.
87. P. depauperata
11. Sepals 11-12 mm long.
12. Leaf-blades glabrous on both sides; floral bracts spinose-serrate. Ecuador.....65. P. eryngioides
12. Leaf-blades lepidote at least beneath.
13. Floral bracts exceeded by the sepals. Venezuela.
46. P. helpsiae
13. Floral bracts exceeding the sepals. Bolivia.
88. P. paupera
1. Sepals densely lanate or tomentose, the indument mostly persistent after anthesis.
14. Floral bracts much exceeded by the sepals.
15. Lateral branches well developed; flowers not fasciculate.
16. Pedicels 12-15 mm long.
17. Indument ferruginous. Peru.....89. P. llatensis
17. Indument cinereous or whitish.
18. Floral bracts thin, violet. Chile.....41. P. coerulea
18. Floral bracts coriaceous. Bolivia.
19. Leaf-blades densely appressed-lepidote beneath; floral bracts broadly ovate, about 35 mm long..61. P. mollis
19. Leaf-blades soon wholly glabrous; floral bracts elliptic-oblong, to 55 mm long.....90. P. valida
16. Pedicels not over 7 mm long.
20. Sterile base of the raceme 20-40 mm long, nearly equaling to exceeding the primary bract.
21. Sepals emarginate and mucronulate; sterile base of raceme 30-40 mm long. Colombia....39. P. lehmanniana
21. Sepals obtuse; sterile base of raceme 20-25 mm long. Peru.....91. P. stipitata
20. Sterile base of raceme not over 12 mm long. Ecuador.
22. Racemes distinctly though briefly stipitate; sepals 40 mm long.....60. P. sodiroana
22. Racemes sessile; sepals 22-23 mm long.
23. Indument whitish; floral bracts heteromorphic; pedicels 5 mm long; sepals asymmetrically rounded and emarginate.....92. P. gummifera
23. Indument brown; floral bracts homomorphic; flowers sessile; sepals subsymmetric.....93. P. asplundii
15. Lateral branches short with the flowers fasciculate, few and basal; pedicels slender, 20 mm long. Peru.
62. P. rauhii
14. Floral bracts nearly equaling (P. lasiopoda) to exceeding the sepals.
24. Sepals 32-45 mm long, narrow; inflorescence lax at least toward base.
25. Racemes secund; sepals narrowly lanceolate or linear, 40-45 mm long.
26. Racemes stipitate. Peru, Bolivia.....94. P. lasiopoda
26. Racemes sessile. Peru.....95. P. commixta
25. Racemes not secund; sepals very narrowly triangular, 32 mm long. Peru.....96. P. oxyantha

24. Sepals 16-25 mm long.
27. Primary bracts conspicuously laciniate or pectinate-serrate; sepals elliptic, broadly acute or subobtusate.
28. Apices of the primary bracts narrowly triangular, distinct, the serration of slender spines. Bolivia.
97. P. ctenorhyncha
28. Apices of the primary bracts broadly triangular, merging with the bases, the serration of broad flat teeth.
- Peru.....98. P. fastuosa
27. Primary bracts entire or obscurely serrulate.
29. Primary bracts spreading to reflexed; racemes ellipsoid.
- Peru.....99. P. weberbaueri
29. Primary bracts suberect, racemes globose. Ecuador.
100. P. glomerifera

SUBKEY IV

1. Outer bracts (the primary bracts or in a simple inflorescence the floral bracts) conspicuously serrate.
2. Apical part of the outer bracts reflexed; bracts thin.
3. Inflorescence densely brown-lanate, compound; sepals 45 mm long; floral bracts light green, drying to stramineous.
- Bolivia.....101. P. fosteriana
3. Inflorescence sparsely white-lanate, simple; sepals 35 mm long; floral bracts rose. Argentina.....102. P. weberiana
2. Apical part of the outer bracts erect.
4. Flowers distinctly pedicellate.
5. Outer bracts lustrous. Peru.
6. Inflorescence compound; outer bracts strongly nerved.
103. P. laccata
6. Inflorescence simple; outer bracts obscurely nerved and rugose.....104. P. angulonis
5. Outer bracts dull or slightly lustrous.
7. Inflorescence compound at least toward base.
8. Sepals densely vestite, not contrasting with the pedicels
9. Leaf-blades covered on both sides with appressed whitish scales; sepals 30 mm long. Peru....105. P. cylindrica
9. Leaf-blades glabrous above; sepals 16-20 mm long.
10. Inflorescence ellipsoid, 30-50 cm long. Colombia.
106. P. santosii
10. Inflorescence slenderly cylindric, 10-20 cm long.
- Peru.....51. P. medica
8. Sepals soon glabrous and contrasting with the densely vestite slender pedicels. Bolivia...53. P. glabrescens
7. Inflorescence simple.
11. Flowering plant 40-80 cm. high. Colombia.
107. P. lineata
11. Flowering plant 15-30 cm high.
12. Floral bracts serrulate; sepals 20-30 mm long, oblong-lanceolate, acute. Argentina.....108. P. volcanensis
12. Floral bracts pectinate-serrate; sepals 17-20 mm long.
- Peru.

13. Sepals with an acicular apex, lance-oblong, carinate.
51. P. medica
13. Sepals obtuse, elliptic, ecarinate...109. P. pratensis
4. Flowers sessile or subsessile.
14. Sepals 18-30 mm long; inflorescence rufous-lanate.
Colombia.....110. P. vestita
14. Sepals 12 mm long; inflorescence glabrous except for the
furfuraceous axis. Ecuador.....65. P. eryngioides
1. Outer bracts entire or very obscurely serrulate.
15. Apical part of each outer bract reflexed.
16. Inflorescence compound; flowers fasciculate.
17. Sepals 17-20 mm long.
18. Outer bracts orbicular, apiculate, membranaceous, drying
pale brown. Peru.....111. P. membranacea
18. Outer bracts narrower, attenuate.
19. Inflorescence 7-8 cm in diameter; outer bracts 7 cm long
20. Pedicels 10 mm long; sepals narrowly triangular.
Ecuador.....112. P. compacta
20. Pedicels very short but distinct; sepals oblong-
elliptic, rounded and apiculate. Bolivia.
113. P. tristis
19. Inflorescence 3 cm in diameter; outer bracts 5 cm long.
Bolivia.....114. P. leptostachya
17. Sepals 24-30 mm long.
21. Indument dark brown; inflorescence clavate; pedicels
stout, obconic, 10 mm long. Colombia.
115. P. cuatrecasasii
21. Indument white or nearly so. Bolivia.
22. Bracts all membranaceous and subhyaline, soon shattered;
pedicels slenderly obconic; leaf-blades nearly
glabrous.....116. P. cardenasii
22. Bracts firmer, persistent; leaf-blades densely and
conspicuously appressed-lepidote beneath.
117. P. herzogii
16. Inflorescence simple.
23. Flowers and bracts reflexed; sepals narrowly spatulate,
obtuse, 40 mm long. Peru.....118. P. huancavelicae
23. Flowers erect to spreading; only the apices of the bracts
reflexed.
24. Floral bracts narrow, leaving much of the flower exposed
(mostly juvenile specimens keyed here).
25. Pedicels rather slender, 12-15 mm long; sepals 25 mm
long.
26. Flowers arcuate-spreading. Colombia.
71. P. sanctae-martae
26. Flowers erect or suberect. Bolivia....73. P. kuntzeana
25. Pedicels obconic, very short. Peru.....119. P. lanata
24. Floral bracts ample, ovate or elliptic.
27. Flowering plant 3-4 meters high; floral bracts 10-14 cm
long. Argentina.....120. P. yakespala
27. Flowering plant and floral bracts much smaller.
-

28. Leaf-blades entire along their apical 1/4; flowering plant 2-3 meters high. Colombia.....121. P. nivalis
28. Leaf-blades serrate throughout although sometimes more laxly so toward apex.
29. Floral bracts much shorter than the sepals. Peru.
122. P. lanuginosa
29. Floral bracts covering the sepals.
30. Sepals 14 mm long, acuminate. Bolivia.
123. P. tunarensis
30. Sepals 20-37 mm long, acuminate to broadly acute.
31. Inner face of the floral bract glabrous and nearly black, contrasting sharply with the pale persistent indument of the outer. Peru.
124. P. cerrateana
31. Inner face of the floral bracts almost exactly like the outer, not blackening.
32. Sepals 35-37 mm long.
33. Floral bracts subcoriaceous, greenish. Peru.
125. P. mariae
33. Floral bracts membranaceous, rose. Argentina.
102. P. weberiana
32. Sepals 20-25 mm long.
34. Floral bracts recurved from near the apex only. Peru.....126. P. isabellina
34. Floral bracts more than half recurved. Colombia.
127. P. trianae
15. Apical parts of the outer bracts erect.
35. Outer bracts clearly defined, their outline not obscured by the indument.
36. Inflorescence compound with the flowers usually fasciculate; branches sometimes 1-flowered but then a floral bract in the axil of the primary bract.
37. Lateral axes developed, but covered by the large imbricate primary bracts before anthesis. Colombia.
58. P. gigas
37. Lateral axes reduced to pulvini, the flowers fasciculate.
38. Sepals thinly vestite to glabrous, 11-16 mm long.
39. Inflorescence 3 dm long, 5-7 cm in diameter; floral bracts broadly acute. Costa Rica.
128. P. dasyliroides
39. Inflorescence not more than 1 dm long; floral bracts acuminate.
40. Sepals obtuse; inflorescence continuous; flowers not secund.
41. Flowers pedicellate for 6 mm. Bolivia.
88. P. paupera
41. Flowers sessile. Colombia.....129. P. boyacana
40. Sepals acute; inflorescence interrupted at base. Venezuela.....46. P. phelpsiae
38. Sepals densely lanate.
42. Leaf-blades lepidote only between the nerves beneath.
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43. Inflorescence 30-50 cm long; leaf-blades concolorous. Colombia.
44. Inflorescence brown-tomentose....130. P. occidentalis
44. Inflorescence white-lanate.....106. P. santosii
43. Inflorescence 15 cm long; leaf-blades with a dark spot at the base of each spine. Ecuador.
131. P. maculata
42. Leaf-blades completely lepidote beneath.
45. Flowers slenderly short-pedicellate; plant 3 dm high. Ecuador.....132. P. pygmaea
45. Flowers subsessile; plant 7 dm high. Colombia.
133. P. cryptantha
36. Inflorescence simple with a single series of bracts.
46. Inflorescence nutant; sepals narrow, 18 mm long.
47. Upper scape-bracts and floral bracts firm, subchartaceous, opaque. Ecuador.....134. P. nutans
47. Upper scape-bracts and floral bracts membranaceous, translucent. Venezuela.....135. P. venezuelana
46. Inflorescence erect, or where uncertain (P. angusta), the sepals larger.
48. Sepals thinly vestite to glabrous.
49. Sepals 12-13 mm long; floral bracts acuminate. Bolivia.....136. P. humilis
49. Sepals 15-33 mm long.
50. Floral bracts narrowly lanceolate, acuminate; sepals triangular-acute, 25 mm long. Bolivia.
73. P. kuntzeana
50. Floral bracts broad.
51. Leaf-blades 7-8 mm wide; inflorescence few-flowered, 4-7 cm long. Colombia.....137. P. brachystachya
51. Leaf-blades 25-50 mm wide.
52. Pedicels 7-10 mm long.
53. Sepals obtuse, oblong, 15-20 mm long. Chile.
43. P. venusta
53. Sepals acute, 25-33 mm long. Peru.
54. Sepals broadly lanceolate, 30-33 mm long.
138. P. dolichostrobila
54. Sepals oblanceolate, 25 mm long.
87. P. depauperata
52. Pedicels very short and stout, the flowers appearing subsessile. Peru.
55. Inflorescence cylindrical, 30 cm long, 10 cm in diameter.....126. P. isabellina
55. Inflorescence ellipsoid, 14 cm long, 6 cm in diameter.....139. P. strobilantha
48. Sepals densely lanate.
56. Sepals emarginate, not over 10 mm long. Ecuador.
140. P. exigua
56. Sepals obtuse to acuminate, 15-28 mm long.
57. Leaf-blades densely lepidote above as well as beneath; sepals acuminate. Peru.....141. P. macrura
57. Leaf-blades soon glabrous above.

58. Inflorescence over 15 cm long; sepals acute or acuminate.
59. Sepals membranaceous, elliptic, 27 mm long; inflorescence slenderly cylindric, 4 cm in diameter. Colombia.....142. P. gargantae
59. Sepals coriaceous, lance-oblong or narrowly elliptic, 22-28 mm long.
60. Floral bracts soon glabrous and contrasting with the remainder of the inflorescence. Colombia. 143. P. angusta
60. Floral bracts equally vestite with the remainder of the inflorescence.
61. Leaf-blades sparsely lepidote beneath; sepals 22 mm long. Bolivia.....144. P. brittoniana
61. Leaf-blades densely appressed-lepidote beneath; sepals 28 mm long. Colombia....145. P. alpicola
58. Inflorescence 5-8 cm long; sepals obtuse.
62. Inflorescence globose, more than twice as wide as the scape and its bracts.
63. Sepals 20-28 mm long; indument nearly white. Colombia.....146. P. santanderensis
63. Sepals 15 mm long; indument ferruginous. Venezuela 147. P. cardonae
62. Inflorescence subcylindric, scarcely wider than the scape and its bracts; sepals 18 mm long. Ecuador. 132. P. pygmaea
35. Outer bracts with their outlines obscured by the very long dense indument.
64. Floral bracts rounded and apiculate.
65. Pedicels 10 mm long; sepals ovate-oblong, 30 mm long, 15 mm wide. Bolivia.....117. P. herzogii
65. Pedicels short and thick; sepals oblong, 25 mm long, 11 mm wide. Peru.....148. P. herrerae
64. Floral bracts acute or acuminate, not rounded. Colombia, Ecuador.
66. Plants 1-1.5 meters high; indument of the inflorescence brown; sepals lanceolate.....149. P. clava-herculis
66. Plants 2.5-4 meters high; indument of the inflorescence white; sepals broadly elliptic.....150. P. hamata

Subgenus PUYA

1. Caudex prostrate, branching and continuing to live after the fruition and death of the flowering shoot; leaf-rossette on a level with the ground; floral bracts mostly exceeded by the sepals.
2. Petals yellow or yellow-green; leaves soon glabrous on both sides. Chile.
3. Inflorescence 1 meter or longer with 80-100 branches, dense; sepals soon glabrous.....151. P. chilensis
3. Inflorescence not over 5 dm long with few branches, lax; sepals always tomentose-lepidote.....152. P. boliviensis

2. Petals blue or blue-green.
4. Sepals 20-25 mm long; petals ca. 5 cm long; leaves densely white-lepidote beneath, flexuous, arching-recurved. Chile.
5. Leaf-blades 15-25 mm wide; inflorescence of not more than 20 branches, lax; branches laxly few-flowered; flowering shoot 1.2-1.5 meters high.....153. P. alpestris
5. Leaf-blades to 50 mm wide; inflorescence of 80-100 branches dense; branches densely many-flowered; flowering shoot to 4.5 meters high.....154. P. berteroniana
4. Sepals to 18 mm long; petals 35 mm long; leaf-blades glaucous-green. Bolivia.....155. P. weddelliana
1. Caudex erect, simple and columnar, dying after the fruition of the flowering shoot; leaf-rosette at the summit of the caudex 4 meters above the ground; floral bracts exceeding the sepals, imbricate. Peru, Bolivia.....156. P. raimondii

Subgenus PITCAIRNIOPSIS

(including subgenus Chagualia Smith & Looser, Revista Univ., Univ. Catól. Chile 20:243. 1935).

1. P. ULTIMA L. B. Smith, Contr. U. S. Nat. Herb. 29:540, fig. 94. 1954. Bolivia.
2. P. LONGISEPALA Mez, Bull. Herb. Boiss. ser. 2, 4:629. 1904. Peru.
3. P. ROEZLII E. Morr. Belg. Hort. 35:80. 1885. Pitcairnia megastachya Baker, Handb. Bromel. 120. 1889. Puya pectinata L. B. Smith, Contr. Gray Herb. 98:12, pl. 4, figs. 1, 2. 1932. Peru.
4. P. MICRANTHA Mez, Fedde Rep. Nov. Spec. 3:8. 1906. Argentina, ("Bolivia").
5. P. LILLOI Castellanos, An. Mus. Nac. Hist. Nat. Buenos Aires 36:54, pl. 7. 1929. Argentina.
6. P. SMITHII Castellanos, Lilloa 2:13, pl. 1. 1938. Argentina
7. P. ALATA L. B. Smith, Phytologia 7:422, pl. 2, figs. 3, 4. 1961. Bolivia.
8. P. SPATHACEA (Griseb.) Mez in DC. Mon. Phan. 9:481. 1896. Pitcairnia spathacea Griseb. Goett. Abh. 24:329. 1879. Puya formosa Spegazzini, Physis 3:155. 1917. Argentina.
9. P. VIOLACEA (Brongn.) Mez in DC. Mon. Phan. 9:476. 1896. Chile.
- Var. a. VIOLACEA. ? Pourretia rubricaulis Miers, Travels in Chile 2:531. 1826, nomen. Pitcairnia violacea Brongn. Ann. Fl. & Pom. ser. 3, 1:116. 1847; Allg. Gartenzeit. 15:299. 1847. Pourretia violacea Linden, Cat. 1853, ex Bot. Zeitung 11:718. 1853. Puya paniculata Phil. Linnaea 33:247. 1864. Pitcairnia philippii Baker, Handb. Bromel. 122. 1889. Puya glabrata Phil. ex Baker, l. c., in synonym. Inflorescence glabrous; floral bracts ovate, acute or apiculate, much shorter than the pedicels.
- Var. b. MONTEROANA Smith & Looser, Revista Univ., Univ. Catól. Chile 20:252, fig. 6. 1935. Floral bracts distinctly exceeding the pedicels but much shorter than the sepals, narrowly lanceolate, acuminate.
- Var. c. INTERMEDIA Smith & Looser, Revista Univ., Univ. Catól.

Chile 20:252, fig. 7. 1935. Inflorescence strongly white-tomentose.

10. P. HOFSTENII Mez, Fedde Rep. Nov. Spec. 3:8. 1906. Puya hauthalii Mez, Fedde Rep. Nov. Spec. 16:65. 1919. Bolivia, Argentina.

11. P. POTOSINA L. B. Smith, Phytologia 7:423, pl. 2, figs. 7, 8. 1961. Bolivia.

12. P. RUSBYI (Baker) Mez in DC. Mon. Phan. 9:482. 1896. Pitcairnia rusbyi Baker, Handb. Bromel. 122. 1889. Bolivia.

13. P. CRISTATA L. B. Smith, Lilloa 14:95, figs. 7, 8. 1948. Bolivia.

14. P. LAXA L. B. Smith, Phytologia 6:195, pl. 1, figs. 7, 8. 1958. Bolivia.

15. P. HORTENSIS L. B. Smith, Phytologia 7:425, pl. 2, figs. 13, 14. 1961. Peru?

16. P. HARMSII (Castellanos) Castellanos, An. Mus. Nac. Hist. Nat. Buenos Aires 37:497. 1933. Puya spathacea var. harmsii Castellanos, An. Mus. Nac. Hist. Nat. Buenos Aires 36:54, pl. 9. 1929. Argentina.

17. P. SANCTAE-CRUCIS (Baker) L. B. Smith, Proc. Am. Acad. Arts & Sci. (Contrib. Gray Herb. 106) 70:154, pl. 2, fig. 1. 1935. Pitcairnia sanctae-crucis Baker, Handb. Bromel. 120. 1889. Puya floccosa sensu Mez in DC. Mon. Phan. 9:478. 1896, as to Bolivian material. Pitcairnia robusta Rusby, Bull. New York Bot. Gard. 6:488. 1910. Bolivia.

18. P. FIEBRIGII Mez, Fedde Rep. Nov. Spec. 3:9. 1906. Bolivia

19. P. MEZIANA Wittm. Mededeel. Rijks Herb. 29:85. 1916. Bolivia.

20. P. SECUNDA L. B. Smith, Phytologia 7:424, pl. 2, figs. 11, 12. 1961. Bolivia.

21. P. STENOTHYRSA (Baker) Mez in DC. Mon. Phan. 9:481. 1896. Pitcairnia stenothyrsa Baker, Handb. Bromel. 122. 1889. Pitcairnia bangii Baker, Mem. Torrey Bot. Club 6:124. 1896. Bolivia.

22. P. CASMICHENSIS L. B. Smith, Publ. Mus. Hist. Nat. "Javier Prado", Univ. Nac. Mayor San Marcos, ser. B, no. 16:2, figs. 3-5. 1964. Peru.

23. P. GLAREOSA L. B. Smith, Lilloa 14:96, figs. 9, 10. 1948. Bolivia.

24. P. OLIVACEA Wittm. Mededeel. Rijks Herb. Leiden 29:83. 1916; emend. L. B. Smith, Contr. U. S. Nat. Herb. 29:538, fig. 92. 1954. Pitcairnia olivacea (Wittm.) Mez in Engl. Pflanzenreich IV. 32:247. 1935. Bolivia.

25. P. OBCONICA L. B. Smith, Lloydia 11:306, fig. 5. 1949. Ecuador.

26. P. AEQUATORIALIS André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888. Ecuador.

Var. a. AEQUATORIALIS. Floral bracts acute or acuminate; petals dark violet.

Var. b. ALBIFLORA André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888. Floral bracts long-setaceous; petals white.

27. P. RAMOSA L. B. Smith, Phytologia 9:250, pl. 3, figs. 1,

2. 1963. Peru.

28. P. RIPARIA L. B. Smith, Phytologia 7:424, pl. 2, figs. 9,

10. 1961. Bolivia.

29. P. ALBA L. B. Smith, Phytologia 5:49, pl. 7, figs. 3-5.

1954. Bolivia.

30. P. PEARCEI (Baker) Mez in DC. Mon. Phan. 9:480. 1896. Pitcairnia pearcei Baker, Handb. Bromel. 120. 1889. Bolivia.

31. P. PENDULIFLORA L. B. Smith, Contr. Gray Herb. 98:12, pl. 4, figs. 3, 4. 1932. Bolivia.

32. P. FLOCCOSA (Linden) E. Morr. ex Mez in DC. Mon. Phan. 9:478. 1896, (earlier publications of name by E. Morren, a nomen, and by Baker, in synonymy, invalid). Puya guianensis Kl. in Schomburgk, Fauna u. Flora 1067. 1848, nomen. Pourretia floccosa Linden, Catal. 1853 ex Bot. Zeitung 11:718. 1853. Pitcairnia floccosa Regel, Act. Hort. Petrop. 3:124. 1875. Pourretia lanuginosa Hort. ex Regel, op. c. 125, nomen. Pourretia violacea Hort. ex Regel, l. c., nomen. Puya meridensis E. Morr. Belg. Hortic. 35:81. 1885, nomen. Puya quetameensis André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888. Pitcairnia guyanensis Baker, Handb. Bromel. 120. 1889. Agallostachys guyanensis Beer ex Baker, l. c., nomen. Pitcairnia quetameensis Baker, op. c. 121. Pitcairnia meridensis Hort. ex Baker, l. c., nomen. Pourretia achupalla Hort. Linden ex Baker, op. c. 126, nomen. Puya bonplandiana sensu Baker, l. c., in part as to above, non Schult. 1830. Puya achupalla Mez in DC. Mon. Phan. 9:479. 1896, erroneously attributed to Baker. Pitcairnia sanctaerucis sensu Mez, l. c., non Baker 1889. British Guiana (Roraima), Venezuela, Colombia.

33. P. THOMASIANA André, Énum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888. Colombia, Ecuador.

34. P. BICOLOR Mez in DC. Mon. Phan. 9:482. 1896. Colombia.

35. P. PICHINCHAE Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4:633. 1904. Ecuador.

36. P. GLAUCOVIRENS Mez, Fedde Rep. Nov. Spec. 3:9. 1906. Peru

37. P. WESTII L. B. Smith, Phytologia 7:421, pl. 1, figs. 16, 17. 1961. Peru.

38. P. ROSEANA L. B. Smith, Phytologia 7:421, pl. 1, fig. 13. 1961. Ecuador.

39. P. LEHMANNIANA L. B. Smith, Phytologia 5:34. 1954. Puya lanuginosa Wittm. Bot. Jahrb. 11:56. 1889, non Schult. 1830. Pitcairnia pastoensis Baker, Handb. Bromel. 122. 1889. Puya pastoensis Mez in DC. Mon. Phan. 9:483. 1896, non André 1889. Colombia.

40. P. FURFURACEA (Willd.) L. B. Smith, Phytologia 5:34. 1954. Pitcairnia furfuracea Willd. Enum. 1:346. 1809. Achupalla Humb. Vues des Cordillères 221, pl. 30. 1813. Pourretia pyramidata sensu H.B.K. Nov. Gen. & Sp. 1:296. 1816, non R. & P. 1802. Pitcairnia pyramidata Link, Enum. 1:308. 1821, as to material not as to basonym. Puya bonplandiana Schult. in R. & S. Syst. 7, pt. 2:1236. 1830. Pourretia bonplandiana D. Dietr. Syn. Pl. 2:1060. 1840. Colombia.

41. P. COERULEA Lindl. Bot. Reg. 26:pl. 11. 1840. Pourretia

caerulea Miers, Travels in Chile 2:531. 1826, nomen. Puya rubri-caulis Steud. Nomencl. ed. 2, pt. 2:419. 1841. Pitcairnia coerulea Benth. ex Baker, Handb. Bromel. 121. 1889. Chile.

42. P. ARANEOSA L. B. Smith, Phytologia 5:48, pl. 6, figs. 7-9. 1954. Peru.

43. P. VENUSTA Phil. An. Univ. Chile 91:613. 1895. Puya venusta Phil. Viaje Des. Atacama 4. 1860, nomen; Phil. ex Baker, Handb. Bromel. 123. 1889, in synonym. Pitcairnia venusta Baker, l. c. Pitcairnia sphaerocephala Baker, l. c. Puya gaudichaudii Mez in DC. Mon. Phan. 9:496. 1896. Chile.

44. P. ATRA L. B. Smith, Contr. U. S. Nat. Herb. 29:536, fig. 90. 1954. Bolivia.

45. P. TOVARIANA L. B. Smith, Phytologia 5:48, pl. 7, figs. 1, 2. 1954. Peru.

46. P. PHELPSIAE L. B. Smith, Brittonia 7:78. 1950. Venezuela.

47. P. DYCKIOIDES (Baker) Mez in DC. Mon. Phan. 9:486. 1896. Pitcairnia dyckioides Baker, Handb. Bromel. 118. 1889. Argentina.

48. P. ASSURGENS L. B. Smith, Lilloa 9:199, pl. 1. 1943. Argentina.

49. P. GOUDOTIANA Mez in DC. Mon. Phan. 9:488. 1896. Colombia.

50. P. ARISTEGUIETAE L. B. Smith, Phytologia 7:2, pl. 1, figs. 9-12. 1959. Venezuela.

51. P. MEDICA L. B. Smith, Phytologia 4:216, pl. 2, figs. 1, 2. 1953. Peru.

52. P. DENSIFLORA Harms, Notizblatt 10:791. 1929. Peru.

53. P. GLABRESCENS L. B. Smith, Contr. U. S. Nat. Herb. 29:537, fig. 91. 1954. Bolivia.

54. P. FULGENS L. B. Smith, Phytologia 9:249, pl. 2, figs. 14-16. 1963. Peru.

55. P. TUBEROSA Mez in DC. Mon. Phan. 9:483. 1896; emend. L. B. Smith, Contr. U. S. Nat. Herb. 29:539, fig. 93. 1954. Bolivia, ("Peru").

56. P. REDUCTA L. B. Smith, sp. nov. A P. tuberosa Mez, cui verisimiliter affinis, foliorum laminis latioribus, pedicellis brevissimis, sepalis multo majoribus differt. A P. sanctae-crucis (Baker) L. B. Smith, cujus bracteas florigeras floresque valde imitans, ramis valde reductis, foliorum laminis multo minoribus differt.

Flowering 35-80 cm high; leaves ca. 4 dm long; sheaths ovate, 15 mm wide, spinose-serrate toward apex; blades linear, long-attenuate, 10 mm wide, glabrous above, subdensely tomentose beneath with white linear trichomes, laxly serrulate with slender pale antrorse spines 4 mm long; scape erect, ca. 3 mm in diameter, finely white-stellate; scape-bracts erect, ovate with a caudate apex, red, the upper ones about equaling the internodes; inflorescence laxly bipinnate, sparsely white-stellate, becoming glabrous; primary bracts like the upper scape-bracts but not caudate, nearly the same size and form as the floral bracts, exceeding the axis of the very short few-flowered lateral branches; branches divergent to spreading with a very short naked sterile base, subdense but with the axis largely exposed; floral bracts suberect, broadly ovate, acute and apiculate, 15 mm long,

ecarinate, broadly convex, red with a narrow scarious margin, subchartaceous; pedicels about 1 mm long but slender and distinct; sepals linear-lanceolate, narrowly obtuse and apiculate, 27 mm long; petals ca. 4 cm long, naked, twisted together after anthesis. Pl. 1, fig. 1: Branch x 1; fig. 2: Sepal x 1.

BOLIVIA: La Paz: On rocky slope between Altunkama and Caupolican, alt. 2600 m, August 1959, Cárdenas 5687 (US, type).

57. *P. VARGASIANA* L. B. Smith, *Phytologia* 8:227, pl. 2, figs. 9, 10. 1962. Peru.

58. *P. GIGAS* André, *Rev. Hort. 53:314*, fig. 74. 1881. Colombia.

59. *P. PARVIFLORA* L. B. Smith, *Contr. U. S. Nat. Herb.* 29:316, fig. 36. 1949. Ecuador.

60. *P. SODIROCANA* Mez, *Bull. Herb. Boiss. ser. 2*, 4:630. 1904. Ecuador.

61. *P. MOLLIS* Baker ex Mez in DC. *Mon. Phan.* 9:488. 1896. Bolivia.

62. *P. RAUHII* L. B. Smith, *Phytologia* 5:398, pl. 1, figs. 7, 8. 1956. Peru.

63. *P. PYRAMIDATA* (R. & P.) Schult. f. in R. & S. *Syst.* 7, pt. 2:1235. 1830. *Pourretia pyramidata* R. & P. *Fl. Peruv. & Chil.* 3:34, pl. 257. 1802. *Pitcairnia pyramidata* (R. & P.) Pers. *Syn. Pl.* 1:344. 1805. *Bromelia pyramidata* (R. & P.) Beer, *Bromel.* 34. 1857. Peru.

64. *P. WURDACKII* L. B. Smith, *Phytologia* 9:251, pl. 3, figs. 3, 4. 1963. Peru.

65. *P. ERYNGIODES* André, *Enum. Bromél.* 5. Dec. 13, 1888; *Rev. Hort.* 60:565. Dec. 16, 1888. Ecuador.

66. *P. MITIS* Mez, *Fedde Rep. Nov. Spec.* 3:10. 1906. Peru.

67. *P. KILLIPII* Cuatrecasas, *Not. Fl. Colombia* 6:38, fig. 31. 1944. Colombia.

68. *P. NIGRESCENS* L. B. Smith, *Publ. Mus. Hist. Nat. "Javier Prado"*, Univ. Nac. Mayor San Marcos ser. B, no. 16:4, figs. 6-8. 1964. Peru.

69. *P. GRANTII* L. B. Smith, *Phytologia* 5:181, pl. 2, figs. 11-13. 1955. Colombia.

70. *P. GRACILIS* L. B. Smith, *Contr. Gray Herb.* 98:11, pl. 3, figs. 12, 13. 1932. Peru.

71. *P. SANCTAE-MARTAE* L. B. Smith, *Phytologia* 4:382, pl. 2, figs. 5-7. 1953. Colombia.

72. *P. PITCAIRNIOIDES* L. B. Smith, *Publ. Mus. Hist. Nat. "Javier Prado"*, Univ. Nac. Mayor San Marcos ser. B, no. 16:5. 1964. *Pitcairnia grandiflora* Mez, *Fedde Rep. Nov. Spec.* 3:5. 1906, non Hook. 1861. Peru.

73. *P. KUNTZEANA* Mez in DC. *Mon. Phan.* 9:490. 1896. *Puya rusbyi* sensu L. B. Smith, *Proc. Am. Acad. (Contr. Gray Herb.* 106) 70:154. 1935, in part not as to type. Bolivia.

74. *P. MINIMA* L. B. Smith, *Phytologia* 7:423, pl. 2, figs. 5, 6. 1961. Bolivia.

75. *P. FERREYRAE* L. B. Smith, *Publ. Mus. Hist. Nat. "Javier Prado"*, Univ. Nac. Mayor San Marcos ser. B, no. 13:1, fig. 1-3. 1963. Peru.

76. P. NITIDA Mez in DC. Mon. Phan. 9:491. 1896. Puya woronowii Harms, Notizblatt 11:58. 1930. Colombia.
77. P. BARKLEYANA L. B. Smith, Phytologia 5:180, pl. 2, figs. 4-7. 1955. Colombia.
78. P. MACBRIDEI L. B. Smith, Contr. Gray Herb. 98:12, pl. 3, figs. 17, 18. 1932. Peru.
79. P. ARGENTEA L. B. Smith, Phytologia 5:397, pl. 1, figs. 5, 6. 1956. Peru.
80. P. LOPEZII L. B. Smith, Phytologia 8:501, pl. 2, figs. 11, 12. 1963. Peru.
81. P. SAGASTEGUII L. B. Smith, Phytologia 8:502, pl. 2, figs. 13, 14. 1963. Peru.
82. P. REFLEXIFLORA Mez, Fedde Rep. Spec. Nov. 16:66. 1919. Peru.
83. P. GRUBBII L. B. Smith, Phytologia 7:420, pl. 1, figs. 11, 12. 1961. Colombia.
84. P. LONGISTYLA Mez, Fedde Rep. Nov. Spec. 3:12. 1906. Peru.
85. P. FEROX Mez, Bull. Herb. Boiss. ser. 2, 4:632. 1904. Peru.
86. P. GRANDIDENS Mez, Fedde Rep. Nov. Spec. 3:10. 1906. Peru.
87. P. DEPAUPERATA L. B. Smith, Contr. Gray Herb. 98:10, pl. 3, figs. 10, 11. 1932. Peru.
88. P. PAUPERA Mez, Fedde Rep. Nov. Spec. 3:14. 1906. Bolivia
89. P. LLATENSIS L. B. Smith, Contr. Gray Herb. 98:11, pl. 3, figs. 14-16. 1932. Peru.
90. P. VALIDA L. B. Smith, sp. nov. A P. mollis Baker ex Mez, cui verisimiliter affinis, foliis mox utrinque glabris, inflorescentiae indumento valde appresso, bracteis florigeris oblongo-ellipticis differt.
- Flowering 3 m high; leaves incompletely known, over 6 dm long; blades narrowly triangular, 4 cm wide, soon wholly glabrous, laxly serrate with brown stiffly antrorse spines 3 mm long; scape erect, over 4 cm in diameter (! photo); scape-bracts early deciduous, unknown; inflorescence subdensely bipinnate, over 1 m long, except for the petals and genitalia covered with a fine white dense appressed tomentum; primary bracts small and inconspicuous (! photo); branches subspreading, strobilate, nearly 3 dm long, 7 cm in diameter; floral bracts elliptic-oblong, acute and apiculate, to 55 mm long, distinctly exceeded by the sepals, coriaceous, rigid, very minutely serrate toward apex; flowers suberect; pedicels subcylindric, 2 cm long, 5 mm in diameter; sepals lance-elliptic, rounded and apiculate, 35 mm long, coriaceous when dry, ecarinate; petals naked, twisted together after anthesis. Pl. 1, fig. 3: Flower and floral bract x 1; fig. 4: Sepal x 1.
- BOLIVIA: Chuquisaca: On rock slope by Río Chico, alt. 2500 m, April 1962, Cárdenas 6012 (US, type).
91. P. STIPITATA L. B. Smith, Contr. Gray Herb. 98:13, pl. 4, figs. 5, 6. 1932. Peru.
92. P. GUMMIFERA Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4: 863. 1904. Ecuador.
93. P. ASPLUNDII L. B. Smith, Phytologia 6:439, pl. 2, figs.

14, 15. 1959. Ecuador.

94. *P. LASIOPODA* L. B. Smith, Proc. Am. Acad. Arts & Sci. (Contr. Gray Herb. 106) 70:153, pl. 1, figs. 16, 17. 1935. Peru, Bolivia.

95. *P. COMMIXTA* L. B. Smith, Phytologia 8:501, pl. 2, figs. 9, 10. 1963. Peru.

96. *P. OXYANTHA* Mez, Bull. Herb. Boiss. ser. 2, 4:631. 1904. Peru.

97. *P. CTENORHYNCHA* L. B. Smith, Phytologia 5:49, pl. 7, figs. 6-9. 1954. Bolivia.

98. *P. FASTUOSA* Mez, Fedde Rep. Nov. Spec. 3:12. 1906. Peru.

99. *P. WEBERBAUERI* Mez, Bull. Herb. Boiss. ser. 2, 4:633. 1904. Peru.

100. *P. GLOMERIFERA* Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4:630. 1904. Ecuador.

101. *P. FOSTERIANA* L. B. Smith, Journ. Washington Acad. Sci. 40:216, fig. 1. 1950. Bolivia.

102. *P. WEBERIANA* E. Morr. ex Mez in DC. Mon. Phan. 9:492. Jan. 1896. *Puya flora* Spegazzini, Pl. Nov. Argent. pt. 3:382. Dec. 1896 (! Castellanos). Argentina.

103. *P. LACCATA* Mez, Fedde Rep. Nov. Spec. 3:11. 1906. Peru.

104. *P. ANGULONIS* L. B. Smith, Phytologia 6:260, pl. 1, figs. 13-15. 1958. Peru.

105. *P. CYLINDRICA* Mez, Fedde Rep. Nov. Spec. 16:66. 1919. Peru.

106. *P. SANTOSII* Cuatrecasas, Rev. Acad. Colombiana Cienc. Exact. Fisico-Quimic. y Nat. 4:160, figs. 1, 2, pls. 1, 2. 1941. Colombia.

Var. a. *SANTOSII*. Leaf-blades 50-60 cm long, 30-35 mm wide; inflorescence 10 cm in diameter; primary bracts elliptic or suborbicular, the lowest with acuminate apices.

Var. b. *VERDENSIS* Cuatrecasas, Not. Fl. Colombia 6:39, figs. 32, 33. 1944. Leaf-blades 30-40 cm long, 45 mm wide; inflorescence considerably less than 10 cm in diameter; primary bracts ovate, apiculate.

107. *P. LINEATA* Mez in DC. Mon. Phan. 9:497. 1896. *Puya leptodota* Cuatrecasas, Caldasia 1, no. 5:17, figs. 1-8. 1942. Colombia

108. *P. VOLCANENSIS* Castillon, Bol. Mus. Hist. Nat. Tucumán no. 7:51, figs. 1, 2. 1926. Argentina.

109. *P. PRATENSIS* L. B. Smith, Phytologia 4:217, pl. 2, figs. 3, 4. 1953. Peru.

110. *P. VESTITA* André, Enum. Bromél. 5. Dec. 13, 1888; Rev. Hortic. 60:565. Dec. 16, 1888. Colombia.

111. *P. MEMBRANACEA* L. B. Smith, Phytologia 7:421, pl. 1, figs. 14, 15. 1961. Peru.

112. *P. COMPACTA* L. B. Smith, Lloydia 11:305, fig. 4. 1949. Ecuador.

113. *P. TRISTIS* L. B. Smith, sp. nov. A *P. leptostachya* L. B. Smith, cui affinis, scapo elatiore folia superante, inflorescentia late ovoidea, bracteis florigeris suborbicularibus differt.

Flowering 6 dm high; leaves numerous in a spreading rosette, ca. 3 dm long; sheaths broadly ovate, 3-4 cm long, glabrous

toward base; blades linear-triangular, attenuate, pungent, 15 mm wide, glabrous above, covered beneath with subappressed white scales, laxly serrate with dark uncinulate spines 4 mm long; scape erect, exceeding the leaves, coarsely brown-tomentose; scape-bracts suboliateous, strict, many-ranked and densely imbricate, wholly covering the scape, brown-tomentose toward base; inflorescence densely ovoid, broadly rounded, 10 cm long, 8 cm in diameter, obscurely bipinnate, densely and coarsely brown-tomentose except the petals and genitalia; primary bracts attenuate from a suborbicular base, to 7 cm long, membranaceous, finely nerved, entire, the apical half reflexed at anthesis; branches nearly aborted, 2-flowered; floral bracts like the primary bracts but short-attenuate and only 35 mm long; pedicels short but slender and distinct; sepals oblong-elliptic, rounded and apiculate, 18 mm long, thin; petals over 3 cm long, blue, twisted together after anthesis. Pl. 1, fig. 5: Inflorescence x 1/4; fig. 6: Primary bract and flowers x 1/2; fig. 7: Sepal x 1.

BOLIVIA: Cochabamba: On rocky slope, km 89 between Cochabamba and Chapare, 3900 m, December 1962, Cárdenas 6067 (US, type).

114. P. LEPTOSTACHYA L. B. Smith, *Lilloa* 14:97, figs. 11, 12. 1948. Bolivia.

115. P. CUATRECASASII L. B. Smith, *Phytologia* 5:33, pl. 1, figs. 5-9. 1954. Colombia.

116. P. CARDENASII L. B. Smith, *Lilloa* 14:94, fig. 6. 1948. Bolivia.

117. P. HERZOGII Wittm. *Mededeel. Rijks Herb.* 29:86. 1916. Bolivia.

118. P. HUANCAVELICAE L. B. Smith, *Phytologia* 7:4, pl. 1, figs. 15, 16. 1959. Peru.

119. P. LANATA (H.B.K.) Schult. f. in R. & S. *Syst.* 7, pt. 2: 1233. 1830. *Pourretia lanata* H.B.K. *Nov. Gen. & Sp.* 1:296. 1816. *Pitcairnia lanata* Dietr. *Lexicogr. Nachtr.* 6:303. 1820. Peru.

120. P. YAKESPALA Castellanos, *Gen. & Sp. Pl. Argent.* 3:213, pl. 55. 1945. Argentina.

121. P. NIVALIS Baker, *Handb. Bromel.* 124. 1889. Colombia.

122. P. LANUGINOSA (R. & P.) Schult. f. in R. & S. *Syst.* 7, pt. 2:1234. 1830. *Pourretia lanuginosa* R. & P. *Fl. Peruv. & Chil.* 3:33, pl. 256. 1802. *Bromelia lanuginosa* Beer, *Bromel.* 32. 1857. *Pitcairnia crystallina* Pers. *Syn. Pl.* 1:344. 1805. *Pitcairnia ruiziana* Mez in DC. *Mon. Phan.* 9:491. 1896, as to material cited. Peru.

123. P. TUNARENSIS Mez in DC. *Mon. Phan.* 9:498. 1896. Bolivia.

124. P. CERRATEANA L. B. Smith, *Contr. U. S. Nat. Herb.* 29:533 fig. 88. 1954. Peru.

125. P. MARIAE L. B. Smith, *Phytologia* 9:250, pl. 2, figs. 17, 18. 1963. Peru.

126. P. ISABELLINA Mez, *Fedde Rep. Spec. Nov.* 16:66. 1919. Peru.

127. P. TRIANAE Baker, *Handb. Bromel.* 124. 1889. Colombia.

128. P. DASYLIRIOIDES Standley, *Journ. Washington Acad. Sci.* 17:159. 1927. Costa Rica.

129. P. BOYACANA Cuatrecasas, *Rev. Acad. Colombiana Cienc.*

Exact. Físico-Químico. y Nat. 4:162. 1941. Colombia.

130. *P. OCCIDENTALIS* L. B. Smith, Phytologia 5:34, pl. 2, figs. 1-3. 1954. Colombia.

131. *P. MACULATA* L. B. Smith, Mem. New York Bot. Gard. 8:26, fig. 1, a-d. 1952. Ecuador.

132. *P. PYGMAEA* L. B. Smith, Mem. New York Bot. Gard. 8:27, fig. 1, g-i. 1952. Ecuador.

133. *P. CRYPTANTHA* Cuatrecasas, Rev. Acad. Colombiana Cienc. Físico-Químico. y Nat. 4:161, pl. 2. 1941. Colombia.

134. *P. NUTANS* L. B. Smith, Mem. New York Bot. Gard. 8:27, fig. 1, e-f. 1952. Ecuador.

135. *P. VENEZUELANA* L. B. Smith, Phytologia 7:3, pl. 1, figs. 13, 14. 1959. Venezuela.

136. *P. HUMILIS* Mez in DC. Mon. Phan. 9:498. 1896. *Puya werdermannii* Harms, Notizblatt 10:793. 1929. Bolivia.

137. *P. BRACHYSTACHYA* (Baker) Mez in DC. Mon. Phan. 9:496. 1896. *Pitcairnia brachystachya* Baker, Handb. Bromel. 118. 1889. Colombia.

138. *P. DOLICHOSTROBILA* Harms, Notizblatt 10:215. 1928. Peru.

139. *P. STROBILANTHA* Mez, Fedde Rep. Nov. Spec. 3:13. 1906. Peru.

140. *P. EXIGUA* Mez in DC. Mon. Phan. 9:495. 1896. Ecuador.

141. *P. MACRURA* Mez, Fedde Rep. Nov. Spec. 3:13. 1906. Peru.

142. *P. GARGANTAE* L. B. Smith, Phytologia 5:180, pl. 2, figs. 8-10. 1955. Colombia.

143. *P. ANGUSTA* L. B. Smith, Publ. Mus. Hist. Nat. "Javier Prado", Univ. Nac. Mayor San Marcos ser. B, no. 16:1, figs. 1, 2. 1964. Peru.

144. *P. BRITTONIANA* Baker, Handb. Bromel. 124. 1889. Bolivia.

145. *P. ALPICOLA* L. B. Smith, Phytologia 7:419, pl. 1, figs. 8-10. 1961. Colombia.

146. *P. SANTANDERENSIS* Cuatrecasas, Rev. Acad. Colombiana Cienc. Exact. Físico-Químico. y Nat. 4:162. 1941. Colombia.

147. *P. CARDONAE* L. B. Smith, Phytologia 7:107, pl. 1, figs. 7-9. 1960. Venezuela.

148. *P. HERRERAE* Harms, Notizblatt 10:792. 1929. Peru.

149. *P. CLAVA-HERCULIS* Mez & Sodiro, Bull. Herb. Boiss. ser. 2, 4:863. 1904. Colombia, Ecuador.

150. *P. HAMATA* L. B. Smith, Contr. U. S. Nat. Herb. 29:315, fig. 35. 1949. Colombia, Ecuador.

Subgenus PUYA

151. *P. CHILENSIS* Mol. Saggio 160, 351. 1782. *Renealmia ramosa*, *lutea*, *foliis spinosis* vulgo *Puya* Feuill. Obs. Hist. Pl. Méd. 3:59, pl. 39. 1725. *Pourretia coarctata* R. & P. Syst. Veg. 1:81. 1798; Fl. Peruv. & Chil. 3:34. 1802. *Pitcairnia coarctata* Pers. Syn. 1:344. 1805. *Puya suberosa* Mol. Saggio, ed. 2. 153. 1810. *Pitcairnia chilensis* Lodd. Cat. ex Loudon, Hort. Brit. 118. 1830, nomen. *Puya coarctata* Fisch. Sert. Petrop. pl. 19. 1846; Gay, Fl. Chil. 6:11. 1853. *Puya gigantea* Phil. Linnaea 33:246. 1864. *Puya chilensis* "Var. *P. gigantea*" Baker, Handb. Bromel. 127.

1889. Puya chilensis var. gigantea Baker ex Mez in DC. Mon. Phan 9:473. 1896. Chile.

152. P. BOLIVIENSIS Baker, Handb. Bromel. 126. 1889. Puya co-
ciapina Phil. An. Univ. Chile 91:613. 1895. Chile.

153. P. ALPESTRIS (Poepp.) Gay, Fl. Chil. 6:12. 1853; Gourlay, Kew Bull. 1952:501, pl. 2, fig. 4. 1952. Pourretia alpestris Poepp. Syn. 8. 1833; Reise 1:81. 1835; Peopp. & Endl. Nov. Gen. 2:41, pl. 156. 1838. Puya whytei Hook. f. Bot. Mag. 94: pl. 5732. 1868. Chile.

154. P. BERTERONIANA Mez in DC. Mon. Phan. 9:477. 1896; Gourlay, Kew Bull. 1952:501, pl. 1, fig. 2. 1952. Puya alpestris sensu Gay, Fl. Chil. 6:12. 1853, in part, as to plant of Valparaíso region, not as to basonym. Puya coarctata sensu Phil. Journ. Bot. 22:208, 1884, non Fisch. 1846. Pitcairnia coerulea sensu Benth. ex Baker, Handb. Bromel. 121. 1889, in part, not as to basonym. Puya coerulea sensu Johow, An. Univ. Chile 126:36. 1910, non Lindl. 1840. Puya whytei sensu Gourlay, Trans. & Proc. Soc. Edinb. 24:72, pl. 8. 1910. Pitcairnia alpestris L. H. Bailey, Stand. Cycl. Hort. 2863. 1916, nomen. Chile.

155. P. WEDDELLIANA (Baker) Mez in DC. Mon. Phan. 9:475. 1896. Pitcairnia weddelliana Baker, Handb. Bromel. 122. 1889. Bolivia.

156. P. RAIMONDII Harms, Notizblatt 10:213. 1928; Kinzl, Jahrb. Osterreich. Alpenvereins 74:59. 1949. Pourretia gigantea Raimondi, El Peru, Bot. 1:295. 1874, non Puya gigantea Phil. 1865, nec André 1879. Peru, Bolivia.

EXCLUDED AND DOUBTFUL TAXA

157. P. acris Hort. ex Gentil, Pl. Cult. Serres Jard. Bot. Brux. 153. 1907, nomen. Unknown.

158. P. altensteinii Lk., Kl. & Otto, Pl. Rar. Hort. Berol. 1: 1, pl. 1. 1840 = PITCAIRNIA ALTENSTEINII (Lk., Kl. & Otto) Lem.

159. P. augustae (Rich. Schomburgk) Mez in DC. Mon. Phan. 9: 487. 1896. = CONNELLIA AUGUSTAE (Rich. Schomburgk) N. E. Brown.

160. P. aurantiaca Hort. ex K. Koch, Ind. Sem. Hort. Berol. 1856, App.:3. 1857 = PITCAIRNIA DENSIFLORA Brongn. ex Lem.

161. P. carnea Regel, Catal. Pl. Hort. Aksak. 117. 1860 = PITCAIRNIA CARNEA Beer.

162. P. echinotricha André, Rev. Hortic. 60:565. 1888 = PITCAIRNIA FERRUGINEA.

163. P. edulis E. Morr. Belg. Hortic. 28:354. 1878 = DYCKIA sp. ?

164. P. flava Willd. ex Baker, Handb. Bromel. 135. 1889, nomen = DEUTEROCOHNIA LONGIPETALA (Baker) Mez

165. P. funkiana Linden, Cat. 5:2. 1850 = PITCAIRNIA MAIDIFOLIA (C. Morr.) Dcne. ex Planch.

166. P. grandiflora Hook. Bot. Mag. 87:pl. 5234. 1861 = PITCAIRNIA FERRUGINEA R. & P.

167. P. heterophylla Lindl. Bot. Reg. 26:pl. 71. 1840 = PITCAIRNIA HETEROPHYLLA (Lindl.) Beer

168. P. lanata R. & S. Syst. 7, pt. 2:1233. 1830, nomen = BROMELIA HUMILIS Jacq.

169. P. longifolia C. Morr. Ann. Soc. Agr. Bot. Gand. 2:483, pl. 101. 1846 = PITCAIRNIA HETEROPHYLLA (Lindl.) Beer.
170. P. macrostachya Schomb. Fl. & Fauna Guayana 1068. 1848, nomen = PITCAIRNIA ALTENSTEINII var. GIGANTEA (Hook.) Baker.
171. P. macrostachys A. Dietr. Allg. Gartenzeit. 16:145. 1848 = PITCAIRNIA ALTENSTEINII var. GIGANTEA (Hook.) Baker.
172. P. maidifolia C. Morr. Ann. Soc. Agr. Bot. Gand. 5:453, pl. 1849 = PITCAIRNIA MAIDIFOLIA (C. Morr.) Dcne. ex Planch.
173. P. nana Wittm. Mededeel. Rijks Herb. 29:85. 1916 = PITCAIRNIA NANA (Wittm.) L. B. Smith, cf. Phytologia 10:1. 1964.
174. P. quelchii (N. E. Brown) L. B. Smith, Contr. Gray Herb. 89:7. 1930 = CONNELLIA QUELCHII N. E. Brown.
175. P. recurvata Scheidw. Allgem. Gartenzeit. 10:275. 1842 = PITCAIRNIA RECURVATA (Scheidw.) K. Koch.
176. P. roraimae Mez, Fedde Rep. Spec. Nov. 12:417. 1913 = CONNELLIA QUELCHII N. E. Brown.
177. P. rubricaulis Steud. Nomencl. ed. 2, 2:419. 1841, nomen (based on Pourretia rubricaulis Miers, Travels in Chile 531. 1826, nomen) = PUYA COERULEA Lindl. or P. VIOLACEA (Brongn.) Mez?
178. P. ruiziana Mez in DC. Mon. Phan. 9:491. 1896, as to synonymy = PITCAIRNIA LANUGINOSA R. & P.
179. P. saxatilis Mart. in Spix & Mart. Reise in Brasilien 2: 757. 1828, nomen = ENCHOLIRIUM SPECTABILE Mart. ex Schult. f.
180. P. sulphurea Hook. Bot. Mag. 79:pl. 4696. 1853 = PITCAIRNIA WENDLANDII Baker
181. P. virescens Hook. f. Bot. Mag. 83:pl. 4991. 1857 = GUZMANIA VIRESCENS (Hook. f.) Mez.
182. P. warszewiczii H. Wendl. ex Hook. Bot. Mag. 87:pl. 5225. 1861 = PITCAIRNIA ATRORUBENS (Beer) Baker.
183. P. weberi Schlumb. ex Lillo, Fl. Tucumán 104. 1888 = DEUTEROCOHNIA LONGIPETALA (Baker) Mez.

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MISCELLANEOUS NOTES

MEXICO

AECHMEA MCVAUGHII L. B. Smith, sp. nov.

In subgenere Podaechmea ab omnibus speciebus inflorescentia pendula lepidibus magnis fulgente albis praedita, floribus magnis, sepalis serrulatis differt.

Leaves to 1 m long, in a large erect basket, waxy glaucous beneath (! McVaugh & Koelz); blades ligulate, 9 cm wide, broadly subacute with a stout rigid mucro 6 mm long, glabrous above, covered beneath with white subappressed scales, laxly serrate with flat curved spines 3-4 mm long; scape decurved, ca. 1 cm thick at apex, covered with persistent spreading coarse brilliantly white scales; scape-bracts suberect, densely imbricate, lanceolate, involute-acuminate at apex, 23 cm long, subchartaceous, rose, glabrous above, covered with appressed white scales beneath; inflorescence pendulous, 1 m long in fruit (! McVaugh & Koelz), bipinnate toward base, racemose toward apex, its axes, ovaries, and sepals coarsely white-lepidote like the scape; primary bracts like the upper scape-bracts, much exceeding the 5 cm long laxly few-flowered branches; floral bracts linear, attenuate, about 10 mm long; pedicels spreading, straight, cylindrical, to 15 mm long, 1 mm in diameter; flowers in line with the pedicels; sepals free or nearly so, subtriangular, 22 mm long, slightly asymmetric, serrulate toward apex, mucronate, ecarinate; petals imperfectly known, about 5 cm long, bearing 2 fimbriate scales at base; ovary globose, enlarged in fruit to 15 mm diameter; epigynous tube shallow; placentae elongate; seed suboblong, 3 mm long, black, finely reticulate. Pl. I, fig. 8: Flower and floral bract x 1; fig. 9: Sepal x 1.

MEXICO: Jalisco: Abundant on limestonerocks and on trees, high dense forest dominated by Brosimum, steep mountainside, 8 miles southwest of Pihuamo, alt. 500-600 m, December 6, 1959, McVaugh & Koelz 1491 (MICH, type; US).

.....

HECHTIA JALISCANA L. B. Smith, sp. nov.

A H. fosteriana L. B. Smith, cui affinis, bracteis primariis dense serratis, bracteis florigeris sepala subaequantibus differt.

Known only from fragments of the pistillate plant; leaves (one known) to 8 dm long; sheaths elliptic, 5-6 cm long, stramineous, glabrous toward base, serrate toward apex; blades narrowly triangular, 3 cm wide, glabrous above, covered with fine appressed cinereous scales beneath, subdensely repand-serrate at base with slender curved antrorse spines 3 mm long, more laxly so above; scape 1 m high (! McVaugh); inflorescence bipinnate so far as known, lax, sparsely pale-lepidote becoming glabrous; primary bracts lanceolate, caudate-acuminate, to 4 cm long, slightly longer to slightly shorter than the bracteate sterile bases of the branches, densely serrate; branches divergent, 14-24 cm long, straight or slightly curved, ca. 3 mm thick, sulcate, laxly subverticillate-flowered, flattened at base; floral bracts lanceovate, acuminate, to 9 mm long, about equaling the sepals, strongly convex, minutely denticulate, green toward base and brown toward apex, the margin not contrasting; pedicels spreading, stout, subcylindric, to 4 mm long, subulate, contracted and articulate at base; pistillate sepals ovate, broadly acute or obtuse, 4 mm long, nearly even, brown with prominent scarious margin; petals ovate, acute, barely exceeding the sepals; ovary wholly superior; capsule narrowly ovoid, acute, 11 mm long, sharply angled, deeply divided between the carpels; seeds caudate. Pl. I, fig. 10: Pistillate flower x 1.

MEXICO: Jalisco: Local around rocks, below Presa de Santa Rosa, in the barranca of the Río Grande de Santiago north of Amatitán, 750-800 m, September 1, 1960, McVaugh 18530 (MICH, type).

HECHTIA LAEVIS L. B. Smith, sp. nov.

H. glabra Brand. atque H. reticulata L. B. Smith affinis, a priore pedicellis teretibus gracilibus, a posteriore carpellis laevibus distinguenda.

Known from very young staminate and very old fruiting plants, flowering 2 m high; leaves densely rosulate, over 6 dm long; blades narrowly triangular, rigid, 3 cm wide, covered with pale appressed scales on both sides, becoming glabrous above, laxly repand-serrate with curved antrorse spines 3 mm long; scape (staminate) straight, ca. 10 mm in diameter, sparsely pale-lepidote, very soon glabrous; scape-bracts erect, exceeding the internodes but so narrow as to expose most of the scape, entire or subentire, the lower linear from a small triangular base, the upper narrowly triangular; inflorescence laxly bipinnate in both sexes, sparsely pale-lepidote when young; primary bracts (staminate) like the upper scape-bracts, to 17 mm long; branches spreading or subspreading, densely flowered with a short flattened sterile base, the pistillate to 15 cm long; floral bracts broadly triangular, much shorter than the pistillate pedicels; staminate flowers much too young (ca. 1 mm long) to show characters but the anthers already exerted; pistillate flowers with pedicels slen-

derly cylindric, 3.5 mm long, smooth, basally articulate; sepals broadly ovate, apiculate, 1.5 mm long; petals triangular, 3.5 mm long, white; ovary wholly superior; capsule ovoid, 8 mm long, deeply sulcate between the carpels, castaneous, even, covered at first with appressed white scales. Pl. I, fig. 11: Fruit x 1; fig. 12: Pistillate sepal x 5.

MEXICO: Colima: Abundant in rocky ravine and on open rocky slopes above, mountains 10 miles south-southwest of Colima on Manzanillo road, alt. 400-500 m, July 18, 1957, McVaugh 15528 (MICH, type; US).

PITCAIRNIA ABUNDANS L. B. Smith, sp. nov.

P. aequatoriale L. B. Smith in systema mea proxima sed rhachi sepalisque minutissime tuberculatis, floribus patentibus, ovario costato differt.

Short-caulescent, flowering 6-7 dm high; leaves subrosulate at the apex of the stem; sheaths concealed by each other; blades dimorphic, some reduced to dark pectinate-serrate flat spines, others foliaceous, deciduous, linear, acuminate, slightly narrowed toward base, 6 dm long, 18 mm wide, sparsely white-flocculose at base, entire above the line of abscission; scape erect, over 1 cm in diameter at base, soon glabrous; scape-bracts all exceeding the internodes, the lower subfoliaceous, the upper triangular, caudate-acuminate, green, entire, sparsely white-flocculose; inflorescence simple, 15-22 cm long, subdense, bearing a tuft of sterile bracts at apex; rhachis sulcate, minutely and obscurely tuberculate, otherwise glabrous; floral bracts narrowly triangular, caudate-acuminate, much exceeding the pedicels and the lowest about equaling the sepals; flowers stiffly spreading; pedicels 6 mm long, strongly sulcate when dry; sepals narrowly triangular, acuminate, 26-29 mm long, minutely tuberculate, sulcate when dry; petals linear, 6 cm long, probably white, bearing a truncate scale at base; stamens included; ovary about 2/3 superior, the lower part strongly costate; ovules caudate. Pl. II, fig. 1: Flower x 1; fig. 2: Sepal x 1.

MEXICO: Nayarit: Abundant on summits of rocks in shade in the barranca, mountains 10 miles southeast of Ahuacatlán, on the road to Barranca del Oro and Amatlán, alt. 1100-1300 m, November 17-18, 1959, McVaugh & Koelz 751 (US, type; MICH).

This is the first endemic Mexican species known to have deciduous leaves combined with appendaged petals.

GUATEMALA

TILLANDSIA LAMPROPODA L. B. Smith var. MAJOR L. B. Smith, var. nov.

A var. lampropoda foliis majoribus, inflorescentia digitata differt.

Flowering over 6 dm high; leaves ca. 8 dm long; blades 3 cm wide; scape-bracts subinflated, the lowest subfoliaceous, the highest apiculate; inflorescence digitate from 3 spikes; primary bracts like the upper scape-bracts, very broadly ovate, 5 cm

long; spikes lanceolate, strongly complanate, 13-19 cm long; floral bracts vermilion with green tips; petals white.

GUATEMALA: Without further locality, cultivated 1964, Wyly M. Billing, Jr. 55 (US, type).

COLOMBIA

GREIGIA MULFORDII L. B. Smith var. MACRANTHA L. B. Smith, var. nov.

A var. mulfordii foliorum laminis angustioribus, bracteis floribusque majoribus differt.

Leaf-blades ca. 3 cm wide, centrally subentire; primary bracts to 75 mm long, their green apices nearly as long as their castaneous bases; sepals 27 mm long; petals 45 mm long.

COLOMBIA: Cundinamarca: On páramo, Macizo de Bogotá, eastern drainage, Quebrada de Casarreales, Páramo de Palacio, alt. 3450 m, December 14, 1959, Cuatrecasas, Murillo & Jaramillo 25625 (US, type).

PERU

AECHMEA RETUSA L. B. Smith, sp. nov.

A Ae. chantinii (Carr.) Baker, cui affinis, foliorum laminis concoloribus, bracteis florigeris ellipticis retusis ovarium multo superantibus differt.

Flowering ca. 6 dm high; leaves 4 dm long, densely punctulate-lepidote; sheaths ovate, but slightly wider than the blades but mostly entire, nearly black above, brown with purple streaks beneath; blades ligulate, broadly subacute, 6 cm wide, wholly green, laxly serrate with dark spreading spines 3 mm long; scape erect, slender; scape-bracts much longer than the internodes but reflexed, lanceolate, rose, serrulate; inflorescence laxly bipinnate with 11 branches; primary bracts nearly all like the scape-bracts and reflexed, much exceeding the sterile naked base of the branch; branches spreading and then curved-ascending, 15 cm long, 2 cm wide, strongly complanate, dense, very sparsely white-flocculose; rhachis geniculate, winged, dark green drying to black, the internodes to 8 mm long; floral bracts distichous, suberect, exposing nearly all of the rhachis, elliptic, retuse, 17 mm long, much exceeding the ovary, ecarinate, pale green drying to stramineous, prominently nerved, soon glabrous; sepals free, asymmetric, suboblong, truncate with a minute mucro, 13 mm long, ecarinate, nerved; petals 16 mm long, bearing 2 fimbriate scales at base; ovary obovoid, 8 mm long at anthesis; epigynous tube distinct, 2 mm high; placentae apical; ovules caudate. Pl. II, fig. 3: Inflorescence x 1/10; fig. 4: Branch x 1/2; fig. 5: Sepal x 1.

PERU: Without further locality but probably from the Amazonian collections of Lee Moore, cultivated in Gotha, Florida, 1963, Julian Nally (US, type).

BRAZIL

BILBERGIA SEIDELII Smith & Reitz, sp. nov.

A *B. pohliana* Mez, cui verisimiliter affinis, scapi bracteis imbricatis, ovario obovoidea sulcato differt.

Flowering shoot 7 dm long, probably decurved; leaves 6 (! Seidel), over 5 dm long; blades ligulate, 3 cm wide, densely lepidote on both sides, prominently white-banded beneath, laxly serrulate with brownish spines 1 mm long; scape decurved, to 2 mm in diameter, soon glabrous; scape-bracts elliptic, acute, rolled about the scape in a slender cylinder, to 11 cm long, the upper imbricate, membranaceous, rose, covered with white appressed scales; inflorescence laxly bipinnate, few-flowered; axis slender, geniculate, finely and sparsely white-lepidote; primary bracts spreading, like the upper scape-bracts, to 8 cm long, much exceeding the branch-axes and about equaling the petals; branches short, 2-flowered; floral bracts broadly ovate, apiculate, about half as long as the ovary; flowers sessile; sepals slightly asymmetric, lance-oblong, broadly subacute and minutely apiculate, 25 mm long, 6 mm wide; petals 5 cm long, blue-purple toward apex; ovary obovoid, 5 mm long, strongly sulcate, densely white-lepidote except the ridge-crests, the epigynous tube short. Pl. II, fig. 6: Branch x 1/2; fig. 7: Sepal x 1.

BRAZIL: Rio de Janeiro: By the road from Niteroi to Campos, November 2, 1962, A. Seidel 504 (HBR, type; US photo).

DYCKIA ODORATA L. B. Smith, sp. nov.

Ab omnibus speciebus adhuc cognitis, scapo subnullo, sepalis 2, petalis 2, staminibus 4 differt.

Flowering shoot 10 cm high; leaves (separated) 15 cm long; sheaths triangular-ovate, inconspicuous, stramineous, smooth, sublustrous, sparsely lepidote toward apex; blades narrowly triangular, 5 mm wide, covered with white appressed scales on both sides, becoming glabrous above, laxly serrate with pale slender spreading spines 2 mm long; scape lacking; inflorescence simple but in 3 parts, a cluster of flowers at the base, the basal part of the raceme (4 cm) with obviously abortive flowers, and the terminal part with apparently well developed flowers, the whole subdensely white-flocculose; floral bracts broadly ovate, the basal ones with long narrowly triangular serrate blades that exceed the flowers, the highest merely apiculate; pedicels spreading, slender, 3 mm long; flowers 2-merous, "with a very sweet and strong fragrance" (David Hutt); sepals suborbicular, very broadly acute and minutely apiculate, 5-6 mm long; petals 10 mm long, orange, short-connate, the blade spreading, broadly rounded; stamens much shorter than the petals, the filaments almost completely connate, the anthers sagittate, curved, 1.5 mm long; ovary slenderly conical, the styles short but obvious and separate. Pl. II, fig. 8: Flower and bract x 1; fig. 9: Sepal x 2.

BRAZIL: Goiás: Region of the Chapada de Veadeiros at 47° 30' W, 14° 30' S, 5 km west of Veadeiros, Dawson 14578 (US, type; UC, cultivated in the Botanical Garden of the University of Califor-

nia and prepared October 5, 1963, by David Hutt).

NEOREGELIA CHLOROSTICTA (L. B. Smith) L. B. Smith, comb. nov.

Neoregelia sarmentosa (Regel) L. B. Smith var. chlorosticta L. B. Smith, Contr. Gray Herb. 104:79. 1934.

Neoregelia marmorata L. B. Smith, Contr. Gray Herb. 124:10. 1939; Smithsonian Misc. Coll. 126:157. 1955, in part, as to material cited not as to basonym.

Further study shows that Neoregelia chlorosticta has leaves of much thinner texture and more even surface than those of typical N. sarmentosa. Its sepals prove to be very close in form and size to those of collections that I had cited mistakenly under N. marmorata because of the leaf coloration. Actually N. marmorata has acuminate sepals while the material cited has them rounded and barely apiculate and much smaller.

NEOREGELIA SEIDELIANA Smith & Reitz, sp. nov.

A N. cruenta (R. Graham) L. B. Smith et N. concentrica (Vell.) L. B. Smith, quibus affinis, foliis e lepidibus appressis magnis omnino cinereo-coloratis differt.

Leaves many in an infundibuliform rosette, 45 cm long, covered on both sides with coarse appressed cinereous scales that obscure their coloration especially beneath; sheaths elliptic, ample, 10 cm long, entire except toward apex; blades ligulate, broadly subacute and slenderly involute-apiculate, 4 cm wide, laxly serrate with flat antrorse reddish spines 3 mm long; scape 8 cm long; inflorescence hemispheric, many-flowered, 6 cm in diameter; outer bracts broadly ovate, apiculate, much exceeded by the sepals, cinereous-lepidote; floral bracts linear, acute and mucronulate, incurved at apex, plicate, about equaling the mid-points of the sepals, cinereous-lepidote; pedicels slender, to 15 mm long; sepals asymmetric, lance-oblong, acuminate, involute-subulate, 24 mm long, connate for 2 mm; petals free, acute, blue toward apex; stamens included; ovary ellipsoid, 12 mm long at anthesis. Pl. II, fig. 10: Floral bract and flower x 1; fig. 11: Sepal x 1.

BRAZIL: Espírito Santo: Santa Tereza, October 13, 1961, L. Seidel 71-A (HBR, type; US photo). Without locality but doubtless the same collection, cultivated in Corupá, Santa Catarina, A. Seidel s. n. (US, received November 8, 1962).

Plate I

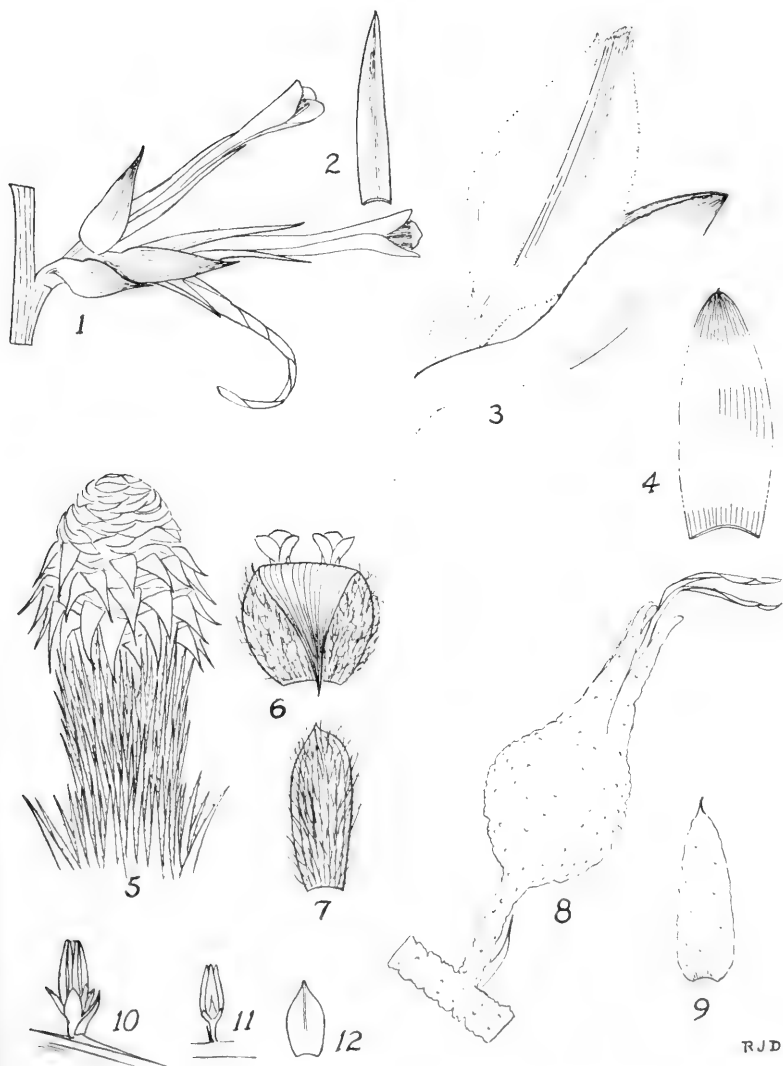


Fig. 1, 2: *Puya reducta*; fig. 3, 4: *P. valida*; fig. 5-7: *P. tristis*; fig. 8, 9: *Aechmea mcvaughii*; fig. 10: *Hechtia jaliscana*; fig. 11, 12: *H. laevis*.

Plate II

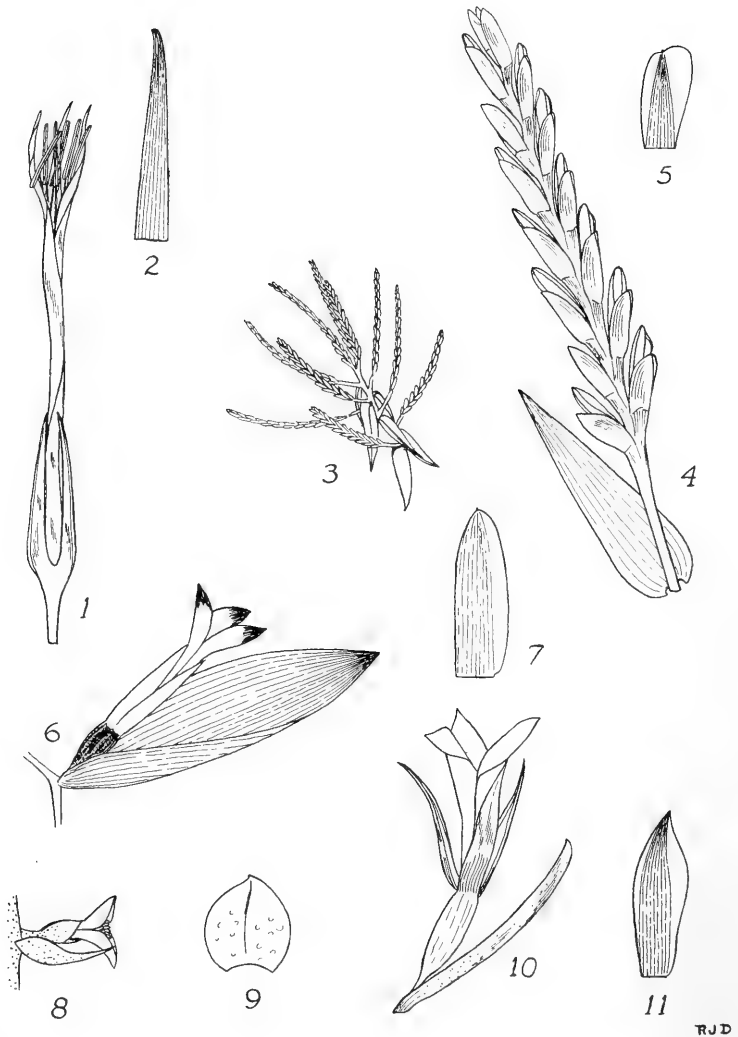


Fig. 1, 2: *Pitcairnia abundans*; fig. 3-5: *Aechmea retusa*; fig. 6, 7: *Billbergia seidelii*; fig. 8, 9: *Dyckia odorata*; fig. 10, 11: *Neoregelia seidelii*.

NOTES ON NEW AND NOTEWORTHY PLANTS. XLI

Harold N. Moldenke

LIPPIA SCHLIMII var. GLABRESCENS (Moldenke) Moldenke, comb. nov.
Lippia hirsuta var. glabrescens Moldenke, Phytologia 9: 500.
1964.

PAEPALANTHUS SPECIOSUS var. PULVERULENTUS Moldenke, var. nov.
Haec varietas a forma typica speciei foliis caulibusque vaginisque pedunculisque plusminus dense albo-pilosis pilis caducis pulveruliformibus recedit.

This variety differs from the typical form of the species in having its stems, leaves, sheaths, and peduncles more or less densely white-pilose with a mealy type of hair which apparently rubs off easily in powdery fashion.

The type of this variety was collected by Edmundo Pereira (no. 7476) at Cristaleira, BR. 7, km. 615, at an altitude of 1250 meters, Goiás, Brazil, on March 30, 1963, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

SYNGONANTHUS HELMINTHORRHIZUS var. GLANDULOSUS Moldenke, var. nov.
Haec varietas a forma typica speciei pilis pedunculorum valde glandulosis recedit.

This variety differs from the typical form of the species in having the pubescence on its peduncles conspicuously glandular-tipped.

The type of the variety was collected by Ezechias Paulo Heringer (no. 8340/534) in the "mata" at Hórto do Guará, Brasília, Dist. Fed., Brazil, on May 17, 1961, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

SYNGONANTHUS NIVEUS var. STRIGOSUS Moldenke, var. nov.

Haec varietas a forma typica speciei vaginis arcte albo-strigosis differt.

This variety differs from the typical form of the species in having the sheaths white-strigose with closely appressed antrorse hairs.

The type of the variety was collected by Apparicio Pereira Duarte in a sandy "restinga" at the Caravelas airport south of Bahia, Bahia, Brazil, on August 18, 1961, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

SYNGONANTHUS XINGUENSIS Moldenke, sp. nov.

Herba parva caulescens; caulibus erectis usque ad 4 cm. altis dense foliosis; foliis basalibus rosulatis recurvatis linearibus glabris, caulibus adscendentibus imbricatis linearibus glanduloso-puberulis; pedunculis numerosissimis 5--8 cm. longis bisulcatis parce glanduloso-puberulis; vaginis arcte adpressis 2 cm. longis

glanduloso-puberulis; capitulis globosis 5 mm. longis latisque griseis.

Small caulescent herb, decidedly glandulose-sticky; stems erect, to 4 cm. tall, densely leafy; basal leaves numerous, recurved, linear, 1.5--3 cm. long, almost 1 mm. wide, flat, not fenestrate, pilose at the base, otherwise glabrous, the cauline leaves shorter, ascending, imbricate, 1--1.5 cm. long, acute at the apex, rather densely glandulose-puberulent on both surfaces; peduncles very numerous, 5--8 cm. long, 2-costate and 2-sulcate, sparsely glandular-puberulous; sheaths about 2 cm. long, closely appressed to the peduncle, densely glandular-puberulent with divergent brownish hairs, obliquely acute at the apex; heads (in fruit) globose, gray, about 5 mm. long and wide, densely many-flowered; bractlets and pistillate florets uniformly gray-scarious or whitish, the perianth parts (in fruit) firm, distinct and erect.

The type of this distinct species was collected by R. Arlé (no. 1) at Igarapé Tutuari, near Porto Capitão Vasconcelos, Alto Xingó, Matto Grosso, Brazil, in June, 1961, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York.

VERBENA HASTATA f. *CAERULEA* Moldenke, f. nov.

Haec forma a forma typica speciei corollis pallide caeruleis recedit.

This form differs from the typical form of the species in having pale-blue corollas.

The type of the form was collected by Andrew Ralph Moldenke (no. 1043) in a moist swale at Amherstburg, Essex County, Ontario, Canada, on August 28, 1964, and is deposited in the H. N. Moldenke Herbarium at Yonkers, New York. There were about 6 husky plants of this distinct color form growing among 100 of the normal form and 30 of f. *rosea* Cheney.

MATERIALS TOWARD A MONOGRAPH OF THE GENUS *VERBENA*. XXII

Harold N. Moldenke

VERBENA PERUVIANA var. *GLABRIUSCULA* Kuntze

Additional bibliography: Moldenke, *Phytologia* 3: 289 (1950) and 3: 467. 1951; Moldenke, *Résumé* 120, 128, 224, & 473. 1959; Moldenke, *Résumé Suppl.* 5: 8. 1962.

This variety differs from the typical form of the species in having almost smooth leaves.

The type of the variety was collected by Rodolfo Hauthals (no. 52) at Sierra Ventana, Buenos Aires, Argentina. The plant has been found in dry grassy places and in fields at 250 meters altitude, flowering in April and from October to December. The corolla is described as red, blood-red, fire-red, or carmine. A

common name, "margarita colorada", has been recorded for the plant. It has been misidentified and distributed in herbaria under the names V. chamaedryfolia Juss. and V. chamaedryfolia Juss. It was introduced into cultivation in Belgium in or before the year 1839.

In all, 15 herbarium specimens have been examined by me, including the type of the synonym, which was collected by Martin Martens in cultivation in the botanical garden at Louvain, Belgium, in 1839, and is deposited in the herbarium of the Jardin Botanique de l'Etat at Brussels.

Citations: URUGUAY: Arechavaleta s.n. [Cerro Largo] (Ug); Berro 4750 (N), 6247 (N), 6718 (N). ARGENTINA: Buenos Aires: Cabrerá 10718 (Mv); Osten 2654 (N, Ug); Pedersen 355 (W--2122395); Wall & Sparre s.n. [Balcarce, 2/11/46] (Ew, Ew, Ew, N). CULTIVATED: Belgium: M. Martens s.n. [h. b. Lov. 1839] (Br), s.n. [hort. Cols.] (Br, Br).

VERBENA PERUVIANA f. ROSEA Moldenke, Phytologia 2: 324. 1947

Synonymy: Verbena chamaedryfolia var. rosea Osten ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena chamaedryfolia var. melindres f. siccanea lus. roseiflora Osten ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena chamaedryfolia var. melindres f. siccanea lus. roseifolia Osten ex Moldenke, Résumé 362, in syn., sphalm. 1959. Verbena chamaedryfolia α melindres rosiflora Osten ex Moldenke, Résumé 362, in syn. 1959. Verbena peruviana var. rosea Moldenke, Résumé 372, in syn. 1959.

Bibliography: Maund & Henslow, Botanist 3: pl. 129. 1839; Moldenke, Phytologia 2: 324 & 337. 1947; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 100 & 199. 1949; Moldenke, Alph. List Cit. 3: 780. 1949; Moldenke, Phytologia 3: 467 (1951) and 4: 188. 1953; Reitz, Sellowia 6: 254 & 257 (1954) and 11: 57 & 134. 1959; Moldenke, Résumé 100, 120, 224, 362, 372, & 473. 1959; Reitz, Sellowia 13: 67. 1961; Moldenke, Résumé Suppl. 5: 7. 1962.

Illustrations: Maund & Henslow, Botanist 3: pl. 129, in part [in color]. 1839.

This form differs from the typical form of the species in having pink or rose-colored corollas [Saccardo 17] instead of bright-scarlet.

The type of the form was collected by Cornelius Osten (no. 3197) at Arroyo Grande, in the department of Soriano, Uruguay, on October 3, 1895, and is deposited in the herbarium of the Museo de Historia Natural at Montevideo. The various Osten designations are also based on this same collection; on the sheet of 4195 Osten has written "Verbena chamaedryfolia floribus roseis (forma teratologica?)" and comments that the plant was growing with the typical form in grassy places at Colon, near Montevideo, on October 2, 1900. He later made this specimen the type of his V. chamaedryfolia (α melindres rosiflora), deposited in the herbarium of the Museo de His-

toria Natural at Montevideo.

The rose-colored spray shown by Maund & Henslow (1839) is apparently this form; it is there called a form of V. chamaedryfolia var. elfordiana Benth.

The plant has been collected in "restinga litoranea", at 1400 meters altitude, blooming in October and December. Common names recorded for it are "camaradinha", "formosa sem dote", and "jurupeba". Reitz & Klein 8168 has elongated petioles, but is otherwise identical with nos. 7436 and 7451; these all look very much like dwarf examples of V. phlogiflora Cham., but the calyx is much shorter.

In all, 7 herbarium specimens, including the types of all the names involved, have been examined by me.

Citations: BRAZIL: Santa Catarina: Reitz & Klein 155 [Herb. Reitz 4703] (N, S, W--2141539), 7436 (Z), 7451 (Mm), 8168 (Mm). URUGUAY: Osten 3197 (Ug--type), 4195, in part (Ug).

VERBENA PHLOGIFLORA Cham., Linnaea 7: 266--267. 1832.

Synonymy: ?Verbena cunha Vell., Fl. Flum. 17--18. 1825. ?Verbena cunea Vell., Fl. Flum. Icon. 1: pl. 41. 1827. Verbena phlogiflora ♂ Cham., Linnaea 7: 266. 1832. Verbena tweediana Niven ex Hook. in Curtis, Bot. Mag. 63: pl. 354l. 1836. Verbena tweediana Hook. ex Maund & Henslow, Botanist 2: pl. 60. 1838. Verbena tweediana Hook. ex Steud., Nom. Bot., ed. 2, 2: 751. 1841. ?Verbena cunea Arrab. ex Steud., Nom. Bot., ed. 2, 2: 750. 1841. Verbena caerulescens Hort., Floricult. Cab. 10: 218. 1842. Verbena phlogiflora ♀ canescenti-hirtello-sabra Walp., Repert. 4: 26. 1845. Verbena tweediana Niven ex Walp., Repert. 4: 28. 1845. Verbena phlogiflora ♂ vulgaris Schau. in A. DC., Prodr. 11: 537. 1847. Verbena phlogifera Cham. ex Rttmpler in Vilm., Illustr. Blumeng., ed. 1, 1263. 1873. Verbena megapotamica ? tweediana Kuntze, Rev. Gen. Pl. 3 (2): 256. 1898. Verbena phlogiflora var. truncatula Briq., Ann. Conserv. & Jard. Bot. Genève. 7-8: 289. 1904. Verbena phlogiflora var. ♀ Cham. ex Briq., Arkiv Bot. Stockh. 2 (10): 7, in syn. (1904) and Ann. Conserv. & Jard. Bot. Genève. 7-8: 288, in syn. 1904. Verbena megapotamica var. tweediana Kuntze ex Briq., Arkiv Bot. Stockh. 2 (10): 7--8 (1904) and Ann. Conserv. & Jard. Bot. Genève. 7-8: 288. 1904. Verbena megapotamica var. tweediana f. truncatula Briq., Arkiv. Bot. Stockh. 2 (10): 8. 1904. Verbena phlogiflora var. vulgaris Schau. ex Briq., Arkiv. Bot. Stockh. 2 (10): 8, in syn. 1904. Verbena megapotamica var. tweediana Kuntze ex Sectt., Rev. Univ. Nac. Cordoba 17: 90. 1930. Verbena phlogiflora var. tweediana (Niven) Kuntze ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941. Verbena phlogiflora var. tweediana f. truncatula (Briq.) Briq. ex Moldenke, Suppl. List Invalid Names 10, in

syn. 1941. Verbena megapotamica var. tweediana (Niven) Kuntze ex Moldenke, Alph. List Invalid Names 43, in syn. 1942. Verbena phlogiphora Cham. ex Schnack, Anal. Inst. Titotéc. Sta. Catalina 4: 19--21. 1942. Glandularia phlogiphora (Cham.) Covas & Schnack, Darwiniana 6: 475. 1944. Glandularia phlogiphora (Cham.) Schnack & Covas apud J. A. Clark, Card Ind. Gray Herb. issue 183. 1944. Verbena megapotamica var. phlogiphora (Cham.) Kuntze ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. Verbena nielli Martens ex Moldenke, Alph. List Invalid Names Suppl. 1: 25, in syn. 1947. Glandularia phlogiphora (Cham.) Schnack & Covas ex Moldenke, Résumé 296, in syn. 1959. Verbena phlogiphora Cham. & Schlecht. ex Moldenke, Résumé 372, in syn. 1959. Verbena phlogiphora var. mucilata Schau. ex Moldenke, Résumé 372, in syn. 1959. Verbena cunea Auct. ex Moldenke, Résumé Suppl. 5: 7. 1962.

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denke, *Cult. Pl.* 35. 1938; Beale, *Chron. Bot.* 5: 517. 1939; Moldenke, *Annot. & Classif. List* 108. 1939; Beale, *Journ. Genet.* 40: 338, 340, 348, 354, & 355. 1940; Moldenke, *Suppl. List Invalid Names* 8--10. 1941; Worsdell, *Ind. Lond. Suppl.* 2: 436. 1941; Schnack, *Anal. Inst. Fitotéc. Sta. Catalina* 4: 19--21. 1942; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 1], 25, 39, 41, 44, 74, & 102. 1942; Moldenke, *Alph. List Invalid Names* 46, 48, 49, & 51. 1942; Herter, *Revist. Sudam. Bot.* 7: 225. 1943; Parodi, *Darwiniana* 6: 150 & 175. 1943; Sampaio & Peckolt, *Arquiv. Mus. Nac. Rio Jan.* 37: 392. 1943; J. A. Clark, *Card Ind. Gray Herb.* issue 183. 1944; Covas & Schnack, *Darwiniana* 6: 475. 1944; Schnack & Covas, *Darwiniana* 6: 471--473. 1944; Cabrera & Dawson, *Rev. Mus. La Plata, new ser., sec. bot.*, 5: 357 & 381. 1944; Schnack & Covas, *Darwiniana* 7: 71--75, pl. 3 E & 4 G. 1945; *Indice Taxon.* 1 (14--16): 6. 1945; Cabrera, *Bol. Arg. Soc. Bot.* 1: 67. 1945; Covas & Schnack, *Darwiniana* 7: 86 & 88. 1945; Moldenke, *Phytologia* 2: 69 & 116. 1945; Augusto, *Fl. Rio Grande do Sul* 209 & 232. 1946; Moldenke, *Alph. List Cit.* 1: 12, 21, 22, 28, 83, 104, 135, 195, 201, 208, 264, 265, & 289. 1946; Moldenke, *Alph. List Invalid Names Suppl.* 1: 10, 23, 25, & 27. 1947; Moldenke, *Phytologia* 2: 343 (1947) and 2: 425. 1948; Moldenke, *Castanea* 13: 117. 1948; H. N. & A. L. Moldenke, *Pl. Life* 2: 86. 1948; Moldenke, *Alph. List Cit.* 2: 363, 364, 367, 369--371, 375, 413, 463, 467, 534, 551, 561, 624, & 628 (1948), 3: 660, 663, 665, 670, 696, 704, 708, 745, 747, 750, 751, 781, 783, 798, 814, 845, 848, 849, 863, 869, 876, 889, 916, 921, & 969 (1949), and 4: 1072, 1081, 1123, 1124, 1204, 1250, 1251, 1256, & 1288. 1949; H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 14. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 45, 94, 99, 100, 106, 164, & 199. 1949; Moldenke, *Phytologia* 3: 136 (1949) and 3: 467. 1951; Moldenke in Chittenden, *Roy. Hort. Soc. Dict. Gard.* 4: 2208--2210 & 2212. 1951; Stellfeld, *Trib. Farmac.* 19 (10): 167 & 172. 1951; E. J. Salisb., *Ind. Kew. Suppl.* 11: 101. 1953; Rambo, *Sellowia* 6: 60 & 84. 1954; Moldenke, *Inform. Mold. Set* 48 *Spec.* [4]. 1954; Moldenke, *Phytologia* 5: 96 (1954) and 5: 132 & 133. 1955; Rambo, *Sellowia* 7: 260. 1956; Moldenke in Humbert, *Fl. Madag.* 174: 8. 1956; Moldenke, *Biol. Abstr.* 30: 1093. 1957; Angely, *Fl. Paran.* 7: 13. 1957; Alain in León & Alain, *Fl. Cuba* 4: 281 & 282. 1957; Moldenke, *Am. Midl. Nat.* 59: 344, 346, & 350. 1958; Moldenke, *Résumé* 53, 110, 118, 120, 128, 224, 296, 358, 360, 363, 369, 370, 372, 377, 421, & 473. 1959; Reitz, *Sellowia* 11: 57. 1959; Rennó, *Levant. Herb. Inst. Agron. Minas* 151. 1960; Moldenke, *Résumé Suppl.* 2: 12 & 13. 1960; Angely, *Fl. Paran.* 16: 79 (1960) and 17: 46. 1961; Moldenke, *Phytologia* 8: 120 & 123 (1961) and 8: 435. 1962; Nair & Rehman, *Bull. Nat. Bot. Gard. Lucknow* 76: 3, 4, & 23, pl. 1 (1), fig. 1. 1962; Moldenke, *Résumé Suppl.* 5: 7 (1962) and 6: 7 & 11. 1963; Moldenke, *Phytologia* 9: 40, 76, 177, 190, 315, 330, 333, 334, & 336 (1963), 9: 362, 364, 365, 367, & 388 (1963), and 10: 160, 174, & 175. 1964; Moldenke, *Résumé Suppl.* 8: 6 (1964) and 10: 130 & 132--134. 1964.

Illustrations: Vell., *Fl. Flum. Icon.* 1: pl. 41. 1827; Curtis, *Bot. Mag.* 63: pl. 3541 [in color]. 1836; J. Harrison, *Floricult.*

Cab. 5: 24 [in color]. 1837; Sweet, Brit. Fl. Gard. 7 [ser. 2, 4]: pl. 391 [in color]. 1837; Maund & Henslow, Botanist 2: pl. 60 [in color]. 1833; Journ. Jard. 1838: 216 [in color]. 1838; Paxt., Mag. Bot. 4: 5 [in color]. 1838; Floricult. Cab. 10: 218 [in color]. 1842; J. W. Loud., Ladies' Fl.-Gard. Ornam. Perenn. 2: pl. 91 [in color]. 1844; L. H. Bailey, Cycl. Amer. Hort., ed. 1, 6: 1912, pl. 2649 (1902) and ed. 4, 6: 1912, pl. 2649. 1906; L. H. Bailey, Stand. Cycl. Hort. 6: 3445, pl. 3910. 1917; Makino, Ill. Flora Japan [215]. 1924; Terasaki, Nippon Shokubutsu Zufu [Jap. Bot. Illustr. Album] 1026. 1933; Schnack & Covas, Darwiniana 7: pl. 4 G. 1945; Nair & Rehman, Bull. Nat. Bot. Gard. Lucknow 76: 3, fig. 1, pl. 1 (1). 1962.

Annual or perennial, low, creeping herb, 30--70 cm. tall, or semi-creeping or climbing subshrub to 2 m. tall, usually sprawling, with hirtellous-scabrous subcanescent pubescence; stems not stoloniferous, creeping or ascending to erect, 80 cm. to 2 m. long; branches numerous, tetragonal, wide-spreading or erect, to 3 m. long, retrorsely hirsutulous; leaves decussate-opposite, petiolate; leaf-blades oblong or lanceolate to lanceolate-triangular, to 9 cm. long and 4 cm. wide, acute at the apex, cuneate and narrowed into the petiole at the base or sometimes subtruncate, unequally subincised-serrate along the margins except for the entire basal prolongation, strigose above, hirtous or substrigillose-hirtellous beneath, somewhat revolute along the margins, the venation rugose-elevated beneath; inflorescence terminal, spicate; spikes pedunculate, solitary, densely congested-capitate, many-flowered, not elongating after anthesis; bractlets subulate-lanceolate or short-ovate, about half as long as the calyx; flowers very showy; calyx 11--14 mm. long, retrorsely hirtellous, with interspersed stipitate and subpetiolar glands, the teeth ovate, acuminate; corolla hypocrateriform, showy, varying from blue, blue-lilac, blue-purple, blue-violet, or rosy-blue to lilac, dull-lilac, purple-lilac, violet-lilac, violet, purple, or even rose or pink [red or red-vermillion according to Moench], sometimes described as "violet-purple above, pale-lavender below", "bright violet-rose when fresh", or "rose on the edges, violet in the center", glabrous on the outer surface, its tube 1.6--2.5 cm. long, the limb mostly lilac, to 2 cm. wide, violet and black-glandulose in the center, the throat covered with violet hairs, the lobes emarginate; chromosome number: $2n = 10$.

This species is apparently based on several Sellow collections from Brazil, originally deposited in the herbarium of the Botanisches Museum at Berlin, now destroyed. Chamisso's original statement is "F Brasilia meridionali misit Sellowius pluribus locis lectam semper paululum variantem.....Herba habitu fere Bidentium nostrorum, at inflorescentiis terminalibus superbienis divitissimis paniculam amplissimam Phlogis paniculatae simulans...in variet. < calyx 6 1/2 lineas, tubus corollinus 10 1/2 lineas metiebantur."

The description and illustration of Velloso's V. cunha are so inadequate that it is not possible to say with certainty that his

plant is conspecific with the one here under discussion. If the two are really conspecific, then his name has priority and must be adopted for the species.

The F. C. Hoehne collections cited hereinafter have statements on their labels to the effect that the corolla is red or red-vermillion. This is most amazing for this species, and I wonder if the statements are not perhaps due to a faulty recollection or a confusion with specimens of V. incisa Hook. or V. peruviana (L.) Britton perhaps collected at the same time and place. Bailey states in a note on his no. 386 that the anthers are "not appendaged". The var. arraniana is said by horticulturists to differ in having uniformly purple corollas, and the lower leaves broader, less attenuate at the base and less acutely pointed at the apex. The name, V. arraniana Hort., was reduced to synonymy under V. phlogiflora by me in my Résumé 358 (1959), but it apparently belongs instead to the synonymy of V. incisa Hook.

Schauer (1851) distinguishes his two varieties as follows: var. vulgaris -- "pube hirtella scabra subcanescens, caulibus gracilibus decumbentibus; ramis patentissimis diffusis adscendentibus-erectis; spicis terminalibus solitariis; bracteis subulato-lanceolatis calyce duplo et quod excedit brevioribus." Var. macilenta -- "major, pube strigosa tenuissima raraque adspectu glabra; caulibus herbaceis, fistulosis, ramosissimis, erectis; spicis ad apicem ramorum saepe ternis, longe pedunculatis, simplicibus vel uno alterove pari ad basin primariae subsessilis accedente cymoso-paniculatis." His var. vulgaris I regard as typical V. phlogiflora, while his var. macilenta I regard as typical V. megapotamica Spreng. His composite descriptive notes are given herewith: "Planta ex loco innumeris modis varians. Forma α habitu Verbena chamaedryfoliae et affinum manifesto accedit; forma β vero cum α forma primarium ab illis primo obtutu abhorrere videtur, accuratius inspecta tamen nulla nota graviore recedit, et pro forma uberrime vegetante recognoscitur. -- Caulis decumbens v. erectus 2--6 pedalis (ex Riedelio) internodia modo elongata, modo foliis breviora. Spicae jam longe jam breviter immo brevissime pedunculatae. Flores arrecti. Calyx tubulosus 5 1/2 lineas longus, plicis s. valleculis ut in affinibus, membranaceis, costis herbaceis et in dentes ovatos acuminatos conspicue inaequales excurrentibus, inter pubem simplicem glandulis rubicundis stipitatis consistus, post anthesin tortus. Corolla in silvestri testi collecta lilacina vel coerulea, extus glabra, intus superne et ad faucem villosa et barbata; fauce staminifera; tubo cylindrico 8--9 lin. longo; limbo amplo 5-fido, laciniis erarginatis. Stylus et fructus Verbenae teucriodis. -- Similis V. chamaedryfoliae sed jam statura validiore ramisque erectis diversa, praeteraque foliis latioribus manifesto petiolatis, floribus majoribus, corolla magis purpurea quam scarlatina. Crescit in campis Brasiliae meridionalis et in provincia Minarum, ad Brandahy alibique: Sellow; ad Formigas: Pohl; pr. Villa das Caldas: Regnell; ad Congonhas do Campo: Stephan; in provincia S.

Pauli ad Ypanema, Januario: Mart.; in locis humidiusculis umbrosis pr. Postinho, Martio, et in locis siccis pr. Penha, Septembri, nec non in umbrosis humidis circa Batatoes et Araracoara, Majo: Riedel, Lund; in province Rio Grande do Sul: Arsene Isabelle ex Gill. et Hook.; in paludosis ad Laguna de la Molina in civitate Uruguay teste Tweedie ex Hook."

Osten, in a long memorandum written at Montevideo in January, 1931, says: "Die Arbeiten von Chodat (Plantae Hasslerianae) und Briquet so weit sie die Sectio 'Mobiles' Schauer betreffen, sind voll von Irrthumern. Ich habe Briquet von 2 Jahren eine grossere Sammlung von Verbenen gesandt mit meinen Bemerkungen, habe aber nicht einmal Empfangsanzeige erhalten. An Hassler sandte ebenfalls, habe von ihm schriftlich die Nachricht, dass er mit meinen Ansichten übereinstimmt (Hassler ist augenblicklich in San Bernardino, ich habe ihn leider nicht sehen können).

"Briquet behauptet, dass V. chamaedryfolia in Paraguay nicht vorkomme. Das ist richtig soweit es sich um V. Melindres Gill. handelt. V. melindroides Cham. habe ich von Misiones und dürfte sie am Alto Paraná jedenfalls auch in Paraguay vorkommen. Wenn man aber die rotblühenden Formen der Nobiles zu einer sp. coll. (turma, grex) V. chamaedr. zusammenfasst, so gehört diese Form 8046 jedenfalls dazu. Ich habe hier in Uruguay, in Paraguay, in Argentinien gefunden dass die Blütenfarbe der einzelnen Arten sehr constant ist, dass dieselbe Art rot, violett, weiss blüht, ist absolut ausgeschlossen (cf. Chodat, in Plant. Hassl.). Soweit ich aus dem Beschreibungen Briquet's ersehen kann, hat er diese Form zu phlogiflora (megapotamica var. Tweediana) als forma truncatula gezogen. Sie hat nichts damit zu tun. V. phlogiflora ist hochwüchsiger, mit grosseren Blüten deren Farbe immer lila violett ist, deren Blütenstände sich nach dem Verblüthen nicht verlängern sondern kopfförmig bleiben. Ich habe diese Form 8046 in meinem Herbar als 'Briquetiana' bezeichnet und halte sie für den Übergang von V. incisa Hook. zu der V. scrobiculata Griseb. (Symbolae no. 1735). V. incisa Hook. aus der Araucariazone, s/ Br. Uruguay [nur fluss littoral!]; V. scrobiculata = Tucumanzone, 'Alles Flusst!' I regard Osten's V. briquetiana as V. incisa Hook.

Walpers classifies V. phlogiflora in his Section Verbenaca, Subsection, Inermes, Group Foliosae, Subgroup Macranthae, and Secondary Subgroup Melindres, with ten other species. He keeps V. tweediana Niven as a distinct species.

Verbena phlogiflora has been collected along riverbanks and the margins of woods, in ravines, wet depressions in the mountains, hedges, river woods, shrubby dry fields, fields and high places, thickets among fields and thickets along small streams, in shrubby campos and virgin woods, at the edge of aqueducts, on forest edges, among grasses in water of swamps, and scattered on sunny hills. Rosengurt found it "en zanjás herbosas", while

Parodi (1943) says "habita en los cerros". Mosén encountered it on stream banks and "sparse in other wet places", while Jørgensen says of it "common among trees". It has been collected at altitudes of 600 to 1600 meters, blooming in every month of the year except June, fruiting in February. It was introduced into cultivation in England in or before the year 1836. Troncoso (1937) reports it cultivated in Argentina. Common names recorded for it are "camaradinha", "margarita", "Mr. Tweedie's vervain", and "Tweedie scarlet vervain" -- the last-mentioned being most inappropriate, since, according to Osten, the flowers are always lilac-violet in color.

The relation of the pistil length to the size of the pollen-grains is discussed by Covas & Schnack (1945). The plant is said to be used for ornament by the local inhabitants in Misiones. Hybrids have been reported with V. peruviana (L.) Britton [=xV. corrupta Moldenke] and with V. tenuisecta Briq. [=xV. dissoluta Moldenke].

Nair & Rehman (1962) describe the pollen-grains of V. phlogiflora as "3-zonicolporate, spheroidal (diameter 47 μ ; range 42--53 μ). Colpi ends acute, margin slightly wavy, membrane faintly crustate. Apocolpium diameter 8.4 μ . Endocolpium faint (olongate). Exine 2.8 μ thick. Exine thin for a small width marking a 'pseudocolpus' round the colpus. Ectine almost as thick as endine, granulate (faint LO). Taking together all the species studied, significant differences have been noticed in the nature of the pseudocolpus." These authors apparently based these observations on a specimen cultivated at Lucknow, India -- "MBG 16511; Sl. 2726". Since I have not seen this specimen, I am not sure that it really represents V. phlogiflora -- xV. hybrida Voss is much more likely.

It should be noted here that the following names, for which one might look in the synonymy of this species, do not belong here: V. arraniana Hort. = V. incisa Hook.; V. megapotamica var. truncatula Briq. = V. incisa Hook.; V. megapotamica var. truncatula f. pinnatiloba Kuntze = V. pinnatiloba (Kuntze) Moldenke; V. phlogiflora Chod. = V. hasslerana Briq.; V. phlogiflora var. mucilenta Schau. = V. megapotamica Spreng.; V. phlogiflora var. mucilenta Schau. = V. megapotamica Spreng.; V. phlogiflora var. J Cham. = V. megapotamica Spreng.; V. phlogiflora α glabra Walp. = V. megapotamica Spreng.; V. phlogiflora β mucilenta Schau. = V. megapotamica Spreng.; and V. tweediana var. grandiflora Martens = V. incisa Hook.

Herbarium material of V. phlogiflora has been misidentified and distributed under the names V. arraniana Hort., V. bonariensis L., V. chamaedrifolia A. L. Juss., V. hasslerana Briq., V. hirta Spreng., V. marrubioides Cham., V. megapotamica Spreng., V. melindres Gill., V. peruviana (L.) Britton, and V. phlogiflora mucilenta Schau.

On the other hand, the F. Faust s.n. [10/25/37], distributed as V. phlogiflora, is actually V. canadensis (L.) Britton; Collector undesignated s.n. [17 Juni 1908] is xv. hybrida Voss; Widgren s.n. [1845] is in part V. kuntzeana Moldenke; Stellfeld s.n. [Herb. Mus. Paran. 1634] is V. montevidensis Spreng.; and Fiebrig 6305 is V. rigida Spreng. The Lindman A.1353 cited below was identified by Briquet as "Verbena megapota mica var. tweediana Kuntze forma". Briquet (1901.) cites Balansa 1024 and 1024a from Paraguay. He places V. megapota mica var. macilentata Schau. (in part) in the synonymy of V. phlogiflora. Cabrera & Lawson (1944) reduce V. phlogiflora to synonymy under V. megapota mica, while Troncoso (1937) reduces V. megapota mica to synonymy under V. phlogiflora! The Wattuone & Bianchi 60 collection, cited below, does not look at all typical and may prove to represent another taxon.

It should perhaps be noted here that the names published in Loud., Hort. Brit. Suppl. 2: 630 (1839) are sometimes accredited to W. Baxter, but apparently should be accredited to G. Don. Also, Loud., Ladies' Fl.-Gard. Ornarn. Perenn. 2: pl. 91, fig. 4 (1841) is marked "fig. 3" in the legend of the New York Botanical Garden's copy of this work.

In all, 197 herbarium specimens and 7 mounted illustrations and photographs have been examined by me.

Citations: CUBA: Havana: Fortún & Arias 7066 (Es); Herb. Cub. Estac. Cent. Agron. s.n. [Nov. 1909] (Es). BRAZIL: Minas Gerais: Bello 173 [Herb. Jard. Bot. Rio Jan. 46306] (N); Black 219m [Herb. Jard. Bot. Rio Jan. 50357] (N); P. Clausen 625 (N, N, S), s.n. [Aug.--April 1840] (Br, Br, Br), s.n. (Ja--46524); Collector undesignated s.n. [Pocos de Caldas] (Ja--46602); A. P. Duarte 484 [Herb. Jard. Bot. Rio Jan. 53832] (N), s.n. [Herb. Jard. Bot. Rio Jan. 60513] (N); Herb. Saldanha 3663 (Ja--46541); F. C. Hoehne s. n. [Caldas, Jan. 10, 1919] (N, Sp--2787), s.n. [Pocos de Caldas, March 27, 1920] (Sp--3846), s.n. [Miguel Bernier, Jan. 27, 1921] (N, Sp--5170); Kuntze s.n. [Contendas, Dec. '92] (N, N); Lindberg 215 (Dr, S); Mosén 639 (S), 965 (S), 3997 (S); Motta s.n. [Pocos de Caldas, Nov. 1881] (Ja--46537, Ja--46538); Regnell I.311 [19/1/1861] (S), I.311 [11/12/1862] (W--1323115), I.311 [17/12/1862] (S), I.311 [14/10/1864] (S, S), I.311 [21/10/1864] (W--209640), I.311b (S); Stephan s.n. [1843] (Br); Widgren 1209 (Br), s.n. [1845] (Br, Ja--46583, Lu, S). MATTO GROSSO: Lankester s.n. [June 27th 1937] (K). PARANÁ: Braga 1030 (W--2369356); Braga & Lange 255 (W--2369343); Collector undesignated s.n. [Campos Gerais, 1374] (Ja--46603); Dusén 10745 (S), 15040 (S), s.n. [Itapurusu, 18/11/1908] (S), s.n. [1914--16] (S); Hatschbach 3067 (Sm), 3138 (Sm), 5522 (Mm), 7246 (Ca), 7369 (Ca); Princesa Imperial s. n. [Campos Gerais, Dec. 1884; Herb. Saldanha 8789] (Ja--46543).

Rio Grande do Sul: Henz 35460 (Lg, N), s.n. [Rambo 35460] (N); Jürgens 13 (B, Ja--17762), 411 (B); Malme 1502 (S), 1502a (S); Moldenke ? Moldenke 19690 (Es, N, Ot, Sm, Ug); Rambo 9767 (Sp--50985), 32817 (S), 36419 (S), 37693 (N), 39020 (N), 52102 (N, W--2102324), 52158 (N, W--2102354); Reineck & Czernak 577 (Po--63877). Santa Catarina: Dusén 17848 (S); Fischer 9 [Herb. A. Lutz 2054] (Hk); Hatschbach 4513 (Sm); F. Müller 91 (Ja--46530); Reitz 3404 (N), 4523 [Herb. Reitz 4741] (Le, S, W--2141739). São Paulo: Bailey & Bailey 986 (Ba), 920 (Ba, Ba); Brade 7002 (N, Sp--6724), 12395 (Ja--46496); Campos Porto 2982, in part [Herb. Jard. Bot. Rio Jan. 32604] (B, N), 2985 [Herb. Jard. Bot. Rio Jan. 32607] (N); Collector undesignated 257-264 (Ja--46593); M. Kuhlmann s.n. [Umarama] (K, Sp, Sp--32386); Leite 4007 (El); Löfgren & Edwall s.n. [Sapucaí, Jan. 14, 1893; Herb. Com. Geogr. & Geol. 2115] (N, Sp--15734); Pickel 1274 (N, Sf); Usteri s.n. [Villa Prudente, Dec. 9, 1906] (N, Sp--15727); Weir 436 (Bm). State undetermined: Glaziou 16289 (Br); Herb. Bot. Mus. Lund. s.n. (Lu); Sellow s.n. [Macbride photos 34351] (Kr--photo of type, N--photo of type). PARAGUAY: Hassler 4585 (Ca--935031, N, S), 10083 (Cb, V), 11312 (Bm, Ca--929878, Cb, N, N--photo, V, Z--photo); Jørgensen 3769, in part [Herb. Osten 22249] (Ug); Lindman A.1853 (S, S); T. Rojas 254 (B), 1466 [Herb. Osten 7907] (N, Ug), 1882 [Herb. Hort. Parag. 10066; Herb. Osten 13571] (Ug). URUGUAY: J. Ball s.n. [prope Paysandu, 1882] (C); Berro 5583 (N); Osten 5389 (Ug); Otto s.n. [Montevideo] (Cp); Rosengurt B.4083 (N). ARGENTINA: Buenos Aires: Archer 4573 (W--1691993); Boffa 148 (Ca--164803); Burkart 4331 [Herb. Osten 22470] (N, Ug); Cabrera 2431 (N, N), 3401 (Sp--38947); Reutzell s.n. [Herb. Inst. Bot. Darwinion 16063] (N); Rodriguez V.566 (Bm, S). Corrientes: Cipolla s.n. [Parodi 12882] (N); T. Meyer 11346 (N), 11486 (N); Parodi 12510 (N); Ruiz Huidobro 3968 (N), 4052 (N), 4085 (N), 4173 (Gg--352679, N, N), 4268 (N), 4408 (Gg--353276, N), 4429 (N). Entre Ríos: Cabrera & Corte 9610 (W--2197990). Formosa: I. Morel 2768 (N). Misiones: Bertoni 1550 (N), 1847 (Au--122468, N), 1937 (N, Ok, Rf); Ekman 1979 (Mi, N, S); Lilliesköld s.n. (S); Montes 1747 [5] (N, Si), 2064 (N, Ok); D. Rodriguez 530 [Herb. Inst. Miguel Lillo 31561] (N); Sahway 2127 (N); A. G. Schulz 6894 (Z); G. J. Schwarz 610 (Bm), 1282 (N), 1412 (Au--122407, N), 2039 (Bm), 2345 (N, St), 2615 (N, Rf), 3192 (N), 3244 (S), 3246 (S), 3367 (N), 3431 (S, S); Vattuone & Bianchi 60 (W--1043508). CULTIVATED: Argentina: O'Donnell 202 [Herb. Inst. Miguel Lillo 95189] (Ca--165871). Belgium: M. Martens s.n. [h. b. lov. 1839] (Br). Brazil: Etzel s.n. [Herb. Inst. Bot. S. Paulo 38719] (N). Germany: Herb. Martius s.n. [hortus Monac. 1843] (Br). Switzerland: Herb. Hort. Bot. Basil. s.n.

[Aug. 1839] (M, M). MOUNTED ILLUSTRATIONS: Color plate 5, 1837 (N); J. & J. Parkin, V. tweediana, color plate (N, N).

VERBENA PHLOGIFLORA f. ALBA Moldenke, Phytologia 4: 184. 1953.

Bibliography: Moldenke, Phytologia 4: 184 & 183. 1953; Moldenke, Biol. Abstr. 27: 1887. 1953; Reitz, Sellowia 11: 57. 1959; Moldenke, Résumé 110 & 473. 1959.

This form differs from the typical form of the species in having white corollas.

The type of the form was collected by Raulino Reitz (no. 3443) in a campo at Cambajuva, São Joaquim, at an altitude of 1200 meters, Santa Catarina, Brazil, between January 23 and 29, 1950, and is deposited in the Britton Herbarium at the New York Botanical Garden. The plant has been found only in fields and cultivated fields, at altitudes of 10 to 1200 meters, blooming in January and October. Common names reported for it are "camaradinha", "fornosa sem dote", and "jurupeba". Only 3 specimens, including the type, have been examined by me.

Citations: BRAZIL: Santa Catarina: Reitz 1947 (S), 3443 (N--type, S--isotype).

VERBENA PINETORUM Moldenke, Phytologia 2: 27--28. 1941.

Bibliography: Moldenke, Phytologia 2: 27--28. 1941; Howard S. Gentry, Carnegie Inst. Wash. Publ. 527: 222 & 306. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 19 & 102. 1942; Moldenke, Alph. List Cit. 1: 233 (1946) and 2: 498. 1948; H. N. & A. L. Moldenke, Pl. Life 2: 44. 1948; Moldenke, Castanea 13: 113. 1948; Moldenke, Phytologia 3: 132. 1949; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 26, 33, & 199. 1949; Moldenke, Alph. List Cit. 3: 677 & 807 (1949) and 4: 1120, 1175, & 1255. 1949; Moldenke, Phytologia 3: 451. 1951; E. J. Salisb., Ind. Kew. Suppl. 11: 263. 1953; Moldenke, Résumé 32, 39, & 473. 1959; Moldenke, Phytologia 8: 141 (1961), 8: 473 (1963), and 9: 165. 1963; Moldenke, Résumé Suppl. 6: 4. 1963; Moldenke, Phytologia 10: 140, 142, & 218. 1964.

Perennial herb, from a crown root; stems slender, sharply tetragonal, bristly-hirsute with whitish hairs about 1 mm. long, much more densely so at the base of the plant; leaves decussate-opposite, 2--3 cm. long; petioles broadly winged, not very distinct from the leaf-blades; leaf-blades chartaceous, uniformly green on both surfaces, deeply pinnatifid-incised, the lower ones often 3-parted and each division again pinnatifid-incised, the uppermost much reduced and simply 3-parted with entire divisions or even oblong or linear and entire, densely hirsute on both surfaces, the larger leaves scabrous with bulbous-based hairs above and very densely white-hirsute beneath, the upper leaves with much more appressed-strigose hairs, especially above; inflorescence spicate, elongate; spikes slender, to 21 or more cm. long, loosely many-flowered (dense in bud and during anthesis, the rachis later elongating considerably), not glandular; peduncles slender, sharply tetragonal, 2--3 cm. long, hirsute like the stems; rachis also tetragonal and densely hirsute; bractlets lanceolate, about 4 mm. long,

attenuate at the apex, rather densely strigose-pilose, about equalling the calyx in anthesis and fruit; calyx tubular, 3.5--4 mm. long, densely strigillose; corolla hypocrateriform, showy, blue or pale-blue to blue-violet or violet, 10--11 mm. long, the tube 7 mm. long or longer, much surpassing the calyx, the limb large and spreading, to 15 mm. wide; cocci very sparsely scaberulous on the commissural face.

The type of this species was collected by Howard Scott Gentry (no. 1522) in pine flats, transition habitat, at Sierra Charuco, Rio Fuerte, Chihuahua, Mexico, on July 22, 1935, and is deposited in the Shreve Herbarium at the University of Arizona. The species has been found on open hillsides, rocky limestone mountains, and rolling oak hills, in fields and woods, and on pine flats, at altitudes of 730 to 3000 meters, flowering from June to October, and fruiting in June, July, September, and October. Gentry encountered it on dry gravel slopes, on open pine slopes in the transition zone, and "scarce on dry gravel benches and slopes". He calls it a "Perennial caespitose herb, with blue flowers in summer. Occurs infrequently in Sierra Charuco and Canelo." He cites his no. 557 as being the same taxon, but this collection is regarded by me as representing V. canescens H.B.K.

Material of V. pinetorum has been misidentified and distributed in herbaria under the names V. menthaefolia Benth., V. neomexicana (A. Gray) Small, V. neomexicana var. xylopoda Perry, V. officinalis L., V. xutha Lehm., Berbenia neomexicana (Gray) Small, and Verbenia xutha Lehm. It should be noted that L. I. Davis regards the Lundell 5047 and Edwards 49, cited below, as V. neomexicana. However, Kearney keys the two species apart as follows:

Corolla-tube about 4 mm. long, slightly to moderately surpassing the calyx, the limb 4--10 mm. wide; nutlets usually densely white-scaberulous on the commissural face....V. neomexicana.
Corolla-tube 7 mm. long or longer, much surpassing the calyx, the limb to 15 mm. wide; nutlets very sparsely scaberulous on the commissural face.....V. pinetorum.

Verbenia pinetorum, however, is very closely related to the puzzling and apparently very variable V. menthaefolia Benth. and more study is needed to clarify this complex. Perry annotated Edw. Palmer 356 (originally distributed as V. officinalis) in the Gray Herbarium, United States National Herbarium, and the herbarium of the Missouri Botanical Garden as V. menthaefolia and E. W. Nelson 6096 as "Aff. V. Halei or V. xutha". The latter collection has had its number changed to "6696" on the label, but seems to have been "6096" in two places on the sheet before.

In all, 27 herbarium specimens, including the type, and 2 mounted photographs have been examined by me.

Citations: ARIZONA: Cochise Co.: Howard S. Gentry 3382 (Ak--23259). Pima Co.: S. L. Berry s.n. [Old Baldy, Aug. 28, 1904] (Gg--31468). MEXICO: Chihuahua: Howard S. Gentry 1522 (Fs--type, Ge--isotype, I--isotype, H--photo of type, Z--photo of type), 1758

(Ge), 1923 (Ca—576767, Fs, Ge, Hp, I). Durango: Edw. Palmer 356 (Ca—104835, N, W—304178). Nuevo León: M. T. Edwards 49 (Au, Au); E. W. Nelson 6096 [6696] (W—347325); S. S. White 1577 (Tu—35530). San Luis Potosí: C. L. Lundell 5047 (Au, Au, Dp, Fs, Lh, Mi, N); F. W. Pennell 17535 (Me). Sonora: F. W. Pennell 19598 (W).

VERBENA PINNATILOBA (Kuntze) Moldenke, Phytologia 2: 28. 1941.

Synonymy: Verbena megapotamica f. 2 pinnatiloba Kuntze, Rev. Gen. Pl. 3 (2): 256. 1898. Verbena megapotamica var. tweediana

f. pinnatiloba Kuntze ex Moldenke, Phytologia 2: 23, in syn.
August 26. 1941. Verbena megapotamica var. pinnatiloba Kuntze ex Moldenke, Suppl. List Invalid Names 9, in syn. August 31. 1941.

Bibliography: Kuntze, Rev. Gen. Pl. 3 (2): 256. 1898; Moldenke, Phytologia 2: 28. 1941; Moldenke, Suppl. List Invalid Names 9. 1941; Moldenke, Alph. List Invalid Names 48. 1942; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 1], 41 & 102. 1942; Moldenke, Alph. List Cit. 2: 627. 1948; Moldenke, Known Geogr. Distrib. Verbenac., [ed. 2], 99, 106, & 199. 1949; Moldenke, Phytologia 3: 134 & 136 (1949) and 3: 289. 1950; E. J. Salisb., Ind. Kew. Suppl. 11: 262. 1953; Moldenke, Résumé 118, 120, 128, 369, & 473. 1959; Moldenke, Résumé Suppl. 3: 15 (1962) and 6: 11. 1963; Moldenke, Phytologia 10: 133. 1964.

Herb, 30--70 cm. tall; stems creeping, somewhat branched; corolla varying from blue to violet or purple. Kuntze's original description is "Folia superiora inciso-dentata, inferiora pinnatifida."

The type of this species was collected by Carl Ernst Otto Kuntze in southern Paraguay in September, 1892, and is deposited in the Britton Herbarium at the New York Botanical Garden.

The species has been collected at the edge of arroyos, while Schulz says that it is rather abundant in low wet soil. It has been found in anthesis from January to May and in September, in fruit in September. Material has been misidentified and distributed in herbaria as V. incisa Hook.

In all, 15 herbarium specimens, including the types of all the names involved, and 4 mounted photographs have been examined by me.

Citations: PARAGUAY: Kuntze s.n. [Stud-Paraguay, IX.92] (F—photo of type, N—type, N—photo of type, Si—photo of type, W—701063— isotype, Z—photo of type); T. Rojas 12524 (Bm). URUGUAY: Berro 5570 (N). ARGENTINA: Chaco: A. G. Schulz 1467 (N, N). Corrientes: Ibarrola 341 (Ca); Rufz Huidobro 2105 (Bm, Gg—352675, N, S), 2199 (Gg—353219, N), 4743 (N). Misiones: Rufz Huidobro 4689 (N).

VERBENA PLATENSIS Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825.

Synonymy: Verbena teucroides Gill. & Hook. in Hook., Bot. Misc. 1: 167. 1829. Verbena scordioides Cham., Linnaea 7: 269.

1832. Verbena tenerioides Gill. & Hook. ex C. Gay, Hist. Fis. Chile Bot. 5: 18, sphalm. 1849. Verbena nivenii Hort. ex Vilm., Fl. Pl. Terre, ed. 1, 938. 1865. Verbena teucrioides Gill. & Arn. ex Rttmpler in Vilm., Illustr. Blumeng., ed. 1, 1263. 1873. Verbena tenerioides Gill. & Hook. ex Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147. 1894. Verbena nivenii Haage & Schmidt, Cat. Général 93, in syn. 1898. Verbena chamaedryfolia f. foliosae Chod., Bull. Herb. Boiss., sér. 2, 2: 818. 1902. Verbena platensis var. latiuscula Briq., Arkiv Bot. Stockh. 2 (10): 10. 1904. Verbena paraguariensis Briq. in Chod. & Hassler, Bull. Herb. Boiss., sér. 2, 4: 1055, in syn. 1904 [not V. paraguariensis Moldenke, 1941]. Verbena pratensis Beale, Chron. Bot. 5: 517, in not. 1939. Verbena teucrioides x tweediana Hort. ex Moldenke, Suppl. List Invalid Names 10, in syn. 1941. Glandularia platensis (Spreng.) Schnack & Covas, Darwiniana 6: 475. 1944. Verbena teucrioides Gill. ex Rosengurtt, Estud. Prad. Nat. Urug. 5: 395. 1946. Verbena candidissima Stecklers ex Moldenke, Alph. List Invalid Names Suppl. 1: 23, in syn. 1947. Verbena tencricides Lossen ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena teneroides Gill. & Arn. ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena teucrioides Hook. ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena teucrioides var. platensis Macbr. ex Moldenke, Alph. List Invalid Names Suppl. 1: 27, in syn. 1947. Verbena teneroides Gill. & Hook. ex Moldenke, Résumé 376, in syn. 1959. Verbena revenii Hort. ex Moldenke, Résumé Suppl. 6: 11, in syn. 1963.
- Bibliography: Spreng. in L., Syst. Veg., ed. 16, 2: 748. 1825; Hook., Bot. Misc. 1: 167--168. 1829; Cham., Linnaea 7: 269. 1832; Paxt., Mag. Bot. 5: 243. 1838; Hook. in Curtis, Bot. Mag. 65: pl. 3694. 1839; Floricult. Cab. 7: 22. 1839; Maund, Bot. Gard. 9: pl. 197. 1839--1851; Steud., Nom. Bot., ed. 2, 2: 750 & 751. 1841; Lem., Horticult. Univ. 3: 9--11. 1842; D. Dietr., Syn. Fl. 3: 601--603. 1843; J. W. Loud., Ladies' Fl.-Gard. Orn. Perenn. 2: pl. 91. 1844; Walp., Repert. 4: 27--29. 1845; Schau. in A. DC., Prodr. 11: 538. 1847; C. Gay, Hist. Fis. Chile Bot. 5: 18. 1849; Schau. in Mart., Fl. Bras. 9: 184. 1851; Vilm., Fl. Pl. Terre, ed. 1, 933--939. 1865; Ulrich, Internat. Wörterb. Pfl., ed. 1, 250. 1872; Rttmpler in Vilm., Illustr. Blumeng., ed. 1, 1263. 1873; Ulrich, Internat. Wörterb. Pfl., ed. 2, 250. 1875; Regel, Gartenfl. 28: 372. 1879; Griseb., Abh. K. Gesell. Wiss. Götting. 24: [Symb. Fl. Argent.] 275. 1879; F. Phil., Cat. Pl. Vasc. Chil. 221. 1881; Hieron., Bol. Acad. Nac. Córdoba 4: 408. 1881; Lorentz & Niederlein, Exped. Rio Negro 2 (bot.): 263--264. 1881; Hieron., Pl. Diaph. Fl. Argent. 214. 1882; J. Ball, Journ. Linn. Soc. Lond. Bot. 21: 231. 1884; Vilm., Alb. de Cliches, ed. 2, fig. 25685. 1888; Briq. in Engl. & Prantl, Nat. Pflanzenfam. 4 (3a): 147. 1894; L. H. Bailey in A. Gray, Field Forest & Gard. Bot. 341. 1895; Jacks. in Hook. f. & Jacks., Ind. Kew. 2: 1179. 1895.

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