

1. *Coryphantha runyonii*.

2. *Dolichothele sphaerica*.



# THE CACTACEAE

## DESCRIPTIONS AND ILLUSTRATIONS OF PLANTS OF THE CACTUS FAMILY

BY

N. L. BRITTON AND J. N. ROSE

Volume IV



THE CARNEGIE INSTITUTION OF WASHINGTON  
WASHINGTON, DECEMBER 24, 1923

CARNEGIE INSTITUTION OF WASHINGTON  
PUBLICATION No. 248 VOLUME IV

Pages 1-80, text only, were distributed  
under date of October 9, 1923

PRESS OF GIBSON BROTHERS, INC  
WASHINGTON

## CONTENTS.

---

	PAGE
Tribe 3. Cerecae— <i>continued from Vol. III</i>	
Subtribe 6, Coryphanthanae	3
Key to Genera	3
Ancistrocactus	3
Thelocactus	6
Neolloydia	14
Mamillopsis	19
Cochemia	21
Coryphantha	23
Neobesseyia	51
Escobaria	53
Bartschella	57
Peleciphora	59
Phellosperma	60
Dolichothele	61
Solisia	64
Neomammillaria	65
Subtribe 7, Epiphyllanae	177
Key to Genera	177
Zygocactus	177
Epiphyllanthus	180
Schlumbergera	182
Epiphyllum	185
Disocactus	201
Chiapasia	203
Eccremocactus	204
Nopalxochia	204
Wittia	206
Subtribe 8, Rhipsalidanae	208
Key to Genera	208
Erythrorhipsalis	208
Rhipsalidopsis	209
Pfeiffera	210
Acanthorhipsalis	211
Pseudorhipsalis	213
Lepismium	215
Hatiora	216
Rhipsalis	219
Appendix	249
Index	291



## ILLUSTRATIONS.

	PLATES	FACING PAGE
Plate 1.	(1) Plant of <i>Coryphantha runyonii</i> from Texas. (2) Plant of <i>Dolichothele sphaerica</i> from Texas . . . . .	Frontispiece.
Plate 2.	(1) Fruiting plant of <i>Coryphantha neo-mexicana</i> . (1 <i>a</i> ) Fruit of same. (2) Top of flowering plant of <i>Ancistrocactus scheeri</i> . (3) Flowering plant of <i>Cochemiea poselgeri</i> . (3 <i>a</i> ) Fruit of same. (3 <i>b</i> ) Seed of same. (4) Flowering plant of <i>Coryphantha cornifera</i> . . . . .	4
Plate 3.	(1) <i>Coryphantha nickelsae</i> from Monterey, Mexico. (2) <i>Neobesseyia similis</i> from Texas . . . . .	34
Plate 4.	(1) <i>Coryphantha aggregata</i> from Arizona . . . . .	46
Plate 5.	(1) A flowering plant of <i>Coryphantha cubensis</i> . (1 <i>a</i> ) Fruit of same. (1 <i>b</i> ) Tubercle of same. (2) Flowering plant of <i>Neomammillaria confusa</i> . (3) Flowering plant of <i>Neomammillaria geminispina</i> . (4) Top of flowering plant of <i>Coryphantha durangensis</i> . (5) A flowering plant of <i>Coryphantha arizonica</i> . (6) Flowering plant of <i>Coryphantha bumamma</i> . (7) Flowering plant of <i>Coryphantha chlorantha</i> . . . . .	48
Plate 6.	(1) <i>Escobaria runyonii</i> from Texas. (2) <i>Neomammillaria hemisphaerica</i> from Texas . . . . .	56
Plate 7.	(1) Flowering plant of <i>Escobaria dasyacantha</i> . (2) Fruit of <i>Dolichothele sphaerica</i> . (2 <i>a</i> ) Seed of same. (3) Flowering plant of <i>Neomammillaria arida</i> . (4) Flowering plant of <i>Escobaria bella</i> . (4 <i>a</i> ) Tubercle of same. (5) Flowering plant of <i>Neomammillaria crocicdata</i> . (6) Flowering plant of <i>Bartschella schumannii</i> . (7) A flowering plant of <i>Neomammillaria carnea</i> . . . . .	58
Plate 8.	(1) Fruiting plant of <i>Neomammillaria gaumeri</i> . (2) Flowering plant of <i>Neomammillaria heyderi</i> . (2 <i>a</i> ) Fruit of same. (3) Flowering and fruiting plant of <i>Neomammillaria hemisphaerica</i> . (4) Flowering plant of <i>Neomammillaria compressa</i> . (5) Flowering plant of <i>Neomammillaria geminispina</i> . (6) Flowering plant of <i>Neomammillaria hemisphaerica</i> . . . . .	72
Plate 9.	(1) Flowering and fruiting plant of <i>Neomammillaria applanata</i> . (2) Top of fruiting plant of <i>Neomammillaria karwinskiana</i> . (3) Top of flowering plant of <i>Neomammillaria aureiceps</i> . (4) Flowering plant of <i>Neomammillaria macracantha</i> . (5) Fruiting plant of <i>Neomammillaria mystax</i> . . . . .	76
Plate 10.	(1) <i>Coryphantha sulcata</i> from Sabinal, Texas. (2) <i>Neomammillaria runyonii</i> from Monterey, Mexico . . . . .	80
Plate 11.	(1) Flowering plant of <i>Neomammillaria magnimamma</i> . (2) Flowering plant of <i>Neomammillaria karwinskiana</i> . (3) Fruiting plant of <i>Neomammillaria gigantea</i> . (4) Fruiting plant of <i>Neobesseyia missouriensis</i> . . . . .	96
Plate 12.	(1) Flowering plant of <i>Neomammillaria pseudoperbella</i> . (2) Top of flowering plant of <i>Neomammillaria spinosissima</i> . (3) Flowering plant of <i>Neomammillaria dealbata</i> . (4) Flowering plant of <i>Neomammillaria amoena</i> . (5) Flowering plant of <i>Neomammillaria polyedra</i> . (6) Flowering plant of <i>Neomammillaria celsiana</i> . . . . .	110
Plate 13.	(1) <i>Neomammillaria wilcoxii</i> from Calabasas, Arizona. (2) <i>Neomammillaria gaumeri</i> from Yucatan, Mexico . . . . .	154
Plate 14.	(1) Flowering plant of <i>Neomammillaria kunzeana</i> . (2) Flowering plant of <i>Neomammillaria bocasana</i> . (3) Flowering plant of <i>Neomammillaria decipiens</i> . (4) Top of flowering plant of <i>Neomammillaria armillata</i> . (5) Flowering plant of <i>Neomammillaria multiceps</i> . (6) Flowering plant of <i>Neomammillaria multiceps</i> . (7) Flowering plant of <i>Neomammillaria palmeri</i> . (8) Flowering plant of <i>Neomammillaria wildii</i> . . . . .	156
Plate 15.	(1) Flowering plant of <i>Neomammillaria bombycina</i> . (2) Flowering plant of <i>Neomammillaria armillata</i> . (3) Top of flowering plant of <i>Neomammillaria armillata</i> . (4) Flowering plant of <i>Neomammillaria armillata</i> . (5) Flowering plant of <i>Neomammillaria goodridgei</i> . . . . .	158
Plate 16.	(1) Flowering plant of <i>Epiphyllum darrahii</i> . (2) Top of flowering plant of <i>Epiphyllum pittieri</i> . . . . .	190
Plate 17.	(1) End of branch of <i>Epiphyllum macropterum</i> . (2) Base of branch of <i>Epiphyllum macropterum</i> . . . . .	192
Plate 18.	<i>Epiphyllum pittieri</i> from Costa Rica . . . . .	194
Plate 19.	<i>Epiphyllum hookeri</i> from Tobago, West Indies . . . . .	198
Plate 20.	<i>Eccremocactus bradei</i> from Costa Rica . . . . .	204
Plate 21.	(1) Fruiting branch of <i>Rhipsalis grandiflora</i> . (2) Flowering branch of <i>Rhipsalis lindbergiana</i> . (3) Fruiting branch of <i>Rhipsalis shaferi</i> . (4) Flowering and fruiting branch of <i>Rhipsalis lindbergiana</i> . (5) Flowering plant of <i>Erythrorhipsalis pilocarpa</i> . (6) Flowering branch of <i>Rhipsalis grandiflora</i> . . . . .	208
Plate 22.	(1) Flowering branch of <i>Pfeiffera ianthothele</i> . (2) Flowering and fruiting branch of <i>Lepismium cruciforme</i> . (3) Top of fruiting branch of <i>Pfeiffera ianthothele</i> . (4) Flowering and fruiting branch of <i>Rhipsalis jamaicensis</i> . (5) Flowering branch of <i>Pseudorhipsalis alata</i> . (6) Flowering and fruiting branch of <i>Pseudorhipsalis himantoclada</i> . (7) Flowering branch of <i>Pfeiffera ianthothele</i> . . . . .	210
Plate 23.	(1) Flowering branch of <i>Hatiora cylindrica</i> . (2) Fruiting branch of <i>Rhipsalis heteroclada</i> . (3) Fruiting branch of <i>Rhipsalis cribrata</i> . (4) Flowering branch of <i>Hatiora salicornioides</i> . . . . .	218

Plate 24.	(1) Flowering branch of <i>Rhipsalis leucorhaphis</i> . (2) Fruiting branch of <i>Rhipsalis leucorhaphis</i> . (3) Fruiting branch of <i>Rhipsalis megalantha</i> . (4) Fruiting branch of <i>Rhipsalis neves-armondii</i> . (5) Fruiting branch of <i>Rhipsalis neves-armondii</i> . (6) Fruiting branch of <i>Rhipsalis pittieri</i> . (7) Flowering and fruiting branch of <i>Rhipsalis shaferi</i> . (8) Fruiting branch of <i>Rhipsalis aculeata</i> . (9) Fruiting branch of <i>Rhipsalis mesembryanthemoides</i> . (10) Flowering branch of <i>Rhipsalis mesembryanthemoides</i> . . . . .	220
Plate 25.	(1) Fruiting branch of <i>Rhipsalis heteroclada</i> . (2) Fruiting branch of <i>Rhipsalis heteroclada</i> . (3) Fruiting branch of <i>Rhipsalis capilliformis</i> . (4) Fruiting branch of <i>Rhipsalis virgata</i> . . . . .	222
Plate 26.	(1) Flowering branch of <i>Rhipsalis cribrata</i> . (2) Fruiting branch of <i>Rhipsalis capilliformis</i> . (3) Flowering branch of <i>Rhipsalis capilliformis</i> . (4) Flowering branch of <i>Rhipsalis capilliformis</i> . (5) Flowering branch of <i>Rhipsalis teres</i> . . . . .	224
Plate 27.	(1) Flowering and fruiting branch of <i>Rhipsalis cassutha</i> . (2) Fruiting branch of <i>Rhipsalis burchellii</i> . (3) Flowering branch of <i>Rhipsalis cereuscula</i> . . . . .	226
Plate 28.	(1) Flowering branch of <i>Rhipsalis neves-armondii</i> . (2) Flowering branch of <i>Rhipsalis paradoxa</i> . (3) Fruiting branch of <i>Rhipsalis pulvinigera</i> . (4) Flowering branch of <i>Rhipsalis tucumanensis</i> . (5) Fruiting branch of <i>Rhipsalis tucumanensis</i> . . . . .	228
Plate 29.	(1) Flowering branch of <i>Rhipsalis floccosa</i> . (2) Flowering branch of <i>Rhipsalis floccosa</i> . (3) Fruiting branch of <i>Rhipsalis puniceo-discus</i> . (4) Flowering branch of <i>Rhipsalis gibberula</i> . (5) Branch of <i>Rhipsalis dissimilis</i> . (6) Flowering and fruiting branch of <i>Rhipsalis dissimilis</i> . . . . .	230
Plate 30.	(1) Fruiting branch of <i>Rhipsalis gonocarpa</i> . (2) Flowering branches of <i>Rhipsalis warmingiana</i> . (3) Fruiting branch of <i>Rhipsalis tonduzii</i> . (4) Fruiting branch of <i>Rhipsalis trigona</i> . (5) Flowering branch of <i>Rhipsalis pentaptera</i> . (6) Fruiting branch of <i>Rhipsalis pentaptera</i> . . . . .	232
Plate 31.	(1) A flowering branch of <i>Rhipsalis grandiflora</i> . (2) Flowering branch of <i>Rhipsalis pulchra</i> . (3) Flowering branch of <i>Rhipsalis grandiflora</i> . . . . .	234
Plate 32.	(1) A fruiting branch of <i>Rhipsalis heteroclada</i> . (2) Fruiting branch of <i>Disocactus biformis</i> . (3) Flowering and fruiting branch of <i>Rhipsalis prismatica</i> . (4) Flowering branch of <i>Rhipsalis coriacea</i> . (5) Fruiting branch of <i>Rhipsalis coriacea</i> . (6) Fruiting branch of <i>Rhipsalis dissimilis</i> . (7) Branch of <i>Rhipsalis dissimilis</i> . . . . .	236
Plate 33.	(1) Flowering branch of <i>Rhipsalis houlettiana</i> . (2) Flowering branch of <i>Rhipsalis houlettiana</i> . (3) Flower of <i>Rhipsalis houlettiana</i> . (4) Fruiting branch of <i>Rhipsalis houlettiana</i> . . . . .	238
Plate 34.	(1) Flowering branch of <i>Rhipsalis houlettiana</i> . (2) Flower of <i>Rhipsalis houlettiana</i> . (3) Fruiting branch of <i>Rhipsalis warmingiana</i> . (4) Fruiting branch of <i>Rhipsalis warmingiana</i> . . . . .	240
Plate 35.	(1) Fruiting branch of <i>Rhipsalis oblonga</i> . (2) Fruiting branch of <i>Rhipsalis elliptica</i> . (3) Flowering branch of <i>Rhipsalis crispata</i> . . . . .	242
Plate 36.	(1) Flowering branch of <i>Rhipsalis pachyptera</i> . (2) Flowering branch of <i>Rhipsalis rhombea</i> . . . . .	244
Plate 37.	(1) A flowering branch of <i>Rhipsalis russellii</i> . (2) Cluster of flowers of <i>Rhipsalis russellii</i> . (3) Enlarged flower of <i>Rhipsalis russellii</i> . (4) Fruiting branch of <i>Rhipsalis russellii</i> . (5) Fruiting branch of <i>Rhipsalis crispimarginata</i> . (6) Fruiting branch of <i>Rhipsalis pachyptera</i> . . . . .	246

## TEXT-FIGURES.

	PAGE.		PAGE.
Fig. 1.	4	Fig. 22.	21
2.	5	23.	21
3.	5	24.	23
4.	7	24a.	23
5.	7	25.	25
6.	9	26.	27
7.	9	27.	27
8.	10	28.	29
9.	10	29.	29
10.	11	30.	32
11.	11	31.	32
12.	14	31a.	35
13.	14	31b.	35
14.	15	32.	36
15.	15	33.	36
16.	17	34.	37
17.	17	35.	37
18.	18	36.	38
19.	19	37.	38
20.	19	38.	40
21.	20	39.	40

## TEXT-FIGURES—continued.

FIG.		PAGE.	FIG.		PAGE.
40.	<i>Coryphantha durangensis</i> . . . . .	43	103.	<i>Neomammillaria collinsii</i> . . . . .	204
41.	<i>Coryphantha durangensis</i> . . . . .	43	104.	<i>Neomammillaria conzattii</i> . . . . .	105
42.	<i>Coryphantha chlorantha</i> . . . . .	44	105.	<i>Neomammillaria lanata</i> . . . . .	105
43.	<i>Coryphantha neo-mexicana</i> . . . . .	44	106.	<i>Neomammillaria kewensis</i> . . . . .	106
44.	<i>Coryphantha deserti</i> . . . . .	46	107.	<i>Neomammillaria subpolyedra</i> . . . . .	106
45.	<i>Coryphantha deserti</i> . . . . .	46	108.	<i>Neomammillaria tetracantha</i> . . . . .	108
46.	Flower of <i>Coryphantha deserti</i> . . . . .	46	109.	<i>Neomammillaria elegans</i> . . . . .	108
47.	<i>Coryphantha aggregata</i> . . . . .	47	110.	<i>Neomammillaria pseudoperbella</i> . . . . .	109
48.	<i>Mammillaria recurvispina</i> . . . . .	47	111.	<i>Neomammillaria dealbata</i> . . . . .	109
49.	Fruit of <i>Coryphantha sulcata</i> . . . . .	49	112.	<i>Neomammillaria haageana</i> . . . . .	110
50.	<i>Neobeseya wissmannii</i> . . . . .	52	113.	<i>Neomammillaria mundtii</i> . . . . .	110
51.	<i>Escobaria tuberculosa</i> . . . . .	54	114.	<i>Neomammillaria donatii</i> . . . . .	111
52.	<i>Escobaria dasyacantha</i> . . . . .	54	115.	<i>Neomammillaria collina</i> . . . . .	111
53.	<i>Escobaria runyonii</i> . . . . .	56	116.	<i>Neomammillaria celsiana</i> . . . . .	112
54.	<i>Escobaria sneedii</i> . . . . .	56	117.	<i>Neomammillaria aureiceps</i> . . . . .	113
55.	<i>Bartschella schumannii</i> . . . . .	58	118.	<i>Neomammillaria aureiceps</i> . . . . .	113
56.	<i>Pelecyphora aselliformis</i> . . . . .	58	119.	<i>Neomammillaria yucatanensis</i> . . . . .	114
57.	Seed of <i>Phellosperma tetrancistra</i> . . . . .	60	120.	<i>Neomammillaria ruestii</i> . . . . .	114
58.	<i>Phellosperma tetrancistra</i> . . . . .	61	121.	<i>Neomammillaria pringlei</i> . . . . .	115
59.	<i>Dolichothele longimamma</i> . . . . .	61	121a.	<i>Neomammillaria cerralboa</i> . . . . .	116
60.	<i>Dolichothele sphaerica</i> . . . . .	62	122.	<i>Neomammillaria phaeacantha</i> . . . . .	116
61.	<i>Dolichothele longimamma</i> . . . . .	62	123.	<i>Neomammillaria graessneriana</i> . . . . .	116
62.	<i>Dolichothele uberiformis</i> . . . . .	64	124.	<i>Neomammillaria spinosissima</i> . . . . .	117
63.	<i>Solisia pectinata</i> . . . . .	64	125.	<i>Neomammillaria spinosissima</i> . . . . .	117
64.	<i>Neomammillaria mammillaris</i> . . . . .	70	126.	<i>Neomammillaria densispina</i> . . . . .	119
65.	<i>Neomammillaria macdougali</i> . . . . .	70	127.	<i>Neomammillaria nunezii</i> . . . . .	119
66.	<i>Neomammillaria nivosa</i> . . . . .	72	128.	<i>Neomammillaria nunezii</i> . . . . .	120
67.	<i>Neomammillaria macdougali</i> . . . . .	75	129.	<i>Neomammillaria rhodantha</i> . . . . .	120
68.	<i>Neomammillaria phymatothele</i> . . . . .	75	120.	<i>Neomammillaria amoena</i> . . . . .	121
69.	<i>Neomammillaria phymatothele</i> . . . . .	77	131.	<i>Neomammillaria plumosa</i> . . . . .	121
70.	<i>Neomammillaria phymatothele</i> . . . . .	77	132.	<i>Neomammillaria prolifera</i> . . . . .	125
71.	<i>Neomammillaria magnimamma</i> . . . . .	78	133.	<i>Neomammillaria multiceps</i> . . . . .	125
72.	<i>Neomammillaria macracantha</i> . . . . .	78	134.	<i>Neomammillaria multiceps</i> . . . . .	126
72a.	<i>Neomammillaria macracantha</i> . . . . .	80	135.	<i>Neomammillaria campotricha</i> . . . . .	127
72b.	<i>Neomammillaria johnstonii</i> . . . . .	81	136.	<i>Neomammillaria schiedeana</i> . . . . .	127
73.	<i>Neomammillaria melanocentra</i> . . . . .	82	137.	<i>Neomammillaria lenta</i> . . . . .	128
74.	<i>Neomammillaria seitziana</i> . . . . .	82	138.	<i>Neomammillaria eriacantha</i> . . . . .	128
75.	<i>Neomammillaria sartorii</i> . . . . .	83	139.	<i>Neomammillaria denudata</i> . . . . .	129
76.	<i>Neomammillaria ortegae</i> . . . . .	84	140.	<i>Neomammillaria lenta</i> . . . . .	129
77.	<i>Neomammillaria meiacantha</i> . . . . .	85	141.	<i>Neomammillaria candida</i> . . . . .	130
78.	<i>Neomammillaria scrippsiana</i> . . . . .	85	142.	<i>Neomammillaria candida</i> . . . . .	130
79.	<i>Neomammillaria sempervivi</i> . . . . .	86	143.	<i>Neomammillaria vetula</i> . . . . .	131
80.	<i>Neomammillaria polythele</i> . . . . .	86	144.	<i>Neomammillaria discolor</i> . . . . .	131
81.	<i>Neomammillaria carnea</i> . . . . .	89	145.	<i>Neomammillaria fragilis</i> . . . . .	133
82.	<i>Neomammillaria lloydii</i> . . . . .	89	146.	<i>Neomammillaria elongata</i> . . . . .	133
83.	<i>Neomammillaria zuccariniana</i> . . . . .	90	147.	<i>Neomammillaria oliviae</i> . . . . .	135
84.	<i>Neomammillaria compressa</i> . . . . .	90	148.	<i>Neomammillaria echinaria</i> . . . . .	136
85.	<i>Neomammillaria compressa</i> . . . . .	91	149.	<i>Neomammillaria rekoi</i> . . . . .	136
86.	<i>Neomammillaria compressa</i> . . . . .	91	150.	<i>Neomammillaria pottsii</i> . . . . .	137
87.	Spine-cluster of <i>N. compressa</i> . . . . .	92	151.	<i>Neomammillaria mazatlanensis</i> . . . . .	137
88.	<i>Neomammillaria compressa</i> . . . . .	92	152.	<i>Neomammillaria albicans</i> . . . . .	138
89.	<i>Neomammillaria mystax</i> . . . . .	93	153.	<i>Neomammillaria slevinii</i> . . . . .	139
90.	<i>Neomammillaria petterssonii</i> . . . . .	93	154.	<i>Neomammillaria hamata</i> . . . . .	141
91.	<i>Neomammillaria eichlamii</i> . . . . .	95	155.	<i>Neomammillaria wildii</i> . . . . .	141
92.	<i>Neomammillaria karwinskiana</i> . . . . .	95	155a.	<i>Neomammillaria rekoi</i> . . . . .	142
93.	<i>Neomammillaria standleyi</i> . . . . .	96	156.	<i>Neomammillaria solisii</i> . . . . .	143
94.	<i>Neomammillaria parkinsonii</i> . . . . .	96	157.	<i>Neomammillaria solisii</i> . . . . .	143
95.	<i>Neomammillaria evermanniana</i> . . . . .	97	157a.	<i>Neomammillaria seideliana</i> . . . . .	144
96.	<i>Neomammillaria collinsii</i> . . . . .	99	158.	<i>Neomammillaria seideliana</i> . . . . .	144
97.	<i>Neomammillaria geminispina</i> . . . . .	99	159.	<i>Neomammillaria barbata</i> . . . . .	145
98.	<i>Neomammillaria woburnensis</i> . . . . .	100	160.	<i>Neomammillaria mercadensis</i> . . . . .	146
99.	<i>Neomammillaria chinocephala</i> . . . . .	100	161.	<i>Neomammillaria multihamata</i> . . . . .	146
100.	<i>Neomammillaria pyrrocephala</i> . . . . .	103	162.	<i>Neomammillaria longicoma</i> . . . . .	147
101.	<i>Neomammillaria polyedra</i> . . . . .	103	163.	<i>Neomammillaria bocasana</i> . . . . .	147
102.	<i>Neomammillaria tenampensis</i> . . . . .	104	164.	<i>Neomammillaria multiformis</i> . . . . .	148



## TEXT-FIGURES—continued.

FIG.		PAGE.	FIG.		PAGE.
165.	<i>Neomammillaria longicoma</i> . . . . .	150	214.	<i>Pseudorhipsalis himantoclada</i> . . . . .	213
166.	<i>Neomammillaria glochidiata</i> . . . . .	150	215.	Top of flowering branch of <i>P. himantoclada</i>	214
167.	<i>Neomammillaria trichacantha</i> . . . . .	151	216.	Longitudinal section of flower of <i>Pseudo-</i>	
168.	<i>Neomammillaria saffordii</i> . . . . .	151		<i>rhipsalis himantoclada</i> . . . . .	214
169.	<i>Neomammillaria painteri</i> . . . . .	152	217.	Section of flower of <i>Pseudorhipsalis alata</i>	214
170.	<i>Neomammillaria microcarpa</i> . . . . .	152	218.	Flowering branch of <i>Pseudorhipsalis alata</i>	214
171.	<i>Neomammillaria wrightii</i> . . . . .	153	219.	Unusual form of <i>Hatiora salicornioides</i>	217
172.	<i>Neomammillaria mainae</i> . . . . .	153	220.	<i>Hatiora bambusoides</i> . . . . .	218
172 <i>a</i> .	<i>Neomammillaria boedekeriana</i> . . . . .	154	221.	<i>Rhipsalis cereuscula</i> . . . . .	223
173.	<i>Neomammillaria microcarpa</i> . . . . .	155	222.	<i>Rhipsalis cassutha</i> . . . . .	226
174.	<i>Neomammillaria microcarpa</i> . . . . .	155	223.	<i>Rhipsalis shaferi</i> . . . . .	228
175.	<i>Neomammillaria sheldoni</i> . . . . .	157	224.	<i>Rhipsalis lumbricoides</i> . . . . .	230
176.	<i>Neomammillaria carretii</i> . . . . .	157	225.	<i>Rhipsalis loefgrenii</i> . . . . .	233
177.	<i>Neomammillaria zephyranthoides</i> . . . . .	159	226.	<i>Rhipsalis sulcata</i> . . . . .	235
178.	<i>Neomammillaria bombycina</i> . . . . .	160	227.	<i>Rhipsalis gibberula</i> . . . . .	235
179.	<i>Neomammillaria occidentalis</i> . . . . .	160	228.	<i>Rhipsalis micrantha</i> . . . . .	239
179 <i>a</i> .	<i>Neomammillaria occidentalis</i> . . . . .	161	229.	Top of fruiting branch of <i>R. ramulosa</i> . . . . .	241
180.	<i>Neomammillaria fasciculata</i> . . . . .	162	230.	<i>Rhipsalis platycarpa</i> . . . . .	242
181.	<i>Neomammillaria longiflora</i> . . . . .	162	231.	<i>Rhipsalis crispimarginata</i> . . . . .	244
182.	Fruit, spine-cluster, and seed of <i>Neomam-</i>		232.	<i>Rhipsalis crispata</i> . . . . .	245
	<i>millaria nelsonii</i> . . . . .	163	233.	<i>Rhipsalis cuneata</i> . . . . .	246
183.	Seed and spine-cluster of <i>N. longiflora</i> . . . . .	163	233 <i>a</i> .	<i>Neoabbottia paniculata</i> . . . . .	248
184.	<i>Neomammillaria xanthina</i> . . . . .	164	234.	Fruit, stem, and seeds of <i>Opuntia wet-</i>	
184 <i>a</i> .	<i>Neomammillaria milleri</i> . . . . .	176		<i>morei</i> . . . . .	255
185.	Flowering branch of <i>Zygocactus truncatus</i>	178	235.	<i>Opuntia impedata</i> . . . . .	257
186.	Fruiting joint of <i>Zygocactus truncatus</i> . . . . .	178	236.	<i>Opuntia pisciformis</i> . . . . .	258
187.	<i>Zygocactus truncatus</i> . . . . .	179	237.	<i>Opuntia eburnispina</i> . . . . .	260
188.	<i>Epiphyllanthus obovatus</i> . . . . .	181	238.	<i>Opuntia macbridei</i> . . . . .	261
189.	<i>Epiphyllanthus obovatus</i> . . . . .	181	239.	<i>Cereus trigonodendron</i> . . . . .	267
190.	<i>Epiphyllanthus microsphaericus</i> . . . . .	182	240.	Flower of <i>Cephalocereus purpusii</i> . . . . .	269
191.	<i>Epiphyllanthus candidus</i> . . . . .	182	241.	Flower of <i>Cephalocereus purpusii</i> . . . . .	269
192.	<i>Schlumbergera gaertneri</i> . . . . .	183	242.	<i>Cephalocereus collinsii</i> . . . . .	270
193.	<i>Schlumbergera gaertneri</i> . . . . .	184	243.	<i>Pachycereus pringlei</i> . . . . .	271
194.	Top of fruiting branch of <i>Epiphyllum</i>		244.	<i>Pachycereus lepidanthus</i> . . . . .	272
	<i>phyllanthus</i> . . . . .	186	245.	<i>Pachycereus lepidanthus</i> . . . . .	272
195.	Seedling of <i>Epiphyllum phyllanthus</i> . . . . .	188	246.	<i>Lemaireocereus eichlamii</i> . . . . .	273
196.	<i>Epiphyllum pumilum</i> . . . . .	189	247.	<i>Lemaireocereus beneckeii</i> . . . . .	274
197.	<i>Epiphyllum caudatum</i> . . . . .	190	248.	Branch, old flowers, and seeds of <i>Penio-</i>	
198.	<i>Epiphyllum darrahii</i> . . . . .	191		<i>cereus johnstonii</i> . . . . .	275
199.	<i>Epiphyllum crenatum</i> . . . . .	193	249.	<i>Dendrocereus nudiflorus</i> . . . . .	276
200.	<i>Epiphyllum macropterum</i> . . . . .	194	250.	<i>Borzicactus fieldianus</i> . . . . .	277
201.	<i>Epiphyllum guatemalense</i> . . . . .	195	251.	<i>Borzicactus fieldianus</i> . . . . .	277
202.	<i>Epiphyllum stenopetalum</i> . . . . .	196	252.	<i>Borzicactus fieldianus</i> . . . . .	278
203.	Tip of branch with flower of <i>Disocactus</i>		253.	<i>Borzicactus fieldianus</i> . . . . .	278
	<i>biformis</i> . . . . .	201	254.	<i>Borzicactus fieldianus</i> . . . . .	278
204.	<i>Disocactus biformis</i> . . . . .	201	255.	<i>Binghamia multangularis</i> . . . . .	279
205.	<i>Disocactus eichlamii</i> . . . . .	202	256.	Flower of <i>Neoabbottia paniculata</i> . . . . .	280
206.	<i>Chiapasia nelsonii</i> . . . . .	203	257.	Fruit of <i>Neoabbottia paniculata</i> . . . . .	280
207.	<i>Nopalxochia phyllanthoides</i> . . . . .	205	258.	<i>Neoabbottia paniculata</i> . . . . .	281
208.	<i>Wittia amazonica</i> . . . . .	206	259.	<i>Neoabbottia paniculata</i> . . . . .	282
209.	<i>Wittia panamensis</i> . . . . .	207	260.	<i>Neoabbottia paniculata</i> . . . . .	282
210.	<i>Rhipsalidopsis rosea</i> . . . . .	209	261.	<i>Selenicereus nelsonii</i> . . . . .	284
211.	<i>Acanthorhipsalis micrantha</i> . . . . .	210	262.	<i>Cactus oaxacensis</i> . . . . .	289
212.	<i>Acanthorhipsalis crenata</i> . . . . .	211	263.	Hillside covered with giant cactus, <i>Car-</i>	
213.	<i>Acanthorhipsalis monacantha</i> . . . . .	212		<i>negia gigantea</i> . . . . .	290



---

---

# THE CACTACEAE

Descriptions and Illustrations of Plants of the Cactus  
Family

---

---





# DESCRIPTIONS AND ILLUSTRATIONS OF PLANTS OF THE CACTUS FAMILY.

## Tribe 3. CEREEAE.

### Subtribe 6. CORYPHANTHANAЕ.

Terrestrial, spiny, low cacti, mostly globose, sometimes cylindric, rarely elongated, 1-jointed, solitary or cespitose, tuberculate, the tubercles numerous; tubercles usually arranged in spirals; juice watery or milky; flowers always solitary at areoles, either at top or side of plant, but never at spine-areoles, large or small, regular (except in the genus *Cochemiea*): ovary naked or bearing a few scales; fruit a green or red indehiscent berry (except in the genus *Bartschella*); seeds small, brown or black.

We recognize 14 genera.

### KEY TO GENERA.

- A. Ovary more or less scaly (not known in *Mamilloopsis*).
  - Flower campanulate with short tube.
    - Some of spines hooked . . . . . 1. *Ancistrocactus* (p. 3)
    - None of spines hooked (see species No. 2 in *Neolloydia*).
      - Tubercles not deeply grooved; fruit scaly . . . . . 2. *Thelocactus* (p. 6)
      - Tubercles deeply grooved; fruit nearly naked . . . . . 3. *Neolloydia* (p. 14)
  - Flower-tube elongated, scaly . . . . . 4. *Mamilloopsis* (p. 19)
- AA. Ovary naked or nearly so.
- B. Flowers irregular . . . . . 5. *Cochemiea* (p. 21)
- BB. Flowers regular.
  - C. Flowers central, borne in axils of young, usually nascent, tubercles, large (except in genus No. 8); tubercles containing a watery Juice; fruit dull green or red; seeds brown or black.
  - D. Tubercles grooved on upper side; flowers borne at base of groove.
    - Seeds mostly light brown; Fruit greenish or yellowish even when mature, ripening slowly . . . . . 6. *Coryphantha* (p. 23)
    - Seeds black to (lark brown; fruit red, maturing rapidly.
      - Tubercles long, not numerous, not persisting as woody knobs; aril of seed large . . . . . 7. *Neobesseya* (p. 51)
      - Tubercles short, numerous, persisting after spines fall off as woody knobs; aril of seed small . . . . . 8. *Escobaria* (p. 53)
  - DD. Tubercles not grooved above.
    - Fruit circumscissile; tubercles fleshy; spines acicular . . . . . 9. *Bartschella* (p. 57)
    - Fruit not circumscissile; tubercles woody; spines peculate . . . . . 10. *Pelecyphora* (p. 59)
- CC. Flowers lateral, borne in axils of old and mature tubercle; these never grooved above.
  - Seeds with a large corky aril . . . . . 11. *Phellosperma* (p. 60)
  - Seeds without a corky aril.
    - Flowers large with an elongated tube; tubercles elongated, flabby . . . . . 12. *Dolichotbele* (p. 61)
    - Flowers small campanulate; tubercles not flabby.
      - Hilum of seed large; tubercles lactiferous; spines pectinate . . . . . 13. *Solisia* (p. 64)
      - Hilum of seed minute; tubercles sometimes lactiferous, but not in species with black seeds; spines not pectinate . . . . . 14. *Neomammillaria* (p. 65)

### 1. ANCISTROCACTUS gen. nov.

Small, globular or short-cylindric plants, indistinctly ribbed, strongly tubercled, very spiny, one of central spines always hooked; flowering tubercles more or less grooved on tipper side; flowers rather small, short, funnelform, borne at top of plant; ovary small, bearing a few thin scales, these always naked in their axils; fruit oblong, greenish, juicy, thin-walled, usually naked below but with a few broad cordate, thin-margined scales above; seeds globular, rather large, brownish to black, the papillae low, flattened; hilum large, depressed, sub-basal, surrounded by a thick rim.

Type species: *Echinocactus megarhizus* Rose.

Engelmann in describing *Echinocactus scheeri*, one of the species of this genus, refers to its anomalous characters when he says:

“Seeds are large, about 1 line long, 0.8 line in diameter, with very minute and flattened tubercles, brown (the only *Echinocactus* with seeds of that color known to me); hilum large and circular, surrounded by a thick rim; albumen very small; embryo curved but cotyledons small, connate, more like those of a *Mammillaria*, separating on the curvature and not at the end of the hook, as in all other hooked embryos of Cactaceae known to me.” (Cact. Mex. Bound. 19. 1859.)

The generic name is from *ἄγκιστρον* fish-hook, and *κάκτος* cactus, referring to the long, hooked central spines.

*Ancistrocactus* was used by Schumann for a subgenus of *Echinocactus*. We recognize three species in the genus, occurring in southern Texas and northern Mexico.

Coulter (Contr. U. S. Nat. Herb. 3: 368, 369) calls attention to grooved areoles of *Echinocactus brevipalmatus* resembling those of *Coryphantha* and *Echinocactus scheeri*.

#### KEY TO SPECIES.

Radial spines 20 or more, strongly appressed, pectinate; flowering areoles naked . . . . . 1. *A. megarhizus*  
 Radial spines 18 or fewer, more or less spreading, hardly pectinate; flowering areoles woolly.  
 Groove half length of tubercle; flower greenish; radial spines 1,5 to 18 . . . . . 2. *A. scheeri*  
 Groove extending full length of tubercle; flower rose-colored; radial spines usually 12 . . . . . 3. *A. brevipalmatus*

#### 1. *Ancistrocactus megarhizus* (Rose).

*Echinocactus megarhizus* Rose, Contr. U. S. Nat. Herb. 12: 290. 1909.

Solitary or in clusters of 3 or 4; plant body nearly globular or a little elongated, 5 to 8 cm. high, usually solitary, from large and fleshy roots; ribs spiral, divided into dark-green tubercles, 4 to 5

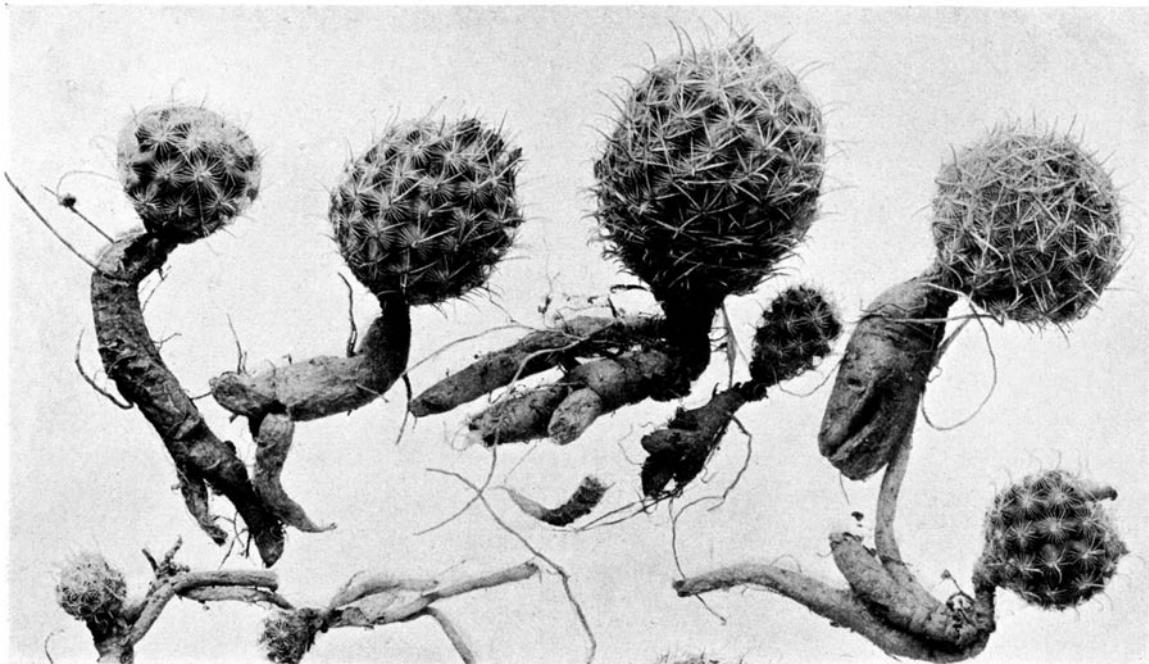


FIG. 1.—*Ancistrocactus megarhizus*.

cm. high; radial spines 20 or more, pectinate, at first pale yellow, in age white; in seedlings the spines pubescent; central spines usually 4, the 3 upper similar to the radials, although a little stouter and in young areoles not easily distinguished from them, the lower central spines stout and strongly hooked, 15 mm. long; flowers not seen; fruit green, suggesting that of a *Coryphantha*, clavate, bearing a few naked scales near top; seed black, smooth, shining.

*Type locality:* Near Victoria, Mexico.

*Distribution:* Known only from the type locality.

Text-figure 1 is from a photograph of the type specimen collected by Dr. Edward Palmer.

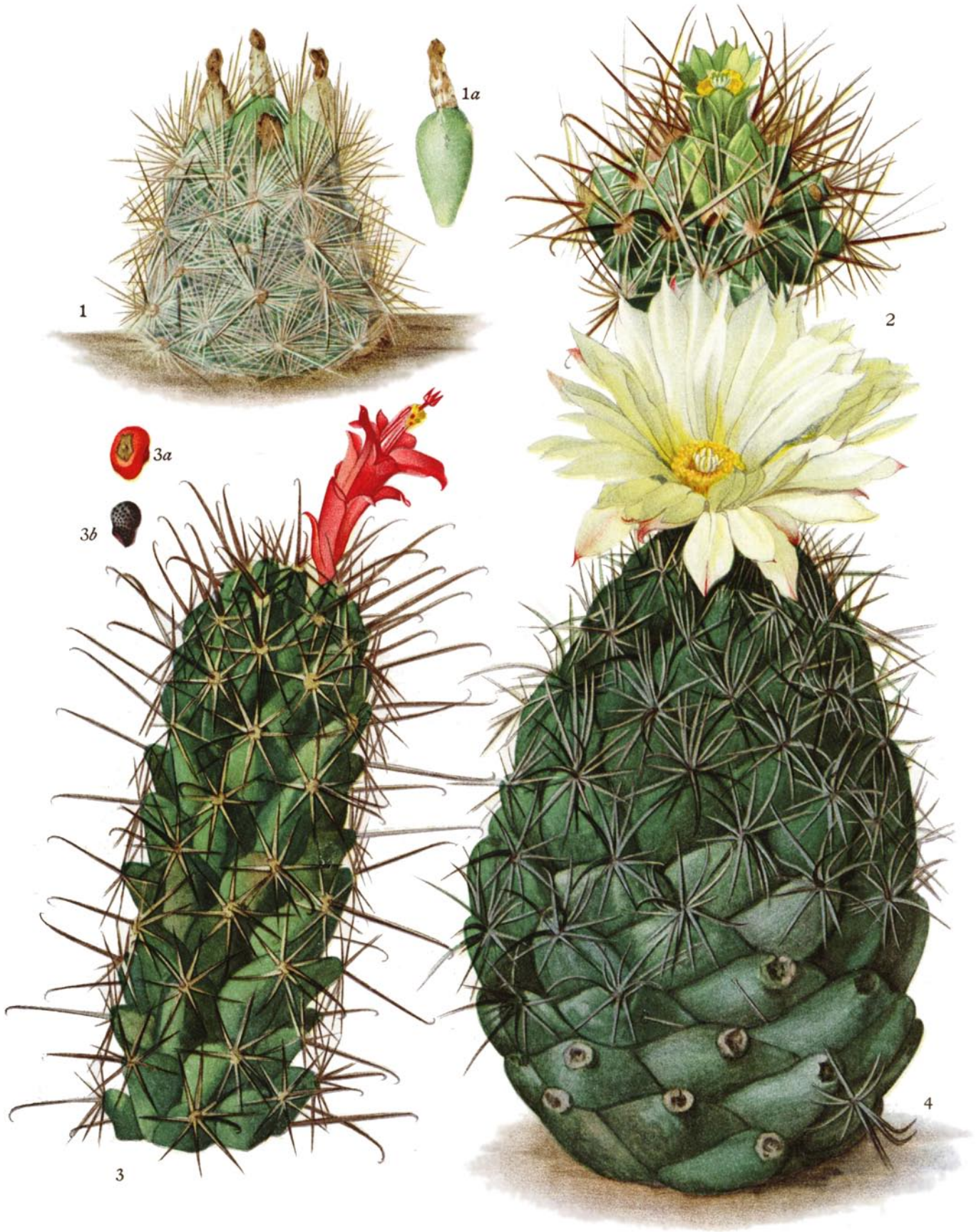
#### 2. *Ancistrocactus scheeri* (Salm-Dyck).

*Echinocactus scheeri* \* Salm-Dyck, Cact. Hort. Dyck. 1849. 155. 1850.

Globular to clavate, 3.5 to 5 cm. long; ribs usually 13, indistinct, somewhat spiraled, strongly divided into stout, terete tubercles grooved only to middle; radial spines 15 to 18, spreading, 12

\* This name was originally spelled *Echinocactus scheerii*.





M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Fruit of plant of *Coryphantha neo-mexicana*.

1a. Fruit of same.

2. Top of flowering plant of *Ancistrocactus scheeri*.

3. Flowering plant of *Cochemiea poselgeri*.

3a. Fruit of same.

3b. Seed of same.

4. Flowering plant of *Coryphantha cornifera*.





mm. long or less, white to straw-colored; central spines 3 or 4, the lowest one strongly hooked; flowers small, 2.5 cm. long, greenish yellow; ovary small, nearly naked; seeds large (about 2 mm. long), brown and minutely tuberculate (according to Coulter).

*Type locality:* Not cited.

*Distribution:* Southern Texas and northern Mexico.

It is probable that this species is based on Potts's specimen from Chihuahua and, if so, may be a different species from the one described by Engelmann, which he said was "a most elegant little species, one and a half to two inches high; larger spines black and white variegated." We have not seen Potts's plant, but it was referred here by Hemsley.

*Illustrations:* Cact. Mex. Bound. pl. 17; Rümpler, Sukkulanten f. 105; Cact. Journ. 1: pl. for March; Schelle, Handb. Kakteenk. 156. f. 84, as *Echinocactus scheeri*.

Plate 11, figure 2, shows a plant collected by Dr. Rose at Laredo, Texas, in 1913, which flowered in the New York Botanical Garden in 1914. Text-figure 2 is from a photograph taken by Robert Runyon of a plant collected in 1921 near Brownsville, Texas.

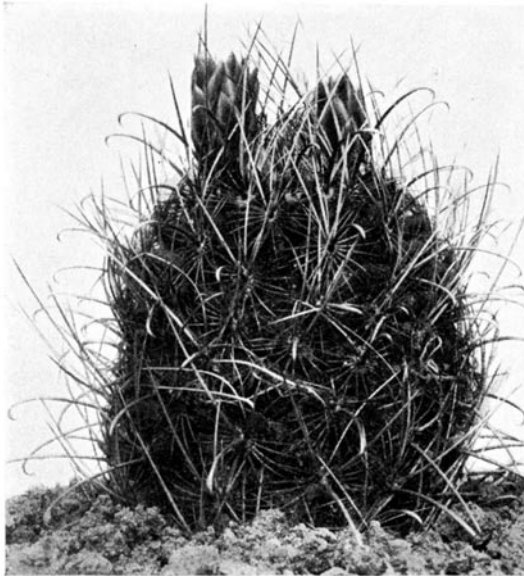


FIG. 2.—*Ancistrocactus scheeri*.

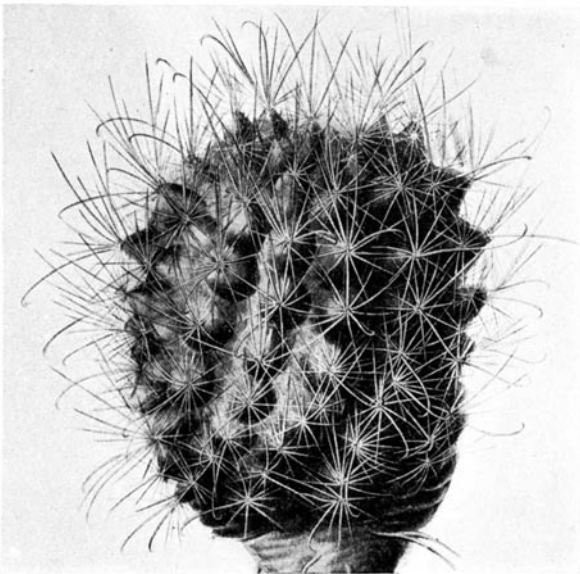


FIG. 3.—*Ancistrocactus brevipilatus*.

### 3. *Ancistrocactus brevipilatus* (Engelmann).

*Echinocactus brevipilatus* Engelmann, Proc. Amer. Acad. 3: 271. 1856.

*Echinocactus scheeri brevipilatus* Weber in Schumann, Gesamtb. Kakteen 336. 1898.

Globular to obovoid, 5 to 10 cm. high, 5 to 7.5 cm. in diameter, dark green; ribs usually 13, compressed, strongly tubercled; tubercles grooved on upper side from spine-cluster to base, the groove woolly; radial spines 10 to 14, terete, white, 10 to 20 mm. long; central spines 4, the lower one porrect, hooked at apex; flowers rose-colored, 25 to 32 mm. long, not so broad as long; inner perianth-segments 15 mm. long, 4 mm. broad; mid-rib darker colored than margins; fruit about 1.5 cm. long, thin-walled, nearly naked; seeds brownish black, about 2 mm. long, smooth or with low flattened papillae, with a deep-set basal hilum.

*Type locality:* On the San Pedros, Texas.

*Distribution:* Southern Texas.

*Illustrations:* Haage and Schmidt, Haupt-Verz. Cact. 1908: 226; Schelle, Handb. Kakteenk. 157. f. 85, as *Echinocactus scheeri brevipilatus*; Cact. Mex. Bound. pl. 18, 19; Ann. Rep. Smiths. Inst. 1908: pl. 3, f. 3; Förster, Handb. Cact. ed. 2. 16. f. 64; Rümpler, Sukkulanten 186. f. 104; Blanc, Cacti 41. No. 414; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 162. f. 56, c, as *Echinocactus brevipilatus*.

Text-figure 3 is a reproduction of plate 18 of the Cactaceae of the Mexican Boundary Survey.

2. **THELOCACTUS** (Schumann) Britton and Rose, Bull. Torr. Club 49: 251. 1922.

Cacti of medium size, globular or somewhat depressed, spiny, often densely so; ribs few, low or even indefinite, divided into large, often spiraled, tubercles; flowering tubercles more or less grooved above; flowers from near center of plant, borne on very young tubercles, rather large for the subtribe, campanulate, diurnal; scales on ovary usually few, their axils naked; fruit so far as known dry, dehiscing by a basal pore; seeds black, finely tuberculate, with a large basal hilum.

Type species: *Echinocactus hexaedrophorus* Lemaire.

The generic name is from  $\theta\eta\lambda\acute{\eta}$  nipple, and cactus, referring to the tubercled ribs. *Thelocactus* was used for a subgenus of *Echinocactus* by Schumann; he described it with "ribs mostly divided into spirally disposed tubercles or mamillae, not protruding like a chin at base; spines straight or slightly curved." He referred to the group a number of diverse species representing several generic types, some of which we took up in Volume III.

We recognize 12 species, all native of Mexico.

To this genus we have referred the *Echinocacti* of previous authors which seem to intergrade with the *Coryphanthanae*. The group is perhaps complex and may contain two or more distinct genera, but most of the species are little known.

KEY TO SPECIES.

- Ribs indefinite, strongly tubercled.  
 Spines all straight.  
 Tubercles not flattened laterally; radial spines 6 to 9 . . . . . 1. *T. hexaedrophorus*  
 Tubercles flattened laterally; spines 1 to 5.  
 Flowers white . . . . . 2. *T. rinconensis*  
 Flowers not white.  
 Flowers salmon to yellow . . . . . 3. *T. lophothele*  
 Flowers rose-purple . . . . . 4. *T. phymatothele*  
 Some of spines curved outward . . . . . 5. *T. buekii*
- Ribs definite, but more or less divided into tubercles.  
 Flowers yellowish.  
 Ribs 8 to 13 . . . . . 6. *T. leucacanthus*  
 Ribs 20 to 25 . . . . . 7. *T. nidulans*
- Flowers red to purple.  
 Spines all straight.  
 Spines subulate . . . . . 8. *T. fossulatus*  
 Spines acicular . . . . . 9. *T. tulensis*
- Spines more or less curved.  
 Spines 8 or fewer . . . . . 10. *T. lloydii*  
 Spines numerous.  
 Central spines flexible, usually straight, porrect or ascending . . . . . 11. *T. bicolor*  
 Central spines subulate, rigid, some of them curved and reflexed . . . . . 12. *T. pottsii*

1. **Thelocactus hexaedrophorus** (Lemaire) Britton and Rose, Bull. Torr. Club 49: 251. 1922.

*Echinocactus hexaedrophorus* Lemaire, Cact. Gen. Nov. Sp. 27. 1839.

*Echinocactus hexaedrophorus roseus* Lemaire in Labouret, Monogr. Cact. 251. 1853.

*Echinocactus hexaedrophorus labouretianus* Schumann, Gesamtb. Kakteen 438. 1898.

*Echinocactus hexaedrophorus major* Quehl in Schumann, Gesamtb. Kakteen 438. 1898.

Globose or somewhat flattened above or umbilicate, glaucous, strongly tubercled, not ribbed, 13 to 14 cm. in diameter; tubercles prominent, somewhat 6-sided, 27 mm. broad at base, arranged in indefinite spirals; radial spines 6 to 9, spreading, unequal, 11 to 18 mm. long, rigid, straight, subulate, annulate; central spine much stouter than the radials, erect, 2.3 to 3 cm. long; flowers large, 5.5 cm. long and broader than long when expanded; perianth-segments oblong, purplish; stigma-lobes yellowish white.

Type locality: Tampico, Mexico.

Distribution: Central Mexico.

Schumann refers a plant from San Luis Potosí\* to this species. The type, however, is said to have come from Tampico on the coast, while San Luis Potosí is on the table-land at an altitude of 7,000 feet or more, and such an altitudinal distribution is not to be expected. It is possible, but hardly probable, that the plant was actually collected at San Luis Potosí but shipped from Tampico, the port of San Luis Potosí, as such mistakes were common in the early shipments of cacti. Thus, species are attributed to Buenos Aires which came

\* This plant of the table-land is *Echinocactus fossulatus* Scheidweiler.

from northwestern Argentina, and *Echinocactus insculptus*, referred to below, although reported from Buenos Aires, is really of Mexican origin.

*Echinocactus insculptus* Scheidweiler (Hort. Belge 4: 120. pl. 7. 1837) is referred here by Schumann, but the illustration indicates a very different plant.

*Echinocactus labouretianus*, referred by Schumann (Gesamtb. Kakteen 438. 1898) to Cels's Catalogue, probably never described, is to be referred here.

*Illustrations:* Cact. Journ. 1: 181; Lemaire, Icon. Cact. pl. 4; Dict. Gard. Nicholson 1: f. 690; Balt. Cact. Journ. 2: 196; Rümpler, Sukkulente 182. f. 101; Knippel, Kakteen pl. 12; Amer. Gard. 11: 461; Blanc, Cacti 45. No. 508; Schumann, Gesamtb. Kakteen 437. f. 76; Watson, Cact. Cult. 105. f. 36; ed. 3. f. 25, as *Echinocactus hexaedrophorus*.

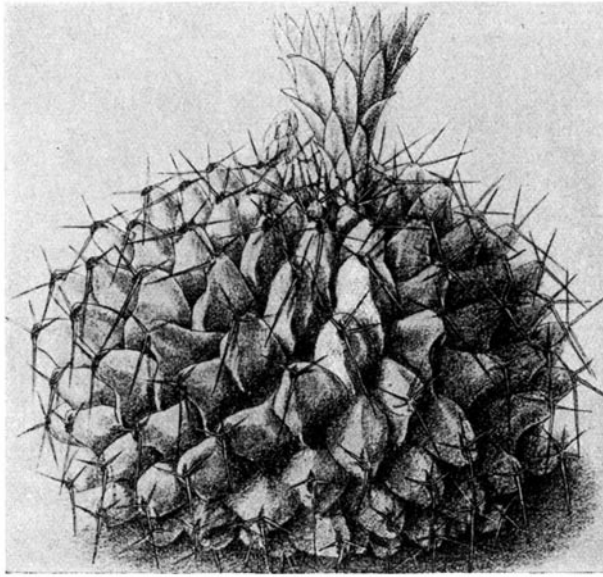


FIG. 4.—*Theolocactus rinconensis*.

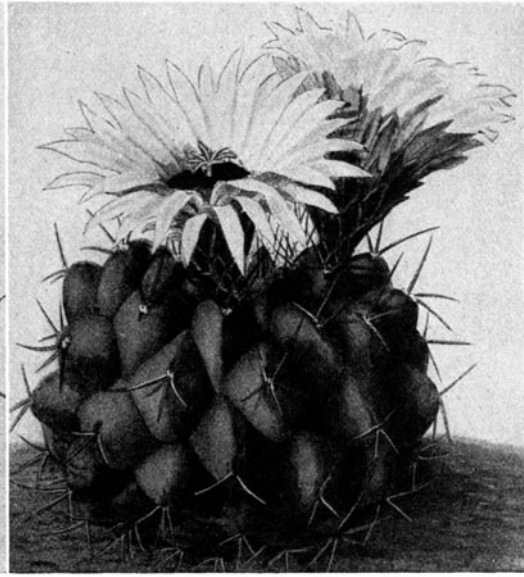


FIG. 5.—*Theolocactus phymatothele*.

## 2. *Theolocactus rinconensis* (Poselger).

*Echinocactus rinconensis* \* Poselger, Allg. Gartenz. 23: 18. 1855.

Simple, globose or somewhat depressed, 6 to 8 cm. high, 12 cm. in diameter; ribs somewhat spiraled, strongly tubercled; tubercles more or less flattened laterally, somewhat angled; spines usually only 3, acicular, 1.5 cm. long; flowers white, 4 cm. long; inner perianth-segments lanceolate, acute.

*Type locality:* Near Rinconada, Mexico.

*Distribution:* Nuevo Leon, Mexico.

We do not know this species definitely, but we suspect that the plant collected and illustrated by Safford as *Echinocactus lophothele* belongs here.

*Illustrations:* Schumann, Gesamtb. Kakteen 433. f. 75; Schelle, Handb. Kakteenk. 197. f. 130, as *Echinocactus rinconadensis*; (?)Ann. Rep. Smiths. Inst. 1908: pl. 3, f. 1, as *Echinocactus lophothele*.

Text-figure 4 is reproduced from the first illustration cited above.

## 3. *Theolocactus lophothele* (Salm-Dyck) Britton and Rose, Bull. Torr. Club 49: 251. 1922.

*Echinocactus lophothele* Salm-Dyck, Allg. Gartenz. 18: 395. 1850.

Simple, or in its native state cespitose, globose, sometimes depressed or short-cylindric, up to 25 cm. high, glaucous; ribs indefinite, strongly tuberculate; tubercles flattened; areoles depressed,

\* Because this species came from Rinconada, Schumann (Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 189. 1894) has changed the name to *Echinocactus rinconadensis*.



grayish lanate when young; radial spines 3 to 5, stout, purplish brown, 1 to 3 cm. long; central spines wanting or solitary; flowers salmon to yellow, about 5 cm. broad; perianth-segments nearly linear, acute; scales of ovary glabrous, 6 mm. long.

*Type locality:* Near Chihuahua.

*Distribution:* Chihuahua, Mexico.

Our description is drawn mostly from the figure in Blühende Kakteen, plate 126.

We have seen flowering specimens of what is called this species at La Mortola, Italy. Although the type came from Chihuahua, we have seen no plant from that region which answers it.

There is a plant in collections, passing as *Echinocactus lophothele longispinus* (Monatschr. Kakteenk. 15: 138. 1905), which we do not know.

*Illustrations:* Schelle, Handb. Kakteenk. 196. f. 129; Blühende Kakteen 3: pl. 126; Weinberg, Cacti 12; Blanc, Cacti 48. No. 560, as *Echinocactus lophothele*.

#### 4. *Thelocactus phymatothele* (Poselger).

*Echinocactus phymatothelos* \* Poselger in Förster, Handb. Cact. ed. 2. 602. 1885.

Simple, depressed-globose, 5 cm. high, 9 to 10 cm. in diameter; ribs 13, glaucous-green, divided into low irregular tubercles, these somewhat flattened and pointed; spines usually 1 to 3, sometimes wanting, subulate, rigid, 2 cm. long, brown, spreading; flowers 6 cm. broad; inner perianth-segments rose-purple to pinkish, narrow, acute; scales on ovary and flower-tube acute.

*Type locality:* Not cited.

*Distribution:* Mexico.

This plant is evidently related to *Thelocactus lophothele*.

*Illustrations:* Möllers Deutsche Gärt. Zeit. 25: 474. f. 6, No. 24; Blühende Kakteen 3: pl. 130, as *Echinocactus phymatothelos*.

Text-figure 5 is reproduced from the second illustration above cited.

#### 5. *Thelocactus buekii* (Klein).

*Echinocactus buekii* † Klein, Gartenflora 8: 257. 1859.

Stems simple, deep green; tubercles distinct, somewhat pointed, angled; spines about 7, reddish, unequal, some of them outwardly curved, the longer ones much elongated; flowers dark red; inner perianth-segments narrow.

*Type locality:* Mexico.

*Distribution:* Known only from the type locality.

Schumann refers this species to *Echinocactus tulensis*, but it is clearly different from his illustration of that species. Its relationship must be rather with *Thelocactus rinconensis* (see Schumann's figure, No. 75).

This plant is probably named for Dr. Johannes Nicolaus Buck, a botanist and physician of Frankfurt, Germany, and author of the Index to De Candolle's Prodrum.

*Illustration:* Gartenflora 8: pl. 266, as *Echinocactus buekii*.

Text-figure 6 is reproduced from the illustration cited above.

#### 6. *Thelocactus leucacanthus* (Zuccarini).

*Echinocactus leucacanthus* Zuccarini in Pfeiffer, Enum. Cact. 66. 1837.

*Cereus tuberosus* Pfeiffer, Enum. Cact. 102. 1837.

*Cereus maelenii* Pfeiffer, Allg. Gartenz. 5: 378. 1837.

*Echinocactus porrectus* Lemaire, Cact. Aliq. Nov. 17. 1838.

*Echinocactus subporrectus* Lemaire, Cact. Aliq. Nov. 25. 1838.

*Echinocactus maelenii* Salm-Dyck, Cact. Hort. Dyck. 1842. 18. 1843.

*Mammillaria maelenii* Salm-Dyck, Cact. Hort. Dyck. 1844. 14. 1845.

*Echinocactus leucacanthus Tuberosus* Förster, Handb. Cact. 287. 1846.

*Echinocactus leucacanthus crassior* Salm-Dyck, Cact. fort. Dyck. 1849. 35. 1850.

*Echinocactus theloideus* Salm-Dyck, Allg. Gartenz. 18: 396. 1850.

\* This is the original spelling of the name, but it is sometimes written *Echinocactus phymatothele*, the ending being the usual one for specific names of this kind.

† The original spelling of this name was *buckii*, but on the accompanying plate it was *buekii*.

‡ This name is spelled *maclenii* by Hemsley (Biol. Centr. Amer. Bot. 1: 534. 1880).



Densely cespitose, short-cylindric, 10 to 15 cm. long; ribs 8 to 13, sometimes spiraled, obtuse, tubercled; radial spines 7 to 20, at first light yellow, in age gray, spreading or recurved, unequal, the longer ones 4 cm. long, more or less annulate; central spine solitary, at first blackish, but in age gray, up to 5 cm. long; flowers yellow, 5 cm. long; inner perianth-segments numerous, lanceolate, acute; ovary and flower-tube bearing broad imbricated scales.

*Type locality:* Near Zimapán, Mexico.

*Distribution:* Zimapán and Ixmiquilpan, Mexico.

We are inclined to refer here *Echinocactus ehrenbergii* Pfeiffer (Allg. Gartenz. 6: 275. 1838), which, according to Schumann, also came from Ixmiquilpan, Mexico. In his monograph Schumann describes the flowers as yellow like those of *E. leucacanthus*, but in his English Keys he says that the flowers are rose-red. Dr. Rose, who collected in this region in 1905, found only one species of this relationship.

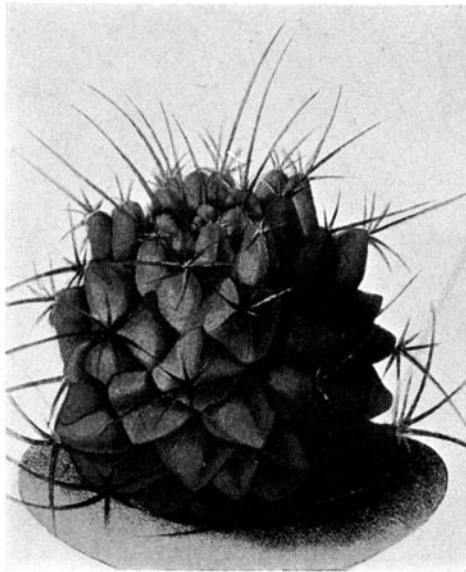


FIG. 6.—*Thelocactus buekii*.

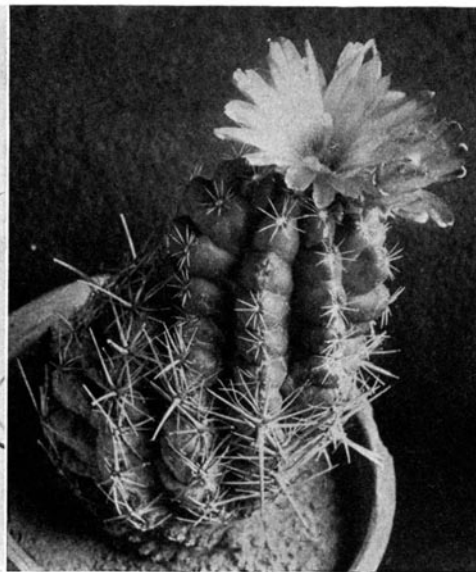


FIG. 7.—*Thelocactus leucacanthus*.

*Echinocactus tuberosus* Salm-Dyck (Förster, Handb. Cact. 287. 1846) is known only as a synonym.

*Echinocactus tuberosus subporrectus* (Förster, Handb. Cact. 523. 1846) belongs here.

*Illustrations:* Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 14; Abh. Bayer. Akad. Wiss. München 2: pl. 2, f. 10; pl. 3, f. 4, as *Echinocactus leucacanthus*.

Figure 7 is from a photograph of the plant collected by Dr. Rose at Ixmiquilpan in 1905.

#### 7. *Thelocactus nidulans* (Quehl).

*Echinocactus nidulans* Quehl, Monatsschr. Kakteenk. 22: 119. 1911.

Simple, depressed-globose, 10 cm. high, sometimes 20 cm. in diameter, gray, usually glaucous; ribs 20 to 25, rather indistinct, divided into tubercles; spines about 15, all similar, 2 to 6 cm. long; flowers 4 cm. long, yellowish white.

*Type locality:* Mexico.

*Distribution:* Mexico, but known only from cultivated plants.

*Illustrations:* Monatsschr. Kakteenk. 22: 51; Alianza Científica Universal 3: 114, as *Echinocactus nidulans*.

Figure 8 is from a photograph given to Dr. Rose by Frantz de Laet in 1912.

### 8. *Thelocactus fossulatus* (Scheidweiler).

*Echinocactus fossulatus* Scheidweiler, Allg. Gartenz. 9: 49. 1841.

*Echinocactus hexaedrophorus subcostatus* Salm-Dyck, Cact. Hort. Dyck. 1849. 34. 1850.

*Echinocactus hexaedrophorus fossulatus* Salm-Dyck in Labouret, Monogr. Cact. 251. 1853.

Globose to much depressed, 10 to 15 cm. in diameter; ribs usually 13, slightly glaucous, bronzed; tubercles large, somewhat flabby, more or less compressed, dorsally somewhat angled; flowering areoles narrow, sometimes extending forward to next tubercle; radial spines 4 or 5, unequal, 1 to 3.5 cm. long, brown; central spine solitary, 3 to 4.5 cm. long, subulate, annulate; flowers nearly white or slightly tinged with pink; scales on flower-tube ovate, their scarios margins slightly ciliate.

*Type locality:* Near San Luis Potosí, Mexico.

*Distribution:* San Luis Potosí, Mexico.

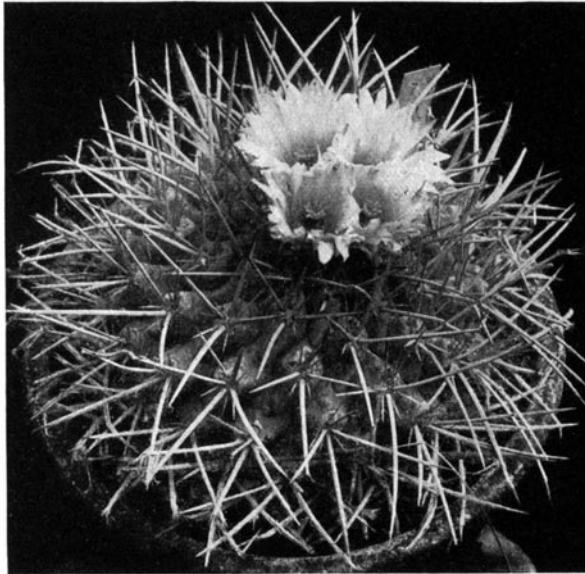


Fig. 8.—*Thelocactus nidulans*.

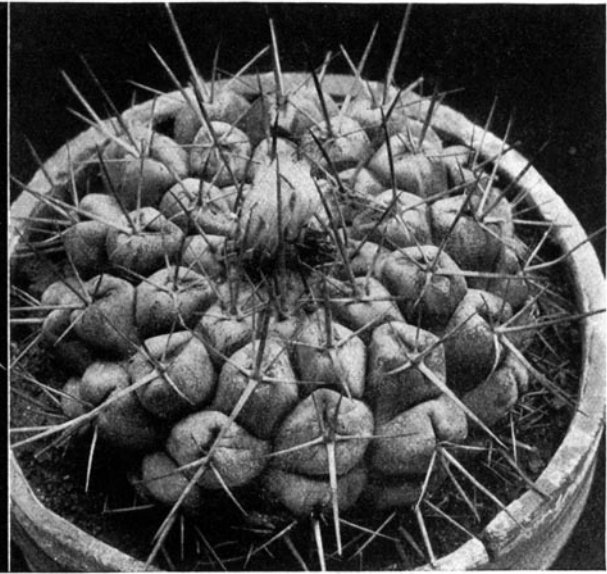


Fig. 9.—*Thelocactus fossulatus*.

Somewhat similar to the foregoing species is C. A. Purpus's No. 15 from Minas de San Rafael, Mexico. This plant has more rounded tubercles, only 4 spines, these all radial and 2 cm. long or less, somewhat flattened.

*Thelocactus fossulatus* is certainly distinct from *Thelocactus hexaedrophorus*, differing in the arrangement of the tubercles and in the color of the flowers. The former is from an altitude of 7,000 feet, while the other is from near sea-level.

*Echinocactus drageanus* (Moerder, Rev. Hort. 67: 186. 1895) and *E. droegeanus* Hildmann (Schumann, Gesamtb. Kakteen 438. 1898) probably belong here, although the latter is referred by Schumann to *Echinocactus hexaedrophorus*. This may be the plant, judging from the name and authorities mentioned, which Schelle (Handb. Kakteenk. 257. 1907) refers to as *Mammillaria rhodantha droegeana* Schumann (*M. droegeana* Hildmann). Schelle questions whether it may not be a distinct species, presumably a *Mammillaria*.

*Illustrations:* Scientific Amer. 124: 492, as *Echinocactus*; Curtis's Bot. Mag. 73: pl. 4311; Ann. Rep. Smiths. Inst. 1908: pl. 13, f. 3, as *Echinocactus hexaedrophorus*; Pfeiffer, Abbild. Besch. Cact. 2: pl. 13, as *Echinocactus fossulatus*; Monatsschr. Kakteenk. 27: 41, as *Echinocactus hexaedrophorus droegeanus*.

Figure 9 is from a photograph of a plant collected by Dr. Edward Palmer at San Luis Potosí, Mexico, in 1905.

**9. *Thelocactus tulensis*** (Poselger).*Echinocactus tulensis* Poselger, Allg. Gartenz. 21: 125. 1853.

Plant simple to abundantly cespitose, globular to short-cylindric, up to 25 cm. high; ribs 8 to 13, strongly tubercled; radial spines 6 to 8, more or less spreading, 10 to 15 mm. long, brownish; central spines solitary or sometimes 2, 3 cm. long; flowers 2.5 cm. long, rose-colored; inner perianth-segments linear-oblong, acute.

*Type locality:* Near Tula, Tamaulipas, Mexico.

*Distribution:* Tamaulipas, Mexico.

We have not seen this plant but we have seen two good illustrations. It is closely related to *Thelocactus hexaedrophorus*.

*Illustrations:* Blühende Kakteen 1: pl. 18; Schumann, Gesamtb. Kakteen 431. f. 74, as *Echinocactus tulensis*.

Figure 10 is reproduced from the first illustration cited above.

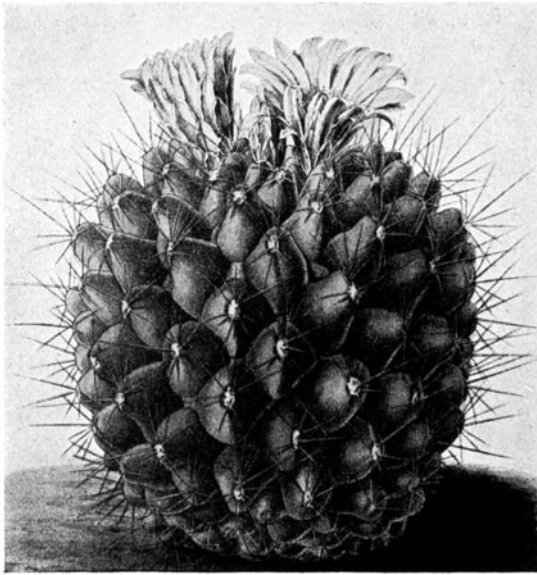


FIG. 10.—*Thelocactus tulensis*.

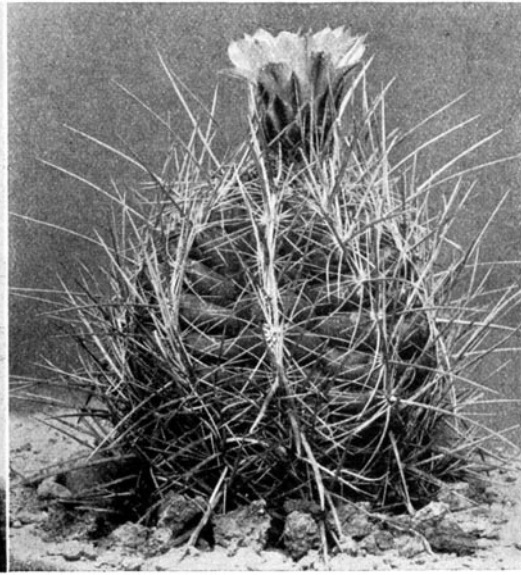


FIG. 11.—*Thelocactus bicolor*.

**10. *Thelocactus lloydii*** sp. nov.

Plants simple, depressed-globose, 8 to 12 cm. broad, pale bluish green, strongly tubercled and strongly armed; tubercles conspicuous but low, often wider than long, sometimes 4 cm. wide; flowering groove rather conspicuous but narrow, extending from spines to about half-way to axil of tubercle; spines usually 8, sometimes with a smaller accessory one, all ascending from base and curved outward from middle, terete or somewhat angled at base, often highly colored below with sharp yellowish-crimson tips, the longer ones 6 cm. long; outer perianth-segments very pale purple, never deep purplish pink; filaments white; anthers deep yellow; style yellowish, pinkish at top; stigma-lobes pinkish yellow.

Collected by F. E. Lloyd in northern Zacatecas, Mexico, May 25, 1908 (No. 33).

**11. *Thelocactus bicolor*** (Galeotti) Britton and Rose, Bull. Torr. Club 49: 251. 1922.

*Echinocactus bicolor* Galeotti in Pfeiffer, Abbild. Beschr. Cact. 2: pl. 25. 1848.

*Echinocactus rhodophthalmus* Hooker in Curtis's Bot. Mag. 76: pl. 4486. 1850.

*Echinocactus rhodophthalmus ellipticus* Hooker in Curtis's Bot. Mag. 78: pl. 4634. 1852.

*Echinocactus ellipticus* Lemaire, Jard. Fleur. 3: pl. 270. 1853.

*Echinocactus bicolor schottii* Engelman, Proc. Amer. Acad. 3: 277. 1856.

*Echinocactus bolansis* Runge, Gartenflora 38: 106. 1889.

*Echinocactus bicolor bolansis* Schumann, Gesamtb. Kakteen 303. 1898.

*Echinocactus bicolor tricolor* Schumann, Gesamtb. Kakteen 303. 1898.

*Echinocactus schottii* Small, Fl. Southeast. U. S. 814. 1903.



Plants simple, globose to conic, glaucous, small, up to 3 cm. high, very spiny; ribs usually 8, broad, somewhat tubercled; areoles approximate; spines highly colored, sometimes bright red or yellowish or red and yellow; radial spines 9 to 18, widely spreading or sometimes bent backward at tip, 3 cm. long or less; central spines usually 4, ascending or porrect, all straight, 3 to 5 cm. long, subulate; flowers large, 5 to 6 cm. long and fully as broad when expanded; outer perianth-segments pale purple; inner perianth-segments deep purplish pink, oblong, acute; scales on ovary and flower-tube imbricated, ovate, with scarious and ciliate margins; filaments white to purple; stigma-lobes pale to pinkish yellow; fruit small, about 1 cm. long, dehiscing by a large irregular basal opening; seeds 2 mm. long, black, broader at apex, tuberculate with a circular and depressed basal hilum.

*Type locality:* Mexico.

*Distribution:* Southern Texas to central Mexico.

*Echinocactus tricolor*, *E. castaniensis*, and *E. bicolor montemorelanus* Weber (all in Dict. Hort. Bois 465. 1896) are usually referred here but were never described.

*Illustrations:* Jard. Fleur. 3: pl. 270, as *Echinocactus ellipticus*; Gartenflora 38: 106. f. 21, as *Echinocactus bolansis*; Curtis's Bot. Mag. 76: pl. 4486; Jard. Fleur 1: pl. 101; Loudon, Encycl. Pl. ed. 3. 1377. f. 19375; Gard. Mag. Bot. 1: 40, as *E. rhodophthalmus*; Curtis's Bot. Mag. 78: pl. 4634, as *E. rhodophthalmus ellipticus*; Karsten and Schenck, Vegetationsbilder 2: pl. 20, c; Pfeiffer, Abbild. Beschr. Cact. 2: pl. 25; Schumann, Gesamtb. Kakteen Nachtr. 87. f. 14; Ann. Rep. Smiths. Inst. 1908: pl. 13, f. 2; Blühende Kakteen 2: pl. 74; Monatsschr. Kakteenk. 12: 7; 29: 81; Schelle, Handb. Kakteenk. 157. f. 86; Blanc, Cacti 41. No. 412, as *E. bicolor*.

Figure 11 is from a photograph taken by Robert Runyon at Saltillo, Mexico, in 1921.

## 12. *Thelocactus pottsii* (Salm-Dyck).

*Echinocactus pottsii*\* Salm-Dyck, Allg. Gartenz. 18: 35. 1850.

*Echinocactus bicolor pottsii* Salm-Dyck, Cact. Hort. Dyck. 1849. 173. 1850.

*Echinocactus heterochromus* Weber, Dict. Hort. Bois 466. 1896.

Globular or somewhat depressed, 10 to 15 cm. in diameter, somewhat glaucous, yellowish; ribs 8 or 9, broad and obtuse, more or less distinctly tubercled; areoles large, closely set on old plants, densely felted when young, naked in age; spines variable as to number, shape, size, and color; radial spines 7 to 10, acicular, usually terete, straight or incurved, more or less banded with red and white or pale yellow, 1 to 3 cm. long; central spines several, stout-subulate, more or less flattened, 3 or 4 cm. long, often white, but sometimes banded with red; flowers 5 to 6 cm. long; scales on ovary and flower-tube ovate, greenish; margins thin and ciliate; inner perianth-segments light purple, darker at base, oblong; stigma-lobes yellow; fruit globose, small, 1.5 cm. in diameter; seed tuberculate, black, truncate at base, ridged on back; hilum basal, white, circular.

*Type locality:* Near Chihuahua City.

*Distribution:* Chihuahua to Coahuila, Mexico.

There are three illustrations passing as *Echinocactus pottsii*, none of which agrees with the original description of Salm-Dyck. Two of these are in Nicholson's Dictionary (Dict. Gard. 4: 540. f. 23 and Suppl. f. 359) where the species is described as follows: flowers yellow, about 2 inches across, short-tubed, several expanding together at the top of the stem; stem globular, 1½ feet in diameter: ridges about a dozen, rounded and even, with acute sinuses; spines 1 inch long, bristle-like, arranged in clusters of 7 or 9, with a cushion of white wool at the base.

Nicholson indicates that his plant of *E. pottsii* was from California and introduced into cultivation in 1840. There is no Californian species which answers this description or illustration.

The other illustration is Schumann's (Gesamtb. Kakteen 328. f. 7), which is somewhat similar to the above. Schumann states that the radial spines are commonly 6, spreading and yellow; central spines solitary. We are not able to identify this illustration; it suggests some *Echinocereus* as much as it does an *Echinocactus*.

\* Salm-Dyck (Cact. Hort. Dyck. 1849. 35. 1850) credits this name to Scheer.

*Illustrations:* Knippel, Kakteen pl. 7, in part; Schelle, Handb. Kakteenk. 144. f. 70, as *Echinocactus heterochromus*; Dict. Gard. Nicholson 4: 540. f. 23; Suppl. 336. f. 359; Schumann, Gesamtb. Kakteen 328. f. 57; Garden 2: 521; Monatsschr. Kakteenk. 30: 53; Schelle, Handb. Kakteenk. 155. f. 82; Watson, Cact. Cult. 117. f. 43, as *Echinocactus pottsii*.

## PUBLISHED SPECIES, POSSIBLY OF THIS RELATIONSHIP.

ECHINOCACTUS CONOTHELOS Regel and Klein, Ind. Sem. Hort. Petrop. 1860: 48. 1860.

Ovoid to subcylindric, 10 cm. high, 7.5 cm. in diameter, grayish green; ribs somewhat spiraled, somewhat tubercled at base, the lower tubercles 12 to 20 mm. long; upper areoles oblique, white-tomentose; radial spines 14 to 16, white, spreading to recurved, 8 to 10 mm. long; central spines 2 to 4, erect or a little spreading and recurved, stouter and longer than the radials, 13 to 34 mm. long; flowers and fruit unknown.

*Type locality:* Near Tanquicillos and Jaumave, Mexico.

This plant was collected by Karwinsky and is known only from his collection. The authors refer the species to Salm-Dyck's section of the *Theloidei*, which, however, is a very diverse group containing representatives of several genera. Schumann was unable to place the species; it may be related to some species of *Thelocactus*.

ECHINOCACTUS HEXAEDRUS Scheidweiler, Bull. Acad. Sci. Brux. 6: 89. 1839.

Globose to oblong-ovate, glaucous; ribs 18, tuberculate; tubercles 6-angled, gibbous below areoles; areoles oblong, lanate; spines 13, white with purplish bases; lowermost spine longest; central spines 2, either straight or recurved; flowers and fruit unknown.

*Type locality:* San Luis Potosí.

ECHINOCACTUS SAUSSIERI Weber, Dict. Hort. Bois 468. 1896.

Depressed-globose, 15 to 20 cm. in diameter; ribs spiraled, strongly tubercled; radial spines 9, grayish white, 15 mm. long; central spines 4, acicular, 3 to 4 cm. long; flowers purplish, 4 cm. in diameter; inner perianth-segments lanceolate; stamens and style yellow.

*Type locality:* Matehuala, state of San Luis Potosí, Mexico.

We know this species from the brief description only and are unable to determine its relationship.

ECHINOCACTUS SMITHII Mühlenpfordt in Otto and Dietrich, Allg. Gartenz. 14: 370. 1846.

Simple, globose to cylindric, 7 cm. in diameter; ribs 21, often spiraled, strongly tubercled, glaucous; radial spines 20 to 27, setaceous, white, 16 mm. long; central spines 4, the upper one flattened, white with brown or black tips; flowers reddish, 3.5 cm. long; fruit globular, 8 mm. in diameter; seed nearly globular, flattened at the hilum.

*Type locality:* San Luis Potosí.

We know this species from description only and are unable to assign it to any genus.

ECHINOCACTUS VARGASII Regel and Klein, Ind. Sem. Hort. Petrop. 1860: 48. 1860.

Globose, 5 cm. high, 6 cm. in diameter; tubercles rather large, somewhat angled, arranged in spirals; radial spines 5 or 6, terete, subulate, brownish, 2 to 6 mm. long; central spine 1, erect, 12 mm. long; flowers and fruit unknown.

*Type locality:* Mexico, near Rio Blanco.

Schumann did not know this plant nor do we, but to us it suggests a *Thelocactus*. The authors of the species compared it with *Echinocactus poselgerianus*, now referred to *Coryphantha*, and with *E. phymatothelos*.

3. **NEOLLOYDIA** Britton and Rose, Bull. Torr. Club 49: 251. 1922.

Small, more or less cespitose cacti, fibrous-rooted, cylindric, densely spiny, tubercled; tubercles more or less arranged on spiraled ribs, grooved above; radial spines numerous, widely spreading; central spines one to several, much stouter and longer than radials; flowers large, pink or purple, subcentral from axils of nascent tubercles, their segments widely spreading; fruit compressed-globose, dull-colored, thin-walled, becoming papery, dry, with few scales or none; seeds globose, black, dull, tuberculate-roughened, with a large white basal scar; embryo straight in typical species.

Type species: *Mammillaria conoidea* De Candolle.

We recognize 7 species from central and northern Mexico and Texas, which have been transferred from *Echinocactus* and *Mammillaria*. The genus is dedicated to Professor Francis E. Lloyd, whose collections and observations have contributed highly important information to our investigations.

KEY TO SPECIES.

- Plants 3 cm. in diameter or less; central spines sometimes wanting . . . . . 1. *N. pilispina*  
 Plants larger; central spines always present.  
   Central spines curved or hooked . . . . . 2. *N. clavata*  
   Central spines all straight.  
     Central spine solitary.  
       Central spine stiff, porrect . . . . . 3. *N. horripila*  
       Central spine weak, ascending or connivent . . . . . 4. *N. beguinii*  
     Central spines several.  
       Spines white or sometimes dark above . . . . . 5. *N. ceratites*  
       Central spines or some of them black.  
         Radial spines 25 or more; Mexican species . . . . . 6. *N. conoidea*  
         Radial spines 15 or less . . . . . 7. *N. texensis*

1. **Neolloydia pilispina** (J. A. Purpus).

*Mammillaria pilispina* J. A. Purpus, Monatsschr. Kakteenk. 22: 150. 1912.

Plants cespitose, about 3 cm. in diameter; ribs indistinct, made up of very definite, somewhat angled tubercles young spine-areoles clothed with abundant, long, white wool covering top of

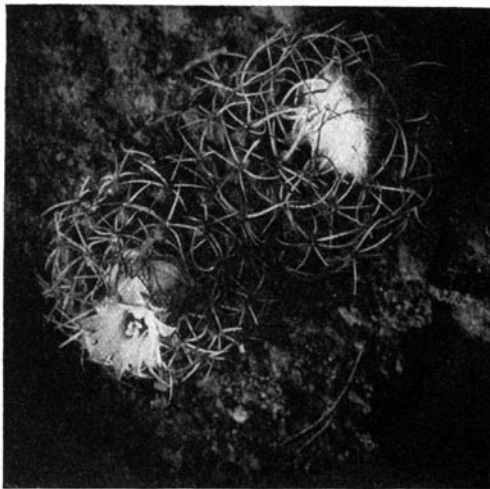


FIG. 12.—*Neolloydia pilispina*.

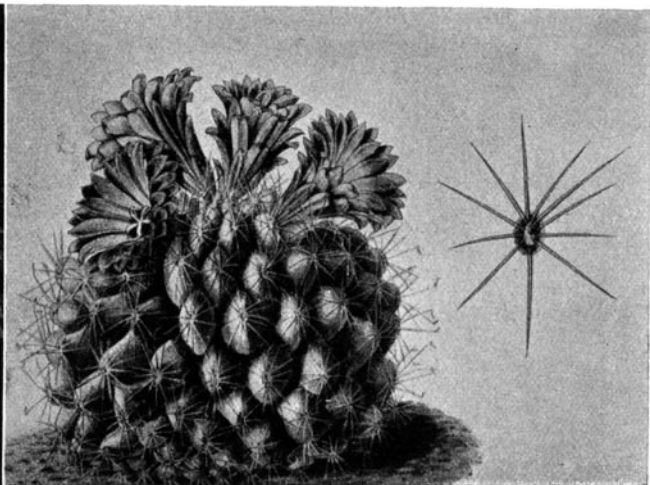


FIG. 13.—*Neolloydia horripila*.

plant; radial spines 6 or 7, 5 to 6 mm. long, weak and spreading, the upper ones longer and connivent over top of plant, 2 cm. long or more, white with blackish tips; central spines often wanting, sometimes one; flowers small, 1.5 to 2 cm. long, purplish; outer perianth-segments brownish.

*Type locality:* Minas de San Rafael, San Luis Potosí, Mexico.

*Distribution.* Known only from the type locality.

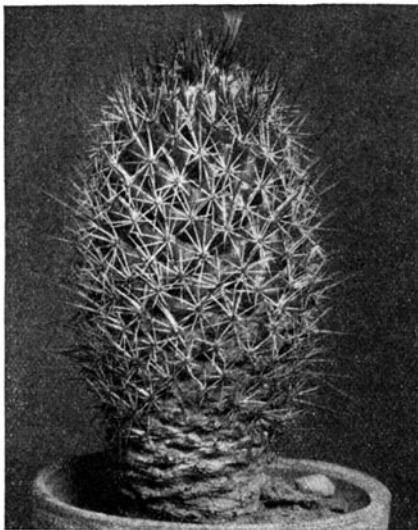
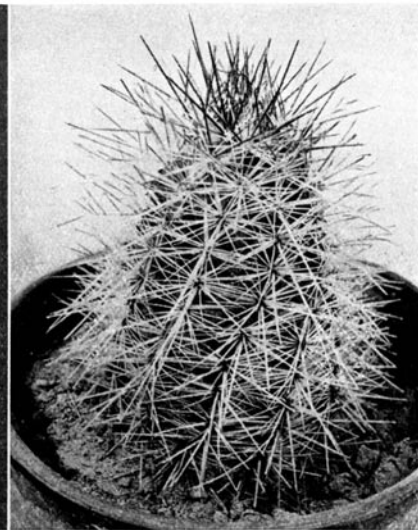
Figure 12 is from a photograph of a plant collected by C. A. Purpus at the type locality.



2. *Neolloydia clavata* (Scheidweiler).

- Mammillaria clavata* Scheidweiler, Bull. Acad. Sci. Brux. 5: 494. 1838.  
*Mammillaria stipitata* Scheidweiler, Bull. Acad. Sci. Brux. 5: 495. 1838.  
*Mammillaria rhabdicantha* Lemaire, Cact. Gen. Nov. Sp. 34. 1839.  
*Mammillaria ancistracantha* Lemaire, Cact. Gen. Nov. Sp. 36. 1839.  
*Mammillaria rhabdicantha humilior* \* Salm-Dyck in Förster, Handb. Cact. 244. 1846.  
*Mammillaria scolymoides rhabdicantha* Salm-Dyck, Cact. Hort. Dyck. 1849. 132. 1850.  
*Echinocactus corniferus rhabdicanthus* Poselger, Allg. Gartenz. 21: 102. 1853.  
 ? *Mammillaria potosiana* Jacobi, Allg. Gartenz. 24: 92. 1856.  
*Mammillaria sulcoglandulifera* Jacobi, Allg. Gartenz. 24: 92. 1856.  
*Coryphantha rhabdicantha* Lemaire, Cactées 34. 1868.  
*Coryphantha ancistracantha* Lemaire, Cactées 34. 1868.  
*Cactus ancistracanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus rhabdicanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus brunneus* Coulter, Contr. U. S. Nat. Herb. 3: 117. 1894.  
*Cactus maculatus* Coulter, Contr. U. S. Nat. Herb. 3: 117. 1894.  
*Mammillaria rhabdicantha* † *ancistracantha* Schumann, Gesamtb. Kakteen 506. 1898.  
*Mammillaria radicansissima* Quehl, Monatsschr. Kakteenk. 22: 164. 1912.

Plants simple, elongated, cylindrical, 10 to 15 cm. high, dark bluish green; tubercles in rows of 5, 8, and 13, conic, grooved above, the axils when young bearing short white wool; glands in the groove 1 to several, large, red; radial spines 6 to 12, with reddish or black tips; central spine 1, somewhat longer than radials, curved or even hooked; flowers small for the genus, about 2 cm. long; outer perianth-segments linear, acute, entire, with broad brownish midrib; inner perianth-segments linear, entire, narrow, creamy white; stamens pinkish, much shorter than the perianth-segments; style pinkish; stigma-lobes 5 or 6, short, greenish.

FIG. 14.—*Neolloydia clavata*.FIG. 15.—*Neolloydia conoidea*.

*Type locality*: Not cited.

*Distribution*: San Luis Potosí, Mexico.

The two species of Coulter, *Cactus brunneus* and *Cactus maculatus*, as well as *Mammillaria radicansissima*, came from San Luis Potosí, and all seem to be so much alike that we do not hesitate to reduce them as above.

*Echinocactus rhabdicanthus* is credited by Schumann to Poselger, but he used the name *rhabdicanthus* only as a variety of *E. corniferus*. This binomial was used in 1850 by Salm-Dyck for a very different plant.

*Mammillaria humilior* Förster we have seen only in Schumann's Index (Gesamtb. Kakteen 824. 1898). He refers it to *M. rhabdicantha ancistracantha*.

\* Schumann (Gesamtb. Kakteen 506, 824, Index, 1898), perhaps not intentionally, gives this name specific rank.

† Schumann has dropped the first "h" in *Mammillaria rhabdicantha* and he is followed by the Monatsschrift für Kakteenkunde.

*Illustrations:* Blühende Kakteen 1: pl. 7; Schumann, Gesamtb. Kakteen 505. f. 83, as *Mammillaria rhabdicantha*; Blühende Kakteen 3: pl. 163; Monatsschr. Kakteenk. 22: 165, as *M. radicansissima*.

Figure 14 is from a photograph of a plant collected by Dr. Edward Palmer at San Luis Potosí, Mexico, in 1908 (No. 814).

### 3. *Neolloydia horripila* (Lemaire).

*Mammillaria horripila* Lemaire, Cact. Aliq. Nov. 7. 1838.

*Echinocactus horripilus* Lemaire, Cact. Gen. Nov. Sp. 91. 1839.

*Echinocactus horripilus longispinus* Monville in Labouret, Monogr. Cact. 265. 1853.

Simple or somewhat cespitose, globular to short-cylindric, 10 to 12 cm. high; tubercles glaucous, prominent, rounded at apex; radial spines 8 to 10, acicular, spreading, 15 mm. long, grayish; central spine solitary, straight, a little longer than the radials; flowers deep purple, 3 cm. long; inner perianth-segments narrowly oblong, acute; stigma-lobes 5, white.

*Type locality:* Not cited.

*Distribution:* Hidalgo, Mexico.

Lemaire first referred this plant to *Mammillaria*, but finally described it as an *Echinocactus* on account of its grooved tubercles; he believed that it was an intergrade between these two genera. As he states, its general appearance is that of a species of the so-called *Mammillaria*.

*Echinocactus caespititius* Pfeiffer is usually given as a synonym of this species, but it seems never to have been described. Schumann cites the place of publication as Salm-Dyck's Cactaceae of 1850 (p. 35), but it is given only as a synonym. It appeared also in Salm-Dyck's Cactaceae of 1845 (p. 17) and in Förster's Handbuch (p. 283), but also as a synonym.

*Illustration:* Blühende Kakteen 1: pl. 6, as *Echinocactus horripilus*.

Figure 13 is reproduced from the illustration above cited.

### 4. *Neolloydia beguinii* (Weber) Britton and Rose, Bull. Torr. Club 49: 252. 1922.

*Echinocactus beguinii* Weber in Schumann, Gesamtb. Kakteen 442. 1898.

Plant-body cylindric, 10 to 15 cm. high; ribs spiraled and divided at regular intervals into low tubercles resembling geometric figures, pale bluish green in color but nearly hidden by the dense covering of spines; radial spines 20 or more, white, but with dark tips; centrals usually single, longer and ascending; flowers appearing from top of plant, large, 3 to 4 cm. long, bright pink; stigma-lobes 7, long, white; ovary without scales; seeds black, tubercled, with a broad triangular hilum.

*Type locality:* Probably at Saltillo, in Coahuila, Mexico.

*Distribution:* Zacatecas and Coahuila, Mexico.

This plant is very distinct from *Echinomastus erectocentrus*, with which it was confused both by Coulter and by Schumann.

*Mammillaria beguinii* and *Echinocactus beguinii* Weber are referred by Weber (Dict. Hort. Bois 466. 1896) as synonyms of *Echinocactus erectocentrus*. The Index Kewensis (Suppl. 5) refers the former name to Schelle (Handb. Kakteenk. 200. 1907). The name *E. beguinii* has been previously used in Rebut's Catalogue and by Schumann (Monatsschr. Kakteenk. 5: 44. 1905), but not described.

### 5. *Neolloydia ceratites* (Quehl).

*Mammillaria ceratites* Quehl, Monatsschr. Kakteenk. 19: 155. 1909.

Simple or in small clusters, short-cylindric, 6 to 10 cm. high; tubercles somewhat 4-angled, more or less arranged in ribs; young areoles very woolly but becoming naked; radial spines 15 to 20, more or less spreading, white, 1.5 cm. long; central spines 5 or 6, longer and stouter than the radials, blackish above; flowers purple, 3 to 3.5 cm. long; perianth-segments oblong, acute.

*Type locality:* Mexico.

*Distribution:* Mexico.

*Illustration:* Monatsschr. Kakteenk. 19: 155, as *Mammillaria ceratites*.

Figure 16 is from a photograph of the type plant sent us by Mr. Quehl.

6. *Neolloydia conoidea* (De Candolle) Britton and Rose, Bull. Torr. Club 49 252.1922.

*Mammillaria conoidea* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 112. 1828.

*Mammillaria grandiflora* Otto in Pfeiffer, Enum. Cact. 33. 1837.

*Mammillaria diaphanacantha* Lemaire, Cact. Aliq. Nov. 93. 1838.

*Mammillaria inconspicua* Scheidweiler, Bull. Acad. Sci. Brux. 5: 49. 1838.

*Mammillaria echinocactoides* Pfeiffer, Allg. Gartenz. 8: 281. 1840.

*Mammillaria scheeri* Mühlenpfordt, Allg. Gartenz. 13: 346. 1845.

*Mammillaria strobiliformis* Engelmann in Wislizenus, Mem. Tour North. Mex. 113. 1848.

*Echinocactus conoideus* Poselger, Allg. Gartenz. 21: 107. 1853.

*Cactus conoideus* \* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus echinocactoides* \* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus grandiflorus* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not Linnaeus, 1753.

Sometimes simple, hut usually cespitose, sometimes forming large clusters, often branching or budding above, short-cylindric; tubercles in 5 or 8 spiral rows, obtuse, their axils very woolly; spines very numerous, often completely covering the plant; radial spines white, 25 or more, widely spread-

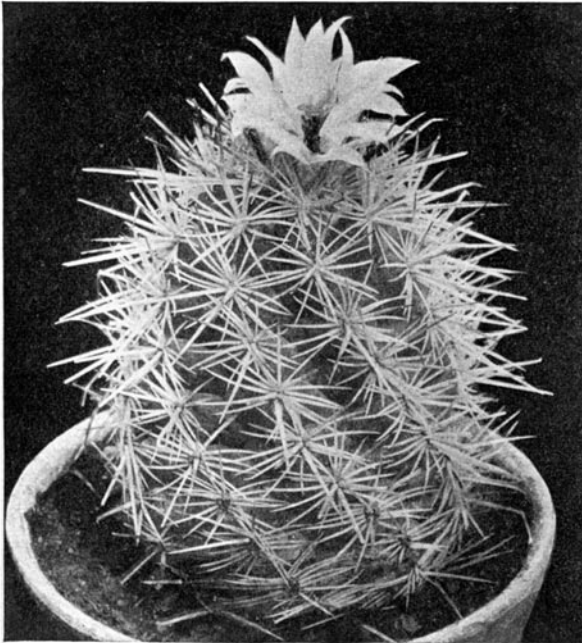


Fig. 16.—*Neolloydia ceratites*.



Fig. 17.—*Neolloydia conoidea*.

ing, 8 to 10 mm. long; central spines several, stouter and longer than the radials, 1 to 3 cm. long, blackish; flowers large; outer perianth-segments dull purple without, lighter toward the margins inner perianth-segments rich purple; anthers orange; filaments pale yellow, purplish at base; style and stigma-lobes pale yellow, the latter 5 or 6; fruit compressed-globose, dull yellow, mottled with red, becoming dry and papery, then brown; seeds 1 mm. in diameter.

*Type locality:* Mexico.

*Distribution:* Northern Mexico.

*Mammillaria canescens*, listed by De Candolle (Prodr. 3: 460. 1828) as hardly known and given by Pfeiffer (Enum. Cact. 33. 1837) as a synonym of *M. grandiflora*, doubtless belongs here. A plant of this name was in the Berlin Botanical Garden in 1829 (Verh. Ver. Beförd. Gartenb. 6: 430. 1830).

The name *Coryphantha conoidea* occurs in C. R. Orcutt's Circular to Cactus Fanciers 1922.

*Illustrations:* De Candolle, Mém. Cact. pl. 2; Pfeiffer, Abbild. Beschr. Cact. 2: pl. 26; Blühende Kakteen 2: pl. 96; Schelle, Handl. Kakteenk. 238. f. 155; Ann. Rep. Smiths.

\* Kuntze's spelling of these two names is as follows: *C. conodeus* and *C. echinocactodes*.



Inst. 1908: pl. 14, f. 1; Thomas, Zimmerkultur Kakteen 46, as *Mammillaria conoidea*; Monatsschr. Kakteenk. 6: 119, as *Mammillaria grandiflora*.

Figure 15 is from a photograph of a barren plant collected by Dr. Safford in Mexico in 1907 (No. 1334); figure 17 is from a photograph of a flowering plant collected by Dr. Chaffey in the state of Zacatecas, Mexico, July 4, 1910.

Related to the preceding is:

MAMMILLARIA CREBRISPINA De Candolle, Mém. Mus. Hist. Nat. Paris 17: 111. 1828.

*Cactus crebrispinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

This plant was collected by Thomas Coulter but its identification is very uncertain. Pfeiffer thought that it was related to *Mammillaria conoidea* and perhaps it should be referred there.

*Mammillaria polychlora* Scheidweiler (Förster, Handb. Cact. 205. 1846) was given as a synonym of *M. crebrispina*.

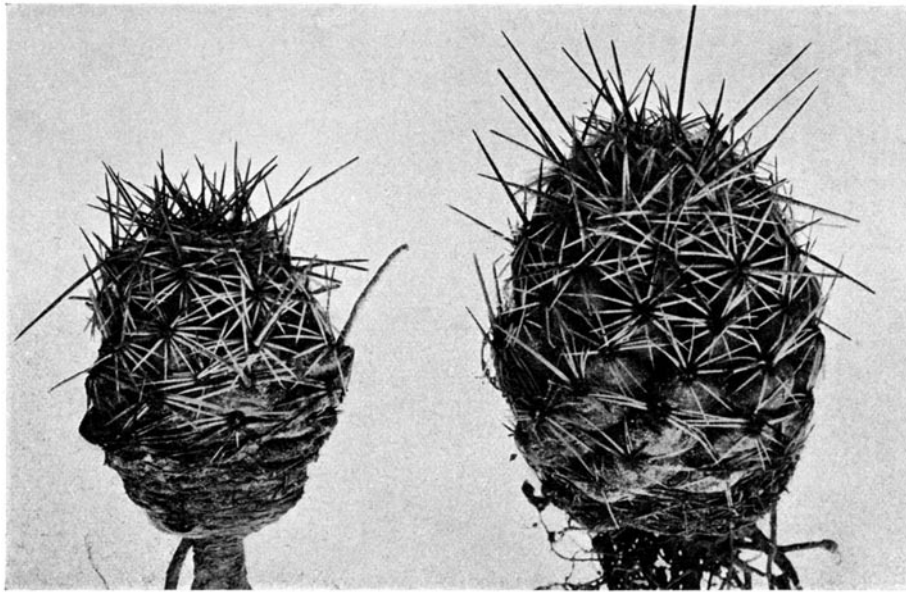


FIG. 18.—*Neolloydia texensis*.

#### 7. *Neolloydia texensis* sp. nov.

Globular to short-oblong, 4 to 6 cm. long; tubercles arranged in long spirals, somewhat imbricated, a little flattened dorsally; radial spines 10 to 15, white, widely spreading, about 1 cm. long; central spines 1 to 3, much stouter than the radials, elongated, 2 to 3 cm. long, black; flowers not seen; fruit small, globular, almost hidden by the spines, greenish, thin-walled, dry; seeds black, tuberculate, 1.5 mm. in diameter; hilum large, basal, white lunate.

Collected by MacDougal and Shreve at Sanderson, Texas, December 1920.

This seems to be the plant from Texas referred by Engelmann to *Mammillaria scolymoides* but it probably is not that species which came from central Mexico. *M. scolymoides* probably should be considered a synonym of *Coryphantha cornifera*, the species of which Engelmann once thought that it might be only a form. Coulter (Contr. U. S. Nat. Herb. 3: 115. 1894) treats the Texan plant under the name of *Cactus scolymoides* but the range which he gives is too wide, and doubtless more than one species is involved, both in his description and range. The only specimen which we have seen of this species, except MacDougal and Shreve's plant, is one collected by Walter M. Evans in 1891, which is mixed with *Cactus echinus* and labeled as from near El Paso, Texas.

Figure 18 is from a photograph of plants collected by Dr. MacDougal and Dr. Shreve.

## 4. MAMILLOPSIS \* (Morren) Weber.

Cespitose cacti, often forming large clusters, globular or short-cylindric, completely hidden under a mass of long, soft, white, hair-like spines; tubercles not arranged in ribs, more or less conic, not grooved above, spine-bearing at apex, their axils pubescent and bristly; radial spines numerous, weak, straight; central spines 4 to 6, with yellow, hooked tips; flowers from near top of plant but apparently from axils of old areoles, with a regular, straight, slender, scaly tube and a broad, spreading limb; perianth-segments oblong, obtuse; stamens and style erect, long-exserted beyond tube; scales on flower-tube orbicular, obtuse.

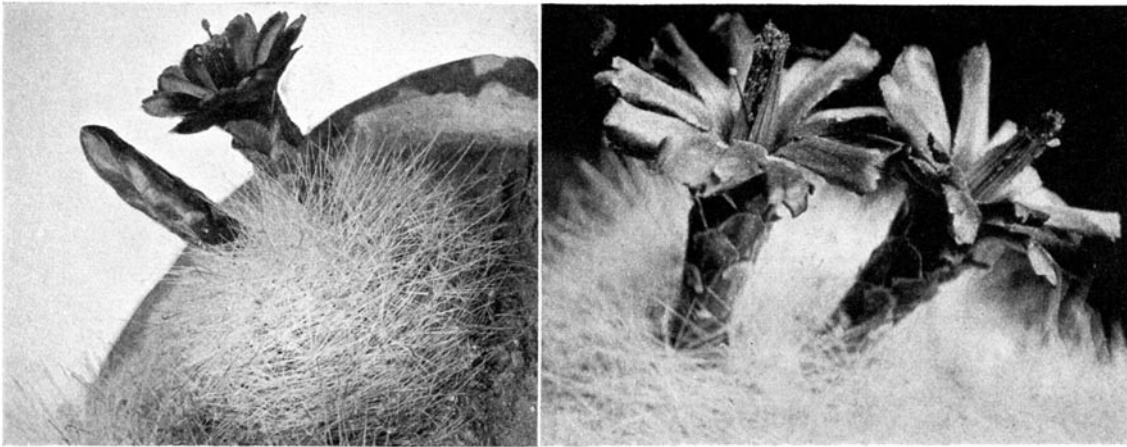
Schumann associated *Mammillaria senilis* Loddiges, the type of the genus, with species now referred to *Cochemia*, treating them all as a subgenus of *Mammillaria*, but *Cochemia* has an irregular flower and otherwise is different from this genus.

Morren first proposed the subgeneric name *Mamillopsis*, but Weber, we believe, was justified in recognizing the genus. He states, very properly, that the flowers are very unlike those of any of the species of *Mammillaria*. He also calls attention to the long-exserted stamens, and long and scaly flower-tube, and also to the fact that the filaments are borne in two series, one series being on the flower-tube. The ovary, too, seems to be scaly, and doubtless other differences will be recorded when the species are better known. Two species are here recognized, both from the high mountains of Mexico.

The generic name, *Mamillopsis*, means *Mammillaria*-like.

## KEY TO SPECIES.

- Flowers 6 to 7 cm. long, orange-yellow ..... 1. *M. senilis*  
 Flowers 3 cm. long, deep red ..... 2. *M. diguetii*



FIGS. 19 and 20.—*Mamillopsis senilis*.

1. *Mamillopsis senilis* (Loddiges) Weber.

*Mammillaria senilis* Loddiges in Salm-Dyck, Cact. Hort. Dyck. 1849. 82. 1850.  
*Cactus senilis* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Haworth, 1824.

Stems 6 to 15. cm. high, 3 to 6 cm. in diameter, the flesh juicy and drying red; tubercles 3 to 4 mm. long; spines 30 to 40, 2 cm. long; flowers 6 to 7 cm. long, 6 cm. broad, orange-yellow; perianth-segments oblong, acute, with serrated margin; stigma-lobes 6, spreading; fruit not known.

Type locality: Not cited.

Distribution: High mountains of Chihuahua and Durango.

\* *Mamillopsis* has never been formally published as a genus, but it is mentioned by Weber as a synonym of *Mammillaria senilis* (Dict. Hort. Bois 805. 1898). It was proposed as a subgenus by Morren in 1874 (Belg. Hort. 24: 33).

This species was probably first collected by Seemann in the Sierra Madre of Mexico, where it was collected by Dr. Rose in 1897. It has frequently been introduced into cultivation but does not do well, soon dying out. It is able to stand considerable cold and in its home is usually covered with snow during the winter.

Salm-Dyck gave two varieties without descriptions, based on two unpublished names, when he first listed *Mammillaria senilis*, as follows: *M. senilis haseloffii* (Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850; *M. haseloffii* Ehrenberg, Allg. Gartenz. 17: 303. 1849) and *M. senilis linkei* (Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850; *M. linkei* Ehrenberg). The former, however, was published the previous year as *M. haseloffii* and has priority.

*Illustrations:* Fl. Serr. 21: pl. 2159; Rev. Hort. iv. 2: pl. 334; Belg. Hort. 24: pl. 3; Cact. Journ. 1: pl. for March; Contr. U. S. Nat. Herb. 5: pl. 62; Schelle, Handb. Kakteenk. 245. f. 163; Tribune Hort. 4: pl. 140; De Laet, Cat. Gén. 28. f. 41; Gartenwelt 14: 331; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 31; Succulenta 4: 80, as *Mammillaria senilis*.

Figure 19 is from a photograph of a flowering plant; figure 20 is from a photograph of two flowers of a plant obtained in the Sierra Madre, Mexico, by I. Ochoterena in 1911; figure 21 is reproduced from the third illustration cited above.

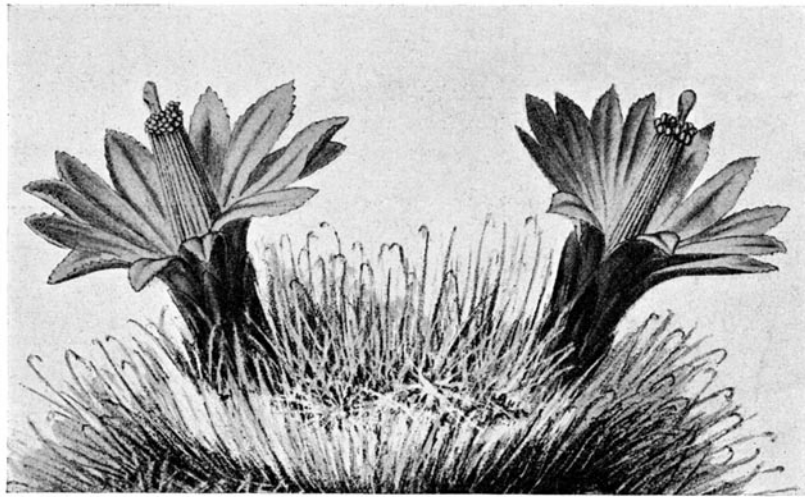


FIG. 21.—*Mamillopsis senilis*.

## 2. *Mamillopsis diguetii* (Weber).

*Mammillaria senilis diguetii* Weber, Bull. Mus. Hist. Nat. Paris 10: 383. 1904.

Plants densely cespitose, forming a hemispheric clump of about 35 globular heads, each 25 cm. in diameter; radial spines numerous, dark straw-colored; flowers 3 cm. long, about 2 cm. broad, deep red; ovary bearing small scales.

*Type locality:* Sierra de Nayarit, Jalisco.

*Distribution:* Jalisco to Sinaloa, Mexico.

This species, until recently, was known only from the single collection of L. Diguet made in March 1900; he found it in the mountains of Jalisco at an altitude of 2,500 meters. It has again been collected by J. G. Ortega in the Sierra de Chabarra, Concordia, Sinaloa, in 1921.

The type is in the Museum of Natural History of Paris and was studied there by Dr. Rose in May 1912; he believes that it is distinct from *M. senilis*, the spines being of a different color and much more rigid than in that species.



## 5. COCHEMIEA (K. Brandegee) Walton, Cact. Journ. 2: 50. 1899.

Plant-body cylindrical, often much elongated, the surface covered with spirally arranged tubercles, these not milky; tubercles not grooved above; spines both central and radial; flowers borne from axils of upper old tubercles, narrowly tubular, curved and bilabiate; perianth-segments in 2 series; stamens and style red, exserted; ovary naked; fruit indehiscent, globular, red, naked, bearing a large scar at top; seeds black, reticulated.

Type species: *Mammillaria halei* Brandegee.

The genus was named for an Indian tribe which once inhabited Lower California. Mrs. Brandegee, who first separated these species as a subgenus, describes the flowers as "scarlet, tubular, slender, somewhat curved, and oblique, with spreading unequal petaloid sepals, so making the flower apparently double as in *Cereus flagelliformis*."

Four species are known, all inhabiting Lower California.

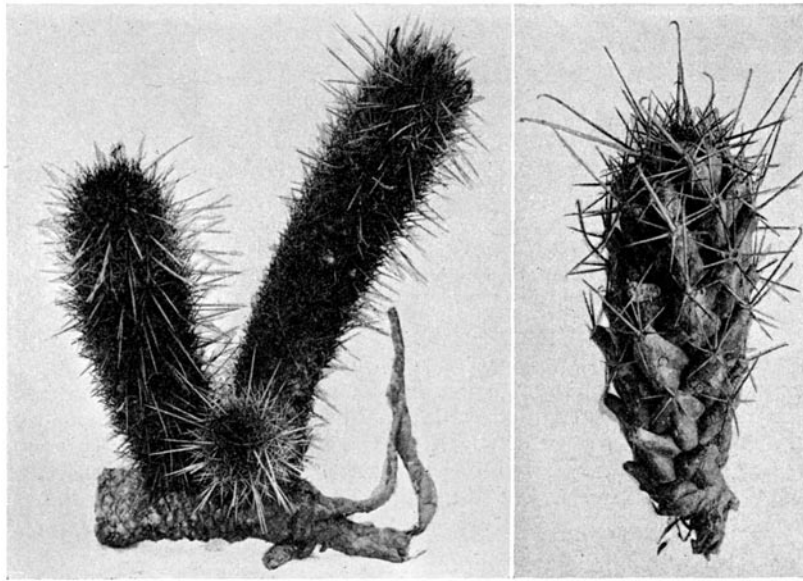


FIG. 22.—*Cochemia halei*.

FIG. 23.—*Cochemia poselgeri*.

The fact that *Cochemia* had been raised to generic rank, to which four species had been transferred, has been overlooked by all our botanical indexes. Walton's remarks in this connection are interesting:

"The plants so classed have flowers very elongated, tubular, with sepals placed as a second ring, removed some distance below the petals; they are oblique like *Epiphyllum truncatum* and *Cereus flagelliformis* and in fact more resemble those flowers than they do those of any *Mammillaria*, so much so that I think it would be best to drop the generic name of *Mammillaria* and simply adopt Mrs. Brandegee's name of *Cochemia* as a generic name."

Mrs. Brandegee suggested (*Erythea* 5: 117), "It is possible that some of the elongated species of Mexico proper will be found to belong to this section when the flowers are better known." But we have seen no plants from the mainland of Mexico which suggest this relationship.

## KEY TO SPECIES.

- Spines all straight. . . . . 1. *C. halei*  
 Some or all of central spines hooked.  
 Central spine normally solitary. . . . . 2. *C. poselgeri*  
 Central spines normally 2 to 11 (sometimes only 1 in *C. setispina*).  
 Central spines 1 to 4. . . . . 3. *C. setispina*  
 Central spines 8 to 11. . . . . 4. *C. pondii*

1. *Cochemiea halei* \* (Brandege) Walton, Cact. Journ. 2: 50. 1899.

*Mammillaria halei* Brandege, Proc. Calif. Acad. II. 2: 161. 1889.  
*Cactus halei* Coulter, Contr. U. S. Nat. Herb. 3: 106. 1894.

Cespitose; stems nearly upright, often 30 to 50 cm. high, 5 to 7.5 cm. in diameter, almost entirely covered by the spines; tubercles short; axils of tubercles woolly but not setose; radial spines 10 to 20, 10 to 12 mm. long; central spines 3 or 4, 25 mm. long, all straight; flowers central or nearly 50, 4 to 5 cm. long; filaments yellow; stigma-lobes scarlet; fruit scarlet, 12 mm. long; seeds reticulated.

*Type locality*: Magdalena Island, Lower California.

*Distribution*: Islands of southern Lower California.

This species was observed first by Mr. T. S. Brandege in 1889, while making a botanical excursion through Lower California, and described by him the same year. It has been reported from only two islands off the coast of Lower California but it is there very abundant. It has been introduced into Europe and is sometimes offered in the trade. It is remarkable for its very large slender flowers. An abundance of material was collected by Dr. Rose in 1911. The plant does not do well in cultivation.

The species was named for Mr. J. P. Hale, who had extensive domains in Lower California and who assisted Mr. Brandege while making explorations in 1889.

*Illustrations*: Proc. Calif. Acad. II. 2: pl. 6; Monatsschr. Kakteenk. 5: 89; Schumann, Gesamtb. Kakteen 510. f. 84; Thomas, Zimmerkultur Kakteen 47, as *Mammillaria halei*.

Figure 22 is from a photograph of a barren shoot of a specimen collected by C. R. Orcutt at Magdalena Bay, Lower California, 1917.

2. *Cochemiea poselgeri* (Hildmann).

*Mammillaria poselgeri* Hildmann, Garten-Zeitung 4: 559. 1885.  
*Mammillaria roseana* Brandege, Zoe 2: 19. 1891.  
*Mammillaria radliana* Quehl, Monatsschr. Kakteenk. 2: 104. 1892.  
*Cactus roseanus* Coulter, Contr. U. S. Nat. Herb. 3: 105. 1894.  
*Cochemiea rosiana* Walton, Cact. Journ. 2: 50. 1899.

Stems numerous from a central root, spreading or sometimes pendent from rocks or creeping over the ground, often 2 meters long, 4 cm. thick; areoles and upper axils white-woolly, the latter rarely setose; tubercles remote, somewhat flattened; radial spines 7 to 9, 9 to 12 mm. long, straw-colored; central spine 1, hooked, 25 mm. long; flowers appearing in the upper axils, 3 cm. long, scarlet; stamens and style exserted; fruit globular, 6 to 8 mm. in diameter.

*Type locality*: Cape Region, Lower California.

*Distribution*: At lower elevations in southern Lower California.

This cactus, according to Mr. Brandege, is one of the most showy of this region.

*Mammillaria longibamata* Engelmann was a manuscript name taken up by Coulter (Contr. U. S. Nat. Herb. 3: 105. 1894) as a synonym of *Cactus roseanus*.

*Illustrations*: Thomas, Zimmerkultur Kakteen 49; Monatsschr. Kakteenk. 2: 105, as *Mammillaria radliana*; Garten-Zeitung 4: 559. f. 131; Schelle, Handb. Kakteenk. 246. f. 164, as *M. poselgeri*.

Plate 11, figure 3, shows a plant collected by Dr. Rose at Cape San Lucas, Lower California, which flowered in the New York Botanical Garden in 1915; figure a shows the fruit and figure 3b the seed from a plant collected by Dr. Wm. S. W. Kew near La Junta, Lower California, November 10, 1920. Figure 23 is from a photograph of a plant collected by C. R. Orcutt near Magdalena, Lower California, and sent to the Bureau of Chemistry, U. S. Department of Agriculture, in 1917.

2. *Cochemiea setispina* (Coulter) Walton, Cact. Journ. 2: 51. 1899.

*Cactus setispinus* Coulter, Contr. U. S. Nat. Herb. 3: 106. 1894.  
*Mammillaria setispina* Engelmann in K. Brandege, Erythea 5: 117. 1897.

Stems ascending, 30 cm. high; tubercles short; axils of tubercles woolly but not setose; radial spines 10 to 12, white with black tips, widely spreading, unequal, 10 to 34 cm. long, slender; central spines 1 to 4, stouter than the radials, one of them strongly hooked; flowers not definitely known but probably large; fruit obovoid, 3 cm. long, scarlet; seeds black and pitted.

\* Walton published this name as *Cochemiea hallei*.

*Type locality:* San Borgia, Lower California.

*Distribution:* Interior of southern Lower California.

We have not seen living specimens of the species. Dr. Rose obtained a small specimen from L. Quehl at Halle in 1912.

The type of this species, now in the herbarium of the Missouri Botanical Garden, was collected by William Gabb in 1867, while Brandegee obtained specimens in 1889. Dr. C. A. Purpus found it near Calmalli and wrote of it as follows (Cact. Journ. 2: 54. 1899):

"My next trip was to a chain of granite mountains about 20 miles from Calmalli.

"I was very much surprised to find on the slope of the mountains *Mamillaria setispina* Engelman, which until now I had not been able to collect as a living specimen. I came upon it afterwards also in gneiss, trachyt, porphur, and in a sandstone conglomerate. Ground composed of granite gravel appears to suit it best."

**4. *Cochemia pondii* (Greene) Walton, Cact. Journ. 2: 51. 1899.**

*Mamillaria pondii* Greene, Pittonia 1: 268. 1889.

*Cactus pondii* Coulter, Contr. U. S. Nat. Herb. 3: 102. 1894.

Stems at first upright, cylindric, simple or few-branched, 7 cm. to 3 dm. high, hidden under a dense covering of spines; axils of tubercles setose; young areoles white-tomentose; radial spines white, whitish or sometimes brownish, 15 to 25, spreading; central spines 8 to 11, much longer and stouter than the radials, the longest 3 cm. long, 1 or 2 hooked; flowers slender, 5 cm. long, bright scarlet; stamens exserted; fruit purplish red, 18 mm. long, ovoid to obovoid.

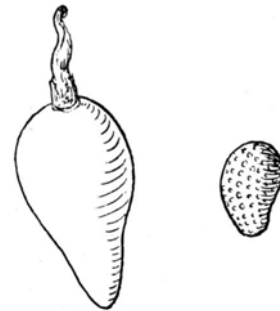
*Type locality:* Cedros Island.

*Distribution:* Islands off the western coast of northern Lower California.

This plant was found in great abundance on Cedros Island by Dr. Rose in 1911 (No. 16090) and a number of living specimens was brought to Washington and New York. These have been in cultivation for more than ten years but have never flowered. It is not often met with in cultivation.

The species was named for Charles Fremont Pond, U. S. N., who collected plants on Cedros and other islands off the coast of Lower California in 1889.

Figure 24 shows the fruit and figure 24a the seed from specimens obtained at the type locality by Dr. Rose in 1911.



FIGS. 24 and 24a.—Fruit and seed of *Cochemia pondii*.

**6. CORYPHANTHA (Engelmann) Lemaire, Cactées 32. 1868.**

Plant body globular to cylindric, either solitary or cespitose; tubercles, except the very earliest ones, grooved on upper surface\* from apex to base; flowers from near top of plant and from base of young and growing tubercles, large and showy, generally yellow, sometimes purple or red; ovary naked or, occasionally, bearing a few scales in some species; perianth long-persistent †; fruit large,‡ ripening slowly, ovoid to oblong, greenish or yellowish; seeds brown (black and angled in *Coryphantha cubensis*), lightly reticulated or nearly smooth, thin-shelled, with a central or subventral hilum; embryo curved, at least in some species.

*Type species:*§ *Mamillaria sulcolanata* Lemaire.

The generic name is from κορυφή top, and ἄνθος flower, referring to the insertion of the flowers at the top of the plant. We recognize 37 species in the genus. The genus *Coryphantha* was proposed by Lemaire in 1868, but he did not designate a type. The

\* In *C. macromeris* the tubercle is grooved only for about half its length.

† We quote the following observation of Engelmann in this connection: "I have repeatedly observed, and in a considerable number of species, that the red berries of the *Mamillariae* are always destitute of the remnants of the perigone, but the green fruits always are topped with it (Mem. Tour North. Mex. 21).

‡ The only fruit which we have seen of *C. nickel* was globose and small, 5 to 7 mm. in diameter, but the species otherwise of this alliance.

§ See Britton and Milispough, Bahama Flora 295. 1920.

name, however, comes from Engelmann, who first used it as a subgenus of *Mammillaria* (Proc. Amer. Acad. 3: 264. 1856).

The position of this group has always been puzzling to cactus students. Dr. Poselger believed that it was a section of *Echinocactus* and transferred certain of these species which had been described under *Mammillaria* to *Echinocactus*. In its vertical, nearly central flowers it does approach the *Echinocactanae*, but otherwise it is quite distinct.

In the origin of their large flowers, in the shape and structure of their fruit, and in the color and form of their seeds the species compose a rather natural group, but they are diverse in form and armament. The species are most common in central Mexico, a few extending into the southern United States, and one extending into southern Canada.

The groove on the upper side of the tubercle which is so characteristic of the genus does not occur on seedlings or on very young plants, but it is always found on old flowering plants and seems to be associated with the inflorescence, for the flowers appear only in the axils of grooved tubercles and originate at the bottom of this groove. Plants which grow in conservatories for a long time without flowering lose this groove; \* we have had one plant of this kind under observation for fifteen years.

### KEY TO SPECIES.

- A. Seeds brown, not angled; flowers usually large.
- B. Tubercles grooved to middle or a little below; ovary bearing scales with woolly axils. Series *Macromeres*.
- Tubercles elongated, bright green . . . . . 1. *C. macromeris*
- Tubercles short, grayish green . . . . . 2. *C. runyonii*
- BB. Tubercles grooved from tip to base except in young plants; ovary naked.
- C. Grooves of tubercles bearing large yellow or red glands. Series *Recurvatae*.
- Flowers white . . . . . 3. *C. ottonis*
- Flowers not white.
- Stems globular.
- Radial spines more or less recurved . . . . . 4. *C. recurvata*
- Radial spines spreading or ascending.
- Spines dark, sometimes black . . . . . 5. *C. poselgeriana*
- Spines yellow or sometimes tinged with red.
- Central spines slender and flexible . . . . . 6. *C. muehlenpfordtii*
- Central spines stout and rigid.
- Radial spines subulate . . . . . 7. *C. guerkeana*
- Radial spines acicular . . . . . 8. *C. echinoidea*
- Stems cylindrical.
- Stems bluish green . . . . . 9. *C. clava*
- Stems yellowish green.
- Central spine usually one.
- Glands in groove red . . . . . 10. *C. octacantha*
- Glands in groove yellow . . . . . 11. *C. exsudans*
- Central spines 2 . . . . . 12. *C. erecta*
- CC. Grooves of tubercles without large glands. Series *Sulcolanatae*.
- D. Outer perianth-segments not ciliate.
- E. Flowers purplish or rose . . . . . 13. *C. elephantidens*
- EE. Flowers yellow or white.
- F. Tubercles very large, broader than high . . . . . 14. *C. bumamma*
- FF. Tubercles of medium size, if large, longer than broad.
- G. Plants large for this genus (often 8 cm. in diameter); seeds 3 mm. in diameter . . . . . 15. *C. robustispina*
- GG. Plants much smaller than in *C. robustispina*; seeds 2 mm. in diameter or less.
- H. Central spines usually wanting.
- Secondary cluster of spines developed in upper part of areoles and connivent at top! . . . . . 16. *C. connivens*
- Secondary cluster of spines not developed.
- Spines pectinate . . . . . 17. *C. pectinata*
- Spines not pectinate.
- Spines 14 or more.
- Spines slender with long black tips . . . . . 18. *C. nickelsae*
- Spines rather short with light tips.
- Spines subulate . . . . . 19. *C. compacta*
- Spines acicular . . . . . 20. *C. radians*
- Spines fewer than 15.
- Spines slender and weak . . . . . 21. *C. sulcolanata*
- Spines not slender . . . . . 22. *C. retusa*

\* *Mammillaria potosiana* and *M. polymorpha* seem to have been based on such plants.



- HH. Central spines one to several.
  - I. Central spines strongly hooked . . . . . 23. *C. palmeri*
  - II. Central spines straight or at most curved.
    - J. Central spines more or less curved.
      - Central spine one, sometimes more in No. 25.
        - Radial spines nearly as long as central . . . . . 24. *C. cornifera*
        - Radial spines about half as long as central . . . . . 25. *C. salm-dyckiana*
      - Central spines several.
        - Radial spines 20 or more . . . . . 26. *C. pallida*
        - Radial spines 12 or fewer . . . . . 27. *C. pycnacantha*
    - JJ. Central spines straight.
      - Radial spines, two kinds (to be looked for here). . . . . 5. *C. poselgeriana*
      - Radial spines of one kind.
        - Plant almost hidden under mass of spines; fruit oblong . . . . . 28. *C. echinus*
        - Plant not hidden under mass of spines; fruit globular . . . . . 29. *C. durangensis*
- DD. Outer perianth-segments ciliate.
  - Flowers yellow . . . . . 30. *C. chlorantha*
  - Flowers purplish to pink.
    - Inner perianth-segments linear or lanceolate.
      - Stigma-lobes purple, apiculate . . . . . 31. *C. vivipara*
      - Stigma-lobes white, obtuse or notched.
        - Flowers 4 to 7 cm. broad, rose to purple.
          - Plants mostly solitary; inner perianth-segments broadly linear . . . 32. *C. neo-mexicana*
          - Plants mostly cespitose; inner segments linear-lanceolate . . . . . 33. *C. arizonica*
          - Flowers very short, 3 cm. broad, light pink . . . . . 34. *C. deserti*
        - Inner perianth-segments oblanceolate . . . . . 35. *C. aggregata*
- AAA. Seeds black, angled; flowers minute. Series *Cubenses* . . . . . 36. *C. cubensis*
- AA. Ungrouped species . . . . . 37. *C. sulcata*

**1. Coryphantha macromeris** (Engelmann) Lemaire, Cactées 35. 1868.

*Mammillaria macromeris* Engelmann in Wislizenus, Mem. Tour North. Mex. 97. 1848.  
*Mammillaria heteromorpha* Scheer in Salm-Dyck. Cact. Hort. Dyck. 1849. 128. 1850.  
*Echinocactus macromeris* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Echinocactus heteromorphus* Poselger, Allg. Gartenz. 21: 126. 1853.  
*Mammillaria dactylithele* Labouret, Monogr. Cact. 146. 1853.  
*Cactus macromeris* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus heteromorphus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Plant branching at base, often many-headed, up to 2 dm. long; tubercles large, soft, loosely arranged, elongated, 12 to 30 cm. long, grooved on upper side about two-thirds of their length; spines 10 to 17, slender, the radials white; central spines several, black, the longer ones 5 cm. long; flowers large, purple, 6 to 8 cm. broad; scales on flower-tube ciliate; ovary bearing a few scales with hairy axils; fruit 15 to 25 mm. long; seeds globose, brown but sometimes described as yellow, smooth.

*Type locality:* Near Doñana, New Mexico.

*Distribution:* Southern New Mexico, western Texas, and Chihuahua, south to Zacatecas, Mexico.

This species and the following one are not closely related to the others of this genus. The tubercles are much more elongated and flattened, and the groove on the upper surface never extends to the base. Sometimes a branch or bulblet is produced instead of a flower.

Here may belong *Coryphantha heteromorpha* Lemaire (Cactées 34. 1868); this name is apparently erroneously referred to in the Index Kewensis (1: 624) as *Coryphantha heterophylla* (see *Ariocarpus fissuratus*, Cactaceae 3 83).

*Mammillaria brownii* Toumey was erroneously referred here by Schumann.

*Mammillaria macromeris* var. *longispina* and var. *nigrispina* are mentioned by Schelle (Handb. Kakteenk. 237. 1907).

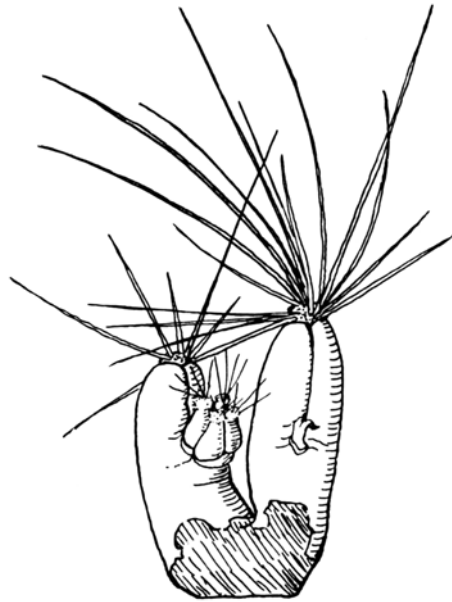


FIG. 25.—Tubercles of *Coryphantha macromeris*.

*Illustrations:* Cact. Journ. 1: 43; Förster, Handb. Cact. ed. 2. 399. f. 41; Rümpler, Sukkulenten 205. f. 116; Dict. Gard. Nicholson 4: 564. f. 36; Suppl. 517. f. 552; Goebel, Pflanz. Schild. 1: pl. 1, f. 6; Amer. Gard. 11: 460; West Amer. Sci. 13: 39; Cact. Mex. Bound. pl. 14, 15; Cycl. Amer. Hort. Bailey 2: f. 746a, 1355; Stand. Cycl. Hort. Bailey 4: f. 2314; Gartenflora 42: 543. f. 111; Schelle, Handb. Kakteenk. 237. f. 152; Balt. Cact. Journ. 1: 21; Watson, Cact. Cult. 165. f. 64; ed. 3. f. 41, as *Mammillaria macromeris*.

Figure 25 is from a drawing of two tubercles, showing the grooves on the upper side, of a plant sent by Mrs. S. L. Pattison from western Texas. At the base of one is shown the flower-scar; in the other is a small bud.

## 2. *Coryphantha runyonii* sp. nov.

Forming low clumps, sometimes 5 dm. in diameter, grayish green, with a thick, elongated taproot; tubercles rather short, 1 to 2 cm. long, terete or somewhat flattened, grooved on the upper half, rarely more, but never to the base; radial spines 6 or more, spreading, acicular, very variable in length, 3 cm. long or less, sometimes all yellow or sometimes one or more in a cluster brown, otherwise yellow; central spines on young plant solitary, dark brown to black but in old plants sometimes 2 or 3, somewhat angled, up to 6 cm. long; flowers large, purple, 5 cm. broad; outer perianth-segments ciliate; inner perianth-segments spatulate, oblong, acute; fruit green; seeds brown.

Found along the Rio Grande from Brownsville to Rio Grande City. This species has been repeatedly observed by Robert Runyon, from whom we received living plants in 1921 (No. 15, type) and 1922.

Mr. Runyon wrote us about the plant as follows:

"I also inclose you herewith two photographs of the plant you have called *Coryphantha runyonii*. I first became interested in this plant about two years ago when I saw it growing near Rio Grande, Texas. It was found at one place only, but in abundance. It grows on the gravel hillside and down in the lower land in a kind of white silt soil.

"The fruit is green and the flowers are a very pretty pink to a purple with a delicate fringed petal. The tubercles are very irregular. The largest plants are about 18 inches in diameter and would weigh not less than fifty pounds."

Plate 1, figure 1, is from a photograph sent us by Robert Runyon.

## 3. *Coryphantha ottonis* (Pfeiffer) Lemaire, Cactées 34. 1868.

*Mammillaria ottonis* Pfeiffer, Allg. Gartenz. 6: 274. 1838.

*Echinocactus ottonianus* Poselger, Allg. Gartenz. 21: 102. 1853.

*Cactus ottonis* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Lehmann, 1827.

*Mammillaria bussleri* Mundt in Schumann, Monatsschr. Kakteenk. 12: 47. 1902.

*Mammillaria golziana* Haage Jr., Monatsschr. Kakteenk. 19: 100. 1909.

Simple, globular to short-cylindric, 12 cm. high or less, 8 cm. in diameter, glaucous to grayish green; radial spines 8 to 12, nearly equal, 8 to 10 mm. long; central spines 3 or 4, longer and a little stouter than the radials; axils of flowering tubercles woolly; flowers white, 4 cm. long; outer perianth-segments oblong, obtuse; inner perianth-segments apiculate; stigma-lobes 10, green.

*Type locality:* Mineral del Monte, Mexico.

*Distribution:* Central Mexico.

The name here used was proposed by Lemaire (Cactées 34) in 1868 but not formally published. *Mammillaria ottonis tenuispina* Pfeiffer is sometimes used but we have seen no formal description.

Nicholson (see also Watson, Cact. Cult. 168. f. 66; and ed. 3. f. 40) describes and illustrates (Dict. Gard. Nicholson Suppl. 517. f. 553) under this name a very peculiar specimen in which the flowers are borne away from the top of the plant; it is doubtless not congeneric with this species. Nicholson's description is here quoted:



"Flowers white, large for the size of the plant. May and June. Stem small, compressed, 3 in. across, with numerous compressed tubercles, and short hair-like spines (Mexico. 1834. See fig. 553). There is another species called *M. ottonis*, having a large spiny stem."

Here we believe belong some of the plants which are passing as *Mammillaria golziana*. Very different, however, are the two published illustrations of Kunze (Cact. 1910 and Monatsschr. Kakteenk. 19: 101. 1909), which also seem to differ from each other.

*Illustrations:* Monatsschr. Kakteenk. 12: 47, as *Mammillaria bussleri*; Monatsschr. Kakteenk. 27: 3. f. a, as *Mammillaria golziana*; Monatsschr. Kakteenk. 27: 3. f. b, as *Mammillaria ottonis*.

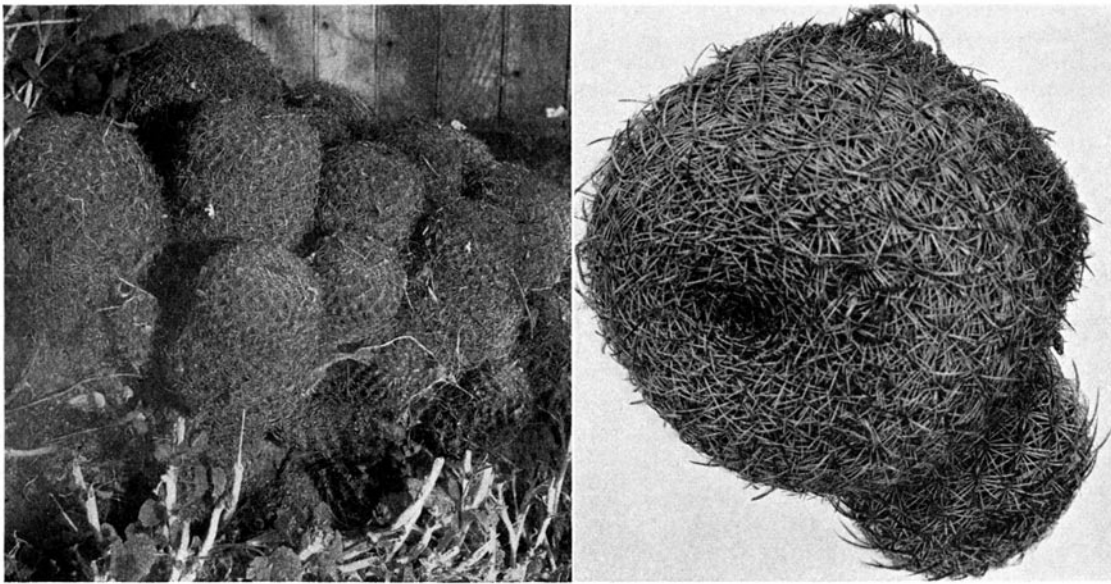
#### 4. *Coryphantha recurvata* (Engelmann).

*Mammillaria recurvispina* Engelmann, Proc. Amer. Acad. 3: 266. 1856. Not De Vriese, 1839.

*Mammillaria recurvata* Engelmann, Trans. St. Louis Acad. 2: 202. 1863.

*Cactus recurvatus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Cactus engelmannii* \* Kuntze, Rev. Gen. Pl. 1: 260. 1891.



FIGS. 26 and 27.—*Coryphantha recurvata*.

Plant-body depressed-globose, 10 to 20 cm. in diameter, often forming large masses 30 to 90 cm. in diameter and sometimes with over 50 heads; tubercles low; radial spines about 20, yellow to gray, with dark tips, pectinate, recurved; central spines 1, rarely 2, longer and darker than the radials, 12 to 20 mm. long, more or less reflexed, often appressed; flowers 25 to 35 mm. long, said to be brownish outside; inner perianth-segments lemon-yellow; fruit not known.

*Type locality:* Sonora. Explained in the Cactaceae of the Mexican Boundary to be eastern parts of Pimeria Alta in Sonora, especially in the Sierra del Pajarito.

*Distribution:* Arizona and Mexico, especially along the United States-Mexican Boundary near Nogales.

Engelmann describes a peculiar flowering habit for *Coryphantha* when he says that the flowers originate in the base of the grooves of full-grown tubercles, being scattered over the top of the plant. We have also noticed this character; not only are the flowers borne in the axils of mature tubercles, but they are produced in great abundance in a circle 5 to 6 cm. in diameter.

\* It is possible that Lemaire also gave the name *Coryphantha engelmannii* for *Mammillaria recurvispina*, though this is not shown by the text.

† See Cact. Mex. Bound. 12. 1859.

Otto Kuntze made the binomial *Cactus engelmannii* because, as he states, the name *Mammillaria recurvispina* De Vriese had priority over Engelmann's name. Engelmann, however, had long before renamed his plant.

*Mammillaria nogalensis* Runge (Schumann, Gesamtb. Kakteen 494. 1898) has been referred here as a synonym, but this name had already been used by Walton.

*Illustrations:* Schelle, Handb. Kakteenk. 239. f. 156, as *Mammillaria recurvata*; Cact. Journ. 1: pl. for March; 2: 148; pl. for September, as *M. nogalensis*.

Figure 26 is from a photograph by Dr. MacDougal at Calabasas, showing a clump; figure 27 is from a photograph of a plant sent by F. J. Dyer from Nogales.

##### 5. *Coryphantha poselgeriana* (Dietrich).

*Echinocactus poselgerianus* Dietrich, Allg. Gartenz. 19: 346. 1851.\*

*Echinocactus saltillensis* Poselger, Allg. Gartenz. 21: 101. 1853.

*Echinocactus salinensis* Poselger, Allg. Gartenz. 21: 106. 1853.

*Mammillaria difficilis* Quehl, Monatsschr. Kakteenk. 18: 107. 1908.

*Mammillaria valida* J. A. Purpus, Monatsschr. Kakteenk. 21: 97. 1911. Not Weber, 1898.

Plant-body large for the genus, globular, bluish green; tubercles large, closely packed together and at base strongly angled; radial spines of two kinds, the 4 or 5 lower ones spreading, subulate, reddish to black, about as long as the single central one (2 to 4 cm. long); the upper radials, 5 to 8, ascending together, yellowish with black tips, weak, acicular; flower large, 4 to 5 cm. long and nearly as broad when expanded, flesh-colored, the segments spatulate, usually rounded at apex; fruit oblong, 15 mm. long; seeds brownish.

*Type species:* Near Saltillo, Mexico.

*Distribution:* States of Nuevo Leon, Coahuila, and Zacatecas, Mexico.

Two different plants have been passing under the name *Echinocactus saltillensis*. The one now in the trade, called *E. ingens* var. *saltillensis* by Schumann, is a very large plant and is a true *Echinocactus* which we have already elsewhere described as *E. palmeri*;† the other, which is the one originally described by Poselger, is a small globular *Coryphantha* and has usually been taken for *Mammillaria scheeri*, more recently described as *M. valida*.

The clusters of connivent weak spines, so characteristic of this species, are not always shown in young plants and this may account for certain seeming discrepancies in the original descriptions. The nascent spines are sometimes red, bleaching white; the gland in the groove of the tubercle is bright red.

*Illustrations:* De Laet, Cat. Gén. f. 44; Schelle, Handb. Kakteenk. 239. f. 157; Tribune Hort. 4: pl. 139; Rev. Hort. Belg. 40: after 196, as *Mammillaria radians*; Monatsschr. Kakteenk. 21: 99, as *Mammillaria valida*; (?) Blanc, Cacti 50. No. 599; (?) Cact. Journ. 2: 55, as *Echinocactus poselgerianus*; Monatsschr. Kakteenk. 18: 107, as *Mammillaria difficilis*; Rother, Praktischer Leitfaden Kakteen 31, as *Echinocactus scheeri*.

##### 6. *Coryphantha muehlenpfordtii* (Poselger).

*Mammillaria scheeri* Muehlenpfordt, Allg. Gartenz. 15: 97. 1847. Not Muehlenpfordt, 1845.

*Echinocactus muehlenpfordtii* Poselger, Allg. Gartenz. 21: 102. 1853.

*Mammillaria scheeri valida* Engelmann, Proc. Amer. Acad. 3: 265. 1856.

*Coryphantha scheeri* Lemaire, Cactées 35. 1868.

*Cactus scheeri* Kuntze, Rev. Gen. Pl. 1: 261. 1891\*

Plants nearly globular, usually simple, short-oblong, 20 cm. long, 7.5 to 15 cm. in diameter; tubercles large, 1 to 2.5 cm. long; axils of young tubercles grooved and young spine-areoles very woolly; grooves bearing large dark-colored glands; spines variable, reddish to yellow with brown to black tips; radials 6 to 16, usually about 2 cm. long, straight; central spines 1 to 4, subulate, stouter than the radials, 3 to 3.5 cm. long, from nearly straight to curved at tip or even strongly hooked; flowers yellow, 6 cm. long; scales on flower-tube and outer perianth-segments more or less lacerated; inner perianth-segments oblong, entire, acute; fruit greenish, oblong, 3 to 3.5 cm. long, naked; seeds large, 3 mm. long, brown, shining, smooth.

*Type locality:* Mexico.

*Distribution:* Northern Chihuahua, western Texas, and southern New Mexico.

\* We have not seen the type of this species but Bödeker has sent us a copy of the photograph of it left by Poselger.  
† See Contr. U. S. Nat. Herb. 12: 290. 1909; Britton and Rose, Cactaceae 3: 172. 1922.

There has been considerable confusion regarding this species, which was first described as *Mammillaria scheeri* by Mühlenpfordt in 1847, but this proved to be a homonym. This led Poselger in 1853, when he transferred the species to *Echinocactus*, to publish it as *E. muehlenpfordtii*.

Dr. Engelmann in 1856 described a variety of *Mammillaria scheeri*, calling it *valida*. Some time afterwards he compared this variety with the type of the species and decided that they were the same. We have examined several specimens from near the type locality of the variety *valida*, which is near El Paso, Texas.

It is possible that Scheer's plant was a very young one, which might account for the differences in form and spines. The *Mammillaria scheeri* of Schumann's Monograph is a complex of 4 or 5 distinct species.

*Illustrations:* Allg. Gartenz. 15: 97. pl. 2; Förster, Handb. Cact. ed. 2. 406. f. 44; Schumann, Gesamtb. Kakteen 485. f. 80; Monatsschr. Kakteenk. 8: 23; 10: 127; Schelle, Handb. Kakteenk. 237. f. 153, as *Mammillaria scheeri*.

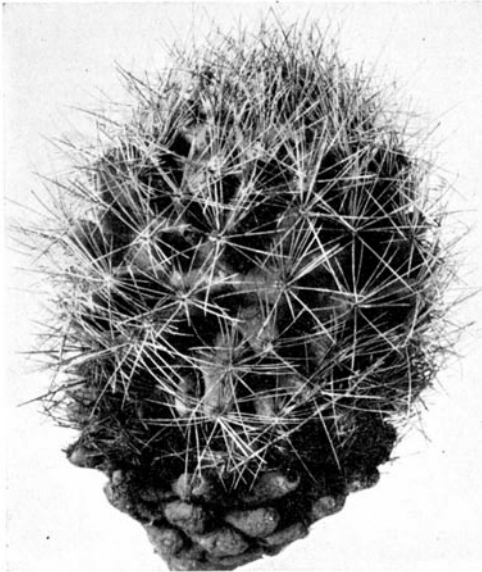


FIG. 28.—*Coryphantha muehlenpfordtii*.

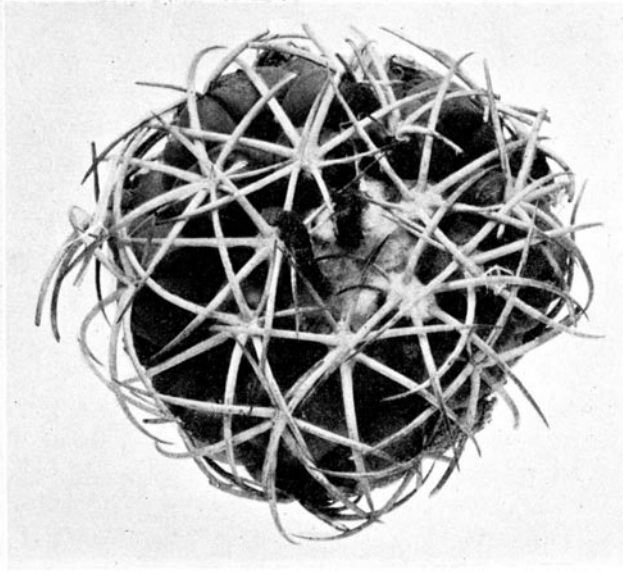


FIG. 29.—*Coryphantha bumamma*.

Figure 28 is from a photograph of a plant collected in western Texas by Mrs. S. L. Pattison in 1920.

#### 7. *Coryphantha guerkeana* (Bödeker).

*Mammillaria guerkeana* Bödeker, Monatsschr. Kakteenk. 24: 52. 1914.

Plant-body globular, 6 to 7 cm. in diameter; tubercles bluish green, somewhat broader than thick, bearing a large red gland at base of groove and sometimes at top; radial spines 9 to 12, yellow when young, spreading, bulbous at base, rather stout; central spines 3 or 4, rarely one of them stouter, often bent slightly at tip; flowering areoles very woolly; ovary oblong, naked; flower and fruit not seen.

*Type locality:* Mexico.

*Distribution:* Durango, Mexico.

This species is near *Coryphantha poselgeriana*, but is smaller and has different spines.

We have seen photographs of the type and have spine-clusters, all obtained from L. Quehl of Halle. We would also refer here specimens obtained by Dr. E. Palmer near Durango City in 1906 (No. 456).



*Illustrations:* Monatsschr. Kakteenk. **24**: 53, as *Mammillaria guerkeana*; Alianza Científica Universal **3**: pl. opp. 119, as *Mammillaria valida*.

**8. Coryphantha echinoidea** (Quehl).

*Mammillaria echinoidea* Quehl, Monatsschr. Kakteenk. **23**: 42. 1913.

Plant solitary, globular or a little broader than high, 5 to 6 cm. in diameter, very woolly at apex; tubercles conic, 1.5 cm. high, 1.2 cm. broad at base; groove with 1 to 3 small, grayish glands; areoles elliptic, woolly when young, glabrate in age; radial spines 20 to 25, 1.5 cm. long, white with darker tips; central spines 1 to 3, a little stouter than the radials, one of them porrect, horn-colored; flowers rose-colored, 6 to 8 cm. broad; perianth-segments oblong, broad at apex, denticulate, sometimes mucronate; filaments numerous, red; fruit and seed unknown.

*Type locality:* Durango.

*Distribution:* Durango, Mexico.

*Illustration:* Monatsschr. Kakteenk. **23**: 42, as *Mammillaria echinoidea*.

**9. Coryphantha clava** (Pfeiffer) Lemaire, Cactées 34. 1868

*Mammillaria clava* Pfeiffer, Allg. Gartenz. **8**: 282. 1840.

*Mammillaria schlechtendalii* Ehrenberg, Linnaea **14**: 377. 1840.

*Mammillaria schlechtendalii levior* Salm-Dyck, Cact. Hort. Dyck. 1849. 127. 1850.

*Echinocactus clavus* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Echinocactus schlechtendalii* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Cactus clavus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.

*Cactus schlechtendalii* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

Plant-body club-shaped, deep green; axils of tubercles with white wool and with a red gland at base of groove; tubercles erect, elongated, somewhat 4-sided; spine-areoles white-villous; radial spines usually 7, straight, horn-colored, about equal; central spine 1, a little longer and stouter than the others; flowers very large, sometimes 9 cm. broad, pale yellow, with the outer segments tinged with red; perianth-segments glossy, linear-oblong to spatulate, outer ones entire, inner ones serrate and mucronate at apex; filaments orange; stigma-lobes 6, linear, yellow.

*Type locality:* Mexico.

*Distribution:* Mexico.

*Coryphantha schlechtendalii* Lemaire (Cactées 34. 1868) is usually given as a synonym of this species.

*Illustrations:* Curtis's Bot. Mag. **74**: pl. 4358; Loudon, Encycl. Pl. ed. 3. 1379. f. 19390, as *Mammillaria clava*.

**10. Coryphantha octacantha** (De Candolle).

*Mammillaria octacantha* De Candolle, Mém. Mus. Hist. Nat. Paris **17**: 113. 1828.

*Mammillaria leucacantha* De Candolle, Mém. Mus. Hist. Nat. Paris **17**: 113. 1828.

*Mammillaria lehmanni* Otto in Pfeiffer, Enum. Cact. **23**: 1837.

*Mammillaria macrothele* Martius in Pfeiffer, Enum. Cact. **24**: 1837.

*Mammillaria plaschnickii* Otto in Pfeiffer, Enum. Cact. **24**: 1837.

*Mammillaria aulacothele* Lemaire, Cact. Aliq. Nov. **8**: 1838.

*Mammillaria biglandulosa* Pfeiffer, Allg. Gartenz. **6**: 274. 1838.

*Mammillaria sulcimamma* Pfeiffer, Allg. Gartenz. **6**: 274. 1838.

*Mammillaria lehmannii sulcimamma* Miquel, Linnaea **12**: 9. 1838.

*Mammillaria martiana* Pfeiffer, Linnaea **12**: 140. 1838.

? *Mammillaria thelocamptos* Lehmann, Linnaea **13**: Litt. 101. 1839.

*Mammillaria aulacothele multispina* Scheidweiler, Bull. Acad. Ci. Brux. **6**: 92. 1839.

*Mammillaria aulacothele spinosior* Monville in Lemaire, Cact. Gen. Nov. Sp. **93**: 1839.

*Mammillaria aulacothele sulcimamma* Pfeiffer in Walpers, Bot. Repert. **2**: 302. 1843.

*Mammillaria aulacothele flavispina* Salm-Dyck, Cact. Hort. Dyck. 1844. 13. 1845.

*Mammillaria polymorpha* Scheer in Mühlenpfordt, Allg. Gartenz. **14**: 373. 1846.

*Mammillaria macrothele lehmanni* Salm-Dyck, Cact. Hort. Dyck. 1849. 19. 1850.

*Mammillaria macrothele biglandulosa* Salm-Dyck, Cact. Hort. Dyck. 1849. 19. 1850.

*Mammillaria plaschnickii straminea* Salm-Dyck, Cact. Hort. Dyck. 1849. 19. 1850.

*Echinocactus macrothele* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Echinocactus plaschnickii* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Echinocactus macrothele lehmanni* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Echinocactus macrothele biglandulosus* Poselger, Allg. Gartenz. **21**: 125. 1853.

*Coryphantha lehmanni* Lemaire, Cactées. **34**: 1868.

*Coryphantha aulacothele* Lemaire, Cactées. **34**: 1868.

*Cactus macrothele* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.

*Cactus aulacothele* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.



*Cactus biglandulosus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus lehmannii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus plaschnickii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus octacanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus martianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plant-body simple, cylindric, 3 dm. high, 12 to 15 cm. in diameter; axils of tubercles bearing white wool, the groove with 1 or 2 red glands; tubercles elongated, up to 25 mm. long, spreading, somewhat 4-angled but with broad bases; radial spines 8, spreading, rigid, horn-colored with black tips, 10 to 12 mm. long; central spines 1 or 2, stouter than the radials, brownish, 25 mm. long; flowers about 6 cm. broad, straw-colored; perianth-segments linear-oblong, obtuse; filaments reddish; style red; stigma-lobe yellow.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

*Mammillaria polymorpha* Scheer (Mühlenpfordt, Allg. Gartenz. 14: 373. 1846) is probably only an abnormal greenhouse form of this species.

*Coryphantha aulacothele* and *C. lehmannii* (Lemaire, Cactées 34. 1868) and *M. macrothele nigrispina* (Schelle, Handb. Kakteenk. 243. 1907) are only names but are usually referred here.

*Mammillaria leucantha* is credited to De Candolle by Steudel (Nom. ed. 2. 2: 97. 1841), but we have not seen such a name used by De Candolle. It may be a misspelling for *M. leucacantha*. Steudel refers the name to *M. lehmannii*, while the Index Kewensis states that it equals *M. recurva*.

*Cereus lehmannii* Hortus is cited by Förster (Handb. Cact. 245. 1846) as a synonym of *M. lehmannii*.

*Illustrations:* Loudon, Encycl. Pl. ed. 2 and 3. 1201. f. 17362; Curtis's Bot. Mag. 65: pl. 3634, as *Mammillaria lehmannii*; Monatsschr. Kakteenk. 20: 85; Krook, Handb. Cact. 38, as *Mammillaria aulacothele*; Schelle, Handb. Kakteenk. 242. f. 161; Förster, Handb. Cact. ed. 2. 391. f. 39, as *Mammillaria macrothele*.

#### 11. *Coryphantha exsudans* (Zuccarini) Lemaire.\*

*Mammillaria exsudans* Zuccarini in Pfeiffer, Enum. Cact. 15. 1837.  
*Mammillaria brevimamma* Zuccarini in Pfeiffer, Enum. Cact. 34. 1837.  
*Mammillaria glanduligera* Otto and Dietrich, Allg. Gartenz. 16: 298. 1848.  
*Mammillaria brevimamma exsudans* Salm-Dyck, Cact. Hort. Dyck. 1849. 19. 1850.  
*Mammillaria asterias* Cels in Salm-Dyck, Cact. Hort. Dyck. 1849. 129. 1850.  
*Echinocactus glanduligerus* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Echinocactus brevimammus* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Coryphantha glanduligera* Lemaire, Cactées 34. 1868.  
*Coryphantha brevimamma* Lemaire in Förster, Handb. Cact. ed. 2. 394. 1885.  
*Cactus brevimamma* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus exsudans* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus glanduliger* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Subcylindric, 4 cm. in diameter; tubercles dull green, thick, ovate; glands in the axils of the tubercles pale yellow; spine-areoles somewhat tomentose, becoming naked; radial spines 6 or 7, 6 to 10 mm. long, slender, straight, spreading, yellow; central spine 1, erect, yellow but brown at tip, perhaps hooked; flowers yellow.

*Type locality:* Between Ixmiquilpan and Zimapán.

*Distribution:* Central Mexico.

All the synonyms cited above may or may not belong here. Our description is compiled mostly from Pfeiffer's.

*Mammillaria curvata* (Pfeiffer, Enum. Cact. 15. 1837) was given as a synonym of *Mammillaria exsudans*.

*Illustrations:* Monatsschr. Kakteenk. 23: 147; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 30, as *Mammillaria glanduligera*.

\* This binomial is credited to Lemaire by Rümpler (Förster, Handb. Cact. ed. 2. 395. 1885), but as a synonym of *Mammillaria brevimamma exsudans*.

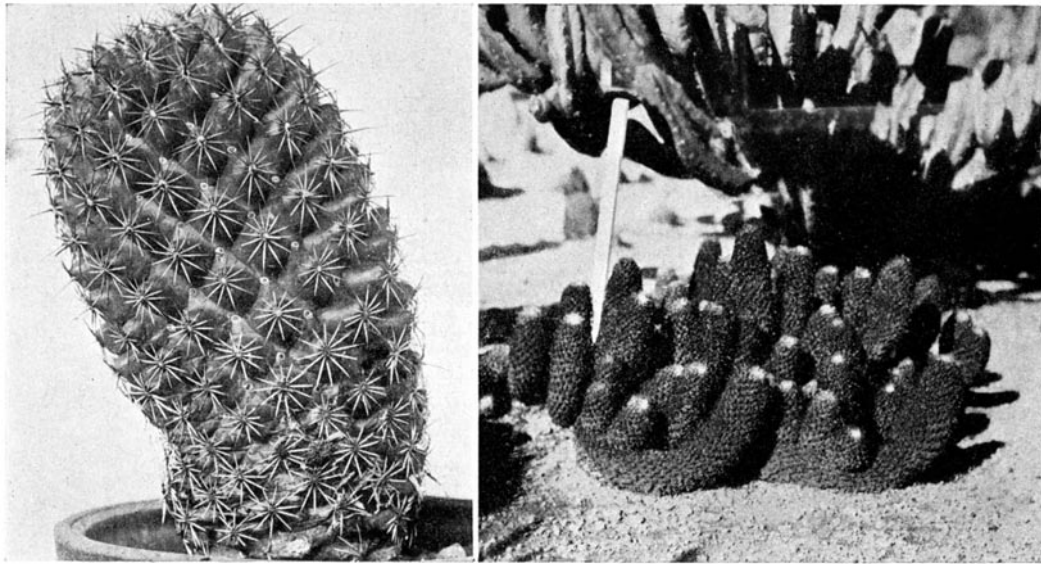
**12. *Coryphantha erecta*** Lemaire, *Cactées* 34. 1868.*Mammillaria erecta* Lemaire in Pfeiffer, *Allg. Gartenz.* 5: 370. 1837.*Mammillaria ceratocentra* Berg, *Allg. Gartenz.* 8: 130. 1840.*Echinocactus erectus* Poselger, *Allg. Gartenz.* 21: 126. 1853.*Cactus erectus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.*Cactus ceratocentrus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.

Plant-body cylindric, yellowish green; axils of young tubercles white-woolly; tubercles obliquely conic, somewhat rhombiform at base; radial spines 8 to 14, subulate, ascending, yellowish; central spines 2, upper one short, lower one curved; flowers large, yellow; perianth-segments very narrow.

*Type locality:* Mexico.

*Distribution:* State of Hidalgo.

The plant described by Schumann has four central spines and may not belong to this species; his illustration answers it fairly well but does not show 4 centrals. We have recently examined specimens labeled *Mammillaria erecta* which were sent by Carl Ackerman, employed at the Huntington estate near Los Angeles, California; his plants grow in clumps



FIGS. 30 and 31.—*Coryphantha erecta*.

one meter in diameter; the larger branches are prostrate below, ascending or erect above, 3 dm. long; the spine-areoles are circular, white-felted when young; the spines are glossy yellow, the radials widely spreading; central spines often wanting or sometimes solitary, correct, and shorter than the radials.

*Mammillaria evarescentis*, according to Lemaire (*Cact. Aliq. Nov.* 4. 1838), was a garden name improperly applied to this species.

The three names *Mammillaria evanescens*, *M. evarescens*, and *M. evarascens* were listed as synonyms of *M. erecta* by Förster (*Handb. Cact.* 243. 1846).

*Illustrations:* Schumann, *Gesamtb. Kakteen* 504. f. 82; Möllers *Deutsche Gärt. Zeit.* 25: 475. f. 8, No. 7; Lemaire, *Icon. Cact.* pl. 10, as *Mammillaria erecta*.

Figure 30 is from a photograph of a plant collected by Dr. Rose in Mexico in 1906 (No. 1072a) and figure 31 is from a photograph of a plant growing in the Huntington collection in southern California which was made by Ernest Braunton.

**13. *Coryphantha elephantidens*** Lemaire, *Cactées* 35. 1868.*Mammillaria elephantidens* Lemaire, *Cact. Aliq. Nov.* 1. 1838.*Echinocactus elephantidens* Poselger, *Allg. Gartenz.* 21: 102. 1853.*Cactus elephantidens* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.

Simple, subglobose, up to 14 cm. high and 19 cm. broad; tubercles very large, somewhat flattened, obtuse, 4 to 5 cm. long, densely woolly in the axils; areoles elliptic, when young woolly, in age naked; spines 8, all radial, somewhat unequal, subulate, the longest about 2 cm. long, spreading, when young brownish with yellowish bases, black at apex; flowers large, rose-colored, 11 cm. broad; perianth-segments numerous, narrowly oblong, apiculate.

*Type locality:* Not cited.

*Distribution:* Central Mexico, but Nicholson's Dictionary of Gardening says Paraguay in error.

This is a very characteristic plant but we know it only from illustrations. Walter Mundt once offered it for sale but his supply has been exhausted; he gives a good illustration of it in a group of cacti printed on his letter heads and he writes us that this plant has a large carmine flower.

Schelle (Handb. Kakteenk. 238. 1907) gives *M. elephantidens spinosissima* Rebut, without synonymy or description.

*Illustrations:* Dict. Gard. Nicholson 4: 563. f. 33; Suppl. 516. f. 550; Förster, Handb. Cact. ed. 2. 397. f. 40; Hort. Univ. 1: pl. 33; Pfeiffer, Abbild. Beschr. Cact. 2 pl. 20; Rümpler, Sukkulenten 206. f. 117; Garden 1: 396; Lemaire, Icon. Cact. pl. 2 [not pl. 3]; Herb. Génér. Amat. II. 2: pl. 17; Palmer. Cult. Cact. 111; Ann. Rep. Smiths. Inst. 1908: pl. 14, f. 3; Goebel, Pflanz. Schild. 1: f. 34; Blanc, Cacti 68. No. 1224; Watson, Cact. Cult. 159. f. 60; Bergen in Rother, Praktischer Leitfaden Kakteen 5 ed. 1. 65; ed. 3. f. 38, as *Mammillaria elephantidens*.

#### 14. *Coryphantha bumamma* (Ehrenberg).

*Mammillaria bumamma* Ehrenberg, Allg. Gartenz. 17: 243. 1849.

*Mammillaria elephantidens bumamma* Schumann, Keys Monogr. Cact. 43. 1903.

Globular or somewhat depressed; tubercles few, very large, rounded at apex, bluish green, very woolly in their axils when young but glabrate in age; spines 5 to 8, subulate, grayish brown, more or less recurved, 2 cm. long or more, all radial; flower large, yellow, 5 to 6 cm. broad; inner perianth-segments narrowly oblong, obtuse or retuse.

*Type locality:* Mexico.

*Distribution:* Mexico.

This plant is perhaps nearest *Coryphantha elephantidens*, to which it was referred as a variety, but the flowers are much smaller and nearly yellow. Mundt states that the flowers are smaller but bright rose with a dark stripe. His plant, however, is not now in his possession.

The plants are often much depressed, arising only a little above the surface of the ground, and are firmly anchored in the soil by a thick root, almost equal in diameter to that of the stem itself.

Dr. Rose made two collections in Mexico which we would refer here, one on the pedregal near Yautepec, Morelos (No. 8530), and the other at Iguala, Guerrero (No. 9320).

*Illustration:* Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 194. f. 67, as *Mammillaria bumamma*.

Plate v, figure 6, shows a plant collected by H. H. Rusby at Lemon Mountain, Guerrero, altitude 800 meters, July 28, 1910 (No. 4), which flowered in the New York Botanical Garden, September 11, 1911. Figure 29 is from a photograph showing a top view of a plant collected by Dr. C. Reiche at Iguala, Mexico, in 1921.

#### 15. *Coryphantha robustispina* (Schott).

*Mammillaria robustispina* Schott in Engelm., Proc. Amer. Acad. 3: 265. 1856.

*Cactus robustispinus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria brownii* Toumey, Bot. Gaz. 22: 253. 1896.

*Cactus brownii* Toumey, Bot. Gaz. 22: 253. 1896.

Stems solitary or clustered, globular or a little longer than thick, 5 to 15 cm. high, densely armed and almost hidden by the spines; tubercles large, 2.5 to 2.8 cm. long, arranged in 13 somewhat spiraled rows, fleshy, in age thickly set one against the other, becoming more or less dorsally flattened, pale, grayish green, narrowly grooved; radial spines 12 to 15, the 3 lower very stout, brown-

ish, the upper generally weaker, the 2 or 3 uppermost ones much weaker, clustered closely together and very pale, some of them sometimes crowded towards the center, the central spine solitary, very stout and erect or sometimes curved or even hooked, yellow, 3.5 cm. long; all the larger spines somewhat bulbous at base; flowers 5 to 6 cm. long, salmon-colored; ovary 20 to 25 mm. long, bearing 4 to 7 minute caducous scales; fruit narrowly oblong, 6 cm. long; seeds large, 3 mm. long, shining.

*Type locality:* Cited as Sonora in first publication of species; afterwards as south side of the Baboquivari Mountains in northern Sonora.

*Distribution:* Mountains of southern Arizona, southwestern New Mexico, and northern Sonora.

We have followed Mrs. K. Brandege in referring *Mammillaria brownii* here, for not only do the original descriptions read much alike but the type localities for the two are in the same mountain range. *M. brownii* was described from a very small plant and differs considerably from mature individuals. Engelmann calls attention to the very large seeds, which he says are "larger than those of any other *Mammillaria* examined." He also states, "embryo with some albumen, curved; cotyledon foliaceous, approaching the structure of the seed of most *Echinocacti*."

Dr. Shreve reports that the flowers appear in the summer and the fruits, which follow, hold over the following winter, gradually drying up. The fruits do not open by a basal pore as in other related species.

We would refer here specimens from Lordsburg, New Mexico, and Bowie, Arizona, which, have heretofore been referred to *Mammillaria valida*, now *Coryphantha muehlenpfordtii*.

*Illustrations:* Bot. Gaz. 22: 254, as *Mammillaria brownii*; Cact. Journ. 1: 85; Cact. Mex. Bound. pl. 74, f. 8, as *Mammillaria robustispina*.

#### 16. *Coryphantha connivens* sp. nov.

Globular or somewhat depressed, 8 to 10 cm. broad, somewhat woolly at the crown at flowering time but becoming glabrate; spines all radial but of two kinds; one kind 5 or 6, spreading or curved backward, subulate, horn-colored, the other 8 to 10, from upper part of spine-areole, clustered, erect, or toward top connivent, acicular, black at tip; flowers yellow, 6 to 7 cm. broad; perianth-segments narrowly oblong, acuminate; fruit greenish, oblong, 3 cm. long; seeds brown, oblong, 2 mm. long.

This species is common in the Valley of Mexico, especially on the pedregal. Dr. Rose collected it first in 1901 and again in 1905 and 1906; the type is his No. 8372 from near Tlalpam, collected in 1905. Dr. C. Reiche also collected it between Tacubaya and Santa Fe in 1922, and according to him the plant from this locality is the one referred to *Mammillaria pycnacantha* by Schumann (Gesamtb. Kakteen 489. 1898).

The species is characterized by the peculiar clusters of spines in the upper angle of the areoles. A small plant was sent by O. Solis from Tlalpam in 1907, but it has fewer acicular spines than described above.

#### 17. *Coryphantha pectinata* (Engelmann).

*Mammillaria pectinata* Engelmann, Proc. Amer. Acad. 3: 266. 1856.

*Mammillaria pectinata cristata* Hortus in Förster, Handb. Cact. ed. 2. 403. 1885.

*Cactus pectinatus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

Usually simple, globose, 3 to 6 cm. in diameter; tubercles usually arranged in 13 spirals; upper tubercles 10 to 12 mm. long, about twice as long as lower ones; areoles a little longer than broad; spines 16 to 24, all radial, those on lower areoles appressed and often a little recurved, those from upper part of upper areoles 12 to 18 mm. long, connivent over apex, yellowish white with black tips; flowers yellow, 5 cm. long; ovary 6 to 8 mm. long; fruit 12 mm. long.

*Type locality:* On the Pecos River in western Texas.

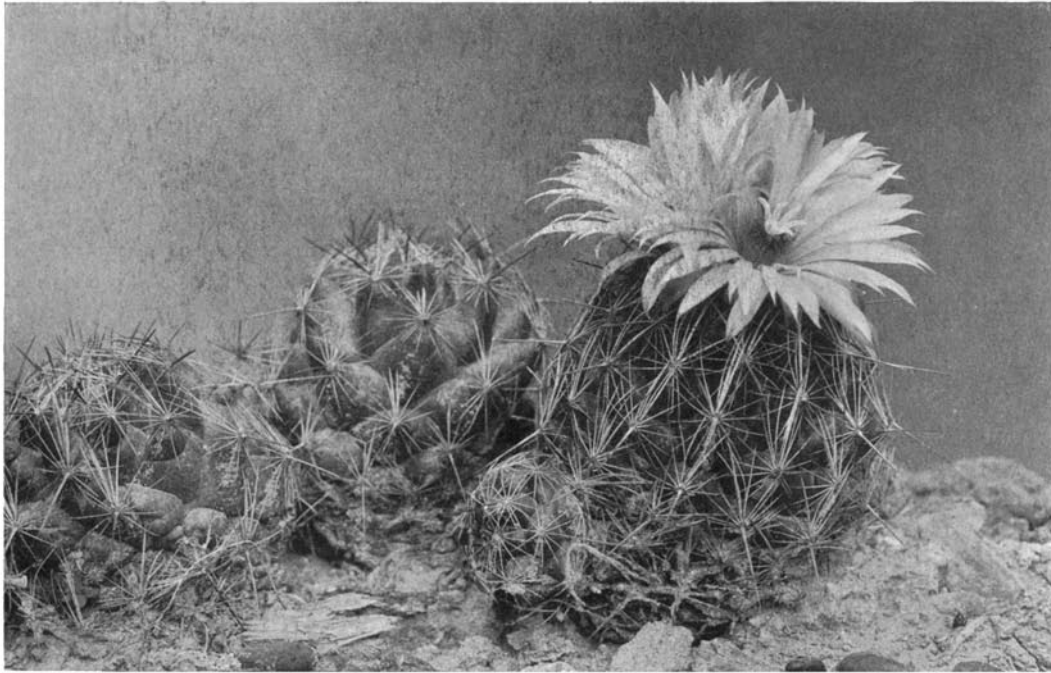
*Distribution:* Southern Texas and adjacent parts of Mexico.

Coulter and Schumann refer it to *Mammillaria radians* De Candolle, but it doubtless is a distinct species.

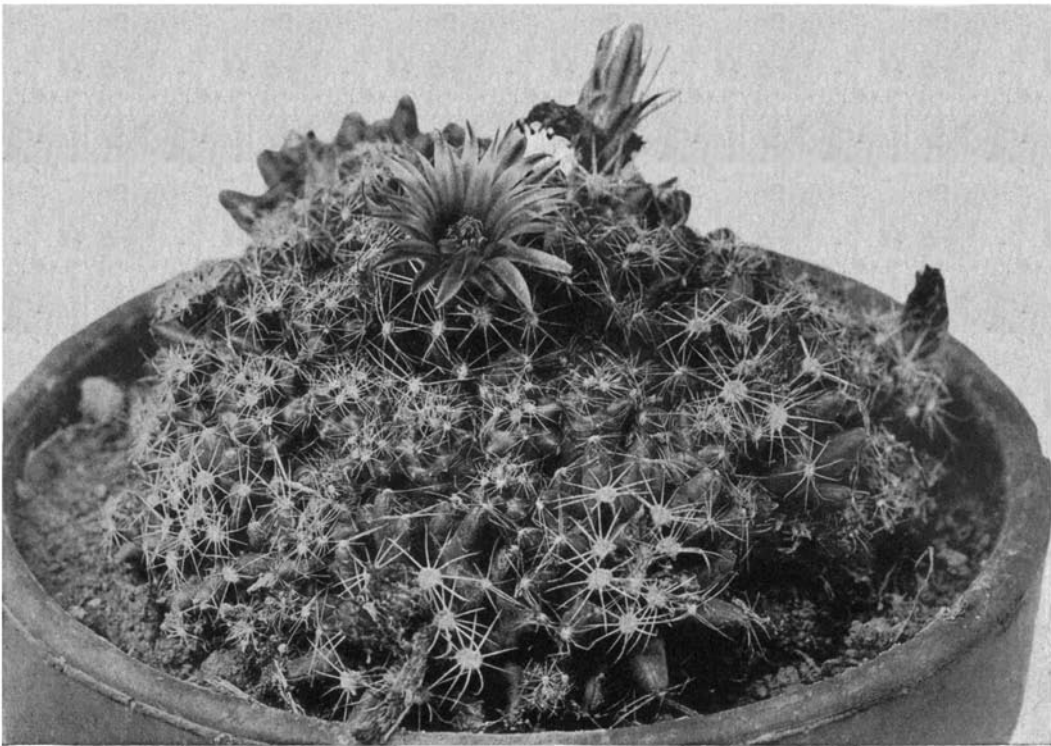
This plant is well illustrated by Engelmann and should be easily recognized. It appears to have been collected only rarely. The only representatives we have of



1



2



1. *Coryphantha nickelsae*, from Monterey, Mexico.
2. *Neobesseya similis*, from Texas.



it are flowers and a spine-cluster from the herbarium of J. W. Toumey, collected in his cactus garden at Tucson, June 12, 1896, and a small specimen from near the type locality obtained by Vernon Bailey, March 22, 1890, and more recently by Fisher at Langtry, Texas.

*Illustrations:* Cact. Journ. 1: 114; 2: 6; Dict. Gard. Nicholson Suppl. 514. f. 546; Förster, Handb. Cact. ed. 2. 402. f. 42; Rümpler, Sukkulente 204. f. 115; Journ. Hort. Home Gard. III. 46: 379; Cact. Mex. Bound. pl. 11; Watson, Cact. Cult. 169. f. 67; ed. 3. f. West Amer. Sci. 13: 40; Blanc, Cacti 73. No. 1459; Cassell's Dict. Gard. 2: 48; Remark, Kakteenfreund 15, as *Mammillaria pectinata*; Schelle, Handb. Kakteenk. 240. f. 158, as *M. radians impexicoma* [Schelle's illustration is the same as Engelmann's].

Figure 31a is from a photograph of a plant obtained by George L. Fisher near Langtry, Texas, in 1922.

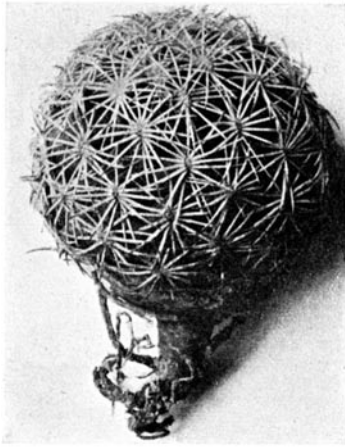


FIG. 31a.—*Coryphantha pectinata*.

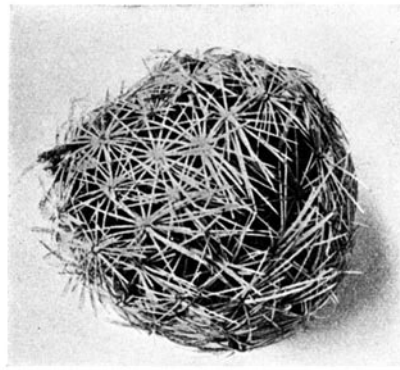


FIG. 31b.—*Coryphantha echinus*.

### 18. *Coryphantha nickelsae* (K. Brandegee).

*Mammillaria nickelsae* K. Brandegee, Zoe 5: 31. 1900.

Described as globular, densely cespitose, often 7 cm. high, pale green and glaucous; older plants becoming purplish; tubercles almost hidden by the overlapping spines, rather broad at base, low, not densely arranged; spines 14 to 16, all radial (a few forming a small fascicle at top of groove), slender, at first simply spreading but afterward bent back and interlaced with those of adjoining tubercles, 8 to 10 mm. long, at first yellowish at base with dark tips, but afterwards bleaching; flowers described as bright yellow, with a red center, 5 to 7 cm. broad; fruit nearly globular, 5 to 7 mm. long, green; seeds small, brown.

*Type locality:* Mexico, southward from Laredo, Texas.

*Distribution:* Northern Nuevo Leon, Mexico.

Plants collected by Robert Runyon in March 1921, on Mount La Mitra, near Monterey, which we believe should be referred here, deserve some detailed description. They grow in clusters of 4 to 12. From the axils of the lower tubercles near the surface of the ground numerous young plants or buds originate; the young spines are pale yellow, with reddish-brown tips, in age some bleaching white, others brownish to nearly black throughout; many of the first areoles have only radial spines but old plants often have one central spine 1.5 to 2 cm. long, from all the upper areoles; flowers large, light yellow; inner perianth-segments spreading, linear-lanceolate, acuminate; anthers bright yellow.

Plate III, figure 1, is from a photograph of the plant collected by Mr. Runyon, which was made at his home in Brownsville, Texas, September 15, 1921. Figure 32 is from a photograph of a specimen sent us by Dr. Richard E. Kunze in 1911.

**19. *Coryphantha compacta* (Engelmann).**

*Mammillaria compacta* Engelmann in Wislizenus, Mem. Tour North. Mex. 105. 1848.  
*Cactus compactus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Plants solitary, somewhat depressed, 3 to 6 cm. high, 5 to 8 cm. broad; tubercles in 13 rows, much crowded, 8 mm. long, sulcate above; radial spines 14 to 16, rigid, appressed, interwoven with adjacent ones, whitish, 10 to 20 mm. long; central spines usually wanting; flowers 2 cm. long and broad, yellow; fruit oval; seeds smooth and yellow.

*Type locality:* Cosihuirachi, Chihuahua.

*Distribution:* Mountains of Chihuahua.

This species had long been known only from the original plant collected by Wislizenus, but in 1908 Dr. Rose visited the type locality, where he re-collected the plant, which later flowered at Washington.

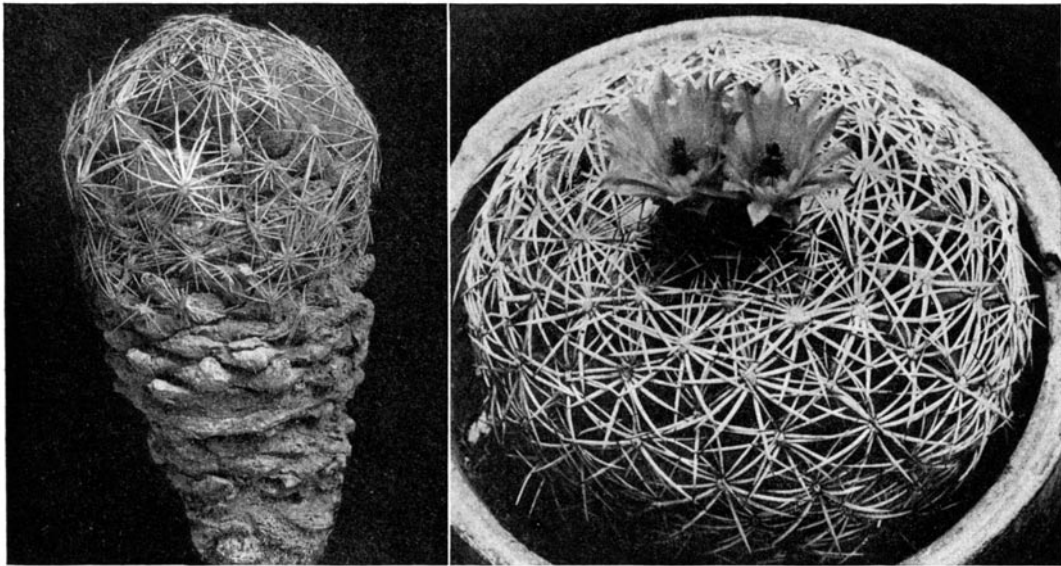


FIG. 32.—*Coryphantha nickelsae*.

FIG. 33.—*Coryphantha compacta*.

The name *Coryphantha compacta* occurs in C. R. Orcutt's Circular to Cactus Fanciers, 1922.

*Illustrations:* Cact. Mex. Bound. pl. 74, f. 2 (seeds); Dict. Gard. Nicholson Suppl. 515. f. 548; Bull. U. S. Dept. Agr. Bur. Pl. Ind. 262: pl. 2, f. 1; Watson, Cact. Cult. ed. 2. 254. f. 95; ed. 3. 76. f. 35, as *Mammillaria compacta*.

Figure 33 is from a photograph of the plant collected by Dr. Rose.

**20. *Coryphantha radians* (De Candolle).**

*Mammillaria radians* De Candolle, Mém. Mus. list. Nat. Paris 17: 111. 1828.  
*Mammillaria impexicoma* Lemaire, Cact. Aliq. Nov. 5. 1838.  
*Mammillaria daimonoceras* Lemaire, Cact. Aliq. Nov. 5. 1838.  
*Mammillaria radians globosa* Scheidweiler, Bull. Acad. Sci. Brux. 5: 494. 1838.  
*Mammillaria cornifera impexicoma* Salm-Dyck, Cact. Hort. Dyck. 1849. 20. 1850.  
*Echinocactus corniferus impexicomus* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Echinocactus radicans* Poselger, Allg. Gartenz. 21: 107. 1853.  
*Coryphantha daimonoceras* Lemaire, Cactées 35. 1868.  
*Cactus radians* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus radians pectinoides* Coulter, Contr. U. S. Nat. Herb. 3: 114. 1894.  
*Mammillaria radians impexicoma* Schumann, Gesamtb. Kakteen 495. 1898.  
*Mammillaria radians daemonoceras* Schumann, Gesamtb. Kakteen 496. 1898.

Solitary, globose, either obtuse or depressed at the top, 7.5 cm. in diameter; tubercles ovoid, large; axils of tubercles naked; areoles glabrate; spines all radial, 16 to 18, white or sometimes yel-



lowish, 10 to 12 mm. long, rigid, tomentose when young; flowers lemon-yellow, with outer segments tinged with red, about 10 cm. broad, the segments narrowly oblong to spatulate, acute, somewhat toothed toward the apex.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

It is difficult to ascertain what the true *Mammillaria radians* of De Candolle really is. The type plant was described from specimens collected by Thomas Coulter, probably in eastern Mexico. We believe that specimens collected by Dr. Edward Palmer near San Luis Potosí, Mexico, represent the species as well as any plants we have yet seen; these, however, are cespitose as well as solitary. The species seems nearest *Coryphantha compacta*.

*Cactus radians pectinoides* Coulter, based on Eschanzier's plant from San Luis Potosí (1891), we have not seen but suspect that it belongs here.

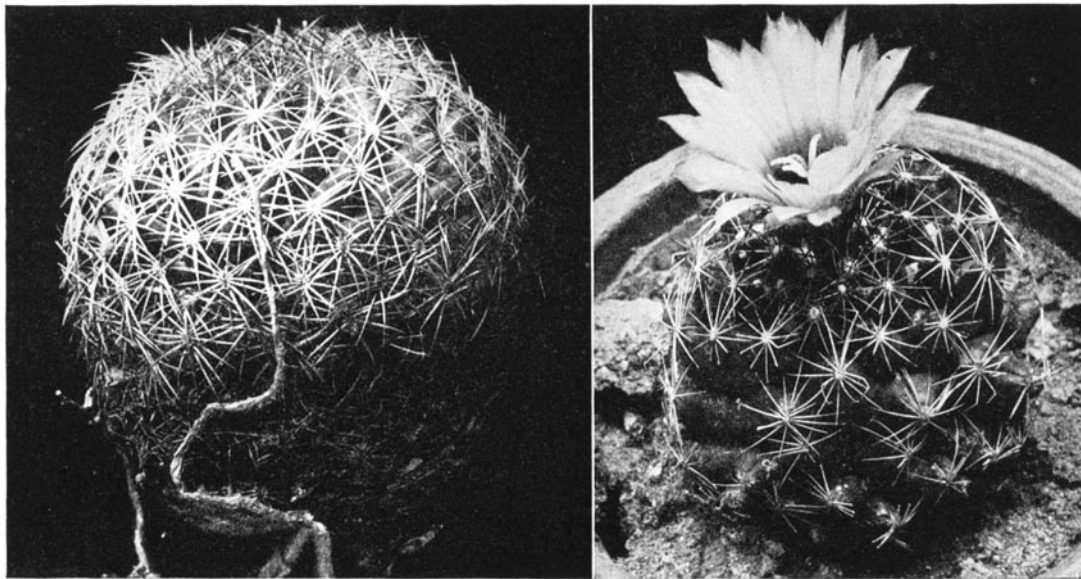


FIG. 34.—*Coryphantha radians*.

FIG. 35.—*Coryphantha sulcolanata*.

*Mammillaria monoclova* is only a garden name cited by Schumann (Gesamtb. Kakteen 495. 1898) as a synonym of this species.

*Coryphantha impexicoma*, credited to Lemaire, is given as a synonym of *Mammillaria cornifera impexicoma* Salm-Dyck by Rümpler (Förster, Handb. Cact. ed. 2. 414. 1885).

*Illustrations:* Blühende Kakteen 2: pl. 102; Tribune Hort. 4: pl. 139; Succulenta 5: 57, as *Mammillaria radians*; Monatsschr. Kakteenk. 15: 7, as *M. radians impexicoma*.

Figure 34 is from a photograph of the plant collected at San Rafael by Dr. Chaffey in 1910.

**21. *Coryphantha sulcolanata* Lemaire, Cactées 35. 1868.**

*Mammillaria sulcolanata* Lemaire, Cact. Aliq. Nov. 2. 1838.

*Echinocactus sulcolanatus* Poselger, Allg. Gartenz. 21: 102. 1853.

*Mammillaria conimamma* Linke, Allg. Gartenz. 25: 239. 1857.

*Mammillaria cornimamma* N. E. Brown, Gard. Chron. III. 2: 186. 1887.

*Cactus sulcolanatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Subglobose, somewhat depressed, cespitose, 5 cm. high, 6 cm. thick or more; tubercles somewhat 5-angled at base, subconic above, their axils very woolly when young; spines 9 or 10, all radial, unequal, 12 to 16 mm. long, the lower and upper weaker and shorter than the lateral ones, brownish with black tips, but when young whitish yellow with purple tips; flowers large, 4 cm. long or more, widely spreading, 6 cm. broad or more; perianth-segments oblong, acute.

*Type locality:* Not cited, but Rümpler states that the plant was collected by Galeotti near Mineral del Monte, Hidalgo, in 1836.

*Distribution:* Mexico, perhaps Hidalgo, but definite range unknown.

*Aulacothele sulcolanatum* Monville (Lemaire, Icon. Cact. pl. 10. 1841-1847), referred here as a synonym, seems never to have been published.

*Mammillaria retusa* Scheidweiler is sometimes referred here also and the name has priority over *M. sulcolanata*, but we are treating it as distinct.

*Echinocactus conimamma* Linke was cited by Schumann (Monatsschr. Kakteenk. 5: 75. 18.) by mistake for *Mammillaria conimamma* Linke. *M. conimamma major* is listed by Haage (Cact. Kultur ed. 2. 179. 1900).

The name *Mammillaria sulcolanata macracantha* (Walpers, Repert. Bot. 2: 273. 1843) was without description.

*Illustrations:* Haage, Cact. Kultur ed. 2. 178, as *Mammillaria bumamma*; Blanc, Hints on Cacti 68. No. 1224, as *Mammillaria elephantidens*; Lemaire, Icon. Cact. pl. 10; Förster, Handb. Cact. ed. 2. 408. f. 45; Schelle, Handb. Kakteenk. 238. f. 154; Watson, Cact. Cult. 178. f. 72 ed. 3. f. 49; Deutsche Gärt. Zeit. 6: 65; Dict. Gard. Nicholson 4: 565. f. 40; Suppl. 518. f. 558, as *Mammillaria sulcolanata*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 2, as *Mammillaria conimamma*; Lemaire, Cactées 35. f. 2.

Figure 35 is from a photograph of the plant collected by Dr. Rose near Pachuca in 1905.

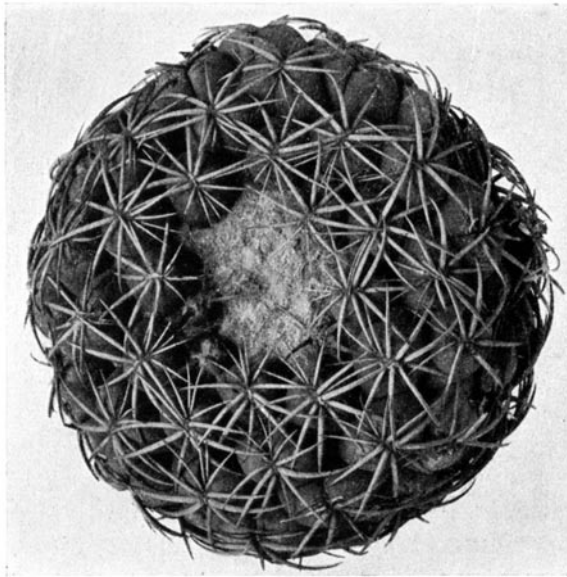


FIG. 36.—*Coryphantha retusa*.

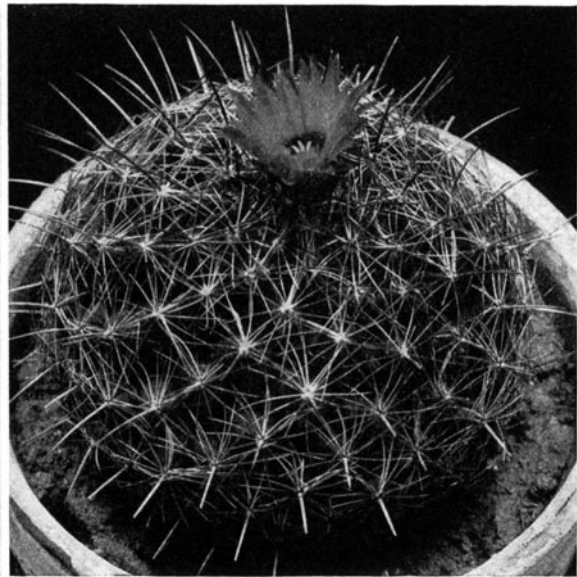


FIG. 37.—*Coryphantha salm-dyckiana*.

## 22. *Coryphantha retusa* (Pfeiffer).

*Mammillaria retusa* Pfeiffer, Allg. Gartenz. 5: 369. 1837.  
*Cactus retusus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plants depressed-globose, 5 to 10 cm. in diameter, the top very woolly; tubercles rather large; areoles elliptic; spines 6 to 12, all radial, appressed, or even curved backward, yellowish to brownish, subulate, except 2 or 3 acicular ones at upper part of areoles; flowers central, yellow, about 3 cm. long; inner perianth-segments oblong, acute.

*Type locality:* Mexico.

*Distribution:* Oaxaca, Mexico.

We have referred to this species a plant common in Oaxaca, which answers the original description very well. It was collected by Pringle in 1894 (No. 5706) and by Conzatti

in 1907, 1909, and 1920. It has also been sent us from the same region by O. Solis and B. P. Reko.

Figure 36 is from a photograph of a plant sent from Oaxaca by O. Solis in 1920.

**23. *Coryphantha palmeri* sp. nov.**

Plant-body globular; tubercles closely set in about 13 rows but not very regularly arranged, pale green, not very flaccid; radial spines 11 to 14, rather stout, spreading nearly at right angles to central one, yellowish; tips often blackish; central spine one, stout, terete, hooked at apex; young areoles very woolly; flowers central, pale yellow to nearly white, about 3 cm. long; outer perianth-segments linear-oblong, acute, brownish on broad mid-rib, entire, the inner yellow throughout, acuminate; stamens numerous; stigma-lobes 9, linear, cream-colored.

Collected by Dr. Edward Palmer on stony ridge near Durango, Mexico, and flowered in Washington, July 1906 (No. 557, type). Here seem to belong plants collected by Dr. Palmer at Agua Nueva, April 1905 (No. 561), and at Saltillo, October 1904 (No. 438), and July 1905 (No. 703), and also by F. E. Lloyd in Zacatecas, 1908 (No. 9).

**24. *Coryphantha cornifera* (De Candolle) Lemaire, Cactées 35. 1868.**

*Mammillaria cornifera* De Candolle, Mém. Mus. Hist. Nat. Paris 1: 112. 1828.

*Mammillaria pfeifferana* De Vriese, Tydschr. Nat. Geschr. 6: 51. 1839.

*Mammillaria scolymoides* Scheidweiler, Allg. Gartenz. 9: 44. 1841.

*Mammillaria scolymoides longiseta* Salm-Dyck, Cact. Hort. Dyck. 1849. 132. 1850.

*Mammillaria scolymoides nigricans* Salm-Dyck, Cact. Hort. Dyck. 1849. 132. 1850.

*Echinocactus corniferus* Poselger, Allg. Gartenz. 21: 102. 1853.

*Echinocactus corniferus longisetus* Poselger, Allg. Gartenz. 21: 102. 1853.

*Echinocactus corniferus nigricans* Poselger, Allg. Gartenz. 21: 102. 1853.

*Echinocactus corniferus scolymoides* Poselger, Allg. Gartenz. 21: 102. 1853.

*Cactus corniferus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus pfeifferanus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus scolymoides* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plant solitary, globose, pale green; tubercles short, broad, somewhat imbricated, 12 cm. high; radial spines 16 or 17, grayish, 10 to 12 mm. long; central spine 1, stout, erect or subincurved, generally dark colored, 14 to 16 mm. long; flowers yellow, tinged with red, 7 cm. broad; inner perianth-segments oblanceolate, acuminate; fruit not seen.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

We refer here a plant collected by Dr. Rose near San Juan del Rio, August 17, 1905.

Schumann referred *Mammillaria scolymoides* to *Mammillaria radians*, but its relationship is rather with *M. cornifera* as suggested by Schumann.

*Mammillaria cornifera mutica* Salm-Dyck (Cact. Hort. Dyck. 1849. 20. 1850), taken up afterwards as *Echinocactus corniferus muticus* by Poselger (Allg. Gartenz. 21: 102. 1853), was without description and to it was referred *Mammillaria radians* Hortus.

*Illustrations:* Schumann, Gesamtb. Kakteen 492. f. 81; Thomas, Zimmerkultur Kakteen 55; Bull. U. S. Dept. Agr. Bur. Pl. Ind. 262: pl. 1; Blühende Kakteen 3: pl. 125; Monatsschr. Kakteenk. 14: 73, as *Mammillaria cornifera*; Karsten and Schenck, Vegetationsbilder 2: pl. 20e, as *Mammillaria scolymoides*; Tydschr. Nat. Geschr. 6: pl. 1, f. 2, as *Mammillaria pfeifferana*.

Plate 11, figure 4, shows a plant collected by Dr. C. A. Purpus in Coahuila in 1905 which flowered in the New York Botanical Garden.

**25. *Coryphantha salm-dyckiana* (Scheer).**

*Mammillaria salm-dyckiana* Scheer in Salm-Dyck, Cact. Hort. Dyck. 1849. 134. 1850.

*Mammillaria salm-dyckiana brunnea* Salm-Dyck, Allg. Gartenz. 18: 394. 1850.

*Echinocactus salm-dyckianus* Poselger, Allg. Gartenz. 21: 102. 1853.

*Cactus salm-dyckianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria delaetiana* Quehl, Monatsschr. Kakteenk. 18: 59. 1908.

Plants either solitary or in clusters, nearly globular or sometimes club-shaped, 10 to 15 cm. in diameter, light green; tubercles rather short, closely set; radial spines about 15, spreading, slender, 10 to 15 mm. long, grayish or whitish; central spines 1 to 4, reddish to black, the upper ones when



present ascending and those near top of plant connivent, the lowest central stouter than others, 2 to 2.5 cm. long, porrect or curved downward; flowers large, 4 cm. long; outer perianth-segments greenish or tinged with red, the inner pale yellow; filaments greenish yellow; stigma-lobes 7.

*Type locality:* Near Chihuahua, Mexico.

*Distribution:* Common in the state of Chihuahua, Mexico.

*Mammillaria salm-dyckiana* was originally collected by John Potts near Chihuahua City and sent to Kew; its flowers and fruit were unknown. Schumann referred it as a synonym of *M. scheeri*, but we believe that it must be distinct and that *M. delaetiana* is the same. It was described from plants distributed by de Laet, who probably obtained them from C. R. Orcutt.

In 1908 Dr. E. Palmer collected some fine plants near Chihuahua City, from which our flower characters have been drawn.

*Illustrations:* Monatsschr. Kakteenk. 18: 59; 20: 92, as *Mammillaria delaetiana*.

Figure 37 is from a photograph of the plant collected by Dr. E. Palmer near Chihuahua City in 1908.

## 26. *Coryphantha pallida* sp. nov.

Plants either solitary or in clusters of about 10 or more, globular, 12 cm. in diameter or less, bluish green; tubercles in 13 rows, short and thick, closely set; radial spines 20 or more, white, ap-

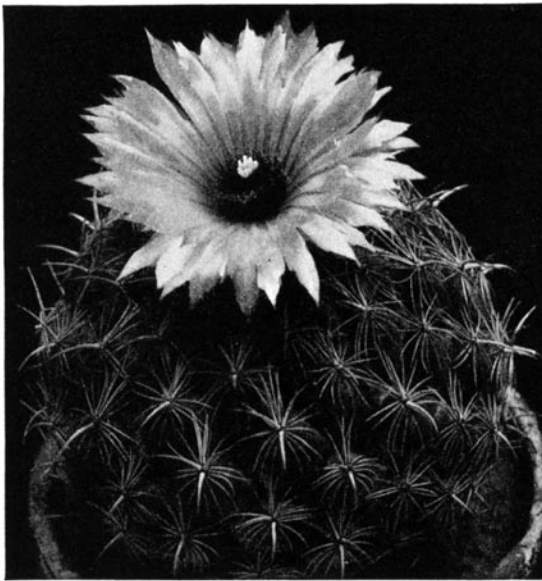


FIG. 38.—*Coryphantha pallida*.

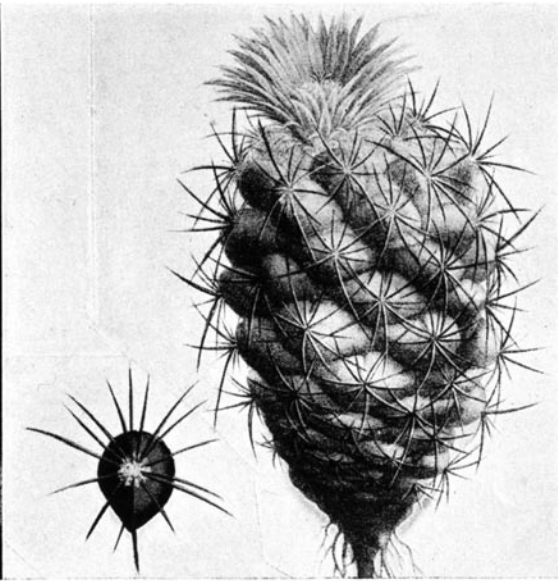


FIG. 39.—*Coryphantha pycnantha*.

pressed; centrals usually 3, but sometimes more, the two upper more or less ascending, the lower porrect or curved downward, with tip black, or sometimes black throughout; flowers very large, often 7 cm. long and nearly as broad; outer perianth-segments narrow, greenish yellow, with a reddish stripe on back; inner perianth-segments pale lemon-yellow, broader than outermost, acuminate; ovary bearing a few narrow scales; stamens deep red, numerous; style yellow, longer than stamens; stigma-lobes; fruit greenish brown, 2 cm. long; seeds brown, shining, broader at apex than below.

Common in calcareous soil about Tehuacán, Mexico. Collected by J. N. Rose in 1901 (No. 5583, type), in '905 (Nos. 99972 and 10001), and in 1906. Living specimens were also obtained and these have flowered repeatedly in cultivation. It was also collected by C. G. Pringle in 1901 (No. 8573) and distributed as *Mammillaria pycnantha*?



In young plants the spines are not so numerous, the central spine is single, porrect, slightly curved, with black tips.

Figure 38 is from a photograph of the plant collected at the type locality in 1906.

**27. *Coryphantha pycnantha* (Martius) Lemaire, Cactées 35. 1868.**

- ?*Mammillaria latimamma* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 114. 1828.  
*Mammillaria pycnantha* Martius, Nov. Act. Nat. Cur. 16: 325. 1832.  
 ?*Mammillaria acanthostephes* Lehmann, Allg. Gartenz. 3: 228. 1835.  
*Mammillaria arietina* Lemaire \* Cact. Aliq. Nov. 10. 1838.  
*Mammillaria scepontocentra* Lemaire, Cact. Gen. Nov. Sp. 43. 1839.  
*Mammillaria arietina spinosior* Lemaire, Cact. Gen. Nov. Sp. 94. 1839.  
*Mammillaria pycnantha spinosior* Monville in Salm-Dyck, Cact. Hort. Dyck. 1844. 14. 1845.  
*Mammillaria magnimamma arietina* Salm-Dyck in Förster, Handb. Cact. 235. 1846.  
*Mammillaria winkleri* Förster, Allg. Gartenz. 15: 50. 1847.  
*Mammillaria magnimamma lutescens* Salm-Dyck, Cact. Hort. Dyck. 1849. 17, 121. 1850.  
*Echinocactus winkleri* Poselger, Allg. Gartenz. 21: 102. 1853.  
 ?*Echinocactus acanthostephes* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Echinocactus pycnanthus* Poselger, Allg. Gartenz. 21: 102. 1853.  
*Mammillaria acanthostephes recta* Hortus in Labouret, Monogr. Cact. 138. 1853.  
 ?*Coryphantha acanthostephes* Lemaire, Cactées 35. 1868.  
*Cactus acanthostephes* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus latimamma* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus pycnanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus scepontocentrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus winkleri* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plant solitary, globular to cylindrical, about 8 cm. high; tubercles broad, grooved above, glaucous-green; radial spines 10 to 12, slender, 10 to 16 mm. long; central spines about 4, stouter than the radials, about 25 mm. long, more or less curved backward, usually black; flowers from near center of plant, 25 mm. in diameter, yellowish; perianth-segments numerous, very narrow; stigma-lobes 5 or 6, white.

*Type locality:* Near the city of Oaxaca, Mexico.

*Distribution:* Oaxaca, Mexico.

The skeleton of the type of this species is preserved in the Munich Museum and Dr. Rose obtained a cluster of spines from this specimen in 1912.

*Coryphantha pycnantha* has long been a desideratum. In September 1920 Professor Conzatti sent several small plants from near the type locality. In these, the radial spines are white, the centrals (3) are nearly black, and all more or less curved backward. In the center of the plant a quantity of white wool is developed, so abundant that it can be gathered for commercial use. With the specimens of Professor Conzatti are samples of the wool with an inquiry as to its value as a fiber.

*Mammillaria magnimamma spinosior* Lemaire (Salm-Dyck, Cact. Hort. Dyck. 1844. 12. 1845) was not described at the place here cited. Labouret afterwards refers it as a synonym of *M. magnimamma lutescens*.

*Mammillaria cephalophora* Salm-Dyck (Cact. Hort. Dyck. 1849. 137. 1850; *Echinocactus cephalophorus* Poselger, Allg. Gartenz. 21: 102. 1853; *Cactus cephalophorus* Kuntze, Rev. Gen. Pl. 1: 260. 1891) was a new name for *Melocactus mammillariaeformis* † Salm-Dyck (Allg. Gartenz. 4: 148. 1836). It was first described as a *Melocactus* (because of its woolly crown), but it seems to be more like a *Coryphantha*. Its exact origin in Mexico seems to be unknown and the flowers had not been described up to 1850. Pfeiffer stated that the seeds obtained from a dead plant were similar to those of *Mammillaria coronaria*. Schumann discussed it under *M. pycnantha* in a note. Hemsley (Biol. Centr. Amer. Bot. 1: 502) listed it as a *Melocactus*.

*Mammillaria pycnantha scepontocentra* Monville (Labouret, Monogr. Cact. 136. 1853) belongs here by implication.

*Mammillaria magnimamma* Otto was referred by De Candolle (Mém. Cact. 17. 1834) to his *M. latimamma*, now referred to this species.

\* Schumann refers this name as a synonym of *Mammillaria centricirrha*.

† Schumann spells this name *Melocactus mamillariiformis*.

*Echinocactus radiatus* Hortus Belg. was referred as a synonym of *Mammillaria pycnacantha* by Pfeiffer (Enum. Cact. 180. 1837).

*Illustrations*: Nov. Act. Nat. Cur. 16: pl. 17; Loudon, Encycl. Pl. ed. 3. 1379. f. 19387; Abh. Bayer. Akad. Wiss. München 2: pl. 3; Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 26; Curtis's Bot. Mag. 69: pl. 3972, as *Mammillaria pycnacantha*.

Figure 39 is reproduced from the first illustration cited above; a spine-cluster is also shown.

## 28. *Coryphantha echinus* (Engelmann).

*Mammillaria echinus* Engelmann, Proc. Amer. Acad. 3: 267. 1856.

*Cactus echinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Mammillaria radians echinus* Schumann, Gesamtb. Kakteen 496. 1898.

Solitary, globose to subconic, 3 to 5 cm. in diameter, almost hidden under the closely appressed spines; areoles orbicular or a little longer than broad; radial spines numerous, white, 10 to 16 mm. long; central spines 3 or 4, the 3 upper erect or connivent over the apex, the lower one porrect on side of plant, erect near top, subulate, straight, 1.5 to 2.5 cm. long, often blackish; flowers 2.5 to 5 cm. long, yellow; outer perianth-segments linear-lanceolate; inner perianth-segments 20 to 30, narrow; stigma-lobes about 12; fruit oblong, 12 mm. long.

*Type locality*: On the Pecos River, Texas.

*Distribution*: Western Texas.

The flowers with the type plant seem to have been shriveled, for Engelmann describes them as large, apparently about 1½ or 2 inches long; in a later description he states that they are yellow. This species is very rare in collections and we have seen no flowers of it. All the illustrations cited below are based on the figure in the Mexican Boundary Survey.

The name *Coryphantha echinus* occurs in C. R. Orcutt's Circular to Cactus Fanciers, 1922.

*Illustrations*: Cact. Mex. Bound. pl. 10; Dict. Gard. Nicholson 4: 562. f. 32; Suppl. 515. f. Watson, Cact. Cult. 157. f. 59; ed. 3. f. 37; Förster, Handb. Cact. ed. 2. 404. f. 43; Blanc, Cacti 68. f. 1228, as *Mammillaria echinus*; Schelle, Handb. Kakteenk. 240. f. 159, as *M. radians echinus*.

Figure 31b is from a photograph of a plant obtained by George L. Fisher near Langtry, Texas, in 1922.

## 29. *Coryphantha durangensis* (Range).

*Mammillaria durangensis* Runge in Schumann, Gesamtb. Kakteen 478. 1898.

Plants solitary or in small clusters, short-cylindric, so cm. long or less, somewhat glaucous; tubercles rather prominent, in 5 or 8 series, somewhat compressed dorsally, very woolly in the axils; radial spines 6 to 8, acicular, spreading, 1 cm. long or less; central spine solitary, often erect, those of uppermost areoles connivent, black; flowers very small, about 2 cm. long, when fully expanded 2.5 to 4 cm. broad; outer perianth-segments dark purple or with only a purple stripe down center; inner perianth-segments cream-colored to pale lemon-yellow; filaments cream-colored, about length of style; style and stigma-lobes cream-colored, the latter 5, linear and curved backward; fruit globular, 5 to 8 mm. in diameter, naked, greenish; seeds brown, about 1 mm. broad.

*Type locality*: Villa Lerdo, Durango, Mexico.

*Distribution*: Northern Mexico.

Dr. E. Chaffey has collected this plant for us several times at the type locality, but it does not survive long under glass. In 1911 he found a cristate form with the lobes flattened like the joints of an *Opuntia*, bearing flowers along the edges.

This is *Mammillaria compressa* of Hildmann's Catalogue, according to Schumann (Gesamtb. Kakteen 479. 1898).

*Illustration*: Wiener Ill. Gart. Zeit. 29: 411. f. 105, as *Mammillaria radians*.

Plate v, figure 4, shows a plant sent by Dr. Chaffey from the type locality in 1918, which flowered in the New York Botanical Garden, April 8, 1918. Figure 40 is from a photograph of a potted plant sent by Dr. Chaffey in 1910 which flowered in Washington; figure 41 is from a photograph of another plant sent by Dr. Chaffey in 1910.

**30. *Coryphantha chlorantha* (Engelmann).**

*Mammillaria chlorantha* Engelmann in Rothrock, Rep. U. S. Geogr. Surv. 6:127. 1878.

*Cactus radiosus chloranthus* Coulter, Contr. U. S. Nat. Herb. 3: 121. 1894.

*Mammillaria radiosa chlorantha* \* Schumann, Gesamtb. Kakteen 481. 1898.

Plant cylindric, sometimes 20 to 25 cm. high, 8 cm. in diameter; tubercles closely set and entirely hidden by the densely matted spines; flowers small, 35 mm. broad; outer perianth-segments ciliate; inner perianth-segments yellow or greenish yellow, linear-lanceolate, acute; stigma-lobes white; fruit central, green, 2.5 cm. long, juicy, bearing 5 or 6 scales near top; seeds brown, flattened, 1.5 mm. long, reticulated.

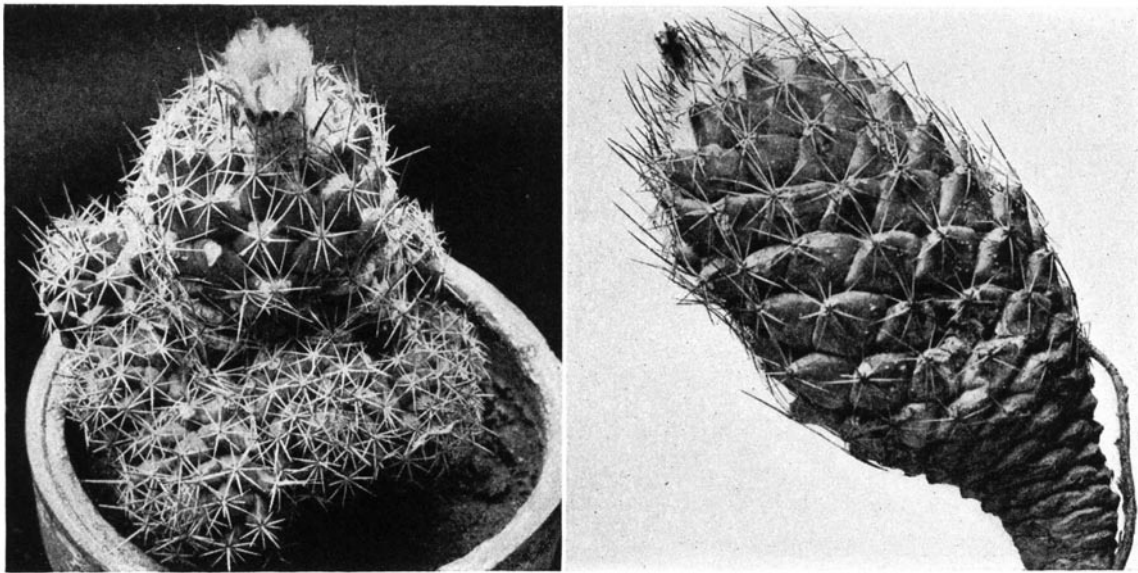
*Type locality*: Southern Utah, east of Saint George.

*Distribution*: Southern Utah, western Arizona, central Nevada, and eastern southern California.

*Mammillaria utahensis* Hildmann, cited by Schumann (Gesamtb. Kakteen 481. 1898) as a synonym of *M. radiosa*, may have been based on this plant.

*Illustrations*: Förster, Handb. Cact. ed. 2. 328. f. 33; Gartenflora 32: 87; Deutsche Gärt. Zeit. 7: 53, as *Mammillaria chlorantha*; Schelle, Handb. Kakteenk. 236. f. 151, as *M. radiosa chlorantha*.

Plate v, figure 7, is from a plant collected by I. Tidestrom at the type locality in 1919, which flowered in the New York Botanical Garden, May 27, 1919. Figure 42 is from a photograph of a plant collected by Major E. A. Goldman in Prospect Valley, Arizona.



FIGS. 40 and 41.—*Coryphantha durangensis*.

**31. *Coryphantha vivipara* (Nuttall) Britton and Rose in Britton and Brown, Illustr. Fl. ed. 2. 2: 571. 1913.**

*Cactus viviparus* Nuttall, Fraser's Cat. No. 22. 1813.

*Mammillaria vivipara* Haworth, Suppl. Pl. Succ. 72. 1819.

*Mammillaria radiosa* Engelmann, Bost. Journ. Nat. Hist. 6: 196. 1850.

*Echinocactus radiosus* Poselger, Allg. Gartenz. 21: 107. 1853.

*Echinocactus viviparus* Poselger, Allg. Gartenz. 21: 107. 1853.

*Mammillaria vivipara vera* Engelmann, Proc. Amer. Acad. 3: 269. 1856.

*Mammillaria vivipara radiosa* Engelmann, Proc. Amer. Acad. 3: 269. 1856.

*Mammillaria vivipara radiosa* Engelmann, Cact. Mex. Bound. 15. 1859, as subspecies.

*Cactus radiosus* Coulter, Contr. U. S. Nat. Herb. 3: 120. 1894.

*Mammillaria hirschtiana* Haage, Monatsschr. Kakteenk. 6: 127. 1896.

*Coryphantha radiosa* Rydberg, Fl. Rocky Mountains 581. 1917.

\* Schumann credits this trinomial to Engelmann at the place here cited, although we believe that Engelmann never used it.



Plants solitary or in clusters forming mounds 3 to 6 dm. in diameter, globular, with prominent tubercles; areoles large, woolly; radial spines about 16, rather delicate, radiating, white; centrals 4 to 6, divergent, much stouter, brownish, swollen at base; ovary green, naked; outer perianth-segments greenish; inner ones somewhat pinkish, long-ciliate; innermost perianth-segments pinkish purple, narrow, acuminate, entire, spreading; filaments much shorter than the segments, pinkish, but paler below; style greenish to purple above, longer than the stamens; stigma-lobes linear, purple, about 8, apiculate; fruit green when mature, juicy, nearly globular, 1.5 cm. in diameter, with several (sometimes 5 or 6) small ciliate scales scattered over its surface; seeds light brown, 1.5 mm. long.

*Type locality*: "Near the Mandan towns on the Missouri, lat. near 49°."

*Distribution*: Manitoba to Alberta, Kansas, south to northern Texas and Colorado.

The group to which *Coryphantha vivipara* belongs has always been very puzzling. Dr. Engelmann, our greatest authority on this group, was sometimes of one opinion and

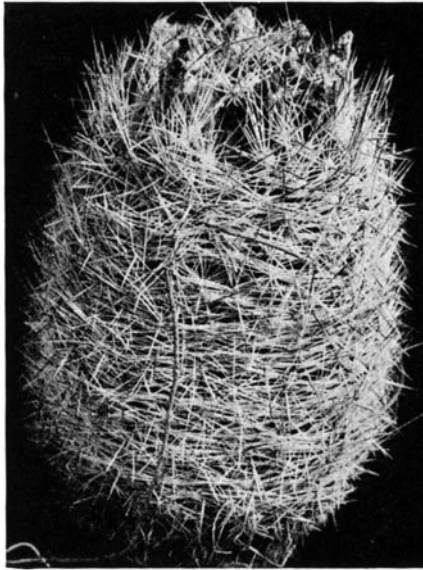


FIG. 42.—*Coryphantha chlorantha*.

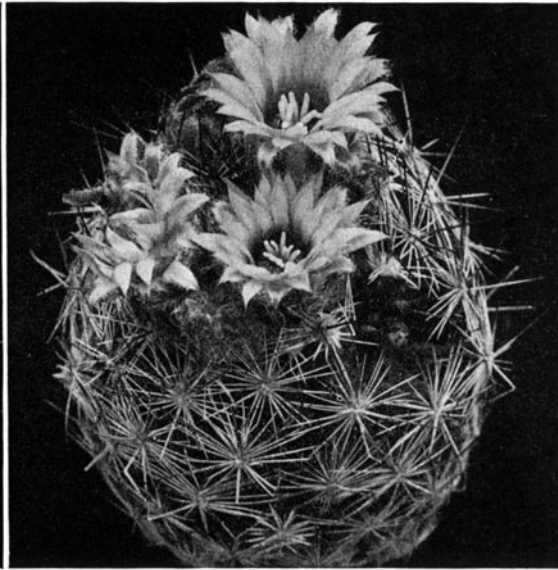


FIG. 43.—*Coryphantha Neo-mexicana*.

sometimes of another. Schumann rejected the specific name *vivipara* of Haworth for this plant since he thought that it was not the same as the *vivipara* of Engelmann, but in this he must be wrong, for *Mammillaria vivipara* Haworth was based upon *Cactus viviparus* Pursh, a name previously used by Nuttall, and both Pursh's and Nuttall's descriptions were based on the specimens collected by Nuttall in "Upper Louisiana" in 1812. This is undoubtedly the plant which Engelmann had in mind and which he called variety *vera*. We have not seen the type, but Pursh stated that he had seen flowers in Lambert's Garden.

Engelmann's remarks regarding the variability of the species are interesting. In the Proceedings of the American Academy (3: 269) he says:

"The extreme forms are certainly very unlike one another, but the transitions are so gradual that I can not draw strict limits between them."

*Coryphantha vivipara* and the three following species are closely related.

This plant is a day bloomer, and according to Engelmann the flowers become fully expanded about one o'clock in the afternoon.

Hooker in Curtis's Botanical Magazine (pl. 7718) figures and describes a plant purchased from D. M. Andrews of Boulder, Colorado, in which all the spines are brown, the flower is rose-red, and the stigma-lobes are linear and white.



*Mammillaria montana* is described briefly and figured (f. 1399) by Blanc in Hints on Cacti, p. 72. It is also described and figured by Darel (Illustr. Handb. Kakteen 96. f. 81), who says that it comes from Montana and Utah. It is illustrated by Haage (Cact. Kultur ed. 2. 187). It is apparently the same as *Coryphantha vivipara*.

*Illustrations:* Cycl. Amer. Hort. Bailey 2: f. 1356; Stand. Cycl. Hort. Bailey 4: f. 2315; Tribune Hort. 4: pl. 140; Curtis's Bot. Mag. 126: pl. 7718; De Laet, Cat. Gén. f. 43; Cact. Mex. Bound. pl. 74, f. 3 (seed); Meehan's Monthly 9: pl. 9, as *Mammillaria vivipara*; Clements, Rocky Mountain Flow. pl. 32, f. 7; Clements, Fl. Mount. Plain pl. 32, f. 7; Britton and Brown, Illustr. Fl. 2: 462. f. 2526, as *Cactus viviparus*; Monatsschr. Kakteenk. 3: 132; Schelle, Handb. Kakteenk. 236. f. 150; Floralia 42: 375, as *Mammillaria radiosa*; Cact. Mex. Bound. pl. 74, f. 4 (seed), as *Mammillaria radiosa texana*; Cact. Mex. Bound. pl. 74. f. 4 (seed), as *M. radiosa borealis*; Britton and Brown, Illustr. Fl. ed. 2. 2: f. 2985.

### 32. *Coryphantha neo-mexicana* (Engelmann).

*Mammillaria vivipara radiosa neo-mexicana* Engelmann, Proc. Amer. Acad. 3: 269. 1856.

*Mammillaria radiosa neo-mexicana* Engelmann, Cact. Mex. Bound. 64. 1859.

*Mammillaria radiosa borealis* Engelmann, Cact. Mex. Bound. 68. 1859.

*Mammillaria radiosa texana* Engelmann, Cact. Mex. Bound. 68. 1859.

*Cactus radiosus neo-mexicanus* Coulter, Contr. U. S. Nat. Herb. 3: 120. 1894.

*Cactus neo-mexicanus* Small, Fl. Southeast. U. S. 812. 1903.

*Mammillaria neo-mexicana* A. Nelson in Coulter and Nelson, Man. Bot. Rocky Mountains 327. 1909.

Plants usually solitary, globular to short-oblong, 8 to 12 cm. long, the whole body usually hidden under a mass of spines; radial spines numerous, acicular, usually white; central spines several, much stouter than the radials, pale below, brown or black towards top; flowers 4 to 5 cm. broad when fully expanded; outer perianth-segments greenish or the ones nearer center purplish, ciliate; inner perianth-segments broadly linear, acuminate and apiculate, more or less serrate above; filaments greenish, much shorter than perianth-segments; stigma-lobes extending beyond filaments, white, obtuse, not apiculate as in *Coryphantha vivipara*; fruit 2.5 cm. long, green, juicy, naked except a few hairy scales near top, capped by withered perianth, depressed at apex.

*Type locality:* Western Texas to New Mexico, doubtless at El Paso.

*Distribution:* Western Texas, New Mexico, and northern Chihuahua.

The distribution of this species can not be stated at present very definitely. It may be that some of the plants from northern New Mexico, especially those found in the mountains, may better be referred to *C. vivipara*, and the same is true of some of the plants from Texas. It is probable that the plants from central Texas and perhaps northwestern Texas may all be referred to *C. vivipara*. We have no Mexican plants before us but we have plants from El Paso, just over the Mexican Boundary line. Just how far south the species extends we do not know. We have greatly restricted the range from that given by Coulter in the Contributions from the U. S. National Herbarium (3: 120. 1894).

*Illustrations:* Gartenwelt 4: 159; Cact. Mex. Bound. pl. 13; Förster, Handb. Cact. ed. 2. 304. f. 30, as *Mammillaria radiosa neo-mexicana*; Watson, Cact. Cult. 181. f. 73; ed. 3. f. 50; Dict. Gard. Nicholson 4: 566. f. 41, as *Mammillaria vivipara radiosa*; Dict. Gard. Nicholson Suppl. 517. f. 554, as *Mammillaria radiosa*; Cact. Mex. Bound. pl. 74 (seed), as *Mammillaria borealis*.

Plate II, figure 1, shows a plant sent from Canutillo, Texas, by Mrs. S. L. Pattison in 1920; figure 1a shows the fruit. Figure 43 is from a photograph of a plant collected by Dr. Rose near Albuquerque, New Mexico, in 1908.

### 33. *Coryphantha arizonica* (Engelmann).

*Mammillaria arizonica* Engelmann, Bot. Calif. 1: 124. 1876.

*Cactus radiosus arizonicus* Coulter, Contr. U. S. Nat. Herb. 3: 121. 1894.

*Mammillaria radiosa arizonica* Schumann, Gesamtb. Kakteen 481. 1898.

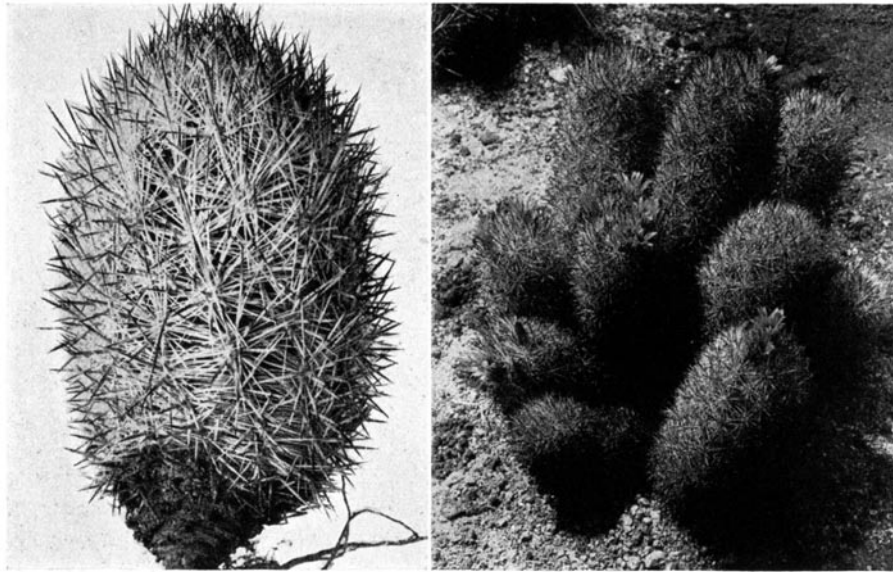
Sometimes cespitose, forming large clumps a meter broad; each head globose to ovoid, 7.5 to 10 cm. in diameter; tubercles about 2.5 cm. long, cylindrical, ascending, deeply grooved; spines numer-

ous, straight, rigid; radial spines 55 to 20, 10 to 30 mm. long, whitish; inner spines 3 to 6, stouter than the radial ones, deep brown above; flowers large, 5 to 7 cm. broad, rose-colored; outer perianth-segments 30 to 40, linear-subulate, with fimbriate margin; inner perianth-segments 40 to 50, lanceolate-linear, attenuate; stigma-lobes 8 to 50, white; fruit oval, green; seeds compressed, light brown, pitted.

*Type locality:* Northern Arizona.

*Distribution:* Northern Arizona, especially along the Upper River of the Grand Canyon, and perhaps also in southern Utah.\*

*Mammillaria arizonica* Engelmann, when first described, was a complex. Engelmann states that it was found "on rocky and sandy soil in northern Arizona from the Colorado eastward (Coues, Palmer, F. Bischoff) and into southern Utah (J. E. Johnson); probably in southeastern California." Engelmann afterwards described Johnson's plant from Utah as *M. chlorantha* and the California plant is doubtless his *M. deserti*. We have in the U. S. National Herbarium Palmer's specimen from Arizona but we have not seen the plant of Coues nor of Bischoff.



FIGS. 44 and 45.—*Coryphantha deserti*.

The northern range of this species is very uncertain. Engelmann extended it into southern Utah.

Plate v, figure 5, shows a plant sent by M. A. H. Spencer from the Grand Canyon, Arizona, in May 1907, which afterwards flowered in Washington.

### 34. *Coryphantha deserti* (Engelmann).

*Mammillaria deserti* Engelmann, Bot. Calif. 2: 449. 1880.

*Cactus radiosus deserti* Coulter, Contr. U. S. Nat. Herb. 3: 121. 1894.

*Cactus radiosus alversonii* Coulter, Contr. U. S. Nat. Herb. 3: 522. 1894.

*Mammillaria alversonii* Zeissold, Monatsschr. Kakteenk. 5: 70. 1895.

*Mammillaria radiosa alversonii* Schumann, Gesamtb. Kakteen 481. 1898.

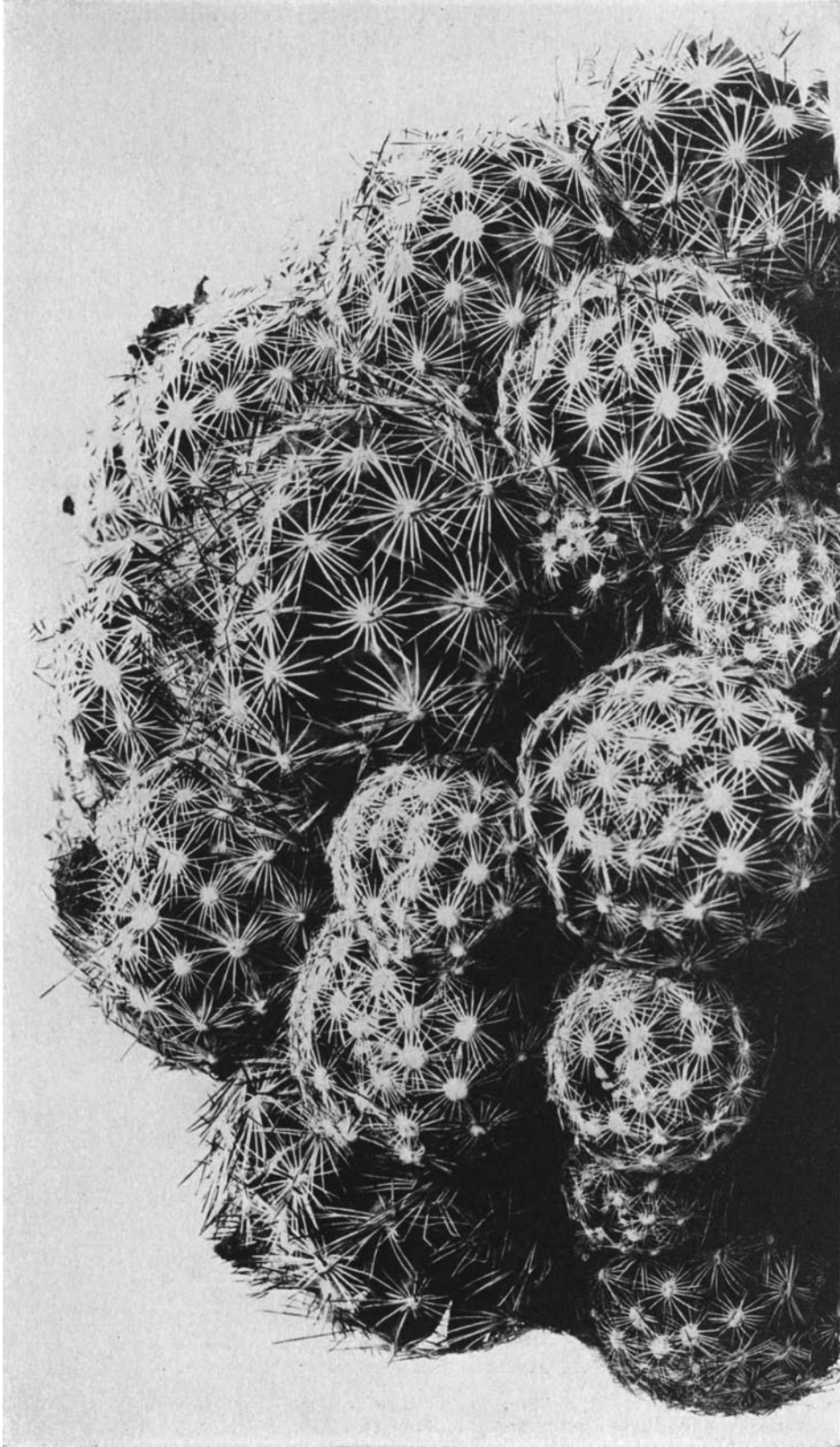
*Mammillaria radiosa deserti* Schumann, Gesamtb. Kakteen 481. 1898.



FIG. 46.—Flower of *C. deserti*.

Solitary or cespitose, usually cylindric, sometimes 2 dm. high, 6 to 9 cm. in diameter, densely covered with spines; radial spines white except at tip,

\* Our Utah reference is based on some detached flowers collected by M. E. Jones and a barren plant sent by Dr. C. D. Marsh in 1922. Both collections came from above Salina.



*Coryphantha aggregata*, from Arizona.





spreading; central spines several, sometimes as many as 14, much stouter than the radials, slightly spreading, those toward top of plant connivent, black or bluish black in their upper half, shading into red, nearly white at base; flowers 3 cm. long and nearly as broad when expanded, light pink, opening in bright sunlight; scales and outer perianth-segments ciliate; inner perianth-segments narrow, acute.

*Type locality:* Ivanpah, California.

*Distribution:* Deserts of southern California and southern Nevada.

This species is characterized by its stiff spines, with bluish-black tips shading into red, and is known in southern California as fox-tail cactus. The original description of *Mammillaria deserti* states that the flowers are straw-colored, tipped with pink, and this suggests *Coryphantha chlorantha* but we believe that it belongs with *Mammillaria alversonii*, which certainly has pinkish flowers, and since the name *deserti* is older than *alversonii* it is substituted for it.

*Illustrations:* Cact. Journ. 1: pl. for February, in part; Alverson's Cat. pl. facing 8, as *Mammillaria alversonii*; Schumann, Gesamtb. Kakteen 480. f. 79, as *M. radiosa alversonii*.

Figure 44 is from a photograph of a single plant sent by E. C. Rost; figure 45 is from a photograph of a clump photographed by E. C. Rost in its natural surroundings; figure 46 shows a flower taken from Mr. Rost's plant.

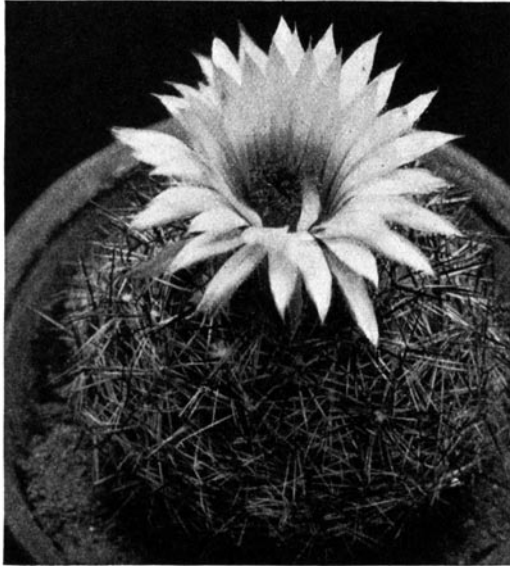


FIG. 47.—*Coryphantha aggregata*.

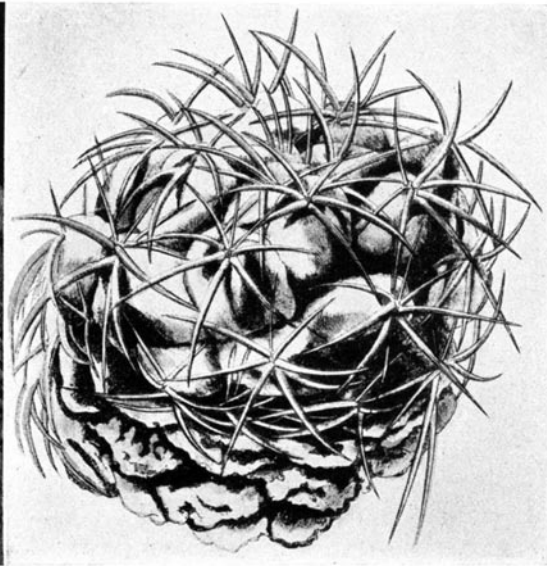


FIG. 48.—*Mammillaria recurvispina*.

### 35. *Coryphantha aggregata* (Engelmann).

*Mammillaria aggregata* Engelmann in Emory, Mil. Recon. 157. 1848.

*Cereus aggregatus* Coulter, Contr. U. S. Nat. Herb. 3: 396. 1896, as to name.

*Echinocereus aggregatus* Rydberg, Bull. Torr. Club 33: 146. 1906, as to name.

Plants solitary or cespitose, globular to short-oblong, very spiny; radial spines numerous, stouter than those of *Coryphantha vivipara*, white, often with brown tips, appressed; central spines several, stout, all erect and appressed or one often prorext, those towards top of plant connivent; flowers very large and showy, purplish, 5 to 7 cm. broad; outer perianth-segments ciliate; inner perianth-segments narrowly oblanceolate, often 6 mm. broad, acute, apiculate; stigma-lobes 8 to 10, elongated, white; fruit green, oblong, 2 to 2.5 cm. long, naked or occasionally bearing a small scale on the side, juicy; seeds dark brown, 2 mm. long.

*Type locality:* Head waters of the Gila.

*Distribution:* Western New Mexico, southeastern Arizona, and northern Sonora.

*Mammillaria aggregata* came from the headwaters of the Gila. The type was not preserved and is known only from a drawing reproduced in Emory's report. There has

been much discussion about the identity of the plant; Coulter transferred it to *Cereus*, referring to it *Cereus coccineus* and *C. phoeniceus* and assigning to it a wide range, Colorado to San Luis Potosí. Rydberg transferred the name to *Echinocereus* but applied it to the same group of plants described by Coulter. A careful restudy of the original illustration and Engelmann's description and a restudy of all the cacti of similar habit in the southwest leads us to a different conclusion from that reached by Dr. Coulter and Dr. Rydberg. Engelmann, who described it as a *Mammillaria*, says that it appears to be allied to *M. vivipara*, and this we believe is its true relationship. A *Mammillaria* from the region about Flagstaff often forms the great clusters mentioned by Engelmann, and while we believe that it differs from the one found in northern Arizona it is certainly a near ally, probably representing the closely related species from southeastern Arizona and southwestern New Mexico which has often passed as *M. arizonica*.

Engelmann referred a specimen which he had from Sonora to his variety *Mammillaria vivipara neo-mexicana* with the remark that it was "a form with more spines than any other."

Plate IV shows a clump sent by Mrs. Ruth C. Ross from near Aravaipa, Arizona, in July 1922. Figure 47 is from a photograph of a single plant obtained by Dr. Rose near Benson May 1, 1908, which afterwards flowered in Washington.

**36. *Coryphantha cubensis*** Britton and Rose, *Torreyana* 12: 15. 1912.

*Mammillaria urbaniana* Vaupel, *Monatsschr. Kakteenk.* 22: 65. 1912.

Plants depressed-globose, tufted, 2 to 3 cm. broad, pale green; tubercles numerous, vertically compressed, 6 to 7 mm. long, 4 to 5 mm. wide, about 3 mm. thick, grooved on upper side from apex to below middle, the groove very distinct; spines about 10, whitish, radiating, acicular but weak, 3 to 4 mm. long, those of young tubercles subtended by a tuft of silvery white hairs, 1.5 mm. long; flowers pale yellowish green, 16 mm. high, the segments acute; filaments, style, and stigma-lobes yellowish; fruit red, less than 1 cm. long, naked; seeds black, somewhat angled.

*Type locality:* Among stones in barren savanna, southeast of Holguin, Oriente, Cuba.

*Distribution:* Type locality and vicinity.

This species is very inconspicuous and perhaps for that reason is rare in collections. It has only twice, to our knowledge, been collected, both times by Dr. J. A. Shafer, once in 1909 (No. 2946) and again in 1912 (No. 12432), who gave a short account of its discovery in the journal of the New York Botanical Garden (No. 155). He states that it barely protrudes through the layer of broken stones that filled the interstices between the larger rocks; that the largest plants were scarcely an inch in diameter, one of them bearing a small yellowish flower. It lives only a short time in greenhouse cultivation.

On account of the name *Mammillaria cubensis* Zuccarini (Labouret, *Monogr. Cact.* 59. 1853) Vaupel gave a new specific name to the plant when he transferred it from *Coryphantha*.

Plate V, figure 1, shows the plant collected by Dr. Shafer in 1912 which flowered in the New York Botanical Garden in July of the same year; figure 1a shows the fruit and figure 1b shows a tubercle from the same plant.

**37. *Coryphantha sulcata*** (Engelmann).

*Mammillaria sulcata*\* Engelmann, *Bost. Journ. Nat. Hist.* 5: 246. 5845.

*Mammillaria strobiliformis* Mühlenpfordt, *Allg. Gartenz.* 16: 19. 1848. Not Engelmann, 1848.

*Mammillaria calcarata* Engelmann, *Bost. Journ. Nat. Hist.* 6: 195. 1850.

*Coryphantha calcarata* Lemaire, *Cactées* 35. 1868.

*Cactus calcaratus* Kuntze, *Rev. Gen. Pl.* 1: 259. 1891.

*Cactus scolymoides sulcatus* Coulter, *Contr. U. S. Nat. Herb.* 3: 116. 1894.

*Mammillaria radians sulcata* Schumann, *Gesamtb. Kakteen* 496. 1898.

*Cactus sulcatus* Small, *Fl. Southeast. U. S.* 812. 1903.

Cespitose, 8 to 12 cm. in diameter; tubercles rather large, 10 to 12 mm. long, somewhat flattened, soft; radial spines acicular, straight, white; central spines several, one somewhat stouter

\* Förster (*Handb. Cact.* 255. 5846) credits such a name to Pfeiffer but it is without description.





M. E. Eaton del. 1 to 4, 6, 7  
 A. A. Newton del. 5

A. Hoern & Co. Baltimore

- 1. Flowering plant of *Coryphantha cubensis*.
- 1a. Fruit of same.
- 1b. Tubercle of same.
- 2. Flowering plant of *Neomammillaria confusa*.
- 3. Flowering plant of *Neomammillaria geminispina*.
- 4. Top of flowering plant of *Neomammillaria confusa*.
- 5. Flowering plant of *Coryphantha arizonica*.
- 6. Flowering plant of *Coryphantha bumamma*.
- 7. Flowering plant of *Coryphantha chlorantha*.





than the others, porrect or slightly curved outward, others erect; flowers several, from near center of plant, 5 cm. in diameter or more, yellow, with a red center; inner perianth-segments lanceolate, apiculate; filaments reddish; style greenish yellow, exerted beyond stamens; stigma-lobes 7 to 10, yellow, notched at apex;\* fruit oblong, greenish; seeds oblong, shining, dark brown.

*Type locality:* Industry, Texas.

*Distribution:* Southern Texas.

The herbarium sheets of this plant, sent us from the Missouri Botanical Garden, contain seeds, fruit, and style. Dr. Coulter speaks of seeing the spines of the type.

The name *Mammillaria sulcata*, first given by Engelm., was changed by him to *M. calcarata* on account of *M. sulcata* Pfeiffer, but this was a later name and hence can not replace Engelm.'s first one.

This species was collected by Lindheimer at Industry, Texas, growing with *Mammillaria similis*, but while the two are similar in habit, this plant differs from *M. similis* in having green fruit and brown oblong seeds instead of red fruit and black globose seeds, as well as in other ways. It has not been collected much in recent years and its characters

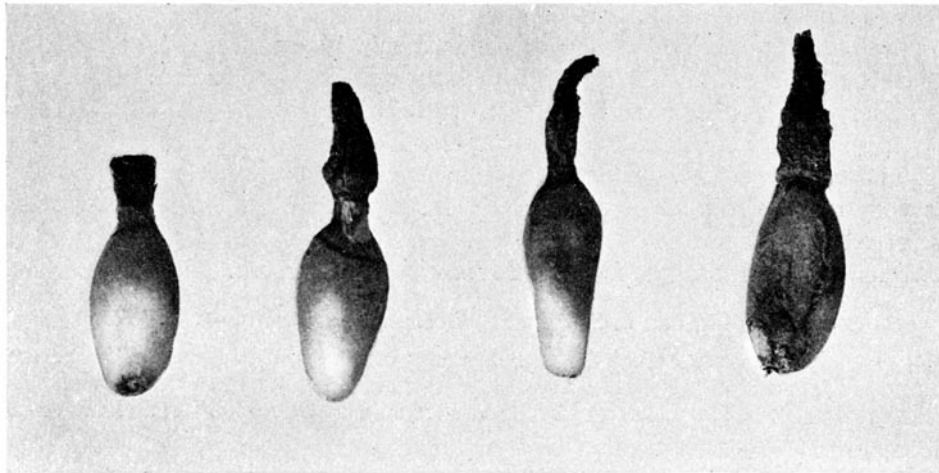


FIG. 49.—*Coryphantha sulcata*.

and range have been involved with other species. Miss Ellen D. Schulz sent us plants from San Antonio, Texas, in June 1921, and Robert Runyon sent us plants and photographs in 1922, which have enabled us to restudy the species in connection with its type now kept in the Engelm. Herbarium in the Missouri Botanical Garden.

*Mammillaria goernгии* was given by Haage (Cact. Kultur ed. 2. 183. 1900) as a new name for *M. calcarata*.

*Illustrations:* Cact. Mex. Bound. pl. 74. f. 1, as *Mammillaria calcarata*; Monatsschr. Kakteenk. 27: 65, as *Mammillaria radians sulcata*.

Plate x, figure 1, shows a plant photographed by Robert Runyon at Sabinal, Texas, April 28, 1922. Figure 49 is from a photograph of four fruits sent by Professor Albert Ruth, of Polytechnic, Texas, in 1922.

\* Whether this is a constant character we do not know, but we have observed it in three flowers, all from the same plant. It has not been noted before in any other species of *Coryphantha*.

## PUBLISHED SPECIES, PERHAPS OF THIS GENUS.

MAMMILLARIA CALOCHLORA Hortus, Monatsschr. Kakteenk. **26**: 167. 1916; **2**: 133. 1917.

This seems undoubtedly a species of *Coryphantha*, but we have not been able to identify it. There is considerable confusion regarding this plant, as the following note from Meyer would indicate:

"I have gotten Mr. Quehl to send me the flower of *Mammillaria calochlora* Hort. and I see that this also agrees exactly with the flower of Grässner's *M. delaetiana*. As third and last I have now gotten Mr. de Laet to send me also a little plant of equal size of his genuine *M. delaetiana* Quehl and this one is entirely different from the two others in form and color of the body, areoles, and spines."

We have a small specimen and a photograph sent us by L. Quehl in 1921.

MAMMILLARIA CORDIGERA Heese, Gartenflora **59**: 445. 1910.

Short-cylindric, 6 cm. high, 4.5 cm. in diameter; tubercles 4-angled, broader than long, grooved above; spine-areoles longer than broad; radial spines 4 to 15, white, spreading; central spines 4, erect, curved if not hooked at apex, 15 mm. long; flowers and fruit unknown.

*Type locality*: Not cited.

*Distribution*: Doubtless Mexico.

This species we know only from descriptions and illustration. The illustration is so much like that of *Mammillaria bombycina* that we at first were inclined to combine them. From the observations of others there seem to be important technical differences which separate them, not only specifically but also generically. It may prove to be a synonym of *C. sulcolanata*, for we have recently examined a skeleton sent us by Bödeker which resembles very much the plants collected by Rose in Hidalgo, Mexico, which we have already referred to that species.

*Illustration*: Gartenflora **59**: f. 50, as *Mammillaria cordigera*.

MAMMILLARIA CORNUTA Hildmann in Schumann, Gesamtb. Kakteen 496. 1898.

Simple, grayish green, somewhat depressed, 4 to 5 cm. high, 6 to 8 cm. in diameter; tubercles spiraled, in 5 to 8 series; radial spines 5 to 7, subulate, straight or somewhat curved, white, 4 to 8 mm. long; central spine solitary, horn-colored; flowers said to be rose-colored; fruit unknown.

*Type locality*: Mexico.

From the description it is difficult to identify this species; its rose-colored flowers suggest a relationship with *Coryphantha elephantidens* but its spine-clusters are differently described.

MAMMILLARIA POTOSIANA Jacobi, Allg. Gartenz. **24**: 92. 1856.

Erect, cylindric, light green; tubercles conical, triangular at base, bearing 2 yellow glands in their axils; radial spines 15 or 16, subulate, equal or nearly so, 6 mm. long; central spine solitary, porrect but somewhat incurved at apex, subulate, 10 to 12 mm. long; flowers yellow.

*Type locality*: San Luis Potosí, Mexico.

Jacobi comments on the species as follows:

"Comptroller Shafer in Münster received this beautiful plant in a shipment of plants from San Luis Potosí in Mexico, under the name of *Mammillaria raphidacantha*. From the given description it is adequately clear that the plant considered is another and undescribed one. The form of the tubercles as well as the number and form of the spines is other evidence, also the grooves upon the upper sides of the tubercles which are always present in the case of *M. raphidacantha* are here lacking throughout.

"The stem of the plant is cylindrical, dark green, finely punctate with white dots; tubercles conical, 3-angled at the base, gradually flattened above; axils sinuate with 2 yellow glands, inclosed by a ring of yellowish-white tomentum; areoles terminal, oval, the younger ones whitish tomentose, later naked; radial spines 15 or 16, radiating, somewhat recurved, needle-formed, two-colored. In older plants there appears here and there a longer and stronger central spine with the tip slightly bent downward. All the spines are awl-shaped and stiff.

"The radial spines when young are white with brownish (burnt) tips, later amber-colored above and below, grayish in the middle. The plant described is 3" high and a little more than an inch in diameter; radials 3, centrals 5 or 6 lines long. The plant in my possession did indeed bloom last summer but I was hindered unfortunately in describing the flowers in detail. They are smaller than those of *M. raphidacantha*, very similar in form, but the petals are yellow with saffron-yellow central stripes on the outer side."

Although Jacobi states definitely that the tubercles are not grooved on the upper surface, yet the presence of glands would indicate that the plant is not a *Mammillaria* but, more likely, a *Coryphantha* of the Series *Recurvatae* and perhaps one of the species already described. We have never seen glands in the axils of tubercles, except in genera having grooved tubercles. In cultivated specimens growing under abnormal conditions tubercles are sometimes produced without a groove and with glands in their axils.

MAMMILLARIA RAMOSISSIMA Quehl, Monatsschr. Kakteenk. 18: 127. 1908.

Globose to short-cylindric, dull grayish green; radial spines about 12, about 1 cm. long; central spines usually 1, sometimes 2 or 3; flowers and fruit unknown.

*Type locality*: Not cited.

*Illustration*: Monatsschr. Kakteenk. 18: 127.

MAMMILLARIA RECURVISPINA De Vriese, Tijdschr. Nat. Geschr. 6: 53. 1839.

*Cactus recurvispinus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Solitary, somewhat depressed, about 16 cm. in diameter, glaucous; tubercles few, large, somewhat compressed, obtuse; areoles and axils of tubercles described as naked; spines all radial, 8, subulate, more or less incurved; flowers and fruit unknown.

*Type locality*: Mexico.

This plant was referred by Labouret to *Mammillaria sulcolanata* but was discussed by Schumann under *M. scheeri*; judging from the illustration, it is not close to either of these species but it is much nearer *Coryphantha bumamma*.

*Illustration*: Tijdschr. Nat. Geschr. 6: pl. 1. f. 1.

Figure 48 is a reproduction of the illustration cited above.

*Mammillaria speciosa* De Vriese (Tijdschr. Nat. Geschr. 6: 52. 1839. Not Don, 1830) is listed by Schumann among the species not known to him. It probably belongs to some species of *Coryphantha*.

The following names are without descriptions and can not be referred to any known species: *Coryphantha conspicua* Lemaire, Cactées 34. 1868; *Coryphantha engelmannii* Lemaire, Cactées 34. 1868; *Coryphantha hookeri* Lemaire, Cactées 34. 1868; *Coryphantha sublanata* Lemaire, Cactées 35. 1868.

#### 7. NEOBESSEYA gen. nov.

Simple or tufted cacti, globose or somewhat depressed; tubercles irregular or somewhat spiraled, most of them grooved on upper side; flowers borne near top of plant, large, yellow or pink, probably always day-blooming; fruit globose, bright red, indehiscent; seeds black, globose, pitted, with a prominent white aril.

*Type species*: *Mammillaria missouriensis* Sweet.

Four species are recognized, all from the Great Plains of the United States.

The generic name commemorates Dr. Charles Edwin Bessey (1845-1915), professor in the University of Nebraska and for many years one of our eminent botanical teachers.

The genus is nearest *Coryphantha*, but it has very different fruit and seeds.

#### KEY TO SPECIES.

Flowers yellow.

Outer perianth-segments naked . . . . . 1. *N. wissmannii*

Outer perianth-segments ciliate.

Inner perianth-segments long-acuminate . . . . . 2. *N. similis*

Inner perianth-segments at most acute . . . . . 3. *N. missouriensis*

Flowers grayish pink . . . . . 4. *N. notesteinii*

### 1. *Neobesseya wissmannii* (Hildmann).

*Mammillaria similis robustior* Engelm., Bost. Journ. Nat. Hist. 6: 200. 1850.

*Mammillaria nuttallii robustior* Engelm., Proc. Amer. Acad. 3: 265. 1856.

*Mammillaria missouriensis robustior* S. Watson, Bibl.

Index 1: 403. 1878.

*Cactus missouriensis robustior* Coulter, Contr. U. S. Nat. Herb. 3: 111. 1894.

*Mammillaria wissmannii* Hildmann in Schumann, Gesamtb. Kakteen 498. 1898.

*Cactus robustior* Small, Fl. Southeast. U. S. 812. 1903.

Plant solitary, or forming mounds 2 to 3 dm. in diameter and 1 dm. high with 25 heads or more; areoles elliptic when young, conspicuously white-woolly, the head usually globose, tubercles rather large, spreading, somewhat narrowed towards apex; Spines 7 to 14, when young white to brownish, in age gray with yellow swollen base, acicular, 1.5 to 2 cm. long, sometimes all radial and spreading, rarely 1 or 2 centrals and these porrect; flowers large, 4 to 5 cm. long, dark yellow; scales on flower-tube strongly nerved; margin of perianth-segments naked; inner segments abruptly long-apiculate; fruit globose, 8 mm. in diameter.

*Type locality:* Not cited, presumably Texas.

*Distribution:* Central Texas.

*Illustration:* Blühende Kakteen 1: pl. 5, as *Mammillaria wissmannii*.

Figure 50 is a reproduction of the illustration cited above.

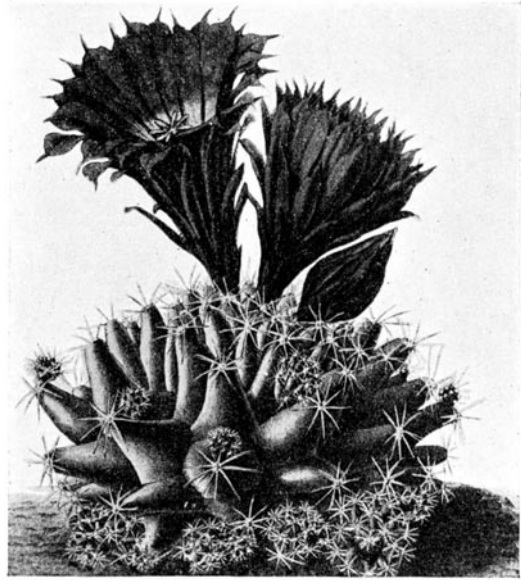


FIG. 50.—*Neobesseya wissmannii*.

### 2. *Neobesseya similis* (Engelmann).

*Mammillaria similis* Engelmann, Bost. Journ. Nat. Hist. 5: 246. 1845.

*Mammillaria similis caespitosa* Engelmann, Bost. Journ. Nat. Hist. 6: 200. 1850.

*Echinocactus similis* Poselger, Allg. Gartenz. 21: 107. 1853.

*Mammillaria nuttallii caespitosa* Engelmann, Proc. Amer. Acad. 3: 265. 1856.

*Mammillaria missouriensis caespitosa* S. Watson, Bibl. Index 1: 403. 1878.

*Cactus missouriensis similis* Coulter, Contr. U. S. Nat. Herb. 3: 111. 1894.

*Mammillaria missouriensis similis* Schumann, Gesamtb. Kakteen 498. 1898.

*Cactus similis* Small, Fl. Southeast. U. S. 812. 1903.

*Coryphantha similis* Britton and Rose in Britton and Brown, Illustr. Fl. ed. 2: 2: 571. 1913.

Plants sometimes growing in large clumps, to 1.5 dm. high by 2 to 3 dm. in diameter, containing 25 individuals or more; larger plants 6 to 10 cm. in diameter; tubercles deep green, cylindric, sometimes 2 cm. long, when young the groove filled with white wool; spines all puberulent; radial spines 12 to 15, spreading, dirty white with brownish tips; central spine solitary or often wanting, similar to but stouter and longer than the radials; flowers 5 to 6 cm. long, light yellow, the outer lobes tinged with brown and green; inner perianth-segments long, narrow, acuminate; flower-tube definite, covered nearly to its base with short greenish stamens; style green; stigma-lobes 4 to 6, linear; fruit globular or short-oblong, 10 to 20 mm. in diameter; seeds large, globose, 2 mm. in diameter.

*Type locality:* Near Industry, Texas.

*Distribution:* Eastern Texas.

Engelmann says that the flowers and fruits are larger than in *Mammillaria nuttallii*.

The inner perianth-segments gradually taper to the apex.

S. Watson and others refer here *Mammillaria caespitosa* Gray (Struct. Bot. 421. f. 838), but the plant illustrated by Gray is *Echinocereus reichenbachii*. The Index Kewensis refers *Mammillaria caespitosa* Gray, as they also do *Mammillaria similis*, to *Mammillaria missouriensis*. (See Cactaceae 3: 26).

*Illustration:* Cact. Mex. Bound. pl. 74, f. 7, as *Mammillaria nuttallii caespitosa* (seed).

Plate in, figure 2, shows a plant collected by F. E. Upham at Fort Worth, Texas, which flowered in Washington.



**3. Neobesseyia missouriensis** (Sweet).

*Cactus mammillaris* Nuttall, Gen. Pl. 1: 295. 1818. Not Linnaeus, 1753.

*Mammillaria missouriensis* Sweet, Hort. Brit. 171. 1826.

*Mammillaria simplex* Torrey and Gray, Fl. N. Amer. 1: 553. 1840.

*Mammillaria nuttallii* Engelm., Pl. Fendl. 49. 1849.

*Mammillaria nuttallii borealis* Engelm., Proc. Amer. Acad. 3: 264. 1856.

*Cactus missouriensis* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Mammillaria missouriensis nuttallii* Schelle, Handb. Kakteenk. 241. 1907.

*Coryphantha missouriensis* Britton and Rose in Britton and Brown, Illustr. Fl. ed. 2: 2: 570. 1913.

Plants solitary or cespitose, globose, 2.5 to 5 cm. in diameter; tubercles more or less spiraled, 10 to 15 mm. long; spines 10 to 20, acicular, gray, pubescent, all radial or sometimes 1 central; flowers greenish yellow; outer perianth-segments narrowly oblong, gradually tapering to an acute apex, ciliate; inner segments linear-lanceolate, attenuate; fruit globose, scarlet, about 1 cm. in diameter; seeds mm. in diameter.

*Type locality*: On the high hills of the Missouri, probably to the mountains.

*Distribution*: North Dakota to Montana, Colorado to Kansas, Oklahoma, and perhaps northern Texas.

This little cactus has a wide distribution on the Great Plains; both its conspicuous yellow flowers and its round red fruits are very attractive.

*Coryphantha nuttallii*, credited to Engelm., is cited as a synonym of *Mammillaria nuttallii* by Rümpler (Förster, Handb. Cact. ed. 2: 407. 1885).

*Illustrations*: Meehan's Monthly 10: pl. 3; Gartenwelt 1: 85, as *Mammillaria missouriensis*; Gartenwelt 1: 89, as *M. missouriensis viridescens*; Britton and Brown, Illustr. Fl. 2: f. 2525, as *Cactus missouriensis*; Schelle, Handb. Kakteenk. 241. f. 160, as *M. missouriensis nuttallii*; Cact. Mex. Bound. pl. 74, f. 6, as *M. nuttallii borealis*; Blanc, Cacti 72. No. 1426; Blühende Kakteen 3: pl. 145, as *M. nuttallii*; Britton and Brown, Illustr. Fl. ed. 2: 2: f. 2984, as *Coryphantha missouriensis*.

Plate XI, figure 4, shows a plant from a large clump sent by Professor C. O. Chambers in 1921 from Stillwater, Oklahoma.

**4. Neobesseyia notesteinii** (Britton).

*Mammillaria notesteinii* Britton, Bull. Torr. Club 18: 367. 1891.

*Cactus notesteinii* Rydberg, Mem. N. V. Bot. Gard. 1: 272. 1900.

Oval, solitary or cespitose, about 3 cm. in diameter; tubercles nearly terete, about 6 mm. high; spines 12 to 18, white, turning gray, weak, slender, 8 to 12 mm. long, pubescent throughout, a central one usually present and frequently pink-tipped; flowers 15 to 25 mm. broad, ash-gray, tinged and penciled with pink, the segments broadly linear-oblong, mucronate; fruit obovoid; seeds black, globose, pitted.

*Type locality*: Near Deer Lodge, Montana.

*Distribution*: Known only from the type locality.

Professor F. N. Notestein, who first collected and observed this little cactus, found it in gravelly soil near a small creek; it differs from the other species of the genus in the color of the flowers and the more pubescent spines.

**8. ESCOBARIA** gen. nov.

Globose or cylindric, usually cespitose cacti, never milky; tubercles grooved above, persisting as knobs at the base of old plants after the spines have fallen; spines both central and radial, never hooked; flowers small, regular, appearing from top of plant at bottom of groove of young tubercles; stamens and style included; fruit red, naked (or with one scale), indehiscent, globular to oblong, crowned by the withering perianth; seeds brown to black; aril basal or subventral, oval.

Type species: *Mammillaria tuberculosa* Engelm.

The two species of this genus known to Schumann were placed by him in the subgenus *Coryphantha* of *Mammillaria*; they are like the *Coryphanthae* in having grooved flower-bearing tubercles, but are otherwise different, especially in the flowers, fruit, and seeds.

Eight species are known from northern Mexico and southern Texas.

The genus commemorates the work of two distinguished Mexicans, the Escobar brothers, Rómulo and Numa, of Mexico City and Juárez.

## KEY TO SPECIES.

- Outer perianth-segments ciliate.  
 Groove of tubercles without glands.  
 Flowers large for the genus, 2 to 2.5 cm. long.  
 Plants elongated; seeds very small, brown, with ventral hilum . . . . . 1. *E. tuberculosa*  
 Plants usually globose; seeds larger than in *E. tuberculosa*, black, with a sub-basal hilum . . . . . 2. *E. dasyacantha*  
 Flowers small, about 1.5 cm. long.  
 Plants globose to stout-cylindric.  
 Inner perianth-segments pointed.  
 Inner perianth-segments broad . . . . . 3. *E. cihuahuensis*  
 Inner perianth-segments narrow . . . . . 4. *E. runyonii*  
 Inner perianth-segments obtuse . . . . . 5. *E. chaffeyi*  
 Plants slender-cylindric . . . . . 6. *E. sneedii*  
 Groove of tubercles with glands . . . . . 7. *E. bella*  
 Outer perianth-segments eciliate . . . . . 8. *E. lloydii*

1. *Escobaria tuberculosa* (Engelmann).

*Mammillaria strobiliformis* Scheer in Salm-Dyck, Cact. Hort. Dyck. 1849. 504. 1850. Not Engelmann, 1848.

*Echinocactus strobiliformis* Poselger, Allg. Gartenz. 21: 107. 1853.

*Mammillaria tuberculosa* Engelmann, Proc. Amer. Acad. 3: 268. 1856.

*Cactus tuberculatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus strobiliformis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria strobiliformis pubescens* Quehl, Monatsschr. Kakteenk. 17: 87. 1907.

*Mammillaria strobiliformis durispina* Quehl, Monatsschr. Kakteenk. 17: 87. 1907.

*Mammillaria strobiliformis rufispina* Quehl, Monatsschr. Kakteenk. 17: 87. 1907.

*Mammillaria strobiliformis caespititia* Quehl, Monatsschr. Kakteenk. 19: 173. 1909.

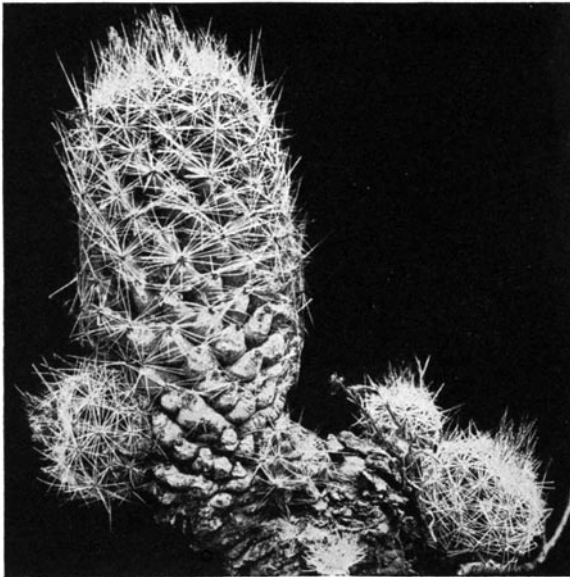


FIG. 51.—*Escobaria tuberculosa*.

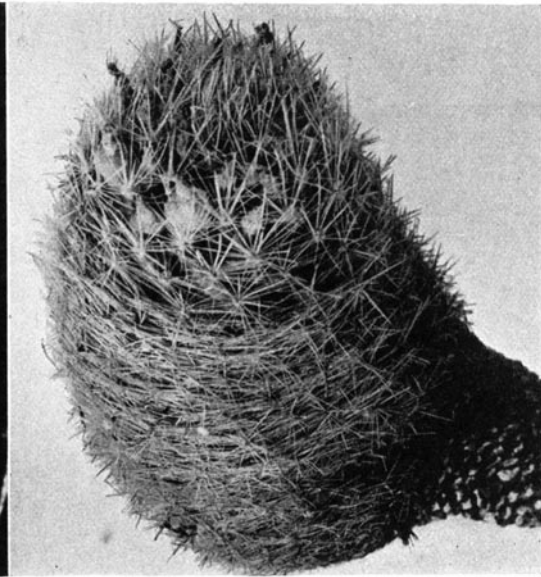


FIG. 52.—*Escobaria dasyacantha*.

Usually growing in clumps, cylindric or becoming so, 5 to 18 cm. high, 2 to 6 cm. in diameter; tubercles more or less regularly arranged in spirals, 6 mm. long; radial spines numerous, white, sometimes as many as 30, acicular, 4 to 15 mm. long; central spines several, stouter than radials, brown to blackish or colored only at tips, one of them usually porrect; flowers 2.5 cm. in diameter when fully expanded, light pink; outer perianth-segments acute, ciliate; inner perianth-segments narrowly pointed; fruit oblong, up to 20 mm. long, red; seeds pitted, with a small ventral hilum.

*Type locality:* Mountains near El Paso and eastward.

*Distribution:* Southwestern Texas, southern New Mexico, and adjacent Mexico.

Flowers appear in the afternoon and last for two days at least.

The name *Coryphantha tuberculosa* occurs in C. R. Orcutt's Circular to Cactus Fanciers, 1922.

*Illustrations:* Cact. Mex. Bound. pl. 12, f. 1 to 16, as *Mammillaria tuberculosa*; Förster, Handb. Cact. ed. 2. 417. f. 46; Schelle, Handb. Kakteenk. 235. f. 149, as *M. strobiliformis*.

Figure 51 is from a photograph of the plant sent by Dr. Shreve from near El Paso, Texas, in 1920.

## 2. *Escobaria dasyacantha* (Engelmann).

*Mammillaria dasyacantha* Engelmann, Proc. Amer. Acad. 3: 268. 1856.  
*Cactus dasyacanthus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

Globose to short-oblong, usually 4 to 7 cm. in diameter but sometimes 20 cm. long; radial spines 20 or more, white, bristle-like; central spines about 9, stouter and longer than the radials, upper half usually reddish or brownish, often 2 cm. long; flowers pinkish; perianth-segments narrowly oblong, ciliate, apiculate; stigma-lobes green; fruit clavate, scarlet, 15 to 20 mm. long; seeds black, 1 mm. in diameter, slightly flattened, pitted, with a narrow white subbasal hilum.

*Type locality:* El Paso and eastward.

*Distribution:* Western Texas, southern New Mexico, and northern Chihuahua.

We have examined the type of this species which was collected by Charles Wright at El Paso in 1852.

*Escobaria dasyacantha* is sometimes mistaken for *Escobaria tuberculosa*, but the stems are usually globose and the seeds larger and of a different shape. Engelmann speaks of its resemblance to *Echinocactus intertextus dasyacanthus*, now *Echinomastus dasyacanthus*, but this is only superficial, for the flowers, fruit, and seeds of the two species are very different. The name *Coryphantha dasyacantha* occurs in C. R. Orcutt's Circular to Cactus Fanciers, 1922. We had never seen this plant in cultivation until it was recently sent by Mrs. S. L. Pattison from western Texas.

*Illustrations:* Cact. Mex. Bound. pl. 12, f. 17 to 22, as *Mammillaria dasyacantha*.

Plate VII, figure 1, shows a plant sent by Mrs. S. L. Pattison from near El Paso, Texas, in 1921 which flowered in the New York Botanical Garden. Figure 52 is from a photograph of another plant sent by Mrs. Pattison from the same region.

## 3. *Escobaria chihuahuensis* sp. nov.

Plants often solitary, perhaps also cespitose, globose to short-cylindric, very spiny; tubercles short, usually hidden by the spines; radial spines numerous, spreading; central spines several, longer than radials, usually brown or black in upper part; flowers small, 1 to 1.5 cm. long, purple; outer perianth-segments broad, often rounded at apex with ciliate margins; inner perianth-segments pointed.

Common in the mountains near Chihuahua, where it was collected by Palmer (No. 72, type) in 1908 and by Pringle (Nos. 250, 251) in 1885.

This plant should be compared with *Mammillaria grusonii* Runge (Gartenflora 38: 105. f. 20. 1889). L. Quehl believed that *M. grusonii* was closely related to *M. scheeri*, but he apparently knew it only from the original illustration and description. It does not suggest any of the species of *Coryphantha* to us.

## 4. *Escobaria runyonii* sp. nov.

Cespitose, with numerous (sometimes 100) globose to short-oblong heads, grayish green, 3 to cm. long with fibrous roots; tubercles 5 mm. long, terete in section with very narrow groove above; groove at first white-woolly, not glandular; radial spines numerous, acicular, white, 4 to mm. long; central spines stouter than radials, to 7, slightly spreading with brown or black tips, 6 to 8 mm. long; flowers 1.5 cm. long, pale purple; segments with a dark purple stripe down the middle and pale margins; outer perianth-segments narrow-oblong, with thin ciliate margins; inner perianth-segments narrower than the outer, with margins entire, acute; filaments purplish; style very pale; stigma-lobes 6, green; fruit scarlet, globose to short-oblong, 6 to 9 mm. long, juicy.

Collected by Robert Runyon in July 1921 and again in October of the same year near Reynosa, Mexico, about 75 miles up the Rio Grande from Brownsville, Texas, and on



August 10, 1921, near Rio Grande, Starr County, Texas. The plant flowered in Washington March 13, 1922.

Plate VI, figure 1, is from a photograph of the type plant taken by Robert Runyon. Figure 53 is from a photograph taken by Robert Runyon.

**5. *Escobaria chaffeyi* sp. nov.**

Short-cylindric, 6 to 12 cm. long by 5 to 6 cm. in diameter, almost covered by the numerous white spines; tubercles rather short, light green, with a narrow groove above; radial spines numerous, spreading, bristly; central spines several, a little shorter than the radials and brown or black-tipped; flowers 15 mm. long, cream-colored or sometimes purplish; outer perianth-segments ciliate; inner perianth-segments oblong, obtuse, entire; style white; stigma-lobes very short, yellowish green; fruit crimson, 2 cm. long.

Collected by Dr. Elswood Chaffey near Cedros, Zacatecas, Mexico, in June 1910 (No. 5, type), and by F. E. Lloyd near the same locality in 1908 (No. 29).

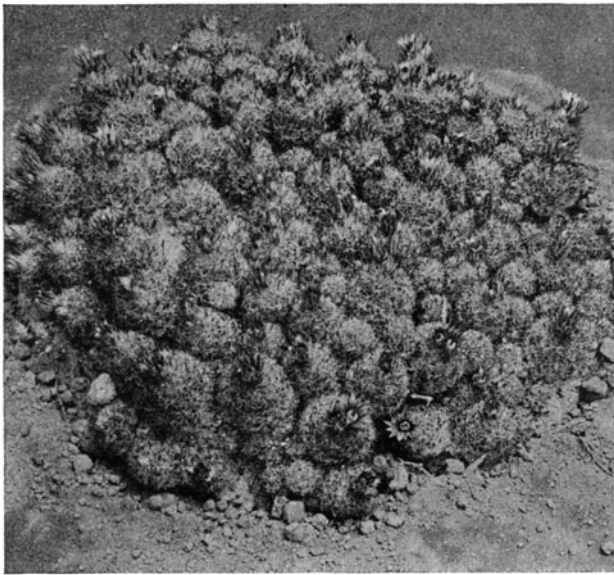


FIG. 53.—*Escobaria runyonii*.

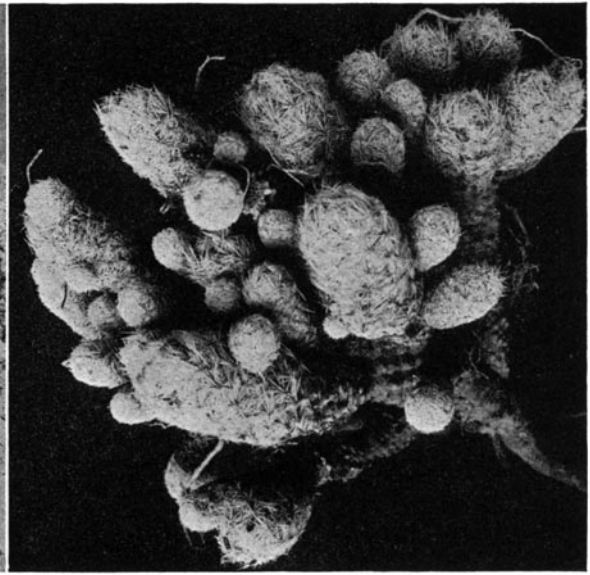


FIG. 54.—*Escobaria sneedii*.

**6. *Escobaria sneedii* sp. nov.**

Densely cespitose, sometimes with as many as 50 joints, creeping or spreading; joints cylindric, up to 6 cm. long, 1 to 2 cm. in diameter; tubercles numerous, hidden under the many spines, terete, 2 to 3 mm. long, in age naked; groove narrow, hairy throughout its length; axils of tubercles not setose; spines 20 in a cluster or more, nearly white, or the larger ones brown at tip, longest one 6 mm. long, all usually appressed, but the longer ones near top, connivent; flowers small, 10 mm. long or less when dry, the outer segments long-ciliate; fruit (immature) a little longer than thick, 5 to 7 cm. long, green (?), at first juicy, naked; seeds globose, brown, nearly 1 mm. in diameter, pitted.

This curious little plant was sent us in February 1921 by Mrs. S. L. Pattison from southwestern Texas; it was collected by J. R. Sneed, who at first found only three clumps, but afterwards a fourth clump was discovered and again it was found in June 1921 just after it had flowered. It is known from a single station on the Franklin Mountains, Texas. According to Mrs. Slater the flowers are pink to saffron.

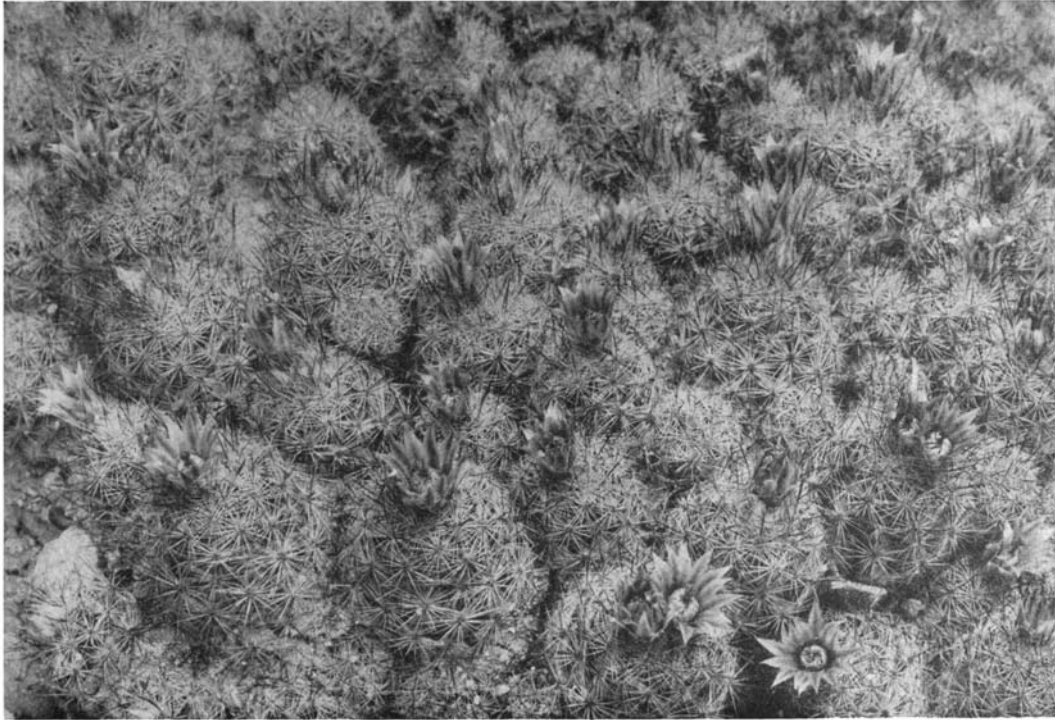
Figure 54 is from a photograph of a single plant sent by Mrs. Pattison in 1921.

**7. *Escobaria bella* sp. nov.**

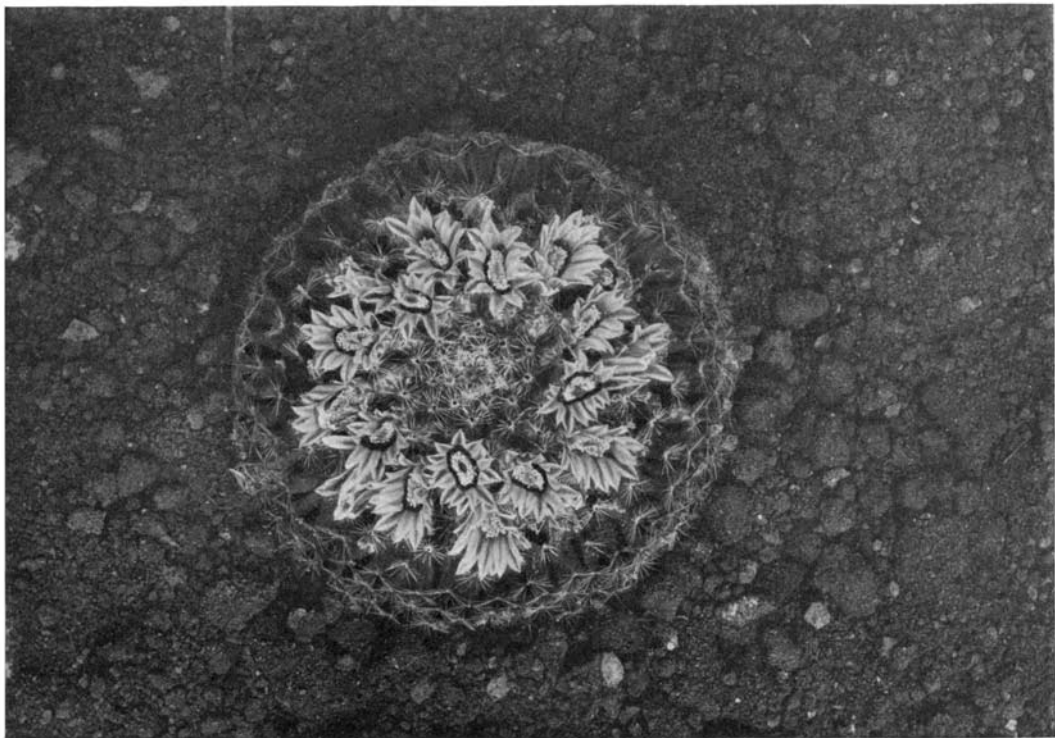
Cespitose, cylindric, 6 to 8 cm. long; tubercles nearly terete, 1.5 to 2 cm. long, the groove white-hairy, with a narrow brownish gland near center; radial spines several, whitish, 1 cm. long or less; central spines 3 to 5, brown, unequal, the largest 2 cm. long or more, ascending; flowers central,



1



2



1. *Escobaria runyonii*, from Texas.
2. *Neomammillaria hemisphaerica*, from Texas.



small, rotate, nearly 2 cm. broad; perianth-segments pinkish with pale margins, linear-oblong, acute, the outer ones ciliate; filaments reddish; upper part of style and stigma-lobes green.

Collected by J. N. Rose and Wm. R. Fitch on hills of Devil's River, Texas (No. 17991).

Plate VII, figure 4, shows the type, which flowered in the New York Botanical Garden, March 31, 1914; figure a shows a tubercle with its gland-bearing groove.

#### 8. *Escobaria lloydii* sp. nov.

Plant growing in clumps and resembling a small species of *Echinocereus*; old plants bearing naked corky tubercles; radial spines about 20, spreading, slender, white; central spines several, stout, with black or with brownish tips, 2 cm. long; flowers greenish with a central stripe on outside, 2.5 cm. long; filaments, style, and stigma-lobes green; fruit red, globose to short-oblong, 6 to 12 mm. long; seeds black, pitted, globose, 1 mm. in diameter.

Collected by F. E. Lloyd in foothills of Sierra Zuluaga, Zacatecas, Mexico, March 29, 1908 (No. 5).

This species is near *Escobaria tuberculosa*, but it has much stouter central spines and greenish white, eciliate inner perianth-segments.

#### SPECIES PERHAPS OF THIS RELATIONSHIP.

MAMMILLARIA EMSKOETTERIANA Quehl, Monatsschr. Kakteenk. 20: 139. 1910.

Cespitose, globose to short-cylindric, 5 cm. high; tubercles conic, their axils naked; radial spines 20 to 25; central spines 6 to 8, setaceous, white with black tips; flowers brownish yellow, 3 cm. long.

*Type locality*: Not cited.

We obtained a specimen of this plant from Quehl in 1913, but it has not done well nor has it flowered and we have not been able to refer it to any described species, but believe that it may be near *Escobaria tuberculosa*. Mr. Quehl believed that it was near *Mammillaria dasyacantha*, but if it came from San Luis Potosí, as Mr. Quehl supposed, it is doubtless specifically distinct from both. The following note is a translation of some remarks by Mr. Quehl:

"Our illustration shows a grafted specimen which has naturally grown more corpulent and consequently permits one to see better its general structure and the arrangement of the spines. Ungrafted specimens are thicker, lower, and, without other characteristics, can not be distinguished from a red-spined *Mammillaria pusilla* var. *multiceps*. Only a closer inspection reveals the wart-furrows and consequently the *Coryphantha*. The similarity is so great that I suspect that the new species is already more disseminated though not correctly recognized and the plants are either set aside or ignored as a form of *Mammillaria pusilla*. The plants before me were raised by Mr. Robert Emskötter, fancy and commercial gardener, of Magdeburg, after whom I have named the species, from mixed seed which he received from San Luis Potosí, so that Mexico may be regarded as its home."

*Illustration*: Monatsschr. Kakteenk. 20: 139.

#### 9. BARTSCHELLA gen. nov.

Usually cespitose, globose to short-oblong cactus; tubercles large, somewhat united with the adjacent ones as in certain species of *Echinocactanae*, terete, not grooved, juicy, not milky; spines both radial and central, the latter usually hooked; flowers borne near top of plant, large, light purple or lavender; fruit short, hidden among the tubercles, seemingly dry, circumscissile; seeds dull black, pitted, with a narrow cylindrical base, slightly constricted above; hilum large, slightly depressed, triangular.

*Type species*: *Mammillaria schumannii* Hildmann.

While this genus is probably to be referred to the *Coryphanthanae*, it possesses some characters of certain species of *Echinocactanae*, but the origin of the flower is quite different from any of them. The flower is large, like that of some species of *Coryphantha*, but the tubercles are not grooved and the seeds are not brown and reticulated. It differs from the

typical species of the so-called *Mammillaria* in its large flowers and black seeds, while from all of these genera it differs in its circumscissile fruit.

This monotypic genus is named for Dr. Paul Bartsch, curator in the United States National Museum, distinguished in conchology, who has sent us cacti from many out of the way places.

**1. *Bartschella schumannii* (Hildmann).**

*Mammillaria schumannii* Hildmann, Monatsschr. Kakteenk. 1: 125. 1891.

*Mammillaria venusta* K. Brandegee, Zoe 5: 8. 1900.

More or less cespitose (as many as 40 stems have been reported in a single cluster), 6 cm. high or less; axils slightly woolly, without bristles; radial spines 9 to 15, stout, 6 to 12 mm, long, brownish above, glabrous; central spines usually 1, sometimes 2 or 3, one of these usually hooked; in seedlings 10 or 11 radial spines developing, these spreading, feather-like with long spreading hairs; in one-year-old plants the spines simply puberulent, all white with brown tips and one central much longer than the others and strongly hooked; flower 3 to 4 cm. in diameter, the segments about 10, lanceolate, acuminate; stamens numerous, erect, shorter than the style; style slender, erect, pale; stigma-lobes 6, linear, green; fruit short, dull in color; seeds usually found in a cup between the tubercles, less than 1 mm. long.

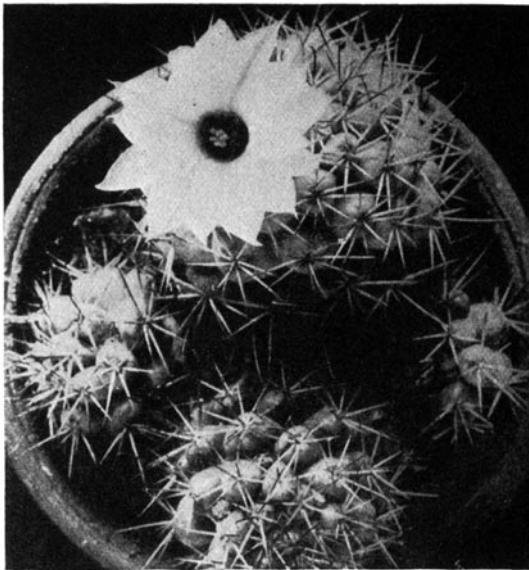


FIG. 55.—*Bartschella schumannii*.

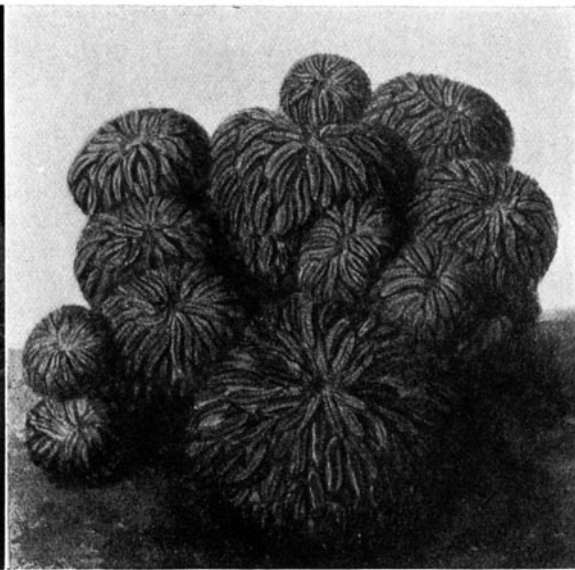


FIG. 55.—*Pelecyphora aselliformis*.

*Type locality:* Not cited.\*

*Distribution:* Southern Lower California.

This species has been rare in collections, but considerable material was collected by Dr. Rose at Cape San Lucas, Lower California, in March 1911 (No. 16375). Living specimens were sent us from Lower California by Ivan M. Johnston in 1921.

Dr. C. H. Thompson writes under date of September 15, 1911, as follows:

“Your No. 16375, *Mammillaria venusta*, puzzles me. We received three plants from the New York Botanical Garden. Two are considerably shriveled but are reviving. The third is more plump and shows the vegetation characters better. In these it would readily be taken for *Mammillaria*, yet there are some appearances of the mamillate *Echinocacti*. You will observe how commonly adjacent tubercles cohere as in that group of *Echinocactus*, quite distinct from any *Mammillaria* that I know. Yet the position of the flower excludes it from *Echinocactus*. With flower and fruit characters you have observed it strikes me as being distinct from either genus.”

\* *Mammillaria schumannii* was described from a cultivated plant, but *M. venusta* came from San José del Cabo, Lower California.





M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Flowering plant of *Escobaria dasyacantha*.
2. Fruit of *Dolicothele sphaerica*.
- 2a. Seeds of same.
3. Flowering plant of *Neomammillaria arida*.
4. Flowering plant of *Escobaria bella*.

- 4a. Tubercle of the same.
5. Flowering plant of *Neomammillaria crocidata*.
6. Flowering plant of *Bartsbella schumannii*.
7. Flowering plant of *Neomammillaria carnea*.



*Mammillaria schumanniana* (Monatsschr. Kakteenk. 12: 178. 1902) was evidently intended for *M. schumannii*.

*Illustrations:* Monatsschr. Kakteenk. 1: facing 89; Thomas, Zimmerkultur Kakteen 51, as *Mammillaria schumannii*.

Plate VII, figure 6, shows a plant collected by Dr. Rose at Cape San Lucas, Lower California, in March 1911 (No. 16375), while a member of the scientific staff of the U. S. Steamer Albatross. Figure 55 is from a photograph of another plant from the same collection.

#### 10. PELECYPHORA Ehrenberg, Bot. Zeit. 1: 737. 1843.

Plants small, cespitose, cylindric or globose, tuberculate, watery tubercles not arranged on ribs, strongly flattened, crowned with an elliptic areole bearing a pectinate spine, never grooved: flowers borne near center, broad, campanulate, purplish, the segments in definite series; flower-tube very short, slender; stamens short; fruit small, naked: seeds black, smooth.

Only one species, native of Mexico, is here recognized, *Pelecyphora aselliformis* Ehrenberg, the type. A second species has generally been referred here but it differs so widely from the other that we have no hesitancy in segregating it generically (see genus No. 13, p. 64).

The generic name is from πέλεκυς hatchet, and φoρός bearing, referring to the shape of the tubercles.

The plant has usually been regarded as a near relative of *Mammillaria*, but it has little in common with that genus. The flowers are central, borne in a mass of wool or hairs; the tubercles are not grooved and the seeds are black and smooth. It has been difficult for us, with the material at hand, to make out definitely the origin and position of the flower, but it seems to originate on the central sunken disk. This disk at first bears only clusters of hairs in the center of which the flower is produced. In time the flower opens and the tubercle, with its peculiar spiny crown, is developed, leaving in its axil the tuft of hairs about the flower.

#### 1. *Pelecyphora aselliformis* Ehrenberg, Bot. Zeit. 1: 737. 1843.

*Pelecyphora aselliformis concolor* Hooker in Curtis Bot. Mag. 99: pl. 6061. 1873

*Pelecyphora aselliformis grandiflora* Haage jr., Cact. Kultur ed. 2. 206. 1900.

Tufted, cylindric, 5 to 10 cm. high, 2.5 to 5 cm. in diameter, covered with tubercles arranged in spirals; tubercles strongly flattened laterally, somewhat stalked at base; areoles at top of tubercles very bug and narrow, crowned by an elongated, scale-like spine with numerous lateral ridges, usually free at tip, giving a peculiar pectinate appearance; flowers cm. broad or more, campanulate; perianth-segments in 4 rows, the outer ones sometimes white, oblong, acute; stamens borne at top of flower-tube, much shorter than perianth-segments; stigma-lobes 4, erect; seeds 1 mm. broad, kidney-shaped.

*Type locality:* Mexico.

*Distribution:* About San Luis Potosí, Mexico.

This plant does not do well in cultivation. It is known generally as the hatchet cactus, and is also called peote and peyote, also peyotillo and peotillo; it is said by the Mexicans to possess medicinal properties.

*Mammillaria aselliformis* is, according to Watson (Cact. Cult. 188. 1889), was described in 1843, but we have found no other reference to it, except that Dr. A. Weber gives it as a synonym, crediting it to Monville. The name *Anhalonium aselliforme* Weber and *Ariocarpus aselliformis* Weber (Dict. Hort. Bois 931. 1898), quoted by Schumann as synonyms, were not formally published. *Pelecyphora fimbriata* Hildmann (Monatsschr. Kakteenk. 3: 68. 1893), simply a name, may or may not belong here.

*Illustrations:* Haage, Cact. Kultur ed. 2. 206, as *Pelecyphora aselliformis grandiflora*; Amer. Gard. 11: 474; Curtis's Bot. Mag. 99 pl. 6061, as *Pelecyphora aselliformis concolor*;



Rümpfer, Sukkulenten 208. f. 118; Gartenflora 34: 25; Watson, Cact. Cult. 189. f. 75; ed. 3. f. 52; Cycl. Amer. Hort. Bailey 1: 203. f. 303; Stand. Cycl. Hort. Bailey 2: f. 718; Illustr. Hort. 5: pl. 186; Förster, Handb. Cact. ed. 2. 237 f. 21; Cact. Journ. 1: 107, 149; Krok, Handb. Cact. 34; Ann. Rep. Smiths. Inst. 1908: pl. 14, f. 6; Palmer, Cult. Cact. 117; Schelle, Handb. Kakteenk. 275. f. 197; Monatsschr. Kakteenk. 29: 81; Weinberg, Cacti 23; Knippel, Kakteen pl. 28; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 3; Garten-Zeitung 4: 218. f. 50; Blanc, Cacti 78. No. 1710; West Amer. Sci. 11: 8; Balt. Cact. Journ. 1: 89; 2: 164; Floralia 42: 369; Remark, Kakteenfreund 22; Haage, Cact. Kultur ed. 2. 206.

Figure 56 is reproduced from a painting made by Miss E. I. Schutt in 1907, of a plant sent from San Luis Potosí in 1905 by Dr. E. Palmer.

### 11. PHELLOSPERMA gen. nov.

A globular to cylindric, usually cespitose cactus with a large, fleshy, branched root; tubercles not grooved above, not milky; flowers borne in axils of old tubercles, funnel-shaped; fruit globular to cylindric, red, depressed at apex; seeds large (for this group), dull black, not pitted but rugose, with a thick corky base nearly as large as the body.

Type species: *Mammillaria tetrancistra* Engelm.

This genus differs from all its relatives in its very peculiar seeds. The flower, in its shape and origin, suggests the following genus, but in its color and size resembles *Coryphantha radiosa*. A single species is known, native of the western United States.

The generic name is from φελλός cork, and σπέρμα seed, referring to the corky base of the seed.

#### 1. *Phellosperma tetrancistra* (Engelmann).

*Mammillaria tetrancistra* Engelmann, Amer. Journ. Sci. II. 14: 337. 1852.

*Mammillaria phellosperma* Engelmann, Proc. Amer. Acad. 3: 262. 1856.

*Cactus phellospermus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus tetrancistrus* Coulter, Contr. U. S. Nat. Herb. 3: 104. 1894.

Solitary or cespitose, cylindric; sometimes becoming very large and then 3 dm. long, usually very spiny; root elongated, carrot-shaped or sometimes branched; tubercles terete, often elongated, their axils naked; radial spines numerous, acicular, white or sometimes with a brown tip, not pungent; central spines 1 to 4, stouter and longer than the radials, often brown or black, one or all strongly hooked; flower 3.5 to 4 cm. long, purple; base of tube slender, greenish, naked; scales and outer perianth-segments ciliate; style and stigma-lobes cream-colored; fruit rather variable in size, sometimes 3.7 cm. long, becoming dry in age, with a depressed umbilicus; seeds black, dull, 2 mm. long.

Type locality: San Felipe, California.

Distribution: Western Arizona, southeastern California, southern Utah, and southern Nevada; probably northern Lower California.

Mr. C. R. Orcutt, under date of March 5, 1922, comments on the distribution of this plant as follows:

"It reaches its greatest development on sandy and gravelly slopes near the White Water River east of Banning, California. It no doubt enters Lower California, for I believe that I have found it within a mile of the boundary line. It is comparatively rare in Arizona."

We have seen no specimens from Utah, but suspect that the plants from that state which have been referred to *Mammillaria grahamii* probably belong here. The species should be looked for in northern Lower California and Sonora.

Illustrations: Cact. Mex. Bound. pl. 7; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 162. f. 56, B; Cact. Journ. 1: pl. for February; Bol. Direccion Estudios Biol. 2: f. 3; Monatsschr. Kakteenk. 20: 167, as *Mammillaria phellosperma*.

Figure 58 is from a photograph of a plant sent from California in 1921 by E. C. Rost; figure 57 shows a seed taken from a plant sent by Loren G. Polhamus in 1921 from Bard, California.



FIG. 57.—Seed of *Phellosperma tetrancistra*.



## 12. DOLICHOTHELE (Schumann) gen. nov.

Plant-body globose, more or less caespitose, soft in texture, never milky; tubercles elongated, not grooved above; flowers borne in axils of old tubercles, very large, with a definite funnel-shaped tube; inner perianth-segments yellow, spatulate, tapering into a claw and borne on top of tube; stamens forming a spiral about style and borne on whole face of throat, but forming a definite ring at top of throat; style slender; stigma-lobes linear; ovary exserted, naked; fruit smooth, greenish, purplish, or red, globose, ellipsoid or short-oblong; seeds black or brownish.

Type species: *Mammillaria longimamma* De Candolle.

The generic name is from  $\delta\omicron\lambda\iota\chi\acute{o}\varsigma$  long, and  $\theta\eta\lambda\acute{\eta}$  nipple, referring to the elongated tubercles.

The fruit is not often collected and is not well known. Dr. Rose obtained a single fruit of one of the species, the only one we had then seen, in a private collection in Rome in 1915; this is nearly globular, red, thin-walled, many-seeded; the seeds are brownish, pitted, slightly flattened, pointed at base, with a small sub-basal hilum. In October 1921, Robert Runyon sent us a number of fruits which were greenish white to purplish, with black seeds, these somewhat flattened and pitted.

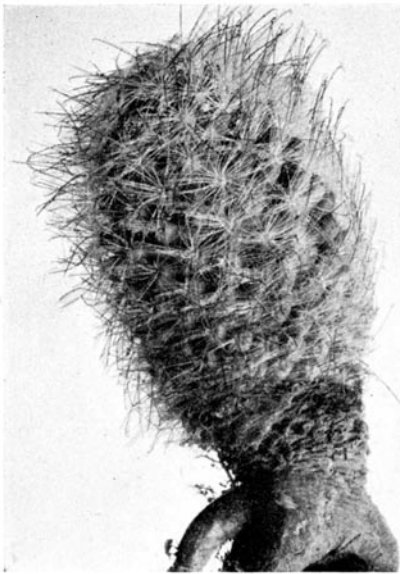


FIG. 58.—*Phellosperma tetrancistra*.

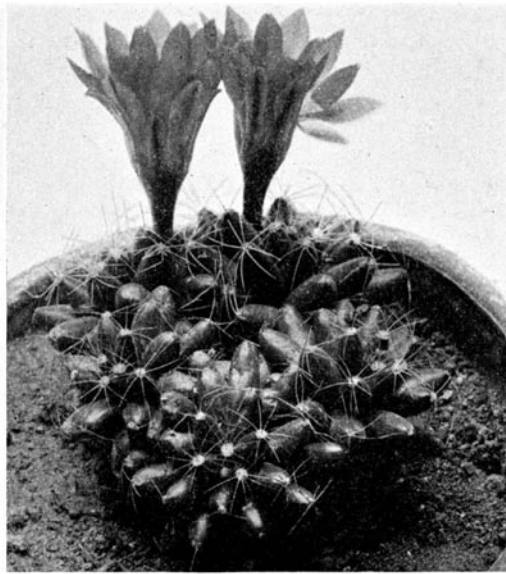


FIG. 59.—*Dolichothele longimamma*.

*Mammillaria camptotricha* Dams (Gartenwelt 10: 14. 1905) is usually considered as a close relative of this group, but it differs widely from it in the flowers as well as in other ways, and we believe that it is not congeneric with it (see page 126).

Three species, natives of southern Texas and northern and central Mexico, are recognized.

## KEY TO SPECIES.

- Spines glabrous, even when very young; species of Texas and northern Mexico . . . . . 1. *D. sphaerica*  
 Spines puberulent; species of central Mexico.  
   Tubercles very long (sometimes cm. long), pale green, glaucous; radials 6 or more;  
     central spines usually present . . . . . 2. *D. longimamma*  
   Tubercles much shorter, bright green; radial spines 4 or 5; central spines none . . . . . 3. *D. uberiformis*

1. *Dolichothele sphaerica* (Dietrich).

*Mammillaria sphaerica* Dietrich in Poselger, Allg. Gartenz. 21: 94. 1853.

*Cactus sphaericus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria longimamma sphaerica* K. Brandegee, Cycl. Amer. Hort. Bailey 2: 975. 1900.

Low and depressed, often growing in large cespitose masses 2 dm. in diameter, with a large thickened root; tubercles soft and turgid, resembling those of the following species (*D. longimamma*) but shorter, 12 to 16 mm. long; areoles small, circular, at first short-lanate; spines 12 to 15, glabrous, generally pale yellow, a little darker at base at first, in age darker, often reddish, 7 to 9 mm. long, spreading or a little curved backward; central spine 1, straight; flowers appearing toward top of plant but not from axils of younger tubercles, with a rotate limb 6 to 7 cm. broad; inner perianth-segments widely spreading, oblanceolate, acute to apiculate, tapering at base into a slender claw; stigma-lobes 8, yellow, narrow; fruit greenish white to purplish, short-oblong, 10 to 15 mm. long, juicy, very fragrant; seeds black, flattened, with a straight ventral face, rounded on the back, pitted; hilum subventral.

*Type locality:* Near Corpus Christi, Texas.

*Distribution:* Southern Texas and northern Mexico, especially along the Rio Grande from Eagle Pass to the sea.

Mr. R. D. Camp and Mr. Robert Runyon have recently found this species in abundance about Brownsville. With the aid of their material and the excellent photograph made by Mr. Runyon we have been able to present a detailed description of this plant.



FIG. 60.—*Dolichothele sphaerica*.

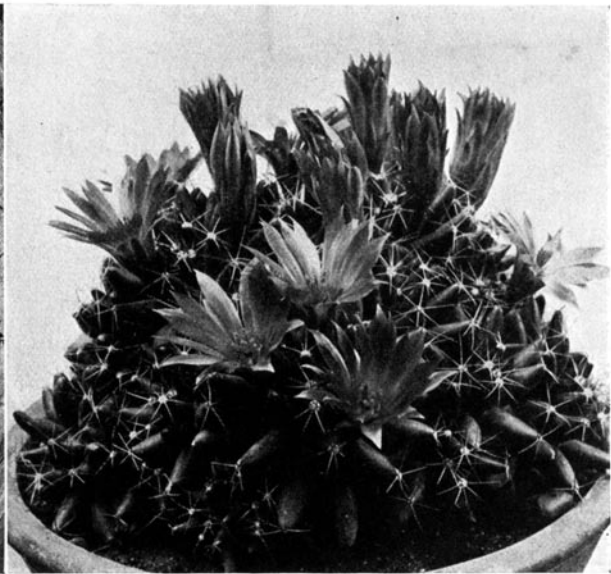


FIG. 61.—*Dolichiotliele longimamma*.

According to Mr. Runyon, the flowers are very large and handsome. The fruit does not ripen until about the middle of October, and in one plant a single fruit continued to grow until the 27th of March and had a pronounced pleasing odor. This is the first case which has come under our notice in which any of the *Coryphanthanae* develop any odor in the fruits.

*Illustration:* Haage and Schmidt, Haupt-Verz. 1912: 36, as *Mammillaria sphaerica*.

Plate 1, figure 2, is from a photograph sent us by Robert Runyon from Brownsville, Texas; plate VII, figure 2, shows a fruit and figure a shows a seed from a plant collected by Mr. Runyon at Brownsville in 1921. Figure 60 is from a photograph of a flowering plant made by Mr. Runyon at Brownsville in 1921.

## 2. *Dolichothele longimamma* (De Candolle).

*Mammillaria longimamma* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 113. 1828.

*Mammillaria longimamma hexacentra* Berg, Allg. Gartenz. 8: 130. 1840.

*Mammillaria longimamma gigantothele* Berg in Förster, Handb. Cact. 183. 1846.

*Mammillaria longimamma congesta* Hortus in Förster, Handb. Cact. 183. 1846.

*Mammillaria uberiformis hexacentra* Salm-Dyck, Cact. Hort. Dyck. 1849. 6. 1850.

- Mammillaria melaleuca* Karwinsky in Salm-Dyck, Cact. Hort. Dyck. 1849. 108. 1850.  
*Mammillaria globosa* Link, Allg. Gartenz. 25: 240. 1857.  
*Mammillaria uberiformis gracilior* Meinshausen, Wochenschr. Gärt. Pflanz. 1: 26. 1858.  
*Mammillaria longimamma luteola* Hortus in Förster, Handb. Cact. ed. 2. 246. 1885.  
*Cactus longimamma* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus melaleucus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Mammillaria longimamma globosa* Schumann, Gesamtb. Kakteen 508. 1898.

Solitary or cespitose, about 10 cm. high; tubercles elongated, 5 cm. long, somewhat glaucous, their axils hairy or naked; spine-areoles with white hairs when young, in age naked; radial spines 6 to 12, widely spreading, acicular, 2.5 mm. long, white to pale yellow, swollen and darker at base, puberulent; central spines 1 to 3, usually solitary, porrect, similar to the radials but usually darker with a blackish tip; flowers citron-yellow, 4 to 6 cm. long.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

F. Haage jr. in his Choice Cacti lists ten varieties under this species; those not accounted for elsewhere are *ludwigii* and *melaleuca*.

Grässner in his Kakteen 1912 and also 1914 listed *Mammillaria longimamma* var. *ludwigii*. This may be a printer's error.

*Mammillaria longimamma melaleuca* is in the trade (Grässner). *Mammillaria longimamma pseudo-melaleuca* is advertised by Haage and Schmidt in their 1922 Catalogue.

*Mammillaria longimamma spinosior* (Wochenschr. Gärt. Pflanz. 1: 26. 1858), credited Link's Catalogue, but without description, is of this relationship.

*Mammillaria hexacentra* Otto and *Mammillaria gigantothele* (Förster, Handb. Cact. 183. 1846) were never described.

Krook (Handb. Cact. 41. 1855) mentions the variety *congesta* Hortus but gives no description. Several varieties of *Mammillaria longimamma* are in gardens; the following are mentioned by Schelle: *cristata*, *compacta* (the name cited by Rümpler in 1885), *major*, *laeta*, and *malaena*.

*Mammillaria centricirrha flaviflora* is referred by Schumann as a synonym of *M. melaleuca* which we have listed among the synonyms of *Dolichothele longimamma*. *M. alpina* Martius, mentioned elsewhere, may be of this relationship.

*Illustrations:* Monatsschr. Kakteenk. 29: 81, as *Mammillaria longimamma globosa*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 23, as *M. longimamma gigantothele*; Blühende Kakteen 2: pl. 73; De Candolle, Mém. Cact. pl. 5; Schumann, Gesamtb. Kakteen 792. f. 114; Monatsschr. Kakteenk. 8: 149; Schelle, Handb. Kakteenk. 244. f. 162; Förster, Handb. Cact. ed. 2. f. 22, a and b; Ann. Rep. Smiths. Inst. 1908: pl. 14, f. 2; Watson, Cact. Cult. 164. f. 63; ed. 3. f. 40; Dict. Gard. Nicholson 4: 564. f. 35; Suppl. 516. f. 551; De Laet, Cat. Gén. f. 89, as *Mammillaria longimamma*.

Figure 61 is from a photograph obtained from L. Quehl; figure 59 is from a photograph of the plant collected by Dr. E. Palmer near Victoria, Mexico, in 1907.

### 3. *Dolichothele uberiformis* (Zuccarini).

- Mammillaria uberiformis* Zuccarini in Pfeiffer, Enum. Cact. 23. 1837.  
*Mammillaria uberiformis major* Hortus in Förster, Handb. Cact. ed. 2. 244. 1885.  
*Mammillaria uberiformis variegata* Hortus in Förster, Handb. Cact. ed. 2. 244. 1885.  
*Mammillaria laeta* Rümpler in Förster, Handb. Cact. ed. 2. 247. 1885.  
*Cactus uberiformis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Mammillaria longimamma uberiformis* Schumann, Gesamtb. Kakteen 508. 1898.

Globose, about 7.5 cm. high and 10 cm. in diameter; tubercles elongated, 2.5 to 3 cm. long, 12 to 15 mm. in diameter, bright green, shining, their axils naked; spine-areoles nearly naked; spines 4 or 5, all radial, puberulent, horn-colored to reddish, nearly equal; flowers yellow, 3 cm. broad; outer perianth-segments reddish; inner perianth-segments in 2 series, oblong, acute, acuminate; filaments white; style yellow; stigma-lobes 5 or 6, reflexed.

*Type locality:* Near Pachuca, Mexico.

*Distribution:* Central Mexico.



*Illustrations:* Pfeiffer and Otto, *Abbild. Beschr. Cact.* 1: pl. 13; *Abh. Bayer. Akad. Wiss. München* 2: pl. 1, VII. f. 6; Rümpler, *Sukkulenten* 196. f. 109, as *Mammillaria uberiformis*.

Figure 62 is reproduced from the first illustration cited above.

### 13. SOLISIA gen. nov.

Plants very small, solitary, globular, tuberculate, milky; tubercles not arranged in ribs, small covered by broad pectinate spines; areoles very narrow and long; flowers lateral, yellow, small borne in axils of old tubercles; axils of tubercles neither hairy nor woolly; fruit naked, small, oblong; seeds black, smooth, dome-shaped with a broad basal hilum.

The type species, *Pelecyphora pectinata* B. Stein, is here segregated from *Pelecyphora*, with which it has little in common; it differs in being solitary, not cespitose, and in having the juice milky, not watery; the flowers small, lateral and yellow, not large, central and purple; the axils of the tubercles naked, not woolly; and the hilum of the seed broad and large, not small.

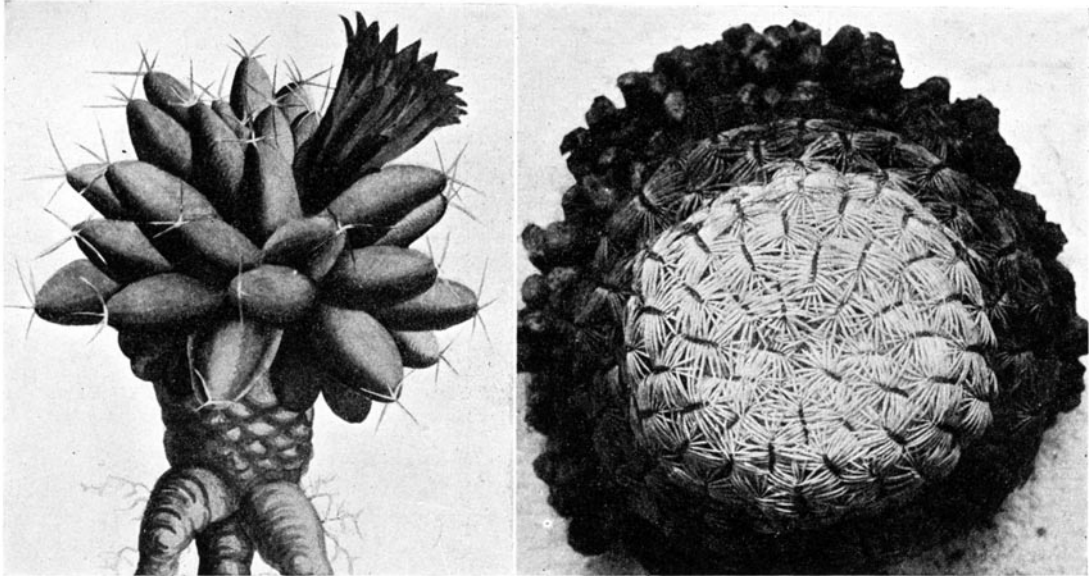


FIG. 62.—*Dolichothele uberiformis*.

FIG. 63.—*Solisia pectinata*.

The genus is named in honor of Octavio Solís of the City of Mexico, an earnest student of the cacti. Only one species is known.

#### 1. *Solisia pectinata* (B. Stein).

*Pelecyphora pectinata* B. Stein, *Gartenflora* 34: 25. 1885.

*Pelecyphora aselliformis pectinifera* Rümpler in Förster, *Handb. Cact. ed.* 2: 238. 1885.

*Pelecyphora aselliformis pectinata* Nicholson, \* *Dict. Gard.* 4: 585. 1888.

*Pelecyphora aselliformis cristata* Watson, *Cact. Cult.* 190. 1899.

*Mammillaria pectinifera* Weber, *Dict. Hort. Bois* 804. 1898.

Plants 1 to 3 cm. in diameter, fibrous-rooted, entirely hidden by the large overlapping spine-clusters; areoles narrow and long; spines 20 to 40, all radial, 5.5 to 2 mm. long, white, appressed; flowers small; fruit 6 mm. long; seed 1 mm. long.

*Type locality:* Mexico.

*Distribution:* Tehuacán, Mexico.

The cristate form of this species, when grown as a graft on some of the *Cereus* allies, becomes much larger than the normal form.

\* Haage (*Cact. Kultur ed.* 2. 206. 1900) credits the variety to Ehrenberg.



This plant is very rare in living collections and is known only from a few localities near Tehuacán; one of these is near El Riego Hotel, where Dr. Rose obtained some 50 plants in 1905 but all have since died. We have been endeavoring since to obtain additional plants but Dr. Reko reports that this hill has been burned over and that no plants can now be found. Dr. Rose found it scattered over the top and side of a rounded hill, growing here and there among the stones and stunted plant life, looking not unlike the dull earth and pebbles.

*Illustrations:* Gartenflora 34: 25; Garten-Zeitung 4: 182. f. 42, No. 14; 217. f. 48; Grässner, Kakteen 1912: 29; Ann. Rep. Smiths. Inst. 1908: pl. 14, f. 5; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 4; 29: 88. f. 10 (abnormal form), as *Pelecyphora pectinata*; Monatsschr. Kakteenk. 29: 81; Schelle, Handb. Kakteenk. 275. f. 198; Garten-Zeitung 4: 217. f. 49, as *P. pectinata cristata*; Monatsschr. Kakteenk. 3: 172. f. 5, as *P. aselliformis pectinata*.

Figure 63 is from an enlarged photograph showing the top of a plant, collected by Dr. Rose at Tehuacán in 1905.

#### 14. NEOMAMMILLARIA nom. nov.

*Mammillaria*\* Haworth, Syn. Pl. Succ. 177. 1812. Not Stackhouse, 1809.

Plants globose, depressed-globose, or short-cylindric, occasionally much elongated, some with milky, others with watery juice; tubercles arranged in more or less spiraled rows, never on vertical ribs, terete, angled or sometimes flattened, never grooved on upper surface, usually bearing wool or hairs and sometimes bristles, but without glands in their axils and crowned by the spine-areoles; spines in clusters on top of tubercles, sometimes all alike, sometimes with central ones very different from the radial, all straight or sometimes one or more of central spines hooked; flowers, so far as known, diurnal, all from axils of old tubercles, much alike as to size and shape, more or less campanulate, comparatively small, variously colored, commonly red, yellowish or white to pinkish; perianth-segments rather narrow, spreading; stamens numerous, borne on base of perianth-tube, short, included; style about length of stamens; stigma-lobes linear; fruit usually clavate, rarely if ever globose, usually ripening rapidly, naked, scarlet (*Mammillaria brandegeei* with some scales and white fruit, according to Schumann) or white or greenish in a few species; seeds brown in some species, black in others.

The type is *Mammillaria simplex* Haworth, based on *Cactus mammillaris* Linnaeus.

We have given much time in attempting to group the species into definite series but have not succeeded, since many of the species are little known and incompletely described.

The name, *Neomammillaria*, as here used, replaces the name *Mammillaria* of Haworth (1812), which is a homonym of the *Mammillaria* of Stackhouse (1809), a genus of *Algae*.

The genus, as here treated, differs from Schumann's treatment (Gesamtb. Kakteen 472-601, 1898) in that we exclude three of his four subgenera, *Coryphantha*, *Dolichothele*, and *Cochemia*, giving them generic rank. From his fourth subgenus we have excluded *Mammillaria micromeris* as the type of the genus *Epithelantha* † and *M. phellosperma* to the genus *Phellosperma* (see page 60).

The species, of which we recognize 150, are native chiefly of Mexico, extending northward into the southwestern United States; one species is reported as far north as Utah and Nevada. Two species are known from the West Indies (none is found in Jamaica or in the Lesser Antilles south of Antigua). Several species are known from Central America (none has been reported from Costa Rica, El Salvador, or Panama). One species is found in Venezuela and neighboring islands and one is described from Colombia, perhaps in error.

During the period of our investigation political conditions in Mexico have prevented our obtaining much original information concerning many of the species and have made it necessary for us to depend largely upon published descriptions and illustrations.

\* The name was also spelled *Mammilaria* by Torrey and Gray (Flora 1: 553) and *Mamillar* a by Reichenbach (Mössler, Handb. ed. 2. 1: 1. 1827) and by Schumann (Gesamtb. Kakteen 472 and elsewhere).

† See Cactaceae, 3: 92. 1922.

## KEY TO SPECIES.

- A. None of spines hooked (1-104, 150).
- B. Seeds brown (1-80).
- C. Tubercles giving off milk freely when pricked or cut (1-53).
- D. Axils of tubercles without bristles (1-33).
- E. Tubercles more or less elongated.
- F. Tubercles terete throughout.
- Spines yellow or reddish.
- Spines red . . . . . 1. *N. mammillaris*
- Spines yellow . . . . . 2. *N. nivosa*
- Spines usually white except tips, at least not red or yellow.
- Central spines 1 or 2.
- Central spines about length of radials . . . . . 3. *N. gaumeri*
- Central spines much longer than radials. . . . . 4. *N. petrophila*
- Central spines 4 to 7.
- Outer perianth-segments entire; central spines long, slender . 5. *N. arida*
- Outer perianth-segments erose; central spines not elongated, stouter than in preceding species. . . 6. *N. brandegeei*
- FF. Tubercles more or less angled.
- G. Tubercles nearly terete towards apex.
- Outer perianth-segments and scales more or less fimbriate.
- Flowers reddish . . . . . 7. *N. gummifera*
- Flowers light yellow . . . . . 8. *N. macdougalii*
- Outer perianth-segments and scales entire.
- Radial spines white; flowers pinkish . . . . . 9. *N. heyderi*
- Radial spines brownish; flowers white to cream-colored.
- Plant hemispheric; radial spines 9 to 13; perianth-segments acute. . . . . 10. *N. hemisphaerica*
- Plant much flattened; radial spines 18 or fewer; perianth-segments acuminate . . . . . 11. *N. applanata*
- GG. Tubercles angled to top.
- H. Spines very unequal, some much elongated.
- Spines whitish. . . . . 12. *N. phymatothele*
- Spines horn-colored, reddish or black.
- No definite central spine.
- Spines horn-colored, short, curved. . . . . 13. *N. magnimamma*
- Spines reddish, long. . . . . 14. *N. macracantha*
- Central spines definite.
- Central spines 2. . . . . 15. *N. johnstonii*
- Central spines solitary.
- Central spine 2 to 3 cm. long . . . . . 16. *N. melanocentra*
- Central spine cm. long; oblong. . . . . 17. *N. runyonii*
- HH. Spines nearly equal, at least none much elongated.
- Flowers red to pinkish.
- Outer perianth-segments ciliate . . . . . 18. *N. sartorii*
- Outer perianth-segments not ciliate (so far as known).
- Central spines none.
- Spines pinkish with black tips . . . . . 19. *N. seitziana*
- Spines straw-colored throughout . . . . . 20. *N. ortegae*
- Central spines 1 or more.
- Central spines solitary; radial spines nearly equal . 21. *N. meiacantha*
- Central spines; some of radials very short . . . . . 22. *N. scrippsiana*
- Flowers yellowish.
- Central spines 4 to 6 . . . . . 23. *N. gigantea*
- Central spines usually wanting . . . . . 24. *N. peninsularis*
- EE. Tubercles very short, symmetric.
- F. Plants globose or depressed.
- G. Axils of tubercles naked. . . . . 25. *N. flavovirens*
- GG. Axils of tubercles laniferous.
- Some of spines deciduous . . . . . 26. *N. sempervivi*
- None of spines deciduous.
- Central spines present. . . . . 27. *N. obscura*
- Central spines wanting. . . . . 28. *N. crocidata*
- FF. Stems cylindric or ovoid.
- Central spines wanting.
- Tubercles nearly terete. . . . . 29. *N. polythele*
- Tubercles 4-angled.
- Tubercles pointed; axils very woolly. . . . . 30. *N. carnea*
- Tubercles not pointed; axils not very woolly . . . . . 31. *N. lloydii*
- Central spines several.
- Radial spines reduced to short bristles . . . . . 32. *N. zuccariniana*
- Radial spines more elongated than in last species . . . . . 33. *N. formosa*

## KEY TO SPECIES—continued.

- DD. Axils of tubercles with bristles as well as wool
- E. Some of spines much elongated, curved, and flexuous.
- Definite central spines wanting . . . . .34. *N. compressa*  
 Central spines present.  
 Central spines weak . . . . .35. *N. mystax*  
 Central spines stiff . . . . .36. *N. petterssonii*
- EE. None of spines elongated, or if elongated, not flexuous.
- F. Tubercles terete or nearly so.
- G. Axils of tubercles bearing yellow wool . . . . .37. *N. eichlamii*
- GG. Axils of tubercles bearing white wool.
- H. Spines all radial.  
 Spines or 6, in young plants sometimes only 4 . . . . .38. *N. karwinskiana*  
 Spines always 4 . . . . .39. *N. praelii*
- HH. Spines both radial and central.
- I. Radial spines numerous, 52 or more.  
 Central spines reddish, not much longer than the  
 radials.  
 Outer perianth-segments ciliate . . . . .40. *N. standleyi*  
 Outer perianth-segments setose . . . . .41. *N. evermanniana*  
 Central spines elongated, usually white except at tip.  
 Flowers yellow . . . . .42. *N. parkinsonii*  
 Flowers dark red . . . . .43. *N. geminispinga*
- II. Radial spines few, to 9.  
 Spines black when young . . . . .44. *N. pyrrocephala*  
 Spines at most brownish.  
 Flowers yellow . . . . .45. *N. woburnensis*  
 Flowers pinkish . . . . .46. *N. collinsii*
- FF. Tubercles strongly angled.
- G. Spines both radial and central.  
 Radial spines numerous . . . . .47. *N. chinocephala*  
 Radial spines few, bristle-like.  
 Central spines 4 to 6 . . . . .48. *N. tenampensis*  
 Central spines 2 . . . . .49. *N. polygona*
- GG. Spines few, all of one kind.  
 Flowers yellow . . . . .50. *N. confusa*  
 Flowers rose-colored or white.  
 Flowers rose-colored.  
 Plants globose; stigma-lobes 4 or 5 . . . . .51. *N. villifera*  
 Plants cylindrical; stigma-lobes 8 . . . . .52. *N. polyedra*  
 Flowers white . . . . .53. *N. conzattii*
- CC. Milk-tubes developed, if at all, only in stem; tubercles not milky (54-80).
- D. Central spines wanting.  
 Spines subulate; areoles elliptic . . . . .54. *N. napina*  
 Spines mostly acicular; areoles circular.  
 Spines numerous . . . . .55. *N. lanata*  
 Spines few (4 to 6).  
 Spines 5 or 6, short, straight . . . . .56. *N. kewensis*  
 Spines 4, elongated, curved.  
 Flowers large (2.5 cm. broad) . . . . .57. *N. subpolyedra*  
 Flowers small.  
 Spines long and weak . . . . .58. *N. galeottii*  
 Spines subulate . . . . .59. *N. tetracantha*
- DD. Central spines present.
- E. Central spines usually 2, sometimes solitary.
- F. Radial spines 20 or more.  
 Central spines stout and not very long; stigma-lobes white.  
 Plant round or nearly so at apex; central spine often 1 . . . . .60. *N. elegans*  
 Plant strongly umbilicate; central spines always 2 . . . . .61. *N. pseudoperbella*  
 Central spines long . . . . .62. *N. dealbata*
- FF. Radial spines 20 or fewer.
- Radial spines white, bristle-like.  
 Stigma-lobes red.  
 Globose or somewhat elongated . . . . .63. *N. haageana*  
 Depressed-globose . . . . .64. *N. perbella*
- Stigma-lobes white.  
 Radial spines appressed . . . . .65. *N. collina*  
 Radial spines not appressed . . . . .66. *N. donatii*  
 Radial spines brownish when young, stouter than in the last . . . . .67. *N. mundtii*
- EE. Central spines usually 4, sometimes more.
- F. Central spines white or yellow.  
 Radial spines white.  
 Plant globose.  
 Axils of tubercles not setose; central spines usually 4 . . . . .68. *N. celsiana*  
 Axils of tubercles setose; central spines usually 9 . . . . .69. *N. aureiceps*  
 Plant cylindrical.  
 Plants from Yucatan . . . . .70. *N. yucatanensis*  
 Plants from Central America . . . . .71. *N. ruestii*

## KEY TO SPECIES—continued.

- Radial spines yellow.  
 Plants globular. . . . . 72. *N. pringlei*  
 Plants slender-cylindric . . . . . 73. *N. cerralboae*
- FF. Central spines brown or black.  
 Central spines black . . . . . 74. *N. phaeacantha*  
 Central spines brown.  
 Axils of tubercles not setose . . . . . 75. *N. graessneriana*  
 Axils of tubercles setose.  
 Tubercles closely set.  
 Central spines not very different from radial.  
 Plant body elongated; spines brownish or reddish. . . . . 76. *N. spinosissima*  
 Plant body globose; radial spines whitish . . . . . 77. *N. densispina*  
 Central spines very different from the radial . . . . . 78. *N. nunezii*  
 Tubercles spreading.  
 Central spines unequal; stigma-lobes green . . . . . 79. *N. amoena*  
 Central spines nearly equal; stigma-lobes rose-colored. . . . . 80. *N. rhodantha*
- BB. Seeds black; neither tubercles nor stems milky (81-104).  
 C. Spines plumose . . . . . 81. *N. plumosa*  
 CC. Spines not plumose.  
 D. Radial spines weak and hair-like.  
 Central spines with yellow tips . . . . . 82. *N. prolifera*  
 Central spines with brown tips . . . . . 83. *N. multiceps*  
 DD. Radial spines not hair-like.  
 E. Spines yellow.  
 Spines 2 to 8, glabrous, more or less twisted or bent. . . . . 84. *N. camptotricha*  
 Spines about 20, pubescent, straight. . . . . 85. *N. eriacantha*
- EE. Spines not yellow.  
 F. Spines 25 to 80.  
 Spines pubescent or lanate.  
 Spines lanate, 25 to 30 . . . . . 86. *N. schiedeana*  
 Spines pubescent or puberulent . . . . . 87. *N. lasiacantha*  
 Spines not pubescent.  
 Spines all very much alike.  
 Perianth-segments obtuse. . . . . 88. *N. denudata*  
 Perianth-segments pointed.  
 Flowers about 7 mm. long . . . . . 89. *N. lenta*  
 Flowers about 2 cm. long. . . . . 90. *N. candida*  
 Central spines 1 to 6, very unlike others. . . . . 91. *N. vetula*
- FF. Spines 20 or fewer but sometimes more in *N. oliviae* and *N. pottsii*.  
 Plant globose.  
 Flowers red . . . . . 92. *N. fertilis*  
 Flowers white.  
 Central spines solitary; radials 7 to 9 . . . . . 93. *N. decipiens*  
 Central spines 5 to 8; radials 16 to 20 . . . . . 94. *N. discolor*
- Plant cylindrical.  
 Joints very fragile, breaking loose when touched or jarred. . . . . 95. *N. fragilis*  
 Joints not fragile.  
 Spines all radial, recurved, sometimes with one central. . . . . 96. *N. elongata*  
 Spines both radial and central.  
 Plants globose to short-cylindric . . . . . 97. *N. oliviae*  
 Plants slender-cylindric.  
 Axils of tubercles not bristly.  
 Spines all yellow . . . . . 98. *N. echinaria*  
 Spines not yellow.  
 Upper central spines more or less connivent  
 over top of plant . . . . . 99. *N. pottsii*  
 Upper central spines not connivent . . . . . 100. *N. mazatlanensis*
- Axils of tubercles bristly.  
 Stems slender-cylindric; central Mexican species. . . . . 101. *N. sphacelata*  
 Stems short-cylindric or globose (sometimes globose  
 in *N. palmeri*); Lower Californian species.  
 Spines nearly white or at least becoming so; seeds  
 minute.  
 Spines all white or nearly so; spine-areoles at  
 first lanate . . . . . 102. *N. albicans*  
 Spines tan with dark tips; spine-areoles not  
 lanate . . . . . 103. *N. slevinii*  
 Spines not white; seeds 3 mm. long . . . . . 104. *N. palmeri*
- AA. Some of central spines hooked; radial spines never hooked (105-149).  
 B. Tubercles milky; seeds brown.  
 Plants globose . . . . . 105. *N. uncinata*  
 Plants cylindrical . . . . . 106. *N. hamata*
- BB. Tubercles not milky except sometimes in *N. rekoii*; seeds mostly black.  
 C. Seeds brown.  
 Fruit red; flowers from side of plant. . . . . 107. *N. rekoii*  
 Fruit green; flowers from near base of plant. . . . . 108. *N. solisii*



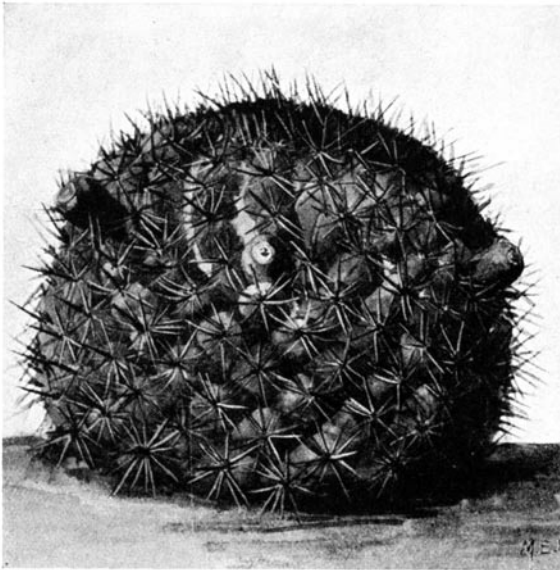
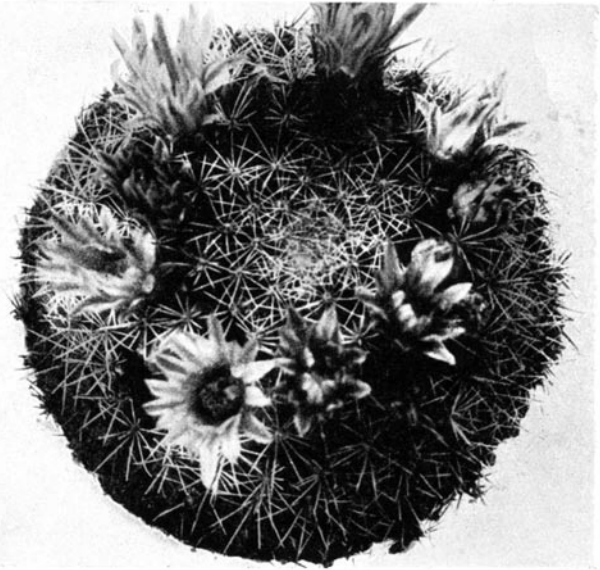
## KEY TO SPECIES—continued.

- CC. Seeds black.
- D. Fruit elongated, clavate, ripening quickly.
- E. Seeds not rugose.
- F. Plants usually small; spines setaceous to delicately acicular.
- Central spines yellow.
- Central spines glabrous . . . . . 109. *N. pygmaea*
- Central spines pubescent.
- Flowers white . . . . . 110. *N. wildii*
- Flowers yellowish . . . . . 111. *N. seideliana*
- Central spines red to brown.
- Outer perianth-segments ciliate.
- Central spines shorter than flower; perianth-segments acute 112. *N. barbata*
- Central spines longer than flower; perianth-segments obtuse 113. *N. mercadensis*
- Outer perianth-segments entire.
- Axils of tubercles setose.
- Inner perianth-segments white to yellowish.
- Central spines 3 or 4.
- Radial spines about 25; flowers 2 cm. long. . . . . 114. *N. kunzeana*
- Radial spines about 20; flowers 1 cm. long. . . . . 115. *N. hirsuta*
- Central spines 7 to 9 . . . . . 116. *N. multibamata*
- Inner perianth-segments red or reddish.
- Radial spines weak and hair-like.
- Central spines several . . . . . 117. *N. longicoma*
- Central spine solitary . . . . . 118. *N. bocasana*
- Radial spines stiff.
- Radial spines glabrous . . . . . 119. *N. multiformis*
- Radial spines pubescent . . . . . 120. *N. scheidweileri*
- Axils of tubercles not setose.
- Flowers 2.2 cm. long or more.
- Central spines solitary . . . . . 121. *N. saffordii*
- Central spines 3 . . . . . 122. *N. schelbasei*
- Flowers 1 to 1.5 cm. long.
- Plants caespitose . . . . . 123. *N. glochidiata*
- Plants solitary.
- Inner perianth-segments acuminate. . . . . 124. *N. trichacantha*
- Inner perianth-segments acute only . . . . . 125. *N. painteri*
- FF. Plants stout; central spines at least stout-acicular to subulate.
- G. Outer perianth-segments ciliate.
- Fruit purple, ovoid to globular.
- Radial spines 15 or less; fruit large (25 mm. long) . . . 126. *N. wrightii*
- Radial spines 20 to 30; fruit 10 to 15 mm. long . . . 127. *N. viridiflora*
- Fruit scarlet, clavate.
- Outer perianth-segments long-ciliate . . . . . 128. *N. wilcoxii*
- Other perianth-segments and upper scales short-ciliate.
- Perianth rotate; stigma-lobes red . . . . . 129. *N. mainae*
- Perianth campanulate; stigma-lobes green.
- Flowers white . . . . . 130. *N. boedekeriana*
- Flowers purple to pinkish.
- Radial spines often as many as 30.
- Inner perianth-segments acuminate . . . . . 131. *N. microcarpa*
- Inner perianth-segments usually obtuse or rounded. . . . . 132. *N. milieri*
- Radial spines often as few as 12; inner perianth-segments acute . . . . . 133. *N. sheldonii*
- GG. Perianth-segments not ciliate.
- H. Setae in axils of tubercles.
- I. Seeds constricted above base.
- J. Flowers greenish or pink, and small.
- K. Flowers greenish, 10 to 12 mm. long; central spines yellowish to reddish. . . . . 134. *N. armillata*
- KK. Flowers pink, 20 mm. long or more; central spines dark brown . . . . . 135. *N. fraileana*
- JJ. Flowers nearly white, seeds much larger. . . . . 136. *N. swinglei*
- II. Seeds not constricted above base.
- Central spines several; flowers yellowish . . . . . 137. *N. dioica*
- Central spines usually solitary; flowers rose-colored. . . 138. *N. goodridgei*
- HH. Setae wanting in axils of tubercles.
- I. Flowers rotate . . . . . 139. *N. zephyranthoides*
- II. Flowers campanulate.
- Plants globose.
- Flowers white . . . . . 140. *N. carretii*
- Flowers pink to purplish.
- Inner perianth-segments obtuse . . . . . 141. *N. jaliscana*
- Inner perianth-segments acute to acuminate . . . . . 142. *N. bombycina*
- Plants slender, elongated and cylindric.
- Flowers small, pinkish . . . . . 143. *N. occidentalis*
- Flowers large, purplish. . . . . 144. *N. fasciculata*
- EE. Seeds rugose (perhaps a generic type) . . . . . 145. *N. nelsoni*,
- DD. Fruit depressed, long-persisting (perhaps a generic type) . . . . . 146. *N. longiflora*
- AAA. Species not grouped: 147, *N. tacubayensis*; 148, *N. umbrina*; 149, *N. verhaertiana*; 150, *N. xanthina*.

1. *Neomammillaria mammillaris* (Linnaeus).

- Cactus mammillaris* Linnaeus, Sp. Pl. 1: 466. 1753.  
*Cactus mammillaris glaber* De Candolle, Pl. Succ. 137. 1799.  
*Mammillaria simplex* Haworth, Syn. Pl. Succ. 177. 1812.  
 ? *Mammillaria conica* \* Haworth, Suppl. Pl. Succ. 71. 1819.  
*Mammillaria parvimamma* Haworth, Suppl. Pl. Succ. 72. 1819.  
*Cactus microthele* Sprengel, Syst. 2: 494. 1825.  
*Mammillaria simplex parvimamma* Lemaire, Cact. Gen. Nov. Sp. 98. 1839.  
*Mammillaria caracasana* † Otto in Salm-Dyck, Cact. Hort. Dyck. 1849. 107. 1850.  
*Mammillaria mammillaris* Karsten, Deutsche Pl. 888. 1882.  
 ? *Cactus conicus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.  
*Cactus parvimammus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

Globose to short-cylindric, 4 to 6 cm. high; tubercles short, 5 to 7 mm. long, conic, nearly terete, pale green, only slightly woolly in their axils; spine-areoles bearing a dense mass of white wool when young; spines reddish brown, acicular; radial spines 10 to 12, spreading, 5 to 7 mm. long; central spines 3 or 4, stouter and a little longer than the radials; flowers 8 to 10 mm. long, cream-colored; outer perianth-segments narrow, bearing long mucronate tips; fruit 15 to 20 mm. long, red; seeds minute, brown.

FIG. 64.—*Neomammillaria mammillaris*.FIG. 65.—*Neomammillaria macdougalii*.

*Type locality:* Tropical America.

*Distribution:* Northern Venezuela and neighboring Dutch Islands.

This plant was the first-known species of the genus and the only one known to Linnaeus; it was described and illustrated by Commelin in 1697 and by Hermann in 1698. It was one of the first cacti discovered; Aiton states that it was cultivated by Bishop Compton before 1688. The cited distribution of the species has usually been inexact or erroneous; Linnaeus gave no definite locality but restricted it to the warm parts of America.

Nuttall assigns it also to the hills of the Missouri River, and De Candolle's range covers that of both Linnaeus and of Nuttall. Nuttall's plant was subsequently found to be different from the one of the Caribbean region. Schumann gives the range as the West Indies but his description covers two or three species. A number of his references are erroneous, for neither Wright's plant (No. 2619, as *Mammillaria pusilla*) from Cuba nor Haworth's plant (Syn. Pl. Succ. 177, as *Mammillaria prolifera*) from the West Indies be-

\* Tubercles large, conic; spines less than 10, all radial, red, but paler at base; flowers and fruit unknown. Neither Pfeiffer nor Schumann knew this species or its origin. The Index Kewensis refers it to South America. If from that region it might be a species of *Discocactus*, near *D. placentiformis*, but it may belong here.

† This is the original spelling, but Schumann wrote it *M. caracasana*.

longs here. The name *Cactus prolifer* Willdenow (Pfeiffer, Enum. Cact. 9. 1837) is doubtless to be referred here. Fawcett lists the plant from Jamaica (as *Mammillaria simplex*) but no specimens are known to us from that island, which was searched by Dr. Britton and the late Mr. William Harris.

De Tussac (Fl. Antill. 2: 216, pl. 32) refers it to Santo Domingo and he describes and figures it, mentioning a locality in the desert near Gonaives which, however, is in Haiti; his illustration, while undoubtedly of this species, is not an original but copied from that of De Candolle (Pl. Succ. pl. 111). The only similar plant we know from his locality is *Mammillaria pusilla*, described as *M. pusilla haitiensis* by Schumann, which has been collected by Buch at this locality, and we have specimens from other collectors. We now believe that *Neomammillaria mammillaris* is confined to the coast of Venezuela and the adjacent islands, among which is Curaçao. In 1913 Dr. Britton and Dr. Shafer found it common on the top of a limestone hill in Curaçao (No. 3085) and in the same year Mr. Pittier obtained living plants near Cabo Blanco, Venezuela (No. 6471). These two are the only collections which have been made in recent years.

Steudel (1821), under *Mammillaria simplex*, compares this species with *Cereus flavescens* and *C. lanuginosus*, but he must have meant *Cactus* instead of *Cereus*.

*Mammillaria microthele* Monville and *M. micrantha* Hortus are names which Rümpler (Förster, Handb. Cact. ed. 2. 335. 1885) refers to *M. caracassana*; Salm-Dyck (Cact. Hort. Dyck. 1844. 9. 1845) also referred to it *M. micracantha* Monville.

*Mammillaria simplex affinis* Otto is mentioned by Förster (Handb. Cact. 217. 1846), but is not described.

*Mammillaria karstenii* Poselger (Allg. Gartenz. 21: 95. 1853) is listed by Schumann among his little-known species. The Index Kewensis states that it comes from Argentina, which is doubtless a mistake. The type locality is given as "La Canada," a common Spanish locality name. If collected by Karsten, it probably was obtained in Venezuela, in which case it would probably be referable to *Neomammillaria mammillaris*.

*Mammillaria fuliginosa* Salm-Dyck (Cact. Hort. Dyck. 1849. 93. 1850) we do not know, but if it came from Venezuela, where it is referred doubtfully by the Index Kewensis, it would belong here.

*Illustrations:* Hermann, Parad. 132. pl. 137, as *Echinomelocactus minor*, etc.; Commelin, Hort. Amst. 1: 105. f. 55; Plukenet, Opera Bot. 1: 148. pl. 29, f. 1, as *Ficoides*, etc.; Bradley, Hist. Pl. Succ. 3: 11. pl. 29, as melon-thistle; Loudon, Encycl. Pl. ed. 2 and 3. 410. f. 6839; De Candolle, Pl. Succ. 137. pl. 111; Fl. Antill. 2: pl. 32, as *Cactus mammillaris*; De Candolle, Mém. Cact. pl. 7, as *Mammillaria simplex*.

Figure 64 is reproduced from a colored drawing by Miss M. E. Eaton of a plant obtained by Dr. Britton and Dr. Shafer on Curaçao in 1913, which fruited the same year in the New York Botanical Garden.

## 2. *Neomammillaria nivosa* (Link).

*Mammillaria nivosa* Link in Pfeiffer, Enum. Cact. II. 1837.

*Cactus nivosus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Coryphantha nivosa* Britton, Ann. Mo. Bot. Gard. 2: 45. 1915.

Often forming large clusters 8 dm. in diameter, of 25 heads or more; separate specimens usually globose but sometimes cylindric, the largest ones 18 cm. in diameter, very spiny; tubercles milky, 10 mm. long, their axils filled with white wool; spines usually 14, bright yellow, acicular, the longer ones 1.5 cm. long; spine-areoles when young woolly, in age naked; flowers cream-colored, 1.5 cm. long; fruit clavate, 12 mm. long, red; seeds brown.

*Type locality:* Tortola Island, Virgin Islands.

*Distribution:* Southern Bahamas, Mona, Desecheo, Culebra, Buck Island, St. Thomas, Little St. James Island, Tortola, and Antigua.

Known as the snowy cactus in the Virgin Islands and as the woolly nipple-cactus in the Bahamas.



The plant inhabits crevices of rocks and locally is very abundant. On Mona Island, between Porto Rico and Santo Domingo in the Mona Passage, it exists in immense numbers on the limestone plateau.

*Mammillaria tortolensis* (Pfeiffer, Enum. Cact. 11. 1837) was published by Pfeiffer as a synonym of *M. nivosa*. The same or similar plant was briefly described by Forbes (Journ. Hort. Tour 148, 1837).

*Illustrations:* Förster, Handb. Cact. ed. 2. 331. f. 34; Schelle, Handb. Kakteenk. 264. f. 186; De Laet, Cat. Gén. f. 46; Blühende Kakteen 3: pl. 165, as *Mammillaria nivosa*.

Figure 66 is from a photograph of a plant collected on Turks Island, British West Indies, in July 1916 and sent us by the Director of the New York Aquarium; figure 243 (Britton and Rose, Cactaceae 3: p. 231) shows the plant on Mona Island, Porto Rico.

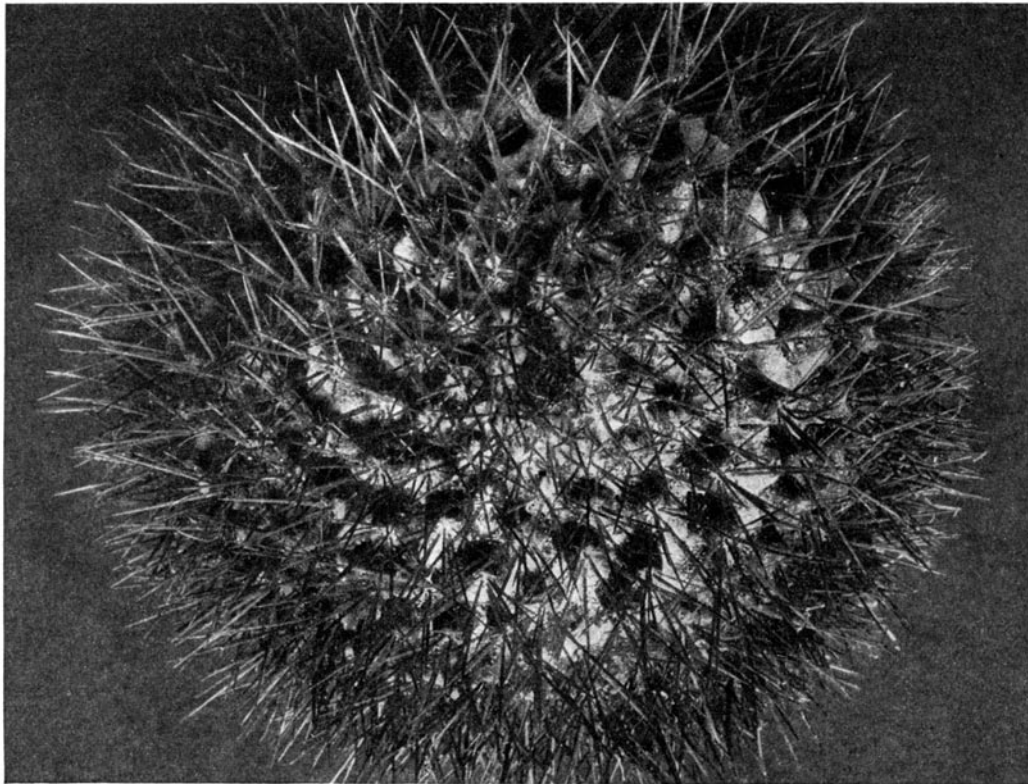


FIG. 66.—*Neomammillaria nivosa*.

### 3. *Neomammillaria gaumeri* sp. nov.

Cespitose, the branches short, globose to short-cylindric, up to 15 cm. long, growing half hidden in the sand; tubercles dark green, short, nearly terete, obtuse, 5 to 7 mm. long, very milky; axils naked even when young; spine-areoles conspicuously white-woolly at first, soon naked; radial spines 10 to 12, spreading, acicular, white with brown tips or lower ones in cluster darker, 5 to 7 mm. long; central spine solitary, porrect, usually brown; flowers very abundant from near top of plant but not from axils of young areoles, creamy white, small, 10 to 14 mm. long; outer perianth-segments greenish, brown-tipped; scales on flower-tube broadly ovate, scarious; fruit crimson, clavate, 18 to 20 mm. long, naked.

Common in the sand dunes of Progreso, Yucatan; collected first by George P. Gaumer and sons, April 1916 (No. 23349, type); re-collected in 1918 and again in 1921.

This species is remarkable for its unusual habitat and was the first of the genus reported from Yucatan. A second species has since been collected by Dr. Gaumer (see p. 114).





M. E. Eaton del.

A. Hoen & Co. Baltimore

- 1. Fruiting plant of *Neomammillaria gaumeri*.
- 2. Flowering plant of *Neomammillaria heyderi*.
- 2a. Fruit of same.
- 3. Flowering and fruiting plant of *Neomammillaria hemisphaerica*.
- 4. Flowering plant of *Neomammillaria compressa*.
- 5. Flowering plant of *Neomammillaria geminispina*.
- 6. Flowering plant of *Neomammillaria hemisphaerica*.





It is perhaps nearest some of the species from Texas, such as *N. hemisphaerica* and *N. heyderi*, but when growing it is easily distinguished by the peculiar white mats of wool on the young spine-areoles.

The following interesting note has been contributed by Dr. Gaumer, in whose honor the plant is named:

"The flowers begin to open at 8 a. m., are fully open at noon, close at dawn, and shrink the next morning, leaving the ovary wholly imbedded in the mass of the plant at the base of the tubercles; it remains dormant from 3 to 6 months, then suddenly develops to an inch in length in 48 hours. If put away in a dry place the bright crimson berries last from 3 to 6 months without decaying or changing their color. When thoroughly ripe they have a rather pleasant sweetish taste and are said to be edible.

"The plant multiplies by seed and by segmentation; this latter is accomplished by the plant putting out numerous shoots from its upper surface; these send out roots; the old plant decays and the little ones are often rolled about by the cattle or by the winds, and later send out stronger roots that finally anchor them to the sand, generally under a clump of brush."

Plate VIII, figure 1, shows the type plant which flowered in the New York Botanical Garden, July 24, 1918, soon after its arrival from Yucatan; plate XIII, figure 2, is from a photograph of the plant showing the large masses of white wool at the young spine-areoles.

#### 4. *Neomammillaria petrophila* (Brandege).

*Mammillaria petrophila* Brandege, *Zoe* 5: 193. 1904.

Sometimes cespitose, milky, globular, 15 cm. in diameter or less; tubercles short, broad at base; spines at first chestnut-colored, becoming pale in age; radial spines 10, about 1 cm. long, a little spreading; central spine 1 (rarely 2), 2 cm. long, darker and stouter than the radials; flowers bright greenish yellow, 18 to 20 mm. long; perianth-segments hardly acute, sometimes slightly erose; stamens and style yellow; stigma-lobes 6; fruit small, roundish; seeds reddish brown, smooth, less than 1 mm. long.

*Type locality*: Sierra de la Laguna, Lower California.

*Distribution*: Mountains of southern Lower California.

We know this species only from description and illustration.

*Illustration*: *Monatsschr. Kakteenk.* 17: 57, as *Mammillaria petrophila*.

#### 5. *Neomammillaria arida* (Rose).

*Mammillaria arida* Rose in Quehl, *Monatsschr. Kakteenk.* 23: 181. 1913.

Plants usually single, globular, deeply seated in the ground, 3 to 6 cm. in diameter, containing much milk and giving it off freely when injured; tubercles nearly terete; radial spines about 15, pale, ascending, the bases sometimes yellowish and the tips dark; central spines 4 to 7, 12 to 16 mm. long, much longer than the radials, dark brown, erect; flowers 1 cm. long; outer perianth-segments dark purple with lighter margins, entire; inner perianth-segments cream-colored to almost pale yellow; stamens pale; stigma-lobes green; fruit clavate, red, 15 cm. long; seeds brown.

*Type locality*: Hills near Pichilique Island near La Paz, Lower California.

*Distribution*: Known only from the type locality.

Plate VII, figure 3, shows one of the plants collected by Dr. Rose in 1911 which flowered in the New York Botanical Garden, July 2, 1912.

#### 6. *Neomammillaria brandegeei* (Coulter).

*Cactus brandegeei* Coulter, *Contr. U. S. Nat. Herb.* 3: 96. 1894.

*Cactus gabbii* Coulter, *Contr. U. S. Nat. Herb.* 3: 109. 1894.

*Mammillaria gabbii* Engelm in K. Brandege, *Erythea* 5: 116. 1897.

*Mammillaria brandegeei* K. Brandege, *Erythea* 5: 116. 1897.

Cylindric to globular, flattened, solitary or in clusters of 2 to 8; tubercles angled; axils woolly; radial spines 9 to 16, 8 to 10 mm. long, yellowish brown; central spines 3 to 6, a little longer and darker than the radials; flowers 15 mm. long; outer perianth-segments ovate, striate, ciliate; inner perianth-segments greenish yellow, narrower than the outer, entire; fruit white (according to Schumann), bearing a few narrow scales.

*Type locality:* San Jorge, Lower California.

*Distribution:* Lower California, San Quintin, and southward.

If we are right in referring *Mammillaria gabbii* here, this species was first collected by W. M. Gabb in southern Lower California in 1867 and was described by Dr. Engelmann as a new species but was not published. In 1894 Dr. Coulter published Engelmann's description, but used the name of *Cactus gabbii*. On a previous page, however, he published *Cactus brandegeei* which, if the same, takes precedence.

We have placed this species next to *Neomammillaria arida*, which is known to have nearly terete tubercles, while *N. brandegeei* is described as having angled tubercles, as they certainly are in herbarium specimens; whether this species has angled or terete tubercles in life we are in doubt.

We have not seen fresh fruit of this plant but Schumann describes it as white, which is unusual in this genus; it is also peculiar in bearing several small scales.

*Illustrations:* Blühende Kakteen 2: pl. 119; Schumann, Gesamtb. Kakteen Nachtr. 137. f. 34; Monatsschr. Kakteenk. 11: 153, as *Mammillaria brandegeei*.

### 7. *Neomammillaria gummifera* (Engelmann).

*Mammillaria gummifera* Engelmann in Wislizenus, Mem. Tour North. Mex. 105. 1848.  
*Cactus gummifer*\* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Depressed-globose, 8 to 12 cm. in diameter; tubercles light green, milky, somewhat 4-angled; axils of tubercles and spine-areoles white-tomentose when young; radial spines 10 to 12, ascending, white with brownish or even blackish tips, the lower ones stouter and longer than the others, often 2 to 2.5 cm. long and somewhat recurved; central spines 1 or 2, sometimes 4; flowers 3 cm. long, 12 to 25 mm. wide when fully open, brownish red outside; inner perianth-segments reddish white with dark red band in middle.

*Type locality:* Cosihuiriachi, Chihuahua.

*Distribution:* Northern Mexico.

This species was collected by Dr. A. Wislizenus in the state of Chihuahua, Mexico, about 1846. Specimens were sent to Dr. Engelmann at St. Louis, who described it in 1848 but without seeing flowers or fruit; two years afterward he described the flowers but the fruit is yet unknown. In 1894 Dr. J. M. Coulter redescribed the species, stating that it had never been re-collected. Professor Schumann in his Monograph does not recognize it, but refers it to his list of doubtful species. In 1908 Dr. Rose visited the type locality and obtained a single living specimen.

*Illustrations:* Cact. Mex. Bound. pl. 9, f. 18 to 20, as *Mammillaria gummifera*.

### 8. *Neomammillaria macdougallii* (Rose).

*Mammillaria macdougallii* Rose, Stand. Cycl. Hort. Bailey 4: 1982. 1916.

Usually low and flattened on top, but very old plants sometimes nearly globular and then 12 to 15 cm. in diameter with a carrot-shaped root; tubercles flattened dorsally, strongly angled, deep green; young areoles bearing white wool, but becoming naked in age; axils of tubercles often bearing long white wool; radial spines 10 to 12, white or somewhat yellowish, the lower ones a little stouter, brown or black at top or sometimes throughout; central spines 1 or 2, stout, yellowish, brown-tipped, similar to the radials; flowers 3.5 cm. long, cream-colored; outer perianth-segments short-fimbriate; fruit red, clavate, 3 cm. long.

*Type locality:* Near Tucson, Arizona.

*Distribution:* Southeastern Arizona.

Figure 65 is from a photograph of a plant collected by Dr. MacDougal in the Santa Catalina Mountains; figure 67 is from a photograph of another plant sent by Dr. MacDougal from the same region in November 1909.

\* Coulter writes this name *Cactus gummiferus* (Contr. U. S. Nat. Herb. 3: 98.1894).



9. *Neomammillaria heyderi* (Mühlenpfordt).

*Mammillaria heyderi* Mühlenpfordt, Allg. Gartenz. 16: 20. 1848.

*Cactus heyderi* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

? *Mammillaria buchbeimeana* Quehl, Monatsschr. Kakteenk. 2: 97. 1917.

Plant globose or somewhat flattened at apex; tubercles conic, 12 mm. long, when young bearing wool in their axils; young spine-areoles white-woolly; radial spines 20 to 22, white, setaceous, the lower ones stouter and longer; central spine solitary, brown at base and apex, 5 to 6 mm. long; flowers pinkish, the segments linear-oblong; fruit oblong, red.

*Type locality*: Not cited.

*Distribution*: Texas and northern Mexico.

*Illustration*: Schulz, Wild Fl. San Antonio pl. 13 in part, as *M. heyderi*.

Plate VIII, figure 2, shows a plant sent to Dr. Rose by Mrs. S. L. Pattison in 1921 which flowered in the New York Botanical Garden on April 21 of that year; figure a shows the fruit.

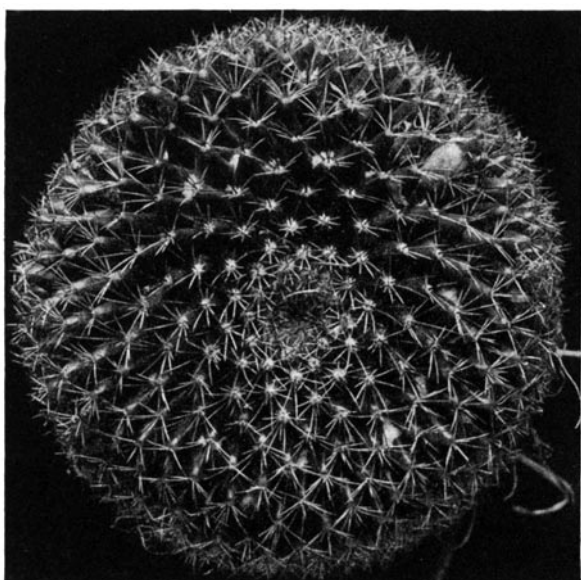


FIG. 67.—*Neomammillaria macdougalii*.

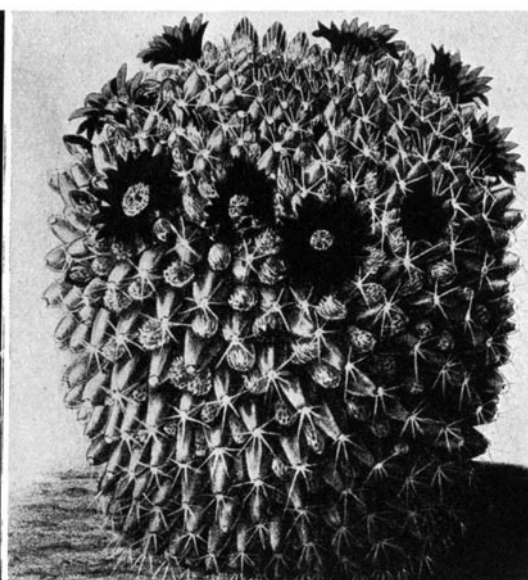


FIG. 68.—*Neomammillaria phymatothele*.

10. *Neomammillaria hemisphaerica* (Engelmann).

*Mammillaria hemisphaerica* Engelmann in Wislizenus, Mem. Tour North. Mex. 105. 1848.

*Mammillaria heyderi hemisphaerica* Engelmann, Proc. Amer. Acad. 3: 263. 1856.

*Cactus heyderi hemisphaericus* Coulter, Contr. U. S. Nat. Herb. 3: 97. 1894.

*Cactus hemisphaericus* Small, Fl. Southeast. U. S. 811. 1903.

Deep-seated in the soil, hemispheric, 8 to 12 cm. broad, dark green; tubercles only slightly angled, not very closely set, 1 to 1.5 cm. long, somewhat pointed, their axils nearly naked in the dormant stages; spine-areoles woolly when young, becoming glabrate in age; radial spines 9 to 13, widely spreading, acicular, the upper ones more delicate, 4 to 8 mm. long, brownish or smoky, often with black tips; central spine solitary, porrect, brown; flowers small, cream-colored, 1 to 1.5 cm. long; inner perianth-segments acute; filaments pinkish; style pinkish; stigma-lobes 6 to 10, greenish yellow; fruit slender, clavate, red, 1 to 1.5 cm. long.

*Type locality*: Below Matamoros on the Rio Grande.

*Distribution*: Southeastern Texas and northeastern Mexico.

This species was collected in 1846 by the St. Louis Volunteers in the Mexican War and taken back to Dr. George Engelmann; it flowered and he described it briefly in 1848 and in more detail in 1850. It was recently re-collected near Brownsville, Texas, just across the river from Matamoros by Robert Runyon and sent to us with a photograph taken in situ, here reproduced (plate VI, figure 2).

This species differs from *Neomammillaria applanata* in being less flattened and in having fewer spines and white flowers.

*Cactus heyderi hemisphaericus*, as treated by Coulter, must be a composite, the western and southern forms probably representing different species.

*Illustrations:* Cact. Mex. Bound. pl. 9, f. 15 to 17, as *Mammillaria heyderi hemisphaerica*.

Plate VIII, figure 6, shows a flowering plant from near Brownsville, Texas, collected by Robert Runyon; figure 3 shows a flowering and fruiting plant obtained by Dr. Rose at Laredo, Texas, in 1913, which flowered in the New York Botanical Garden, March 23, 1914; plate VI, figure 2, is from a photograph taken near Brownsville, Texas, by Robert Runyon in 1920.

#### 11. *Neomammillaria applanata* (Engelmann).

*Mammillaria applanata* Engelmann in Wislizenus, Mem. Tour North. Mex. 105. 1848.

*Mammillaria declivis* Dietrich, Allg. Gartenz. 18: 235. 1850.

*Mammillaria texensis* Labouret, Monogr. Cact. 89. 1853.

*Mammillaria heyderi applanata* Engelmann, Proc. Amer. Acad. 3: 263. 1856.

*Cactus texensis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plants much flattened; tubercles somewhat angled, their axils naked; radial spines 10 to 18, the radials widely spreading, lower ones darker brown than upper; central spine one, porrect, dark brown; young spine-areoles very woolly; flower-buds pointed, greenish; outer perianth-segments greenish, lanceolate, acuminate margins not ciliate; inner segments 2.5 cm. long, cream-colored, lanceolate, acuminate, with a broad green stripe down the middle; filaments white, shorter than the style; stigma-lobes green; fruit scarlet, naked, 2.5 to 3.5 cm. long; seeds brown.

*Type locality:* Rocky plains on the Pieddenales, Texas.

*Distribution:* Central and southern Texas.

The description is based on plants flowering in cultivation. It is one of the earliest species to flower in the spring, beginning soon after the first of March; the fruit requires a full year to mature.

*Mammillaria lindheimeri* Engelmann, given by Hemsley (Biol. Centr. Amer. Bot. 1: 525. 1880) and by the Index Kewensis as a synonym of *M. texensis*, belongs here.

*Neomammillaria applanata*, *N. heyderi*, and *N. hemisphaerica* are closely related and may represent races of the same species.

*Illustrations:* Blanc, Cacti 66. No. 1116; Gartenflora 30: 412; Cact. Journ. 1: pl. for March; Meehan's Monthly 1: 4; Balt. Cact. Journ. 1: 138; 2: 259; Förster, Handb. Cact. ed. 2. 333. f. 35, as *Mammillaria applanata*; Ann. Rep. Smiths. Inst. 1908: pl. 9, f. 1; Gartenflora 29: 52, as *Mammillaria heyderi*; Schelle, Handb. Kakteenk. 263. f. 185; Blühende Kakteen 1: pl. 43; Cact. Mex. Bound. pl. 9, f. 4 to 14, as *Mammillaria heyderi applanata*.

Plate IX, figure 1, shows a plant in flower and fruit, collected by Dr. Rose on hills above Devil's River, Texas, in 1913, which flowered in the New York Botanical Garden, February 2, 1914.

#### 12. *Neomammillaria phymatothele* (Berg).

*Mammillaria phymatothele* Berg, Allg. Gartenz. 8: 129. 1840.

*Mammillaria ludwigii* Ehrenberg, Linnaea 14: 376. 1840.

*Cactus ludwigii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus phymatothele* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

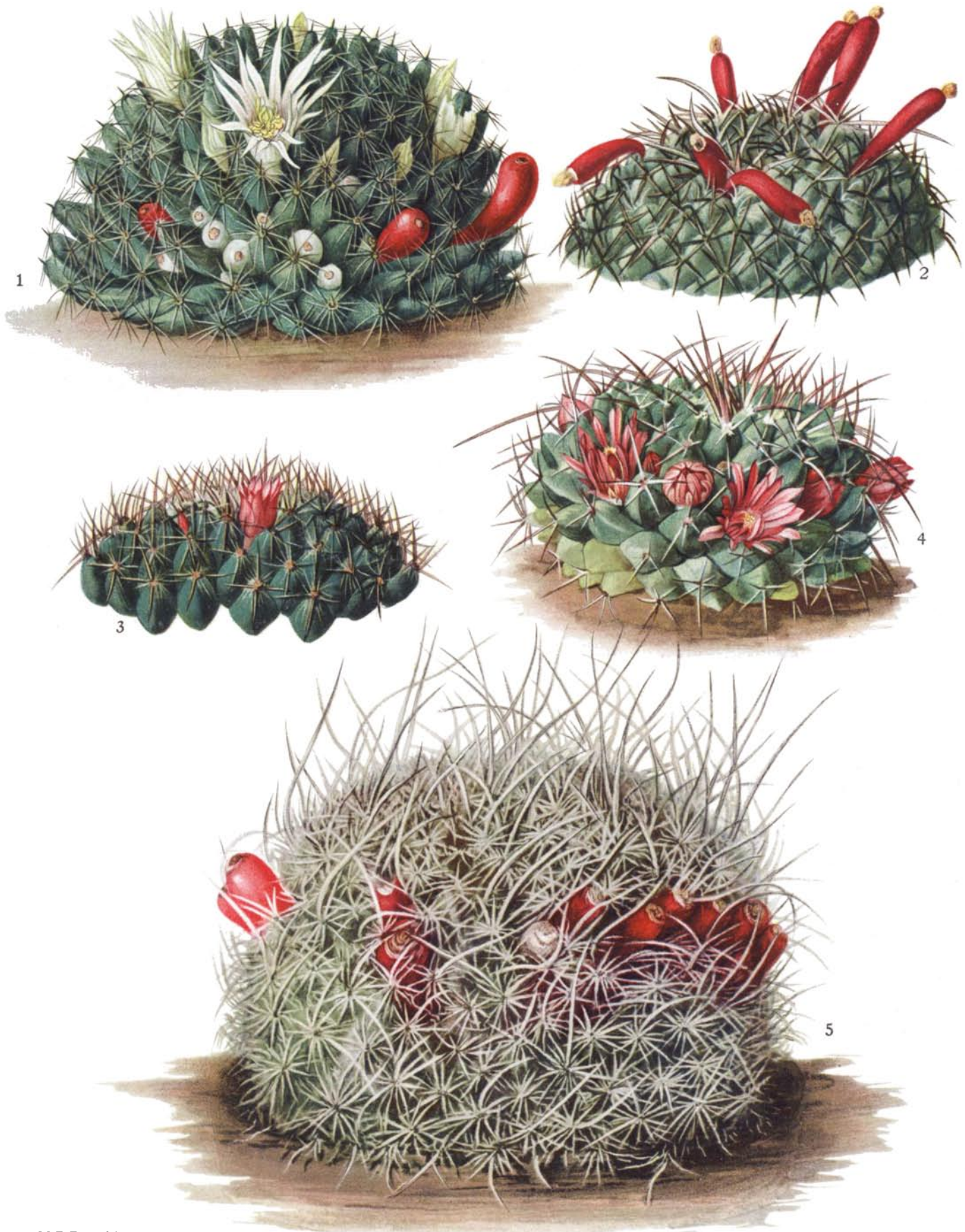
Simple, subglobose, glaucous-green; axils of young tubercles bearing white wool, becoming naked; tubercles large, 4-sided; areoles when young white-woolly, in age naked; radial spines 7 to so, grayish white, the three upper smaller, the central (Schumann says 1 or 2) recurved; flowers described by Schumann as carmine-colored.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

We know this species only from the description and illustration.





M. E. Eaton del. 1 to 4  
 D. G. Passmore del. 5

A. Hoen & Co. Baltimore

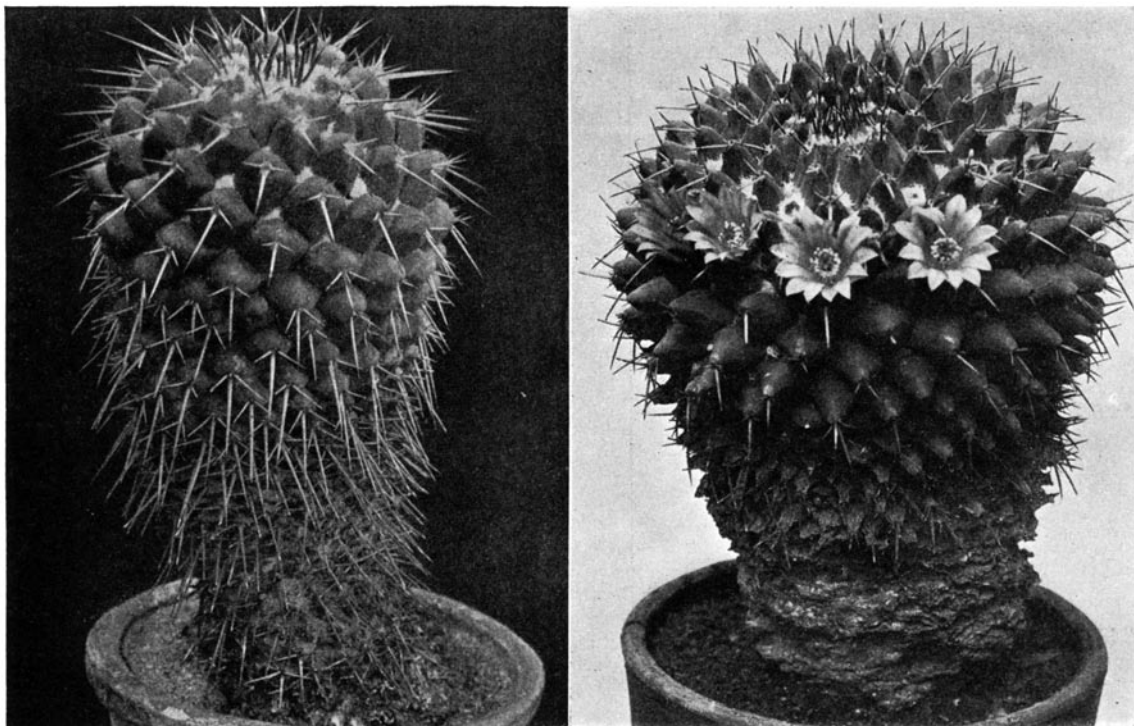
- 1. Flowering and fruiting plant of *Neomammillaria applanata*.
- 2. Top of fruiting plant of *Neomammillaria karwinskiana*.
- 3. Top of flowering plant of *Neomammillaria karwinskiana*.
- 4. Flowering plant of *Neomammillaria macrantha*.
- 5. Flowering plant of *Neomammillaria mystax*.





*Illustration.* Blühende Kakteen 1: pl. 32, as *Mammillaria centricirrha* var.

Figure 69 is from a photograph sent us by L. Quehl; figure 68 is a reproduction of the illustration cited above; figure 70 shows a plant grown in the Missouri Botanical Garden in 1905 as *Cactus neumannianus*.

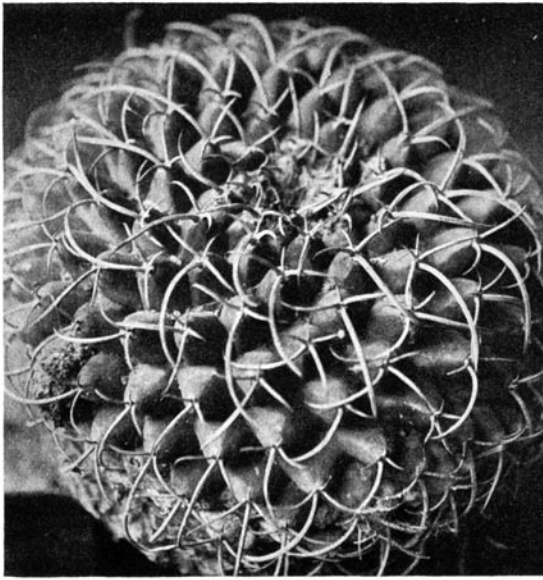
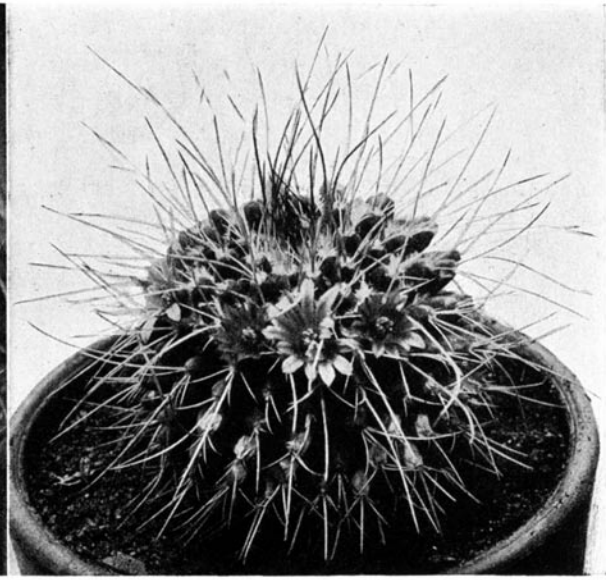


FIGS. 69 and 70.—*Neomammillaria phymatothele*.

### 13. *Neomammillaria magnimamma* (Haworth).

- Mammillaria magnimamma* Haworth, Phil. Mag. 63: 41. 1824.  
*Mammillaria divergens* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 113. 1828.  
*Mammillaria gladiata* Martius, Nov. Act. Nat. Cur. 16: 336. 1832.  
*Mammillaria ceratophora* Lehmann, Allg. Gartenz. 3: 228. 1835.  
*Mammillaria recurva* Lehmann in Pfeiffer, Enum. Cact. 15. 1837.  
*Mammillaria hystrix* Martius in Pfeiffer, Enum. Cact. 25. 1837.  
*Mammillaria ebrenbergii* Pfeiffer, Allg. Gartenz. 6: 274. 1838.  
*Mammillaria microceras* Lemaire, Cact. Aliq. Nov. 6. 1838.  
*Mammillaria deflexispina* Lemaire, Cact. Aliq. Nov. 6. 1838.  
*Mammillaria versicolor* Scheidweiler, Bull. Acad. Sci. Brux. 5: 494. 1838.  
? *Mammillaria conopsea* Scheidweiler, Bull. Acad. Sci. Brux. 5: 496. 1838.  
*Mammillaria centricirrha* Lemaire, Cact. Gen. Nov. Sp. 42. 1839.  
*Mammillaria centricirrha macrothele* Lemaire, Cact. Gen. Nov. Sp. 42. 1839.  
*Mammillaria neumanniana* Lemaire, Cact. Gen. Nov. Sp. 53. 1839.  
*Mammillaria conopsea longispina* Scheidweiler, Bull. Acad. Sci. Brux. 6: 92. 1839.  
*Mammillaria pentacantha* Pfeiffer, Allg. Gartenz. 8: 406. 1840.  
*Cactus magnimamma* Salm-Dyck in Steudel, Nom. ed. 2. 1: 246. 1840.  
*Mammillaria subcurvata* Dietrich, Allg. Gartenz. 12: 232. 1844.  
*Mammillaria diadema* Mühlenpfordt, Allg. Gartenz. 13: 346. 1845.  
*Mammillaria krameri* Mühlenpfordt, Allg. Gartenz. 13: 347. 1845.  
*Mammillaria foersteri* Mühlenpfordt, Allg. Gartenz. 14: 371. 1846.  
? *Mammillaria tetracentra* Otto in Förster, Handb. Cact. 214. 1846.  
*Mammillaria bockii* Förster, Allg. Gartenz. 15: 50. 1847.  
*Mammillaria pazzanii* Stieber, Bot. Zeit. 5: 491. 1847.  
*Mammillaria divaricata* Dietrich, Allg. Gartenz. 16: 210. 1848.  
*Mammillaria hopferiana* Linke, Allg. Gartenz. 16: 329. 1848.  
*Mammillaria glauca* Dietrich in Linke, Allg. Gartenz. 16: 330. 1848.  
*Mammillaria centricirrha hopferiana* Salm-Dyck, Cact. Hort. Dyck. 1849. 17, 123. 1850.  
*Mammillaria megacantha* Salm-Dyck, Cact. Hort. Dyck. 1849. 123. 1850.  
*Mammillaria megacantha rigidior* Salm-Dyck, Cact. Hort. Dyck. 1849. 18, 124. 1850.

- Mammillaria uberimamma* Monville in Labouret, Monogr. Cact. 520. 1853.  
 ? *Mammillaria cirrosa*\* Poselger, Allg. Gartenz. 21: 94. 1853.  
*Mammillaria pachytele* Poselger, Allg. Gartenz. 23: 17. 1855.  
*Mammillaria lactescens*† Meinshausen, Wöchenschr. Gärtn. Pflanz. 2: 117. 1859.  
*Mammillaria falcata* Hortus in Förster, Handb. Cact. ed. 2. 345. 1885.  
*Mammillaria gebweileriana* Haage in Förster, Handb. Cact. ed. 2. 358. 1885.  
*Mammillaria schmidtii* Sencke in Förster, Handb. Cact. ed. 2. 376. 1885.  
*Mammillaria krameri viridis* Haage in Förster, Handb. Cact. ed. 2. 372. 1885.  
*Cactus bockii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus centricirrhus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus conopseus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus diadema* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus divergens* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus ehrenbergii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus foersteri* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus gladiatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus glaucus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus kranzeri* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus lactescens* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus megacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus microceras* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus bystrix* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus divaricatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Lamarck, 1783.  
*Cactus neumannianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pazzanii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pentacanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus recurvus* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Miller, 5768.  
*Cactus versicolor* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus tetracentrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus subcurvatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Mammillaria centricirra magnimamma* Schumann, Gesamtb. Kakteen 582. 1898.  
*Mammillaria centricirra divergens* Schumann, Gesamtb. Kakteen 582. 1898.  
*Mammillaria centricirra bockii* Schumann, Gesamtb. Kakteen 582. 1898.  
*Mammillaria centricirra recurva* Schumann, Gesamtb. Kakteen 582. 1898.  
*Mammillaria centricirra krameri* Schumann, Gesamtb. Kakteen 582. 1898.

FIG. 71.—*Neomammillaria magnimamma*.FIG. 72.—*Neomammillaria macracantha*.

Globose, the larger plants 10 cm. in diameter, sometimes solitary but oftener cespitose with 25 in a cluster or more, very milky throughout; tubercles conic or somewhat flattened or faintly 4-angled, 1 cm. long, the axils when young densely woolly; spines 3 to 5, very unequal in length, the upper ones short and straight, the lower one or two 1.5 to 4.5 cm. long, recurved or incurved, all horn-colored, with black tips; flowers cream-colored; fruit clavate, 2 cm. long, crimson; seeds brownish.

\* Schumann refers *Mammillaria cirrosa* (he spells it *M. cirrhosa*) doubtfully to *M. centricirra*, but judging from the description it may belong elsewhere.

† Here was referred *M. neumanni glabrescens* Regel (Förster, Handb. Cact. ed. 2. 370. 1885).

*Type locality:* Not cited.

*Distribution:* Central Mexico.

This plant is very common in central Mexico, especially in the Valley of Mexico, about Tula, farther north, and also east of the City of Mexico. It makes large cespitose mounds, sometimes with many-headed branches, and has peculiar incurved spines and small flowers. It is frequently collected and has been shipped abundantly to Europe, where it has been much named, often from single joints. Our synonymy shows 34 specific names under *Mammillaria* and nearly as many under *Cactus*. Some writers have given these names varietal rank, so that this species now has about 100 names. It is a very characteristic plant and, while it may easily be confused with other species, yet, when clearly understood, its distinctness is evident.

*Mammillaria zooderi* was referred by Schumann (Gesamtb. Kakteen 582. 1898) as a synonym of *M. centricirrha* but the Index Kewensis Suppl. 5. cites Schelle (Handb. Kakteenk. 268. 1907), who gives it as a synonym of *M. centricirrha zooderi*. Neither the specific nor the varietal name can be considered published.

Schelle (Handb. Kakteenk. 266 to 268. 1907) lists 62 varietal names of *Mammillaria centricirrha*, all but one or two of which are based on species of the same name. Some of these perhaps are to be referred elsewhere, but we have listed them here as follows:

amoena	falcata	lactescens	posteriana
arietina	foersteri	lehmannii	pulchra
bockii	gebweileri	longispina	recurva
boucheana	gladiata	macracantha	schiedeana
ceratophora	glauca	magnimamma	schmidtii
cirrhusa	globosa	megacantha	spinosior
conopsea	grandidens	microceras	subcurvata
cristata	guilleminiana	montsii	tetracantha
deflexispina	hopfferiana	moritziana	uberimamma
destorum	hystrix	neumanniana	valida
de tampico	hystrix grandicornis	nordmannii	versicolor
diacantha	hystrix longispina	obconella	viridis
diadema	jorderi	pachythele	zooderi
clivaricata	krameri	pazzanii	zuccariniana
divergens	krameri longispina	pentacantha	
ehrenbergii	krausei	polygoria	

The following garden names are listed by Schumann (Gesamtb. Kakteen 582. 1898) as belonging to this species:

boucheana	hystrix	moritziana	tetracantha
destorum	jorderi	nordmannii	viridis
de tampico	lehmannii	obconella	zooderi
grandicornis	longispina	posteriana	
grandidens	montsii	spinosior	

*Illustrations:* Hort. Belge 5: pl. 6, as *Mammillaria conopsea*; Reiche, Elem. Bot. f. 166, as *M. centricirrha*. Schelle's figure (Handb. Kakteenk. 268. f. 189) we are not able to place. The illustration in Blühende Kakteen (1: pl. 32) as *M. centricirrha* var. does not seem to be of this relationship.

Plate XI, figure 1, shows a small potted plant which flowered in the New York Botanical Garden, May 6, 1913. Figure 71 is from a photograph of a plant obtained on the pedregal near San Angel, Valley of Mexico, by O. Solis in 1919.

#### 14. *Neomammillaria macracantha* (De Candolle).

*Mammillaria macracantha* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 113. 1828.

*Cactus macracanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus alternatus* Coulter, Contr. U. S. Nat. Herb. 3: 95. 1894.

*Mammillaria centricirrha macracantha* Schumann, Gesamtb. Kakteen 582. 1898.

Depressed-globose, 2 to 3 cm. high, 6 to 15 cm. in diameter; axils of old tubercles naked, of young ones densely lanate; tubercles ovoid, somewhat 4-sided; young spine-areoles somewhat tomentose; spines 1 or 2, somewhat angled, elongated, the longest 5 cm. long (but not elongated



in greenhouse specimens), porrect or more or less reflexed, reddish in age; flowers dark pink, a little longer than the tubercles; perianth-segments linear, spreading; stigma-lobes 5 to 7, rose-colored.

*Type locality:* Mexico.

*Distribution:* San Luis Potosí.

Our description is based on plants from San Luis Potosí, Mexico, especially those collected by Mrs. Vera in 1912.

Schumann refers *Mammillaria macracantha* to *M. centricirrha* but it must be different. Rümpler refers to it also *M. zuccarinii*, but this has different flowers and we have recognized it as a species. *M. macrantha* (Förster, Handb. Cact. 189. 1894) is referred here.

*Illustrations:* De Candolle, Mém. Cact. pl. 9; Förster, Handb. Cact. ed. 2. 378. f. 38, as *Mammillaria macracantha*; Schumann, Gesamtb. Kakteen f. 93; Thomas, Zimmerkultur Kakteen 57; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 13, as *M. centricirrha macracantha*; (?) Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 170. f. 7, E, as *M. centricirrha*.

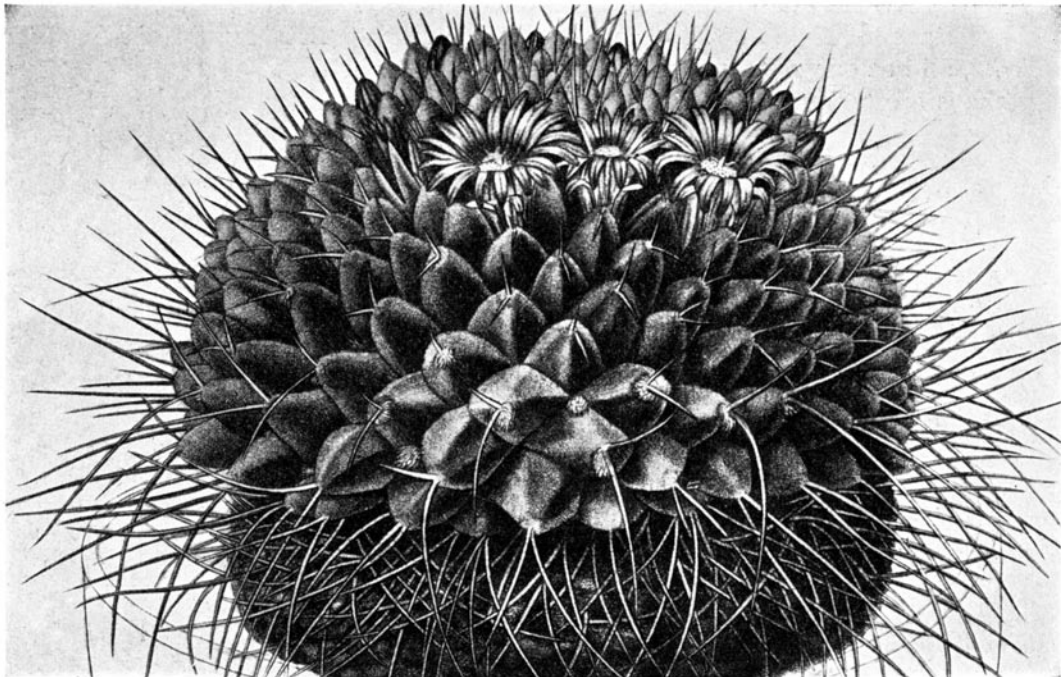


FIG. 72a.—*Neomammillaria macracantha*.

Plate IX, figure 4, shows a plant received from Kew in 1902, which flowered in the New York Botanical Garden on April 27, 1912. Figure 72 is a reproduction of the first illustration cited above; figure 72 is from a photograph of the plant distributed by the Kew Gardens in 1902 which flowered in the New York Botanical Garden in 1905.

#### 15. *Neomammillaria johnstonii* sp. nov.

Plants large for the genus, globular to short-oblong, 15 to 20 cm. high, slightly depressed at apex; tubercles 1 to 1.5 cm. long, 4-angled throughout, somewhat bluish, naked in their axils, milky; spine-areoles when young short-floccose, in age glabrate, circular; radial spines 10 to 14, white, but with brown tips, somewhat spreading, stiff acicular; central spines 2, much longer and stouter than the radials, slightly diverging, bluish brown; flowers from near top of plant but from axils of old tubercles, campanulate, 2 cm. long; outer perianth-segments ovate-lanceolate, greenish white with a reddish-brown mid-rib; inner perianth-segments narrow, acuminate, white; filaments short, pinkish; style pinkish; stigma-lobes linear, 6 or 7, green.



1



2



1. *Coryphantha sulcata*, from Sabinal Texas.
2. *Neomammillaria runyonii*, from Monterey, Mexico.



Collected at San Carlos Bay, Sonora, Mexico, by Ivan M. Johnston in 1921 (No. 4373) and flowered in Washington in April 1922 and April 1923.

Figure 72*b* is from a photograph of the type specimen.

**16. *Neomammillaria melanocentra* (Poselger).**

*Mammillaria melanocentra* Poselger, Allg. Gartenz. 23: 17. 1855.

*Mammillaria erinacea* Poselger, Allg. Gartenz. 23: 18. 1855.

*Mammillaria valida* Weber, Dict. Hort. Bois 806. 1898.

Short-cylindric, glaucous-green; tubercles in 8 and 13 spirals, strongly angled; radial spines 6, stout-subulate, 1.5 to 2 cm. long, brownish; central spines solitary, black, 2 to 3 cm. long, greatly overtopping the stem; flowers pinkish red, the segments linear, acute.

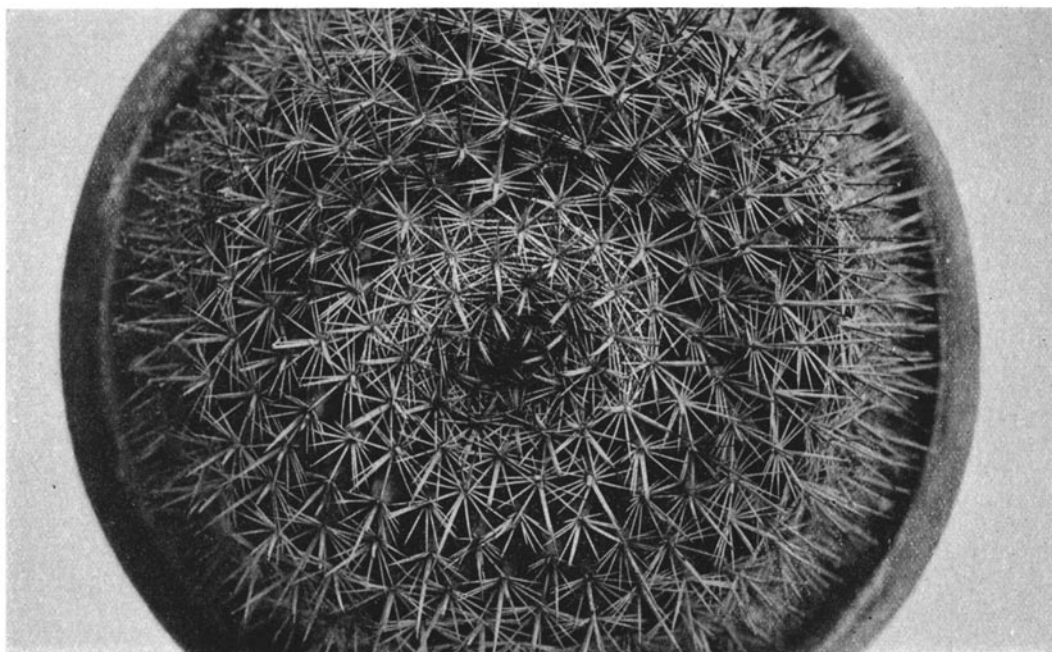


FIG. 72*b*.—*Neomammillaria johnstonii*.

*Type locality*: Near Monterey, Mexico.

*Distribution*: Mexico, but range unknown.

*Illustration*: Blühende Kakteen 3: pl. 129, as *Mammillaria melanocentra*.

Figure 73 is a reproduction of the illustration cited above.

**17. *Neomammillaria runyonii* sp. nov.**

Plants deep-seated, depressed; tubercles milky, elongated, 1.5 cm. long, strongly 4-angled, their tips widely separated from each other, their axils long-woolly (never setose), especially when young, sometimes permanently so; young spine-areoles long-woolly, but in age glabrate; radial spines 6 to 8, slightly ascending, the outer ones stouter and often dark brown in color, the inner ones about half the length of the outer and nearly white; central spine solitary, brown to black, erect, 10 to 14 mm. long; flowers about 2 cm. long, purple; perianth-segments oblong; fruit red, clavate, 12 to 16 mm. long; seeds brown.

Collected on El Mirador, near Monterey, Mexico, by Robert Runyon in 1921.

Plate x, figure 2, is from a photograph of one of the plants Mr. Runyon originally brought from El Mirador.

**18. *Neomammillaria sartorii* (J. A. Purpus).**

*Mammillaria sartorii* J. A. Purpus, Monatschr. Kakteenk. 21: 50. 1911.

Globose to short-cylindric, 5 to 13 cm. in diameter, cespitose, very milky, bluish green; tubercles strongly 4-angled, pointed, 8 to 12 mm. long, their axils without bristles and in time without wool; spine-areoles circular when young, densely white-woolly but in age glabrate; spines 4 to 6, very unequal, 5 to 8 mm. long, whitish or sometimes brownish, the central spine solitary; flowers 1.5 to about 2 cm. long, deep carmine; perianth-segments oblong, apiculate, the tip dry, the outer ciliate, the inner serrulate; stamens and style purplish above; stigma-lobes 4, purple, short; fruit carmine; seeds brown.

*Type locality:* Barranca de Panoaya, Vera Cruz, Mexico.

*Distribution:* Mountains of Vera Cruz, 300 to 600 meters altitude.

Our description of this interesting and variable little plant is drawn from specimens sent to us by Dr. C. A. Purpus in 1920, collected at the type locality. There the plant

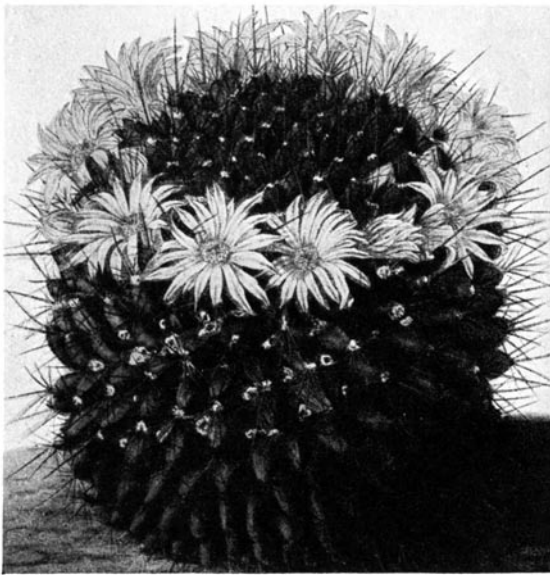


FIG. 73.—*Neomammillaria melanocentra*.

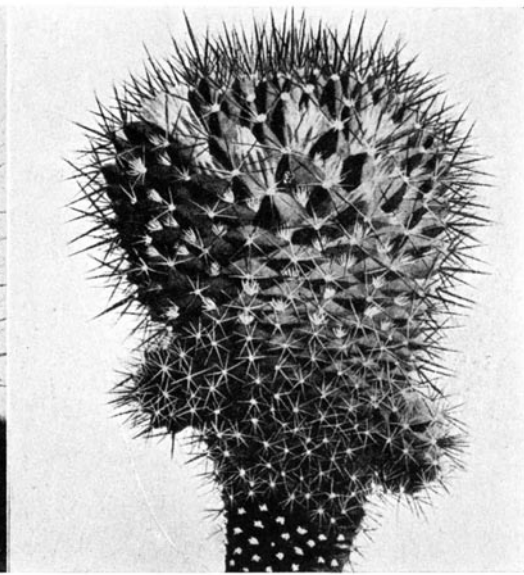


FIG. 74.—*Neomammillaria seitziana*.

grows among rocks in rich humus of the decaying leaves in half shade or in the sun. It is very different from any other *Neomammillaria* which we have seen; the tubercles are copiously milky and the slightest bruise causes the white milk to ooze out. It flowered in Washington in April 1923.

Dr. C. A. Purpus writes that this species is common in many of the barrancas of Vera Cruz and that it is very variable. When first described two forms (*brevispina* and *longispina*) were characterized.

The species was named for Florantino Sartorius (1837-1908) who assisted Dr. Purpus for many years in his botanical expeditions. He was a son of Carlos Sartorius (1795-1872), a distinguished scientist who went to Mexico about 1825, where he made large collections of plants. Mr. W. Botting Hemsley (Biol. Centr. Amer. Bot. 4 123) states that his herbarium was left to the Smithsonian Institution, but no record of this gift can now be found nor can any of his plants be found in the U. S. National Herbarium.

Here may or may not belong *Mammillaria rebsamiana* (Cact. Journ. 2 176), advertised as a new discovery by Louis Murillo, who lived at Jalapa, Mexico.

*Illustration:* Monatschr. Kakteenk. 21: 51, as *Mammillaria sartorii*.

Figure 75 is from a photograph showing two plants sent from the type locality of *Mammillaria sartorii* by Dr. Purpus in 1920.



**19. Neomammillaria seitziana** (Martius).

*Mammillaria seitziana* Martius in Pfeiffer, Enum. Cact. 18. 1837.  
*Mammillaria foveolata* Mühlenpfordt, Allg. Gartenz. 14: 372. 1846.  
*Cactus foveolatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus seitzianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Solitary or somewhat proliferous at base, cylindric, 12 cm. high; tubercles green, conic, somewhat angled; axils of tubercles woolly; areoles at first white-woolly, becoming glabrate; spines 4,\* the upper and lower longer than the lateral; flowers rose-colored, about 25 mm. long; outer perianth-segments olive colored; inner perianth-segments linear, lanceolate, white, nerved with red; stamens white; stigma-lobes 6.

*Type locality:* Ixmiquilpan, Mexico.

*Distribution:* State of Hidalgo.

We have not seen this species and hence our description is compiled.

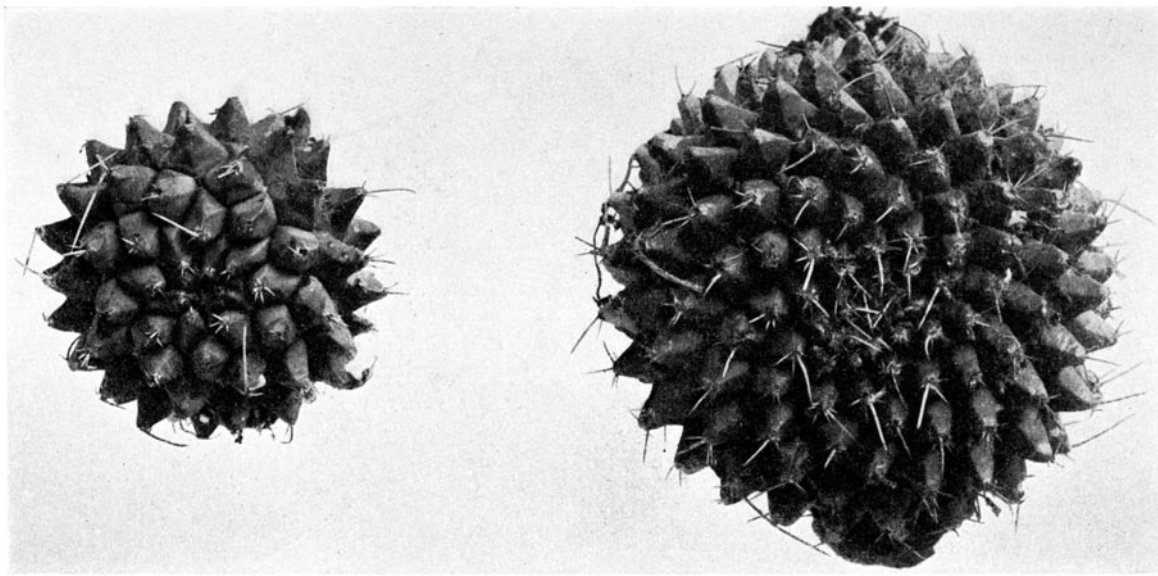


FIG. 75.—*Neomammillaria sartorii*.

*Mammillaria senckena* and *M. senckei* are two names listed as synonyms of this species, but we do not find that they have ever been published.

*Illustration:* Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 8, as *Mammillaria seitziana*. Figure 74 is reproduced from the illustration cited above.

**20. Neomammillaria ortegae** sp. nov.

Simple to short-clavate, 5 to 8 cm. in diameter, light green, lactiferous; tubercles rather short (8 to 10 mm. long), broader at base, obscurely 4-angled, somewhat pointed, very woolly but not setose in their axils; spines all radial, 3 or 4, more commonly (sometimes with 1 or 2 small additional spines or bristles, perhaps deciduous), spreading, straw-colored, 6 to 10 mm. long; flowers small; fruit clavate, 1 cm. long; seeds numerous, small, angled, brown.

Collected by J. G. Ortega in Sinaloa, Mexico, in 1921 and 1922.

Figure 76 shows the type specimens as photographed in the U. S. National Museum under the direction of A. J. Olmstead.

\* Schumann says central spines yellow.

**21. Neomammillaria meiacantha** (Engelmann).

*Mammillaria meiacantha* Engelmann, Proc. Amer. Acad. 3: 263. 1856.  
*Cactus meiacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Somewhat depressed, 12 cm. broad or more; tubercles milky, bluish green, more or less angled, somewhat flattened dorsally, their axils naked; spines 5 to 9, ascending, pale flesh-colored, the tips darker, the lower a little stouter than the upper; central spines porrect, similar to but a little stouter than radials and often subradial; spine-areoles short-woolly at first; flowers not very abundant, at least on cultivated plants; inner perianth-segments white with a pink stripe along inside of midrib, one-fourth its width, greenish brown on outside; filaments white; style pink; stigma-lobes yellow; fruit scarlet, 22 mm. long; seeds brownish.

*Type locality:* Western Texas and New Mexico.

*Distribution:* Texas, New Mexico, and northern Mexico.

According to Dr. Engelmann, this species was first obtained in New Mexico by the Missouri Volunteers in 1847 and it has frequently been collected since that time. In Mexico it extends as far south as Zacatecas, but develops into some unusual forms. It was repeatedly collected in Zacatecas by F. E. Lloyd in 1908.

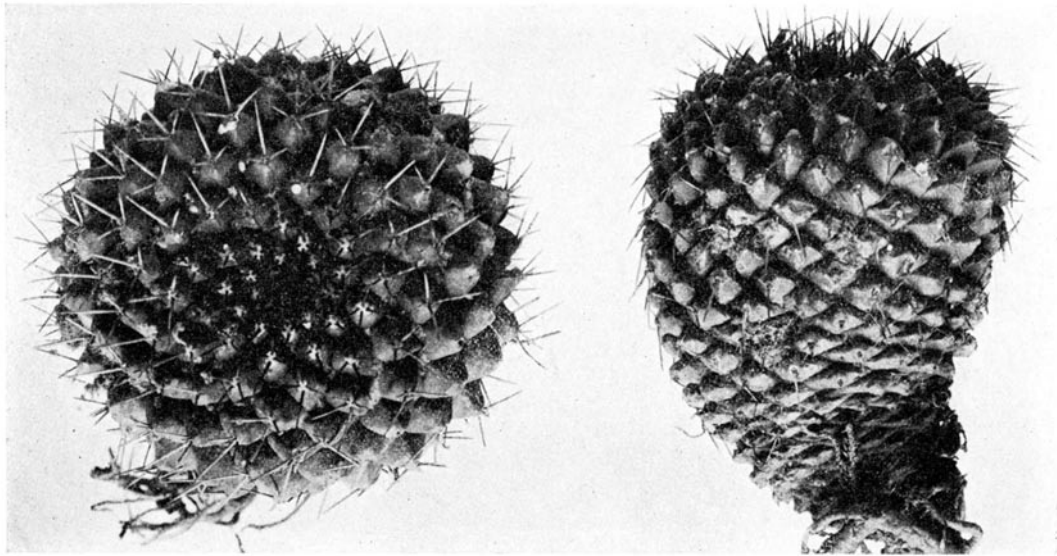


FIG. 76.—*Neomammillaria ortegae*.

*Illustrations:* Blühende Kakteen 1: pl. 47\*; Blanc, Cacti 71. No. 1388; Cycl. Amer. Hort. Bailey 2: f. 1357. Stand. Cycl. Hort. Bailey 4: f. 2316; West Amer. Sci. 13: 39; Schelle, Handb. Kakteenk. 258. f. 190; Cact. Mex. Bound. pl. 9, f. 1 to 3; Cact. Journ. 1: pl. for October, as *Mammillaria meiacantha*.

Figure 77 shows the plant illustrated in the Mexican Boundary Report as cited above.

**22. Neomammillaria scrippsiana** sp. nov.

Globose or becoming short-cylindric, 6 cm. high; tubercles milky, in 26 rows, bluish green, very woolly in axils when young; spine-areoles very woolly at first; radial spines 8 to 20, slender, pale with reddish tips; central spines generally 2, a little longer than radials, brown throughout, slightly divergent; flowers borne near top of plant but not in axils of youngest tubercles, about 1 cm. long, pinkish, with margins of perianth-segments paler; anthers pinkish; stigma-lobes about 6, recurved, cream-colored.

Collected by Dr. Rose in the barranca of Guadalajara, Jalisco, in September 1903 (No. 871, type). The plant has flowered repeatedly in Washington since April 1906. Specimens were afterward collected near the same place by C. R. Orcutt. It is named in honor of E. W. Scripps, the founder of Science Service and The Scripps Institution for Biological Research of the University of California.

Figure 78 is from a photograph of the type specimen.

\* This plate is labeled *Mammillaria meionacantha*, but described under *M. meonacantha*.

**23. Neomammillaria gigantea** (Hildmann).

*Mammillaria gigantea* Hildmann in Schumann, Gesamtb. Kakteen 578. 1898.

Solitary or cespitose, depressed-globose, 10 cm. high, 15 to 17 cm. in diameter; axils of tubercles lanate; radial spines 12, subulate, white, 3 mm. long; central spines 4 to 6, stout, 2 cm. long, curved, yellowish brown; flowers yellowish green.

*Type locality:* Guanajuato, Mexico.

*Distribution:* Known only from the type locality.

*Mammillaria macdowellii* Heese and *M. guanajuatensis* Runge are two names referred here by Schumann (Gesamtb. Kakteen 578. 1898), but they were not published.

Plate XI, figure 3, shows a plant in fruit, collected by Dr. Safford at the type locality.

**24. Neomammillaria peninsularis** sp. nov.

Plants solitary or in clusters, deeply seated in the ground, more or less flat-topped, bluish green, the stems and tubercles very milky; tubercles erect, pointed, 4-angled, pale green; radial spines 4 to 8,

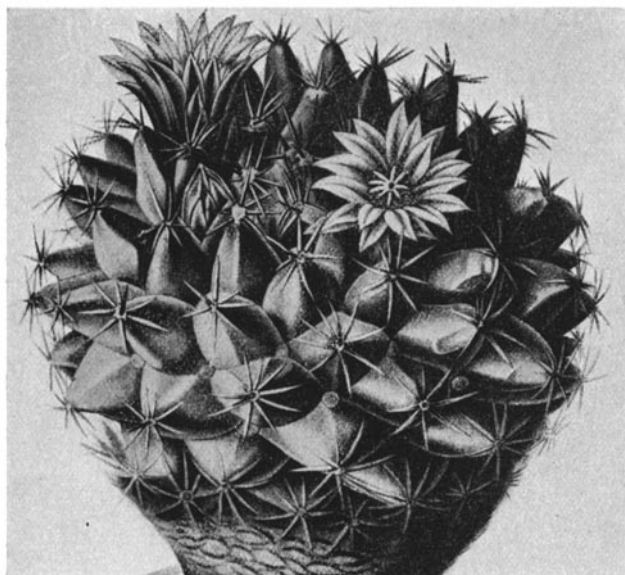


FIG. 77.—*Neomammillaria meiacantha*.

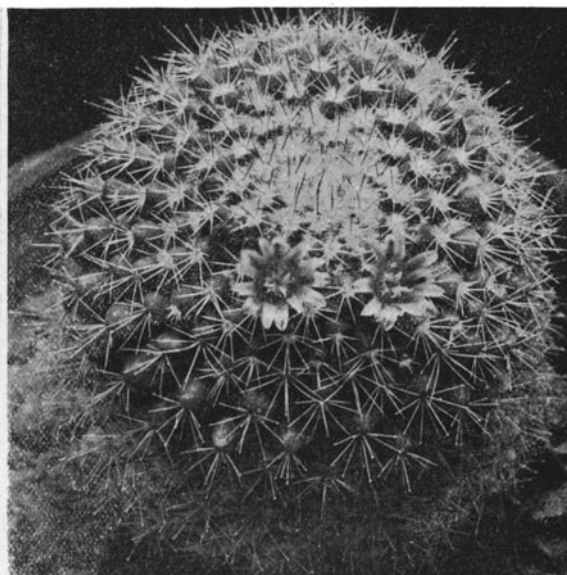


FIG. 78.—*Neomammillaria scripsiana*.

nearly erect, short and pale with brown tips, one sometimes nearly central; axils of tubercles bearing long wool but in age naked; flowers 1.5 cm. long, arising from old tubercles but near the center; outer perianth-segments narrow, reddish; inner perianth-segments narrow, acuminate, green or light yellow with erose margins; stamens pale; style longer than stamens; stigma-lobes green, linear.

Collected by Dr. Rose at Cape San Lucas, Lower California, March 23, 19 " (No. 16377).

**25. Neomammillaria flavovirens** (Salm-Dyck).

*Mammillaria flavovirens* Salm-Dyck, Cact. Hort. Dyck. 1849. 117. 1850.

Either solitary or somewhat cespitose, globose or short-cylindrical, 6 to 8 cm. high, light or yellowish green; tubercles somewhat 4-angled; axils naked; radial spines 5, slender, subulate; central spines solitary, porrect; flowers white, streaked with rose.

*Type locality:* Not cited.

*Distribution:* Mexico.

The above description is compiled, since the species is not otherwise known to us.



*Mammillaria flavovirens cristata* Salm-Dyck (Cact. Hort. Dyck. 1849. 16. 1850) is only a name.

The name *Mammillaria daedalea viridis* Fennel is given by Labouret (Monogr. Cact. 100. 1853) as a synonym of *M. flavovirens*.

**26. Neomammillaria sempervivi** (De Candolle).

*Mammillaria sempervivi* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 114. 1828.

*Mammillaria sempervivi tetracantha* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 114. 1828.

*Mammillaria caput-medusae* Otto in Pfeiffer, Enum. Cact. 22. 1837.

*Mammillaria diacantha* Lemaire, Cact. Aliq. Nov. 2. 1838.

*Mammillaria sempervivi laeteviridis* Salm-Dyck, Cact. Hort. Dyck. 1849. 113. 1850.

*Mammillaria caput-medusae centrispina* Salm-Dyck in Labouret, Monogr. Cact. 91. 1853.

*Mammillaria caput-medusae crassior* Salm-Dyck in Labouret, Monogr. Cact. 91. 1853.

*Mammillaria caput-medusae tetracantha* Salm-Dyck in Labouret, Monogr. Cact. 91. 1853.

*Cactus sempervivi* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

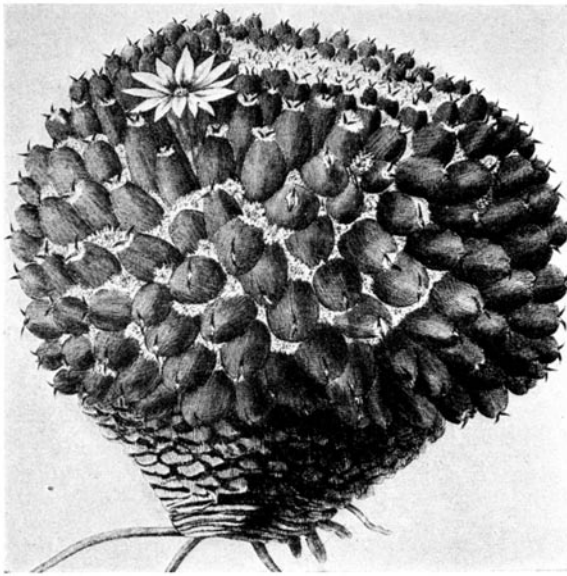


FIG. 79.—*Neomammillaria sempervivi*.

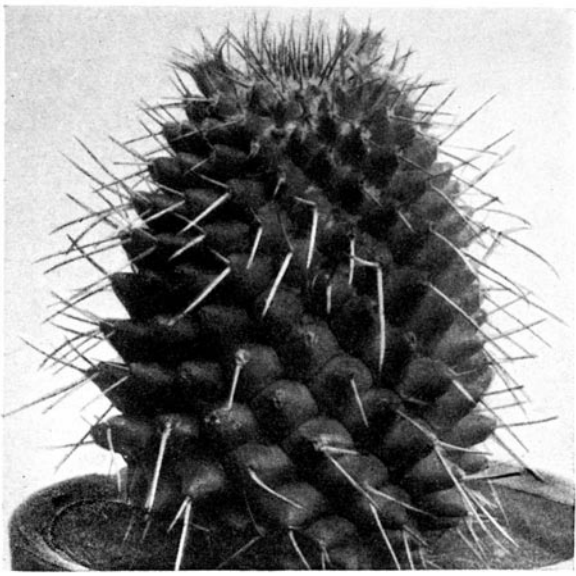


FIG. 80.—*Neomammillaria polythele*.

Solitary or somewhat cespitose, flattened above, narrowed below; axils of tubercles very woolly; tubercles short, milky, angled; spine-areoles very woolly when young, but glabrate in age; radial spines 3 to 7, short, white, caducous; central spines 2, ascending, brownish, stoutish; flowers dull white with reddish lines; inner perianth-segments acute, spreading.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

Dr. Rose collected what he took to be this species in the Barranca Sierra de la Mesa, Hidalgo, Mexico, in 1905, but this plant differs somewhat from De Candolle's illustration. The central spines, while generally 2, are sometimes 3 and are not so stout; the radial spines are deciduous, as they should be in this species. It flowered once at Washington.

An examination of the original description of *Mammillaria caput-medusae* suggests the probability that this species is identical with *Mammillaria sempervivi*. The two names appeared in collections in 1829 and may have come from a common source. Indeed, Schumann credits T. Coulter with having obtained *M. caput-medusae*, while we know that *M. sempervivi* was based on Coulter's plant and, then, too, Pfeiffer refers *M. sempervivi* as a synonym of *M. caput-medusae*. Knippel's illustration of *M. caput-medusae* (pl. 19) seems to be referable here. Nicholson states that *M. caput-medusae* is only a form of this species.



*Mammillaria staurotypa* (Förster, Handb. Cact. 221. 1846), credited to Scheidweiler by Schumann and referred by him as a synonym of *M. caput-medusae*, seems never to have been described but may belong here.

The two varieties of *Mammillaria caput-medusae*, *tetracantha* and *hexacantha*, given by Salm-Dyck (Cact. Hort. Dyck. 1844. 10. 1845) are without description. The first was afterwards described by Labouret.

*Illustrations*: De Candolle, Mém. Cact. pl. 8; Förster, Handb. Cact. ed. 2. 344. f. 36; Schumann, Gesamtb. Kakteen 589. f. 95; Dict. Gard. Nicholson 4: 565. f. 38; Suppl. 518. f. 556; Watson, Cact. Cult. 175. f. 70, as *Mammillaria sempervivi*; Schelle, Handb. Kakteenk. 270. f. 192; Succulenta 5: 51, as *M. caput-medusae*.

Figure 79 is a reproduction of the first illustration cited above.

### 27. *Neomammillaria obscura* (Hildmann).

*Mammillaria obscura* Hildmann, Monatsschr. Kakteenk. 1: 52. 1891.

Solitary, depressed-globose, blackish green; axils woolly; tubercles arranged in 13 and 2! spirals, angled, stout, woolly in their axils but not setose; radial spines 6 to 8, subulate, white, unequal, the upper ones shorter than the lower; central spines 2 to 4, the lower one slightly curved, black; flowers small, yellowish white.

*Type locality*: Mexico.

*Distribution*: Mexico, but range unknown.

The plant is known to us only from description and illustration.

Seeds of this species were introduced into Germany from Mexico about 1885 by Mr. Droege and flowers were obtained in 1891.

The earlier name, *Mammillaria obscura* Scheidweiler (Förster, Handb. Cact. 213. 1846), but used only as a synonym and for some other plant, does not interfere with our present use of the name.

*Illustration*: Monatsschr. Kakteenk. 1: facing 52, as *Mammillaria obscura*.

### 28. *Neomammillaria crocidata* (Lemaire).

*Mammillaria crocidata* Lemaire, Cact. Aliq. Nov. 9. 1838.

*Mammillaria webbiana* Lemaire, Cact. Gen. Nov. Sp. 45. 1839.

*Cactus crocidatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus webbianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plant globose or a little depressed, 5 to 6 cm. in diameter; radial spines 6 or 7, dark brown or nearly black; central spines none; axils of tubercles in young plant densely woolly; flowers from axils of old tubercles near the top of plant, small, reddish purple, 12 to 14 mm. long; outer perianth segments ciliate; inner perianth-segments acuminate; filaments, style, and stigma-lobes reddish; stigma-lobes 3 or 4; fruit not seen.

*Type locality*: Mexico.

*Distribution*: Central Mexico.

Described here from plants collected by Dr. Rose near Queretaro, Mexico, in 1906, which flowered in August and September 1908, and again in April 1909 (No. 1072). Our specimen has more spines than the original *M. crocidata*; it is also near *M. carnea* but with different colored stigma-lobes; its tubercles are about 6 mm. high.

Schumann places this species near *M. carnea* and among the cylindrical species, but it was originally described as depressed.

*Mammillaria crocidata quadrispina* Pfeiffer and Salm-Dyck, mentioned by Förster (Handb. Cact. 220. 1846) as a rare form and afterwards briefly described by Labouret (Monogr. Cact. 93. 1853), may or may not belong here.

Plate VII, figure 5, shows a flowering plant collected by Dr. Rose in Queretaro in 1906 and painted in the New York Botanical Garden, September 5, 1911.

**29. Neomammillaria polythele** (Martius).

- Mammillaria polythele* Martius, Nov. Act. Nat. Cur. **16**: 328. 1832.  
*Mammillaria quadrispina* Martius, Nov. Act. Nat. Cur. **16**: 329. 1832.  
*Mammillaria columnaris* Martius, Nov. Act. Nat. Cur. **16**: 330. 1832.  
*Mammillaria affinis* De Candolle, Mém. Cact. **11**. 1834.  
*Mammillaria setosa* Pfeiffer, Allg. Gartenz. **3**: 379. 1835.  
*Mammillaria polythele quadrispina* Salm-Dyck in Walpers, Repert. Bot. **2**: 271. 1843.  
*Mammillaria polythele columnaris* Salm-Dyck in Walpers, Repert. Bot. **2**: 271. 1843.  
*Mammillaria polythele setosa* Salm-Dyck, Cact. Hort. Dyck. 1844. 9. 1845.  
*Mammillaria polythele hexacantha* Salm-Dyck, Cact. Hort. Dyck. 1849. 15. 1850.  
*Mammillaria polythele latimamma* Salm-Dyck, Cact. Hort. Dyck. 1849. 112. 1850.  
*Cactus affinis* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.  
*Cactus quadrispinus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus setosus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus polythele* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
 ? *Mammillaria hidalgensis* Purpus, Monatsschr. Kakteenk. **17**: 118. 1907.

Elongated, cylindric, often 3 to 5 dm. high, 7 to 10 cm. in diameter; tubercles milky, in about 21 spirals, 10 to 12 mm. long, nearly terete, somewhat narrowed toward apex, dull green; axils of young tubercles densely long-woolly, the wool nearly covering the top of the plant, in age becoming naked; spines 2 to 4, sometimes 6, all radial, somewhat spreading, 1 to 2.5 cm. long, reddish, straight or a little curved; flowers from near top of plant, reddish, 8 to 10 mm. long; perianth-segments narrow, acuminate; fruit red, clavate; seeds small, brownish.

*Type locality*: Mexico.

*Distribution*: State of Hidalgo.

In 1905 Dr. Rose collected living plants of this species near Ixmiquilpan. It is a rather striking plant, growing very tall and flowering near the top.

Schumann places this species in the Section *Hydrochylus*, in which the sap is watery, but Martius in his original description says definitely that it is milky.

*Mammillaria aciculata* Otto (Pfeiffer, Enum. Cact. 29. 1837; *M. polythele aciculata* Salm-Dyck, Cact. Hort. Dyck. 1844. 9. 1845) is referred here by Schumann but should be excluded; it came from the cold regions of Mexico and was described as having 20 white slender radial spines.

*Mammillaria columnaris minor* Martius and *M. quadrispina major*, mentioned by Förster (Handb. Cact. 214, 215. 1846), probably belong here.

*Mammillaria cataphracta* Martius was given by Pfeiffer (Enum. Cact. 11. 1837) as a synonym of *M. affinis* and by Salm-Dyck (Hort. Dyck. 155. 1834) as a synonym of *M. angularis*.

*Illustrations*: Nov. Act. Nat. Cur. **16**: pl. 19, as *Mammillaria polythele*; Monatsschr. Kakteenk. **17**: 119; Möllers Deutsche Gärt. Zeit. **25**: 47. f. 8, No. 10, as *M. hidalgensis*; De Candolle, Mém. Cact. pl. 6, as *M. affinis*; Abh. Bayer. Akad. Wiss. München **2**: pl. 1, I. f. 2, as *M. columnaris*.

Figure 80 is from a photograph of a plant collected in the state of Hidalgo in 1905 which has heretofore passed as *Mammillaria hidalgensis*.

**30. Neomammillaria carnea** (Zuccarini).

- Mammillaria carnea* Zuccarini in Pfeiffer, Enum. Cact. 19. 1837.  
*Mammillaria subtetragona* Dietrich, Allg. Gartenz. **8**: 169. 1840.  
*Mammillaria aeruginosa* Scheidweiler, Allg. Gartenz. **8**: 338. 1840.  
*Mammillaria pallescens* Scheidweiler, Allg. Gartenz. **9**: 42. 1841.  
*Mammillaria villifera carnea* Salm-Dyck, Cact. Hort. Dyck. 1849. 16. 1850.  
*Mammillaria villifera aeruginosa* Salm-Dyck, Cact. Hort. Dyck. 1849. 16. 1850.  
*Mammillaria villifera cirrosa*\* Salm-Dyck, Cact. Hort. Dyck. 1849. 115. 1850.  
*Cactus aeruginosus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.  
*Cactus carneus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.  
*Cactus pallescens* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus subtetragonus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Mammillaria carnea cirrosa* Gürke, Blühende Kakteen **1**: under pl. 60. 1905.  
*Mammillaria carnea aeruginosa* Gürke, Blühende Kakteen **1**: under pl. 60. 1905.

Plants solitary, cylindric, 8 to 9 cm. high; tubercles 4-angled, milky, their axils woolly, the upper ones erect; spines 4, straight, reddish, the lower one 10 mm. long, twice as long as the other; flowers

\* Förster (Handb. Cact. ed. 2. 342. 1885) spells this name, *cirrrosa*.

borne in the old axils; outer perianth-segments nearly 2 cm. long, nearly erect, flesh-colored; fruit pear-shaped, obtuse, bright red.

*Type locality:* Ixmiquilpan, Mexico.

*Distribution:* Central and southern Mexico.

*Mammillaria villifera* Otto, referred here by Schumann, must belong elsewhere, since the axils of the tubercles bear setae.

*Illustrations:* Blühende Kakteen 1: pl. 60; Monatsschr. Kakteenk. 28: 59; Schelle, Handb. Kakteenk. 271. f. 193, as *Mammillaria carnea*.

Plate VII, figure 7, shows a plant collected by Dr. Rose at Tehuacán in 1906, which flowered in the New York Botanical Garden, May 4, 1912. Figure 81 is from a photograph of a plant collected by Dr. Rose at Tehuacán in 1905.

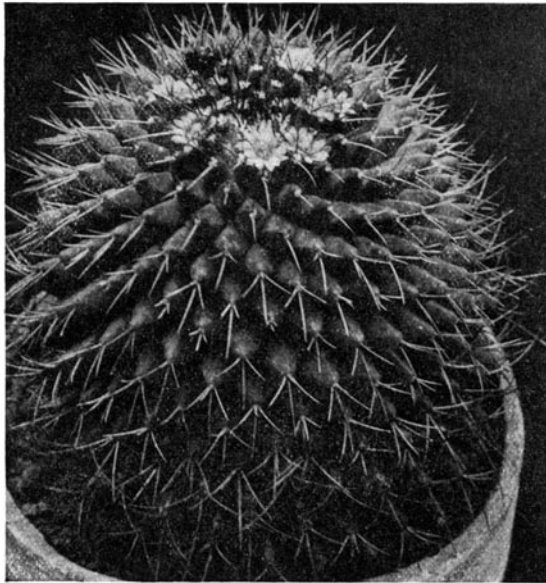


FIG. 81.—*Neomammillaria carnea*.

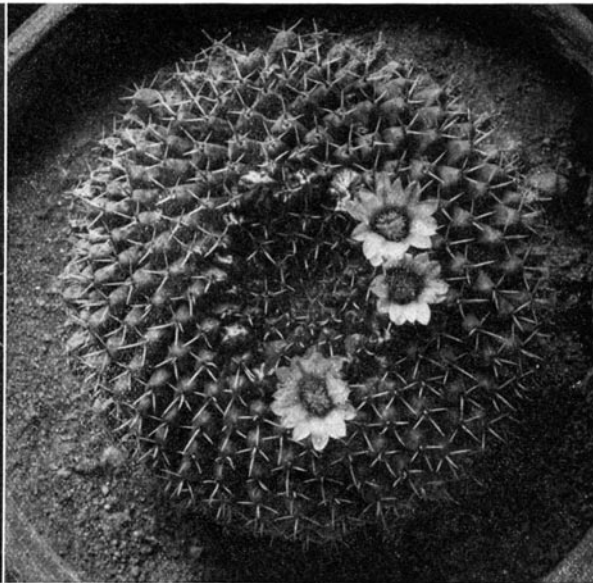


FIG. 82.—*Neomammillaria lloydii*.

### 31. *Neomammillaria lloydii* sp. nov.

Plant-body at first flattened but in cultivation becoming elongated, sometimes 10 cm. long, 6 to 7 cm. in diameter; axils of young tubercles only slightly woolly; tubercles milky, small, numerous, 4-angled, woolly when quite young; radial spines 3 or 4, ascending, glabrous, the uppermost one red or dark brown, the others whitish, 2 to 5 mm. long; central spines none; flowers in a ring near center of plant; outer perianth-segments dark red with light or colored margins; inner perianth-segments white with a tinge of red, and dark-red central stripes, not ciliate, apiculate, spreading above; filaments pale below, pinkish above; style pinkish above.

Collected by F. E. Lloyd in the State of Zacatecas, Mexico, in '909, and flowered in Washington in 1911, 1912 (March), and 1915 (April).

Figure 82 is from a photograph of the type plant (Lloyd, No. 55).

### 32. *Neomammillaria zuccariniana* (Martius).

*Mammillaria zuccariniana* Martius, Nov. Act. Nat. Cur. 16: 331. 1832.

Globose to elongated-cylindric, 8 to 20 cm. long, bluish green, milky; areoles and axils of young tubercles filled with white wool; radial spines wanting or represented by very stout bristles; central spines 2 to 4, black, unequal, 2 to 12 mm. long, spreading; flowers about 1 cm. long, with a broad open throat; outer perianth-segments brownish, acute; inner perianth-segments lanceolate, acute, entire, magenta-colored; filaments purplish; stigma-lobes 3 or 4, purplish, broad, truncate; fruit red, 10 mm. long; seeds brownish.



*Type locality:* Mexico.

*Distribution:* San Luis Potosí, Mexico.

We have had this plant in cultivation for a number of years; Dr. E. Palmer obtained it near San Luis Potosí in 1905 (No. 590); it was also collected by Mrs. Vera from the same locality in 1912.

*Illustration:* Martius, Nov. Act. Nat. Cur. 16: pl. 20, as *Mammillaria zuccariniana*.

Figure 83 is from a photograph of a plant collected by Dr. E. Palmer near Alvarez, San Luis Potosí, May 1905, which afterwards flowered in Washington, D. C.

### 33. *Neomammillaria formosa* (Galeotti).

*Mammillaria formosa* Galeotti in Scheidweiler, Bull. Acad. Sci. Brux. 5: 497. 1838.

*Mammillaria formosa microthele* Salm-Dyck, Cact. Hort. Dyck. 1849. 87. 1850.

*Mammillaria formosa dispicula* Monville in Labouret, Monogr. Cact. 60. 1853.

*Mammillaria formosa gracilispina* Monville in Labouret, Monogr. Cact. 60. 1853.

*Mammillaria formosa laevior* Monville in Labouret, Monogr. Cact. 60. 1853.

*Cactus formosus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Somewhat clavate, sunken at the apex; axils lanate; tubercles spirally arranged, obtusely 4-angled, light green; areoles naked; radial spines 20 to 22, white, rigid, radiating; central spines 6, spreading, thickened at base, at first flesh-colored at base, black at tip, becoming black throughout or grayish; flowers red.

*Type locality:* Near San Felipe.

*Distribution:* San Luis Potosí, Mexico, according to Hemsley.

Dr. Safford has referred here a plant collected by Dr. E. Palmer at San Luis Potosí which may be the plant which is passing under this name, but it does not seem to answer the original descriptions.

*Illustration:* Garten-Zeitung 4: 182. f. 42, No. 11, as *Mammillaria formosa*.

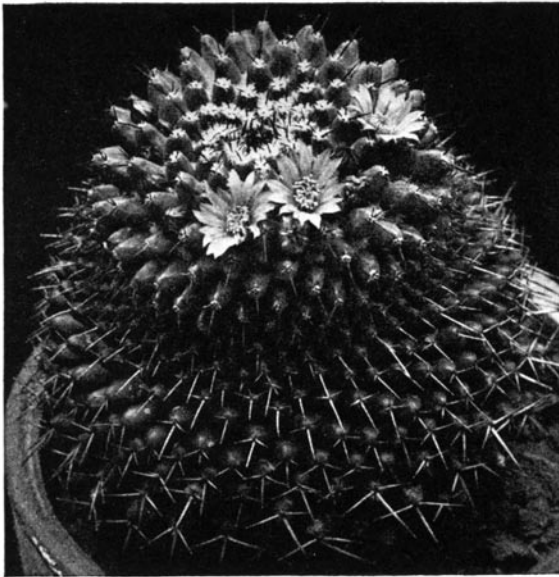


FIG. 83.—*Neomammillaria zuccariniana*.

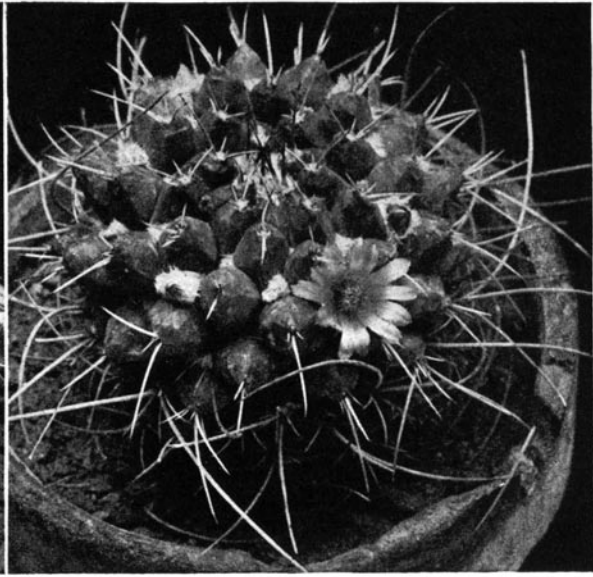


FIG. 84.—*Neomammillaria compressa*.

### 34. *Neomammillaria compressa* (De Candolle).

*Mammillaria compressa* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 112. 1828.

*Mammillaria subangularis* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 112. 1828.

*Mammillaria triacantha* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 113. 1828.

*Mammillaria cirrhifera* Martius, Nov. Act. Nat. Cur. 16: 334. 1832.

*Mammillaria angularis* Link and Otto in Pfeiffer, Enum. Cact. 12. 1837.

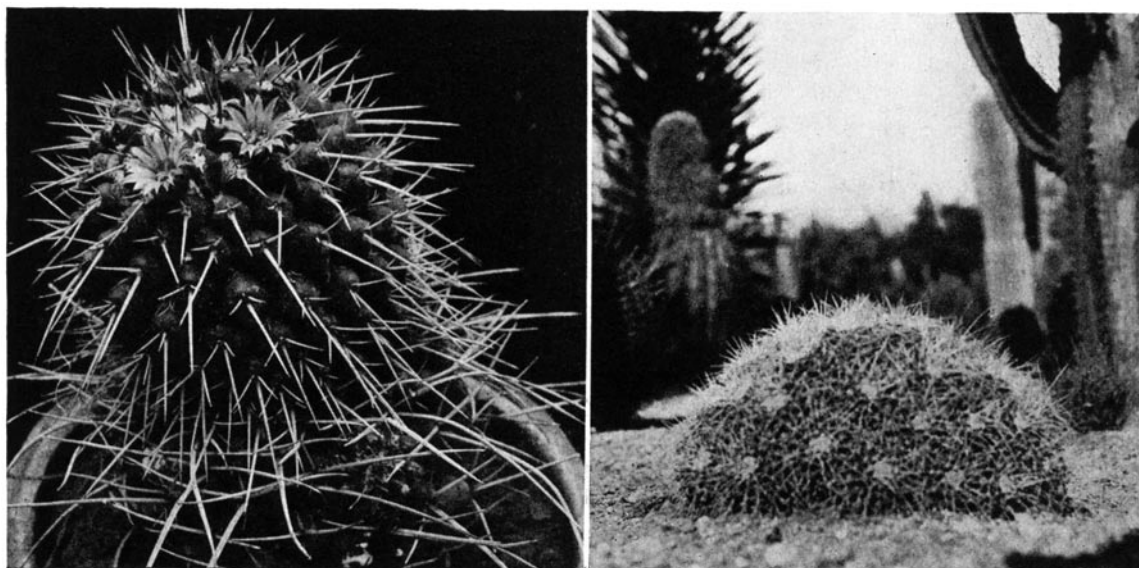
*Mammillaria cirrhifera angulosior* Lemaire, Cact. Gen. Nov. Sp. 95. 1839.

*Mammillaria longiseta* Mühlenfordt, Allg. Gartenz. 53: 346. 1845.



- Mammillaria cirrifer longiseta* Salm-Dyck, Cact. Hort. Dyck. 1849. 18. 1850.  
*Mammillaria squarrosa* Meisner, Wöchenschr. Gärten. Pflanz. 2: 116. 1859.  
*Cactus cirrhifer* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus compressus* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not Salisbury, 1796.  
*Cactus longisetus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus squarrosus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus subangularis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus triacanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
 ? *Mammillaria angularis fulvispina* Schumann, Gesamtb. Kakteen 576. 1898.  
*Mammillaria angularis longiseta* Salm-Dyck in Schumann, Gesamtb. Kakteen 576. 1898.  
*Mammillaria angularis triacantha* Salm-Dyck in Schumann, Gesamtb. Kakteen 576. 1898.  
*Mammillaria angularis compressa* Schumann, Gesamtb. Kakteen 577. 1898.  
*Mammillaria oettingenii* Zeissold, Monatsschr. Kakteenk. 8: 10. 1898.  
*Mammillaria kleinschmidtiana* Zeissold, Monatsschr. Kakteenk. 8: 21. 1898.

Growing in large clumps, cylindric, pale bluish green; axils of tubercles white-woolly, setose; tubercles short, compressed laterally, keeled below, more rounded above; young spine-areoles white-woolly; principal spines 4, sometimes with 1 to 3 very short accessory ones from the lower part of the areole; lower spine much longer, spreading or recurved, 5 to 6 cm. long, somewhat angled; all spines pale, more or less tinged with brown, with dark tips; flower small, pinkish, 10 to 12 mm. long; outer perianth-segments acute, somewhat ciliate; inner perianth-segments narrow, acuminate, with spreading tips; stamens and style pale; stigma-lobes 5, linear; fruit clavate, red; seeds brown.



FIGS. 85 and 86.—*Neomammillaria compressa*.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

Our description is drawn largely from specimens which flowered in March 1908 and which were collected by Dr. Rose at Higuerrillas, Queretaro, in 5905. Dr. Rose also found this species very abundant in the deserts of Queretaro and living specimens brought back by him have frequently flowered both in New York and Washington. These are identical with plants sent from Berlin, labeled *Mammillaria angularis longiseta*. The species as here treated is variable and more exhaustive field work might require some modifications in the description.

The varieties *Mammillaria cirrifer major* and *M. cirrifer fulvispina* (Salm-Dyck, Cact. Hort. Dyck. 1844. 11. 1845) are without descriptions. The two varieties *M. cirrifer albispina* and *M. centricirra macrothela* were listed as synonyms of *M. subangularis* by Walpers (Repert. Bot. 2: 272. 1843). To *M. subangularis* is also referred *M. subcirrifer* by Förster (Handb. Cact. 234. 1846).

Here doubtless belongs *Mammillaria angularis fulvescens* (Salm-Dyck, Cact. Hort. Dyck. 1849. 18. 1850).

*Illustrations:* Schelle, Handb. Kakteenk. 264. f. 187 (?); Möllers Deutsche Gärt. Zeit. 25: 486. 1. 20; Krook, Handb. Cact. 38 (?); Gartenwelt 15: 410; Contr. U. S. Nat. Herb. 10: pl. 16, f. B, as *Mammillaria angularis*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 8, as *M. angularis compressa*; Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 7, as *M. cirrhifera*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 28, as *M. angularis rufispina*; Blanc, Cacti 67. f. 1170; Cact. Journ. 1: pl. for March; 2: 7, 93, as *M. cirrhifera longispina*.

Plate VIII, figure 4, shows a plant collected by Dr. Rose in Queretaro in 1905, which flowered in the New York Botanical Garden, March 17, 1913. Figure 84 is from a photograph of a plant sent by Dr. E. Palmer from San Luis Potosí in 1905; figure 8 is from a photograph of a plant collected by Dr. Rose near Higuierillas, Mexico, in 1905; figure 86 is from a photograph of this plant growing in the open in the Huntington Collection, southern California; figure 88 is from a photograph of a plant sent by Dr. C. A. Purpus from Minas de San Rafael in 1910; figure 87 shows spines from the plant collected by Dr. Rose at Ixmiquilpan in 1905.

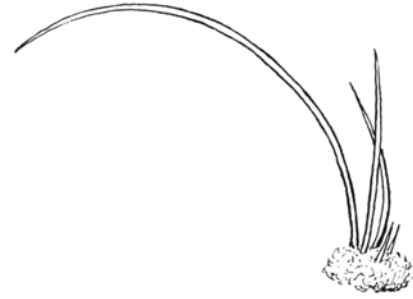


FIG. 87.—Spine-cluster of *N. compressa*.

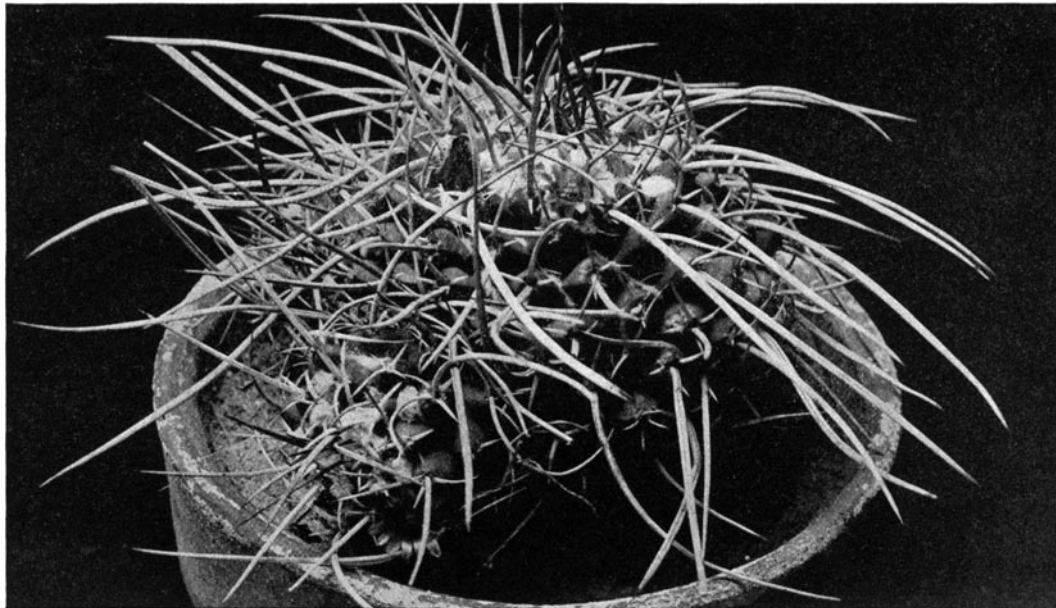


FIG. 88.—*Neomammillaria compressa*.

### 35. *Neomammillaria mystax* (Martius).

- Mammillaria mystax* Martius, Nov. Act. Nat. Cur. 16: 332. 1832.  
*Mammillaria leucotricha* Scheidweiler, Allg. Gartenz. 8: 338. 1840.  
*Mammillaria zanthotricha* Scheidweiler, Allg. Gartenz. 8: 338. 1840.  
*Mammillaria mutabilis* Scheidweiler, Allg. Gartenz. 9: 43. 1841.  
*Mammillaria funkii* Scheidweiler, Allg. Gartenz. 9: 43. 1841.  
*Mammillaria autumnalis* Dietrich, Allg. Gartenz. 16: 297. 1848.  
*Mammillaria mutabilis xanthotricha* Salm-Dyck, Cact. Hort. Dyck. 1849. 17, 120. 1850.  
*Mammillaria maschalacantha* Monville in Labouret, Monogr. Cact. 106. 1853.  
*Mammillaria maschalacantha leucotricha* Monville in Labouret, Monogr. Cact. 106. 1853.

*Mammillaria maschalacantha xanthotricha* Monville in Labouret, Monogr. Cact. 106. 1853.

*Cactus funckii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus maschalacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus leucotrichus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus mutabilis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus mystax* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus xanthotrichus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Globose to short-cylindric, 7 to 15 cm. high, flat-topped; tubercles in as many as 34 rows, thickly set, full of milk which freely flows when pricked or cut; radial spines 8 to 10, small, white; central spines 4, 3 about twice as long as the radial ones, the other much elongated, 6 to 7 cm. long; flowers 1.5 to 2 cm. long, appearing in 2 or 3 rows, very abundant; inner perianth-segments dark red, 12 mm. long; stigma-lobes 4 or 5, greenish; fruit red, 2 to 2.5 cm. long.

*Type locality:* Mexico. According to Hemsley, Karwinsky's plant, which is the type, came from Ixmiquilpan and San Pedro Nolasco at about 6,000 feet altitude.

*Distribution:* Highlands of southern central Mexico.

This species is characterized by the long, erect, central spines which overtop the plant in the wild state; in cultivation these elongated spines do not always occur. The species is common in cultivation; in collections it is usually known as *Mammillaria mutabilis*.



FIG. 89.—*Neomammillaria mystax*.



FIG. 90.—*Neomammillaria petterssonii*.

*Mammillaria krauseana*, a name from Gruson's Catalogue, is cited by Schumann (Gesamtb. Kakteen 595. 1898) as a synonym of *M. mutabilis*.

*Mammillaria meschalacantha* Hortus (Salm-Dyck, Cact. Hort. Dyck. 1844. 10. 1845), according to the Index Kewensis, is a misspelling for *M. maschalacantha*.

*Mammillaria maschalacantha dolichacantha* Monville was given as a doubtful synonym of *M. maschalacantha* by Labouret (Monogr. Cact. 106. 1853).

*Mammillaria mutabilis autumnalis* (Monatsschr. Kakteenk. 30: February 1920) is offered for sale by Grässner.

*Mammillaria mutabilis laevior* Salm-Dyck (Cact. Hort. Dyck. 1849. 17, 120. 1850), with *M. leuocarpa* Scheidweiler as a synonym, was given as a variety of *M. mutabilis*, but it was not described. *M. xanthotricha laevior* Salm-Dyck (Cact. Hort. Dyck. 1844. 11. 1845), also undescribed, seems to be the same.



Schumann refers here *Mammillaria cirrhifera*, but certainly Pfeiffer's illustration (Abbild. Besch. Cact. 1: pl. 7) with its long, curved, radial spines and no centrals is very different; we have referred it to *Neomammillaria magnimamma*.

*Illustrations:* Nov. Act. Nat. Cur. 16: pl. 21; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 17, as *Mammillaria mystax*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 1; Karsten and Schenck, Vegetationsbilder 1: pl. 44; Schelle, Handb. Kakteenk. 272. f. 195, as *M. mutabilis*; Schelle, Handb. Kakteenk. 273. f. 196, as *M. mutabilis longispina*.

Plate IX, figure 5, shows a plant collected by Dr. Rose at Tehuacán which flowered and fruited in Washington in 1907. Figure 89 is from a photograph of a potted plant obtained by Dr. Rose at Tehuacán in 1905.

### 36. *Neomammillaria petterssonii* (Hildmann).

*Mammillaria petterssonii* Hildmann, Deutsche Garten-Zeitung 1886: 185. 1886.  
*Mammillaria heeseana* McDowell, Monatsschr. Kakteenk. 6: 125. 1896.

Plants rather large for this genus, cylindrical, 2 dm. high or more, very spiny; tubercles arranged in 13 or 21 spirals, terete, setose in their axils; radial spines 10 to 12, white, with black tips; central spines 4, the longer ones 4.5 cm. long; flowers unknown; fruit small, naked, oblong.

*Type locality:* Mexico.

*Distribution:* Guanajuato, Mexico.

We have followed Schumann in uniting *Mammillaria petterssonii* and *M. heeseana* but have selected the older name.

Dr. Rose collected this plant in Guanajuato in 1889 (No. 4846) and Dr. Safford obtained it there a few years later.

*Mammillaria heeseana brevispina* and *M. heeseana longispina* are two varieties listed by Schelle.

*Illustrations:* Ann. Rep. Smiths. Inst. 1908: pl. 7; Schelle, Handb. Kakteenk. 265. f. 188, as *Mammillaria heeseana*; Blanc, Cacti 70. f. 1350, as *M. krameri* (this is the same figure as that used by Schelle as *M. heeseana*); Cact. Journ. 1: pl. for March; Blanc, Cacti 73. No. 1460; Deutsche Garten-Zeitung 1886: 186. f. 45, as *M. petterssonii*.\*

Figure 90 is a reproduction of the first illustration cited above.

### 37. *Neomammillaria eichlamii* (Quehl).

*Mammillaria eichlamii* Quehl, Monatsschr. Kakteenk. 18: 6. 1898.

Solitary or growing in large clumps of 25 or more, but loosely held together; plant-body cylindrical, 6 to 15 cm. long; tubercles yellowish green, very milky, only slightly angled; axils filled with dense yellow (sometimes whitish) wool and longer white bristles; radial spines 7 or 8, ascending, whitish with brown tips; central spines usually 1, rarely 2, stouter, darker colored than the radials; spine-areoles when young filled with short yellow wool, in age glabrate; flower-buds covered with long wool; outer perianth-segments narrow, acuminate, with a dark red stripe down the center, otherwise cream-colored, slightly ciliate; inner perianth-segments narrowly lanceolate, acuminate, entire, cream-colored to light lemon-yellow; style longer than the stamens, pale; stigma-lobes linear, 4 to 6, yellow, obtuse.

*Type locality:* Guatemala.

*Distribution:* Guatemala and Honduras.

This plant differs from the other Guatemalan species in the yellow wool in the axils of the tubercles and in the areoles.

Our first knowledge of this species came from a photograph and living and herbarium material collected by Dr. William R. Maxon in Guatemala in 1905. In 1908 Quehl described it as new from specimens sent by F. Eichlam; the plant since then has been common in cultivation. It flowered first in Washington, December '909.

\* This name appears as *M. petersonii* in Blanc and Schumann.



The plant is named for Federico Eichlam (1862–1911), an enthusiastic cactus collector who made very valuable discoveries in Guatemala. He published a cactus list in 1911 (Kakteen-Verzeichnis Abgeschlossen Ende 1910).

*Illustrations:* Monatsschr. Kakteenk. 19: 7; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 14, as *Mammillaria eichlamii*.

Figure 91 is from a photograph of a plant collected in Guatemala by F. Eichlam in 1908.

### 38. *Neomammillaria karwinskiana* (Martius).

*Mammillaria karwinskiana* Martius, Nov. Act. Nat. Cur. 16: 335. 1832.

(?) *Mammillaria fischeri* Pfeiffer, Allg. Gartenz. 4: 257. 1836.

*Mammillaria centrispina* Pfeiffer, Allg. Gartenz. 4: 258. 1836.

*Mammillaria karwinskiana flavescens* Zuccarini in Pfeiffer, Enum. Cact. 19. 1837.

(?) *Mammillaria virens* Scheidweiler, Allg. Gartenz. 9: 43. 1841.

*Mammillaria karwinskiana virens* Salm-Dyck, Cact. Hort. Dyck. 1844. 10. 1845.

*Mammillaria karwinskiana centrispina* Salm-Dyck, Cact. Hort. Dyck. 1844. 10. 1845.

*Cactus centrispinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus fischeri* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus karwinkianus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus virens* Kuntze, Rev. Gen. Pl. 1: 261. 1891.



FIG. 91.—*Neomammillaria eichlamii*.

FIG. 92.—*Neomammillaria karwinskiana*.

Globose to cylindrical, somewhat flattened above; tubercles terete, yielding milk when pricked; axils very woolly and with long conspicuous white or brown-tipped bristles, much longer than the tubercles; spines 4, 5, or 6, all radial, sometimes one nearer the center than the others, nearly equal, short, brown or blackish at the tips or throughout; flowers nearly 2 cm. long, the scales and outer perianth-segments narrow, reddish except at the margins, ciliate; inner perianth-segments broader, cream-colored, not ciliate, mucronate-tipped; stamens cream-colored, much shorter than the inner perianth-segments; style a little longer than the stamens; stigma-lobes 5, cream-colored; fruit 15 mm. long, red; seeds brown.

*Type locality:* Mexico.

*Distribution:* Oaxaca, Mexico.

This species is near *Neomammillaria mystax* but the spines are usually radial, short, and nearly equal. Specimens sent to Washington in 1918 had some of the lowermost spines much elongated and curved backward, sometimes 2.5 cm. long.

The plant flowers readily in cultivation. Professor C. Conzatti has repeatedly sent it to us from Oaxaca.

*Illustrations:* Nov. Act. Nat. Cur. **16**: pl. 22; Ann. Rep. Smiths. Inst. **1908**: pl. 14, f. 4, as *Mammillaria karwinskiana*.

Plate XI, figure 2, shows a plant collected by Dr. Rose in Oaxaca in 1906, which flowered in Washington, April 16, 1907; plate IX, figure 2, shows a plant collected by B. P. Reko also in Oaxaca, which fruited in the New York Botanical Garden in 1918. Figure 92 is from a photograph of a plant collected by Dr. Rose in Oaxaca in 1906.

Related to this species is the following:

MAMMILLARIA KNIPPELIANA Quehl, Monatsschr. Kakteenk. **17**: 59. 1907.

Stem solitary, about 7 cm. high by 6 cm. in diameter, slightly depressed at apex; tubercles when young pyramidal, 4-sided, 8 mm. long, their axils setose; areoles circular, at first white-woolly, soon glabrate; spines usually 6, up to 6 cm. long, whitish with blood-red or brown tips, sometimes accompanied with smaller spines; flowers and native country unknown.

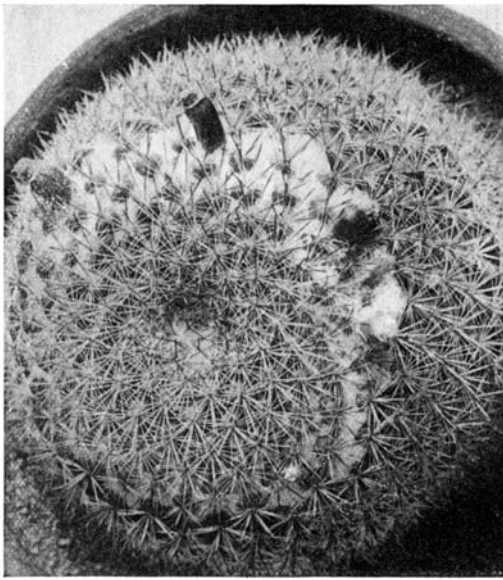


FIG. 93.—*Neomammillaria Standleyi*.

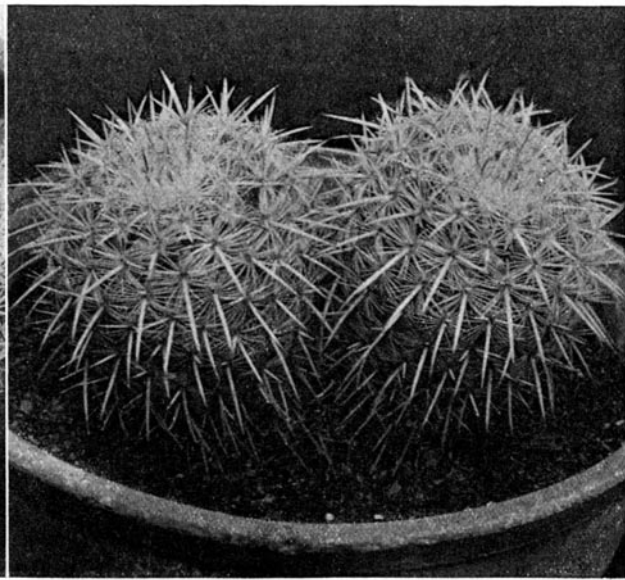


FIG. 94.—*Neomammillaria parkinsonii*.

### 39. *Neomammillaria praelii* (Mühlenpfordt).

- Mammillaria praelii* Mühlenpfordt, Allg. Gartenz. **14**: 372. 1846.  
*Mammillaria viridis praelii* Salm-Dyck, Cact. Hort. Dyck. 1849. 16. 1850.  
*Mammillaria viridis* Salm-Dyck, Cact. Hort. Dyck. 1849. 116. 1850.  
*Mammillaria inclinis* Lemaire, Illustr. Hort. **5**: Misc. 9. 1858.  
*Cactus praelii* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus viridis* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

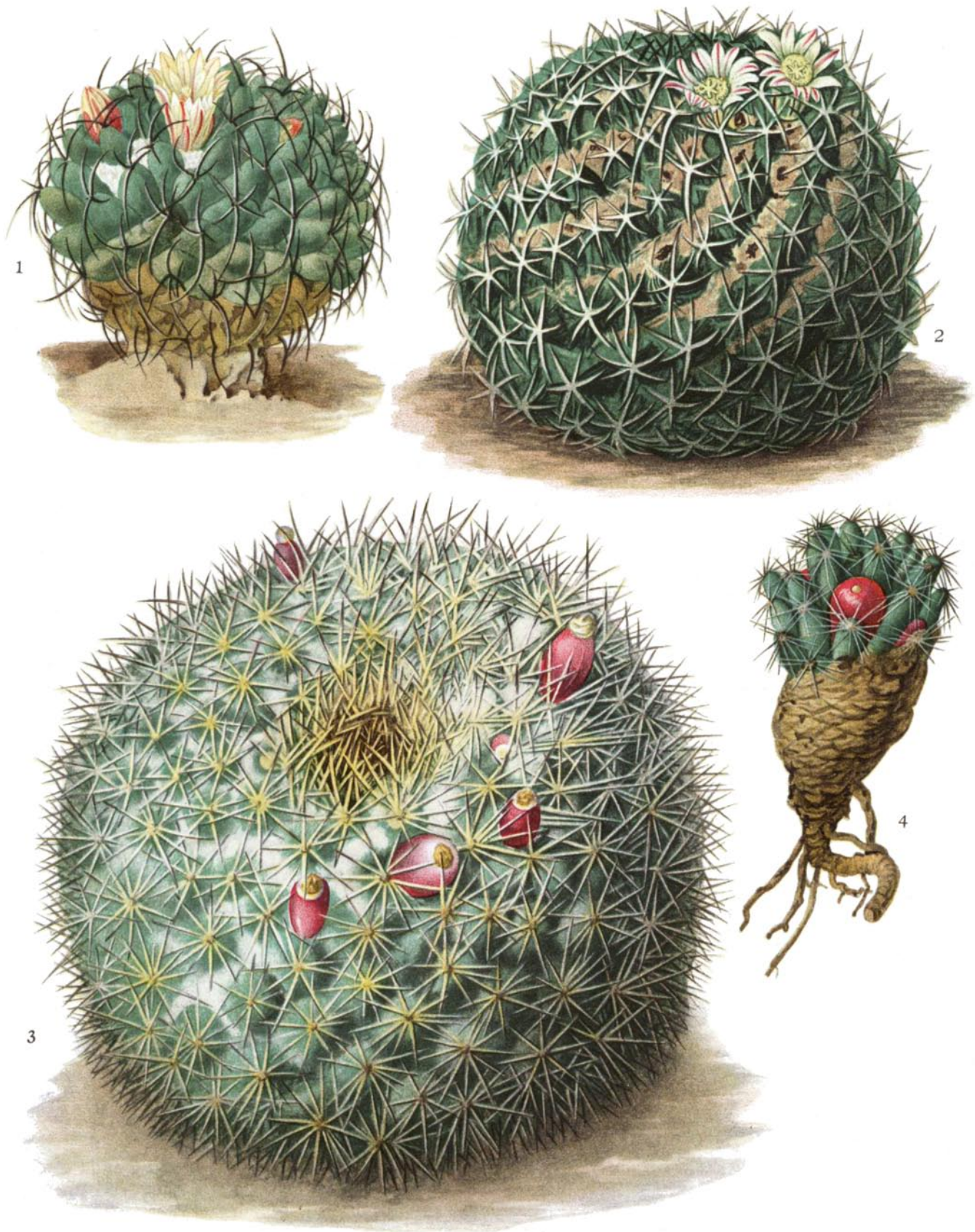
Globose, light green, sunken at the apex; axils of the tubercles lanate and setose; tubercles somewhat 4-angled; spine-areoles villous; spines 4, radial, forming a cross, the uppermost and lowermost elongated; flowers and fruit unknown.

*Type locality:* Guatemala.

*Distribution:* Guatemala.

We do not know this species but we are following previous authors in our classification of it. When flowers and fruit become known this may be subject to modification. Until recently it and *Neomammillaria woburnensis* were the only species of this genus known from Guatemala; neither was known in cultivation. Through the efforts of Dr. William R. Maxon, Mr. F. Eichlam, Professor Kellermann, and others, much material has been collected, new species discovered, and *N. woburnensis* rediscovered, but not *N. praelii*.





M. E. Eaton del. 1 to 4  
E. I. Schutt del. 2  
D. G. Passmore del. 5

A. Hoen & Co. Baltimore

1. Flowering plant of *Neomammillaria magnimamma*.  
2. Flowering plant of *Neomammillaria karwinskiana*.

3. Flowering plant of *Neomammillaria gigantea*.  
4. Flowering plant of *Neobeseya missouriensis*.





Schumann described the plant in some detail, but apparently confused it with another species, possibly *Mammillaria karwinskiana*, inasmuch as he reported it from Oaxaca as well as from Guatemala. He referred here as a synonym *M. viridis* Salm-Dyck (Cact. Hort. Dyck. 1849. 16. 1850), which may be the Mexican element.

**40. *Neomammillaria standleyi* sp. nov.**

Plants usually solitary, nearly globular, often 10 cm. in diameter, pale green, densely covered with spines; axils of tubercles containing white bristles, the flowering and fruiting ones filled with dense white wool; radial spines about 16, slightly spreading, white except the dark tips; central spines 4, longer and stouter than the radials, porrect, reddish brown; flowers rather small, about 12 mm. long, purplish; inner perianth-segments oblong, entire; filaments pale; stigma-lobes green; fruit scarlet, 12 to 16 mm. long; seeds brownish.

Collected by Rose, Standley, and Russell on rocks in the Sierra de Alamos, Sonora, Mexico, March 14, 1910 (No. 12849).

It is common in dry stony places above Alamos, where both living and herbarium specimens were obtained, and is an attractive plant flowering freely in cultivation.

The plant is named for Paul C. Standley of the U. S. National Museum.

Figure 93 is from a photograph of the type specimen which flowered in Washington.

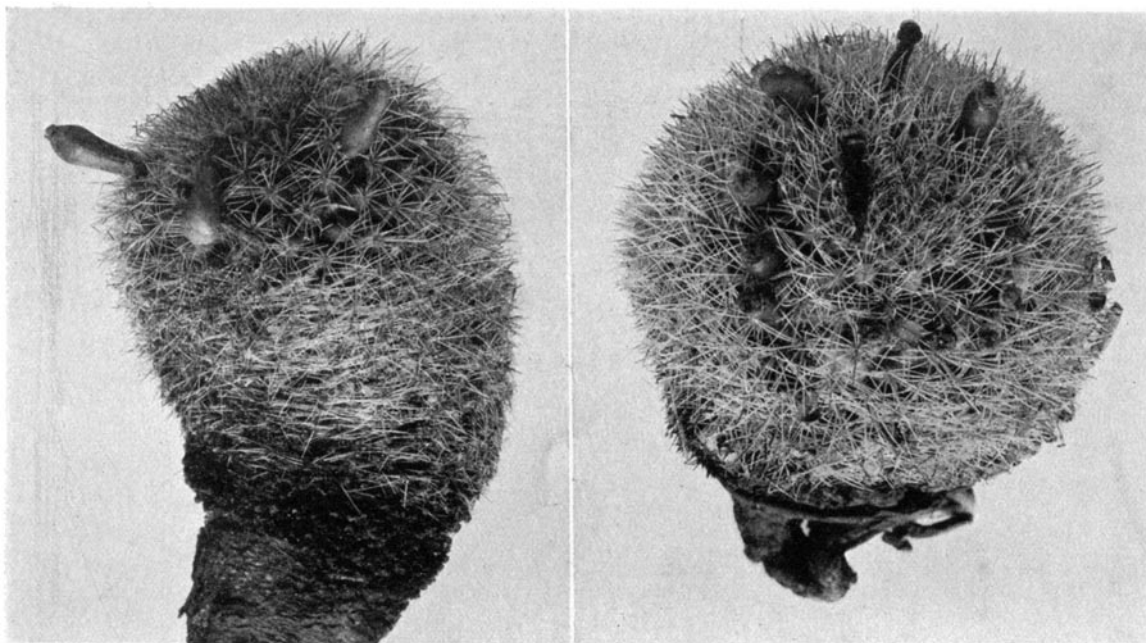


FIG. 95.—*Neomammillaria evermanniana*.

**41. *Neomammillaria evermanniana* sp. nov.**

Globose to elongate-turbinate, 5 to 7 cm. in diameter, lactiferous; tubercles closely set, terete, nearly hidden under the numerous slender spines; axils of tubercles at first very woolly and setose; spines white except at tip and there brown; radial spines 12 to 15; central spines 3, erect or nearly so; fruit red, about 1 cm. long; seeds brown.

Collected by Ivan M. Johnston on Cerralbo Island, Gulf of California, 1921 (No. 4058). Mr. Johnston writes of it as follows:

"I found it growing wedged in narrow dirt-filled cracks on the canyon side of the island. It is quite common on this island, usually growing singly, but one cespitose mass with 19 unequal heads was observed."

The species is named for Dr. Barton W. Evermann, Director of the Museum of the California Academy of Sciences, who organized the scientific expedition to the Gulf of California in 1921, which obtained this as well as many other new and rare plants.

Related to this species, but perhaps distinct from it, is Johnston's No. 3121 from Nolasco Island, Gulf of California. It has fewer spines (about 10 radials and 1 or 2 centrals).

Figure 95 is from a photograph of plants from the type collection.

**42. *Neomammillaria parkinsonii* (Ehrenberg).**

*Mammillaria parkinsonii* Ehrenberg, *Linnaea* 14: 375. 1840.  
*Cactus parkinsonii* Kuntze, *Rev. Gen. Pl.* 1: 261. 1891.

Cespitose, somewhat depressed to cylindrical, 15 cm. high, 7.5 cm. in diameter, globose, glaucous, green; axils of tubercles lanate and setose; tubercles milky, short, conic; radial spines numerous (20 or more), setaceous, short, white; central spines 2 or sometimes 4 or 5, brownish at tip; flowers surrounded by a mass of wool, small, yellowish; inner perianth-segments apiculate; stigma-lobes elongated; fruit clavate, scarlet, 1 cm. long; seeds brown.

*Type locality:* At San Onofre in the Mineral del Doctor, Mexico.

*Distribution:* Central Mexico.

We have a photograph, identified as this plant, sent us by L. Quehl in 1921, and also specimens which are like this photograph, collected by Dr. Rose near Higuierillas, Querétaro, Mexico, in 1905 (No. 9798).

The plant was named for John Parkinson, at one time British Consul-General in Mexico, who died in Paris, April 3, 1847.

*Mammillaria parkinsonii rubra* (Förster, *Handb. Cact.* 196. 1846) is only a name.

*Mammillaria parkinsonii waltonii* we do not know, although it is frequently referred to in cactus literature. Haage and Schmidt offer it for sale in their catalogue (1920) under the name of *M. waltonii* Quehl.

*Illustrations:* *Cact. Journ.* 1: pl. for March, as *Mammillaria waltonii*; *Gartenwelt* 14: 232; Möllers *Deutsche Gärt. Zeit.* 25: 475. f. 8, No. 15; Rother, *Praktischer Leitfaden Kakteen* 39, as *M. parkinsonii*.

Figure 94 is from a photograph sent by L. Quehl.

**43. *Neomammillaria geminispina* (Haworth).**

*Mammillaria geminispina* Haworth in Gillies, *Phil. Mag.* 63: 42. 1824.  
*Mammillaria bicolor* Lehmann, *Samen. Hamb. Gartz.* 7. 1830.  
*Mammillaria nivea* Wendland in Pfeiffer, *Enum. Cact.* 27. 1837.  
*Mammillaria daedalea* Scheidweiler, *Hort. Belge* 4: 16. 1837.  
*Mammillaria toaldoae* Lehmann, *Linnaea* 12: 13. 1838.  
*Mammillaria eburnea* Miquel, *Linnaea* 12: 14. 1838.  
*Mammillaria nivea daedalea* Lemaire, *Cact. Gen. Nov. Sp.* 101. 1839.  
*Mammillaria nobilis* Pfeiffer, *Allg. Gartenz.* 8: 282. 1840.  
*Mammillaria bicolor longispina* Salm-Dyck, *Cact. fort. Dyck.* 1844. 6. 1845.  
*Mammillaria bicolor cristata* Salm-Dyck, *Cact. Hort. Dyck.* 1844. 6. 1845.  
*Mammillaria bicolor nobilis* Förster, *Handb. Cact.* 198. 1846.  
*Cactus geminispinus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.  
*Cactus niveus* Kuntze, *Rev. Gen. Pl.* 1: 261. 1891.  
*Cactus nobilis* Kuntze, *Rev. Gen. Pl.* 1: 261. 1891. Not Lamarck, 1783.  
*Mammillaria bicolor nivea* Schumann, *Gesamtb. Kakteen* 569. 1898.

Cespitose, or single in cultivation, cylindrical, somewhat glaucous; axils woolly; tubercles terete, conic; radial spines numerous (16 to 20), very short, setaceous, white; central spines 2 to 4, stouter and longer than the radials, about 25 mm. long, black-tipped; flowers dark red; inner perianth-segments oblong, obtuse, serrate.

*Type locality:* Mexico.

*Distribution:* North-central Mexico.

*Mammillaria daedalea*, which is referred here by Schumann, is based on an abnormal specimen which has elongated, contorted stems and looks very unlike the typical plant. Scheidweiler illustrated his species.

*Mammillaria nivea cristata* Salm-Dyck (Walpers, Repert. Bot. 2: 270. 1843) is only a name. *M. nivea wendlei* Pfeiffer (Labouret, Monogr. Cact. 57. 1853) was given as a synonym of *M. bicolor*.

To this relationship we would refer the plant which has long been known in collections under the name of *Mammillaria potosina*\* and *M. potosina* var. *longispina*. It resembles *M. celsiana* in the spines, but the tubercles are milky and the stem is more elongated. We have seen the following illustration: Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 9, as *M. potosina*.

De Candolle (Prodr. 3: 459. 1828) referred here *Cactus columnaris* Mociño and Sessé.

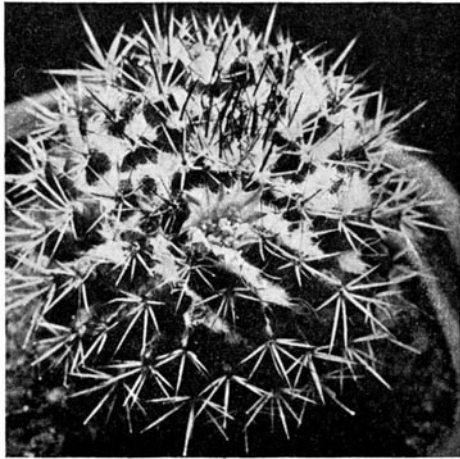


FIG. 96.—*Neomammillaria collinsii*.

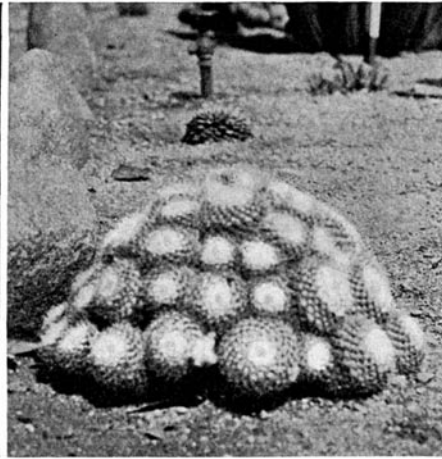


FIG. 97.—*Neomammillaria geminispina*.

*Illustrations:* Wiener Ill. Gart. Zeit. 11: pl. 3, in part, as *Mammillaria nobilis*; Hort. Belge 4 pl. 1, as *M. daedalea*; Möllers Deutsche Gärt. Zeit. 25: 75. f. 8, No. 4, as *M. bicolor nobilis*; Cact. Journ. 1: pl. for March, as *M. nivea cristata*; Cact. Journ. 1: pl. for March, as *M. nivea longispina*; Pfeiffer and Otto, Abbild. Besch. Cact. 1: pl. 3; De Laet, Cat. Gén. f. 50, No. 8; Wiener Ill. Gart. Zeit. 29: f. 22, No. 8; Knippel, Kakteen pl. 19, as *M. bicolor*.

Plate v, figure 3, shows a flowering plant sent by Carl Ackerman which flowered in the New York Botanical Garden, October 9, 1920; plate VIII, figure 5, shows a plant which flowered in the New York Botanical Garden, November 11, 1911. Figure 97 is from a photograph by Ernest Branton showing a plant grown in southern California.

#### 44. *Neomammillaria pyrrocephala* (Scheidweiler).

*Mammillaria pyrrocephala* Scheidweiler, Allg. Gartenz. 9: 42. 1841.

*Mammillaria mallettiana* Cels, Portef. Hort. 2: 222.

*Mammillaria senckeii* Förster, Handb. Cact. 227. 1846.

*Mammillaria pyrrocephala donkelaeri* Salm-Dyck, Cact. Hort. Dyck. 1849. 17, 121. 1850.

*Cactus pyrrocephalus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Cylindric; axils lanate and setose; tubercles angled, green or subglaucous; areoles bearing yellowish wool; spines all black when young, when old becoming gray below; radial spines 6, spreading, the upper ones a little longer; central spines single, erect; flowers red.

*Type locality:* Real del Monte, Mexico.

*Distribution:* Hidalgo and, perhaps, Oaxaca.

\* This name is sometimes credited to Rebut (Möllers Deutsche Gärt. Zeit. 25: 475. 1910) but if he published it we are unaware of it.

† This was originally written *M. senkii*, although the plant was named for F. Senke of Leipzig.



We have followed Schumann and others who refer this species also to Oaxaca but the plants from that state may represent more than one species. In fact, the plant figured in *Blühende Kakteen* we have described as new (see No. 50), while the one illustrated by Mr. H. H. Thompson is like others sent by Dr. Reko and Professor Conzatti, which we have referred here.

*Illustration:* Thompson, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 262: pl. 2, f. 2, as *Mammillaria pyrrocephala*.

Figure 100 is from a photograph of the plant sent to Washington by Dr. Reko from Oaxaca in 1919.

**45. *Neomammillaria woburnensis* (Scheer).**

*Mammillaria woburnensis*\* Scheer, Lond. Journ. Bot. 4: 136. 1845.

*Cactus woburnensis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria chapinensis* Eichlam and Quehl, Monatsschr. Kakteenk. 19: 1. 909.



FIG. 98.—*Neomammillaria woburnensis*.

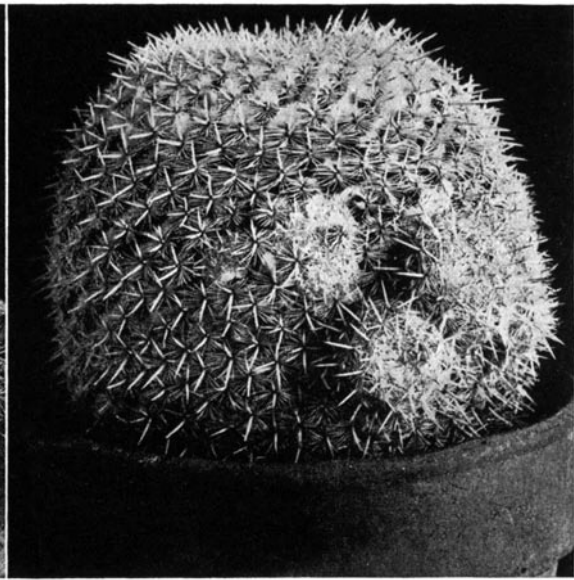


FIG. 99.—*Neomammillaria chinocephala*.

Growing in clumps, giving off new plants from all parts of the body, globose to cylindric, dull green, milky; tubercles angled, setose and woolly in their axils; radial spines 5 to 9, yellowish or white; central spines 1 to 8, often long, reddish or yellow; flowers yellow, small, about 1 cm. long; fruit red, clavate, 18 to 25 mm. long; seeds minute, brown.

*Type locality:* Guatemala.

*Distribution:* Guatemala.

For a long time little was known about this plant, but a few years ago it was discovered in abundance by Wm. R. Maxon (1905) and by F. Eichlam (1908). It was given a new name, *Mammillaria chapinensis*, under which it is to be found in most collections.

The plant was described by Frederick Scheer from a barren specimen in the Royal Botanical Garden at Kew, sent from Guatemala. It was named for Woburn Abbey, where there was once a very large collection of cacti under the care of James Forbes.

*Illustrations:* Monatsschr. Kakteenk. 24: 87; Succulenta 4: 40; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 12, as *Mammillaria chapinensis*.

Figure 98 is from a photograph of a plant sent to Washington by F. Eichlam in 1908.

\* This name was originally printed by Scheer as *Mamillaria woburnensis*.



**46. *Neomammillaria collinsii* sp. nov.**

Plants becoming large clumps, the individuals globose, 4 cm. in diameter; tubercles terete, milky, green, but becoming bronzed or even a deep purple; axils of tubercles both lanate and setose; radial spines usually 7, pale yellowish below, with dark brown or blackish tips, subequal, 5 to 7 mm. long; central spine 1, similar to or a little longer and usually darker than the radials; flowers 12 to 15 mm. long; outer perianth-segments reddish with a yellowish margin, ciliate; inner perianth-segments lighter, entire, acuminate; fruit clavate, 1.5 to 2 cm. long, deep red; seeds brownish.

Collected by G. N. Collins at San Gerónimo, near Tehuantepec, Mexico, December 1906, and flowered in Washington, July and August 1909, type, and near the same locality by A. Groeschner, February 1923.

Figures 96 and 103 are from photographs showing the type plant in flower and fruit.

**47. *Neomammillaria chinocephala* (J. A. Purpus).**

*Mammillaria chinocephala* J. A. Purpus, Monatsschr. Kakteenk. 16: 41. 1906.

Plant-body globose, sometimes 8 cm. in diameter, almost hidden by the white spines; tubercles very milky; axils of tubercles densely filled with white wool and numerous hair-like bristles; tubercles low; radial spines 35 to 40, somewhat pectinate, spreading; central spines 2 to 7, more or less divergent, much stouter than the radials, rigid, white with brownish tips; flowers 1 cm. long, rose-red; fruit clavate, red; seeds small, brown.

*Type locality:* Sierra de Parras, Coahuila, Mexico.

*Distribution:* Highlands of central Mexico.

This species is common in collections, both living and dried, and it is surprising that it remained so long undescribed. It was distributed by Pringle in 1890 as *Mammillaria acanthophlegma*. It resembles very much a large plant of *Mammillaria elegans*, but the tubercles are milky and bear setae in their axils.

*Illustrations:* Monatsschr. Kakteenk. 16: 3; 20: 46, as *Mammillaria chinocephala*.

Figure 99 is from a photograph of a plant collected by Dr. Purpus at Minas de San Rafael, Mexico, in 1910.

**48. *Neomammillaria tenampensis* sp. nov.**

Globose, light green, 5 to 6 cm. in diameter; tubercles 6 to 7 mm. long, 4-sided, milky, pointed; axils of upper tubercles naked, but those producing flowers filled with yellow wool and numerous yellow bristles, while in the older axils the wool disappears and the bristles become white; spines 4 to 6, brownish with dark tips, ascending, surrounded at base by 8 to 10 small white bristles; wool in young spine-areoles yellowish; outermost perianth-segments small, brownish, the outer ones lanceolate, acuminate, similar to the inner ones, all ciliate; inner perianth-segments reddish purple, 8 to 10 mm. long, lanceolate, apiculate, denticulate; stamens much shorter than the perianth-segments; filaments pale below, purplish above; style reddish; stigma-lobes 4 or 5.

Collected by C. A. Purpus in the Barranca de Tenampa, Mexico, in 1909 and flowered in Washington in November 1910.

Figure 102 is from a photograph of the type specimen.

**49. *Neomammillaria polygona* (Salm-Dyck).**

*Mammillaria polygona* Salm-Dyck, Cact. Hort. Dyck, 1849. 120. 1850.

*Cactus polygonus* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Lamarck, 1783.

Subclavate, 10 cm. high, simple; axils of tubercles lanate and setose; tubercles 4-angled; radial spines about 8, 2 or 3 upper ones minute, the lateral ones and the lowermost one longer; central spines 2, stout, brownish at tip, often long and recurved; flowers pale rose-colored; stigma-lobes 5 or 6, linear.

*Type locality:* Not cited.

*Distribution:* Mexico, according to Labouret.

Schumann lists this species among those unknown to him. Rümpler refers it to *Mammillaria subpolyedra*, but it must be related more nearly to *M. polyedra*, with which it was compared by Salm-Dyck. We know it only from descriptions.

*Mammillaria polyedra spinosior* Salm-Dyck (Cact. Hort. Dyck. 1849. 17. 1850) is usually referred here, but was never described.

Related to this species is the following:

MAMMILLARIA ECHINOPS Scheidweiler, Hort. Belge 5: 5. 1838.

Simple, globose or a little broader than high, 8 cm. in diameter, lactiferous; tubercles ovoid, light green, somewhat 4-angled, lanate and setose in their axils; radial spines 12 or 13, the upper three much shorter, setose, the others about equal; central spines 4, stout when young, white, with rosy brown tips, these black in age; flowers not known; fruit red, clavate, 8 mm. long.

*Type locality:* Mexico.

We have not been able to associate this description or illustration with any species which we know. The author believed that it was related to *Mammillaria polyedra*. The setae in the axils of the tubercles suggest this relationship, but we believe that it is very distinct from that species.

The original description seems to have been unknown to the compilers of the Index Kewensis and to Schumann, for they refer the name to Förster's Handbuch, where it is used as a synonym of another species. Förster, followed by the Index Kewensis, refers it as a synonym of *Mammillaria oothele*, which is a very different plant if we can judge from the description.

*Illustration:* Hort. Belge 5: pl. 5.

#### 50. *Neomammillaria confusa* sp. nov.

At first solitary, becoming cespitose, globose to short-cylindric, deep green; axils densely white-woolly and setose; tubercles short, a little flattened, 4-angled, pointed; spines 4 to 6, all radial, ascending, at first yellowish with brown tips, in age white below, 2 to 3 mm. long; flowers yellow, small, about 8 mm. long, opening for 2 or 3 successive days; outer perianth-segments ovate, ciliate, with a black tip; inner perianth-segments spreading, acute; filaments and style yellowish white; stigma-lobes 6, greenish yellow.

In 1912 Dr. Rose obtained a plant from W. Mundt near Berlin which flowered in the New York Botanical Garden in April 1914 and in 1918 and which we have designated as the type. It is not known in the wild state, but is doubtless from Mexico.

This is the plant which Schumann described and figured as *Mammillaria pyrrhocephala*, but it does not accord with the original description.

*Illustration:* Blühende Kakteen 1: pl. 20, as *Mammillaria pyrrhocephala*.

Plate v, figure 2, shows the type plant.

#### 51. *Neomammillaria villifera* (Otto).

*Mammillaria villifera* Otto in Pfeiffer, Enum. Cact. 18. 1837.

*Cactus villifer* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria carnea villifera* Gürke, Blühende Kakteen 1: under pl. 60. 1905.

Subglobose, proliferous; axils lanate and setose; tubercles angled; areoles at first lanate, in age naked; spines 4, rigid, straight, the lowest one longer (8 mm. long), at first purplish, in age black; flowers pale rose-colored; inner perianth-segments 14, acute; stigma-lobes 4 or 5.

*Type locality:* Mexico.

*Distribution:* Mexico, but range not known.

The species is often referred to *Mammillaria carnea*, but the axils are setose.

#### 52. *Neomammillaria polyedra* (Martius).

*Mammillaria polyedra* Martius, Nov. Act. Nat. Cur. 16: 326. 1832.

*Mammillaria polytricha* Salm-Dyck, Allg. Gartenz. 10: 289. 1842.

*Mammillaria polytricha hexacantha* Salm-Dyck, Allg. Gartenz. 10: 289. 1842.

*Mammillaria polytricha tetracantha* Salm-Dyck, Allg. Gartenz. 10: 290. 1842.

*Mammillaria polyedra laevior* Salm-Dyck in Labouret, Monogr. Cact. 105. 1853.

*Mammillaria polyedra scleracantha* Labouret, Monogr. Cact. 105. 1853.

*Cactus polyedrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus polytrichus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Solitary, cylindrical or somewhat thicker above; axils of tubercles setose; tubercles 12 mm. long, flattened dorsally, angled, pointed; spines 4, ascending, short, grayish with purplish tips; flowers inconspicuous, reddish; inner perianth-segments short-acuminate; anthers white; style white, longer than the stamens; stigma-lobes 8, greenish; fruit unknown.

*Type locality:* Near Oaxaca, Mexico.

*Distribution:* Southern Mexico.

This species was collected by Baron Karwinsky near Oaxaca City, about 1832. It has been reported over a large area of central Mexico, but is doubtless much more restricted in range. One small specimen from near the type locality was sent to Washington in 1909.

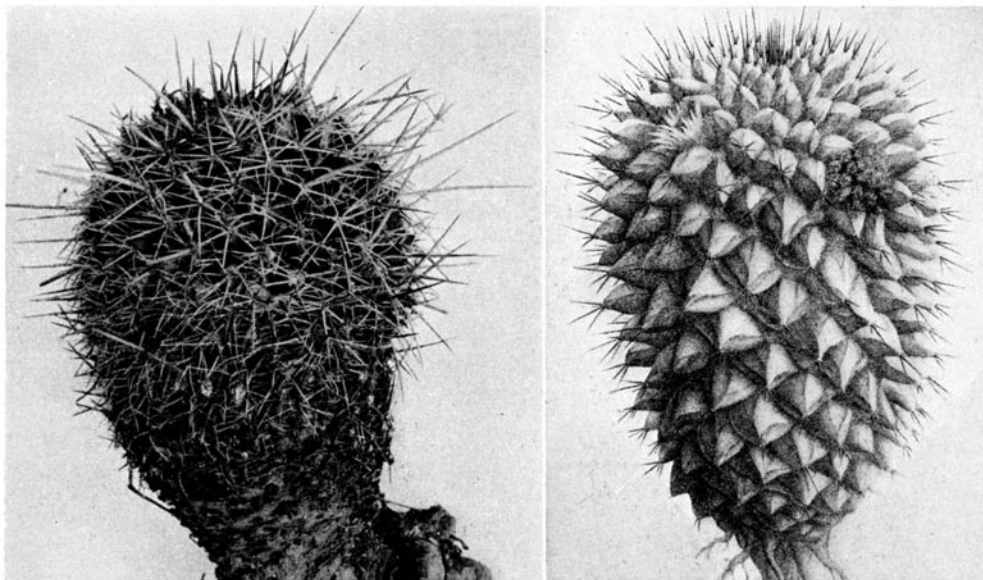


FIG. 100.—*Neomammillaria pyrrocephala*.

FIG. 101.—*Neomammillaria polyedra*.

*Mammillaria anisacantha* Hortus first appeared as a synonym of *M. polyedra anisacantha* Salm-Dyck (Cact. Hort. Dyck. 1844. 11. 1845) and then as a synonym of *M. polyedra laevior* Salm-Dyck (Cact. Hort. Dyck. 1849. 17. 1850); neither of the varieties was here described, but the latter was briefly characterized by Labouret. *Mammillaria scleracantha* is cited from Monville's Catalogue of 1846 but we have not seen this publication; it does occur as a synonym of *M. polyedra scleracantha* in Labouret's Monograph, p. 105.

*Illustrations:* Martius, Nov. Act. Nat. Cur. 16: pl. 18; Blühende Kakteen 2: pl. 112; Schelle, Handb. Kakteenk. 271. f. 194, as *Mammillaria polyedra*.

Plate XII, figure 5, shows the plant sent from the Berlin Botanical Garden in 1914 which flowered in the New York Botanical Garden on April 1, 1918. Figure mi shows the type plant, being a reproduction of the first illustration cited above.

### 53. *Neomammillaria konzattii* sp. nov.

Short-cylindric, 8 cm. high, sometimes branched at apex, dark green, very milky; axils of young tubercles bearing abundant white wool and conspicuous white bristles; tubercles short, 4 to 5 mm. long, somewhat angled; young spine-areoles woolly; spines 4 or 5, all radial, somewhat spreading, brownish, the tips usually darker than the bases; flowers opening in bright sunlight, white, campanulate, sometimes tinged with red, about 2 cm. long, the segments somewhat spreading, narrowly oblong, the outer ones serrulate, apiculate; style pale green; stigma-lobes 3, white.

Collected by C. Konzatti on Cerro San Felipe, Oaxaca, in 1907 and flowered in 1913 (type); collected again in 1921 (No. 4140) and flowered in April 1922.

Figure 104 is from a photograph of the plant collected by C. Konzatti in 1921.

**54. *Neomammillaria napina* (Purpus).**

*Mammillaria napina* Purpus, Monatsschr. Kakteenk. 22: 161. 1912.

Roots thick, but when in a cluster of 3 or 4 somewhat spindle-shaped; plants globose, 4 to 6 cm. in diameter; tubercles low, terete in section, not at all milky; spines all radial, 10 to 12, pectinate, white or yellowish, spreading and interlacing; flowers unknown.

*Type locality:* Mountains west of Tehuacán, Mexico.

*Distribution:* Southern Mexico.

The plant was collected by C. A. Purpus in 1911. In 1901 Dr. Rose collected near Tehuacán three small plants which we now believe are to be referred here; these differ from the type plant chiefly in having usually one porrect central spine 5 to 8 mm. long. Some of the spine-clusters have no central spines and then they look very much like those of *Neomammillaria napina*. Dr. Rose's plants were globose when collected but now are cylindric, and after 20 years are less than 6 cm. high; they have never flowered.

*Illustration:* Monatsschr. Kakteenk. 23: 123, as *Mammillaria napina*.

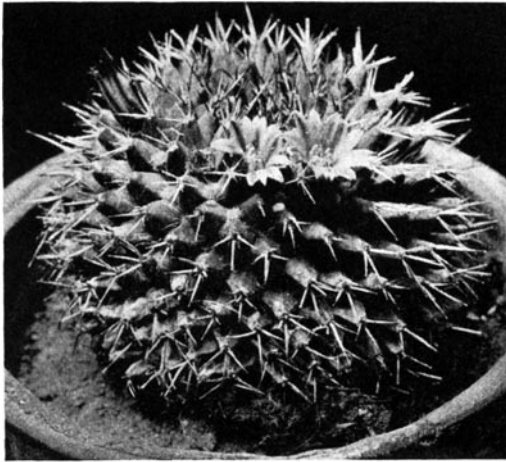


FIG. 102.—*Neomammillaria tenampensis*.

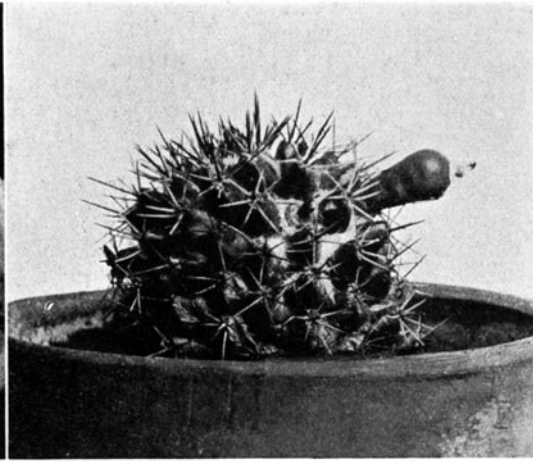


FIG. 103.—*Neomammillaria collinsii*.

**55. *Neomammillaria lanata* sp. nov.**

Small, short-cylindric; tubercles short, 2 to 4 mm. long; spine-areoles short-elliptic; spines 12 to 14, all radial, widely spreading, white except the brown bases; flowering areoles very woolly, the young flowers surrounded by a mass of long white hairs; flowers very small, 6 to 7 mm. long, red; inner perianth-segments about 15, oblong, obtuse or acutish, spreading above; stigma-lobes 3, short, obtuse.

Collected by C. A. Purpus near Rio de Santa Luisa, Mexico, in 1907 and since grown in Washington.

Figure 105 is from a photograph of the type specimen.

**56. *Neomammillaria kewensis* (Salm-Dyck).**

*Mammillaria kewensis* Salm-Dyck, Cact. Hort. Dyck. 1849. 112. 1850.

Globose to cylindric, 3 to 4 cm. in diameter; tubercles short, terete, when young short-woolly in the axils and at the areoles; spines 5 or 6, all radial, 4 or 5 mm. long, brown with dark tips; axils of tubercles bearing crisp hairs; flowers about 15 mm. long, reddish purple; perianth-segments lanceolate, acute; stigma-lobes 5, reddish.

*Type locality:* Not cited.

*Distribution:* Doubtless Mexico.

We have had a living plant from Haage and Schmidt and one from Quehl which we have used in our description.



Salm-Dyck (Cact. Hort. Dyck. 1849. 15. 1850) mentions *Mammillaria kewensis* var. *albispina* and also *M. spectabilis* Hortus as synonyms.

This plant was named for the Royal Botanic Gardens, Kew.

*Illustration*: Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 3, as *Mammillaria kewensis*. Figure 106 is reproduced from a photograph sent us by L. Quehl in 1921.

**57. Neomammillaria subpolyedra** (Salm-Dyck).

*Mammillaria subpolyedra* Salm-Dyck, Hort. Dyck. 343. 1834.  
*Cactus subpolyedrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Solitary, subcylindric, 10 cm. high, 6 cm. in diameter; tubercles pointed, strongly angled; axils and spine-areoles white-woolly; spines 4, at first blackish purple, becoming paler but the tips remaining purplish, the lowest one the largest; flowers 2.5 cm. broad; perianth-segments obtuse, erose, with a darker midrib; fruit red, 2.5 cm. long, pyriform, 12 mm. in diameter at apex.

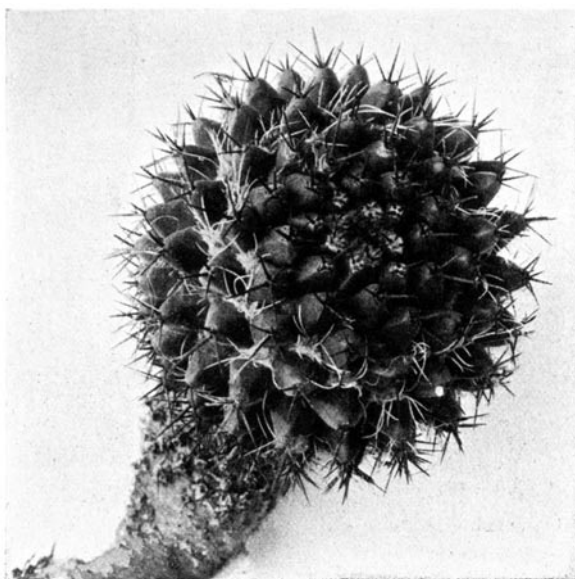


FIG. 104.—*Neomammillaria conzattii*.

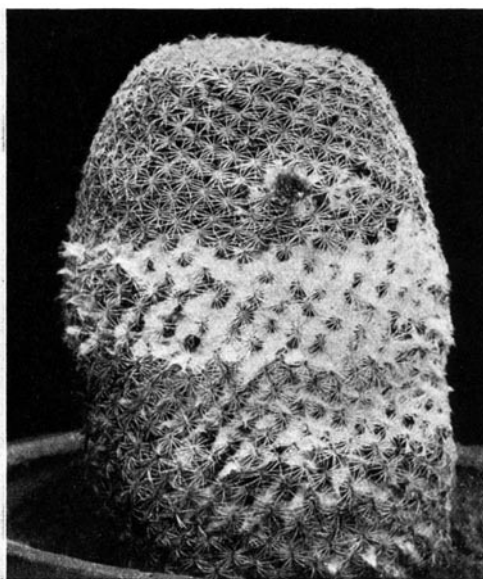


FIG. 105.—*Neomammillaria lanata*.

*Type locality*: Not cited.

*Distribution*: According to Rümpler, Zimapán and Ixmiquilpan, Mexico.

Some of the illustrations here cited do not correspond very well with the original description. This species is listed by Schumann with those unknown to him, and it is known to us only from descriptions and illustrations.

*Mammillaria polygona* Zuccarini (Pfeiffer, Enum. Cact. 17. 1837) is referred here but it was never described. Salm-Dyck afterwards used the name for a very different plant.

*Mammillaria jalappensis* and *M. anisacantha* are referred by Pfeiffer (Enum. Cact. 17. 1837) as synonyms of *M. subpolyedra*.

*Illustrations*: (?) Förster, Handb. Cact. ed. 2. 357. f. 37; (?) Dict. Gard. Nicholson 4: 565. f. 39; Suppl. 518. f. 557; Watson, Cact. Cult. 176. f. 71; ed. 3. f. 48, as *Mammillaria subpolyedra*.

Figure 107 is reproduced from the illustration used in Nicholson's Dictionary.

**58. Neomammillaria galeottii** (Scheidweiler).

*Mammillaria galeottii* Scheidweiler, Hort. Belge 4: 93. 1837.  
*Mammillaria obconella* galeottii Scheidweiler, Hort. Belge 4: 93. 1837.  
*Mammillaria dolichocentra* galeottii Salm-Dyck in Förster, Handb. Cact. 213. 1846.  
*Mammillaria dolichocentra phaeacantha* Labouret, Monogr. Cact. 50. 1853.

Solitary or cespitose, globose; tubercles pointed; spines 4, elongated, the upper ones erect and connivent over apex of plant, on older tubercles weak and spreading, 2.5 cm. long, pale rose to crimson.

*Type locality:* Mexico.

*Distribution:* Mexico.

We have not seen this plant, but we have examined the illustration which accompanies the original description. L. Quehl has had it in cultivation, and sent us a photograph.

This must be a very distinct species and not at all closely related to *Mammillaria dolichocentra*, to which Schumann referred it as a variety, crediting himself as the authority; the name, however, had been used by Förster in 1846. The illustrations in Förster's Handbuch der Cacteenkunde and in Nicholson's Dictionary cited below probably are not to be referred here and they certainly should not be referred to *Mammillaria dolichocentra*.

*Mammillaria obscura galeottii* Salm-Dyck (Förster, Handb. Cact. 213. 1846) is mentioned as a synonym of this species, but so far as we can learn it was never described.

*Illustrations:* Hort. Belge 4: pl. 6; Rother, Praktischer Leitfaden Kakteen 37, as *Mammillaria galeottii*; Förster, Handb. Cact. ed. 2. 323. f. 32; Dict. Gard. Nicholson 2: 321. f. 508, as *Mammillaria dolichocentra*.

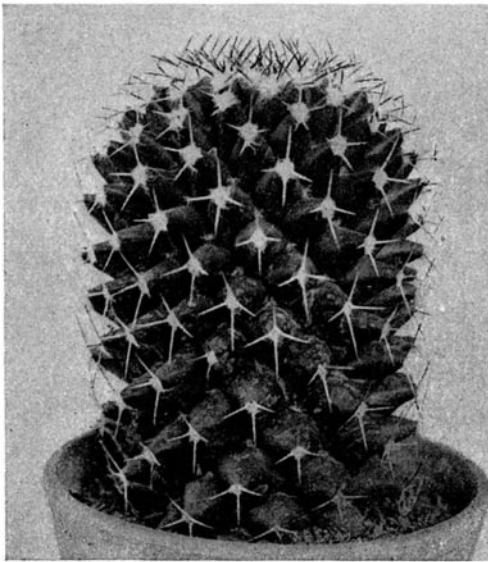


FIG. 106.—*Neomammillaria kewensis*.

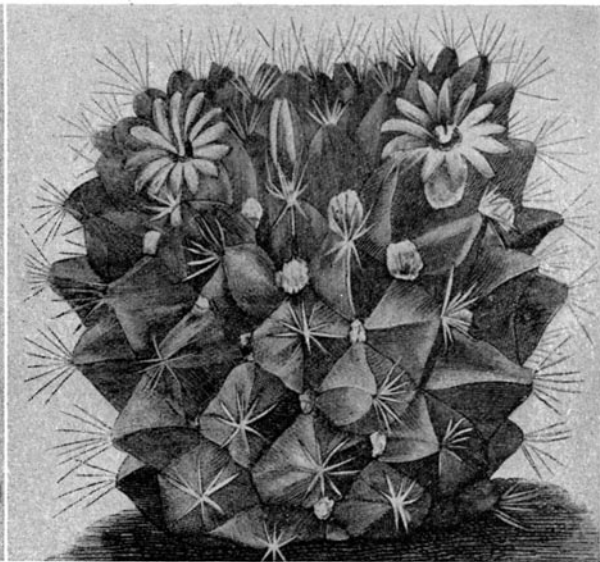


FIG. 107.—*Neomammillaria subpolyedra*.

### 59. *Neomammillaria tetracantha* (Salm-Dyck).

*Mammillaria tetracantha* Salm-Dyck in Pfeiffer, Enum. Cact. 18. 1837.

*Mammillaria obconella* Scheidweiler, Hort. Belge 4: 93. 1837.

*Mammillaria dolichocentra* Lemaire, Cact. Aliq. Nov. 3. 1838.

*Mammillaria dolichocentra staminea* Labouret, Monogr. Cact. 50. 1853.

*Cactus obconella* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Cactus dolichocentrus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus tetracanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria rigidispina* Hildmann, Monatsschr. Kakteenk. 3: 112. 1893.

*Mammillaria dolichocentra brevispina* Runge, Monatsschr. Kakteenk. 3: 112. 1893.

Nearly globular, 6 to 8 cm. in diameter; axils of tubercles with scanty persistent wool; tubercles 8 to 10 mm. long, obscurely 4-angled; areoles small, at first lanate, somewhat 4-angled; spines 4, all radial, slender, the 3 lower equal, the upper one incurved, longer, 25 mm. long, when young all yellowish white, in age grayish yellow or brown; flowers numerous from towards top of plant, small, pinkish to rose-colored; inner perianth-segments narrowly lanceolate, acuminate.

*Type locality:* Mexico, but no definite locality cited.

*Distribution:* Mexico, but range unknown.

Schumann refers here *Mammillaria longispina* Reichenbach (Suppl. Terschek Cact. Verz.; see also Walpers, Repert. Bot. 2: 301. 1843) and *M. obconella* Scheidweiler (Hort. Belge 4: 93. f. 6. 1837), but we are uncertain as to their relationship. To the former Walpers refers as a synonym *M. galeottii* Otto.

*Mammillaria dolichacantha* Lemaire (Förster, Handb. Cact. 213. 1846) and *M. dolichocentra picta* (Salm-Dyck, Cact. Hort. Dyck. 1844. 9. 1845) were never described.

*Illustrations:* Curtis's Bot. Mag. 70: pl. 4060, as *Mammillaria tetracantha*; Cassell's Dict. Gard. 2: 48; Karsten, Deutsche Fl. 887. f. 501, No. 2; ed. 2. 2: 456. f. 605, No. 2; Schelle, Handb. Kakteenk. 260. f. 182; Watson, Cact. Cult. 155. f. 58; ed. 3. f. 36; Lemaire, Icon. Cact. pl. 5; Schumann, Gesamtb. Kakteen 558. f. 91; Förster, Handb. Cact. ed. 2. 322. f. 31; Gartenwelt 9: 265; Lemaire, Cactées 37. f. 3, as *Mammillaria dolichocentra*; Rev. Hort. 1861: 270. f. 72, as *Mammillaria*; Thomas, Zimmerkultur Kakteen 54; Monatschr. Kakteenk. 3: 11 3, as *Mammillaria rigidispina*.

Figure 108 is a reproduction of the first illustration cited above.

#### 60. *Neomammillaria elegans* (De Candolle).

- Mammillaria geminispina*\* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 30. 1828. Not Haworth, 1824.  
*Mammillaria elegans* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 111. 1828.  
*Mammillaria elegans minor* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 111. 1828.  
 ? *Mammillaria elegans globosa* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 111. 1828.  
*Mammillaria acanthophlegma* Lehmann, Del. Sem. Hamb. 1832.  
*Mammillaria supertexta* Martius in Pfeiffer, Enum. Cact. 25. 1837.  
*Mammillaria dyckiana* Zuccarini in Pfeiffer, Enum. Cact. 26. 1837.  
*Mammillaria elegans micrantha* Lemaire, Cact. Gen. Nov. Sp. 100. 1839.  
*Mammillaria geminispina tetracantha* Lemaire, Cact. Gen. Nov. Sp. 100. 1839.  
*Mammillaria klugii* Ehrenberg, Bot. Zeit. 2: 834. 1844.  
*Mammillaria meisneri* Ehrenberg, Bot. Zeit. 2: 834. 1844.  
*Mammillaria kunthii* Ehrenberg, Bot. Zeit. 2: 835. 1844.  
*Mammillaria splendens* Ehrenberg, Allg. Gartenz. 57: 242. 1849.  
*Mammillaria acanthophlegma decandollii* Salm-Dyck, Cact. Hort. Dyck. 1849. 9. 1850.  
*Mammillaria elegans klugii* Salm-Dyck, Cact. Hort. Dyck. 5849. 9. 1850.  
*Mammillaria acanthophlegma meisneri* Salm-Dyck, Cact. Hort. Dyck. 1849. 9. 1850.  
*Mammillaria supertexta tetracantha* Salm-Dyck in Labouret, Monogr. Cact. 61. 1853.  
*Mammillaria acanthophlegma elegans* Monville in Labouret, Monogr. Cact. 63. 1853.  
*Mammillaria acanthophlegma monacantha* Monville in Labouret, Monogr. Cact. 63. 1853.  
*Mammillaria acanthophlegma leucocephala* Monville in Labouret, Monogr. Cact. 63. 1853.  
*Mammillaria acanthophlegma abducta* Monville in Labouret, Monogr. Cact. 64. 1853.  
*Cactus acanthophlegma* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus dyckianus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus elegans* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not Link, 1822.  
*Cactus kunthii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus klugii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus meisneri* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus supertextus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Simple, obovate to globose, 5 cm. in diameter, somewhat umbilicate at apex; tubercles ovate, naked in their axils, not lactiferous; spine-areoles tomentose when young; radial spines stiff, bristle-like, 25 to 30, white, spreading; central spines 1 (sometimes 2 or 3), rigid.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

This species was based on Thomas Coulter's No. 48 from Mexico but no definite locality was cited. The type was not preserved nor is there any illustration extant of the original. De Candolle may have had more than one species before him when he drew up his description, for he described two varieties, one of which has bristles in the axils of the tubercles, which are never found in *Neomammillaria elegans* as we have treated it here.

Plants named *Mammillaria elegans* are to be found in most collections of cacti, but the name is often applied to several closely allied species. A plant from northern Mexico, *Mammillaria chinocephala*, resembles it very much but has milky tubercles. Other species

\* Here De Candolle referred *Cactus columnaris* Mociño and Sessé (De Candolle, Prodr. 3: 459. 188), which Schumann has inadvertently taken up as *Mammillaria columnaris* Mociño and Sessé (Gesamtb. Kakteen 565. 1898).



which have passed as *M. elegans* have recently been described as *Mammillaria pseudo-perbella* and *M. perbella*.

*Mammillaria supertexta caespitosa* Monville (Salm-Dyck, Cact. Hort. Dyck. 1844. 6. 1845) is only a name; *M. supertexta compacta* Scheidweiler (Labouret, Monogr. Cact. 61. 1853) was given as a synonym of *M. supertexta tetracantha* but may not belong here.

The name *Mammillaria leucocephala* Hortus is given by Pfeiffer as a synonym of *M. acanthophlegma*. *M. recta* Miquel (Labouret, Monogr. Cact. 63. 1853) occurs only as a synonym for the same species.

*Illustrations:* Blühende Kakteen 3: pl. 139; Cact. Journ. 1: pl. for February; Schelle, Handb. Kakteenk. 261. f. 183; Schumann, Gesamtb. Kakteen 564. f. 92, as *Mammillaria elegans*; Mém. Mus. Hist. Nat. Paris 17: pl. 3, as *Mammillaria geminispina*; Cact. Journ. 1: pl. for February in part, as *Mammillaria supertexta*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 24, as *Mammillaria dyckiana*.

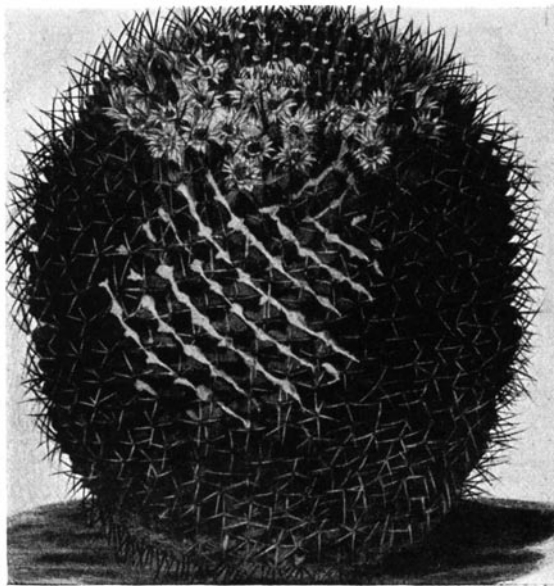


FIG. 108.—*Neomammillaria tetracantha*.



FIG. 109.—*Neomammillaria elegans*.

Figure 109 is from a photograph of the plant grown in the Huntington Collection near Los Angeles, California, as this species.

Of this relationship are the following:

MAMMILLARIA CONSPICUA J. A. Purpus, Monatsschr. Kakteenk. 22: 163. 1912.

Simple, cylindric to globose, not milky; spine-areoles small, short-elliptic, when young a little woolly, in age glabrate; radial spines 10 to 25, rigid; central spines 2, a little curved; fruit red; seeds 1 mm. long.

*Type locality:* Near Zapotitlán, Puebla, Mexico.

*Illustration:* Monatsschr. Kakteenk. 24: 37.

MAMMILLARIA MICROTHELE Mühlenpfordt, Allg. Gartenz. 16: 11. 1848.

*Cactus bispinus* Coulter, Contr. U. S. Nat. Herb. 3: 101. 1894.

Cespitose, many-headed; joints globose, small; tubercles when dry 6 mm. long, naked or woolly in their axils; radial spines 22 to 24, white-setiform, spreading, 2 to 4 mm. long; central spines 2, much stouter than the radials, 2 mm. long or less; flowers flesh-colored without, white within, small, only 3 to 4 mm. long when dried; fruit clavate, 10 mm. long; seeds rather large, probably black.

*Type locality:* Not known but supposed to be Mexico.

*Distribution:* Mexico.



Our description is drawn from the original, supplemented by specimens in the Engelmann Herbarium obtained from Salm-Dyck's garden in January 1857, which consist of two packets, one containing a few spine-clusters and the other several withered flowers and nearly ripe fruits; these latter are labeled "Baumann 857." Engelmann and Coulter compare this species with *Mammillaria micromeris* but we believe that it is related to *M. elegans* and its allies.

It seems to have been described from specimens of Haage of unknown origin but supposed to be from Mexico; Coulter's reference, on the statement of Budd, that it occurs within the southern border of Pecos County, Texas, is to be doubted.

Coulter renamed *Mammillaria microthele* because of an older *Cactus microthele*. Martius used the name *M. microthele* in 1829 (Hort. Reg. Monac. 127) but without description. The names *M. brongniartii* Hortus, *M. microthele brongniartii*, and *M. compacta* Hortus (not Engelmann, 1848) have been used (Salm-Dyck, Cact. Hort. Dyck. 1849. 9. 1850) but without descriptions.

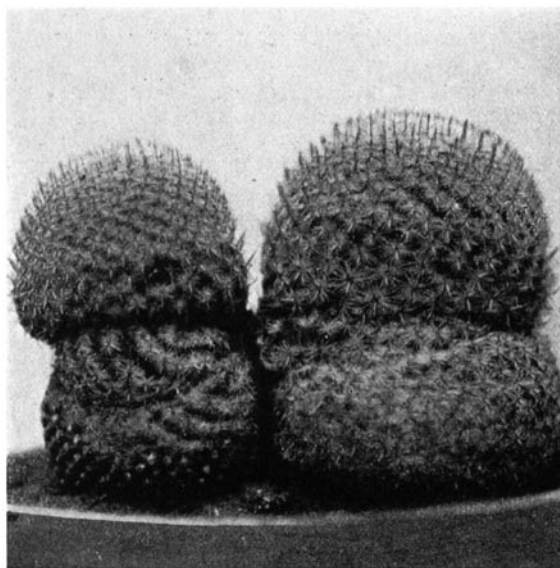


FIG. 110.—*Neomammillaria pseudoperbella*.

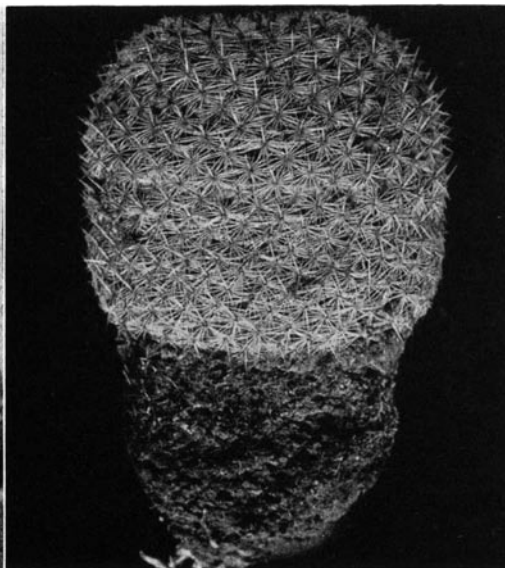


FIG. 111.—*Neomammillaria dealbata*.

### 61. *Neomammillaria pseudoperbella* (Quehl).

*Mammillaria pseudoperbella* Quehl, Monatsschr. Kakteenk. 19: 188. 1909.

*Mammillaria pseudoperbella rufispina* Quehl, Monatsschr. Kakteenk. 26: 94. 1916.

Solitary, or few together, globose to short-cylindrical, very spiny, depressed at apex; tubercles short-cylindric; radial spines 20 to 30, setaceous, white, short; central spines 2, one erect, the other turned backwards; flowers small, purple; perianth-segments narrow-oblong, with an ovate acute tip; style longer than the filaments, pinkish; stigma-lobes 3, obtuse.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

The flowers of this plant were not known when first described nor was its exact origin known. An illustration of it was given. We have also received a dead plant from Bödeker. This illustration and specimen seem to point to a species which has been frequently sent to us from Oaxaca by Conzatti, Reko, and Soils. These plants from Oaxaca normally have 2 short, stout, divergent, central spines. In one specimen sent by Professor Conzatti in 1922 the central spines are often 2 and 4, with one of the centrals more elongated and those near the top of the plant connivent.

*Illustration:* Monatsschr. Kakteenk. 19: 189, as *Mammillaria pseudoperbella*.

Plate XII, figure 1, shows a plant sent by C. Conzatti from Oaxaca, in 1921. Figure 110 is from a photograph of the type specimen.

**62. *Neomammillaria dealbata* (Dietrich).**

*Mammillaria dealbata* Dietrich, Allg. Gartenz. 14: 309. 1846.

*Cactus dealbatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Globose to short-cylindric, glaucous, more or less depressed at apex but almost hidden by the many closely appressed spine-clusters; axils of tubercles and young spine-areoles densely lanate but in age glabrate; radial spines about 20, white, short, appressed; central spines 2, much stouter and longer than the radials, sometimes 1 cm. long, the upper ones often erect, white below, brown or black at tip; flowers small, carmine; fruit clavate, red; seeds brown.

*Type locality:* Mexico.

*Distribution:* Central Mexico, especially on the pedregal about the City of Mexico.

We have referred to this species a plant which is very common in the Valley of Mexico and which is known in collections as *Mammillaria peacockii*. The name, first used by Rümpler (Förster, Handb. Cact. ed. 2. 286. 1885), was given as a synonym of *Mammillaria dealbata*. It was offered for sale by Grässner as *M. elegans dealbata* (Monatsschr. Kakteenk. February 1920).

*Illustration:* Grässner, Haupt-Verz. Kakteen 1912: 23, as *Mammillaria peacockii*.

Plate XII, figure 3, shows a plant from Mexico, sent to the New York Botanical Garden in 1911. Figure 111 is from a photograph of a plant sent by Dr. Reiche from the Valley of Mexico in 1922.



FIG. 112.—*Neomammillaria haageana*.

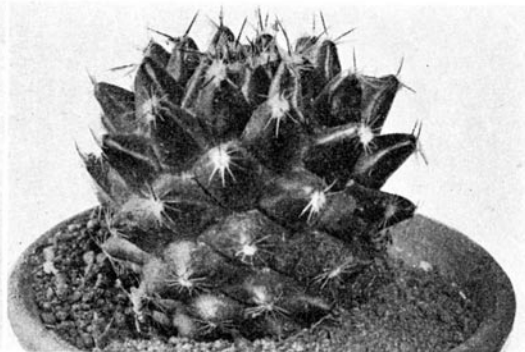


FIG. 113.—*Neomammillaria mundtii*.

**63. *Neomammillaria haageana* (Pfeiffer).**

*Mammillaria haageana* Pfeiffer, Allg. Gartenz. 4: 257. 1836.

*Mammillaria diacantha* Haage in Steudel, Nom. ed. 2. 2: 96. 1841. Not Lemaire, 1838.

*Mammillaria haageana validior* Monville in Labouret, Monogr. Cact. 54. 1853.

*Cactus haageanus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Somewhat cespitose, the individual plants globose or somewhat elongated in age; axils slightly woolly; radial spines about 20, radiating, white; central spines 2, a little longer than the radials, black; flowers small, carmine-rose.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

Pfeiffer (Enum. Cact. 26. 1837) refers here *Mammillaria diacantha nigra* which Haage had listed in his Catalogue of 1836. Here Pfeiffer also refers *M. perote* (Allg. Gartenz. 4: 257. 1836) of gardens.

*Illustrations:* Dict. Gard. Nicholson 2: 321. f. 509; Cact. Journ. 1: 165; Knippel, Kakteen f. 21; Förster, Handb. Cact. ed. 2. 284. f. 29; Watson, Cact. Cult. 163. f. 62; ed. 3. f. 9; Schelle, Handb. Kakteenk. 262. f. 184; Rümpler, Sukkulenten 201. f. 114, as *Mammillaria haageana*.





M. E. Eaton del.

A. Hoen & Co. Baltimore

- 1. Flowering plant of *Neomammillaria pseudoperbella*.
- 2. Flowering plant of *Neomammillaria spinosissima*.
- 3. Flowering plant of *Neomammillaria dealbata*.

- 4. Flowering plant of *Neomammillaria amoena*.
- 5. Flowering plant of *Neomammillaria polyedra*.
- 5. Flowering plant of *Neomammillaria celsiana*.





Figure 112 is reproduced from the first illustration cited above. Nicholson recorded the receipt of the plant figured by him from Haage.

**64. *Neomammillaria perbella* (Hildmann).**

*Mammillaria perbella* Hildmann in Schumann, Gesamt. Kakteen 567. 1898.

Solitary or somewhat cespitose, depressed-globose, glaucous-green; tubercles short-conic, their axils lanate; radial spines 14 to 18, 1 to 1.5 mm. long, setaceous, white; central spines 2, very short (4 to 6 mm. long); flowers 9 to 10 mm. long, reddish; stigma-lobes red.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

We know this species from description only; Schumann places it near *Mammillaria donatii*.

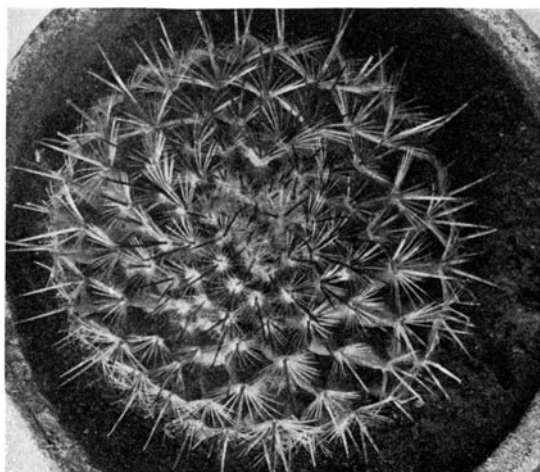


FIG. 114.—*Neomammillaria donatii*.

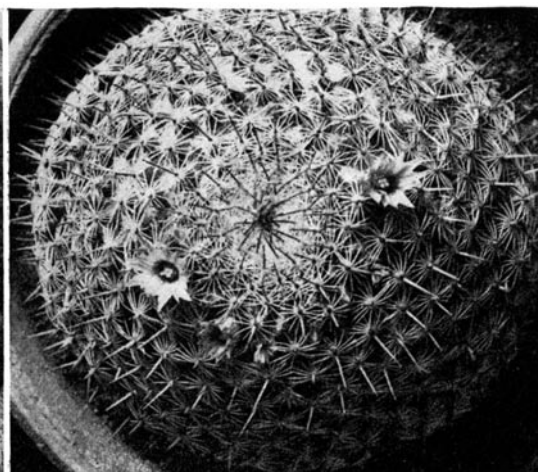


FIG. 115.—*Neomammillaria collina*.

**65. *Neomammillaria collina* (J. A. Purpus).**

*Mammillaria collina* J. A. Purpus, Monatsschr. Kakteenk. 22: 162. 1912.

Solitary, globose, 12 to 13 cm. in diameter, somewhat depressed at apex; tubercles cylindric, 1 cm. long or less, woolly in their axils; radial spines 16 to 18, white, 4 mm. long; central spines 1 or 2, longer than the radials; flowers rose-colored, 1.5 to 2 cm. long; fruit 2 cm. long, red.

*Type locality:* Esperanza, Puebla, Mexico.

*Distribution:* Puebla, Mexico.

We refer here specimens collected near the type locality in 1912 by Dr. C. A. Purpus.

*Illustrations:* Monatsschr. Kakteenk. 23: 99; Grässner, Haupt-Verz. Kakteen 1914: 28, as *Mammillaria collina*.

Figure 115 shows a plant sent by Dr. Purpus to Washington.

**66. *Neomammillaria donatii* (Berge).**

*Mammillaria donatii* Berge in Schumann, Gesamt. Kakteen Nachtr. 135. 1903.

Usually simple, stout and globose, but sometimes cespitose, glaucous-green; tubercles small, conic, naked in their axils; radial spines 16 to 18, 8 mm. long, glassy; central spines 2, yellowish black, 10 mm. long; flowers reddish, 15 mm. long; style and stigma-lobes white.

*Type locality:* Mexico.

*Distribution:* Mexico.

We do not know the exact type locality or distribution of this plant. It is now in the trade and we recently obtained a specimen from Haage and Schmidt.

Figure 114 is from a photograph of the plant received from Haage and Schmidt in 1920, referred to above.

**67. *Neomammillaria mundtii* (Schumann).**

*Mammillaria mundtii* Schumann, Monatsschr. Kakteenk. 13: 141. 1903.

Solitary, so far as known, globose, 6 to 7 cm. in diameter; tubercles not milky, nearly terete, dark green, rather short and stubby, their axils naked; spine-areoles circular, somewhat lanate when young; radial spines 8 to 19, swollen at base, spreading or somewhat curved backward, 6 to 8 mm. long, brownish when young, the tips usually darker; central spines 2, a little stouter and longer than the radials, porrect; flower from toward the center of the plant, 2 cm. long.

*Type locality:* Not cited.

*Distribution:* Mexico, but known only from cultivated plants.

We know this plant from a specimen sent to Washington in 1921 by W. Mundt, in whose honor the species had been named.

*Illustration:* Monatsschr. Kakteenk. 13: 142, as *Mammillaria mundtii*.

Figure 113 is a reproduction of a photograph sent us by L. Quehl in 1921.

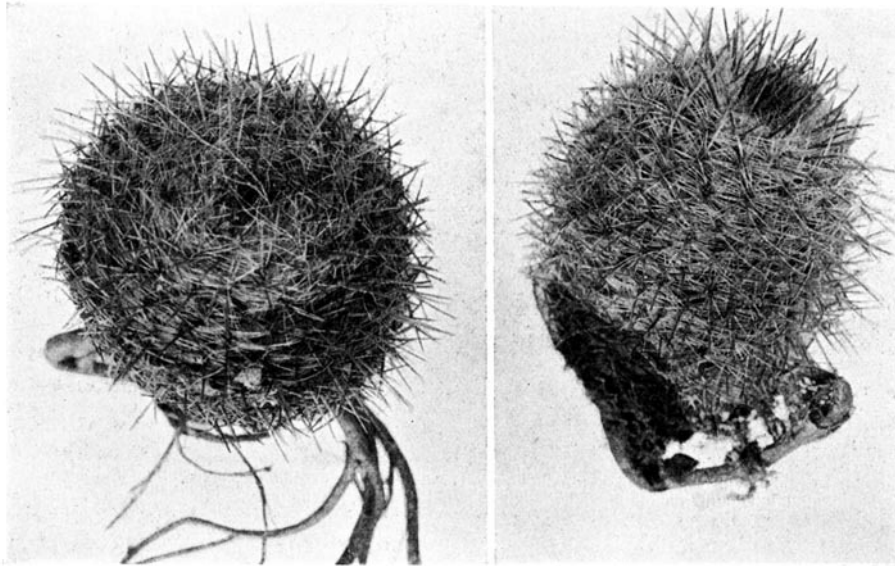


FIG. 116.—*Neomammillaria celsiana*.

**68. *Neomammillaria celsiana* (Lemaire).**

*Mammillaria celsiana* Lemaire, Cact. Gen. Nov. Sp. 41. 1839.

*Mammillaria muehlenpfordtii* Förster, Allg. Gartenz. 15: 49. 1847.

*Mammillaria schaeferi* Fennel, Allg. Gartenz. 15: 66. 1847.

*Mammillaria schaeferi longispina* Haage, Hamb. Gartenz. 17: 160. 1861.

*Cactus muehlenpfordtii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus celsianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus schaeferi* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

(?) *Mammillaria perringii* Hildmann, Gartenwelt 10: 250. 1906.

Plant-body subglobose, becoming cylindric, 10 to 12.5 cm. high, 7.5 cm. in diameter, deep green; axils of tubercles woolly; tubercles conic, compact; spine-areoles small, round, woolly when young; radial spines 24 to 26, about equal, white, setaceous; central spines 4 to 6, rarely 7, somewhat longer than the radials, terete, rigid, pale yellow, more or less recurved and unequal, 8 to 16 mm. long; flowers red: fruit described as green.

*Type locality:* Not cited.

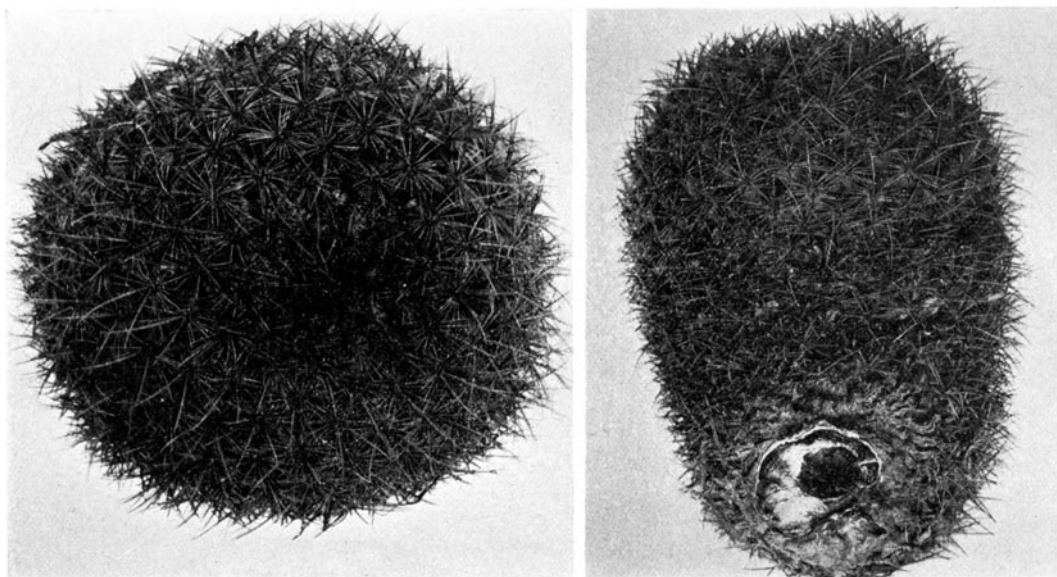
*Distribution:* Southern Mexico.

In 1920 Professor Conzatti sent us two specimens from the District of Cuicatlán, Oaxaca, which we refer here; these are the only plants of this species we have seen.

According to Salm-Dyck, *Mammillaria celsiana* differs from *M. rutila* in its columnar stem and in its spines.

Schumann refers *Mammillaria perringii* to *M. celsiana*, while Hildmann claims that it is possible that the two may be distinct, but we do not have the material at hand to decide definitely.

*Mammillaria lanifera* Haworth (Phil. Mag. 63: 41. 1824; *Cactus lanifer* Kuntze, Rev. Gen. Pl. 1: 260. 1891) is referred here by Schumann; it is probably different but, if not, the name has priority over *M. celsiana*. To *M. lanifera* De Candolle (Prodr. 3: 459. 1828) refers *Cactus canescens* Mociño and Sessé. *M. geminispina monacantha* Lemaire (Cact. Gen. Nov. Sp. 100. 1839) was supposed to be the same as *M. lanifera*. *Mammillaria polycephala* Mühlenpfordt (Allg. Gartenz. 13: 347. 1845; *Cactus polycephalus* Kuntze, Rev. Gen. Pl. 1: 261. 1891) was referred by Schumann to *M. elegans*, but it was described with 4 central spines. It seems to be related to *M. crucigera*, which we have tentatively referred to *M. celsiana*, which has yellow central spines, while both *M. polycephala* and *M. elegans* have white centrals.



FIGS. 117 and 118.—*Neomammillaria aureiceps*.

*Mammillaria supertexta dichotoma* (Salm-Dyck, Cact. Hort. Dyck. 1849. 9. 1850) is based on *M. polycephala*.

*Mammillaria crucigera* Martius (Nov. Act. Nat. Cur. 16: 340. pl. 25, f. 2. 1832; *Cactus cruciger* Kuntze, Rev. Gen. Pl. 1: 260. 1891) is related to this species, judging from the description, but the illustration suggests that it is a distinct species. It was collected by Karwinsky in Mexico, but he does not give a definite locality. It was unknown to Schumann.

*Illustrations:* Gartenwelt 10: 250; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 29, as *Mammillaria celsiana*; Gartenwelt 10: 250, as *Mammillaria perringii*; ?Mém. Mus. Hist. Nat. Paris 17: pl. 4, as *Mammillaria lanifera*; ?Martius, Nov. Act. Nat. Cur. 16: pl. 25, f. 2, as *Mammillaria crucigera*.

Plate XII, figure 6, shows a plant in the New York Botanical Garden which flowered October 16, 1911. Figure 116 is from a photograph of two plants sent by Professor Conzatti in 1920.



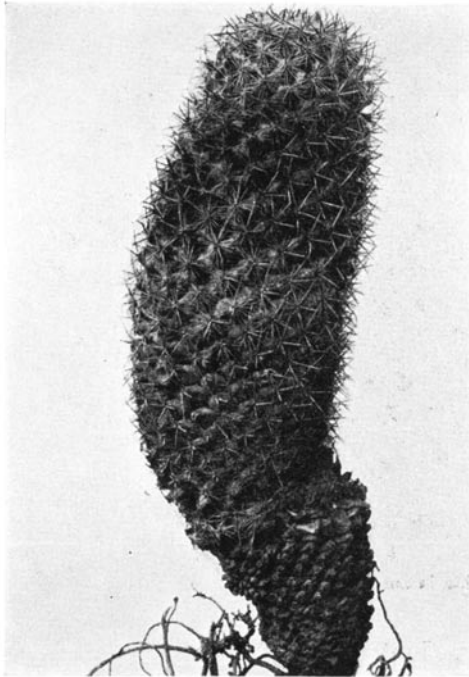
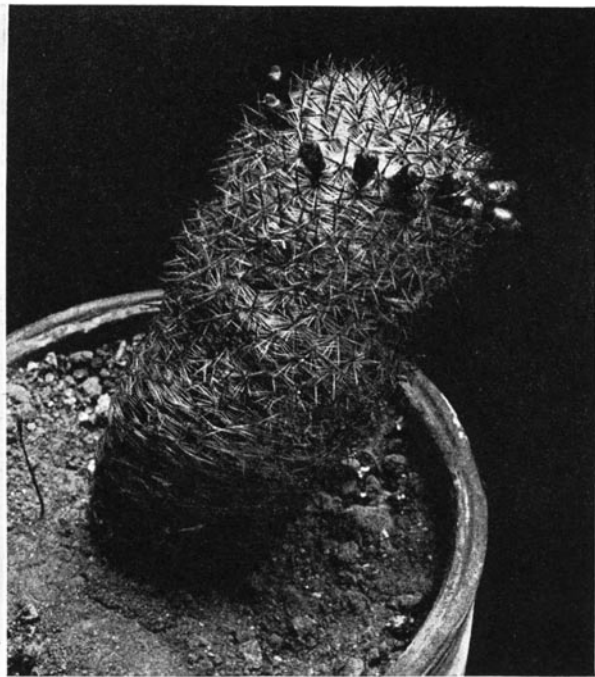
**69. *Neomammillaria aureiceps* (Lemaire).***Mammillaria aureiceps* Lemaire, Cact. Aliq. Nov. 8. 1838.*Mammillaria rhodantha aureiceps* Salm-Dyck, Cact. Hort. Dyck. 1844. 7. 1845.*Cactus aureiceps* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Globose to short-oblong, 8 to 10 cm. in diameter; tubercles short, terete in section, woolly and setose in their axils; radial spines about 20, bristle-like, white, 5 to 8 mm. long, spreading; central spines several, sometimes as many as 9, yellow, stouter and longer than the radials, 10 to 14 mm. long, somewhat spreading and a little curved inward; flowers small, dark red.

*Type locality:* Mexico.*Distribution:* Valley of Mexico.

Our description is based on specimens recently sent us by Dr. Karl Reiche as *Mammillaria rhodantha*, under which name it usually passes. *M. rhodantha*, however, has different spines and is more strictly a mountain species.

Plate IX, figure 3, shows a plant sent from the Edinburgh Botanical Garden in 1902 as *Mammillaria rhodantha* which flowered in the New York Botanical Garden, October 15, 1912. Figures 117 and 118 give two views of this plant sent us by Dr. Reiche from the Valley of Mexico.

FIG. 119.—*Neomammillaria yucatanensis*.FIG. 120.—*Neomammillaria ruestii*.**70. *Neomammillaria yucatanensis* sp. nov.**

Plants in clumps of 4, erect, cylindric, not milky, 10 to 15 cm. long, 3 to 6 cm. in diameter, very spiny; tubercles conic, woolly in their axils but not setose; radial spines about 20, white, spreading, acicular; central spines 4 or rarely 5, much stouter than the radials, 6 to 8 mm. long, slightly spreading above, yellowish brown; flowers very small, rose; fruit oblong, bright red."

Collected by George F. Gaumer at Progreso, Yucatan, Mexico, in 1918 (No. 23939) and again in 1921 (No. 24367, type).

We have not seen this species in flower or fruit but Dr. Gaumer has described them as above. He says that the plant is rare on the land side of the coastal marshes.

Figure 119 is from a photograph of the plant sent in 1921 by Dr. Gaumer.



**71. *Neomammillaria ruestii* (Quehl).***Mammillaria ruestii* Quehl, Monatsschr. Kakteenk. 15: 173. 1905.*Mammillaria celsiana guatemalensis* Eichlam, Monatsschr. Kakteenk. 19: 59. 1909.

Cylindric, 6 to 7 cm. high, 4 to cm. in diameter, light green, almost hidden by the spines; axils of tubercles more or less woolly, at least when young; flowering areoles at first quite woolly; radial spines 20 or more, white, glossy, to 6 mm. long, spreading; central spines usually 4, sometimes, much stouter than the radials, yellow, swollen at base, ascending, 7 to 8 mm. long; flowers small, sometimes almost hidden by the spines, 8 mm. long; inner perianth-segments about 25, lanceolate, acute, pale purple, the margins almost colorless; filaments colorless below, purplish above; style pale; stigma-lobes 4, linear, elongated, reflexed; fruit clavate, red; seeds brown.

*Type locality:* Honduras.*Distribution:* Honduras and Guatemala.

We have had the Guatemala plant under observation for 14 years and it has both flowered and fruited.

Figure 120 is from a photograph of a plant sent by Dr. A. W. Kellermann from Guatemala in 1908.



FIG. 121.—*Neomammillaria pringlei*.

**72. *Neomammillaria pringlei* (Coulter).***Cactus pringlei* Coulter, Contr. U. S. Nat. Herb. 3: 109. 1894.*Mammillaria pringlei* K. Brandegee, Zoe 5: 7. 1900.

Solitary, with long fibrous roots, usually globose, but sometimes depressed or short-cylindric, 6 to 16 cm. high, 6 to 7 cm. in diameter; tubercles dull green, terete, conic, 6 to 10 mm. long; axils of tubercles woolly and setose; spines all yellow; radial spines 18 to 20, setaceous, spreading, 5 to 8 mm. long; central spines 5 to 7, much stouter and longer than the radials, more or less recurved, 2 to 2.5 cm. long, those from the upper areoles curved over the apex of the plant; flowers deep red, 8 to 10 mm. long; fruit borne in a circle near the middle of the plant, oblong, 12 to 15 mm. long; seeds small, brown.

*Type locality:* Cited as San Luis Potosí, but doubtless Tultenango Canyon, state of Mexico, according to Pringle, who collected the type.

*Distribution:* Known only from the type locality.

Dr. Rose collected living specimens from the type locality some years ago but these never flowered. In April 1921 we sent Dr. Reiche to the type locality and he obtained thirteen beautiful specimens, one of which was in fruit.

Coulter (Contr. U. S. Nat. Herb. 3: 109. 1894) states that *Cactus pringlei* was near *Cactus rhodanthus sulphureospinus*, which was based on *M. sulphurea* Förster.

Figure 121 is from a photograph of the plants collected at Tultenango Canyon in 1921.

**73. *Neomammillaria cerralboa* sp. nov.**

Cylindric, solitary, 1 to 1.5 dm. high, 5 to 6 cm. in diameter; tubercles not milky, yellowish, terete, obtuse, closely set; spines all yellow, very much alike, about 11, one usually more central, the longer ones nearly 2 cm. long; flowers small, 1 cm. long or less, forming a circle around the plant about 3 cm. below the top.

Collected by Ivan M. Johnston on Cerralbo Island, Gulf of California, June 6, 1921 (No. 4038). The next day on the same island he collected three more plants (No. 4053) which seem to be referable here, except that two of them have hooked spines; Dr. Rose also collected on this same island (No. 16877) in 1911 specimens with hooked spines which are like Mr. Johnston's plant. Whether this plant has normally these two forms or whether the hooked-spined one is a hybrid we are unable to determine.

Figure 121a is a photograph of the type plant, collected by Johnston (No. 4038).

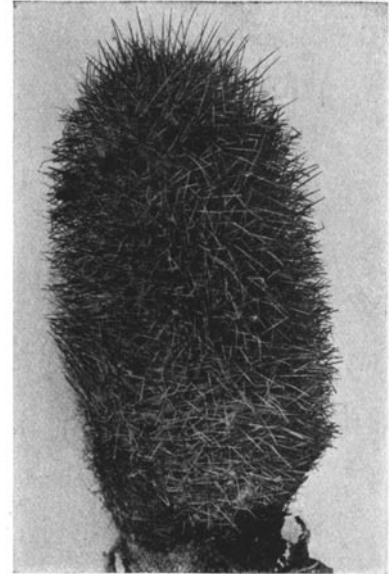


FIG. 121a.—*Neomammillaria cerralboa*.

**74. *Neomammillaria phaeacantha* (Lemaire).**

*Mammillaria phaeacantha* Lemaire, Cact. Gen. Nov. Sp. 47. 1839.

*Mammillaria nigricans* Fennel, Allg. Gartenz. 15: 66. 1847.

*Cactus nigricans* Kuntze, Rev. Gen. Pl. 1: 261. 1891. Not Haworth, 1803.

*Cactus phaeacanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

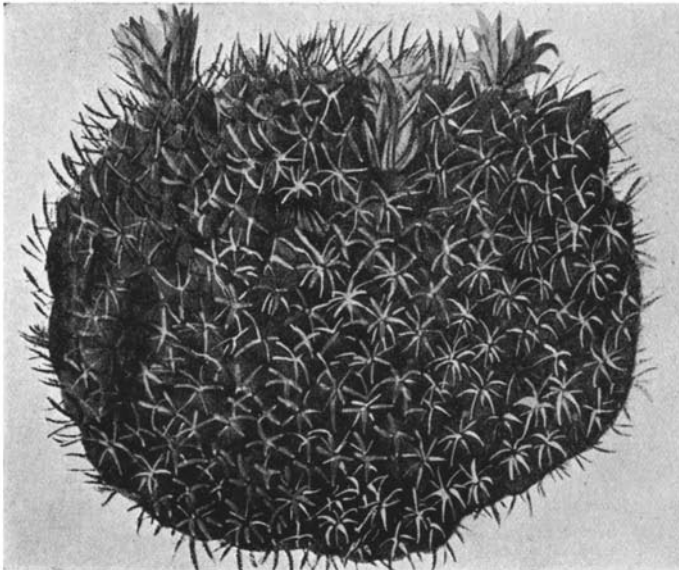


FIG. 122.—*Neomammillaria phaeacantha*.

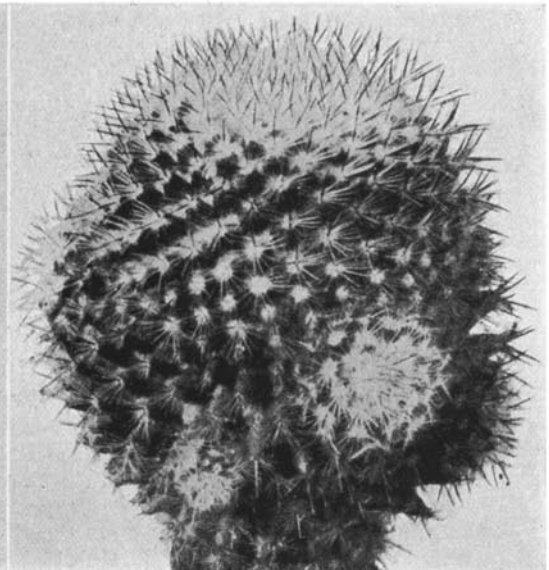


FIG. 123.—*Neomammillaria graessneriana*.

Globose or somewhat depressed, green; axils of tubercles woolly; tubercles conic, hardly, if at all, angled; spine-areoles small, yellowish tomentose (probably so only when young); radial spines

16 to 20, white, setaceous; central spines 4, black, subulate, spreading or reflexed, the lowest one longest; flowers from upper part of plant, dark red; perianth-segments oblong, acuminate.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

This species has not been recognized by recent writers, and while we have seen no specimens we believe it deserves specific rank.

Schumann refers *Mammillaria nigricans* definitely to *M. rhodantha* but, it appears to us, without justification; the Index Kewensis has referred it, we believe properly, to *M. phaeacantha*.

*Mammillaria phaeacantha rigidior* (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845) is only a name.

*Illustration:* Pfeiffer, Abbild. Besch. Cact. 2: pl. 23, as *Mammillaria nigricans*.

Figure 122 is reproduced from the illustration cited above.

#### 75. *Neomammillaria graessneriana* (Bödeker).

*Mammillaria graessneriana* Bödeker, Monatsschr. Kakteenk. 30: 84. 1920.

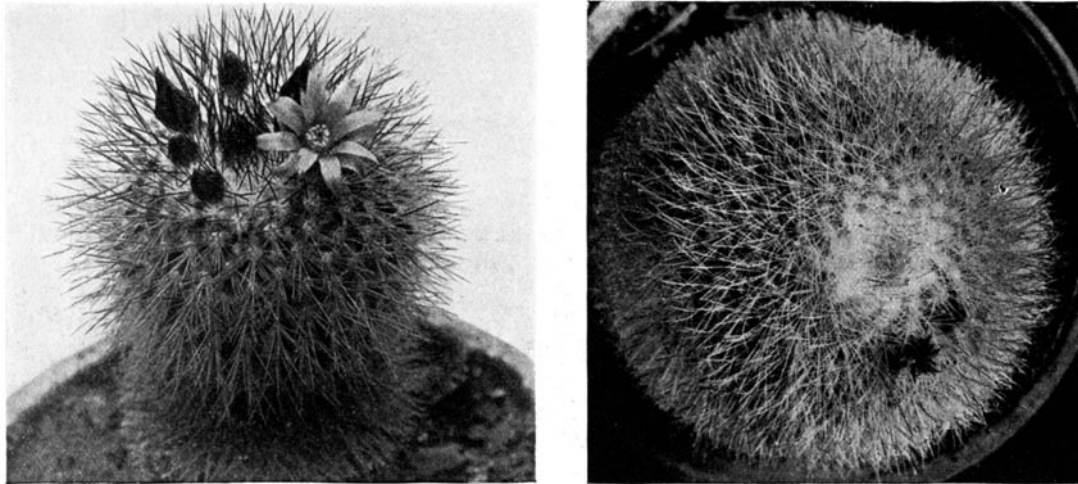
Solitary, or becoming cespitose, globose, 6 to 8 cm. in diameter, dark bluish green, somewhat depressed at apex; tubercles 4-angled, 8 mm. long, not milky, obtuse or truncate at apex, not setose in their axils; spine-areoles circular, white-woolly when young, nearly naked in age; radial spines 18 to 20, acicular, 6 to 8 mm. long, white; central spines 2 to 4, stouter than the radials, spreading, 8 mm. long, reddish brown; flowers small, somewhat distant from the apex of the plant.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

*Illustration:* Monatsschr. Kakteenk. 30: 85, as *Mammillaria graessneriana*.

Figure 123 is reproduced from the illustration cited above.



FIGS. 124 and 125.—*Neomammillaria spinosissima*.

#### 76. *Neomammillaria spinosissima* (Lemaire).

*Mammillaria spinosissima* Lemaire, Cact. Aliq. Nov. 4. 1838.

*Mammillaria polycentra* Berg, Allg. Gartenz. 8: 130. 1840.

*Mammillaria auricoma* Dietrich, Allg. Gartenz. 14: 308. 1846.

*Mammillaria polyacantha* Ehrenberg, Allg. Gartenz. 16: 265. 1848.

*Mammillaria polyaculina* Ehrenberg, Allg. Gartenz. 16: 266. 1848.

*Mammillaria hepatica* Ehrenberg, Allg. Gartenz. 16: 267. 1848.

*Mammillaria pomacea* Ehrenberg, Allg. Gartenz. 16: 267. 1848.

*Mammillaria pulcherrima* Ehrenberg, Allg. Gartenz. 17: 249. 1849.

*Mammillaria pretiosa* Ehrenberg, Allg. Gartenz. 17: 250. 1849.



- Mammillaria caesia* Ehrenberg, Allg. Gartenz. 17: 251. 1849.  
*Mammillaria mirabilis* Ehrenberg, Allg. Gartenz. 17: 251. 1849.  
*Mammillaria pruinosa* Ehrenberg, Allg. Gartenz. 17: 261. 1849.  
*Mammillaria seegeri* Ehrenberg, Allg. Gartenz. 17: 261. 1849.  
*Mammillaria haseloffii* Ehrenberg, Allg. Gartenz. 17: 261. 1849.  
*Mammillaria herrmannii* Ehrenberg, Allg. Gartenz. 17: 303. 1849.  
*Mammillaria aurea* Ehrenberg, Allg. Gartenz. 17: 303. 1849.  
*Mammillaria linkeana* Ehrenberg, Allg. Gartenz. 17: 308. 1849.  
*Mammillaria vulpina* Ehrenberg, Allg. Gartenz. 17: 308. 1849.  
*Mammillaria eximia* Ehrenberg, Allg. Gartenz. 17: 309. 1849.  
*Mammillaria isabellina* Ehrenberg, Allg. Gartenz. 17: 309. 1849.  
*Mammillaria spinosissima brunnea* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria spinosissima flavida* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria spinosissima rubens* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria herrmannii flavicans* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria seegeri gracilispina* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria seegeri pruinosa* Salm-Dyck, Cact. Hort. Dyck. 1849. 8. 1850.  
*Mammillaria uhdeana* Salm-Dyck, Cact. Hort. Dyck. 1849. 83. 1850.  
*Mammillaria spinosissima hepatica* Labouret, Monogr. Cact. 35. 1853.  
*Mammillaria castaneoides* Lemaire in Labouret, Monogr. Cact. 37. 1853.  
*Mammillaria seegeri mirabilis* Labouret, Monogr. Cact. 37. 1853.  
*Mammillaria sanguinea* Haage jr. in Regel, Act. Hort. Petrop. 8: 276. 1883.  
*Mammillaria poselgeriana* Haage in Förster, Handb. Cact. ed. 2. 269. 1885.  
*Mammillaria pretiosa cristata* Hildmann in Förster, Handb. Cact. ed. 2. 273. 1885.  
*Cactus auricomus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus aureus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus eximius* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus isabellinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus linkeanus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus mirabilis* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus polycentrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pomaceus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pretiosus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pulcherrimus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus spinosissimus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus vulpinus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Mammillaria spinosissima sanguinea* Haage in Brandegee, Cycl. Amer. Hort. Bailey 2: 976. 1900.  
*Mammillaria spinosissima aurea* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima auricoma* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima eximia* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima haseloffii* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima herrmannii* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima isabellina* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima linkeana* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima mirabilis* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima pruinosa* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima pulcherrima* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima seegeri* Gürke, Blühende Kakteen 2: under pl. 71. 1905.  
*Mammillaria spinosissima vulpina* Gürke, Blühende Kakteen 2: under pl. 71. 1905.

Cylindric, 7 to 30 cm. long, 2.5 to 10 cm. in diameter, almost hidden under a dense covering of spines; axils of tubercles setose; tubercles very short, 2 to 3 mm. long; spines brownish to red, usually weak, hardly pungent; radial spines about 20, 1 cm. long or less; central spines 7 or 8, 2 cm. long or more; flowers from the upper part of the plant, purplish, 12 mm. long; inner perianth-segments acute; filaments much shorter than the perianth-segments, purple.

*Type locality:* Not cited.

*Distribution:* Mountains of central Mexico.

The above description is drawn from collections obtained in the high mountains between the City of Mexico and Cuernavaca. There seems to be little doubt but that they are the *M. sanguinea* Haage which Schumann refers to *M. spinosissima*.

We are disposed to refer here *Echinocactus spinosissimus* (Forbes, Journ. Hort. Tour Germ. 152. 1837). Forbes did not have much knowledge of the cacti but was the gardener of the Duke of Bedford, who sent him to the Continent of Europe in 1835, where he obtained many cacti and on his return to England published a list of them, sometimes with brief descriptions. The names had been given to him by Pfeiffer and others who were studying this family. As he published his list very promptly after his return to England many names appear there first or in the same year as in Pfeiffer's Enumeratio. *Mammillaria*



*spinosissima* may have been in cultivation at the time of Forbes's visit to Germany, for it was published in 1838.

*Illustrations:* Möllers Deutsche Gärt. Zeit. 25: 475. f. 8. No. 26, as *Mammillaria poselgeriana*; Gartenflora 32: pl. 111; Dict. Gard. Nicholson 2: 322. f. 510; Förster, Handb. Cact. ed. 2. 271. f. 28; Watson, Cact. Cult. 172. f. 68; ed. 3. f. 46, as *Mammillaria sanguinea*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 11, as *Mammillaria eximia*; Möllers Deutsche Gart. Zeit. 25: 475. f. 8, No. 18, as *Mammillaria spinosissima auricoma*; Balt. Cact. Journ. 2: 150, as *M. spinosissima brunnea*; Möllers Deutsche Gärt. Zeit. 25: 487. f. 21; Cact. Journ. 2: 93; Blanc, Cacti 74. No. 1580; Schelle, Handb. Kakteenk. 253. f. 174; Blühende Kakteen 2: pl. 71, as *Mammillaria spinosissima*.

Plate XII, figure 2, shows a plant collected by Dr. Rose at El Parque, Mexico, in 1906. Figure 124 is from a photograph of a plant sent to the New York Botanical Garden by Frank Weinberg in 1906 as *Cactus spinosissimus*; figure 125 is from a photograph of a plant sent by William Brockway from the mountains above the City of Mexico.

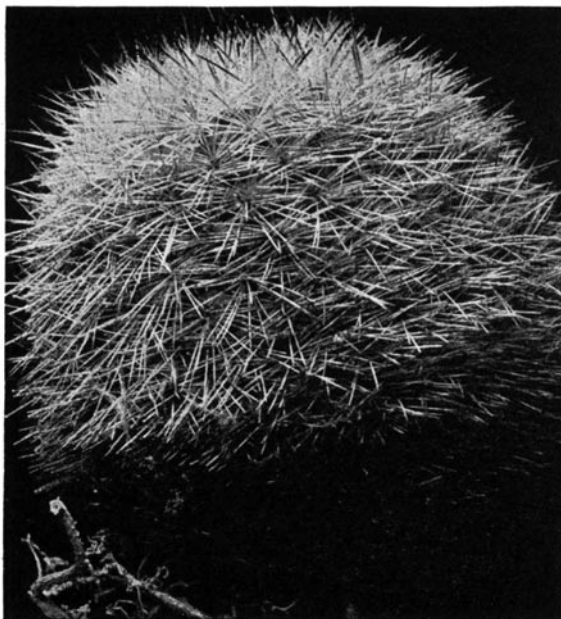


FIG. 126.—*Neomammillaria densispina*.

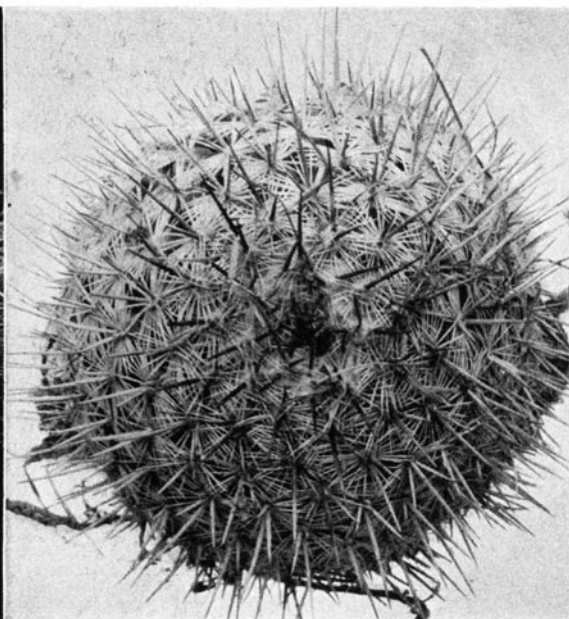


FIG. 127.—*Neomammillaria nunezii*.

#### 77. *Neomammillaria densispina* (Coulter).

*Cactus densispinus* Coulter, Contr. U. S. Nat. Herb. 3: 96. 1894.

*Mammillaria pseudofuscata* Quehl, Monatsschr. Kakteenk. 24: 114. 1914.

Globose, 6 to 10 cm. in diameter, entirely hidden by the dense covering of spines; tubercles short and thick, green, not milky; radial spines 25 or more, slightly spreading, about 1 cm. long, whitish or pale yellow; central spines 5 or 6, longer than the radials, 10 to 12 mm. long, the upper half or third dark brown; flowers purple without, yellowish within, 1.5 cm. long; seeds obovate, reddish brown, 1 mm. in diameter.

*Type locality:* San Luis Potosí, Mexico.

*Distribution:* San Luis Potosí, Mexico.

We have had this plant in cultivation since 1912, specimens having been sent to Washington by Mrs. Irene Vera from San Luis Potosí. Our plant is probably a part of the type collection of Quehl's *Mammillaria pseudofuscata*, as Mrs. Vera wrote us that she had sent specimens to Germany which had been identified as *M. fuscata*. Our plant has been compared with Eschancier's specimen from the same locality which is the type of Coulter's

*Cactus densispinus* and we are convinced that they are the same; Coulter's type is now in the Field Museum of Natural History.

*Illustration:* Monatsschr. Kakteenk. 24: 115, as *Mammillaria pseudofuscata*.

Figure 126 shows the plant sent by Mrs. Vera from San Luis Potosí.

**78. *Neomammillaria nunezii* sp. nov.**

Globose to cylindric, 1.5 cm. long, 6 to 8 cm. in diameter; tubercles closely set, short, terete in section, setose in their axils; radial spines white, stiff, about 30, widely spreading; central spines 2 to 4, stout, 10 to 15 mm. long, brown to nearly blackish at tips; fruit 2.5 cm. long, clavate, white or tinged with pink; seeds small, brown.

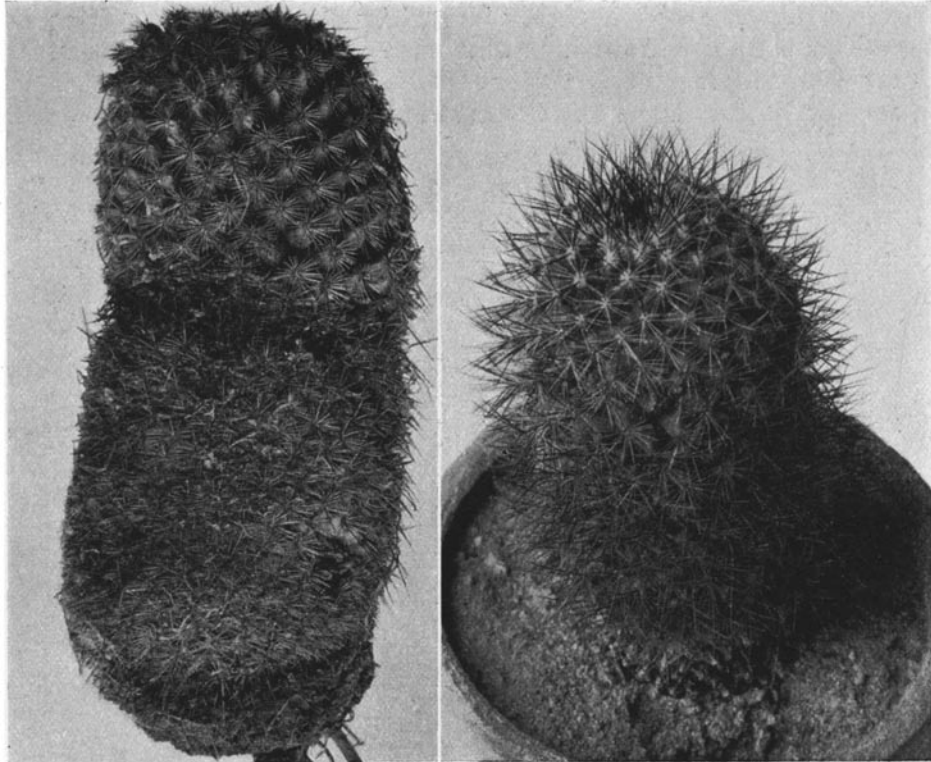


FIG. 128.—*Neomammillaria nunezii*.

FIG. 129.—*Neomammillaria rhodantha*.

Collected by Professor C. Núñez at Buenavista de Cuellar, Guerrero, Mexico, in 1921 (Nos. 1, 2 and 3), and communicated to us by Octavio Solís. This species is rather variable in habit and spines and is very unlike anything that we have heretofore studied.

Figures 127 and 128 are from photographs of the top and side of two plants of this collection.

**79. *Neomammillaria amoena* (Hoppfer).**

*Mammillaria amoena* Hoppfer in Salm-Dyck, Cact. Hort. Dyck. 1849. 99. 1850.

Stems robust, columnar; tubercles green, ovoid, obtuse, subglaucous; radial spines 16, slender, radiating, white; central spines 2, rigid, yellowish brown, 8 to 10 mm. long, the upper one longer and recurved; flowers appearing from axils above middle of plant, 2 cm. long; tube cone-shaped, green; outer perianth-segments somewhat brownish; inner perianth-segments with a pale-brown central stripe; margins nearly white, obtuse, entire; stamens short; filaments pale; anthers red; style pale green; stigma-lobes green, linear.

*Type locality:* Not cited.

*Distribution:* Central Mexico.

Förster's Handbuch (254. 1846) is often given as the place of publication, but while the name is found in the place cited it is without description.

Plate XII, figure 4, shows a plant which flowered in the New York Botanical Garden in 1912, sent from Cuernavaca, Mexico, by Wm. Brockway the preceding year. Figure 130 is from a photograph of a plant from the same collection which flowered in Washington.

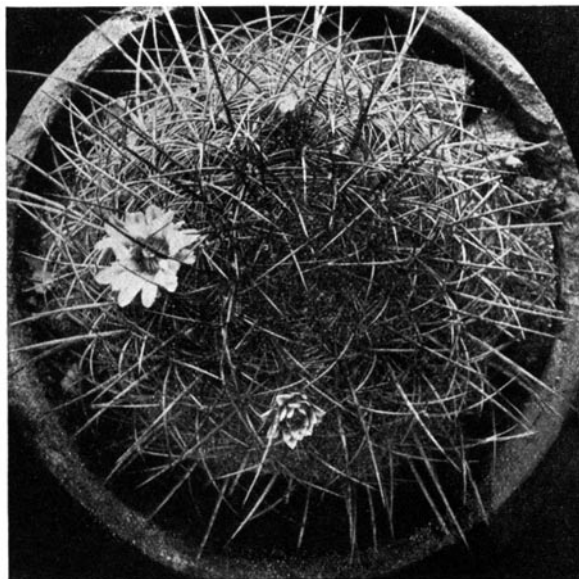


FIG. 130.—*Neomammillaria amoena*.



FIG. 131.—*Neomammillaria plumosa*.

#### 80. *Neomammillaria rhodantha* (Link and Otto).

- Mammillaria rhodantha* Link and Otto, Icon. Pl. Rar. 51. 1829.  
*Mammillaria pulchra* Haworth in Edwards's Bot. Reg. 16: pl. 1329. 1830.  
*Mammillaria fulvispina* Haworth, Phil. Mag. 7: 108. 1830.  
 ? *Mammillaria inuncta* Hoffmannsegg, Preiss-Verz. ed. 7. 23. 1833.  
*Mammillaria erinacea* Wendland, Cact. Herrenh. 1835.  
*Mammillaria chrysacantha* Otto in Pfeiffer, Enum. Cact. 28. 1837.  
*Mammillaria fuscata* Pfeiffer, Enum. Cact. 28. 1837.  
*Mammillaria tentaculata* Otto in Pfeiffer, Enum. Cact. 29. 1837.  
*Mammillaria rhodantha rubens* Pfeiffer, Enum. Cact. 31. 1837.  
*Mammillaria rhodantha andreae* \* Otto in Pfeiffer, Enum. Cact. 31. 1837.  
*Mammillaria rhodantha prolifera* Pfeiffer, Enum. Cact. 31. 1837.  
*Mammillaria rhodantha neglecta* Pfeiffer, Enum. Cact. 31. 1837.  
*Mammillaria rhodantha wendlandii* Pfeiffer, Enum. Cact. 31. 1837.  
*Mammillaria ruficeps* Lemaire, Cact. Gen. Nov. Sp. 37. 1839.  
*Mammillaria odieriana* Lemaire, Cact. Gen. Nov. Sp. 46. 1839.  
*Mammillaria pyrrochroacantha* Lemaire, Cact. Gen. Nov. Sp. 51. 1839.  
*Mammillaria rhodantha major* Monville in Lemaire, Cact. Gen. Nov. Sp. 98. 1839.  
*Mammillaria pfeifferi* Booth in Scheidweiler, Bull. Acad. Sci. Brux. 6: 93. 1839.  
*Mammillaria pfeifferi altissima* Scheidweiler, Bull. Acad. Sci. Brux. 6: 93. 1839.  
*Mammillaria pfeifferi dichotoma* Scheidweiler, Bull. Acad. Sci. Brux. 6: 93. 1839.  
*Mammillaria pfeifferi flaviceps* Scheidweiler, Bull. Acad. Sci. Brux. 6: 93. 1839.  
*Mammillaria pfeifferi fulvispina* Scheidweiler, Bull. Acad. Sci. Brux. 6: 3. 1839.  
*Mammillaria pfeifferi variabilis* Scheidweiler, Bull. Acad. Sci. Brux. 6: 93. 1839.  
 ? *Mammillaria crassispina* Pfeiffer, Allg. Gartenz. 8: 406. 1840.  
 ? *Mammillaria stenocephala* Scheidweiler, Allg. Gartenz. 9: 43. 1841.  
 ? *Mammillaria imbricata* Wegener, Allg. Gartenz. 12: 66. 1844.  
*Mammillaria crassispina gracilior* Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845.  
*Mammillaria rhodantha centrispina* Link in Förster, Handb. Cact. 198. 1846.  
*Mammillaria sulphurea* Sencké in Förster, Handb. Cact. 200. 1846.  
*Mammillaria robusta* Otto in Förster, Handb. Cact. 207. 1846.  
*Mammillaria tentaculata ruficeps* Förster, Handb. Cact. 207. 1846.  
*Mammillaria stueberi* Otto in Förster, Handb. Cact. 517. 1846.  
*Mammillaria fulvispina rubescens* Salm-Dyck, Cact. Hort. Dyck. 1849. 10. 1850.

\* *Mammillaria andreae* was used by Schumann (Gesamtb. Kakteen 598. 1898).



- Mammillaria rhodantha sulphurea* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850.  
*Mammillaria rhodantha ruficeps* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850.  
*Mammillaria chrysacantha fuscata* Salm-Dyck, Cact. Hort. Dyck. 1849. 12. 1850.  
*Mammillaria rhodantha rubescens* Salm-Dyck, Cact. Hort. Dyck. 1849. 97. 1850.  
*Mammillaria odieriana rigidior* Salm-Dyck, Cact. Hort. Dyck. 1849. 98. 1850.  
*Mammillaria lanifera* Salm-Dyck, Cact. Hort. Dyck. 1849. 98. 1850. Not Haworth, 1824.  
? *Mammillaria russea* Dietrich, Allg. Gartenz. 19: 347. 1851.  
*Mammillaria odieriana rubra* Sencke in Förster, Handb. Cact. ed. 2. 295. 1885.  
*Mammillaria odieriana cristata* Hortus in Förster, Handb. Cact. ed. 2. 295. 1885.  
*Mammillaria tentaculata picta* Förster, Handb. Cact. ed. 2. 309. 1885.  
*Mammillaria crassispina rufa* Rümpler in Förster, Handb. Cact. ed. 2. 311. 1885.  
*Cactus chrysacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus crassispinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus fuscatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus odieranus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus pyrrobroacanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus rhodanthus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus ruficeps* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus stenocephalus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus stueberi* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus tentaculatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.  
*Cactus capillaris* Coulter, Contr. U. S. Nat. Herb. 3: 107. 1894.  
*Cactus rhodanthus sulphureospinus* Coulter, Contr. U. S. Nat. Herb. 3: 107. 1894.  
*Mammillaria rhodantha pfeifferi* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha rubra* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha ruberrima* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha pyramidalis* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha callaena* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha crassispina* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha droegeana* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha chrysacantha* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha stenocephala* Schumann, Gesamtb. Kakteen 550. 1898.  
*Mammillaria rhodantha fuscata* Schumann, Gesamtb. Kakteen 551. 1898.  
*Mammillaria rhodantha odieriana* Schelle, Handb. Kakteenk. 257. 1907.  
*Mammillaria rhodantha fulvispina* Schelle, Handb. Kakteenk. 257. 1907.  
*Mammillaria rhodantha tentaculata* Hortus in Schelle, Handb. Kakteenk. 257. 1907.

Cylindric, 1 to 3 dm. long, erect, dull green; tubercles terete, somewhat narrowed toward the apex, 3 to 5 mm. long, not yielding milk when pricked; axils of tubercles sometimes bearing bristles, often naked; radial spines 15 to 20, white, 5 to 7 mm. long; central spines 4 to 6, reddish brown, straight, ascending, much stouter than the radials, 10 to 12 mm. long; flowers numerous, rose-colored, 12 mm. broad; inner perianth-segments linear, somewhat spreading, pointed; filaments red; stigma-lobes 4 or 5, rose-colored; fruit 2.5 cm. long, cylindric, lilac to red; seeds brownish.

*Type locality:* Mexico.

*Distribution:* Probably central Mexico.

We have had this plant in cultivation but it has never flowered with us; however, it is very distinct from anything else we know.

*Mammillaria flaviceps* is referred by Labouret to *M. crassispina*, now usually referred to *M. rhodantha*.

*Mammillaria floccigera* (and its variety *longispina*) Förster (Handb. Cact. 254. 1846), as well as *M. aurata* and *M. hybrida* (Pfeiffer, Enum. Cact. 31. 1837), are given by Schumann as synonyms of *M. rhodantha*, but none of them was described at the places cited.

*Mammillaria erinacea* Wendland is unknown to us; it is referred to *Mammillaria rhodantha* by the Index Kewensis, but whether it was described or not we do not know.

*Mammillaria fulvispina* was said by Haworth to come from Brazil, while the Index Kewensis refers it to Brazil and Mexico. If of this relationship, it is from Mexico. *Mammillaria radula* Scheidweiler (Förster, Handb. Cact. 208. 1846), referred by Schumann as a synonym of this species, was given by Förster as a synonym of *Mammillaria phaeacantha*.

*Mammillaria pyramidalis* Link and Otto (Verh. Ver. Beförd. Gartenb. 6: 429. 1830), given as a synonym of this species by Schumann, is only a name.

*Mammillaria atrata* Mackie (Curtis's Bot. Mag. 65: pl. 3642. 1839) is also referred here by Schumann. The plant is supposed to have come from Chile and is probably referable to *Neoporteria*, which see (Cactaceae 3: 97. 1922).

*Mammillaria pyrrhocentra* Otto, its var. *gracilior* (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845), and *M. fulvispina pyrrhocentra* Salm-Dyck (Cact. Hort. Dyck. 1849. 10. 1850) were referred as synonyms of *M. rhodantha* by Schumann, but were not described at the places cited.

*Mammillaria aurea* Pfeiffer (Förster, Handb. Cact. 200. 1846; *M. rhodantha aurea* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850) is referred here. We have found no description of it. *M. odieriana aurea* Salm-Dyck (Cact. Hort. Dyck. 1844. 7. 1845), also undescribed, may be the same.

*Mammillaria rhodantha cristata* (Förster, Handb. Cact. ed. 2. 292. 1885) is only an abnormal form.

*Mammillaria recurvispina* Hildmann (Schelle, Handb. Kakteenk. 257. 1907) is given without synonymy or description. *M. rhodantha schochiana* (*M. schochiana* Hortus) is also given at the same place, but so far as we can learn has not been published.

*Mammillaria tentaculata conothele* Monville is given by Labouret (Monogr. Cact. 55. 1853) as a synonym of *M. stueberi*, while he refers *M. tentaculata fulvispina* (Monogr. Cact. 44. 1853) to *M. fulvispina*.

*Mammillaria tentaculata rubra* (Förster, Handb. Cact. 207. 1846) was given as a synonym of *M. tentaculata ruficeps*.

*Mammillaria olivacea* was cited by Pfeiffer (Enum. Cact. 180. 1837) as a synonym of *M. tentaculata*.

*Mammillaria neglecta* was given as a synonym of *M. rhodantha neglecta* by Salm-Dyck (Cact. Hort. Dyck. 1849. 11. 1850).

*Mammillaria rhodantha* var. *inuncta* Hoffmannsegg was listed by Labouret (Monogr. Cact. 45. 1853) as one of the synonyms of *M. rhodantha*. *M. rhodantha rubra* was given by Rümpler (Förster, Handb. Cact. ed. 2. 292. 1885) as a synonym of *M. rhodantha ruficeps*, but afterwards was formally published by Schumann.

*Mammillaria rhodantha celsii* Lemaire (Labouret, Monogr. Cact. 48. 1853) was given as a synonym of *M. lanifera*. It probably belongs to *M. rhodantha*. *Cactus capillaris* was made by Coulter because of the older *Mammillaria lanifera* of Haworth. Palmer's plant from Saltillo (1880), preserved in the Missouri Botanical Garden, is very different and suggests that the labels have been mixed.

*Illustrations:* Knippel, Kakteen pl. 24; De Laet, Cat. Gén. f. 50, No. 9; Wiener Illustr. Gart. Zeit. 29: f. 22, No. 9; Haage and Schmidt, Haupt-Verz. Cact. 1912: 37; Link and Otto, Icon. Pl. Rar. pl. 26; Gard. Chron. 111. 42: 290. f. 116; Schelle, Handb. Kakteenk. 256. f. 179; Gartenwelt 1: 200; Abh. Bayer. Akad. Wiss. München 2: pl. 1, 1. f. 3; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 22, as *Mammillaria rhodantha*; Grässner, Haupt-Verz. Kakteen 1912: 24; Schelle, Handb. Kakteenk. 258. f. 181, as *Mammillaria rhodantha pfeifferi*; Grässner, Haupt-Verz. Kakteen 1912: 24, as *M. rhodantha fuscata*; Schelle, Handb. Kakteenk. 258. f. 180, as *M. rhodantha fulvispina*; Blanc, Cacti 73. No. 1434; Cact. Journ. 1: 43, as *M. odieriana*; Cact. Journ. 1: 43; pl. for February, as *M. pfeifferi*; Edwards's Bot. Reg. 16: pl. 1329, as *M. pulchra*; Nov. Act. Nat. Cur. 19: pl. 16, f. 8, as *Mammillaria tentaculata*.

Figure 129 is from a photograph of a plant obtained by Dr. Rose through W. Mundt in 1913, which is now growing at Washington.

### 81. *Neomammillaria plumosa* (Weber).

*Mammillaria plumosa* Weber, Dict. Hort. Bois 804. 1898.

Small, growing in dense clusters sometimes 15 cm. broad, entirely covered by the mass of white spines; tubercles small, somewhat woolly in their axils, 2 to 3 mm. long; spines about 40, all radial, weak, plumose, 3 to 7 mm. long; flowers white, small, 3 to 4 mm. long; perianth-segments with a red line running down the center; seeds black.

*Type locality:* Northern Mexico.

*Distribution:* Northern Mexico.

This plant for a long time passed in the trade under the name of *Mammillaria lasiacantha*, but it is, of course, very different. It is a very striking species and differs from all the others in its feather-like spines. We have had it under observation since 1907 and it has only once flowered (1921).

According to Walton, it is called the feather ball on account of the feather-like spines.

*Illustrations:* Möllers Deutsche Gart. Zeit. 25: 475. f. 8, No. 16; Schelle, Handb. Kakteenk. 252. f. 173; Ann. Rep. Smiths. Inst. 1908: pl. 3, f. 6; Haage, Cact. Kultur ed. 2. 189; Journ. Hort. Home Farm. 111. 60: 7, as *Mammillaria plumosa*; Cact. Journ. 1: pl. for February, in part; Darel, Illustr. Handb. Kakteenk. 94. f. 76; Blanc, Hints on Cacti 70. f. 1355; Blanc, Illustr. Price List Cacti 13, as *M. lasiacantha*.

Figure 131 is from a photograph, furnished by Dr. Safford, showing the spines.

## 82. *Neomammillaria prolifera* (Miller).

*Cactus proliferus* Miller, Gard. Dict. ed. 8. No. 6. 1768.

*Cactus glomeratus* Lamarck, Encycl. 1: 537. 1783.

*Cactus mammillaris prolifer* Aiton, Hort. Kew. 2: 150. 1789.

*Mammillaria prolifera* Haworth, Syn. Pl. Succ. 177. 1812.

*Cactus pusillus* De Candolle, Cact. Hort. Monsp. 184. 1813. Not Haworth, 1803.

*Cactus stellatus* Willdenow, Enum. Pl. Suppl. 30. 1813.

*Mammillaria stellaris* Haworth, Suppl. Pl. Succ. 72. 1819.

*Mammillaria pusilla* Sweet, Hort. Brit. 171. 1826.

*Mammillaria stellata* Sweet, Hort. Brit. 171. 1826.

*Mammillaria glomerata* De Candolle, Prodr. 3: 459. 1828.

*Mammillaria pusilla major* Pfeiffer, Enum. Cact. 36. 1837.

*Cactus haworthianus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Mammillaria pusilla baitiensis* Schumann, Blühende Kakteen 1: under pl. 46. 1904.

Low, growing in colonies often 6 dm. in diameter, the individual plants globose or cylindric, 3 to 6 cm. in diameter, of soft texture; tubercles conic, about 8 mm. long, spreading; axils of tubercles with long, hair-like bristles; radial spines many, hair-like; central spines 5 to 12, much stouter than the radials, with bright yellow tips, puberulent; flowers borne in old axils but toward top of plant, small, yellowish white; inner perianth-segments erect, pale yellow, with brownish mid-rib, acute; filaments pale rose-colored; anthers at first deflexed inward; style shorter than filaments; stigma-lobes 3, yellow; fruit crowned by persistent withering perianth, clavate, somewhat curved, 1.5 to 2 cm. long, scarlet; seeds black, pitted, a little depressed; aril white, triangular.

*Type locality:* West Indies.

*Distribution:* Cuba and Hispaniola. Loddiges reports it from South America, doubtless in error.

At the United States Naval Station, Guantánamo Bay, Cuba, the plant grows in low, dry thickets and is quite inconspicuous but abundant.

Dr. Shafer referred to this species (Bull. N. Y. Bot. Gard. 13: 139) as *Mammariella*, without description or citation.

Burmans's plate (201, f. 1) of this plant shows most of the tubercles without spines or hairs but these have doubtless been omitted by the artist, for Plumier says (Cat. p. 19): "*Melocactus minimus, lanuginosus et tuberosus.*"

Haworth (Phil. Mag. 7: 114. 1830) would exclude *Mammillaria pusilla* (Mém. Mus. Hist. Nat. Paris 17: pl. 2, f. 1) as figured by De Candolle. His illustration is evidently faulty, but his description seems to answer our plant.

The name *Mammillaria pusilla minor* occurred in the Index of the Cacti in the Botanical Garden of Berlin for 1829 (Verh. Ver. Beförd. 6: 429. 1830), but it is without description. It is mentioned again by Salm-Dyck (Hort. Dyck. 156. 1834), who credits the name to Otto, but he does not describe it.

\* Otto Kuntze (Rev. Gen. Pl. 1: 259. 1891) publishes this binomial as *Cactus prolifer*. Pfeiffer (Enum. Cact. 9. uses this later binomial for another species, crediting it to Willdenow, but we do not find it used elsewhere.



*Mammillaria granulata* Meinshausen (Wöchenschr. Gärt. Pflanz. 1: 264. 1858; *Cactus granulatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891) was described without the flowers and fruit being known and it has never been identified. Meinshausen says that it has the habit of *M. pusilla*, but he considered it different otherwise.

*Cactus stellaris* was given by Haworth (Suppl. Pl. Succ. 72. 1819) instead of *C. stellatus* Willdenow.

*Mammillaria pusilla cristata* (Schelle, Handb. Kakteenk. 249. 1907) is probably only a form.

*Illustrations:* Loudon, Encycl. Pl. 410. f. 6842, as *Cactus stellaris*; Loddiges, Bot. Cab. 1: pl. 79, as *Cactus stellatus*; Plukenet, Opera Bot. 1: pl. 29, f. 2, as *Ficoides* etc.; Dict. Hort. Nicholson Suppl. 514. f. 547; Abh. Bayer. Akad. Wiss. München 2: pl. 1, VIII, f. 7; Rümpler, Sukkulente 197. f. 110; Monatsschr. Kakteenk. 8: 73; Mém. Mus. Hist. Nat. Paris 17: pl. 2, f. 1; Ann. Rep. Smiths. Inst. 1908: pl. 2, f. 4; Blanc, Cacti 74, No. 1500; Schumann, Gesamt. Kakteen f. 87; Blühende Kakteen 1: pl. 46; Ann. Inst. Roy. Hort. Fromont 2: pl. 1, f. B; Watson, Cact. Cult. ed. 2. 255. f. 96; ed. 3. f. 45; Remark, Kakteenfreund 15; Cact. Journ. 2: 6, as *Mammillaria pusilla*.

Figure 132 is from a photograph by Ernest Braunton of a clump of plants growing in the Huntington collection near Los Angeles, California.

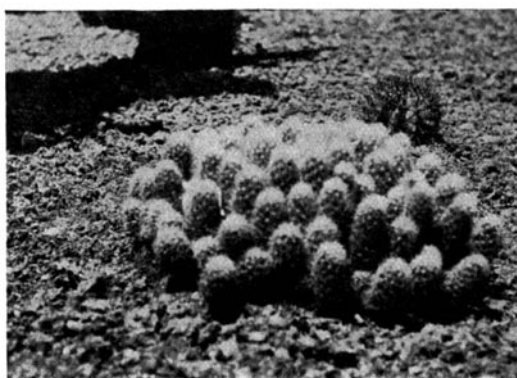


FIG. 132.—*Neomammillaria prolifera*.



FIG. 133.—*Neomammillaria multiceps*.

### 83. *Neomammillaria multiceps* (Salm-Dyck).

*Mammillaria multiceps* Salm-Dyck, Cact. Hort. Dyck. 1849.81. 1850.

*Mammillaria multiceps elongata* Meinshausen, Wöchenschr. Gärt. Pflanz. 1: 27. 1858.

*Mammillaria multiceps grisea* Meinshausen, Wöchenschr. Gärt. Pflanz. 1: 27. 1858.

*Mammillaria multiceps humilis* Meinshausen, Wöchenschr. Gärt. Pflanz. 1: 27. 1858.

*Mammillaria multiceps perpusilla* Meinshausen, Wöchenschr. Gärt. Pflanz. 1: 27. 1858.

*Mammillaria pusilla texana* Engelman, Cact. Mex. Bound. 5. 1859.

*Mammillaria texana* Poselger in Young, Fl. Texas. 279. 1873.

*Cactus multiceps* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus stellatus texanus* Coulter, Contr. U. S. Nat. Herb. 3: 108. 1894.

*Cactus texanus* Small, Fl. Southeast. U. S. 812. 1903.

Cespitose, often forming large clumps; separate plants globose to short-oblong, often only 1 to 2 cm. in diameter; tubercles small, terete, hairy in their axils; radial spines hair-like, white; central spines several, pubescent, yellowish at base, dark brown above; flowers about 12 mm. long, whitish to yellowish salmon, often becoming reddish on outside; fruit oblong, 8 to 12 mm. long, scarlet; seeds black, 1 mm. long, punctate.

*Type locality:* Not cited.

*Distribution:* Texas and northeastern Mexico.

It is sometimes classified as a variety of *Mammillaria prolifera*, from which it differs in having the central spines always brown-tipped instead of golden yellow; it is somewhat smaller, with slightly smaller seeds.

Mr. Robert Runyon says that this plant forms clumps usually about 10 cm. broad, but sometimes broader. It is never very plentiful but has a rather wide distribution, and seems to prefer mesquite thickets where the soil is very rich, but occasionally is found on rocky hillsides.

*Mammillaria pusilla mexicana*, offered for sale by Grässner (Monatsschr. Kakteenk. February 1920), probably belongs here.

*Mammillaria caespititia* Hortus was referred by Salm-Dyck as a synonym of *M. multiceps*. *M. pusilla caespititia* (Schelle, Handb. Kakteenk. 249. 1907) is the same.

*Mammillaria parvissima* Karwinsky (Wöchenschr. Gärtn. Pflanz. 1: 27. 1858) is sometimes credited to Meinshausen, but seems never to have been described. *M. perpusilla* Meinshausen, given only as a synonym, belongs here and the name occurs on the page mentioned above.

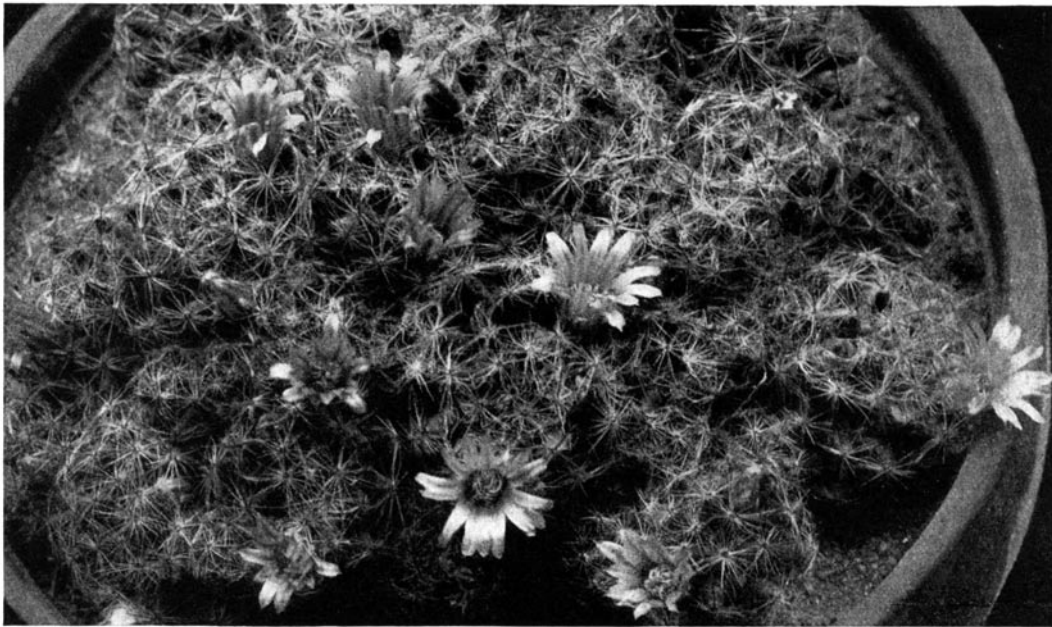


Fig. 134.—*Neomammillaria multiceps*.

*Illustrations:* Cact. Mex. Bound. pl. 5; Cact. Journ. 2: 93; Förster, Handb. Cact. ed. 2. 262. f. 25; Schelle, Handb. Kakteenk. 249. f. 68, as *Mammillaria pusilla texana*.

Plate XIV, figure 5, shows a very small plant in flower, collected by Robert Runyon near Brownsville, Texas, in 1921; figure 6 shows a plant received from the Missouri Botanical Garden in 1904 which flowered in the New York Botanical Garden in March 1912. Figure 134 is from a photograph of a plant collected near Victoria, Mexico, by Dr. Edward Palmer, which was grown for many years in Washington; figure 133 shows a small plant photographed by Robert Runyon on July 10, 1921.

#### 84. *Neomammillaria camptotricha* (Dams).

*Mammillaria camptotricha* Dams, Gartenwelt 10: 14. 1905.

Plants globose, caespitose, deep green, 5 cm. in diameter; tubercles somewhat elongated, often curved, 2 cm. long, terete, not at all milky, bearing bristles in the axils; spines 2 to 4, described as up to as many as 8, yellowish, bristle-like, spreading and twisted or bent, often 3 cm. long; spine-areoles small, circular, a little woolly at first; axils of tubercles bristly; flowers small, about 1 cm. long; outer perianth-segments greenish; inner perianth-segments white, 10 mm. long, acute.

*Type locality:* Mexico.

*Distribution:* Deserts of eastern Queretaro, Mexico.

This plant was collected by Rose and Painter between Higuierillas and San Pablo, August 23, 1905 (No. 11536), and flowered in Washington on October 3, 1905. In 1913 L. Quehl of Halle sent us some flowers of this species.

*Illustrations:* Blühende Kakteen 3: pl. 151; Möllers Deutsche Cart. Zeit. 25: 475. f. 8, No. 6, as *Mammillaria camptotricha*.

Figure 135 is from a photograph of the plant collected by Dr. Rose in 1905.

**85. Neomammillaria eriacantha** (Link and Otto).

*Mammillaria eriacantha* Link and Otto in Pfeiffer, Enum. Cact. 32. 1837.

*Cactus eriacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Solitary or cespitose, 10 to 15 cm. high, cylindric, 5 cm. in diameter; tubercles spiraled, in 22 rows; radial spines about 20, delicate, spreading, pubescent; central spines 2, widely spreading, stouter than the radials, also pubescent, yellowish; flowers borne in a ring above the middle of the plant, yellow, 14 mm. broad; inner perianth-segments about 14, linear, acute; stigma-lobes 4; fruit at first greenish white, afterwards tinged with red, short-clavate.

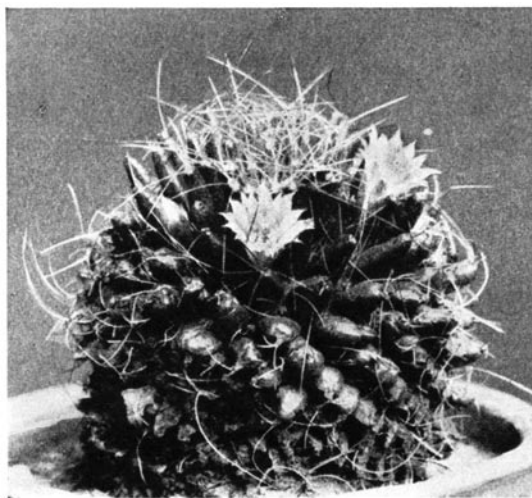


Fig. 135.—*Neomammillaria camptotricha*.



Fig. 136.—*Neomammillaria schiedeana*.

*Type locality:* Mexico.

*Distribution:* Central Mexico.

A plant, collected by McDowell, was seen in the collection of the Instituto Medico Nacional in the City of Mexico, but no specimen was obtained.

*Mammillaria columbiana* Salm-Dyck (Cact. Hort. Dyck. 1849. 99. 1850) is probably to be referred here. It is doubtless of Mexican rather than of Colombian origin.

*Mammillaria eriantha* (Pfeiffer, Enum. Cact. 32. 1837), referred here by Pfeiffer, was never described.

*Mammillaria cylindracea* De Candolle (Mém. Mus. Hist. Nat. Paris 17: 111. 1828) is referred here by Schumann and also by Pfeiffer and Otto, but the description of it would suggest a different species. Kuntze changes the name to *Cactus cylindraceus* (Rev. Gen. Pl. 1: 260. 1891). Here is also referred *Mammillaria cylindrica flavispina* (Labouret, Monogr. Cact. 88. 1853).

*Illustrations:* Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 25; Schelle, Handb. Kakteenk. 256. f. 178, as *Mammillaria eriacantha*.

Figure 138 is a reproduction of the first illustration above cited.



**86. *Neomammillaria schiedeana* (Ehrenberg).**

*Mammillaria schiedeana* Ehrenberg in Schlechtendal, Allg. Gartenz. 6: 249. 1838.

? *Mammillaria sericata* Lemaire, Cact. Gen. Nov. Sp. 44. 1839.

*Cactus schiedianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria dumetorum* J. A. Purpus, Monatsschr. Kakteenk. 22: 149. 1912.

? *Mammillaria cephalophora* Quehl, Monatsschr. Kakteenk. 24: 158. 1914. Not Salm-Dyck, 1850.

Densely cespitose, somewhat soft in texture; axils of tubercles bearing long bristle-like white hairs; tubercles green, terete; radial spines about 30, white, spreading, bristle-like, puberulent; central spines 6 to 10, spreading and appressed against the radials, a little stouter, often tinged with yellow; flowers 15 mm. long; inner perianth-segments white; filaments white; style cream-colored; stigma-lobes 4, short, obtuse.

*Type locality:* Near Puente de Dios, Mexico.

*Distribution:* Central Mexico.

The Index Kewensis refers *Mammillaria sericata* Lemaire to *M. magnimamma*.

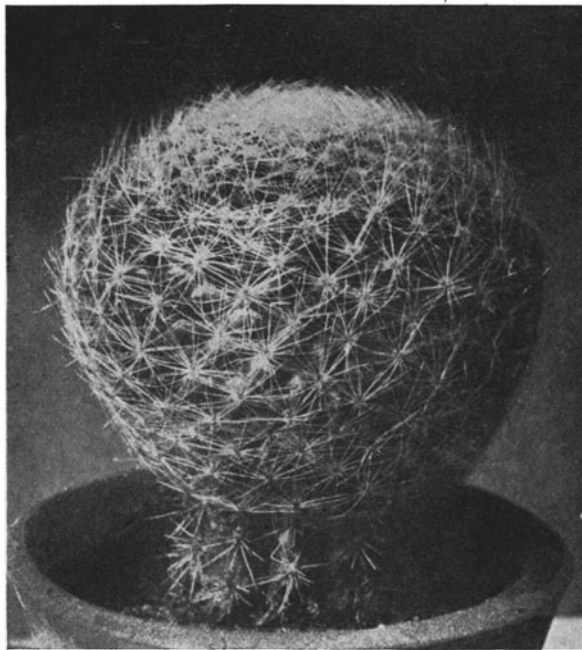


FIG. 137.—*Neomammillaria lenta*.

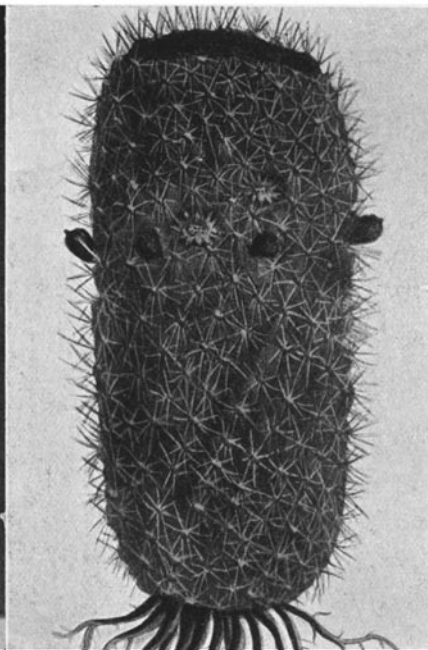


FIG. 138.—*Neomammillaria ericantha*.

*Illustrations:* Schumann, Gesamtb. Kakteen f. 113; Blühende Kakteen 1: pl. 13; Monatsschr. Kakteenk. 8: 12; 13: 92, f. A, as *Mammillaria schiedeana*; Monatsschr. Kakteenk. 23: 89, as *Mammillaria dumetorum*; (?) Monatsschr. Kakteenk. 24: 158, as *Mammillaria cephalophora*.

Figure 136 is from a photograph of a plant collected by Dr. C. A. Purpus at San Rafael, Mexico, in 1910.

**87. *Neomammillaria lasiacantha* (Engelmann).**

*Mammillaria lasiacantha* Engelmann, Proc. Amer. Acad. 3: 261. 1856.

*Mammillaria lasiacantha minor* Engelmann, Cact. Mex. Bound. 5. 1859.

*Cactus lasiacanthus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

Globose, 2 to 2.5 cm. in diameter; tubercles small, their axils naked; spines 40 to 60, in more than one series, white, puberulent, 2 to 4 mm. long; flowers 12 mm. long, whitish or pink; fruit 1 to 2 cm. long; seeds blackish, pitted.

*Type locality:* On the Pecos in western Texas.

*Distribution:* Western Texas and northern Chihuahua. Reported also from Arizona, but doubtless incorrectly.

We have seen no specimens of *N. lasiacantha*, except the type, but the following species, first described as a variety of *lasiacantha*, is very common in eastern Texas and northern Mexico. Possibly the two should be united, the typical form simply representing a juvenile phase.

*Illustrations:* Cact. Mex. Bound. pl. 3; Schumann, Gesamtb. Kakteen 522. f. 86; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 56, A; Blanc, Cacti 70. No. 1335; West Amer. Sci. 13: 39, as *Mammillaria lasiacantha*.

#### 88. *Neomammillaria denudata* (Engelmann).

*Mammillaria lasiacantha denudata* Engelmann, Cact. Mex. Bound. 5. 1859.

*Cactus lasiacanthus denudatus* Coulter, Contr. U. S. Nat. Herb. 3: 100. 1894.

*Mammillaria lasiandra denudata* Quehl, Monatsschr. Kakteenk. 19: 79. 1909.

Globose, 2.5 to 3.5 cm. in diameter; tubercles 5 to 6 mm. long; spines 50 to 80, glabrous or nearly so, 3 to 5 mm. long, the innermost usually much shorter; flowers and fruit from near the center but not from the axils of young tubercles; flowers 10 to 12 mm. long; perianth-segments few, about 12, oblong, obtuse, the margins white, the center light purple; stamens white; style and stigma-lobes green; fruit clavate, red, 1.5 to 2 cm. long; seeds black with basal hilum.



FIG. 139.—*Neomammillaria denudata*.

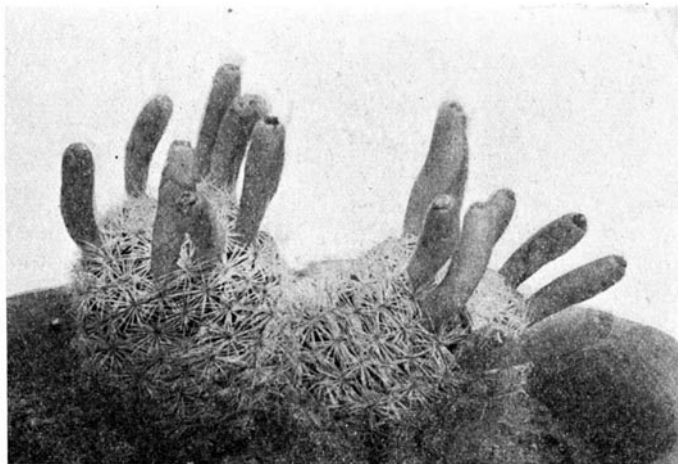


FIG. 140.—*Neomammillaria lenta*.

*Type locality:* Western Texas.

*Distribution:* Western Texas and northern Coahuila, Mexico.

The flowers open about mid-day and close at night; in one case which we recorded the flowers opened for six consecutive days.

*Mammillaria rungii* (Schumann, Gesamtb. Kakteen 522. 1898), an unpublished garden name, was supposed by Schumann to be referable to *M. lasiacantha denudata*.

*Illustrations:* Cact. Mex. Bound. pl. 4; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 21, as *Mammillaria lasiacantha denudata*.

Figure 139 is from a photograph of a plant collected by Elmer Steams in 1909, which afterwards flowered in Washington.

#### 89. *Neomammillaria lenta* (K. Brandegee).

*Mammillaria lenta* K. Brandegee, Zoe 5:194. 1904.

Described as cespitose; individuals globose to short-cylindric, almost hidden by the white delicate spines; tubercles very slender, light green; spine-areoles naked; spines about 40, very fragile; axils woolly and occasionally bearing a single bristle; flowers whitish, 7 mm. long; perianth-segments pointed; fruit red, clavate; seeds 1 mm. in diameter, dull black.

*Type locality:* Near Viesca, in Coahuila, Mexico.

*Distribution:* Coahuila, Mexico.

*Illustration:* Monatsschr. Kakteenk. **16**: 40, as *Mammillaria lenta*.

Figure 137 is from a photograph obtained from L. Quehl in 1921; figure 140 is from a photograph of a fruiting plant sent from Parras, Mexico, by C. A. Purpus in 1905.

**90. *Neomammillaria candida* (Scheidweiler).**

*Mammillaria candida* Scheidweiler, Bull. Acad. Sci. Brux. **5**: 496. 1838.

*Mammillaria sphaerotricha* Lemaire, Cact. Gen. Nov. Sp. **33**. 1839.

*Mammillaria humboldtii* Ehrenberg, Linnaea **14**: 378. 1840.

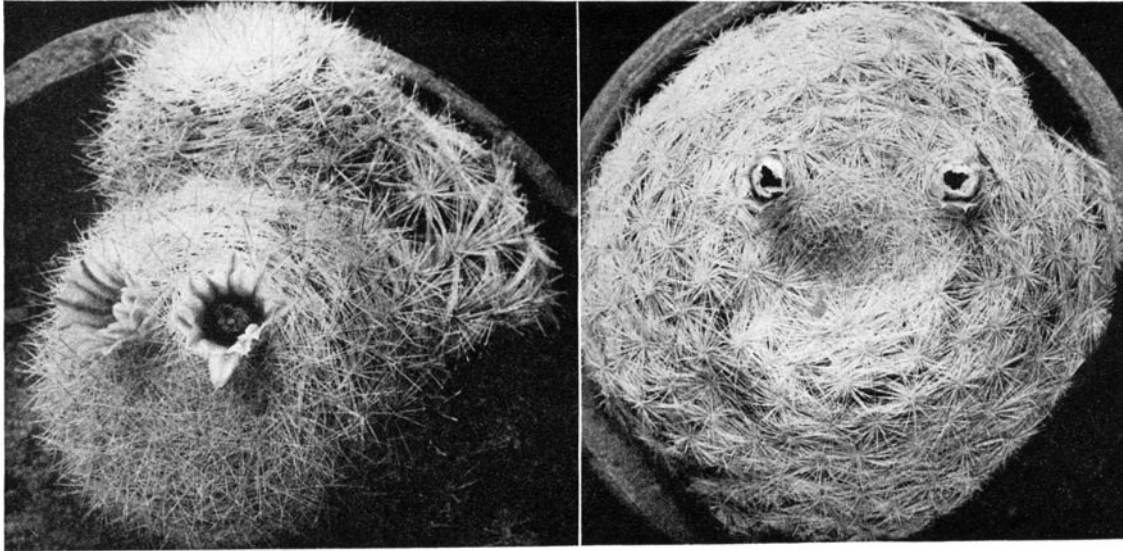
*Mammillaria sphaerotricha rosea* Salm-Dyck, Cact. Hort. Dyck. 1849. 85. 1850.

*Cactus humboldtii* Kuntze, Rev. Gen. Pl. **1**: 260. 1891. Not Humboldt, Bompland, and Kunth, 1823.

*Cactus sphaerotrachus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

*Mammillaria candida rosea* Salm-Dyck in Schumann, Gesamtb. Kakteen **525**. 1898.

Cespitose; individual plant globose, 5 to 7 cm. in diameter, almost hidden by the white spines; radial spines numerous, radiating; central spines 8 to 12, porrect, often brownish at tip, a little stouter than the radials; axils setose; flowers 2 cm. long, rose-colored; perianth-segments serrulate towards the apex; fruit red; seeds black.



FIGS. 141 and 142.—*Neomammillaria candida*.

*Type locality:* Near San Luis Potosí.

*Distribution:* Central Mexico.

*Illustrations:* Monatsschr. Kakteenk. **29**: 141, as *Mammillaria candida rosea*; Hort. Belge **5**: pl. 117; Möllers Deutsche Gärt. Zeit. **25**: 475. f. 8, No. 27; Blühende Kakteen **3**: pl. 169, as *Mammillaria candida*.

Figure 141 is from a photograph of a plant obtained by Dr. Palmer near San Luis Potosí in 1905; figure 142 is from a photograph of a plant collected by C. A. Purpus from near the same locality in 1910.

**91. *Neomammillaria vetula* (Martius).**

*Mammillaria vetula* Martius, Nov. Act. Nat. Cur. **16**: 338. 1832.

*Cactus vetulus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

Plant somewhat club-shaped, small, 4 to 5 cm. high; tubercles terete, light green, somewhat shining; axils of tubercles naked or sometimes with a small tuft of wool; radial spines about 25, spreading, white, bristle-like; central spines 1 to 6, stouter than the radials, brownish; flowers 12 to 15 mm. long, borne at upper part of plant; outer perianth-segments red with yellowish margins; inner perianth-segments cream-colored; filaments greenish; style green; stigma-lobes 5, white.



*Type locality:* San José del Oro, Hidalgo, Mexico.

*Distribution:* Hidalgo, Mexico.

The above description was drawn in part from a plant which flowered in Washington on November 8, 1912, and which had been sent to us by L. Buscacioni from Catania, Italy. This plant gave off numerous young ones from the axils of the tubercles, but it has died.

*Mammillaria vetula major* Salm-Dyck (Walpers, Repert. Bot. 2: 270. 1843) is said to be the same as *M. grandiflora* Hortus. If so, this must be different from *M. grandiflora* Otto, which we have referred to *Neolloydia conoidea*.

*Illustration:* Nov. Act. Nat. Cur. 16: pl. 24, as *Mammillaria vetula*.

Figure 143 is reproduced from the illustration above cited.

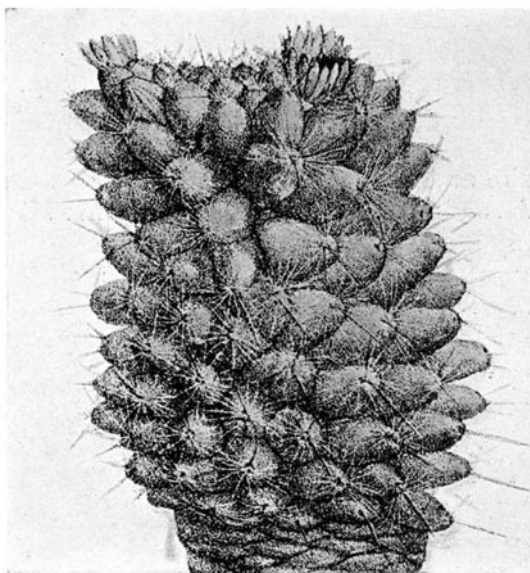


FIG. 113.—*Neomammillaria vetula*.

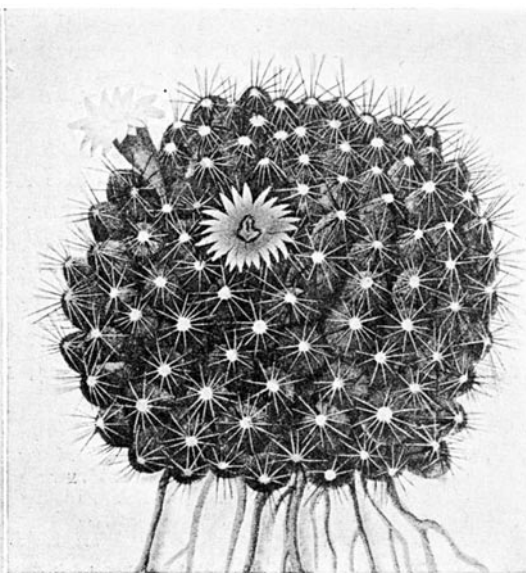


FIG. 144.—*Neomammillaria discolor*.

## 92. *Neomammillaria fertilis* (Hildmann).

*Mammillaria fertilis* Hildmann in Schumann, Gesamtb. Kakteen 503. 1898.

Cespitose, the individual plant globose to short-cylindric, dark green; tubercles arranged in 8 or 13 rows, a little woolly in their axils; radial spines 7 to 10, acicular, 6 mm. long; central spines 1 or 2, straight, stouter than the radials, 10 mm. long; flowers deep crimson, 2 cm. long; inner perianth-segments linear-lanceolate, acute.

*Type locality:* Mexico, but definite station not given.

*Distribution:* Mexico, but range unknown.

We have not seen living specimens of this plant but L. Quehl of Halle had it growing in 1913 and sent us flowers which we have used in this description.

## 93. *Neomammillaria decipiens* (Scheidweiler).

*Mammillaria decipiens* Scheidweiler, Bull. Acad. Sci. Brux. 5: 496. 1838.

*Mammillaria anacistris*\* Lemaire, Cact. Gen. Nov. Sp. 39. 1839.

*Mammillaria guillemianiana* Lemaire, Cact. Gen. Nov. Sp. 48. 1839.

*Mammillaria glochidiata inuncinata* Lemaire, Cact. Gen. Nov. Sp. 102. 1839.

*Cactus decipiens* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus guillemianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Cactus anacistrus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Usually cespitose, deep green; tubercles soft, cylindric, about 1 cm. long, their axils bearing 2 or 3 bristles each; radial spines 7 to 9, spreading, slender, white, sometimes yellowish with brown

\* Spelled *M. anacistris* by Walpers (Repert. Bot. 2: 296. 1843.)

tips, puberulent when young; central spine x, much longer than the radials, erect or ascending, 15 to 18 mm. long, dark brown; flower-buds pinkish, acute; flower 15 mm. long, broadly funnel-shaped; inner perianth-segments nearly white or faintly tinged with pink, acute; filaments white to pinkish; stigma-lobes 4, white or pinkish, slender, filiform.

*Type locality:* Not cited.

*Distribution:* San Luis Potosí.

The above description is drawn from plants growing in the top of *Calibanus caespitosus*, a curious, globose, liliaceous plant of the desert of central Mexico, sent by Dr. E. Palmer from San Luis Potosí in 1905.

Schumann says that the axils of the tubercles are naked, while K. Brandegees describes them as bearing bristles as in our plant and so called for in the original description.

In some plants one or two of the upper radial spines are brown like the central spine; the flowers are delicately fragrant, remaining open during cloudy days. In cultivation this is one of the earliest species to flower; in 1918 it began to bloom early in January.

*Mammillaria inuncinata* (Lemaire, Cact. Gen. Nov. Sp. 39. 1839) was never described but belongs here.

*Mammillaria ancistroides inuncinata* Lemaire and *M. deficum* (Förster, Handb. Cact. 1846), as synonyms, were referred here. *M. deficiens* Hortus (Salm-Dyck, Cact. Hort. Dyck. 1849. 7. 1850) is another name, used only as a synonym of this species.

*Illustrations:* Schumann, Gesamtb. Kakteen 528. f. 88; Knippel, Kakteen pl. 20; Schelle, Handb. Kakteenk. 249. f. 169; Blanc, Cacti 68. No. 100, as *Mammillaria decipiens*.

Plate XIV, figure 3, is from a plant sent to the New York Botanical Garden by Weinberg in 1903, which flowered November 14, 1911.

#### 94. *Neomammillaria discolor* (Haworth).

*Mammillaria discolor* Haworth, Syn. Pl. Succ. 177. 1812.

*Cactus depressus* De Candolle, Cact. Hort. Monsp. 84. 1813. Not Haworth, 182.

*Cactus pseudomammillaris* Salm-Dyck, Liste Pl. Gr. 1: 1. 1815.

*Cactus spini* Colla, Mem. Accad. Sci. Torino 33: 133. 1826.

*Mammillaria pseudomammillaris* Pfeiffer, Allg. Gartenz. 3: 57. 1835.

*Mammillaria discolor prolifera* Pfeiffer, Enum. Cact. 28. 1837.

*Mammillaria albida* Haage in Pfeiffer, Enum. Cact. 28. 1837.

*Mammillaria aciculata* Otto in Pfeiffer, Enum. Cact. 29. 1837.

*Mammillaria discolor monstrosa* Monville in Lemaire, Cact. Gen. Nov. Sp. 99. 1839.

*Mammillaria discolor albida* Salm-Dyck, Cact. Hort. Dyck. 1844. 7. 1845.

? *Mammillaria curvispina* Otto in Dietrich, Allg. Gartenz. 14: 204. 1846.

? *Mammillaria discolor pulchella* Otto in Förster, Handb. Cact. 206. 1846.

*Mammillaria curvispina parviflora* A. Dietrich, Allg. Gartenz. 14: 204. 1846.

*Mammillaria nitens* Otto in Linke, Allg. Gartenz. 16: 331. 1848.

*Mammillaria pulchella* Otto in Linke, Allg. Gartenz. 16: 331. 1848.

*Mammillaria discolor aciculata* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850.

*Mammillaria discolor curvispina* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850.

*Mammillaria discolor nitens* Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850.

*Mammillaria polythebe aciculata* Salm-Dyck, Cact. Hort. Dyck. 1849. 15. 1850.

*Mammillaria pulchella nigricans* Monville in Labouret, Monogr. Cact. 40. 1853.

*Cactus aciculatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus discolor* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus pulchellus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Globose or somewhat depressed, often solitary, about 7 cm. in diameter; tubercles ovoid-conic, arranged in 13 to 15 spirals, their axils naked; radial spines 16 to 20, white, setaceous, widely spreading; central spines about 6, stouter than the radials, straight, at first black with white bases; flowers 15 mm. broad when fully open; inner perianth-segments linear, white, with a violet-rose stripe; fruit red, 2.5 cm. long.

*Type locality:* Not cited.

*Distribution:* Puebla, according to Schumann.

We have been unable to identify definitely this species. As there seems to be no type preserved we must rely upon the short original description and the early illustrations. The illustration of Loddiges (Bot. Cab. 17: pl. 1871) shows a plant with yellowish-brown spines and must belong elsewhere.

*Mammillaria depressa* was credited by mistake to De Candolle by Pfeiffer in listing the synonyms of *M. discolor* (Enum. Cact. 28. 1837).

*Mammillaria confinis* Haage, according to Pfeiffer (Enum. Cact. 28. 1837), appeared in "Haage, Catal. Cact. 1836" and he lists it as a synonym of *M. albida*.

*Mammillaria canescens* Hortus (Pfeiffer, Enum. Cact. 28. 1837) was given as a synonym of *M. discolor*. This is different from *M. canescens* Jacobi (Allg. Gartenz. 24: 89. 1856) which Schumann lists among his unknown plants. (See also Lemaire, Cact. Gen. Nov. Sp. 99. 1839.)

*Mammillaria coniflora* Hortus and *M. discolor coniflora* Salm-Dyck (Cact. Hort. Dyck. 1849. 11. 1850) are only names which belong here.

*Mammillaria discolor fulvescens* Salm-Dyck (Cact. Hort. Dyck. 1844. 7. 1845) was not formally published at the place here cited.

*Mammillaria discolor breviflora* (Förster, Handb. Cact. 206. 1846), although not described at the place here cited, is usually referred here.

*Cactus pseudomammillaris* appeared simply as a name in 1815 (Desfontaines, Tab. Bot. ed. 2. 191), and again in Pfeiffer's Enumeratio (28. 1837) as a synonym of *Mammillaria discolor prolifera*. Pfeiffer credits the name to Salm-Dyck and gives the reference to Allgemeine Gartenzeitung (3: 57. 1835), but the name appeared there under *Mammillaria* along with *spinii* and *canescens*. *M. spinii*, credited to Colla, is given by Salm-Dyck (Cact. Hort. Dyck. 1849. 11. 1850) as a synonym of *M. discolor*.

Schumann lists *Mammillaria rhodacantha* Salm-Dyck (Cact. Hort. Dyck 1849. 96. 1850) among his unknown species. *M. rhodacantha pallidior* (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845) is only a name, while *M. discolor rhodacantha* (Walpers, Repert. Bot. 2: 271. 1843), although never described, seems to be the same as *M. rhodacantha*.

*Illustrations*: Mém. Mus. Hist. Nat. Paris 17: pl. 2, f. 2; Ann. Inst. Roy. Hort. Fromont 2: pl. 1, f. A; Loddiges, Bot. Cab. 17: pl. 1671 (?), as *Mammillaria discolor*; Mem. Accad. Sci. Torino 33: pl. 11, as *Cactus spini*.

Figure 144 is reproduced from the first illustration cited above.



FIG. 145.—*Neomammillaria fragilis*.

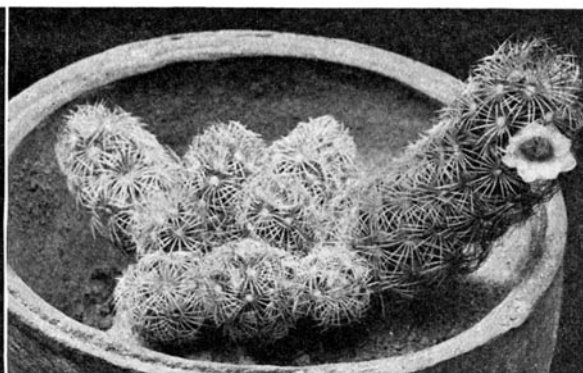


FIG. 146.—*Neomammillaria elongata*.

### 95. *Neomammillaria fragilis* (Salm-Dyck).

*Mammillaria fragilis* Salm-Dyck, Cact. Hort. Dyck. 1849. 103. 1850.

Stems usually oblong or club-shaped, sprouting freely towards the top; branches globose and breaking off at the slightest touch; tubercles bright green, terete, their axils nearly naked; radial spines 12 to 14, white, naked, spreading; central spines usually wanting, especially on branches, if present 1 or 2, elongated, erect, brownish especially at tip; young spine-areoles with white wool; flowers from upper part of plant but not from center, small, lasting for several days; cream-colored with outer segments somewhat pinkish; petals broad with a mucronate tip; filaments and style pale.



*Type locality:* Not cited.

*Distribution:* Doubtless Mexico, but not known from wild plants.

Mrs. K. Brandege, some years ago (*Zoe* 5: 5. 1900), called attention to the fact that this fragile little plant did not answer Pfeiffer's description of *Mammillaria gracilis* and that Salm-Dyck had suggested the very appropriate name of *M. fragilis*, which we have adopted here. The plant is known in the trade as *Mammillaria gracilis pulchella*, under which designation we received plants from Haage and Schmidt in 1921.

*Illustrations:* Schumann, *Gesamtb. Kakteen* 552. f. 90 (?); *Blühende Kakteen* 2: pl. 68; *Monatsschr. Kakteenk.* 6: 2; *Möllers Deutsche Gärt. Zeit.* 25: 475. f. 8, No. 19; *Gartenwelt* 12: 333, as *Mammillaria gracilis*.

Figure 145 is from a photograph sent us by L. Quehl.

#### 96. *Neomammillaria elongata* (De Candolle).

- Mammillaria elongata* De Candolle, *Mém. Mus. Hist. Nat. Paris* 17: 109. 1828.  
*Mammillaria subcrocea* De Candolle, *Mém. Mus. Hist. Nat. Paris* 17: 110. 1828.  
*Mammillaria intertexta* De Candolle, *Mém. Mus. Hist. Nat. Paris* 17: 110. 1828.  
*Mammillaria tenuis* De Candolle, *Mém. Mus. Hist. Nat. Paris* 17: 110. 1828.  
*Mammillaria tennis media* De Candolle, *Mém. Mus. Hist. Nat. Paris* 17: 110. 1828.  
? *Mammillaria densa* Link and Otto, *Icon. Pl. Rar.* 69. 1830.  
*Mammillaria echinata densa* Pfeiffer, *Enum. Cact.* 6. 1837.  
? *Mammillaria stella-aurata* Martius in Zuccarini, *Abh. Bayer. Akad. Wiss. München* 2: 201. 1837.  
? *Mammillaria minima* Reichenbach in Terschek, *Suppl. Cact. Verz.* 1.  
*Echinocactus densus* Steudel, *Nom. ed. 2.* 1: 536. 1840.  
*Mammillaria stella-aurata* Salm-Dyck in Walpers, *Repert. Bot.* 2: 272. 1843.  
*Mammillaria subcrocea intertexta* Salm-Dyck, *Cact. Hort. Dyck.* 1844. 13. 1845.  
*Mammillaria elongata intertexta* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 12. 1850.  
*Mammillaria elongata subcrocea* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 12. 1850.  
*Mammillaria subcrocea rufescens* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 100. 1850.  
*Mammillaria stella-aurata gracilispina* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 101. 1850.  
? *Mammillaria anguinea* Otto in Salm-Dyck, *Cact. Hort. Dyck.* 1849. 201. 1850.  
? *Mammillaria subechinata* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 101. 1850.  
? *Mammillaria rufocrocea* Salm-Dyck, *Cact. Hort. Dyck.* 1849. 102. 1850.  
*Cactus anguineus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.  
*Cactus densus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.  
*Cactus elongatus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891. Not Willdenow, 1813.  
*Cactus intertextus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.  
*Cactus minimus* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.  
*Cactus stella-auratus* Kuntze, *Rev. Gen. Pl.* 1: 2601. 1891.  
*Cactus subcroceus* Kuntze, *Rev. Gen. Pl.* 1: 2601. 1891.  
*Cactus subechinatus* Kuntze, *Rev. Gen. Pl.* 1: 2601. 1891.  
*Cactus tenuis* Kuntze, *Rev. Gen. Pl.* 1: 2601. 1891.  
*Mammillaria elongata tenuis* Schumann, *Gesamtb. Kakteen* 520. 1898.  
*Mammillaria elongata stella-aurata* Schumann, *Gesamtb. Kakteen* 520. 1898.  
*Mammillaria elongata anguinea* Schumann, *Gesamtb. Kakteen* 521. 1898.  
*Mammillaria elongata rufocrocea* Schumann, *Gesamtb. Kakteen* 521. 1898.

Densely cespitose, forming small clumps, erect, ascending or prostrate, 3 to 10 cm. long, 1 to 1.5 cm. in diameter, almost covered by a mass of interlocking spines; tubercles arranged in a few rows, usually in spirals, short, their axils naked; spines usually all radial but sometimes with 1 porrect central spine, yellow or with brown tips, more or less recurved, 8 to 12 mm. long; spine-areoles pubescent when young; flowers at the upper part of the plant, white or nearly so, 6 to 7 mm. long; perianth-segments about 12, rather broad, obtuse or sometimes apiculate.

*Type locality:* Mexico.

*Distribution:* Eastern Mexico.

*Mammillaria supertexta rufa* is referred to *M. elongata intertexta* by Labouret (*Monogr. Cact.* 68. 1853).

*Mammillaria caespitosa* was first listed by De Candolle (*Prodr.* 3: 460. 1828). It next appears in 1830 as a synonym in a list of the cacti of the Botanical Garden of Berlin. In 1837 Pfeiffer (*Enum. Cact.* 6) gives it as a synonym of *M. echinata densa*.

The three varieties *Mammillaria tenuis arrecta*, *M. tenuis coerulescens*, and *M. tenuis derubescens* were garden names in the Botanical Garden at Berlin, listed by Förster (*Handb. Cact.* 240. 1846).

Walpers (Repert. Bot. 2: 272. 1843) records *M. intertexta rufocrocea*, but without any description.

Labouret (Monogr. Cact. 67. 1853) records the variety *M. stella-aurata minima* Salm-Dyck.

The two varieties of *Mammillaria subcrocea*, *anguinea*, and *rutila* (Walpers, Repert. Bot. 2: 272. 1843) are without descriptions.

*Mammillaria elongata rufescens* Salm-Dyck (Cact. Hort. Dyck. 1844. 12. 1845) was not described at the place here cited, while the variety *straminea* was a garden name (Förster, Handb. Cact. 240. 1846).

*Illustrations:* Schumann, Gesamt. Kakteen 519. f. 85; Blühende Kakteen 3: pl. 174, as *Mammillaria elongata*; Schelle, Handb. Kakteenk. 247. f. 165, as *M. elongata minima*; Blanc, Cacti 72. No. 1398, as *M. minima*; Link and Otto, Icon. Pl. Rar. pl. 35, as *M. densa*; Abh. Bayer. Akad. Wiss. München 2: pl. 1. VIII. f. 5, as *M. stella-aurata*; Curtis's Bot. Mag. 65: pl. 3646; Edwards's Bot. Reg. 18: pl. 1523; De Candolle, Mém. Cact. pl. 1; Loudon, Encycl. Pl. ed. 2 and 3. 1201. f. 17359, as *M. tenuis*.

Figure 146 is from a photograph of the common form in cultivation.

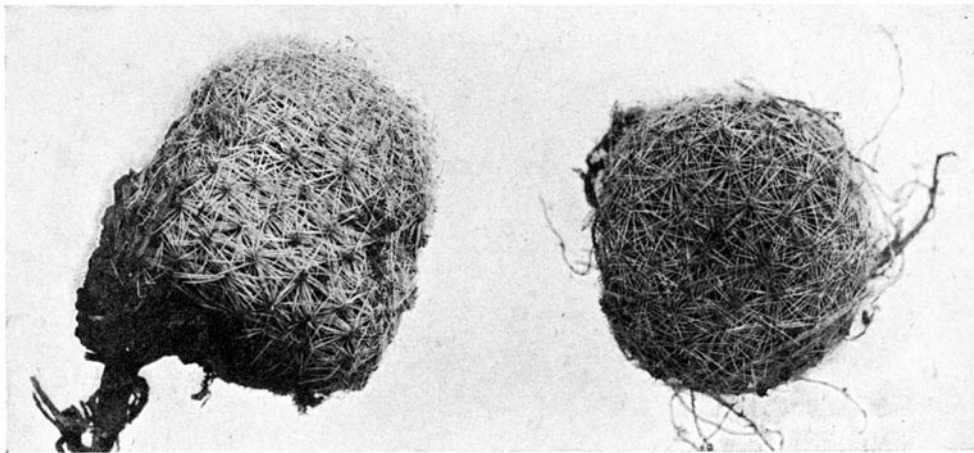


FIG. 147.—*Neomammillaria oliviae*.

#### 97. *Neomammillaria oliviae* (Orcutt).

*Mammillaria oliviae* Orcutt, West Amer. Sci. 12: 163. 1902.

Globose to short-cylindric, up to 10 cm. high, simple or becoming cespitose, sometimes as many as 8 together; tubercles ovoid, their axils naked; radial spines 25 to 36, snowy white or sometimes reddish brown, slender, rigid, 6 mm. long, the upper ones shorter; central spines 1 to 3, the lower one erect, rigid, white or tipped with chocolate brown; flowers about 3 cm. broad; perianth-segments lanceolate, acute, magenta, the upper part of the margins and tip with a narrow band of white; filaments deep magenta; style light pink; stigma-lobes olive-green; fruit scarlet, clavate, up to 2.5 cm. long; seeds small, black.

*Type locality:* West of Vail, a flag station on the Southern Pacific Railroad, near Tucson, Arizona.

*Distribution:* Mountains and deserts of Arizona.

Our description of the flowers is drawn from the notes and photograph of F. E. Lloyd's specimen sent us from Oro Blanco Mountains, Arizona. This is the only record we have had of this plant blooming, but fruiting plants were collected by C. R. Orcutt in 1922 (No. 802). It was first collected in considerable quantity by Mr. Orcutt, but his supply soon died out and most of the skeletons were sent to the U. S. National Herbarium,

where they are now preserved. In April 1921 Mr. Vernon Bailey rediscovered the species in Arizona and sent in a number of living specimens, but none has yet flowered. Mr. Orcutt reports that he has collected specimens which have hooked spines.

Mr. Orcutt dedicated this species to his wife, Mrs. Olivia Orcutt.

Figure 147 is from a photograph of two plants sent by Mr. Vernon Bailey from Continental, Arizona, in 1920.

**98. *Neomammillaria echinaria* (De Candolle).**

*Mammillaria echinaria* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 110. 1828.

*Mammillaria echinata* De Candolle, Mém. Cact. 3. 1834.

*Mammillaria gracilis* Pfeiffer, Allg. Gartenz. 6: 275. 1838.

*Cactus echinaria* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus gracilis* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not Miller, 1770.

*Mammillaria elongata echinata* Schumann, Gesamtb. Kakteen 521. 1898.

Plants caespitose, often forming large clumps, ascending or spreading, about 1 dm. long, 1 to 1.5 cm. in diameter; tubercles short, terete, their axils naked; spines pale yellow to glassy white; radial spines about 1, spreading; central spine one, straight, acicular, about 1 cm. long; flowers and fruit not known.

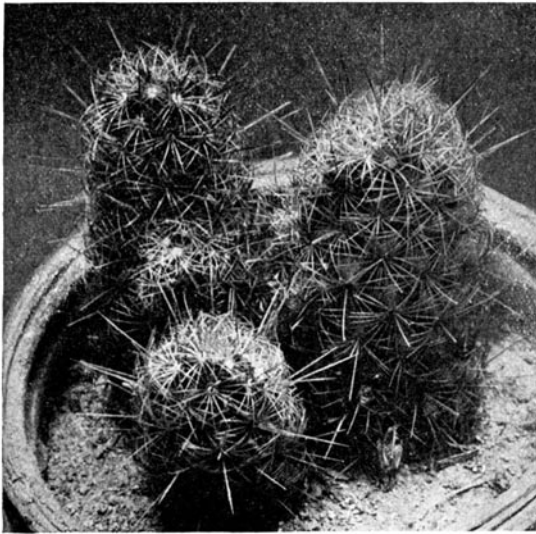


FIG. 148.—*Neomammillaria echinaria*.

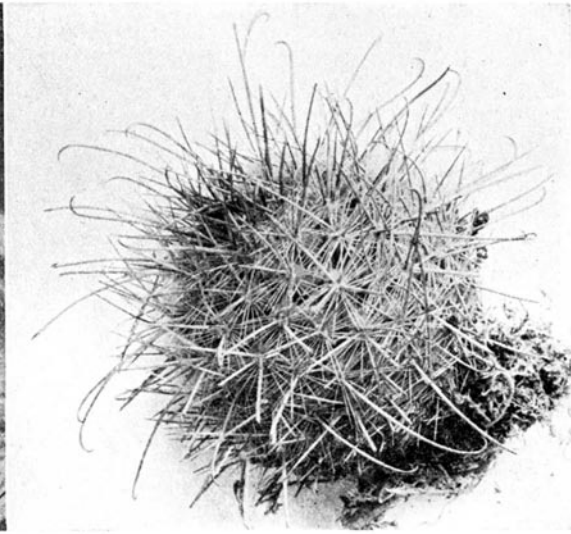


FIG. 149.—*Neomammillaria rekoii*.

*Type locality:* Mexico.

*Distribution:* Hidalgo, Mexico.

The above description is based on a plant collected by Dr. Rose in 1905 near Ixmiquilpan, and this we have had growing ever since.

The two varieties of *Mammillaria echinata*, *gracilior* Ehrenberg and *pallida*, published by Förster (Handb. Cact. 239. 1846), are probably only forms of the species.

The varieties of *Mammillaria gracilis* may or may not belong here. They are as follows: var. *laetevirens* Salm-Dyck (as a synonym of var. *pulchella*), var. *pulchella* Hoppfer and *virens*, all given by Förster in 1846 (Handb. Cact. 242). *Mammillaria elongata centrispina* (Förster, Handb. Cact. 240. 1846), which is only a name, may belong here.

*Illustrations:* Gartenflora 34: pl. 1208, f. d, e, as *Mammillaria echinata*.

Figure 148 is from a photograph of the plant collected by Dr. Rose (No. 8990), mentioned above.

**99. *Neomammillaria pottsii* (Scheer).**

*Mammillaria pottsii* Scheer in Salm-Dyck, Cact. Hort. Dyck. 1849. 104. 1850.

*Mammillaria leona* Poselger, Allg. Gartenz. 21: 94. 1853.

*Echinocactus pottsi* Poselger, Allg. Gartenz. 21: 107. 1853.

*Cactus pottsii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.



More or less cespitose, the individual plants cylindric, 12 cm. long or more; tubercles almost hidden by the spines; radial spines about 30, white, weak, short; central spines 6 to 12, much stouter and longer, more or less ascending, grayish with brown tips; axils of tubercles woolly; flowers borne in a circle about 2 cm. below top of plant, about 1 cm. long; inner perianth-segments light purple, somewhat spreading at tip, acute; stamens pale, much shorter than the style, purplish above; stigma-lobes narrow; fruit red, clavate; seeds blackish brown, the surface deeply pitted.

*Type locality:* Not cited.

*Distribution:* In the highlands of the Rio Grande, Texas; Nuevo Leon and Coahuila to Chihuahua and Zacatecas, Mexico.

This species is widely grown in collections but the flowers are inconspicuous.

In the Engelmann Collection, now in the Missouri Botanical Garden, is a specimen labeled "*Mammillaria pottsii vera*—original coll. Dyck. Jan. 1857." This proves to be identical with the plant well known in our collections as *M. leona*. With specimens of this plant in hand Salm-Dyck's description, which heretofore we had not understood, is clearly

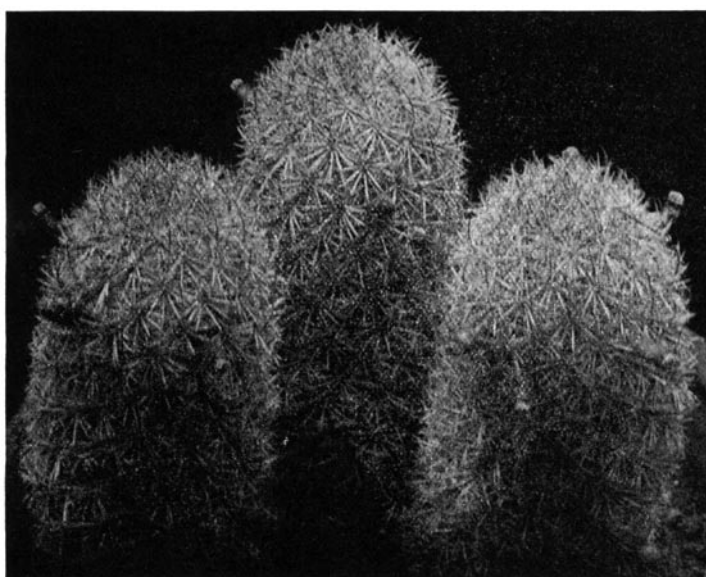


Fig. 150.—*Neomammillaria pottsii*.

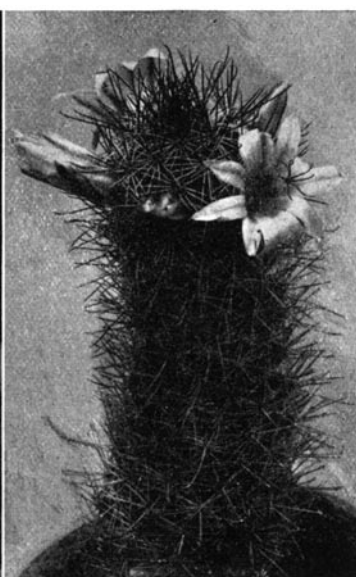


Fig. 151.—*N. mazatlanensis*.

interpreted, except that he states that the tubercle is slightly sulcate above. From the fact that Engelmann says that his specimen is "*M. pottsii vera*" we suspect that he may have had a plant like *M. tuberculosa* mixed with it. This seems to have been Poselger's idea, for he refers the plant to *Echinocactus*, doubtless on account of this supposed groove. The plant which Poselger describes under *Echinocactus pottsonianus*, collected at Guerrero, south of the Rio Grande, is very different from Salm-Dyck's plant; his fragment, also deposited in the Missouri Botanical Garden, consists of a fruit, a few brownish seeds, and a spine-cluster, one attached to the top of a grooved tubercle, and is to be referred to *Escobaria tuberculosa*, or a related species. The specimen is too fragmentary to identify definitely. Poselger's misunderstanding of Salm-Dyck's plant left the way open for his species, *Mammillaria leona*, described shortly afterwards.

The description of the flower and fruit as given by Coulter is doubtless taken from Poselger but does not apply to the true *M. pottsii*. Our only Texas record is based on J. H. Ferriss's plant from the Big Bend of the Rio Grande, November 15, 1922.

*Coryphantha pottsii* occurs in C. R. Orcutt's Circular to Cactus Fanciers 1922 (unsigned and undated) to which he assigns *M. leona*.

*Illustrations:* Ann. Rep. Smiths. Inst. 1908: pl. 2, f. 3; Blanc, Cacti 70. No. 1359, as *Mammillaria leona*.

Figure 150 is from a photograph of a cluster of plants obtained in Zacatecas by F. E. Lloyd in 1908.

**100. *Neomammillaria mazatlanensis*** (Schumann).

*Mammillaria mazatlanensis* Schumann, Monatsschr. Kakteenk. 11: 154. 1901.

*Mammillaria littoralis* K. Brandegee, Kew Bull. Misc. Inf. 1908: App. 91. 1908.

Plants cespitose, often forming broad clumps with many oblong heads, 4 to 10 cm. long, about 2 cm. in diameter; tubercles terete, 3 to 4 mm. long, their axils naked; radial spines 12 to 15, setaceous, spreading, white; central spines 4 to 6,\* stouter than the radials, reddish, ascending, 8 to 10 mm. long; flowers from the axils of the old tubercles but towards the top of the plant, 3 cm. long or more, red; perianth-segments oblong, spreading; stigma-lobes 8, very long and slender.

*Type locality:* Mazatlán.

*Distribution:* On the hills near the sea, about Mazatlán, Mexico.

Dr. Rose collected this plant in 1897 and again in 1910. From this last collection we still have growing plants, but these have never flowered.

*Mammillaria littoralis* K. Brandegee, first mentioned in 1907 (Monatsschr. Kakteenk. 17: 80), seems never to have been described by Mrs. Brandegee but was described in the Kew Bulletin as mentioned above, where it was stated to be from "California(?)." It was doubtless sent by Mrs. Brandegee from California but collected at Mazatlán.

*Illustration:* Monatsschr. Kakteenk. 15: 155, as *Mammillaria mazatlanensis*.

Figure 151 is from a photograph sent by L. Quehl, showing a flowering plant.

**101. *Neomammillaria sphaclata*** (Martius).

*Mammillaria sphaclata* Martius, Nov. Act. Nat. Cur. 16: 339. 1832.

*Echinocactus sphaclatus* Poselger, Allg. Gartenz. 21: 107. 1853.

*Cactus sphaclatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Usually densely cespitose, often grayish, forming clumps 3 to 4 dm. in diameter, the individual plants cylindric, more or less elongated, often 1 to 2 dm. high; radial spines 54 to 20, usually white with black tips; central spines 3 or 4, usually black or reddish throughout, sometimes becoming white in age; axils of tubercles often bearing tufts of short hairs and occasionally a few bristles; flowers about 15 mm. long, purplish; fruit red, clavate; seeds black, the surface deeply pitted.

*Type locality:* Mexico, possibly in Oaxaca or Puebla; it was collected by Karwinsky.

*Distribution:* Puebla and Oaxaca; Schumann reports it, but doubtless erroneously, from Hidalgo (Zimapán) and Sonora (Guaymas).

*Illustrations:* Nov. Act. Nat. Cur. 16: pl. 25, f. 1; Monatsschr. Kakteenk. 28: 74; Grässner, Haupt-Verz. Kakteen 1914: 36, as *Mammillaria sphaclata*.

**102. *Neomammillaria albicans*** sp. nov.

Plants at first globose but becoming cylindric and then 10 to 20 cm. long, up to 6 cm. in diameter, often in clumps of 5 to 15; spines almost hiding the plant body and often pure white; radial spines numerous, short, stiff, widely spreading; central spines several, straight, stiff, often brownish



FIG. 152.—*Neomammillaria albicans*.

\* Sometimes one of the central spines is hooked, as is shown in plants from near the type locality collected by Señor J. G. Ortega in 1922.

or blackish at tip; spine-areoles when young densely white-woolly; fruit clavate, red, 10 to 18 mm. long; seeds black with basal hilum.

Collected on Santa Cruz Island, Gulf of California, by J. N. Rose, April 16, 1911 (No. 16842, type), and by Ivan M. Johnston in 1921 (No. 3912) also on the adjacent island of San Diego by Mr. Johnston (No. 3923).

This is a very beautiful plant which grows in small clusters and is covered with nearly pure white spines. A number of plants were brought back to the New York Botanical Garden in 1911 by Dr. Rose but they have all since died. We now have living plants sent in by Mr. Johnston from two localities.

Figure 152 is from a photograph of a plant sent by Mr. Johnston to Washington from the type locality.

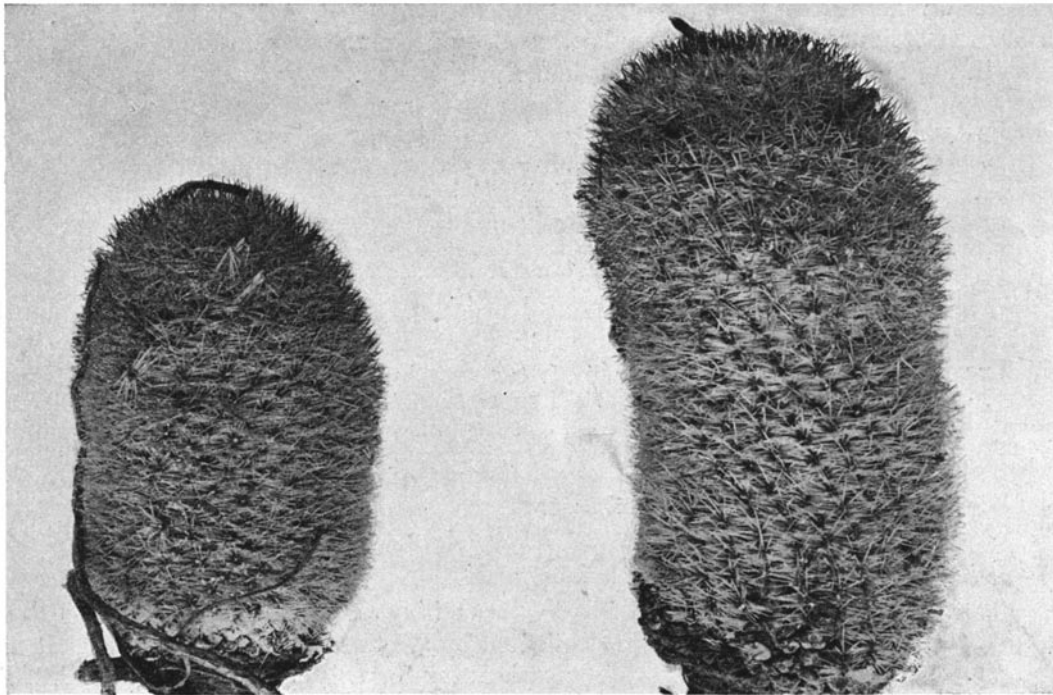


FIG 153.—*Neomammillaria slevinii*.

**103. *Neomammillaria slevinii* sp. nov.**

Plants simple, cylindric, 1 dm. high or more, 5 to 6 cm. in diameter, entirely hidden under the many closely set spines; spines at top of plant pinkish below, with brown to blackish tips, on lower part of plant bleaching white; radial spines numerous, acicular, widely spreading; central spines about 6, a little longer and stouter than the radials, slightly spreading; flowers about 2 cm. broad; outer perianth-segments with a pinkish mid-rib; inner perianth-segments white; filaments pinkish; style nearly white; stigma-lobes nearly white; fruit red, about 1 cm. long; seeds black, nearly globular, with a projection at base and a large basal hilum.

Collected by J. N. Rose, March 31, 1911 (No. 16550, type), on San Josef Island, and by Ivan M. Johnston in 1921 (No. 3943) on San Francisco Island just off the southern end of San Josef Island.

This species is related to *Neomammillaria albicans*, but it has darker spines and the spine-areoles are not densely lanate.

The plant is named for J. R. Slevin, who was in charge of the scientific expedition of the California Academy of Sciences to the Gulf of California in 1921, at which time the plant was collected.



Figure 153 is from a photograph of one of the plants collected by Mr. Johnston and sent to Washington.

**104. *Neomammillaria palmeri* (Coulter).**

*Cactus palmeri* Coulter, Contr. U. S. Nat. Herb. 3: 108. 1894.  
*Mammillaria dioica insularis* K. Brandegee, Erythea 5: 115. 1897.

Densely cespitose; individuals small; axils densely woolly and bristly; radial spines 25 to 30, slender, white, 5 mm. long, radiating; central spines 3 to 5, stouter and longer than the radials, brownish with black tips, straight, 7 to 8 mm. long; flowers cream-colored, sometimes tinged with pink; fruit clavate, scarlet; seeds black.

*Type locality*: "San Benito Island." \*

*Distribution*: San Benito Islands and possibly Guadalupe Island off the west coast of Lower California.

Plate XIV, figure 7, shows the plant, collected on the San Benito Islands, which flowered in the New York Botanical Garden, April 1, 1912.

**105. *Neomammillaria uncinata* (Zuccarini).**

*Mammillaria uncinata* Zuccarini in Pfeiffer, Enum. Cact. 34. 1837.  
*Mammillaria bibamata* Pfeiffer, Allg. Gartenz. 6: 274. 1838.  
*Mammillaria depressa* Scheidweiler, Bull. Acad. Sci. Brux. 5: 494. 1838.  
*Mammillaria uncinata biuncinata* Lemaire, Cact. Gen. Nov. Sp. 96. 1839.  
*Mammillaria uncinata spinosior* Lemaire, Cact. Gen. Nov. Sp. 96. 1839.  
*Mammillaria uncinata rhodacantha* Hortus in Förster, Handb. Cact. ed. 2. 347. 1885.  
*Cactus bibamatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.  
*Cactus depressus* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not De Candolle, 5813.  
*Cactus uncinatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Globose or somewhat depressed, usually half-buried in the soil, 8 to 30 cm. in diameter; tubercles lactiferous, short, obtuse; axils of old tubercles naked, of young ones lanate, forming a mass of wool at top; young spine-areoles also lanate; radial spines 4 to 6, usually white, subulate, 4 to 5 mm. long; central spines usually solitary, sometimes 2 or 3, much stouter than the radials, 8 to 12 mm. long, brown, hooked at apex; flowers small, reddish white, about 2 cm. long; inner perianth-segments linear-oblong; stigma-lobes pinkish; fruit clavate, 10 to 18 mm. long, red; seeds small, brown.

*Type locality*: Mexico.

*Distribution*: Common in central Mexico, especially in Hidalgo and San Luis Potosí. Schumann reports it from Chihuahua, as collected by Wislizenus, but we suspect that there is an error. Pfeiffer does not give a definite locality for this species but Zuccarini, who redescribed the plant soon afterwards, says that Karwinsky obtained it in the mountains near Pachuca, Mexico.

This species and the following two are the only milk-bearing *Neomammillaria* which have hooked spines.

*Mammillaria adunca* Scheidweiler (Förster, Handb. Cact. 222. 1846), referred here as a synonym, was never described.

*Illustrations*: Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 19; Schumann, Gesamtb. Kakteen f. 94; Abh. Akad. Bayer. Wiss. München 2: pl. 4, f. 3; Schelle, Handb. Kakteenk. 269. f. 191, as *Mammillaria uncinata*.

**106. *Neomammillaria hamata* (Lehmann).**

*Cactus cylindricus* Ortega, Nov. Rar. Pl. 528. 1800. Not Lamarck, 1783.  
*Mammillaria hamata* Lehmann in Pfeiffer, Enum. Cact. 34. 1837.  
*Cactus hamatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Stem 6 dm. long, cylindrical, somewhat branched at base, described as milky; tubercles conic or a little compressed; radial spines 15 to 20, white, spreading; central spines several, brownish, stouter than the radials, one of them hooked; flowers small, probably scarlet, from near top of plant but from

\*Although San Benito Island is given as the type locality, San Benito is really a group of three small islands. Dr. Rose found this species on two of these islands in 1911 (No. 16042).

axils of old tubercles; inner perianth-segments lanceolate, acute; filaments half length of perianth-segments, white; stigma-lobes 4, yellowish; fruit slender, clavate, probably red; seeds minute, brown.

*Type locality:* Mexico.

*Distribution:* Mexico, but range not known.

Schumann referred both *Cactus cylindricus* and *Mammillaria hamata* to *M. coronaria*, but the last name must be excluded from this genus. The specific name, *cylindricus*, which has been used four times in the genus *Cactus*, can not be transferred to *Neomammillaria* on account of the earlier use of this specific name by Lamarck.

*Mammillaria hamata* was first mentioned in the Seed Catalogue of the Hamburg Garden in 1832.

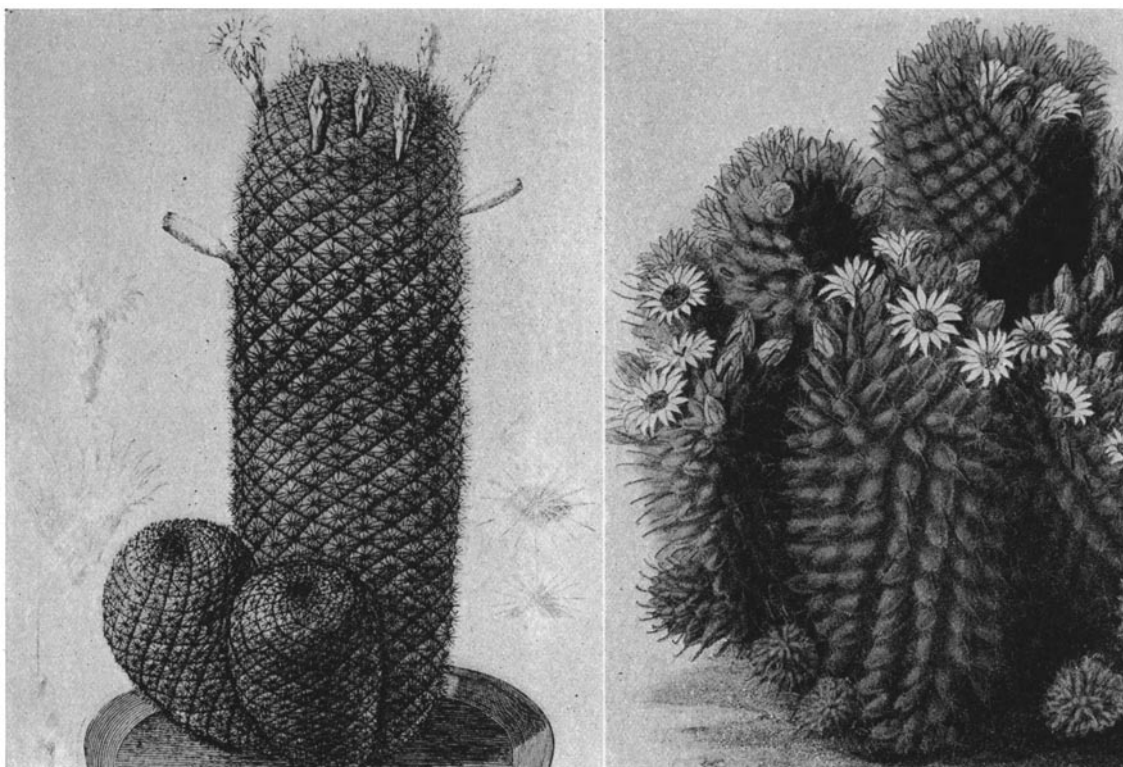


FIG. 154.—*Neomammillaria hamata*.

FIG. 155.—*Neomammillaria wildii*.

The following are usually referred as synonyms of *Mammillaria coronaria*, but probably belong here: *Mammillaria hamata brevispina* and *M. hamata principis* Salm-Dyck (Labouret, Monogr. Cact. 34. 1853) and *M. hamata longispina* Salm-Dyck (Cact. Hort. Dyck. 1844. 8. 1845). *Mammillaria principis* Monville (Labouret, Monogr. Cact. 34. 1853) was given as a synonym of the last variety here cited.

*Illustration:* Ortega, Nov. Rar. Pl. pl. 16, as *Cactus cylindricus*.

Figure 154 is reproduced from the illustration above cited.

#### 107. *Neomammillaria rekoii* sp. nov.

Globular to short-cylindric, becoming 12 cm. long, 5 to 6 cm. in diameter, sometimes milky; tubercles green, terete, 8 to 10 mm. long, not very closely set, each bearing in its axil a tuft of short white wool and 1 to 8 long white bristles; radial spines spreading, about 20, white, delicately acicular, 4 to 6 mm. long; central spines 4, brown, much stouter than the radials, 10 to 15 mm. long, the

lower one sometimes strongly hooked; flowers from axils of old tubercles, near top of plant; 1.5 cm. long, deep purple; inner perianth-segments narrowly oblong, apiculate; filaments and style purplish; stigma-lobes greenish; fruit clavate, red, 12 mm. long; seeds minute, brown.

This species has been sent to us repeatedly from Oaxaca, Mexico, by Dr. B. P. Reko and it has been named in his honor; we have selected as the type his specimen of 1921, which flowered in Washington.

This is a remarkable species, being the only one we know, except the following, which has the characters of watery tubercles, a hooked spine, and brown seeds, but some plants give out a very diluted milk and have no hooked spines.

Dr. Reko sent us a single plant in April 1922, which was about 12 cm. long and short-clavate; the central spines were mostly 4, but sometimes 5, and none of them hooked. In this specimen we obtained a diluted milky juice from the upper tubercles while the lower ones are entirely devoid of milk. It flowered in April 1923 and seemed to be referable here.

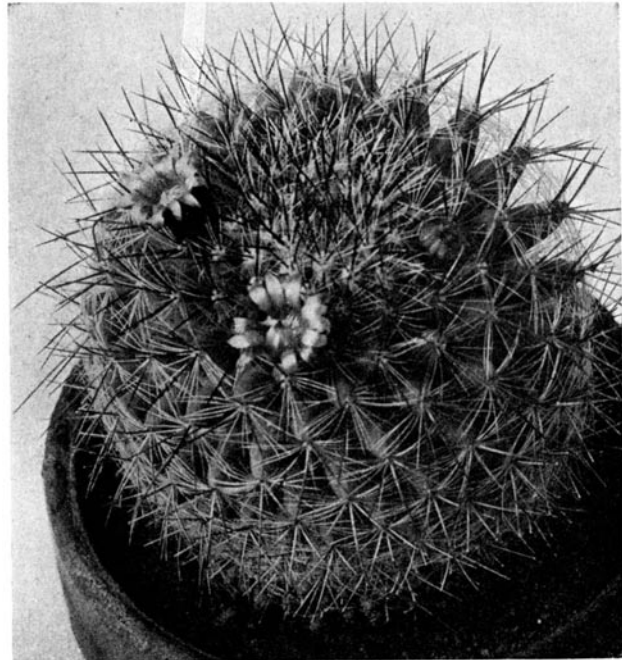


FIG. 155.—*Neomammillaria rekoii*.

Figure 149 shows a plant sent by Dr. B. P. Reko from Oaxaca, Mexico, in 1919; figure 155*a* shows the plant collected by Dr. Reko in 1922, referred to above.

#### 108. *Neomammillaria solisii* sp. nov.

Simple, globular or nearly so, 5 to 7 cm. in diameter, green or becoming purplish; tubercles 8 mm. long, terete in section, a little narrow towards the tip and thus separated above from the adjoining tubercles, their axils without wool even when quite young, and usually with 1 to many bristles; radial spines about 10 to 20, spreading, 6 to 7 mm. long, white, bristle-like; central spines 3 or 4, a little stouter than the radials, becoming brown, one of them strongly hooked (sometimes 2 cm. long).

Collected by Octavio Solís in Cerro de Buenavista de Cuellar, Guerrero, Mexico, in 1920 (No. 5) and in 1921, type, and at the same station by Professor C. Núñez in April and November 1921 (Nos. 4 and 6).

Figure 156 is from a photograph of a plant sent by Octavio Solís from Guerrero, Mexico, in 1920; figure 157 is from a photograph of a plant sent by Professor C. Núñez in 1922.

#### 109. *Neomammillaria pygmaea* sp. nov.

Plant very small, globose to cylindric, 2 to 3 cm. in diameter; tubercles small, obtuse; radial spines about 15, white, stiff, hardly puberulent even under a lens; central spines 4, ascending, golden yellow, the lower one hooked, 5 to 6 mm. long; flowers about 1 cm. long, the outer segments tinged with red, apiculate; inner perianth-segments about 10, cream-colored; filaments greenish, much shorter than the perianth-segments; style greenish.

Collected by J. N. Rose near Cadereyta, Querétaro, Mexico, in 1905 (No. 9863). It has repeatedly flowered but was only 3 cm. high in 1921 when it died.



The species is known only from the single collection recorded above. It grows on stony hills in a very arid part of Queretaro. It is very inconspicuous and is easily overlooked in the field.

**110. *Neomammillaria wildii* (Dietrich).**

*Mammillaria wildii* Dietrich, Allg. Gartenz. 4: 137. 1836.

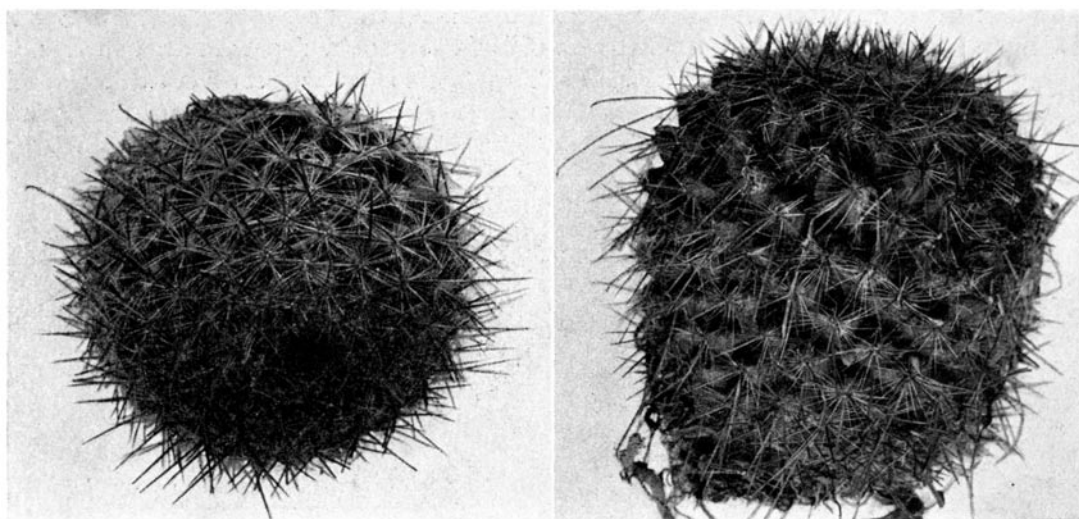
*Mammillaria wildiana* Otto in Pfeiffer, Enum. Cact. 37. 1837.

*Mammillaria wildiana compacta* Hortus in Förster, Handb. Cact. ed. 2. 258. 1885.

*Mammillaria wildiana cristata* Hortus in Förster, Handb. Cact. ed. 2. 258. 1885.

*Cactus wildianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Cylindric to globose, cespitose at base; axils of tubercles bearing rose-colored hairs and bristles; tubercles slender, elongated, 8 to 10 mm. long, obtuse, green or somewhat rose-colored at base; young areoles tomentose; spines all pubescent; radial spines 8 to 10, 8 mm. long, setiform, white; central spines 4, yellow, one of them hooked; flowers white, 12 mm. in diameter; inner perianth-segments acuminate; stigma-lobes 4 or 5, straw-colored; fruit clavate, red.



FIGS. 156 and 157.—*Neomammillaria solisii*.

*Type locality:* Mexico.

*Distribution:* State of Hidalgo, Mexico, according to Schumann.

We have had this plant growing for a number of years, obtained from other collectors, but we do not know its natural habitat. It sprouts freely and new plants are easily started. Dr. Rose examined a specimen, labeled *Mammillaria wildii*, in the Botanical Garden at Halle in 1911; we have a cluster of spines and a flower of that plant.

*Mammillaria glochidiata aurea* (Pfeiffer, Enum. Cact. 37. 1837), although never described, is referred usually as a synonym of this species. The two varieties of *Mammillaria wildii*, *cristata* and *compacta*, are listed but not described by Schelle (Handb. Kakteenk. 251. 1907), the latter being offered for sale by Grässner in his Kakteen for 1914 as form *cristata*.

The two varieties, *Mammillaria wildiana major* and *M. wildiana spinosior*, were given by Walpers (Repert. Bot. 2: 270. 1843) as synonyms of *M. wildiana*. The variety *monstrosa* Cels was given by Rümpler (Förster, Handb. Cact. ed. 2. 258. 1885) as a synonym of *M. wildiana cristata*.

*Illustrations:* Blühende Kakteen 2: pl. 64; Monatsschr. Kakteenk. 32: 103, as *Mammillaria wildii*; Grässner, Haupt-Verz. Kakteen 1912: 27, as *M. wildii cristata*.

Plate XIV, figure 8, shows a plant from the Missouri Botanical Garden which flowered in the New York Botanical Garden, April 25, 1913. Figure 155 is reproduced from the first illustration cited above.

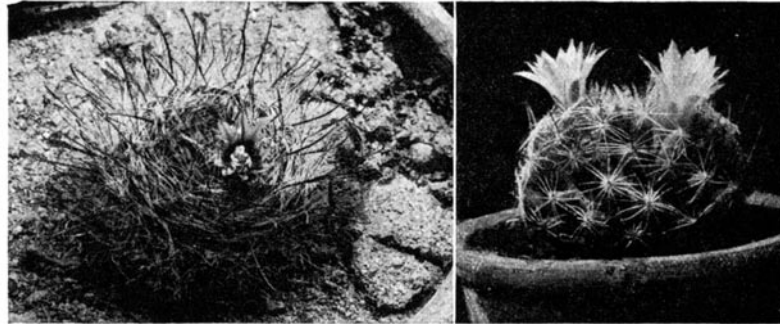
**111. *Neomammillaria seideliana* (Quehl).***Mammillaria seideliana* Quehl, Monatsschr. Kakteenk. 21: 154. 1911.

Solitary, globose, becoming cespitose, 3 to 4. cm. in diameter; tubercles purplish, their axils naked; radial spines 20 to 25, white, long and slender, ascending, puberulent; central spines yellow, 3 or 4, puberulent when young, one hooked; flowers arising from near top of plant, about 15 to 18 mm. long, creamy yellow; outer perianth-segments brownish; inner perianth-segments oblong, acute; style cream-colored, much longer than stamens; stigma-lobes 5 or 6, cream-colored, obtuse; fruit persisting in axils of tubercles, apparently for a number of years; seeds black, with thick neck at base; the hilum basal, large.

*Type locality:* Zacatecas, Mexico.*Distribution:* Known only from the state of Zacatecas.

Collected by F. E. Lloyd in Zacatecas, Mexico, in 1908 (No. 54), who states that he found but a single specimen, though he made diligent search for others.

Although the flowers appear to come from near the top of the plant they are all from axils of old tubercles. In the single specimen examined the flowers appeared before the plant began to form new tubercles. In *Mammillaria barbata*, a closely related species, the flowers occur at both the old and new tubercles, but so far as known no other species possesses that character, although there is no good reason for not finding it in closely related species.



FIGS. 157a and 158.—*Neomammillaria seideliana*.

We have also had a plant sent us by Haage and Schmidt; it is a profuse bloomer.

*Illustration:* Monatsschr. Kakteenk. 21: 155, as *Mammillaria seideliana*.

Figure 157a is from a photograph of a plant sent us from Zacatecas, Mexico, by Professor Lloyd in 1908; figure 158 is from a photograph sent by L. Quehl.

**112. *Neomammillaria barbata* (Engelmann).***Mammillaria barbata* Engelmann in Wislizenus, Mem. Tour North. Mex. 105. 1848.*Cactus barbatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Often densely cespitose, globose, 3 to 4 cm. in diameter; radial spines 20 or more, acicular, spreading or ascending, white, sometimes with brown tips; central spines several, subulate, brown, puberulent, 1 or 2 hooked; flowers 15 mm. long; outer perianth-segments ovate to lanceolate, ciliate; inner perianth-segments erect or spreading at tip, light straw-colored or greenish, brown without, acute; filaments numerous, short, purplish; stigma-lobes 5 to 7, greenish.

*Type locality:* Cosihuirachi, Mexico.*Distribution:* Western Chihuahua, Mexico.

This species was collected by Dr. Wislizenus in 1846 and rediscovered and collected at the type locality in 1908 by Dr. Rose, and upon this latter collection the above description is based. Schumann did not recognize the species, but thought that it might be near *Mammillaria grahamii*.

*Illustrations:* Cact. Mex. Bound. pl. 6, f. 9 to 12; Monatsschr. Kakteenk. 20: 181; Gartenflora 34 pl. 1208, f. a, b, c; 43 pl. 1400, as *Mammillaria barbata*.

Figure 159 is from a photograph of the specimen collected by Dr. Rose in 1908 at the type locality.

**113. *Neomammillaria mercadensis* (Patoni).**

*Mammillaria mercadensis* Patoni, Alianza Científica Universal 1: 54. 1910.

*Mammillaria ocamponis* Ochoterena, Bol. Dirección Estudios Biol. 2: 355. 1918.

Solitary or cespitose, small, globose; radial spines numerous, sometimes 25, widely spreading, white; central spines 4 or 5, elongated, much longer than the flowers, one of them strongly hooked at apex; flowers small, pale rose-colored; perianth-segments oblong, obtuse.

*Type locality:* Cerro de Mercado, Durango.

*Distribution:* Durango, Mexico.

We know this plant only from descriptions and illustrations.

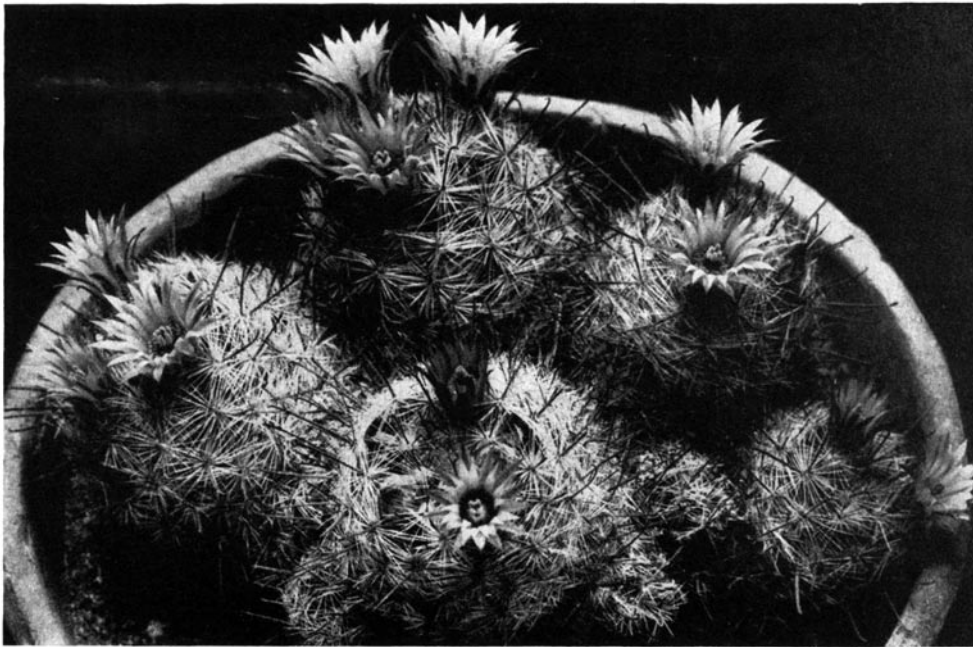


FIG. 159.—*Neomammillaria barbata*.

*Illustrations:* Alianza Científica Universal 3: pl. facing 223, as *Mammillaria barbata*; Bol. Dirección Estudios Biol. 2: facing 356, as *Mammillaria ocamponis*.

Figure 160 is from a photograph of the type plant, which has the same origin as the illustrations cited above.

**114. *Neomammillaria kunzeana* (Bödeker and Quehl).**

*Mammillaria kunzeana* Bödeker and Quehl, Monatsschr. Kakteenk. 22: 177. 1912.

*Mammillaria bocasana kunzeana* Quehl, Monatsschr. Kakteenk. 26: 46. 1916.

Cespitose, globose or sometimes becoming cylindric, light green; tubercles cylindric, setose in their axils; radial spines about 25, white, setaceous; central spines 3 or 4, brown, puberulent, one of them hooked; flowers white or yellowish white, rose-colored on the outside, 2 cm. long; inner perianth-segments acuminate; stigma-lobes 4, whitish yellow.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

This species is dedicated to Dr. Richard Ernest Kunze (1838-1919), who was an enthusiastic student of cacti and for many years a resident of Phoenix, Arizona. He sent the plant to Germany in 1910.



*Illustration:* Monatsschr. Kakteenk. 22: 178, as *Mammillaria kunzeana*.

Plate XIV, figure 1, is of a plant obtained by Dr. Rose in 1912 from W. Mundt as *Mammillaria bocasana*, which flowered in the New York Botanical Garden, April 21, 1914.

**115. *Neomammillaria hirsuta* (Bödeker).**

*Mammillaria hirsuta* Bödeker, Monatsschr. Kakteenk. 29: 130. 1919.

Solitary or becoming cespitose, globose, about 6 cm. in diameter; tubercles 10 mm. long, in 8 or 13 spiraled rows, cylindric, their axils setose; spine-areoles naked; radial spines about 20, white, 10 to 15 mm. long; central spines 3 or 4, the lower one hooked; flowers small, 10 mm. long; fruit and seeds unknown.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

The plant was exhibited by de Laet at Contich, Belgium, in 1914, as sent to him by Mrs. Nichols, presumably from northern Mexico.

*Illustration:* Monatsschr. Kakteenk. 29: 131, as *Mammillaria hirsuta*.

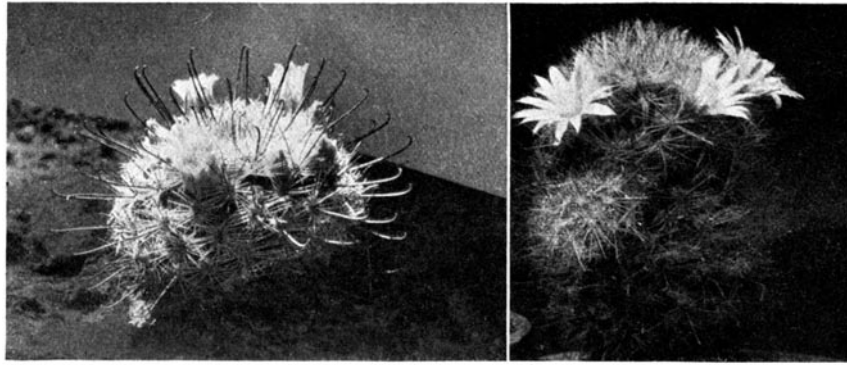


FIG. 160.—*Neomammillaria mercadensis*.

FIG. 161.—*N. multihamata*.

**116. *Neomammillaria multihamata* (Bödeker).**

*Mammillaria multihamata* Bödeker, Monatsschr. Kakteenk. 25: 76. 1915.

Short-cylindric, about 5 cm. in diameter; tubercles cylindric, setose in their axils; spine-areoles white-lanate; radial spines 25, acicular, white, 8 mm. long; central spines 7 to 9, several of them hooked; flowers numerous from near top of plant, small, 1.5 cm. long; inner perianth-segments narrow, acute, spreading; seeds blackish brown.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

This plant is in the trade. A specimen was sent us in 1914 by L. Quehl, but it never flowered and soon died.

*Illustration:* Monatsschr. Kakteenk. 25: 77, as *Mammillaria multihamata*.

Figure 161 is reproduced from a photograph furnished by L. Quehl.

**117. *Neomammillaria longicoma* sp. nov.**

Cespitose, often forming broad clumps; individual specimens 3 to cm. in diameter; tubercles conic, 4 to 5 mm. long, dark green, obtuse, bearing long white hairs in their axils; radial spines 25 or more, weak and hair-like, more or less interlocking; central spines 4, 10 to 12 mm. long, brown above, a little paler below, 1 or 2 hooked; flowers from axils of upper tubercles; outer perianth-segments pinkish, darker along the center; inner perianth-segments lanceolate, acute, nearly white or sometimes tinged with rose; stamens and style much shorter than the inner perianth-segments; stigma-lobes 3, cream-colored.

The plant is common about San Luis Potosí, Mexico, where it was collected by Dr. E. Palmer in 1905 (type) and by Mrs. Irene Vera in 1912. We have had it in cultivation since

1905. It differs considerably from *Neomammillaria kunzeana*, from the same region, in its hair-like radial spines. It is perhaps nearest *M. bocasana*, but that species has single central spines.

*Illustration:* Ann. Rep. Smiths. Inst. 1908: pl. 4, f. 4, as *Mammillaria bocasana*.

Figure 162 is from a photograph of a plant (type) collected by Dr. E. Palmer near San Luis Potosí in 1905 and figure 165 shows a cluster of plants from the same colony.

**118. *Neomammillaria bocasana* (Poselger).**

*Mammillaria bocasana* Poselger, Allg. Gartenz. 21: 94. 1853.

*Cactus bocasanus* Coulter, Contr. U. S. Nat. Herb. 3: 104. 1894.

Cespitose, often forming large mounds; individual plants globose, 3 to 4 cm. in diameter, light green; tubercles slender, 6 to 8 mm. long, terete, their axils sometimes hairy or bristly; radial spines represented by numerous long white silky hairs; central spines solitary, 5 to 8 mm. long, brown, but paler at base, hooked, much shorter than the radial hairy ones; flower-buds rose-colored; flowers described as white; perianth-segments lanceolate-linear, acute, spreading; fruit "green, 4 mm. long; seeds cinnamon brown, oblique, broadly obovate, with narrowly basal hilum."

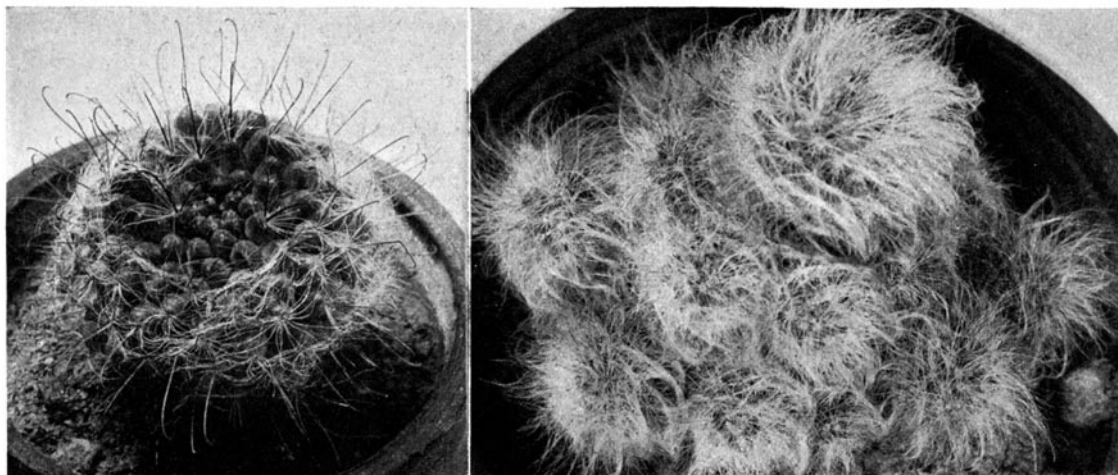


Fig 162.—*Neomammillaria longicoma*.

Fig 163.—*Neomammillaria bocasana*.

*Type locality:* Sierra de Bocas,\* Mexico.

*Distribution:* Northern central Mexico, especially in San Luis Potosí.

This species has not been well understood and is usually misnamed in collections.

The two varieties of *Mammillaria bocasana*, *cristata* and *glochidiata*, are listed by Schelle (Handb. Kakteenk. 250. 1907), but not described. The former is offered for sale by Grässner in his Kakteen for 1914. We do not find that *M. bocasana splendens* Liebner and *M. bocasana sericata* Lemaire, mentioned by Quehl (Monatsschr. Kakteenk. 19 46. 1909), have ever been described.

*Mammillaria schelbensei lanuginosior* Hildmann (Schumann, Gesamtb. Kakteen 531. 1898) we have not seen but it may belong here.

*Mammillaria bocasana splendens*, credited to Schlechtendal, is offered for sale by Haage and Schmidt in their 1922 Catalogue.

*Illustrations:* Schelle, Handb. Kakteenk. 250. f. 170; Blanc, Cacti 67, No. 1148; West Amer. Sci. 13: 40 (these three illustrations are from the same source); Blühende Kakteen 1: pl. 35; Monatsschr. Kakteenk. 31: 103; Schumann, Gesamtb. Kakteen f. 89, as *Mammillaria bocasana*; De Laet, Cat. Gén. 28. f. 42; Schelle, Handb. Kakteenk. 251. f.

\*Coulter (Contr. U. S. Nat. Herb. 3: 104) states that Poselger says the plant is from Texas "auf der Seira de Bocas," but in the original place of publication he does not give the state. Bocas, however, is in San Luis Potosí.

171; Rev. Hort. Belg. 40: after 186; Tribune Hort. 4: pl. 139 (these four illustrations are all from the same source); Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 25; Monatsschr. Kakteenk. 29: 81, as *Mammillaria bocasana cristata*.

Plate XIV, figure 2, shows a plant, collected by S. S. Hordes in 1915, which flowered in the New York Botanical Garden, May 11, 1916. Figure 163 shows a plant received from San Luis Potosí through Mrs. Irene Vera in 1912.

**119. *Neomammillaria multiformis* sp. nov.**

Cespitose, forming dense clumps, sometimes 25 or more from a single root, either globose or much elongated and 3 to 6 times as long as thick; tubercles terete, 6 to 8 mm. long, their axils bearing long white bristles and white wool; radial spines 30 or more, acicular, 8 mm. long, yellow

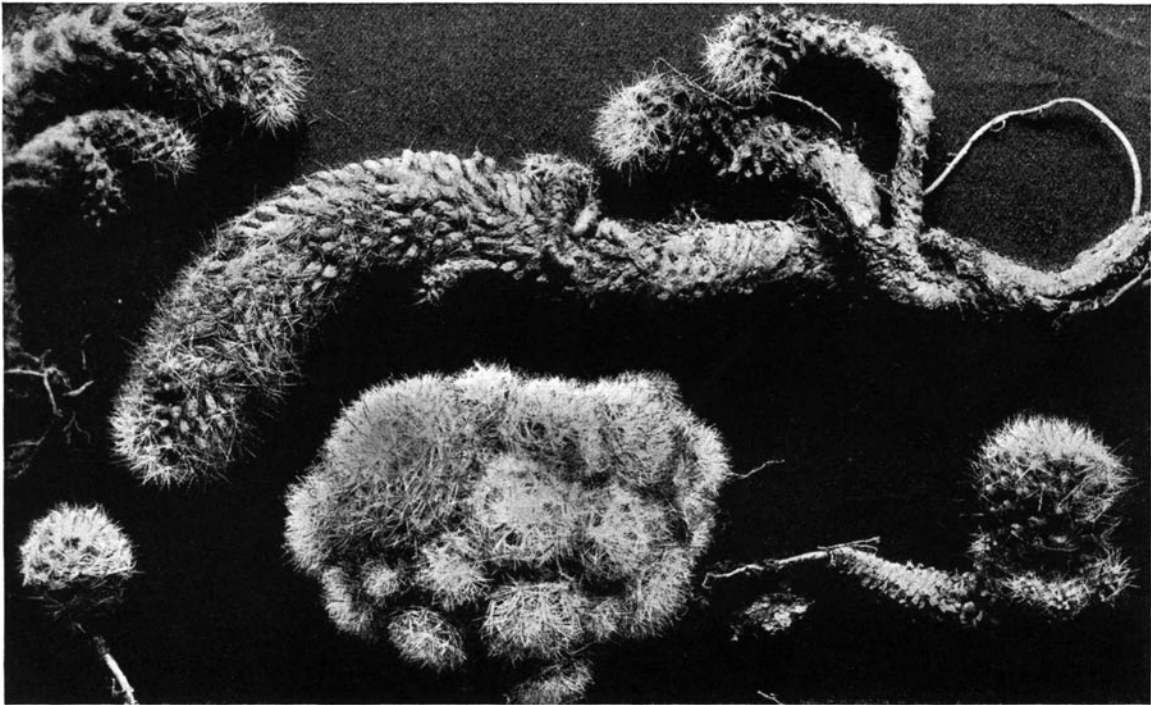


FIG. 164.—*Neomammillaria multiformis*.

or at least becoming so, ascending; central spines 4, a little longer and stouter than radials, nearly erect, reddish in upper part, one of them strongly hooked; flowers deep purplish red, 8 to 10 mm. long, usually broader than long; inner perianth-segments oblong, acute; filaments red; fruit nearly globose, at least when dry; seeds black.

Collected by Dr. E. Palmer at Alvarez, near San Luis Potosí, Mexico, in May 1905 (No. 591, type, and No. 592).

Figure 164 is from a photograph made from Dr. Palmer's specimen just after it was received in Washington.

**120. *Neomammillaria scheidweileriana* (Otto).**

*Mammillaria glochidiata sericata* Lemaire, Cact. Gen. Nov. Sp. 40. 1839.

*Mammillaria scheidweileriana* Otto in Dietrich, Allg. Gartenz. 9: 179. 1841.

*Mammillaria wildiana rosea* Salm-Dyck, Cact. Hort. Dyck. 1849. 81. 1850.

*Cactus scheidweilerianus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

*Mammillaria monancistrina*\* Berg in Schumann, Gesamtb. Kakteen 533. 1898.

\* The publication of *Mammillaria monancistrina* is usually referred to Förster's Handbuch (254. 1846), but the name occurs there without description.



Cespitose, globose to cylindric, light green; tubercles setose in their axils, in 8 and 13 spirals, cylindric; spines all puberulent; radial spines 9 to 10, setaceous, white, 1 cm. long; central spine, 1 to 4, brown, 1 or 2 hooked; flowers rose-colored, 12 to 13 mm. long.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

The plant is known to us from description only.

**121. *Neomammillaria saffordii* sp. nov.**

Plants small, globose to short-cylindric, 3 to 4 cm. high, dull green, nearly hidden under the dense covering of spines; axils naked; spine-areoles when quite young slightly woolly, but early glabrate, circular; spines all puberulent under a lens when young; radial spines 12 to 14, somewhat ascending, but in age more or less curved outward, when just developing with bright red tips and white bases, later the lower part becoming yellowish; central spines single, stout, reddish, 1.5 cm. long, hooked at apex; flowers 2.5 cm. long, rose-colored; outer perianth-segments tipped by long bristles, the inner obtuse; stigma-lobes green.

This beautiful little species was collected by W. E. Safford, February 3, 1907, near Icamole, Nuevo León (No. 1250). Two plants, which were sent to Washington, flowered June 21, 1912; but they have not done well in cultivation. The plants sprout freely in cultivation and in this way we hope to distribute material to other collections. It is near *Mammillaria carretii* and was so figured by Dr. Safford, but it differs in several important respects from that species. It is named for Dr. Safford, the author of a very interesting paper, entitled Cactaceae of Northeastern and Central Mexico (Ann. Rep. Smiths. Inst. 1908), frequently referred to in these volumes.

*Illustration:* Ann. Rep. Smiths. Inst. 1908: pl. 4, f. 2, as *Mammillaria carretii*.

Figure 168 is from a photograph of the type plant.

**122. *Neomammillaria schelhasei* (Pfeiffer).**

*Mammillaria schelhasii* Pfeiffer, Allg. Gartenz. 6: 274. 1838.

*Mammillaria glochidiata purpurea* Scheidweiler, Bull. Acad. Sci. Brux. 5: 495. 1838.

*Cactus schelhasii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Cespitose, forming a large hemispheric mound; individual plants globose to short-cylindric, olive-green; tubercles cylindric, their axils a little woolly, but not setose; radial spines 14 to 16, setaceous, white; central spines 3, brown, one hooked at apex; flowers large, 2.2 to 2.5 cm. long, salmon or rose-colored (Nicholson says white with line of rose down each petal); fruit 5 mm. long.

*Type locality:* Mineral del Monte, Mexico.

*Distribution:* Hidalgo, Mexico.

Salm-Dyck (Cact. Hort. Dyck. 1849. 7, 81. 1850) describes the three following varieties: *sericata*, *rosea*, and *triuncinata*, some of which may belong elsewhere. Of these Schumann recognizes only the last. The first Lemaire has referred to a different species, *Mammillaria glochidiata sericata* Lemaire (Cact. Gen. Nov. Sp. 40. 1839).

*Illustrations:* Schelle, Handb. Kakteenk. 252. f. 172; Dict. Gard. Nicholson 4: 565. f. 37; Suppl. 518. f. 555; Förster, Handb. Cact. ed. 2. 254. f. 24 (32, in error); Rümpler, Sukkulanten 198. f. 111; Watson, Cact. Cult. 173. f. 69; ed. 3. f. 47; Knippel, Kakteen pl. 25; Blühende Kakteen 3: pl. 170; Monatsschr. Kakteenk. 30: 163, as *Mammillaria schelhasei*; Gartenflora 6: pl. 207, as *M. schelhasei sericata*.

**123. *Neomammillaria glochidiata* (Martius).**

*Mammillaria glochidiata* Martius, Nov. Act. Nat. Cur. 16: 337. 1832.

*Mammillaria ancistroides* Lehmann, Del. Sem. Hort. Hamb. 1832.

*Cactus glochidiatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus ancistrodes* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Densely cespitose, forming clusters sometimes 15 cm. high; tubercles cylindric, green, shining, 8 to 15 mm. long, well separated from one another towards the tip, obtuse, terete; radial spines 12 to 15, widely spreading, puberulent, white, setiform, 10 to 12 mm. long; central spines 4, brownish, one of them hooked; flowers white; inner perianth-segments lanceolate, acuminate; style longer than the stamens; stigma-lobes 4 or 5, yellow; fruit clavate, scarlet, 16 mm. long; seeds black.

*Type locality:* Mexico.

*Distribution:* Southern Mexico.

Martius, who described this species, based it on a plant of Karwinsky, but did not cite a definite locality; Hemsley, however, records Karwinsky's plant as from near San Pedro Nolasco, Hidalgo, at 7,000 to 8,000 feet altitude.

As it is a high mountain species it would doubtless not remain long in cultivation. Pfeiffer refers here *Mammillaria criniformis* De Candolle (Mém. Cact. 8. pl. 4. 1834) and transfers his two varieties *rosea* and *albida* to *M. glochidiata* as variety *rosea* and *albida* (Enum. Cact. 37. 1837). *Mammillaria criniformis* must be very different, for it has only 8 to 10 radial spines and one central spine, and this yellow. The two varieties also may belong elsewhere; in fact, the variety *rosea* has been referred to *Mammillaria decipiens*.

*Mammillaria ancistrata* Schelhase (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845), given as a synonym of *M. ancistroides* Lemaire, is referred here by Schumann, perhaps wrongly.

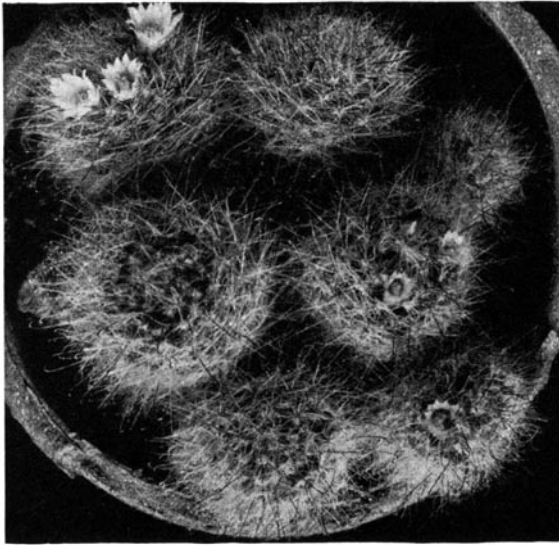


FIG 165.—*Neomammillaria longicoma*.

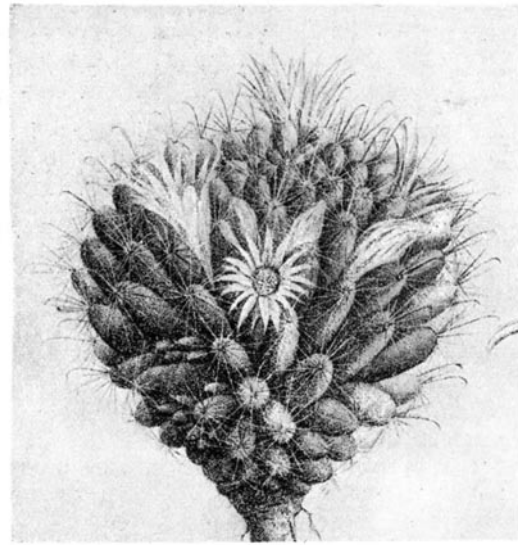


FIG 166.—*Neomammillaria glochidiata*.

*Mammillaria ancistrina* Hortus (Salm-Dyck, Cact. Hort. Dyck. 1849. 10. 1850) was given as a synonym of *M. ancistroides*.

To *Mammillaria ancistroides major* (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845) was referred *M. ancistrata* as a synonym. Afterwards it was briefly described in Förster's Handbuch.

*Mammillaria bergeana*, a name from Hildmann's Catalogue, is referred as a synonym of *M. glochidiata* (Schumann, Gesamtb. Kakteen 532. 1898), and so also is *M. glochidiata alba* (Förster, Handb. Cact. 188. 1846).

*Mammillaria ancistroides* Lehmann (Delect. Sem. Hort. Hamb. 1832) is usually referred to this species but it must go elsewhere; it has setae in the axils of the tubercles, the radial spines are 6 to 8, and the hooked spine is brown at tip.

Schumann (Gesamtb. Kakteen 532. 1898) describes two varieties, *crinita* and *prolifera*. The former is based on *Mammillaria crinita* De Candolle (Mém. Mus. Hist. Nat. Paris 17: 112. 1828; *Cactus crinitus* Kuntze, Rev. Gen. Pl. 1: 260. 1891), and has the central spines straight (at least so shown in the illustration, but described as hooked), and must be ex-

cluded from this species. *Mammillaria crinita pauciseta* De Candolle (Mém. Mus. Hist. Nat. Paris 17: 112. 1828) may be of this relationship but we do not know it.

Other varietal names have been given, such as *M. glochidiata alba* (Förster, Handb. Cact. 188. 1846).

*Illustrations:* Blühende Kakteen 2: pl. 82; Nov. Act. Nat. Cur. 16: pl. 23, f. 1; Abh. Bayer. Akad. Wiss. München 2: pl. 1, I. f. 4; Monatsschr. Kakteenk. 29: 141, as *Mammillaria glochidiata*. The following illustrations we have not placed: De Candolle, Mém. Cact. pl. 3; Krook, Handb. Cact. 38, as *M. crinita*; De Candolle, Mém. Cact. pl. 4, as *M. criniformis*.

Figure 166 is reproduced from the original illustration of the type as shown in the second illustration cited above.

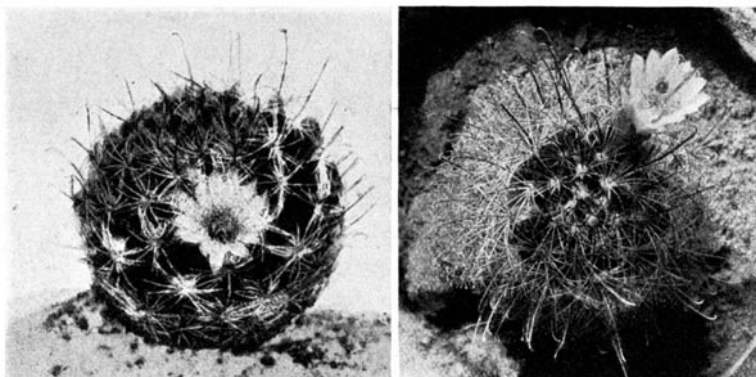


FIG. 167.—*Neomammillaria trichacantha*. FIG. 168.—*Neomammillaria saffordii*.

#### 124. *Neomammillaria trichacantha* (Schumann).

*Mammillaria trichacantha* Schumann, Gesamtb. Kakteen Nachtr. 133. 1903.

Solitary, globose to short-cylindric, small; tubercles small, clavate, 4 to 5 cm. high, slightly glaucous; radial spines 15 to 18, pubescent, acicular, white, 8 mm. long; central spines 2, brownish, 12 mm. long, one of them hooked; flowers red or yellow, 1.5 cm. long; inner perianth-segments lanceolate, widely spreading, acuminate; style pale green; stigma-lobes white.

*Type locality:* Not cited.

*Distribution:* Undoubtedly Mexico, but known only from cultivated plants.

The relationship of this species is somewhat uncertain. Schumann placed it next to *Mammillaria carretii* and described the flowers as red, while Quehl stated that the inner perianth-segments are pale yellow, and this is clearly shown by an unpublished study of Mrs. Gürke, made May 26, 1907, now in our possession. We have received such flowers from Quehl.

Quehl refers here *Mammillaria hamuligera* (sometimes written *M. lamuligera*) while Bödeker would keep it distinct. We have received flowers from Quehl which correspond with Mrs. Gürke's painting of *M. trichacantha*, but her plant may be different from Schumann's type, which had red flowers.

*Illustrations:* Schumann, Gesamtb. Kakteen Nachtr. 133. f. 33; Monatsschr. Kakteenk. 14: 45, as *Mammillaria trichacantha*.

Figure 167 is reproduced from the first illustration cited above.

#### 125. *Neomammillaria painteri* (Rose).

*Mammillaria painteri* Rose in Quehl, Monatsschr. Kakteenk. 27: 22. 1917.

*Mammillaria erythrosperma* Bödeker, Monatsschr. Kakteenk. 28: 101. 1918.

*Mammillaria erythrosperma similis* De Laet in Bödeker, Monatsschr. Kakteenk. 28: 102. 1918.



Plant globose, small, 2 cm. in diameter, almost hidden by the spines; tubercles without bristles in their axils; radial spines about 20, stiff, white, puberulent under a hand lens; central spines 4 or 5, ascending, dark brown, one hooked, puberulent; flowers 15 mm. long, greenish white, the outer segments brownish; inner perianth-segments broad, with an ovate acute tip; stamens white; stigma-lobes cream-colored.

*Type locality:* Near San Juan del Rio, Queretaro.

*Distribution:* Central Mexico.

Collected in Querétaro, Mexico, in 1905 by J. N. Rose. It has flowered repeatedly in cultivation (August 1909, June 1911, 1912, April 1915), and is nearest perhaps to *Neomammillaria kunzeana* and *N. multihamata*, but the axils of the tubercles are naked.

*Illustrations:* Monatsschr. Kakteenk. 27: 23, as *Mammillaria painteri*; Monatsschr. Kakteenk. 28: 103, as *M. erythrosperma* and var. *simulis*.

Figure 169 is from a photograph of the type plant.



FIG. 169.—*Neomammillaria painteri*.

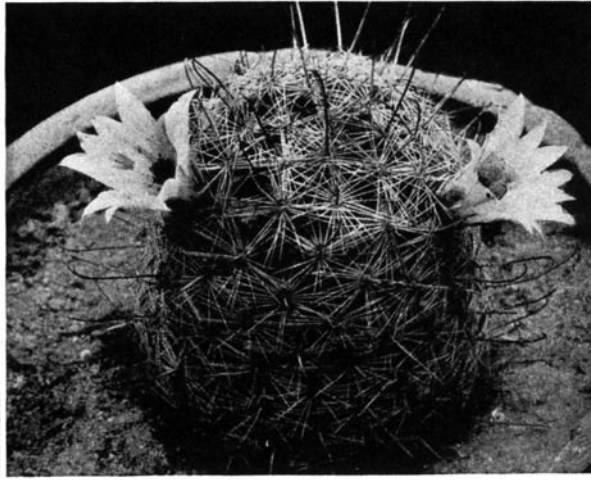


FIG. 170.—*Neomammillaria microcarpa*.

### 126. *Neomammillaria wrightii* (Engelmann).

*Mammillaria wrightii* Engelmann, Proc. Amer. Acad. 3: 262. 1856.

*Cactus wrightii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Depressed-globose, simple; tubercles terete, 10 to 12 mm. long, with naked axils; radial spines 8 to 15, white, spreading, acicular; central spines 1 to 3, stouter than the radials, brown to black, 1 or sometimes 2 or 3 hooked at apex; flowers large, 25 mm. long and as broad as long when expanded; outer segments about 13, triangular-obtuse, fimbriate; inner perianth-segments bright purple; fruit obovoid, large, 25 mm. long, purple; seeds 1.5 mm. long, black, with a narrow ventral hilum.

*Type locality:* Anton Chico on the Pecos east of Santa Fe, New Mexico.

*Distribution:* Mountains of northeastern New Mexico.

*Mammillaria wrightii* as described by Dr. Engelmann is complex, his original description being based on two collections, one from the upper Pecos, the type, and one from the Santa Rita Copper mines in southwestern New Mexico. This latter specimen is referable to a new species described below. There has always existed much confusion regarding *M. wrightii*, and several species have been distributed under that name. It is very rare in collections. In the National Herbarium we have only a part of the type (clusters of spines) and spines and fruit collected by J. W. Tourney at White Oaks, New Mexico, October 20, 1896. Engelmann cites a specimen in Mexico (near Lake Santa Maria) which doubtless is to be referred elsewhere.

This species was named for Charles Wright (1811-1855), who explored extensively in Texas and Cuba.

*Illustrations:* Cact. Mex. Bound. pl. 8, f. 1 to 8; Monatsschr. Kakteenk. 14: 9; Möllers Deutsche Gärt. Zeit. 25: 475. f. 8, No. 5; West Amer. Sci. 13: 40; Förster, Handb. Cact. ed. 2. 249. f. 23 (as f. 31, in error); Schelle, Handb. Kakteenk. 255. f. 177; Remark, Kakteenfreund 16, 17, as *M. wrightii*.

Figure 171 is a reproduction of the first illustration cited above.

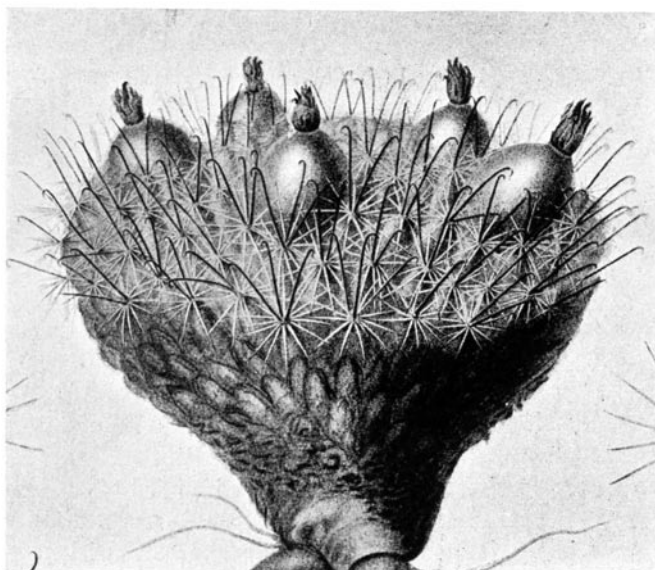


FIG. 171.—*Neomammillaria wrightii*.

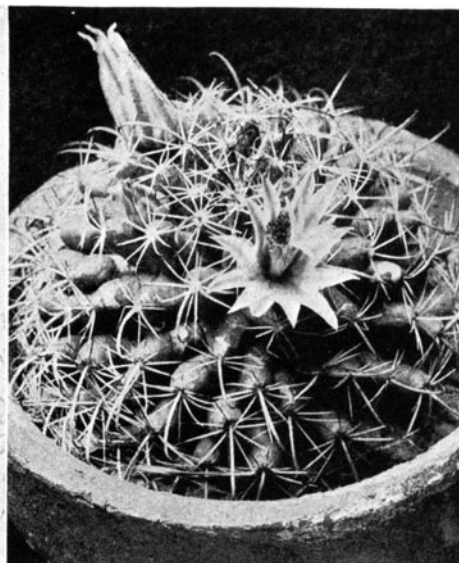


FIG. 172.—*Neomammillaria mainae*.

### 127. *Neomammillaria viridiflora* sp. nov.

Globular to short-oblong, 5 to 10 cm. long, the plant-body well hidden under the closely appressed radial spines; tubercles terete, small, naked in their axils; radial spines 20 to 30, widely spreading, white with brown tip, bristle-like, 10 to 12 mm. long; central spines much stouter than the radials, 1.5 to 2 cm. long, brown, one or more of them hooked; flowers greenish, narrowly campanulate, 1.5 cm. long; fruit globose to ovoid, 10 to 15 mm. long, purplish, very juicy; seeds minute, 1 mm. long.

Collected by C. R. Orcutt on Superior-Miami Highway, near Boundary Monument, between Pinal and Gila counties, Arizona, 4,700 feet elevation, July, 1922 (No. 608, type), and by Mrs. Ruth C. Ross near Tula Spring, south of Aravaipa, Arizona, June 1922 (No. 14).

Here perhaps are to be referred plants collected in New Mexico by O. B. Metcalfe (Nos. 797, 803, and 820) and probably that part of *Mammillaria wrightii* which came from Santa Rita. Mr. Orcutt has repeatedly written to us about this green-flowered species, which we are now able to separate very distinctly from both *M. wrightii* and *M. wilcoxii*.

Dr. Forrest Shreve has also reported a green-flowered species from Arizona which he states is common in oak-woods.

### 128. *Neomammillaria wilcoxii* (Tourney).

*Mammillaria wilcoxii* Tourney in Schumann, Gesamtb. Kakteen 545. 1898.

Solitary, almost globose, flabby in texture, 10 cm. in diameter, almost covered by a mass of interlocking spines; axils of tubercles naked; radial spines 14 to 20, widely spreading, often 15 mm. long, bristle-like, white with colored tips; central spines 1 to 3, brown, 2 cm. long, or more hooked; flowers pink to purple, large, 3 cm. long, 4 cm. broad when fully expanded; outer perianth-segments about 20, fringed with white hairs; inner perianth-segments about 40, in 2 rows.

*Type locality:* Arizona.

*Distribution:* Southeastern Arizona. It should be looked for in northern Sonora.

This species is very rare in living collections and in herbaria. When found in the field it is often associated with *Mammillaria grahamii* and *Coryphantha aggregata*, which has led to the suggestion that it might be a hybrid between these species.

The plant is named for General Timothy E. Wilcox, U. S. A., who collected extensively in Arizona, Oklahoma, Washington, and Alaska.

*Illustration:* Monatsschr. Kakteenk. 24: 23, as *Mammillaria wilcoxii*.

Plate XIII, figure 1, is from a photograph of a plant collected at Calabasas, Arizona, by Dr. Rose in 1908 (No. 11955).

**129. *Neomammillaria mainae* (K. Brandegee).**

*Mammillaria mainae* K. Brandegee, Zoc 5: 31. 1900.

Globose or somewhat depressed, 5 to 8 cm. broad; tubercles pale, green, naked in their axils; spines all puberulent, at least when young; radial spines about 10, widely spreading, yellowish or white except the brownish tips; central spines usually stout, yellowish except the strongly hooked tip; flowers from upper part of plant but in old axils, about 2 cm. long, with a broad open throat; outer perianth-segments with a brownish stripe, inner ones with a reddish central stripe with broad nearly white margins; acute inner perianth-segments more or less spreading; stamens purplish; style also purplish, stout, much longer than stamens; stigma-lobes 5 or 6, purplish, elongated, linear; fruit red, globose to obovate, not projecting beyond the tubercles; seeds dull black, obovate, 1 mm. long, punctate, with a narrow basal hilum.

*Type locality:* South of Nogales, Sonora, Mexico.

*Distribution:* Northern Sonora.

For a long time it was known only from material collected by Mrs. F. M. Main, near Nogales, Mexico. It has been offered in the trade under the name of *Mammillaria galeottii*, to which, according to Mrs. K. Brandegee, it is not at all related. It was observed by Rose, Standley, and Russell in two localities near Hermosillo, Sonora, Mexico, and living plants were sent to Washington, which flowered in August 1910. This is not very close to any of the other species. It was collected again in Sonora by C. R. Orcutt in 1922.

*Illustration:* Monatsschr. Kakteenk. 22: 19, as *Mammillaria mainae*.

Figure 172 is from a photograph of a specimen sent by Dr. Trelease from the Missouri Botanical Garden in 1910.

**130. *Neomammillaria boedekeriana* (Quehl).**

*Mammillaria boedekeriana* Quehl, Monatsschr. Kakteenk. 20: 108. 1910.

Globose to ovoid, but in collections becoming cylindric, dull green; tubercles cylindric; radial spines about 20, white; central spines 3, brownish black, one hooked; axils naked; flowers white with brownish stripes.

*Type locality:* Not cited.

*Distribution:* Doubtless Mexico, but range unknown.

This plant, which was for a long time in cultivation in Europe, has, according to Mr. Bödeker, entirely disappeared. He writes that it is a prolific bloomer and that once he had a plant with 32 flowers open at the same time. The species is named for Friederich Bödeker of Cologne, Germany. Quehl groups this species next to *Mammillaria wrightii*.

*Illustration:* Monatsschr. Kakteenk. 20: 109, as *Mammillaria boedekeriana*.

Figure 172a is from a photograph of a plant which had been in cultivation 14 years by Bödeker. The photograph was sent to us in 1923.

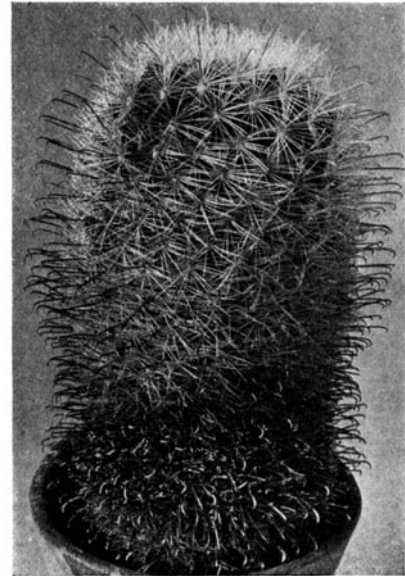
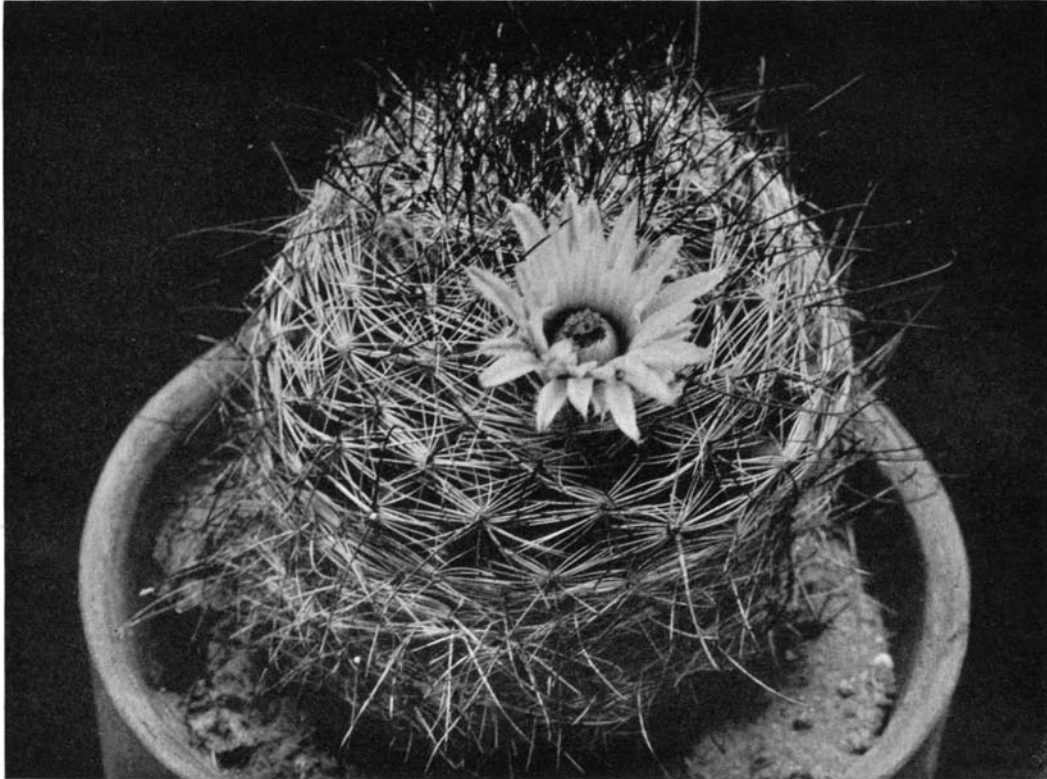


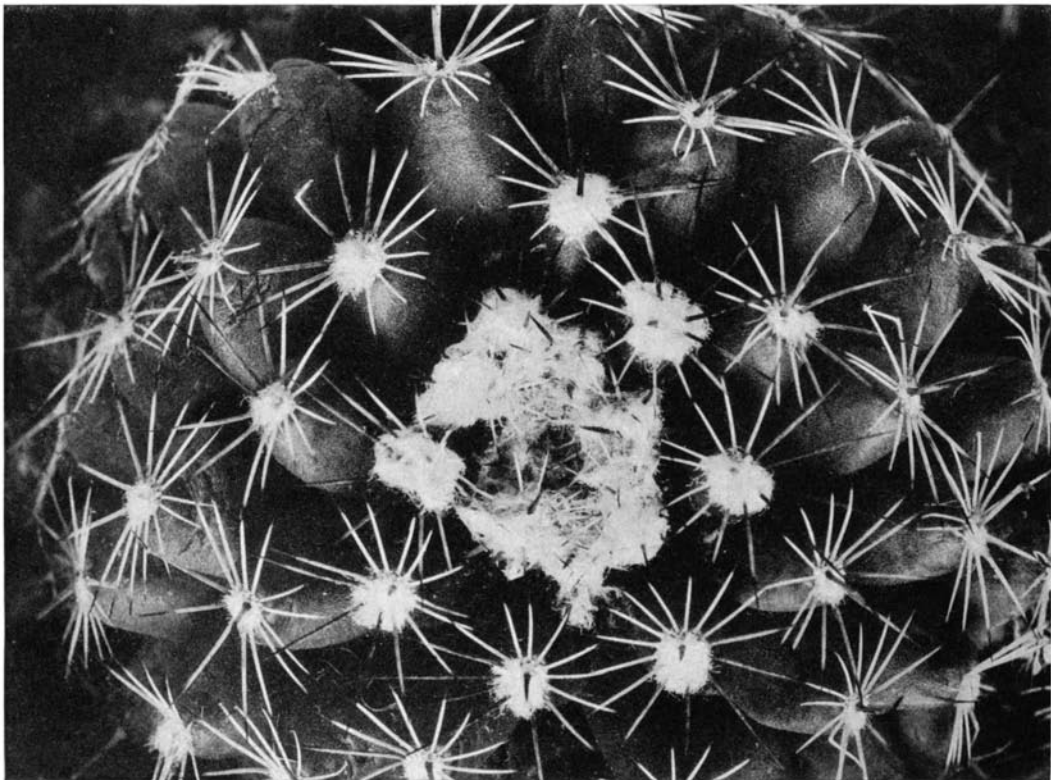
Fig. 172a.—*Neomammillaria boedekeriana*.



1



2



1. *Neomammillaria wilcoxii*, from Calabasas, Arizona.  
2. *Neomammillaria gaumeri*, from Yucatan, Mexico.



**131. *Neomammillaria microcarpa* (Engelmann).**

*Mammillaria microcarpa* Engelmann in Emory, Mil. Recon. 157. 1848.

*Mammillaria grahamii* Engelmann, Proc. Amer. Acad. 3: 262. 1856.

*Cactus grahamii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

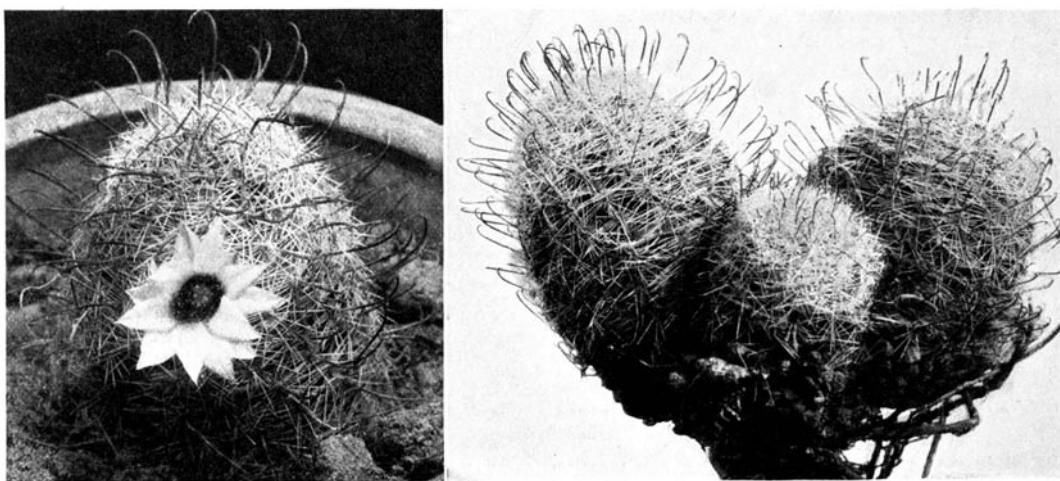
*Mammillaria grahamii arizonica* Quehl, Monatsschr. Kakteenk. 6: 44. 1896.

*Coryphantha grahamii* Rydberg, Fl. Rocky Mountains 581. 1917.

Globose to cylindrical, simple or budding either at base or near middle, often cespitose, but in small clusters, sometimes 8 cm. high; tubercles small, corky when old; axils of tubercles naked; radial spines 15 to 30, spreading, white, sometimes with dark tips, slender, rigid, glabrous, 6 to 12 mm. long; central spines 1 to 3, dark, when more than one the lower stouter, often 18 mm. long, hooked; flowers from near top of plant, 2 to 2.5 cm. long, broadly funnel-shaped; outer perianth-segments ovate, obtuse, short-ciliate; inner perianth-segments purplish, sometimes with whitish margins, obovate, acuminate; style longer than stamens, purplish; stigma-lobes 7 or 8, linear, green; fruit clavate, 2 to 2.5 cm. long, scarlet; seeds black, shining, pitted, globose, 0.8 to 1 mm. in diameter.

*Type locality*: "On the Gila, 3,000 to 4,000 feet above the sea."

*Distribution*: Southwestern Texas and Chihuahua to Arizona and Sonora; recorded from southern California and southern Utah.



Figs. 173 and 174.—*Neomammillaria microcarpa*.

*Neomammillaria microcarpa* has long been a favorite in living collections under the name of *Mammillaria grahamii*, but it does not do well in cultivation and soon dies out.

This plant is generally known under the name of *Mammillaria grahamii*. The specific name must now give place to an older one, *microcarpa*. *Mammillaria microcarpa* was based on a drawing made by J. M. Stanly, the artist on W. H. Emory's famous expedition across the continent. This drawing was sent to Dr. George Engelmann by Colonel Emory, early in 1848, with the following note: "November 4, 1846, abundant." From Emory's narrative map of his journey published later, in 1848, we know that on that date his camp was on the eastern side of the Gila and only one day's trip by pack train from the mouth of the San Pedro. His camp was "in a grove of cacti of all kinds; among them being the huge pitahaya [*Carnegiea gigantea*], one of which was 50 feet high." For years we have been striving to have this plant re-collected from the type locality; in 1908 Dr. Rose made an unsuccessful attempt to reach Emory's station.

Finally, at Dr. Rose's request, Mrs. Ruth C. Ross, on June 11, 1922, visited the locality at which Emory's party was camped on November 4, 1846, where he had said that the little *Mammillaria* was abundant. The *Mammillaria* which Mrs. Ross found there, also in some abundance, was the plant which has long passed as *M. grahamii*. Mrs. Ross



deserves great credit for the enthusiasm which she has shown in visiting this remote locality and clearing up a botanical puzzle which had remained unsolved for 70 years.\*

We have not seen any California or Utah plants and we suspect that the material so-named from those states may belong to the genus *Phellosperma*, which resembles this species in its hooked central spine. The plant is undoubtedly found in northern Mexico, but how far south it extends we are in doubt.

The variety *Mammillaria grahamii californica* has not been described.

*Illustrations:* Emory, Mil. Recon. 157. No. 3, as *Mammillaria microcarpa*; Cact. Mex. Bound. pl. 6, f. 1 to 8; Bol. Direccion de Estudios Biol. 2: f. 2; Rümpler, Sukkulenten 199. f. 112; Schelle, Handb. Kakteenk. 254. f. 176; Remark, Kakteenfreund 16, as *M. grahamii*; Cact. Journ. 1: 171, as *M. grayhamii*.

Figures 170 and 173 are from photographs of the plants collected by Dr. Rose from the northern end of the Tucson Mountains, Arizona, April 22, 1908; figure 174 is from a photograph of a plant collected by Mrs. Ross at the type locality.

CACTUS ESCHANZIERI Coulter, Contr. U. S. Nat. Herb. 3: 104. 1894.

"Depressed-globose, 3 cm. in diameter, simple; tubercles broader at base, 6 to 8 mm. long, with naked axils; spines all pubescent; radials 15 to 20, with dusky tips, the lateral 10 to 12 mm. long, the lower weaker, shorter, and curved, the upper shorter; solitary central spines reddish slender, somewhat twisted, usually hooked upwards, 15 to 25 mm. long; flowers red (?); fruit reddish (?), ovate, about 10 mm. long; seeds reddish, oblique-obovate, 1.2 mm. long, pitted, with subventral hilum."

It is stated at the original place of publication that the type collected by Eschanzier in 1901 was in the herbarium of Coulter, but it can not be found and is probably lost. Coulter says that it resembles *Cactus grahamii*, but judging from the description and its habitat it is not very near that species. It is evidently a *Neomammillaria*, possibly referable to one of the many species which have been described from San Luis Potosí.

### 132. *Neomammillaria milleri* sp. nov.

Globose to elongated cylindrical, sometimes more than 2 dm. long and up to 8 cm. in diameter; tubercles closely set, rather thick, nearly 1 cm. long, the axils not bristly and seemingly always naked; radial spines about 20, widely spreading, 12 mm. long or less, white, with brownish tips; central spines 2 to 4, one or all hooked at apex, brown, about 2 mm. long; flowers campanulate, about 2 cm. long, the limb 2.5 cm. broad, purple to nearly pink; inner perianth-segments similar to the outer, oblong, the margins a little paler and somewhat undulate, the apex usually obtuse, often rounded, rarely acute; stamens pale purple; style white; stigma-lobes 7 to 9, linear, yellowish to cream-colored; fruit clavate, scarlet, 1.5 cm. long; seeds black.

Collected by Dr. Gerrit S. Miller jr., near Phoenix in 1921, and by Mrs. Bly near Kingman, June 29, 1921, and in 1922. It has been observed by C. R. Orcutt near Phoenix (No. 559a, type) and near Wickenburg (No. 559,) during the summer of 1922 and several fine specimens were sent in by him. He states that it has long been known as "*Mammillaria grahamii* var." and that it suggested at times *M. phellosperma*, *M. goodridgei*, and *M. grahamii*. It differs, however, from the first in its seeds, from the second in its naked axils, and from the last in its stouter habit and stronger central spines.

Figure 184a is from a photograph of the type, collected by Mr. Orcutt.

### 133. *Neomammillaria sheldonii* sp. nov.

Stems slender-cylindrical, about 8 cm. high; axils of tubercles without setae; radial spines 12 to 15, pale with dark tips, the 3 or 4 upper ones darker, a little stouter and 1 or 2 of them subcentral, the true central erect or porrect, with upturned hook at end; outer perianth-segments ciliate; inner perianth-segments about 10, broad, acute, light purple with very pale margins; filaments and style light purple; stigma-lobes 6, green; fruit clavate, 2.5 to 3 cm. long, pale scarlet.

\*Mrs. Ross's label bears this note: On upper terrace on right bank of Gila River in s. e. corner, section 15, t. 4 s. R. 16 E. (Christmas Triangle). From grove of cactus in which we believe Emory camped, Nov. 4, 1846.



M. E. Eaton del.

A. Hoen & Co. Baltimore

- 1. Flowering plant of *Neomammillaria kunzeana*.
- 2. Flowering plant of *Neomammillaria bocasana*.
- 3. Flowering plant of *Neomammillaria decipiens*.
- 4. Top of flowering plant of *Neomammillaria armillata*.
- 5. Flowering plant of *Neomammillaria multiceps*.
- 6. Flowering plant of *Neomammillaria multiceps*.
- 7. Flowering plant of *Neomammillaria palmeri*.
- 8. Flowering plant of *Neomammillaria wildii*.





This plant is described chiefly from the specimens collected by Rose, Standley, and Russell, near Hermosillo, Sonora, Mexico (No. 12366, type), but it has also been collected in Sonora by C. R. Orcutt and by Charles Sheldon, for whom it is named.

The plant differs from the *Neomammillaria microcarpa* in its stouter redder spines, in its heavier and shorter central spine with the hook more uniformly turned upward, and in its flowers, which appear to be smaller.

Figure 175 shows a plant collected by Rose, Standley, and Russell, in Hermosillo in 1910 (No. 12366), which flowered in Washington.



FIG. 175.—*Neomammillaria sheldonii*.

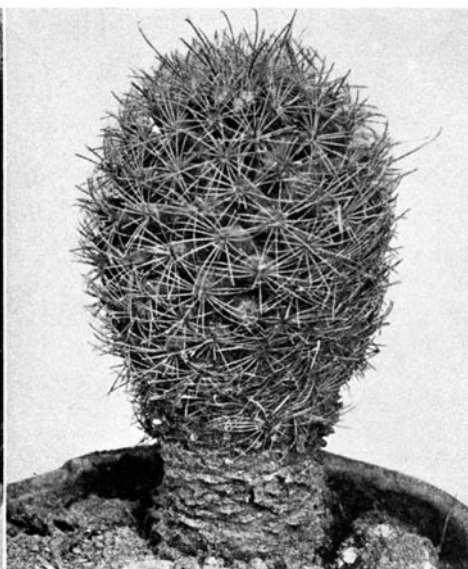


FIG. 176.—*Neomammillaria carretii*.

#### 134. *Neomammillaria armillata* (K. Brandegee).

*Mammillaris armillata* K. Brandegee, *Zoe* 5: 7. 1900.

In clusters of 3 to 12, cylindrical, sometimes 30 cm. high; tubercles bluish green, somewhat angled; axils setose and slightly woolly; radial spines 9 to 15, 7 to 12 mm. long, yellowish; central spines 1 to 4, but usually 2, brownish, the lowest one hooked and a little longer than the others; flowers 10 to 12 mm. long, greenish to flesh-colored; stigma-lobes greenish, short; fruit red, clavate, 15 to 30 mm. long; seeds black, punctate, constricted just above the base.

*Type locality*: San José del Cabo.

*Distribution*: Southern Lower California and on islands adjacent to it.

This species is very common in southern Lower California near the coast. Dr. Rose in 1911 collected it both at the type locality (No. 16455), and at Cape San Lucas (No. 16374). Similar to this is his plant (No. 16877) from Cerralbo Island off the coast of Lower California.

*Illustration*: Grässner, *Haupt-Verz. Kakteen* 1914: 23, as *Mammillaria armillata*.

Plate XIV, figure 4, shows the top of a plant collected by Dr. Rose on Margarita Island, Lower California, in 1911 (No. 16302); plate xv, figure 2 shows a plant collected by Dr. Rose on Santa Maria Bay (No. 16276); figure 3 shows the top of a plant collected by Dr. Rose at San Esteban, Lower California; figure 4 shows another plant from the same island.

#### 135. *Neomammillaria fraileana* sp. nov.

Stems elongated, cylindrical, 1 to 1.5 dm. long; axils of tubercles naked or containing at most a single bristle; central spines dark brown, one of them strongly hooked; flowers rather large, pinkish;

inner perianth-segments acuminate, 2 to 2.5 cm. long, often lacerate towards the tip; filaments and style pinkish, the latter paler and much longer than the stamens; stigma-lobes 6, long and slender, rose-colored.

Collected by Dr. J. N. Rose on Pichilique Island, March 27, 1911 (No. 16508, type); on Cerralbo Island, April 19, 1911 (No. 16895); and on Catalina Island, April 16, 1911 (No. 16831).

**136. *Neomammillaria swinglei* sp. nov.**

Stems cylindrical, 1 to 2 dm. long, 3 to 5 cm. in diameter; axils of tubercles more or less setose; radial spines rather stout for this group, spreading, dull white with dark tips; central spines 4, ascending, dark brown or black, the lowest one elongated (1 to 1.5 cm. long), hooked at apex or sometimes straight; outer perianth-segments greenish or sometimes pinkish; margins somewhat scarious; inner perianth-segments narrowly oblong, nearly white with a brown stripe down center; style pink, twice as long as the pink filaments; stigma-lobes 8, linear, pointed, green; fruit dark red, clavate, 14 to 18 mm. long; seeds 1 mm. in diameter, constricted below, black with a large elliptic basal hilum.

Common about Guaymas, Sonora; flowers and stems described from Rose's plant (No. 12568, type) and Johnston's plant (No. 3086), and the fruit and seeds from one collected by Swingle; also collected by Dr. W. S. W. Kew in 1920.

In cultivation the inodorous flowers remain open for several days (at least three).

Growing with this species (see Rose, No. 12569) were plants with all the central spines straight. This may be the plant from Guaymas which Scheer called "a very robust species of *Mammillaria sphaerica*." \* Neither flowers nor fruit were seen.

**137. *Neomammillaria dioica* (K. Brandege).**

*Mammillaria dioica* K. Brandege, *Erythea* 5: 115. 1897.

*Mammillaria fordii* Orcutt, *West Amer. Sci.* 13: 49. 1902.

Either solitary or clustered, cylindrical, 5 to 25 cm. high or even higher;† axils of tubercles woolly and short-setose; radial spines 11 to 22, white, the tips often brownish to black or rose-colored throughout, 5 to 7 mm. long, spreading; central spines 3 or 4, brownish, the lower one a little longer than the others and hooked; flowers borne towards top of plant, yellowish white with purplish mid-rib, 10 to 22 mm. long, incompletely dioecious; outer and inner perianth-segments usually 6 each; outer perianth-segments reddish, especially along midrib, the inner ones oblong, pale cream-colored, notched or toothed near apex; style white; stigma-lobes 6, linear, bright yellow to brownish green; fruit scarlet, clavate, 10 to 25 mm. long; seeds black.

*Type locality:* West coast of Lower California.

*Distribution:* Southwestern California and northwestern Lower California. According to Mr. Orcutt, this plant extends east of the coastal mountains on the border of Imperial and San Diego Counties.

Although we have not seen the type of *Mammillaria fordii* we have referred it here on the advice of Mr. Orcutt, the author of this species.

*Illustrations:* *Cact. Mex. Bound. pl.* 8, f. 9 to 14, as *Mammillaria goodridgii*.

**138. *Neomammillaria goodridgei* (Scheer).**

*Mammillaria goodridgei* ‡ Scheer in Salm-Dyck, *Cact. Hort. Dyck.* 1849. 91. 1850.

*Mammillaria goodridgii* Scheer in Seemann, *Bot. Herald* 286. 1856.

*Cactus goodridgii* Kuntze, *Rev. Gen. Pl.* 1: 260. 1891.

Stems clustered, erect, globose to cylindrical, up to 10 cm. long, 3 to 4 cm. in diameter; axils of tubercles not setose; radial spines 12 to 15, spreading, white, sometimes with dark tips; central spines usually 1, white below, brown above, hooked; flowers perfect, rose-colored, 15 mm. long;

\* *Bot. Herald* 286.

† In February 1922, Mr. C. R. Orcutt sent us a single plant from the Mason's Valley on the eastern side of the Coast Mountains in San Diego County, California, which was the largest solitary one we had ever seen, being more than 33 cm. long, 10 cm. in diameter, and weighed 3 lbs. 13 oz. Three small buds were produced near the middle of the plant.

‡ Given as *Mammillaria goodrichii*, in error.





M. E. Eaton del.

1. Flowering plant of *Neomammillaria bombycina*.
2. Flowering plant of *Neomammillaria armillata*.
3. Top of flowering plant of *Neomammillaria armillata*.

A. Hoen & Co. Baltimore

4. Flowering plant of *Neomammillaria armillata*.
5. Flowering plant of *Neomammillaria goodridgei*.





segments oblong, obtuse or retuse; fruit clavate, 1.5 to 2 cm. long, scarlet, naked; seeds black, punctate, with a narrow basal hilum.

*Type locality:* Cedros Island, off Lower California.

*Distribution:* Cedros Island and the adjacent mainland of Lower California.

This species was originally collected on Cedros Island, by Mr. J. Goodridge, surgeon on the Herald during its memorable trip to the western coast of the Americas. The plant, which was sent to Scheer and named by him, was sent to Prince Salm-Dyck, who described it without knowing the flowers or fruit. The name has been associated with *N. dioica*.

Several collectors have visited Cedros Island, but all failed to find *Mammillaria goodridgei* until Dr. Rose collected it in 1911 (No. 16171); he also found it on the nearby mainland at Abrejos Point (No. 16248). Recently a plant was sent in from near Mulegé by B. F. Hake.

Plate xv, figure 5, shows a plant collected by Dr. Rose at Mulegé, Lower California, in 1911, which flowered in the New York Botanical Garden, April 11, 1912.

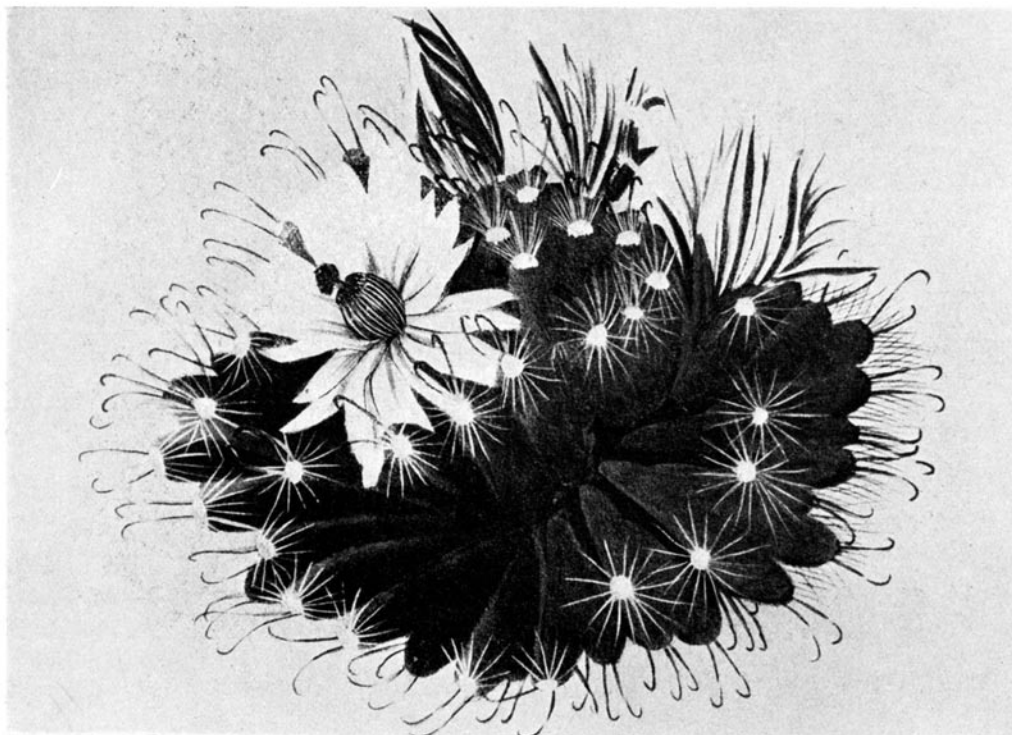


FIG. 177.—*Neomammillaria zephyranthoides*.

**139. *Neomammillaria zephyranthoides* (Scheidweiler).**

*Mammillaria zephyranthoides* Scheidweiler, Allg. Gartenz. 9: 41. 1841.

*Mammillaria fennelii* Hopffer, Allg. Gartenz. 11: 3. 1843.

*Cactus zephyranthodes* Kuntze, Rev. Gun. Pl. 1: 261. 1891.

Depressed-globose to short-cylindric, up to 8 cm. high, 10 cm. in diameter; tubercles about 2 cm. long; radial spines 14 to 18, 8 to 10 mm. long, very slender, white; central spines 1 (sometimes 2), larger than the radials and hooked, at first purple, but in age yellowish at base; flowers 3 to 4 cm. broad with rotate limb; perianth-segments white with red stripes; fruit and seeds unknown.

*Type locality:* Oaxaca, altitude about 2,300 meters.

*Distribution:* Oaxaca, Mexico.

We have followed previous authors in referring here *Mammillaria fennelii* and Pfeiffer's illustration, based on his statement that the type plant was abnormal and much smaller than the one figured and with smaller tubercles.

The plant was in flower at Erfurt, Germany, where Dr. Rose studied it in 1912.

*Illustrations:* Pfeiffer, *Abbild. Besch. Cact.* 2: pl. 8, as *Mammillaria zephyranthiflora*; Schelle, *Handb. Kakteenk.* 254. f. 175, as *Mammillaria zephyranthoides*.

Figure 177 is reproduced from the first illustration cited above.

**140. *Neomammillaria carretii* (Rebut).**

*Mammillaria carretii* Rebut in Schumann, *Gesamtb. Kakteen* 542. 1898.

Solitary, dull green, globose, depressed, small, 5 to 6 cm. in diameter; tubercles cylindrical; axils of tubercles naked; radial spines 14, subulate, spreading, recurved, nearly clothing the plant, long, yellowish; central spine 1, slender, chestnut-brown, hooked; flowers 2.5 cm. long; inner perianth-segments white, streaked with rose; fruit and seeds unknown.

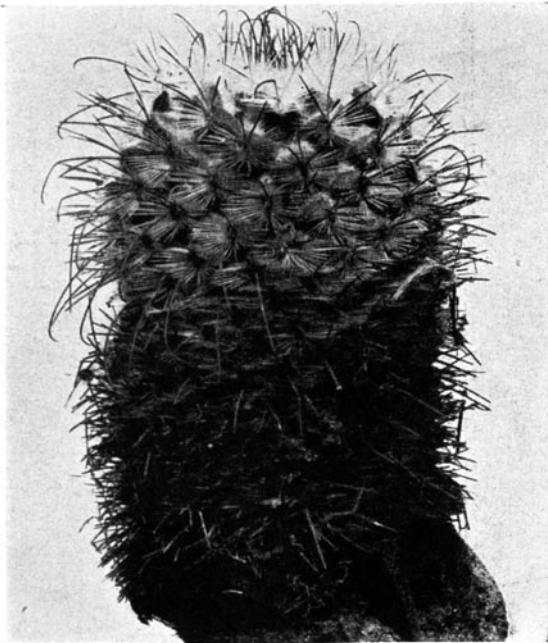


FIG. 178.—*Neomammillaria bombycina*.

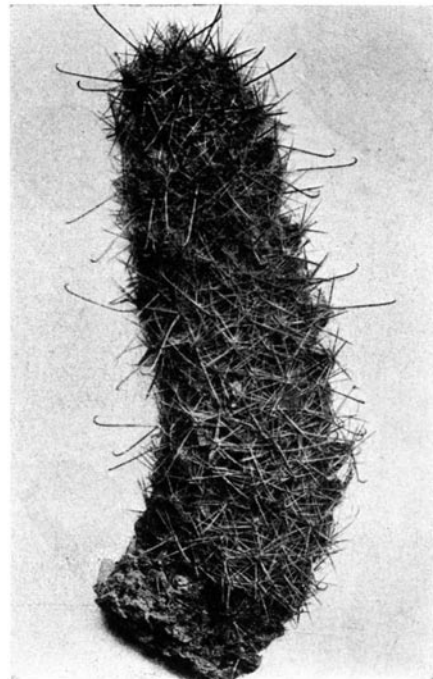


FIG. 179.—*Neomammillaria occidentalis*.

*Type locality:* Not cited.

*Distribution:* Doubtless Mexico, but no definite locality known.

We have not seen this species and know it only from descriptions and illustrations.

It is related to *Neomammillaria saffordii* but radial spines are yellow, flowers white with a streak of rose, and probably larger throughout.

*Illustrations:* Grässner, *Haupt-Verz. Kakteen* 1912: 18; 1914: 24, as *Mammillaria carretii*.

Figure 176 is reproduced from a photograph sent us by L. Quehl in 1921.

**141. *Neomammillaria jaliscana* sp. nov.**

Cespitose, globose, 5 cm. in diameter, bright green; tubercles in 13 rows, 4 to 5 mm. high; radial spines 30 or more, at right angles to the tubercles; central spines 4 to 6, reddish brown, darker toward the tips, one of them strongly hooked; axils naked; flowers pinkish to purplish,



delicately fragrant, 1 cm. broad when fully expanded; outer segments ovate-oblong, acute or obtuse with a more or less serrulate margin; inner perianth-segments oblong, obtuse; filaments pinkish; stigma-lobes 3 or 4, white; fruit white, 8 mm. long; seeds black.

Collected by J. N. Rose at Rio Blanco, near Guadalajara, Mexico, in September 1903 (No. 858, type), by C. R. Orcutt near Guadalajara and by B. P. Reko from the same locality in 1922 (No. 4410).

Dr. Rose introduced this species into cultivation but his plants all died. It flowered with us in March '904 and again in 1923.

**142. *Neomammillaria bombycina* (Quehl).**

*Mammillaria bombycina* Quehl, Monatsschr. Kakteenk. 20: 149. 1910.

Cylindric, 15 to 20 cm. long, to 6 cm. in diameter; tubercles spiraled, obtuse; young areoles conspicuously white-woolly; radial spines numerous, acicular, widely spreading, short, 1 cm. long or less; central spines 4, elongated, a little spreading, those toward the top of plant erect, 2 cm. long, brown except at base, the lower one hooked; flowers from near top, light purple, about 1 cm. long; perianth-segments narrowly oblong; filaments and style pinkish; stigma-lobes 4, purplish.

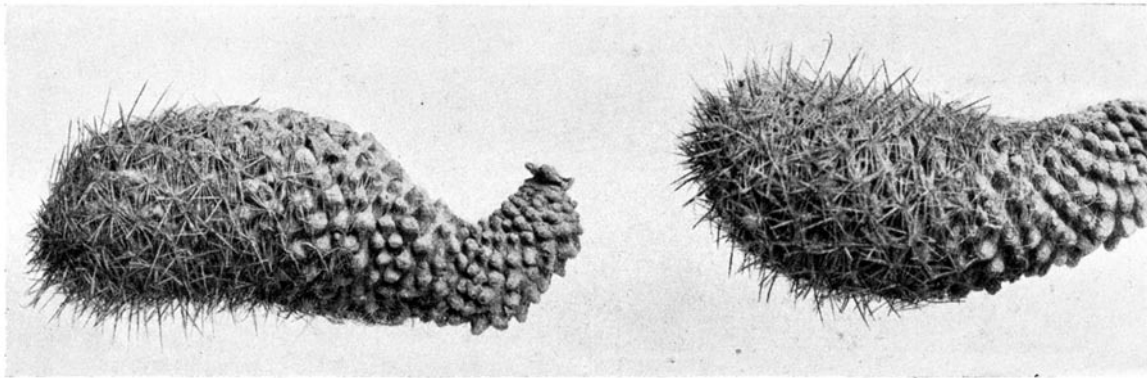


FIG. 179a.—*Neomammillaria occidentalis*.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

We have had this plant in cultivation for a number of years. It is a very attractive plant, the top being covered by a mass of white hairs which come from the closely set young tubercles.

*Mammillaria cordigera* Heese resembles this species very much in its spines and form, but is described as with grooved tubercles, which would exclude it from this genus (see page 50).

*Illustration:* Monatsschr. Kakteenk. 20: 151, as *Mammillaria bombycina*.

Plate xv, figure 1, shows a plant received by Dr. Rose from M. de Laet in 1910 and probably from the type collection. Figure 178 is from a photograph of another plant from the same collection.

**143. *Neomammillaria occidentalis* sp. nov.**

Cespitose, the branches slender, cylindric, to cm. high, densely spiny; radial spines about 12, yellowish, spreading; central spines 4 or 5, reddish or brown, one of them longer and hooked; flowers small, 1 cm. long, pink; stigma-lobes 9, slender; fruit said to be red.

Collected by Dr. E. Palmer near Manzanillo, Colima, Mexico, December 1890 (No. 1053, type) and again from the same locality by Stephen E. Aguirre, American Vice-Consul-in-Charge, October 1922. Dr. Palmer's field notes say:

"A cactus quite plentiful among rocks in exposed places. Three flowers of a pink color and three red fruits were collected. The specimens of the plants collected were cut off close to the ground; they are a fair sample of plants of the average height and diameter, but in drying they shrink to three-fourths their original dimensions."

Figure 179 is from a photograph of a plant from the type collection; figure 179a is from a photograph of the plants referred to above, sent by Mr. Aguirre.

**144. *Neomammillaria fasciculata* (Engelmann).**

*Mammillaria fasciculata* Engelmann in Emory, Mil. Recon. 157. 1848.

*Cactus fasciculatus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

*Mammillaria thornberi* Orcutt, West Amer. Sci. 12: 101. 1902.

Forming clumps, often containing many plants (as many as 110 have been noted), slender-cylindric, usually 5 to 8 cm., but sometimes 30 cm. high; axils of tubercles naked; radial spines 13 to 20, slender, 5 to 7 mm. long, white, with dark brown or nearly black tips; central spine usually 1, sometimes 2 or 3, often much elongated and 18 mm. long, brownish or black, one (sometimes all) strongly hooked; flowers broadly funnel-shaped, purplish; inner perianth-segments broad, acute; fruit short-clavate, scarlet, 8 mm. long; seeds black.

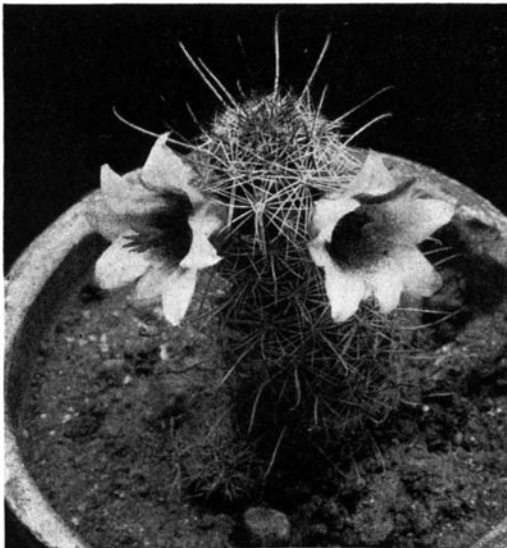


Fig. 180.—*Neomammillaria fasciculata*.

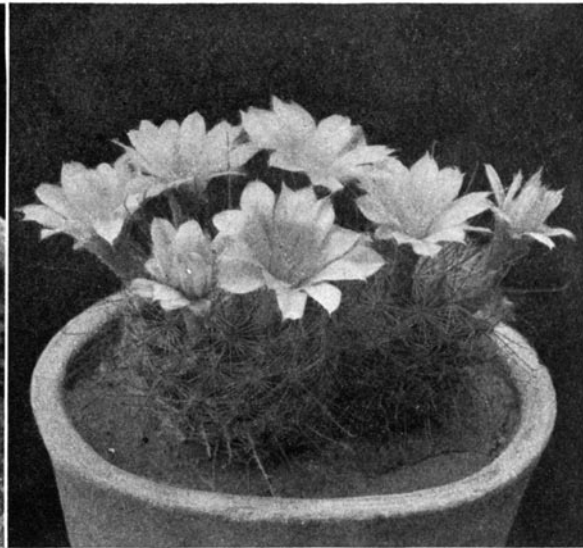


Fig. 181.—*Neomammillaria longiflora*.

*Type locality:* Along the Gila River.

*Distribution:* Southern Arizona.

This plant was found by Emory, October 20, 1846, on the Gila River, 3,000 or 4,000 feet above the sea, and was afterwards described by Engelmann from the sketch made in the field; for more than 50 years afterwards the plant remained otherwise unknown. About 1902 it was rediscovered by Professor Thornber and Mr. Orcutt near Tucson. On this latter collection Mr. Orcutt based *Mammillaria thornberi*, but he afterwards referred it to *M. fasciculata*; he is now inclined to question this reduction and thinks that *M. fasciculata* may be a species of *Echinocereus*. Engelmann, however, pointed out, when he described this species, that the spines were not arranged in vertical ribs as in *Echinocereus*. While we have not been able to prove beyond doubt the identity of the two names, as there is only one plant of this habit known from southeastern Arizona, we have admitted only one species and have used for it the older name; if a second species is afterwards found it may then be necessary to revise our conclusions. The plant has been collected several times since 1902 but it is still rare.

*Illustration:* Emory, Mil. Recon. 157. f. 2, as *Mammillaria fasciculata*.

Figure 180 is from a photograph of a plant collected by F. E. Lloyd near Tucson in 1906.

**145. *Neomammillaria nelsonii* sp. nov.**

Globose, 5 cm. in diameter; tubercles numerous, small, terete, apparently not milky, 5 to 7 mm. long, their axils naked; radial spines about 15, acicular, white, 6 to 8 mm. long, spreading; central spines several, all like the radials; but one of them elongated, stouter and longer than the others, brown to black, strongly hooked, 12 to 15 mm. long; flowers unknown; fruit very slender, clavate, 3 cm. long or more, red, few-seeded; seeds globose, black, rugose, 2 mm. in diameter; hilum basal, triangular, white, depressed.

Collected by E. W. Nelson on cliffs at La Salada, Michoacán, Mexico, March 23, 1903 (No. 6932).

This plant in its form and in the color and shape of the fruit agrees with *Neomammillaria* but differs from all the species we know in its rather large rugose black seeds. It somewhat resembles *Neomammillaria zephyranthoides*.

Figure 182 shows the fruit, spine-cluster, and seed of the type.

**146. *Neomammillaria longiflora* sp. nov.**

Solitary or clustered, small, 3 cm. in diameter, apparently not at all milky; tubercles small, terete, not grooved on upper side, 5 to 7 mm. long, rather closely set and nearly hidden by the spines; radial spines about 30, acicular, 10 to 13 mm. long, yellow or straw-colored, somewhat spreading; central spines 4, reddish brown, much stouter than the radials, of them straight, about length of radials, 1 of them hooked at apex, twice as long as others; flowers several, even on small plants, borne near top, 2 cm. long or more, with a distinct narrow tube; perianth-segments pinkish, oblong, acute; ovary very small, ovoid, more or less sunken in the axils, thin above and perhaps opening by an operculum, the lower part with the seeds persisting for years; seed nearly globose, minutely pitted, 1 to 1.5 mm. in diameter, black with a prominent white hilum.

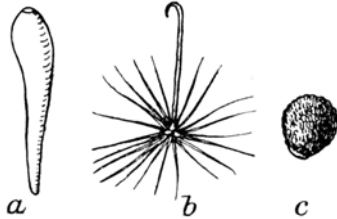


FIG. 182.—Fruit, spine-cluster, and seed of *N. nelsonii*.

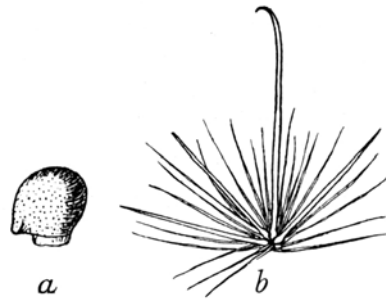


FIG. 183.—Seed and spine-cluster of *N. longiflora*.

Collected at Santiago Papasquiaro, Durango, by Dr. Edward Palmer in 1897 (No. 89).

We have repeatedly studied this curious plant during the last 25 years, but have never been able to identify it or reach a definite conclusion as to its relationship. Our material consists of a single plant split down one side, bearing several withered flowers, and two detached flowers. Recently, we were sent a photograph of a cactus from Mexico, labeled *Mammillaria* n. sp., Sierra de Cacaria S. de Ulama, which seemed to be Dr. Palmer's plant and led us to make a detailed study of it. One of the peculiarities was the absence of an exerted ovary, so conspicuous in all the *Neomammillaria*. The cut stem showed an exposed sunken ovary, and by mere chance an old fruit with ripe seeds, probably several years old, was found in the axils of one of the oldest tubercles. As described above, the seeds are very unlike those of any species of *Neomammillaria*.



Figure 181 is a reproduction of the photograph mentioned above; figure 183 shows the seed and spine-cluster of the type.

**147. *Neomammillaria tacubayensis* (Fedde).**

*Mammillaria tacubayensis* Fedde, Nov. Gen. Sp. Ind. 1905. 443. 1905.

Globose, 3 to 5 cm. in diameter; radial spines 35 to 40, white, 3 to 5 mm. long; central spines 1, black, 5 to 6 mm. long, hooked; flower 1. cm. long.

*Type locality:* Near Tacubaya, Mexico.

*Distribution:* Mexico, but range unknown.

We know the plant only from the original description and illustration.

*Illustration:* Gartenflora 53: 214. f. 33, as *Mammillaria stella de Tacubaya* (but legend placed under figure 32).

**148. *Neomammillaria umbrina* (Ehrenberg).**

*Mammillaria umbrina* Ehrenberg, Allg. Gartenz. 17: 287. 1849.

*Cactus umbrinus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Simple or becoming cespitose, cylindric, 10 to 12.5 cm. high, dull green; tubercles conic; axils of tubercles naked; radial spines 22 to 25, spreading, white, 4 to 6 mm. long; central spines 4, 3 being 8 to 10 mm. long, one being 20 to 24 mm. long, hooked; flowers large, 2 cm. long; inner perianth-segments about 15, narrowly lanceolate, acute, purple; stamens numerous, described as connivent, white; style filiform, longer than the stamens; stigma-lobes 7, green.

*Type locality:* Mexico.

*Distribution:* Hidalgo, according to Schumann.

We know this species from description only; it is peculiar in having hooked spines and large flowers; it resembles somewhat *Neomammillaria zephyranthoides* but is undoubtedly distinct.

**149. *Neomammillaria verhaertiana* (Bödeker).**

*Mammillaria verhaertiana* Bödeker, Monatsschr. Kakteenk. 22: 152. 1912.

Solitary, short-cylindric; tubercles subconic, their axils setose; radial spines 20 or more yellowish, setaceous, 1 cm. long, glabrous; central spines 4 to 8, stouter than the radials, brown at tip, one of them hooked at apex; flowers white, 2 cm. long, appearing in a circle below top of plant; outer perianth-segments broadly lanceolate, yellowish white; anthers rose-colored; style rose; stigma-lobes 8 or 9.

*Type locality:* Mexico.

*Distribution:* Known only from the type locality.

We know the plant only from descriptions and illustrations and a few-spine-clusters sent us by L. Quehl. Bödeker placed it next to *Mammillaria spinosissima*, but unlike that species one of the central spines is hooked.

The species is named for François Verhaert.

*Illustration:* Monatsschr. Kakteenk. 22: 153, as *Mammillaria verhaertiana*.

**150. *Neomammillaria xanthina* sp. nov.**

Depressed-globose, 7 cm. high, 8 to 9 cm. broad, dull bluish green; axils of tubercles and spine-areoles densely white-woolly when young, glabrate in age; tubercles lactiferous, broader than high, the free part about mm. long, somewhat flattened dorsally, arranged in 34 spiral

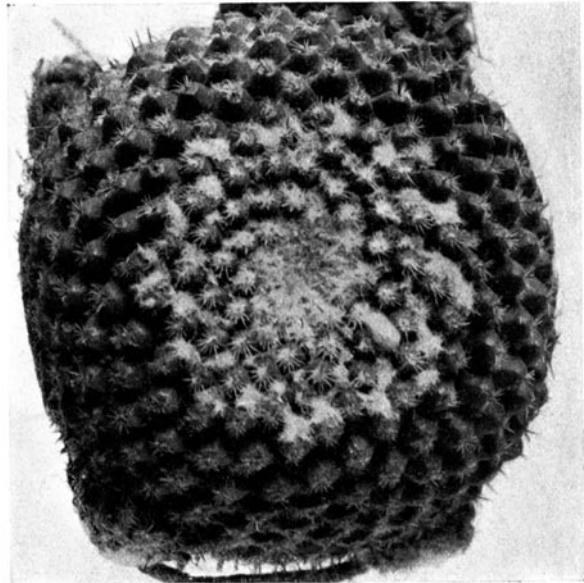


FIG. 154.—*Neomammillaria xanthina*.

rows; spine-areole circular, small; radial spines 10 to 12, spreading, acicular, white, 4 mm. long or less; central spines 2, stouter, but not much longer than the radials, somewhat brownish, more or less erect; flowers from the top of the plant but in the axils of old tubercles, the tube not exerted and the limb appressed against the adjacent tubercles; perianth rotate, 16 mm. broad, its segments, stamens, and style pale lemon-yellow; outer perianth-segments oblong, obtuse with ciliate margins, the inner a little longer than the outer, usually entire, oblong, usually retuse at apex, sometimes apiculate.

Sent by B. P. Reko (No. 4401) but collected by A. Groeschner from the vicinity of Monte Mercado, Durango, Mexico, in 1922 and flowered in Washington in May 1923.

Figure 184 is from a photograph of the type specimen.

LITTLE-KNOWN SPECIES PROBABLY OF THIS GENUS.

MAMMILLARIA ALPINA Martius in Salm-Dyck, Cact. Hort. Dyck. 1849. 79. 1850.

*Cactus alpinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

This plant has not been identified. Its large flowers, 2.5 cm. broad, suggest a species of *Coryphantha*. It was collected by Karwinsky in the state of Oaxaca.

MAMMILLARIA BELLATULA Förster, Allg. Gartenz. 15: 51. 1847.

*Cactus bellatulus* Kuntze, Rev. Gen. Pl. 1: 259. 1891.

Spherical, somewhat compressed, bright green; tubercles broadly cone-shaped, 4 mm. long, their axils naked; spine-areoles white-woolly when young; radial spines 12 to 16, whitish, bristle-like, spreading, 6 to 8 mm. long; central spines 2, straight, one pointing downward, the other upward, 12 to 16 mm. long, at first almost black, grayish brown in age; flowers and fruit unknown.

This species is said to have been grown from Brazilian seed; if this were true it would exclude it from this genus and for this reason Schumann questioned whether it might not be an *Echinocactus*. Judging from the description we believe that it is closely related to *Neomammillaria elegans* and is probably of Mexican origin.

MAMMILLARIA BERGII Miquel, Comment. Phytogr. 104. 1840.

Simple, subglobose, glaucous green; tubercles somewhat 4-angled at base, nearly terete above, woolly in the axils; spine-areoles woolly when young, becoming naked; spines 4, spreading, the uppermost one largest.

This plant is from Mexico.

MAMMILLARIA CAESPITITIA De Candolle, Mém. Mus. Hist. Nat. Paris 17: 112. 1828.

*Mammillaria nitida* Scheidweiler, Allg. Gartenz. 9: 42. 1841.  
*Cactus caespitilius* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Densely caespitose, the clump 10 cm. in diameter; joints globose, 2.5 cm. in diameter; tubercles small, ovate; spines straight, rigid, when young whitish yellow, in age gray; radial spines 9 or 10; central spines 1 or 2, longer than the radials, erect; flowers and fruit unknown.

Both Pfeiffer and Schumann overlooked this species and it is doubtful if it can ever be identified. The plant was collected by Thomas Coulter in Mexico.

MAMMILLARIA CONICA Haworth, Suppl. Pl. Succ. 71. 1819.

Tubercles large, conic; spines less than 10, all radial, red but paler at base; flowers and fruit unknown.

Neither Pfeiffer nor Schumann knew this species or its origin. The Index Kewensis refers it to South America. If from that region it must be a species of *Discocactus*, near *D. placentiformis*.

MAMMILLARIA DIACENTRA Jacobi, Allg. Gartenz. 24: 91. 1856.

Globose, about 7 cm. in diameter; tubercles milky, rhomboid at base, not setose in their axils; radial spines 5 or 6, white, with blackish tips; central spines 2, stouter and longer than the radials, grayish, with blackish tips, the lower centrals 2.5 cm. long or more; flowers small, reddish; style rose-colored: stigma-lobes 6.

This species was unknown to Schumann, and we are unable to group it; its origin is not recorded.

MAMMILLARIA FLAVESCENS Haworth, Suppl. Pl. Succ. 71. 1819.

*Cactus mammillaris lanuginosus* De Candolle, Pl. Succ. 111. 1799.

*Cactus flavescens* De Candolle, Cat. Hort. Monsp. 83. 1813.

*Mammillaria straminea* Haworth, Suppl. Pl. Succ. 71. 1819.

*Cactus stramineus* Sprengel, Syst. 2: 494. 1825, as to name.

*Mammillaria simplex flavescens* Schumann, Gesamtb. Kakteen 573. 1898.

This plant was first described in 1799 by De Candolle as "var.  $\beta$ " of *Cactus mammillaris* or *Cactus mammillaris lanuginosus* (Pl. Succ. pl. 111); at this time he referred to it certain citations of Plumier and Hermann which we now know belong to *Neomammillaria prolifera* and *N. mammillaris* respectively. This variety was raised to specific rank by De Candolle in 1813 as *Cactus flavescens* (Cact. Hort. Monsp. 83). From the more detailed description then given it is clear that *Cactus flavescens* can not be referred to either *N. prolifera* or *N. mammillaris*. It was transferred to the genus *Mammillaria* by Haworth in 1819, but he added little information except the statement that it had been in cultivation in the Chelsea Garden before 1811.

The question has been raised whether this plant is really West Indian. It is true that De Candolle does not state its origin, but it would be indicated that he believed that it was West Indian by his treating it as a variety of the common West Indian species and by his referring to it several West Indian descriptions when he later published it as a species. Pfeiffer states that it is tropical American. As *Neomammillaria mammillaris* is the only species known from South America it could not have come from that continent, and at that time no *Mammillaria* had been discovered in the United States or Mexico. Förster in 1846 says that it is West Indian, and this was Schumann's conclusion.

MAMMILLARIA FLAVICOMA Hortus in Förster, Handb. Cact. ed. 2. 298. 1885.

This species was described from garden plants of unknown origin. Schumann does not mention it in his monograph and it has remained unknown.

MAMMILLARIA GRISEA Salm-Dyck, Cact. Hort. Dyck. 1849. 110. 1850.

*Cactus griseus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Stout, short-cylindric, 10 to 12.5 cm. high, 7.5 cm. in diameter; tubercles glaucous-green, somewhat 4-angled, their axils woolly and setose; radial spines 10 to 12, spreading, short, rigid, white; central spines 4 to 6, white, with brown or blackish tips, on greenhouse plants 10 to 15 mm. long, but on wild plants 5 cm. long or more; flower and fruit unknown.

This is perhaps different from *Mammillaria grisea* Galeotti (Förster, Handb. Cact. 219. 1846), which was never described.

MAMMILLARIA HEINEI Ehrenberg, Bot. Zeit. 2: 833. 1844.

*Cactus heinei* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Schumann thought that this name was referable to *Mammillaria umbrina* but we have not been able to satisfy ourselves that the two are the same.

Much confusion is found in the spelling of the name; it sometimes appears as *M. haynii* and *M. haynei*. Salm-Dyck transfers two species of Ehrenberg to varieties of *M. haynii* but both are unknown to us. These varieties are as follows: var. *viridula* Salm-Dyck (Cact. Hort. Dyck. 1849. 10. 1850; *M. viridula* Ehrenberg, Allg. Gartenz. 16: 267. 1848),



and var. *minima* Salm-Dyck (Cact. Hort. Dyck 1849. 10. 1850; *M. digitalis* Ehrenberg, Allg. Gartenz. 16: 267. 1848).

MAMMILLARIA HELICTERES De Candolle, Mém. Mus. Hist. Nat. Paris 17: 31. pl. 5. 1828.

This name was based on Mociño and Sessé's drawing of a Mexican plant, which has never since been definitely identified. It was called by them *Cactus helicteres* (De Candolle, Prodr. 3: 460. 1828), but it was renamed *Mammillaria convoluta* by St. Lager (Ann. Soc. Bot. Lyon 7: 130. 1880). The published drawing indicates that the plant is of this genus.

MAMMILLARIA HEXACANTHA Salm-Dyck, Hort. Dyck. 344. 1834.

*Cactus hexacanthus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Solitary, short-cylindric; tubercles somewhat compressed, light green; areoles ovate to oblong when young, white-tomentose, glabrate in age; radial spines 25 to 30, white, 4 mm. long; central spines 6, stouter than the radials, brown, the 4 lateral ones 8 mm. long, the uppermost ones a little longer, the lowermost ones 18 mm. long, somewhat deflexed; flowers and fruit unknown.

This plant, which is of Mexican origin, is unknown to us except from description; Schumann referred it to *Mammillaria coronaria*, but it has nothing to do with that plant.

MAMMILLARIA IRREGULARIS De Candolle, Mém. Mus. Hist. Nat. Paris 17: 111. 1828.

*Cactus irregularis* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Cespitose, 5 cm. high, with a subtuberous base; joints ovoid, 2.5 cm. in diameter; spines all radial, 20 to 25, spreading or somewhat reflexed; flowers and fruit unknown.

This plant was collected by T. Coulter (No. 31). It has never been re-identified. It was grown at the Botanical Garden at Geneva, Switzerland, at the time the description was published but, unfortunately, no specimens were preserved; other types based on Coulter's plants are similarly lost and can never be certainly identified.

MAMMILLARIA JOOSSENSIANA Quehl, Monatsschr. Kakteenk. 18: 95. 1908.

Simple, globose to cylindric, up to 5 cm. high, 3 cm. in diameter, pale green, slightly depressed at apex; young areoles white-woolly; radial spines 20, slender-subulate, straight, white, 12 mm. long; central spines 4, stouter than the radials, 15 mm. long or more, one of them often hooked; flowers small, yellow.

We know this plant, which is a native of Mexico, only from description and two small plants sent us by Frantz de Laet in 1922. Quehl places it in Schumann's classification just after *M. amoena*, although one of the central spines is hooked.

MAMMILLARIA LESAUNIERI Rebut in Schumann, Gesamtb. Kakteen 533. 1898.

Simple, globose, or a little longer than broad; tubercles conic, their axils naked; radial spines 11 to 13, slender, subulate, straight, white, 6 to 8 mm. long; central spines solitary, very short (5 mm. long or less), brownish, erect; flowers reddish, 2.5 cm. long.

*Type locality:* Described from cultivated plants.

*Distribution:* Supposed to be Mexico proper or Lower California.

This species is supposed to have the habit of *Mammillaria heyderi*.

Here probably belongs *Mammillaria lassonneriei* Rebut (Monatsschr. Kakteenk. 7: 29. 1897), a garden name of which we have found no accompanying description. The dealer, Grässner, in his Catalogue of Cacti for 1912 (p. 21) and 1914 (p. 33) has illustrated *M. lassauineri*.

MAMMILLARIA LEUCOCENTRA Berg, Allg. Gartenz. 8: 130. 1840.

*Cactus leucocentrus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Ovoid, about 10 cm. high; tubercles ovoid, their axils very white-woolly; young spine-areoles white-tomentose at first, becoming naked; radial spines spreading, numerous, setose, white; central spines 4 to 6, stouter and longer than the radials, white throughout or with black.

Recorded from Oaxaca, but not identified.

MAMMILLARIA LORICATA Martius in Pfeiffer, Enum. Cact. 13. 1837.

*Echinocactus loricatus* Poselger, Allg. Gartenz. 21: 107. 1853.

*Coryphantha loricata* Lemaire, Cactées 35. 1868.

*Cactus loricatus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Solitary, simple, globose, 4 to 5 cm. in diameter, glaucous-green; tubercles short-ovate, 4-angled at base; radial spines 12, spreading, rigid, yellow, 6 to 8 mm. long; central spines 2, stouter than the radials, 8 to 10 mm. long, black at tip, the upper one straight, the lower one curved; flowers and fruit not described.

This plant is recorded as of Mexican origin, but we have found no description of it subsequent to the original and it may never be identified. Förster referred it to *Mammillaria polythele*, but Schumann did not know it.

*Mammillaria heteracantha* was referred here as a synonym by Pfeiffer (Enum. Cact. 13. 1837). This plant was mentioned by Martius (Verz. König. Bot. Gard. München 127. 1829), but so far as we can learn was never described.

MAMMILLARIA MONOCENTRA Jacobi, Allg. Gartenz. 24: 90. 1856.

Depressed-globose, up to 12 cm. high, about 8 cm. in diameter, umbilicate at apex; tubercles milky, somewhat rhomboid at base, a little flattened, not setose in their axils; radial spines 6, white with black tips, a little spreading; central spine solitary, stouter and longer than the radials, about 2.5 cm. long; flowers rather large, rose-colored; style rose-colored; stigma-lobes 6, reddish yellow.

Jacobi referred this plant, presumably of Mexican origin, to the group *Angulosae-tetragonae* of Salm-Dyck.

Schumann placed it among his list of little-known species; we know it from description only.

MAMMILLARIA NERVOSA CRISTATA Journ. Hort. Home Farm. III. 60: (?) 7. 1910.

We know this plant only from a brief description and an illustration on pages 7 and 8 of the journal here cited:

*Mammillaria nervosus cristatus* \* grows in convoluted sinuous masses like a great brain-mass. The growths are covered with spiny mamillae (whence the name of the genus) and are of a dull olive-brownish hue. It, too, is Mexican."

We are not able to place this plant; it resembles the cristate form sometimes assumed by *Pediocactus simpsonii* and also resembles *Mammillaria bicolor* as shown by the illustration under *M. daedalea*.

*Illustration:* Journ. Hort. Home Farm. III. 60: 8 (or 7).

MAMMILLARIA NICHOLSONI Journ. Hort. Home Farm. III. 60: 7. 1910.

We know this species only from the illustration referred to below and the following brief note taken from the place of publication:

"*Mammillaria nicholsoni* resembles several of the Echinocactuses in external form. It was named we believe in honor of the late Mr. George Nicholson and came to Kew from the Swanley Collection. All our illustrations were secured at Kew where the collection is well cultivated. *M. nicholsoni* forms spherical masses with the typical protuberances or tubercles, these being tipped with sharp spines."

It is doubtless of Mexican origin.

*Illustration:* Journ. Hort. Home Farm. III. 60: 9.

MAMMILLARIA NUDA De Candolle, Prodr. 3: 460. 1828.

This is based on *Cactus nudus* (Mociño and Sessé, Pl. Mex. Sc. ined.), but has never been subsequently identified. It was also taken up by Otto Kuntze as *Cactus nudus* (Rev. Gen.

\* This is the original spelling.

Pl. 1: 261. 1891). The original description was based on a drawing and calls for a cylindrical, unbranched plant, bearing unarmed tubercles and rose-colored flowers.

MAMMILLARIA PICTA Meinshausen, Wöchenschr. Gärtn. Pflanz. 1: 27. 1858.

*Cactus pictus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Globose to ovoid, dull green; tubercles cylindrical, somewhat oblique, obtuse, their axils setose; spines pubescent; radial spines 12, yellowish at base, white near middle, above dark purple; central spines 1 (rarely 2), erect; flowers greenish white; stigma-lobes 3.

This species is known from the description only. It was recorded as from Mexico.

MAMMILLARIA PLECOSTIGMA Meinshausen, Wöchenschr. Gärtn. Pflanz. 1: 27. 1858.

*Mammillaria plecostigma major* Meinshausen, Wöchenschr. Gärtn. Pflanz. 1: 27. 1858.

*Mammillaria plecostigma minor* Meinshausen, Wöchenschr. Gärtn. Pflanz. 1: 27. 1858.

*Cactus plecostigma* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Proliferous, the joints cylindrical; tubercles cylindrical, the apex oblique and rounded, with setae in their axils; radial spines 16 to 20, setaceous, white; central spines 3 or 4, at first yellow, becoming brown, one hooked at apex; flowers and fruit unknown.

Presumably of this genus and recorded as of Mexican origin; but not identified since it was described.

MAMMILLARIA PLINTHIMORPHA Jacobi, Allg. Gartenz. 24: 92. 1856.

Cespitose, forming clumps 15 cm. in diameter or more; joints globose; tubercles 4-angled, obtuse, bearing yellowish white wool in their axils; spines 4, subulate, somewhat angled, flesh-colored with blackish tips, the upper one the longest and sometimes more than 2.5 cm. long; flowers not known.

This plant was collected by Galeotti in Mexico in 1847; we do not know it and it was listed by Schumann among his little-known species.

MAMMILLARIA PULCHRA Haworth in Edwards's Bot. Reg. 16: pl. 1329. 1830.

*Cactus pulcher* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

This species, which has yellow spines and dark-red flowers, was referred by Schumann, doubtfully, to *Mammillaria centricirrha*, and by Pfeiffer with doubt to *M. tentaculata*.

MAMMILLARIA RUTILA Zuccarini in Pfeiffer, Enum. Cact. 29. 1837.

*Cactus rutilus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Simple, globose; axils of tubercles nearly naked; tubercles 1 cm. long, conic, dull green; areoles when young tomentose; radial spines 14 to 16, setiform, the upper ones smaller, 4 to 8 mm. long; central spines 4 to 6, spreading, rigid, 8 to 12 mm. long, curved, reddish brown, the lower one longest.

*Type locality:* Mexico.

This name is referred by Schumann to *M. coronaria*.

*M. rutila pallidior* Salm-Dyck (Cact. Hort. Dyck. 1849. 11. 1850) was never described, while *M. eugenia* (Salm-Dyck, Cact. Hort. Dyck. 1849. 11. 1850) is given as a synonym of *M. rutila*.

*M. rutila octospina* Scheidweiler (Bull. Acad. Sci. Brux. 6: 91. 1839) is briefly described.

MAMMILLARIA SAXATILIS Scheer, Bot. Herald 286. 1856.

*Cactus saxatilis* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Plant small; spines brownish to straw-colored.

Only two plants were collected, somewhere in Mexico, by Potts and sent to Scheer; the flowers and fruit were not described. The species may never be identified.

MAMMILLARIA SCHMERWITZII Haage in Förster, Handb. Cact. ed. 2. 270. 1885.

Depressed-globose, 10 cm. in diameter, grassy green; radial spines 10 to 25, yellow, 4 to 5 mm. long; central spines 4 or 5, dark brown, 15 mm. long; flowers red.



This plant, recorded as of Mexican origin, was at one time offered for sale by A. Blanc and Company; we know it only from description and are unable to identify it.

MAMMILLARIA SEEMANNII Scheer in Seemann, Bot. Herald 288. 1856.

*Cactus seemannii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Hemispheric, stout, 10 cm. in diameter, 7.5 cm. high; tubercles somewhat ovoid, elongated, greenish, minutely punctate, their axils soon white-woolly; radial spines 11 to 13, nearly equal, less than 6 mm. long; central spines 1, shorter than the radials, subulate, straight, erect, blackish purple, becoming white.

This plant was sent to F. Scheer in 1850, who states that it came from Sonora or Durango. It is incompletely described and can not be identified. It may be a species of *Coryphantha*.

MAMMILLARIA SORORIA Meinshausen, Wöchenschr. Gärtn. Pflanz. 1: 28. 1858.

*Cactus sororius* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Depressed-globose, to 6 cm. high, 7.5 to 10 cm. in diameter, milky; tubercles angled, 12 mm. long, naked in their axils; radial spines 6, 4 mm. long; central spines 1, erect, stouter than the radials, blackish at apex; flowers greenish purple; stigma-lobes 4.

Recorded as of Mexican origin but otherwise unknown.

MAMMILLARIA SPINAUREA Salm-Dyck, Allg. Gartenz. 18: 59. 1850.

*Cactus spinaureus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

Globose or becoming depressed; tubercles light green, somewhat 4-angled, gibbous at base, obtuse and oblique at apex, their axils woolly; radial spines about 12, slender, rigid, spreading; central spines 5 or 6, twice as long and stouter than the radials, recurved or reflexed, yellow.

The above was sent by John Potts from Chihuahua in 1850; Scheer thought that it might have been collected in Durango or Sonora. We have not been able to identify it.

MAMMILLARIA SUAVEOLENS Rümpler in Förster, Handb. Cact. ed. 2. 297. 1885.

About 4 cm. high; radial spines 13 to 15; central spines 4, brown; flowers and fruit unknown.

The above is unidentifiable from the brief description. It was grown in Germany from Mexican seed.

MAMMILLARIA TROHARTII Hildmann in Schumann, Gesamtb. Kakteen 586. 1898.

Simple or proliferous and densely cespitose, globose or somewhat depressed, glaucous-green, small (6 cm. in diameter); axils naked; areoles at first woolly, afterwards naked; tubercles very small, scarcely angled; radial spines 5, with brown tips; central spines solitary, dark brown, subulate; flowers and fruit unknown.

*M. trohartii* is of Mexican origin.

MAMMILLARIA UNISETA Quehl, Monatsschr. Kakteenk. 14: 128. 1904.

Solitary, globose, about cm. in diameter, somewhat depressed at apex; tubercles dark green, 4-angled; spines 6, about 3 mm. long, at first black, changing to gray; flowers and fruit unknown.

This plant was described from a specimen in the Botanical Garden at Halle of unknown origin, but doubtless from Mexico.

MAMMILLARIA VIPERINA J. A. Purpus, Monatsschr. Kakteenk. 22: 148. 1912.

Cespitose, decumbent, cylindrical, 1.5 to 2 cm. in diameter; tubercles very short, sometimes nearly globular; spines numerous, mm. long, whitish brown to brownish black; flowers and fruit unknown.

This plant came from Rio de Zapotitlán, Puebla; we know it only from description and the very characteristic published illustration. Quehl, who had seen it, said that it was a form of *Mammillaria elongata*. We believe that it is near *M. sphaelata* and perhaps

a distinct species. The plant figured by Grässner (Haupt-Verz. Kakteen 38. 1914) shows nearly upright branches.

*Illustration:* Monatsschr. Kakteenk. 23: 21, as *Mammillaria viperina*.

MAMMILLARIA ZEYERIANA Haage jr. in Schumann, Gesamtb. Kakteen 574. 1898.

Simple, hemispheric to short-cylindric, up to 10 cm. high, pale glaucous-green; tubercles in 13 or 21 spirals, terete, 10 to 12 mm. long, their axils naked; spine-areoles elliptic, 3 mm. long; radial spines 10, white; central spines 4, the uppermost one curved, 15 mm. long, brownish; flowers and fruit unknown.

Described from Mexican plants; supposed to be of Mexican origin.

PLANTS KNOWN BY NAME ONLY.

*Mammillaria acicularis* Lemaire (Cact. Gen. Nov. Sp. 34. 1839) was described without the flowers, fruit, or native country being known and has not been identified; here belongs *Cactus acicularis* (Kuntze, Rev. Gen. Pl. 1: 261. 1891), but *C. acicularis* (Kuntze, Rev. Gen. Pl. 1: 260. 1891) based on some name of Lehmann we have not been able to find.

*Mammillaria aulacantha*, referred by Schumann and the Index Kewensis to De Candolle's Revision (Mém. Mus. Hist. Nat. Paris 1: 113. 1828), is not to be found at the place cited by them; here probably belongs *Cactus aulacanthus* Kuntze (Rev. Gen. Pl. 1: 260. 1891).

*Mammillaria beneckeii* Ehrenberg (Förster, Handb. Cact. 210. 1846; *Cactus beneckeii* Kuntze, Rev. Gen. Pl. 1: 260. 1891) was referred to *M. coronaria* by Schumann.

*Mammillaria brandi* is described in Blanc, Hints on Cacti, p. 67, as "a rare Mexican sort, with very long straw-colored spines deflecting from the plant. Flowers cream-colored and very fragrant."

*Mammillaria centa* is mentioned by C. A. Purpus in a short article in Die Gartenwelt (9: 249. 1905).

*Mammillaria chrysantha* is listed by De Candolle (Prodr. 3: 460. 1828) among species little known but not described. It is said to have been in the Berlin Botanic Garden.

*Mammillaria circumtexta* Martius (Hort. Reg. Monac. 127. 1829) seems never to have been described.

*Mammillaria hochderferi* is mentioned by C. A. Purpus in a short article in Die Gartenwelt (9: 249. 1905).

*Mammillaria multiradiata* (Martius, Hort. Reg. Monac. 127. 1829) is only a name.

*Mammillaria nigra* Ehrenberg (Allg. Gartenz. 17: 287. 1849) was referred to *M. coronaria* by Schumann; *Cactus niger* Kuntze (Rev. Gen. Fl. 1: 261. 1891) is a synonym of it.

*Mammillaria parmentieri* Link and Otto (Verh. Ver. Beförd. Gartenb. 6: 429. 1830), without description, was doubtfully referred to *M. flavescens*. It was supposed, however, to have come from Mexico.

The following species, briefly described by F. Schlumberger (Rev. Hort. IV. 5: 404. 1856), we do not know, nor do we find them mentioned elsewhere:

*Mammillaria albiseta*, with flowers like those of *M. spinosissima*.

*Mammillaria bocasiana*, with clear yellow flowers.

*Mammillaria cunendstiana*, with flowers like those of *M. clillifera*.

*Mammillaria decholaria*, with very small red flowers.

*Mammillaria klenneirii*, with rose-colored flowers.

*Mammillaria roematactina*, with abundant small rose-red flowers.

*Mammillaria saluciana*, flowers 1.5 cm. long and of the same diameter, flesh-colored.

The following names, without descriptions, appear in Förster's Handbuch (254, 255, 1846). Some of the names have been used subsequently, but so far as our observation goes

they are all still *nomen nudum*. *Mammillaria asteriflora* Cels, *M. binops* Haage, *M. cantera* Haage, *M. citrina* Scheidweiler, *M. contacta* Wendland, *M. coryphides* Forbes, *M. crinigera* Otto, *M. daedalea viridis* Fennel, *M. echinops* Fennel, *M. enneacantha* Otto, *M. heteracentra* Otto, *M. intricata* Otto, *M. miqueliana* Pfeiffer, *M. palmeri* Fennel, *M. pyrrhacantha* Pfeiffer, *M. pyrrhacantha pallida* Pfeiffer, *M. salmiana* Fennel, *M. stephani* Hortus, *M. suberecta* Pfeiffer, and *M. villosa* Fennel.

The following names appeared first, published by Forbes (Journ. Hort. Tour Germ. 147. 1837), but are so briefly described that they can not be identified: *Mammillaria cuneiflora* Hitchcock, *M. cylindraca* Hitchcock, *M. divaricata*, *M. flavescens* Hitchcock, *M. grandis* Hitchcock, *M. lutescens*, and *M. pulcherrima*. Some of these names were afterwards used, but whether they were applied to the same plants we can not tell.

The following names of *Mammillaria* listed by Haage (Cact. Knit. ed. 2. 1900) are without description: *brandtii* Haage jr., *bruennowii*, *celsiana longispina*, *de grandii*, *deleuili* Rebut, *desertorum*, *donkelaari*, *dubia* Hildmann, *fulvolanata*, *geminiflora*, *glabrescens*, *goeringii*, *grusonii similis*, *guebwilleriana* Haage jr., *hermantiana* Monville, *hevernickii* Senke, *lapaixi* Rebut, *microdasys*, *monothele*, *morini* Rebut, *multicolor*, *nickelsi*, *nigerrima*, *numina*, *polia* Sieber, *quehlii*, *rebuti*, *roii* Rebut, *roessingii* Gruson, *semilonia*, *simonis*, *lellii*, *variimamma* Ehrenberg, *villa-lerdo*, *wegeneri cristata*, and *xanthispina*.

Schumann, at the close of his treatment of the genus *Mammillaria* (Gesamtb. Kakteen 599. 1898), lists 158 names which he had not been able to refer. Later, Otto Kuntze referred many of the names to the genus *Cactus*, thus making many useless synonyms. Some of these names of Schumann we have been able to refer more or less definitely to other species, but there still remain many which we can not place. Most of them were described without flower and fruit, and since the types were not preserved it is doubtful if many more can be ever identified. The residue is as follows:

MAMMILLARIA ACTINOPLEA Ehrenberg, Allg. Gartenz. 16: 266. 1848.

*Mammillaria amabilis* Ehrenberg, Allg. Gartenz. 17: 326. 1849.

*Mammillaria albiseta* Hortus in Förster, Handb. Cact. ed. 2. 354. 1885.

*Cactus actinopleus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Cactus amabilis* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Mammillaria crebrispina nitida* Monville (Labouret, Monogr. Cact. 75. 1853) is known only as a synonym.

MAMMILLARIA ARGENTA Fennel, Allg. Gartenz. 15: 66. 1847.

*Cactus argenteus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA ATRORUBRA Ehrenberg, Allg. Gartenz. 17: 327. 1849.

*Cactus atroruber* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA ATROSANGUINEA Ehrenberg, Allg. Gartenz. 17: 270. 1849.

*Cactus atosanguineus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA BADISPINA Förster, Hamb. Gartenz. 17: 159. 1861.

MAMMILLARIA BARLOWII Regel and Klein, Ind. Sem. Hort. Petrop. 1860: 46. 1860.

*Cactus barlowii* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA BERGENII Ehrenberg, Allg. Gartenz. 17: 326. 1849.

MAMMILLARIA BIFURCA A. Dietrich, Allg. Gartenz. 18: 186. 1850.

MAMMILLARIA BREVISETA Ehrenberg, Allg. Gartenz. 17: 251. 1849.

*Cactus brevisetus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA CLOSIANA Roumey, Bull. Soc. Bot. France 2: 372. 1855.

MAMMILLARIA COROLLARIA Ehrenberg, Allg. Gartenz. 17: 294. 1849.

*Cactus corallarius* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

MAMMILLARIA CORONATA Scheidweiler, Allg. Gartenz. 8: 338. 1840.

*Cactus coronatus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

MAMMILLARIA CURVISPINA Otto in Dietrich, Allg. Gartenz. 14: 204. 1846.

*Cactus curvispinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891. Not Bertero, 1829.



- MAMMILLARIA DECORA Förster, Hamb. Gartenz. **17**: 159. 1861.  
*Mammillaria decora obscura* Förster, Hamb. Gartenz. **17**: 159. 1861.
- MAMMILLARIA EBORINA Ehrenberg, Allg. Gartenz. **17**: 309. 1849.  
*Cactus eborinus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA EMUNDTSIANA Hortus in Förster, Handb. Cact. ed. 2. 341. 1885.
- MAMMILLARIA ERECTACANTHA Förster, Allg. Gartenz. **15**: 50. 1847.  
*Cactus erectacanthus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA EUCHLORA Ehrenberg, Allg. Gartenz. **16**: 266. 1848.  
*Cactus euchlorus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA FELLNERII Ehrenberg, Allg. Gartenz. **17**: 261. 1849.  
*Cactus fellneri* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA FLAVA Ehrenberg, Allg. Gartenz. **17**: 261. 1849.  
*Mammillaria tomentosa flava* Salm-Dyck, Cact. Hort. Dyck. 1849. 12. 1850.
- MAMMILLARIA GEMINATA Scheidweiler, Allg. Gartenz. **9**: 42. 1841.  
*Cactus geminatus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- Illustration*: Möllers Deutsche Gart. Zeit. **25**: 475. f. 8, No. 20.
- MAMMILLARIA GIBBOSA Salm-Dyck, Hort. Dyck. 343. 1834.  
*Cactus gibbosus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891. Not Haworth, 1812.
- MAMMILLARIA GLABRATA Salm-Dyck, Cact. Hort. Dyck. 1849. 109. 1850.  
*Cactus glabratus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA GRANDICORNIS Mühlenpfordt, Allg. Gartenz. **14**: 372. 1846.  
*Cactus grandicornis* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA HAEMATICTINA Ehrenberg, Allg. Gartenz. **16**: 266. 1848.  
*Cactus haematictina* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA INCURVA Scheidweiler, Bull. Acad. Sci. Brux. **6**: 92. 1839.  
*Cactus incurvus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA JUCUNDA Ehrenberg, Allg. Gartenz. **17**: 250. 1849.  
*Cactus jucundus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA KLEINII Regel, Ind. Sem. Hort. Petrop. **1860**: 7. 1860.  
*Cactus kleinii* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA LAMPROCHAETA Jacobi, Allg. Gartenz. **24**: 82. 1856.
- MAMMILLARIA LEUCODASYS Salm-Dyck in Scheer, Seemann, Bot. Herald 286. 1856.  
*Cactus leucodasys* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- Mexico. Probably *M. micromeris* Engelm (fide Schumann).
- MAMMILLARIA LEUCODICTIA Linke, Allg. Gartenz. **16**: 330. 1848.  
*Cactus leucodictyus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA LIVIDA Fennel, Allg. Gartenz. **15**: 66. 1847.  
*Cactus lividus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- Mammillaria farinosa* (Fennel, Allg. Gartenz. **15**: 66. 1847) is referred to *M. livida* by the Index Kewensis.
- MAMMILLARIA MELANACANTHA Hortus in Förster, Handb. Cact. ed. 2. 386. 1885.
- MAMMILLARIA MICANS Dietrich in Linke, Allg. Gartenz. **16**: 330. 1848.  
*Cactus micans* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA MICRACANTHA Miquel, Linnaea **12**: 16. 1838.  
*Cactus micracanthus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA MUCRONATA Ehrenberg, Allg. Gartenz. **17**: 294. 1849.  
*Cactus mucronatus* Kuntze, Rev. Gen. Pl. **1**: 260. 1891.
- MAMMILLARIA MULTISETA Ehrenberg, Allg. Gartenz. **17**: 242. 1849.  
*Cactus multisetus* \* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA OBLIQUA Ehrenberg, Allg. Gartenz. **17**: 250. 1849.  
*Cactus obliquus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

---

\* Kuntze's specific name is credited to Scheidweiler, but we do not find it.

- MAMMILLARIA OBVALLATA Otto in Dietrich, Allg. Gartenz. **14**: 308. 1846.  
*Cactus obvallatus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA OLORINA Ehrenberg, Allg. Gartenz. **17**: 326. 1849.  
*Cactus olorinus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA OOTHELE Lemaire, Cact. Gen. Nov. Sp. 37. 1839.  
*Mammillaria ovimamma* Lemaire, Cact. Gen. Nov. Sp. 4. 1839.  
*Mammillaria ovimamma brevispina* Salm-Dyck, Cact. Hort. Dyck. 1849. 108. 1850.  
*Mammillaria ovimamma oothele* Labouret, Monogr. Cact. 85. 1853.  
*Cactus oothele* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus ovimamma* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PERSICINA Ehrenberg, Allg. Gartenz. **17**: 250. 1849.  
*Cactus persicanus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PHAEOTRICA Monville in Labouret, Monogr. Cact. 39. 1853.  
*Cactus phaeotrichus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PLEIOCEPHALA Regel and Klein, Ind. Sem. Hort. Petrop. **1860**: 7. 1860.  
*Cactus pleiocephalus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA POLYMORPHA Scheer in Mühlenpfordt, Allg. Gartenz. **14**: 373. 1846.  
*Cactus polymorphus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PORPHYRACANTHA Jacobi, Allg. Gartenz. **24**: 81. 1856.
- MAMMILLARIA PROCERA Ehrenberg, Allg. Gartenz. **17**: 241. 1849.  
*Cactus procerus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PUGIONACANTHA Förster, Allg. Gartenz. **15**: 50. 1847.  
*Cactus pugionacanthus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA PUNCTATA Labouret in Förster, Handb. Cact. ed. 2. 293. 1885.
- MAMMILLARIA PURPURASCENS Ehrenberg, Allg. Gartenz. **17**: 260. 1849.
- MAMMILLARIA PURPUREA Ehrenberg, Allg. Gartenz. **17**: 270. 1849.  
*Cactus purpureus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA REGIA Ehrenberg, Allg. Gartenz. **17**: 269. 1849.  
*Cactus regius* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA ROSEA Scheidweiler, Hort. Belge **5**: 118. 1838.  
*Mammillaria rhodeocentra* Lemaire, Cact. Gen. Nov. Sp. 52. 1839.  
*Mammillaria discolor nigricans* Salm-Dyck in Walpers, Repert. Bot. **2**: 271. 1843.  
*Mammillaria rhodeocentra gracilispina* Salm-Dyck, Cact. Hort. Dyck. 1849. 14. 1850.  
*Cactus roseus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.  
*Cactus rhodeocentrus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- Salm-Dyck referred *Mammillaria rosea* to *M. rhodeocentra*, but the former is the older name.
- Illustration*: Hort. Belge **5**: pl. 7. as *Mammillaria rosea*.
- MAMMILLARIA RUFIDULA Ehrenberg, Allg. Gartenz. **17**: 295. 1849.  
*Cactus rufidulus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA RUFO-CROCEA Salm-Dyck, Cact. Hort. Dyck. 1849. 102. 1850.  
*Cactus rufo-croceus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA RUSCHIANA Regel, Ind. Sem. Hort. Turic. 4. 1830, in adnot.  
*Cactus rueschianus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA SEIDELII Terschek, Suppl. Cact. Verz. **1**.  
*Cactus seidelii* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA SEVERINI Regel and Klein, Ind. Sem. Hort. Petrop. **1860**: 46. 1860.  
*Cactus severinii* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA SPECIOSA De Vriese, Tijdschr. Nat. Geschr. **6**: 52. 1839. Not Gillies, 1830.  
*Cactus vrieseanus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA SPECTABILIS Mühlenpfordt, Allg. Gartenz. **13**: 346. 1845.  
*Cactus spectabilis* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA SUBULIFERA Ehrenberg, Allg. Gartenz. **17**: 242. 1849.  
*Cactus subulifer* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.
- MAMMILLARIA TECTA Miquel, Linnaea **12**: 12. 1838.  
*Cactus tectus* Kuntze, Rev. Gen. Pl. **1**: 261. 1891.

- MAMMILLARIA TOMENTOSA Ehrenberg, Allg. Gartenz. 17: 262. 1849.  
*Cactus tomentosus* Kuntze, Rev. Gen. Pl. 1: 261. 1891.
- MAMMILLARIA VARIMAMMA Ehrenberg, Allg. Gartenz. 17: 242. 1849.  
*Cactus varimamma* Kuntze, Rev. Gen. Pl. 1: 261. 1891.
- MAMMILLARIA WEGENERI Ehrenberg, Bot. Zeit. 1: 738. 1843.  
*Cactus wegeneri* Kuntze, Rev. Gen. Pl. 1: 261. 1891.
- MAMMILLARIA ZEGSCHWITZII Terschek, Suppl. Cact. Verz. 1.  
*Cactus zegschwitzii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.
- MAMMILLARIA ZEPNICKII Ehrenberg, Bot. Zeit. 2: 835. 1844.  
*Cactus zepnickii* Kuntze, Rev. Gen. Pl. 1: 261. 1891.

## NAMES TO BE EXCLUDED FROM THIS GENUS.

The names *Mammillaria solitaria*, *M. spinosa*, *M. caudata*, *M. ambigua*, and *M. quadrata*, credited to G. Don, with the synonyms *Cactus solitarius*, *C. spinosus*, *C. caudatus*, *C. ambiguus* [Not Bonpland, 1813], and *C. quadratus*, credited to Gillies, respectively, each with a single word description, viz., solitary, spiny, tailed, ambiguous, quadrate, appeared in 1830 (Loudon, Hort. Brit. 194). As they all are said to come from Chile they can not be of this alliance.

*Mammillaria brachydelphys* Schumann (Just, Bot. Jahresb. 26: 343. 1898) seems to have been intended for *Maihuenia brachydelphys*.

*Cereus caudatus* Gillies (Sweet, Hort. Brit. ed. 3. 285. 1839) is probably the same as *M. caudata*.

*Mammillaria corioides* Bosch (Sweet, Hort. Brit. ed. 3. 281. 1839) was described as leather-like and native of South America. It can not be identified, but it is not of this relationship if it comes from South America. Schumann referred it to *Echinocactus*, but it does not belong to that genus as we now define it.

*Mammillaria dichotoma* (Sweet, Hort. Brit. ed. 3. 281. 1839), described only as forked, can not be identified.

*Mammillaria mitis* (De Candolle, Prodr. 3: 460. 1828), without description, is credited to Miller (Dict. Gard.), but Miller never used the generic name *Mammillaria*. Pfeiffer and Förster also refer this name to Miller. Steudel states that it is from South America. Kuntze also refers to the same as *Cactus mitis* (Rev. Gen. Fl. 1: 259. 1891). Schumann thought that it might be an *Echinocactus* and, if it really came from South America, as stated by the Index Kewensis, it is probably of the *Echinocactanae*.

*Mammillaria speciosa* Gillies (Sweet, Hort. Brit. ed. 2. 235. 1830), to which *Cactus speciosus* Gillies is referred as a synonym, is based upon some Chilean plant.

*Mammillaria subulata* Mühlenpfordt is listed both by Schumann and the Index Kewensis but the name intended was *Pereskia subulata*!

MAMMILLARIA CHILDSI Blanc, Illustr. Cat. 14. 1894.

"This line *Mammillaria* was sent out by us as *M. pectinata* before we bloomed it, from the fact that small plants answered the description exactly. After blooming, however, we discovered that it was a valuable new variety and named it as above. When small, the spines are regular, short and white; as the plant becomes older the spines also increase in size and assume a beautiful purple color. Flowers very numerous, even on small plants; color a clear pink."

We have not been able to identify this plant definitely. From the illustration, which shows large flowers from the center of the plant, we judge that it can not be referred to *Neomammillaria* nor to any of its near relatives. It may be a *Coryphantha*; in fact, at first it was taken for *C. pectinata*. The spines, however, are shown as arranged on vertical ribs, while the central spine is shown as erect; these two characters along with the central purple flowers suggest *Echinomastus erectocentrus*.

*Illustration*: Blanc, Illustr. Cat. 14.



MAMMILLARIA CORONARIA Haworth, Rev. Pl. Succ. 69. 1821, as to name.

*Cactus coronatus* Willdenow, Enum. Pl. Hort. Berol. Suppl. 30. 1813. Not Lamarck, 1783.

Judging from Willdenow's original descriptions of this plant it is not of this genus. He says that it is 5 feet long and a foot in diameter and that the central spine of the areole is hooked. Its geographical origin was not recorded and its flowers were not described. It was grown at Berlin prior to 1813 and later at the Chelsea Garden, London. Descriptions of this species are based largely on *Cactus cylindricus* Ortega, a very different plant.

Through the courtesy of N. E. Brown we have a photograph of *Mammillaria coronaria* from Haworth's collection with the date "Feb. 20, 1846." This photograph answers Haworth's brief description and differs from Willdenow's in having the spines all straight. Haworth's plants we would refer to *Neomammillaria*.

*Cactus coronarius* Willdenow, given by Haworth as a synonym of *Mammillaria coronaria*, is a mistake for *C. coronatus*.

The variety *Mammillaria coronaria minor* was briefly described by Förster (Handb. Cact. 212. 1846).

MAMMILLARIA FULVISPINA Haworth, Phil. Mag. 7: 108. 1830.

*Cactus fulvispinus* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

*Mammillaria rhodantha fulvispina* Schelle, Handb. Kakteenk. 257. 1907.

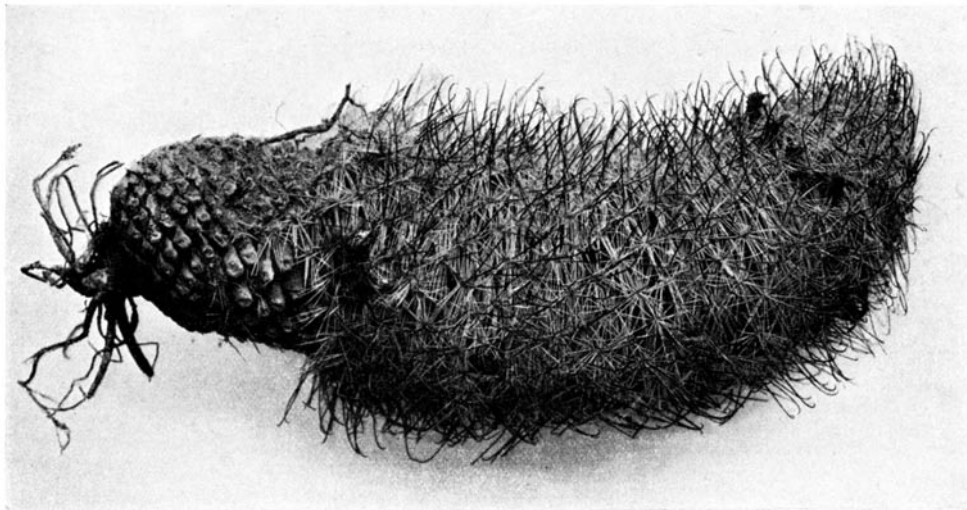
This plant was said by Haworth to come from Brazil and if so it is to be excluded from this relationship. Pfeiffer associated the name with a Mexican specimen which has led to its being referred by later writers to *M. rhodantha*. The varieties *M. fulvispina media* and *M. fulvispina minor* (Salm-Dyck, Cact. Hort. Dyck. 1844. 8. 1845) were not described.

MAMMILLARIA PICTURATA Labouret, Rev. Hort. IV. 4: 28. 1855.

Simple, cylindric, 8 cm. high, 5 cm. in diameter; radial spines 20, white, setiform, 4 mm. long; central spines 6, yellowish; flowers and fruit unknown.

Although Labouret stated that this plant came from Mendoza, Argentina, the Index Kewensis says Chile. If it is in southern South America, it does not belong to *Neomammillaria*.

The illustration (figure 1840) at the bottom of this page is of *Neomammillaria milleri* described on page 156.



## Subtribe 7. EPIPHYLLANAE.

Mostly epiphytic and night-blooming cacti, generally growing on trees, but sometimes on the earth when this is rich in humus, rarely in the crevices of rocks, much branched, spineless (except *Eccremocactus* and some species of *Epiphyllanthus*); joints several or many, usually flat except at base, often thin, with the areoles borne along the margin (except in *Epiphyllanthus*); flowers regular (except in *Zygocactus* and *Epiphyllanthus*); perianth various; filaments usually long and slender; style long and slender; fruit spineless, usually red or purple, either naked or bearing a few scales (rarely many), these usually with naked axils; seeds small, black.

We recognize 9 genera, diverse both in the plant-body and in the flowers. While apparently not closely related among themselves, the genera forming this subtribe are not any more closely related to other genera, either in the *Cereanae* or in the *Rhipsalidanae*.

## KEY TO GENERA.

- Plants branching dichotomously.  
 Perianth irregular.  
 Joints thin and leaf-like with toothed margin; areoles all marginal . . . . . 1. *Zygocactus* (p. 177)  
 Joints thick, without teeth, bearing areoles all around . . . . . 2. *Epiphyllanthus* (p. 180)  
 Perianth regular or nearly so; joints thin . . . . . 3. *Schlumbergera* (p. 182)  
 Plants branching irregularly.  
 Perianth-segments spreading or reflexed; flowers mostly large.  
 Tube of flower definitely longer than limb . . . . . 4. *Epiphyllum*. (p. 185)  
 Tube of flower not longer than limb.  
 Perianth campanulate, its segments few.  
 Stamens few; flowers small. . . . . 5. *Disocactus* (p. 201)  
 Stamens many; flowers large. . . . . 6. *Chiapasia* (p. 203)  
 Perianth short-funnel form, its segments many.  
 Outer perianth-segments short, obtuse or rounded, the inner white . . . . . 7. *Eccremocactus* (p. 204)  
 Outer perianth-segments acute or acuminate, the inner rose or red . . . . . 8. *Nopalxochia* (p. 204)  
 Perianth-segments erect; flowers small . . . . . 9. *Wittia*. (p. 206)

1. ZYGOCACTUS Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 223. 1890.

Stems dichotomously much branched, flattened, divided into short joints; flowers terminal, polychromic, irregular; ovary terete, smooth, gradually broadening from base, bearing minute scales at top; flower-tube abruptly bent just above the ovary, ending in a serrate mouth, bearing petaloid spreading scales scattered along its sides; stamens slender, white, arranged in 2 clusters; outer stamens borne along inside of flower-tube from near base to near middle; inner clusters of stamens about 20, arising from center and forming a short tube about base of style with an inner deflexed toothed membrane, upper part free, and all appressed against upper side of flower-tube and tipper perianth-segments; style purple, slender, as long as stamens and usually not surrounded by them; stigma-lobes linear, purple, erect and adhering (so far as we have seen); fruit purple, turgid, not at all angled; skin thin; seeds dark brown to nearly black, shining.

Type species: *Epiphyllum truncatum* Haworth.

This genus has passed for many years under the name of *Epiphyllum* but that name was wrongly applied to it. One species is here recognized, although several have been proposed by previous authors.

The generic name is from ζυγόν yoke and κάκτος cactus, referring, doubtless, to the peculiarly jointed stems.

1. *Zygocactus truncatus* (Haworth) Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 224. 1890.

- Epiphyllum truncatum* Haworth, Suppl. Pl. Succ. 8. 1819.  
*Cactus truncatus* Link, Enum. Pl. 2: 24. 1822.  
*Cereus truncatus* Sweet, Hort. Brit. 272. 1826.  
*Epiphyllum altensteinii* Pfeiffer, Enum. Cact. 128. 1837.  
*Epiphyllum truncatum altensteinii* Lemaire, Cact. Gen. Nov. Sp. 76. 1839.  
*Epiphyllum purpurascens* Lemaire, Hort. Univ. 2: 349. 1841.  
*Epiphyllum truncatum violaceum* Morren, Belg. Hort. 16: 260. 1866.  
*Epiphyllum truncatum spectabile* Morren, Belg. Hort. 16: 260. 1866.  
*Zygocactus altensteinii* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 225. 1890.  
*Epiphyllum delicatum* N. K. Brown, Gard. Chron. 111. 32: 411. 1902.  
*Epiphyllum delicatulum* Schumann, Monatsschr. Kakteenk. 13: 9. 1903.  
*Zygocactus delicatus* Britton and Rose, Contr. U. S. Nat. Herb. 16: 260. 1913.

Joints dark glossy green, about 3 cm. long, sharply serrate, with two prominent teeth at other-wise truncate apex; terminal areole broad and thin, filled with brown wool and bristles; flowers 6

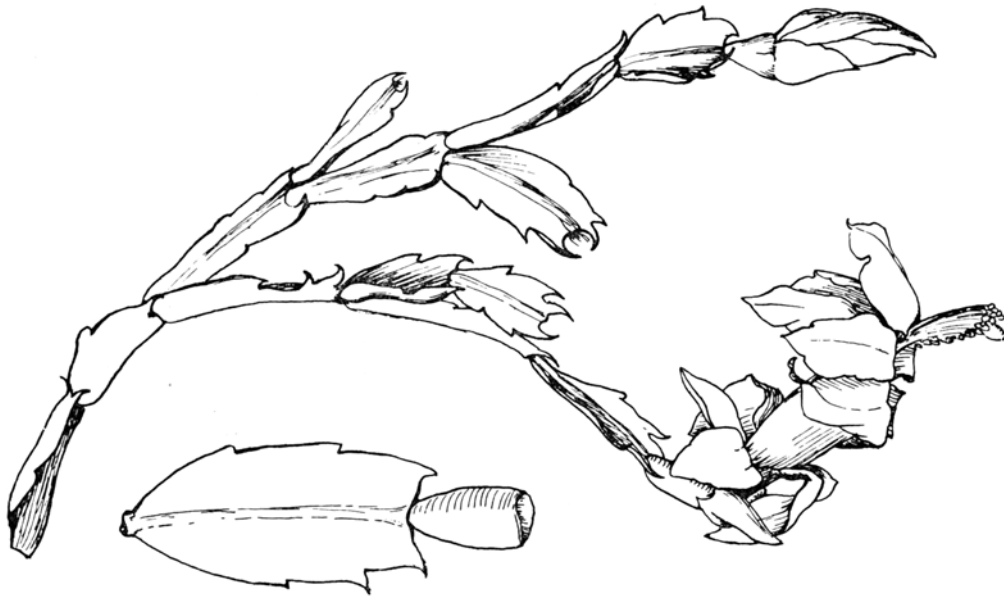
to 7 cm. long; tube 2 cm. long; inner perianth-segments scarlet to white, oblong, obtuse to acute, reflexed; filaments white; style purple throughout; fruit obovoid, 1.5 to 2 cm. long.

*Type locality:* Brazil.

*Distribution:* Mountains, state of Rio de Janeiro, Brazil.

This species has been cultivated widely for many years under various names. It was introduced into cultivation about 1818 and, according to Edwards, flowered first in England in 1822 and has since been a great favorite as a household plant, blooming freely about the end of the year, hence the name Christmas cactus. It is also called crab cactus and ringent-flowered cactus.

Schumann gives as synonyms of this species *Epiphyllum salmoneum* and *E. spectabile*, referring them to Cels's Catalogue, which, however, we have not seen.



FIGS. 185 and 186.—Flowering branch and fruiting joint of *Zygodactylus truncatus*.

*Cereus truncatus altensteinii* (Salm-Dyck, Hort. Dyck. 65. 1834) occurs in literature, sometimes attributed to Otto, but we have seen no description. We follow Löfgren, who refers *Zygodactylus altensteinii* to *Z. truncatus*. The type came from the Organ Mountains near Rio de Janeiro; in 1915, Dr. Rose visited these mountains, where he found the true *Z. truncatus*.

There are many garden varieties, most of which are very beautiful. Among these are *Epiphyllum gibsonii*, introduced in 1886, with dark orange-red flowers, and *Epiphyllum guedeneyi*, of unknown origin, with large flowers, the outer segments white, tinged with sulphur, and the inner ones creamy white; the variety is referred by some to *Phyllocactus guedeneyi*. Nicholson (Dict. Gard. 1:517) describes some of the best as follows:

“*Bicolor*, white, edged with rose; *coccineum*, rich deep scarlet; *elegans*, bright orange-red, centre rich purple; *magnificum*, flowers large, white, tips bright rose-colored; *roseum*, bright rose; *ruckerianum*, deep reddish purple, with a rich violet centre; *salmoneum*, reddish salmon; *spectabile*, white, with delicate purple margin; *violaceum superbum*, pure white, rich deep purple edge.”

Rümpel (Förster, Handb. Cact. ed. 2. 870, 871. 1885) described nine varieties, among which are *cruentum* and *tricolor*; *E. truncatum cruentum* was also briefly described by Morren (Belg. Hort. 16: 260. 1866). Among other varieties are *albiflorum*, *aurantiacum*, *grandidens*, *minus*, *purpuraceum*, and *vanhoutteanum*.



*Epiphyllum ruckeri* Paxton (Mag. Bot. 12: 46. 1846) was described from cultivated plants of unknown origin as an improved variety of *Epiphyllum truncatum*. It may have been a hybrid.

*Epiphyllum truncatum multiflorum* was given as a synonym of *Epiphyllum altensteinii* by Pfeiffer (Enum. Cact. 128. 1837).

*Epiphyllum elegans* Cels and *E. violaceum* Cels (Förster, Handb. Cact. 446. 1846) were supposed to be only varieties of *Epiphyllum truncatum*.

Schelle (Handb. Kakteenk. 223. 1907) lists more than fifty forms of *Epiphyllum truncatum*; the following not hitherto mentioned by us under *Epiphyllum* have the regular Latin form:

amabile roseum	maximum	salmoneum brasiliense	spectabile superbum
carmineum	morellianum	salmoneum flavum	splendens
gracile	pallidum roseum	salmoneum marginatum	translucens
grandiflorum rubrum	purpureum	salmoneum rubrum	violaceum album
harrisonii	rubrum violaceum	snowi	violaceum grandiflorum
lateritium album	salmoneum aurantiacum	spectabile carmineum	superbum
makoyanum			

*Illustrations*: Nov. Herb. Amat. pl. 83; Loudon, Encycl. Pl. 413. f. 6903; Loddiges, Bot. Gart. 13: pl. 1207; Curtis's Bot. Mag. 52: pl. 2562; Edwards's Bot. Reg. 9: pl. 696;

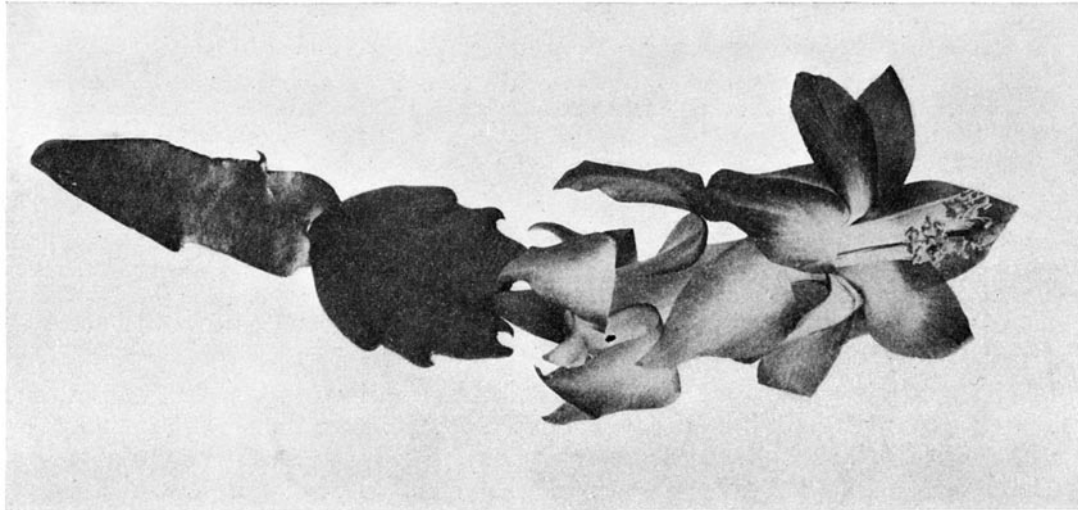


FIG. 187.—*Zygocactus truncatus*.

Reichenbach, Fl. Exot. pl. 325; Hooker, Exot. Fl. 1: pl. 20, as *Cactus truncatus*; Wiener Ill. Gart. Zeit. 18: 265. f. 55, as *Phyllocactus delicatus*; Blühende Kakteen 1: pl. 25; Cact. Journ. 1: 34, 114; Cycl. Amer. Hort. Bailey 2: f. 765; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 61, A, B, C; Schumann, Gesamtb. Kakteen f. 9, 43; Hort. Univ. 7: facing 132; Karsten, Deutsche Fl. 887. f. 501, No. 3; ed. 2. 2: 456. f. 605, No. 3; Förster, Handb. Cact. ed. 2. 129. f. 5; Rümpler, Sukkulente f. 87; Hort. Franc. 11. 4 pl. 3; Schelle, Handb. Kakteenk. 223. f. 145; Balt. Cact. Journ. 1: 49; Floralia 42: 375; Gard. Chron. 1847: 324; 11. 6: 808. f. 148; 111. 7: 173. f. 29; 111. 19: f. 1; West Amer. Sci. 7: 172; Amer. Gard. 11: 534; Schelle, Handb. Kakteenk. 224. f. 146; 225. f. 147; Rother, Praktischer Leitfaden Kakteen 104; Belg. Hort. 16: pl. 257; also the vars. *spectabile*, *cruentum*, and *violaceum*; Deutsches Mag. Gart. Blumen. 1852: pl. 176. f. 2; Gartenwelt 4: 230; Goebel, Pflanz. Schild. 1: f. 55 (seedling); Garten-Zeitung 4: 182. f. 42, No. 2; Jacquin, Ecl. Pl. Rar. 2: pl. 142, as *Epiphyllum truncatum*; Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 28, as *E. altensteinii*; Gard. Chron. 111. 32: f. 140, as *E. delicatum*; Schumann, Gesamtb. Kakteen Nachtr. f. 9; Monatsschr. Kakteenk. 13: 7, as *E. delicatulum*; Deutsches

Mag. Gart. Blumen. 1852: pl. opp. 176, f. 1, as *E. truncatum elegans*; Arch. Jard. Bot. Rio de Janeiro 2: pl. 3, as *Zygocactus delicatus*; Van Géel, Sert. Bot. 1: pl. 117 as *Cactus truncatus*; Martius, Fl. Bras. 4<sup>2</sup>: pl. 46; Contr. U. S. Nat. Herb. 16: pl. 80; Stand. Cycl. Hort. Bailey 6: f. 4055.

Figure 185 shows a plant in the New York Botanical Garden which flowered December 15, 1911; figure 186 shows a fruiting joint collected by Dr. Rose in the Organ Mountains of Brazil in 1915 (No. 20819); figure 187 is from a photograph of a cultivated plant obtained by Dr. Rose in the Botanical Garden at Rio de Janeiro in 1915 (No. 20855).

## 2. EPIPHYLLANTHUS Berger, Rep. Mo. Bot. Gard. 16: 84. 1905.

Plants either epiphytic or growing in shade of rock in rich humus, often in clumps, more or less branched; joints globular, cylindric or much flattened; areoles scattered over surface of joints, circular, tomentose, either with or without spines; flowers zygomorphic, slender, purple to white; stamens somewhat exerted, arranged in 2 series, those forming the inner series united at base; style slender, a little longer than stamens; ovary angled, bearing a few small scales; fruit small.

Type species: *Epiphyllanthus obtusangulus* Berger.

The type of this genus has long been treated as a species of *Cereus*, although its dissimilarity to *Cereus* proper or to any of its immediate relatives must have been observed. It was left to Alwin Berger to call attention to its true alliance and to propose for it a new generic name; his statement regarding it is so clear that we quote from it as follows:

"This very strange little plant, still rare in cultivation, can not be considered either a *Cereus* or an *Epiphyllum*. But no doubt it is much more nearly allied to the latter than to the former genus. Schumann brought it into *Cereus* on account of its round and ribbed stems, but there exists no *Cereus* of a similar articulated growth; only with *Rhipsalis* and *Epiphyllum* can it be compared. The plant resembles somewhat a minute *Platyopuntia*. The joints are slightly flattened and have numerous little prominent areoles distributed spirally all over the surface. In this it differs greatly from *Epiphyllum* with which it agrees in all the characters of the flowers, the angular, nearly alate ovary, and especially in the inner stamens being united at the base into a small incurved membrane. Also, the fruit resembles more that of an *Epiphyllum* than that of a *Cereus*. The flowers rise from the top of the joints as in *Epiphyllum*. The plant is best considered as generically different from both, but must be placed with *Epiphyllum* and *Rhipsalis* among the *Inarmatae* of K. Schumann."

We recognize 3 species, all from central Brazil. All occur on the high mountain Itatiaya, province of Rio de Janeiro; what their actual relationships may be can be determined only by further field observations. They may all be referable to one variable species.

The generic name was given because of the resemblance of the flowers of the type species to those of *Epiphyllum truncatum* (*Zygocactus*).

### KEY TO SPECIES.

- Joints or some of them flattened, *Opuntia*-like. . . . . 1. *E. obovatus*  
 Joints terete or obtusely angled. . . . .  
     Flower purple to rose. . . . . 2. *E. microsphaericus*  
     Flowers white. . . . . 3. *E. candidus*

#### 1. *Epiphyllanthus obovatus* (Engelmann).

*Epiphyllum obovatum* Engelmann in Schumann, Gesamtb. Kakteen 224. 1897.

*Epiphyllum opuntioides* Löfgren and Dusén, Arch. Mus. Nac. Rio de Janeiro 13: 49. 1905.

*Zygocactus opuntioides* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 26. 1918.

Usually growing in shade of rocks, at first erect, becoming more or less decumbent, very much branched; joints usually . to 7 cm. long, obovate to oblong, more or less flattened, often suggesting small joints of some *Opuntia*, bearing scattered areoles and these often spinescent; old and lower joints often nearly terete, bearing large areoles with numerous short yellow spines; flowers 5 cm. long, purple; ovary naked.

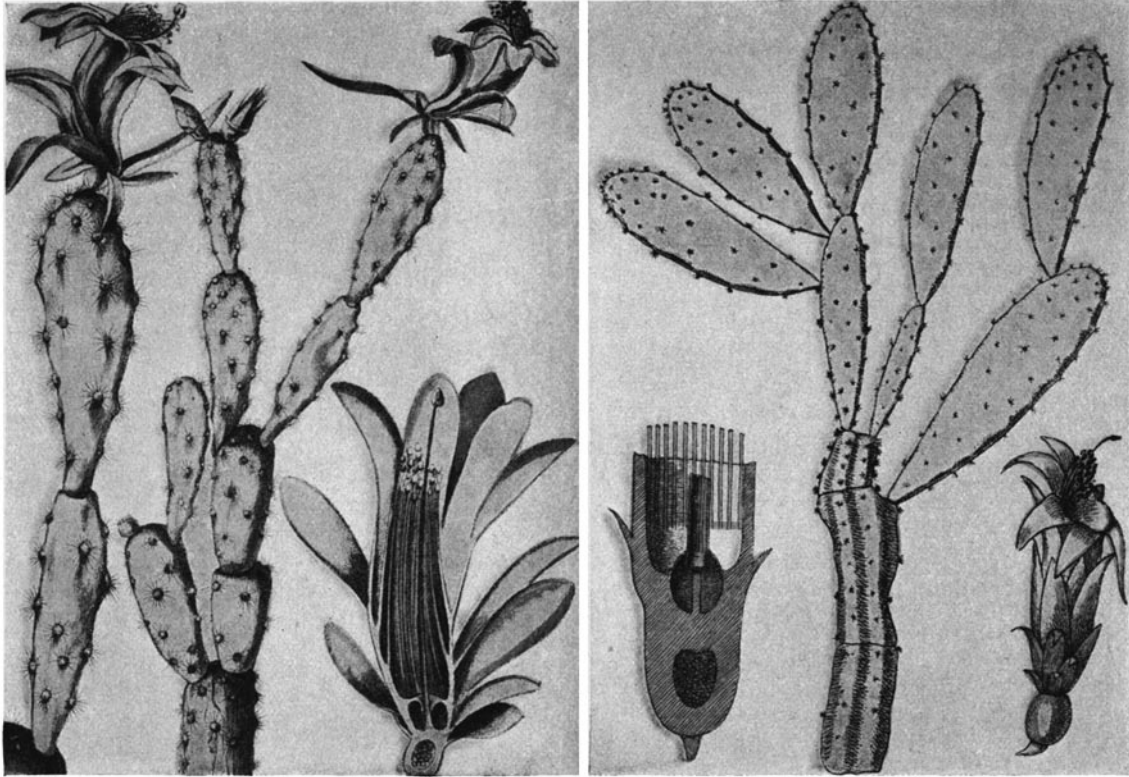
Type locality: Brazil.

Distribution: Central Brazil.

Dr. Rose collected this species on Itatiaya, altitude about 2,300 meters, in July 1915 (No. 20495); the plant did not do well in cultivation with us and his specimens died.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 4, as *Zygocactus opuntioides*; Arkiv Bot. Stockholm 8: pt. 7. 10, as *Epiphyllum opuntioides*.

Figure 188 is reproduced from the first illustration cited above; figure 189 is reproduced from the second illustration cited above.



FIGS. 188 and 189.—*Epiphyllanthus obovatus*.

## 2. *Epiphyllanthus microsphaericus* (Schumann).

*Cereus microsphaericus* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 297. 1890.

*Cereus parvulus* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 297. 1890.

*Cereus obtusangulus* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 298. 1890.

*Cereus anomalus* Schumann, Keys Monogr. Cact. 16. 1903.

*Epiphyllanthus obtusangulus* Berger, Rep. Mo. Bot. Gard. 16: 84. 1905.

*Zygocactus obtusangulus* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 28. 1918.

Low, at first erect, much branched and more or less prostrate, growing under rocks and perhaps epiphytic on trees; joints slender, terete or obtusely angled, somewhat spiny or often naked; flowers all terminal, purple to rose.

*Type locality:* Province of Rio de Janeiro, Brazil.

*Distribution:* Central Brazil.

Dr. Rose collected this species on Itatiaya, Brazil, in 1915 (No. 20494), growing at higher altitudes than *E. obovatus*.

*Epiphyllum obtusangulum* Lindberg (Martius, Fl. Bras. 4<sup>2</sup>: 198. 1890), usually referred here as a synonym, has not been published.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 5, as *Zygocactus obtusangulus*; Schumann, Gesamtb. Kakteen f. 30, as *Cereus obtusangulus*.

Figure 190 is reproduced from the first illustration cited above.



### 3. *Epiphyllanthus candidus* (Löfgren).

*Zygocactus candidus* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 30. 1918.

Usually epiphytic on shrubs, but sometimes growing in the shade of large boulders; joints usually terete or nearly so, 2 to 4 cm. long, naked or sometimes bristly; flowers solitary, terminal, white; fruit globose, red.

*Type locality:* On Itatiaya, Brazil.

*Distribution:* Known only from the type locality.

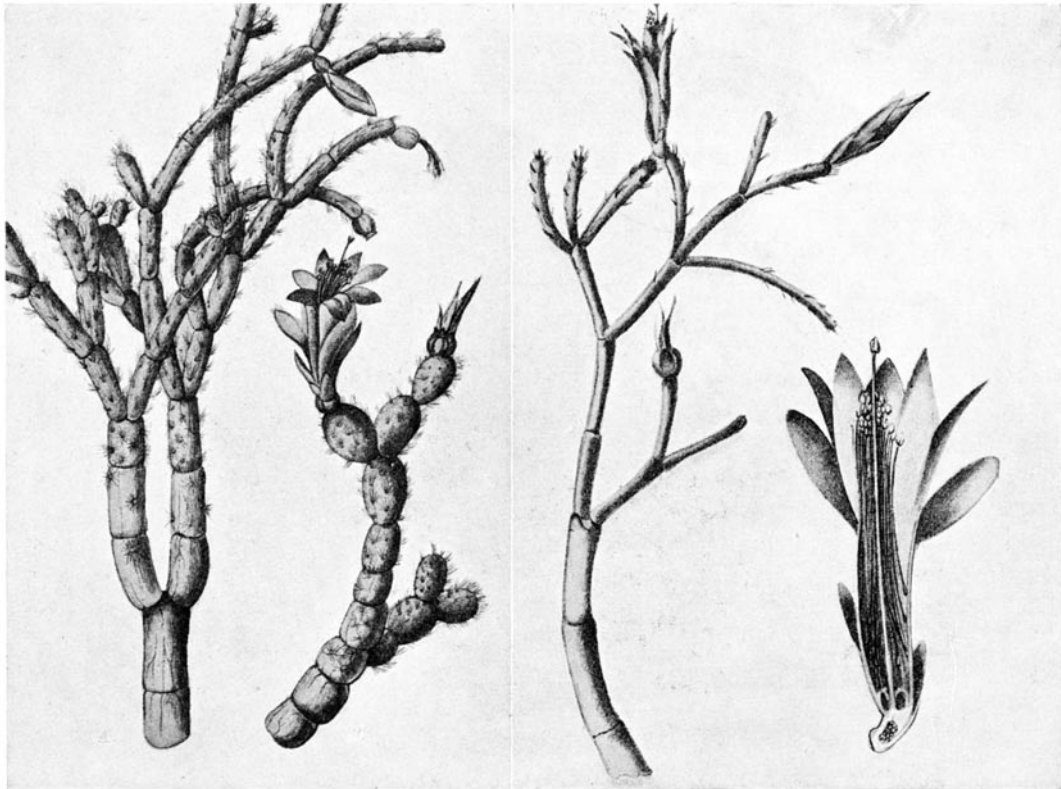


FIG. 190.—*Epiphyllanthus microsphaericus*.

FIG. 191.—*Epiphyllanthus candidus*.

Dr. Rose collected this species on the very top of Itatiaya, growing in the shade of rocks (No. 20610) and in the deep cleft of the rock cap through which the ascent to the top is made.

*Epiphyllum candidum* Barbosa-Rodrigues (Arch. Jard. Bot. Rio de Janeiro 2: 30. 1918) is only a name.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 6, as *Zygocactus candidus*.

Figure 191 is reproduced from the illustration cited above.

### 3. *SCHLUMBERGERA* Lemaire, Rev. Hort. iv. 7 253. 1858.

Similar in habit to *Zygocactus*; stems much branched; joints short, crenate or serrate, mostly flattened; flowers purple to scarlet, regular; tube very short; stamens in 2 clusters, one scattered over the throat, the other forming a short tube at base of flower and surrounding style or free at base; ovary and fruit strongly 5-angled, naked or rarely bearing areole on one of the ribs and crowned by 5 more or less persistent, sepal-like scales; fruit hard, often remaining on plant for a long time.

*Type species:* *Epiphyllum russellianum* Hooker.

The taxonomic history of the two species here recognized is interesting. *Schlumbergera gaertneri* was at first supposed to be conspecific with *S. russelliana* and was made a variety

of that species by Regel. In 1890 Schumann considered them distinct species but congeneric; in 1897 he referred them to different genera. Both species are native of Brazil.

These plants have usually been associated with *Zygocactus truncatus* and all included in *Epiphyllum*. Although resembling *Zygocactus* very much in habit, they differ from it in flower and fruit characters. The flowers are nearly regular, not strongly oblique; are nearly rotate, not elongated; the stamens are of equal length and in a cylindrical cluster shorter than the style, not of unequal lengths and in a flattened cluster, not extending beyond the style; the ovary and fruit are strongly angled, not terete.

Lemaire named the genus for Frederick Schlumberger, an amateur student of plants and a collector of cacti, begonias, and bromelias.

## KEY TO SPECIES.

Flowers scarlet . . . . . 1. *S. gaertneri*  
Flowers purplish . . . . . 2. *S. russelliana*

1. *Schlumbergera gaertneri* (Regel) Britton and Rose, Contr. U. S. Nat. Herb. 16: 260. 1913.

*Epiphyllum russellianum gaertneri* Regel, Gartenflora 33: 323. 1884.

*Epiphyllum makoyanum* W. Watson, Gard. and For. 2: 243. 1889.

*Epiphyllum gaertneri* Schumann in Martius, Fl. Bras. 4: 218. 1890.

*Phyllocactus gaertneri* Schumann in Rümpler, Sukkulenten 147. 1892.

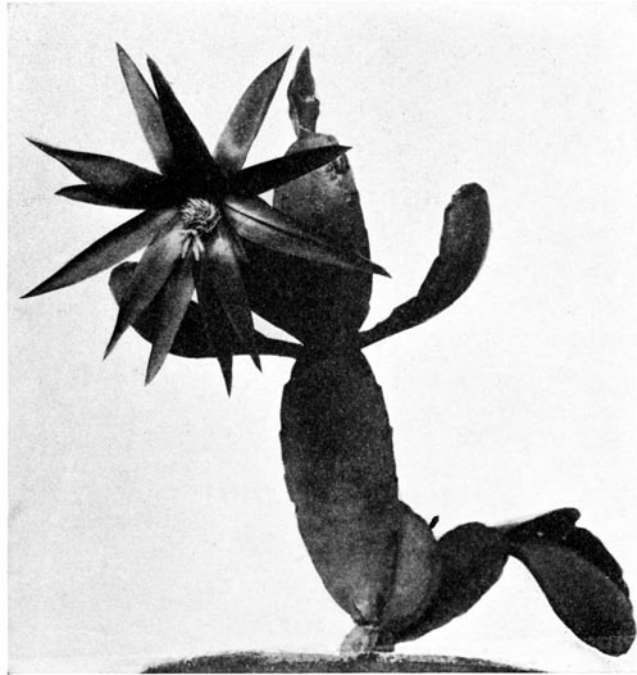


FIG. 192.—*Schlumbergera gaertneri*.

Branches spreading, the terminal ones often pendent; joints usually flattened, but sometimes 3 to 6-angled, fleshy, 5 cm. long or more by 2 cm. broad, dull green except the purplish crenate margins; areoles small, with short white wool and a few yellowish bristles; flowers 1 to 3, usually all at distal end of the terminal branches, 4 cm. long, dark scarlet; outermost perianth-segments usually 5, short, thick, triangular, drying separately from the others; outer perianth-segments spreading; innermost perianth-segments more erect, nearly distinct, acute; all of the segments, except the 5 outer ones, more or less coalesce and withering, remaining on top of ovary; ovary crowned by a slightly depressed disk or umbilicus with upturned margin, which passes into the flower-tube; on the margin are borne the free stamens; style slender, 1.5 cm. long, red; stigma-lobes 6, linear, cream-colored; ovary dark red, angled, 12 mm. long; fruit red, oblong, 15 mm. long, depressed at apex, in cultivation ripening in July.

*Type locality:* Minas Geraes, Brazil.

*Distribution:* Brazil.

While the joints are usually much flattened, yet they are sometimes strongly angled. In some cases too the juvenile growth is peculiar, forming short stubby joints with 6 ribs, with closely set areoles, each bearing a cluster of 7 or more bristly spines.

The plant flowers abundantly in Washington in April.

The two varieties *Epiphyllum gaertneri coccineum* and *E. gaertneri mackoyanum* (Monatsschr. Kakteenk. 7: 101. 1897) are doubtless forms of this species.

*Illustrations:* Wiener Ill. Gart. Zeit. 10: 136. f. 60; Rev. Hort. 59: pl. opt. 516; Blanc, Cacti 64. 1002 Cact. Journ. 1: 9, 114; Gartenflora 33: pl. 1172; 39: f. 96; Rev. Hort. Belg. 15: f. 23; pl. [19.] f. 2, opp. 229, as *Epiphyllum russellianum gaertneri*; Schelle, Handb. Kakteenk. 213. f. 141; Curtis's Bot. Mag. 117: pl. 7201; Gartenwelt 10: 559, as *Epiphyllum gaertneri*; Blühende Kakteen 1: pl. 21; Thomas, Zimmerkultur Kakteen

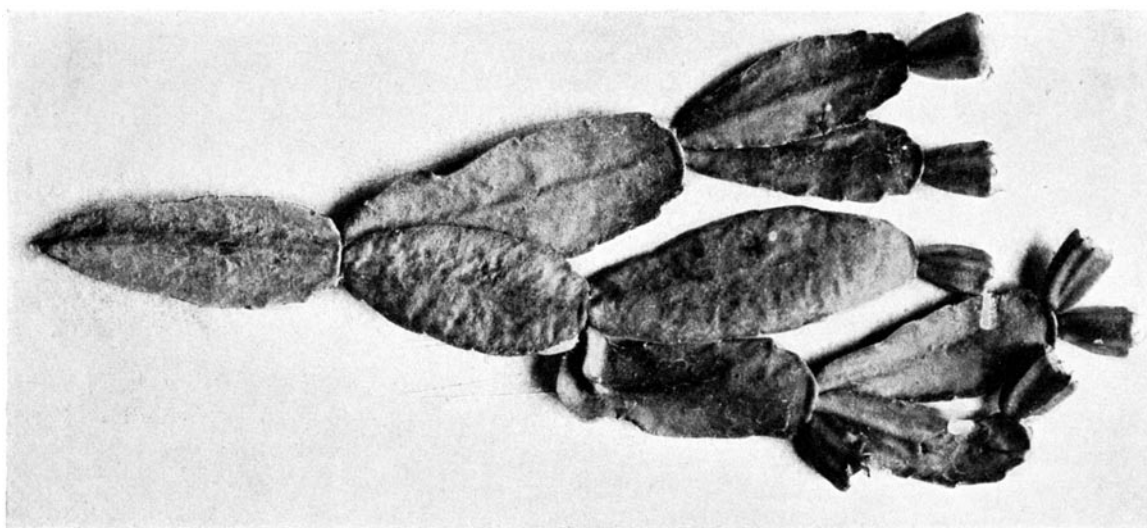


FIG. 193.—*Schlumbergera gaertneri*.

19; Monatsschr. Kakteenk. 4: 107; Rümpler, Sukkulenten 148. f. 80, as *Phyllocactus gaertneri*; Rev. Hort. Belg. 15: pl. [19.] f. 1, opp. 229; Journ. Hort. Home Farm. III. 18: 362. f. 58, as *Epiphyllum makoyanum*.

Figure 192 is from a photograph of a plant which flowered in the New York Botanical Garden in 1912; figure 193 shows a fruiting plant in the collections of the U. S. Department of Agriculture at Washington, D. C.

## 2. *Schlumbergera russelliana* (Gardner) Britton and Rose, Contr. U. S. Nat. Herb. 16: 261. 1913.

*Cereus russellianus* Gardner in Lemaire, Hort. Univ. 1: 31. 1839.

*Epiphyllum russellianum* Hooker in Curtis's Bot. Mag. 66: pl. 3717. 1840.

*Phyllocactus russellianus* Salm-Dyck, Cact. Hort. Dyck. 1844. 37. 1845.

*Epiphyllum truncatum russellianum* G. Don in Loudon, Encycl. Pl. ed. 3. 1378. 1855.

*Schlumbergera epiphyllodes* Lemaire, Rev. Hort. IV. 7: 253. 1858.

Epiphytic, growing on trees, rocks, or in humus, often found in dark crevices, 1 to 3 dm. long, either hanging or erect, much branched, divided into short joints; joints 1 to 2.5 cm. long; lower joints usually terete, covered with a brown epidermis; young joints green, flat, usually thin, with 1 or 2 small teeth on a side, 8 mm. broad or less, usually truncate at apex; areoles in axils of teeth, small, naked or bearing 1 or 2 bristles; flowers terminal, 4 to 5 cm. long, reddish purple; style slender, purple; ovary glabrous, sharply 4-angled, 1-celled; ovules numerous, arranged in 4 or 5 vertical double rows along walls of ovary; fruit described as red, 4-angled, or narrowly wined.



*Type locality:* Organ Mountains, Brazil.

*Distribution:* Brazil.

This plant was introduced into England in 1839. It was named by G. Gardner for the Duke of Bedford, who had sent him to Brazil to collect plants. The Duke of Bedford brought together at Woburn Abbey a very large and choice collection of cacti which became one of the finest in England. His gardener, Mr. James A. Forbes, published a catalogue of this collection in 1837.

Two varieties of this species are mentioned in horticultural works, namely, var. *rubra* and var. *superbum* under *Epiphyllum russellianum*.

*Illustrations:* Curtis's Bot. Mag. 66: pl. 3717; Watson, Cact. Cult. 42. f. 9; Dict. Gard. Nicholson Suppl. 346. f. 370; Gartenflora 33: pl. 1172; Förster, Handb. Cact. ed. 2. 873. f. 119; Rother, Praktischer Leitfaden Kakteen 106; Paxton's Mag. Bot. 10: facing 245, as *Epiphyllum russellianum*; Hort. Univ. 1: pl. 5, as *Cereus russellianus*; Rümpler, Sukkulente 146. f. 79, as *Phyllocactus russellianus*; Cycl. Amer. Hort. Bailey 2: f. 766, as *Epiphyllum truncatum russellianum* (perhaps a hybrid); Contr. U. S. Nat. Herb. 16: pl. 81.

#### SPECIES OF THIS RELATIONSHIP.

EPIPHYLLUM BRIDGESII Lemaire, Illustr. Hort. 8: Misc. 5. 1861.

*Epiphyllum truncatum bridgesii* Rümpler in Förster, Handb. Cact. ed. 2. 870. 1885.

Epiphytic; joints green, flattened with 2 or more crenations on the side; areoles more or less setose, the setae yellowish brown; flowers terminal, 6 cm. long, nearly regular, purplish to crimson; perianth-segments oblong, acute; stamens long-exserted; style about as much exserted as stamens, purplish; ovary angled, angles sometimes bearing setose areoles.

*Type locality:* Not cited. Described from garden plants of unknown origin.

*Distribution:* Brazil or Bolivia or both.

This plant was described by Lemaire from a vegetative specimen seen in the collection of L. Desmet and from one in the collection of Schlumberger. He associated it with *Epiphyllum russellianum*, with which it must be allied, rather than with *E. truncatum*, to which it is referred as a synonym by the Index Kewensis.

Schlumberger had named the plant *Epiphyllum rueckerianum*, and here this name, often referred to in horticultural literature, should be referred.

It was briefly described by W. Watson (Gard. For. 2: 243. 1889), who writes of its being awarded a first-class certificate at a flower show.

Schumann unfortunately describes the flower as zygomorphic, which may be an error; specimens recently sent to us from A. Berger have a regular flower. The ovary was originally described as angled and this is one of the differences between *Zygocactus* and *Schlumbergera*.

We do not know the origin of this plant. As it seems to have been introduced by Bridges it may have come from Bolivia, where he did much of his work.

This plant is sometimes called *Epiphyllum truncatum rueckerianum*.

*Illustration:* Dict. Hort. Bois 497. f. 347, as *Epiphyllum ruckerianum*.

#### 4. EPIPHYLLUM (Hermann) Haworth, Syn. Pl. Succ. 197. 1812.

*Phyllocactus* Link, Handb. Erkenn. Gewächse 2: 10. 1831.

*Phyllocereus* Miquel, Bull. Sci. Phys. Nat. Néerl. 112. 1839.

Plants mostly epiphytic, the main stem often terete and woody; branches usually much flattened, often thin and leaf-like, sometimes 3-winged; areoles small, borne along the margins of the flattened branches; spines usually wanting in mature plants, but often represented in seedlings and juvenile forms by slender bristles; true leaves wanting; cotyledons rather large, sometimes persisting for a long time; flowers usually large, in some species nocturnal, in others diurnal, either odorless or very fragrant; flower-tube longer than the limb, in some species greatly elongated; filaments usually long, borne at top of tube or scattered over surface of throat; style elongated, white or

colored; stigma-lobes several, linear; perianth soon dropping from the ovary; fruit globular or short-oblong to narrowly oblong, often with low ridges, sometimes tubercled, red or purple, edible or insipid, when mature splitting down one side and exposing the white or crimson pulpy interior; seeds black, shining.

Type species: *Cactus phyllanthus* Linnaeus.

The generic name is from ἐπί upon, and φύλλον leaf, as it was supposed that the flowers were borne on leaves; it is a misnomer, for the flowers are not borne on leaves but on stems as in all other cacti.

In 1890 K. Schumann recognized 15 species; but, as a number of new ones were described soon afterward, he increased this number to 21 in his Keys of the Monograph published in 1903. In our treatment 16 species are recognized.

The name *Epiphyllum* is often used for a different group of cacti, that is, the crab cactus; the type species of *Epiphyllum* is, however, in the genus as we have here limited it. When Haworth published the genus he referred to it but one species, *Epiphyllum phyllanthus*, but he later added another species, *E. truncatum*, which, when it was found to belong to a different generic type, was erroneously allowed to retain the name *Epiphyllum*, while *Epiphyllum phyllanthus* became the type of the genus *Phyllocactus*, which, when first described in 1831, contained but a single species, so that *Epiphyllum* and *Phyllocactus* were based on the same type and *Phyllocactus* is a synonym of *Epiphyllum*. This is also true of *Phyllocereus*, which was based on the *Epiphyllum* of Haworth (Syn. Pl. Succ. 197. 1812), where only *E. phyllanthus* is described.

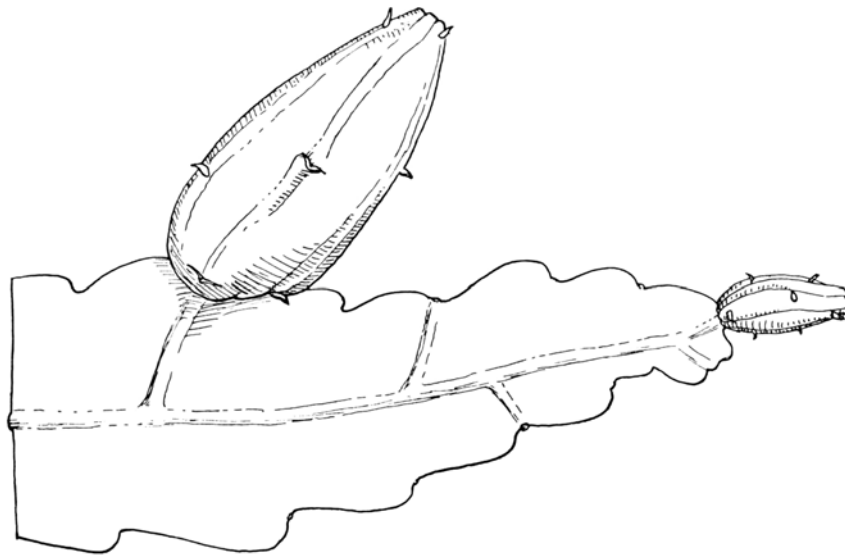


FIG. 194.—Top of fruiting branch of *Epiphyllum phyllanthus*.  $\times 0.66$ .

The pre-Linnaean species of this genus were usually referred to *Cereus* and, for it, the section *Alati* in *Cereus* was proposed by De Candolle (Prodr. 3: 469. 1828). Linnaeus, however, referred the only species which he recognized to *Cactus*, and Philip Miller referred the same species to *Opuntia*, but neither have had many followers.

Haworth (Phil. Mag. 6: 108, 109. 1829) followed by Don (Hist. Dichl. Pl. 3: 170. 1834) divides the genus into two sections, the *Nocturna* and the *Diurna*.

*Phyllanthus* Nicker (Elam. 2: 85. 1790) is generally supposed to be a synonym of this group but the genus is not typified; the Index Kewensis refers it to *Cereus* (?); Dr. E. L. Greene (Leaflets 1: 52) says that it applied to *Phyllanthus* and *Opuntia* of earlier authors: the *Phyllanthus* here referred to was *Cactus phyllanthus* Linnaeus.

Hermann (Par. Botavus Prodr. Add. 2. 1689) first used the name *Epiphyllum* when he listed the name *Epiphyllum americanum*. Haworth credited the name also to Hermann in 1812 when he established the genus.

## KEY TO SPECIES.

- A. Perianth-tube 7 to 9 times as long as the limb. . . . . 1. *E. phyllanthus*  
 AA. Perianth-tube 1½ to 3 times as long as the limb.  
 B. Ultimate joints acuminate.  
 Flowers 25 to 30 cm. long . . . . . 2. *E. oxypetalum*  
 Flowers 10 to 15 cm. long.  
 Margins of joints crenate . . . . . 3. *E. pumilum*  
 Margins of joints undulate . . . . . 4. *E. caudatum*  
 BB. Ultimate joints acute, obtuse or rounded.  
 C. Joints deeply lobed.  
 Joints 2 to 7 cm. broad.  
 Lobes of joints spreading; outer perianth-segments lemon-yellow. . . . . 5. *E. darrahii*  
 Lobes of joints pointing forward; outer perianth-segments reddish yellow . . . . . 6. *E. anguliger*  
 Joints very large, up to 25 cm. broad . . . . . 7. *E. grandilobum*  
 CC. Joints crenate or nearly entire.  
 D. Joints deeply crenate, thick; perianth-tube bearing foliaceous scales . . . . . 8. *E. crenatum*  
 DD. Joints low-crenate to nearly entire; perianth-tube without foliaceous scales.  
 E. Sinui of the joint-margins very narrow; flowers up to 20 cm. broad;  
 stamens yellow . . . . . 9. *E. macropterum*  
 EE. Sinui of the joint-margins open; flowers 15 cm. wide or less; stamens  
 not yellow.  
 Ovary and fruit bearing linear scales . . . . . 10. *E. lepidocarpum*  
 Ovary and fruit without linear scales.  
 Flowers 10 to 13 cm. long . . . . . 11. *E. pittieri*  
 Flowers 15 to 28 cm. long.  
 Flowers about 28 cm. long; style orange . . . . . 12. *E. guatemalense*  
 Flowers 15 to 25 cm. long; style white or pink.  
 Joints very stiff . . . . . 13. *E. strictum*  
 Joints flexible or moderately stiff.  
 Joints very large, up to 1 meter long and 22 cm. wide . . . . . 14. *E. stenopetalum*  
 Joints smaller, rarely ever 7 cm. wide.  
 Joints shallowly crenate or subdentate; species of Costa  
 Rica . . . . . 15. *E. cartagense*  
 Joints deeply crenate; species of Tobago, Trinidad, and  
 Venezuela . . . . . 16. *E. hookeri*

**1. *Epiphyllum phyllanthus* (Linnaeus) Haworth, Syn. Pl. Succ. 197. 1812.**

- Cactus phyllanthus* Linnaeus, Sp. Pl. 469. 1753.  
*Opuntia phyllanthus* Miller, Gard. Dict. ed. 8. No. 9. 1768.  
*Cereus phyllanthus* De Candolle, Prodr. 3: 469. 1828.  
*Phyllocactus phyllanthus* Link, Handb. Erkenn. Gewächse 2: 11. 1831.  
*Rhipsalis macrocarpa* Miquel, Bull. Sci. Phys. Nat. Néerl. 1838: 49. 1838 (in most part).  
*Rhipsalis phyllanthus* Schumann in Martius, Fl. Bras. 4: 298. 1890 (in part).  
*Hariota macrocarpa* Kuntze, Rev. Gen. Pl. 1: 263. 1891.  
*Phyllocactus phyllanthus paraguayensis* Weber, Dict. Hort. Bois 957. 1898.  
*Phyllocactus phyllanthus boliviensis* Weber, Dict. Hort. Bois 957. 1898.  
*Phyllocactus phyllanthus columbiensis* Weber, Dict. Hort. Bois 957. 1898.  
*Epiphyllum gaillardae* Britton and Rose, Contr. U. S. Nat. Herb. 16: 240. 1913.  
*Phyllocactus gaillardae* Vaupel, Monatsschr. Kakteenk. 23: 87. 1913.

Elongated and much branched; main branches narrow, terete or 3 or 4-angled, woody; terminal joints elongated, terete or 3-angled below, usually flat or thin, rarely 3-winged, bright green with a purple margin, sometimes 7 cm. broad, obtuse, the margin coarsely serrate, the teeth obtuse; flower slender, 25 to 30 cm. long, the slender tube very much longer than the limb, green, the limb greenish or white, its segments narrow, 2 to 2.5 cm. long; scales on flower-tube few, minute, spreading; style long, slender, pinkish (Schumann says white); filaments short; stigma-lobes short, white; fruit oblong, 7 to 9 cm. long, somewhat 8-ribbed, bright red; pulp white; seeds large, black, numerous.

According to De Candolle, the flowers are nocturnal and odoriferous.

*Type locality:* Brazil.

*Distribution:* Panama to British Guiana, Bolivia, Peru, and Brazil. Recorded from Paraguay.



The species has been recorded from the West Indies, apparently erroneously.

Our description is based on field notes made by Dr. Rose in Brazil in 1915 which differ slightly from published descriptions. This plant is common in the woods along the coast of eastern Brazil, often growing in inaccessible places high up in the great trees. Open flowers were not seen, but buds, fruit, and seeds were obtained. Living plants were collected and these have done well; one flower appeared in the collection of the Department of Agriculture during Dr. Rose's absence in Ecuador in 1918. The caretaker, Mr. Fraile, describes the flower as long and slender and very unlike other species of *Epiphyllum*, of which he has seen many (Rose, No. 19627). It fruited in the New York Botanical Garden in 1920. The plant is called for de baile or flower of the ball.

An *Epiphyllum* grows in the lowlands of Ecuador which we have tentatively referred here, although we have never seen its flowers or fruits. Dr. Rose collected it below Huigra, September 8, 1918 (No. 22614), and again above Santa Rosa near Limón Playó, October 17 (No. 23493).

*Cactus phyllanthus* of Linnaeus (Sp. Pl. 469. 1753) and *Epiphyllum phyllanthus* Haworth (Syn. Pl. Succ. 197. 1812) both contain references not only to this species but to *Epiphyllum phyllanthoides* also.

The variety *columbiensis* was described by both Weber and Schumann with a flower-tube only 6 cm. long.

*Cereus phyllanthus marginatus* Parmentier is mentioned by Lemaire (Cact. Gen. Nov. Sp. 76. 1839) but not described.

*Illustrations:* Contr. U. S. Nat. Herb. 16: pl. 68, as *Epiphyllum gaillardae*; Pfeiffer and Otto, Abbild. Beschr. Cact. 1: pl. 10, f. 1, as *Cereus phyllanthus*; Petiver, Gazoph. Dec. pl. 59, f. 10. 1709, as *Heliotropium*, etc.; Dillenius, Hort. Elth. pl. 64, as *Cereus scolopendrii*, etc.; De Candolle, Pl. Succ. Hist. pl. 145; Vellozo, Fl. Flum. 5: pl. 33 (except flower), as *Cactus phyllanthus*; Monatsschr. Kakteenk. 2: 73, as *Phyllocactus phyllanthus*; Martius, Fl. Bras. 4<sup>2</sup>: pl. 44.

Figure 194 is from a photograph of a fruiting branch borne on the specimens obtained by Dr. Rose in Brazil in 1915; figure 195 shows a seedling with its two large cotyledons, grown from seeds sent by Mrs. D. D. Gaillard from Panama.

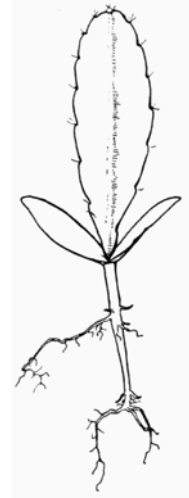


FIG. 195.—Seedling of *Epiphyllum phyllanthus*.  $\times 0.6$ .

## 2. *Epiphyllum oxypetalum* (De Candolle) Haworth, Phil. Mag. 6: 109. 1829.

*Cereus oxypetalus* De Candolle, Prodr. 3: 470. 1828.

*Cereus latifrons* Pfeiffer, Enum. Cact. 125. 1837.

*Phyllocactus oxypetalus* Link in Walpers, Repert. Bot. 2: 341. 1843.

*Phyllocactus latifrons* Link in Walpers, Repert. Bot. 2: 341. 1843.

*Phyllocactus grandis* Lemaire, Fl. Serr. 3: 255b. 1847.

*Phyllocactus guyanensis* Brongnart in Labouret, Monogr. Cact. 416. 1853.

*Epiphyllum acuminatum* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 222. 1890.

*Phyllocactus acuminatus* Schumann, Gesamtb. Kakteen 213. 1897.

*Phyllocactus purpusii* Weingart, Monatsschr. Kakteenk. 17: 34. 1907.

*Epiphyllum grande* Britton and Rose, Contr. U. S. Nat. Herb. 16: 257. 1913.

Plants stout, 3 meters long or more, much branched; branches flat and thin, 10 to 12 cm. broad, long-acuminate, deeply crenate; flowers opening in the evening, drooping and limp after anthesis, fragrant; tube of flower 13 to 15 cm. long, rather stout, red, about 1 cm. thick, bearing distant narrow scales about 10 mm. long; outer perianth-segments narrow, reddish to amber, 8 to 10 cm. long; inner perianth-segments oblong, white; stamens numerous, white; style white, thick, 20 cm. long; stigma-lobes numerous, cream-colored, entire.

*Type locality:* Mexico.

*Distribution:* Mexico and Guatemala, Venezuela, and Brazil. Widely cultivated in the tropics and doubtless an escape in many places.

This species has long been cultivated and has always been a great favorite on account of the ease with which it is grown and the abundance of large flowers it furnishes. These begin to open in the early evening and are perfect about midnight.

According to Mr. Pittier, this plant is known as flor de baile in Venezuela.

*Epiphyllum latifrons* Zuccarini (Pfeiffer, Enum. Cact. 125. 1837) was given as a synonym of *Cereus latifrons* when that name was first published.

The name *Cactus oxypetalus* Mocino and Sesse was the first one given to this plant, but De Candolle (Prodr. 3: 470. 1828) published the species as a *Cereus*, citing the above name as a synonym.

The following hybrids were listed by Labouret (Monogr. Cact. 429. 1853) between *Phyllocactus latifrons* and some other species of *Epiphyllum* or related genera; *Phyllocactus longipes*, *P. lothii*, *P. londonii*, *P. macquianus*, *P. maelenii*, *P. maurantianus*, *P. mexicanus*, *P. roseus albus*, *P. roseus superbus*, *P. selloi*, *P. smoli*, and *P. smithii*.

*Illustrations:* Monatschr. Kakteenk. 17: 35, as *Phyllocactus purpusii*; Meehans' Monthly 12: 188, as *Epiphyllum latifrons*; Mém. Mus. Hist. Nat. Paris 17: pl. 14, as *Cereus oxypetalus*; Förster, Handb. Cact. ed. 2. 849. f. 112, as *Phyllocactus oxypetalus*; Rother, Praktischer Leitfaden Kakteen 93; Monatschr. Kakteenk. 20: 123, as *Phyllocactus grandis*; Martius, Fl. Bras. 4<sup>2</sup>: pl. 45, as *Epiphyllum acuminatum*; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 59, D, as *Phyllocactus acuminatus*; Gard. Chron. 1849: 788; Pfeiffer and Otto, Abbild. Besch. Cact. 1: pl. 10, f. 2, 3; Curtis's Bot. Mag. 67: pl. 3813, as *Cereus latifrons*; Gartenwelt 10: 560; Cact. Journ. 1: 55; Goebel, Pflanz. Schild. 1: pl. 2, f. 6; Schelle, Handb. Kakteenk. 209. f. 139; 210. f. 10, as *Phyllocactus latifrons*.

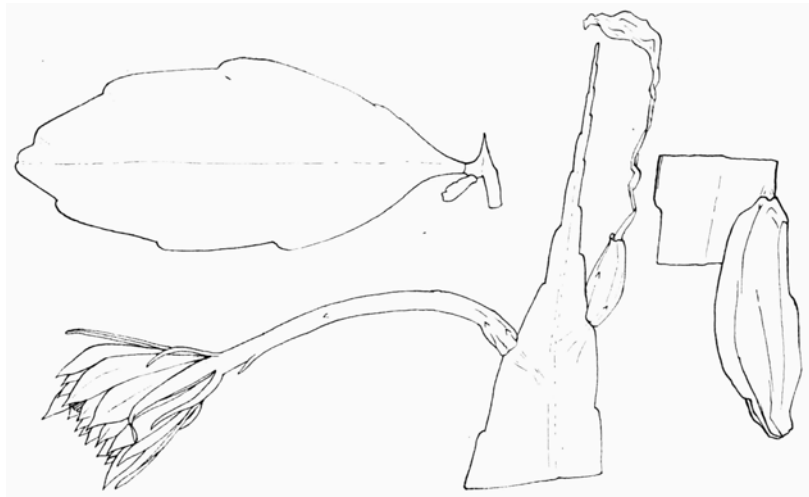


FIG. 196.—*Epiphyllum pumilum*.  $\times 0.5$ .

### 3. *Epiphyllum pumilum* Britton and Rose, Contr. U. S. Nat. Herb. 16: 258. 1913.

*Phyllocactus pumilus* Vaupel, Monatschr. Kakteenk. 23: 117. 1893.

At first erect or ascending but often becoming pendent, sometimes 5 meters long; main stems terete; branches of two types; some of them elongated, 8 to 15 dm. long, terete, whip-like, sometimes becoming flattened at tip; some broad and flattened, rarely 3-winged, except at base, usually acute or acuminate, 1 to 6 dm. long, 3 to 8.5 cm. broad, becoming thick when old, the margin remotely toothed; flowers small for the genus; tube . to 6 cm. long, greenish white to reddish, bearing a few very small ascending and appressed reddish scales; outer perianth-segments linear, greenish or reddish, acute; inner perianth-segments white, lanceolate, acuminate, 3 to 4 cm. long; stamens in two groups; style slender, white, oblong, 4 to 7 cm. long, 2 to 2.5 cm. in diameter; fruit brilliant cerise when ripe, 5 to 7-ridged, bearing a few very small reddish ascending scales; pulp of fruit white, edible, sweet; seeds minute, jet-black.

*Type locality:* Guatemala.

*Distribution:* Lowlands of Guatemala.

This species has frequently been collected in Guatemala and is usually called *Epiphyllum pittieri*, which it somewhat resembles in the size of the flower, but the style is always white.

The flowers are night-blooming and sweet-scented. The fruit is much sought after by the Guatemalan Indians, who call it pitahaya.

The above description is based on living specimens, full notes, and drawings, furnished by Harry Johnson, a very keen observer, at one time stationed in Guatemala.

Figure 196 is copied from pencil sketches made by Mr. Harry Johnson at Chamá, Alta Verapaz, Guatemala, in 1920.

**4. *Epiphyllum caudatum*** Britton and Rose, Contr. U. S. Nat. Herb. 16: 256. 1913.

*Phyllocactus caudatus* Vaupel, Monatsschr. Kakteenk. 23: 116. 1913.

Old stems terete and slender; lateral branches elongated-lanceolate, cuneately narrowed at base into a terete stalk, long-acuminate, 15 to 20 cm. long, 3 to 4 cm. wide, the margins low-undulate; flowers white, the tube slender, about 7 cm. long; inner perianth-segments about 6 cm. long; ovary and most of the flower-tube quite naked.

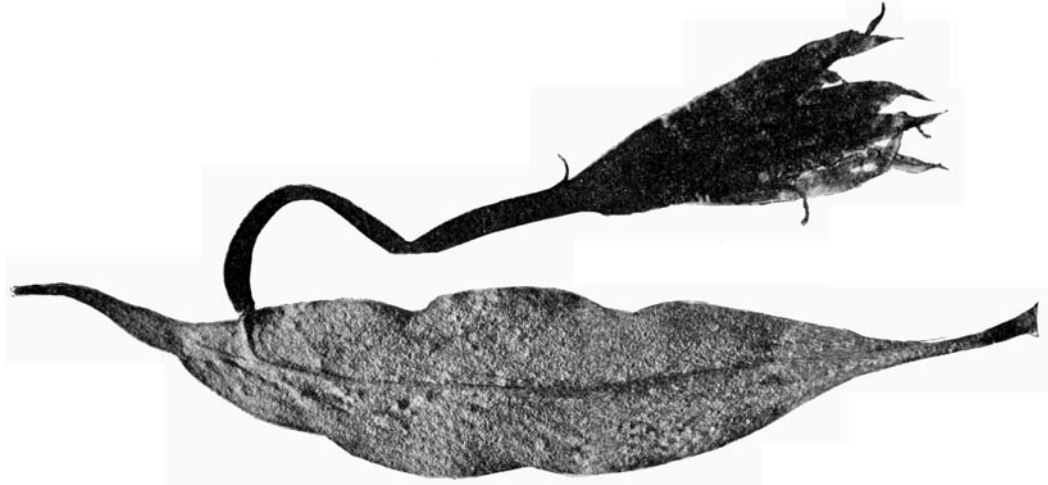


FIG. 197.—*Epiphyllum caudatum*.

*Type locality:* Near Comaltepec, Oaxaca, Mexico, altitude 540 to 900 meters.

*Distribution:* Known only from the type locality.

We have seen no specimens of this species except the type, but Dr. B. P. Reko, under date of June 28, 1919, wrote that he had seen the plant not only at Comaltepec, but at other places in the Sierra Juarez.

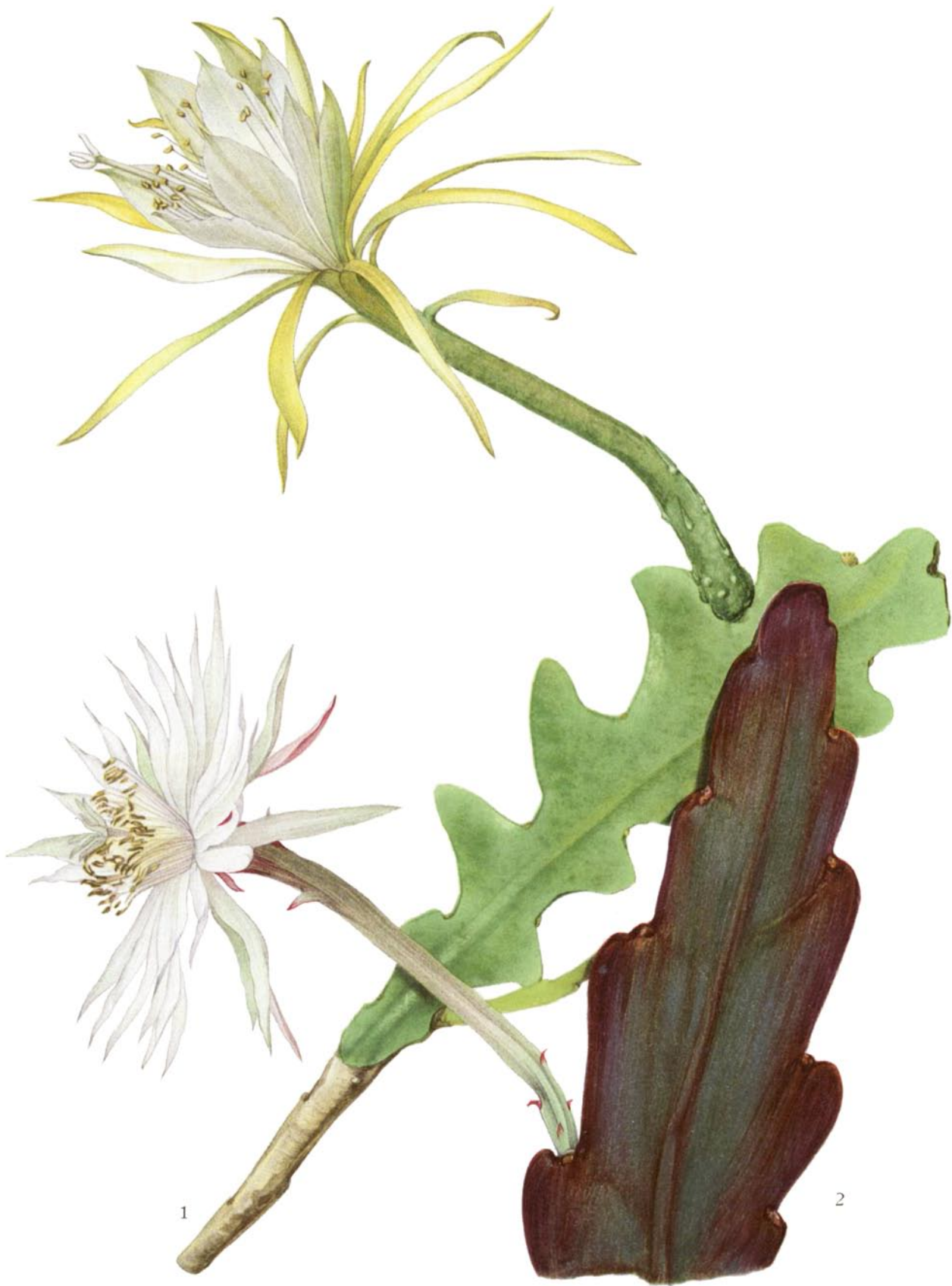
A plant sent from Chiapas, Mexico, by Dr. C. A. Purpus in 1920 has joints with similar acuminate tips, but the margins are indented. We do not know its flowers.

Figure 197 is from a photograph of the type specimen.

**5. *Epiphyllum darrahii*** (Schumann) Britton and Rose, Contr. U. S. Nat. Herb. 16: 256. 1913.

*Phyllocactus darrahii* Schumann, Gesamtb. Kakteen Nachtr. 69. 1903.

Stems much branched, often terete and woody below; joints rather thick, 2 to 3 dm. long, 3 to 5 cm. wide, deeply lobed, sometimes nearly to the midrib, the lobes usually obtuse; tube of flower 9 cm. long, somewhat curved, greenish; scales on tube and ovary small, linear, green, appressed; outer perianth-segments 10, linear, spreading or reflexed, acute, 4 cm. long, lemon-yellow; inner perianth-segments pure white, nearly as long as the outer, broader and more erect, short-



1

2

M. E. Eaton del.

1. Flowering plant of *Epiphyllum darrabii*.
2. Top of flowering plant of *Epiphyllum pittieri*.

A. Hoehn & Co. Baltimore





acuminate; filaments white, nearly as long as the perianth-segments; style overtopping the stamens, pure white; stigma-lobes 8, linear.

*Type locality:* Mexico.

*Distribution:* Mexico, but range unknown.

This species was named for Charles Darrah of Heaton Mersey near Manchester, England (1844-1903). His large and valuable collection of succulents, especially cacti, was presented to the Corporation of Manchester by his widow and family and is now housed in specially constructed houses in Alexander Park. In 1908 the late Robert Lamb published a catalogue of 129 pages of this collection.

The plant is cultivated in Mexico and is much prized as a potted plant for the patio; one of these was obtained by Dr. Rose in Ixmiquilpan in 1905 (No. 9091). Living specimens were sent home and these have repeatedly flowered in Washington and New York. It flowers abundantly, its blossoms giving off a most delicious honeysuckle-like fragrance; we have seen no specimens of wild plants.

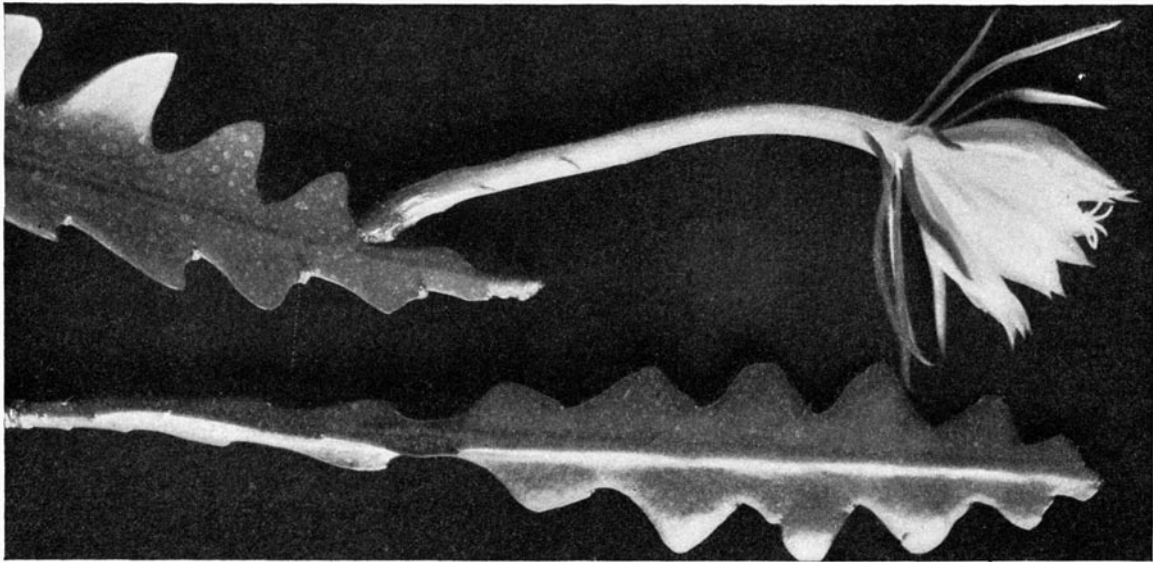


FIG. 198.—*Epiphyllum darrahii*.

*Illustration:* Blühende Kakteen 2: pl. 91, as *Phyllocactus darrahii*.

Plate XVI, figure 1, shows the plant in flower, collected by Dr. Rose in Mexico in 1905, which flowered in the New York Botanical Garden in September 1917. Figure 198 is from a photograph of the plant collected by Dr. Rose at Ixmiquilpan, Mexico, in 1905 which afterwards flowered in Washington.

**6. *Epiphyllum anguliger*** (Lemaire) Don in Loudon, *Encycl. Pl. ed. 3.* 1380. 1855.

*Phyllocactus anguliger* Lemaire, *Jard. Fleur.* 1: pl. 92. 1851.

*Phyllocactus serratus* Brongnart in Labouret, *Monogr. Cact.* 417. 1853.

Much branched; stems and lower branches terete; upper branches flattened with deeply toothed margins, rather fleshy; areoles small, usually felted and sometimes bearing 1 or 2 white bristles; flower-tube stout, without scales, about 8 cm. long; outer perianth-segments brownish yellow, inner perianth-segments white, oblong, acuminate, about 5 cm. long; style slender, white.

*Type locality:* Near Matanejo, Mexico.

*Distribution:* Central and southern Mexico.

We know the species only from cultivated plants. When not in flower it is difficult to distinguish it from *Epiphyllum darrahii*.

This plant was first distributed by the Horticultural Society of London, which obtained it from the collector, T. Hartweg, in 1846, from southern Mexico, where it was found growing on oak trees.

*Phyllocactus angularis* occurs in the index of Labouret's Monograph (511), credited to Lemaire, and also is listed in the Index Kewensis. It may have been a manuscript name for this species.

*Illustrations:* Lemaire, Jard. Fleur. 1: pl. 92; Lindley and Paxton, Fl. Gard. 1: pl. 34; Curtis's Bot. Mag. 85: pl. 5100; Dict. Gard. Nicholson 3: f. 134; Amer. Gard. 11: 538; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 24; Cycl. Amer. Hort. Bailey 1: f. 306; Palmer, Cult. Cact. 167; Watson, Cact. Cult. 48. f. 11; ed. 3. f. 9; Florialia 42: 377, as *Phyllocactus anguliger*.

**7. *Epiphyllum grandilobum*** (Weber) Britton and Rose, Contr. U. S. Nat. Herb. 16: 257. 1913.  
*Phyllocactus grandilobus* Weber, Bull. Mus. Hist. Nat. Paris 8: 464. 1902.

Branches bright green, very large, up to 25 cm. broad with the margins deeply lobed and with a thick midvein and obtuse or rounded apex; lobes rounded, 3 to 5 cm. long; flowers described as large, white, opening at night; fruit red without.

*Type locality:* La Hondura, Costa Rica.

*Distribution:* Costa Rica.

Weber speaks of this as a very remarkable species of which he had not seen flowers or fruit. His description was based on specimens collected by Wercklé in 1900 and also by Pittier in 1905.

Specimens of the type collection were obtained by Mr. Wm. R. Maxon from A. Brade in Costa Rica in 1906 (No. 13), but these have never flowered. In the New York Botanical Garden is a small specimen received from Wercklé in 1902 as *Epiphyllum grandilobum*; this shows one very deep lobe; a young joint shows shallow crenations and suggests *E. macropterum*. A plant of this relationship was collected by Mr. Pittier in Panama in 1911 (No. 4229) and is now growing in Washington, but has not flowered.

We believe that *Phyllocactus macrolobus* of Schumann's Keys belongs here, the specific name in error for *grandilobus*.

**8. *Epiphyllum crenatum*** (Lindley) G. Don in Loudon, Encycl. Pl. ed. 3. 1378, 1855.

*Cereus crenatus* Lindley in Edwards's Bot. Reg. 30: pl. 31. 1844.

*Phyllocactus crenatus*\* Lemaire, Hort. Univ. 6: 87. 1845.

*Phyllocactus caulorrhizus* Lemaire, Jard. Fleur. 1: Misc. 6. 1851.

*Epiphyllum caulorbizum* G. Don in Loudon, Encycl. Pl. ed. 3. 1380. 1855.

Old stems woody and terete; branches glaucous, often rooting at the tips, rather stiff, 2 to 3 cm. broad, obtuse, erect, at least at first, with large deep crenations, cuneate at base, the midrib thick; areoles at base of stem and branches often bearing hairs or small bristles; flowers very fragrant, rather large, the limb 10 to 12 cm. broad, cream-colored to greenish yellow, tube 10 to 12 cm. long, slender, bearing linear scales 2 to 3 cm. long; inner perianth-segments oblanceolate, 6 cm. long; filaments yellow; style white; stigma-lobes narrow; ovary scaly, some of the scales 2 cm. long, somewhat spreading.

*Type locality:* Honduras.

*Distribution:* Honduras and Guatemala.

This species has long been a favorite with gardeners, and many hybrids with it have been produced; the flowers, which are delicately fragrant, are diurnal and remain expanded for several days.

Among hybrids with other species are *Phyllocactus crenatus amaranthinus*, *P. elegans*, *erleri*, *haageanus*, *lateritius*, *roseus*, *splendens*, *superbus*, and *vogelii*.

*Illustrations:* Edwards's Bot. Reg. 30: pl. 31, as *Cereus crenatus*; Blühende Kakteen 3: pl. 180, as *Phyllocactus crenatus vogelii*; Gartenflora 40: pl. 1347; Garten-Zeitung 4: 182.

\* This name was also published by Walpers in 1843 (Repert. Bot. 2. 820).



M. E. Eaton del.

1. End of branch of *Epiphyllum macropterum*.
2. Base of branch of same.

A. Hoen & Co. Baltimore





f. 42, No. 4; Rother, Praktischer Leitfaden Kakteen 80, as *Phyllocactus crenatus*; Loudon, Encycl. Pl. ed. 3. 1379. f. 19401.

Figure 199 is from a photograph showing the base and tip of a branch of this species sent from Guatemala.

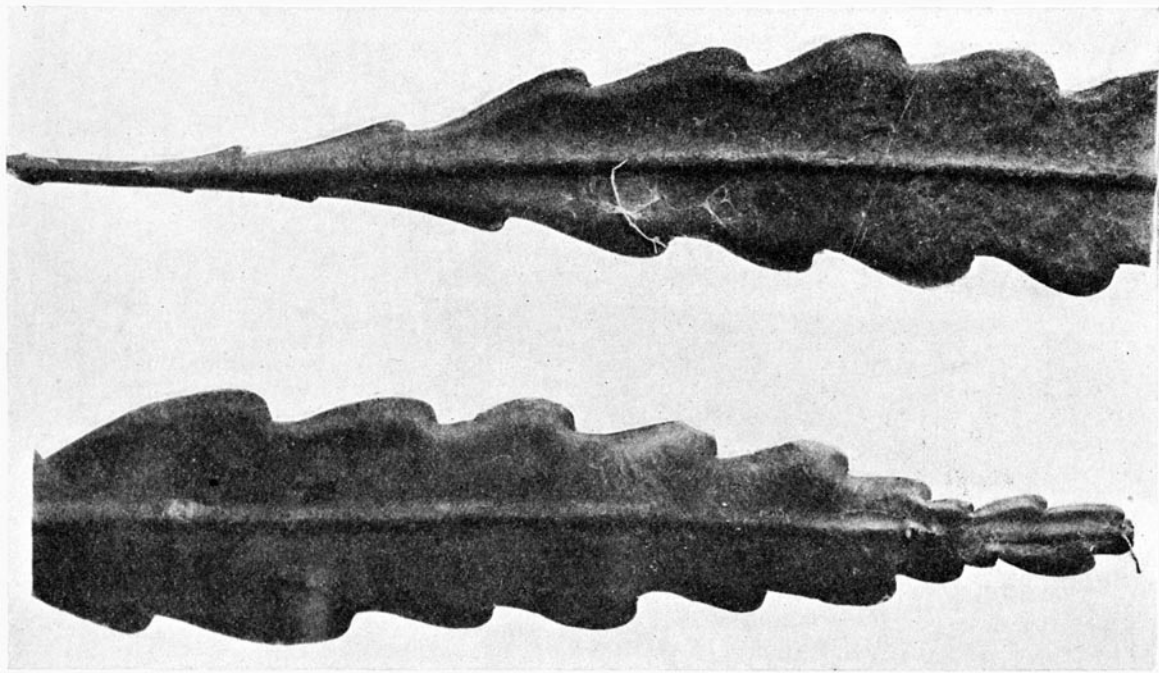


FIG. 199.—*Epiphyllum crenatum*.

#### 9. *Epiphyllum macropterum* (Lemaire).

- Phyllocactus macropterus* Lemaire, Illustr. Hort. 11: Misc. 7. 1864.  
*Phyllocactus thomsonianus* Schumann, Monatsschr. Kakteenk. 5: 6. 1895.  
*Phyllocactus costaricensis* Weber, Bull. Mus. Hist. Nat. Paris 8: 463. 1902.  
*Phyllocactus macrocarpus* Weber, Bull. Mus. Hist. Nat. Paris 8: 464. 1902.  
*Epiphyllum costaricense* Britton and Rose, Contr. U. S. Nat. Herb. 16: 256. 1913.  
*Epiphyllum thomsonianum* Britton and Rose, Contr. U. S. Nat. Herb. 16: 259. 1913.

Plants up to 2 meters long, the joints weak, sometimes 10 cm. broad, thin, their margins horny; areoles distant (to 6 cm. apart) along the slightly indented margins; flower very large for genus, long, curved as in *Epiphyllum oxypetalum*; scales of ovary small, green, spreading, with long hairs in their axils; scales on tube longer (10 to 12 mm. long), less spreading but similar to those on ovary, acute; outer perianth-segments narrow, salmon-colored or with yellow tips, 10 cm. long; inner perianth-segments pure white, 8 to 9 cm. long, 2 to 3 cm. broad; tube of the flower 10 to 12 cm. long; throat 5 to 6 cm. long, funnellform, narrow below, 3 cm. broad at top; stamens lemon-yellow, slender, in 2 definite clusters, a single continuous row at top of throat, the second cluster scattered all over throat except for intervals of 2 cm. below upper one; style stout, 20 cm. long, pure white.

*Type locality:* Not cited.

*Distribution:* Costa Rica.

According to Mr. Fraile, the flower always comes out on the under side of the joint and lies appressed to it, instead of standing out free from it as in other species of the genus.

A vigorous plant in greenhouse cultivation but it flowers only sparingly.

*Illustrations:* Monatsschr. Kakteenk. 5: pl. [1]; Blühende Kakteen 1: pl. 41, as *Phyllocactus thomsonianus*.

Plate xvii, figure 1, shows a branch of a plant sent by Dr. Wm. R. Maxon from San José, Costa Rica, which flowered in the New York Botanical Garden in 1912; figure 2

shows the base of the branch. Figure 200 is from a photograph showing the top and base of a joint.

**10. *Epiphyllum lepidocarpum*** (Weber) Britton and Rose, Contr. U. S. Nat. Herb. **16**: 257. 1913.  
*Phyllocactus lepidocarpus* Weber, Bull. Mus. Hist. Nat. Paris **8**: 462. 1902.

Old and lower part of stems woody, cylindric; upper branches usually flattened, sometimes 3-winged, thickish, but not very stiff, 2 to 3 cm. wide; margins cut "stair-like," the areole closed by a small scale bearing in its axil short wool and a few bristles; flowers 20 cm. long, white and night-blooming; stamens in 2 rows; style white; fruit 9 cm. long by 4 cm. in diameter, violet-red, covered with long scales, at first erect, but finally becoming reflexed; flesh described as white, \* acidulous, somewhat agreeable to the taste.

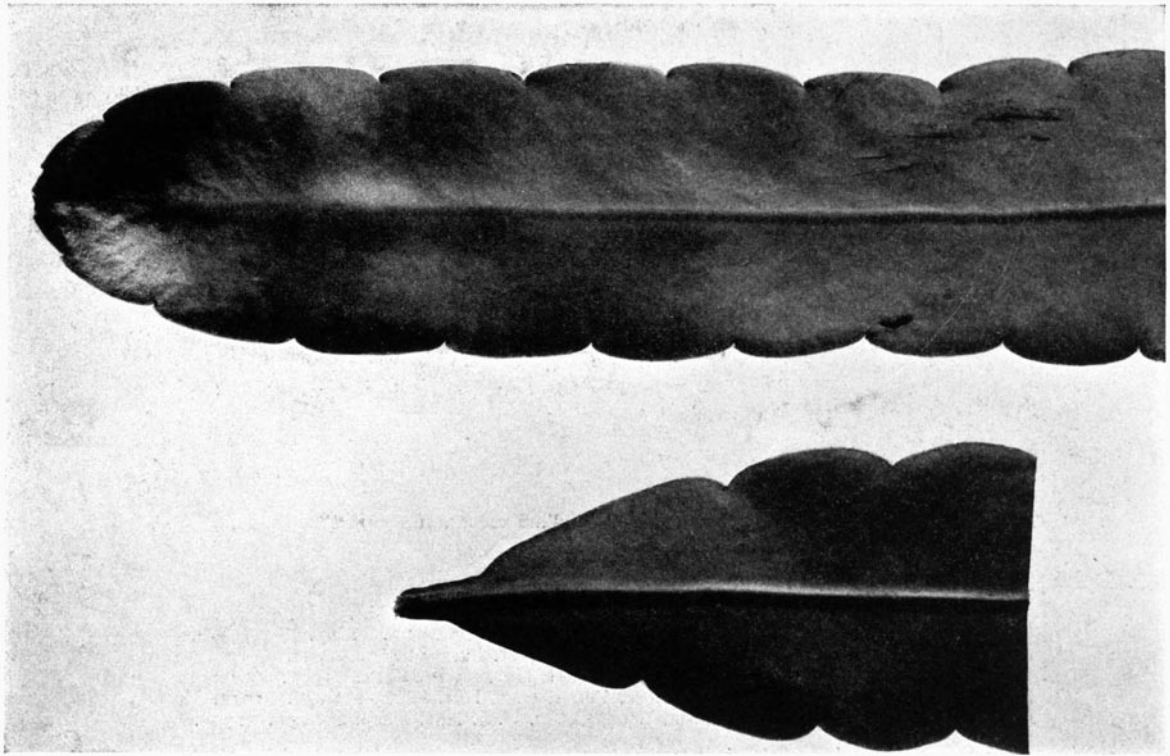


FIG. 200.—*Epiphyllum macropterum*.

*Type locality*: Near Cartago, Costa Rica.

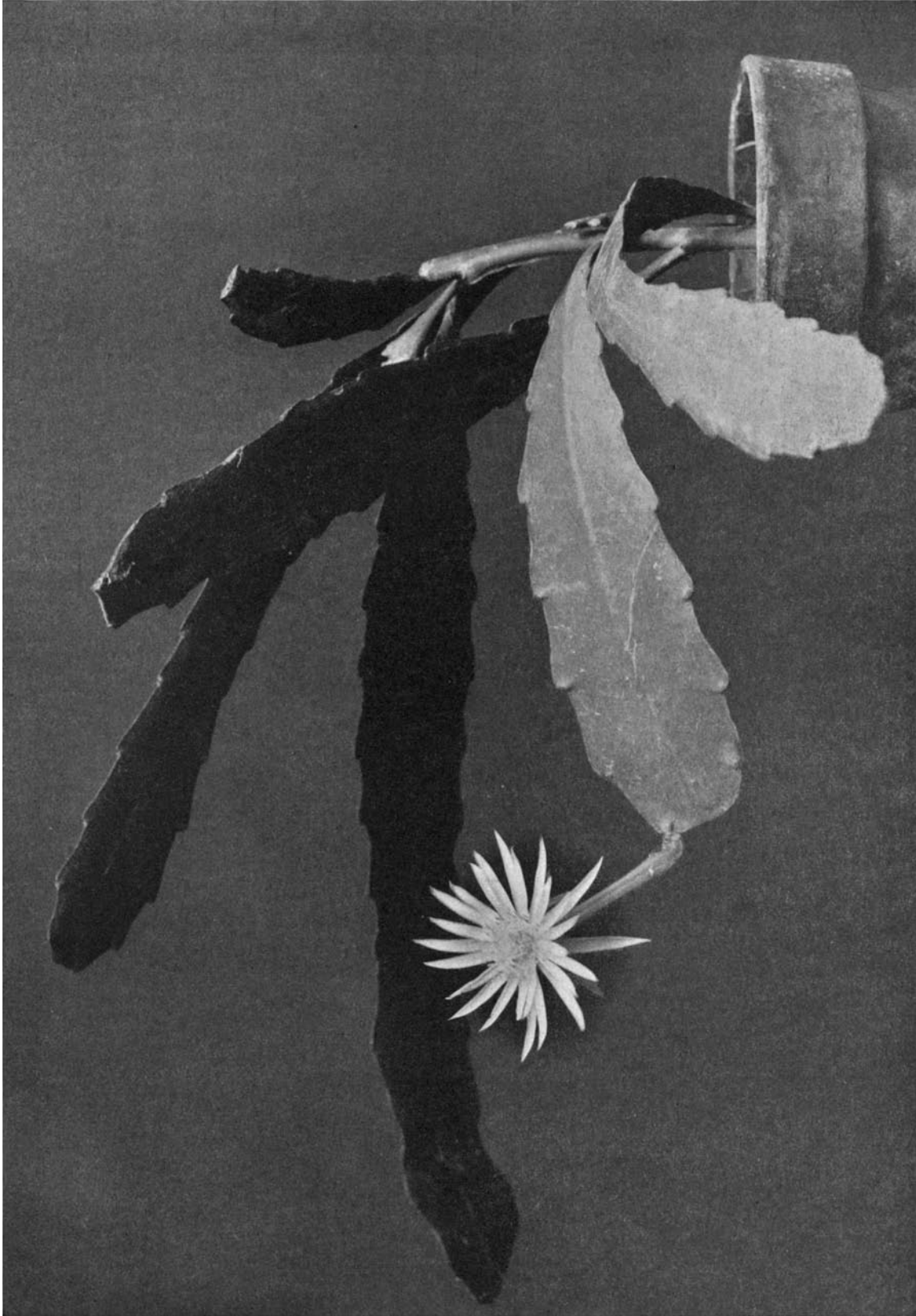
*Distribution*: Known only from the type locality.

Our description is based on that of M. Weber. The very scaly fruit should be characteristic, but plants received from Costa Rica under the name *Phyllocactus lepidocarpus* produced smooth fruits at the New York Botanical Garden.

**11. *Epiphyllum pittieri*** (Weber) Britton and Rose, Contr. U. S. Nat. Herb. **16**: 258. 1913.  
*Phyllocactus pittieri* Weber, Dict. Hort. Bois 957. 1898.

Stem usually terete below, much divided, 2 to 3 meters long; branches flat and thin, mostly cm. wide or less, the margins coarsely toothed; flowers rather small, the tube about 8 cm. long, white to greenish white, bearing a few red, ascending scales; outer perianth-segments 4 to 4.5 cm. long, narrow, yellowish green, or some of the lower ones tinged with red, acute; inner perianth-segments white, a little shorter than the outer; stamens white, erect, in 2 series, longer than the style; style white above, red or purplish below; ovary with a few red scales; fruit dark red, 2 cm. long; seeds dull black.

\*Mr. Wercklé, who discovered this species, states in a letter (September 22, 1921) that the flesh is crimson.



*Epiphyllum pittieri*, from Costa Rica.





*Type locality:* Costa Rica.

*Distribution:* Costa Rica.

This species is an abundant bloomer, flowering in cultivation usually in January but also at other times of the year; its flowers are the smallest of the genus.

Plate xvi, figure 2, shows a flowering branch from the specimen sent by Mr. Pittier from Zent, Costa Rica, in 1904; plate xviii shows another plant of the same collection which flowered in Washington.

**12. *Epiphyllum guatemalense*** Britton and Rose, Contr. U. S. Nat. Herb. 16: 257. 1913.

*Phyllocactus guatemalensis* Vaupel, Monatsschr. Kakteenk. 23: 116. 1913.

Plant rather stout, in cultivation a meter long or longer; old stem woody, with gray bark, terete; branches green, flat, 4 to 8 cm. broad, narrowed at base and there terete, coarsely crenate, obtuse at apex flower-bud pointed flowers nocturnal, about 2.8 cm. long; tube about 1.5 cm. long,

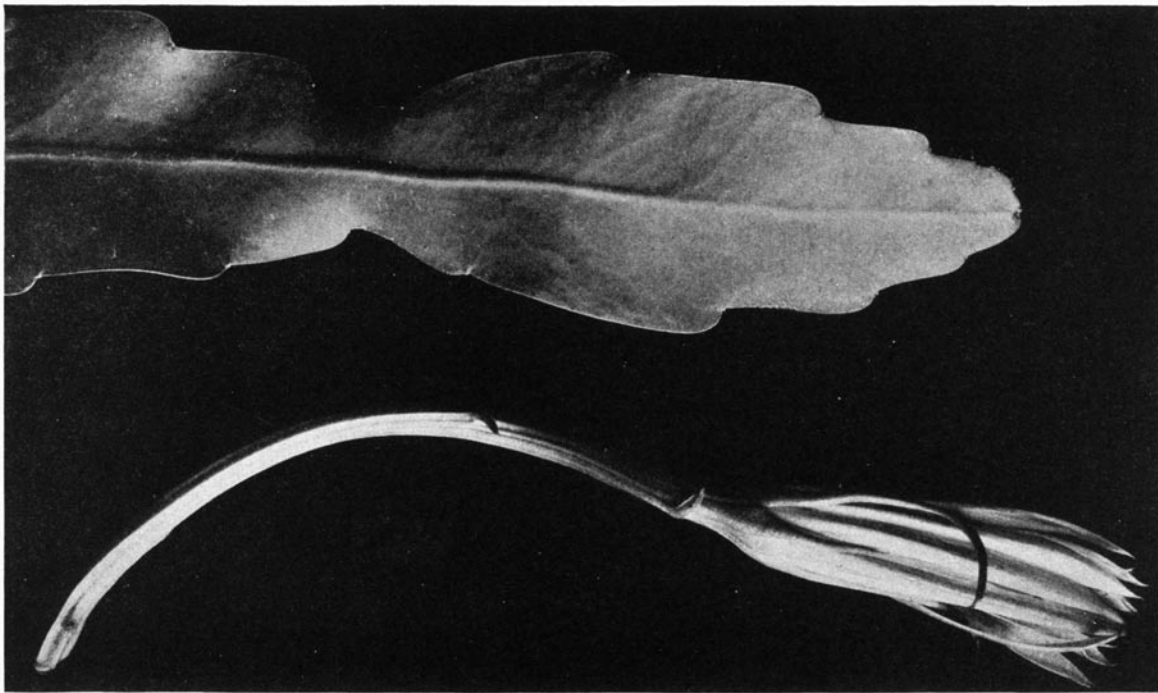


FIG. 202.—*Epiphyllum guatemalense*.

straight or nearly so, green or yellowish green, somewhat angled, at least below, bearing only a few red-tipped scales; inner central part of tube densely pilose; outer perianth-segments scale-like with red reflexed tips; inner pure white, narrow, 8 to 9 cm. long, acuminate; stamens borne on whole surface of rather short throat and therefore in more than one series; filaments pure white; style 2.5 cm. long, somewhat glossy, orange; stigma-lobes orange; ovary pale, bearing a few spreading scales.

*Type locality:* Guatemala.

*Distribution:* Guatemala, but range unknown.

Two very distinct forms occur in this species which are hard to explain. They are so different that it seemed at first they must represent two distinct species, as they occur on separate plants. In one (it may be simply the juvenile form) the joints are rather thin and broad (to 8 cm. broad), the margins soft, with low broad undulations separated by a narrow, nearly closed sinus; in the other (it may perhaps be the adult form) the joints are stiff and narrow, the margins horny, the undulations with an open triangular sinus.

*Illustration:* Contr. U. S. Nat. Herb. 16: pl. 78.

Figure 201 is from a photograph of the type plant.

13. **Epiphyllum strictum** (Lemaire) Britton and Rose, Contr. U. S. Nat. Herb. 16: 259. 1913.  
*Phyllocactus strictus* Lemaire, Illustr. Hort. 1: Misc. 107. 1854.

Plant up to 2 meters long; joints linear, green, 5 to 8 cm. broad, coarsely serrate, stiff; tube of flower 13 to 15 cm. long, slender, green, bearing a few distant scales 8 to 12 mm. long; outer perianth-segments pink, the inner white, narrow, acuminate, 6 to 8 cm. long; filaments white; style pink or red; stigma-lobes yellow; fruit globose, 4 to 5 cm. in diameter; seeds black.

*Type locality:* Cuba, but the plant was grown there from seed.

*Distribution:* Southern Mexico and Guatemala to Panama.

The plant was found in the wild state in Honduras by Mr. Percy Wilson in 1902. All the other specimens studied by us are from cultivated plants. The species is common in collections.

*Illustrations:* Schumann, Gesamtb. Kakteen f. 41; Monatsschr. Kakteenk. 6: 183; Thomas, Zimmerkultur Kakteen 18, as *Phyllocactus strictus*.

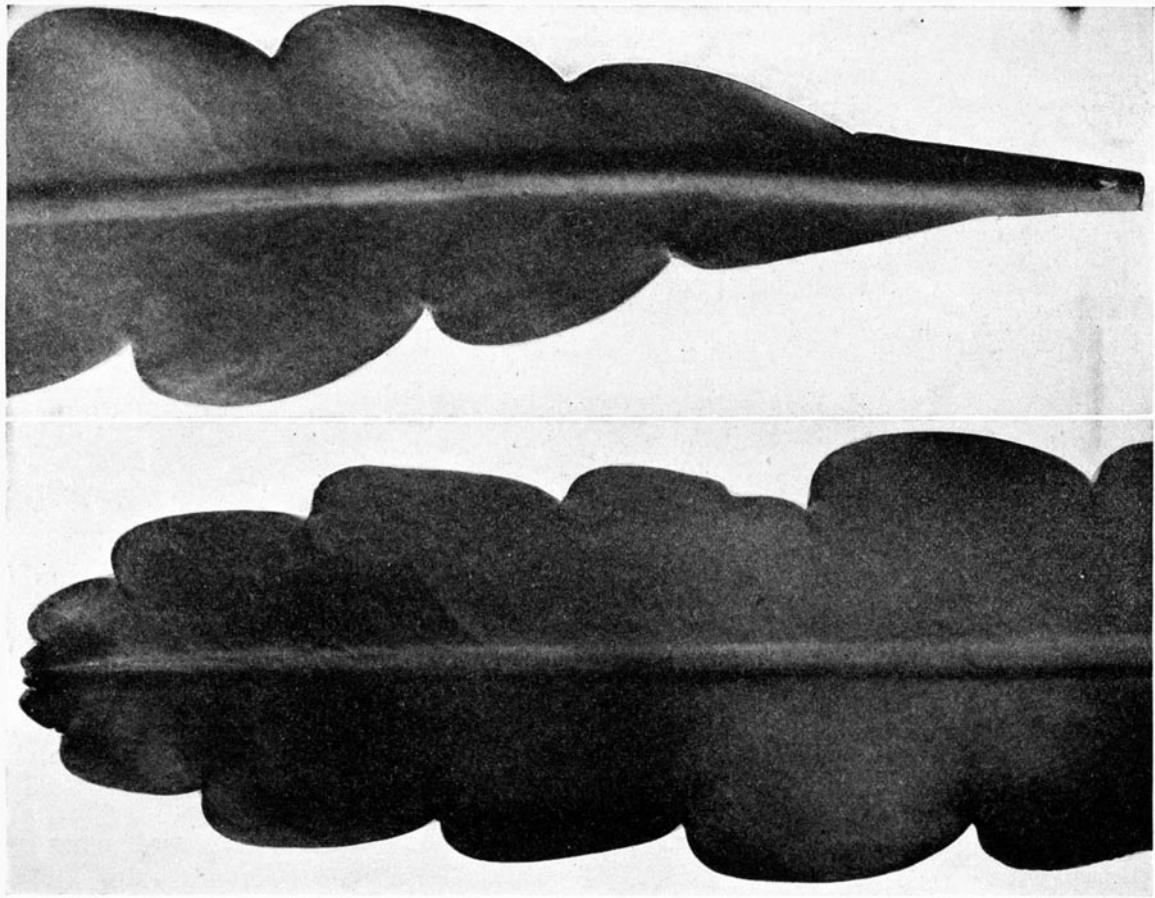


FIG. 202.—*Epiphyllum stenopetalum*.

14. **Epiphyllum stenopetalum** (Förster) Britton and Rose, Contr. U. S. Nat. Herb. 16: 259. 1913.  
*Phyllocactus stenopetalus* Förster, Handb. Cact. 441. 1846.

Described as with the habit of *Epiphyllum latifrons* but with different flowers, these delicately fragrant; flower-tube 2 to 5 cm. long, bearing small, spreading, rose-colored scales; outer perianth-segments rose-colored to reddish green; inner perianth-segments white, elongated, linear (7 to 8 cm. long, very narrow, 4 to 7 mm. broad), spreading or recurved; stamens somewhat exserted; style slender, pink or purplish; stigma-lobes 12 to 14, yellow; fruit unknown.

*Type locality:* Not cited.

*Distribution:* Oaxaca, Mexico.

This plant is a night-bloomer but the flowers are late in closing, sometimes remaining partially open as late as 9 o'clock in the morning.

The above description is compiled from that of Salm-Dyck with reference to a plant at the New York Botanical Garden, received from Paris in 1909.

It resembles *E. strictum* but the joints are more flexible and broader and it has somewhat larger flowers than that species; we have a herbarium specimen identified by Schumann which was collected by P. Sintenis from a cultivated plant grown in Porto Rico.

In 1911 C. Conzatti sent us from Coyula, Cuicatlán, Oaxaca, cuttings of what we now take to be this species. These grew into vigorous plants 3 meters long and flowered in Washington in 1921 and 1922.

*Illustration:* Goebel, Pflanz. Schild. 1: f. 56, as *Phyllocactus stenopetalus* (seedling).

Figure 202 is from a photograph showing the top and base of a branch from Professor Conzatti's plant.

**15. *Epiphyllum cartagense* (Weber) Britton and Rose, Contr. U. S. Nat. Herb. 16: 256. 1913.**

*Phyllocactus cartagensis* Weber, Bull. Mus. Hist. Nat. Paris 8: 462. 1902.

*Phyllocactus cartagensis refractus* Weber, Bull. Mus. Hist. Nat. Paris 8: 462. 1902.

*Phyllocactus cartagensis robustus* Weber, Monatsschr. Kakteenk. 15: 180. 1905.

Plants 2 to 3 meters long, usually more or less flattened in the lower and older parts; joints short or elongated, 4 to 5 cm. broad, coarsely toothed or crenate, green; flowers opening at night, the slender tube 10 to 15 cm. long, reddish, bearing a few short distant scales; outer perianth-segments pink to yellowish; inner segments 5 to 7 cm. long, white; stamens in one series; filaments white; style pink to white; stigma-lobes yellow; fruit oblong, 7 to 8 cm. long, 3 cm. in diameter, red without, white within.

*Type locality:* Near Cartago, Costa Rica.

*Distribution:* Costa Rica.

A species apparently composed of several races, differing in margins of the joints, in size of flowers, and in color of style. It is called in Costa Rica platanillo de monte.

**16. *Epiphyllum hookeri* Haworth, Phil. Mag. 6: 108. 1829.**

*Cereus hookeri* Link and Otto, Cat. Sem. Hort. Berol. 1828.

*Cereus marginatus* Salm-Dyck, Hort. Dyck. 340. 1834. Not De Candolle, 1828.

*Phyllocactus hookeri* Salm-Dyck, Cact. Hort. Dyck. 1841. 38. 1842.

Plants usually 2 to 3 meters long, but sometimes 7 meters long; joints 5 to 9 cm. broad, rather thin, light green, deeply crenate; flowers inodorous, the tube slender, 11 to 13 cm. long, greenish, bearing a few narrow, slightly spreading, rose-tipped scales; outer perianth-segments narrow, greenish pink, sometimes rose-colored at tip, the inner pure white, narrow, 5 cm. long; stamens in a single series, attached at top of throat; filaments white; style carmine, except yellowish base and pinkish top, smooth in upper half, papillose in lower half; stigma-lobes yellow; ovary green, somewhat angled, 2 cm. long, bearing a few small spreading scales; fruit oblong, 8 cm. long, red, somewhat angled, bearing a few scattered scales; seeds numerous, black, shining, reniform.

*Type locality:* Cited as Brazil, presumably in error.

*Distribution:* Tobago, Trinidad, and northern Venezuela.

This plant when it first flowered in cultivation in 1826 was taken for *Cactus phyllanthus* and was so figured and described in the Botanical Magazine, but it was soon discovered to be very different from that species.

While Brazil is cited as the type locality for this species we have seen no specimens from any point south of Venezuela. The plant is and has been widely cultivated in tropical America, commonly under the erroneous name, *Epiphyllum phyllanthus*. In Trinidad it forms great masses on trees and on coastal cliffs, ascending the trees to a length of 10 meters or more, branching profusely, and is very floriferous.

*Phyllocactus marginatus* Salm-Dyck (Cact. Hort. Dyck. 1844. 37. 1845) doubtless belongs here.



*Illustrations:* Pfeiffer and Otto, *Abbild. Besch. Cact.* 1: pl. 5, as *Cereus hookeri*; Curtis's *Bot. Mag.* 53: pl. 2692; Loudon, *Encycl. Pl.* 413. f. 6901, as *Cactus phyllanthus*; Addisonia 5: pl. 192.

Plate XIX shows a flowering branch from a specimen sent by W. E. Broadway from the Island of Tobago in 1909.

## HYBRIDS.

EPIPHYLLUM ACKERMANNII Haworth, *Phil. Mag.* 6: 109. 1829.

*Cactus ackermannii* Lindley in Edwards's *Bot. Reg.* 16: pl. 1331. 1830.

*Cereus ackermannii* Otto in Pfeiffer, *Enum. Cact.* 123. 1837.

*Phyllocactus ackermannii* Salm-Dyck, *Cact. Hort. Dyck.* 1841. 38. 1842.

Branches weak, flat, and thin with crenate margins; areoles felted, often bristly or with weak spines, especially on the young growth; flowers day-blooming, very large, sometimes 1.5 to 2 dm. broad, crimson; inner perianth-segments oblong, acute; filaments long, weak, declined; style more or less declined, pinkish; stigma-lobes white; ovary more or less bristly.

*Type locality:* Mexico.

*Distribution:* Mexico.

This species was originally described as from Mexican plants sent to Haworth from Ackermann and, supposedly, from wild plants, but the general belief now is that the plant is of hybrid origin. The flowers are so much like those of *Heliocereus* that this genus probably furnished one of its parents (see *Botanical Magazine*, pl. 3598).

On the other hand, E. A. Goldman collected in Chiapas a series of specimens which seems to represent more than one species, but all the flowers are similar to those of *Epiphyllum ackermannii* and one of the specimens may represent the wild state of that species. The plants all have flat joints bearing clusters of spines in their areoles.

Many garden varieties and artificial hybrids have been obtained from this plant, some described under English and others under Latin names.

*Illustrations:* Edwards's *Bot. Reg.* 16: pl. 1331, as *Cactus ackermannii*; Curtis's *Bot. Mag.* 64: pl. 3598, as *Cereus ackermannii*; *Blühende Kakteen* 1: pl. 49; *Cycl. Amer. Hort. Bailey* 3: f. 1773; *Dict. Gard. Nicholson* 3: f. 133; Karsten, *Deutsche Fl.* 887. f. 501, No. 6; ed. 2. 2: 456. f. 605, No. 6; Förster, *Handb. Cact.* ed. 2. 841. f. 111; Rümpler, *Sukkulenten* 149. f. 81; Watson, *Cact. Cult.* 47. f. 10; Rother, *Praktischer Leitfaden Kakteen* 97; ed. 3. f. 8; *Amer. Gard.* 11: pl. opp. 445; *Gartenflora* 32: 374, as *Phyllocactus ackermannii*; Loudon, *Encycl. Pl.* 1202. f. 17368 *Encycl. Britannica* ed. 11. 4: 926. f. 3, as *Phyllocactus*; *Rev. Hort.* 1861: 226. f. 44; *Stand. Cycl. Hort. Bailey* 2: f. 1402.

*Cactus hybridus* was described and illustrated by P. C. Van Géel (*Sert. Bot.* 1: pl. 115. 1832). He states that it is known in Great Britain as *C. ackermannii*.

EPIPHYLLUM HYBRIDUM Hortus in Pfeiffer, *Enum. Cact.* 121. 1837.

This was given as a synonym of *Cereus speciosissimus lateritius*, which is briefly mentioned in volume 2 (p. 128) of this work.

EPIPHYLLUM JENKENSONII G. Don, *Gen. Hist. Dichl. Fl.* 3: 170. 1834.

*Epiphyllum speciosum jenkensonii* G. Don in Loudon, *Encycl. Pl.* ed. 2. 1202. 1841.

This plant is an artificial hybrid raised from *Heliocereus speciosissimus*, impregnated by the pollen of *Epiphyllum phyllanthoides*; it has branches 3-angled at base but flattened above, with areoles very prominent and spiny; flowers large, 10 cm. broad and deep scarlet; fruit nearly globular, purple, 2.5 cm. in diameter, its areoles bearing a few spines and bristles. We have had it to flower and fruit in cultivation.

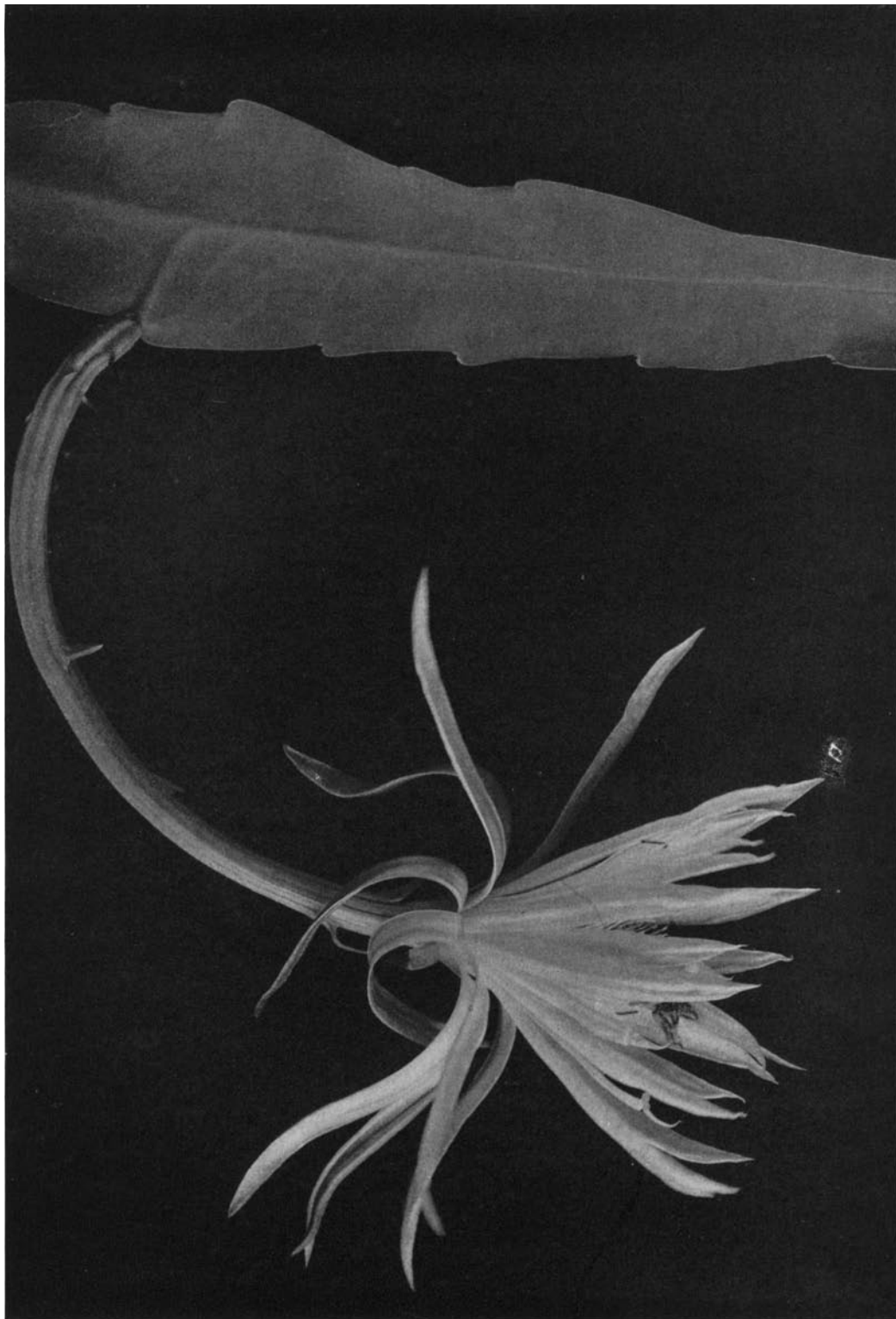
EPIPHYLLUM SPLENDIDUM Paxton, *Mag. Bot.* 1: 49. 1834.

*Cereus splendidus* Steudel, *Nom. ed. 2. 1: 336.* 1840.

*Epiphyllum aitoni* Steudel, *Nom. ed. 2. 1: 561.* 1840.

*Epiphyllum hitcheni* Steudel, *Nom. ed. 2. 1: 561.* 1840.

We know this plant only from a colored illustration (Paxton, *Mag. Bot.* 1: pl. facing 49). The flower is very large, 10 inches broad, red, tinged with orange; flower-tube much shorter than limb, and suggests a relationship with *Epiphyllum ackermannii*. Branches flat and strongly crenate. It



*Epiphyllum hookeri*, from Tobago, West Indies.



is said to be a native of Mexico, but probably is of hybrid origin. It is described as having one of the largest flowers among cacti, rivaling *Selenicereus grandiflorus* and *Helicocereus speciosus*.

*Epiphyllum splendens* Hortus (Ann. Fl. Porn. 343, 1839) is referred here by the Index Kewensis. It is, however, described on page 345 and illustrated on plate 44. This illustration is very different from that of Paxton.

PHYLLOCACTUS ALBUS GRANDIFLORUS.

*Illustration:* Cact. Journ. 1: 37.

PHYLLOCACTUS ALBUS SUPERBUS.

*Illustration:* Blanc, Cacti 88, No. 2511.

PHYLLOCACTUS COOPERI Regel, Gartenflora 33: 218. 1884.

This is a hybrid between *Epiphyllum crenatum* and *Selenicereus grandiflorus*. It has large yellowish flowers.

*Illustrations:* Gartenflora 33: pl. 1176, as *Phyllocactus crenato grandiflorus*; Cassell's Dict. Gard. 2: 192.

PHYLLOCACTUS EREBUS.

This is a large red-flowered hybrid.

*Illustration:* Blühende Kakteen 3: pl. 160.

PHYLLOCACTUS HAAGEI.

This is doubtless a garden hybrid related to *Epiphyllum ackermannii*. It has large flowers, 12.5 cm. broad, at first flesh-colored, becoming carmine.

*Illustrations:* Dict. Gard. Nicholson 4: 590. f. 8; Watson, Cact. Cult. 54. f. 13.

PHYLLOCACTUS HIBRIDUS GORDONIANUS.

*Illustration:* Blühende Kakteen 1: pl. 36.

PHYLLOCACTUS HIBRIDUS WRAYI.

This is said to be a cross between *Selenicereus grandiflorus* and *Epiphyllum crenatum*.

*Illustration:* Blühende Kakteen 2: pl. 6.

PHYLLOCACTUS HILDMANNII.

*Illustration:* Gartenflora 44: pl. 1421, f. 2.

PHYLLOCACTUS MARSUS.

*Illustration:* Dict. Gard. Nicholson Suppl. 598. f. 631.

PHYLLOCACTUS PFERSDORFFII.

*Illustrations:* Cact. Journ. 1: 38; Rümpler, Sukkulente f. 85; Schelle, Handb. Kakteenk. 221. f. 144.

PHYLLOCACTUS ROSEUS GRANDIFLORUS Watson, Cact. Cult. 55. 1889.

This was figured and described by Watson with flowers 15 cm. long and broad, nodding and white (!); doubtless of hybrid origin; it may be the same as *Phyllocactus roseus grandissimus* (Monatsschr. Kakteenk. 19: 182. 1909).

*Illustrations:* Dict. Gard. Nicholson 4: 591. f. 59; Förster, Handb. Cact. ed. 2. 857. f. 117; Watson, Cact. Cult. 55. f. 14.

PHYLLOCACTUS RUESTII Weingart, Monatsschr. Kakteenk. 24: 123. 1914.

We have not seen this plant and Mr. Weingart, who described it, says that he does not possess either living or herbarium material but that it is still growing at Halle, Germany.



## PHYLLOCACTUS TRIUMPHANS.

*Illustration:* Monatsschr. Kakteenk. 20: 3.

*Epiphyllum speciosum lateritium* Henslow (Loudon, Encycl. Pl. ed. 2. 1202. 1841), an English hybrid, produced in 1828, is described as having brick-colored flowers.

*Phyllocactus tonduzii* Weber is mentioned by Schumann (Monatsschr. Kakteenk. 10: 127. 1900).

*Phyllocactus tuna* is a name used by Wercklé (Monatsschr. Kakteenk. 15: 180. 1905) for a Costa Rican plant, without description.

*Phyllocactus weingartii* Berger (Monatsschr. Kakteenk. 30: 33. 1920) is related to *Epiphyllum ackermannii*.

Charles Simon in 1893 published a list of 62 names of *Epiphyllum*, most of which are undoubtedly hybrids and some are referable to *Zygocactus*. The following binominals and trinominals are in the usual Latin form for specific and varietal names and are not recorded elsewhere:

album violaceum	grandiflorum	palidum roseum	translucens
amabile	grande superbum	purpureum	tricolor
aurantiacum	harrissoni	roseum	violaceum elegans
brasiliense	hercule	rubrum violaceum	violaceum grandiflorum
carminatum	latetium album	ruckerianum superbum	violaceum rubrum
cruentum	maximum	salmoneum marginatum	violaceum speciosum
gracilis	multiflorum	spectabile coccineum	violaceum superbum

There are many Latin names of *Phyllocactus* in catalogues, representing hybrids. We give below only those which have been used more or less in general botanical works, either as binominals or trinominals in regular Latin form:

acutifrons	buestii	germania	lunus
agatha	campmannii	guentneri	mexicanus *
alatus	caparti	hamburgiensis	purpureus
albus superbiens	capelleanus	hauffii	ruelcheri
alexandrinae	carolus magnus	helenus	speciosissimus feltonii
amarantinus	castneri	hempelii	superbus
arnoldi	chico	hibridus	ulbrechtii
aurantiacus superbus	coccineus	incomparabilis minuatus	victoria-regia
belgicus	demouline	jenkinsonii	vogelii
bergen	dolores	kerthii	wippermannii
bleindlii	epirus	laarsenii	wrayi
boehmii	fuertii	lorenzii	zarka

In 1897 Charles Simon, of Saint-Ouen, Paris, published a list of 370 names of *Phyllocactus*, most of which were probably hybrids. The following binominals and trinominals are in the usual Latin form for specific and varietal names and are not recorded elsewhere:

ackermannii hybridus	crenatus hirsutis	funkii	lorenzii
ackermannii major	crenatus lateralis	gloriosus	ludmani
alatus major	crenatus latifolius	gordonianus	ludwigi
albus grandidissimus	crenatus luteus	grandidissimus	maigretii
albus perfectus	crenatus ruber	grandiflorus	magnificus
albus superbissimus	crispielsi	grandiflorus albiflorus	makoyi
amabilis	curtissi	grandiflorus ruber	mayanus
amabilis perfectus	dangeli	guebwillerianus	meyerianus
atrosanguineus	decumbens	guedeneyi	muehlenpfordtii
aurantiacus	deveauxi	hansii	mulhousiauus
bergei	dieffenbacchianus	havermansii	multiflorus
billiardieri	dumoulini	hitchensis	neubertii
binderi	edwardsii	ignescens	niedtii
blindii	elegans	jenkinsonii superbus	niger
boliviensis	erectus perfectus	johnsonii	nitens
bolivillerianus	erectus superbus	jordanis	nymphoea beata
bothii	ernesti	kampmannii	paraguayensis
brongnarti	erubescens	kermesimus magnus	pentneri
burmeisteri	fastuosus	kiardi	phyllantoides
colmariensis	feasti	kranzii	phyllantoides crenatus
colombiensis	felonis	krausei	potstachianus
courantii	feltoni	laetingii	poullertianus
crassuliefolius	floribundus	laloyi	pressleri
crenatus amarantinus	formosus	laudowi	
crenatus caulorhizus	franzii	leopoldii	

\* A hybrid referred by Index Kewensis to *Cereus mexicanus*.

pulcherrimus	roseus miniatus	schmidtii	tettani
quilliardetti	roseus splendidus	sellowii	tricolor
raveaudii	roydii	specillimus	undiflorus
rebuti	ruber	speciosissimus	vandesii
reichei	ruber perfectus	speciosissimus grandiflorus	vonhoffini
reineckii	ruber violaceus	speciosus roseus	vitellinus
roseus carmineus	sarniensis	splendens	warszewiczii
roseus carneus	schaffieri	splendidus	wittmackianus
roseus floribundus	schallerianus	stenesi	
roseus grandidissimus	schlimmi	superbissimus	

CACTUS ENSIFORMIS Biden, Gard. Chron, II. 20: 53. 1883.

This is evidently some *Epiphyllum* hybrid. It was sent to H. B. Biden from Manchester, England, in 1883 and flowered the same year. Its flowers were described as 6 inches across, white, richly scented, and remaining open for 3 days.

*Cactus speciosus grandiflorus* (Monatsschr. Kakteenk. 14: 11. 1904) is supposed to be some hybrid *Epiphyllum*.

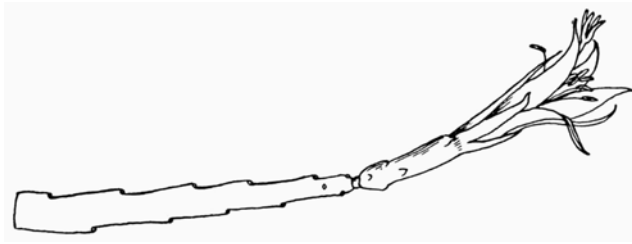


FIG. 203.—Tip of branch with flower of *Disocactus biformis*.  $\times 0.8$ .

##### 5. DISOCACTUS Lindley in Edwards's Bot. Reg. 31: pl. 9. 1845.

*Disisocactus* Kunze, Bot. Zeit. 3: 533. 1845.

Irregularly branching, spineless epiphytes, the stem terete; branches numerous, flattened; areoles marginal; flowers diurnal, borne near tips of branches, nearly regular; tube shorter than limb; perianth-segments few, elongated, spreading; ovary small, cylindric, elongated, bearing a few minute scales; fruit globular to ovoid, not at all angled.



FIG. 104.—*Disocactus biformis*.

Type species: *Cereus biformis* Lindley.

We recognize two species, both from Central America.

The name is from  $\delta\iota\varsigma$  twice, and  $\kappa\acute{\alpha}\kappa\tau\omicron\varsigma$  cactus, and was given because the perianth-segments of the inner and outer series were equal in the type specimens.

## KEY TO SPECIES.

Slender with linear lateral branches, their margins slightly toothed; style and stamens about length of perianth-segments. . . . . 1. *D. biformis*  
 Spreading with oblanceolate lateral branches, their margins crenate; style and stamens long-exserted . . . . . 2. *D. eichlamii*

1. *Disocactus biformis* Lindley in Edwards's Bot. Reg. 31: pl. 9. 1845.

*Cereus biformis* Lindley in Edwards's Bot. Reg. 29 Misc. 51. 1843.  
*Disocactus biformis* Kunze, Bot. Zeit. 3: 533. 1845.  
*Phyllocactus biformis* Labouret, Monogr. Cact. 418. 1853.  
*Epiphyllum bifforme* G. Don in Loudon, Encycl. Pl. ed. 3: 1378. 1855.

Plant 2 dm. long or longer; branches linear, 5 to 8 cm. long, 1 to 2 cm. broad, with serrate margins; flower-bud elongated, curved upward, pointed; tube of the flower about 1 cm. long, the segments 8 (rarely 9), magenta, about 3 cm. long, the outer 4 or 5 spreading or curved backward, linear, the inner 3 or 4 broader and more erect; stamens 10 to 12, slightly exserted, borne in 2 series at top of tube; style slender, purple; stigma-lobes 4, white; ovary short-oblong, green, somewhat tubercled, with a few areoles subtended by small ovate scales; fruit ovoid, 1.5 cm. long, turgid, wine-colored.

*Type locality:* Honduras. The species described from a garden specimen, introduced into England in 1839.

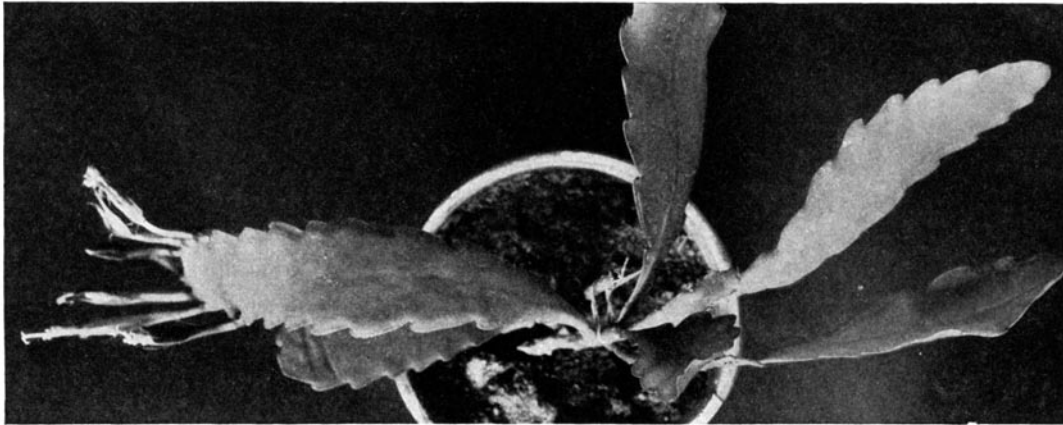


FIG. 205.—*Disocactus eichlamii*.

*Distribution:* Honduras and Guatemala.

We have had this plant under observation for a number of years. It is rather a shy bloomer with us, although we get one or two flowers each spring; the flowers open in the night or early morning and remain open all day; they begin to wither the second morning. The perianth-segments are more widely spreading in the morning than in the afternoon. The flower is almost horizontal and the tube proper is about the length of the ovary. The fruit matures very slowly. In 1920 we had a plant flower in April, but the fruit did not mature until July 8.

*Illustrations:* Förster, Handb. Cact. ed. 2. 876. f. 120; Rümpler, Sukkulenten f. 86, as *Disocactus biformis*; Blühende Kakteen 1: pl. 54; Curtis's Bot. Mag. 101: pl. 6156; Dict. Gard. Nicholson 3: f. 135; Monatsschr. Kakteenk. 9: 141; Watson, Cact. Cult. 50. f. 12, as *Phyllocactus biformis*; Loudon, Encycl. Pl. ed. 3. 1379. f. 19403, as *Epiphyllum bifforme*; Edwards's Bot. Reg. 31: pl. 9; Palmer, Cult. Cact. 175.

Plate xxxii, figure 2, shows a branch of a fruiting plant sent to Dr Rose by Robert Lamb of Manchester, England, in 1912. Figure 203 shows the flower of the same plant; figure 204 is from a photograph of the same plant in flower.

2. *Disocactus eichlamii* (Weingart) Britton and Rose, Contr. U. S. Nat. Herb. 16: 259. 1913.

*Phyllocactus eichlamii* Weingart, Monatsschr. Kakteenk. 21: 5. 1911.

Branching near the base; branches oblong, 2 to 3 dm. long, 3 to 5 cm. broad, cuneate at base, obtuse, thickish, strongly crenate; flowers several at the uppermost areoles, slender, 4 cm. long; stamens and style exserted; stigma-lobes; fruit red, 1.5 cm. in diameter with white pulp; seeds 1.5 mm. long.

*Type locality:* Guatemala.

*Distribution:* Guatemala.

This plant we know only from the collection of F. Eichlam; living specimens were sent to Washington by him which soon afterward flowered, but these have since died. Eichlam wrote that the flowers were a brilliant red. The species was named for Federico Eichlam, who lived in Guatemala at the time of his death in 1911.

*Illustration:* Contr. U. S. Nat. Herb. 16: pl. 79.

Figure 203 is from a photograph of the type plant in flower.

6. *CHIAPASIA* gen. nov.

An epiphytic spineless cactus, the branches flattened, crenate, with slender terete bases, the large flowers borne at upper areoles; perianth narrowly campanulate; tube about half as long as limb, bearing a few small triangular scales; segments about 8, linear, recurved, spreading; ovary ovoid, shorter than tube, also with a few small scales; filaments about 20, not longer than perianth-segments; stigma-lobes few.

*Type species:* *Epiphyllum nelsonii* Britton and Rose.

A monotypic genus, its name taken from that of the Mexican state in which it grows.

1. *Chiapasia nelsonii* Britton and Rose.

*Epiphyllum nelsonii* Britton and Rose, Contr. U. S. Nat. Herb. 16: 257. 1913.

*Phyllocactus nelsonii* Vaupel, Monatsschr. Kakteenk. 23: 116. 1913.

*Phyllocactus chiapensis* J. A. Purpus, Monatsschr. Kakteenk. 28: 118. 1918.

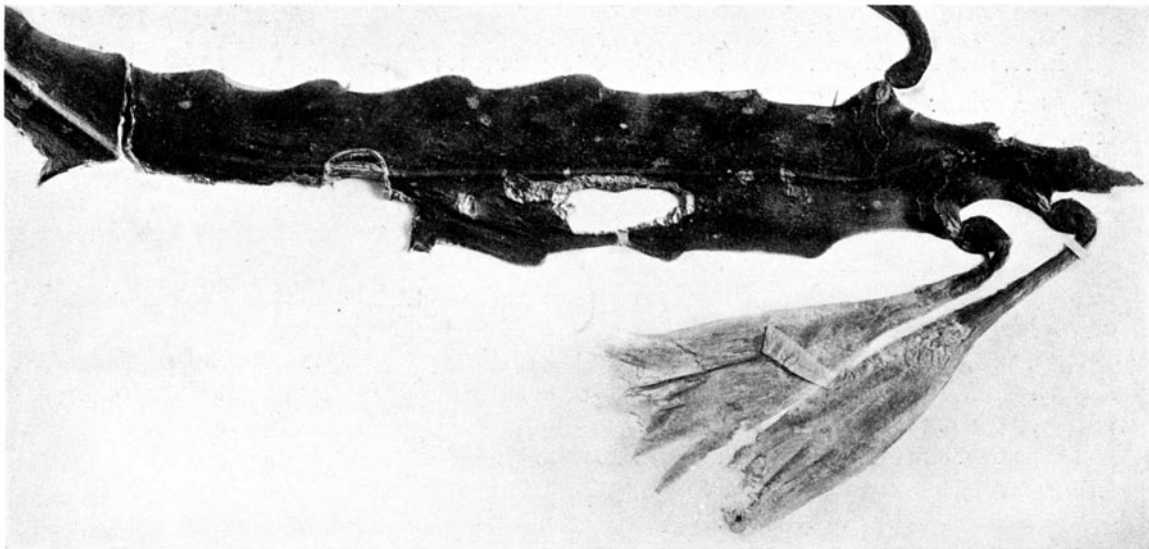


FIG. 206.—*Chiapasia nelsonii*.

Branches 6 to 12 dm. long, slender and terete below, flat and thin above, 3 to 4 cm. broad; margin low, crenate; flowers light rose-red; tube 2 to 3 cm. long; segments about 6 cm. long, narrow, acute.

*Type locality:* Near Chicharras, Chiapas, Mexico, altitude 900 to 1,800 meters.

*Distribution:* Known only from Chiapas.



Our first description of this plant was based on an herbarium specimen, but considerable additional information is now known regarding its habit. A very fine plant was grown at Darmstadt by J. A. Purpus, a photograph of which we have, showing that the main branches are long and terete while the lateral branches are broad and thin, often pendent, with 1 to 3 flowers near the end; the flowers are horizontal, with the perianth-segments more or less recurved; the stamens and style are slender and long-exserted.

*Illustration:* Monatsschr. Kakteenk. 28: 119, as *Phyllocactus chiapensis*.

Figure 206 is from a photograph of the type specimen.

**7. ECCREMOCACTUS** Britton and Rose, Contr. U. S. Nat. Herb. 16: 261. 1913.

Plants epiphytic, pendent (erect or ascending in cultivation), several-jointed, the joints flat and thickish with spine-bearing marginal areoles or in cultivation often spineless; flowers solitary at upper areoles, funnellform, the short, nearly cylindrical tube bearing small somewhat spreading scales, but no spines; perianth withering-persistent, its segments obtuse, rounded, or the innermost acutish; stamens and style white, included, slender, declinate; fruit carmine-red, oblong, with a few spineless areoles; seeds numerous, minute, black.

Type species: *Eccremocactus bradei* Britton and Rose.

Only one species is known, a native of Costa Rica. We have had the plant in cultivation for a number of years; it is a shy bloomer.

The generic name is from εκκρεμής hanging from, and κάκτος cactus.

**1. Eccremocactus bradei** Britton and Rose, Contr. U. S. Nat. Herb. 16: 262. 1913.

*Phyllocactus bradei* Vaupel, Monatsschr. Kakteenk. 23: 118. 1913.

Epiphytic on trees; joints 15 to 30 cm. long, 5 to 10 cm. broad, light dull green, flat, but the central axis somewhat elevated on both sides, the margins shallowly crenate, with small spine-bearing areoles in the sinuses; spines solitary or in 2's or 3's, dark brown, 6 mm. long or less; flowers developing very slowly, 6 to 7 cm. long, slightly asymmetrical; outermost perianth-segments thick, shining, pinkish; outer ones oblong, thinner, pinkish white; inner perianth-segments oblong, obtuse, 3 to 3.5 cm. long; flower-tube 1 cm. long; throat broad, short, covered with stamens; filaments very slender, delicate, white, strongly declined; style slender, nearly white, slightly pinkish above, elongated, glabrous; stigma-lobes 8; ovary angled by the elongated tubercles; its areoles bearing a line of short hairs, subtended by thick ovate purple scales; seeds 1.5 mm. long.

*Type locality:* Cerro Turriwares, near Orotina (formerly Santo Domingo de San Mateo), Costa Rica.

*Distribution:* In dense forests at low altitudes, Costa Rica.

Our attention was first called to this plant by Dr. Maxon, who obtained specimens from Mr. Alfredo Brade in 1906; these bloomed in June 1911, but good flowers were not obtained. In 1913 Otón Jiménez sent specimens to Dr. Rose which flowered in 1918.

The flowers open in the night and are closed on the following morning. The branches of wild plants bear clusters of spines at the areole, but our cultivated plants are spineless and in the vegetative state resemble those of a turgid *Epiphyllum*. When the plant sent by Mr. Jiménez from Costa Rica (No. 905) flowered in 1921 seven flower-buds were produced from the seven uppermost areoles.

*Illustration:* Contr. U. S. Nat. Herb. 16: pl. 83.

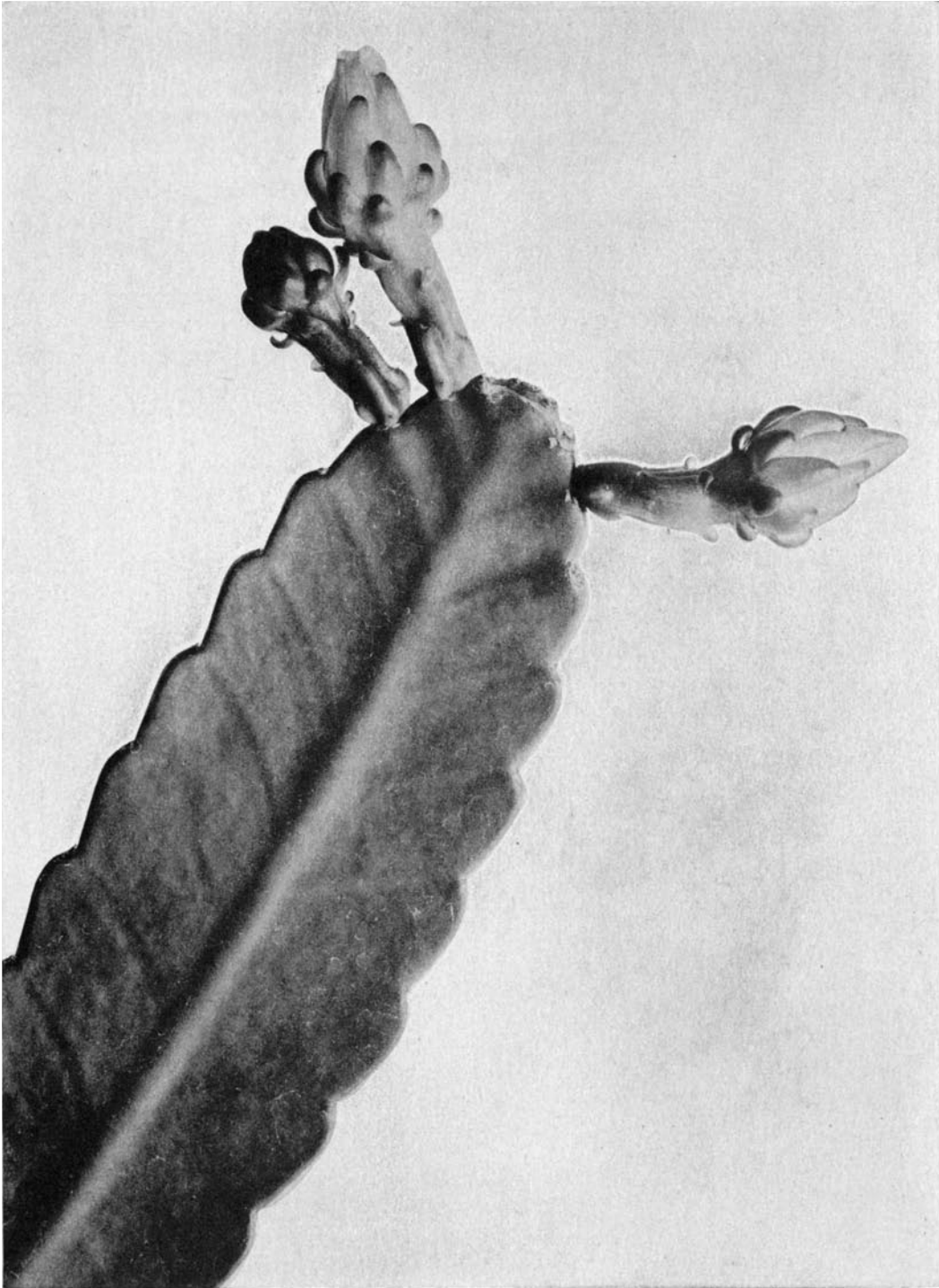
Plate xx is from a photograph of a plant sent to Washington by Otón Jiménez in 1913, which flowered in May 1921.

**8. NOPALXOCHIA** gen. nov.

A flat-jointed, spineless epiphytic cactus; joints crenate, the rather large, short-funnelform, rose or red flowers, solitary at lateral marginal areoles; flower-tube about as long as limb, bearing several narrow scales; outer perianth-segments short, acute, reflexed or spreading; inner spreading or connivent, acute; stamens numerous.

Type species: *Cactus phyllanthoides* De Candolle.

A monotypic Mexican genus, the name taken from the Aztec of Hernández.



*Eccremocactus bradei*, from Costa Rica.



**1. Nopalxochia phyllanthoides** (De Candolle).

- Cactus phyllanthoides* De Candolle, Cat. Hort. Monsp. 84. 1813.  
*Cactus speciosus* Bonpland, Descr. Pl. Rar. Malm. 8. 1813. Not Cavanilles, 1803.  
*Epiphyllum speciosum* Haworth, Suppl. Pl. Succ. 84. 1819.  
*Cactus elegans* Link, Enum. 2: 25. 1822.  
*Epiphyllum phyllanthoides* Sweet, Hort. Brit. 172. 1826.  
*Cereus phyllanthoides* De Candolle, Prodr. 3: 469. 1828.  
*Phyllocactus phyllanthoides* Link, Handb. Gewächs. 2: 11. 1831.  
*Opuntia speciosa* Steudel, Nom. ed. 2. 2: 222. 1841.

Stems somewhat woody, branching, the branches terete at base, flattened and thin above, sometimes 5 cm. broad, green; margin of branches coarsely crenate; flowers diurnal, the tube 2 cm. long; inner perianth-segments oblong, more or less spreading; filaments and style elongated, slender; stigma-lobes 5 to 7.

*Type locality:* Mexico.

*Distribution:* Mexico or Colombia, but known only from cultivated plants.

The distribution of this species is assigned to Mexico, but both Edwards and Sims state definitely that it was first observed by Humboldt and Bonpland near the village of Turbaco, which is a few leagues south of Cartagena, Colombia. From seeds collected at that time, plants were grown in the garden of La Malmaison; one of these flowered in 1811 and was described and illustrated as *Cactus speciosus* in 1813.

This is one of the oldest known species of cacti; it was figured by Hernández in 1651 and by Plukenet in 1691. It has long been in cultivation, perhaps in prehistoric times.

It is often hybridized with other species. The following hybrids with it are given: *Phyllocactus phyllanthoides albiflorus*, *striatus*, *striatus multiflorus*.

Salm-Dyck (Hort. Dyck. 65. 1834) lists four varieties as follows: *Cereus phyllanthoides curtisii*, *C. phyllanthoides guillardieri*, *C. phyllanthoides jenkinsonii*, and *C. phyllanthoides vandesii*. Pfeiffer (Enum. Cact. 124. 1837) also mentions *Cereus phyllanthoides albiflorus*.

*Epiphyllum vandesii* Don (Gen. Hist. Dichl. Pl. 3: 170. 1834) is a hybrid produced by placing the pollen of *Epiphyllum phyllanthoides* on the stigmas of *Heliocereus elegantissimus*.

*Illustrations:* Plukenet, Phyt. pl. 247, f. 5, as *Phyllanthos*; Loudon, Encycl. Pl. 413. f. 6902; Curtis's Bot. Mag. 46: pl. 2092, as *Cactus phyllanthoides*; Schumann, Gesamtb. Kakteen 217. f. 42; Monatsschr. Kakteenk. 7: 87; Wiener Ill. Gart. Zeit. 28: f. 39; Gartenwelt 4: 560; 5: 6 and pl. facing 6; Ann. Rep. Smiths. Inst. 1908: f. 24; Möllers Deutsche Gärt. Zeit. 11: 61; Goebel, Pflanz. Schild. 1: f. 13, 52, 54, as *Phyllocactus phyllanthoides*; Bonpland, Descr. Pl. Rar. pl. 3; Edwards's Bot. Reg. 4: pl. 304; Herb. Génér. Amat. 4: pl. 244, as *Cactus speciosus*; Loudon, Encycl. Pl. ed. 2. 1202. f. 17367, as *Epiphyllum speciosum*; Pfeiffer, Abbild. Beschr. Cact. 2: pl. 17, as *Cereus phyllanthoides* var. *stricta*; Ann. Inst. Roy. Hort. Fromont 2: pl. 1, f. E, as *E. phyllanthoides*; Hort. Ripul. pl. 10; Van Géel, Sert. Bot. pl. 111, as *Cactus alatus*.

Figure 207 is a reproduction of Bonpland's illustration as *Cactus speciosus*.



FIG. 207.—*Nopalxochia phyllanthoides*.



9. *WITTIA* Schumann, Monatsschr. Kakteenk. 13: 117. 1903.

Epiphytic, branching cacti, pendent from trees and rocks; joints elongated, flattened or somewhat thickened, spineless, the margins more or less crenate; flowers small for this group, not fugacious, with a definite tube, much longer than limb; perianth-segments short, erect; style (so far as known) slender, white, a little exserted; fruit small, berry-like.

Type species: *Wittia amazonica* Schumann.

In vegetative characters this genus is similar to some of the *Rhipsalidanae*, but the flower has a tube longer than the limb.

The genus is named for N. H. Witt, who made valuable collections in Brazil.

We recognize two species, natives of Panama and northern South America.

## KEY TO SPECIES.

Fruit roughened by small tubercles . . . . . 1. *W. amazonica*  
 Fruit smooth . . . . . 2. *W. panamensis*

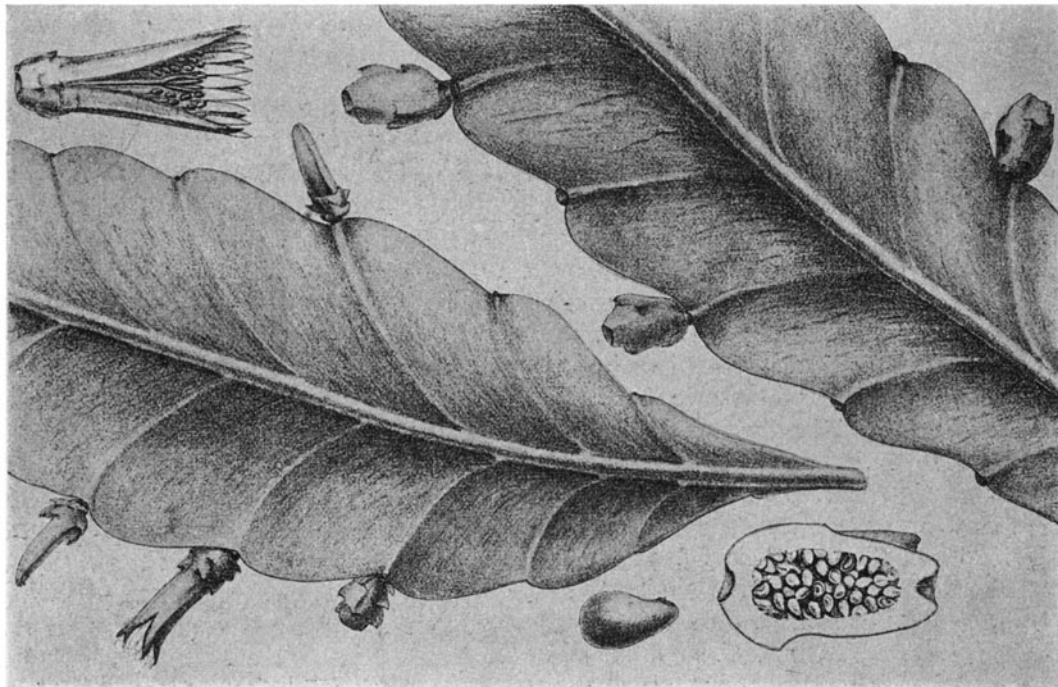


FIG. 208.—*Wittia amazonica*.

1. *Wittia amazonica* Schumann, Monatsschr. Kakteenk. 13: 117. 1903.

Branches flattened except at base, 15 to 40 cm. long, 4.5 to 9 cm. broad, often with constrictions, cuneate at base, coarsely crenate, obtuse or acute at apex; flowers 2.5 cm. long; perianth wine-colored, 2 cm. long, cylindric, somewhat curved; perianth-segments 10, erect, in 2 series; stamens included, in 2 series; style 18 mm. long; stigma-lobes 5; ovary strongly tuberculate; scales on ovary 3-angled; fruit 12 to 17 mm. long, deeply umbilicate at apex.

*Type locality:* Near Laetitia and Tarapoto, Peru.

*Distribution:* Northeastern Peru, not far from the Brazilian border.

We know the plant from description and illustration only.

*Illustration:* Monatsschr. Kakteenk. 13: 119.

Figure 208 is reproduced from the illustration cited above.

2. *Wittia panamensis* Britton and Rose, Contr. U. S. Nat. Herb. 10: 241. 1913.

Branches much flattened, up to 1 meter long, 4 to 7 cm. wide, low-crenate; flowers sometimes 15 or more on a branch but solitary at areoles on upper half of joint, purple, becoming straight, 2.5 to 3.5 cm. long, 5-angled, stiff; outer perianth-segments 10, in 2 series, equal, obtuse; outermost ones angled on back; inner perianth-segments 5, similar to outer but thinner, not angled or only slightly so, a little longer, all erect; innermost segments 10 or 11, thinner, paler, and much smaller than outer, apiculate, sometimes toothed above; tube proper 5 to 6 mm. long, the throat 10 mm. long; stamens many, in 2 series, one on base of throat on long filaments, one on top of throat on short filaments, all included; stigma-lobes 4, white, but remaining in a close cluster, the top exerted beyond perianth-segments; ovary globular, purple, bearing a few scarious scales.

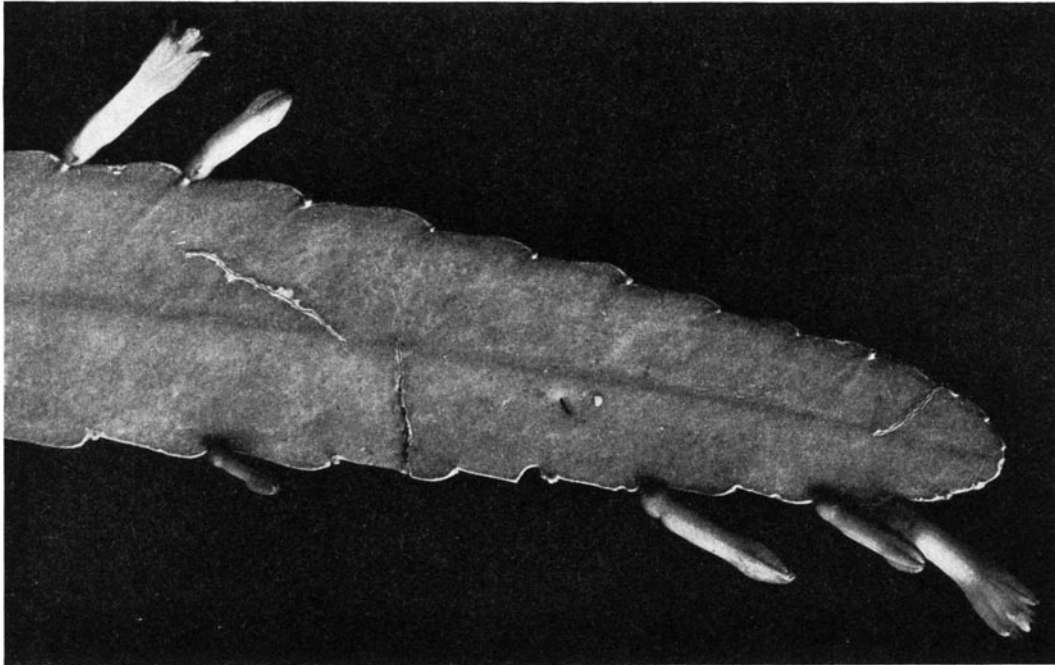
*Type locality:* Mountains above Chepo, Panama.

*Distribution:* Panama, Colombia, and perhaps Venezuela.

Mr. Henri Pittier has collected in Venezuela a plant which is closely related to this species (No. 7656).

*Illustrations:* Contr. U. S. Nat. Herb. 16: pl. 73; Curtis's Bot. Mag. 145: pl. 8799.

Figure 209, shown below, is from a photograph showing the plant collected by Mr. Pittier in 1912 which afterwards flowered in Washington.



## Subtribe 8. RHIPSALIDANAE.

Mostly epiphytic cacti, generally growing on trees but sometimes clambering over rocks or pendent from them, much branched; branches alternate or often in whorls, slender, terete, angled or flat and thin, spineless, except in *Pfeiffera* and *Acanthorhipsis*; flowers regular, mostly small, rotate, and without any tube or with a very short tube; stamens usually few, attached to disk or near base of flower-tube; style usually short; fruit a small juicy berry, white, red, or purple; seeds minute.

We have placed this subtribe at the end of our monograph because it appears to us to represent the most extreme differentiation within the family. It is indeed difficult to explain to most people that its species are really cacti.

We recognize eight closely related genera.

## KEY TO GENERA.

- Flowers with a short definite tube.  
 Joints terete. . . . . 1. *Erythrorhipsis* (p. 208)  
 Joints flattened, ribbed, or angled.  
 Joints and flowers terminal . . . . . 2. *Rhispalidopsis* (p. 209)  
 Joints and flowers normally lateral.  
 Joints with spiny areoles; ovary and fruit with areoles subtended by scales.  
 Joints ribbed; fruit-areoles spiny . . . . . 3. *Pfeiffera* (p. 250)  
 Joints flattened or 3-winged; fruit-areoles not spiny . . . . . 4. *Acanthorhipsis* (p. 211)  
 Joints not spiny; fruit mostly without areoles.  
 Upper joints normally flattened; areoles not pilose . . . . . 5. *Pseudorhipsis* (p. 253)  
 Upper joints flattened or 3-angled; areoles long-pilose . . . . . 6. *Lepismium* (p. 215)  
 Flowers without tube.  
 Petals erect; ends of same joint unlike; flowers and branches always terminal. . . . . 7. *Hatiora* (p. 216)  
 Petals usually widely spreading; ends of same joint usually similar; flowers and  
 branches lateral or terminal . . . . . 8. *Rhipsis* (p. 219)

## 1. ERYTHRORHIPSALIS Berger, Monatsschr. Kakteenk. 30: 4. 1920.

Epiphytic, with slender terete stem and branches, often pendent; branches dichotomous or sometimes in whorls of 3 to 6; areoles scattered, small, all bearing several bristles; flowers terminal, regular, diurnal, white to rose-colored with a short but definite tube; ovary and fruit bristly, the latter red; seeds much larger than in *Rhipsis*.

Type species: *Rhipsis pilocarpa* Löfgren.

The generic name is from ἐρυθρός red, and *Rhipsis*, referring to the red fruit and to the resemblance of this genus to *Rhipsis*. Only one species is known.

The genus resembles in habit some of the species of *Rhipsis* with round stems but has a distinct flower-tube, on the top of which the stamens are borne. It also differs from *Rhipsis* in having a long exserted style, exserted even in the bud; in its slowly opening flower (requiring several days to expand); in its very fragrant flower; in having its ovary and fruit bearing areoles, each with a cluster of bristles; and in its larger seeds.

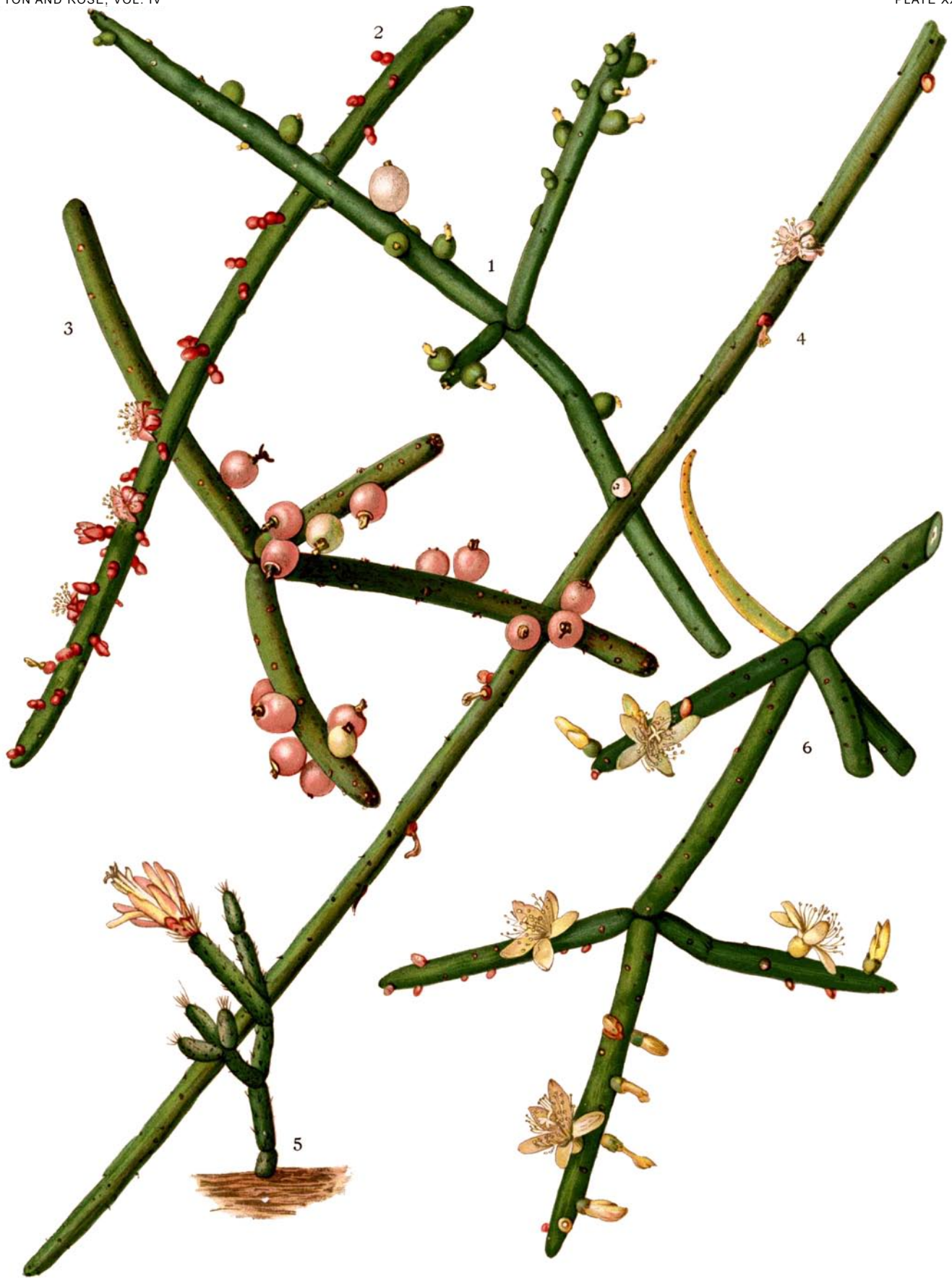
Löfgren, when he described *Rhipsis pilocarpa*, was inclined to think that it might belong to *Pfeiffera*. In his latest treatment of it (Arch. Jard. Bot. Rio de Janeiro 1: 68) he referred it and *Pfeiffera ianthothele* to *Rhipsis* under the subgenus *Pfeiffera*.

At the place cited above, Berger proposed that *Rhipsis pilocarpa* should be regarded as a new subgenus of *Rhipsis* but at the same time he incidentally made it the type of a new genus. Mr. Berger, who has written most interestingly of it, says in part:

"In 1903, Löfgren made known *Rhipsis pilocarpa* (Monatsschr. Kakteenk. 13: 52 to 57) which formerly had a fairly wide distribution in our collections. I received it from various sources, the finest specimens coming from the Botanic Garden in Bremen, from which place it was sent for naming. The plant grew well in my hothouse but appeared to prefer it cooler and sunnier. The habit picture in the Monatsschrift, above cited, is not exactly right. The plant is striking because of its beautiful bristles; it is very odd. In general it does not differ from the rest of the species of *Rhipsis*. Because of its beautiful bristles one is persuaded to put it into *Ophiorhipsis*. Meantime the habit, the flowers, and the fruit show themselves to be a fundamental obstacle.

"In all the species of *Rhipsis* which I have had experience with, the ovary and later the fruit are entirely naked; at the most there is at times a little scale. In these plants, however, the ovaries, which in form remind one of those of *Cereus*, bear a mass of small tubercles with little scales, in whose





M. E. Eaton del.

A. Hoen & Co. Baltimore

- 1. Fruiting branch of *Rhipsalis grandiflora*.
- 2. Flowering branch of *Rhipsalis lindbergiana*.
- 3. Fruiting branch of *Rhipsalis shaferi*.
- 4. Flowering and fruiting branch of *Rhipsalis lindbergiana*.
- 5. Flowering plant of *Erythrorhipsalis pilocarpa*.
- 6. Flowering branch of *Rhipsalis grandiflora*.





axils are a large number of projecting white bristles. Still more different is the fruit, which Löfgren did not know. It is striking because of its size, about 10 to 12 mm. by 10 to 12 mm., and while the rest of the *Rhipsalis* fruits in size, form, and color resemble mistletoe berries or are rarely yellow or pale rose, these are strongly wine-red and beset with numerous bristles bearing small areoles, forming a wreath on the umbilicus of the fruit, like *Cereus* and especially *Opuntia*, only the bristles are white and not pricking. In cross-sections the fruit is also red but has a watery sap and a larger number of seeds, coiled on the placenta in the middle of the fruit. The seeds are about double the size of those of *Rhipsalis*."

**1. *Erythrorhopsis pilocarpa* (Löfgren) Berger, Monatsschr. Kakteenk. 30: 4. 1920.**

*Rhipsalis pilocarpa* Löfgren, Monatsschr. Kakteenk. 13: 52. 1903.

Stems dark green to purple, at first erect, sometimes 4 dm. long and unbranched, terminated by 2 to 4 branches in a whorl, the ultimate branches often only 1 cm. long, in time the whole plant becoming pendent; joints clustered, when withering somewhat angled, tipped by yellow bristles; areoles filled with long setose hairs or bristles subtended by ovate scarios bracts; flowers at ends of terminal branches, very fragrant, opening slowly, up to 2 cm. broad; flower-tube 2 mm. long, reddish on the inside; outer perianth-segments 5 or 6, triangular, rose-colored; inner perianth-segments 10 to 15, spreading or sometimes recurved, lanceolate, acuminate, 10 mm. long, white or cream-colored with pinkish tips; stamens numerous, red at bases; ovary with several areoles, bearing as many as 10 bristles, subtended by small scarios scales and surrounded by purple spots; style exerted in the bud; stigma-lobes 4 to 8, white, spreading apart the second day after the appearance of the style and before the stamens appear.

*Type locality:* Ytu and Ypanema, São Paulo, Brazil.

*Distribution:* States of São Paulo and Rio de Janeiro, Brazil.

*Pfeiffera rhipsaloides* Löfgren (Monatsschr. Kakteenk. 13: 54. 1903) was another name suggested for this plant when it was first described.

*Illustrations:* Blühende Kakteen 2: pl. 99; Monatsschr. Kakteenk. 13: 55; Rev. Centr. Sci. Campinas No. 4, Opp. 188; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 11, 20; Arch. Jard. Bot. Rio de Janeiro 1: pl. 1, as *Rhipsalis pilocarpa*.

Plate XXI, figure 5, is of a plant in the New York Botanical Garden which flowered in April 1919 and was obtained by Dr. Shafer from Dr. Löfgren at Rio de Janeiro in 1917.

**2. RHIPSALIDOPSIS gen. nov.**

Somewhat shrubby, erect, reclining or pendulous, the joints 3 to 5-angled; branches usually several, terminal; areoles small, sometimes bearing setae; flowers terminal, with a broad rotate limb and a very short tube; stamens erect; style slender; fruit unknown.

*Type species:* *Rhipsalis rosea* Lagerheim.

One species is known, native of southern Brazil.

This plant was originally described as *Rhipsalis*, but it has a much larger flower and the perianth-segments are united into a short tube. In habit it resembles some of the species of *Epiphyllanthus* but has a regular flower. We have placed it near *Pfeiffera*, but we do not believe that it is close to that genus, for it has a rotate flower and the flowers and branches are terminal, as in *Zygocactus*.

The generic name is given on account of its resemblance to some of the species of *Rhipsalis*.

**1. *Rhpsalidopsis rosea* (Lagerheim).**

*Rhpsalidopsis rosea* Lagerheim, Svensk Bot. Tidskr. 6: 717. 1912

Branches short, 1 to 3, strongly 4-angled or sometimes 3 or 5-angled, with concave sides; buds red; flowers 3.7 cm. broad, fragrant; perianth-segments few, rose-colored; stamens 11 mm. long, rose-colored; style 13 mm. long, rose-colored; stigma-lobes 3, white, 3 mm. long.



Fig. 210.—*Rhpsalidopsis rosea*.

*Type locality:* Woods near Caguava, state of Parana, Brazil, altitude 1,100 to 1,300 meters.

*Distribution:* Southern Brazil.

*Illustrations:* Svensk Bot. Tidskr. 6: pl. 28; Arch. Jard. Bot. Rio de Janeiro 2: pl. 14, 15; Monatsschr. Kakteenk. 32: 121, as *Rhipsalis rosea*.

Figure 210 is reproduced from the first illustration above cited.

### 3. PFEIFFERA Salm-Dyck, Cact. Hort. Dyck. 1844. 40. 1845.

Epiphytic, with a woody base; branches in wild state hanging, mostly 4-angled, not emitting aerial roots; spines several, acicular; flowers regular, diurnal, pale yellow to rose-colored (sometimes described as purple-red), small, the segments united at base into a very short tube; stamens included, some borne on flower-tube and some on disk; ovary and fruit spiny; seeds black, oblong.

*Type species:* *Cereus ianthothele* Monville.

Only one species is known, and this was first described as a *Cereus* and afterwards referred to *Rhipsalis*. We agree with the author in regarding it as a distinct genus.

The genus was named for Dr. Ludwig Pfeiffer, a physician by profession and one of the most distinguished authorities on the Cactaceae. He visited Cuba in 1838-1839. Dr. Pfeiffer was born July 4, 1805, at Kassel, Germany, and died in 1877.

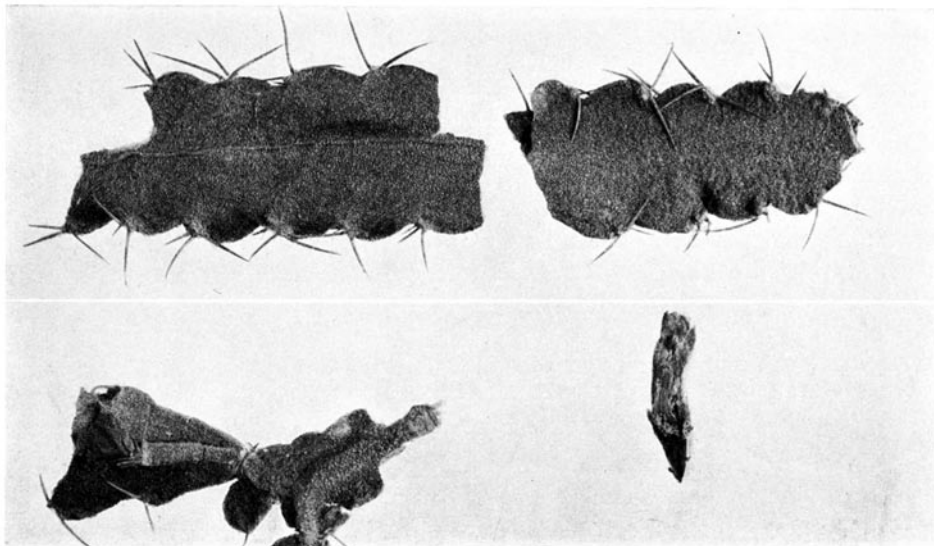


FIG. 211.—*Acanthorhipsalis micrantha*.

### 1. *Pfeiffera ianthothele* (Monville) Weber, Dict. Hort. Bois 944. 1898.

*Cereus ianthothele* \* Monville, Hort. Univ. 1: 218. 1839.

*Pfeiffera cereiformis* Salm-Dyck, Cact. Hort. Dyck. 1844. 41. 1845.

*Rhipsalis cereiformis* Förster, Handb. Cact. 454. 1846.

*Hariota cereiformis* Kuntze, Rev. Gen. Pl. 1: 262. 1891.

*Rhipsalis ianthothele* K. Brandegee, Cycl. Amer. Hort. Bailey 4: 1514. 1902.

Stem weak, spreading or pendent, 3 to 6 dm. long, 2 cm. in diameter or less; joints 8 to 12 cm. long, 3 to 5-ribbed, 10 mm. in diameter, light green, spiny; ribs tuberculate; areoles 10 mm. apart; spines 6 or 7, 5 to 7 mm. long, yellowish; flowers including the ovary about 15 mm. long; inner perianth-segments 5, pale yellow to cream-colored, acute, erect or slightly spreading at tip; stamens numerous, shorter than the perianth-segments, included; style longer than stamens; stigma-lobes 8, linear, spreading; ovary strongly tuberculate, purplish, its areoles bearing white bristly spines; fruit globose, 12 to 16 mm. in diameter, rose-red, spiny; seeds numerous, black.

\* The specific name is sometimes spelled *janthothele*; it was originally given as *ianthobelus*.



M. E. Eaton del.

A. Hoen &amp; Co. Baltimore

1. Flowering branch of *Pfeiffera ianthothele*.
2. Flowering and fruiting branch of *Lepismium cruciforme*.
3. Top of fruiting branch of *Pfeiffera ianthothele*.
4. Flowering and fruiting branch of *Rhipsalis jamaicensis*.
5. Flowering branch of *Pseudorhipsalis alata*.
6. Flowering and fruiting branch of *Pseudorhipsalis himantoclada*.
7. Flowering branch of *Rhipsalis grandiflora*.





*Type locality:* Montevideo is cited in the original description, but this must be wrong.  
*Distribution.* Northwestern Argentina, especially in the states of Salta, Tucuman, and Catamarca.

*Illustrations:* Goebel, Pflanz. Schild. 1: 45, B; Palmer, Cult. Cact. 191; Förster, Handb. Cact. ed. 2. 895. f. 122; Pfeiffer, Abbild. Beschr. Cact. 2: pl. 9; Garten-Zeitung 4: 182. f. 42, No. 10, as *Pfeiffera cereiformis*; Schumann, Gesamtb. Kakteen 611. f. 97, A, B; Blühende Kakteen 3: pl. 152.

Plate XXII, figures 1 and 7, shows flowering branches from a plant collected by Dr. Shafer in Argentina in 1917 (No. 71), which flowered in April 1919; figure 3 shows the mature fruit.

#### 4. ACANTHORHIPSALIS (Schumann) gen. nov.

Small branching cacti, more or less epiphytic, growing on forest trees or creeping over rocks; joints flattened or sometimes 3-winged, short or elongated, their margins crenate or serrate; areoles spiny; flowers solitary from lateral areoles; perianth-segments united into a short tube; ovary bearing on its surface small scales with tufts of felt in their axils, at least in typical species; seeds small, black, narrowed at base.

The type is *Cereus micranthus* Vaupel and to this genus we have also referred two little-known species of *Rhipsalis*, both of which have flattened joints and spiny areoles. In their habit and armament they resemble *Acanthorhipsalis micrantha* more than they do the true species of *Rhipsalis*. The plants are native of Peru, Bolivia, and Argentina.

#### KEY TO SPECIES.

Joints crenate.

Joints about 2 cm. broad; spines 5 to 15 mm. long. . . . . 1. *A. micrantha*

Joints usually 4 to 6 cm. broad; spines 4 mm. long or less . . . . . 2. *A. crenata*

Joints serrate. . . . . 3. *A. monacantha*

#### 1. *Acanthorhipsalis micrantha* (Vaupel).

*Cereus micranthus* Vaupel, Bot. Jahrb. Engler 50: Beibl. 111: 19. 1913.

Stems much branched; joints 2 or 3-winged, about 2 dm. long and 2 cm. broad, yellowish green, at least when dry; areoles 6 to 10 mm. apart; spines 3 to 10, 5 to 15 mm. long, brown to blackish, straight or a little curved; flower, including the ovary, 22 mm. long.

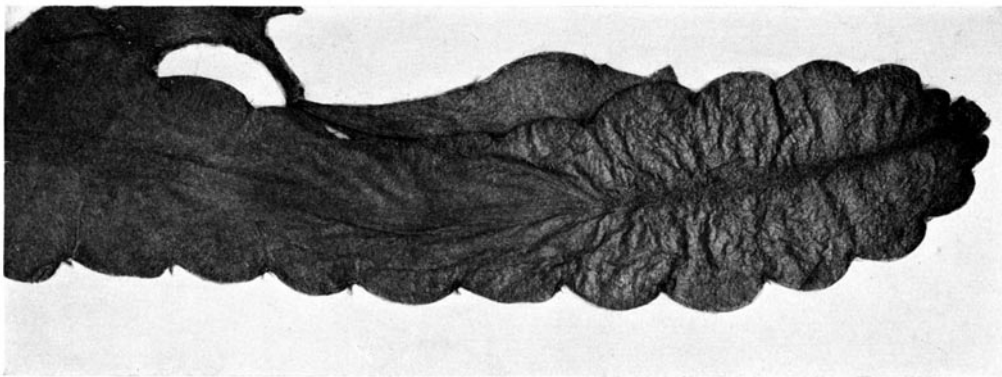


FIG. 212.—*Acanthorhipsalis crenata*.

*Type locality:* Sandia, southeastern Peru, altitude 2,100 meters.

*Distribution:* Known only from the type locality.

This plant was described by Dr. Vaupel as a species of *Cereus*, but as he writes us under date of October 20, 1920, it is of course not a *Cereus* in the stricter sense, but is more

nearly related to *Rhipsalis*. This view was taken by Schumann, who had labeled it *Rhipsalis peruviana* Schumann (Vaupel, Bot. Jahrb. Engler 50: Beibl. 111: 19. 1913).

The plant was collected by A. Weberbauer July 31, 1902 (No. 1353); a fragment of the type, which is in the Berlin Herbarium, was sent us by Dr. Vaupel in 1920.

Figure 211 is from a photograph of a part of the type specimen now in the National Herbarium at Washington.

## 2. *Acanthorhipsalis crenata* (Britton).

*Hariota crenata*\* Britton, Bull. Torr. Club 18: 35. 1891.

Branches lateral, narrowly oblong, very flat, obtuse, 20 to 30 cm. long, 3 to 6 cm. broad, strongly crenate, with a stout central axis; areoles between crenations rather large, filled with wool and bearing 3 to 8 spines, these 2 to 4 mm. long; flowers red, lateral, small; berry 7 mm. in diameter.

*Type locality*: Yungas, Bolivia.

*Distribution*: Known only from the type locality.

When first described, this species was thought to be nearest the Brazilian *Rhipsalis platycarpa*, which it resembles, but that species has no spines.

Figure 212 is from a photograph of Dr. Rusby's herbarium specimen (No. 2047).

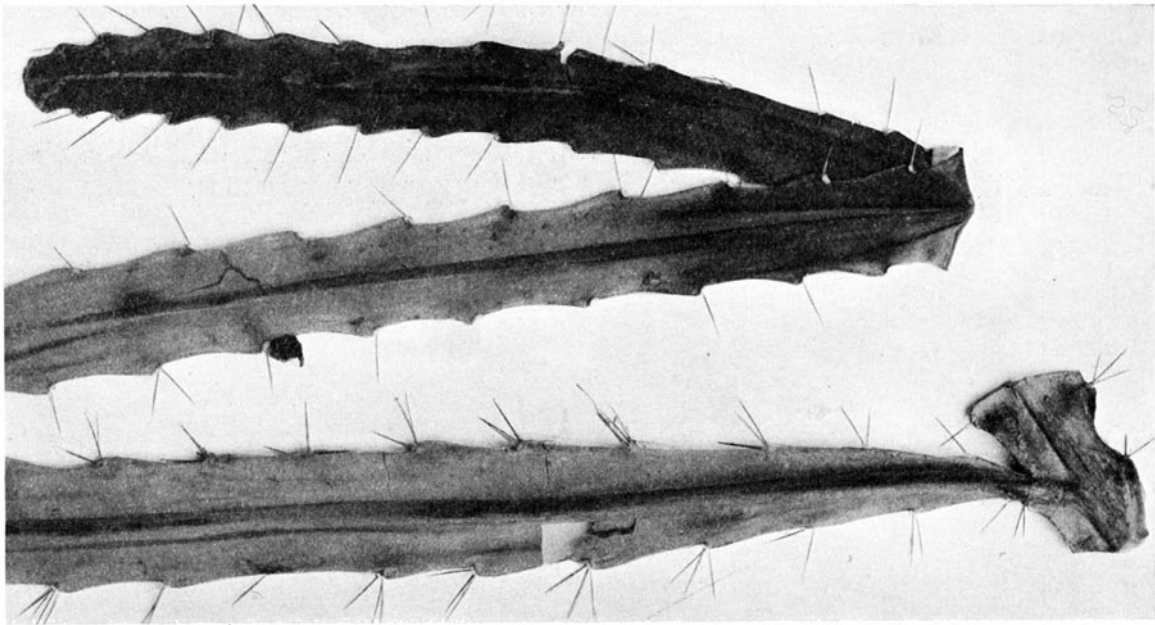


FIG. 213.—*Acanthorhipsalis monacantha*.

## 3. *Acanthorhipsalis monacantha* (Grisebach).

*Rhipsalis monacantha* Grisebach, Abh. Ges. Wiss. Göttingen 24: 140. 1879.

*Hariota monacantha* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Epiphytic, branching; branches flat and thin, linear-oblong, 2 cm. broad, sometimes 8 dm. long, obtuse, cuneate at base; serrate (acuminate says Schumann, but figured by him as obtuse); areoles white-felted and spiny, spines 1 to 6, but usually only 1 or 2, 5 to 10 mm. long, yellow; flowers solitary at the areoles, lateral, white, 1 cm. long; fruit globular, 8 to 10 mm. in diameter, white; seeds blackish, pitted, obovoid.

*Type locality*: Oran, near San Andrés, Argentina.

*Distribution*: Northern Argentina.

\* This name is printed *H. cinerea* in the Index Kewensis.

*Illustration:* Schumann, Gesamt. Kakteen 633. f. 98, H, as *Rhipsalis monacantha*.

Figure 213 is from a photograph of a herbarium specimen collected at Calilegua, Jujuy, Argentina, by J. A. Shafer in 1917 (No. 56).

### 5. PSEUDORHIPSALIS gen. nov.

Epiphytic, much branched, and elongated cacti, at first erect, but soon prostrate or hanging; branches flattened, rather thin, serrate or crenate; flowers numerous, borne solitary at the lateral areoles, narrowly campanulate; segments united into a short but definite tube; ovary and fruit globular, bearing several scales; seeds black.

Two species are here included, of which *Cactus alatus* Swartz is made the generic type. These plants in their habit and branches resemble certain species of *Rhipsalis*, especially *R. ramulosa* and its relatives, but differ from all the species of *Rhipsalis* in having united perianth-segments and more scaly ovary and fruit.

#### KEY TO SPECIES.

Ovary and outer perianth-segments reddish . . . . . 1. *P. himantoclada*  
Ovary and outer perianth-segments greenish or yellowish green . . . . . 2. *P. alata*

#### 1. *Pseudorhipsalis himantoclada* (Roland-Gosselin).

*Rhipsalis himantoclada* Roland-Gosselin, Bull. Soc. Bot. France 55: 694. 1908.  
*Wittia costaricensis* Britton and Rose, Contr. U. S. Nat. Herb. 16: 261. 1913.

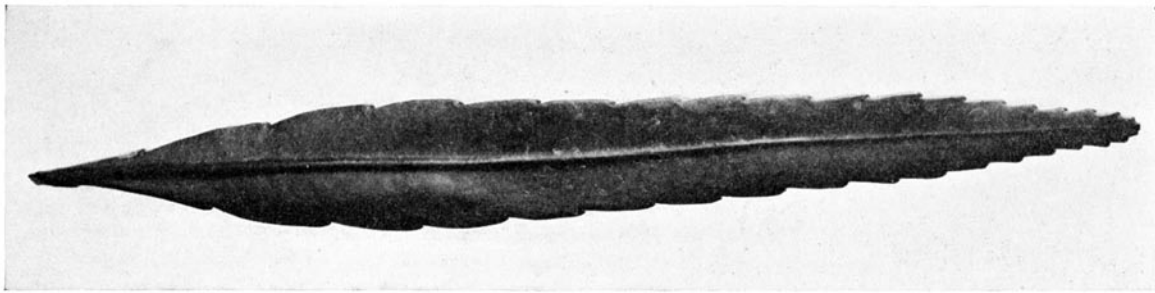


FIG. 214.—*Pseudorhipsalis himantoclada*.

Stems 4 to 5 dm. long, erect or curved, flat, 1 to 3 cm. broad, with horizontal branches narrowed at base, pointed, the margin low-serrate; areoles 12 to 15 mm. apart; ovary, tube, and sepals purplish; ovary 3 mm. long, bearing a few very short scales; tube of flower about 8 mm. long; inner perianth-segments white, obtuse, spreading; stamens erect; style white; stigma-lobes 4.

*Type locality:* Pozo Azul, Costa Rica.

*Distribution:* Costa Rica.

We are told by Mr. Otón Jiménez that Mr. Wercklé, who first collected the plant, would refer *Wittia costaricensis* here. He states also that it is very luxuriant and when growing wild becomes so large that one man can not carry a single plant.

*Illustration:* Contr. U. S. Nat. Herb. 16: pl. 82, as *Wittia costaricensis*.

Plate xxii, figure 6, shows a flowering branch collected by Wercklé in 1907 which flowered in the New York Botanical Garden, December 20, 1911. Figure 214 is from a photograph of a terminal branch; figure 215 shows a flowering branch; figure 216 shows a flower cut longitudinally.

#### 2. *Pseudorhipsalis alata* (Swartz).

*Cactus alatus* Swartz, Prodr. 77. 1788.  
*Cereus alatus* De Candolle, Prodr. 3: 470. 1828.  
*Epiphyllum alatum* Haworth, Phil. Mag. 6: 109. 1829. Not Haworth, 1819.  
*Rhipsalis swartziana* Pfeiffer, Enum. Cact. 131. 1837.  
*Hariota swartziana* Lemaire, Cact. Gen. Nov. Sp. 75. 1830.  
*Rhipsalis alata* Schumann in Martius, Fl. Bras. 4: 288. 1890.  
*Hariota alata* Kuntze, Rev. Gen. Pl. 1: 262. 1891.  
*Rhipsalis harrisii* Gürke, Monatsschr. Kakteenk. 18: 180. 1809.

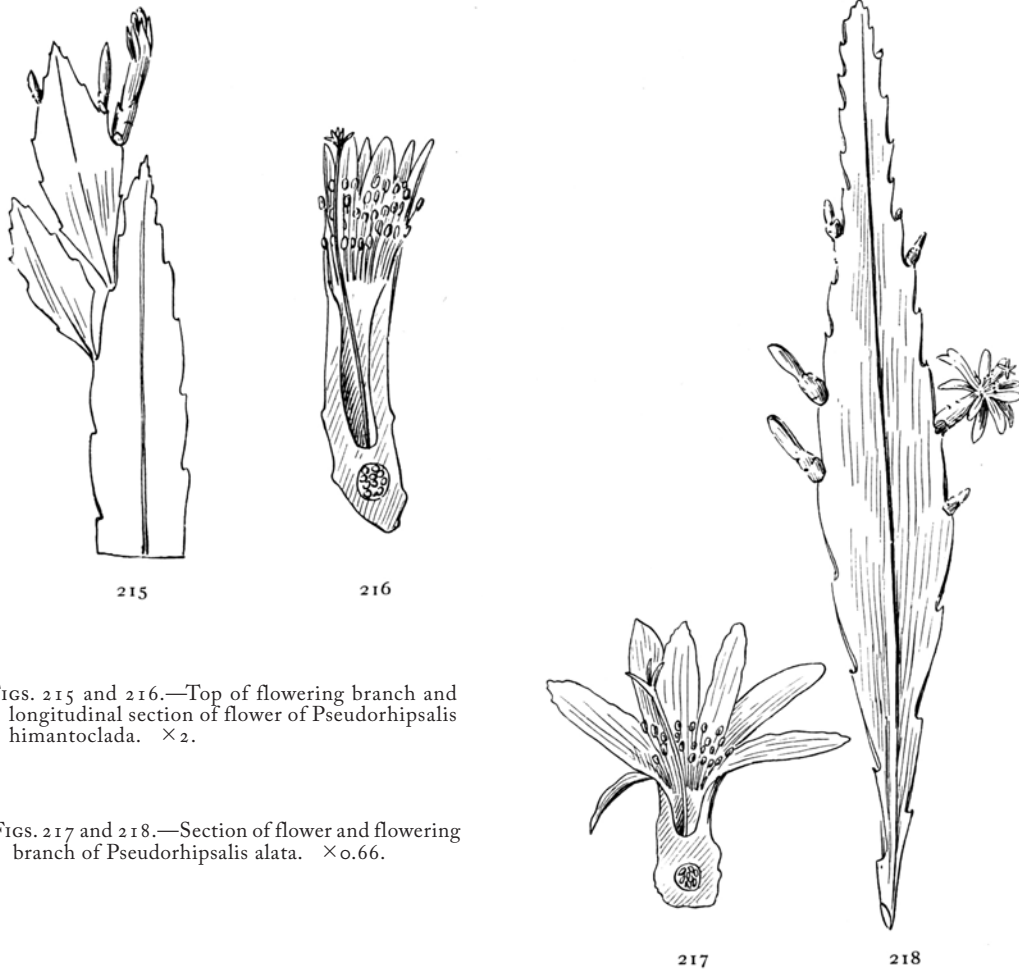


Pendent from trees and rocks, up to 5 meters long, branched; joints broadly linear to lanceolate or linear-oblong, 2 to 4 dm. long, 3 to 6 cm. broad, obtuse, the margin crenate-undulate; flowers yellowish white, 15 mm. long; flower-tube 4 mm. long; perianth-segments 10, lanceolate, acute; stamens numerous, about half as long as perianth; style slender; stigma-lobes; ovary somewhat tubercled, bearing several broad scales; fruit ovoid, 1 cm. long, yellowish green; seeds obovate, black, bearing depressed tubercles; hilum oblique.

*Type locality:* Jamaica.

*Distribution:* Mountains of Jamaica.

This plant has usually passed as a *Rhipsalis*, but its definite flower-tube and somewhat tubercled and scaly ovary exclude it from that genus. This species has long been known in Jamaica; it was mentioned by Sloane as a spineless *Opuntia* and it is also referred to by Patrick Browne.



FIGS. 215 and 216.—Top of flowering branch and longitudinal section of flower of *Pseudorhipsalis himantoclada*.  $\times 2$ .

FIGS. 217 and 218.—Section of flower and flowering branch of *Pseudorhipsalis alata*.  $\times 0.66$ .

*Cactus dentatus* Ruiz (Martius, Fl. Bras. 4<sup>2</sup>: 288. 1890) was given as a synonym of *Rhipsalis alata* by Schumann, but better referred to *R. ramulosa* (see page 241).

*Cereus alatus crassior* Salm-Dyck (Hort. Dyck. 66. 1834) is only a name, which may or may not refer to the Jamaican plant.

*Illustration:* Torrey **9**: 157. f. 2, as *Rhipsalis alata*.

Plate XXII, figure 5, shows a plant collected by Dr. Britton in Jamaica in 1907, which flowered in the New York Botanical Garden, November 8, 1912. Figure 218 shows a flowering branch (natural size); figure 217 shows half of a flower with tube, perianth-segments, and stamens.

6. **LEPISMIUM** Pfeiffer, Allg. Gartenz. 3: 315, 380. 1835.

Saxicolous or epiphytic cacti, usually much branched and elongated, the branches flat, angled or 3-winged, the margins strongly crenate; areoles in the crenations producing a tuft of long white hairs; flowers 1 to 5 at an areole, white to pinkish; perianth-segments united at base into a short tube; filaments slender, adnate to flower-tube; stigma-lobes 4 or 5; fruit globose, smooth, turgid, purple; seeds minute; cotyledons broad, acuminate.

Type species: *Lepismium commune* Pfeiffer.

We recognize but one species, which has been described under many names. The generic name is from *λεπίς*, a scale, referring to the small scales subtending the areole.

1. **Lepismium cruciforme** (Vellozo) Miquel, Bull. Néerl. 49. 1838.

- Cactus cruciformis* Vellozo, Fl. Plum. 207. 1825.  
*Cereus tenuispinus* Haworth, Phil. Mag. 1: 125. 1827.  
*Cereus myosurus* Salm-Dyck in De Candolle, Prodr. 3: 469. 1828.  
*Cereus tennis* De Candolle, Prodr. 3: 469. 1828.  
*Cereus squamulosus* Salm-Dyck in De Candolle, Prodr. 3: 469. 1828.  
*Cereus setosus* Loddiges, Bot. Cab. 19: pl. 1887. 1832.  
*Lepismium tenue* Pfeiffer, Allg. Gartenz. 3: 315. 1835.  
*Lepismium commune* Pfeiffer, Allg. Gartenz. 3: 315. 1835.  
*Lepismium knightii* Pfeiffer, Allg. Gartenz. 3: 380. 1835.  
*Lepismium myosurus* Pfeiffer, Enum. Cact. 139. 1837.  
*Cereus cruciformis* Steudel, Nom. ed. 2. 1: 333. 1840.  
*Rhipsalis myosurus* Förster, Handb. Cact. 455. 1846.  
*Rhipsalis mittleri* Förster, Handb. Cact. 455. 1846.  
*Rhipsalis knightii* Förster, Handb. Cact. 456. 1846.  
*Lepismium myosurus knightii* Salm-Dyck in Labouret, Monogr. Cact. 445. 1853.  
*Lepismium myosurus laevigatum* Salm-Dyck in Labouret, Monogr. Cact. 446. 1853.  
*Lepismium radicans* Vöchting, Jahrb. Wiss. Bot. Leipzig 9: 399. 1873.  
*Lepismium cavernosum* Lindberg, Gartenflora 39: 251. 1890.  
*Rhipsalis brevisbarbis* Schumann in Martius, Fl. Bras. 4: 268. 1890.  
*Rhipsalis squamulosa* Schumann in Martius, Fl. Bras. 4: 280. 1890.  
*Rhipsalis macropogon* Schumann in Martius, Fl. Bras. 4: 282. 1890.  
*Hariota cruciformis* Kuntze, Rev. Gen. Pl. 1: 262. 1891.  
*Hariota squamulosa* Kuntze, Rev. Gen. Pl. 1: 263. 1891.  
*Hariota knightii* Kuntze, Rev. Gen. Pl. 1: 263. 1891.  
*Hariota knightii tenuispinis* Kuntze, Rev. Gen. Pl. 1: 263. 1891.  
*Rhipsalis anceps* Weber, Rev. Hort. 64: 427. 1892.  
*Rhipsalis cavernosa* Schumann, Monatsschr. Kakteenk. 3: 24. 1893.  
*Rhipsalis radicans* Weber, Dict. Hort. Bois 1047. 1898.  
*Rhipsalis radicans anceps* Weber, Dict. Hort. Bois 1047. 1898.  
*Rhipsalis radicans ensiformis* Weber, Dict. Hort. Bois 1047. 1898.  
*Lepismium cavernosum ensiforme* Weber in Roland-Gosselin, Rev. Hort. 70: 108. 1899.

Usually creeping over rocks, freely rooting, appressed, somewhat branching; branches foliaceous, usually flat, sometimes 3, 4, or even 5-angled, linear-lanceolate, 2 cm. broad, narrowed at base, more or less purplish, especially on edges; margins somewhat repand; areoles sunken in margins; flowers white, 2 to 5, or even more from an areole, 12 to 13 mm. long; fruit globular, juicy, purplish to red, translucent, 6 to 12 mm. in diameter; seeds light brown to black, 1.8 mm. long.

Type locality: Coast of Brazil.

Distribution: States of Rio de Janeiro and Minas Geraes, Brazil.

*Rhipsalis radicans rosea* Weber (Dict. Hort. Bois 1047. 1898) has small rose-colored flowers which, according to Weber, resemble those of *R. myosurus*.

Schumann (Gesamtb. Kakteen 649. 1898) gives *Lepismium anceps* Weber (in Hort. Paris) as a synonym for *Rhipsalis anceps*. Here belongs also *R. ensiformis* Weber (Dict. Hort. Bois 1047. 1898).

Some of the plants now in cultivation are not so broadly winged as is shown in the illustration in Curtis's Botanical Magazine referred to below. This illustration was based upon specimens which were supposed to have come from Prince de Salm-Dyck and, therefore, presumably are typical.

*Cereus knightii* Parmentier (Pfeiffer, Enum. Cact. 139. 1837) is given as a synonym of *Lepismium knightii*.

*Cactus tenuis* Schott (De Candolle, Prodr. 3: 469. 1828) was cited as a synonym of *Cereus tenuis*.

Schumann cited *Lepismium mittleri* as a synonym of *Rhipsalis squamulosa*, referring it to Förster (Handb. Cact. 455. 1846), but the plant is there described as *Rhipsalis mittleri*.

*Cereus elegans* Hortus appeared first (Pfeiffer, Enum. Cact. 138. 1837) as a synonym of *Lepismium commune*, while the Index Kewensis refers it to *Rhipsalis mittleri*.

*Cereus myosurus tenuior* Salm-Dyck (Hort. Dyck. 65. 1834) is only a name.

*Lepismium cavernosum minus* Lindberg is a name mentioned by Roland-Gosselin (Rev. Hort. 70: 108. 1899).

*Lepismium duprei*, the name mentioned by Salm-Dyck (Cact. Hort. Dyck. 1844. 41. 1845) and by Förster (Handb. Cact. 456. 1846) as in the collections at Paris, was never described.

*Lepismium laevigatum* Salm-Dyck (Cact. Hort. Dyck. 1844. 41. 1845) is without description, nor do we find it listed in the Index Kewensis.

*Illustrations*: Fl. Flum. 5: pl. 29, as *Cactus cruciformis*; Loddiges, Bot. Cab. 19: pl. 1887; Loudon, Encycl. Pl. ed. 2. 1202. f. 17365, as *Cereus setosus*; Palmer, Cult. Cact. 195, as *Lepismium*; Curtis's Bot. Mag. 66: pl. 3755; Garten-Zeitung 4: 182. f. 42, No. 3; Loudon's Encycl. Pl. ed. 3. 1380. f. 19411, as *Lepismium myosurum*; Monatsschr. Kakteenk. 3: 41, as *L. knightii*; Abh. Bayer. Akad. Wiss. München 2: pl. 7, f. 1; Curtis's Bot. Mag. 66: pl. 3763; Förster, Handb. Cact. ed. 2. 898. f. 123 (in error 103); Loudon, Encycl. Pl. ed. 3. 1380. f. 19412; Nov. Act. Nat. Cur. 19<sup>1</sup>: pl. 16, f. 12, as *L. commune*; Goebel, Pflanz. Schild. 1: pl. 2, f. 3, 4, as *L. radicans* (seedling); Gartenwelt 16: 633; Schumann, Gesamtb. Kakteen f. 98, C, D, as *Rhipsalis cavernosa*; Gartenflora 39: f. 38, as *Lepismium cavernosum*; Martius, Fl. Bras. 4<sup>2</sup>: pl. 55, f. 2, as *Rhipsalis macropogon*; Arch. Jard. Bot. Rio de Janeiro 1: pl. 25, as *Rhipsalis radicans*; Arch. Jard. Bot. Rio de Janeiro 1: pl. 24, as *R. myosura*; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 19, as *R. squamulosa*; Rev. Hort. 85: f. 152, as *R. anceps*.

Plate XXII, figure 2, shows the plant obtained by Dr. Rose in Brazil in 1915 which flowered November 18 of that year.

LEPISMIUM RAMOSISSIMUM Lemaire in Förster, Handb. Cact. ed. 2. 899. 1885.

*Rhipsalis ramosissima* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 299. 1890.

*Hariota ramosissima* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

This is a very uncertain species which we know only from descriptions. It is from Brazil.

7. HATORIA Britton and Rose, Stand. Cycl. Hort. Bailey 3: 1432. 1915.

*Hariota* De Candolle, Mém. Cact. 23. 1834. Not Adanson, 1763.

Unarmed, slender, branched cacti; branches terete, short, arising in 2's or 3's from tops of older ones, smooth, leafless and spineless,\* bearing several small areoles along their sides and each a large, woolly, terminal one from which the flower and succeeding branches arise; sepals usually in 2 series, outer ones broader and short, inner ones larger and more petal-like; petals distinct, narrowed toward base; stamens distinct, erect, borne on disk; stigma-lobes 4 or 5, erect or a little spreading, white; ovary globular, naked or nearly so.

Type species: *Rhipsalis salicornioides* Haworth.

Some six or seven species have been described; we recognize three.

The genus *Hariota* was named for Thomas Hariot, a botanist of the 16th century, *Hatoria* being an anagram. It is closely related to *Rhipsalis*, with which it is often united.

The flowers open only in bright sunlight and are rotate or nearly so. In the United States the plants flower under glass, usually in the winter from December to February, but sometimes as late as April.

\*Sometimes peculiar lateral branches are produced which are made up of short, rounded joints with numerous areoles bearing several bristles or hairy spines. See illustrations of Schumann (Gesamtb. Kakteen f. 97, I) and Loddiges (Bot. Cab. 4: 369). In cases which we have observed these occur on stunted or starved plants, the areoles arranged in 6 rows forming low angles on the branchlets.

## KEY TO SPECIES.

- Lower part of joints slender, pedicel-like . . . . . 1. *H. salicornioides*  
 Joints only slightly narrowed below or not narrowed.  
 Joints clavate . . . . . 2. *H. bambusoides*  
 Joints cylindrical . . . . . 3. *H. cylindrica*

**1. *Hatiora salicornioides*** (Haworth) Britton and Rose, Stand. Cycl. Hort. Bailey 3: 1433. 1915.

*Rhipsalis salicornioides* Haworth, Suppl. Pl. Succ. 83. 1819.

*Cactus salicornioides*\* Link and Otto, Icon. Pl. Select. 49. 1822.

*Cactus lyratus* Vellozo, Fl. Flum. ed. 2. 4: 205. 1825.

*Hariota salicornioides* De Candolle, Mém. Cact. 23. 1834.

*Rhipsalis salicornioides strictior* Salm-Dyck, Cact. Hort. Dyck. 1849. 230. 1850.

*Hariota salicornioides strictior* Gürke, Blühende Kakteen 2: under pl. 95. 1907.

Stems 1 to 2 meters long with a jointed cylindrical trunk; branchlets club-shaped, the lower part very slender and pedicel-like, 1.5 to 3 cm. long, green or purplish; areoles of cultivated specimens without setae; flowers 8 to 10 mm. long, salmon-colored, the outer sepals short and obtuse; inner petals somewhat crenate, obtuse; filaments yellowish, at top appressed against style, shorter than petals; style yellowish; stigma-lobes 4 or 5, white.

*Type locality:* Recorded originally from the West Indies in error.

*Distribution:* Southeast Brazil.

These plants grow quite differently in the woods from the way they do in greenhouses. The following note was made by Dr. Rose in 1915 while collecting at Rio de Janeiro:

The plant grows on trunks of trees, its roots long and fibrous, dm. long or more and wrapped about the trunk of the tree; at first it is erect, then spreading and finally pendent; it is then a meter long or more and very much branched; main stem and branches 5 to 10 mm. in diameter, made up of short terete joints (2 to 5 cm. long); branches in whorls of 2 to 6.

A very remarkable form, if not a distinct species, was obtained by Dr. Rose in the forest of Itatiaia, altitude 1,200 meters, in July 1915 (No. 20585). The terminal joints are 1 to 2 cm. long, the lower half slender, pedicel-like, the upper half twisted and contorted. This is well shown in our illustration (figure 219).

*Rhipsalis salicornioides gracilior* (Salm-Dyck, Cact. Hort. Dyck. 1844. 40. 1845; *Hariota salicornioides gracilior* Gürke, Blühende Kakteen. 2: under pl. 9. 1907) is only a name.

The following varieties of *Rhipsalis salicornioides* of Weber are probably to be referred here: var. *gracilis* Weber (Dict. Hort. Bois 1048. 1898; *Rhipsalis gracilis* Weber and *Hariota gracilis* Weber, Dict. Hort. Bois 1048. 1898) and var. *stricta* Weber (Dict. Hort. Bois 1048. 1898; *Rhipsalis stricta* Cels, Dict. Hort. Bois 1048. 1898). The name *Rhipsalis stricta* seems never to have been published. Weber cited it as above, referring it to Cels as the author. Schumann uses the name earlier where he states that it was used in France for *Hariota salicornioides* (Monatsschr. Kakteenk. 4: 74. 1894). Pfeiffer refers here as a synonym *Opuntia salicornioides* (Enum. Cact. 141. 1837), attributing the name to Sprengel, who, however, used it as *Cactus (Opuntia) salicornioides*. *Hariota stricta* has been used (Monatsschr. Kakteenk. 5: 22. 1895). The variety *ramosior* Salm-Dyck (Pfeiffer, Enum. Cact. 142. 1837) may or may not belong to this species.

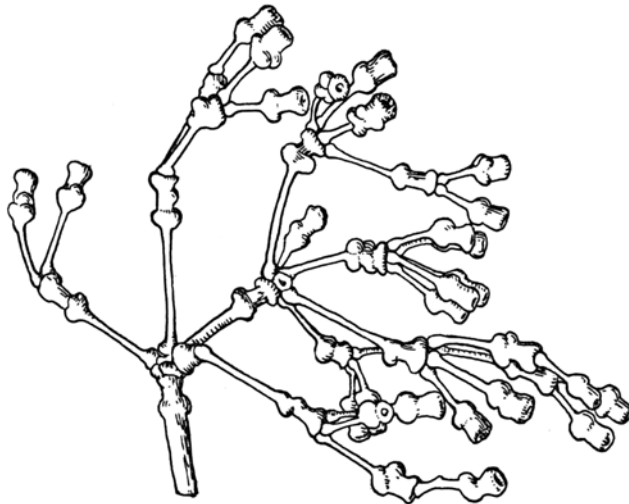


FIG. 219.—Unusual form of *Hatiora salicornioides*.  $\times 0.8$ .

\* This name is often credited to Sprengel (Syst. 2: 497. 1825).



*Rhipsalis schottmuelleri* Hortus is given by Schelle (Handb. Kakteenk. 227. 1907) as a synonym of *Hariota salicornioides schottmuelleri*, an unpublished variety.

*Hariota villigera* (Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 265. 1890; *Rhipsalis salicornioides villigera* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 85. 1915) we know from description only; it seems to be stouter than *salicornioides* but may belong here. It was based on Sellow's specimen from São Paulo, but its flowers are unknown.

*Illustrations*: Loddiges, Bot. Cab. 4: pl. 369; Cact. Journ. 1: 180; Curtis's Bot. Mag. 51: pl. 2461; Blanc, Cacti 90. No. 1013; Balt. Cact. Journ. 1: 122; Gard. Chron. II. 6: 731. f. 134; Amer. Gard. 11: 463; Goebel, Pflanz. Schild. 1: pl. 4, f. 5, 6; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 17; Arch. Jard. Bot. Rio de Janeiro 1: pl. 12; Gartenwelt 13: 117, as *Rhipsalis salicornioides*; Link and Otto, Icon. Pl. Select. pl. 21, as *Cactus salicornioides*; Schumann, Gesamtb. Kakteen f. 97, C, D; Martius, Fl. Bras. 4<sup>2</sup>: pl. 52; Monatsschr. Kakteenk. 5: 23; Schelle, Handb. Kakteenk. 227. f. 148, as *Hariota salicornioides*; Rev. Hort. 1861: 110. f. 23, as *Rhipsalis salicorne*; Fl. Flum. 5: pl. 21, as *Cactus lyratus*.

Plate xxiii, figure 4, shows a plant in the New York Botanical Garden which flowered February 2, 1912. Figure 219 shows a peculiar form collected by Dr. Rose in Brazil in 1915.

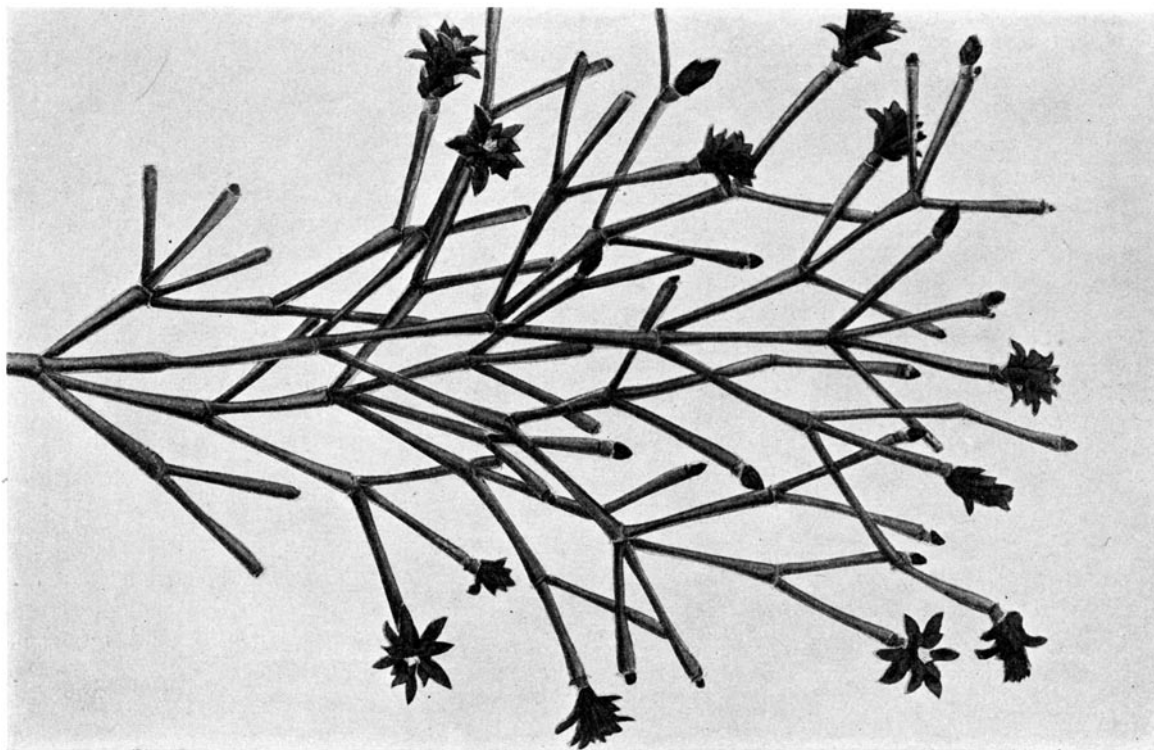


FIG. 220.—*Hattiora bambusoides*.

## 2. *Hattiora bambusoides* (Weber).

*Rhipsalis salicornioides bambusoides* Weber, Rev. Hort. 64: 429. 1892.

*Hariota salicornioides bambusoides* Schumann, Gesamtb. Kakteen 613. 1898.

*Rhipsalis bambusoides* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 41. 1918.

Stems becoming 2 meters high and stouter than those of *H. salicornioides*; joints clavate, 3 to 5 cm. long, 4 mm. in diameter at the top; flowers orange; sepals obtuse; petals usually erect but sometimes spreading.

*Type locality*: Brazil.

*Distribution*: State of Rio de Janeiro, Brazil.



M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Flowering branch of *Hatiora cylindrica*.
2. Fruiting branch of *Rhipsalis heteroclada*.

3. Fruiting branch of *Rhipsalis cribrata*.
4. Flowering branch of *Hatiora salicornioides*.



Introduced into Jardin des Plantes, Paris, France, from Brazil.

We have not seen this type material, but if plate 95 in the Blühende Kakteen is typical, our identification is correct. In the description accompanying this plate it is stated that the drawing was made from a plant sent by Mr. Weber to the Berlin Botanical Garden.

*Hariota bambusoides* Weber (Dict. Hort. Bois 1048. 1898) was given as a synonym but was never described.

*Illustrations:* Blühende Kakteen 2: pl. 95, as *Hariota salicornioides bambusoides*; Gartenwelt 13: 117, as *Rhipsalis salicornioides bambusoides*.

Figure 220 is reproduced from the first illustration cited above.

### 3. *Hattoria cylindrica* sp. nov.

Forming dense masses one meter in diameter or more; joints cylindrical, 3 cm. long or less, pale green, becoming spotted or finally red throughout; flowers usually solitary, 12 mm. long; sepals ovate, short, red; petals orange to yellow, oblong, obtuse.

Collected by J. N. Rose in company with Dr. Löfgren and Señor Porto at Ilha Grande, Distrito Federal, near Rio de Janeiro, July 22 to 24, 1915.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 13, ad *Rhipsalis bambusoides*.

Plate xxiii, figure 1, shows the plant collected by Dr. Rose on Ilha Grande, near Rio de Janeiro, which flowered in the New York Botanical Garden, December 18, 1918.

### 8. RHIPSALIS Gaertner, Fruct. Sem. 1 137. 1788.

\**Hariota* Adanson, Fam. Pl. 2: 243. 1763.

†*Cassytha* Miller, Gard. Dict. ed. 8. 1768. Not Linnaeus, 1753.

Cacti sometimes growing in humus, but usually epiphytic and hanging from trees, sometimes erect, sometimes clambering over rocks, more or less rooting or, when hanging, irregularly producing aerial roots; roots always fibrous; stems usually much branched (often heteromorphic), terete, angled or much flattened and leaf-like, very slender and thread-like or stout and stiff; leaves wanting or represented by minute bracts; areoles borne along margin of flat-branched forms, along ribs or scattered irregularly in other forms, usually small, bearing hairs, wool, bristles, and flowers; flowers usually solitary, but sometimes several from a single areole, opening night or day and remaining open for 1 to 8 days, small for the family; perianth-segments distinct, few, sometimes only 5, usually spreading, sometimes reflexed; filaments few or numerous, erect, slender, borne on outer margin of disk in one or two rows; style erect; stigma-lobes 3 or more, usually slender, spreading; ovary small, sometimes depressed or sunken in branch; fruit globular or oblong, sometimes angled when immature, but finally turgid, juicy, white or colored, usually naked (setose at areoles in 1 or 2 species) or sometimes bearing a few scales; seeds small, few to many.

Type species: *Rhipsalis cassutha* Gaertner.

The generic name is from ριψ wicker-work, referring to the slender, pliable branches of the typical species.

We recognize 57 species, although more than 115 names have been published.

The species range from Florida, Mexico, and the West Indies through continental America to Argentina; only 2 species are found in Mexico; 1 in Florida; 2 are known in the West Indies; a very few in northern South America; 3 or 4 only on the west coast of South America; and 5 or 6 in Argentina. The center of distribution is in the states of Rio de Janeiro, São Paulo, and Minas Geraes, in southern Brazil. In the little state of Rio de Janeiro and chiefly about the city of the same name, Dr. Rose collected 15 species in 1915.

The occurrence of species of *Rhipsalis*, in the wild state, in tropical Africa and in Ceylon, forms the only possible exception to the American natural distribution of cacti. Eight

\* No species was cited by Adanson for his genus *Hariota* but it was based on Burmann's plate of Plumier (pl. 197, f. 2), which has been identified as *Cactus parasiticus* Lamarck, not Linnaeus. The type of *Cactus parasiticus* Linnaeus is a species of *Vanilla*, probably *V. claviculata* Swartz.

† Miller, in his Gardeners' Dictionary of 1768, described *Rhipsalis cassutha* under the name of *Cassytha filiformis*, a name which had already been published by Linnaeus for a wholly different plant. Miller's generic name, *Cassytha*, therefore, being a misidentification, should not be treated as a synonym proper of *Rhipsalis*, although usually so cited.



supposedly distinct species have been described by authors from tropical Africa, and *R. cassutha* has long been known to exist in Ceylon. M. Roland-Gosselin, a diligent French student of cacti, after an investigation of these Old World plants, published in 1912 a very interesting paper,\* giving his conclusion that they are really all American species, their seeds having been transmitted to the Old World by migratory birds, and he referred them all to known American species. We have followed him in these reductions but we have not been able in all cases to study authentic specimens. It raises the interesting question if the Old World plants should be regarded as native or introduced.

In stem structure some of the species, such as *Rhipsalis elliptica*, approach very closely *Zygocactus truncatus*, while certain forms of *Epiphyllum* are easily mistaken for a *Rhipsalis*.

As we have treated the genus here, the flowers and fruits are fairly uniform. The stem structures are various and parallel in a way those of *Opuntia*, ranging from slender and terete to broad and thin; in some species they are leaf-like as in *Epiphyllum*, or 3-angled, suggesting *Hylocereus*. The areoles are usually small and bear only a small tuft of wool, but in some species they bear hairs or bristles. The flowers may open at any time of the day and in most species do not close at the approach of night; they are not readily affected by shade or direct sunlight and open but once.

### KEY TO SPECIES.

- A. Joints terete, ribbed or angled, none of them flat.  
 B. Joints terete or young ones angled, smooth, or areoles bristly or hairy.  
 C. Joints short, oblong, not more than 5 times as long as thick; areoles of young joints with a few long hairs.  
   Lateral joints simple; flowers lateral. Series 1, *Mesembryanthemoides* . . . . . 1. *R. mesembryanthemoides*  
   Lateral joints much branched; flowers terminal. Series 2, *Cereusculae* . . . . . 2. *R. cereuscula*  
 CC. Joints cylindrical, rarely clavate, slender, short or elongated.  
 D. Flowering areoles small, not very woolly, not depressed.  
 E. Ultimate joints slender, about 2.5 mm. thick or less, relatively short.  
 F. Young joints or some of them angled, their areoles bearing hairs. Series 3, *Prismaticae*.  
   Species of Brazil or Madagascar . . . . . 3. *R. prismatica*  
   Species of Costa Rica . . . . . 4. *R. simmleri*  
 FF. All joints cylindrical to clavate. Series 4, *Capilliformes*.  
   Joints clavate . . . . . 5. *R. clavata*  
   Joints cylindrical.  
     Ultimate joints up to 2.5 mm. thick; petals 9 mm. long . . . . . 6. *R. campos-portoana*  
     Ultimate joints about 1.5 mm. thick; petals 6 mm. long or less.  
     Plant stiff; areoles red; flowers white . . . . . 7. *R. heteroclada*  
     Plant weak; areoles not red.  
     Flowers greenish white or yellowish, to 6 mm. wide. . . . . 8. *R. capilliformis*  
     Flowers white or nearly white, about 8 mm. wide.  
     Pendent; secondary branches 2 to 3-chotomous . . . . . 9. *R. burchellii*  
     Spreading or diffuse; upper branches subverticillate . . . . . 10. *R. cribrata*  
 EE. Ultimate joints stouter, mostly 3 to 10 mm. thick and elongated.  
 F. Scale subtending the areoles inconspicuous or none.  
 G. Ultimate joints 3 to 6 mm. thick. Series 5, *Cassuthae*.  
 H. Ultimate joints definitely shorter than others, often verticillate.  
   Plants weak, pendent. . . . . 11. *R. cassutha*  
   Plants stiffer, not strictly pendent.  
     Ultimate joints slender . . . . . 12. *R. virgata*  
     Ultimate joints stout . . . . . 13. *R. teres*  
 HH. Ultimate joints not definitely shorter than others, simple or dichotomous, rarely verticillate.  
 I. Areoles without bristles or with spreading bristles.  
   Petals about 4 mm. long.  
   Fruit naked  
     Petals pink . . . . . 14. *R. lindbergiana*  
     Petals white. . . . . 15. *R. shaferi*  
   Fruit with scales and these setose in axils . . . . . 16. *R. fasciculata*  
   Petals 8 to 12 mm. long.  
     Flowers purplish red; areoles not bristly. . . . . 17. *R. pulchra*  
     Flowers white; areoles somewhat bristly . . . . . 18. *R. lumbricoides*

\* Bull. Soc. Bot. France 59: 97-102. 1912. Translation in Torreya 13: 151-156. 1913.



M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Flowering branch of *Rhipsalis leucorbaphis*.
2. Fruiting branch of same.
3. Fruiting branch of *Rhipsalis megalantha*.
4. Fruiting branch of *Rhipsalis neves-armondii*.
5. Fruiting branch of same.

6. Fruiting branch of *Rhipsalis pittieri*.
7. Flowering and fruiting branch of *Rhipsalis shaferi*.
8. Flowering branch of *Rhipsalis aculeata*.
9. Flowering of *Rhipsalis mesembryanthemoides*.
10. Flowering of same.



## KEY TO SPECIES—continued.

- II. All areoles with appressed bristles . . . . . 19. *R. aculeata*
- GG. Ultimate joints 8 to 12 mm. thick. Series 6, *Grandiflorae*.  
 Flowers 2 to 2.5 cm. broad . . . . . 20. *R. grandiflora*  
 Flowers up to 4 cm. broad . . . . . 21. *R. megalantha*
- FF. Scale subtending the areole white, scarious, appressed, conspicuous. Series 7, *Leucorbaphes*.  
 Joints 5 to 8 mm. thick; areoles with deciduous bristles. . . . . 22. *R. leucorbaphis*  
 Joints 3 mm. thick; areoles without bristles . . . . . 23. *R. loefgrenii*
- DD. Flowering areoles large, very woolly, depressed. Series 8, *Floccosae*.  
 Ultimate joints much shorter than others; verticillate; plants stiff. . . . . 24. *R. neves-armondii*  
 Ultimate joints not much shorter than others; plants weak.  
 Main branches stout, 8 to 10 mm. in diameter.  
 Fruit pure white; Venezuelan species . . . . . 25. *R. pittieri*  
 Fruit red or tinged with red; Brazilian and Argentine species.  
 Fruit bright red . . . . . 26. *R. pulvinigera*  
 Fruit whitish but when mature tinged with red or purple.  
 Fruit 5 mm. in diameter; flowers white, becoming yellowish . . . . . 27. *R. floccosa*  
 Fruit 8 to 10 mm. in diameter; flowers tinged with red, larger than the last . . . . . 28. *R. tucumanensis*  
 All branches slender, 3 to 6 mm. in diameter.  
 Flowers white . . . . . 29. *R. gibberula*  
 Petals with red tips. . . . . 30. *R. puniceo-discus*
- BB. Joints ribbed or angled, at least when old.  
 C. Some joints bristly, others unarmed, ribbed when old. Series 9, *Dissimiles*. . . . . 31. *R. dissimilis*
- CC. All joints unarmed, angled or winged.  
 Joints 5-angled or 5-winged.  
 Joints 5-winged; wings crenate. Series 10, *Pentapterae*. . . . . 32. *R. pentaptera*  
 Joints 5-angled; ribs nearly continuous. Series 11, *Sulcatae*. . . . . 33. *R. sulcata*  
 Joints 3-angled.  
 Angles of joints continuous, wingless. Series 12, *Trigonae*. . . . . 34. *R. trigona*  
 Angles of joints interrupted, winged. Series 13, *Paradoxae*. . . . . 35. *R. paradoxa*
- AA. At least some of joints flat, on same plant or on different plants.  
 B. Joints deeply serrate; flowers nodding. Series 14, *Houlettianae*. . . . . 36. *R. houlettiana*
- BB. Joints repand, entire or crenate; flowers not nodding.  
 C. Joints linear to linear-lanceolate. Series 15, *Lorentzianae*.  
 D. Joints both flat and 3-angled or rarely 4-angled, mostly narrowly linear.  
 Fruit black.  
 Joints 10 mm. wide or less; fruit 5 to 6 mm. in diameter . . . . . 37. *R. warmingiana*  
 Joints 10 to 15 mm. wide; fruit about 10 mm. in diameter . . . . . 38. *R. gonocarpa*  
 Fruit white to reddish.  
 Joints long-acuminate . . . . . 39. *R. linearis*  
 Joints blunt.  
 Joints scarcely crenate; Ecuadorean and Peruvian species . . . . . 40. *R. micrantha*  
 Joints definitely crenate; Costa Rican species . . . . . 41. *R. tonduzii*
- DD. All joints flat, linear-lanceolate to oblong.  
 Joints deeply crenate, the lobes rounded . . . . . 42. *R. boliviana*  
 Joints repand, low-crenate, or nearly entire.  
 Joints coriaceous, distinctly crenate . . . . . 43. *R. lorentziana*  
 Joints thin in texture, merely repand or low-crenate.  
 Bolivian species . . . . . 44. *R. ramulosa*  
 West Indian and Central American species.  
 Larger joints 3 cm. wide . . . . . 45. *R. purpusis*  
 Joints 0.5 to 2.5 cm. wide.  
 Perianth-segments 7 to 8 mm. long, greenish white or pinkish . . . . . 46. *R. coriacea*  
 Perianth-segments 5 to 6 mm. long, green . . . . . 47. *R. jamaicensis*
- CC. Joints elliptic to oblong. Series 16, *Crispatae*.  
 Joints thick, coriaceous.  
 Joints oblong, cuneate at base.  
 Flowers and fruit usually solitary at areoles . . . . . 48. *R. platycarpa*  
 Flowers several at an areole . . . . . 49. *R. russellii*  
 Terminal joints short-oblong to elliptic.  
 Fruit red. . . . . 50. *R. elliptica*  
 Fruit white . . . . . 51. *R. pachyptera*
- Joints thin.  
 Brazilian species.  
 Joints purplish green, obovate . . . . . 52. *R. rhombea*  
 Joints bright green or reddish.  
 Joints reddish green, the margins much crisped . . . . . 53. *R. crispimarginata*  
 Joints bright green, the margins slightly crisped.  
 Ultimate joints broad, elliptic to obovate. . . . . 54. *R. crispata*  
 Ultimate joints narrow, oblong to narrowly obovate. . . . . 55. *R. oblonga*  
 Bolivian species . . . . . 56. *R. cuneata*
- AAA. Species not grouped . . . . . 57. *R. roseana*



**1. *Rhipsalis mesembryanthemoides*\*** Haworth, Rev. Pl. Succ. 71. 1821.*Rhipsalis salicornioides* \* (variety B) Haworth, Suppl. Pl. Succ. 83. 1819.*Hariota mesembrianthemoides* † Lemaire, Cact. Gen. Nov. Sp. 74. 1839.

Branches very dissimilar; main branches elongated, slender, terete, more or less setose, often bearing aerial roots, covered with short stubby branchlets: these sometimes also bearing short joints, usually less than 1 cm. long, more or less angled, often with short setae from the small areoles; flower-buds small, pinkish; flowers solitary at areoles of the branchlets, opening in early morning, rather large, 1.5 cm. broad, white or light pink; petals 5, spreading, acute; stamens about 20, erect, white; style white; stigma-lobes 3, white; fruit short-oblong, 5 mm. long, white or tinged with red.

*Type locality:* Not cited where published.*Distribution:* Rio de Janeiro, Brazil.

The plant is common in cultivation; in nature it grows in dense masses on trunks of trees. It first flowered in cultivation in England in 1831. Its short joints have a fancied resemblance to species of 11 *Mesembryanthemum*.

A dried specimen of Haworth's plant is still preserved in London and through the kindness of N. E. Brown we have a photograph of it.

*Rhipsalis echinata* was published as a synonym by Pfeiffer (Enum. Cact. 136. 1837).

*Illustrations:* Cact. Journ. 1: 180; Curtis's Bot. Mag. 58: pl. 3078; Schumann, Gesamtb. Kakteen 633. f. 98, G; Monatsschr. Kakteenk. 2: 9; 4: 59; Arch. Jard. Bot. Rio de Janeiro 1: pl. 11; Goebel, Pflanz. Schild. 1: pl. 4, f. 7; Loddiges, Bot. Cab. 20: pl. 1920; Thomas, Zimmerkultur Kakteen 58.

Plate xxiv, figure 9, shows a fruiting plant obtained by Dr. Rose in Rio de Janeiro in 1915 (No. 20246); figure 10 shows a flowering plant sent by Alwin Berger in 1908.

**2. *Rhipsalis cereuscula*** Haworth, Phil. Mag. 7: 112. 1830.*Hariota saglionis* Lemaire, Cact. Aliq. 39. 1838.*Rhipsalis saglionis* Otto in Walpers, Repert. Bot. 2: 936. 1843.*Rhipsalis brachiata* Hooker in Curtis's Bot. Mag. 69: pl. 4039. 1843.*Hariota cereuscula* Kuntze, Rev. Gen. Pl. 1: 262. 1891.*Rhipsalis saglionis rubrodiscus* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 80. 1915.

Stems and branches terete; stem slender, usually elongate, often erect, sometimes 6 dm. high, crowned by a cluster of short branches; upper branches short, 2 to 6 times as long as thick, somewhat angled, the areoles bearing 2 to 4 short bristles; flowers terminal or near the ends of the branches, 16 mm. broad; petals about 12, spreading, pinkish to white with yellowish midrib; stigma-lobes 3 or 4; berries white.

*Type locality:* Brazil.*Distribution:* Uruguay to central Brazil.

*Illustrations:* Curtis's Bot. Mag. 69: pl. 4039; Loudon, Encycl. Pl. ed. 3. 1380. f. 19408, as *Rhipsalis brachiata*; Cycl. Amer. Hort. Bailey 4: f. 2101; Stand. Cycl. Hort. Bailey 5: f. 3377; Cact. Journ. 1: 180; Monatsschr. Kakteenk. 4: 75, as *R. saglionis*.

Plate xxvii, figure 3, is of a plant which flowered in the New York Botanical Garden in March 1912. Figure 221 is from a photograph of a flowering plant from Misiones, obtained by Dr. Rose in 1915 from Dr. Spegazzini.

**3. *Rhipsalis prismatica*** Rümpler in Förster, Handb. Cact. ed. 2. 884. 1885.*Hariota prismatica* Lemaire, Illustr. Hort. 10: Misc. 84. 1863.*Rhipsalis suareziana* Weber, Rev. Hort. 64: 425. 1892.*Rhipsalis tetragona* Weber, Rev. Hort. 64: 428. 1892.

Very much branched, prostrate; lower branches elongated and terete; upper branches short and somewhat angled; areoles more or less setose; flowers white; petals usually 5, obtuse; fruit small, pinkish to white, globose.

\* Haworth spelled this *R. mesembryanthoides* and also *R. salicornoides*.

† The Index Kewensis gives the place of publication erroneously as Lemaire, Cact. Aliq. Nov. 39. 1838.

‡ According to the Index Kewensis, *Rhipsalis suarensis* Weber (Dict. Hort. Bois 1046. 1898) is the same.



M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Fruiting branch of *Rhipsalis heteroclada*.
2. Fruiting branch of same.

3. Fruiting branch of *Rhipsalis capilliformis*.
4. Fruiting branch of *Rhipsalis virgata*.



*Type locality:* Not cited, but Förster and Weber state that it came from Brazil.

*Distribution:* Brazil and northern Madagascar, but range not known.

Weber thought that *Rhipsalis tetragona* was the same as *R. prismatica* Rümpler, but because he was not certain he described it as new.

*Illustration:* Gartenwelt 16: 634, as *Rhipsalis suareziana*; Monatsschr. Kakteenk. 18: 74, as *R. tetragona*.

Plate xxxii, figure 3, shows a plant from Berlin which flowered in the New York Botanical Garden on November 23, 1915.



FIG. 221.—*Rhipsalis cereuscula*.

**4. *Rhipsalis simmleri*** Beauverd, Bull. Herb. Boiss. II. 7: 136. 1907.

Stems pendent, cylindric, 2 to 3 mm. in diameter, very much branched, the branches dichotomous or 3 or 4-verticillate, upper short and somewhat angled, quite unlike lower ones; flowers solitary, subterminal; petals white with pink tips, oblong, 6 to 8 mm. long; filaments 5 to 8 mm. long, white, filiform; style exserted, 9 mm. long; stigma-lobes ovate, reflexed, white; ovary obconic, 3 to 3.5 mm. in diameter; fruit white.

*Type locality:* Costa Rica.

*Distribution:* Costa Rica.

This species is named for Paul Simmler, chief gardener of the Boissier Collections at Geneva, Switzerland. The plant was introduced in a collection of orchids from Costa Rica and flowered in cultivation. Dr. Rose saw it when in Geneva in 1912 and obtained a small fragment, but he did not see it in flower.

*Illustration:* Bull, Herb. Boiss. II. 7: 137.

**5. *Rhipsalis clavata*** Weber, Rev. Hort. 64: 429. 1892.

*Rhipsalis clavata delicatula* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 45. 1918.

Erect when young but soon hanging, often a meter long or more, much branched; joints all similar, narrowly clavate, sometimes 4-angled when young, short, 1 to 3 cm. long, deep green,



becoming brown, produced in terminal whorls of 2 to 7; areoles few, sometimes bearing 1 to 5 white hairs; flowers near end of branches, white, 1.5 cm. long; petals hardly spreading; fruit spherical, 6 mm. in diameter, white or yellowish; seeds 1.5 cm. long.

*Type locality:* Petropolis, in the state of Rio de Janeiro, Brazil.

*Distribution:* State of Rio de Janeiro.

This species is much like *Hatiora* and it was really referred to *Hariota* at one time by Weber, himself. Schumann gives only one locality for it, but Dr. Rose found it on Corcobado in Rio de Janeiro, altitude 465 meters, growing on branches of trees, and on this plant the description has been partly based. Weber's manuscript name, *Hariota clavata*, has appeared only as a synonym of this species (Monatsschr. Kakteenk. 5: 172. 1895).

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 17, as *Rhipsalis clavata delicatula*; Arch. Jard. Bot. Rio de Janeiro 1: pl. 13; Möllers Deutsche Gärt. Zeit. 25: f. 11, No. 16.

**6. *Rhipsalis campos-portoana*** Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 35. 1918.

Stem slender, terete, usually pendent, usually dichotomous; primary branches elongated; terminal branches in 2's or 4's, somewhat clavate, 3 to 5 cm. long; areoles few, naked; flowers terminal or usually so, white; petals about 8, slightly spreading, obtuse, up to 9 mm. long; fruit globose, 4 mm. in diameter, red.

*Type locality:* Serra de Itatiaya, Brazil

*Distribution:* Known only from the type locality.

This plant was collected by Dr. Rose and Campos Porto in July 1915 (No. 20612) and flowered in the Jardim Botânico do Rio de Janeiro in September of that year, and from this the description was drawn. Dr. Rose brought home living specimens but these have not yet flowered.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 7.

**7. *Rhipsalis heteroclada*** nom. nov.

Stems stiff, dark green, but purple about areoles and tips of branches, often erect in cultivation, much branched toward top of plant; branches often in verticillate clusters, much more slender than the main stem, 1 to 2 mm. in diameter; areoles small, often bearing a single bristle; flowers small, white or greenish; petals 5, obtuse, spreading or recurved; filaments about 20, white, erect; style white, sunken at base into a little cup; stigma-lobes 3, white; ovary green, about 2 mm. long; fruit globose, to 6 mm. in diameter, white.

This plant is very common in Brazilian collections, where it is planted on fruit trees. Dr. Rose found some beautiful examples in the Horto Bolanco Paulista, near São Paulo, and on Ilha Grande (Rose 20371, type).

Plate XXIII, figure 2, shows a fruiting branch obtained by Dr. Rose in Rio de Janeiro; plate XXV, figures 1 and 2, shows fruiting plants collected by Dr. Rose in Rio de Janeiro; plate XXXII, figure 1, shows a fruiting plant obtained by Dr. Rose in Rio de Janeiro.

**8. *Rhipsalis capilliformis*** Weber, Rev. Hort. 64: 425. 1892.

*Rhipsalis gracilis* N. E. Brown, Gard. Chron. III. 33: 18. 1903.

Stems and branches very slender and weak, the main branches often much elongated, the branchlets short, spreading or drooping; flowers numerous, scattered along sides of branches, cream-colored, rotate, 5 to 6 mm. broad; petals few, sometimes only 5, short and obtuse; fruit globose, naked, white or pinkish, 4 to mm. in diameter; seeds very numerous.

*Type locality:* Not cited.

*Distribution:* Eastern Brazil, but not known to us in the wild state.



M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Flowering branch of *Rhipsalis cribrata*.
2. Fruiting branch of *Rhipsalis capilliformis*.
3. Flowering branch of same.

4. Flowering branch of same.
5. Flowering branch of *Rhipsalis teres*.



This is a very attractive little plant, often forming a dense mass of delicate branches. It is a rather shy bloomer, but grows well in damp greenhouses.

*Illustration:* Gartenwelt 13: 117.

Plate xxvi, figure 4, is from a plant obtained in the Botanical Garden at Brussels by Dr. Rose in 1912, which flowered and fruited in Washington in 1919; figure 3 shows a plant sent from Paris, France, which flowered in the New York Botanical Garden in 1911 (No. 14795); figure 2 is from a plant sent by R. Lamb, from Manchester, England; plate xxv, figure 3, shows a fruiting plant sent from Paris in 1901.

### 9. *Rhipsalis burchellii* nom. nov.

*Rhipsalis cribrata* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 81. pl. 10. 1915. Not Rümpler, 1885.

Much branched, very weak, with long slender hanging branches, the branching usually dichotomous; ultimate branches usually 4 to 10 cm. long; flowers subterminal, campanulate, 10 to 12 mm. long, white; fruit turbinate, rose-colored.

This plant is very common in the forests about São Paulo. Dr. Rose collected it in the forest of Jabaquara, August 15, 1915 (No. 20857, type), and also in the Botanical Garden of Museu Paulista on August 14, 1915 (No. 20849).

This species is named for William John Burchell (1781-1863), who went to Brazil in 1825, where he made large and valuable collections.

Plate xxvii, figure 2, shows a fruiting branch taken from Dr. Rose's plant No. 20857.

### 10. *Rhipsalis cribrata* (Lemaire) Rümpler in Förster, Handb. Cact. ed. 2. 889. 1885.

*Hariota cribrata* Lemaire, Illustr. Hort. 4: Misc. 12. 1857.

*Rhipsalis pendula* Vöchting, Jahrb. Wiss. Bot. Leipzig 9: 371. 1873. Not Pfeiffer, 1837.

*Rhipsalis penduliflora* N. E. Brown, Gard. Chron. II. 7: 716. 1877.

*Hariota penduliflora* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

*Rhipsalis cribrata filiformis* Engelhardt in Möllers, Deutsche Gärt. Zeit. 18: 583. 1903.

Woody at base, much branched; branches of two forms; stems terete, elongated, at first erect, then hanging, without aerial roots; terminal branches very short, 2 to 3 cm. long, usually in whorls of 2 to 20; areoles small, often with 1 or 2 small setae; flowers generally terminal, pendulous, white or cream-colored, 8 to 10 mm. long; petals usually 5 to 7, obtuse, drying yellow; filaments erect, numerous, white, salmon-colored at base; style white; stigma-lobes 3 or 4, spreading, white; ovary naked; fruit small, globose, 2 to 3 mm. in diameter, pinkish, terminated by the old perianth.

*Type locality:* Brazil.

*Distribution:* States of Minas Geraes, Rio de Janeiro, and São Paulo, Brazil.

This species was introduced into Europe in 1856 from Brazil, as some of the other species have been, through sendings of orchids, where it was discovered by Lemaire, and when it flowered the following year it was named and described by him.

*Hariota penduliflora* (Monatsschr. Kakteenk. 1: 69. 1891) is listed but not described.

*Rhipsalis penduliflora laxa*, referred to by Schumann (Martius, Fl. Bras. 4: 276. 1890), comes from the gardens at Kew.

*Illustrations:* Möllers Deutsche Gärt. Zeit. 18: 585, as *Rhipsalis cribrata filiformis*; Blühende Kakteen 1: pl. 27, A; Arch. Jard. Bot. Rio Janeiro 1: pl. 9, as *R. penduliflora*.

Plate xxiii, figure 3, shows a fruiting branch collected by Dr. Rose in Rio de Janeiro in 1915; plate xxvi, figure 1, shows a flowering branch obtained by Dr. Rose in Rio de Janeiro.

### 11. *Rhipsalis cassutha* \* Gaertner, Fruct. Sem. 1: 137. 1788.

*Cassytha filiformis* Miller, Gard. Dict. ed. 8. 1768. Not Linnaeus, 1753.

*Cactus parasiticus* Lamarck, Encycl. 1: 541. 1783. Not Linnaeus, 1768.

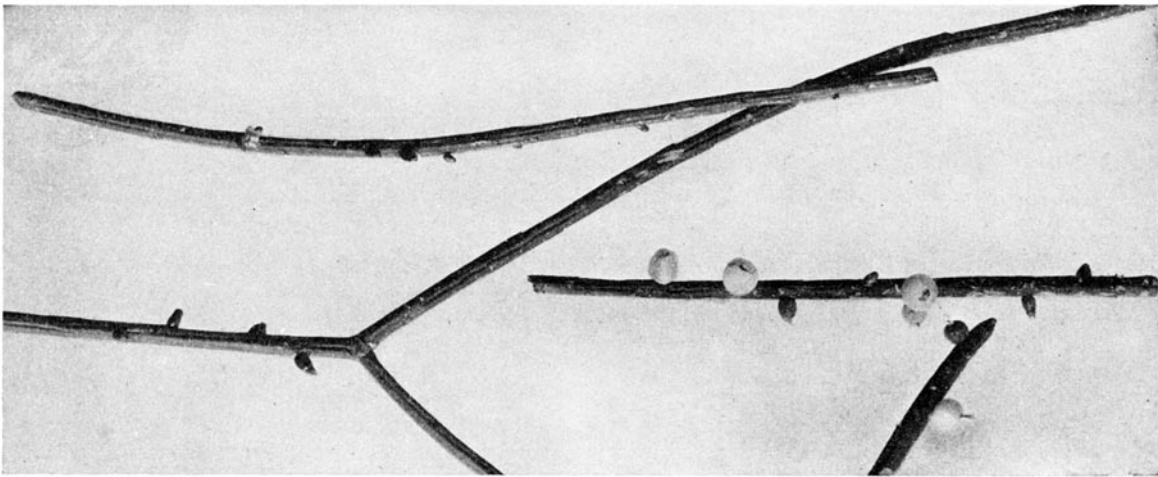
*Cactus pendulus* Swartz, Prodr. 77. 1788.

---

\*The original spelling given by Gaertner is as above. The usual spelling, however, is *R. cassytha*.



- Rhipsalis parasitica* Haworth, Syn. Fl. Succ. 187. 1812.  
*Cactus caripensis*\* Humboldt, Bonpland, and Kunth, Nov. Gen. at Sp. 6: 66. 1823.  
*Cereus caripensis* De Candolle, Prodr. 3: 467. 1828.  
*Rhipsalis cassytha dichotoma* De Candolle, Prodr. 3: 476. 1828.  
*Rhipsalis cassytha mauritiana* † De Candolle, Prodr. 3: 476. 1828.  
*Rhipsalis cassytha mociniana* De Candolle, Prodr. 3: 476. 1828.  
*Rhipsalis cassytha hookeriana* De Candolle, Prodr. 3: 476. 1828.  
*Rhipsalis cassytha swartziana* De Candolle, Mém. Mus. Hist. Nat. Paris 17: 80. 1828.  
*Rhipsalis dichotoma* G. Don, Hist. Dichl. Pl. 3: 176. 1834.  
*Rhipsalis hookeriana* G. Don, Hist. Dichl. Pl. 3: 176. 1834.  
*Rhipsalis cassythoides* G. Don, Hist. Dichl. Pl. 3: 176. 1834.  
*Rhipsalis cassutha pendula* Salm-Dyck in Pfeiffer, Enum. Cact. 134. 1837.  
*Rhipsalis undulata* Pfeiffer, Enum. Cact. 136. 1837.  
*Hariota cassytha* Lemaire, Cact. Gen. Nov. Sp. 75. 1839.  
*Cereus parasiticus* Haworth in Steudel, Nom. ed. 2. 1: 335. 1840.  
*Rhipsalis aethiopica* Welwitsch, Journ. Linn. Soc. Bot. 3: 152. 1859.  
*Rhipsalis minutiflora* Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 271. 1890.  
*Hariota parasitica* Kuntze, Rev. Gen. Pl. 1: 262. 1891.  
*Rhipsalis comorensis* Weber, Rev. Hort. 64: 424. 1892.  
*Rhipsalis zanzibarica* ‡ Weber, Rev. Hort. 64: 425. 1892.

FIG. 222.—*Rhipsalis*.

Epiphytic or saxicolous, usually growing on trunk or branches of large trees, hanging in large clusters, 1 to 9 meters long, the branches weak and pendent; branches when young bearing 5 to 9 white bristles at the areoles, when old naked, terete, sometimes producing aerial roots, often only 3 mm. in diameter, light green, usually growing from tips of other branches, generally in pairs but sometimes in clusters of 6 or 8; flowers lateral, solitary, small, greenish in bud, sometimes subtended by a single bristle; petals 2 mm. long, cream-colored; stamens borne on disk; ovary exserted; fruit naked, white or pink, maturing a few days after flowering, globose, 5 mm. in diameter.

*Type locality:* Not cited.

*Distribution:* Florida, Mexico, Central America, West Indies, Panama to Dutch Guiana, eastern and southern Brazil, Colombia, Ecuador, Bolivia, and Peru, also in Ceylon and tropical Africa.

The fruit of *Rhipsalis cassutha*, while usually white, is sometimes described as red or pinkish. Hooker, in his Exotic Flora, figured and described the fruit as flesh-colored. Weber, who received a red-fruited form from Costa Rica, has named it variety *rhodocarpa* (Dict. Hort. Bois 1046. 1898). In the West Indies the plants inhabit moist districts and are most abundant in forests, but in the vicinity of Matanzas, Cuba, occur on cliffs.

\*This name was written *Cactus garipensis* by Kunth (Syn. Pl. Aeq. 3: 370. 1824) and is so listed in the Index Kewensis.

† De Candolle gives *Cactus pendulinus* Sieber (Fl. Maur. 2. n. 259) as a synonym of this variety.

‡ Schumann (Gesamtb. Kakteen 623) spells the name *Rhipsalis sansibarica*.



M. E. Eaton del.

1. Flowering and fruiting branch of *Rhipsalis cassutha*.
2. Fruiting branch of *Rhipsalis burchelli*.
3. Flowering branch of *Rhipsalis cereuscula*.

A. Hoen & Co. Baltimore



Hitherto unknown wild within the continental United States, the plant was found on August 5, 1923, by C. A. Mosier on trees in Wallenstein's Hammock, Dade County, Florida.

*Cactus cassythoides* Mociño and Sessé was given by De Candolle (Prodr. 3: 476. 1828) as a synonym of *R. cassutha mociniana*.

Löfgren (Arch. Jard. Bot. Rio de Janeiro 2: 40. pl. 11. 1918) has figured and described as new a plant under the name of *Rhipsalis cassythoides* which may belong here. The name had already been used by Don and we have referred it as a synonym of *R. cassutha*.

*Cactus epidendrum* Linnaeus (Amen. Acad. 8: 257. 1785) is without description and has been referred to *Rhipsalis undulata*. It was from Surinam.

*Cereus bacciferus* (Hemsley, Biol. Centr. Amer. Bot. 1: 548. 1880) appears only as a synonym of *Rhipsalis cassutha*.

*Cassutha baccifera* Miller (De Candolle, Prodr. 3: 476. 1828) and *C. polysperma* Aiton (Gaertner, Fruct. Sem. Pl. 1: 137. 1788) are known in synonymy only.

*Rhipsalis pendula* Hortus (Pfeiffer, Enum. Cact. 133. 1837) occurs only as a synonym.

*Rhipsalis caripensis* Weber is listed as one of the synonyms of this species by Schumann (Gesamtb. Kakteen 622. 1898).

*Rhipsalis cassutha* vars. *major* and *pilosiuscula* (Salm-Dyck, Hort. Dyck. 228. 1834) and var. *tenuior* (Schumann, Monatsschr. Kakteenk. 1: 78. 1891) are only names. The first has been referred to *R. floccosa*, while the second is sometimes referred to *R. pulvinigera*.

*Illustrations*: De Tussac, Fl. Antill. 3: pl. 22, as *Cactus pendulus*; Plunkenet, Phyt. Pl. 172, f. 2. 1692, as *Cuscuta baccifera*, etc.; De Candolle, Mém. Mus. Hist. Nat. Paris 17: pl. 21; Förster, Handb. Cact. ed. 2. 888. f. 121. as *Rhipsalis cassutha mociniana*; Ann. Inst. Roy. Hort. Fromont 2: pl. 3, as *R. parasitica*; Arch. Jard. Bot. Rio de Janeiro 2: pl. 11, as *R. cassythoides*; Gartenwelt 13: 117, as *R. minutiflora*; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 18, as *R. sansibarica*; (Hortus malabaricus pl. 7, *fide* Miller); Gaertner, Fruct. Sem. Pl. 1: pl. 28, f. 1; Torreya 9: 154. f. 1; Ann. Rep. Smiths. Inst. 1908: 537. f. 1; Journ. N. Y. Bot. Gard. 11: f. 23; Loudon, Encycl. Pl. 413. f. 6907; Loddiges, Bot. Cab. 9: pl. 865; Goebel, Pflanz. Schild. 1: pl. 4, f. 2; Karsten, Deutsche Fl. 887. f. 501, No. 5; ed. 2, 2: 456. f. 605, No. 5; Stand. Cycl. Hort. Bailey 2: f. 712; Nov. Act. Nat. Cur. 1: pl. 16. f. 1; Hooker, Exot. Fl. 1: pl. 2; Curtis's Bot. Mag. 58: pl. 3080; Gartenwelt 16: 633.

Plate xxvii, figure 1, shows a plant received from the Hope Botanical Garden in Jamaica. Figure 222 is from a photograph showing branches of a plant sent us from R. Lamb's collection at Manchester, England.

## 12. *Rhipsalis virgata* Weber, Rev. Hort. 64: 425. 1892.

Main stem or branches meter long or more, terete, about 5 mm. thick, erect or ascending but in time often pendent, often bearing aerial roots; upper branches short, 1 to 6 cm. long, terete; areoles small, a little hairy, often with a white or pinkish bristle, subtended by a minute bract; flowers borne along sides of the 2 and 3-year old branches, solitary at areoles, rotate, 8 to 10 mm. broad, open throughout day; outer perianth-segments few, ovate, greenish yellow, sometimes tinged with red; inner perianth-segments 4 to 6, oblong, cream-colored, obtuse; filaments erect, white; style white, about as long as stamens; stigma-lobes 3, white; ovary broader than high, crowned by a circle of scales and bearing one on the side.

*Type locality*: Described from a garden plant supposed to have come from Brazil.

*Distribution*: Eastern Brazil.

*Illustration*: Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 12.

Plate xxv, figure 4, shows a plant, received from M. Simon of St. Ouen, Paris, in 1901, which flowered and fruited in the New York Botanical Garden in 1916.

## 13. *Rhipsalis teres* (Vellozo) Steudel, Nom. ed. 2: 449. 1841.

*Cactus teres* Vellozo, Fl. Flum. 207. 1825.

*Rhipsalis conferta* Salm-Dyck, Cact. Hort. Dyck. 1849. 229. 1850.

*Hariota conferta* Kuntze, Rev. Gen. Pl. 1: 262. 1891.

*Hariota teres* Kuntze, Rev. Gen. Pl. 1: 263. 1891.



Stems erect or spreading, woody at base, 10 to 12 mm. in diameter, much branched, especially above, with 5 to 12 short ultimate branches at top of main ones; old branches terete, green or blotched with red; flowers usually several at top of short terminal branches and scattered all along the primary ones, 10 to 12 mm. broad, pale yellow; petals widely spreading; filaments and style white, erect.

*Type locality:* Brazil.

*Distribution:* States of Minas Geraes, Rio de Janeiro, and São Paulo, Brazil.

*Rhipsalis floribunda* Schott was given by Schumann (Martius, Fl. Bras. 4<sup>2</sup>: 274. 1890) as a synonym of this species.

*Illustrations:* Vellozo, Fl. Flum. 5: pl. 30, as *Cactus teres*; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 22; Garten-Zeitung 4: 182. f. 42, No. 7, as *Rhipsalis conferta*.

Plate xxvi, figure 5, shows a plant received from Kew in 1902 which flowered in the New York Botanical Garden in 1917.

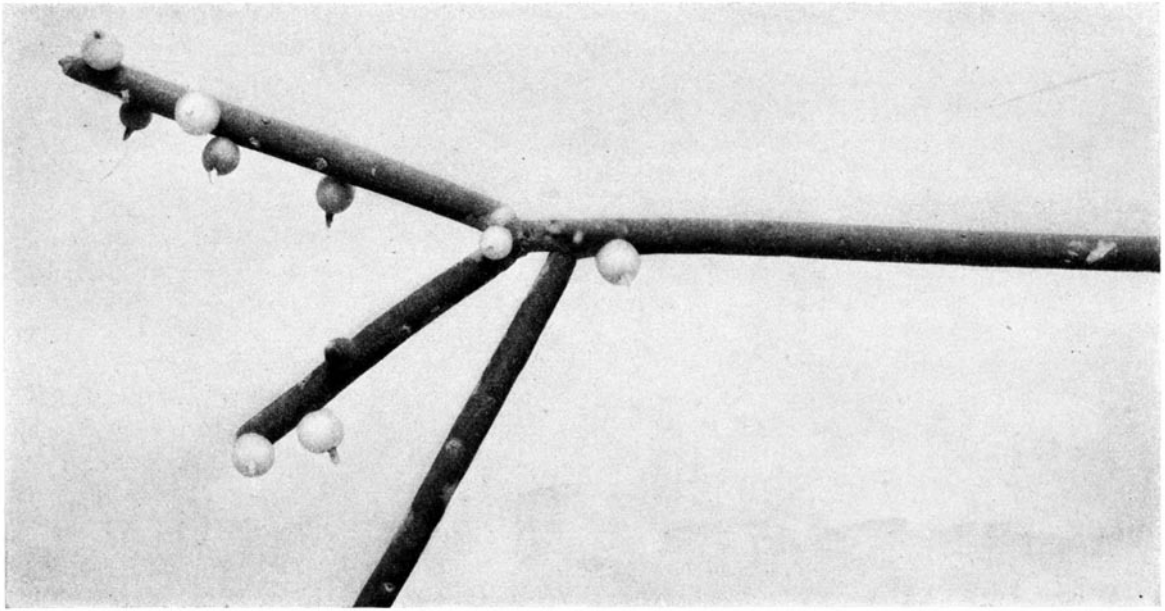


FIG. 223.—*Rhipsalis shaferei*.

**14. *Rhipsalis lindbergiana*** Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 271. 1890.

*Rhipsalis erythrocarpa* Schumann in Engler, Pflanzenw. Ost. Afrikas 282. 1895.

*Hariota lindbergiana* Kuntze, Rev. Gen. Pl. 32: 107. 1898.

*Rhipsalis densiareolata* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 41. 1918.

Very much branched, hanging from tree-trunks in great festoons, 1 to 2 meters long; joints elongated, 3 to 5 mm. in diameter; areoles filled with hairs and 2 bristles; flowers numerous, lateral, pinkish; ovary naked or nearly so; fruit light red, globose, 2 to 3 mm. in diameter, 16 to 20-seeded.

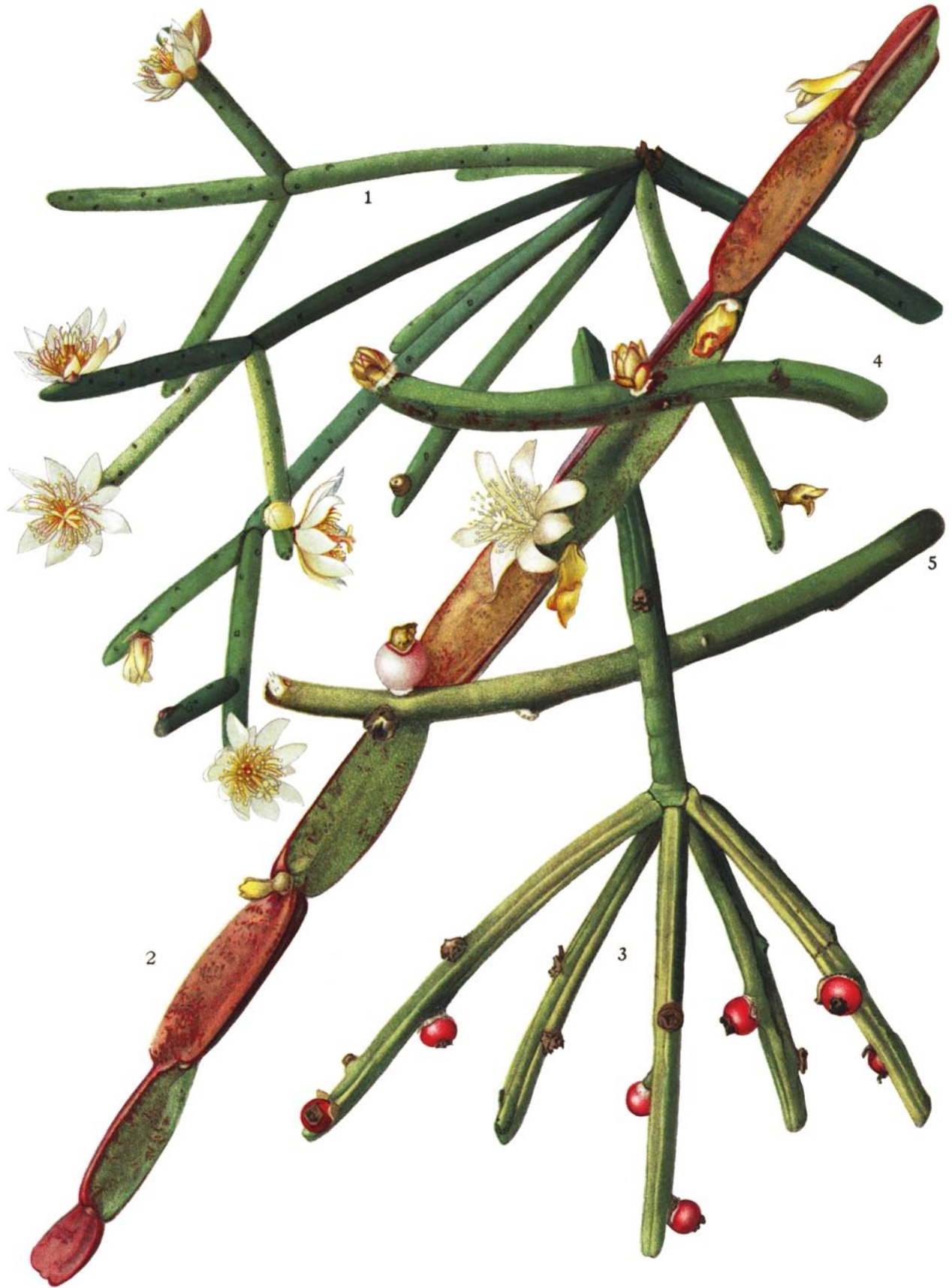
*Type locality:* Near the city of Rio de Janeiro.

*Distribution:* Mountainous regions in the state of Rio de Janeiro, Brazil, and. Mount Kilman-Djaro, Africa.

*Rhipsalis erythrocarpa* Schumann was described from herbarium specimens, collected on Mount Kilman-Djaro, in tropical Africa. We refer it to *R. lindbergiana* Schumann in deference to the opinion of Mr. Roland-Gosselin\* but we have not had specimens for study.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 12, as *Rhipsalis densiareolata*. Rev. Hort. 85: f. 152, in part, as *R. erythrolepis*; Martius, Fl. Bras. 4<sup>2</sup>: pl. 53; Arch. Jard. Bot. Rio de Janeiro 1: pl. 4.

\*Bull. Soc. Bot. France 59: 100.



M. E. Eaton del.

A. Hoen & Co. Baltimore

1. Flowering branch of *Rhipsalis neves-armondii*.
2. Flowering branch of *Rhipsalis paradoxa*.
3. Fruiting branch of *Rhipsalis pulvinigera*.

4. Flowering branch of *Rhipsalis tucumanensis*.
5. Flowering branch of same.



Plate XXI, figure 4, shows a branch from the plant collected by Dr. Rose on Tijuca in 1915 (No. 21 174); figure 2 shows another plant collected by him in Rio de Janeiro, Brazil (No. 20309).

**15. *Rhipsalis shaferi* sp. nov.**

Stems at first stiff, erect or ascending, afterwards spreading or procumbent, 4 to 5 mm. thick, terete, green or more or less purplish at tips; juvenile and lower branches often bearing several bristles at areoles; upper branches without bristles or with a single appressed one; scales subtending the areoles small but broad; flowers numerous, scattered all along side of branch, solitary (rarely in pairs) at areoles, small, rotate, greenish white, 8 to 10 mm. broad; petals 5 or 6, short-oblong, obtuse; filaments greenish, erect; stigma-lobes 4, white; ovary not sunken in branch; fruit small, globose, 2 to 3 mm. in diameter, white or sometimes tinged with pink.

Collected by John A. Shafer on trees at Asunción, Paraguay, March 18, 1917 (No. 139), on trees at Trinidad, Paraguay, March 17, 1917 (No. 134, type), again in Paraguay (Nos. 145 and 147), and on trees at Posados, Misiones, Argentina (No. 131).

Plate XXIV, figure 7, shows a branch in flower; plate XXI, figure 3, shows a branch in fruit of the type which flowered in the New York Botanical Garden in 1921. Figure 223 is from a photograph of Shafer's No. 131, which flowered and fruited in Washington in 1921.

**16. *Rhipsalis fasciculata* (Willdenow) Haworth, Suppl. Pl. Succ. 83. 1819.**

*Cactus fasciculatus* Willdenow, Enum. Pl. Suppl. 33. 1813.

*Rhipsalis horrida* Baker, Journ. Linn. Soc. 21: 347. 1884.

*Rhipsalis madagascarensis* Weber, Ind. Sem. Hort. Paris 1889; Rev. Hort. 64: 424. 1892.

*Hariota fasciculata* Kuntze, Rev. Gen. Pl. 1: 262. 1891.

*Hariota horrida* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Stems woody, terete, much branched; branchlets clavate to cylindrical, faintly ribbed when old, 4 mm. in diameter, with numerous areoles, each with a cluster of fragile hairs 3 to 4 mm. long; flowers lateral but not described; ovary not sunken in the branch; fruit globose, small, bearing a few areoles, these pubescent and setose.

*Type locality:* Not cited.

*Distribution:* Brazil and Madagascar.

We have studied Madagascan specimens of this plant sent from Kew and one sent from Bahia, Brazil, to Dr. Rose by L. Zehntner in 1920. De Candolle (*Plantes Grasses* 1: pl. 59) states that it occurred in Santo Domingo. Roland-Gosselin \* says that it inhabits American Islands; our very extensive explorations in the West Indies have failed to discover it. The Brazilian plant differs only from the Madagascan by having fewer hairs at the areoles.

*Rhipsalis pilosa* Weber is listed by Schumann (*Martius, Fl. Bras.* 4<sup>2</sup>: 300. 1890) with the statement that it occurs in P. Rebut's Catalogue without description; A. Berger in a letter (dated March 7, 1920) states that this name is said to be a synonym of *R. madagascarensis*. It is illustrated (*Möllers Deutsche Gärt. Zeit.* 25: 477. f. 11, No. 20). *Rhipsalis madagascarensis dasycerca* Weber is listed by R. Lamb (*Collection of Cacti* 73. 1908.)

*Illustrations:* De Candolle, *Pl. Succ.* 1: pl. 59, as *Cactus parasiticus*; Curtis's *Bot. Mag.* 58: pl. 3079; *Gartenwelt* 13: 117, *Ann. Inst. Roy. Hort. Fromont* 2: pl. 1, f. G, as *R. fasciculata*; Loudon, *Encycl. Pl.* 413. f. 6908. as *R. parasitica*.

**17. *Rhipsalis pulchra* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 75. 1915.**

Stems much branched, often pendent; branches often in whorls of 3's or 4's, 3 to 4 mm. in diameter, bright green; areoles minute, reddish; flowers few, usually from near the tips of terminal branches, purplish red, large, 12 to 14 mm. long; petals oblong, obtuse; stigma-lobes white; ovary purplish red.

*Type locality:* Serra da Mantiqueira, Brazil.

*Distribution:* State of Rio de Janeiro.

---

\* *Bull. Soc. Bot. France* 59: 99.



Our living specimens came from the Organ Mountains, Rio de Janeiro, Brazil, obtained by J. N. Rose through Ph. Luetzelburg, September 21, 1915 (No. 21157).

Dr. Rose examined the type collected by A. O. Darby in 1915 in the Museu Paulista and obtained a fragment of it through the kindness of the Director.

*Rhipsalis pulcherrima* Löfgren (Monatsschr. Kakteenk. 9: 136. 1899) seems to have been the name first given to this plant.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 1: pl. 5.

Plate xxxi, figure 2, shows a flowering branch of the plant obtained by Dr. Rose in 1915 which flowered in the New York Botanical Garden in 1918 (No. 21151).

**18. *Rhipsalis lumbricoides* Lemaire, Illustr. Hort. 6: Misc. 68. 1859.**

*Cereus lumbricoides* Lemaire, Cact. Gen. Nov. Sp. 60. 1839.

*Rhipsalis sarmentacea* Otto and Dietrich, Allg. Gartenz. 9: 98. 1841.

*Lepismium sarmentaceum* Vöchting, Jahrb. Wiss. Bot. Leipzig 9: 399. 1873.

*Hariota lumbricalis* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

*Hariota sarmentacea* Kuntze, Rev. Gen. 3: 107. 1898.



FIG. 224.—*Rhipsalis lumbricoides*.

Stems terete when glowing, but angled when dormant, 3 to 4 meters long, about 6 mm. thick rooting freely, much branched; young growth with 5 to 10 white bristles from each areole, usually spreading, but old branches naked; flowers white to cream-colored, sometimes tinged with green; petals few, often only 5, lanceolate, acute, 10 to 12 mm. long, acuminate; style slender, greenish, longer than the stamens; stigma-lobes 4, spreading, greenish; ovary naked; fruit white.

*Type locality:* Montevideo, Uruguay.

*Distribution:* Uruguay and Paraguay, also probably southern Brazil. Hooker says that it is a native of Buenos Aires, but this is doubtless an error.

This plant flowered in Washington on March 16, 1915. Schumann's drawing of the flower is not very good.

*Rhipsalis sarmentosa* (Monatsschr. Kakteenk. 4: 46. 1894) and *R. larmentacea* (Illustr. Hort. 6: 88. 1859) are misspellings for *R. sarmentacea*.

According to Lemaire (Cact. Gen. Nov. Sp. 60. 1839) *Cereus flagelliformis minor* Salm-Dyck (Hort. Dyck. 64. 1834) belongs here. Grisebach (Symb. Fl. Argen. 139) referred *Cereus donkelaarii* here.

*Illustrations:* Martius, Fl. Bras. 4: pl. 59; Curtis's Bot. Mag. 85: pl. 5136; Dict. Gard. Nicholson 4: 598. f. 60; Suppl. 635. f. 646; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 69, D, E; Gard. Chron. III. 2: 465. f. 95; Watson, Cact. Cult. 232. f. 90; ed. . f. 66, as *Rhipsalis sarmentacea*; Schumann, Gesamtb. Kakteen 633. f. 98, F; Arch. Jard. Bot. Rio de Janeiro 1: pl. 3; Gartenwelt 13: 117.



M. E. Eaton del.

A. Hoen & Co. Baltimore

- 1. Flowering branch of *Rhipsalis floccosa*.
- 2. Flowering branch of same.
- 3. Fruiting branch of *Rhipsalis puniceo-discus*.

- 4. Flowering branch of *Rhipsalis gibberula*.
- 5. Branch of *Rhipsalis dissimilis*.
- 6. Flowering and fruiting branch of same.



Figure 224 is from a photograph taken by H. Buch which was given to Dr. Rose when he was in La Plata, Argentina, in 1915.

**19. *Rhipsalis aculeata*** Weber, Rev. Hort. **64**: 428. 1892.

Stems terete, 3 to 4 mm. in diameter, somewhat angled and roughened in dried specimens; areoles close together, bearing wool and 8 to 10 appressed white bristles or spines; fruit not immersed, globose, 7 to 8 mm. in diameter, dark purple to nearly black, either naked or with 3 or 4 hairy areoles.

*Type locality*: Catamarca, Argentina.

*Distribution*: Northern Argentina, in the provinces of Catamarca and Tucuman.

A round-stemmed species collected by Otto Kuntze on the Sierra de Santa Cruz, Bolivia, and labeled *Hariota sarmentacea* may belong here.

This species is described by Schumann as 8 to 10-ribbed, but no ribs are shown in growing plants; in drying the branches are somewhat angled but one could hardly describe them as ribbed. Dr. Shafer made a single collection of this plant at Tucuman in 1917 (No. 92); part of this material is living in the New York Botanical Garden. Dr. Rose also obtained a specimen through one of his Argentina correspondents from Catamarca.

Plate xxiv, figure 8, is from Dr. Shafer's plant mentioned above.

**20. *Rhipsalis grandiflora*** Haworth, Suppl. Fl. Succ. **83**. 1819.

*Cactus funalis* Sprengel, Syst. **2**: 479. 1825.

*Cactus cylindricus* Vellozo, Fl. Flum. **207**. 1825. Not Lamarck, 1783. Not Ortega, 1800.

*Rhipsalis funalis* Salm-Dyck in De Candolle, Prodr. **3**: 476. 1828.

*Hariota funalis* Lemaire, Cact. Gen. Nov. Sp. **74**. 1839.

*Rhipsalis cylindrica* Steudel, Nom. ed. **2**: 448. 1841.

*Hariota cylindrica* Kuntze, Rev. Gen. Pl. **1**: 262. 1891.

*Hariota grandiflora* Kuntze, Rev. Gen. Pl. **1**: 262. 1891.

*Rhipsalis robusta* Lindberg, Monatsschr. Kakteenk. **6**: 53. 1896. Not Lemaire, 1860.

*Rhipsalis hadrosoma* Lindberg, Monatsschr. Kakteenk. **6**: 96. 1896.

Branches divaricate, often reddish, especially about the areoles, stout, 8 to 10 mm. in diameter; flowers numerous, scattered all along branches, 12 mm. long, 2 cm. broad, light rose or cream-colored; sepals reddish; petals few, oblong, obtuse, widely spreading; anthers and style white; stigmalobes 4, white; fruit naked, purplish, 6 to 7 mm. in diameter.

*Type locality*: Not cited.

*Distribution*: State of Rio de Janeiro, Brazil.

We have not seen the type specimen of this species, but through the kindness of Mr. N. E. Brown of Kew we have seen a photograph of Haworth's specimens, which are the same as the species here described. Haworth's plant was received from Brazil in 1816, sent by Messrs. Bowie and Cunningham.

*Rhipsalis calamiformis* (Pfeiffer, Enum. Cact. **135**. 1837) was published as a synonym of *R. funalis*.

Walpers gives *Rhipsalis funalis gracilior* Pfeiffer (Repert. Bot. **2**: 279. 1843) as a synonym.

*Illustrations*: Gartenwelt **13**: 117; Watson, Cact. Cult. **228**. f. 89; ed. **3**. f. 65; Amer. Gard. **11**: 465; Dict. Gard. Nicholson **3**: 289. f. 365; Gartenflora **42**: 234. f. 48; Link and Otto, Icon. Pl. Rar. pl. **38**, as *Rhipsalis funalis*; Vellozo, Fl. Flum. **5**: pl. 31, as *Cactus cylindricus*; Monatsschr. Kakteenk. **6**: 55, as *R. robusta*; Blühende Kakteen **3**: pl. 141; Monatsschr. Kakteenk. **7**: 151. f. 1 to 8; Arch. Jard. Bot. Rio de Janeiro **1**: pl. 7, as *R. hadrosoma*; Curtis's Bot. Mag. **54**: pl. 2740; Schumann, Gesamtb. Kakteen **633**. f. 98, A; Martius, Fl. Bras. **4**<sup>2</sup>: pl. 54; Monatsschr. Kakteenk. **7**: 151. f. 9 to 11; Arch. Jard. Bot. Rio de Janeiro **1**: pl. 6.

Plate xxxi, figure 3, shows a plant collected by Dr. Rose near Rio de Janeiro in 1915 (No. 20746) which flowered in the New York Botanical Garden in 1918; figure 1 is of a plant which also flowered in the New York Botanical Garden, April 3, 1912; plate xxi, figures 1 and 6, shows the flowers and fruit of specimens sent by Alwin Berger in 1908.



**21. *Rhipsalis megalantha*** Löfgren, Monatsschr. Kakteenk. **9**: 134. 1899.*Rhipsalis novaesii* Gürke, Monatsschr. Kakteenk. **19**: 12. 1909.

Plants stout, up to 1 cm. thick, at first erect but in time spreading or with pendent branches, dull green, often spotted with purple; areoles rather prominent, especially after flowering; flowers large, 4 cm. broad; petals 8 to 12, oblong, often shortly acuminate or obtuse, white; filaments erect, orange at base, rose-colored above; style thick, longer than the stamens; stigma-lobes 6 to 8; fruit surrounded with white hairs, rather small, 6 mm. in diameter, white or tinged with red; seeds nearly black.

*Type locality*: Island of São Sebastião, Brazil.

*Distribution*: Known only from the type locality, an island off the coast of Brazil, belonging to the state of São Paulo.

This plant is known wild only from the collection of Dr. Löfgren, but is now widely found in cultivation, sometimes under the names *Rhipsalis grandiflora* or *R. novaesii*. It has the largest flower of any species of *Rhipsalis*.

*Illustrations*: Blühende Kakteen **2**: pl. 116; Monatsschr. Kakteenk. **19**: 13, as *Rhipsalis novaesii*; Monatsschr. Kakteenk. **9**: 137; Schumann, Gesamtb. Kakteen Nachtr. 147. f. 35; Arch. Jard. Bot. Rio de Janeiro **1**: pl. 8.

Plate XXIV, figure 3, shows a fruiting branch obtained by Dr. Rose in Rio de Janeiro, Brazil, in 1915 (No. 20400).

**22. *Rhipsalis leucorhaphis*** Schumann, Monatsschr. Kakteenk. **10**: 125. 1900.

Epiphytic, much branched, about dm. long, rooting abundantly along the branches, jointed, 5 to 8 mm. in diameter, terete or showing 4 or 5 ribs in herbarium specimens; bristles 1 to 5, appressed, early deciduous; areoles subtended by an ovate papery bract; flowers white, nodding, large, 1.5 cm. long; petals only slightly spreading; filaments purplish or white with orange-colored base; stigma-lobes 3 or 4, greenish, spreading; ovary not sunken in the branch; fruit globose, bright red, 6 to 8 mm. in diameter; seeds numerous, brown.

*Type locality*: Estancia Tagatiya, Paraguay.

*Distribution*: Paraguay and northern Argentina.

We did not know this species until it was brought back by Dr. Shafer in 1917 from Paraguay, where he obtained good specimens; he also found it abundant in northern Argentina. Like many of the other species it grows in various situations, sometimes sprawling over rocks or growing on forest trees. One of his living plants fruited in the New York Botanical Garden and from this we have drawn part of our description.

Plate XXIV, figure 1, shows the plant in flower, and figure 2 shows it in fruit, collected by Dr. Shafer at Trinidad, Paraguay (No. 143).

**23. *Rhipsalis loefgrenii*** nom. nov.*Rhipsalis novaesii* Löfgren, Arch. Jard. Bot. Rio de Janeiro **1**: 69. 1915. Not Gürke, 1909.

Stems long and slender, rooting freely all along stem, pale green to purple, terete, 3 mm. in diameter; areoles small, subtended by a large scarious bract with appressed hairs in axils when young; flowers very numerous, 12 to 15 mm. long, white, campanulate; filaments purplish at base; fruit purplish, 5 to 8 mm. in diameter.

*Type locality*: Near Campinas, Brazil.

*Distribution*: Brazil.

Dr. Rose saw the Löfgren type in the Botanical Garden at Rio de Janeiro and obtained living and herbarium specimens of the plant. Dr. Shafer also obtained living specimens from Löfgren in 1917.

Unfortunately, Löfgren's name was given to another plant by Gürke and for this reason we have renamed it in honor of Dr. Alberto Löfgren (1854-1918), who long studied this genus and published an excellent monograph of it in 1915.

*Illustration*: Arch. Jard. Bot. Rio de Janeiro **1**: pl. 2, as *Rhipsalis novaesii*.



M. E. Eaton del.

A. Hoen &amp; Co. Baltimore

1. Flowering branch of *Rhipsalis gonocarpa*.
2. Flowering branches of *Rhipsalis warmingiana*.
3. Fruiting branch of *Rhipsalis tonduzii*.

4. Fruiting branch of *Rhipsalis trigona*.
5. Flowering branch of *Rhipsalis pentaptera*.
6. Fruiting branch of same.



Figure 225*a* shows two branches with a single fruit 1.33 times natural size; figure 225*b* shows a branch twice natural size; figure 225*c* shows one of the bracts which subtend the areoles, 4 times natural size, all drawn from plants obtained by Dr. Shafer from Dr. Löfgren in 1917 and since grown in the New York Botanical Garden.

**24. *Rhipsalis nevesarmondii***  
Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 284. 1890.

? *Rhipsalis rigida* Löfgren,  
Arch. Jard. Bot. Rio de Janeiro 1: 93. 1915.

Stems elongated, much branched, and hanging from trees in large clusters; branches arranged in whorls of 3 to 10, 4 to 5 mm. thick, terete, elongated, deep green; flowers widely spreading, 2 cm. broad, white to cream-colored; petals about 12, acute; style erect, white; stigma-lobes 5, white; ovary sunken in the branch; fruit globose, red, 10 mm. in diameter; seeds brown.

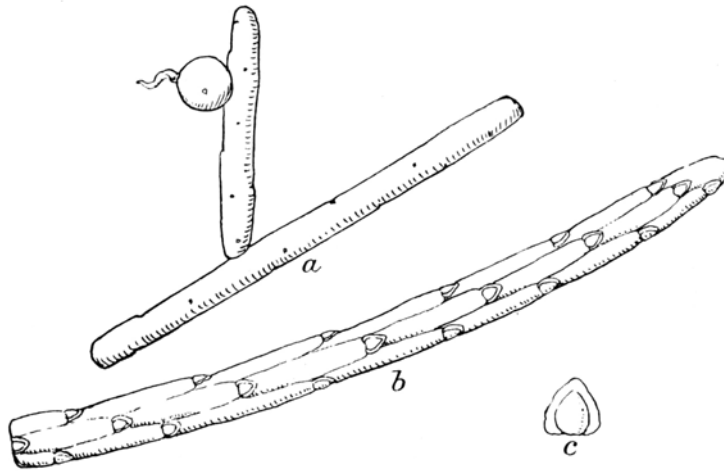


FIG. 225.—*Rhipsalis loefgrenii*. *a*, fruiting branch; *b*, tip of branch; *c*, bract.

*Type locality*: Mount Tijuca, Rio de Janeiro, Brazil.

*Distribution*: Rio de Janeiro, Brazil.

There has long been much uncertainty regarding this species and Dr. Rose, during his trip to South America, in 1915, endeavored to solve the problem. He first visited one of the three localities mentioned in the original description, namely Tijuca, a mountain near Rio de Janeiro. Here he found two species which belonged to the same group, *Rhipsalis grandiflora* and *R. pulvinigera*. He then visited the herbarium of the Museo Nacional, where he found specimens of *R. neves-armondii*. Unfortunately, they did not bear an original label but one doubtless written after the appearance of the description in the Flora Brasiliensis for the three localities mentioned therein. After studying this material carefully, he visited the mountain region just above Tijuca, namely Pica Popagaya, where he feels certain he has collected the true form, although the joints are more terete and the flowers are pure white instead of yellow; it is a singular *Rhipsalis* and a very shy bloomer. A second visit was then made to Tijuca, but lower down on the mountain, and here he again found this species.

*Illustrations*: Martius, Fl. Bras. 4<sup>2</sup>: pl. 56; Arch. Jard. Bot. Rio de Janeiro 1: pl. 19; Blühende Kakteen 2: pl. 80, A.

Plate xxviii, figure 1, shows a flowering plant collected by Dr. Rose at the type locality in 1915 (No. 20673), which flowered in the New York Botanical Garden in 1916; Plate xxiv, figures 4 and 5 show branches from the same plant, in fruit.

**25. *Rhipsalis pittieri* sp. nov.**

Epiphytic, resembling in habit *Rhipsalis cassutha*; branches 5 to 6 mm. in diameter, dull green, terete; petals greenish yellow, 5 to 6 mm. long; ovary sunken in the stem, surrounded by white hairs; fruit maturing very slowly, white; seeds black.

Collected by H. Pittier near Hacienda Koster, Borburata, near Puerto Cabello, Venezuela, in 1913 (No. 6467), and flowered first in Washington in the fall of 1914 (October 16), the fruit maturing March 16, 1915. The plant has repeatedly flowered since. This



species is perhaps nearest *Rhipsalis floccosa*, from Brazil, and is the most northern representative of the Series *Floccosae*.

Plate xxiv, figure 6, is of a fruiting specimen of the type plant.

**26. *Rhipsalis pulvinigera*** Lindberg, *Gartenflora* **38**: 186. 1889.

*Rhipsalis funalis minor* Pfeiffer, *Enum. Cact.* 135. 1837.

Plant epiphytic, rather stout, at first erect but in time hanging, and then sometimes 3 to 5 meters long, the branches dull green with purple about the areoles, 5 to 7 mm. in diameter; terminal branches often in whorls of 3 to 5; flowers at first white, in age yellowish, 2 cm. broad; ovary sunken in the branch; fruit globose, red, 8 mm. in diameter.

*Type locality*: Brazil.

*Distribution*: In the coastal mountains of central Brazil.

Schumann gives *Rhipsalis grandiflora minor* (Gesamtb. Kakteen 644. 1898) as a synonym of this species, but he evidently meant *R. funalis minor*.

*Rhipsalis cassytha pilosiuscula* Salm-Dyck (Hort. Dyck. 228. 1834), although never described, probably is to be referred here.

*Illustrations*: *Gartenflora* 42 f. 48, as *Rhipsalis funalis*; *Gartenflora* **38**: f. 33, 34; Rümpler, *Sukkulenten* 210. f. 119; 211. F. 120; *Rev. Hort.* **85**: f. 152, in part.

Plate xxviii, figure 3, is from a plant collected by Dr. Rose near Rio de Janeiro in 1915, which fruited in the New York Botanical Garden in 1915 (No. 43060).

**27. *Rhipsalis floccosa*** Salm-Dyck in Pfeiffer, *Enum. Cact.* 134. 1837.

*Hariota floccosa* Lemaire, *Cact. Gen. Nov. Sp.* 75. 1839.

*Rhipsalis rugulosa* Lemaire, *Illustr. Hort.* 8: after pl. 293. 1861.

*Hariota rugosa* Kuntze, *Rev. Gen. Pl.* 1: 263. 1891.

Stems slender, 5 to 8 mm. in diameter, much branched, at first erect, becoming pendent; branches alternate; flowers lateral, 2 cm. broad, white, tinged with yellow, surrounded by a tuft of wool; ovary sunken in the branch; fruit globose, 5 mm. in diameter, rose-colored or nearly white.

*Type locality*: Not cited.

*Distribution*: Brazil.

*Rhipsalis cassytha major* Salm-Dyck (Pfeiffer, *Enum. Cact.* 134. 1837), a synonym only, is referred here by Pfeiffer.

*Hariota floccosa* Cels was used as a synonym by Förster (*Handb. Cact.* 458. 1846), but was not technically published until 1891.

*Illustration*: *Gartenflora* **38**: 185. f. 35.

Plate xxix, figure 1, shows a flowering branch from a specimen sent by Mr. Lamb from Manchester, England, in 1914, and figure 2 shows a flowering branch collected by Dr. Rose in Brazil in 1915 which flowered in the New York Botanical Garden on February 24, 1922.

**28. *Rhipsalis tucumanensis*** Weber, *Rev. Hort.* **64**: 426. 1892.

*Hariota tucumanensis* Kuntze, *Rev. Gen. Pl.* 3: 107. 1898.

Epiphytic on forest trees, when young setose, but soon naked, much branched; branches often pendent, sometimes in whorls of 4, 4 to 10 mm. in diameter, when young nearly terete, bright green with a red spot at the areoles, when old angled, yellowish green; flowers one from an areole, 15 to 18 mm. in diameter, rosy white to cream-colored; sepals 4, white but rose-colored on the back; petals 8, ovate-lanceolate; stamens numerous, white, spreading, much shorter than petals; style white; stigma-lobes 4 or 5; ovary sunken in the branch, surrounded by a tuft of wool; fruit described as white tinged with red, but often red or pinkish, 8 to 10 mm. broad.

*Type locality*: Tucuman, Argentina.

*Distribution*: Tucuman to Catamarca, Argentina, and perhaps Bolivia and Paraguay.



M. E. Eaton del.

1. Flowering branch of *Rhipsalis grandiflora*.
2. Flowering branch of *Rhipsalis pulchra*.
3. Flowering branch of *Rhipsalis grandiflora*.

A. Hoehn & Co. Baltimore



This species is common in northern Argentina, where it was repeatedly collected by Dr. Shafer in 1917.

Of this relationship, but perhaps specifically distinct, is the plant sent by M. Bang (No. 2323) from Coripati, Yungas, Bolivia, distributed as *Rhipsalis salicornioides*. Here we have tentatively referred K. Fiebrig's plant (No. 5801) from the Upper Paraná, Paraguay.

Of plate xxviii, figures 4 and 5 show flowering and fruiting branches from Dr. Shafer's collection from Calilegua, Argentina (Nos. 55 and 68), painted at the New York Botanical Garden, May 24, 1922.

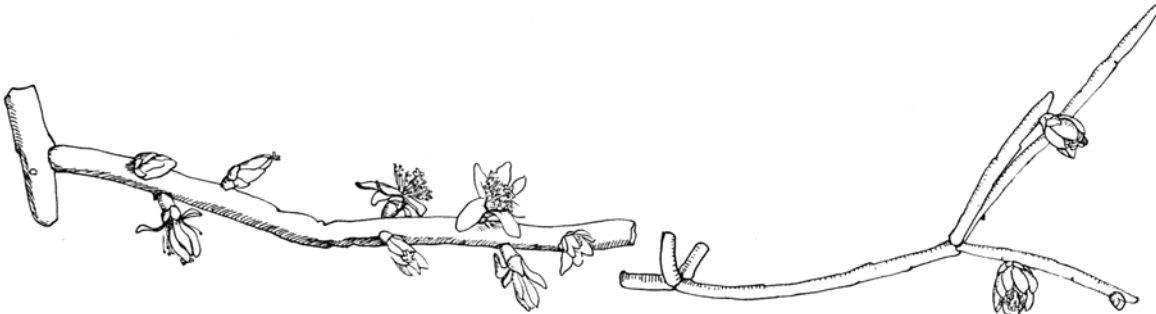


FIG. 226.—*Rhipsalis stilcata*. Reduced.

FIG. 227.—*Rhipsalis gibberula*.  $\times 0.5$ .

**29. *Rhipsalis gibberula* Weber, Rev. Hort. 64: 426. 1892.**

Stems 3 to 6 mm. thick, yellowish green, with dichotomous or trichotomous branches or sometimes with terminal whorls of 6; areole small; buds obtuse, pinkish, hairy when in flower; flowers scattered along branches toward tip, white to pale pink, 8 to 9 mm. long, 12 to 1.5 mm. broad; petals not widely spreading (at least in our specimen); stigma-lobes 3 to 6, white; fruit white, somewhat depressed, 8 to 10 mm. in diameter, 7 to 8 mm. high, the base sunken in the branch.

*Type locality:* Brazil.

*Distribution:* Organ Mountains, Brazil.

The species was described from plants brought to Paris from Brazil in 1887, their habitat not recorded, but Dr. Rose traced it to the Organ Mountains in 1915 and his plant flowered in the New York Botanical Garden in February 1921 (No. 21161). In 1902 a specimen was sent from Paris to the New York Botanical Garden and one specimen was obtained from R. Lamb, Superintendent of Parks at Manchester, England, in 1914, but neither has done well in cultivation.

Plate xxix, figure 4, is from a plant collected by Dr. Rose in the Organ Mountains in 1915, which flowered in the New York Botanical Garden, February 17, 1921. Figure 227 shows the plant received from Paris in 1902 which flowered in the New York Botanical Garden on March 6, 1917.

**30. *Rhipsalis puniceo-discus* G. A. Lindberg, Gartenflora 42: 233. 1890.**

*Rhipsalis foveolata* Weber, Dict. Hort. Bois 1047. 1898. According to Roland-Gosselin.

*Rhipsalis chrysocarpa* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 94. 1915.

? *Rhipsalis chrysantha* Löfgren, Arch. Jard. Bot. Rio de Janeiro 1: 99. 1915.

Branches slender, almost filiform, hanging, pale green when young, freely rooting; branches in terminal whorls, often as many as 6; flowers large, 1.5 cm. long, white; perianth-segments widely spreading; stamens orange-colored, at least at base; fruit at first dark red but in age golden yellow.

*Type locality:* Not cited.

*Distribution:* Brazil.

This plant first passed in living collections as *R. funalis gracilis* (Gartenflora 42: 233. 1893.)



Dr. Löfgren gave Dr. Rose a cutting of the original plant of *Rhipsalis chrysantha*.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 1: pl. 20, as *Rhipsalis chrysoearpa*; Rev. Hort. 79: 106. f. 33, as *R. foveolata*; Gartenflora 42: 235. f. 49; Arch. Jard. Bot. Rio de Janeiro 1: pl. 21.

Plate XXIX, figure 3, shows a plant also brought by Dr. Rose from Brazil (No. 20662) which flowered and fruited in the New York Botanical Garden, March 7, 1921.

**31. *Rhipsalis dissimilis*** (G. A. Lindberg) Schumann in Martius, Fl. Bras. 4: 286. 1890.

*Lepismium dissimile* G. A. Lindberg, Gartenflora 39: 148. 1890.

*Rhipsalis dissimilis setulosa* Weber, Rev. Hort. 64: 428. 1892.

*Rhipsalis pacheco-leonii* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 38. 1918.

In clumps on large limbs of trees and freely rooting; branches very diverse, some with numerous bristly hairs from the areoles, others naked, erect, prostrate or even hanging; hairy branches with 9 very low ribs, the areoles close together, each with about 15 long white bristles; glabrous branches, 5-angled, with the areoles alternating as in *Rhipsalis paradoxa*; flower-buds red; flowers solitary, about 6 mm. broad; petals few, oblong, obtuse, widely spreading, sometimes turned back, pinkish; stamens erect, numerous, white; ovary sunken in the branch; style pinkish, erect; stigma-lobes 3 or 4, white.

*Type locality:* São Paulo, Brazil.

*Distribution:* States of São Paulo and Rio de Janeiro, Brazil.

We have referred *Rhipsalis pacheco-leonii* here after studying living specimens of *R. dissimilis* and specimens from the type collection obtained by Dr. Rose in 1915 (No. 20707).

*Rhipsalis setulosa* Weber (Hort. Bois Paris) was published as a synonym of *R. dissimilis* var. *setulosa*.

*Illustrations:* Gartenflora 39: 148. f. 36, 37, as *Lepismium dissimile*; Arch. Jard. Bot. Rio de Janeiro 2: pl. 10, as *Rhipsalis pacheco-leonii*; Curtis's Bot. Mag. 131: pl. 8013, as *R. dissimilis setulosa*; Blühende Kakteen 2: pl. 80, B; Gartenflora 40: f. 121.

Plate XXIX, figures 4 and 6, shows the two diverse forms which this plant takes, as does also plate XXXII, figures 6 and 7. The specimens were collected by Dr. Rose in the state of Rio de Janeiro in 1915 and are a part of the type material of *R. pacheco-leonii*.

**32. *Rhipsalis pentaptera*** Pfeiffer in Dietrich, Allg. Gartenz. 4: 105. 1836.

*Hariota pentaptera* Lemaire, Cact. Gen. Nov. Sp. 75. 1839.

Branches stiff, bright green, 6 to 15 mm. in diameter, strongly 6-ribbed, the ribs indented at areoles; areoles often 2 cm. apart, small, subtended by broad bracts, usually bearing 2 white bristles; flowers usually scattered along whole length of branches, opening in daytime, 1 to 4 from an areole; scales 4 or at base of corolla, broad and obtuse; petals 5, reddish on back, cream-colored on face, 4 mm. long, obtuse; stamens numerous, about 25, free from petals, white, about as long as style; style and stigma-lobes white; ovary truncate, naked; fruit 3 to 4 mm. in diameter, white, naked, or with an occasional small scale.

*Type locality:* Not cited. Otto says, in a note, probably Brazil.

*Distribution:* Southern Brazil and Uruguay.

A very common species in cultivation, flowering freely in March and April.

*Hariota pentaptera* Lemaire and *Rhipsalis pentagona* are given as synonyms of this species by Förster (Handb. Cact. 453. 1846).

*Illustrations:* Pfeiffer and Otto, Abbild. Besch. Cact. 1: pl. 17, f. 1; Goebel, Pflanz. Schild. 1: pl. 4, f. 4; Gartenwelt 13: 117; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 21; Rev. Hort. 85: f. 152, in part.

Plate xxx, figures 5 and 6, shows a plant which flowered and fruited in the New York Botanical Garden in 1912 and 1915, obtained from Paris, France, in 1902.

**33. *Rhipsalis sulcata*** Weber, Dict. Hort. Bois 1046. 1898.

Stems woody, sometimes 10 to 15 mm. in diameter, often long and pendent; branches elongated, the joints 2 to 3 dm. long, 5-angled, light green; areoles remote (2.5 to 5 cm. apart), usually near the



M. E. Eaton del.

1. Fruiting branch of *Rhipsalis heteroclada*.
2. Fruiting branches of *Disocactus biformis*.
3. Flowering and fruiting branch of *Rhipsalis prismatica*.
4. Flowering branch of *Rhipsalis coriacea*

5. Fruiting branch of same.
6. Fruiting branch of *Rhipsalis dissimilis*.
7. Branch of same.

A. Hoen & Co. Baltimore



center of a purple blotch; flowers solitary at the areoles, rather large, rotate, white to pinkish; ovary naked.

*Type locality:* Not cited.

*Distribution:* Not known in the wild state.

Weber found this plant in cultivation under the name of *Rhipsalis micrantha*, but it is very different from the true *R. micrantha* which comes from Ecuador.

Figure 226 shows a plant received from Paris in 1902 which flowered in the New York Botanical Garden on March 21, 1912.

**34. *Rhipsalis trigona*** Pfeiffer, Enum. Cact. 133. 1837.

*Hariota trigona* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Stems stout, very much branched, 1.5 cm. in diameter, strongly 3-angled, the angles or ribs alternating with those of adjoining joints; flowers solitary, white to pinkish, widely spreading, sometimes 2 cm. broad; sepals usually 3, short, obtuse; petals generally 7, oblong, obtuse; filaments numerous, white; style white; stigma-lobes 4, white; ovary sunken in the branch; fruit globose, 8 to 10 cm. in diameter, red.

*Type locality:* Brazil.

*Distribution:* Brazil.

Wildeman states that the species is probably from the state of Rio de Janeiro.

*Illustrations:* Wildeman, Icon. Select. 5: pl. 193; Arch. Jard. Bot. Rio de Janeiro 1: pl. 23; Gartenflora 40: 38. f. 15, 16; Gartenwelt 13: 117.

Plate xxx, figure 4, shows a plant sent to Dr. Rose by R. Lamb of Manchester, England, in 1914, which flowered and fruited in the New York Botanical Garden in 1919.

**35. *Rhipsalis paradoxa*** Salm-Dyck, Cact. Hort. Dyck. 1844. 39. 1845.

*Lepismium paradoxum* Salm-Dyck in Pfeiffer, Enum. Cact. 140. 1837.

*Hariota alternata* Lemaire, Hort. Univ. 2: 39. 1841.

*Rhipsalis alternata* Lemaire, Cactées 80. 1868.

*Hariota paradoxa* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Plants freely giving off aerial roots, branched, hanging in large clusters 1 meter long or more; branches in zigzag links, terminal, in pairs or in whorls of 3 to 8, more or less spreading, 3-winged, pale; flowering areoles very woolly, setose when young, borne at upper ends of ribs; flowers sub-terminal, large, 2 cm. long, white; ovary sunken in stem; fruit not seen.

*Type locality:* Brazil.

*Distribution:* Brazil, especially near the city of São Paulo, Brazil.

The young growth is glossy green, the areoles subtended by broad round bracts. Seedling plants are very different from the adult plant; they are strongly 4-angled, with each angle bearing closely-set areoles, filled with slender bristles and showing no resemblance to the typical form; gradually as the plants grow older their mature joints take on the normal form. This plant is a prolific bloomer and in the garden of the Museo Paulista it remains in flower for three weeks.

Pfeiffer (Enum. Cact. 140. 1837) gives *Cereus pterocaulis* Hortus as a synonym of *Lepismium paradoxum* while Förster (Handb. Cact. 453. 1846) gives *Rhipsalis pterocaulis* as a synonym of *R. paradoxa*.

*Lepismium alternatum* Hortus (Loudon, Hort. Brit. Suppl. 3: 576. 1850) appeared as a questionable synonym of *Lepismium paradoxum*.

*Illustrations:* Herb. Génér. Amat. II. 2: pl. 38; Hort. Univ. 2: pl. 50, as *Hariota alternata*; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 69, A, B; Schumann, Gesamt. Kakteen 633. f. 98, B; Karsten, Deutsche Fl. 887. f. 501, No. 4; ed. 2. 2: 456. f. 605, No. 4; Martius, Fl. Bras. 4<sup>2</sup>: pl. 55, f. 1; Arch. Jard. Bot. Rio de Janeiro 1: pl. 22; Goebel, Pflanz. Schild. 1: pl. 1, f. 5; Rev. Hort. 85: f. 152, in part; Karsten and Schenck, Vegetationsbilder 1: pl. 6, f. c.

Plate xxviii, figure 2, is from a plant received from La Mortola in 1908 which flowered in the New York Botanical Garden in 1916.



**36. *Rhipsalis houlettiana*** Lemaire, *Illustr. Hort.* 5: Misc. 64. 1858.*Rhipsalis houlettii* Lemaire in Curtis's Bot. Mag. 100: pl. 6089. 1874.*Rhipsalis regnellii* Lindberg, *Gartenflora* 39: 119. 1889.*Hariota houlettiana* Kuntze, *Rev. Gen. Pl.* 1: 263. 1891.

Stems 1 to 2 meters long, slender, terete below but flat and broad above; branches flat and thin, 1 to 5 cm. broad, tapering into a petiole-like base; margin serrate; flowers numerous, bell-shaped with a red eye; petals cream-colored, turning pale yellow, lanceolate, acute; stamens numerous; ovary not sunken in the branch, strongly 4 to 5-angled; fruit not angled, globose, red, 5 to 6 mm. in diameter.

*Type locality:* Not cited.*Distribution:* Brazil, in the states of Minas Geraes, Rio de Janeiro, and São Paulo.

This species grows on trees in the mountains at an altitude of 1,000 meters.

*Rhipsalis regnelliana* appears in the general index for the *Monatsschrift für Kakteenkunde* (volumes 1-20) in place of *R. regnellii*.

*Illustrations:* Blühende Kakteen 1: pl. 56; Engler and Prantl, *Pflanzenfam.* 3<sup>6a</sup>: f. 69, C; *Gartenflora* 39: f. 29, 31 to 33; Schumann, *Gesamtb. Kakteen* f. 98, E; Martius, *Fl. Bras.* 4<sup>2</sup>: pl. 8; Möllers *Deutsche Cart. Zeit.* 25: 477. f. 11, No. 14, as *Rhipsalis regnellii*; Curtis's Bot. Mag. 100: pl. 6089; *Gartenflora* 39: f. 30; Rümpler, *Sukkulenten* 212. f. 121, as *R. houlettii*; *Rev. Hort. Belge* 40 after 186, as *R. kegnelli* (in error for *R. regnellii*); Blühende Kakteen 2: pl. 111; *Arch. Jard. Bot. Rio de Janeiro* 1: pl. 17.

Plate xxxiii, figure 1, shows a flowering plant collected by Dr. Rose in Rio de Janeiro, Brazil, in 1915 (No. 20307), which flowered in the New York Botanical Garden in 1918; figure 2 shows a plant obtained from M. Simon of St. Ouen, Paris, in 1901, as *Rhipsalis regnellii*, which flowered in the New York Botanical Garden December 16, 1916; figure 3 shows a dissected flower and figure 4 a fruiting branch; plate xxxiv, figure 1, shows a plant with flowers obtained in Paris in 1901; figure 2 shows a flower cut through the center.

**37. *Rhipsalis warmingiana*** Schumann in Martius, *Fl. Bras.* 4<sup>2</sup>: 291. 1890.

At first erect, then spreading or hanging; branches elongated, jointed, 10 mm. wide or less, either flat or sharply 3 or 4-angled, more or less blotched or colored throughout with purple or red; flowers one at an areole, 20 mm. long, white, directed forward, the perianth-segments spreading, acute; stamens 25 to 30, white; ovary strongly angled; fruit globose, 5 to 6 mm. in diameter, dark purple to nearly black, capped by the withered flower.

*Type locality:* Near Lagoa Santa, Minas Geraes; two localities were cited when first described, this being the first.*Distribution:* State of Minas Geraes, Brazil.

The plant has long been in cultivation, where it does well and blooms freely. Dr. Rose brought back a fresh supply from Brazil in 1915. According to Robert Lamb, the flowers have a perfume resembling that of a hyacinth.

*Illustrations:* *Monatsschr. Kakteenk.* 9: 151; *Arch. Jard. Bot. Rio de Janeiro* 1: pl. 18; *Gartenflora* 41: f. 5, 6, 7.

Plate xxx, figure 2, shows a plant from M. Simon which flowered in the New York Botanical Garden in 1912; plate xxxiv, figures 3 and 4, shows two fruiting branches received from the Berlin Botanical Garden in 1902.

**38. *Rhipsalis gonocarpa*** Weber, *Rev. Hort.* 64: 427. 1892.

Very much branched; joints narrowly lanceolate to linear, crenate, 3-angled or flattened, becoming purplish; flowers lateral, white, 15 mm. long; petals 7 or 8, lanceolate; stamens 20 to 30, white; ovary strongly 3-angled; stigma-lobes 3 or 4; fruit terete, dark purple to black, globular to short-oblong, 10 to 12 mm. long.

*Type locality:* São Paulo, Brazil.*Distribution:* State of São Paulo, Brazil.



M. E. Eaton del.

1. Fruiting branch of *Rhipsalis houlettiana*.
2. Fruiting branch of same.

3. Flower of same.
4. Fruiting branch of same.

A. Hoen & Co. Baltimore



Schumann (Gesamtb. Kakteen 641. 1898) refers here as a synonym *Rhipsalis pterocarpa* Weber, a name which he had previously listed in the Flora Brasiliensis (4<sup>2</sup>: 300. 1890).

Plate xxx, figure 1, is from a plant sent to Dr. Rose in 1914 by R. Lamb of Manchester, England, which flowered in the New York Botanical Garden in 1920.

**39. *Rhipsalis linearis*** Schumann in Martius, Fl. Bras. 4<sup>2</sup>: 296. 1890.

Stems at first erect but afterwards spreading or prostrate, 6 to 8 dm. long, much branched; branches vary narrow, serrate, narrowed at base and woody; flowers white, 16 to 18 mm. long; fruit white, 5 mm. in diameter.

*Type locality*: Southern Brazil, but no definite locality cited. Localities in Paraguay and Argentina also cited in the original place of publication.

*Distribution*: Southern Brazil, Uruguay, Paraguay, and northern Argentina.

We know this species only from description.

**40. *Rhipsalis micrantha*** (HBK.) De Candolle, Prodr. 3: 476. 1828.

*Cactus micranthus* Humboldt, Bonpland, and Kunth, Nov. Gen. et Sp. 6: 65. 1823.

*Hariota micrantha* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Either epiphytic and pendulous or clambering over rocks; branches 3 or 4-angled or flattened, 5 to 8 mm. broad; areoles small, remote, bearing often 1 to 4 bristles; flowers white, lateral, 7 mm. long including the ovary; petals cream-colored, spreading, obtuse; filaments, style, and stigma-lobes white; fruit 8 to 10 mm. long, naked, white to reddish, globose; seeds black.

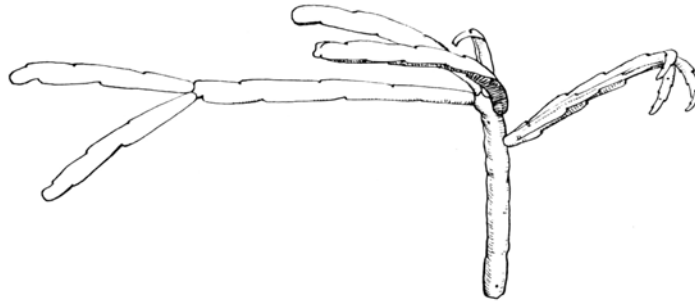


FIG. 228.—*Rhipsalis micrantha*. ×0.5.

*Type locality*: Near Olleros, formerly in Ecuador, now in northern Peru.

*Distribution*: Ecuador and northern Peru.

Schumann describes this species as having 5 angles and cites only Humboldt's plant. The original description says 3 or 4-angled or compressed. The plant which he actually described is doubtless *Rhipsalis sulcata*, which has long passed in collections as *R. micrantha*.

Dr. Rose found this species quite common in southern Ecuador and brought back living specimens of it. The specimen in the New York Botanical Garden which came from Berlin agrees with Schumann's description.

Figure 228 shows a branch from the plant brought by Dr. Rose from southern Ecuador in 1918 (No. 23248).

**41. *Rhipsalis tonduzii*** Weber, Dict. Hort. Bois 1046. 1898.

Stems giving off aerial roots freely, at first erect but branches hanging, 1 cm. in diameter or less, normally 4 or 5-angled, sometimes 7-angled, but terminal branches often 3-angled or occasionally flattened and 2-angled; branches about 10 cm. long, usually terminal but always in clusters of 2 to 6, pale green; areoles close together, forming notches in the branch; flowers small, 22 mm. long, white; ovary exserted (Schumann says immersed); fruit globose, short-oblong, white, 7 to 10 mm. long, usually on upper half of terminal branches, resembling fruit of *Rhipsalis cassutha* but much longer, sometimes abortive and covered with hairs, thus resembling a small chestnut-bur, perhaps the result of insect stings; seeds oblong, numerous, black.

*Type locality*: Costa Rica.

*Distribution*: Costa Rica but range unknown.

This species flowered in Washington in March 1912, in June 1919, and again in April 1920; fruit was obtained July 31, 1919, and in April 1920.



Plate xxx, figure 3, shows a branch of a plant brought back from Costa Rica by Dr. Maxon in 1906.

Of this relationship is the following:

*RHIPSALIS WERCKLEI* Berger, Monatsschr. Kakteenk. 16: 64. 1906.

Epiphytic, much branched, hanging, 3 to 6 dm. long; branches 2 to 4-angled, mostly 3, 8 to 10 cm. long, 10 mm. broad or less, without aerial roots; flowers borne singly along the whole branch, small; sepals 2; petals 4, creamy white; ovary not sunken in the branch; fruit globose, naked or with an occasional small scale, white, 5 mm. long; seeds numerous, brownish.

*Type locality:* Navarro, Costa Rica.

*Distribution:* Costa Rica.

The above description with regard to flowers and fruit has been copied. Our living specimens suggest that it may be different from *Rhipsalis tonduzii*, but whether specifically distinct will require further study to determine.

42. *Rhipsalis boliviana* (Britton) Lauterbach in Buchtien, Contr. Fl. Bolivia 1: 145. 1910.

*Hariota boliviana* Britton in Rusby, Mem. Torr. Club 3: 40. 1893.

Stems somewhat 4-angled and narrowly winged at base, setose at the areoles, the setae 5 to 10, yellowish white, about 2 mm. long; branches 5.5 to 30 cm. long, flattened and thin, 1 to 2 cm. broad, broadly crenate, the crenations 1.5 to 3 cm. long; flowers usually solitary but sometimes 2 or 3 at an areole, about 15 mm. long, one-half to two-thirds as broad, "yellow"; fruit globose, nearly 1 cm. in diameter, truncate at apex.

*Type locality:* Yungas, Bolivia.

*Distribution:* Wet forests of Bolivia.

43. *Rhipsalis lorentziana* Grisebach, Abh. Ges. Wiss. Göttingen 24: 139. 1879.

Epiphytic on forest trees or clambering over rocks, freely rooting along stems; lower part of stem often terete; branches thin, flattened or sometimes 3-angled, usually elongated and narrow, sometimes more or less constricted near middle, 3 cm. broad or less, coarsely serrate, usually cuneate at base; flowers white, about 4 cm. long; ovary oblong, strongly angled, naked except a few scales at the top; fruit globose, purplish, 3 mm. in diameter.

*Type locality:* Oran, Argentina.

*Distribution:* Northwestern Argentina and to be expected in southern Bolivia.

Dr. Kurtz gave to Dr. Rose when he was in Córdoba, Argentina, in 1915, a part of the plant collected by Lorentz and Hieronymus in 1893 (No. 454), which proves to be the type.

44. *Rhipsalis ramulosa* (Salm-Dyck) Pfeiffer, Enum. Cact. 130. 1837.

*Cereus ramulosus* Salm-Dyck, Hort. Dyck. 340. 1834.

*Hariota ramulosa* Lemaire, Cact. Gen. Nov. Sp. 75. 1839.\*

Stems woody, 3 dm. or more high, erect, terete; branches 7 to 12 cm. long, 1.2 to 2.5 cm. broad, pale green, with distant low crenations 12 to 20 mm. apart, when young often ciliate at areoles but in age naked; flowers solitary at the areoles, small, rotate, greenish white; sepals and petals 6 or 7, ovate-lanceolate, adhering to the base of the ovary, persistent; stamens 12 to 18; style filiform; stigma lobes inconspicuous; fruit glabrous, 5 to 6 mm. in diameter, white and subpellucid with 2 to 3 minute scales; seeds small, black.

*Type locality:* Not cited.

*Distribution:* Western Brazil and the adjacent borders of Bolivia and Peru (according to Vaupel).

Collected by R. S. Williams at Isapuri, Bolivia, altitude 5,550 feet, October 1, 1901 (No. 734). We have also referred here H. H. Rusby's No. 749 from trunk of trees near the cataracts of Bopi River, Bolivia, altitude 2,500 feet, September 8, 1921.

We know this plant from herbarium specimens; it is similar to *Rhipsalis lorentziana* but bearing scales on the ovary.

\* Lemaire, in 1839 (Cact. Gen. Nov. Sp. 74,75), combines *Rhipsalis* with *Hariota*, and 8 of the 10 species which he lists had not heretofore been referred to *Hariota*. They are, therefore, to be credited to Lemaire rather than to Otto Kuntze (Rev. Gen. Pl. 1: 262. 1891), as has been done in the Index Kewensis.



M. E. Eaton del.

A. Hoehn & Co. Baltimore

- 1. Flowering branch of *Rhipsalis houlettiana*.
- 2. Flower of same.

- 3. Fruiting branch of *Rhipsalis warmingiana*.
- 4. Fruiting branch of same.



*Rhipsalis ramulosa* has long been a doubtful species. Its origin was unknown at the time of its first publication, but Schumann in 1890 attributed it to Costa Rica, but this was evidently a mistake.

Vaupel has recently published an article (*Zeitschrift für Sukkulantenkunde* 1: 19, 1923) in which he states that the type was cultivated in the Botanical Garden of Berlin in 1833 and that specimens are now preserved in the herbarium there. He states that these are the same as the plant collected by Ule at Seringal, San Francisco, in the Upper Acre region of Brazil, about 10° south latitude, towards the border of Bolivia and Peru. He would also refer here a plant collected by Tafalla in 1790 at Pozugo in eastern Peru. *Cactus dentatus* Ruiz (Martius, Fl. Bras. 4<sup>2</sup>: 288, 1890), given as a synonym of *Rhipsalis alata* by Schumann, is based on Tafalla's plant and according to Vaupel should not have been credited to Ruiz.

*Epiphyllum ramulosum*, *E. ciliare*, and *E. ciliatum* were all given by Pfeiffer (Enum. Cact. 130, 1837) as synonyms of *Rhipsalis ramulosa*.

Figure 229 shows a drawing made from Mr. Williams's specimen.

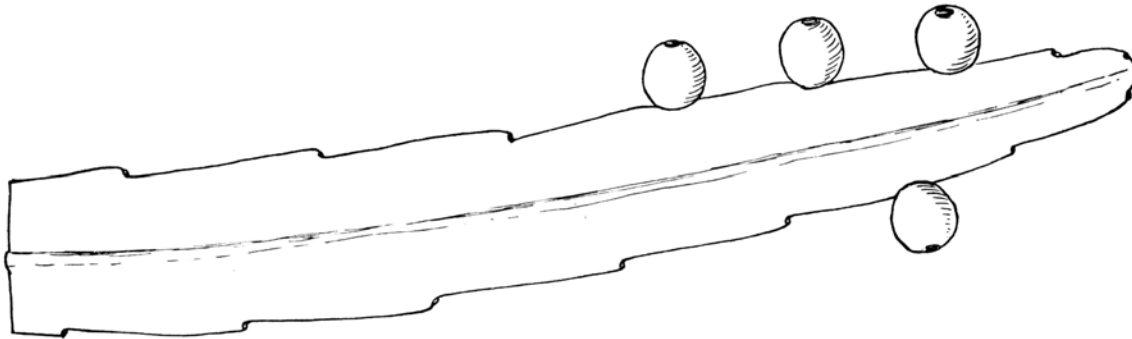


FIG. 229.—Top of fruiting branch of *Rhipsalis ramulosa*.  $\times 0.75$ .

**45. *Rhipsalis purpusii*** Weingart, *Monatsschr. Kakteenk.* 28: 78. 1918.

Plant epiphytic; stems 8 mm. in diameter, woody, terete, brown; branches weak, elongated, terete below, flattened above, thin, remotely crenate; flowers small, white, solitary.

*Type locality*: Cerro de Boqueron, Chiapas, Mexico.

*Distribution*: Known only from the type locality.

This must be related to the Costa Rican plant, *Rhipsalis coriacea*, and perhaps conspecific.

*Illustrations*: *Monatsschr. Kakteenk.* 28: 79; *Möllers Deutsche Gärt. Zeit.* 35: 117.

**46. *Rhipsalis coriacea*** Polakowsky, *Linnaea* 41: 562. 1877.

*Hariota coriacea* Kuntze, *Rev. Gen. Pl.* 1: 262. 1891.

*Rhipsalis angustissima* Weber *Bull. Mus. Hist. Nat. Paris* 8: 465. 1902.

*Rhipsalis leiophloea* Vaupel, *Zeitschrift Sukkulentk.* 1: 20. 1923.

Stems 2 to 10 cm. high, woody and terete at base, with many lateral branches; branches often hanging, 1 to 3.5 cm. broad, thin, serrate, the teeth 1.5 to 2.5 cm. apart, bearing the small areoles; young branches purple, terete at first, but finally broad and flattened above; areoles at base of branch and sometimes but rarely on flattened part, bearing 2 to 7 long, hairy bristles; flowers rather narrow, including ovary 12 mm. long, each subtended by a shallow scale; sepals and petals erect below; sepals usually 3, cream-colored, tinged with red; petals greenish white to pinkish, usually 5 to 10, obtuse, 7 to 8 mm. long; stamens numerous, white; style white; stigma-lobes short, white; fruit white, 7 mm. in diameter, bearing several broad, rounded scales; seeds black.

*Type locality*: Near Cartago, Costa Rica.

*Distribution*: Widely distributed in Costa Rica.



This species flowers in March.

*Rhipsalis coriacea*, which originally came from Costa Rica, Schumann referred to *R. alata* of Jamaica, a plant of similar habit but yet very distinct.

*Illustration*: Bull. Mus. Hist. Nat. Paris 8: 466, as *Rhipsalis angustissima*.

Of plate xxxii, figure 4 shows a flowering specimen and figure 5 a fruiting specimen from a plant collected by Wm. R. Maxon at Tunialba, Costa Rica, in April 1900, painted at the New York Botanical Garden on April 12, 1912.

**47. *Rhipsalis jamaicensis*** Britton and Harris, Torreyia 9: 159. 1909.

Pendent from trees, 3 to 10 dm, long, the main axis angular; joints 1 to 4 dm. long, 1 to 2.5 cm. broad, thin, dull green, bluntish at apex, narrowed into a short or elongated stipe at base, the margins low-crenate; flowers yellowish green, about 6 mm. long; perianth-segments about 7, oblong to oblanceolate, only a little spreading, obtusish; ovary oblong, bearing a few small scales; stamens 20 to 30; style longer than stamens; stigma-lobes 3; fruit globose, 6 to 8 mm. in diameter, white, the scales 3 mm. broad.

*Type locality*: Troy, Cockpit Country, Jamaica.

*Distribution*: Forests of Jamaica.

*Illustration*: Torreyia 9: 158. f. 3.

Plate xxii, figure 4, shows a plant with flowers and young fruit from Jamaica.

**48. *Rhipsalis platycarpa*** (Zuccarini) Pfeiffer, Enum. Cact. 131. 1837.

*Epiphyllum Platycarpum* Zuccarini, Cat. Cact. Monac. 1836.

*Cereus Platycarpus* Zuccarini, Abh. Bayer. Akad. Wiss. München 2: 736. 1837.

*Hariota Platycarpa* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

Branches broad and flat, 1 to 2 dm. long, 3 cm. broad or more, dull green becoming red when grown in sunlight, with broad deep crenations; flowers borne toward apex of branch, 1 to 3 from an areole, 16 to 18 mm. long, greenish yellow or dull white; petals 8 mm. long, ovate; stamens white; stigma-lobes 5, white; fruit (doubtless immature) naked, green, somewhat compressed, angled, truncate.

*Type locality*: Brazil.

*Distribution*: Organ Mountains, Brazil.

We have obtained plants of this species from Mr. Lamb at Manchester in 1904 and Dr. Rose found it wild in the Organ Mountains of Brazil in 1915 (No. 21159). It grows well in cultivation but it has never flowered with us.

*Illustrations*: Pfeiffer and Otto, Abbild. Beschr. Cact. 1 pl. 17, f. 2; Blühende Kakteen 2: pl. 90.

Figure 230 shows a branch of the plant obtained by Dr. Rose in the Organ Mountains.

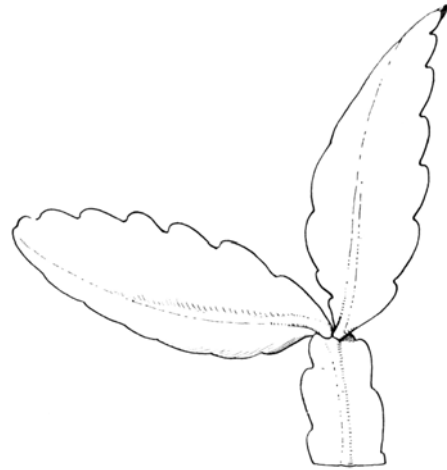
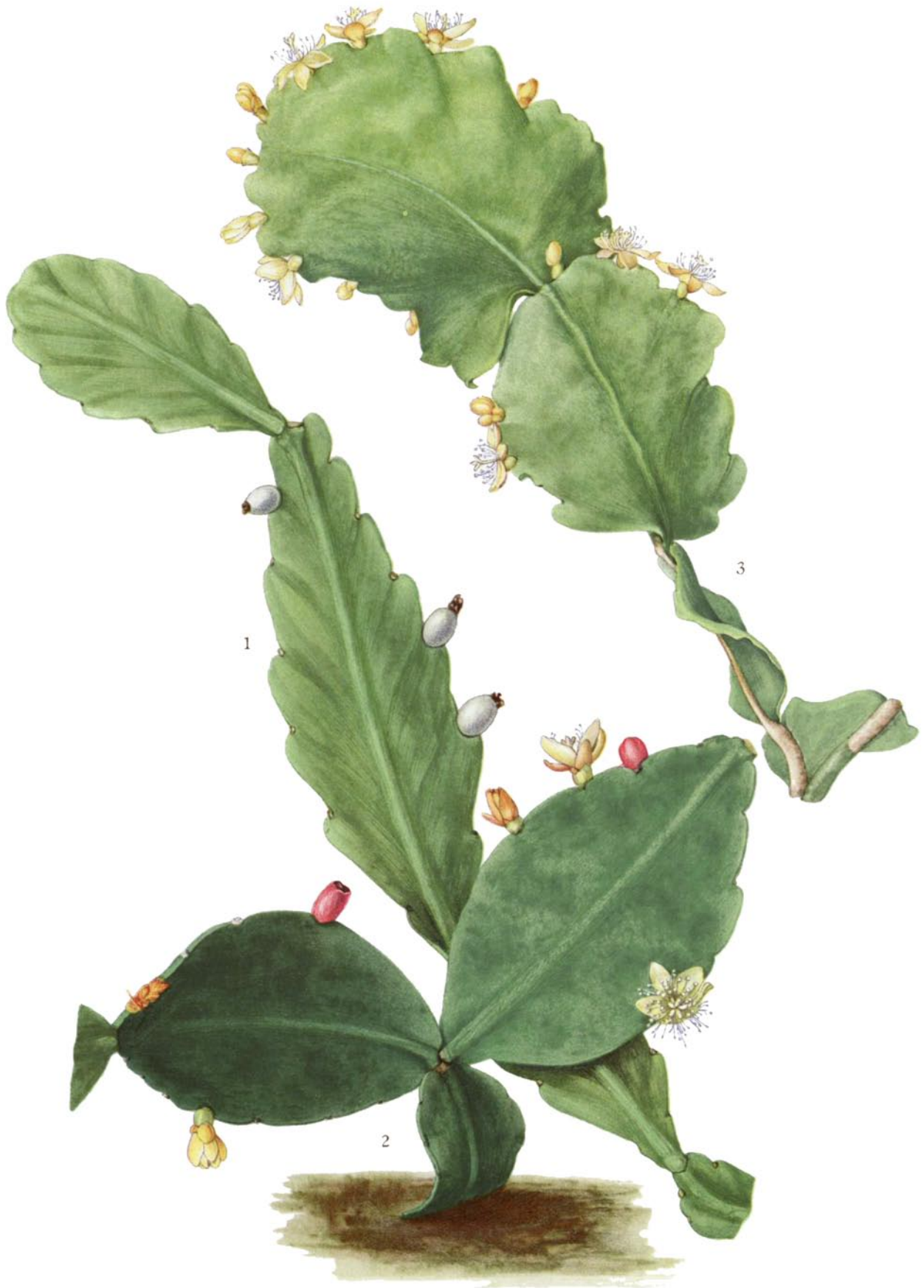


FIG. 230.—*Rhipsalis platycarpa*.  $\times 0.4$

**49. *Rhipsalis russellii*** sp. nov.

Hanging in great clusters from the horizontal branches of trees; branches strongly flattened, 15 cm. long, 5 to 6 cm. broad, cuneate at base, strongly crenate, dark green or purplish along margins; flowers often 9 at an areole, minute; sepals few, obtuse, reddish at tips; petals usually 5, cream-colored, obtuse, 2 mm. long; fruit usually 1 at an areole, small, globose, to 6 mm. in diameter, purple.

Collected by J. N. Rose and Paul G. Russell near Toca da Onca, Bahia, Brazil, June 27 to 29, 1915 (No. 20106). This species suggests *Rhipsalis elliptica*, but has very different flowers and fruit.



M. E. Eaton del.

1. Fruiting branch of *Rhipsalis oblonga*.
2. Fruiting branch of *Rhipsalis elliptica*.
3. Flowering branch of *Rhipsalis crispata*.

A. Hoen & Co. Baltimore



Of plate xxxvii, figures 1 to 4 are from the type specimen which has repeatedly flowered and fruited in the New York Botanical Garden; figure 1 shows the tip of a flowering branch; figure 2 shows a cluster of six flowers; figure 3 shows a flower enlarged four diameters; figure 4 shows a fruiting branch.

**50. *Rhipsalis elliptica*** Lindberg in Martius, Fl. Bras. 4<sup>2</sup>: 293. 1890.

*Rhipsalis chloroptera* Weber, Dict. Hort. Bois 1045. 1898.

*Rhipsalis elliptica helicoidea* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 44. 1918.

Plants growing in clumps, at first ascending, often hanging from trees; joints flat and broad, oblong to elliptic, 3 to 20 cm. long, 2 to 7 cm. broad, the margin faintly to strongly crenate; flowers generally 1, sometimes 2 or 3 at an areole, 12 mm. broad; petals usually 5, yellowish, widely spreading, oblong, obtuse; filaments numerous, nearly erect, white; style white; stigma-lobes white, 5; ovary not sunken in the branch; fruit reddish, a little longer than broad, 6 to 7 mm. long.

*Type locality:* Near Sorocaba, south of Santos, São Paulo, Brazil.

*Distribution:* States of São Paulo and Santa Catharina, Brazil.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 16, as *Rhipsalis elliptica helicoidea*; Blühende Kakteen 2: pl. 104, as *Rhipsalis chloroptera*; Arch. Jard. Bot. Rio de Janeiro 1: pl. 15.

Plate xxxv, figure 2, is from a plant collected by Dr. Rose at Jabaquara, near Rio de Janeiro, Brazil, in 1915, which flowered in the New York Botanical Garden in 1916.

**51. *Rhipsalis pachyptera*** Pfeiffer, Enum. Cact. 132. 1837.

*Cactus alatus* Willdenow, Enum. Pl. Suppl. 35. 1813. Not Swartz, 1788.

*Epiphyllum alatum* Haworth, Suppl. Pl. Succ. 84. 1819.

*Cactus triquetus* Vellozo, Fl. Flum. 206. 1825. Not Willdenow, 1813. Not Haworth, 1803.

*Cereus alatus* Link and Otto, Icon. Pl. Rar. 77. 1830.

*Lepismium fluminense* Miquel, Bull. Neerl. 48. 1838.

*Rhipsalis robusta* Lemaire, Rev. Hort. IV. 9: 502. 1860.

*Rhipsalis pachyptera purpurea* Corderoy, Gard. Chron. III. 2: 468. 1887.

*Hariota triquetra* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

*Hariota pachyptera* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

*Hariota robusta* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

*Rhipsalis crassa* Schumann, Keys 54. 1903.

Stems much jointed, pendent; joints often 3 to 6 dm. long, 5 to 7 cm. broad, thickish, stiff, sometimes nearly orbicular, often purple, deeply crenate; flowers numerous, but solitary, rarely 2 to 4 from the areole, large; petals widely spreading, yellowish; stamens numerous; stigma-lobes 4 or 5, slender; fruit globose, white.

*Type locality:* Originally given as the West Indies,\* but this is doubtless a mistake.

*Distribution:* States of Rio de Janeiro, Minas-Geraes, Santa Catherina, and São Paulo, Brazil.

The species grows in the high mountains on trunks of trees, altitude 1,000 meters, down to nearly sea-level.

A variety, *crassior* Salm-Dyck (Pfeiffer, Enum. Cact. 132. 1837), with thick green orbicular joints, has been described.

Steudel's name of *Rhipsalis alata* (Nom. ed. 2. 1: 333. 1840), given as a synonym of *Cereus alatus* De Candolle, is referred here by Schumann, but probably relates to *Pseudorhipsalis*.

This species was for a long time confused with *Rhipsalis alata*, a very distinct species from Jamaica, now referred by us to the genus *Pseudorhipsalis*.

*Illustrations:* Curtis's Bot. Mag. 55: pl. 2820,\* as *Cactus alatus*; Vellozo, Fl. Flum. 5: pl. 25, as *Cactus triquetus*; pl. 33, as to flower only; Link and Otto, Icon. Pl. Rar. pl. 39, as *Cereus alatus*; Monatsschr. Kakteenk. 6: 55; 7: 151, in part, as *Rhipsalis robusta*;

\* The plant, however, which Hooker described and figured (Curtis's Bot. Mag. 55: pl. 2820) as *Cactus alatus* and which Pfeiffer cited in his original description, came from the Organ Mountains near Rio do Janeiro, Brazil.



Blühende Kakteen 1: pl. 34; Martius, Fl. Bras. 4<sup>2</sup>: pl. 57; Paxton's Fl. Gard. 1: pl. 99; Arch. Jard. Bot. Rio de Janeiro 1: pl. 14; Möllers Deutsche Gärt. Zeit. 25: 77. f. 11, No. 15; Gartenwelt 13: 117; 16: 633, 635; Karsten and Schenck, Vegetationsbilder 1: pl. 5, f. d.

Plate xxxvii, figure 6, shows a fruiting branch from the plant obtained by Dr. Rose in Brazil in 1915 (No. 20346); plate xxxvi, figure 1, shows a flowering branch from a plant obtained from M. Simon, of Paris, in 1901.

**52. *Rhipsalis rhombea*** (Salm-Dyck) Pfeiffer, Enum. Cact. 130. 1837.

*Cereus rhombeus* Salm-Dyck, Hort. Dyck. 341. 1834.

*Hariota rhombea* Lemaire, Cact. Gen. Nov. Sp. 75. 1839.

Stems terete or angled; branches usually flat and thin, but sometimes 3-angled; joints oblong, 1 to 3 cm. broad, cuneate at base, strongly crenate, dark green or purple; flowers usually solitary at areoles but sometimes in 2's, small, cream-colored, with a red spot at base of stamens; sepals reddish; petals obtuse; fruit dark red.

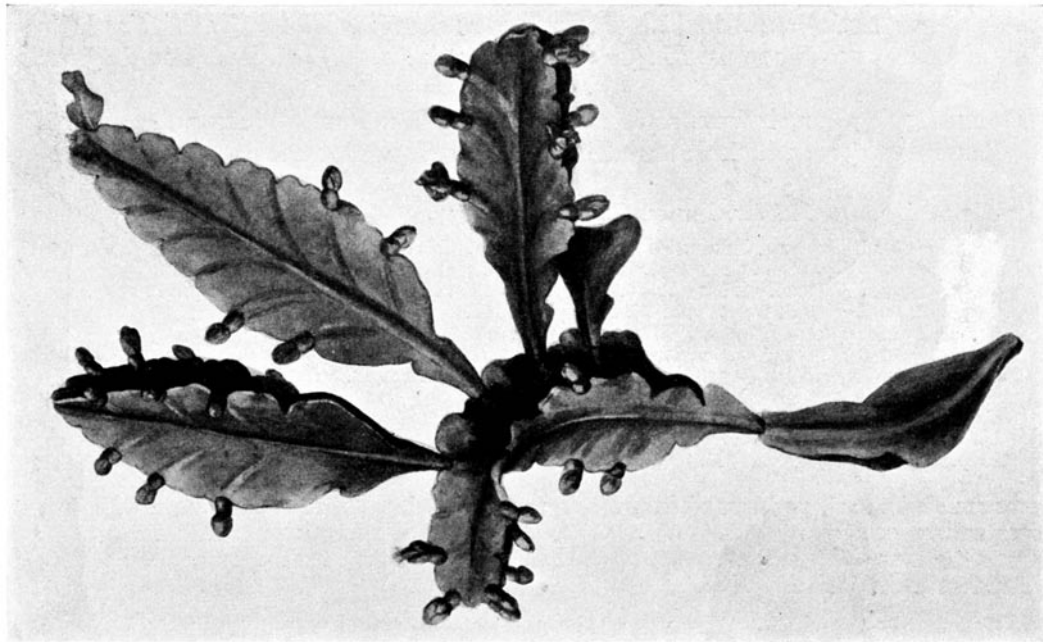


FIG. 231.—*Rhipsalis crispimarginata*.

*Type locality*: Not cited.

*Distribution*: Brazil, but range unknown.

*Cereus crispatus crenulatus*, *Epiphyllum crenulatum*, and *E. rhombeum* were referred by Pfeiffer (Enum. Cact. 130. 1837) as synonyms of this species.

Here perhaps also belongs *Cereus crispatus latior* (Salm-Dyck, Hort. Dyck. 66. 1834), which is without description.

*Illustrations*: Gartenwelt 16: 635; Karsten and Schenck, Vegetationsbilder 1: pl. 6, f. e; Möllers Deutsche Gärt. Zeit. 25: 477. f. 11, No. 13; Wildeman, Icon. Select. 2: pl. 67; Arch. Jard. Bot. Rio de Janeiro 1: pl. 16.

Plate xxxvi, figure 2, shows a flowering plant received from the Royal Botanic Garden at Kew in 1902 which flowered in the New York Botanical Garden in January 1912.

\*According to the Index Kewensis this is *Cactus speciosus* Hooker, said to be equal to *Rhipsalis swartziana*.



1

2

M. E. Eaton del.

1. Flowering branch of *Rhipsalis pachyptera*.
2. Flowering branch of *Rhipsalis rhombea*.

A. Hoen & Co. Baltimore



53. *Rhipsalis crispimarginata* Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 37. 1918.

Plants pendulous, the main stem terete below, often 3-winged above; terminal branches in clusters, oblong, flat, obtuse, narrowed at base, shining green or tinged with purple, 4 to 6 cm. long; flowers usually solitary but sometimes 2 or 3 at an areole, white, drying pale yellow; sepals ovate-obtuse, reflexed; petals white, widely spreading, numerous; stigma-lobes white; fruit globose, white.

*Type locality:* Ilha Grande, near the city of Rio de Janeiro.

*Distribution:* State of Rio de Janeiro, Brazil.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 9.

Plate xxxvii, figure 5, shows a fruiting branch of the type collection obtained by Dr. Rose on Ilha Grande near Rio de Janeiro in 1915 (No. 20401). Figure 231 is from a photograph of Miss Eaton's painting of a plant given to Dr. Shafer by Dr. Löfgren in 1917 at Rio de Janeiro which flowered in the New York Botanical Garden in May 1922.

54. *Rhipsalis crispata* (Haworth) Pfeiffer, Enum. Cact. 130. 1837.

*Epiphyllum crispatum* Haworth, Phil. Mag. 7: 111. 1830.

*Rhipsalis crispata latior* Salm-Dyck in Pfeiffer, Enum. Cact. 130. 1837.

*Hariota crispata* Lemaire, Cact. Gen. Nov. Sp. 75. 1839.

*Rhipsalis rhombea crispata* Schumann, Gesamtb. Kakteen 638. 1898.

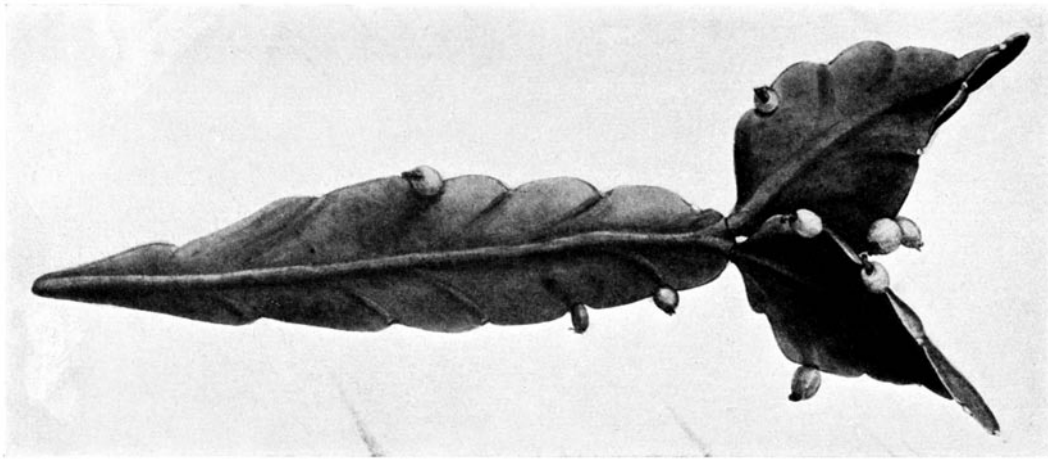


FIG. 232.—*Rhipsalis crispata*.

Branches divided into short flat joints 6 to 10 cm. long, broad both at base and apex, green, more or less crenate; flowers solitary or sometimes 2 to 4 at an areole, 10 to 12 mm. broad, cream-colored to light yellow; filaments numerous; fruit white, 7 mm. in diameter.

*Type locality:* Brazil.

*Distribution:* Brazil, but range unknown.

The synonyms *R. crista* and its var. *major* (Förster, Handb. Cact. 450. 1846) and *R. crista latior* Salm-Dyck (Walpers, Repert. Bot. 2: 279. 1843); *Hariota crispata latior* Lemaire (Cact. Gen. Nov. Sp. 75. 1839) doubtless belong here. Schumann, in Nachtrag, page 144, refers here *Rhipsalis swartziana* Pfeiffer.

Pfeiffer publishes as a synonym of the above *Cereus crispatus* (Enum. Cact. 130. 1837), as does also Förster. Schumann (Gesamtb. Kakteen 638. 1898) makes this species a variety of *Rhipsalis rhombea*, but later (Gesamtb. Kakteen Nachtr. 145. 1903) recognizes two species.

*Cactus torquatus* (Walpers, Repert. Bot. 2: 342. 1843), referred to *Rhipsalis rhombea* by Walpers, was only a garden name.

*Illustrations:* Arch. Jard. Bot. Rio de Janeiro 1: pl. 16, as *R. rhombea*; Gartenwelt 13: 117; Garten-Zeitung 1: 459. f. 109; Rev. Hort. 85: f. 152, in part.



Plate xxxv, figure 3, shows a flowering plant received from A. Berger in 1908. Figure 232 is from a photograph of Miss Eaton's painting of the plant obtained by Dr. Rose in Brazil in 1915 (No. 20708) which flowered and fruited in the New York Botanical Garden in 1922.

**55. *Rhipsalis oblonga*** Löfgren, Arch. Jard. Bot. Rio de Janeiro 2: 36. 1918.

In cultivation bushy; main branches terete below, more or less flattened above; ultimate branches narrowly oblong, 5 to 15 cm. long, 1 to 2 cm. broad, shining green even in sunlight; flowers borne along the sides of the branches, solitary at the areoles; fruit globular to short-oblong, 3 to 4 mm. long, nearly white, naked, crowned by the withered perianth.

*Type locality:* On Ilha Grande, Brazil.

*Distribution:* Known only from the type locality.

*Illustration:* Arch. Jard. Bot. Rio de Janeiro 2: pl. 8, as *Rhipsalis oblonga*.

Plate xxxv, figure 1, shows the plant grown by Dr. Löfgren at Rio de Janeiro and given to Dr. Shafer in 1917, which flowered and fruited in the New York Botanical Garden in May 1922.

**56. *Rhipsalis cuneata*** sp. nov.

Epiphytic on trees; joints oblong to spatulate, 8 to 12 cm. long, thin, obtuse, cuneate at base, strongly crenate, naked at the areoles or with a bristle or two; flowers so far as known solitary; fruit globose, 4 mm. in diameter, naked.

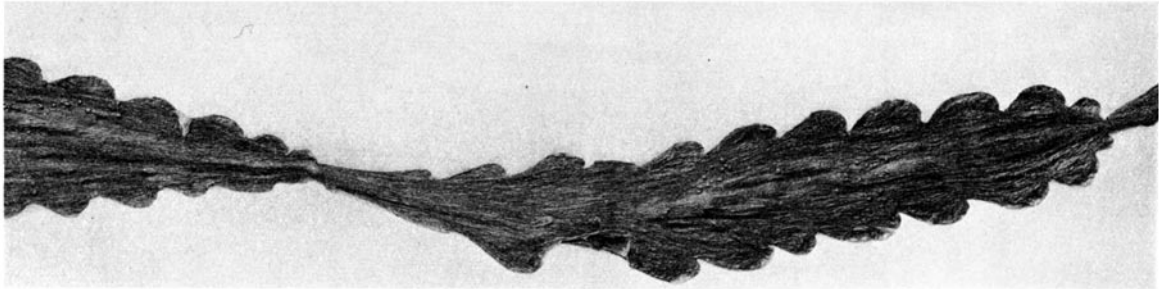


FIG. 233.—*Rhipsalis cuneata*.

Collected by R. S. Williams above San Juan, Bolivia, altitude 5,500 feet, April 2, 1902 (No. 2458). This species is known to us only from herbarium specimens.

Figure 233 is from a photograph of the specimen in the U. S. National Herbarium.

**57. *Rhipsalis roseana*** Berger, Zeitschrift für Sukkulantenkunde 1: 22. 1923.

Lower joints flat, 15 to 20 mm. broad, distinctly alternately notched; areoles small, with a little tuft of white wool and a single short brown hair, 15 to 20 mm. apart, the upper ones more closely set; upper joints narrower and more linear or linear-lanceolate, 10 to 15 mm. broad and 6 to 12 cm. long or more, equally notched, smooth, bright green; some of the uppermost joints often narrower, 8 to 10 mm. broad and only shallowly notched, others triangular with prominent notched angles and excavated sides, others 1 cm. wide, with 3 or 4 prominent wing-like distinctly but remotely notched ribs and areoles about 4 cm. apart; flowers small, whitish yellow.

This species was described from cultivated plants of unknown origin. We believe that it may be from Colombia and we would refer here the following specimens: Wilson Popenoe's No. 518 from near San Miguel, Perdona, Tolima, 1921, and Ellsworth P. Killip's No. 8203 from mountains west of Popayán, 1922.

Mr. Berger writes: "This new *Rhipsalis* is decidedly distinct from *R. wercklei*; its branches are shorter, broader, more deeply notched and of a firmer nature. Its growth too is far less quick and it does not form so promptly long and pendent shoots as *R. wercklei*."



M. E. Eaton del.

1. Flowering branch of *Rhipsalis russelli*.
2. Cluster of flowers of same.
3. Flower of same.

4. Fruiting branch of same.
5. Fruiting branch of *Rhipsalis crispimarginata*.
6. Fruiting branch of *Rhipsalis pachyptera*.

A. Hoen & Co. Baltimore



## UNPUBLISHED OR INCOMPLETELY DESCRIBED SPECIES.

RHIPSALIS CHRYSANTHA Löfgren, Arch. Jard. Bat. Rio de Janeiro 1: 99. 1915.

We know this species only from description. Löfgren places it in his subgenus *Lepismium* near *Rhipsalis dissimilis*, but his descriptions suggest *R. rosea* (our *Rhipsalidopsis rosea*). Both names are based on Dr. P. Dusen's collections from Paramá, Brazil. It seems near *R. puniceo-discus*.

RHIPSALIS FRONDOSA Wercklé, Subregion Fitogeografica Costa Ricense 42. 1909.

The above name is given without description.

Weingart (Monatsschr. Kakteenk. 20: 185. 1910) refers to this plant as a new species represented in a sending from Costa Rica by Wercklé. Nothing further is known about it.

RHIPSALIS RIEDELIANA Regel, Ind. Sem. Hort. Petrop. 1860: 49. 1860.

*Hariota riedeliana* Kuntze, Rev. Gen. Pl. 1: 263. 1891.

This plant was sent from Brazil by Riedel, but we do not know it. Schumann did not know it.

*Rhipsalis bucheni* Béhagnon (Rev. Hort. 85: 436. f. 152. 1913) we know only from the illustration of a poor potted plant and an incomplete description.

*Rhipsalis carnososa* and *R. lagenaria* are names mentioned by Vöchting (Jahrb. Wiss. Bot. Leipzig 9: 368, 372. 1873).

*Rhipsalis erythrolepis* Béhagnon (Rev. Hort. 85: f. 152, part) is known only from a potted plant of some species with broad, flat joints.

*Rhipsalis filiformis* seems to be only a garden name (Monatsschr. Kakteenk. 6: 47. 1896). It may be the same as *R. cribrata filiformis* Engelhardt (Möllers Deutsche Gärt. Zeit. 18: 585. 1903).

*Rhipsalis itatiaiae* Weber appears in Robert Lamb's Collection of Cacti, page 72, 1908, without description. In 1914 Mr. Lamb sent Dr. Rose a specimen under this name, but it has not bloomed. A part of this plant from Mount Itatiaia, Brazil, is now growing in the New York Botanical Garden (Rose, No. 888).

*Rhipsalis macabensis* Glaziou (Bull. Soc. Bot. France Mem. III. 326. 1909) is only a name. According to Glaziou he collected it on rocks and trees at Alto Macahé, Rio de Janeiro (No. 18262).

*Rhipsalis microcarpa* Steudel, is a name found only in Schumann's Index (Gesamtb. Kakteen 832. 1898).

*Rhipsalis miquelii* Lemaire (Cactées 80. 1868) is not described but it is grouped with *R. pachyptera*, *R. rhombea*, and other flat-jointed species. Lemaire also lists *R. turpinii* on the same page, associating it with *R. micrantha* and *R. trigona*.

*Rhipsalis oligosperma* Lindberg (Monatsschr. Kakteenk. 7: 21. 1897) is a name only.

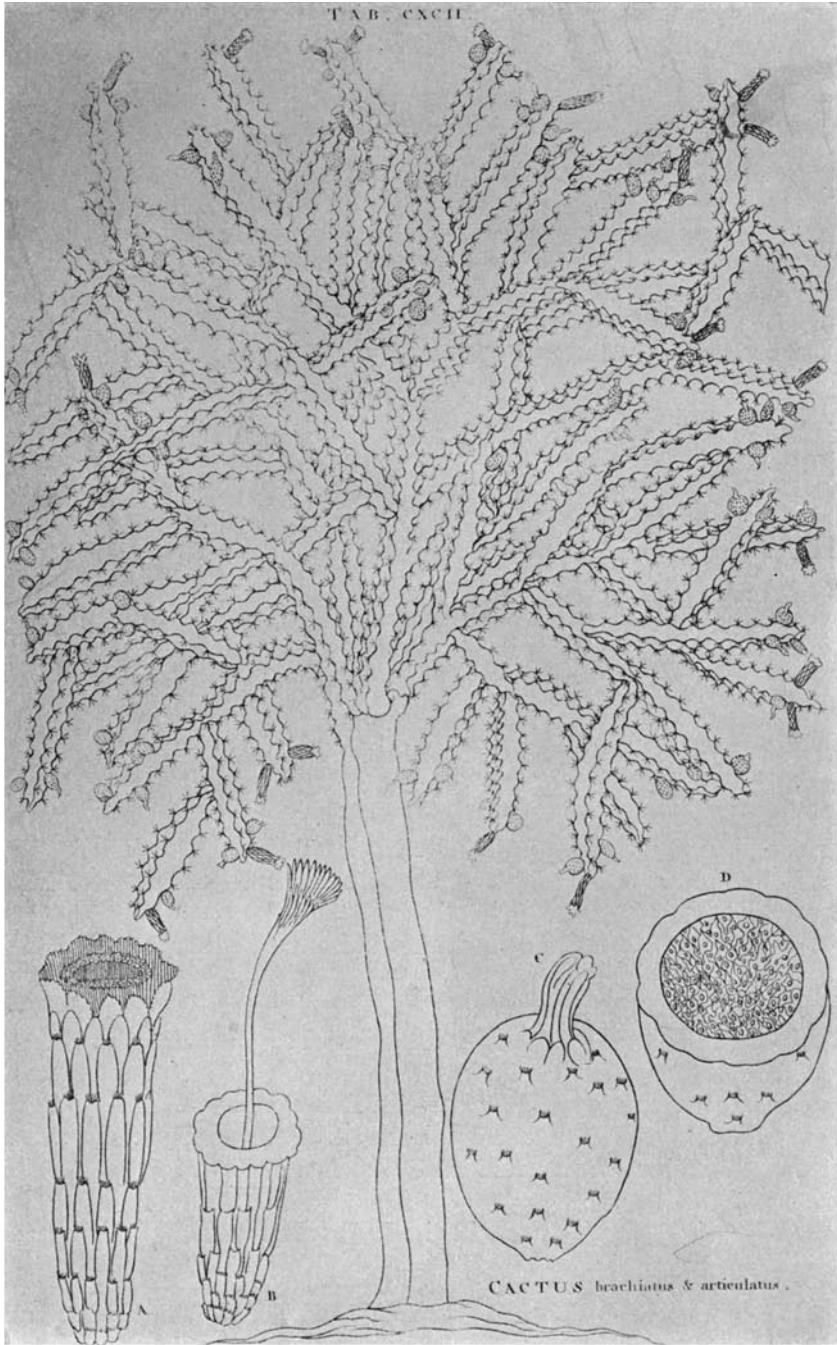
*Rhipsalis spathulata* Otto (Sweet, Hort. Brit. ed. 3. 1839) Schumann thought might be a mistake for *Pereskia spathulata*. Kuntze takes it up, however, as *Hariota spathulata* (Rev. Gen. Pl. 1: 263. 1891).

The name *Rhipsalis taglionis* occurs in the Index Kewensis Supplement 1, by error for *R. saglionis*.

*Rhipsalis wettsteinii* Schumann (Monatsschr. Kakteenk. 17: 48. 1907) is a name only.

The illustration (fig. 233a) given on next page is a reproduction of Plumier's plate 92 of Burmann Plantarum Americanum published in 1755 and now referred to *Neoabbottia paniculata*, discussed on page 280 of this volume.





CACTUS brachiatus & articulatus .

## APPENDIX.

During the progress of our investigations much information has been received from numerous sources which could not be included in publication at the logical places. Some of this was taken up in the appendix to the first volume (Cactaceae 1: 2 16-225) and some in the appendix to the second (Cactaceae 2: 223-226); what remains is included in this appendix to the whole work.

Dr. David Griffiths, who studied the species of *Opuntia*, especially with relation to their economic possibilities, and grew many of them at experimental stations of the United States Department of Agriculture at Brownsville, Texas, and at Chico, California, has published and described many species as new. We have included these in our studies of the genus and have grouped them with the species known to us as accurately as has been possible from his published descriptions and illustrations and after examination of as many of his type specimens as we have been permitted to see; however, conditions were such that we have not been able to study a number of them. They have not been arranged for ready reference by students.

The preface to Volume I gives a list of volunteers who have made valuable contributions of specimens and data to this investigation. Many of these have continued to aid us.

Dr. Britton, in continuing his West Indian studies, investigated the cacti of Grenada and of Trinidad in 1920 and 1921 and published an account of the Trinidad species.

Dr. John K. Small has continued his investigation of the southeastern United States and of Florida in particular, in cooperation with Mr. Charles Deering, and has greatly increased our knowledge of the cacti existing there, including the discovery of many undescribed species of *Opuntia*.

Dr. Francis W. Pennell, Curator of Botany at the Academy of Natural Sciences of Philadelphia, and Mr. E. P. Killip, of the United States National Museum, made extensive botanical collections in Colombia in 1922, including some specimens of cacti, which we have studied.

Dr. Henry H. Rusby led the Mulford Biological Exploring Expedition to Bolivia in 1921-1922 and with the assistance of Dr. O. E. White obtained for us specimens of several little-known cacti.

Dr. Philip A. Munz has sent us cacti from the deserts of southern California.

Mr. C. Z. Nelson obtained cacti from southern Mexico, including a beautiful new species of *Selenicereus*.

Mr. Francis J. Dyer, while connected with the Consular Service in Honduras and at Nogales, Mexico, sent us many specimens from those stations.

Professor Harvey M. Hall, while making extensive explorations in the western United States in connection with his own work, has forwarded interesting cactus plants.

Dr. and Mrs. Charles D. Walcott have sent specimens from Alberta, Canada, some of them coming from near the most northern range of the family.

Dr. W. L. Abbott and Mr. E. C. Leonard made extensive collections in Haiti in 1920 and obtained a number of rare and little-known plants, including one which had been collected by Charles Plumier about 1698 and which proved to be a new genus; this was named by us for Dr. Abbott. More recently Dr. Abbott has sent us specimens from Santo Domingo.

Dr. George F. Gaumer, the veteran collector in Yucatan, has sent very important collections from his region, including a number of new species.

Mr. Ivan M. Johnston, who accompanied the scientific expedition sent out by the California Academy of Sciences in 1921 to explore the islands of the Gulf of California,

collected many cacti, especially species of *Neomammillaria*, duplicating many of the important discoveries made by Dr. Rose on the same islands in 1911. He has also sent us cacti from Colorado.

Professor Fortunato L. Herrera has sent some very interesting plants from eastern Peru, especially from about his home at Cuzco.

Mr. Robert Runyon has collected extensively in southern Texas and northern Mexico and has supplemented his specimens with some very beautiful photographs.

Dr. L. H. Bailey and his daughter, Miss Ethel Zoe Bailey, obtained valuable cacti from Venezuela, especially from the region about Ciudad Bolívar, on the Orinoco, in 1921.

Mr. W. B. Alexander was sent to Argentina by the Australian Government in 1920 and 1921 in search of enemies of the weed prickly pears and there made many important observations, especially on the genus *Opuntia*. He sent us two undescribed species.

Dr. B. P. Reko, a very diligent collector, has sent many cacti from Mexico, especially from Oaxaca, including several new to science.

Señor Octavio Solís, in charge of the cactus garden belonging to the Mexican Government in the City of Mexico, has sent many living plants from his country, especially of the genus *Neomammillaria*. To him we have dedicated the genus *Solisia*.

Señor J. G. Ortega has collected extensively on the west coast of Mexico, especially in the state of Sinaloa, and for him we have named *Neomammillaria ortegae*.

Mr. J. Francis Macbride and Mr. William Featherstone, who were in charge of the botanical expedition of the Field Museum to Peru in 1922 and 1923, made large and valuable collections of cacti in central and eastern Peru.

Mr. E. C. Rost has collected and photographed many interesting cacti for us in southern California and Lower California.

Dr. W. S. W. Kew explored extensively in Lower California in 1921 and sent not only many specimens but numerous habit photographs.

Mr. James H. Ferriss, while making various excursions through the western United States, has sent in many specimens. Among his interesting discoveries was the finding of *Neomammillaria pottsii* in southern Texas.

Mrs. S. L. Pattison, an enthusiastic collector in western Texas, has sent many valuable specimens, including new species collected by herself or for her by local collectors.

Mrs. Ruth C. Ross spent considerable time in eastern Arizona in 1921 and collected cacti along the route traversed by Emory in 1847, re-collecting certain species which he had discovered at that time.

Mr. Harry Johnson was located for about a year in Guatemala, during which time he sent a number of very interesting cacti, especially species of *Epiphyllum*. Some of these were accompanied by full notes and drawings.

Señor P. Campos-Porto has sent a number of interesting specimens from Brazil belonging to the genus *Rhipsalis*.

The following persons have contributed valuable specimens, usually from about their homes or while engaged in other work: G. W. Goldsmith, Colorado; B. C. Tharp, Texas; Charles O. Chambers, Oklahoma; James S. Holmes, Washington, D. C.; Joseph A. Holmes, Wyoming; William Hertrich, California; William Tell, Texas; Albert Ruth, Texas; D. C. Parman, Texas; Karl Reiche, Mexico; Gerold Stahel, Surinam; Rev. Louis Mille, Ecuador; H. M. Pilkington, Haiti; Percy L. Ports, Washington, D. C.; W. E. Broadway, Trinidad; A. F. Moeller, Mexico; W. E. Meyer, Bolivia; Stephen E. Aguirre, Mexico; Mrs. Elsie McElroy Slater, Texas; Paul C. Standley, Central America; R. D. Camp, Brownsville, Texas; George L. Fisher, Texas; A. V. Frič, Mexico; and Dana Lee, Wyoming.

As treated in this monograph the Cactus family is composed of 3 tribes. The first and second tribes are taken as units, but the third is composed of 8 subtribes. The number of genera recognized is 124 and the number of species is 1,235.

## CORRECTIONS AND ADDITIONS TO VOLUME I.

On page 11, vol. 1, under *Pereskia pereskia*, add to illustrations: Garten-Zeitung 4: 182. f. 42, No. 5; Gard. Chron. III. 20: f. 108; Stand. Cycl. Hort. Bailey 2: f. 714, as *Pereskia aculeata*; Loudon, Encycl. Pl. ed. 3. 413, as *Cactus pereskia*; Möllers Deutsche Gärt. Zeit. 23: 256. 1. 15, as *Pereskia godseffiana*.

Also insert: *Pereskia longispina rubescens* Pfeiffer and *P. longispina rotundifolia* Salm-Dyck were given by Walpers (Repert. Bot. 2: 283. 1843) as synonyms of *P. aculeata*, but they were not described.

On page 12, vol. 1, under *Pereskia autumnalis*, add to distribution: Common in Salvador where it is much planted for hedges.

Also add to illustrations: Monatsschr. Kakteenk. 25: 35, as *Pereskopsis autumnalis*; Engler and Drude, Veg. Erde 13: f. 10, as *Pereskia guatemalensis*.

On page 14, vol. 1, under *Pereskia sacharosa*, add the synonym: *Pereskia amapola argentina* Weber in Weingart, Monatsschr. Kakteenk. 14: 87. 1894.

On page 17, vol. 1, under *Pereskia guamacho*, insert: *Illustration*: Carnegie Inst. Wash. 269: pl. 11, f. 92, 93.

On page 20, vol. 1, under *Pereskia grandifolia*, add to illustrations: Rümpler, Sukkulente f. 128; Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 57, J; Blühende Kakteen 3: pl. 137; Watson, Cact. Cult. f. 6, in part; 222. f. 87; ed. 3. f. 63; Karsten, Deutsche Fl. ed. 2. 2: 456. f. 605, No. 9; Loudon, Encycl. Pl. ed. 3. 1202. f. 17371; Van Géel, Sert. Bot. 4: pl. 1, as *Pereskia bleo*; Dict. Gard. Nicholson 3: 75. f. 81; Monatsschr. Kakteenk. 15: 81.

Also add synonym: *Cactus grandiflorus* Link, Enum. Hort. Berol. 2: 25. 1822.

On page 21, vol. 1, *Pereskia zinniaeflora*, add to illustrations: Watson, Cact. Cult. ed. 1 and 2. 223. f. 88; ed. 3. f. 64; Dict. Gard. Nicholson 4: 586. f. 55.

On page 21, vol. 1, under *Pereskia horrida*, substitute for this name:

**Pereskia humboldtii** nom. nov.

*Cactus horridus* Humboldt, Bonpland, and Kunth, Nov. Gen. et Sp. 6: 70. 1823. Not Salisbury, 1796.

*Pereskia horrida* De Candolle, Prodr. 3: 475. 1828.

On page 24, vol. 1, at end of *Pereskia*, add: *Pereskia recurvifolia* and *P. galeottiana* are two names marked with an asterisk by Lemaire (Cactées 95. 1868), indicating that they are new. So far as we know they were never described.

On page 24, vol. 1, at end of *Pereskia* insert:

**Pereskia pflanzii** Vaupel, Zeitschrift Sukkulente n. 1: 56. 1923.

Tree about 15 meters high, with verticillate branches, not very spiny; leaves thick, ovoid, narrowed at base, 4 cm. long by 2 cm. broad; flowers solitary at apex of leafy branches; corolla 3 cm. long, rose-colored.

*Type locality*: Vicinity of Laguna Santa Isabel, Bolivia.

*Distribution*: Bolivia, but known only from type locality.

**Pereskia verticillata** Vaupel, Zeitschrift Sukkulente n. 1: 55. 1923.

Erect shrub, 2 meters high, very spiny, with verticillate branches; leaves thick, lanceolate, 5 cm. long by 1.5 cm. broad; flowers borne at apex of leafy branches; corolla 1.5 cm. long, rose-colored.

*Type locality*: Vicinity of Laguna Santa Isabel, Bolivia.

*Distribution*: Bolivia, but known only from type locality.

On page 27, vol. 1, under *Pereskopsis chapistla*, add to illustration: Smiths. Misc. Coll. 50: pl. 43.

On page 28, vol. 1, under *Pereskopsis porteri*, add the synonym: *Opuntia rotundifolia* Brandege, Zoe 2: 21. 1891. Not *Pereskia rotundifolia* De Candolle, 1828.

On page 29, vol. 1, under *Pereskopsis spathulata*, insert: *Illustration*: Möllers Deutsche Gärt. Zeit. 25: 488. f. 22, No. 1, as *Pereskia spathulata*.



On page 29, vol. 1, under *Pereskiopsis pititache*, add to illustrations: Deutsche Gärt. Zeit. 8: 33, as *Pereskia calandriniaefolia*.

On page 30, vol. 1, insert the following:

**11. *Pereskiopsis scandens* sp. nov.**

Slender, climbing or clambering over walls, up to 10 meters long; branches terete, grayish, smooth; areoles circular, white-woolly when young, gray in age, with a short spine ( mm. long) and a bunch of brown glochids in the upper edge; leaves ovate, 1.5 to 2 cm. long, glabrous, acute; flowers yellow, from the areoles on old branches, appearing in June; fruit maturing slowly (perhaps requiring 2 to 3 years to ripen), very narrow, 5 to 7 cm. long, somewhat tubercled, with a deep umbilicus; seeds few.

Living specimens of *P. scandens* were sent by Dr. George F. Gaumer from Izamal, Yucatan, Mexico, in July 1921 (type). It was also collected by A. Schott at Mérida in 1865 (No. 409).

Withdraw the name *Pereskia zehntneri* from page 14, vol. 1, and substitute the following at the end of *Pereskiopsis* on page 30:

**1a. QUIABENTIA gen. nov.**

A low, leafy, much branched shrub with numerous horizontal branches, usually in whorls; leaves fleshy but flattened, stiff, borne at right angles to the branches; areoles large, white-felted, often with numerous spines, these acicular and white, the upper part of areole bearing glochids; flowers terminal, very large, bright red; ovary leafy, very narrow; stamens numerous, a little shorter than the style, much shorter than the petals; style short and stiff; stigma-lobes very short, obtuse; seeds white, a little flattened, covered with a hard bony aril as in *Opuntia*.

A monotypic genus, native of the semiarid region of Bahia, Brazil. The generic name is from quiabento, the native name of the plant.

**1. *Quiabentia zehntneri* Britton and Rose.**

*Pereskia zehntneri* Britton and Rose, Cactaceae 1: 14. 1919.

Flowers at ends of branches, large, 7 to 8 cm. broad, 3 to 4 cm. long, bright red, appearing in November; petals broad, retuse; ovary borne in the upper end of the branch, very narrow, 3 to 4 cm. long, bearing the usual leaves, areoles, and spines of the branches; fruit oblong to clavate, 6 to 7 cm. long, 1.5 cm. in diameter at the top, slightly angled by the low elongated tubercles running downward from the small scattered areoles, and finally without leaves, spines, or bristles, sterile below, with thick fleshy walls and with a small narrow seed-cavity; umbilicus broad, slightly depressed; seeds thick with flattened sides rounded on the back, 5 mm. in diameter.

In its large, red, rotate flowers this plant at once suggests a *Pereskia*. Its red flowers are so similar to those of *P. bahiensis* of the same region that at first we considered the two species congeneric. Now that we have studied the fruit and seed it is evident that *P. zehntneri* belongs to a very different genus. Then, too, the old areoles develop deciduous spines or bristles which are doubtless glochids; these occur on the upper part of the areoles but do not form the definite brush of the *Opuntiae*. These glochids would exclude it from the *Pereskiae*. It must therefore be referred to the *Opuntiae* and next to *Pereskiopsis*. In its broad, thick leaves it resembles that genus, but its flowers are terminal, very large, and rotate; its fruit is much elongated and the seeds are glabrous.

We are indebted to Dr. Leo Zehntner, a very keen observer, for many fine specimens and much information regarding it. He has found it only on a small calcareous mountain near the city of Born Jesus da Lapa, Brazil, but it has been transplanted to the Horto Florestal of Joazeiro where it is well established and where it flowered three years after being replanted. In 1915 Dr. Rose brought living specimens to the New York Botanical Garden from this stock (No. 19722).

On page 32, vol. 1, under *Pterocactus tuberosus*, add the synonym: *Opuntia tuberosa albispina* Salm-Dyck in Förster, Handb. Cact. ed. 2. 911. 1885.

Also add to illustrations: Haage and Schmidt, Cat. Gen. 230. 1908; De Laet, Cat. Gén. f. 74, as *Pterocactus kuntzei*.

On page 34, vol. 1, under *Nopalea cochenillifera*, add the synonyms: *Cactus nopal* Thierry, Dict. Sci. Nat. 6: 103. 1817; *Cactus splendidus* Thierry, Dict. Sci. Nat. 6: 103. 1817; *Cactus campechianus* Thierry, Dict. Sci. Nat. 6: 103. 1817; *Nopalea coccifera* Lemaire, Cactées 89. 1868.

Also add to illustrations: Loudon, Encycl. Pl. ed. 1 and 3. 412. f. 6888, as *Cactus cochenillifer*; Contr. U. S. Nat. Herb. 8: pl. 48, as spineless opuntia; Knorr, Thesaurus pl. 0,1.

On page 37, vol. 1, under *Nopalea auberi*, insert:

*Opuntia auberi* was described as from Cuba, but as no *Nopalea* is known from Cuba we have been unable to account for this reference. The following incidents may explain it:

L. Pfeiffer described the plant in 1840 just after his return from Cuba, where he had gone with Otto in 1838. At Havana they visited the Botanical Garden, then in charge of Pedro Auber, for whom this plant was doubtless named. It is also stated that, although Pfeiffer made this trip especially to gather cacti, he saw only one species, *Opuntia horrida*. The probabilities, therefore, are that this plant was obtained from the Botanical Garden at Havana, perhaps with a statement from Auber that it was Cuban.

On page 37, vol. 1, under *Nopalea dejecta*, add the synonym: *Nopalea angustifrons*\* Lindberg, Act. Soc. Sc. Fenn. 10: 123. 1871.

Add to illustrations: Act. Soc. Sc. Fenn. 10: pl. 2, as *Nopalea angustifrons*.

On page 41, vol. 1, under *Maihuenia poeppigii*, add to illustrations: Gartenflora 30: 412, as *Pereskia poeppigii*.

On page 42, vol. 1, under *Maihuenia brachydelphys*, insert the synonym: *Opuntia brachydelphis* Schumann in Just, Bot. Jahresb. 26<sup>1</sup>: 343. 1898.

Insert: *Mammillaria brachydelphis* is a clerical error for *Opuntia brachydelphis*.

On page 42, vol. 1, under *Opuntia*, add the synonym: *Cactus* Lemaire, † Cactées 86. 1868. Not Linnaeus, 1753.

On page 46, vol. 1, under *Opuntia ramosissima*, insert: *Opuntia tessellata denudata*, according to C. R. Orcutt, is only a form—spiny joints frequently occurring on the same plant with the spineless form; it is common in the Mojave Desert, California. It was mentioned by Alverson (Cact. Cat. 6) while *O. ramosissima denudata* is listed by Weinberg (Cacti 22). *O. ramosissima cristata* is mentioned by Schelle (Handb. Kakteenk. 41. 1907).

Also add to illustrations: Cact. Journ. 1: pl. for February; Monatsschr. Kakteenk. 8: 71, as *Opuntia tessellata cristata*; Stand. Cycl. Hort. Bailey 4: f. 2596, 2610.

On page 47, vol. 1, under *Opuntia leptocaulis*, add the synonym: *Opuntia californica* Engelm. in Emory, Mil. Recon. 158. 1848.

Also insert: *Opuntia stipata* (Schumann, Index Gesamtb. Kakteen 830. 1898) refers to *O. leptocaulis stipata*.

Also add to illustrations: Emory, Mil. Recon. 158. No. 11, as *Opuntia californica*; Gartenwelt 11: 75, as *O. vaginata*; Carnegie Inst. Wash. 269: pl. 10, f. 89; pl. 11, f. 96; Stand. Cycl. Hort. Bailey 2: f. 717; Schelle, Handb. Kakteenk. 41. f. 2; Möllers Deutsche Gärt. Zeit. 25: 475. f. 9, No. 21.

On page 49, vol. 1, under *Opuntia caribaea*, insert: Dr. Britton endeavored to find this plant in Trinidad in 1920 and 1921 but failed and he could not learn anything about it. It appears probable that the drawing sent by Mr. Lockhart to Kew in 1825 was made from a Venezuelan plant.

On page 54, vol. 1, under *Opuntia clavellina*, add to illustration: Karsten and Schenck, Vegetationsbilder 13: pl. 18, in part.

On page 56, vol. 1 under *Opuntia whipplei* in last line of description read cm as mm.

\*The Index Kewensis refers this name to *Opuntia leucacantha*, but the illustration shows that it belongs to *Nopalea*.

† Lemaire in his Les Cactées, published in 1868, takes up the name *Cactus* for certain of the low, depressed, much branched or cespitose species of *Opuntia*. He lists a number of these on pages 8 and 88, but as they are not connected through published species their identification is made only by inference.

Add to illustration: Bull. Agr. Exper. Sta. N. Mex. **78**: pl. 11, 12; North Amer. Fauna **7**: pl. 9; Pac. R. Rep. **4**: pl. 17, f. 1 to 4; Stand. Cycl. Hort. Bailey **4**: f. 2609.

On page 57, vol. 1, under *Opuntia acanthocarpa*, add to illustration: Stand. Cycl. Hort. Bailey **4**: f. 2606; Gartenwelt **11**: 75.

On page 57, vol. 1, under *Opuntia echinocarpa* and *O. parryi*, respectively, add the synonyms: *Cactus echinocarpus* and *C. parryi* Lemaire, Cactées 88. 1868.

On page 58, vol. 1, under *Opuntia bigelovii*, add to illustrations: MacDougal, Bot. N. Amer. Des. pl. **47**: Shreve, Veg. Des. Mt. Range pl. 4; Contr. U. S. Nat. Herb. **16**: pl. 10; Stand. Cycl. Hort. Bailey **4**: f. 2607; Karsten and Schenck, Vegetationsbilder **4**: pl. 40, B.

On page 61, vol. 1, under *Opuntia cholla*, insert: *Opuntia chella* (Index Kew. Suppl. **1**: 302) is a typographical error for *O. cholla*.

On page 62, vol. 1, under *Opuntia versicolor*, add to illustrations: Carnegie Inst. Wash. **269**: pl. 8, f. 81; pl. 9 MacDougal, Bot. N. Amer. Des. pl. 58; Plant World **9**<sup>12</sup>: f. 50.

On page 63, vol. 1, under *Opuntia imbricata*, add the synonym: *Cactus imbricatus* Lemaire, Cactées 88. 1868. Also add to distribution: Oklahoma.

Insert: Rydberg (Fl. Rocky Mountains 576. 1917) reports this species from Utah under the name of *Opuntia arborescens*; we have seen no specimens of it from Utah.

Insert: *Cactus subquadriflorus* Mociño and Sessé (De Candolle, Prodr. **3**: 471. 1828), given as a synonym of *Opuntia rosea*, doubtless belongs here. Schumann's reference, *C. quadriflorus*, is incorrect. *C. subquadrifolius* (Cactaceae **3**: 65) is a clerical error.

Add to illustrations: Dict. Gard. Nicholson Suppl. 179. f. 195, as *Opuntia decipiens*; Dict. Gard. Nicholson **4**: 581. f. 52, as *O. rosea*; Stand. Cycl. Hort. Bailey **4**: f. 2608; Engler and Drude, Veg. Erde **13**: f. 28, in part; Gartenwelt **4**: 159, as *O. arborescens*; Bot. Jahrb. Engler **58**: Beibl. **129**: 33. f. 10.

On page 66, vol. 1, under *Opuntia tunicata*, add to illustrations: Garden **13**: 107,\* as *Opuntia exuviata*; Möllers Deutsche Gärt. Zeit. **25**: 476. f. 9, No. 7; Goebel, Pflanz. Schild. **1**: f. 36, as *O. stapeliae*; Contr. U. S. Nat. Herb. **10**: pl. 17, f. A.

On page 68, vol. 1, under *Opuntia fulgida*, add to illustrations: MacDougal, Bot. N. Amer. Des. pl. 57, as *Opuntia mamillata*; MacDougal, Bot. N. Amer. Des. pl. 87.

On page 68, vol. 1, under *Opuntia spinosior*, insert: This plant is sometimes found in the trade as *Opuntia arborescens spinosior* (see Grässner).

Add to illustrations: Emory, Mil. Recon. App. 2. f. 10, as *Opuntia arborescens*; Shreve, Veg. Des. Mt. Range pl. 2, A.

On page 71, vol. 1, under *Opuntia vestita*, insert: Illustration: Möllers Deutsche Gärt. Zeit. **25**: 476. f. 9, No. 8.

On page 73, vol. 1, under *Opuntia clavarioides*, add to illustrations: Garden **13**: 107, as *Opuntia clavarioides cristata*; Rother, Praktischer Leitfaden Kakteen 106; Möllers Deutsche Gärt. Zeit. **15**: 67; **25**: 476. f. 9, No. 19; Thomas, Zimmerkultur Kakteen 59; Wiener Ill. Gärt. Zeit. **28**: f. 18; Monatsschr. Kakteenk. **32**: 131.

On page 73, vol. 1, under *Opuntia salmiana*, insert: Extend range to central Argentina and habit to rocky hillsides (according to W. B. Alexander).

On page 75, vol. 1, under *Opuntia subulata*, add to illustrations: Deutsche Gärt. Zeit. **8**: 32, as *Pereskia subulata*; Haage and Schmidt, Haupt-Verz. Kakteen **1919**: 169; Goebel, Pflanz. Schild. **1**: f. 5; Möllers Deutsche Gärt. Zeit. **25**: 476. f. 9, No. 15.

On page 78, vol. 1, under *Opuntia cylindrica*, add to illustrations: Möllers Deutsche Gärt. Zeit. **25**: 476. f. 9, No. 12; Gartenwelt **15**: 539; Rother, Praktischer Leitfaden Kakteen 107; Cact. Journ. **1**: 100; Schelle, Handb. Kakteenk. 42. f. 4, as *Opuntia cylindrica cristata*; Wiener Illustr. Gartenz. **29**: f. 22, No. 10; De Laet, Cat. Gén. f. 88; Monatsschr. Kakteenk. **13**: 71; Schelle, Handb. Kakteenk. 42. f. 3.

\*This illustration is very poor and is only tentatively referred here. If native to California, as one might infer from the account which accompanies the illustration, it may refer to a form of *Opuntia prolifera* or *O. echinocarpa*.

On page 80, vol. 1, under *Opuntia stanlyi*, add the synonym: *Cactus emoryi* Lemaire, Cactées 88. 1868.

Also add to illustrations: Schelle, Handb. Kakteenk. 38. f. 1, as *Opuntia emoryi*; Nat. Geogr. Mag. 21: pl. on p. 716, as *O. kunzei*.

On page 80, vol. 1, under *Opuntia schottii*, insert: *Opuntia greggii* occurs only in Schumann's Index (Gesamtb. Kakteen 829) with page reference to *O. schottii greggii*.

On page 81, vol. 1, under *Opuntia clavata*, insert the synonym: *Cactus clavatus* Lemaire, Cactées 88. 1868.

Add to illustrations: Stand. Cycl. Hort. Bailey 4: f. 2605.

On page 82, vol. 1, under *Opuntia pulchella*, add to illustration: MacDougal, Bot. N. Amer. Des. pl. 26, as *O. pusilla*.

On page 83, vol. 1, under *Opuntia bulbispina*, insert: *Cactus bulbispinus* Lemaire. (Cactées 88. 1868) was intended as a synonym of this species.

On page 89, vol. 1, under *Opuntia glomerata*, insert: Extend range to central and northern Argentina.

Insert: *Tephrocactus polyacanthus* (Index Kewensis Suppl. 1: 421) was intended for *T. platyacanthus* Lemaire (Förster, Handb. Cact. ed. 2. 915. 1885).

Add to illustrations: Watson, Cact. Cult. ed. 1 and 2. 257. f. 97; ed. 3. f. 60, as *Opuntia papyracantha*; Dict. Gard. Nicholson 2: 503. f. 755; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 1, as *O. platyacantha*; Schelle, Handb. Kakteenk. 45. f. 7, as *O. andicola*; De Laet, Cat. Gén. f. 60; Rev. Hort. Belg. 40: after 186; Schelle, Handb. Kakteenk. 44. f. 6; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 2, as *O. diademata*.

On page 92, vol. 1, under *Opuntia aoracantha*, add to illustrations: Schelle, Handb. Kakteenk. 44. f. 5.

On page 93, vol. 1, under *Opuntia hickenii*, insert: Mr. W. B. Alexander suggests that *Opuntia platyacantha* Spegazzini (not Salm-Dyck) is probably a synonym of this species.

On page 94, vol. 8, insert:

**64a. *Opuntia wetmorei* sp. nov.**

Forming low mounds of considerable extent with hundreds of branches; joints 4 to 10 cm. long, terete, turgid, 2. cm. in diameter or less, slightly tapering towards each end, dull green, but



Fig. 234.—*Opuntia wetmorei*, fruit, stem, and seeds.



dull purple around and especially below the areoles; leaves subtending the minute areoles, 1 to 2 mm. long, caducous; areoles circular, bearing tawny or white wool when young; glochids short, yellowish; spines numerous, very unequal, scarcely pungent, white to straw-colored or brownish, 3 or 4 of lower ones almost hair-like, reflexed or appressed to joints, 3 or 4 of uppermost erect or ascending, flattened, 2 to 3.5 cm. long; flowers not known; immature fruit glabrous at first, dull green, becoming reddish purple especially about the areoles, 3 cm. long, bearing long white bristly spines, especially from upper areoles, deeply umbilicate.

Collected by W. B. Alexander in the barranca of the Tunuyán River near Tunuyán, Mendoza, Argentina, March 22 and 23, 1921.

This species is perhaps nearest *Opuntia darwinii*. We are under great obligation to W. B. Alexander for sending us very fine living plants by Alexander Wetmore, who brought them to us directly from Argentina. Mr. Wetmore was with Mr. Alexander when the plant was collected and he has given us a word picture of the plant; we take pleasure in naming the species for him, not only in recognition of this service but also for obtaining other valuable specimens of cacti.

Figure 234 is from a photograph of the type plant, one-half natural size.

On page 95, vol. 1, under *Opuntia corrugata*, insert: *Tephrocactus retrospinus* (Index Kewensis Suppl. 1: 421) is a misspelling for *T. retrospinosus* Lemaire.

Also insert: *Illustrations*: Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 11; 488. f. 22, No. 8.

On page 95, vol. 1, under *Opuntia ovata*, add:

*Opuntia pusilla* Salm-Dyck (Observ. Bot. 3: 10. 1822. Not Haworth, 1812) was referred by Schumann to *O. corrugata*. We have seen a photograph of Haworth's specimen (bearing the date November 8, 1824) which seems to answer to Salm-Dyck's plant which we would refer here.

On page 96, vol. 1, under *Opuntia sphaerica*, add the synonym: *Opuntia ovata leonina* Schelle, Handb. Kakteenk. 46. 1907.

Also add to illustrations: Deutsche Gärt. Zeit. 7: 313, as *Opuntia leonina*; Schelle, Handb. Kakteenk. 46. f. 8, as *O. grata leonina*.

On page 97, vol. 1, under *Opuntia pentlandii*, add the synonym: *Cactus bolivianus* Lemaire, Cactées 88. 1868.

Also add to illustrations: Watson, Cact. Cult. ed. 3. 106. f. 54; Deutsche Gärt. Zeit. 7: 312; Schelle, Handb. Kakteenk. 58. f. 16, as *Opuntia boliviana*; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 14.

On page 99, vol. 1, insert:

**76a. *Opuntia alexanderi* sp. nov.**

Low, depressed, forming a small clump; joints readily detached, grayish green, strongly tubercled, globose, 2 to 3 cm. in diameter, nearly hidden by the numerous spines; areoles small, close together, circular; spines 4 to 12, up to 4 cm. long, flexible, white below, dark above or with black tips, scurfy-pubescent even in age; flowers not known; fruit red, dry, obovoid, 2 cm. long, lower areoles not spiny, but upper ones bearing 2 to 8 long, white, erect, weak spines overtopping the fruit; umbilicus of fruit depressed; seeds white, 5 to 6 mm. broad.

Collected by W. B. Alexander, between Chilecito and Famatina, province of La Rioja, Argentina, February 19, 1921. Mr. Alexander studied this species in the field but could not identify it and sent it to us for study. It belongs to the subgenus *Tephrocactus*, but is not near any of the known species. We take great pleasure in naming it for Mr. Alexander, who has extensively studied the cacti in Argentina.

On page 100, vol. 1, under *Pumilae*, add to distribution: Venezuela.

On page 100, vol. 1, under *Opuntia pumila*, insert: Illustration: Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 5.

On page 101, vol. 1, under *Opuntia pubescens*, add the synonym: *Cactus pubescens* Lemaire, Cactées 87. 1868.

On page 102, vol. 1, under *Opuntia curassavica*, add to illustrations: Dillenius, Hort. Elth. 2: pl. 295, as tuna; Loudon, Encycl. Pl. 413. f. 6897, as *Cactus curassavicus*; Knorr, Thesaurus pl. o.2.

On page 102, vol. 1, insert:

**80a. *Opuntia abjecta*** Small, sp. nov.

Prostrate, often growing in large irregular patches on almost bare limestone or where some sand and humus has accumulated, irregularly branched; joints suborbicular, sometimes nearly subglobose, oval, or broadly obovate, mostly 4 to 8 cm. long, very thick, frequently turgid, light green, loosely attached to each other; leaves ovoid to conic-ovoid, 2 to 3 mm. long, ascending and slightly curved upward, green or purplish; glochids yellowish; spines setaceous-acicular, mostly solitary, brown, or reddish purple, mottled light and dark, becoming chalky gray when dry; the larger ones 2 to 6 cm. long; flowers usually solitary on a joint; berry urceolate, 1 to 1.5 cm. long, somewhat tuberculate, red or purple-red, rounded at base; umbilicus relatively broad, concave; seeds few, flattish, about 4 mm. wide.

On edge of hammock, southern end of Big Pine Key, Florida. Type collected in May 1921 by J. K. Small, preserved in the herbarium of the New York Botanical Garden.

Similar to *Opuntia drummondii* but with shorter joints, longer and more slender spines, and different fruit.

On page 105, vol. 1, under *Opuntia drummondii*, add to illustration: Journ. Elisha Mitchell Sci. Soc. 34: pl. 13, 14.

On page 105, vol. 1, under *Opuntia tracyi*, insert:

*Type Locality:* Biloxi, Mississippi. *Distribution:* Southern Mississippi, southeastern Georgia to northern Florida.

On page 105, vol. 1, insert:

**86a. *Opuntia impedata*** Small, sp. nov.

Prostrate, ultimately copiously branched, the joints often piled several layers deep and forming viciously armed mats, elliptic or oblong, mostly 7 to 15 cm. long, rather thick, pale green; leaves



FIG. 235.—*Opuntia impedata*.

stout-subulate, 4 to 6 mm. long, erect or ascending, slightly curved upward, dark green; glochids brownish; spines subulate, usually numerous, solitary or 2 together, light gray, except the brown tip, salmon-colored when dry, and faintly banded when wet; flowers often several on a joint; ovary obconic, nearly terete; sepals green, outer lanceolate to ovate, 4 to 8 mm. long, acuminate, the inner much larger, with shoulders of very broad body narrowed into stoutish tip; corolla bright yellow, 4.5 to 5.5 cm. wide; petals about 12, 2.5 to 3 cm. long, broadly obovate to cuneate-obovate, broadly rounded at apex, mucronate; anthers nearly 2 mm. long; berry clavate, about 3 cm. long, narrowed at base; umbilicus rather small, somewhat concave; seeds rather few, 4 to 4.5 mm. in diameter.

Sand dunes, northeastern Florida. Type in the herbarium of the New York Botanical Garden; collected on dunes at Atlantic Beach, Florida, in April 1921, by J. K. Small.

Dr. Small notes that the stiff spines may penetrate leather shoes and that the plant is very prolific, both vegetatively and through its fruit.

Figure 235 is from a photograph taken by Dr. Small of the type plant.

On page 110, vol. 1, insert:

**Series 3a. PISCIFORMES.**

Plants in dense colonies with turgid, very spiny, narrow, deep green joints, the spines conspicuously long and slender, salmon-colored in the first year, gray in the second; flowers numerous, bright yellow; berry turbinate-obovoid, 4 cm. long or less. The only species inhabits Florida.

**96a. *Opuntia pisciformis* Small, sp. nov.**

Prostrate, copiously branched, forming dense mats often 1 to 3 meters in diameter, with joints piled several layers deep, roots fibrous; joints narrowly elliptic, linear-elliptic, or spatulate, mostly



FIG. 236.—*Opuntia pisciformis*.

1 to 3 dm. long, very thick, deep green, readily detached; leaves stout-subulate, 2 to 4 mm. long, incurved; areoles rather prominent, mostly armed; spines solitary or 2 or 3 together, cream-colored, becoming salmon-colored and gray with a dark tip when dry, salmon when wet, the longer ones 5 to 6 cm. long; flowers numerous; ovary turbinate, angular and tuberculate; sepals green, the outer lanceolate to triangular-lanceolate, 9 to 12 mm. long, acuminate, the inner much larger, the broad ovate or suborbicular base broadly tapering into the very stout tip; corolla bright yellow, 6 to 7.5 cm. wide; petals about 12, 3 to 4 cm. long, broadly cuneate, mostly truncate or emarginate at apex, mucronate; anthers nearly 2 mm. long; berry broadly turbinate-obovoid, 3.5 to 4 cm. long, purple, narrowed at base, the umbilicus deeply concave; seeds rather numerous, 5 to 5.5 mm. in diameter.



Sand dunes, estuary of the Saint Johns River, Florida. Type in the herbarium of the New York Botanical Garden; collected on dunes at Atlantic Beach, Florida, in April 1921, by J. K. Small,

Figure 236 is from a photograph by Dr. Small of the type plant.

On page 113, vol. 1, under *Opuntia tuna*, in first line read 1769 as 1768.

Add the synonyms: *Cactus horridus* Salisbury, Prodr. 348. 1796; *Opuntia tuna humilior* Salm-Dyck, Cact. Hort. Dyck. 1849. 66. 1850.

Insert: *Opuntia maidenii* Griffiths (Bull. Torr. Bot. Club 46: 201. 1919) described from a cultivated plant sent from Australia and grown at Chico, California, seems referable to this species.

Add to illustrations: Loudon, Encycl. Pl. 411. f. 6880, as *Cactus polyanthos*; Monatschr. Kakteenk. 6: 25, as *Opuntia polyantha*; Deutsche Gärt. Zeit. 7: 447, as *O. humilis*; Watson, Cact. Cult. ed. 3. f. 62; Cact. Journ. 2: 169; Useful Wild Plants U. S. Canada, opp. 18, 108, 174; Stand. Cycl. Hort. Bailey 4: f. 2599; Schelle, Handb. Kakteenk. 51. f. 13; Remark, Kakteenfreund 24.

On page 115, vol. 1, under *Opuntia antillana*, insert: *Opuntia domingensis* appears without description in Urban's Symbolae (8: 466. 1920). It was a manuscript name for which *O. antillana* was substituted.

On page 117, vol. 1, under *Opuntia decumbens*, add to illustrations: Bull. U. S. Dept. Agr. 31: pl. 7, f. 1, as *Opuntia puberula*; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 3.

On page 119, vol. 1, under *Opuntia basilaris*, insert: *Opuntia dorffii* is advertised by Haage and Schmidt (Monatsschr. Kakteenk. 29: September). We have had a cutting which we would refer to one of the forms of *O. basilaris*.

Also add to illustrations: Cact. Journ. 2: 163, as *Opuntia basilaris albiflora*; Cact. Journ. 1: pl. for October; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 13, as *O. basilaris cordata*; Möllers Deutsche Gärt. Zeit. 25: f. 9, No. 9, as *O. basilaris minima*; Watson, Cact. Cult. ed. 3. f. 53; Deutsche Gärt. Zeit. 7: 312; Remark, Kakteenfreund 23; Monatsschr. Kakteenk. 7: 125; Stand. Cycl. Hort. Bailey 4: f. 2597; Gartenflora 31: 280; Schelle, Handb. Kakteenk. 47. f. 10.

On page 121, vol. 1, under *Opuntia microdasys*, add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 488. f. 2, No. 4, as *Opuntia microdasys monstrosa*; Garden 13: 107,\* as *O. pubescens*; Schelle, Handb. Kakteenk. 47. f. 9; Möllers Deutsche Gart. Zeit. 25: 476. f. 9, No. 16; Karsten and Schenck, Vegetationsbilder 2: pl. 22, B.

On page 123, vol. 1, under *Opuntia pycnantha*, insert: *Opuntia pycnacantha* (Just's Jahresb. 24: 380. 18) seems to have been a misspelling for *O. pycnantha*.

On page 127, vol. 1, under *Opuntia opuntia*, add the synonym: *Opuntia compressa* Macbride, Contr. Gray Herb. 11. 65: 41. 1922.

Also add to illustrations: Contr. U. S. Nat. Herb. 21: pl. 23, B; Bailey, Sand Dunes Indiana 94; Ann. Inst. Roy. Hort. Fromont 2: pl. 1, f. F; Deutsches Mag. Gart. Blumen. 1869: pl. 17. opp. 257; Kraemer, Appl. Econ. Bot. f. 341, as *Opuntia vulgaris*; Watson, Cact. Cult. 212. f. 84; Ann. Rep. Bur. Amer. Ethn. 33: pl. 20, A; Clements and Clements, Rocky Mt. Fl. pl. 32, f. 6; Clements, Fl. Mount. Plain pl. 32, f. 7, as *O. humifusa*; Wiener, Ill. Gart. Zeit. 2: 40. f. 10, as *O. rafinesquiana*; Deutsche Gärt. Zeit. 7: 447; Wiener Ill. Gärt. Zeit. 2: f. 112, as *O. rafinesquiana arkansana*; Watson, Cact. Cult. ed. 3. f. 61;

\*This illustration is very poor and the identification is based largely upon the description.



Schelle, Handb. Kakteenk. 50. f. 12; Belg. Hort. 26: pl. 8; Illustr. Hort. 15: pl. Opp. 51; Deutsches Mag. Gart. Blumen. 1869: pl. 17, Opp. 257, as *O. rafinesquei*; Kraemer, Appl. Econ. Bot. f. 341.

On page 130, vol. 1, insert:

**121a. *Opuntia eburnispina*** Small, sp. nov.

Prostrate, widely branched and forming mats on dune sands, with tuberous roots; joints oval or suborbicular, varying to broadest above middle, thickish, 6 to 13 cm. long, pale green, somewhat shining, especially when young; leaves ovoid-subulate, 4 to 5 mm. long, pale green, recurved-spreading; spines relatively stout, 2 to 4 at an areole or sometimes solitary, 1 to 2 cm. long, ivory-white with yellowish tips when young, becoming dark gray, not spirally twisted, greenish when wet; flowers few; ovary obconic; sepals triangular, green, 5 to 7 mm. long; corolla clear yellow, 4 to 5 cm. wide; petals few, narrowly cuneate, often minutely pointed; berries obovoid, 2 cm. long or less.

Coastal sands, Cape Romano, Florida. Type specimens in the herbarium of the New York Botanical Garden; collected in May 1922, by J. K. Small.

Figure 237 is from a photograph by Dr. Small of the type plant.

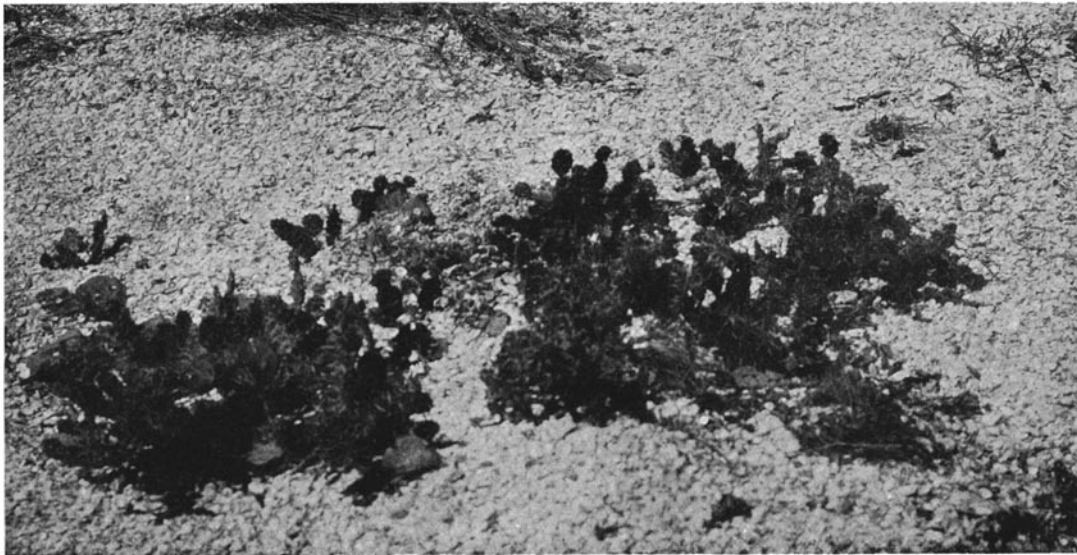


FIG. 237.—*Opuntia eburnispina*.

On page 131, vol. 1, under *Opuntia macrorhiza*, add to illustrations: Watson, Cact. Cult. ed. 3. f. 59 Dict. Gard. Nicholson 4: 580. f. 50, 51.

On page 131, vol. 1, under *Opuntia tortispina*, add the synonym: *Opuntia cymochila montana* Engelmann, Proc. Amer. Acad. 3: 296. 1856.

Also add to distribution: Southeastern Colorado. Established and slowly spreading east of Cincinnati, Ohio (E. T. Wherry).

Also add to illustrations: Watson, Cact. Cult. ed. 3. pl. 102; Meehans' Monthly 11: 57, as *Opuntia mesacantha*; Meehans' monthly 5: 172, as *O. oplocarpa*.

On page 134, vol. 1, *Opuntia sulphurea*, insert: Mr. W. B. Alexander writes as follows concerning this species:

"This is by far the commonest species of *Opuntia* in the Argentine, where it is commonly known as 'penca,' i. e. the spiny plant, sometimes being distinguished from other larger species by the name 'penquilla' or 'penca chica.' The writer met with it in the provinces of Buenos Aires, Córdoba, San Luis, Mendoza, San Juan, La Rioja, Catamarca and Santiago del Estero."

Add to illustrations: Wiener Ill. Gärt. Zeit. 28: f. 17, as *Opuntia maculacantha*; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 18.

On page 134 vol. 1, under *Opuntia soehrensii*, add the synonyms: *Cactus ayrampo* Azara, Voy. 2: 526. 1809; *Opuntia haenquiana* Herrera, Rev. Univ. Cuzco 8: 60. 1919.

Also insert: Azara's original description is interesting and a translation of it is given:

"A species of tunilla (cactus) which is found in the temperate gorges near the Cordillera produces the seed in question. The plant is found in arid and sterile soil where ordinarily this family of plants grows and thrives by creeping on the ground in such a way as to stifle all the others. From the seed confined within the round and spiny fruit is derived a color of a clear violet, brilliant and extremely agreeable to the eye but very superficial and very light, although it acquires a little stability and durability by the means of alum and some other chemicals."

On page 135, vol. 1, insert:

**129a. *Opuntia macbridei* sp. nov.**

A low bush, 6 dm. high, forming broad impenetrable thickets on gravelly river flats; joints obovate, 6 to 8 cm. broad, 8 to 15 cm. long, glabrous, at first light green, in age dark green; leaves minute, 1 to 2 mm. long, caducous; areoles on young joints hemispheric, brown-felted and with



FIG. 238.—*Opuntia macbridei*.

brown glochids, on old joints 2 to 3 cm. apart; spines 2 to 4, in age gray to horn-colored, with yellowish tips, very unequal, the longest up to 5 cm. long, stout-subulate; flowers very small, orange to orange-red; petals only 4 to 5 mm. long; ovary tuberculate, bearing many brown-felted tubercles but without spines, deeply umbilicate; fruit deeply umbilicate, red to purple.

Collected by Macbride and Featherstone at Huanuco, Peru, altitude 2,300 meters, August 28 to September 3, 1922 (No. 2365, type), and April 8, 1923 (No. 3250).

Mr. Macbride states that the seeds are brown. All the fruits we have seen were sterile; these sterile fruits on falling to the ground take root and form new plants.

This interesting plant, which proves to be undescribed, we have named for Mr. J. Francis Macbride, who led the Botanical Expedition of 1922 to South America, sent out by the Field Museum of Natural History, under the Captain Marshall Field fund.

Figure 238 is from a photograph showing the habit of this plant.

On page 135, vol. 1, under *Opuntia penicilligera*, insert: Mr. W. B. Alexander sends us the following account of this plant:

"This plant was met with close to the coast at Bahia Blanca, and near the foot of the Andes at Tunuyán. As remarked by Spegazzini, this species is very distinct from any other found in Argentina and there seems no reason for thinking that it may belong to the Series *Sulphureae* in which it is

tentatively placed in the Cactaceae. It should surely either be the type of a separate series or be placed in the Series *Basilares*, to the members of which, judging by illustrations, it shows great resemblance."

On page 138, vol. 1, under *Opuntia pottsii*, add to illustrations: Watson, Cact. Cult. ed. 3. 1. 58; Dict. Gard. Nicholson 4:580. f. 49, as *Opuntia filipendula*.

On page 145, vol. 1, under *Opuntia phaeacantha*, add to illustrations: Deutsche Gärt. Zeit. 7: 447, as *Opuntia camanchica*; Meehans' Monthly 11: 57, as *O. phaeacantha major*; Shreve, Veg. Des. Mt. Range pl. 5, A, as *O. toumeyii*; De Laet, Cat. Gén. f. 58.

On page 147, vol. 1, under *Opuntia engelmannii*, add the synonym: *Opuntia engelmannii discata* C. Z. Nelson, Trans. Ill. State Acad. Sci. 12: 124. 1919.

Also add to illustrations: Cact. Journ. 1: pl. for February; 2: 162, as *Opuntia engelmannii cristata*; Gard. Chron. 111. 39: 148. f. 58; Plant World 9<sup>12</sup>: f. 49; Shreve, Veg. Des. Mt. Range pl. 5, B; Stand. Cycl. Hort. Bailey 4: f. 2601; Scientific Month. 17: 70, 71, 72.

On page 149, vol. 1, under *Opuntia discata*, add to illustrations: Carnegie Inst. Wash. 269: pl. 10, f. 87.

On page 153, vol. 1, under *Opuntia bergeriana*, add to illustrations: Gartenwelt 11: 75.

On page 153, vol. 1, under *Opuntia elatior*, add to illustrations: Loudon, Encycl. Pl. ed. 3. 411. f. 6879, as *Cactus nigricans*.

On page 155, vol. 1, under *Opuntia boldinghii*, add to distribution: Chacachacare and Patos Islands, Trinidad.

On page 156, vol. 1, under *Opuntia vulgaris*, insert: *Opuntia gracilior* (Index Kewensis 3 357. 1894) is a mistake for *O. inonacantha gracilior* Lemaire.

Add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 20, as *Opuntia monacantha variegata*; Pl. Utiles Madagascar 124. f. 39; 125. f. 39.

On page 158, vol. 1, under *Opuntia arechavaletai*, add to illustration: Karsten and Schenck, Vegetationsbilder 11: pl. 1.

On page 158, vol. 1, under *Opuntia bonaerensis*, insert: Mr. W. B. Alexander writes of this species as follows:

This species was seen only on rocky slopes in the Sierra de la Ventana in the south of the province of Buenos Aires. It is known only from the few Sierras which rise from the pampas in the east of the province. There is little doubt that it is nearly related to *Opuntia vulgaris* Miller (*O. monacantha* Haworth) which was found by the writer at Rio de Janeiro and is familiar in Australia.

Add to illustration: Anal. Mus. Nac. Montevideo 5: pl. 33, as *Opuntia chakensis*.

On page 159, vol. 1, insert after *Opuntia scheeri*: *Opuntia diversispina* Griffiths (Bull. Torr. Club 46: 197. pl. 9. 1919) grown from seed of unknown origin at Brownsville, Texas, is described as similar to *O. scheeri* and in the accompanying illustration the joints resemble those of that species.

On page 160, vol. 1, *Opuntia chlorotica*, add to illustrations: Bull. N. Mex. Coll. Agr. No. 78. pl. [4]; Stand. Cycl. Hort. Bailey 4: f. 2600.

On page 161, vol. 1, under *Opuntia laevis*, add to illustrations: MacDougal, Bot. N. Amer. Des. pl. 56.

On page 163, vol. 1, under *Opuntia dillenii*, add to illustrations: Garden 13: 107,\* as *Opuntia crassa*; Bull. Torr. Club 46: pl. 10, as *O. maritima*; Lindley, Veg. King. ed. 3. 746. f. 498, No. 1, 2 Knorr, Thesaurus pl. o; Watson, Cact. Cult. ed. 3. f. 6.

On page 163, vol. 1, insert:

**174a. *Opuntia ochrocentra*** Small, sp. nov.

Erect, 1 meter tall or less, much branched or sometimes diffuse, with fibrous roots; joints elliptic to oval varying to broadest above the middle 1 to 3 dm long thickish light green not

\* This illustration is not very good for this species. It is, however, the same one that Nicholson used (f. 757) and that W. Watson used (f. 86) as *Opuntia tuna*, which we have referred here.



repand; leaves ovoid, 2 to 4 mm. long, often purplish; areoles rather prominent; glochids yellowish brown; spines 5 to 6 together or sometimes fewer on new joints, yellow, stiff, subulate, reflexed, becoming gray when dry, yellowish green when wet, straight, the longer ones 4.6 to 5 cm. long; flowers rather few; ovary turbinate, even; sepals often purple-tinged, deltoid to rhombic-orbicular or rhombic-reniform, acute; corolla bright lemon-yellow, 7 to 8.5 cm. wide; petals few, cuneate, somewhat crisped; berry obovoid, red, about 2 cm. long.

On edge of hammock, southeastern end of Big Pine Key, Florida. Type specimens collected in December 1921, by J. K. Small, in the herbarium of the New York Botanical Garden.

Related to *O. dillenii*, differing in shape of the joints, which are not repand, and the strongly reflexed, scarcely flattened spines.

On page 166, vol. 1, under *Opuntia lindheimeri*, add to illustrations: Journ. Hered. Washington, 6<sup>4</sup>: f. 19, as *Opuntia ellisiana*; Journ. Hered. Washington 6<sup>4</sup>: f. 15, 16, as *O. cacanapa*; Journ. Hered. Washington 6<sup>4</sup>: f. 17, 18; as *O. subarmata*; Journ. Hered. Washington 5: 223. f. 13; Schulz, 500 Wild Fl. San Antonio pl. 12.

Also insert: Dr. Small has found this plant established, after cultivation, in pine lands west of Halenville, Florida.

On page 167, vol. 1, under *Opuntia cantabrigiensis*, add to illustrations: Gartenwelt 10: 560; Gard. Chron. III. 33: 98. f. 42.

Also insert: Professor Duncan S. Johnson found this species naturalized on sand dunes at Beaufort, North Carolina, in 1899, and Doctor Small studied it there in 1922.

At Cambridge, England, it has passed through many winters out of doors.

On page 168, vol. 1, under *Opuntia beckeriana*, insert: *Opuntia prostrata spinosior* (Schumann, Gesamtb. Kakteen 723. 1898) seems to have been a garden name which Schumann would refer to *O. beckeriana*.

On page 173, vol. 1, under *Opuntia tomentosa*, add to illustrations: Blanc, Cacti 82. No. 2200, as *Opuntia lurida*; Reiche, Elem. Bot. f. 165; Gartenwelt 11: 75.

On page 175, vol. 1, under *Opuntia leucotricha*, add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 4, as *Opuntia leucacantha*; Cassell's Dict. Gard. 2: 138; Bull. U. S. Dept. Agr. 31: pl. 6, f. 2; pl. 7, f. 2; U. S. Dept. Agr. Bur. Pl. Ind. Bull. 262: pl. 4; pl. 5, f. 1.

Insert: Dr. John K. Small has found this plant naturalized in a hammock south of Fort Pierce, Florida, where it is reported as established during the Seminole wars.

On page 176, vol. 1, under *Opuntia orbiculata*, add to the illustrations: Schelle, Handb. Kakteenk. 48. f. 11, as *Opuntia crinifera*; Gartenwelt 11: 76, as *O. lanigera*.

In third line of description on page 177 read cm. as dm.

On page 178, vol. 1, under *Opuntia ficus-indica*, add to illustration: Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 57, H; Gard. Chron. 111. 34: 89. f. 34; 92. f. 42; Karsten, Deutsche Fl. 887. f. 501. No. 10, 11; ed. 2. 2: 456. f. 605. No. 10, 11; Journ. Dept. Agr. S. Austr. 13: 764; Garten-Zeitung 4: 182. f. 42, No. 1; Stand. Cycl. Hort. Bailey 4: f. 2598; Watson, Cact. Cult. ed. 3. f. 57.

On page 180, vol. 1, under *Opuntia maxima*, add the synonym: *Cactus maximus* Colla, Mem. Accad. Sci. Torino 33: 140. 1826 (?).

Also insert: *Illustration*: Möllers Deutsche Gärt. Zeit. 25: 488. f. 22, No. 3, as *Opuntia labouretiana*.

On page 181, vol. 1, under *Opuntia hernandezii*, insert: *Opuntia hernandezii* first appeared in De Candolle's Prodrômus (3: 474. 1828).

Also insert: *Nopal silvestre* Thierry (Förster, Handb. Cact. ed. 2. 929. 1885) is cited as a synonym of *Opuntia hernandezii*. This reference is given also in the Index Kewensis.

Also insert: *Illustration*: Förster, Handb. Cact. ed. 2. 930. f. 128.

On page 184, vol. 1, under *Opuntia streptacantha*, add to illustrations: Useful Wild Pl. U. S. Canada opp. 18, 108, 174, as *Opuntia tuna*.



On page 185, vol. 1, under *Opuntia megacantha*, insert: *Opuntia effulgia* Griffiths (Bull. Torr. Club 46: 195. 1919) was obtained from San Luis Potosí, Mexico, and grown at Chico, California; *O. hispanica* Griffiths (Bull. Torr. Club 46: 198. 1919) was described from a plant received from Spain and grown at Chico; *O. chata* Griffiths (Bull. Torr. Club 46: 199. 1919), from Aguascalientes, Mexico, was grown at Brownsville, Texas, and at Chico; *O. obovata* Griffiths (Bull. Torr. Club 46: 202. 1919) from Hepasote, Mexico, was also grown at Brownsville and at Chico; *O. amarilla* Griffiths (Bull. Torr. Club 46: 205. 1919) was obtained in cultivation at Cardenas, Mexico, and grown at Chico. These are known to us only from descriptions and appear to be races of *O. megacantha* or of some of the related tall, white-spined species.

Add to illustrations: Ann. Rep. Smiths. Inst. 1917: pl. 16, f. 2.

On page 191, vol. 1, under *Opuntia robusta*, insert: *Opuntia cyanea* Griffiths (Bull. Torr. Club 46: 196. 1919) judging from the original description may be related to *O. robusta*.

Add to illustrations: Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: f. 56, g, as *Opuntia albicans*.

On page 194, vol. 1, *Opuntia fragilis*, add to illustrations: Watson, Cact. Cult. ed. 3. f. 5; Deutsche Gärt. Zeit. 7: 313; Remark, Kakteenfreund 22, as *Opuntia brachyarthra*; Schelle, Handb. Kakteenk. 6. f. 15, as *O. fragilis brachyarthra*; Meehans' Monthly 11: 57.

On page 195, vol. 1, under *Opuntia arenaria*, add to illustration: Meehans' Monthly 11: 57.

On page 195, vol. 1, *Opuntia erinacea*, add the synonym: *Opuntia ursus horribilis* Walton, Cact. Journ. 2: 152. 1899.

Also add to illustrations: Cact. Journ. 1: 93, as *Opuntia*; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 10; Cycl. Amer. Hort. Bailey 3: 1149. f. 1548; Stand. Cycl. Hort. Bailey 4: 2363. f. 2603, as *O. ursina*; Meehans' Monthly 4: 9; Monatsschr. Kakteenk. 14: 10; N. Amer. Fauna 7: pl. 11, as *O. rutila*.

On page 198, vol. 1, under *Opuntia rhodantha*, add to illustrations: Monatsschr. Kakteenk. 30: 153, as *Opuntia xanthostemma*.

On page 199, vol. 1, under *Opuntia polyacantha*, add the synonym: *Opuntia missouriensis watsonii* Schumann, Gesamtb. Kakteen 735. 1898.

Also insert: Extend range to northwestern Oklahoma.

Add to illustrations: Rep. Mo. Bot. Gard. 13: pl. 13; Schelle, Handb. Kakteenk. 54. f. 14, as *Opuntia missouriensis*; Möllers Deutsche Gärt. Zeit. 25: 476. f. 9, No. 6, as *O. schweriniana*; Scientific American 124: 492; Meehans' Monthly 11: 57; Stand. Cycl. Hort. Bailey 4: f. 2604.

On page 201, vol. 1, under *Opuntia grandis*, add to illustration: The Garden 62: 425; Möllers Deutsche Gärt. 25: 476. f. 9, No. 17.

On page 203, vol. 1, under *Opuntia nashii*, insert: *Illustration*: Journ. N. Y. Bot. Gard. 6: f. 3.

On page 204, vol. 1, *Opuntia spinosissima*, insert at end: A species of this series, *Spinossissimae*, occurs on Navassa Island off the southeastern point of Haiti; specimens were sent us by Mr. F. P. Dillan, Superintendent of Light Houses, San Juan, Porto Rico, but they are not complete enough to be specifically referred.

On page 206, vol. 1, under *Opuntia moniliformis*, add the synonyms: *Cactus reticulatus* Index Kewensis 1: 369. 1893;\* *Opuntia reticulata* Karsten, Deutsche Fl. ed. 2. 2: 457. 1895; *Opuntia picardae* Urban, Repert. Sp. Nov. Fedde 16: 35. 1919.

On page 208, vol. 1, under *Opuntia rubescens*, add to illustration: Carnegie Inst. Wash. 269: pl. 10, f. 90. 91, as *Opuntia catacantha*.

\*The Index Kewensis refers *Cactus reticulatus* to Descourtilz (Fl. Med. Antill. 1: pl. 68), but the formal name was not used by him.

On page 209, vol. 1, under *Opuntia brasiliensis*, add to distribution: Peru.

Insert: *Opuntia brasiliensis gracilior* Salm-Dyck was given by Förster (Handb. Cact. 500. 1846) as a synonym of *O. brasiliensis minor*.

Also insert: Dr. Small has found this plant established after planting on shell mounds and waste places in southern Florida.

Add to illustrations: Goebel, Pflanz. Schild. 1: f. 37, 38.

On page 211, vol. 1, under *Ammophilae*, substitute for characters of the series:

Erect species, sometimes with a definite continuous trunk, often much branched, the joints broad and flat, spiny or unarmed, the spines (when present) subulate or subulate-acicular, whitish, gray or reddish, the large flowers yellow.

The series now appears to be most nearly related to the Series *Tortispinae* (vol. 1: 126) and may be placed to follow it as series a. *Opuntia austrina* Small, of southern Florida, may be transferred from the *Tortispinae* to the *Ammophilae*.

On page 211, vol. 1, under *Opuntia ammophila*, insert: More recent collections of this plant by Dr. Small, show that its range extends south to Cape Romano, Florida, and that the definite trunk, at first taken as characteristic of it, is not always developed; his living plants from different stations show slight individual differences which do not appear to be specific. This species has been erroneously referred by Dr. Griffiths (Bull. Torr. Club 46: 201) to *Opuntia bartramii* Rafinesque.

On page 213, vol. 1, insert:

**239a. *Opuntia turgida* Small, sp. nov.**

Plant erect, more or less diffusely branched, 0.5 meter tall or less, with fibrous roots; joints elliptic to elliptic-obovate, 5 to 12 cm. long, thickish, deep green, sometimes slightly glaucous when young; leaves subulate, 6 to 10 mm. long, spreading and more or less recurved, green, sometimes accompanied by fine bristles, but without spines; areoles scattered, often prominent and densely bristly on the older joints; spines (as far as known) wanting; flowers often several on a joint; ovary obovoid or obconic-obovoid, 2 to 2.5 cm. long, slightly tubercled; sepals green or purple-tinged, the outer subulate to lanceolate, 4 to 10 mm. long, acute, the inner rhombic-ovate, fully .5 cm. long, stout-pointed; corolla bright yellow, 5.5 to 6.5 cm. wide; petals 10 to 12, about 3 cm. long, broadly cuneate, abruptly narrowed, rounded or subtruncate at the apex, mucronate; anthers 2 mm. long; berry obovoid, 2 to 2.5 cm. long, greenish purple, even, broadly rounded at the base, the umbilicus flat or a little depressed at the middle; seeds rather numerous, about 4 mm. in diameter, somewhat turgid.

Hammocks near Yulee and on the mainland along the Halifax River south of Daytona, Florida. Type collected about five miles south of Daytona, in December 1919, by J. K. Small, preserved in the herbarium of the New York Botanical Garden.

This spineless, small-jointed species is tentatively referred to the Series *Ammophilae* on account of its fruit characters and erect habit. A plant sent from Kew to the New York Botanical Garden in 1902, under an unpublished name, very closely resembles this species.

On page 214, vol. 1, insert the following:

*Opuntia napolea*, offered for sale by Grässner (Monatsschr. Kakteenk. February 1920) we have not seen.

The name *Opuntia spirocentra* Engelmann and Bigelow (Haage, Verz. Cact. 30), found in the Index Kewensis, we have not been able to verify. As the name is credited to Engelmann and Bigelow and the habitat of the plant is said to be New Mexico it is doubtless an error and probably was intended for *O. macrocentra*.

*Opuntia todari* (Haage and Schmidt, Haupt-Verz. 230. 1912) is known only in the trade.

*Cactus italicus* referred by the Index Kewensis to Tenore (Steudel, Nom. ed. 2. 2: 246. 1840) occurs first in 1831 (Tenore, Syll. Pl. Neop. 241) where also occurs the name *Opuntia italica*. Both are unpublished but doubtless refer to some species of *Opuntia*.

CACTUS PARVIFOLIUS Ehrenberg in F. G. Dietrich, Vollst. Lex. Gaertn. 2: 416. 1802.

An upright, cylindrical, almost articulate stem; the upper part bedecked with small, cylindrical, fleshy, pointed leaves; on lower part of the stem, at the place where the leaves are attached, stiff bristles are formed which are surrounded at the base by a whitish-gray, woolly substance; in old age the stem requires a support on account of its slender growth; if the stem is cut through in the middle and the wound well dried, young sprouts make their appearance at this place which serve to propagate the plant. South America is its home.

The above paragraph is a free translation of the description.

We have not been able to identify this plant, but it is probably some species of *Opuntia* or possibly *Tacinga funalis*.

*Cereus vulnerator* Cortes (Fl. Colombia 69. 1897) and *C. guasabara* Cortes (Fl. Colombia 208. 1897) are different names for the same plant. From the brief descriptions it is difficult to identify this plant but it certainly is not a *Cereus*. It suggests some sheathed-spined *Opuntia* such as *O. tunicata* which has been introduced into South America and is common in northern Ecuador. It is known as curuntilla or guasabara in Colombia.

#### CORRECTIONS AND ADDITIONS TO VOLUME II.

On page 4, vol. II, under *Cereus hexagonus*, add the synonyms: *Cereus regalis* Haworth, Suppl. Pl. Slice. 75. 1819; *Cactus regalis* Sprengel, Syst. 2: 476. 1825; *Cereus childsi* Blanc, Cacti 39, No. 375.

Insert: *Cereus cyaneus* Hortus is listed by Berger (Hort. Mortola 69. 1912) as a South American plant grown at La Mortola. From drawings sent by Berger it is probably to be referred to *C. hexagonus*.

Add to illustrations: Andrews, Bot. Rep. 8: pl. 513; Reichenbach, Fl. Exot. pl. 322; Van Géel, Sert. Bot. 1: pl. 114, as *Cactus hexagonus*; Blanc, Cacti 39, No. 375, as *Cereus childsi*.

On page 8, vol. II, under *Cereus jamacaru* insert: *Cereus caracore* (Gosselin, Bull. Soc. Acclim. France 51: 58. 1905) belongs to the group containing *C. jamacaru*, that is, it is a true *Cereus*, according to Gosselin. He does not claim that it is a good species. No species of *Cereus*, however, are natives of Chile, from which this plant is said to have come. If indigenous to that country it is more likely to be *Trichocereus chiloensis*.

On page 9, vol. II, under *Cereus jamacaru*, add to illustrations: Monatsschr. Kakteenk. 26: 181; Karsten, Deutsche Fl. ed. 2. 2: 456. f. 605, No. 8.

On page 11, vol. II, under *Cereus peruvianus*, add the synonyms: *Piptanthocereus peruvianus* Riccobono, Boll. R. Ort. Bot. Palermo 8: 232. 1909; *Piptanthocereus peruvianus monstrosus* Riccobono, Boll. Ort. Bot. Palermo 8: 233. 1909.

Also add to illustrations: Saint-Hilaire, Exp. Fam. Nat. 2: pl. 95, in part as f. 1(?); De Candolle, Pl. Succ. Hist. 1: pl. 8, as *Cactus peruvianus*; Blanc, Cacti 36. No. 252; Rother, Praktischer Leitfaden Kakteen 15, as *Cereus peruvianus monstrosus*; Karsten and Schenck, Vegetationsbilder 1: pl. 41; 42, f. b; Gartenwelt 6: 133; Mem. Acad. Roy. Sci. pl. 4, 5; Haage and Schmidt, Haupt-Verz. 1919: 134. f. 10737; Goebel, Pflanz. Schild. 1: f. 5, 53.

On page 14, vol. II, under *Cereus pernambucensis*, add to illustration: Remark, Kakteenfreund 7, as *Cereus formosus monstrosus*.

On page 17, vol. II, under *Cereus aethiops*, add to illustrations: Förster, Handb. Cact. ed. 2. 207. f. 15, as *Cereus landbeckii*; Blanc, Cacti 26. No. 27; Gartenwelt 16: 537, as *Cereus coeruleascens*.

On page 19, vol. II, insert:

25. *Cereus trigonodendron* Schumann, Bot. Jahrb. Engler 40: 413. 1908.

Simple, or in age with a much branched top, 15 meters high; trunk 5 meters long, smooth, dm. in diameter or more; ribs 3 to 6, 2 to 3 cm. high; areoles in young growth 2 to 3 cm. apart, producing abundant white wool, 1 cm. long or more; spines 4 to 7, at first brown, subulate, 2 to 5.5 cm. long; flowers as in typical species of *Cereus*, 10 to 15 cm. long; fruit smooth, edible.

*Type locality:* Department of Loreto, Peru.

*Distribution:* Valleys of eastern Peru and Bolivia.

This species is briefly described on page 19 of volume II of The Cactaceae, but at that time we knew little about it and were disposed to exclude it from the genus *Cereus*. We have since had a photograph of the type specimen from Berlin. In December 1922 F. L. Herrera sent us flowers from the Santa Ana Valley, province of Convención, Peru, and in February 1923 we received herbarium specimens of branches and flowers from W. E. Meyer, collected in 1922 at Cachucla-Esperanza, Boni, Bolivia. It is found only in the Atlantic drainage of Peru and Bolivia and is therefore geographically within the range of the genus *Cereus* as limited by us.

*Illustration:* Bot. Jahrb. Engler 40: pl. 10.

Figure 239 is from a photograph sent by Dr. Vaupel from Berlin.

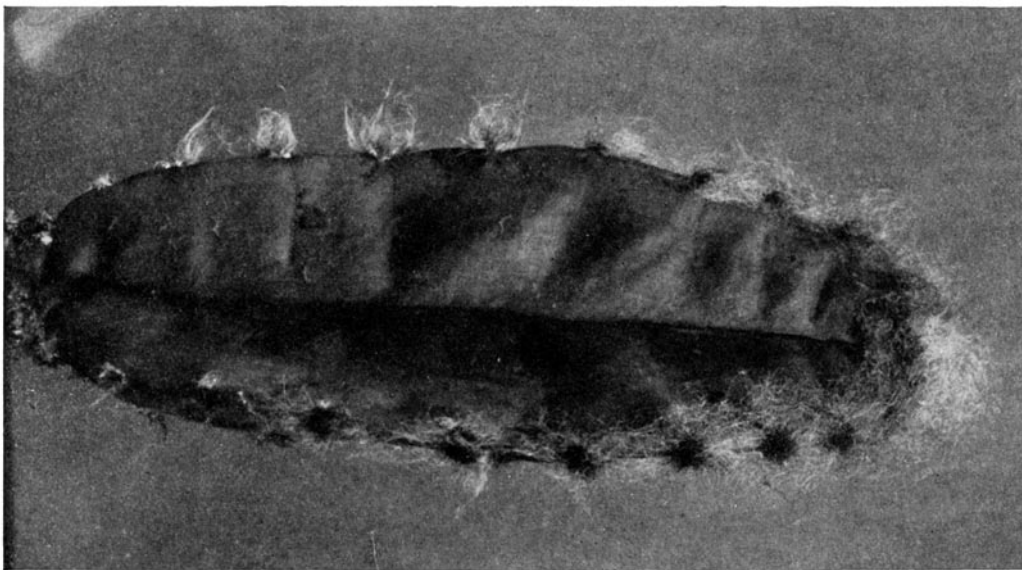


FIG. 239.—*Cereus trigonodendron*.

On page 20, vol. II, add at end of page: *Cereus amalonga* and its variety *cristata* are described in the Cactus journal (2: 93, 104, 119) and both are illustrated in the plate for August of that volume. They are said to have been imported from Mexico. We are unable to identify these plants either from the descriptions or illustrations.

On page 21, vol. II, under *Cereus lormata*, insert: We listed *Cereus lormata* among the species unknown to us but we have since seen an illustration (Wiener Ill. Gart. Zeit. 11: pl. 3, in part) of a barren plant. It has about 10 vertical ribs with clusters of subulate spines, some of them greatly elongated. It is probably not a true *Cereus*.

On page 21, vol. II, at end of *Cereus* add: *Cereus perviridis* Weingart is advertised by Haage & Schmidt (Cat. 1914). We have seen a cutting but do not know its relationship.

*Cereus pitahaya variabilis* Weingart (Monatsschr. Kakteenk. 16: 158. 1906) is only a form and is not described.



*Cereus roezlii* Haage jr. (Schumann, Gesamtb. Kakteen 64. f. 12. 1897) was described as columnar with 9 obtuse ribs, 9 to 12 radial spines, and one central spine much larger than the radials. Its flowers were unknown. It is said to come from the Andes of Peru or Ecuador. It is probably some species of *Lemaireocereus* or *Trichocereus*.

*Cereus stolonifer* Weber is listed by Schumann (Monatsschr. Kakteenk. 5: 43. 1895) as a plant grown in the Botanical Garden in Paris.

*Cereus tripteris* Salm-Dyck (De Candolle, Prodr. 3: 468. 1828) was described from barren plants of unknown origin and has never been identified.

*Cereus uspenshi* Haage jr. is mentioned in a report by Karl Hirscht (Monatsschr. Kakteenk. 8: 109. 1898).

*Cereus auratus* Labouret (Rev. Hort. iv. 4: 27. 1855) is a tall *Cereus*-like plant, originally reported as from Peru, but the Index Kewensis says it is from Mexico. The four following varieties: *genuinus*, *intermedius*, *mollissimus*, and *pilosus* are briefly described by Regel & Klein (Ind. Sem. Hort. Petrop. 1860: 4. 1860); *Pilocereus auratus* (Rümpler in Förster, Handb. Cact. ed. 2. 650. 1885) is doubtless the same.

On page 22, vol. II, under *Monvillea cavendishii*, add to illustrations: Blühende Kakteen 3: pl. 171, as *Cereus euchlorus*; Blühende Kakteen 3: pl. 172, as *C. rhodoleucanthus*; Blühende Kakteen 3: pl. 178, as *C. cavendishii*.

On page 23, vol. II, under *Monvillea spegazzinii*, add the synonyms: *Piptanthocereus spegazzinii* Riccobono, Boll. R. Ort. Bot. Palermo 8: 233. 1909; *Cereus spegazzinii hassleri* Weingart, Monatsschr. Kakteenk. 32: 163. 1922.

Add to illustrations: De Laet, Cat. Gén. f. 28, as *Cereus spegazzinii*.

On page 27, vol. II, under *Cephalocereus senilis*, add to illustrations: Journ. Intern. Gard. Club 3: 640, as *Cephalocereus* sp.; Gard. Chron. III. 32: 35; Journ. Hort. Home Farm. III. 59: 625; Amer. Garden II: 479; West Amer. Sci. 13: 16, as *Cereus senilis*; West Amer. Sci. 13: 23, as *C. hoppenstedtii*; Möllers Deutsche Gart. Zeit. 25: 473. f. 5, No. 19; Remark, Kakteenfreund 20, as *Pilocereus hoppenstedtii*; Cact. Journ. 1: pl. 5; Gartenflora 27: 114; Deutsche Gärt. Zeit. 6: 64; Gard. Chron. 1873: f. 15; Garten-Zeitung 4: 182. f. 42, No. 6; Gartenwelt 2: 574; 116: 175; Watson, Cact. Cult. ed. 2. 260. f. 98; ed. 3. f. 34; West Amer. Sci. 9: 2; Journ. Intern. Gard. Club 3: 640; Blanc, Cacti 76. No. 1755; Weinberg, Cacti 26, as *Pilocereus senilis*; Palmer, Cult. Cact. 148, as *Pilocereus*; Engler and Drude, Veg. Erde 13: f. 30; Tribune Hort. 4: 283; Möllers Deutsche Gart. Zeit. 25: 473. f. 5, No. 3; Schelle, Handb. Kakteenk. 108. f. 44, 45; Floralia 42: 370; Balt. Cact. Journ. 1: 116.

On page 30, vol. II, under *Cephalocereus fluminensis*, add to illustrations: Goebel, Pflanz. Schild. II: pl. 3, f. 1 to 3, as *Pilocereus*.

On page 31, vol. II, under *Cephalocereus macrocephalus*, add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 2.

On page 32, vol. II, under *Cephalocereus polylophus*, insert: *Pilocereus angulosus* Förster, according to Lemaire (Rev. Hort. 1862: 428. 1862) is little known; it is perhaps to be referred here.

Add to illustration: Gard. Chron. III. 50: 135. f. 64, c, as *Cereus polylophus*.

On page 42, vol. II, under *Cephalocereus arrabidae*, insert: The following names relate to this species and other names associated with it: *Pilocereus sublanatus* Förster (Haage, Verz. Cact. 22) is referred to *Cereus sublanatus* by the Index Kewensis. *Pilocereus tilophorus* (Index Kewensis) is evidently a mistake for *Cereus tilophorus*. *Pilocereus oligogonus* Lemaire (Rev. Hort. 1862: 428. 1862) is said to come from Mexico; the two varieties, *houletianus* and *sublanatus*, given at this same place as synonyms, may or may not belong with it; they should doubtless be referred to the species bearing the same names respectively.

Add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 9, as *Pilocereus exerens*.

On page 44, vol. II, under *Cephalocereus nobilis*, add the synonyms *Cereus polyptychus* Lemaire, Cact. Gen. Nov. Sp. 56. 1839; *Pilocereus polyptychus* Rümpler in Förster, Handb. Cact. ed. 2. 680. 1885.

Insert: The plant upon which this name was based was a small, barren one of unknown origin.

Insert: *Pilocereus houletianus niger* (Förster, Handb. Cact. ed. 2. 676. 1885) is only a name given as a synonym of *P. niger*, while *P. niger aureus* is briefly described on the same page.

Add to illustrations: Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 4, as *Pilocereus curtisi*.

On page 47, vol. II, under *Cephalocereus polygonus*, add the synonym: *Cephalocereus schlumbergeri* Urban, Symb. Antill. 8: 464. 1920.

On page 49, vol. II, under *Cephalocereus lanuginosus*, add the synonym: *Pilocereus lanuginosus virens* Salm-Dyck in Förster, Handb. Cact. ed. 2. 672. 1885.

Insert: Curran reports that this fruit is edible (Inventory No. 50. p. 50. U. S. Dept. Agr. Bur. Plant Industry).

On page 51, vol. II, under *Cephalocereus royenii*, add to illustrations: Journ. N. V. Bot. Gard. 15: pl. 133, 134.

On page 52, vol. II, under *Cephalocereus leucocephalus*, add to illustrations: Watson, Cact. Cult. 145. f. 6; Deutsche Gärt. Zeit. 7: 312, as *Pilocereus houletianus*; Gard. Chron. III. 29: f. 79, as *P. houletianus leucocephalus*; Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 14, as *P. cometes*; De Laet, Cat. Gén. No. 51, 52, 53 Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 7; Blühende Kakteen 2: pl. 79; West Amer. Sci. 13: 24; Schelle, Handb. Kakteenk. 101. f. 40. as *P. houletii*; Gard. Chron. III. 32: 253, as *Cereus houletii*.

On page 56, vol. II, under *Cephalocereus purpusii*, insert: Wilhelm Weingart, under date of June 18, 1921, wrote of this species as follows:

"*Cephalocereus purpusii* sp. nov. was collected by C. A. Purpus in 1902 near Mazatlán, was sent to me February 18, 1907, and bloomed in Darmstadt in 1918."

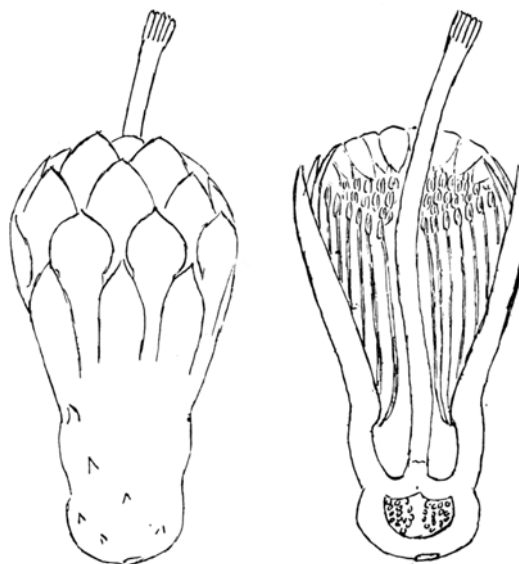
Figures 240 and 241 are reproduced from a drawing furnished by Wilhelm Weingart.

On page 56, vol. II, under *Cephalocereus catiingicola*, add to illustrations: Vegetationsbilder 6: pl. 14, as *Cereus catiingicola*; Engler, Bot. Jahrb. 40: Suppl. pl. 5, as *C. catiingae*.

On page 58, vol. II, insert:

**49. *Cephalocereus collinsii* sp. nov.**

About 3 meters high with few slender, elongated branches, these 3 to 4 cm. in diameter; ribs about 7, obtuse; tubercles about 1.5 cm. apart, circular, long-woolly as well as spiny; flowering areoles not much more woolly than the others; spines numerous, acicular, longer ones 3 to 4 cm. long; flowers borne near ends of branches, about 5 cm. long; fruit somewhat depressed, about 3 cm. broad; seed shining, black, 1.5 to 2 mm. broad.



FIGS. 240, 241.—*Cephalocereus purpusii*, flower.

Common in thickets near Tehuantepec, Oaxaca, Mexico. The type was collected by Dr. C. A. Purpus near Gerónimo in April 1923. It was reported by O. F. Cook and G. N. Collins from this region in 1902. The plant is named for Mr. Collins, who first brought it to our attention more than 20 years ago while carrying on field work in southern Mexico for the U. S. Department of Agriculture.

Figure 242 is from a photograph taken by Mr. Collins in 1902; it is three-fourths natural size.

On page 58, vol. 11, under *Cephalocereus hermentianus*, add: Illustration: Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 10, as *Pilocereus hermentiauus*.

On page 58, vol. 11, under *Pilocereus albisetosus*, add the synonyms: *Cactus albisetosus* Sprengel, Syst. 2: 496. 1825; *Cactus albisetus* Steudel, Nom. ed. 2. 1: 245. 1840.

On page 61, vol. 11, under *Espostoa lanata*, add to illustrations: Schelle, Handb. Kakteenk. 105. f. 41, as *Pilocereus lanatus*; Schelle, Handb. Kakteenk. 105. f. 42, as *P. lanatus cristatus*; Wiener Ill. Gart. Zeit. 11: pl. 3, in part, as *P. dautwitzii*.

On page 64, vol. 11, under *Stetsonia coryne*, insert: W. B. Alexander wrote, under date of March 7, 1921, as follows:

"Noticing your statement that the fruit of *Stetsonia coryne* is unknown, I obtained a ripe specimen at La Rioja for you and am sending it by parcel post."

This we describe as follows:

Oblong, 6 cm. long, glabrous, bearing scattered scales, these 5 mm. broad, 1 mm. high, each with a cartaceous tip and a denticulate margin; seeds numerous, small, 1.5 mm. long, flattened, pitted; hilum large, basal.

On page 65, vol. 11, under *Stetsonia coryne*, add to illustrations: Thomas, Zimmerkultur Kakteen 11, as *Cereus coryne*.

On page 66, vol. 11, under *Escontria chiotilla*, add to illustrations: Möllers Deutsche Gärt. Zeit. 29: 438. f. 13; Floralia 42: 389, as *Cereus chiotilla*.

On page 69, vol. 11, under *Pachycereus pringlei*, insert: The distribution of *Pachycereus pringlei* in northern Sonora is not well defined. Dr. MacDougal has recently visited northwestern Sonora and states that he saw it along the route between Altar and Port Libertad to within a hundred miles of the United States boundary. Prospectors and ranchers also speak of it as being abundant in the valley of the Asuncion or Altar River some miles to the northward. He writes of it as follows:

"On the whole, however, my chief interest was centered on the sowesa or *Pachycereus pringlei*. We began to get into this about 85 miles from the Gulf, and in the region below a thousand feet it attains perfectly tremendous size, as you will see from some photographic prints."

Figure 243 is from a photograph obtained by Dr. MacDougal at Port Libertad, Sonora, May 4, 1923.

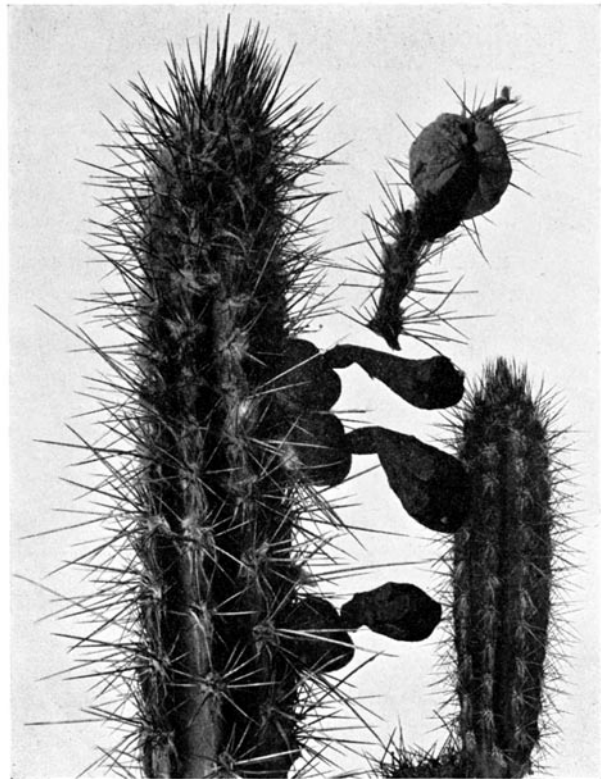


FIG. 242.—*Cephalocereus collinsii*.



Also add to illustrations: Zeitschr. Ges. Erdk. 1916: f. 6, in part; Contr. U. S. Nat. Herb. 16: 131, A; 132, A; Karsten and Schenck, Vegetationsbilder 13: pl. 13, as *Pachycereus calvus*; Contr. U. S. Nat. Herb. 16: pl. 131, B, as *P. titan*; Ann. Rep. Smith. Inst. 1908: 553. f. 17.

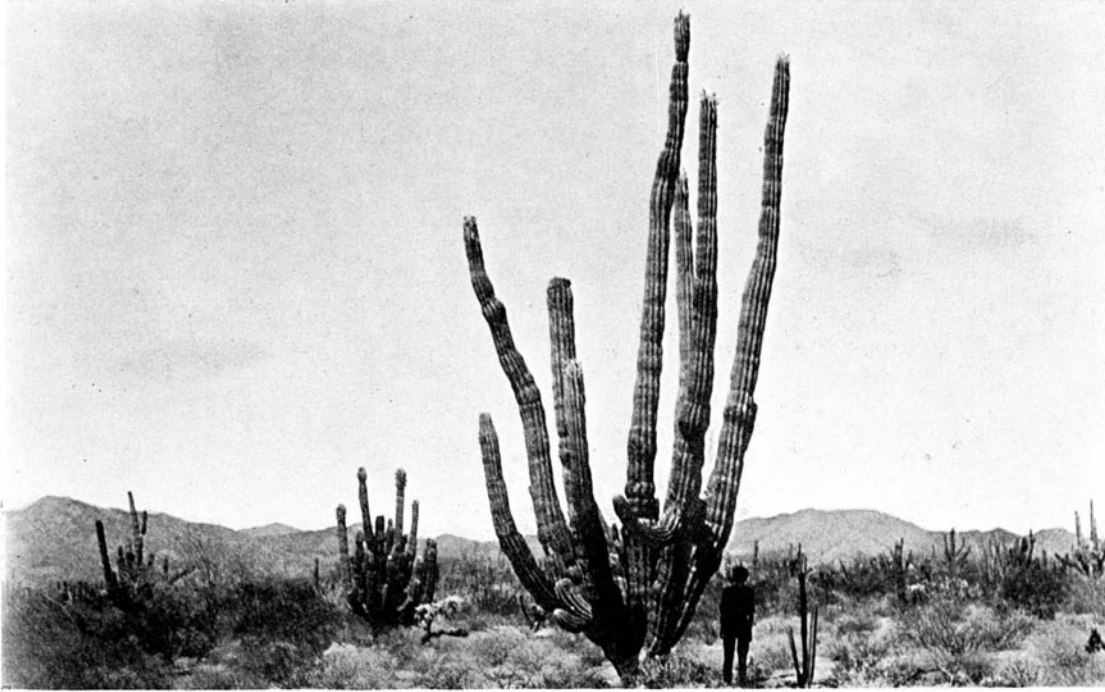


FIG. 243.—*Pachycereus pringlei*.

On page 71, vol. II, under *Pachycereus pecten-aboriginum*, add to illustrations: Engler and Drude, Veg. Erde 13: 297. f. 9; Watson, Cact. Cult. ed. 2. 246. f. 92 ed. 3. f. 17; Karsten and Schenck, Vegetationsbilder 1: pl. 48, as *Cereus pecten-aboriginum*; Karsten and Schenck, Vegetationsbilder 13: pl. 14; Contr. U. S. Nat. Herb. 16: pl. 132, B.

On page 71, vol. II, under *Pachycereus gaumeri*, add additional characters:

Ribs sometimes only 3, thin, 3 to 4 cm. high; areoles sometimes 2.5 cm. apart; fruit becoming dry, globose, 3 to 4 cm. in diameter, scales at base of fruit small, becoming long and foliaceous above, fleshy at base but tips thin and soon drying black; axils of scales felted, with a cluster of about 8 very short black spines; seeds numerous, brown, 4 mm. long.

The above description is drawn from specimens sent by Dr. Gaumer to Washington in June 1922.

On page 73, vol. II, under *Pachycereus chrysomallus*, add to illustrations: Reiche, Elem. Bot. 226. f. 162, as *Pilocereus*; Möllers Deutsche Gärt. Zeit. 29: 297. f. 5; U. S. Dept. Agr. Bur. Pl. Ind. Bull. 262: pl. 13, f. 1, as *Pilocereus fulviceps*; Florialia 42: 377; Belg. Hort. 3: pl. 57, as *P. chrysomallus*; Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 1.

On page 74, vol. II, under *Pachycereus marginatus*, insert: The two varieties, *Cereus marginatus monstrosus* (Monatsschr. Kakteenk. 19: 62. 1909) and *C. marginatus cristatus* (Monatsschr. Kakteenk. 4: 194. 1894) occur in the trade.

Also add to illustrations: West Amer. Sci. 13: 6; Möllers Deutsche Gärt. Zeit. 25: 472. f. 2, No. 15; De Laet, Cat. Gén. f. 23; Möllers Deutsche Gärt. Zeit. 29: 355. f. 11; Bot. Jahrb. Engler 58: Beibl. 129: 27. f. 9, as *C. marginatus*; Remark, Kakteenfreund 7; Karsten and Schenck, Vegetationsbilder 1: pl. 43; 48, as *Cereus gemmatus*; Ann. Rep. Smiths. Inst. 1908: pl. 11, f. 2.



On page 76, vol. II, under *Pachycereus lepidanthus*, insert: Since the appearance of volume II, we have received flowers of this species from Wilhelm Weingart, which show a very close likeness to those of *Escontria chiotilla*. The fruit of the latter, however, is a juicy edible berry, while that of the former is described as dry. The illustrations here printed may lead to the rediscovery of this rare plant.

Figure 244 is from a photograph of a plant grown in Washington, showing a joint as it came from the field and also the young growth as developed in the greenhouse; figure 245 is from a photograph of two flowers and a spine-cluster.

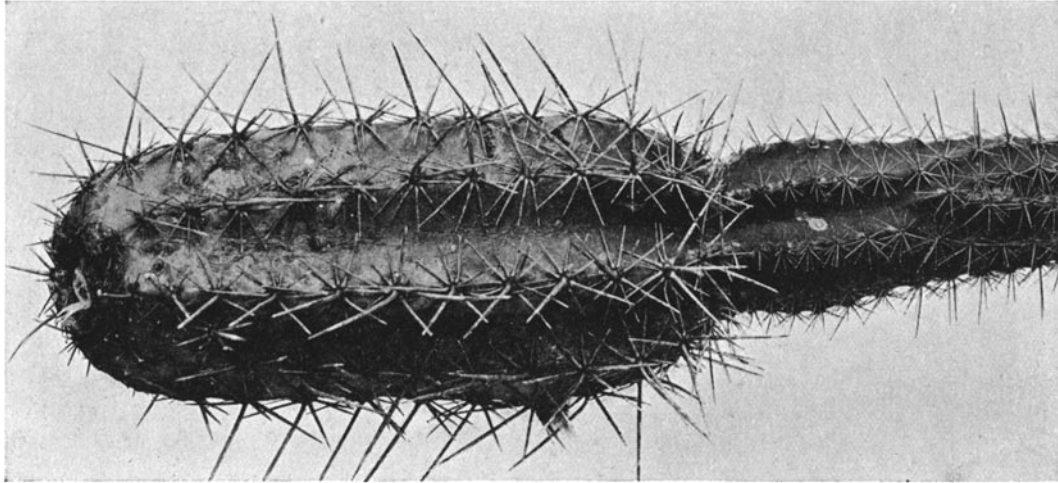


FIG. 244.—*Pachycereus lepidanthus*.

On page 78, vol. II, under *Leptocereus leonii*, insert: Specimens collected in June 1923, by Brother Leon and Dr. Roig on Loma de Somorrostro, Jamaica, Havana Province, Cuba, show that the fruit of this species becomes 6.5 cm. long by 5.5 cm. thick, when fully mature. The fruits are borne near the ends of the branches, 3 or 4 close together.

On page 76, vol. II, under *Cereus tetezo*, insert: *Pilocereus tetezo cristatus* Weber (Schumann, Gesamtb. Kakteen 176. 1897) is only a name and so is *Cephalocereus tetezo* (Monatsschr. Kakteenk. 19: 73. 1909) and *Cereus tetezo* and *C. tetezo* (Monatsschr. Kakteenk. 17: 79. 1907).

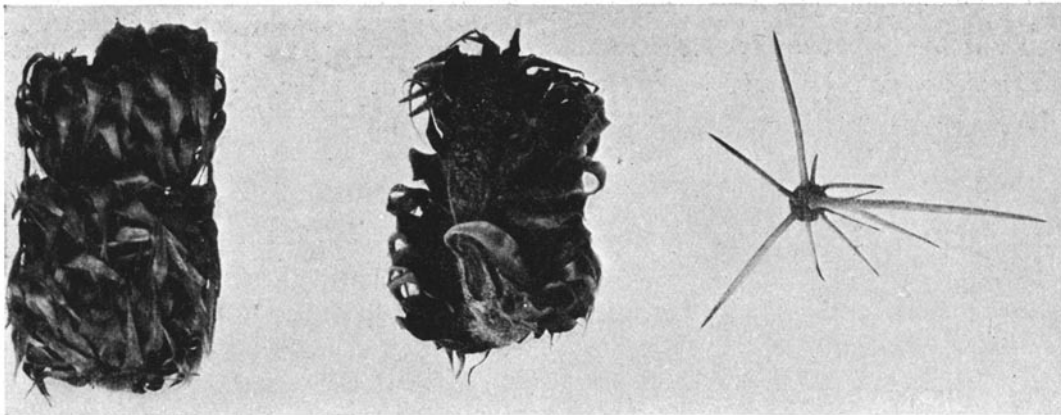


FIG. 245.—*Pachycereus lepidanthus*.

Also insert: *Illustration*: Bull. Soc. Nat. Acclim. 52: 55. f. 14, as *Cereus tetezo*.

On page 82, vol. II, under *Eulychnia spinibarbis*, add to illustrations: Engler and Drude, Veg. Erde 8: pl. 5, f. 11, as *Cereus coquimbanus*.

On page 86, vol. II, under *Lemaireocereus hollianus*, add to illustrations: Bull. Soc. Nat. Acclim. 52: 45. f. 9, as *Cereus bavosus*.

On page 86, vol. II, under *Lemaireocereus hystrix*, add the synonym: *Cactus americanus* Vitman, Summa Pl. 3: 209. 1789.

Insert: *Cactus americanus* is based on Bradley's illustration (Hist. Succ. Pl. 12) which De Candolle referred to *Cereus eburneus*, but as the plant came from the West Indies it is perhaps better referred to *Lemaireocereus hystrix*.

Also insert: We have recently obtained from N. E. Brown a photograph of Haworth's *Cereus hystrix*, with the date, "Oct. 24, 1824."

On page 87, vol. II, under *Lemaireocereus griseus*, add to illustrations: Monatsschr. Kakteenk. 24: 5, as *Cereus eburneus*; Ann. Rep. Smiths. Inst. 1908: pl. 9, f. 5.

On page 89, vol. II, under *Lemaireocereus eichlamii*, add to the description:

Fruit globular, about 5 cm. in diameter, becoming dry, not edible, thin-skinned, filled with numerous large seeds, the surface bearing scattered areoles, these densely short-felted with clusters of short spines subtended by small, ovate, acute scales; seeds black, 4 to 5 mm. long with a prominent hilum.

Insert: This plant is much used for hedges in Salvador and was obtained there by Mr. Paul C. Standley in the vicinity of Sonsonate, altitude 220 to 300 meters, March 1922 (No. 22328), but was not seen in the wild state. It is called there *órgano*. This species heretofore has been known only from Guatemala and was not known to us in fruit; this differs from that of the other species of *Lemaireocereus* in being rather dry with very large seeds.

Also insert: Figure 246 is from a photograph of the plant, sent by F. Eichlam in 1909 to Washington, which flowered in 1918.

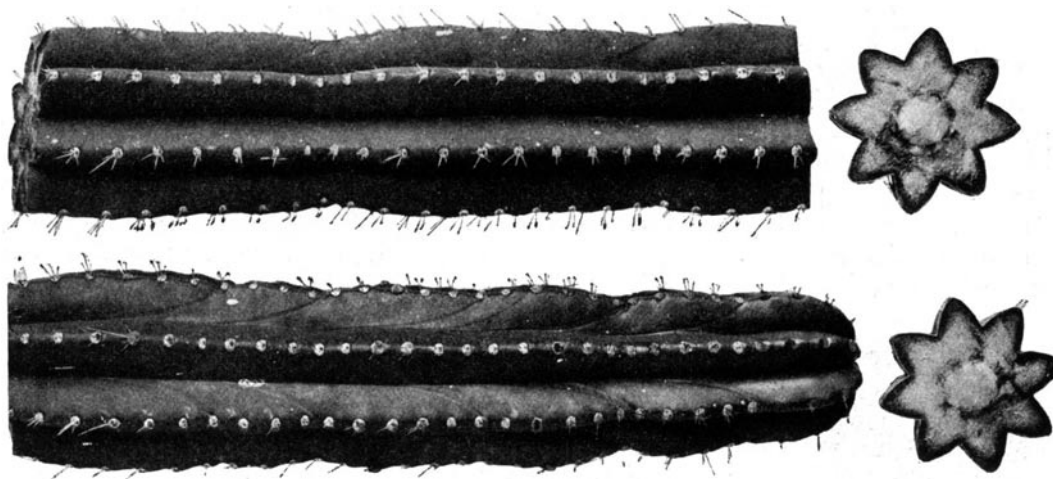


FIG. 246.—*Lemaireocereus eichlamii*.

On page 91, vol. II, under *Lemaireocereus chende*, add to illustrations: Grässner, Haupt-Verz. Kakteen 1912: 3, as *Cereus del moralii*.

On page 96, vol. II, under *Lemaireocereus weberi*, add to illustrations: Floralia 42: 388, as *Cereus candelabrum*.

On page 96, vol. II, insert:

**14a. *Lemaireocereus beneckeii* (Ehrenberg).**

*Cereus beneckeii* Ehrenberg, Bot. Zeit. 2: 835. 1844.

*Cereus farinosus* Haage in Salm-Dyck, Allg. Gartenz. 13: 355. 1845.

*Cereus beneckeii farinosus* Salm-Dyck, Cact. Hort. Dyck. 1849. 49. 1850.

*Piptanthocereus beneckeii* Riccobono, Boll. R. Ort. Bot. Palermo 8: 226. 1909.

Plants 4 to 5 meters high, much branched; branches 6 to 7 cm. in diameter, the growing tips very glaucous; ribs 7 or 8, strongly tuberculate, obtuse, separated by narrow intervals; areoles small, circular, borne on the upper side of the tubercle, brown to black-felted; spines 1 to 7, acicular, the longest sometimes 2.5 cm. long, brown to black; flowers night-blooming, small, 4 cm. long, greenish brown without; inner perianth-segments rose-colored to white (?); ovary globose, glaucous, tuberculate, its areoles brown-felted and bearing 3 to 7 acicular spines, the longest sometimes 2.5 cm. long and brown to black; fruit about 2 cm. in diameter, somewhat tubercled, bearing clusters of spines at the areoles, red; pericarp thick, somewhat fleshy; pulp disappearing, leaving the large seeds loose, these escaping by a basal pore as in *Oreocereus* and many of the *Echinocactanae*.

*Type locality:* Mexico on red lava beds.

*Distribution:* Central Mexico.

In volume 11 of *The Cactaceae* (p. 18), we described this plant under *Cereus* but with the statement that it was not a true *Cereus*; we were not then able to refer it to any known genus. At that time we knew little about the flowers and nothing accurate about the ovary and fruit. In 1921 Professor K. Reiche sent us some living plants from Iguala, the station from which Dr. Rose obtained his plants in 1905. These contained some old withered flowers and some well-developed ovaries which have enabled us to refer the plant to *Lemaireocereus*.

Figure 247 is from a photograph of K. Reiche's plant, slightly reduced, showing the top of a branch bearing an old flower and a half-ripe fruit.

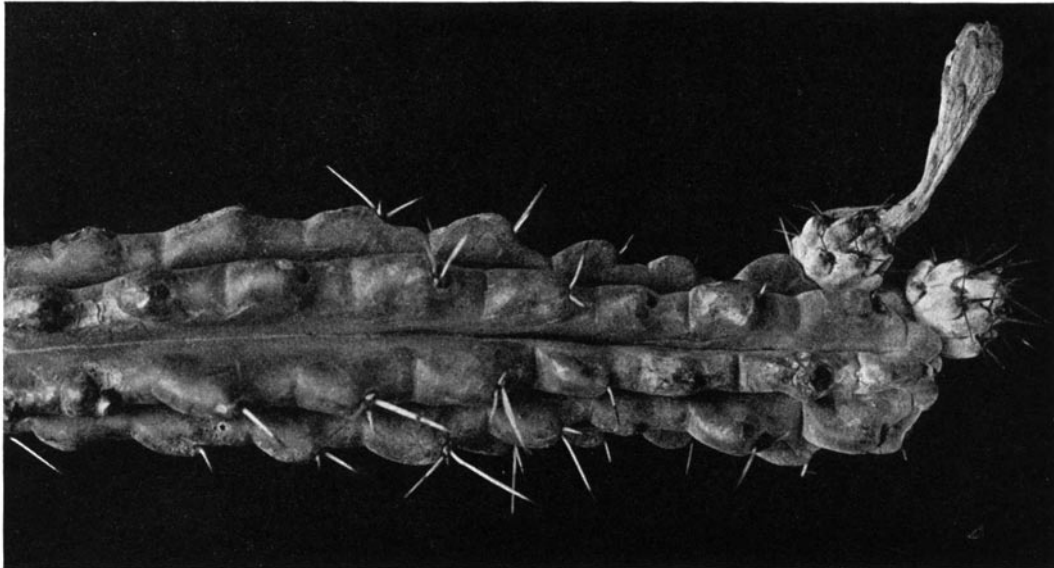


FIG. 247.—*Lemaireocereus beneckeii*.

On page 98, vol. 11, under *Lemaireocereus thurberi*, add to illustrations: Journ. N. Y. Bot. Gard. 3: f. 13, as *Cereus thurberi*; Bull. U. S. Nat. Mus. 56: pl. 8, f. 2; Karsten and Schenck, Vegetationsbilder 13: pl. 15; 21, f. A; Contr. U. S. Nat. Herb. 16: pl. 125, A; Amer. Bot. 20: 88.

On page 108, vol. 11, under *Bergerocactus emoryi*, add to illustrations: Cact. Journ. 1: 59; Gartenwelt 11: 498, as *Cereus emoryi*.

On page 111, vol. 11, under *Wilcoxia poselgeri*, add to illustrations: Remark, Kakteenfreund 6; Deutsche Garten-Zeitung 1886: f. 25, as *Cereus tuberosus*.



On page 111, vol. II, under *Wilcoxia striata*, insert: According to T. S. Brandege (under date of June 8, 1921), the flowers of *Wilcoxia striata* are nocturnal.

On page 112, vol. II, under *Peniocereus greggii*, add to illustrations: Amer. Gard. 11: 474, as *Cereus greggii*; Journ. Wash. Acad. 12: 329. f. i; Succulenta 4: 71.

On page 113, vol. II, insert:

**2. *Peniocereus johnstonii*** Britton and Rose, Journ. Wash. Acad. 12: 329. 1922.

A climbing or clambering plant, up to 3 meters long, with a very large fleshy root sometimes weighing 14 pounds; stems and branches 3 to 5-angled, the young growth not pubescent; spines 9 to 12, brown to black, glabrous; upper radial spines short, stubby, swollen at base, nearly black, the two lower light brown, elongated, bristle-like, reflexed; central spines 1 to 3, subulate, 4 to 8 mm. long; flower (only an old flower seen) about 15 cm. long; perianth-segments about 3 cm. long; the lower and outer ones bearing tawny hairs and long bristles; flower-tube slender, with prominent areoles on knobby projections and bearing tawny wool and bristly spines; fruit ovoid to oblong, about 6 cm. long, bearing prominent clusters of black spines, dry (?), many-seeded; seeds oblong, 3 mm. long or more, black, shining; seedling dark purple; cotyledons very thick, triangular.

*Type locality:* San Josef Island, off the east coast of southern Lower California.

*Distribution:* Southern Lower California.

This plant was always found growing up through bushes of *Olneya tesota*.

*Illustrations:* Journ. Wash. Acad. 12: 330. f. 2 Succulenta 4: 73.

Figure 248 shows a branch, old flowers, and seeds of the type specimen.

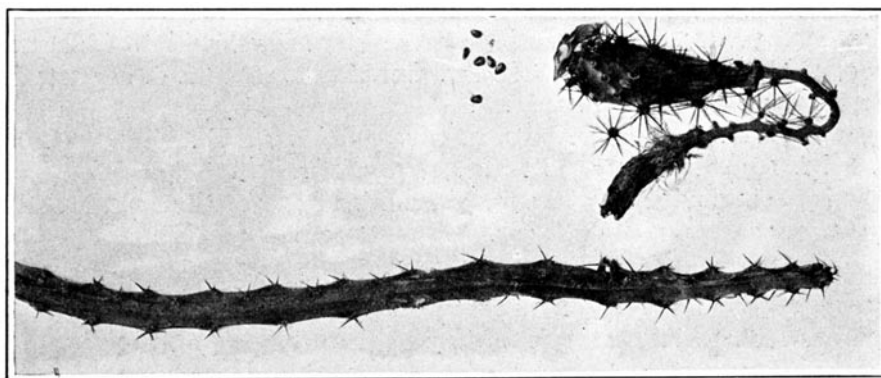


FIG. 248.—*Peniocereus johnstonii*, showing branch, old flower, and seeds.

On page 113, vol. II, under *Dendrocereus nudiflorus*, insert: In 1922 Dr. L. H. Bailey sent us two photographs and some stem-sections (No. 806) which he had obtained from the Botanic Garden at Roseau, Dominica. It grows as a low, rounded, much branched bush with the outer joints often pendent. Mr. Joseph Jones, curator of the Botanic Garden wrote that the group is made up of six plants which have not been cut back or interfered with in any way and have experienced two hurricanes without having a piece broken off. One of our colleagues, Dr. William R. Maxon, who had rediscovered this plant some years ago in Cuba, suggested that the plant grown in Dominica might be that species; a careful study of our material convinces us that he is correct. *Dendrocereus nudiflorus*, however, is naturally a large tree with a very definite trunk and a large, much branched top. An explanation of this inconsistency is that the Dominican plant was doubtless grown from cuttings, causing it to assume this bushy habit, a phenomenon also observed in other cacti.

Also insert: *Cereus undiflorus* is a misspelling, used by Sauvalle (Fl. Cuba 59. 1873) and reprinted in the Index Kewensis (1: 493).

Figure 249 is from one of the photographs sent us by Dr. Bailey.



On page 116, vol. 11, under *Machaerocereus eruca*, add to illustrations: Journ. Intern. Gard. Club 3: 641; Karsten and Schenck, Vegetationsbilder 13: pl. 16, as *Cereus eruca*.



FIG. 249.—*Dendrocereus nudiflorus*.

On page 117, vol. 11, under *Machaerocereus gummosus*, add to illustrations: Cact. Journ. 2: 107, as *Cereus gummosus*; Zeitschr. Ges. Erdk. 1916: f. 6, in part; Karsten and Schenck, Vegetationsbilder 13: pl. 17, f. A.

On page 119, vol. 11, under *Nyctocereus serpentinus*, add to illustrations: Watson, Cact. Cult. 67: f. 16; ed. 3: f. 12, as *Cereus serpentinus*.

On page 119, vol. 11, under *Nyctocereus guatemalensis*, add to illustrations: Monatsschr. Kakteenk. 31: 41, as *Cereus hirschtianus*.

On page 123, vol. 11, under *Acanthocereus pentagonus*, add to illustrations: De Laet, Cat. Gén. f. 32, as *Cereus baxaniensis*; Monatsschr. Kakteenk. 32: 21, as *C. princeps*.

On page 125, vol. 11, insert the following:

**3a. *Acanthocereus floridanus* Small, sp. nov.**

Stems and branches diffusely spreading or reclining, 3 to 10 meters long, stout: joints prominently 3 to 5-angled, but mostly 3-angled, dark green, often forming impenetrable thickets: areoles remote, with mostly 4 to 7 slender or subulate spines, the central one often 1 to 2 cm. long: ovary stout-trumpet-shaped, 8 to 10 cm. long, with few large, separated tubercled areoles at the base, bearing mostly 3 to diverging spines, those on the upper part usually with one spine each; outer perianth-segments deltoid to triangular-lanceolate or lanceolate-subulate and almost linear, the longer ones 3.5 to 4 cm. long, acuminate; inner perianth-segments broadly linear, 3.5 to 4.5 cm. long, about six times as long as wide, broadly acuminate; filaments adnate more than halfway up from the base of the hypanthium; anthers less than 2.5 mm. long.

Hammocks, along or near the coast, southern peninsular Florida, adjacent islands, and Florida Keys. Type collected by J. K. Small, on Key Largo, December 1917 and 1918; preserved in the herbarium of the New York Botanical Garden.

This Florida plant has been referred by us to *A. pentagonus*, but specimens recently collected by Dr. Small, including good flowers, which we had not seen before, indicate it to be a distinct species, characterized by its much shorter perianth and more spiny ovary.

*Illustrations:* Britton and Rose, Cactaceae 2: 123. f. 182; 124. f. 184, as *Acanthocereus pentagonus*.

On page 129, vol. 11, under *Heliocereus speciosus*, add to the illustrations: Herb. Génér. Amat. 4: pl. 244; Colla, Hort. Ripul. pl. 10; Bonpl. Descr. Pl. Rar. pl. 3, as *Cactus*

*speciosus*; Maund, Bot. 1: pl. 12, as *C. speciosus lateritius*; Curtis's Bot. Mag. 49: pl. 2306  
 Edwards's Bot. Reg. 6: pl. 486, as *C. speciosissimus*; Edwards's Bot. Reg. 19: pl. 1596, as  
*C. speciosissimus lateritius*; Newman, Illustr. Bot. 209; Abh. Bayer. Akad. Besch. Cact.  
 2: pl. 3, f. 5; De Laet, Cat. Gén. f. 24, as *Cereus speciosus*; Lindley, Veg. King. ed. 3. 746.  
 f. 498; Curtis's Bot. Mag. 67: pl. 3822; The Garden 53: 153, as *C. speciosissimus*; Illustr.  
 Hort. 32: pl. 548, as *C. speciosissimus howeyi*; Sci. Amer. 124: 492, as *Heliocereus mallisoni*;  
 Van Géel, Sert. Bot. 1: 116, as *Cactus speciosissimus*.

On page 129, vol. II, under *Heliocereus cinnabarinus*, add: *Illustration*: Monatschr.  
 Kakteenk. 32: 54, 55, as *Cereus cinnabarinus*.

On page 129, vol. II, under *Heliocereus amecamensis*, add to illustrations: Rother,  
 Praktischer Leitfaden Kakteen 74, as *Cereus amecamensis*.

On page 132, vol. II, under *Trichocereus spachianus*, add to illustrations: Remark, Kak-  
 teenfreund 5, as *Cereus spachianus*.

On page 133, vol. II, under *Trichocereus pasacana*, insert: The name *Cephalocereus*  
*pasacana* (Engler and Prantl, Pflanzenfam. 3<sup>6a</sup>: 182. 1894) has been used for this plant.



FIG. 250.—*Borzicactus fieldianus*.



FIG. 251.—*Borzicactus fieldianus*.

On page 136, vol. II, *Trichocereus macrogonus*, add: *Illustrations*: Garten-Zeitung 4<sup>a</sup>:  
 182. f. 8, as *Cereus macrogonus*.

On page 140, vol. II, under *Trichocereus coquimbanus*, add to illustrations: Engler  
 and Drude, Veg. Erde 8: pl. 16, as *Cereus nigripilis*.

On page 140, vol. II, under *Trichocereus terscheckii*, insert: This cactus is the only  
 timber found in the region of the Puna and in the western mountains of Argentina that  
 can be utilized in any form. It is employed on a large scale in the mines for timbering  
 the galleries, if these happen to be dry. It is called cardón.

Add: *Illustration*: Sci. Amer. 124: 492.

On page 143, vol. II, under *Trichocereus candicans*, insert: The names *Cereus gladiatus*  
*vernaculatus* Monville (Labouret, Monogr. Cact. 327. 1853) and *C. gladiatus courantii*  
 (Förster, Handb. Cact. ed. 2. 833. 1885) were given as synonyms of *C. candicans*.

*Cereus candicans dumesnilianus* is figured and briefly described in the Gardeners'  
 Chronicle (III. 26: 415. f. 132). It is an upright plant with long, straight spines; the flowers  
 are large and pure white. It flowered in the collection of Justus Corderoy.

On page 144, vol. II, under *Trichocereus schickendantzii*, add to illustration: Möllers Deutsche Gärt. Zeit. 25: 475. f. 7, No. 16, as *Echinopsis schickendantzii*.

On page 146, vol. II, under *Echinopsis catamarcensis*, add: Illustration: Möllers Deutsche Gärt. Zeit. 25: 475. f. 7, No. 19.

On page 149, vol. II, under *Harrisia eriophora*, add to illustration: Journ. N. Y. Bot. Gard. 11: 234. f. Roig. Cact. Fl. Cub. pl. [5], as *Harrisia undata*.

Insert: *Cactus peruvianus jamaicensis* appears in Grisebach's Flora (Fl. Brit. W. Ind. 301. 1860) as a synonym of *Cereus eriophorus*, but refers to *Harrisia gracilis*.

On page 151, vol. II, under *Harrisia nashii*, add: Illustration: Descourtilz, Fl. Med. Antill. 1: pl. 66, as *Cactus divaricatus*.

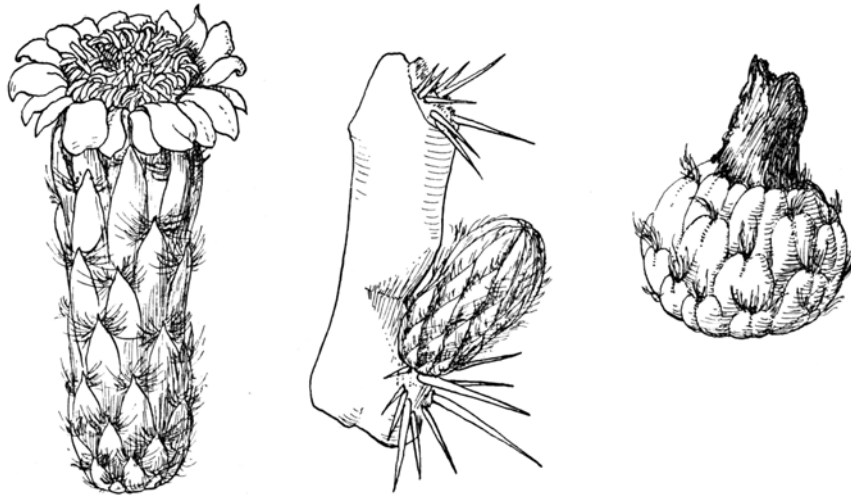
On page 151, vol. II, under *Harrisia gracilis*, add the synonym: *Cactus subrepandis* Sprengel, Syst. 2: 495. 1825.

Add to illustrations: Förster, Handb. Cact. ed. 2. f. 139; Blühende Kakteen 2: pl. 84; Watson, Cact. Cult. 85. f. 28; ed. 3. f. 19; Dict. Gard. Nicholson Suppl. 220. f. 255, as *Cereus repandus*; Addisonia 2: pl. 61.

On page 154, vol. II, under *Harrisia aboriginum*, add: Illustration: Journ. N. V. Bot. Gard. 22: pl. 253.

On page 155, vol. II, under *Harrisia martinii*, add to illustrations: Addisonia 2: pl. 68.

On page 157, vol. II, under *Harrisia bonplandii*, add to illustrations: Monatsschr. Kakteenk. 25: 3, as *Cereus bonplandii*.



FIGS. 252, 253, 254.—*Borzicactus fieldianus*.

On page 163, vol. II, insert:

**9. *Borzicactus fieldianus* sp. nov.**

Forming thickets 3 to 6 meters high, the branches elongated, at first erect or ascending but sometimes becoming pendent or even prostrate; ribs few, perhaps only 6 or 7, stout, broad, 1 to 2 cm. high, depressed between the areoles and on young shoots and appearing as tubercled; areoles large, circular, short-lanate and spiny, with a depression extending upward from its upper side to constriction of rib; spines 6 to 10, white, subulate, very unequal, the longest ones 5 cm. long or longer; flowers several, from near tip of branches, but with only one from an areole, with a cylindrical tube 6 to 7 cm. long and a very narrow limb; ovary and flower-tube bearing ovate, acute scales, 1 to 3 mm. long, these with long brown hairs in their axils; flower-tube within glabrous below its throat, bearing many stamens 4 cm. long; perianth-segments red, 1 cm. long; stamens exerted only beyond the perianth-segments, if at all; ovary globular, perhaps somewhat tuberculate, with scattered, long-hairy areoles; fruit probably fleshy, globular to ovoid, 2 cm. in diameter.

Collected by Macbride and Featherstone on gravelly river bluffs, eastern exposure at Huaraz, Peru, altitude about 2,600 meters, October 6, 1922 (No. 2519).



This very interesting plant we have named in honor of Captain Marshall Field, a patron of science, who financed the Botanical Expedition of 1922 to South America, sent out by the Field Museum of Natural History.

Figure 250 shows the habit of the plant, 251 a flowering branch, and figures 252 to 254 show flower, rib, and fruit.

On page 164, vol. II, under *Carnegiea gigantea*, add to illustrations:\* Remark, Kakteenfreund 19, as *Pilocereus giganteus*; Nat. Geogr. Mag. 41: 373, as giant cactus; Tribune Hort. 4: 243; Journ. N. Y. Bot. Gard. 3: f. 15, 16, 17; 5: 173. f. 27; 6: f. 31, 32; Gartenwelt 8: 485; 11: 498; Schelle, Handb. Kakteenk. f. 20, 21; Cact. Mex. Bound. frontispiece; Bull. U. S. Nat. Mus. 56: pl. 8, f. 1; Useful Wild Pl. U. S. Canada opp. 112; Gartenflora 54: 589. f. 70; Gard. Chron. II. 20: 265. f. 39; Rev. Hort. IV. 3: 343. f. 20; Wiener Ill. Gart. Zeit. 11: 216. f. 47; Watson, Cact. Cult. 76. f. 22; Balt. Cact. Journ. 1: 67; Blanc, Cacti 30. No. 120; Carnegie Institution of Washington 6: pl. 1; De Laet, Cat. Gén. f. 26; Monatsschr. Kakteenk. 32: 87, as *Cereus giganteus*; Contr. U. S. Nat. Herb. 16: pl. 7; Amer. Bot. 26: 136; Stand. Cycl. Hort. Bailey; 1: Pl. 3; 2: f. 819; Nat. Geogr. Mag. 44: 171.

On page 167, vol. II, for *Binghamia melanostele*, substitute for this name:

***Binghamia multangularis*** (Willdenow).

*Cactus multangularis* Willdenow, Enum. Pl. Suppl. 33. 1813.

*Cereus multangularis* Haworth, Suppl. Pl. Succ. 75. 1819.

*Echinocereus multangularis* Rümpler in Förster, Handb. Cact. ed. 2. 825. 1885.

*Cephalocereus melanostele* Vaupel, Bot. Jahrb. Engler 50: Beibl. 111: 12. 1913.

*Binghamia melanostele* Britton and Rose, Cactaceae 2: 167. 1921.

Insert: We have recently obtained a photograph of Haworth's plant bearing the date "Oct. 29, 1824." A careful comparison of this photograph with photographs and specimens obtained by Dr. Rose in Peru in 1914 convinces us that this is the same plant as *Cephalocereus melanostele* which we referred to *Binghamia*.

Figure 255 is from a photograph of Haworth's plant, from N. E. Brown of Kew.

On page 171, vol. II, under *Oreocereus celsianus*, add to illustrations: Karsten and Schenck, Vegetationsbilder 7: pl. 42; Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 11, as *Pilocereus celsianus*; Möllers Deutsche Gärt. Zeit. 25: 473. f. 5, No. 6, as *P. kranzleri*;† Watson, Cact. Cult. 146. f. 57, as *P. bruenowii*; Balt. Cact. Journ. 1: 133, as *P. fossulatus*; Monatsschr. Kakteenk. 31: 123; 32: 9; Gartenflora 62: f. 55, as *Cereus straussii*; Möllers Deutsche Gärt. Zeit. 25: 475. f. 5, No. 15, as *P. williamsii*; Amer. Mus. Journ. 16: 39; Bull. Pan Amer. Union 42: 408.

On page 174, vol. II, under *Cleistocactus baumannii*, add to illustrations: Deutsches Mag. Gart. Blumen. 1851: pl. opp. 48, as *Cereus tweediei*; Jard. Fleur. 1: pl. 48; De Laet, Cat. Gén. f. 25; Blanc, Cacti 24. f. 2; West Amer. Sci. 13: 8, as *Cereus colubrinus*.

On page 177 vol. II, under *Lophocereus schottii* add to illustrations Karsten and Schenck Vegetationsbilder 13: pl. 18, in part

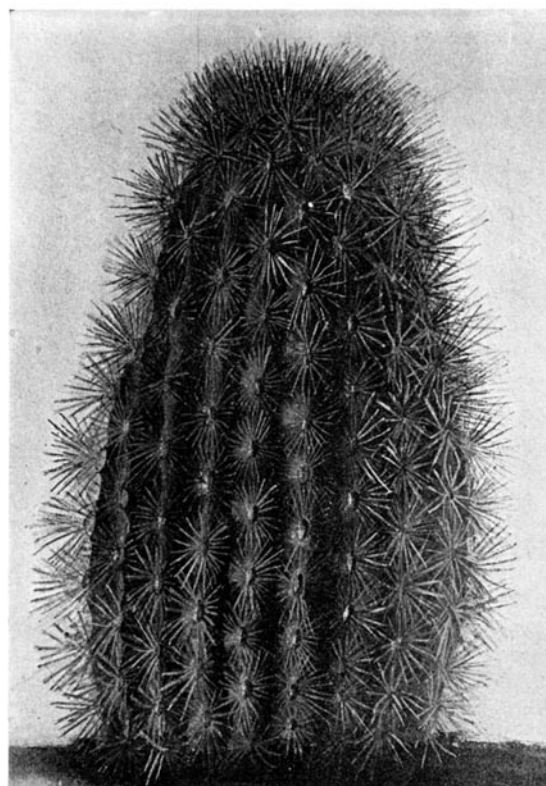


FIG. 255.—*Binghamiana multangularis*.

\* Some of the illustrations cited here and on pages 166 and 167 do not have the technical name of the plants.

† This name is credited to Rümpler but he gives the spelling as *Pilocereus kanzleri*.



Contr. U. S. Nat. Herb. **16**: pl. 126, B, as *Lophocereus australis*; Möllers Deutsche Gärt. Zeit. **25**: 473. f. 5, No. 8; Cycl. Amer. Hort. Bailey **3**: f. 1803; Schumann, Gesamtb. Kakteen f. 7, 8; Nachtr. f. 8; Monatsschr. Kakteenk. **11**: 10; **18**: 101, as *Pilocereus schottii*; West Amer. Sci. **13**: 16, as *Cereus sargentianus*; Rep. Mo. Bot. Gard. **16**: pl. 4, 5, 6, 7, 8, as *Cereus schottii*; Contr. U. S. Nat. Herb. **16**: pl. 125, B, as *Lophocereus schottii*; Thomas, Zimmerkultur Kakteen **17**, as *Pilocereus sargentianus*.

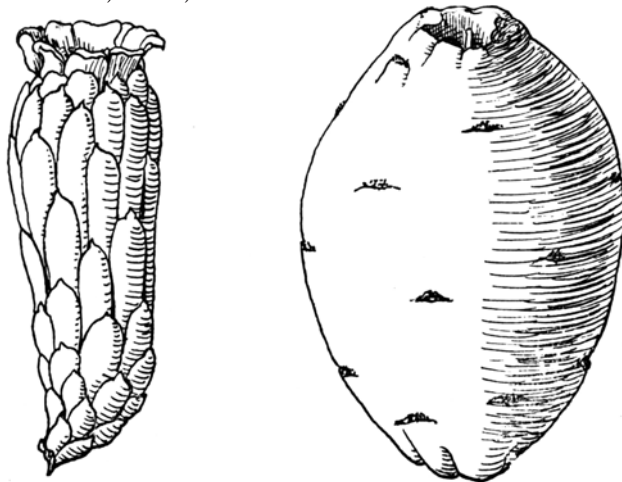
On page 180, vol. 11, under *Myrtillocactus geometrizans*, add to illustrations: Reiche, Elem. Bot. 228. f. 164; Engler and Drude, Veg. Erde **13**: f. 31; Möllers Deutsche Gart. Zeit. **25**: 482. f. 13; West Amer. Sci. **13**: 15; Zeitschrift Sukkulenk. **1**: 31, as *Cereus geometrizans*.

On page 180, vol. 11, under *Myrtillocactus cochal*, add to illustrations: Thomas, Zimmerkultur Kakteen **13**, as *Cereus cochal*.

On page 183, vol. 11, insert the following:

**39. NEOABBOTTIA** Britton and Rose, Smiths. Misc. Coll. **72**<sup>9</sup>: 2. 1921.

A tree-like cactus with a smooth, upright, terete trunk and a much branched top, the branches strongly winged or ribbed, normally from distal end of preceding branch, but sometimes from below tip and usually in the same plane; ribs thin and high, very spiny; flowers nocturnal, small, tubular, with a narrow limb, borne several together at distal end of a terminal branch from a small, felted cephalium; perianth persisting on the ovary; perianth-tube and ovary bearing small scales with short wool and an occasional bristle in their axils; perianth-segments very small; throat of flower a little broadened at top, bearing many stamens; style slender; fruit oblong, turgid, nearly naked, deeply umbilicate; seed minute, black, muricate.



FIGS. 256, 257.—Flower and fruit of *Neoabbottia paniculata*. Natural size.

Type species: *Cactus paniculatus* Lamarck.

A monotypic genus of Hispaniola, dedicated to Dr. W. L. Abbott, a patron of natural history.

**1. Neoabbottia paniculata** (Lamarck) Britton and Rose, Smiths. Misc. Coll. **72**<sup>9</sup>: 3. 1921.

*Cactus paniculatus* Lamarck, Encycl. **1**: 540. 1783.  
*Cereus paniculatus* De Candolle, Prodr. **3**: 466. 1828.

Plant 6 to 10 meters high or higher; trunk woody, 30 cm. in diameter, the wood close-grained, yellowish white; bark of trunk 1.5 cm. thick, brown, not spiny in age, smooth; branches 4 to 6 cm. broad, strongly 4-ribbed, occasionally 6-ribbed or winged; ribs thin, 1.5 to 2.5 cm. high, their margins somewhat crenate, areoles borne at base of sinuses, 1.5 to 2 cm. apart; spines 12 to 20, acicular, brownish to gray, 2 cm. long or less; cephalium 1 to 1.5 cm. in diameter, becoming elongated and angled; flowers straight, cm. long, with a limb about 3 cm. broad, tube 6 to 7 mm. long, about 18 mm. in diameter, with walls 5 to 6 mm. thick; inner perianth-segments greenish white, short-oblong, about 1 cm. long, obtuse; throat 18 mm. long, covered with numerous filaments, these with a knee

near base and pressing against style; stamens and style included; ovary and flower-tube tubercled, the former with short tubercles, the latter with oblong ones (sometimes 1.5 cm. long), each ending in a depressed areole subtended by a minute scale; areoles bearing a tuft of brown felt and an occasional brown bristle; fruit oblong in outline, 6 to 7 cm. long, 4 to 5.5 cm. in diameter, turgid, nearly naked; rind green, thick, hard; seeds rounded above, cuneate at base, with a large lateral depressed hilum.



FIG. 258.—*Neoabbottia paniculata*.

*Type locality:* Haiti.

*Distribution:* Hispaniola.

This plant was described by Plumier as follows: "*Melocactus arborescens, tetragonus, flore ex albedo.*" This description was repeated by Tournefort, with the addition of a single word, in 1719. Plumier's drawing of this plant was published long after his death by Burmann as plate 192 of the *Plantarum Americanum*, and upon this plate Lamarck based his *Cactus paniculatus*, which De Candolle a little later took up as *Cereus paniculatus*. Ever since, the plant has usually passed under the latter name, with an occasional reversal to the earlier one.

Until recently, the species has been known only from this old illustration and these brief descriptions. It was collected near Port-au-Prince, Haiti, on the Cul-de-sac, by Dr. W. L. Abbott and Mr. E. C. Leonard, April 1920 (No. 3500); also at the same locality by Mr. H. M. Pilkington, December 1920; also a single branch by Dr. Paul Bartsch at Thomazeau in 1917 (No. 221). The Abbott and Leonard material consists of wood-sections and herbarium specimens of branches, flowers, fruit, and seeds, supplemented by living specimens and by fruit and flowers in formalin, together with several habit photographs.

In habit it resembles *Dendrocereus*, its branches resemble *Acanthocereus*, and the small limb of the flower resembles *Leptocereus*; but the plant differs from all of these in bearing several flowers at the ends of terminal branches and in developing a kind of cephalium. In the last respect it approaches *Neoraimondia*, near which we would place it in our present classification.

*Illustrations:* Smiths. Misc. Coll. 72<sup>o</sup>: pl. 1 to 4; pl. 2, f. 1, 2; Bull. Amer. Mus. Nat. Hist. 33: 31. f. 11.

Figures 256 and 257 show the flower and fruit; figure 258 shows the top of a tree; figures 259 and 260 show the plant in its natural surroundings; figure 223a, page 248, is a reproduction of Plumier's plate.

On page 187, vol. 11, under *Hylocereus undatus*, add to illustrations: De Laet, Cat. Gen. f. 31; Tribune Hort. 4: pl. 140; Blanc, Cacti 37. No. 346; Ann. Inst. Roy. Hort.

Fromont 2 pl. 1, f. D; Gartenwelt 11: 101; Watson, Cact. Cult. ed. 3. pl. opp. 29; Rev. Hort. Belg. 40: after 184; Meehans' Monthly 6: 5; West Amer. Sci. 13: 5; Gartenflora 55: f. 2, as *Cereus triangularis*; De Tussac, Fl. Antill. 4: pl. 26, as *Cactus triangularis*; Stand. Cycl. Hort. Bailey 3: pl. 57, as *Hylocereus tricostatus*; Cañizares, Jard. Bot. Inst. Habana 98, as *H. triangularis*.

On page 189, vol. 11, under *Hylocereus lemairei*, add to illustrations: Blühende Kakteen 3: pl. 173, as *Cereus lemairei*.

On page 191, vol. 11, under *Hylocereus napoleonis*, add to illustrations: Hartinger, Parad. 2: 1, as *Cereus napoleonis*.



Figs. 259 and 260.—*Neoabbotia paniculata*.

On page 192, vol. 11, under *Hylocereus triangularis*, insert: The name *Cactus anizogonus* of English gardens is given as a synonym of *Cereus triangularis* by Rümpler (Förster, Handb. Cact. ed. 2. 764. 1885).

On page 192, vol. 11, under *Hylocereus trigonus* insert: *Cereus triqueter* Haworth (Syn. Pl. Succ. 181. 1812) is some species of *Hylocereus* near *H. trigonus*. If really from South America, as stated by Haworth, it may be the same as *H. lemairei*.

On page 194, vol. 11, under *Hylocereus* sp., insert after first paragraph: This species of *Hylocereus* from the Guianas should be studied in connection with *Cereus scandens* Salm-Dyck (Cact. Hort. Dyck. 1849. 219. 1850), which is said to have come from Guiana. The variety *C. scandens minor* Boerhaave (Monatsschr. Kakteenk. 1: 82. 1891) is only mentioned.

After page proof had been read, some fine specimens of a *Hylocereus* were received from Surinam through Gerold Stahel, which we describe as follows:



Stems much elongated, 3-angled, 2 to 6 cm. broad, bluish or whitened, somewhat glaucous; ribs often thin; margins of ribs not horny, nearly straight, areoles distant, sometimes 6 cm. apart; spines brown, 2 or 3, very short, much swollen at base.

In the shape, number, and size of spines this specimen resembles *H. lemairei*, but differs from it in the whitened stems. We do not know its flowers.

On page 197, vol. II, under *Selenicereus grandiflorus*, insert: *Cereus haitiensis* Hortus is cited by Schelle (Handb. Kakteenk. 89. 1907) as a synonym of *C. grandiflorus*.

*Cereus grandiflorus flemingii* Rümpler (Förster, Handb. Cact. ed. 2. 751. 1885; *C. flemingii*, Monatsschr. Kakteenk. 3: 109. 1893) is said to be a hybrid between *C. grandiflorus* and *C. speciosissimus*.

Add to illustrations: Fl. Serr. 3: pl. 1-2, as *Cereus grandifloro-speciosissimus*; Balt. Cact. Journ. 1: 56, as queen of the night; Remark, Kakteenfreund 8; Gartenflora 42: 541. f. 110; 64: 90. f. 22; Gartenwelt 16: 613; 19: 18; Gard. Chron. III. 14: 187. f. 36; Thomas, Zimmerkultur Kakteen 15; Tribune Hort. 4: pl. 139; Blanc, Cacti 32; De Laet, Cat. Gén. f. 29; Fl. Serr. 3: 233-234; Weinberg, Cacti 8; Knippel, Kakteen pl. 1; Goebel, Pflanz. Schild. 1: pl. 2, f. 5; Möllers Deutsche Gärt. Zeit. 14: 340 to 343; 20: 561, as *Cereus grandiflorus*; Cañizares, Jard. Bot. Inst. Habana 100.

On page 198, vol. II, under *Selenicereus urbanianus*, add to illustrations: Gartenwelt 12: 255, as *Cereus urbanianus*; Roig, Cact. Fl. Cub. pl. [3] f. 2; pl. [4], as *Selenicereus maxonii*.

On page 199, vol. II, under *Selenicereus coniflorus*, insert: Dr. J. K. Small finds this plant naturalized in pinelands near the Everglades, west of Halenville, Florida.

On page 200, vol. II, under *Selenicereus pteranthus*, also add to illustrations: Garden 13: 291; Monatsschr. Kakteenk. 31: 71; Watson, Cact. Cult. 63. f. 15; ed. 3. f. 10; Gartenflora 41: f. 23, 24, as *Cereus nycticalus*.

Add the synonym: *Cereus nycticalus peanii* Beguin in Riccoboni, Boll. R. Ort. Bot. Giard. Col. Palermo 8: 252. 1909.

On page 202, vol. II, under *Selenicereus boeckmannii*, add to illustration: Blühende Kakteen 3: pl. 175, 176, as *Cereus boeckmannii*.

On page 202, vol. II, under *Selenicereus macdonaldiae*, add the synonym: *Cereus grandiflorus macdonaldiae* Blanc, Cacti 34.

Also insert: *Cereus kewensis* Worsley (Journ. Roy. Hort. Soc. 39: 92. 1913) is said to be a "garden hybrid between *C. macdonaldiae* and probably *C. nycticalus*."

Also add to illustrations: Blanc, Cacti 34. No. 206, as *Cereus grandiflorus macdonaldiae*; Monatsschr. Kakteenk. 30: 107; Gartenwelt 16: 537; Möllers Deutsche Gärt. Zeit. 25: 488. f. 22, No. 6, as *Cereus macdonaldiae*, Blühende Kakteen 3: pl. 166, 167, as *Cereus grusonianus*.

Insert: *Cereus rothii* Weingart (Monatsschr. Kakteenk. 32: 146. 1922) is of this relationship. It is a new name for the plant from South America called *Cereus macdonaldiae* by Spegazzini; we have not seen it.

On page 204, vol. II, under *Selenicereus hamatus*, add to illustrations: Tribune Hort. 4: pl. 140; Floralia 42: 371, as *Cereus rostratus*.

On page 209, vol. II, insert the following:

#### 17. *Selenicereus nelsonii* (Weingart).

*Cereus nelsonii* Weingart, Zeitschrift Sukkulantenkunde 1: 33. 1823.

A slender, much branched vine, 1 to 1.5 cm. in diameter, giving off occasional aerial roots; ribs 6 or 7, low, somewhat tubercled; areoles small, circular, about 1 cm. apart; spines about 12, acicular, white to yellowish, 5 to 7 mm. long; length of flower including ovary and closed perianth



about 20 cm.; outer perianth-segments linear, pointed, reddish brown, the inner perianth-segments narrowly lanceolate, 7 cm. long, 12 to 15 mm. broad, acute; filaments numerous, weak, white; style long and slender, exerted beyond the withering perianth; stigma-lobes slender, white, entire; scales on the ovary and flower-tube minute, 1 to 1.5 mm. long, reddish brown, bearing white felt and white bristles in their axils; fruit crowned by the withering perianth, globular, 2 to 2.5 cm. in diameter, reddish, bearing numerous, small, circular areoles, these with clusters of acicular spines sometimes 1 cm. long.

*Type locality:* Southern Mexico.

*Distribution:* Mexico, but range not known.

We have had this plant under observation since 1914 when cuttings were sent us by C. Z. Nelson, an enthusiastic grower of cacti at Galesburg, Illinois, who obtained it from southern Mexico from Dr. J. L. Slater. This plant made two flowers during the week of May 17, 1922; the fruit ripens very slowly and did not mature until October 10, 1922.

According to Wilhelm Weingart, the same species has long been grown by Frantz de Laet at Contich, Belgium, also from Mexican material.

*Illustration:* Zeitschrift Sukkulentenk. 1: 33, as *Cereus nelsonii*.

Figure 261 shows a branch bearing a newly matured fruit.

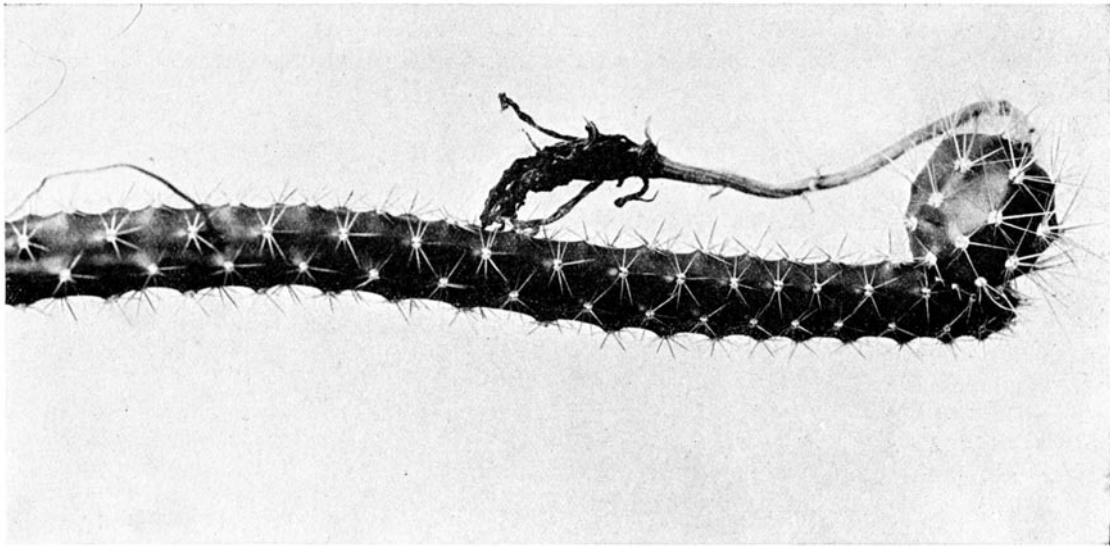


FIG. 261.—*Selenicereus nelsonii*.

On page 216, vol. II, under *Werckleocereus tonduzii*, add: *Illustration:* Monatsschr. Kakteenk. 31: 85, as *Cereus tonduzii*.

On page 218, vol. II, under *Aporocactus leptophis*, add to illustrations: Ann. Fl. Pom. 1839: pl. 43, as *Cereus leptophis*.

On page 219, vol. II, under *Aporocactus flagelliformis*, add to illustrations: Tribune Hort. 1: pl. 4, as *Cereus serpentinus*; Fl. Antill. 1: pl. 67, as *cierge queue de souris*; Cact. Journ. 1: 82; Rother, Praktischer Leitfaden Kakteen 57; Remark, Kakteenfreund 6; Watson, Cact. Cult. ed. 3. f. 11; Floralia 42: 371; Gartenwelt 15: 637; Blanc, Cacti 27. No. 104; Amer. Gard. 11: 527 as *Cereus flagelliformis*; Cact. Journ. 1: 125; 2: 34; 2: 153, as *C. flagelliformis cristatus*.

Insert: *Cereus smithianus* is a hybrid listed by Sweet (Hort. Brit. ed. 2. 237. 1830) which the Index Kewensis refers to *C. smithii*, a generic hybrid already referred to.

On page 221, vol. II, under *Aporocactus martianus*, add to the illustrations: Thomas, Zimmerkultur Kakteen 14, as *Cereus martianus*.

## CORRECTIONS AND ADDITIONS TO VOLUME III.

On page 6, vol. III, under *Echinocereus scheeri*, add to illustrations: Thomas, Zimmerkultur Kakteen 27.

On page 7, vol. III, under *Echinocereus salm-dyckianus*, add to illustrations: Thomas, Zimmerkultur Kakteen 25.

On page 11, vol. III, under *Echinocereus polyacanthus*, add to illustrations: Förster, Handb. Cact. ed. 2. 212. f. 19, as *Cereus polyacanthus*; Floralia 42: 376, as *Echinocereus polyacanthus* var.; Thomas, Zimmerkultur Kakteen 29; De Laet, Cat. Gén. f. 34, 37, 38; Möllers Deutsche Gärt. Zeit. 36: 145. f. 111; Succulenta 5: 74.

On page 12, vol. III, under *Echinocereus acifer*, add to illustrations: Thomas, Zimmerkultur Kakteen 26, as *Echinocereus acifer trichacanthus*; Blühende Kakteen 3: pl. 179, as *E. durangensis*.

On page 14, vol. III, under *Echinocereus coccineus*, add to illustrations: Pac. R. Rep. 4: pl. 4, f. 1 to 3, as *Cereus phoeniceus*.

On page 17, vol. III, under *Echinocereus viridiflorus*, add the synonym: *Cereus viridiflorus minor* Engelmann, Proc. Amer. Acad. 3: 278. 1856.

On page 21, vol. III, under *Echinocereus blankii*, add to illustrations: Watson, Cact. Cult. 70. f. 18, as *Cereus blankii*; Watson, Cact. Cult. 68. f. 17; ed. 3. f. 13, as *C. berlandieri*.

On page 22, vol. III, under *Echinocereus pentalophus*, add to illustrations: Watson, Cact. Cult. 78. f. 23, as *Cereus leptacanthus*; Watson, Cact. Cult. 83. f. 27; ed. 3. f. 18, as *C. procumbens*; Balt. Cact. Journ. 2: 218, as *Echinocereus procumbens*.

Also add the synonym: *Cereus propinquus subarticulatus* Pfeiffer in Förster, Handb. Cact. 373. 1846.

On page 23, vol. III, under *Echinocereus cinerascens*, insert: *Echinocactus deppii* Link and Otto (Steudel, Nom. ed. 2. 1: 536. 1840) was given in error for *Echinocereus deppii*.

On page 25, vol. III, under *Echinocereus reichenbachii*, insert: Watson, Cact. Cult. ed. 3. f. 14, as *Cereus caespitosus*; West Amer. Sci. 7: 237; 13: 14; Gartenflora 23: pl. 813, as *C. pectinatus*; Remark, Kakteenfreund 17; Balt. Cact. Journ. 2: 218, as *Echinocereus caespitosus*.

On page 37, vol. III, under *Echinocereus enneacanthus*, add to illustrations: Bull. Univ. Tex. 60: pl. 11, f. 1, as *Cereus longispinus*; Watson, Cact. Cult. 75. f. 21; ed. 3. f. 15, as *C. enneacanthus*.

Also insert: *Echinocereus saltillensis* is offered for sale by Haage and Schmidt, 1920, page 75.

Mr. C. R. Orcutt has called our attention to the following varieties which have been omitted: *Cereus engelmannii* var. *albispinus* Cels, var. *caespitosus*, var. *fulvispinus* Cels, var. *pfersdorffii* Heiden, all of which are listed by him (Orcutt, Rev. Cact. 1: 13. 1897).

On page 45, vol. III, insert: The name *Cactus bertini* was given for this plant when awarded a silver medal soon after its discovery (Hort. Franc. 11. 5: 222).

On page 45, vol. III, *Rebutia minuscula*, add to illustrations: Succulenta 3: 96; Thomas, Zimmerkultur Kakteen 34; Kaktusy 25, as *Echinocactus minusculus*.

On page 48, vol. III, under *Chamaecereus silvestrii*, add to illustrations: Blühende Kakteen 3: pl. 168, as *Cereus silvestrii*.

On page 48, vol. III, substitute for *Echinopsis deminuta*:

##### 5. *Rebutia deminuta* (Weber).

*Echinopsis deminuta* Weber, Bull. Mus. Hist. Nat. Paris 10: 386. 1904.

Through the kindness of J. J. Verbeek Wolthuys, we have been able to examine a flower of this plant which shows that it belongs to the genus *Rebutia*.

On page 54, vol. III, under *Lobivia pentlandii*, add to illustrations: Watson, Cact. Cult. ed. 3. f. 32, as *Echinopsis pentlandii*.

On page 59, vol. III, insert the following:

**21. *Lobivia famatimensis*** (Spegazzini).

*Echinocactus famatimensis* Spegazzini, Anal. Soc. Cient. Argentina 92: 44. 1921.

Solitary or in clusters, short-cylindric, 3 to 3.5 cm. high, 2.5 to 2.8 cm. in diameter, strongly umbilicate at apex; ribs 24, low, obtuse, somewhat tuberculate; areoles approximate; spines small, appressed, whitish; flowers solitary, from the side near the middle, about 3 cm. long.

*Type locality:* Near Famatima, Argentina, altitude 2,000 to 3,000 meters.

*Distribution:* Province of La Rioja, Argentina.

*Illustration:* Anal. Soc. Cient. Argentina 92: f. 9, as *Echinocactus famatimensis*.

On page 64, vol. ii, under *Echinopsis multiplex*, add to illustrations: Watson, Cact. Cult. ed. 3. f. 16, as *Cereus multiplex*; Rev. Hort. 48: 13. f. 1, as *Echinocactus multiplex*; Rev. Hort. 48: 13. f. 2, as *E. multiplex cristata*; Gard. Chron. III. 56: 145. f. 60.

On page 65, vol. III, under *Echinopsis oxygona*, add to illustrations: Thomas, Zimmerkultur Kakteen 23, as *Echinopsis oxygona inermis*; Succulenta 5: 85.

On page 66, vol. III, under *Echinopsis eyriesii*, add to illustrations: Rother, Praktischer Leitfaden Kakteen 47, as *Echinopsis triumphans*; Remark, Kakteenfreund 9; Rother, Praktischer Leitfaden Kakteen 45, 106.

On page 67, vol. III, under *Echinopsis turbinata*, add to illustrations: Watson, Cact. Cult. 131. f. 50; ed. 3. f. 30; Gard. Chron. III. 16: 625. f. 79, as *Echinopsis decaisneana*; Floralia 42: 374, as *E. gemmata*.

On page 67, vol. III, under *Echinopsis tubiflora*, add to illustrations: Thomas, Zimmerkultur Kakteen 20, as *Echinopsis tubiflora rohlundii*; Rother, Praktischer Leitfaden Kakteen 44, as *E. zuccariniana*.

On page 72, vol. III, under *Echinopsis leucantha*, add to illustrations: Thomas, Zimmerkultur Kakteen 21.

On page 74, vol. III, under *Echinopsis bridgesii*, insert: *Illustration:* Möllers Deutsche Gärt. Zeit. 25: 475. f. 7, No. 18, as *Echinopsis salmiana*.

On page 75, vol. III, under *Echinopsis formosa*, add to illustrations: Monatsschr. Kakteenk. 32: 149.

On page 76, vol. III, *Echinopsis formosissima*, insert: *Cereus formosissimus* Weber (Dict. Hort. Bois 471. 1896) was cited by Weber as a synonym of this species.

On page 80, vol. III, under *Ariocarpus retusus*, add the synonyms: *Cactus areolus* Kuntze, Rev. Gen. Pl. 1: 260. 1891; *Cactus pulwilliger* Kuntze, Rev. Gen. Pl. 1: 260. 1891.

Add to illustrations: Monatsschr. Kakteenk. 23: 66, 67, as *Ariocarpus trigonus*.

On page 82, vol. III, under *Ariocarpus kotschoubeyanus* insert: *Anhalonium kotschubeyi* Lemaire (Salm-Dyck, Cact. Hort. Dyck. 1849. 5. 1850), given as a synonym of *A. sulcatum*, is to be referred here.

On page 83, vol. III, under *Ariocarpus fissuratus*, add to illustrations: Bull Univ. Texas 60: pl. 11, f. 2, as *Ariocarpus fissuratus*; Gard. Chron. III. 12: 789. f. 130; Watson, Cact. Cult. 161. f. 61, as *Mammillaria fissurata*; Watson, Cact. Cult. ed. 3. f. 6, as *Anhalonium engelmannii*; Remark, Kakteenfreund 10; Bait. Cact. Journ. 1: 27; 2: 247, as *Anhalonium fissuratum*; Rother, Praktischer Leitfaden Kakteen 35.

On page 85, vol. III, under *Lophophora williamsii*, add to illustrations: Sci. Amer. 124: 492, as mescal button; Rother, Praktischer Leitfaden Kakteen 36; Remark, Kakteenfreund 11; Karsten and Schenck, Vegetationsbilder 2: pl. 20, B; Thomas, Zimmerkultur Kakteen 30; Monatsschr. Kakteenk. 31: 187, as *Echinocactus williamsii*; Balt. Cact. Journ. 1: 71; 2: 247; Watson, Cact. Cult. ed. 2. 243. f. 91; ed. 3. f. 7, as *Anhalonium williamsii*; Succulenta 2: 3; 4: 7.

On page 91, vol. III, under *Pediocactus simpsonii*, add to illustrations: Wiener Obst. Zeit. 2: 90. f. 13; Remark, Kakteenfreund 13, as *Echinocactus simpsonii*.

On page 106, vol. III, under *Hamatocactus setispinus*, add to illustrations: Schulz, 500 Wild Fl. San Antonio pl. 12, as *Echinocactus setispinus*.

On page 107, vol. III, under *Strombocactus disciformis*, add to illustrations: Remark, Kakteenfreund 12, as *Echinocactus turbiniformis*.

On page 123, vol. III, at end of *Echinofossulocactus*, insert the following:

*Echinocactus tetracentrus* Lemaire (Cact. Gen. Nov. Sp. 31. 1839) has not been identified. It is to be referred to one of the species of *Echinofossulocactus*.

*Echinocactus barcelona* (Cact. Journ. 2: 79, 175, 191) was offered for sale by F. A. Walton.

On page 124, vol. III, under *Ferocactus stainesii*, insert: *Echinocactus pilosus canescens* Scheidweiler is listed in Index Bibliographique (286. 1887).

On page 129, vol. III, under *Ferocactus lecontei*, insert: *Echinocactus leopoldii* (Belg. Hort. 25: 132. 1876) was only briefly described when awarded a prize in Belgium. Schumann referred it as a synonym of *E. cylindraceus*, while De Laet, who saw the plant, thought it was a form of *Ferocactus lecontei*. It is misspelled in Volume III.

Add to illustrations: Wiener Ill. Gart. Zeit. 11: pl. 3, in part; Thomas, Zimmerkultur Kakteen 32; Watson, Cact. Cult. ed. 3. f. 26, as *Echinocactus lecontei*.

On page 130, vol. III, under *Ferocactus acanthodes*, add to illustrations: Thomas, Zimmerkultur Kakteen 40, as *Echinocactus cylindraceus*.

On page 132, vol. III, insert:

**11a. *Ferocactus johnstonianus*** Britton and Rose, sp. nov.

Plants simple, short-cylindric, 6 dm. high or less, up to 3.5 dm. in diameter; ribs 24 to 31, with margins undulate; areoles elliptic, rather closely set; spines 20 or more, subulate, very much alike, none hooked, slightly spreading and more or less outwardly recurved, 7 cm. long or less, yellow to brownish yellow, annulate; flowers including ovary 5 cm. long; perianth-segments narrow, yellowish, or the outer ones tinged with red, short-acuminate, the margins slightly erose; filaments yellowish below, becoming reddish above; stigma-lobes 8 to 13, flesh-colored; scales on the ovary orbicular; fruit small, 2.5 cm. in diameter, the seed dehiscing by a large pore at the base; seeds angled, black, pitted, 2 mm. long; hilum small, circular, depressed, white.

Collected by Ivan M. Johnston at Angel de la Guardia Island, Lower California May 2, 1921 (Nos. 3394, type, and 3395).

This species is perhaps nearest *Ferocactus diguetii* but is much smaller and has fewer ribs, many more spines in a cluster, and yellow flowers.

On page 140, vol. III, under *Ferocactus viridescens*, add to illustrations: Blühende Kakteen 3: pl. 177, as *Echinocactus viridescens*.

On page 143, vol. III, under *Ferocactus latispinus*, add to illustrations: Remark, Kakteenfreund 13, as *Echinocactus cornigerus flavispinus*.

Also add the note: *Cactus cornigerus* Mociño and Sessé (De Candolle, Prodr. 3: 461. 1828) is given as a synonym of *Echinocactus cornigerus*.

On page 144, vol. III, under *Ferocactus hamatacanthus*, add to illustrations: Rother, Praktischer Leitfaden Kakteen 106, as *Echinocactus longihamatus*.

On page 148, vol. III, under *Echinomastus erectocentrus*, insert: Mr. C. R. Orcutt has called our attention to the fact that in *Echinomastus erectocentrus* the fruit opens by splitting down one side, and in this respect differs from our generic description. This character in the description was drawn from a study of the fruits of *E. intertextus*, the only species in this genus of which we know much about the fruit. He also states that the fruit of *Astrophytum myriostigma* splits open on one side, an observation we had not recorded.

On page 150, vol. III, under *Echinomastus unguispinus*, add to illustrations: Thomas, Zimmerkultur Kakteen 31; Schelle, Handb. Kakteenk. 200. f. 132, as *Echinocactus unguispinus*.



On page 155, vol. III, under *Gymnocalycium denudatum*, insert: *Echinocactus denudatus multiflorus* (Monatsschr. Kakteenk. 14: 178) is only a name.

Also add to illustrations: Thomas, Zimmerkultur Kakteen 41, as *Echinocactus denudatus*.

On page 157, vol. III, under *Gymnocalycium saglione*, add to illustrations: Thomas, Zimmerkultur 37, as *Echinocactus saglionis*.

On page 158, vol. III, under *Gymnocalycium gibbosum* add to illustrations: Van Géel, Sert. Bot. 1: 113, as *Cactus gibbosus*.

On page 159, vol. III, under *Gymnocalycium brachyanthum*, insert: *Illustration: Möllers Deutsche Gärt. Zeit. 36: 145. No. 11, as Echinocactus brachyanthus.*

On page 161, vol. III, under *Gymnocalycium monvillei*, add to illustrations: Möllers Deutsche Gärt. Zeit. 36: 145. f. 1, as *Echinocactus monvillei*.

On page 168, vol. III, under *Echinocactus grusonii*, add to illustrations: Watson, Cact. Cult. ed. 3. f. 23; Rother, Praktischer. Leitfaden Kakteen 30; Deutsche Garten-Zeitung 28. f. 6; Zeitschrift Sukkulenk. 1: 15.

On page 168, vol. III, under *Echinocactus ingens*, add to illustrations: Remark, Kakteenfreund 14.

On page 171, vol. III, under *Echinocactus visnaga*, add to illustrations: Balt. Cact. Journ. 2: 181.

On page 181, vol. III, insert the following paragraphs:

*Echinocactus acutispinus* Hildmann (Deutsche Garten-Zeitung 1886: 116. f. 27. 1886) was described and figured, but the plant is a small, barren one which we have not been able to associate with any described species. It came from Mexico and may be one of the species of *Echinocactus*.

*Echinocactus cylindricus* Hortus (Forbes, Hort. Tour Germ. 152) was described as cylindrical, with 12 or 13 ribs, the radial spines white and the central ones light brown. It was introduced from Mexico in 1836. It can not be identified.

On page 182, vol. III, under *Homalocephala texensis*, add to illustrations: Schulz, 500 Wild Flowers of San Antonio, pl. 13 in part as *Echinocactus texensis*.

*Echinocactus darrahii* Schumann (Monatsschr. Kakteenk. 12: 21. 1902) is only mentioned.

*Echinocactus dicracanthus* Hortus (Forbes, Journ. Hort. Tour Germ. 160) is only a name.

*Echinocactus inflatus* Gillies (Steudel, Nom. ed. 2. 1: 536. 1840) seems never to have been published. Steudel simply states that it was from Chile.

*Echinocactus praegnacanthus* Förster (Handb. Gartenz. 17: 160. 1861) is a plant from Chile which has never been identified.

*Echinocactus purpureus* (Monatsschr. Kakteenk. 5: 106. 1895) is listed by Schumann as in Gruson's Garden.

*Echinocactus rhodanthus* (Forbes, Journ. Hort. Tour Germ. 151) is only a name.

On page 182, vol. III, under *Astrophytum myriostigma*, add to illustrations: Remark, Kakteenfreund 11; Balt. Cact. Journ. 1: 82.

On page 185, vol. III, under *Astrophytum capricorne*, add to illustrations: Remark, Kakteenfreund 12, as *Echinocactus capricornis*.

On page 188, vol. III, under *Malacocarpus tephracanthus*, add the synonym: *Echinocactus sellowii tetracanthus* Lemaire in Schumann, Monatsschr. Kakteenk. 18: 150. 1908.

Insert: *Echinocactus buchheimianus* Haage in Quehl (Monatsschr. Kakteenk. 9: 74. 1899) has been described briefly but its flower and fruit are unknown. It is said to resemble *E. sellowii*.

Add to illustrations: Schumann, Gesamtb. Kakteen f. 15, as *Cereus tephraacanthus*.

On page 193, vol. III, under *Malacocarpus concinnus*, add to illustrations: Succulenta 3: 22, 48, as *Echinocactus concinnus*.

On page 193 vol. III, under *Malacocarpus scopa*, add to illustrations: Rother, Praktischer Leitfaden Kakteen 107, as *Echinocactus scopa cristatus*; Kaktusy 26, as *Echinocactus scopa*; Kaktusy 27, as *E. scopa cristata*; Kaktusy 28, as *E. scopa rubra*.

On page 195 vol. III, under *Malacocarpus linkii*, insert: *Echinocactus ottonis linkii* Hortus (Förster, Handb. Cact. ed. 2. 554. 1885) is given as a synonym of *E. linkii*.

On page 196, vol. III, under *Malacocarpus ottonis*, add to illustrations: Succulenta 3: 56, as *Echinocactus ottonis tenuispinus*; Rother, Praktischer Leitfaden Kakteen 34, as *E. ottonis*.

On page 198, vol. III, under *Malacocarpus erinaceus*, add to illustrations: Watson, Cact. Cult. 98. f. 32, as *Echinocactus corynodes*.

On page 200, vol. III, under *Malacocarpus mammulosus*, add to illustrations: Rother, Praktischer Leitfaden Kakteen 30, as *Echinocactus submammulosus*.

On page 202, vol. III, under *Malacocarpus haselbergii*, add to illustrations: Succulenta 3: 31, as *Echinocactus haselbergii*.

On page 205, vol. III, under *Malacocarpus leninghausii*, add to illustrations: Succulenta 3: 39, as *Echinocactus leninghausii*.

On page 207, vol. III, under *Hickenia microsperma*, add to illustrations: Succulenta 3: 71; 5: pl. 1; Thomas, Zimmerkultur Kakteen 35, as *Echinocactus microspermus*.

On page 237, vol. III, insert the following:

**19. *Cactus oaxacensis* sp. nov.**

Globular to ovoid, 12 to 15 cm. thick, with a small, low crown only 2 to 3 cm. high and 3 to 4 cm. broad; ribs 11 to 15, prominent, usually rounded; radial spines 8 to 12, subulate, more or less recurved at first, reddish brown but grayish in age, 2 cm. long or less; central spines 1 or sometimes 2, erect or porrect; flowers slender, about 2 cm. long, dark rose; filaments and style light yellow; fruit thick-clavate, 2 to 4.5 cm. long, scarlet, shiny; seeds small, black.

This plant was illustrated and mentioned in the place here cited (Cactaceae 3: 237. f. 249) but was not given a specific name. Since then C. R. Orcutt reports finding it at Salina Cruz and Dr. B. P. Reko sends us a photograph and flowers obtained by him in 1923, while Dr. J. A. Purpus re-collected it in 1923 (type) and has sent us living plants.

*Illustration:* Cactaceae 3: 236. f. 249, as *Cactus* sp.

Figure 262 is from a photograph of the plant sent us by Dr. Reko.

On page 238, vol. III, insert: *Melocactus ellemeetii* Miquel (Nederl. Kruidk. Arch. 4: 336. 1858) and *M. pachycentrus* Suringar (Verh. Akad. Wettensch. Amst. II. 8: 28. 1901) have not been identified.

On page 238, vol. III, at end of *Cactus* add: *Cactus aculeatissimus* is listed by Steudel (Nom. 131. 1821) credited to Zeyher and cited by the Index Kewensis, but it has never been identified.

*Cactus tuna major* is used by Roxburgh (Hort. Beng. 37. 1814).

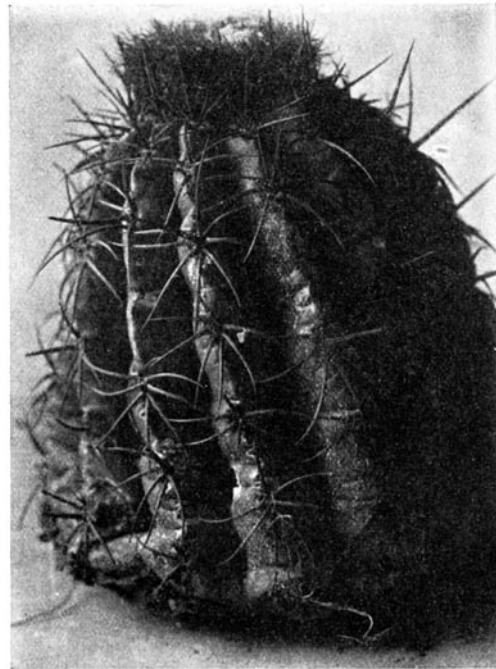


Fig. 262.—*Cactus oaxacensis*.

*Cactus reptans* Willdenow (Ann. Hort. Berol. Suppl. 33. 1813) was taken up in this work by mistake as *Cereus reptans*.

*Cactus neglectus* Dehnhardt (Rivist. Napol. 1. 3: 166.), according to the Index Kewensis, is a species of *Pereskia*.

*Cereus erinaceus* is credited to Haworth by Steudel (Nom. ed. 2. 1: 334. 1840) and said to come from the West Indies. Steudel must have had in mind *Cactus erinaceus* Haworth; if so, the plant is from South America.

*Cereus torrellianus* (Monatsschr. Kakteenk. 20: 42. 1910) is probably a misspelling for *C. tonelianus*.

Figure 263, shown below, gives a typical Arizona landscape in which *Carnegiea gigantea* is the dominant plant.



## INDEX.

This index covers the four volumes. The large capitals occurring before the figures indicate the particular volume. Pages of principal entries are in heavy-faced type.

- Aaron's beard, I, 175  
Acanthocereus, **11**, 1, 2, 15, **121-126**, 207, 281  
albicaulis, **11**, 122, **125**, 126  
brasilensis, **11**, 122, **125**, 126  
colombianus, **11**, 122  
floridanus, **11**, 276  
horridus, **11**, 122, 123  
occidentalis, **11**, 122, **125**  
pentagonus, **11**, 122, **123**, 124, 191; **11**, 276  
subinermis, **11**, 122, **125**  
Acanthorhopsalis, **11**, 208, **211-213**  
crenata, **11**, 211, **212**  
micrantha, **11**, 211  
monacantha, **11**, 211, **212**  
Acutangles, **11**, 122  
Agave, I, 117  
Agave cactus, **11**, 108  
Agave lophantha, **11**, 109  
Agua-colla, **11**, 135  
Ahoplocarpus, I, 11  
Airampo, I, 161  
Alati, **11**, 186  
Alfilerillo, I, 26  
Algae, **11**, 65  
Allicochle, **11**, 40  
Ammophilac, I, 45, **211**; **11**, 265  
Ancistracanthi, **11**, 45  
Ancistrocactus, **11**, 3-5  
brevihamatus, **11**, 4, 5  
megarhizus, **11**, 4  
scheeri, **11**, 4, 5  
Angulosae-tetragonae, **11**, 168  
Anhalonium, **11**, 80, 83  
abides pulvilligerum, **11**, 81  
areolusum, **11**, 80  
aselliforme, **11**, 59  
elongatum, **11**, 80, 81  
engelmannii, **11**, 83; **11**, 286  
fissipedum, **11**, 82  
fissuratum, **11**, 83; **11**, 286  
furfuraceum, **11**, 80  
heteromorphum, **11**, 83  
jordanianum, **11**, 85  
kotschoubeyanum, **11**, 82  
kotschubeyi, **11**, 286  
lewinii, **11**, 84, 85  
prismaticum, **11**, 80, 81  
pulvilligerum, **11**, 80, 81  
retusum, **11**, 80  
rungei, **11**, 84  
subnodosum, **11**, 84  
sulcatum, **11**, 82; **11**, 286  
trigonum, **11**, 80, 81  
turbiniiforme, **11**, 106  
visnagra, **11**, 84  
williamsii, **11**, 84, 85; **11**, 286  
Anomali, **11**, 22  
Aporocactus, **11**, 183, **217-221**  
baumannii, **11**, 174  
colubrinus, **11**, 174  
conzattii, **11**, 217, **220**, 221  
flagelliformis, **11**, 217, **218**, 219, 221; **11**, 284  
flagriformis, **11**, 217, **218**, 219  
leptophis, **11**, 217, **218**; **11**, 284  
martianus, **11**, 217, **220**, 221; **11**, 284  
Apple, I, 9  
Arequipa, **11**, 77, **100**, **101**  
leucotricha, **11**, **101**  
myriacantha, **11**, **101**  
Aria, **11**, 80  
Ariocarpus, **11**, 77, 78, **80-83**, 84, 93  
arelliformis, **11**, 59  
Ariocarpus—*continued*,  
fissuratus, **11**, 80, 81, **83**; **11**, 23, 286  
furfuraceus, **11**, 80, 81, 184  
kotschoubeyanus, **11**, 80, **82**; **11**, 286  
kotschubeyanus, **11**, 82  
lloydii, **11**, 83  
mcdowellii, **11**, 82  
prismaticus, **11**, 80  
pulvilligerus, **11**, 80  
retusus, **11**, **80**, 81; **11**, 286  
sulcatus, **11**, 82  
trigonus, **11**, 80, 81; **11**, 286  
williamsii, **11**, 84  
Arrojadoa, **11**, 2, **170**, **171**, 178  
rhodantha, **11**, 170  
Astrophytum, **11**, 78, 167, **182-185**  
asterias, **11**, 182, **183**, 184  
capricorne, **11**, 182, **184**; **11**, 288  
glabrescens, **11**, 185  
myriostigma, **11**, **182**, 183, 185; **11**, 287, 288  
ornatum, **11**, 182, **185**  
prismaticum, **11**, 182  
Aulacothele sulcolanatum, **11**, 38  
Aurantiacae, I, 45, 74, 106  
Austrocactus, **11**, 3, **44**, **45**  
bertinii, **11**, **44**  
Ayrampo, I, 135  
Azurae, **11**, 4  
Bande du sud, **11**, 151  
Barbados gooseberry, I, 10  
Barrel cacti, **11**, 131  
Bartschella, **11**, 3, **57-59**  
schumannii, **11**, 58  
Basilares, I, 45, **118**, 193; **11**, 262  
Bauhinia, **11**, 92  
Bavoso, **11**, 86  
Beaucarnea, I, 117  
Beaver-tail, I, 120  
Bergerocactus, **11**, 2, **107**, **108**; **11**, 4  
emoryi, **11**, 107, **108**; **11**, 274  
Bergerocereus, **11**, 108  
Bigelovianae, I, 44, **58**  
Binghamia, **11**, 2, **167-169**; **11**, 279  
acrantha, **11**, 167, **168**  
melanostele, **11**, **167**, 168; **11**, 279  
multangularis, **11**, 279  
Bisnaga, **11**, 134  
Blade apple, I, 10  
Borzicactus, **11**, 2, **159-164**, 173; **11**, 103  
acanthurus, **11**, 159, **161**  
aurivillus, **11**, 159, **163**, **226**  
decumbens, **11**, 159, **162**  
fieldianus, **11**, 277, **278**  
humboldtii, **11**, 159, **163**  
icosagonus, **11**, 159, 160  
morleyanus, **11**, 159, 160, 161  
plagiostoma, **11**, 159, **163**  
sepium, **11**, 159, **160**  
ventimigliae, **11**, 159, 160  
Bottle cactus, **11**, 60  
Brachycereus, **11**, 2, **120**, **121**  
thouarsii, **11**, **120**, 121  
Brain cactus, **11**, 90  
Brasilienses, I, 45, **209**  
Brasiliopuntia, I, 209  
Breebee, **11**, 18  
Bromeliads, **11**, 42; **11**, 183  
Browningia, **11**, 2, **63**, **64**  
candelaris, **11**, **63**, 64  
Bullucker, I, 43, 116  
Button cactus, **11**, 93  
Cabeça branca, **11**, 30  
Cabeça de frade, **11**, 221, 235  
Cabeza del viego, **11**, 28  
Cactaceae, I, 3, 8; **11**, 1, 211; **11**, 3  
Cactales, I, 8  
Cactanae, **11**, 1; **11**, 216; **11**, 273  
Cacti, I, 5, 6, 7, 9, 28, 33, 39, 42, 49, 66, 67, 80, 87, 94, 95, 111, 126, 137, 151, 216, 219, 220; **11**, 1, 2, 3, 8, 9, 19, 21, 23, 25, 28, 32, 65, 67, 77, 82, 113, 116, 117, 121, 122, 124, 127, 145, 147, 159, 165, 166, 167, 169, 173, 176, 177, 178, 182, 183, 185, 189, 196, 212, 214, 216, 217, 224; **11**, 3, 4, 6, 32, 33, 42, 46, 61, 63, 64, 70, 90, 91, 100, 108, 109, 123, 166, 167, 172, 179, 202, 207, 212, 213, 221, 224, 225, 226, 236; **11**, 3, 6, 14, 19, 33, 48, 51, 53, 58, 64, 70, 71, 100, 107, 118, 134, 145, 155, 177, 183, 185, 186, 191, 205, 206, 208, 211, 213, 215, 216, 219, 220, 249, 250, 253, 256, 275, 284  
Cactier rouge, **11**, 232  
Cactier rouge main, **11**, 226  
Cactodendron, I, 42, 43  
Cactus, I, 5, 6, 8, 9, 23, 30, 32, 34, 35, 43, 49, 87, 88, 93, 107, 113, 114, 116, 120, 121, 146, 164, 177, 186, 207, 210, 215, 216, 217, 221; **11**, 1, 5, 9, 19, 23, 25, 40, 42, 58, 61, 62, 64, 65, 70, 71, 72, 76, 87, 88, 90, 92, 102, 107, 111, 113, 115, 124, 125, 135, 140, 147, 150, 151, 153, 158, 159, 163, 164, 165, 166, 167, 170, 172, 179, 181, 191, 192, 195, 210, 212, 221, 222, 224; **11**, 3, 6, 7, 23, 29, 31, 32, 44, 45, 54, 60, 78, 90, 91, 104, 106, 107, 109, 123, 142, 155, 166, 170, 173, 175, 182, 186, 193, 208, 212, 213, 215, 216, **220-238**; **11**, 3, 4, 6, 22, 24, 35, 53, 57, 60, 71, 79, 95, 98, 141, 156, 162, 163, 172, 177, 186, 201, 203, 204, 249, 250, 253, 261, 277, 280, 289  
abnormis, **11**, 12  
acanthophlegma, **11**, 107  
acanthostephes, **11**, **41**  
acicularis, **11**, 171  
aciculatus, **11**, 132  
ackermannii, **11**, 198  
actinopleus, **11**, 172  
aculeatissimus, **11**, 238; **11**, 289  
aeruginosus, **11**, 88  
affinis, **11**, 88  
alatus, **11**, 205, 213, 243  
albisetosus, **11**, 270  
albisetus, **11**, 270  
alpinus, **11**, 165  
alteolens, **11**, 218  
alternatus, **11**, 79  
amabilis, **11**, 172  
ambiguus, **11**, 118, 119; **11**, 98; **11**, 75  
americanus, **11**, 273  
Cactus—*continued*,  
amoenus, **11**, 222, **232**  
ancistracanthus, **11**, 15  
ancistrius, **11**, 131  
ancistrodes, **11**, 149  
anguineus, **11**, 134  
anizogonus, **11**, 282  
arbores, I, 209, 210  
areolusos, **11**, 286  
argenteus, **11**, 172  
atratrus, **11**, 97  
atoruber, **11**, 172  
atrosanguineus, **11**, 172  
aulacanthus, **11**, 171  
aulacothele, **11**, 30  
aurantiacus, I, 107  
aurantiiformis, **11**, 238  
aureiceps, **11**, 114  
aureus, **11**, 105  
auricomus, **11**, 118  
aureorus, **11**, 118  
ayrampo, **11**, 261  
bahiensis, **11**, 222, **234**  
barbatus, **11**, 144  
barlowii, **11**, 172  
bellatulus, **11**, 165  
beneckeii, **11**, 171  
berteri, **11**, 97, 98  
bertini, **11**, 285  
bicolor, **11**, 105  
biglandulosus, **11**, 31  
bihamatus, **11**, 140  
bispinus, **11**, 108  
bleo, I, 17, 63  
bocasanus, **11**, 147  
bockii, **11**, 78  
bolivianus, **11**, 256  
bonplandii, I, 223  
bradypus, I, 121; **11**, 27  
brandegeei, **11**, 73, 74  
brasilensis, I, 209  
brevimamma, **11**, 31  
brevisetus, **11**, 172  
broadwayi, **11**, 217, 222, 234, 235  
brownii, **11**, 33  
brunneus, **11**, 15  
bulbispinus, **11**, 255  
caesius, **11**, 222, 232, **233**, 234, 235  
caespitius, **11**, 165  
calcaratus, **11**, 48  
californicus, I, 8  
campachianus, **11**, 253  
candelaris, **11**, 63, 145  
canescens, **11**, 113  
capillaris, **11**, 122, 123  
caripensis, **11**, 124; **11**, 226  
carneus, **11**, 88  
cassithoides, **11**, 227  
caudatus, **11**, 175  
celasianus, **11**, 112  
centricirrhus, **11**, 78  
centrispinus, **11**, 5  
cephalophorus, **11**, 41  
ceratocentrus, **11**, 32  
chiloensis, **11**, 137  
chinensis, I, 156, 157  
chlorocarpus, **11**, 224  
chrysacanthus, **11**, 122  
cirrhifer, **11**, 91  
clavatus, **11**, 255  
clavus, **11**, 30  
coccinellifer, I, 179, 224; **11**, 252  
coccineus, **11**, 79  
cochenillifer, I, 34, 35, 173; **11**, 253  
columnaris, **11**, 99, 107  
communis, **11**, 224, 225, 226  
compactus, **11**, 36



- Cactus—continued,*  
*compressus*, I, 127; IV, 91  
*conicus*, IV, 70  
*conodeus*, IV, 17  
*conoideus*, IV, 17  
*conopseus*, IV, 78  
*coquimbanus*, II, 88, 139  
*corniferus*, IV, 39  
*cornigerus*, IV, 287  
*corollarius*, IV, 172  
*coronarius*, IV, 176  
*coronatus*, III, 224; IV, 172, 176  
*corrugatus*, I, 95; III, 179  
*crassispinus*, IV, 122  
*crebrispinus*, IV, 18  
*crinitus*, IV, 150  
*crispatus*, III, 116  
*crocidatus*, IV, 87  
*cruciformis*, IV, 215  
*cruciger*, IV, 113  
*curassavicus*, I, 102; IV, 257  
*curvispinus*, III, 203; IV, 172  
*cylindraceus*, IV, 127  
*cylindricus*, I, 63, 77; IV, 140, 141, 176, 231  
*dasyacanthus*, IV, 55  
*dealbatus*, IV, 110  
*decipiens*, IV, 131  
*decumanus*, I, 80  
*densispinus*, IV, 119, 120  
*densus*, IV, 134  
*dentatus*, IV, 214, 241  
*depressus*, III, 177; IV, 132, 140  
*diadema*, IV, 78  
*dillenii*, I, 162, 163  
*disciformis*, III, 106  
*discolor*, IV, 132  
*divaricatus*, II, 151; IV, 78, 278  
*divergens*, IV, 78  
*dolichocentrus*, IV, 106  
*dyckianus*, IV, 107  
*eborinus*, IV, 173  
*eburneus*, I, 95; II, 225  
*echinaria*, IV, 136  
*echinocactodes*, IV, 17  
*echinocactoides*, IV, 17  
*echinocarpus*, IV, 254  
*echinus*, IV, 18, 42  
*ehrenbergii*, IV, 78  
*elatior*, I, 153  
*elegans*, IV, 107, 205  
*elephantidens*, IV, 32  
*elongatus*, I, 179; IV, 134  
*emoryi*, IV, 255  
*engelmannii*, IV, 27, 28  
*ensifformis*, IV, 201  
*epidendrum*, IV, 227  
*erectacanthus*, IV, 173  
*erectus*, IV, 32  
*eriocanthus*, IV, 127  
*erinaceus*, III, 198; IV, 290  
*eschanzieri*, IV, 156  
*euchlorus*, IV, 173  
*euphorbioides*, II, 33  
*eximius*, IV, 118  
*exsudans*, IV, 31  
*fascicularis*, II, 141  
*fasciculatus*, IV, 162, 229  
*fellneri*, IV, 173  
*ferox*, I, 199, 200, 206  
*ficus-indica*, I, 177  
*fimbriatus*, I, 13; II, 87, 151  
*fischeri*, IV, 95  
*flagelliformis*, II, 217, 218, 219  
*flavescens*, IV, 166  
*flavispinus*, II, 60  
*floribundus*, III, 97  
*foersteri*, IV, 78  
*foliosus*, I, 105; III, 179  
*formosus*, IV, 90  
*foveolatus*, IV, 83  
*fragilis*, I, 193  
*frutescens*, I, 27
- Cactus—continued,*  
*fulvispinus*, IV, 176  
*fulvispinosus*, II, 50  
*funalis*, I, 231  
*funkii*, IV, 93  
*fuscatus*, IV, 122  
*gabbii*, IV, 73, 74  
*garipensis*, IV, 226  
*geminatus*, IV, 173  
*geminispinus*, IV, 98  
*gibbosus*, III, 18, 159, 177; IV, 173, 288  
*glabratus*, IV, 173  
*gladiatus*, IV, 78  
*glanduliger*, I, 31  
*glaucus*, I, 78  
*glochidiatus*, IV, 149  
*glomeratus*, IV, 124  
*goodridgii*, IV, 158  
*gracilis*, II, 151; IV, 136  
*grahamii*, IV, 155, 156  
*grahlianus*, III, 209  
*grandicornis*, IV, 173  
*grandiflorus*, II, 196, 197, 198; IV, 17, 251  
*granulatus*, IV, 125  
*griseus*, IV, 166  
*guilleminianus*, IV, 131  
*gummifer*, IV, 74  
*gummiferus*, IV, 74  
*haageanus*, IV, 110  
*haematactinus*, IV, 173  
*halei*, IV, 22  
*hamatus*, IV, 140  
*harlowii*, III, 221, 222, 232  
*haworthianus*, IV, 124  
*haworthii*, II, 44  
*heinei*, IV, 166  
*helicteres*, IV, 167  
*hemisphaericus*, IV, 75  
*heptagonus*, II, 43; III, 237  
*heterocladus*, I, 210  
*heterogonus*, III, 237  
*heteromorphus*, IV, 25  
*hexacanthus*, IV, 167  
*hexagonus*, II, 3, 4, 5, 43, 223; IV, 266  
*heyderi*, IV, 75  
*heyderi hemisphaericus*, IV, 75, 76  
*horridus*, I, 21; III, 202, 203; IV, 251, 259  
*humboldtii*, II, 163; IV, 130  
*humifusus*, I, 127  
*humilis*, I, 113  
*hybridus*, IV, 198  
*hyptiacanthus*, III, 156  
*hystrix*, II, 86; I, 78  
*icosagonus*, II, 160  
*imbricatus*, IV, 254  
*incurvus*, I, 173  
*indicus*, I, 156  
*intertextus*, IV, 134  
*intortus*, III, 220, 221, 222, 230, 231  
*irregularis*, I, 167  
*isabellinus*, I, 118  
*italicus*, I, 266  
*jamacaru*, II, 8  
*jucundus*, IV, 173  
*kageneckii*, II, 20  
*karwinskianus*, IV, 95  
*kleinei*, IV, 173  
*klugii*, I, 107  
*kotschoubeyi*, III, 82  
*kotschubei*, III, 82  
*kotschubeyi*, III, 82  
*krameri*, IV, 78  
*kunthii*, IV, 107  
*lactescens*, IV, 78  
*laetus*, II, 99  
*lamarckii*, III, 224, 225  
*lanatus*, II, 61, 62  
*lanceolatus*, I, 179  
*langsdorffii*, III, 199, 200  
*lanifer*, IV, 113  
*lanuginosus*, II, 49
- Cactus—continued,*  
*lanuginosus aureus*, II, 20  
*lasiacanthus*, IV, 128  
*lasiacanthus denudatus*, IV, 129  
*latimamma*, IV, 41  
*latispinus*, III, 143  
*lecchii*, II, 20  
*lehmannii*, IV, 31  
*lemairei*, III, 222, 225, 226  
*leucocentrus*, IV, 167  
*leucodasys*, IV, 173  
*leucodictyus*, IV, 173  
*leucotrichus*, IV, 93  
*linkeanus*, IV, 118  
*linkii*, I, 121; III, 193  
*lividus*, IV, 173  
*longimamma*, IV, 163  
*longisetus*, IV, 91  
*loricatus*, IV, 168  
*luteus*, III, 238  
*ludwigii*, IV, 76  
*luteus*, III, 238  
*lyratus*, IV, 217, 218  
*macracanthus*, III, 222, 226; IV, 79  
*macroanthos*, III, 222  
*macromeris*, IV, 25  
*macrothele*, IV, 30  
*maculatus*, IV, 15  
*magnimamma*, IV, 77  
*mallisonii*, II, 219  
*mammillaris*, I, 4; IV, 53, 65, 70, 71, 166  
*mammillaris glaber*, IV, 70  
*mammillaris lanuginosus*, IV, 166  
*mammillaris prolifer*, IV, 124  
*martianus*, IV, 31  
*maschalacanthus*, IV, 93  
*maximus*, IV, 263  
*maxonii*, III, 221, 222, 227, 228  
*megacanthus*, IV, 78  
*meiacanthus*, IV, 84  
*meissneri*, IV, 107  
*melaleucus*, IV, 63  
*melocactoides*, III, 222, 228, 235  
*melocactus*, II, 29, 30 III, 220, 221, 222, 224, 233  
*melocactus communis*, III, 224  
*mensarum*, III, 238  
*meonacanthus*, III, 224  
*mexicanus*, II, 197  
*micans*, IV, 173  
*micracanthus*, IV, 173  
*micranthus*, IV, 239  
*microceras*, IV, 78  
*microdasys*, I, 120, 121  
*micromeris*, III, 93  
*micromeris greggii*, III, 93  
*microthele*, IV, 70, 109  
*minimus*, IV, 134  
*mirabilis*, IV, 118  
*missouriensis*, IV, 53  
*missouriensis robustior*, IV, 52  
*missouriensis similis*, IV, 52  
*mitis*, IV, 175  
*moniliformis*, I, 206, 207  
*monocanthos*, I, 156  
*mucronatus*, IV, 173  
*muehlenpfordtii*, IV, 112  
*multangularis*, II, 19; III, 139, 142; IV, 279  
*multiceps*, IV, 125  
*multisectus*, IV, 173  
*mutabilis*, IV, 93  
*mystax*, IV, 93  
*nanus*, I, 217  
*napoleonis*, II, 191  
*neglectus*, IV, 290  
*neo-mexicanus*, IV, 45  
*neryi*, III, 222, 236, 237  
*neumannianus*, IV, 77, 78
- Cactus—continued,*  
*niger*, II, 44; IV, 171  
*nicaricensis*, I, 153; IV, 116, 262  
*niveus*, IV, 98  
*nivosus*, IV, 71  
*nobilis*, III, 123, 141, 143, 158; IV, 98  
*nopal*, IV, 253  
*notesteinii*, IV, 53  
*nudus*, IV, 168  
*oaxacensis*, IV, 289  
*obconella*, IV, 106  
*obliquus*, IV, 173  
*obtusipetalus*, III, 222, 232  
*obvallatus*, III, 115; IV, 174  
*octacanthus*, IV, 31  
*octogonus*, II, 4; III, 238  
*odieranus*, IV, 122  
*olorinus*, IV, 174  
*ootherle*, IV, 174  
*opuntia*, I, 43, 115, 127, 128, 129, 163, 177  
*opuntia inermis*, I, 161, 162  
*opuntia nana*, I, 127, 128  
*opuntia polyanthos*, I, 115  
*opuntia tuna*, I, 157  
*opuntiaeflorus*, I, 27  
*oreas*, III, 222, 227  
*ottonis*, I, 121; III, 195, 196, 197; IV, 26  
*ovatus*, II, 20  
*ovimamma*, IV, 174  
*ovooides*, I, 95  
*oxypetalus*, IV, 189  
*pallescens*, IV, 88  
*palmeri*, IV, 140  
*paniculatus*, II, 82; IV, 280, 281  
*paradoxus*, I, 209  
*parasiticus*, IV, 219, 225, 229  
*parkinsonii*, IV, 98  
*parryi*, IV, 254  
*parvifolius*, IV, 266  
*parvimamma*, IV, 70  
*parvispinus*, III, 237  
*pazzanii*, IV, 78  
*pectinatus*, IV, 34  
*pendulinus*, IV, 226  
*pendulus*, IV, 225, 227  
*pentacanthus*, IV, 78  
*pentagonus*, II, 15, 121, 123, 193  
*pentlandii*, I, 98  
*pereskia*, I, 9, 10, II; IV, 251  
*persicanus*, IV, 174  
*peruvianus*, II, 11, 13, 225; III, 234; IV, 266  
*peruvianus jamaicensis*, IV, 278  
*pfeifferanus*, IV, 39  
*phaeacanthus*, IV, 116  
*phaeotrichus*, IV, 174  
*phellospermus*, IV, 60  
*phyllanthoides*, IV, 204, 205  
*phyllanthus*, IV, 186, 187, 188, 197, 198  
*phymatotothele*, IV, 76  
*pictus*, IV, 169  
*pitajaya*, II, 15, 123  
*placentiformis*, III, 219, 220  
*plaschnickii*, IV, 31  
*plecostigma*, IV, 169  
*pleiocephalus*, IV, 174  
*polyanthos*, I, 113, 115; IV, 259  
*polycentrus*, IV, 118  
*polycephalus*, IV, 113  
*polyedrus*, IV, 102  
*polygonus*, II, 47; IV, 101  
*polymorphus*, II, 139, 174  
*polythele*, IV, 88  
*polytrichus*, IV, 102  
*pomaceus*, IV, 118  
*pondii*, IV, 23  
*portulacifolius*, I, 23  
*pottsi*, IV, 136  
*praelii*, IV, 96

Cactus—*continued*,

pretiosus, IV, 118  
 pringlei, IV, 114, 116  
 prismaticus, II, 123; III, 80  
 procerus, IV, 174  
 prolifer, IV, 71, 124  
 proliferus, IV, 124  
 proteiformis, III, 238  
 pruinosus, II, 88  
 pseudococcinifer, I, 153  
 pseudomammillaris, IV, 132, 133  
 pseudotuna, III, 238  
 pubescens, IV, 257  
 pugionacanthus, IV, 174  
 pulchellus, IV, 132  
 pulcher, IV, 160  
 pulcherrimus, IV, 118  
 pulvilliger, IV, 286  
 purpureus, IV, 174  
 pusillus, I, 105; IV, 124  
 pycnacanthus, IV, 41  
 pyramidalis, III, 222  
 pyrrocephalus, IV, 99  
 pyrrochroacanthus, IV, 122  
 quadrangularis, II, 124  
 quadratus, IV, 175  
 quadriflorus, IV, 254  
 quadrispinus, IV, 88  
 radians, IV, 36  
 radians pectinoides, IV, 36, 37  
 radiosus, IV, 43  
 radiosus alversonii, IV, 46  
 radiosus arizonicus, IV, 45  
 radiosus chloranthus, IV, 43  
 radiosus deserti, IV, 46  
 radiosus neo-mexicanus, IV, 45  
 recurvatus, IV, 27  
 recurvispinus, IV, 51  
 recurvus, III, 123, 141, 142; IV, 78  
 reductus, III, 158  
 regalis, IV, 266  
 regius, IV, 174  
 repandus, II, 17, 151, 152  
 reptans, IV, 290  
 reticulatus, IV, 264  
 retusus, IV, 38  
 raphidacanthus, IV, 15  
 rhodanthus, IV, 122  
 rhodanthus sulphureospinus, IV, 116, 122  
 rhodocentrus, IV, 174  
 robustior, IV, 2  
 robustispinus, IV, 33  
 rosa, I, 19, 20  
 roseanus, IV, 22  
 roseus, IV, 174  
 rotundifolius, I, 27  
 royenii, II, 50  
 ruschianus, IV, 174  
 ruestii, III, 221, 222, 227  
 ruficeps, IV, 122  
 rufidulus, IV, 174  
 rufocroceus, IV, 174  
 rutilus, IV, 169  
 salicornioides, IV, 217, 218  
 salm-dyckianus, IV, 39  
 salmianus, I, 74  
 salvador, III, 222, 228, 229  
 saxatilis, IV, 169  
 scepontocentrus, IV, 41  
 schaeferi, IV, 112  
 scheeri, IV, 28  
 scheidweilerianus, IV, 148  
 schelhasei, IV, 149  
 schideanum, IV, 128  
 schilinzkyanus, III, 210  
 schlehtendalii, IV, 30  
 schlumbergeri, IV, 269  
 scolymoides, IV, 18, 39  
 scolymoides sulcatus, IV, 48  
 scopa, III, 193  
 seemannii, IV, 170  
 seidelii, IV, 174

Cactus—*continued*,

seitzianus, IV, 83  
 sempervivi, IV, 86  
 senilis, II, 25, 27; IV, 19  
 sepium, II, 160  
 sericeus, I, 134  
 serpens, II, 163  
 serpentinus, II, 118, 119  
 setispinus, IV, 22  
 setosus, IV, 88  
 severinii, IV, 174  
 similis, IV, 52  
 solitarius, IV, 175  
 sororius, IV, 170  
 speciosissimus, II, 128, 129; IV, 277  
 speciosissimus lateritius, II, 128; IV, 277  
 speciosus, II, 127, 128; IV, 175, 205, 244, 277  
 speciosus grandiflorus, IV, 201  
 speciosus lateritius, IV, 277  
 spectabilis, IV, 174  
 sphacelatus, IV, 138  
 sphaericus, IV, 61  
 sphaerotrachus, IV, 130  
 spinaureus, IV, 170  
 spini, IV, 132, 133  
 spinosissimus, I, 204; IV, 118, 119  
 spinosus, IV, 175  
 splendidus, IV, 253  
 squarrosus, IV, 91  
 stella-auratus, IV, 134  
 stellaris, IV, 125  
 stellatus, IV, 124, 125  
 stellatus texanus, IV, 125  
 stenocephalus, IV, 122  
 stramineus, IV, 166  
 strictus, I, 161; II, 44  
 strobiliformis, IV, 54  
 stueberi, IV, 122  
 subangularis, IV, 91  
 subcroceus, IV, 134  
 subcurvatus, IV, 78  
 subechinatus, IV, 134  
 subinermis, I, 34  
 subpolyedrus, IV, 105  
 subquadriflorus, IV, 254  
 subquadrifolius, I, 65; IV, 254  
 subrepandus, IV, 278  
 subtetragonus, IV, 88  
 subulifer, IV, 174  
 sulcatus, IV, 48  
 sulcolanatus, IV, 37  
 sulphureus, I, 134  
 supertextus, IV, 107  
 sylvestris, III, 238  
 tectus, IV, 174  
 tentaculatus, IV, 122  
 tenuis, IV, 134, 215  
 teres, IV, 227  
 tetraacanthus, IV, 106  
 tetracentrus, IV, 78  
 tetragonus, II, 9, 14  
 tetrancistrus, IV, 60  
 texanus, IV, 125  
 texensis, IV, 76  
 tomentosus, I, 73; IV, 175  
 torquatus, IV, 245  
 townsendii, III, 222, 234  
 triacanthos, I, 112  
 triacanthus, IV, 91  
 triangularis, II, 183, 187, 188, 192, 193, 194, 212; IV, 282  
 triangularis aphyllus, II, 187  
 triangularis foliaceus, II, 192  
 triangotomus, III, 238  
 trigonus, II, 192  
 triqueter, II, 192; IV, 243  
 truncatus, IV, 177, 179, 180  
 tuberculatus, I, 214  
 tuberculosus, IV, 54  
 tuna, I, 113, 114, 163  
 tuna elatior, I, 153

Cactus—*continued*,

tuna major, IV, 289  
 tuna nigricans, I, 153  
 tunicatus, I, 65  
 turbinatus, III, 106  
 uberiformis, IV, 63  
 umbrinus, IV, 164  
 uncinatus, IV, 140  
 undulosus, II, 123  
 urumbaba, I, 156, 157  
 urumbella, I, 157  
 varimamma, IV, 175  
 versicolor, IV, 78  
 verticillatus, III, 238  
 vetulus, IV, 130  
 villifer, IV, 102  
 villosus, III, 103  
 virens, IV, 95  
 viridis, IV, 96  
 viviparus, IV, 43, 44, 45  
 vrieseanus, IV, 174  
 vulpinus, IV, 118  
 webbianus, IV, 87  
 wegeneri, IV, 175  
 wildianus, IV, 143  
 winkleri, IV, 41  
 woburnensis, IV, 100  
 wrightii, IV, 152  
 xanthotrachus, IV, 93  
 zegschwartzii, IV, 175  
 zehntneri, III, 222, 235, 236  
 zephyranthodes, IV, 159  
 zepnickii, IV, 175  
 zinniaeflorus, I, 21  
 Cactuses, II, 116  
 Calibanus caespitosus, IV, 132  
 Camussa, I, 191  
 Candebobe, II, 96  
 Cane cactus, I, 43  
 Capilliformes, IV, 220  
 Cardon, II, 70, 96; III, 232; IV, 277  
 Cardon grande, II, 140  
 Cardoncillo, II, 112  
 Carnegiea, II, 2, 164-167, 178  
 gigantea, II, 133, 164, 165, 166, 178; IV, 155, 279, 290  
 Cassuthae, IV, 220  
 Cassytha, IV, 219  
 baccifera, IV, 227  
 filiformis, IV, 219, 225  
 polysperma, IV, 227  
 Cephalocactus, III, 85  
 Cephalocereus, I, 116; II, 1, 3, 13, 25-60, 178, 224, 225; III, 6, 7; IV, 268  
 alensis, II, 26, 55  
 arrabidae, II, 26, 42, 43, 136; IV, 268  
 bahamensis, II, 26, 38  
 bakeri, II, 39, 40  
 barbadensis, II, 26, 44, 45, 46  
 brasiliensis, II, 26, 57  
 brooksonianus, II, 26, 49  
 californicus, II, 224  
 catingicola, II, 26, 49, 56; IV, 269  
 chrysacanthus, II, 26, 48  
 chrysomallus, II, 72  
 collinsii, IV, 269, 270  
 colombianus, II, 26, 34, 55, 56  
 columna, II, 76  
 columna-trajani, II, 76  
 cometes, II, 26, 51, 52  
 compressus, II, 193  
 deeringii, II, 26, 38, 39  
 delaetii, III, 6  
 dybowskii, II, 25, 30, 58  
 euphorbioides, II, 25, 33  
 exerens, II, 42  
 fluminensis, II, 25, 29, 33, 57; IV, 268  
 fouachianus, II, 51  
 gaumeri, II, 26, 47  
 gounellei, II, 25, 34, 35; III, 236  
 hermentianus, II, 58; IV, 270

Cephalocereus—*continued*,

hoppenstedtii, II, 25, 27, 225  
 keyensis, II, 26, 40  
 lanuginosus, II, 18, 26, 49, 50; IV, 269  
 leucocephalus, II, 26, 52, 53; IV, 269  
 leucosteles, II, 25, 36, 37, 39, 60  
 macrocephalus, II, 25, 31, 75, 76; IV, 268  
 maxonii, II, 26, 48, 53  
 melanosteles, II, 167; IV, 279  
 melocactus, II, 29, 30, 8  
 millsbaughii, II, 26, 45, 46  
 monoclonus, II, 26, 40, 41  
 moritzianus, II, 26, 41, 42  
 nobilis, II, 26, 44, 45; IV, 269  
 palmeri, II, 26, 53  
 pasacana, IV, 277  
 pentaedrophorus, II, 25, 31  
 phaeacanthus, II, 26, 57  
 piauhyensis, II, 26, 48, 49  
 polygonus, II, 26, 47; IV, 269  
 polylophus, II, 25, 32; IV, 268  
 purpureus, II, 25, 28, 29  
 purpusii, II, 26, 56; IV, 269  
 robinii, II, 26, 39, 40  
 robustus, II, 26, 51, 52  
 royenii, II, 26, 46, 50; IV, 269  
 russelianus, II, 25, 33, 34, 56  
 sartorianus, II, 26, 53  
 schlumbergeri, IV, 269  
 scoparius, II, 26, 41  
 senilis, II, 25, 27, 28, 31; III, 4, 6; IV, 268  
 smithianus, II, 26, 36, 37  
 swartzii, II, 26, 46, 47  
 tetetzo, IV, 272  
 tweedyanus, II, 26, 54, 55  
 ulei, II, 26, 52, 58  
 urbanianus, II, 26, 43  
 zehntneri, II, 25, 35  
 Cephaloidei, III, 8, 90, 176  
 Cephalophora, II, 25  
 Cephalophorus, II, 25  
 columna-trajani, II, 76  
 senilis, II, 27  
 Ceratistes copiapensis, III, 186  
 Cereanae, II, 1; III, 3; IV, 177  
 Cereaceae, I, 8, 24, 215; II, 1, 111; III, 3; IV, 3  
 Cerei, II, 59, 70  
 Cereus, I, 8, 75, 151, 215, 217; II, 1, 3-21, 33, 41, 42, 47, 58, 59, 68, 77, 82, 87, 105, 108, 110, 118, 122, 127, 144, 145, 147, 152, 158, 163, 164, 170, 173, 192, 219, 221, 222, 223, 224, 225; III, 3, 8, 11, 23, 25, 45, 60, 76, 78, 79, 121, 132, 154, 166, 237; IV, 48, 64, 71, 180, 186, 189, 208, 209, 210, 211, 266, 267, 268, 274  
 abnormis, II, 12  
 acanthosphaera, II, 209  
 acanthurus, II, 161  
 acidus, II, 84  
 acifer, III, 12  
 aciniformis, III, 23  
 ackermannii, IV, 198  
 acranthus, II, 168  
 acromelas, II, 59  
 aculeatus, II, 21  
 acutangulus, II, 123, 124, 157  
 ascendens, II, 155, 156  
 adustus, III, 23  
 adustus radians, III, 24  
 aethiops, II, 4, 16, 17, 18; IV, 266  
 affinis, II, 14  
 aggregatus, III, 14; IV, 47  
 alacriportanus, II, 4, 6, 7

*Cereus—continued,*

alamosensis, II, 169  
 alatus, IV, 213, 243  
 alatus crassior, IV, 214  
 albertinii, II, 21  
 albiflorus, II, 128  
 albisetosus, II, 8  
 albispinus, II, 37, 59, 118  
 albispinus major, II, 59  
 alensis, II, 5  
 amalonga, IV, 267  
 amalonga cristata, IV, 267  
 amazonicus, II, 24  
 ambiguus, II, 118  
 ambiguus strictior, II, 118  
 amblyogonus, II, 20  
 amecaensis, II, 129  
 amecanensis, II, 129; IV, 277  
 americanus octangularis, II, 89  
 americanus triangularis, II, 193  
 amoenus, III, 33  
 andalgalensis, III, 6  
 andryanus, II, 59  
 anguiniformis, II, 22, 174  
 anguinus, II, 175  
 angulosus, II, 32  
 anisacanthus, II, 102  
 anisacanthus ortholophus, II, 102  
 anisacanthus subspiralis, II, 102  
 anisitsii, II, 23  
 anizogonus, II, 193  
 anomalus, IV, 181  
 antoinii, II, 201  
 apiciflorus, II, 107  
 aquicaulensis, II, 180  
 aragonii, II, 92, 103  
 aragonii palmatus, II, 92  
 arboreus, II, 80  
 arcuatus, II, 124  
 arendtii, II, 154  
 areolatus, II, 159  
 arequipensis, II, 134, 145  
 argentincensis, II, 4, 11, 12  
 armatus, II, 50  
 arrabidaei, II, 42, 43  
 arrigens, II, 180  
 articulatus, I, 89  
 assurgens, II, 77, 79  
 atacamensis, II, 145  
 atropurpureus, II, 154  
 atrovirens, II, 21  
 aurantiacus, II, 128  
 aurantiacus superbus, II, 129  
 auratus, IV, 268  
 auratus genuinus, IV, 268  
 auratus intermedius, IV, 268  
 auratus mollissimus, IV, 268  
 auratus pilosus, IV, 268  
 aureus, II, 44, 105, 106, 107  
 aureus pallidior, II, 44  
 aurivillus, II, 173, 226  
 aurora, II, 219  
 azureus, II, 4, 15, 16  
 azureus seidelii, II, 15  
 baccilerus, IV, 227  
 bahamensis, II, 38  
 bajanensis, II, 124  
 bakeri, II, 39  
 balansaei, II, 157, 158  
 barbatus, II, 51  
 baumannii, II, 173, 174, 217  
 baumannii colubrinus, II, 174  
 baumannii flavispinus, II, 174  
 baumannii smaragdiflorus, II, 174  
 bavirus, II, 86; IV, 273  
 baxaniensis, II, 123, 124; IV, 276  
 baxaniensis ramosus, II, 124  
 belieuli, II, 96  
 beneckeii, II, 18; IV, 273  
 beneckeii farinosus, II, 18; IV, 273

*Cereus—continued,*

bergerianus, II, 72  
 berlandieri, III, 20, 21; IV, 285  
 bertini, III, 44  
 bertinii, III, 44, 45  
 beysiegelii, II, 223  
 bififormis, IV, 201, 202  
 bifrons, II, 128  
 bigelovii, III, 8, 9  
 bigelovii zuniensis, III, 14  
 biolleyi, II, 215  
 blankii, III, 20  
 blankii, III, 21; IV, 285  
 boeckmannii, II, 202; IV, 283  
 bolivianus, II, 136  
 bonariensis, II, 7  
 bonplandii, II, 157, 158; IV, 278  
 bonplandii brevispinus, II, 157  
 bonplandii pomaniensis, II, 155  
 brachiatus, II, 86  
 brachypetalus, II, 67  
 braditianus, I, 215  
 bradypus, II, 27  
 brandegeei, III, 34  
 brandii, II, 14  
 breviflorus, II, 82, 83  
 brevispinulus, II, 200  
 brevistylus, II, 66  
 bridgesii, II, 134  
 bridgesii brevispinus, II, 134  
 bridgesii lageniformis, II, 134  
 bridgesii longispinus, II, 134  
 brookii, II, 151  
 brooksianus, II, 49  
 caesius, II, 4, 13, 15  
 caespitosus, III, 25, 26; IV, 285  
 caespitosus castaneus, III, 25  
 caespitosus major, III, 25  
 caespitosus minor, III, 25  
 calcaratus, II, 193  
 californicus, I, 8; II, 224  
 callicanthus, II, 197  
 callicochae, III, 182  
 calvescens, II, 11  
 calvus, II, 69, 70  
 candelabrium, II, 126  
 candelabrum, II, 96; IV, 273  
 candelarius, II, 63  
 candicans, II, 142, 143; III, 28; IV, 277  
 candicans courantii, II, 142  
 candicans dumesnilianus, II, 143; IV, 277  
 candicans gladiatus, II, 142  
 candicans robustior, II, 142  
 candicans spinosior, II, 143  
 candicans tenuispinus, II, 142  
 caracore, IV, 266  
 caripensis, II, 124; IV, 226  
 castaneus, II, 84  
 catamarcensis, II, 146  
 catingae, IV, 269  
 catingicola, II, 56; IV, 269  
 cauchinii, II, 8  
 caudatus, II, 20; IV, 175  
 cavendishii, II, 21, 22; IV, 268  
 celsianus, II, 171, 172  
 chacoanus, II, 224  
 chalybaeus, II, 4, 16, 17, 223  
 chende, II, 90, 91  
 chichipe, II, 89, 90  
 childsi, IV, 266  
 chilensis, II, 137, 138, 139  
 chilensis acidus, II, 84  
 chilensis breviflorus, II, 83  
 chilensis brevispinulus, II, 139

*Cereus—continued,*

chilensis eburneus, II, 139  
 chilensis flavescens, II, 139  
 chilensis fulvibarbis, II, 139  
 chilensis funkianus, II, 138  
 chilensis heteromorphus, II, 137  
 chilensis linnaei, II, 139  
 chilensis nigripilis, II, 140  
 chilensis panhoplites, II, 137  
 chilensis polygonus, II, 137  
 chilensis poselgeri, II, 137  
 chilensis pycnanthus, II, 137  
 chilensis quisco, II, 139  
 chilensis spinosior, II, 139  
 chilensis zizkaanus, II, 137, 224  
 chilensis zizkeanus, II, 224  
 chiloensis, I, 79 II, 84, 137, 138  
 chiloensis lamprochlorus, II, 133  
 chiotilla, II, 6, 66; IV, 270  
 chloranthus, III, 16, 17  
 chlorocarpus, II, 224  
 chotaensis, II, 163  
 chrysacanthus, II, 48  
 chrysomallus, II, 72  
 cinerascens, III, 23  
 cinerascens crassior, III, 23  
 cinerascens tenuior, III, 23  
 cinnabarinus, II, 129; IV, 277  
 cirrhiferus, III, 23  
 clavarioides, I, 73  
 clavatus, II, 94  
 claviformis, III, 43  
 coccineus, II, 127, 210, 211, 212; III, 14; IV, 48  
 cochal, II, 180; IV, 280  
 coeruleascens, II, 17, 59; IV, 266  
 coeruleascens fulvuspinus, II, 17  
 coeruleascens landbeckii, II, 17  
 coeruleascens longispinus, II, 17  
 coeruleascens melanacanthus, II, 17  
 coeruleus, II, 17  
 cognatus, II, 123  
 colombianus, II, 55  
 colubrinus, II, 174, 217; IV, 279  
 colubrinus flavispinus, II, 174  
 colubrinus smaragdiflorus, II, 175  
 columna-trajani, II, 76  
 columnaris, II, 224  
 colvillii, II, 14  
 cometes, II, 52  
 compressus, II, 192, 193  
 concinnus, II, 21  
 concolor, III, 25, 26  
 conformis, II, 103  
 conglomeratus, III, 39  
 conicus, II, 33  
 coniflorus, II, 199  
 conoideus, III, 13, 14  
 coquimbanus, II, 83, 139, 225; IV, 272  
 coracare, II, 10  
 coryne, II, 64, 65; IV, 270  
 cossyrensis, II, 152  
 crenatus, II, 59; IV, 192  
 crenulatus, II, 49, 59  
 crenulatus gracilior, II, 49  
 crenulatus griseus, II, 87  
 crimsonii, II, 219  
 crispatus, IV, 245  
 crispatus crenulatus, IV, 244  
 crispatus laevior, IV, 244  
 cruciformis, IV, 213, 216  
 ctenoides, III, 19

*Cereus—continued,*

cubensis, II, 149  
 cumengei, II, 116  
 cupulatus, II, 74  
 curtisii, II, 44  
 cyaneus, IV, 266  
 cylindricus, I, 77  
 damacaro, II, 21  
 damazioi, II, 159  
 dasyacanthus, III, 19  
 dasyacanthus minor, III, 31  
 dasyacanthus neo-mexicanus, III, 19  
 dautwitzii, II, 61, 62  
 davisii, II, 154  
 dayamii, II, 4, 11  
 decagonus, II, 59  
 decandollii, II, 13  
 decorus, II, 20  
 decumbens, II, 162  
 deficiens, II, 94  
 de laguna, II, 20  
 del moralii, II, 90, 91; IV, 273  
 denudatus, III, 155  
 deppei, III, 23  
 devauxii, II, 128  
 dichroacanthus, III, 97, 98  
 diguetii, II, 111  
 divaricatus, II, 151  
 divergens, II, 151  
 donatii, II, 203  
 donkelaari, II, 200; IV, 230  
 donkelaerii, II, 200  
 donkelaarii, II, 200  
 dumesnilianus, II, 143, 159  
 dumortieri, II, 102  
 dusenii, III, 197  
 dussii, II, 123  
 dybowskii, II, 30  
 dyckii, II, 92, 93  
 eburneus, II, 20, 87, 89, 99, 103, 224, 225; III, 43; IV, 273  
 eburneus clavatus, II, 94  
 eburneus monstrosus, II, 88  
 eburneus polygonus, II, 87, 88  
 edulis, II, 89  
 ehrenbergii, III, 41  
 elegans, II, 139; IV, 216  
 emoryi, II, 108; IV, 274  
 engelmannii, III, 38  
 engelmannii albispinus, IV, 285  
 engelmannii caespitosus, IV, 285  
 engelmannii chrysocentrus, III, 38  
 engelmannii fulvispinus, IV, 285  
 engelmannii pferisdorfii, IV, 285  
 engelmannii variegatus, III, 38  
 enneacanthus, III, 36, 37; IV, 285  
 enriquezii, II, 88  
 erectus, II, 49, 152  
 erectus cristatus, II, 193  
 erectus maximus, II, 13  
 ericomus, II, 4  
 erinaceus, IV, 290  
 eriocarpus, II, 145  
 eriophorus, II, 149, 202; IV, 278  
 eriophorus laeteviridis, II, 149  
 eruca, II, 114, 115, 116; IV, 276  
 erythrocephalus, III, 7  
 estrellensis, II, 216  
 euchlorus, II, 21, 22; IV, 268  
 euphorbioides, II, 33  
 exerens, II, 42, 43  
 extensus, II, 191  
 eryiesii, II, 159; III, 65

*Cereus—continued,*

farinosus, II, 18; IV, 273  
 fascicularis, II, 141  
 fendleri, III, 35, 36  
 fendleri pauperculus, III, 35  
 fercheckii, II, 140  
 fernambucensis, II, 14  
 ferox, II, 30  
 fimbriatus, II, 151  
 flagelliformis, II, 218, 219;  
 IV, 21, 284  
 flagelliformis cristatus, IV,  
 284  
 flagelliformis funkii, II, 219  
 flagelliformis leptophis, II,  
 218  
 flagelliformis mallisoni, II,  
 219  
 flagelliformis minor, II, 218,  
 219; IV, 230  
 flagelliformis nothus, II, 219  
 flagelliformis scotii, II, 219  
 flagelliformis smithii, II, 219  
 flagelliformis speciosus, II,  
 219  
 flagriformis, II, 219, 220  
 flavescens, II, 20; III, 212;  
 IV, 71  
 flavicomus, II, 52  
 flaviflorus, III, 15  
 flavispinus, II, 20, 60  
 flavispinus hexagonus, II,  
 224  
 flemingii, IV, 283  
 flexuosus, IV, 116  
 floccosus, II, 50, 51  
 fluminensis, II, 29  
 foersterii, II, 53  
 forbesii, II, 7  
 formosissimus, IV, 286  
 formosus, II, 14  
 formosus monstrosus, IV, 266  
 fouchianus, II, 50  
 foveolatus, III, 98  
 fulgens, II, 210  
 fulgidus, II, 210  
 fulvibarbis, II, 139  
 fulviceps, II, 72  
 fulvispinosus, II, 50  
 fulvispinus, II, 140  
 funkii, II, 137  
 galapagensis, II, 146, 147  
 garambello, II, 180  
 geminisetus, II, 224  
 gemmatus, II, 74; III, 66,  
 67; IV, 271  
 geometrizans, II, 20, 179,  
 180; IV, 280  
 geometrizans cochal, II, 180  
 geometrizans pugioniferus,  
 II, 179, 180  
 geometrizans quadrangula-  
 rispinus, II, 179, 180  
 geometrizans quadranguli-  
 spinus, II, 180  
 ghiesbreghtii, II, 60  
 gibbosus, III, 158  
 giganteus, II, 135, 164, 167;  
 IV, 279  
 gilliesii, III, 75  
 gilvus, II, 137  
 glaber, II, 216  
 gladiator, II, 179  
 gladiator geometrizans, II,  
 180  
 gladius, II, 142  
 gladius courantii, IV, 277  
 gladius vernaculatus, IV,  
 277  
 gladiger, II, 87, 88, 180  
 gladiiger, II, 87  
 gladiiger, II, 87  
 glaucescens, II, 59  
 glaucus, II, 8, 15  
 glaucus speciosus, II, 14  
 glaziovii, II, 109  
 glomeratus, III, 15

*Cereus—continued,*

gloriosus, II, 51  
 glycimorphus, III, 23  
 gonacanthus, III, 10  
 gonzalezii, II, 77, 214  
 gracilis, II, 19, 147, 151, 209  
 gracilis scandens, II, 198  
 grandifloro-speciosissimus,  
 IV, 283  
 grandiflorus, II, 197, 198,  
 199; IV, 282, 283  
 grandiflorus affinis, II, 197  
 grandiflorus barbadensis, II,  
 198  
 grandiflorus callicanthus, II,  
 197  
 grandiflorus flemingii, IV, 283  
 grandiflorus grusonianus, II,  
 197  
 grandiflorus haitiensis, II,  
 197  
 grandiflorus hybridus, II,  
 210  
 grandiflorus macdonaldiae,  
 IV, 283  
 grandiflorus major, II, 198  
 grandiflorus maximiliani, II,  
 197  
 grandiflorus maynardii, II,  
 210  
 grandiflorus mexicanus, II,  
 197  
 grandiflorus minor, II, 197  
 grandiflorus ophites, II, 197  
 grandiflorus ruber, II, 210  
 grandiflorus schmidtii, II, 197  
 grandiflorus speciosissimus,  
 II, 210  
 grandiflorus spectabilis, II,  
 197  
 grandiflorus uranos, II, 197  
 grandiflorus viridiflorus, II,  
 197  
 grandis, II, 14  
 grandis gracilior, II, 14  
 grandis ramosior, II, 14  
 grandispinus, II, 87  
 greggii, II, 112, 113, 122;  
 IV, 275  
 greggii cismontanus, II, 112  
 greggii roseiflorus, II, 112  
 greggii transmontanus, II,  
 112, 113  
 grenadensis, II, 4, 18, 223  
 griseus, II, 87  
 grossei, II, 174  
 grusonianus, II, 203; IV, 283  
 guasabara, IV, 266  
 guatemalensis, II, 89, 119  
 guelichii, II, 158  
 gummatosus, II, 117  
 gummosus, II, 117  
 gummosus, II, 116, 117; IV,  
 276  
 haageanus, II, 19  
 haematuricus, II, 8  
 haitiensis, IV, 283  
 hamatus, II, 203, 205  
 hankeanus, II, 3, 7, 8  
 hansii, II, 128  
 hassleri, II, 211  
 haworthii, II, 44  
 hayni, III, 102, 103  
 hempelianus, II, 136  
 heptagonus, III, 237  
 hermannianus, II, 17  
 hermentianus, II, 8  
 heteracanthus, II, 224  
 heteromorphus, II, 137  
 hexaedrus, III, 10  
 hexagonus, II, 4, 5, 9, 13,  
 223, 224; III, 238; IV, 266  
 hexangularis, II, 14  
 hildmannii, II, 103  
 hildmannianus, II, 4, 6  
 hirschtianus, II, 119; IV,  
 276

*Cereus—continued,*

hoffmannseggii, III, 98  
 hollianus, II, 8, 86  
 hondurensis, II, 199  
 hoogendorpii, II, 22, 5  
 hookeri, IV, 197, 198  
 hoppenstedtii, II, 27; IV,  
 268  
 horizontalis, II, 20  
 horrens, II, 195  
 horribarbis, II, 8  
 horridus, II, 5, 9  
 houletii, II, 52, 53; IV, 269  
 huascha, II, 142; III, 57  
 huascha flaviflorus, II, 142  
 huascha flaviformis, II, 142  
 huascha rubriflorus, III, 6  
 huitchubensis, III, 8  
 humboldtii, II, 163  
 humilis, II, 209, 210  
 humilis major, II, 210  
 humilis minor, II, 209  
 humilis myriacaulon, II, 210  
 humilis rigidior, II, 210  
 huottii, III, 63  
 hyalacanthus, II, 173, 176  
 hybridus, II, 210  
 hypogaeus, II, 106, 107  
 hystrix, II, 86, 87, 99, 103;  
 IV, 273  
 ianthothele, IV, 210  
 ianthothelus, IV, 210  
 icosogonus, II, 360  
 ictidurus, II, 224  
 imbricatus, I, 63  
 incrassatus, II, 21  
 incrustans, II, 74  
 incrustatus, II, 74  
 incurvispinus, III, 72  
 inermis, II, 207, 208; III, 183  
 inermis laetevirens, II, 208  
 ingens, III, 171  
 insularis, II, 23  
 intricatus, II, 143  
 inversus, II, 191  
 iquiquensis, II, 83  
 irradians, II, 202  
 isogonus, II, 160, 161  
 jacquin, II, 21  
 jalapaensis, II, 199  
 jamaru, II, 4, 5, 6, 8, 9,  
 15, 18; IV, 266  
 jamaru caesius, II, 15  
 jamaru glaucus, II, 9  
 janthothele, IV, 210  
 jasmineus, III, 66  
 jenkinsonii, II, 128  
 jenkinsonii verus, II, 128  
 jocostonie, II, 93  
 josselinaeus, II, 129  
 jubatus, II, 52  
 jusbertii, II, 157, 158  
 kageneckii, II, 20  
 kalbreyerianus, II, 118  
 karstenii, II, 5, 207, 208  
 karwinski, II, 21  
 kerberi, II, 170  
 kewensis, II, 40; IV, 283  
 knightii, IV, 215  
 knippelianus, III, 32  
 kostratus, II, 205  
 kunthianus, II, 200, 201  
 labouretianus, II, 8  
 laetevirens, II, 8  
 laetevirens caesina, II, 15  
 laetus, II, 99  
 laevigatus, II, 88  
 laevigatus guatemalensis, II,  
 89  
 lagenaeformis, II, 134  
 lamprochlorus, II, 132, 133  
 lamprochlorus salinicolus, II,  
 133  
 lamprospermus, II, 4, 10  
 lanatus, II, 61, 62  
 lanceanus, II, 191  
 landbeckii, II, 17; IV, 266

*Cereus—continued,*

langlassei, II, 20  
 laniceps, II, 173, 175  
 lanuginosus, II, 4; IV, 71  
 lanuginosus aureus, II, 20  
 lanuginosus glaucescens, II,  
 49  
 lasianthus, II, 134  
 lateribarbus, II, 76  
 lateritus, II, 128  
 latifrons, IV, 188, 189  
 lauterbachii, II, 22  
 leccii, II, 20  
 lecanus, III, 9  
 lehmannii, IV, 31  
 leiocarpus, II, 50  
 lemairei, II, 189; IV, 282  
 lemoinei, II, 189  
 leonensis, III, 120  
 leonii, II, 78  
 lepidanthus, II, 76  
 lepidotus, II, 4, 5, 6; IV, 284  
 leptacanthus, III, 22; IV,  
 285  
 leptophis, II, 218; IV, 284  
 leucanthus, II, 72  
 leucosteles, II, 36, 37  
 limensis, II, 20  
 lindbergianus, II, 211  
 lindenzweigianus, II, 23  
 lindmanii, II, 211  
 linkii, III, 195  
 linnaei, II, 137  
 lividus, II, 8, 9  
 lividus glaucior, II, 9  
 longicaudatus, II, 205  
 longifolius, II, 20  
 longipedunculatus, II, 21  
 longisetus, III, 42  
 longispinus, II, 137; III,  
 37; IV, 285  
 lormata, II, 21; III, 237;  
 IV, 267  
 lumbricoides, IV, 230  
 lutescens, II, 44  
 macdonaldiae, II, 202, 203;  
 IV, 283  
 macracanthus, III, 43  
 macrocephalus, II, 31  
 macrogonus, II, 43, 130, 136;  
 IV, 277  
 macrostibas, II, 181, 182  
 maelenii, IV, 8  
 magnus, II, 159  
 malletianus, II, 145  
 mallisonii, II, 219  
 mamillatus, III, 41  
 margaritensis, II, 4, 18, 224  
 marginatus, II, 69, 74; IV,  
 197, 271  
 marginatus cristatus, IV, 271  
 marginatus gemmatus, II, 74  
 marginatus gibbosus, II, 74  
 marginatus monstrosus, IV,  
 271  
 mariculi, II, 209  
 maritimus, III, 15  
 marmoratus, II, 23  
 martianus, II, 219, 220, 221;  
 IV, 284  
 martinii, II, 155, 190  
 martinii perviridis, II, 155  
 maximiliani, II, 197  
 maxonii, II, 48  
 maynardeae, II, 210  
 maynardii, II, 210  
 megalanthus, II, 212  
 melanacanthus, II, 17  
 melanotrichus, II, 68  
 melanoma, II, 109, 110  
 melocactus, II, 29  
 mendory, II, 17  
 merkeri, III, 5  
 mexicanus, II, 129; IV, 200  
 micranthus, IV, 211  
 microsphaericus, II, 159; IV,  
 181



- Cereus—continued,*  
 militaris, II, 73  
 militaris californicus, II, 86  
 millspaughii, II, 45  
 minor, II, 218  
 minutiflorus, II, 195  
 miravallensis, II, 213  
 mirbelii, II, 74  
 mixtecensis, II, 89, 90  
 moeninghoffii, II, 219  
 mojaviensis, III, 8, 2  
 mojaviensis zuniensis, III, 14  
 mollis, II, 44  
 mollis nigricans, II, 44  
 monacanthus, II, 155, 190  
 moniliformis, I, 206, 217  
 monoclonos, II, 13, 41  
 monstrosus, II, 12  
 monstrosus minor, II, 12  
 monstrosus, II, 12  
 montevidensis, III, 98  
 montezumae, II, 143  
 monvilleanus, II, 173  
 moritzianus, II, 41, 42  
 moritzianus pfeifferi, II, 42  
 multangularis, II, 19, 20, 30  
 111, 142, 143; IV, 279  
 multangularis albispinus, II, 20  
 multangularis limensis, II, 20  
 multangularis pallidior, II, 19  
 multangularis prolifer, II, 20  
 multangularis rufispinus, II, 21  
 multicostatus, III, 9  
 multiplex, III, 64; IV, 286  
 multiplex cristatus, III, 64  
 multiplex monstrosus, III, 64  
 myosurus, IV, 215  
 myosurus tenuior, IV, 216  
 myriacaulon, II, 209  
 myriophyllus, II, 143  
 nanus, I, 217; II, 19  
 napoleonis, II, 185, 187, 191; IV, 282  
 nashii, II, 151  
 nelsonii, IV, 283, 284  
 nesioticus, II, 120, 121  
 neumannii, II, 119  
 nickelsii, II, 32  
 niger, II, 44  
 niger gracilior, II, 44  
 nigricans, II, 44  
 nigripilis, II, 139, 140 IV, 277  
 nigrispinus, II, 17  
 nitens, II, 132  
 nitidus, II, 123  
 nobilis, II, 44  
 northumberlandia, II, 4  
 northumberlandianus, II, 4  
 nothus, II, 201  
 nudiflorus, II, 113, 114  
 nycticalus, II, 200, 201, 216  
 nycticalus, II, 196, 199; IV, 283  
 nycticalus armatus, II, 199  
 nycticalus gracilior, II, 201  
 nycticalus maximiliani, II, 197, 201  
 nycticalus peanii, IV, 283  
 nycticalus viridior, II, 201  
 nyriacaulon, II, 209  
 obtusangulus, II, 22; IV, 181  
 obtusus, II, 4, 13, 14, 15, 16  
 ocamponis, II, 184, 185  
 ochracanthus, II, 20  
 octacanthus, III, 13  
 octogonus, II, 39  
 olfersii, II, 33  
 oligolepis, II, 225  
 olivaceus, II, 225  
 ophites, II, 21  
 orcuttii, II, 70  
 ottonis, III, 196  
 ovatus, I, 91; II, 20
- Cereus—continued,*  
 oxygonus, III, 64  
 oxyptetalus, IV, 188, 189  
 pachyrhizus, II, 4, 10  
 pacificus, III, 12  
 palmeri, II, 177  
 paniculatus, II, 82; IV, 280, 281  
 panoplaeatus, II, 82, 137, 138  
 papillosus, III, 19  
 paradisiacus, II, 198  
 paradoxus, I, 209  
 paraguayensis, II, 6  
 parasiticus, IV, 226  
 parviflorus, II, 173, 176  
 parvisetus, II, 173  
 parvulus, IV, 181  
 pasacana, II, 133; III, 74, 76  
 patagonicus, III, 197  
 paucispinus, III, 10, 14  
 paxtonianus, II, 21, 22  
 peanii, II, 201  
 pecten-aboriginum, II, 70, 71; IV, 271  
 pectinatus, III, 29; IV, 285  
 pectinatus armatus, III, 24  
 pectinatus centralis, III, 149, 130  
 pectinatus laevior, III, 30  
 pectinatus rigidissimus, III, 27  
 pectinatus spinosus, III, 24  
 pectiniferus, III, 29  
 pellucidus, II, 79, 122, 133  
 penicillatus, II, 171  
 pensilis, III, 8  
 pentaedrophorus, II, 31  
 pentagonus, II, 123, 195, 210, 213  
 pentagonus glaucus, II, 31  
 pentalophorus, II, 31  
 pentalophus, III, 21, 22  
 pentalophus leptacanthus, III, 22  
 pentalophus radicans, II, 210; III, 21  
 pentalophus simplex, III, 21, 22  
 pentalophus subarticulatus, III, 21, 22  
 pentapterus, II, 213  
 pepinianus, II, 137  
 perlucens, II, 4, 13  
 pernambucensis, II, 4, 14, 15, 213; IV, 266  
 perotetti, II, 9  
 perrottetianns, II, 4, 6  
 peruvianus, II, 3, 4, 5, 11, 13, 133, 147; IV, 266  
 peruvianus alacriportanus, II, 6  
 peruvianus brasiliensis, II, 13  
 peruvianus cristatus, II, 12  
 peruvianus monstrosus, II, 12, 13; IV, 266  
 peruvianus monstrosus minor, II, 13  
 peruvianus monstrosus, II, 223  
 peruvianus monstrosus nanus, II, 12  
 peruvianus spinosus, II, 13  
 peruvianus tortuosus, II, 12  
 peruvianus tortus, II, 12  
 perviridis, IV, 267  
 pfeifferi, II, 42  
 pfersdorffii, II, 117  
 phaeacanthus, II, 57  
 phatnospermus, II, 24  
 philippii, II, 105  
 phoeniceus, III, 14; IV, 48, 285  
 phoeniceus inermis, III, 14  
 phoeniceus pacificus, III, 12  
 phyllanthoides, IV, 203
- Cereus—continued,*  
 phyllanthoides albiflorus, IV, 205  
 phyllanthoides curtisii, IV, 205  
 phyllanthoides guillardieri, IV, 203  
 phyllanthoides jenkinsonii, IV, 205  
 phyllanthoides stricta, IV, 205  
 phyllanthoides vandesii, IV, 205  
 phyllanthus, IV, 187, 188  
 phyllanthus marginatus, IV, 188  
 piuhyensis, II, 49  
 pitahaya variabilis, IV, 267  
 pitajaya, II, 13, 14, 15, 123  
 plagiostoma, II, 163  
 platycarpus, IV, 242  
 platygonus, II, 11, 156, 157, 159  
 pleiogonus, III, 43  
 plumieri, II, 191  
 polyacanthus, III, 11, 15; IV, 285  
 polychaetus, II, 17  
 polygonatus, II, 88  
 polygonus, II, 47  
 polylophus, II, 32, 33; IV, 268  
 polymorphus, II, 138, 139  
 polyptychus, IV, 269  
 polyrhizus, II, 185  
 pomanensis, II, 135, 158  
 pomanensis grossei, II, 135  
 portoricensis, II, 150  
 poselgeri, II, 111  
 poselgerianus, III, 20  
 pottsii, II, 112  
 princeps, II, 123; IV, 276  
 pringlei, II, 68, 69, 70  
 prismaticus, II, 123, 212  
 prismatiformis, II, 14  
 procumbens, III, 22; IV, 285  
 propinquus, III, 21, 22  
 propinquus subarticulatus, IV, 285  
 proteiformis, III, 238  
 pruinatus, II, 21  
 pruinosis, II, 88, 89  
 pseudosonorensis, II, 169  
 pteranthus, II, 200  
 pterocaulis, IV, 237  
 pterogonus, II, 201, 213  
 pugionifer, II, 96  
 pugioniferus, II, 179, 180  
 pugioniferus quadrangulispinus, II, 180  
 pulchellus, III, 33  
 purpusii, II, 184  
 pycnacanthus, II, 137, 138  
 quadrangularis, II, 124  
 quadrangulispinus, II, 180  
 quadricostatus, II, 8  
 queretaroensis, II, 96, 97  
 quintero, II, 139  
 quisco, II, 137  
 radicans, II, 195  
 ramosus, II, 123  
 ramulosus, IV, 240  
 recurvus, III, 142  
 reductus, III, 158, 159  
 reflexus, II, 43; IV, 266  
 regalis, II, 20  
 regelii, II, 155; IV, 266  
 reichenbachianus, III, 23  
 reichenbachianus castaneus, III, 25  
 repandus, II, 4, 17, 18, 151, 152, 224; IV, 278  
 repandus lactevirens, II, 149  
 reptans, II, 8, 195; IV, 290  
 resupinatus, II, 87  
 retroflexus, II, 43  
 rhodacanthus, III, 79
- Cereus—continued,*  
 rhodanthus, II, 170  
 rhodocephalus, II, 158  
 rhodoleucanthus, II, 21, 22; IV, 268  
 rhombeus, IV, 244  
 rigidispinus, II, 103  
 rigidissimus, III, 28  
 rigidus, II, 210  
 robustior, III, 28  
 robustus, II, 21  
 roemerii, III, 13, 14  
 roetteri, III, 31  
 roezlii, IV, 268  
 rogallii, II, 21  
 roridus, II, 89  
 rosaceus, II, 201  
 roseanus, II, 198  
 rostratus, II, 203, 204, 205; IV, 283  
 rothii, IV, 283  
 royeii, II, 44, 30  
 royeii armatus, II, 40, 51  
 royeii floccosus, II, 51  
 ruber, II, 223  
 ruferi, II, 219  
 ruferi major, II, 219  
 ruficeps, II, 75  
 rufispinus, III, 23  
 russellianus, IV, 184, 185  
 russellianus, II, 33  
 salm-dyckianus, III, 7  
 salmianus, III, 7, 74  
 salpingensis, II, 21  
 sanborgianus, III, 34  
 santiaguensis, II, 131  
 sargentianus, II, 177, 178; IV, 280  
 saxicola, II, 21, 22  
 saxicola anguiniformis, II, 22  
 scandens, IV, 282  
 scandens minor, II, 197; IV, 282  
 scheeri, III, 6  
 schelhasii, III, 66  
 schenckii, II, 180  
 schickendantzii, II, 144  
 schmidtii, II, 197  
 schoenemannii, II, 21  
 schomburgkii, II, 191  
 schottii, II, 177, 178; IV, 280  
 schottii australis, II, 177  
 schrankii, II, 127  
 schumannii, II, 103  
 sciurus, III, 22  
 sclerocarpus, II, 146, 147  
 scolopendrii, IV, 188  
 scopa, III, 193  
 scoparius, II, 41  
 seidelii, II, 15  
 senilis, II, 27; IV, 268  
 sepium, II, 160  
 sericeus, I, 73  
 serpens, I, 217; II, 163  
 serpentinus, II, 20, 117, 118, 119; IV, 276, 284  
 serpentinus albispinus, II, 59, 118  
 serpentinus splendens, II, 21, 118  
 serpentinus stellatus, II, 118  
 serpentinus strictior, II, 118  
 serratus, II, 129  
 serruliflorus, II, 131  
 setaceus, II, 211, 212  
 setaceus viridior, II, 211  
 setiger, II, 129  
 setosus, II, 34, 35; IV, 215, 216  
 silvestrii, III, 48, 49; IV, 283  
 simonii, II, 169  
 sirul, II, 123  
 smaragdiflorus, II, 174, 173  
 smithianus, IV, 284  
 smithii, II, 218; IV, 284  
 sonorensis, II, 169

*Cereus—continued,*

- spachianus, II, 131, 132; IV, 277  
 spathulatus, II, 21  
 speciosissimus, II, 128 129; IV, 277, 283  
 speciosissimus albiflorus, II, 128  
 speciosissimus aurantiacus, II, 128  
 speciosissimus blindii, II, 128  
 speciosissimus bodii, II, 129  
 speciosissimus bollwillerianus, II, 128  
 speciosissimus bowtrianus, II, 128  
 speciosissimus candesii, II, 128  
 speciosissimus coccineus, II, 127, 128  
 speciosissimus colmariensis, II, 128  
 speciosissimus curtisii, II, 128  
 speciosissimus danielsii, II, 128  
 speciosissimus devauxi, II, 128  
 speciosissimus edesii, II, 128  
 speciosissimus elegans, II, 128  
 speciosissimus eugenia, II, 128  
 speciosissimus finkii, II, 128  
 speciosissimus gebvillerianus, II, 128  
 speciosissimus gloriosus, II, 128  
 speciosissimus grandiflorus, II, 128  
 speciosissimus guillardieri, II, 128  
 speciosissimus hansii, II, 128  
 speciosissimus hitchensii, II, 128  
 speciosissimus hitchensii hybridus, II, 128  
 speciosissimus hitchensii speciosus, II, 128  
 speciosissimus hoveyi, II, 128; IV, 277  
 speciosissimus ignescens, II, 128  
 speciosissimus jenkinsonii, II, 128  
 speciosissimus kampmannii, II, 128  
 speciosissimus kiardii, II, 128  
 speciosissimus kobii, II, 128  
 speciosissimus latifrons, II, 128  
 speciosissimus lateritius, II, 128; IV, 198  
 speciosissimus longipes, II, 128  
 speciosissimus lothii, II, 128  
 speciosissimus loudonii, II, 128  
 speciosissimus macqueanus, II, 128  
 speciosissimus maelenii, II, 128  
 speciosissimus maurantianus, II, 128  
 speciosissimus merckii, II, 128  
 speciosissimus mexicanus, II, 128  
 speciosissimus mittleri, II, 128  
 speciosissimus mulhausianus, II, 128  
 speciosissimus peacockii, II, 128

*Cereus—continued,*

- speciosissimus peintneri, II, 128  
 speciosissimus rintzii, II, 128  
 speciosissimus roidii, II, 128  
 speciosissimus roseus albus, II, 128  
 speciosissimus roseus superbus, II, 128  
 speciosissimus roydii, II, 128  
 speciosissimus sarniensis, II, 128  
 speciosissimus seidelii, II, 128  
 speciosissimus seitzii, II, 128  
 speciosissimus selloi, II, 128  
 speciosissimus smithii, II, 128  
 speciosissimus superbus, II, 128  
 speciosissimus suwaroffii, II, 128  
 speciosissimus suwarowii, II, 128  
 speciosissimus triumphans, II, 128  
 speciosissimus unduliflorus, II, 128  
 speciosissimus vitellinus, II, 128  
 speciosus, II, 128, 129; IV, 277  
 speciosus albiflorus, II, 128  
 speciosus coccineus, II, 127  
 spegazzinii, II, 23; IV, 268  
 spegazzinii hassleri, IV, 268  
 spinibarbis, II, 82  
 spinibarbis flavidus, II, 144  
 spinibarbis minor, II, 139  
 spinibarbis purpureus, II, 139  
 spinosissimus, II, 11  
 spinulosus, II, 207  
 splendens, II, 21, 118  
 splendidus, IV, 198  
 squamosus, II, 173, 176  
 squamulosus, IV, 215  
 squarrosus, II, 104  
 steckmannii, II, 21  
 stellatus, II, 92, 93, 169  
 stenogonus, II, 4, 9, 10, 11  
 stenopterus, II, 190  
 stolonifer, IV, 268  
 stramineus, III, 40  
 straussii, II, 171, 226; IV, 279  
 striatus, II, 22, III  
 strictus, II, 44  
 strigosus, II, 143, 144  
 strigosus intricatus, II, 143  
 strigosus longispinus, II, 143  
 strigosus rufispinus, II, 144  
 strigosus spinosior, II, 144  
 subinermis, III, 16  
 subintortus, II, 19  
 subintortus flavispinus, II, 19  
 sublanatus, II, 43; IV, 268  
 subrepandus, II, 151  
 subsquamatus, II, 191  
 subtortuosus, II, 174  
 subuliferus, II, 137  
 superbus, II, 128  
 surinamensis, II, 13  
 swartzii, II, 46, 87  
 syringacanthus, I, 89  
 tacaquirensis, II, 225  
 tarijensis, II, 226  
 taylorii, II, 153  
 tellii, II, 21  
 tenellus, II, 126  
 tenuis, II, 19; IV, 215  
 tenuispinus, IV, 21, 5  
 tephacanthus, III, 188; IV, 289  
 tephacanthus bolivianus, II, 136  
 terscheckii, II, 143

*Cereus—continued,*

- testudo, II, 213  
 tetazo, II, 76; IV, 272  
 tetezo, IV, 272  
 tetetzo, IV, 272  
 tetracanthus, II, 136  
 tetragonus, II, 3, 4, 7, 9, 14  
 tetragonus major, II, 9  
 tetragonus minor, II, 14  
 tetragonus ramosior, II, 9  
 thalassinus, II, 5, 9  
 thalassinus quadrangularis, II, 5  
 thelegonoides, II, 131  
 thelegonus, II, 130, 131  
 thourarii, II, 120, 121  
 thurberi, II, 68, 97, 98, 99; III, 43; IV, 274  
 thurberi littoralis, II, 97  
 thurberi monstrosus, II, 98  
 tilophorus, II, 43; IV, 268  
 tinei, II, 152  
 titan, II, 69, 70  
 tonduzii, II, 77, 26; IV, 284  
 tonelianus, II, 92; IV, 290  
 torrellianus, IV, 290  
 tortuosus, II, 154, 155  
 tortus, II, 83  
 treleasei, II, 93  
 triangularis, II, 187, 188, 192, 193; IV, 282  
 triangularis major, II, 187, 191  
 triangularis pictus, II, 192  
 triangularis undeanus, II, 193  
 trichacanthus, II, 44  
 trichocentrus, II, 21  
 tricoctatus, II, 187  
 triglochidiatus, III, 10  
 trigonodendron, II, 19; IV, 267  
 trigonus, II, 186, 192  
 trigonus costaricensis, II, 186  
 trigonus guatemalensis, II, 184  
 trigonus quadrangularis, II, 124  
 trinitatis, II, 189  
 tripteris, IV, 268  
 triqueter, IV, 282  
 truncatus, IV, 177  
 truncatus altensteinii, IV, 178  
 tuberosus, II, 111; IV 8, 274  
 tunicatus, I, 66  
 tubiflorus, III, 67  
 tunilla, II, 214  
 tupizensis, II, 226  
 turbinatus, III, 66  
 tweediei, II, 174; IV, 279  
 ulei, II, 52  
 undatus, II, 149, 151, 152, 187  
 undiflorus, IV, 275  
 undulatus, II, 124  
 undulosus, II, 123  
 uranos, II, 197  
 uranus nycticalus, II, 197  
 urbanianus, II, 43, 198; IV, 283  
 ureacanthus, II, 158  
 uspenski, IV, 268  
 vagans, II, 205  
 validissimus, III, 63  
 validus, II, 4, 7  
 variabilis, II, 4, 13, 14, 123, 124  
 variabilis glaucescens, II, 14  
 variabilis gracilior, II, 14  
 variabilis laetevirens, II, 14  
 variabilis micracanthus, II, 14  
 variabilis obtusus, II, 14  
 variabilis ramosior, II, 14  
 variabilis salm-dyckianus, II, 14

*Cereus—continued,*

- vasmeri, II, 123  
 vaupelii, II, 202  
 venditus, II, 192  
 ventimigliae, II, 160  
 verschaffeltii, II, 21  
 victoriensis, II, 53  
 violaceus, II, 44  
 viperinus, II, 110  
 virens, II, 43  
 viridiflorus, III, 17, 18  
 viridiflorus cylindricus, III, 17  
 viridiflorus minor, IV, 285  
 viridiflorus tubulosus, III, 17  
 vulcan, II, 219  
 vulnerator, IV, 266  
 warmingii, II, 42  
 weberbaueri, II, 141  
 weberi, II, 95, 96  
 weingartianus, II, 77, 78  
 wercklei, II, 208  
 wittii, II, 221, 222  
 xanthocarpus, II, 4, 10  
 xantochaetus, II, 225  
 ziczkaanus, II, 224  
 ziczkaanus, II, 224  
 Chacoub, II, 187  
 Chaetophorae, I, 174  
 Chaffeyanae, I, 45, 213  
 Chalote, III, 84  
 Chamaecereus, III, 3, 48, 49  
 silvestrii, III, 48; IV, 285  
 Chaute, III, 8  
 Chende, II, 91  
 Chente, II, 91  
 Chiapas, IV, 177, 203, 204  
 nelsonii, IV, 203  
 Chichibe, II, 90  
 Chichipe, II, 90  
 Chichituna, II, 90  
 Chilotos, III, 93  
 Chino, II, 91  
 Chiotilla, II, 66  
 Chique-chique, II, 35  
 Chique-chique das pedras, II, 35  
 Chirinola, II, 115  
 Cholla, I, 43, 61  
 Christmas cactus, IV, 178  
 Cina, II, 169  
 Clavarioides, I, 44, 72  
 Clavatae, I, 4, 79, 84  
 Cleistocactus, II, 2, 173-176; III, 60, 78, 79  
 anguinus, II, 173, 175  
 areolatus, II, 159  
 aureus, II, 105  
 baumannii, II, 163, 173, 174, 175, 226; IV, 279  
 baumannii colubrinus, II, 174  
 baumannii flavispinus, II, 174  
 celsianus, II, 171  
 chotaensis, II, 163  
 colubrinus, II, 174  
 humboldtii, II, 163  
 hyalacanthus, II, 176  
 icosagonus, II, 160  
 kerberi, II, 170  
 lanatus, II, 61  
 laniceps, II, 175  
 monvilleanus, II, 173  
 parviflorus, II, 176  
 parvisetus, II, 175  
 rhodacanthus, III, 79  
 sepium, II, 160  
 serpens, II, 163  
 smaragdiflorus, II, 173, 174, 175  
 Cob cactus, III, 37  
 Cochal, II, 180  
 Cochemia, IV, 3, 19, 21-23, 65  
 halei, IV, 21, 22  
 hallei, IV, 22  
 pondii, IV, 21, 23

- Cochemica—*continued*,  
 poselgeri, IV, 21, 22  
 rosiana, IV, 22  
 spinispina, IV, 21, 22  
 Coerulescentes, II, 3, 59  
 Cola de diablo, I, 26  
 Compresso-costati, II, 3  
 Consolia, I, 42, 43, 202  
 catacantha, I, 208  
 ferox, I, 206  
 leucacantha, I, 175  
 rubescens, I, 43, 208  
 spinosissima, I, 204  
 Copado, II, 83  
 Copiapoa, III, 77, 85-90, 100  
 cinerascens, III, 85, 88  
 cinerea, III, 85, 86  
 coquimbana, III, 85, 87  
 echinoides, III, 85, 88  
 marginata, III, 85, 86  
 megarhiza, III, 85, 89  
 Corotilla, I, 96  
 Corryocactus, II, 2, 66-68  
 brachypetalus, II, 66, 67, 68  
 brevistylus, II, 66, 67, 68  
 melanotrichus, II, 66, 68  
 Coryphantha, III, 3, 45, 148;  
 IV, 3, 4, 13, 23-51, 53, 55,  
 57, 65, 165, 170, 175  
 acanthostephes, IV, 41  
 aggregata, IV, 25, 47, 154  
 ancistracantha, IV, 15  
 arizonica, IV, 25, 45  
 aulacothele, IV, 30, 31  
 brevimamma, IV, 31  
 bumamma, IV, 24, 29, 33, 51  
 calacarata, IV, 48  
 chlorantha, IV, 25, 43, 44, 47  
 clava, IV, 24, 30  
 compacta, IV, 24, 36, 37  
 connivens, IV, 24, 34  
 conoidea, IV, 17  
 conspicua, IV, 51  
 cornifera, IV, 18, 25, 39  
 cubensis, IV, 23, 25, 48  
 daimonoceras, IV, 36  
 dasyacantha, IV, 55  
 deserti, IV, 25, 46  
 durangensis, IV, 25, 42, 43  
 echinoidea, IV, 24, 30  
 echinus, IV, 25, 35, 42  
 elephantidens, IV, 24, 32, 33,  
 50  
 engelmannii, IV, 27, 51  
 erecta, IV, 24, 32  
 exsudans, IV, 24, 31  
 glanduligera, IV, 31  
 grahamii, IV, 155  
 guerkeana, IV, 24, 29  
 heteromorpha, IV, 25  
 heterophylla, IV, 25  
 hookeri, IV, 51  
 impexicoma, IV, 37  
 lehmanni, IV, 30, 31  
 loricata, IV, 168  
 macromeris, IV, 23, 24, 25  
 missouriensis, IV, 53  
 muehlenpfordtii, IV, 24, 28,  
 29, 34  
 neo-mexicana, IV, 25, 44, 45  
 nickelsae, IV, 23, 24, 35, 36  
 nivosa, IV, 71  
 nuttallii, IV, 53  
 octacantha, IV, 24, 30  
 ottonis, IV, 24, 26  
 pallida, IV, 25, 40  
 palmeri, IV, 25, 39  
 pectinata, IV, 24, 34, 35, 175  
 poselgeriana, IV, 24, 2, 28, 29  
 pottsii, IV, 137  
 pycnacantha, IV, 25, 40, 41  
 radians, IV, 24, 36, 37  
 radiosa, IV, 43, 60  
 raphidacantha, IV, 15  
 recurvata, IV, 24, 27  
 retusa, IV, 24, 38  
 raphidacantha, IV, 15  
 Coryphantha—*continued*,  
 robustispina, IV, 24, 33  
 runyonii, IV, 24, 26  
 salm-dyckiana, IV, 25, 38, 39  
 scheeri, IV, 28  
 schlechtendalii, IV, 30  
 similis, IV, 52  
 sublanata, IV, 51  
 sulcata, IV, 25, 48, 49  
 sulcolanata, IV, 24, 37, 50  
 tuberculosa, IV, 54  
 vivipara, IV, 25, 43, 44, 45,  
 47  
 Coryphanthae, IV, 53  
 Coryphanthanae, II, 1; III, 77,  
 90, 146, 149; IV, 3, 6, 57,  
 62  
 Cow's tongue, I, 164  
 Crab cactus, IV, 178, 186  
 Creeping devil cactus, II, 115  
 Criniferae, I, 140, 176  
 Crispatae, IV, 221  
 Cruciformes, I, 208  
 Cubenses, IV, 25  
 Cuija, I, 149  
 Curassavicae, I, 45, 102, 104,  
 106, 193  
 Curuntilla, IV, 266  
 Cuscuta baccifera, IV, 227  
 Cycad, III, 108  
 Cylindropuntia, I, 32, 44, 45,  
 46, 71, 75, 79, 84, 100, 142  
 Daatoc, II, 88  
 Deamia, II, 183, 212-214  
 testudo, II, 209, 213, 214  
 Deerhorn cactus, II, 113  
 Dendrocerus, II, 2, 113, 114;  
 IV, 281  
 nudiflorus, II, 113, 114; IV,  
 276  
 Denmoza, III, 77, 78, 79  
 rhodacantha, III, 79  
 Devil's bead cactus, III, 182  
 Devil's pincushion, III, 182  
 Devil's root, III, 84  
 Dildo, II, 224  
 Dildoes, I, 105  
 Dillenianae, I, 45, 159, 169  
 Discocactus, III, 216-220; IV,  
 70, 165  
 alteolens, III, 216, 217, 218  
 bahiensis, III, 217, 220  
 besleri, III, 219  
 hartmannii, III, 217  
 heptacanthus, III, 217, 218  
 insignis, III, 216, 219, 220  
 lehmannii, III, 219  
 linkii, III, 219  
 placentiformis, III, 216, 217,  
 218, 219; IV, 70, 165  
 subnudus, III, 216, 217  
 tricornis, III, 218  
 zehntneri, III, 217, 218, 220  
 Disisocactus, IV, 201  
 biformis, IV, 202  
 Disocactus, IV, 177, 201-203  
 biformis, IV, 201, 202  
 eichlamii, IV, 202, 203  
 Dissimiles, IV, 221  
 Diurna, IV, 186  
 Dolichothele, IV, 3, 61-64, 6  
 longimamma, IV, 61, 62, 63  
 sphaerica, IV, 61, 62  
 uberiformis, IV, 61, 63, 64  
 Dumpling cactus, III, 84  
 Durasnilla, I, 175  
 Ecremocactus, IV, 177, 204  
 bradei, IV, 204  
 Echinocactanae, II, 1; III, 3, 77-  
 215; IV, 24, 57, 175, 274  
 Echinocacti, IV, 6, 34, 58  
 Echinocactus, I, 117; II, 1, 105,  
 137, 171; III, 3, 32, 45,  
 48, 49, 55, 60, 77, 78, 83,  
 85, 90, 92, 93, 94, 98, 100,  
 101, 104, 108, 109, 118,  
 123, 128, 140, 142, 148,  
 Echinocactus—*continued*,  
 151, 152, 166-181, 186,  
 187, 205, 206, 207, 211,  
 216, 237; IV, 3, 4, 6, 10,  
 12, 16, 24, 28, 29, 58, 137,  
 165, 175, 288  
 acanthion, III, 98, 120  
 acanthodes, III, 129  
 acanthostephes, IV, 41  
 aciculatus, III, 198  
 acifer, III, 111  
 acifer spinosus, III, 111  
 acrocanthus, III, 120  
 acrocanthus, III, 121  
 acuatus, III, 188  
 acuatus arehavaletai, III,  
 200  
 acuatus corynodes, III, 198  
 acuatus depressus, III, 198  
 acuatus erinaceus, III, 198  
 acuatus sellowii, III, 188  
 acuatus spinosior, III, 188  
 acuatus tetraacanthus, III,  
 188  
 acutangulus, III, 199  
 acutatus, III, 188  
 acutispinus, III, 179; IV, 288  
 acutissimus, III, 97, 98, 99,  
 103  
 acutissimus cristatus, III, 98  
 adversispinus, III, 121  
 agglomeratus, III, 136, 143  
 alamosanus, III, 137  
 albatu, III, 112  
 allardtianus, III, 114  
 alteolens, III, 218  
 amazonicus, III, 175  
 ambiguus, III, 88  
 ancylicanthus, III, 146  
 anfractuosus, III, 117, 123  
 anfractuosus ensiferus, III,  
 114  
 anfractuosus laevior, III, 116  
 anfractuosus orthogonus, III,  
 157  
 anfractuosus pentacanthus,  
 115, 116  
 anfractuosus spinosior, III,  
 117  
 anisitsii, III, 159, 161  
 apricus, III, 192  
 arachnoideus, III, 176  
 araneifer, III, 177  
 araneolarius, III, 176  
 arcuatus, III, 188  
 arehavaletai, III, 196, 197,  
 200, 201  
 arizonicus, III, 127, 128  
 armatissimus, III, 176  
 armatus, III, 178, 238  
 arrectus, III, 114  
 arrigens, III, 114  
 arrigens atropurpureus, III,  
 114  
 asterias, III, 183, 184  
 aulacogonus, III, 169, 170  
 aulacogonus diacopaulax,  
 III, 169  
 aurantiacus, III, 102  
 auratus, II, 143; III, 186  
 aureus, II, 105; III, 168  
 baldianus, III, 163, 164  
 barcelona, IV, 287  
 beguinii, III, 148, 149; IV,  
 16  
 berterii, III, 7  
 biceras, III, 115  
 bicolor, III, 43, 105; IV,  
 11, 12  
 bicolor bolansii, IV, 11  
 bicolor montemorelanus, IV,  
 12  
 bicolor pottsii, IV, 12  
 bicolor schottii, IV, 11  
 bicolor tricolor, IV, 11  
 bolansii, IV, 11, 12  
 bolivianus, III, 88  
 Echinocactus—*continued*,  
 brachiatus, III, 121  
 brachyanthus, III, 159; IV,  
 288  
 brachycentrus, III, 121  
 brachycentrus olygacanthus,  
 III, 121  
 brevihamatus, IV, 4, 5  
 brevimammus, IV, 31  
 bridgesii, III, 88, 89  
 buchheimianus, IV, 288  
 buckii, IV, 8  
 bukkii, IV, 8  
 cachensis, III, 53  
 cachetianus, III, 105, 106  
 cachetianus orcuttii, III, 105  
 caespitius, IV, 16  
 caespitosus, III, 208, 211  
 californicus, III, 130, 141  
 campylacanthus, III, 140  
 candicans, II, 143  
 capricornis, III, 184, 185; IV,  
 288  
 capricornis major, III, 185  
 capricornis minor, III, 184,  
 185  
 castaneoides, III, 99  
 castaniensis, III, 179; IV, 12  
 catamarcensis, II, 146; III,  
 197  
 catamarcensis obscurus, III,  
 197  
 catamarcensis pallidus, III,  
 197  
 cataphractus, III, 208, 210  
 celasianus, III, 158  
 centeterius, III, 203, 204  
 centeterius grandiflorus, III,  
 203, 204  
 centeterius major, III, 203,  
 204  
 centeterius pachycentrus, III,  
 203  
 cephalophorus, IV, 41  
 ceratistes, II, 143; III, 176,  
 178, 186  
 ceratistes celsii, III, 186  
 ceratistes melanacanthus,  
 III, 186  
 ceratistes, III, 187  
 ceratitis, III, 186  
 cerebriformis, III, 179  
 cereiformis, III, 121  
 chereauxianus, III, 54  
 chilensis, III, 99  
 chilensis confinis, III, 99  
 chionanthus, III, 49, 58  
 chlorophthalmus, III, 32  
 chrysacanthus, III, 176  
 chrysacanthus, III, 127  
 cinerascens, III, 59, 87, 88, 89  
 cinereus, III, 86  
 cinnabarinus, III, 54, 59  
 cinnabarinus spinosior, III,  
 54  
 clavatus, III, 99, 101  
 clavus, IV, 30  
 coccineus, III, 79  
 columbaris, III, 86, 87  
 concinnus, III, 192, 193, 208;  
 IV, 288  
 concinnus joadii, III, 192  
 concinnus tabularis, III, 193  
 confertus, III, 179  
 conglomeratus, III, 39, 88  
 conimamma, IV, 38  
 conoideus, IV, 17  
 conothelos, IV, 13  
 conuades, III, 199  
 contractus, III, 161  
 copiapiensis, III, 88, 89, 186  
 copoldi, III, 130  
 coptonogonus, III, 109, 110,  
 111  
 coptonogonus major, III, 110  
 coptonogonus obvallatus, III,  
 115

- Echinocactus—continued,*  
 coquimbanus, III, 87  
 corniferus, IV, 13, 39  
 corniferus impexicomus, IV, 36  
 corniferus longisetus, IV, 39  
 corniferus muticus, IV, 39  
 corniferus nigricans, IV, 39  
 corniferus raphidacanthus, IV, 15  
 corniferus scolymoides, IV, 39  
 corniger flavispinus, III, 143  
 corniger rubrispinosus, III, 143  
 cornigerus, III, 116, 142, 143; IV, 287  
 cornigerus flavispinus, III, 143; IV, 287  
 cornigerus latispinus, III, 143; IV, 287  
 corrugatis, III, 179  
 corynacanthus, III, 168  
 corynodes, III, 187, 198, 199; IV, 289  
 corynodes erinaceus, III, 198  
 coulteri, III, 138  
 courantianus, III, 182  
 courantii, III, 188  
 courantii spinosior, III, 188  
 coxii, III, 197  
 crassihatatus, III, 144  
 crenatus, III, 98  
 criocereus, III, 180  
 crispatus, III, 115, 116, 117  
 crispatus cristatus, III, 117  
 crispatus horridus, III, 116  
 ctenoides, III, 19  
 cumingii, III, 59  
 cumingii flavispinus, III, 39  
 cumingii, III, 99  
 cupreatus, III, 96, 176  
 cupulatus, III, 176  
 curvicornis, III, 142  
 curvispinus, III, 100, 203  
 cylindraceus, III, 129, 130  
 cylindraceus albispinus, III, 130  
 cylindraceus longispinus, III, 130  
 cylindricus, IV, 288  
 dadaki, III, 179  
 damsii, III, 163  
 darrahi, IV, 288  
 debilispinus, III, 121  
 decaisnei, III, 66  
 deflexispinus, III, 145  
 delaetii, III, 164, 165  
 deminutus, III, 48  
 densus, IV, 134  
 denudatus, III, 155; IV, 288  
 denudatus andersohnianus, III, 155  
 denudatus bruennowianus, III, 163  
 denudatus bruennowii, III, 156  
 denudatus delaetianus, III, 155  
 denudatus delaetii, III, 155  
 denudatus flavispinus, III, 156  
 denudatus golzianus, III, 155  
 denudatus heuschkehlilii, III, 156  
 denudatus heuschkelianus, III, 155, 156  
 denudatus intermedius, III, 156  
 denudatus meiklejohnianus, III, 155  
 denudatus multiflorus, IV, 288  
 denudatus octogonus, III, 155
- Echinocactus—continued,*  
 denudatus paraguayensis, III, 156  
 denudatus roseiflorus, III, 156  
 denudatus scheidelianus, III, 155  
 denudatus typicus, III, 155  
 denudatus wagnerianus, III, 155  
 denudatus wiedzianus, III, 155  
 deppii, IV, 285  
 depressus, III, 576, 235  
 dichroacanthus, III, 117  
 dichroacanthus spinosior, III, 117  
 dicracanthus, IV, 288  
 dietrichianus, III, 137  
 dietrichii, III, 118, 119  
 diguetii, III, 131, 132  
 disciformis, III, 106  
 dolichacanthus, III, 136  
 dolichocentrus, III, 136  
 drageanus, IV, 10  
 droegeanus, IV, 10  
 dumesnilianus, III, 79  
 durangensis, III, 152  
 ebenacanthus, III, 99  
 ebenacanthus affinis, III, 99  
 ebenacanthus intermedius, III, 99  
 ebenacanthus minor, III, 99  
 echidna, III, 136  
 echidne, III, 136  
 echidne gilvus, III, 136  
 echinatus, III, 177  
 echinoides, II, 138; III, 88, 89  
 echinoides pepinianus, II, 137  
 edulis, III, 170  
 ehrenbergii, IV, 9  
 elachisanthus, III, 205  
 electracanthus, III, 138, 139  
 electracanthus capuliger, III, 138  
 electracanthus haematacanthus, III, 147  
 electracanthus rufispinus, III, 139  
 elegans, II, 139  
 elephantidens, IV, 32  
 ellemeetii, III, 121  
 ellipticus, IV, 11, 12  
 emoryi, III, 127, 128, 132, 133, 134  
 emoryi chrysacanthus, III, 127  
 emoryi rectispinus, III, 134  
 engelmannii, III, 38  
 ensiferus, III, 114  
 ensiferus pallidus, III, 114  
 equitans, III, 175  
 erectocentrus, III, 148, 149; IV, 16, 287  
 erectus, IV, 32  
 erinaceus, III, 198, 199, 200  
 erinaceus elatior, III, 199  
 escayachensis, III, 205  
 exsculptus, III, 97, 98, 110  
 exsculptus cristatus, III, 98  
 exsculptus dichroacanthus, III, 98  
 exsculptus elatior, III, 98  
 exsculptus foveolatus, III, 98  
 exsculptus fulvispinus, III, 98  
 exsculptus gayanus, III, 98  
 exsculptus tenuispinus, III, 98  
 exsculptus thrincogonus, III, 98  
 cyriesii, III, 60, 65, 66, 142  
 cyriesii glaucus, III, 66  
 falconeri, III, 127, 128  
 famatimensis, IV, 286
- Echinocactus—continued,*  
 farinosus, II, 19  
 fascicularis, II, 141  
 fennellii, III, 158  
 ferox, III, 158  
 fiebrigii, III, 46, 47  
 fiedlerianus, III, 87  
 fischeri, III, 178, 238  
 flavescens, III, 138  
 flavicoma, III, 179  
 flavispinus, III, 143, 145  
 flavovirens, III, 138, 147  
 flexispinus, III, 117, 144  
 flexuosus, III, 121  
 floricosus, III, 200, 201  
 fluctuosus, III, 121  
 fobeanus, III, 89  
 foersteri, III, 121  
 foliosus, III, 179  
 forbesii, III, 62  
 fordii, III, 126, 127  
 formosus, III, 3  
 formosus crassispinus, III, 75  
 fossulatus, IV, 6, 10  
 foveolatus, III, 98  
 fricii, III, 188, 189  
 froehlichianus, III, 203  
 fuscus, III, 99  
 galeottii, III, 168  
 gayanus, III, 98  
 gayanus intermedius, III, 98  
 geissei, III, 177  
 geissei albicans, III, 177  
 gemmatus, III, 66  
 gerardii, III, 147  
 ghiesbreghtii, II, 60; III, 185  
 gibbosus, III, 152, 158  
 gibbosus celsianus, III, 158  
 gibbosus cerebriformis, III, 158  
 gibbosus chubutensis, III, 158  
 gibbosus fennellii, III, 158  
 gibbosus ferox, III, 158  
 gibbosus leonensis, III, 158  
 gibbosus leucacanthus, III, 158  
 gibbosus leucodictyus, III, 158  
 gibbosus nobilis, III, 158, 159  
 gibbosus platensis, III, 163  
 gibbosus pluricostatus, III, 158  
 gibbosus polygonus, III, 158  
 gibbosus schlumbergeri, III, 158  
 gibbosus typicus, III, 158  
 gibbosus ventanicola, III, 158  
 gigas, III, 179  
 gilliesii, III, 75  
 gilvus, III, 136  
 glabrescens, III, 180  
 gladiatus, III, 119, 120, 123  
 gladiatus intermedius, III, 119  
 gladiatus ruficeps, III, 119  
 glanduligerus, IV, 31  
 glaucescens, III, 137  
 glaucus, III, 143, 213  
 globosus cristatus, III, 138  
 gracilis, III, 209  
 gracillimus, III, 209, 211  
 graessneri, III, 203  
 grahlianus, III, 209  
 grahlianus adustior, III, 209  
 grandicornis, III, 114  
 grandicornis fulvispinus, III, 114  
 grandicornis nigrispinus, III, 114  
 grandis, III, 167, 169, 171  
 griseispinus, III, 122  
 grossei, III, 190  
 grusonii, III, 167, 168; IV, 288  
 grusonii azureus, III, 68
- Echinocactus—continued,*  
 guerkeanus, III, 134, 153  
 guyanensis, III, 98  
 haageanus, III, 77, 170, 185  
 haematacanthus, III, 147  
 haematanthus, III, 37  
 haematochroanthus, III, 145  
 hamatacanthus brevispinus, III, 145  
 hamatacanthus longihatatus, III, 145  
 hamatacanthus, III, 144  
 hamatus, III, 104, 177  
 hamulosus, III, 104  
 hankeanus, III, 99  
 hartmannii, III, 217  
 haselbergii, III, 201, 202; IV, 289  
 haselbergii cristatus, III, 202  
 hastatus, III, 111  
 hastatus fulvispinus, III, 111  
 haynei, III, 102, 103  
 bayou, III, 102, 103  
 helianthoidiscus, III, 107  
 helophorus, III, 169  
 helophorus laevior, III, 169  
 helophorus longifossulatus, III, 169  
 hemifossus, III, 180  
 hemifossus gracilispinus, III, 180  
 hempelianus, III, 101  
 heteracanthus, III, 112, 117  
 heterochromus, IV, 12, 13  
 heteromorphus, IV, 23  
 hexacanthus, III, 122  
 hexaedrophorus, IV, 6, 7, 10  
 hexaedrophorus droegeanus, IV, 10  
 hexaedrophorus fossulatus, IV, 10  
 hexaedrophorus labouretianus, IV, 6  
 hexaedrophorus major, IV, 6  
 hexaedrophorus roseus, IV, 6  
 hexaedrophorus subcostatus, IV, 10  
 hexaedrus, IV, 13  
 heyderi, III, 122  
 heynei, III, 10  
 histrix, III, 138  
 hoffmannseggii, III, 98  
 holopteris, III, 185  
 hookeri, III, 122  
 horizontalis, III, 173  
 horizontalionus, III, 100, 167, 175, 177  
 horizontalionus centrispinus, III, 175  
 horizontalionus curvispinus, III, 175  
 horizontalionus obscurispinus, III, 175  
 horridus, III, 202  
 horripilus, IV, 16  
 horripilus erectocentrus, III, 149  
 horripilus longispinus, IV, 16  
 humilis, III, 89, 99  
 huottii, III, 63  
 hybocentrus, III, 203, 204  
 hybogonus, III, 157  
 hybogonus saglionis, III, 157  
 hylainacanthus, III, 179  
 hypocrateriformis, III, 200  
 hypocrateriformis spinosior, III, 200  
 hyptiacanthus, III, 154, 156, 157  
 hyptiacanthus eleutheracanthus, III, 156  
 hyptiacanthus megalotelus, III, 156  
 hyptiacanthus nitidus, III, 156  
 hystrichacanthus, III, 139  
 hystrichocentrus, III, 122



- Echinocactus*—*continued*,  
 hystrichoides, III, 122  
 hystrix, II, 86; III, 138, 170  
 inflatus, IV, 288  
 ingens, III, 18, 167, 168,  
 169, 170, 171; IV, 288  
 ingens edulis, III, 170  
 ingens grandis, III, 170  
 ingens helophorus, III,  
 ingens irroratus, III, 169  
 ingens saltillensis, III, 172;  
 IV, 28  
 ingens subinermis, III, 170,  
 172, 173  
 ingens visnaga, III, 170, 171  
 insculptus, IV, 7  
 insignis, III, 145; IV, 287  
 intermedius, III, 155  
 interruptus, III, 98, 110  
 intertextus, III, 149, 150,  
 197  
 intertextus dasyacanthus,  
 III, 149, 150; IV, 55  
 intortus, III, 230  
 intortus purpureus, III, 226  
 intricatus, III, 180, 206  
 intricatus longispinus, III,  
 88  
 irroratus, III, 170  
 islavensis, III, 201  
 joadi, III, 192, 193  
 jeneschianus, II, 138  
 johnsonii, III, 141  
 johnsonii octocentrus, III,  
 141  
 joossensianus, III, 166  
 jordanianus, III, 85  
 junori, III, 180  
 juori, III, 180  
 jussianus, III, 96  
 jussieui, III, 96, 97  
 jussieui cristatus, III, 96  
 karwinskius, III, 169  
 karwinskii, III, 169  
 knippelianus, III, 211  
 krausei, III, 150  
 kunzei, III, 99  
 kunzei brevispinus, III,  
 100  
 kunzei rigidior, III, 100  
 kunzii, III, 99  
 kurtzianus, III, 163  
 labouretianus, IV, 7  
 lamellosus, III, 113  
 lamellosus fulvescens, III,  
 114  
 lancifer, III, 115, 118, 119,  
 138  
 langsdorfii, III, 199, 200  
 laticostatus, III, 175  
 latispinus, III, 180  
 latispinus, III, 143  
 latispinus flavispinus, III,  
 143  
 lecchii, II, 20  
 lecomtei, III, 129  
 lecontei, III, 129; IV, 287  
 lecontei albispinus, III, 129  
 lecontei hagei, III, 129  
 lecontei, III, 129; IV, 256  
 lecanus, III, 154  
 lemarii, III, 226  
 leninghausii, III, 204, 205;  
 IV, 289  
 leninghausii cristatus, III,  
 205  
 leonensis, III, 21, 158  
 leopoldi, III, 130; IV, 287  
 leucacanthus, III, 225; IV,  
 8, 9  
 leucacanthus crassior, IV, 8  
 leucacanthus tuberosus, IV, 8  
 leucanthus, III, 72  
 leucocarpus, III, 198, 199  
 leucodictyus, III, 158  
 leucotrichus, III, 100, 101  
 lewinii, III, 84  
 limitus, III, 140
- Echinocactus*—*continued*,  
 lindheimeri, III, 181  
 lindleyi, III, 90  
 linkeanus, III, 122  
 linkii, III, 195; IV, 289  
 linkii spinosior, III, 195  
 longihamatus, III, 117, 144,  
 145, 146; IV, 287  
 longihamatus bicolor, III, 145  
 longihamatus brevispinus,  
 III, 145  
 longihamatus crassispinus,  
 III, 145  
 longihamatus deflexispinus,  
 III, 145  
 longihamatus gracilispinus,  
 III, 144  
 longihamatus hamatacan-  
 thus, III, 144  
 longihamatus insignis, III,  
 145  
 longihamatus sinuatus, III,  
 145, 146  
 longispinus, III, 180  
 lophothele, IV, 7, 8  
 lophothele longispinus, IV, 8  
 loratus, III, 155; IV, 168  
 maassii, III, 202  
 macdowellii, III, 151  
 mackieanus, III, 158, 159  
 macleanii, IV, 8  
 macracanthus, III, 89, 169  
 macracanthus cinerascens,  
 III, 89  
 macrocephalus, III, 122  
 macrodiscus, III, 139, 140  
 macrodiscus decolor, III, 139  
 macrodiscus laevior, III, 139  
 macrodiscus multiflorus, III,  
 139, 140  
 macromeris, IV, 25  
 macrothele, IV, 30  
 macrothele biglandulosus,  
 IV, 30  
 macrothele lehmanni, IV, 30  
 maelenii, IV, 8  
 malletianus, III, 100, 177  
 mammosus, III, 180  
 mammillifer, III, 122, 137  
 mammillarioides, III, 138,  
 203, 204  
 mammillosus, III, 200  
 mammillosus cristatus, III,  
 200  
 mammillosus hircinus, III,  
 200  
 mammillosus minor, III, 200  
 mammillosus pampeanus, III,  
 200  
 mammillosus spinosior, III,  
 200  
 mammillosus submammillo-  
 sus, III, 200  
 mammillosus typicus, III,  
 200  
 marginatus, III, 85, 86, 87  
 marisianus, III, 105  
 martinii, III, 189  
 mathssonii, III, 144  
 mcdowellii, III, 151  
 megalothelos, III, 87, 162  
 megarhizus, IV, 3, 4  
 melanacanthus, III, 186  
 melanocarpus, III, 161, 162  
 melanochnus, III, 86  
 melmsianus, III, 117  
 melocactiformis, III, 138,  
 139  
 melocactoides, III, 224  
 meonacanthus, III, 224  
 merbellii ornatus, III, 185  
 merckeri, III, 180  
 micracanthus, III, 180  
 micromeris, III, 93  
 microspermus, III, 176, 207,  
 208; IV, 289  
 microspermus brevispinus,  
 III, 208
- Echinocactus*—*continued*,  
 microspermus elegans, III,  
 208  
 microspermus erythranthus,  
 III, 208  
 microspermus macrancistrus,  
 III, 207, 208  
 microspermus thionanthus,  
 III, 208  
 mihanovichii, III, 153, 151  
 minax, III, 169  
 minax laevior, III, 169  
 minusculus, III, 45, 46, 176;  
 IV, 285  
 minusculus cristatus, III, 46  
 mirbeli, III, 185  
 mirbeli ornatus, III, 185  
 misleyi, III, 73  
 mitis, III, 181  
 molendensis, III, 201  
 montevidensis, III, 180  
 monvillei, III, 155, 161; IV,  
 288  
 mostii, III, 158  
 muchlenpfordti, III, 104;  
 IV, 28, 29  
 multangularis, III, 142  
 multicoctatus, III, 111  
 multiflorus, III, 155, 156, 159  
 multiflorus albispinus, III,  
 159  
 multiflorus hybopleurus, III,  
 159  
 multiflorus parisiensis, III,  
 159  
 multiplex, III, 64; IV, 286  
 multiplex cristatus, IV, 286  
 muricatus, III, 194, 195  
 muricatus hortatani, III, 196  
 mutabilis, III, 177  
 myriacanthus, III, 101  
 myriostigma, III, 182, 183  
 myriostigma amabile, III,  
 183  
 myriostigma amabilis, III,  
 183  
 myriostigma amoenus, III,  
 183  
 myriostigma bedinghausi,  
 III, 183  
 myriostigma bedinghausii,  
 III, 183  
 myriostigma begunii, III,  
 183  
 myriostigma bellus, III, 183  
 myriostigma candidus, III,  
 183  
 myriostigma cereiformis, III,  
 183  
 myriostigma cinerascens, III,  
 183  
 myriostigma cinerascens bre-  
 vispinus, III, 183  
 myriostigma cinerascens bre-  
 vispinus, III, 183  
 myriostigma cinerascens  
 crassispinus, III, 183  
 myriostigma cinerascens  
 longispinus, III, 183  
 myriostigma cinerascens  
 parvimaculatus, III, 183  
 myriostigma columnaris, III,  
 182, 183  
 myriostigma conspicuum, III,  
 183  
 myriostigma conspicuum, III,  
 183  
 myriostigma cornutus, III,  
 183  
 myriostigma cornutus can-  
 didus, III, 183  
 myriostigma crenatus, III,  
 183  
 myriostigma darrahii, III,  
 183  
 myriostigma delaeti, III, 183  
 myriostigma diadematus, III,  
 183  
 myriostigma elegantissimus,  
 III, 183
- Echinocactus*—*continued*,  
 myriostigma erectus, III, 183  
 myriostigma formosus, III,  
 183  
 myriostigma gardei, III, 183  
 myriostigma glabrescens, III,  
 183  
 myriostigma hanburyi, III,  
 183  
 myriostigma hybridus, III,  
 183  
 myriostigma imperiale, III,  
 183  
 myriostigma imperialis, III,  
 183  
 myriostigma incanus, III,  
 183  
 myriostigma incomparabilis,  
 III, 183  
 myriostigma inermis, III, 183  
 myriostigma insignis, III,  
 183  
 myriostigma jusberti, III,  
 183  
 myriostigma lapaixi, III, 183  
 myriostigma lapaixii, III,  
 183  
 myriostigma laurani, III, 183  
 myriostigma lesaunieri, III,  
 183  
 myriostigma lophothele, III,  
 183  
 myriostigma lophothele ce-  
 reiformis, III, 183  
 myriostigma martini, III,  
 183  
 myriostigma mirabile, III,  
 183  
 myriostigma mirabilis, III,  
 183  
 myriostigma nobilis, III, 183  
 myriostigma nudus, III, 182,  
 183  
 myriostigma octagonus, III,  
 183  
 myriostigma octogonum, III,  
 183  
 myriostigma pentagonus,  
 III, 183  
 myriostigma pictus, III, 183  
 myriostigma princeps, III,  
 183  
 myriostigma quadratus, III,  
 183  
 myriostigma rebuti, III, 183  
 myriostigma regale, III, 183  
 myriostigma regalis, III, 183  
 myriostigma regulare, III,  
 183  
 myriostigma regulare spino-  
 sum, III, 183  
 myriostigma robustum, III,  
 183  
 myriostigma schilinskyi, III,  
 183  
 myriostigma sehlinzkyi, III,  
 183  
 myriostigma schumannii, III,  
 183  
 myriostigma speciosus, III,  
 183  
 myriostigma spectabilis, III,  
 183  
 myriostigma spiralis, III, 183  
 myriostigma splendidus, III,  
 183  
 myriostigma variegatus, III,  
 183  
 myriostigma weberi, III, 183  
 myriostigma zonatus, III,  
 183  
 napinus, III, 191  
 netrelianus, III, 154  
 neumannianus, III, 100  
 neumannianus rigidior, III,  
 100  
 nidulans, IV, 9, 10  
 nidus, III, 94, 207

- Echinocactus*—*continued*,  
*niger*, III, 96  
*nigricans*, III, 95, 96, 176  
*nigrispinus*, III, 190, 191  
*nobilis*, III, 158  
*nodosus*, III, 17, 105  
*nummularioides*, III, 203  
*obrepandus*, III, 73  
*obvallatus*, III, 115, 116, 119  
*obvallatus pluricostatus*, III, 115  
*obvallatus spinosior*, III, 115  
*occutus*, III, 95  
*ochroleucus*, III, 122  
*octacanthus*, III, 122  
*octogonus*, III, 6  
*odieri*, III, 177  
*odieri magnificus*, III, 178  
*odieri mebbesi*, III, 178  
*odieri spinis nigris*, III, 178  
*odierianus*, III, 177  
*olacogonus*, III, 180  
*oligacanthus*, III, 121, 170  
*orcuttii*, III, 134, 135  
*oreptilis*, III, 180  
*ornatus*, III, 185  
*ornatus glabrescens*, III, 185  
*ornatus mirbelii*, III, 185  
*orthacanthus*, III, 138  
*ottonianus*, IV, 26  
*ottonis*, III, 142, 195, 196; IV, 289  
*ottonis brasiliensis*, III, 196  
*ottonis linkii*, IV, 289  
*ottonis minor*, III, 196  
*ottonis pallidior*, III, 195  
*ottonis paraguayensis*, III, 196  
*ottonis pfeifferi*, III, 196  
*ottonis spinosior*, III, 195  
*ottonis tenuispinus*, III, 195, 196; IV, 289  
*ottonis tortuosus*, III, 195  
*ottonis uruguayus*, III, 196  
*ourselianus*, III, 159  
*ourselianus albispinus*, III, 159  
*oxyacanthus*, III, 180  
*oxygonus*, III, 64, 65  
*oxypterus*, III, 138  
*pachycentrus*, III, 203, 204  
*pachycornis*, III, 178  
*palmeri*, III, 167, 172; IV, 28  
*pampeanus*, III, 200, 201  
*pampeanus charruanus*, III, 200  
*pampeanus rubellianus*, III, 200  
*pampeanus subplanus*, III, 200  
*papyracanthus*, III, 91, 92  
*paraguayensis*, III, 156  
*parryi*, III, 175  
*parvispinus*, III, 237  
*pauciareolatus*, III, 188, 189  
*pectinatus*, III, 29  
*pectiniferus*, III, 29, 30  
*pectiniferus laevior*, III, 29  
*pelachicus*, III, 180  
*peninsulae*, III, 133, 134  
*pentacanthus*, III, 115, 116  
*pentlandii*, III, 49, 54, 55  
*pepinianus*, II, 137; III, 100  
*pepinianus affinis*, III, 89  
*pepinianus echinoides*, II, 138  
*peruvianus*, III, 102  
*pfeifferi*, III, 137, 138  
*pfersdorffii*, III, 139  
*philippi*, II, 105  
*phoeniceus inermis*, III, 14  
*phyllacanthoides*, III, 118  
*phyllacanthus*, III, 118  
*phyllacanthus laevior*, III, 118  
*phyllacanthus laevis*, III, 118  
*phyllacanthus macracanthus*, III, 118
- Echinocactus*—*continued*,  
*phyllacanthus micracanthus*, III, 118  
*phyllacanthus pentacanthus*, III, 118  
*phyllacanthus tenuiflorus*, III, 118  
*phyllacanthus tricuspidatus*, III, 117, 118  
*phymatothele*, IV, 8  
*phymatothelos*, IV, 8, 13  
*piliferus*, III, 125  
*pilosus*, III, 124, 125, 126, 147  
*pilosus canescens*, IV, 287  
*pilosus pringlei*, III, 125  
*pilosus steinesi*, III, 124  
*placentiformis*, III, 219  
*plaschnickii*, IV, 30  
*platensis*, III, 163, 164  
*platensis leptanthus*, III, 163, 164  
*platensis parvulus*, III, 163  
*platensis quehlianus*, III, 163  
*platensis typicus*, III, 163  
*platyacanthus*, III, 166, 167, 171  
*platycarpus*, III, 180  
*platycephalus*, III, 181  
*platyceras*, III, 169  
*platyceras laevior*, III, 169  
*platyceras minax*, III, 169  
*plicatilis*, III, 180  
*pluricostatus*, III, 180  
*poliacanthus*, III, 198  
*polyacanthus*, III, 167  
*polyancistrus*, III, 167, 212, 213, 214  
*polycephalus*, III, 167, 174  
*polycephalus flavispinus*, III, 174  
*polycephalus xeranthemoides*, III, 173  
*polygrhaphis*, III, 103  
*polyocentrus*, III, 138  
*polyraphis*, III, 103  
*polyrhaphis*, III, 103  
*porrectus*, IV, 8  
*posegerianus*, IV, 13, 28  
*pottsianus*, IV, 136, 137  
*pottsii*, IV, 12, 13  
*praegnacanthus*, IV, 288  
*pringlei*, III, 125, 126  
*pruinosis*, III, 88, 89  
*pseudo-cereus*, III, 98  
*pseudominusculus*, III, 47  
*pubispinus*, III, 213  
*pulchellus*, III, 33  
*pulcherrimus*, III, 194  
*pulverulentus*, III, 178  
*pumilus*, III, 209, 210  
*pumilus gracillimus*, III, 209  
*punctulatus*, III, 180  
*purpureus*, IV, 288  
*pycnacanthus*, IV, 41  
*pycnoxyphus*, III, 139  
*pygmaeus*, III, 210, 211  
*pygmaeus phaeodiscus*, III, 210  
*pyramidatus*, III, 90  
*pyramidalis*, II, 139  
*quadrinatus*, III, 122  
*quehlianus*, III, 163, 164  
*radians*, IV, 36  
*radiatus*, IV, 42  
*radicans*, IV, 36  
*radiosus*, IV, 43  
*rafaelensis*, III, 47  
*raphidacanthus*, III, 122; IV, 15  
*raphidocentrus*, III, 122  
*rebutii*, III, 180  
*rectispinus*, III, 134  
*recurvus*, III, 141, 142, 143  
*recurvus bicolor*, III, 143  
*recurvus latispinus*, III, 143  
*recurvus solenacanthus*, III, 143
- Echinocactus*—*continued*,  
*recurvus spiralis*, III, 142  
*recurvus tricuspidatus*, III, 143  
*reductus*, III, 158  
*reichei*, III, 191  
*reichenbachii*, III, 25  
*rettigii*, III, 101  
*retusus*, III, 180  
*rhodacanthus*, III, 78, 79  
*rhodacanthus coccineus*, III, 79  
*rhodanthus*, IV, 288  
*rhodophthalmus*, IV, 11, 12  
*rhodophthalmus ellipticus*, IV, 11, 12  
*rinconadensis*, IV, 7  
*rinconensis*, IV, 7  
*robustus*, III, 135, 136, 147  
*robustus monstrosus*, III, 136  
*robustus prolifer*, III, 136  
*rosaceus*, III, 199  
*rostratus*, III, 59, 97, 98  
*rotherianus*, III, 206  
*rubidus superbissimus*, III, 98  
*rubrispinus*, III, 127  
*sagliensis*, III, 197; IV, 288  
*salmensis*, IV, 28  
*salm-dyckianus*, III, 88; IV, 39  
*salmianus*, III, 74, 222  
*salmii*, III, 180  
*salpingophorus*, III, 72  
*saltensis*, III, 5  
*saltillensis*, III, 172, 173; IV, 28  
*sandillon*, III, 186, 187  
*sanjuanensis*, III, 206  
*santa-maria*, III, 131  
*sassierii*, IV, 13  
*scheeri*, IV, 3, 4, 5, 28  
*scheeri brevispinus*, IV, 5  
*scheerii*, IV, 4  
*schickendantzii*, III, 87, 152, 164, 165  
*schilinzkyanus*, III, 210  
*schilinzkyanus grandiflorus*, III, 210  
*schlechtendalii*, IV, 30  
*schlumbergeri*, III, 158  
*schottii*, IV, 11  
*schumannianus*, III, 189  
*schumannianus longispinus*, III, 189  
*schumannianus nigrispinus*, III, 191  
*sclerothrix*, III, 128  
*scopa*, III, 122, 193, 194, 202; IV, 289  
*scopa albicans*, III, 193  
*scopa candidus*, III, 193, 194  
*scopa candidus cristatus*, III, 193, 194  
*scopa cristatus*, III, 193, 194; IV, 289  
*scopa ruberrimus*, III, 193  
*scopa rubra*, IV, 289  
*scopa rubrinus*, III, 193  
*sellowianus*, III, 188, 189  
*sellowianus tetracanthus*, III, 188  
*sellowii*, III, 188, 189; IV, 288  
*sellowii acutatus*, III, 188  
*sellowii courantii*, III, 188  
*sellowii macroacanthus*, III, 188, 189  
*sellowii macrogonus*, III, 188, 189  
*sellowii martinii*, III, 188, 189  
*sellowii tetracanthus*, IV, 288  
*sellowii turbinatus*, III, 188, 189  
*sellowii typicus*, III, 188
- Echinocactus*—*continued*,  
*senilis*, II, 27; III, 94  
*sessiliflorus*, III, 188, 189  
*sessiliflorus pallidus*, III, 188  
*sessiliflorus tetracanthus*, III, 188  
*setispinus*, III, 104, 105, 106; IV, 287  
*setispinus cachetianus*, III, 104  
*setispinus hamatus*, III, 104, 105  
*setispinus longihamatus*, III, 144  
*setispinus longispinus*, III, 106  
*setispinus martelii*, III, 105  
*setispinus micrensis*, III, 105  
*setispinus muehlenpfordtii*, III, 105  
*setispinus orcuttii*, III, 105  
*setispinus robustus*, III, 144  
*setispinus setaceus*, III, 104, 105  
*setispinus sinuatus*, III, 144  
*setosus*, III, 77  
*sickmannii*, III, 180  
*sileri*, III, 215  
*similis*, IV, 52  
*simpsonii*, III, 90, 91, 92; IV, 286  
*simpsonii minor*, III, 90  
*simpsonii robustior*, III, 90, 91  
*sinuatus*, III, 144, 146  
*smithii*, IV, 13  
*soehrensii*, III, 202, 203  
*soehrensii albispinus*, III, 203  
*soehrensii brevispinus*, III, 203  
*soehrensii niger*, III, 203  
*solenacanthus*, III, 142  
*sparthacanthus*, III, 180  
*spectabilis*, III, 136  
*spgazzinii*, III, 158, 190  
*sphaelacanthus*, IV, 138  
*sphaerocephalus*, III, 114  
*spina-christi*, III, 178, 238  
*spiniflorus*, III, 8, 78, 178, 179  
*spinosior*, III, 213  
*spinosissimus*, III, 179; IV, 118  
*spinosus*, III, 111  
*spiralis*, III, 141, 142, 143  
*spiralis stellaris*, III, 142  
*stapesii*, III, 124, 125, 180  
*staplesiae*, II, 27  
*steinmannii*, III, 47, 45  
*stellaris*, III, 142  
*stellatus*, III, 142, 152, 163  
*stenocarpus*, III, 163  
*stenogoni*, III, 118  
*stenogonus*, III, 117  
*strausianus*, III, 201  
*streptocaulon*, III, 86, 87  
*strobiliformis*, IV, 54  
*stuckertii*, III, 165  
*suberinaceus*, III, 158  
*subgibbosus*, III, 59, 94, 96, 97, 98  
*subglaucus*, III, 213  
*subgrandicornis*, III, 181  
*submammulosus*, III, 200, 201; IV, 289  
*subniger*, III, 100  
*subporrectus*, IV, 8  
*subuliferus*, III, 136  
*sulcatus*, III, 64  
*sulcolanatus*, IV, 37  
*sulphureus*, III, 123  
*supertextus*, III, 100  
*tabularis*, III, 193  
*tabularis cristatus*, III, 193  
*tellii*, III, 123  
*tenuiflorus*, III, 118  
*tenuispinus*, III, 166, 195, 196

- Echinocactus*—*continued*,  
*tenuispinus minor*, III, 195  
*tenuispinus ottonis*, III, 196  
*tenuissimus*, III, 196  
*tephracanthus*, III, 188  
*tephracanthus spinosior*, III,  
 188  
*teretispinus*, III, 123  
*terscheckii*, III, 199  
*tetracanthus*, III, 188, 189  
*tetracentrus*, IV, 287  
*tetraxiphus*, III, 112  
*texensis*, III, 167, 181, 182;  
 IV, 288  
*texensis gourgensii*, III, 181  
*texensis longispinus*, III, 181  
*texensis treculianus*, III, 145  
*theiakanthus*, III, 122, 137  
*theionacanthus*, III, 122, 137  
*thelephorus*, III, 181  
*theloides*, IV, 8  
*thionanthus*, III, 49, 57  
*thrinogonus*, III, 97, 98  
*thrinogonus elatior*, III, 97  
*tortuosus*, III, 195, 196  
*tortus*, III, 185  
*towensis*, III, 158  
*treculianus*, III, 144  
*tribolacanthus*, III, 123  
*tricolor*, IV, 12  
*tricornis*, III, 218  
*tricuspidatus*, III, 117  
*trifurcatus*, III, 123  
*trolletii*, III, 150, 151  
*tuberculatus*, III, 170  
*tuberculatus spiralis*, III, 170  
*tuberisulcatus*, III, 202, 203  
*tuberosus*, IV, 9  
*tuberosus subporrectus*, IV,  
 9  
*tubiflorus*, III, 67  
*tulensis*, IV, 8, 11  
*turbinatus*, III, 66  
*turbiniiformis*, III, 106, 107;  
 IV, 287  
*uncinatus*, III, 146  
*uncinatus wrightii*, III, 146  
*undulatus*, III, 117  
*unguispinus*, III, 150, 151;  
 IV, 287  
*uruguayensis*, III, 162  
*valparaiso*, III, 98  
*vanderacyi*, III, 136  
*vargasii*, IV, 13  
*verutum*, III, 118  
*victoriensis*, III, 136  
*villiferus*, III, 181  
*villosus*, III, 103  
*villosus crenator*, III, 103  
*violaciflorus*, III, 114, 115  
*violicens*, III, 135, 140,  
 141; IV, 287  
*viridescens cylindraceus*, III,  
 129  
*viridiflorus*, III, 17  
*visnaga*, III, 167, 170, 171;  
 IV, 288  
*viviparus*, IV, 43  
*wangertii*, II, 133  
*weberbaueri*, III, 103  
*wegeneri*, III, 122  
*weingartianus*, III, 206  
*whipplei*, III, 167, 213  
*whipplei nanus*, III, 213  
*whipplei spinosior*, III, 213  
*wilhelmii*, III, 181  
*williamsii*, III, 83, 84, 85;  
 IV, 286  
*williamsii lewinii*, III, 85  
*winkleri*, IV, 41  
*wippermannii*, III, 111  
*wislizeni*, III, 123, 127, 128  
*wislizeni albispinus*, III, 127  
*wislizeni albus*, III, 129  
*wislizeni decipiens*, III, 127  
*wislizeni latispinus*, III, 128  
*wislizeni lecontei*, III, 129  
*wislizeni phoeniceus*, III, 129
- Echinocactus*—*continued*,  
*wislizeni purpureus*, III, 128  
*wrightii*, III, 146  
*xanthacanthus*, III, 230, 231  
*xeranthemoides*, III, 167, 173  
*xiphacanthus*, III, 114  
*Echinocactuses*, IV, 168  
*Echinocarpae*, I, 44, 56  
*Echinocereanae*, II, 1; III,  
 3-77; IV  
*Echinocereus*, I, 79, 215; II, 3,  
 104, 110; III, 3-44, 45, 48,  
 60, 104, 146, 150, 202, 211,  
 212; IV, 12, 48, 57, 162;  
 IV, 285  
*acifer*, III, 4, 12, 13, 14; IV,  
 285  
*acifer brevispinulus*, III, 12  
*acifer diversispinus*, III, 12  
*acifer durangensis*, III, 12  
*acifer tenuispinus*, III, 12  
*acifer trichacanthus*, III, 12,  
 13; IV, 285  
*adustus*, III, 5, 23, 24  
*aggregattis*, III, 14; IV, 47  
*amoenus*, III, 5, 33  
*baileyi*, III, 3, 5, 26, 27  
*barcelona*, IV, 287  
*barcelona*, III, 43  
*barthelowanus*, III, 5, 41  
*berlandieri*, III, 20, 21  
*bertinii*, III, 45  
*bicolor*, III, 43  
*blanckii*, III, 5, 20, 21; IV,  
 285  
*blankii*, III, 20  
*bolansis*, III, 40  
*boliviensis*, III, 43  
*brandegeei*, III, 5, 34  
*caespitosus*, III, 25, 26; IV,  
 285  
*caespitosus castaneus*, III, 25  
*caespitosus major*, III, 25  
*candicans*, II, 142; III, 28  
*candicans tenuispinus*, II,  
 143  
*carneus*, III, 36  
*centralis*, III, 149  
*chiloensis*, II, 138  
*chloranthus*, 4, 16  
*chlorophthalmus*, III, 5, 32  
*cinerascens*, III, 5, 23; IV,  
 285  
*cinerascens crassior*, III, 23  
*cinnabarinus*, III, 54  
*cirrhiferus*, III, 23  
*cirrhiferus monstrosus*, III,  
 23  
*clavatus*, II, 106  
*claviformis*, III, 43  
*coccineus*, III, 4, 13, 14; IV,  
 285  
*conglomeratus*, III, 5, 32,  
 39, 40  
*conoideus*, III, 4, 11, 13  
*ctenoides*, III, 5, 19, 20  
*dahliaeflorus*, III, 44  
*dasyacanthus*, III, 5, 18, 19,  
 31  
*degandii*, III, 19  
*delatetii*, III, 4, 6  
*deppei*, III, 23; IV, 285  
*dubius*, III, 5, 39  
*durangensis*, III, 12; IV, 285  
*durangensis nigrispinus*, III,  
 12  
*durangensis rufispinus*, III,  
 12  
*ehrenbergii*, III, 5, 41  
*ehrenbergii cristatus*, III, 42  
*emoryi*, II, 108; III, 127  
*engelmannii*, III, 5, 38  
*engelmannii albispinus*, III,  
 38  
*engelmannii chrysoctrus*,  
 III, 38  
*engelmannii fulvispinus*, III,  
 38
- Echinocereus*—*continued*,  
*engelmannii pferdorffii*, III,  
 38  
*engelmannii robustior*, III, 38  
*engelmannii variegatus*, III,  
 38  
*engelmannii versicolor*, III,  
 38  
*enneacanthus*, III, 5, 36, 39;  
 IV, 285  
*enneacanthus carneus*, III,  
 36  
*fendleri*, III, 5, 9, 14, 35, 36,  
 37, 40  
*fitchii*, III, 5, 30  
*flavescens*, II, 20; III, 212  
*flaviflorus*, III, 15, 21  
*galtieri*, III, 43  
*gladiatus*, II, 142  
*glycymorphus*, III, 23  
*gonacanthus*, III, 10  
*grahamii*, III, 43  
*grandis*, III, 4, 18  
*havermansii*, III, 43  
*hempelii*, III, 5, 34, 35  
*hexaedrus*, III, 10  
*hildmannii*, III, 36  
*huitcholensis*, III, 4, 8  
*hypogaeus*, II, 106  
*inermis*, III, 14, 32  
*intricatus*, II, 143  
*jacobyi*, III, 35  
*knippelianus*, III, 5, 32  
*krausei*, III, 14  
*kunzei*, III, 31  
*labouretianus*, III, 17  
*labouretii*, III, 17  
*lamprochlorus*, II, 132  
*leanus*, III, 4, 9, 43  
*leanus multicostatus*, III, 9  
*leonensis*, III, 20, 21  
*leptacanthus*, III, 22  
*liebnerianus*, III, 32  
*limensis*, II, 20  
*lloydii*, III, 5, 37  
*longisetus*, III, 5, 42  
*luteus*, III, 4, 16, 17  
*malibranii*, III, 43  
*mamillatus*, III, 5, 41, 42  
*mamillosus*, III, 43  
*maritimus*, III, 4, 15  
*merkeri*, III, 5, 35, 36  
*mohavensis*, III, 8  
*mojavensis*, III, 4, 8  
*mojavensis zuniensis*, III, 14  
*monacanthus*, III, 10  
*multangularis*, II, 19; IV,  
 279  
*multangularis limensis*, II,  
 20  
*multangularis pallidior*, II,  
 19  
*multicostatus*, III, 9  
*neo-mexicanus*, III, 4, 11, 13  
*octacanthus*, III, 4, 13  
*orcuttii*, III, 15  
*pacificus*, III, 4, 11, 12  
*palmeri*, III, 5, 34  
*papillosus*, III, 5, 19  
*papillosus rubescens*, III, 19  
*paucispinus*, III, 10  
*paucispinus flavispinus*, III,  
 10  
*paucispinus gonacanthus*,  
 III, 10  
*paucispinus hexaedrus*, III,  
 10  
*paucispinus triglochidiatus*,  
 III, 10  
*paucupina*, III, 44  
*pectinatus*, III, 29, 5, 30  
*pectinatus adustus*, III, 24  
*pectinatus armatus*, III, 24  
*pectinatus caespitosus*, III,  
 25, 26  
*pectinatus candicans*, III, 28  
*pectinatus castaneus*, III, 26  
*pectinatus centralis*, III, 149
- Echinocereus*—*continued*,  
*pectinatus chrysacanthus*,  
 III, 29  
*pectinatus cristatus*, III, 30  
*pectinatus laevior*, III, 30  
*pectinatus rigidissimus*, III,  
 27, 28  
*pectinatus robustior*, III, 28  
*pectinatus robustus*, III, 27,  
 28  
*pectinatus rufispinus*, III, 24  
*penicilliformis*, III, 4  
*pensilis*, III, 4, 8  
*pentalophus*, III, 5, 20, 21;  
 IV, 285  
*pentlandii*, III, 54  
*perbellus*, III, 5, 24, 25  
*persolutus*, III, 44  
*phoeniceus*, III, 14  
*phoeniceus albispinus*, III,  
 14  
*phoeniceus conoideus*, III, 13  
*phoeniceus inermis*, III, 14  
*phoeniceus longispinus*, III,  
 14  
*phoeniceus rufispinus*, III,  
 14  
*pleiogonus*, III, 9, 43  
*polycanthus*, III, 4, 9, 11,  
 12, 15; IV, 285  
*polycephalus*, III, 44  
*poselgeri*, II, 110, 111  
*poselgerianus*, III, 20  
*princeps*, III, 44  
*procumbens*, III, 22; IV, 285  
*procumbens longispinus*, III,  
 22  
*propinquus*, III, 22  
*pulchellus*, III, 5, 33  
*pulchellus amoenus*, III, 33  
*radians*, III, 23  
*raphicephalus*, III, 44  
*reichenbachianus*, III, 25  
*reichenbachii*, III, 5, 25, 27,  
 28, 31; IV, 52, 285  
*rigidispinus*, III, 28  
*rigidissimus*, III, 5, 27, 28, 29  
*robustior*, III, 28  
*roemerii*, III, 13, 14  
*roetteri*, III, 5, 31  
*rosai*, III, 4, 11, 14, 15  
*rotatus*, III, 25  
*rubescens*, III, 19  
*ruengei*, III, 19  
*rufispinus*, III, 23  
*salm-dyckianus*, III, 4, 6,  
 7, 8; IV, 285  
*salmianus*, III, 7  
*saltillensis*, IV, 285  
*sanborgianus*, III, 34  
*sanguineus*, III, 44  
*sarissophorus*, III, 5, 38  
*scheeri*, III, 4, 6, 7, 43; IV,  
 285  
*scheeri major*, III, 6  
*scheeri minor*, III, 6  
*scheeri nigrispinus*, III, 6  
*scheeri robustior*, III, 6  
*schlini*, III, 43  
*sciurus*, III, 5, 22, 23  
*schlechterdalii*, III, 250  
*scopulorum*, III, 5, 30, 31  
*serpentinus*, II, 118  
*spachianus*, II, 131  
*spinibarbis*, II, 82  
*spinosissimus*, III, 19  
*splendens*, II, 118  
*standleyi*, III, 4, 5, 24  
*stramineus*, III, 5, 38, 39, 40,  
 41  
*straussianus*, III, 17  
*strigosus*, II, 143  
*strigosus rufispinus*, II, 113  
*strigosus spinosior*, II, 143  
*subinermis*, III, 4, 16  
*texensis*, III, 19, 25  
*theionacanthus*, III, 122  
*theionacanthus*, III, 122

- Echinocereus*—*continued*,  
 thurberi, III, 43  
 thwaitesii, III, 44  
 trichacanthus, II, 44  
 triglochidiatus, III, 4, 10  
 trockyi, III, 44  
 tuberosus, II, 111  
 uehri, III, 44  
 undulatus, III, 23  
 uspenskii, III, 44  
 viridiflorus, III, 3, 4, 16, 17,  
 24, 31; IV, 285  
 viridiflorus cylindricus, III,  
 17  
 viridiflorus gracilispinus, III,  
 17  
 viridiflorus major, III, 17  
 viridiflorus tubulosus, III, 17  
 turbergii, III, 5, 29
- Echinofossulocactus*, III, 78,  
 109-123, 138; IV, 287  
 albus, III, 110, 112  
 anfractuosus, III, 110, 117  
 arrigens, III, 110, 113, 114  
 confusus, III, 110, 120  
 coptonogonus, III, 110, 121  
 coptonogonus major, III,  
 110  
 cornigerus, III, 143  
 cornigerus angustispinus, III,  
 143  
 cornigerus elatior, III, 143  
 cornigerus rubrospinus,  
 III, 143  
 crispatus, III, 110, 116  
 dichroacanthus, III, 110,  
 117  
 echidne, III, 136  
 ensiformis, III, 114  
 gladiatus, III, 110, 119, 120  
 grandicornis, III, 110, 114  
 harrisii, III, 109  
 hastatus, III, 110, 111  
 helophora, III, 170  
 helophora longifossulatus,  
 III, 170  
 heteracanthus, III, 110, 112  
 ignotus-venosus, III, 109  
 karwinskianus, III, 170  
 lamellosus, III, 110, 113  
 lancifer, III, 110, 118, 119  
 lloydii, III, 110, 112, 113  
 macracanthus, III, 170  
 mirbelii, III, 185  
 multicostatus, III, 110, 111,  
 113  
 obvallatus, III, 110, 115, 116  
 oxypterus, III, 138  
 pentacanthus, III, 110, 115  
 pfeifferi, III, 137  
 phyllacanthus, III, 110, 118,  
 119  
 phyllacanthus macracanthus,  
 III, 118  
 phyllacanthus micracanthus,  
 III, 118  
 platyceras, III, 169  
 recurvus campylacanthus,  
 III, 142  
 robustus, III, 135  
 tricuspидatus, III, 110, 117  
 turbiniiformis, III, 106  
 vanderacyi, III, 136  
 vanderacyi ignotus-longispi-  
 nus, III, 136  
 violaciflorus, III, 110, 114,  
 115  
 wippermannii, III, 110, 111  
 zacatecasensis, III, 110, 113
- Echinomastus*, III, 78, 147-152  
 dasycanthus, III, 148, 150,  
 151; IV, 55  
 durangensis, III, 148, 152  
 erectocentrus, III, 148; IV,  
 16, 175, 287  
 intertextus, III, 148, 149,  
 150; IV, 287  
 maddowellii, III, 148, 151
- Echinomastus*—*continued*,  
 unguispinus, III, 148, 150,  
 152; IV, 287
- Echinomelocactus*, III, 221,  
 225, 231  
 minor, IV, 71
- Echinonyctanthus*, III, 60  
 decaisneanus, III, 66  
 eyriesii, III, 65  
 leucanthus, III, 72  
 multiplex, III, 64  
 nigrispinus, III, 67  
 oxygonus, III, 64  
 pictus, III, 66  
 pulchellus, III, 33  
 schelhasii, III, 66  
 tubiflorus, III, 67  
 tubiflorus nigrispinus, III, 67  
 turbinatus, III, 66  
 turbinatus pictus, III, 66
- Echinopsis*, II, 3, 105, 130, 144,  
 158, 159, 219; III, 3, 4,  
 45, 48, 49, 53, 60-77, 78,  
 79, 100, 101  
 achatina, III, 55  
 albispina, III, 76  
 albispinosa, III, 61, 67  
 amoena, III, 33, 34  
 ancistrophora, III, 61, 69  
 apiculata, III, 63  
 aurata, II, 143; III, 79,  
 186  
 aurea, III, 60, 61, 74  
 baldiana, III, 61, 74  
 beckmannii, III, 76  
 boeckmannii, III, 76  
 boutillieri, III, 76  
 bridgesii, III, 61, 63, 74;  
 IV, 286  
 cachensis, III, 52  
 caespitosa, III, 53  
 calochlora, III, 61, 68  
 campylacantha, III, 69, 72  
 campylacantha brevispina,  
 III, 72  
 campylacantha leucantha,  
 III, 72  
 campylacantha longispina,  
 III, 72  
 campylacantha stylodes, III,  
 72  
 campylacantha stylosa, III,  
 72  
 candicans, II, 142  
 catamarcensis, II, 146; IV,  
 278  
 cavendishii, III, 54  
 chereauiana, III, 54  
 cinnabarina, III, 54, 55  
 cinnabarina cheroniana, III,  
 54  
 cinnabarina cristata, III, 54  
 cinnabarina scheeriana, III,  
 54  
 cinnabarina spinosior, III,  
 54  
 colmariensis, III, 55  
 colmarii, III, 54, 55  
 columnaris, III, 55  
 cordobensis, III, 61, 69  
 cristata, III, 73  
 cristata purpurea, III, 73  
 decaisneana, III, 66, 67; IV,  
 286  
 deminuta, III, 48; IV, 285  
 droegeana, III, 67  
 ducis paulii, III, 76  
 dumeliana, II, 143  
 dumesniliana, II, 143  
 duvallii, III, 76  
 elegans vittata, III, 55  
 eyriesii, III, 61, 65, 76; IV,  
 286  
 eyriesii cristata, III, 65  
 eyriesii duvallii, III, 65  
 eyriesii flore-pleno, III, 66  
 eyriesii glauca, III, 65  
 eyriesii glaucescens, III, 65
- Echinopsis*—*continued*,  
 eyriesii grandiflora, III, 6  
 eyriesii inermis, III, 66  
 eyriesii lagemannii, III, 64  
 eyriesii major, III, 65  
 eyriesii phyligera, III, 65  
 eyriesii rosea, III, 65  
 eyriesii tettavii, III, 65, 66  
 eyriesii triumphans, III, 65,  
 66  
 eyriesii wilkensis, III, 64  
 falcata, III, 66  
 fiebrigii, III, 61, 70, 71  
 fischeri tephacantha, III, 77  
 fobeana, III, 76  
 forbesii, III, 60, 62, 63  
 formosa, III, 60, 61, 75; IV,  
 286  
 formosa albispina, III, 75  
 formosa gilliesii, III, 75  
 formosa laevior, III, 75  
 formosa rubripina, III, 75  
 formosa spinosior, III, 75  
 formosissima, III, 76; IV, 286  
 gemmata, III, 66, 67; IV, 286  
 gemmata cristata, III, 67  
 gemmata decaisneana, III, 66  
 gemmata schelhasii, III, 66  
 gibbosa, III, 158  
 gigantea, III, 76  
 grandiflora, III, 67  
 haageana, III, 185  
 hempeliana, III, 101  
 huottii, III, 60, 63  
 intricatissima, 61, 73  
 jamesiana, III, 66  
 kuottii, III, 63  
 lagemannii, III, 64, 65  
 lamprochlora, II, 132  
 lateritia, III, 56  
 leucantha, III, 61, 72, 98,  
 140; IV, 286  
 leucantha aurea, III, 72, 73  
 leucantha salpingophora,  
 III, 72  
 longispina, III, 76  
 mamilliosa, III, 61, 75  
 maximiliana, III, 54  
 maximiliana longispina, III,  
 55  
 melanacantha, III, 67  
 melanopotamica, III, 72  
 meyeri, III, 60, 61, 62  
 mieckleyi, III, 75  
 minuana, III, 60, 63  
 minuscula, III, 45  
 mirabilis, III, 60, 62  
 misleyi, III, 73  
 molesta, III, 61, 74  
 muelleri, III, 76  
 multiplex, III, 60, 61, 64; IV,  
 286  
 multiplex cossa, III, 64  
 multiplex cristata, III, 64  
 multiplex monstrosa, III, 64  
 multiplex picta, III, 64  
 nigerrima, III, 65, 77  
 nigricans, III, 76, 95  
 nigrispinosa, III, 67  
 nodosa, III, 105  
 obliqua, III, 73  
 obrepanda, III, 61, 73  
 ochroleuca, III, 55  
 octacantha, III, 13  
 oxygona, III, 60, 61, 64, 65,  
 76; IV, 286  
 oxygona inermis, III, 65; IV,  
 286  
 oxygona subinermis, III, 65  
 oxygona turbinata, III, 65  
 paraguayensis, III, 76  
 pectinata, III, 29, 30  
 pectinata laevior, III, 30  
 pectinata reichenbachiana,  
 III, 25  
 pentlandii, III, 51, 54, 55;  
 IV, 285  
 pentlandii achatina, III, 55
- Echinopsis*—*continued*,  
 pentlandii albiflora, III, 55  
 pentlandii cavendishii, III,  
 54  
 pentlandii coccinea, III, 54  
 pentlandii colmari, III, 55  
 pentlandii cristata, III, 55  
 pentlandii elegans, III, 54  
 pentlandii forbesii, III, 54  
 pentlandii gracilispina, III,  
 54  
 pentlandii integra, III, 55  
 pentlandii laevior, III, 54  
 pentlandii levior scheeri, III,  
 55  
 pentlandii longispina, III,  
 54, 55  
 pentlandii maximiliana, III,  
 54, 55  
 pentlandii neuberti, III, 54  
 pentlandii ochroleuca, III, 54  
 pentlandii pferdorffii, III, 54  
 pentlandii pyracantha, III,  
 54  
 pentlandii pyrantha, III, 55  
 pentlandii radians, III, 54  
 pentlandii scheeri, III, 54, 55  
 pentlandii tricolor, III, 54  
 pentlandii vitellina, III, 54  
 pferdorffii, III, 55  
 philippi, II, 105  
 picta, III, 66  
 polyacantha, III, 72  
 polyphylla, III, 76  
 poselgeri brevispina, III, 72  
 poselgeri longispina, III, 72  
 pseudominuscula, III, 47  
 pudatti, III, 6, 66  
 pulchella, III, 33  
 pulchella amoena, III, 33  
 pulchella rosea, III, 34  
 pygmaea, III, 47  
 pyrantha, III, 76  
 quehlii, III, 76  
 reichenbachiana, III, 26  
 rhodacantha, III, 79, 101  
 rhodacantha aurea, III, 79  
 rhodacantha gracilior, III, 79  
 rhodotricha, III, 61, 71  
 rhodotricha argentiniensis,  
 III, 71  
 rhodotricha robusta, III, 71  
 rhodotricha roseiflora, III, 71  
 roehlandii, III, 65  
 rohlandii, III, 64  
 salm-dyckiana, III, 76  
 salmiana, III, 74; IV, 286  
 salmiana bridgesii, III, 74  
 salpingophora, III, 72  
 salpingophora, III, 69, 72  
 salpingophora aurea, III, 72,  
 73  
 saltensis, III, 53  
 saluciana, III, 76  
 scheeri, III, 54, 55  
 scheeriana, III, 55  
 schelhasii rosea, III, 66  
 schelhasii, III, 66  
 schickendantzii, II, 144; IV,  
 278  
 scopa, III, 193, 194  
 scopa candida cristata, III,  
 194  
 shaferi, III, 61, 69, 70  
 silvestrii, III, 61, 68  
 simplex, III, 72  
 spagazziniana, III, 61, 69, 70  
 spagazzinii, III, 71  
 stylosa, III, 72  
 sulcata, III, 64  
 tacuarembense, III, 76  
 tettavii, III, 66  
 tougardii, III, 76  
 tricolor, III, 54  
 triumphans, III, 65; IV, 286  
 tuberculata, III, 76  
 tubiflora, III, 61, 6, 67; IV,  
 286



- Echinopsis*—*continued*,  
*tubiflora nigrispina*, III, 67  
*tubiflora paraguayensis*, III, 67  
*tubiflora rohlandii*, III, 67; IV, 286  
*tubiflora rosea*, III, 67  
*turbinata*, III, 61, 66; IV, 286  
*turbinata picta*, III, 66  
*undulata*, III, 6, 76  
*valida*, III, 62, 63  
*valida densa*, III, 12, 13, 14  
*valida forbesii*, III, 62  
*verschaffeltii*, III, 63  
*wilkensii*, III, 64  
*yacutulana*, III, 72  
*zuccariniana*, III, 67; IV, 286  
*zuccariniana cristata*, III, 67  
*zuccariniana monstrosa*, III, 67  
*zuccariniana nigrispina*, III, 67  
*zuccariniana picta*, III, 67  
*zuccariniana rohlandii*, III, 67  
*zuccariniana rosea*, III, 67  
*zuccarinii*, III, 67, 196  
*zuccarinii monstrosa*, III, 67  
*zuccarinii nigrispina*, III, 67  
*zuccarinii picta*, III, 67  
*zuccarinii robusta*, III, 67  
*Elatae*, I, 45, 152, 156  
*Elatiores*, I, 45, 149, 152, 155, 156, 222  
*Epiphyllanae*, II, 1; IV, 177-207  
*Epiphyllanthus*, IV, 177, 180-182, 209, 220  
*candidus*, IV, 180, 182  
*microsphaericus*, IV, 180, 181  
*obovatus*, IV, 180  
*obtusangulus*, IV, 180, 181  
*Epiphyllum*, I, 9; II, 127, 221; III, 7; IV, 177, 179, 180, 183, 185-201, 204, 220, 250  
*ackermannii*, II, 128, 219; IV, 198, 199, 200  
*acuminatum*, IV, 188, 189  
*aitoni*, IV, 198  
*alatum*, IV, 213, 243  
*album violaceum*, IV, 200  
*altensteinii*, IV, 177, 179  
*amabile*, IV, 200  
*americanum*, IV, 187  
*anguliger*, IV, 187, 191  
*aurantiacum*, IV, 200  
*biforme*, IV, 202  
*brasilense*, IV, 200  
*bridgesii*, IV, 185  
*candidum*, IV, 182  
*carminatum*, IV, 200  
*cartagense*, IV, 187, 197  
*caudatum*, IV, 187, 190  
*caulorhizum*, IV, 192  
*chiapensis*, IV, 203  
*ciliare*, IV, 241  
*ciliatum*, IV, 241  
*costaricense*, IV, 193  
*crenatum*, IV, 187, 192, 193, 199  
*crenulatum*, IV, 244  
*crispatum*, IV, 245  
*cruentum*, IV, 200  
*darrahii*, IV, 187, 190, 191  
*delicatulum*, IV, 177, 179  
*delicatum*, IV, 177, 179  
*elegans*, IV, 179  
*gaertneri*, IV, 183, 184  
*gaertneri coccineum*, IV, 184  
*gaertneri mackoyanum*, IV, 184  
*gaillardae*, I, 6; IV, 187, 188  
*gibsonii*, IV, 178  
*gracilis*, IV, 200  
*Epiphyllum*—*continued*,  
*grande*, IV, 188  
*grande superbum*, IV, 200  
*grandiflorum*, IV, 200  
*grandilobum*, IV, 187, 192  
*guatemalense*, IV, 187, 195  
*guedeneyi*, IV, 178  
*harrisonii*, IV, 200  
*hercule*, IV, 200  
*hitcheni*, IV, 198  
*hookeri*, IV, 187, 197  
*hybridum*, IV, 198  
*jenkensoni*, IV, 198  
*latetium album*, IV, 200  
*latifrons*, IV, 189, 196  
*lepidocarpum*, IV, 187, 194  
*macropterum*, IV, 187, 192, 193, 194  
*makoyanum*, IV, 183, 184  
*maximum*, IV, 200  
*multiflorum*, IV, 200  
*nelsonii*, IV, 203  
*obovatum*, IV, 180, 181  
*obtusangulum*, IV, 181  
*opuntioides*, IV, 180, 181  
*oxypetalum*, IV, 187, 188, 193  
*palidum roseum*, IV, 200  
*phyllanthoides*, II, 128; IV, 188, 198, 205  
*phyllanthus*, IV, 186, 187, 188, 197  
*pittieri*, IV, 187, 190, 194  
*platycarpum*, IV, 242  
*pumilum*, IV, 187, 189  
*purpurascens*, IV, 177  
*purpureum*, IV, 179  
*ramulosum*, IV, 241  
*rhombeum*, IV, 244  
*roseum*, IV, 200  
*rubrum violaceum*, IV, 200  
*ruckeri*, IV, 179  
*ruckerianum superbum*, IV, 200  
*ruckerianum*, IV, 185  
*russellianum*, IV, 182, 184, 185  
*russellianum gartneri*, IV, 184  
*russellianum gaertneri*, IV, 183  
*russellianum rubrum*, IV, 185  
*russellianum superbum*, IV, 185  
*salmonium*, IV, 178  
*salmonium marginatum*, IV, 200  
*smithianum*, II, 128  
*speciosum*, IV, 200, 205  
*speciosum jenkensoni*, IV, 198  
*speciosum lateritium*, IV, 200  
*spectabile*, IV, 178  
*spectabile coccineum*, IV, 200  
*splendens*, IV, 199  
*splendidum*, IV, 198  
*stenopetalum*, IV, 187, 196  
*strictum*, IV, 187, 196, 197  
*thomasianum*, IV, 193  
*translucens*, IV, 200  
*tricolor*, IV, 200  
*truncatum*, IV, 21, 177, 178, 179, 180, 185, 186  
*truncatum albiflorum*, IV, 178  
*truncatum altensteinii*, IV, 177  
*truncatum amabile roseum*, IV, 179  
*truncatum aurantiacum*, IV, 178  
*truncatum bicolor*, IV, 178  
*truncatum bridgesii*, IV, 185  
*truncatum carmineum*, IV, 179  
*truncatum coccineum*, IV, 178  
*Epiphyllum*—*continued*,  
*truncatum cruentum*, IV, 178, 179  
*truncatum elegans*, IV, 178, 180  
*truncatum gracile*, IV, 179  
*truncatum grandidens*, IV, 178  
*truncatum grandiflorum rubrum*, IV, 179  
*truncatum harrisonii*, IV, 179  
*truncatum lateritium album*, IV, 179  
*truncatum magnificum*, IV, 178  
*truncatum makoyanum*, IV, 179  
*truncatum maximum*, IV, 179  
*truncatum minus*, IV, 178  
*truncatum morellianum*, IV, 179  
*truncatum multiflorum*, IV, 179  
*truncatum pallidum roseum*, IV, 179  
*truncatum purpureum*, IV, 178  
*truncatum purpurascens*, IV, 179  
*truncatum purpureum*, IV, 179  
*truncatum roseum*, IV, 178  
*truncatum rubrum violaceum*, IV, 179  
*truncatum ruckerianum*, IV, 178, 185  
*truncatum russellianum*, IV, 184, 185  
*truncatum salmonium*, IV, 178  
*truncatum salmonium aurantiacum*, IV, 179  
*truncatum salmonium brasiliense*, IV, 179  
*truncatum salmonium flavum*, IV, 179  
*truncatum salmonium marginatum*, IV, 179  
*truncatum salmonium rubrum*, IV, 179  
*truncatum snowi*, IV, 179  
*truncatum spectabile*, IV, 177, 178, 179  
*truncatum spectabile superbum*, IV, 179  
*truncatum splendens*, IV, 179  
*truncatum translucens*, IV, 179  
*truncatum tricolor*, IV, 178  
*truncatum vanhoutteanum*, IV, 178  
*truncatum violaceum*, IV, 177, 197  
*truncatum violaceum album*, IV, 179  
*truncatum violaceum grandiflorum*, IV, 179  
*truncatum violaceum superbum*, IV, 178  
*vandesii*, IV, 205  
*violaceum*, IV, 179  
*violaceum elegans*, IV, 200  
*violaceum grandiflorum*, IV, 200  
*violaceum rubrum*, IV, 200  
*violaceum speciosum*, IV, 200  
*violaceum superbum*, IV, 200  
*Epithelantha*, III, 77, 92, 93, 208; IV, 65  
*micromeris*, III, 93  
*Erdisia*, II, 2, 104-107; III, 4  
*meyenii*, II, 104, 105, 106  
*philippii*, II, 104, 105  
*Erdisia*—*continued*,  
*spiniflora*, II, 104, 106  
*squarrosa*, II, 104, 105, 107  
*Eriocerei*, II, 154  
*Eriocereus*, TI, 22, 147, 148  
*bonplandii*, II, 157  
*cavendishii*, II, 21  
*justbertii*, II, 158  
*martianus*, II, 220  
*martinii*, II, 155  
*platygonus*, II, 156  
*subrepandus*, II, 151  
*tephracanthus*, II, 136  
*tortuosus*, II, 154  
*Eriosyce*, II, 143; III, 78, 167, 186, 187  
*ceratistes*, III, 79, 186  
*sandillon*, II, 143; III, 186  
*Erythrina*, I, 181  
*Erythrorhispalis*, IV, 208, 209  
*pilocarpa*, IV, 209  
*Escobaria*, IV, 3, 53-57  
*bella*, IV, 54, 56  
*chaffeyi*, IV, 54, 56  
*chihuahuensis*, IV, 54, 55  
*dasyacantha*, IV, 54, 55  
*lloydii*, IV, 54, 57  
*runyonii*, IV, 54, 55, 56  
*sneedii*, IV, 54, 56  
*tuberculosa*, IV, 54, 55, 57  
*Escontria*, II, 2, 63, 65, 66  
*chiotilla*, II, 65, 66, 76; IV, 270, 272  
*Espina*, I, 76  
*Espina blanca*, I, 41  
*Espinha de São Antonio*, I, 19  
*Espostoa*, II, 2, 60-63  
*lanata*, II, 61, 62, 225; IV, 270  
*Etuberculatae*, I, 72, 73  
*Eucereus*, II, 3, 117  
*Euharrisia*, II, 148  
*Eulychnia*, II, 2, 66, 82-85, 181; III, 4  
*acida*, II, 82, 83, 84  
*breviflora*, II, 82, 83  
*castanea*, II, 82, 84  
*clavata*, II, 106  
*eburnea*, II, 139  
*iquiquensis*, II, 82, 83  
*spinibarbis*, II, 82, 83; IV, 272  
*Eupereskia*, I, 10  
*Euphorbia hystrix*, II, 19  
*Facheiropreto*, II, 177  
*preto da Serra de Canabrava*, II, 173  
*Facheiroa*, II, 2, 173  
*pubiflora*, II, 173  
*Feather ball*, IV, 124  
*Ferocactus*, III, 78, 123-147, 148, 177, 212  
*acanthodes*, III, 124, 129, 130, 131, 147; IV, 287  
*alamosanus*, III, 124, 137  
*chrysacanthus*, III, 123, 127  
*covillei*, III, 124, 132, 133, 134  
*crassihamatus*, III, 124, 144  
*diguetii*, III, 124, 131; IV, 287  
*echidne*, III, 124, 136  
*flavovirens*, III, 124, 138  
*fordii*, III, 123, 126  
*glaucescens*, III, 124, 137  
*hamatacanthus*, III, 124, 144; IV, 287  
*horridus*, III, 123, 128  
*johnsonii*, III, 124, 141, 142  
*johnstonianus*, IV, 287  
*latispinus*, III, 124, 143; IV, 287  
*lecontei*, III, 124, 129; IV, 287  
*macrodiscus*, III, 124, 139, 140  
*melocactiformis*, III, 124, 138, 139

- Ferocactus*—*continued*,  
 nobilis, III, 123, 124, 141, 142  
 orcuttii, III, 124, 134, 141  
 peninsulae, III, 124, 133, 134  
 pringlei, III, 123, 125  
 rectispinus, III, 124, 134, 135  
 robustus, III, 124, 134, 135, 136, 138  
 rostii, III, 124, 146, 147  
 santa-maria, III, 124, 131  
 stansesii, III, 123, 124; IV, 287  
 townsendianus, III, 123, 126, 127  
 uncinatus, III, 124, 145, 146  
 viridescens, III, 124, 135, 140, 141; IV, 287  
 wislizeni, III, 123, 125, 127, 128, 129, 130, 132, 134
- Ficindica*, I, 42, 43  
*Ficoides*, IV, 71, 125  
*Ficus-indicae*, I, 45, 156, 166, 177, 191  
*Floccosae*, I, 44, 86; IV, 221, 234  
*Flor de baile*, IV, 189  
*Flor de cera*, I, 19  
*Flor de copa*, II, 114  
*Flor de cuerno*, II, 2, 18  
*Flor de la oración*, III, 62  
*Formosi*, II, 3, 13  
*Fox-tail cactus*, IV, 7  
*Fraillea*, III, 78, 208-211  
*caespitosa*, III, 209, 211  
*cataphracta*, III, 209, 210, 211  
*gracillima*, III, 209  
*grahlana*, III, 209  
*knippeliana*, III, 209, 211  
*pumila*, III, 209  
*pygmaea*, III, 209, 210  
*schilinzkyana*, III, 209, 210
- Frutescentes*, I, 73  
*Fulgidae*, I, 44, 67  
*Fulvispinosae*, I, 148  
*Furcraea*, II, 92  
*Garranibullas*, II, 179  
*Geotilla*, II, 66  
*Giant cactus*, I, 92, 164; IV, 279  
*Giganton*, II, 135  
*Gladiatores*, III, 109  
*Glomeratae*, I, 44, 87  
*Graciles*, II, 159  
*Grandiflorae*, IV, 221  
*Grandifoliae*, I, 9, 11  
*Green-flowered petaya*, III, 17  
*Grizzly bear cactus*, I, 196  
*Grusonia*, I, 24, 215  
*bradtiana*, I, 215  
*crecififormis*, I, 215  
*Guamacho*, I, 17  
*Guasabara*, IV, 266  
*Gymnocalycium*, II, I; III, 78, 87, 152-166  
*anisitsii*, III, 159, 160  
*brachyanthum*, III, 153, 159; IV, 288  
*damsii*, III, 153, 163  
*denudatum*, III, 152, 155, 156; IV, 288  
*gibbosum*, III, 153, 157, 158, 161; IV, 288  
*guerkeanum*, III, 152, 154, 155  
*hyptiacanthum*, III, 152, 156  
*joossellianum*, III, 153, 166  
*kurtzianum*, III, 153, 162, 163  
*leanum*, III, 152, 154, 156, 157  
*megalothelos*, III, 153, 162  
*melanocarpum*, III, 153, 161  
*mihanovichii*, III, 152, 153  
*monvillei*, III, 153, 160, 161; IV, 288  
*mostii*, III, 153, 158  
*multiflorum*, III, 153, 159
- Gymnocalycium*—*continued*,  
 netrelianum, III, 152, 153, 154  
 platense, III, 153, 163, 164, 165  
 reductum, III, 158, 159  
 saglione, III, 152, 153, 157; IV, 288  
 schickendantzii, III, 153, 164, 165  
 spegazzinii, III, 152, 155  
 stuckertii, III, 153, 165  
 uruguayense, III, 153, 161, 162  
 villosum, III, 103  
*Hamatocactus*, III, 78, 104-106  
 setispinus, III, 104, 105; IV, 287  
*Harioata*, IV, 216, 219, 224, 240  
*alata*, IV, 213  
*alternata*, IV, 237  
*bambusoides*, IV, 219  
*boliviana*, IV, 240  
*cassytha*, IV, 226  
*ceriformis*, IV, 210  
*cereuscula*, IV, 222  
*cinerea*, IV, 212  
*clavata*, IV, 224  
*conferta*, IV, 227  
*coriacea*, IV, 241  
*crenata*, IV, 212  
*cribrata*, IV, 225  
*crispata*, IV, 245  
*crispata latior*, IV, 245  
*cruciformis*, IV, 215  
*cylindrica*, IV, 231  
*fasciculata*, IV, 229  
*floccosa*, IV, 234  
*funalis*, IV, 231  
*gracilis*, IV, 217  
*grandiflora*, IV, 231  
*horrida*, IV, 229  
*houlettiana*, IV, 238  
*knightii*, IV, 211  
*knightii tenuispinis*, IV, 215  
*lindbergiana*, IV, 228  
*lumbricalis*, IV, 230  
*macrocarpa*, IV, 187  
*mesembrianthemoides*, IV, 222  
*micrantha*, IV, 239  
*monacantha*, IV, 212  
*pachyptera*, IV, 243  
*paradoxa*, IV, 237  
*parasitica*, IV, 226  
*penduliflora*, IV, 225  
*pentaptera*, IV, 236  
*platycarpa*, IV, 242  
*prismatica*, IV, 222  
*ramosissima*, IV, 216  
*ramulosa*, IV, 240  
*rhombea*, IV, 244  
*riedeliana*, IV, 246  
*robusta*, IV, 243  
*rugosa*, IV, 234  
*saglionioides*, IV, 217, 218  
*salicornioides bambusoides*, IV, 218, 219  
*salicornioides gracilior*, IV, 217  
*salicornioides ramosior*, IV, 217  
*salicornioides schottmuelleri*, IV, 218  
*salicornioides strictior*, IV, 217  
*sarmentacea*, IV, 230, 231  
*spatulata*, IV, 247  
*squamulosa*, IV, 215  
*stricta*, IV, 217  
*swartziana*, IV, 213  
*teres*, IV, 227  
*trigona*, IV, 237  
*triquetra*, IV, 243  
*tucumanensis*, IV, 234  
*villigera*, IV, 218
- Harrisia*, I, 24; II, 1, 2, 147-159; III, 60  
 aboriginum, II, 148, 154; IV, 278  
 adscendens, II, 148, 155, 196  
 bonplandii, II, 148, 157; IV, 278  
 brookii, II, 148, 151  
 earlei, II, 148, 154  
 eriophora, II, 148, 149; IV, 278  
 fernowi, II, 148, 153  
 fragrans, II, 148, 149  
 gracilis, II, 148, 151, 152; IV, 278  
 guelichii, II, 148, 158  
 martinii, II, 148, 155; IV, 278  
 nashii, II, 148, 150, 151; IV, 278  
 platygona, II, 148, 156  
 pomanensis, II, 148, 155, 156  
 portoricensis, II, 148, 150  
 simpsonii, II, 148, 152, 153  
 taylori, II, 153  
 tortuosa, II, 148, 154  
 undata, II, 151; IV, 278
- Harrisiae*, II, 154  
*Hatchet cactus*, IV, 59  
*Hatioira*, IV, 208, 216-219, 224  
*bambusoides*, IV, 217, 218  
*cylindrica*, IV, 217, 219  
*salicornioides*, IV, 217  
*Hedgehog cactus*, III, 177  
*Heliotropium*, II, 2, 127-129, 218, 225; IV, 198  
 amecamensis, II, 127, 129; IV, 277  
 cinnabarinum, II, 127, 129; IV, 277  
 coccineum, II, 127  
 elegantissimum, II, 127, 129; IV, 205  
 mallisoni, IV, 277  
 schrankii, II, 127, 225  
 speciosum, II, 127, 128, 129, 201, 210; III, 3; IV, 198, 199, 276  
*Heliotropium*, IV, 188  
*Hexagonae*, II, 4  
*Hibiscus*, I, 19  
 esculentus, I, 19  
*Hickenia*, III, 78, 207, 208  
 microsperma, III, 207, 208; IV, 289  
*Homalocephala*, III, 78, 181, 182  
 texensis, III, 77, 181; IV, 288  
*Houlettianae*, IV, 221  
*Hybocactus*, III, 94, 152  
*Hydrochylus*, IV, 88  
*Hylocereanae*, II, 1, 183  
*Hylocereus*, I, 24; II, 1, 63, 126, 183-195, 210, 215, 216; IV, 220, 282  
 antiguensis, II, 184, 193, 194  
 bronxensis, II, 183, 185, 226  
 calcaratus, II, 184, 193, 194  
 costaricensis, II, 183, 186  
 cubensis, II, 184, 188  
 extensus, II, 184, 190, 191  
 guatemalensis, II, 183, 184  
 lemairei, II, 184, 189, 194, 226; IV, 282, 283  
 minutiflorus, II, 195, 196  
 monacanthus, II, 184, 190, 226  
 napoleonis, II, 184, 191; IV, 282  
 ocamponis, II, 126, 183, 184, 185  
 polyrhizus, II, 183, 185, 226  
 purpusii, II, 183, 184  
 stenopterus, II, 184, 190  
 triangularis, II, 184, 185, 191, 192, 193; IV, 282  
 tricostatus, II, 187; IV, 282  
 trigonus, II, 184, 192, 193; IV, 282
- Hylocereus*—*continued*,  
 undatus, II, 184, 187, 188, 189; IV, 281  
 venezuelensis, II, 183, 186, 226  
*Imbricatae*, I, 44, 60  
*Inamoenae*, I, 45, 125  
*Inarmatae*, I, 208; IV, 180  
*Iniabanto*, I, 19  
*Ipomoea*, II, 92  
 Jaatote, II, 88  
*Jaramataca*, II, 111  
*Jasminocereus*, II, 2, 146, 147  
 galapagensis, II, 146, 147  
*Jocostonia*, II, 93  
*Junco*, II, 119  
*Junco espinoso*, II, 119  
*Kadoesji*, II, 18, 88  
*La bande de sud*, II, 151  
*Lanuginosii*, II, 59  
*Latispineae*, III, 109  
*Lemaireocereus*, I, 116; II, 2, 25, 43, 69, 85-103, 114, 135, 151; IV, 268, 273, 274  
 aragonii, II, 8, 92, 93, 103  
 beneckeii, IV, 273, 274  
 cartwrightianus, II, 8, 100  
 chende, II, 8, 90, 91; IV, 273  
 chichipe, II, 85, 89  
 cumengei, II, 116  
 deficiens, II, 85, 94, 96  
 dumortieri, II, 85, 102  
 eichlamii, II, 85, 89, 90; IV, 273  
 eruca, II, 115, 116  
 godingianus, II, 85, 91, 92, 135  
 griseus, II, 20, 85, 87, 88, 89, 103, 225; IV, 273  
 gummosus, II, 116, 117  
 hollianus, II, 85, 86; IV, 273  
 humilis, II, 85, 100, 101  
 hystrix, II, 46, 85, 86, 87, 225; IV, 273  
 laetus, II, 85, 99, 100  
 longispinus, II, 85, 89, 90  
 mixtecensis, II, 89, 91  
 montanus, II, 85, 97  
 pruinatus, II, 85, 88, 89  
 queretarocensis, II, 85, 96, 97  
 schumannii, II, 103  
 stellatus, II, 85, 92, 93, 94, 169  
 thurberi, II, 85, 96, 97, 98; IV, 274  
 treleasei, II, 85, 93, 95, 224  
 weberi, II, 85, 95, 97, 164; IV, 273  
*Lemon vine*, I, 10  
*Lengua de vaca*, I, 164  
*Leocereus*, II, 2, 108-110, 175, 225  
 bahiensis, II, 108, 109  
 glaziovii, II, 108, 109  
 melannurus, II, 108, 109  
*Leon*, I, 96  
*Leoncito*, I, 96  
*Lepismium*, IV, 208, 215, 216  
 alternatum, IV, 237  
 anceps, IV, 215  
 cavernosum, IV, 215, 216  
 cavernosum ensiforme, IV, 215  
 cavernosum minus, IV, 216  
 commune, IV, 215, 216  
 cruciforme, IV, 215  
 dissimilis, IV, 236  
 duprei, IV, 216  
 fluminense, IV, 243  
 knightii, IV, 215, 216  
 laevigatum, IV, 216  
 mittleri, IV, 216  
 myosurus, IV, 215, 216  
 myosurus knightii, IV, 215  
 myosurus laevigatum, IV, 215  
 paradoxum, IV, 237

- Lepismium*—*continued*,  
 radicans, IV, 215, 216  
 ramosissimum, IV, 216  
 sarmentaceum, IV, 230  
 tenue, IV, 213
- Leptocaulis*, I, 44, 46, 49
- Leptocereus*, II, 2, 77-82, 104, 122; IV, 281  
 arboreus, II, 77, 80  
 assurgens, II, 77, 79, 80  
 leonii, II, 77, 78, 79; IV, 272  
 maxonii, II, 77, 80  
 prostratus, II, 7, 79  
 quadricostatus, II, 77, 81  
 sylvestris, II, 77, 80, 81  
 weingartianus, II, 77, 82
- Leucorhaphes*, IV, 221
- Leucotrichae*, I, 174
- Leuchtenbergia*, III, 78, 107-109  
 principis, III, 107, 108
- Living rock, III, 83
- Lobivia*, III, 3, 49-60, 78, 179  
 andalgalensis, III, 49, 55, 56, 58  
 boliviensis, III, 49, 52  
 bruchii, III, 49, 50  
 cachensis, III, 49, 52  
 caespitosa, III, 49, 53  
 chionanthus, III, 49, 58, 179  
 cinnabarina, III, 40, 54  
 corbula, III, 49, 56  
 cumingii, III, 49, 59, 117, 177  
 famatimensis, IV, 286  
 ferax, III, 49, 50, 51, 52  
 grandiflora, III, 49, 57  
 grandis, III, 58  
 haematantha, III, 49, 57  
 lateritia, III, 49, 56  
 longispina, III, 49, 51, 52  
 pampana, III, 49, 56  
 pentlandii, III, 49, 54, 55; IV, 285  
 saltensis, III, 49, 53  
 shaferei, III, 40, 52, 55  
 thionanthus, III, 49, 57, 179
- Lophocereus*, II, 3, 170, 177, 178, 179  
 australis, II, 177; IV, 280  
 sargentianus, II, 177  
 schottii, II, 177, 178, 179; IV, 279, 280
- Lophophora*, III, 77, 83-85, 93  
 lewinii, III, 84, 8  
 williamsii, III, 84, 184; IV, 286  
 williamsii lewinii, III, 84
- Loranthus aphyllus*, I, 79
- Lorentzianae*, IV, 221
- Machaerocereus*, II, 2, 114-117  
 eruca, II, 114, 115, 116; IV, 276  
 gummosus, II, 114, 116, 117; IV, 276
- Macromeres*, IV, 24
- Maihuen*, I, 40
- Maihuenia*, I, 8, 24, 40-42, 45, 95  
 brachydelphys, I, 41, 42; IV, 175, 253  
 patagonica, I, 41  
 philippii, I, 41  
 poeppigii, I, 41, 42; IV, 253  
 tehuelches, I, 41, 42  
 valentinii, I, 40, 41, 42
- Malacocarpus*, III, 78, 94, 96, 138, 167, 177, 178, 187-207, 208, 216  
 aciculatus, III, 198  
 acutus, III, 198  
 apricus, III, 187, 192  
 catamarcaensis, III, 187, 197  
 concinnus, III, 187, 192, 193; IV, 289  
 corynodes, III, 198, 199  
 corynodes erinaceus, III, 198, 199  
 courantii, III, 188
- Malacocarpus*—*continued*,  
 curvispinus, III, 188, 203  
 erinaceus, III, 187, 198, 199; IV, 289  
 escayachensis, III, 188, 205  
 graessneri, III, 188, 205  
 grossei, III, 187, 190  
 haselbergii, III, 188, 201, 205; IV, 289  
 heptacanthus, III, 218  
 islayensis, III, 188, 201  
 langsdorfii, III, 188, 199  
 leninghausii, III, 188, 204; IV, 289  
 linkii, III, 187, 195; IV, 289  
 maassii, III, 188, 202  
 mammillarioides, III, 188, 203  
 mammosus, III, 188, 200; IV, 289  
 martinii, III, 188  
 muricatus, III, 187, 194  
 napinus, III, 187, 190, 191  
 nigripinus, III, 187, 190  
 ottonis, III, 187, 195, 196; IV, 289  
 patagonicus, III, 187, 197, 198  
 polyacanthus, III, 198, 200  
 pulcherrimus, III, 187, 194  
 reichei, III, 187, 191  
 schumannianus, III, 187, 189, 190  
 scopa, III, 187, 193; IV, 289  
 sellowianus, III, 188  
 sellowianus tetraacanthus, III, 188  
 sellowii, III, 188, 189  
 sellowii tetraacanthus, III, 188  
 strausianus, III, 188, 201  
 tabularis, III, 187, 192, 193  
 tephraacanthus, III, 187, 188, 189, 191; IV, 288  
 tetraacanthus, III, 188  
 tuberculatus, III, 188, 202
- Malus*, I, 9
- Mamillaria*, IV, 6
- Mamillopsis*, IV, 3, 19, 20  
 diguetii, IV, 19, 20  
 senilis, IV, 19, 20
- Mammariella*, IV, 24
- Mammillaria*, IV, 6, 5
- Mammillaria*, I, 4; II, 3, 118; III, 80, 83, 84, 90, 91, 92, 93, 108, 110, 208, 210, 237; IV, 3, 10, 14, 16, 19, 21, 24, 34, 48, 51, 53, 58, 59, 65, 79, 107, 155, 163, 166, 172, 175
- acanthophlegma*, IV, 101, 107, 108  
*acanthophlegma abducta*, IV, 107  
*acanthophlegma decandollii*, IV, 107  
*acanthophlegma elegans*, IV, 107  
*acanthophlegma leucocephala*, IV, 107  
*acanthophlegma meisneri*, IV, 107  
*acanthophlegma monacantha*, IV, 107  
*acanthostephes*, IV, 41  
*acanthostephes recta*, IV, 41  
 acicularis, IV, 171  
 aciculata, IV, 88, 132  
 actinoplea, IV, 172  
 adunca, IV, 140  
 aeruginosa, IV, 88  
 affinis, IV, 88  
 aggregata, III, 14; IV, 47  
 albidula, IV, 132, 133  
 albiseta, IV, 171, 172  
 aloidaea pulviligera, III, 81  
 abides, III, 81  
 alpina, IV, 63, 165
- Mammillaria*—*continued*,  
 alversonii, IV, 46, 47  
 amabilis, IV, 172  
 ambigua, III, 98; IV, 175  
 amoena, IV, 120, 167  
 anancistraria, IV, 131  
 anacistracantha, IV, 15  
 anacistrata, IV, 150  
 ancistria, IV, 131  
 ancistrina, IV, 10  
 ancistroides, IV, 149, 150  
 ancistroides inuncinata, IV, 132  
 ancistroides major, IV, 150  
 andreae, IV, 121  
 anguinea, IV, 134  
 angularis, IV, 88, 90, 92  
 angularis Compressa, IV, 91, 92  
 angularis fulvescens, IV, 92  
 angularis fulvispina, IV, 91  
 angularis longiseta, IV, 91  
 angularis rufispina, IV, 92  
 angularis triacantha, IV, 91  
 anisacantha, IV, 103, 105  
 appanata, IV, 76  
 areolesa, III, 80  
 argentea, IV, 172  
 arida, IV, 73  
 arietina, IV, 41  
 arietina spinosior, IV, 41  
 arizonica, IV, 43, 46, 48  
 armillata, IV, 157  
 aselliformis, IV, 59  
 asterias, IV, 31  
 asteriflora, IV, 172  
 atrata, III, 97, 98; IV, 122  
 atrorubra, IV, 172  
 atrosanguinea, IV, 172  
 aulacantha, IV, 171  
 aulacothele, IV, 30, 31  
 aulacothele flavispina, IV, 30  
 aulacothele multispina, IV, 30  
 aulacothele spinosior, IV, 30  
 aulacothele sulcimamma, IV, 30  
 aurata, IV, 122  
 aurea, IV, 123  
 aureiceps, IV, 114  
 auricoma, IV, 117  
 aureora, IV, 118  
 autumnalis, IV, 92  
 badispina, IV, 172  
 barbata, IV, 144, 145  
 harlowii, IV, 172  
 beguinii, IV, 16  
 bellatula, IV, 165  
 benckeii, IV, 171  
 bergeana, IV, 150  
 bergeni, IV, 172  
 bergii, IV, 165  
 besleri, III, 220  
 bicolor, IV, 98, 99, 168  
 bicolor cristata, IV, 98  
 bicolor longispina, IV, 98  
 bicolor nivea, IV, 98  
 bicolor nobilis, IV, 98, 99  
 bifurca, IV, 172  
 biglandulosa, IV, 30  
 bihamata, IV, 140  
 binops, IV, 172  
 bocasana, IV, 147  
 bocasana cristata, IV, 147, 148  
 bocasana glochidiata, IV, 147  
 bocasana kunzeana, IV, 145  
 bocasana sericata, IV, 147  
 bocasana splendens, IV, 147  
 bocasiana, IV, 171  
 bockii, IV, 77  
 boederkeriana, IV, 154  
 bombycina, IV, 50, 161  
 borealis, IV, 45  
 boucheana, IV, 79  
 brachydelphys, IV, 175, 253  
 brandegeei, IV, 65, 73, 74  
 brandi, IV, 171
- Mammillaria*—*continued*,  
 brandtii, IV, 172  
 brevimamma, IV, 31  
 brevimamma exsudans, IV, 31  
 breviseta, IV, 172  
 bronngiartii, IV, 109  
 brownii, IV, 25, 33, 34  
 bruennowii, IV, 172  
 buchheimiana, IV, 75  
 bumama, IV, 33, 38  
 bussleri, IV, 26, 27  
 caesia, IV, 118  
 caespititia, IV, 126, 165  
 caespitosa, III, 25, 26; IV, 52, 134  
 calcarata, IV, 48, 49  
 calochlora, IV, 50  
 campotricha, IV, 61, 126, 127  
 candida, IV, 130  
 candida rosea, IV, 130  
 canescens, IV, 17, 133  
 cantera, IV, 172  
 caput-medusae, IV, 86, 87  
 caput-medusae centrispina, IV, 86  
 caput-medusae crassior, IV, 86  
 caput-medusae hexacantha, IV, 87  
 caput-medusae tetraacantha, IV, 86, 87  
 caracassana, IV, 70  
 caracassana, IV, 70, 71  
 carnea, IV, 87, 88, 89, 102  
 carnea aeruginosa, IV, 88  
 carnea cirrosa, IV, 88  
 carnea villifera, IV, 102  
 carretii, IV, 149, 151, 160  
 castaneooides, IV, 118  
 cataphracta, IV, 88  
 caudata, IV, 175  
 celsiana, IV, 99, 112, 113  
 celsiana guatemalensis, IV, 115  
 celsiana longispina, IV, 172  
 centa, IV, 171  
 centricirra, IV, 41, 77, 78, 79, 80, 169  
 centricirra amoena, IV, 79  
 centricirra arietina, IV, 79  
 centricirra bockii, IV, 78, 79  
 centricirra boucheana, IV, 79  
 centricirra ceratophora, IV, 79  
 centricirra cirrhosa, IV, 79  
 centricirra conopsea, IV, 79  
 centricirra cristata, IV, 79  
 centricirra deflexispina, IV, 79  
 centricirra destorum, IV, 79  
 centricirra tampico, IV, 79  
 centricirra diacantha, IV, 79  
 centricirra diadema, IV, 79  
 centricirra divaricata, IV, 79  
 centricirra divergens, IV, 78, 79  
 centricirra ehrenbergii, IV, 79  
 centricirra falcata, IV, 79  
 centricirra flaviflora, IV, 63  
 centricirra foersteri, IV, 79  
 centricirra gebweileriiana, IV, 79  
 centricirra gladiata, IV, 79  
 centricirra glauca, IV, 79  
 centricirra globosa, IV, 79  
 centricirra globulifera, IV, 79  
 centricirra guillemiana, IV, 79

- Mammillaria—continued,*  
*centricirrho hopferiana,* IV, 77  
*centricirrho hopfferiana,* IV, 79  
*centricirrho hystrix,* IV, 79  
*centricirrho hystrix grandicornis,* IV, 79  
*centricirrho hystrix longispina,* IV, 79  
*centricirrho jorderi,* IV, 79  
*centricirrho krameri,* IV, 78, 79  
*centricirrho krameri longispina,* IV, 79  
*centricirrho krausei,* IV, 79  
*centricirrho lactescens,* IV, 79  
*centricirrho lehmannii,* IV, 79  
*centricirrho longispina,* IV, 79  
*centricirrho macracantha,* IV, 79, 80  
*centricirrho macrothele,* IV, 77, 91  
*centricirrho magnimamma,* IV, 78, 79  
*centricirrho megacantha,* IV, 79  
*centricirrho microceras,* IV, 79  
*centricirrho montsii,* IV, 79  
*centricirrho moritziana,* IV, 79  
*centricirrho neumanniana,* IV, 79  
*centricirrho nordmannii,* IV, 79  
*centricirrho obconella,* IV, 79  
*centricirrho pachythele,* IV, 179  
*centricirrho pazzanii,* IV, 79  
*centricirrho pentacantha,* IV, 79  
*centricirrho polygona,* IV, 79  
*centricirrho posteriana,* IV, 79  
*centricirrho pulchra,* IV, 79  
*centricirrho recurva,* IV, 78, 79  
*centricirrho schiedeana,* IV, 79  
*centricirrho schmidtii,* IV, 79  
*centricirrho spinosior,* IV, 79  
*centricirrho subcurvata,* IV, 79  
*centricirrho tetracantha,* IV, 79  
*centricirrho uberimamma,* IV, 79  
*centricirrho valida,* IV, 79  
*centricirrho versicolor,* IV, 79  
*centricirrho viridis,* IV, 79  
*centricirrho zooberi,* IV, 7  
*centricirrho zucchariniana,* IV, 79  
*centrispina,* IV, 95  
*cephalophora,* IV, 41, 128  
*ceratites,* IV, 16  
*ceratocentra,* IV, 32  
*ceratophora,* IV, 77  
*chapinensis,* IV, 100  
*childsii,* IV, 175  
*chinocephala,* IV, 101, 107  
*chlorantha,* IV, 43, 46  
*chrysacantha,* IV, 121  
*chrysacantha fuscata,* IV, 122  
*chrysantha,* IV, 171  
*circumtexta,* IV, 171  
*cirrhifera,* IV, 90, 92, 94  
*cirrhifera albispina,* IV, 91
- Mammillaria—continued,*  
*cirrhifera angulosior,* IV, 90  
*cirrhifera fulvispina,* IV, 91  
*cirrhifera longispina,* IV, 92  
*cirrhifera major,* IV, 91  
*cirrhosa,* IV, 78  
*cirrifera longiseta,* IV, 91  
*cirrosa,* IV, 78  
*citrina,* IV, 172  
*clava,* IV, 30  
*clavata,* IV, 15  
*closiana,* IV, 172  
*coccinea,* III, 79  
*collina,* IV, 111  
*columbiana,* IV, 127  
*columnaris,* IV, 88, 107  
*columnaris minor,* IV, 88  
*communis,* III, 225  
*compacta,* IV, 36, 109  
*compressa,* IV, 42, 90  
*confinis,* IV, 133  
*conica,* IV, 70, 165  
*coniflora,* IV, 133  
*conimamma,* IV, 37, 38  
*conimamma major,* IV, 38  
*conoidea,* IV, 14, 17, 18  
*conopsea,* IV, 77, 79  
*conopsea longispina,* IV, 77  
*conspicua,* IV, 108  
*contacta,* IV, 172  
*convoluta,* IV, 167  
*corbula,* III, 56  
*cordigera,* IV, 50, 161  
*corioides,* IV, 175  
*cornifera,* IV, 39  
*cornifera impexicoma,* IV, 36, 37  
*cornifera mutica,* IV, 39  
*cornimamma,* IV, 37  
*cornuta,* IV, 50  
*corollaria,* IV, 172  
*coronaria,* IV, 41, 141, 167, 169, 171, 176  
*coronaria minor,* IV, 176  
*coronata,* IV, 172  
*coryphides,* IV, 172  
*crassispina,* IV, 121, 122  
*crassispina gracilior,* IV, 121  
*crassispina rufa,* IV, 122  
*crebrispina,* IV, 18  
*crebrispina nitida,* IV, 172  
*criniformis,* IV, 150, 151  
*criniformis albida,* IV, 150  
*criniformis rosea,* IV, 150  
*crinifera,* IV, 172  
*crinita,* IV, 150  
*crinita pauciseta,* IV, 151  
*crocidata,* IV, 87  
*crocidata quadrispina,* IV, 87  
*crucigera,* IV, 113  
*cubensis,* IV, 48  
*cuneiflora,* IV, 172  
*cunendstiana,* IV, 171  
*curvata,* IV, 31  
*curvispina,* IV, 132, 172  
*curvispina parviflora,* IV, 132  
*cylindracea,* IV, 172  
*cylindracea,* IV, 127  
*cylindrica flavispina,* IV, 127  
*dactylithele,* IV, 25  
*daedalea,* IV, 98, 99, 168  
*daedalea viridis,* IV, 86, 172  
*daimonoceras,* IV, 36  
*dasyacantha,* IV, 55, 57  
*dealbata,* IV, 110  
*decholara,* IV, 171  
*decipiens,* IV, 131, 150  
*decipiens rosea,* IV, 150  
*declivis,* IV, 76  
*decora,* IV, 173  
*decora obscura,* IV, 173  
*dedalea viridis,* IV, 86  
*deficiens,* IV, 132  
*deficum,* IV, 132  
*deflexispina,* IV, 77  
*degrandii,* IV, 172  
*delactiana,* IV, 39, 40, 50
- Mammillaria—continued,*  
*deleuli,* IV, 172  
*densa,* IV, 134, 135  
*depressa,* IV, 133, 140  
*deserti,* IV, 46, 47  
*desertorum,* IV, 172  
*destorum,* IV, 79  
*de tampico,* IV, 79  
*diacantha,* IV, 86, 110  
*diacantha nigra,* IV, 110  
*diacentra,* IV, 166  
*diadema,* IV, 77  
*diaphanacantha,* IV, 17  
*dichotoma,* IV, 175  
*difficilis,* IV, 28  
*digitalis,* IV, 167  
*dioica,* IV, 1, 58  
*dioica insularis,* IV, 140  
*disciformis,* III, 106  
*discolor,* IV, 132, 133  
*discolor aciculata,* IV, 132  
*discolor albida,* IV, 132  
*discolor breviflora,* IV, 133  
*discolor coniflora,* IV, 133  
*discolor curvispina,* IV, 132  
*discolor fulvescens,* IV, 133  
*discolor monstrosa,* IV, 132  
*discolor nigricans,* IV, 174  
*discolor nitens,* IV, 132  
*discolor prolifera,* IV, 132, 133  
*discolor pulchella,* IV, 132  
*discolor rhodacantha,* IV, 133  
*divaricata,* IV, 77, 172  
*divergens,* IV, 77  
*dolichacantha,* IV, 107  
*dolichocentra,* IV, 106, 107  
*dolichocentra brevispina,* IV, 106  
*dolichocentra galeottii,* IV, 105  
*dolichocentra phaeacantha,* IV, 105  
*dolichocentra picta,* IV, 107  
*dolichocentra staminea,* IV, 106  
*donatii,* IV, 111  
*donkelaari,* IV, 172  
*droegeana,* IV, 10  
*dubia,* IV, 172  
*dumetorum,* IV, 128  
*durangensis,* IV, 42  
*dyckiana,* IV, 107, 108  
*eborina,* IV, 173  
*eburnea,* IV, 98  
*echinaria,* IV, 136  
*echinata,* IV, 136  
*echinata densa,* IV, 134  
*echinata gracilior,* IV, 136  
*echinata pallida,* IV, 136  
*echinocactoides,* IV, 17  
*echinoidea,* IV, 30  
*echinops,* IV, 102, 172  
*echinus,* IV, 42  
*ehrenbergii,* IV, 77  
*eichlamii,* IV, 94, 95  
*elegans,* IV, 101, 107, 108, 109, 113  
*elegans dealbata,* IV, 110  
*elegans globosa,* IV, 107  
*elegans klugii,* IV, 107  
*elegans micrantha,* IV, 107  
*elegans minor,* IV, 107  
*elephantidens,* IV, 32, 33, 38  
*elephantidens bumamma,* IV, 33  
*elephantidens spinosissima,* IV, 33  
*elongata,* III, 80; IV, 134, 135, 170  
*elongata anguinea,* IV, 134  
*elongata centrispina,* IV, 136  
*elongata echinata,* IV, 136  
*elongata intertexta,* IV, 134  
*elongata minima,* IV, 135  
*elongata rufescens,* IV, 135  
*elongata rufocrocea,* IV, 134
- Mammillaria—continued,*  
*elongata stella-aurata,* IV, 134  
*elongata straminea,* IV, 135  
*elongata subcrocea,* IV, 134  
*elongata tennis,* IV, 134  
*emskoetteriana,* IV, 57  
*emundtsiana,* IV, 173  
*enneacantha,* IV, 172  
*erecta,* IV, 32  
*erectacantha,* IV, 173  
*eriacantha,* IV, 127  
*eriantha,* IV, 81, 121, 122  
*eriantha,* IV, 127  
*erythrosperma,* IV, 151  
*erythrosperma similis,* IV, 151, 152  
*euchlora,* IV, 173  
*eugenia,* IV, 169  
*evanescens,* IV, 32  
*evarascens,* IV, 32  
*evarescens,* IV, 32  
*evarescentis,* IV, 32  
*eximia,* IV, 118, 119  
*exsudans,* IV, 31  
*falcata,* IV, 78  
*farinosa,* IV, 173  
*fasciculata,* IV, 162, 163  
*fellneri,* IV, 173  
*fennelii,* IV, 159, 160  
*fertilis,* IV, 131  
*fischeri,* IV, 95  
*fissurata,* III, 183; IV, 286  
*flava,* IV, 173  
*flavescens,* III, 212; IV, 166, 171, 172  
*flaviceps,* IV, 122  
*flavicomma,* IV, 166  
*flavovirens,* IV, 85, 86  
*flavovirens cristata,* IV, 86  
*flocigera,* IV, 122  
*flocigera longispina,* IV, 122  
*floribunda,* III, 97, 98  
*foersteri,* IV, 77  
*fordii,* IV, 158  
*formosa,* IV, 90  
*formosa dispicula,* IV, 90  
*formosa gracilispina,* IV, 90  
*formosa laevior,* IV, 90  
*formosa microthele,* IV, 90  
*foveolata,* IV, 83  
*fragilis,* IV, 133, 134  
*fuliginosa,* IV, 71  
*fulvispina,* IV, 121, 122, 123, 176  
*fulvispina media,* IV, 176  
*fulvispina minor,* IV, 176  
*fulvispina pyrrocentra,* IV, 123  
*fulvispina rubescens,* IV, 121  
*fulvulata,* IV, 172  
*funckii,* IV, 92  
*furfuracea,* III, 80  
*fuscata,* IV, 119, 121  
*gabbii,* IV, 73, 74  
*galeottii,* IV, 105, 106, 107, 154  
*gebweileriiana,* IV, 78  
*geminata,* IV, 173  
*geminiflora,* IV, 172  
*gemmaispina,* IV, 98, 107, 108  
*geminispina monacantha,* IV, 113  
*geminispina tetracantha,* IV, 107  
*gibbosa,* III, 98; IV, 173  
*gigantea,* IV, 85  
*gigantothele,* IV, 63  
*glabrata,* IV, 173  
*glabrescens,* IV, 172  
*gladiata,* IV, 77  
*glanduligera,* IV, 31  
*glauca,* IV, 77  
*globosa,* IV, 63  
*glochidiata,* IV, 149, 150, 151  
*glochidiata alba,* IV, 150  
*glochidiata albida,* IV, 150  
*glochidiata aurea,* IV, 143



Mammillaria—*continued*,

glochidiata crinata, IV, 150  
 glochidiata inuncinata, IV, 131  
 glochidiata prolifera IV, 150  
 glochidiata purpurea, IV, 149  
 glochidiata rosea IV, 150  
 glochidiata sericata, IV, 148, 149  
 glomerata, IV, 124  
 goeringii, IV, 172  
 goerngi, IV, 49  
 golziana, IV, 26, 27  
 goodrichii, IV, 158  
 goodridgei, IV, 156, 158, 159  
 goodridgii, IV, 158  
 gracilis, IV, 134, 136  
 gracilis laetevirens, IV, 136  
 gracilis pulchella, IV, 134, 136  
 gracilis virens, IV, 136  
 graessneriana, IV, 117  
 grahamii, III, 43; IV, 60, 144, 154, 155, 156  
 grahamii arizonica, IV, 155  
 grahamii californica, IV, 156  
 grandicornis, IV, 79, 173  
 grandidens, IV, 79  
 grandiflora, IV, 17, 18, 131  
 grandis, IV, 172  
 granulata, IV, 125  
 grayhamii, IV, 156  
 greggii, III, 93  
 grisea, IV, 166  
 grusonii, IV, 55  
 grusonii similis, IV, 172  
 guanajuatensis, IV, 85  
 guebwilleriana, IV, 172  
 guerkeana, IV, 29, 30  
 guillemianiana, IV, 131  
 gummifera, IV, 74  
 haageana, IV, 110  
 haageana validior, IV, 110  
 haematactina, IV, 173  
 halei, IV, 21, 22  
 hamata, IV, 140, 141  
 hamata brevispina, IV, 141  
 hamata longispina, IV, 141  
 hamata principis, IV, 141  
 hamuligera, IV, 151  
 haseloffii, IV, 20, 118  
 haynei, IV, 166  
 haynii, IV, 166  
 haynii minima, IV, 167  
 haynii viridula, IV, 166  
 heeseana, IV, 94  
 heeseana brevispina, IV, 94  
 heeseana longispina, IV, 94  
 heinei, IV, 166  
 helicteres, IV, 167  
 hemisphaerica, IV, 75  
 hepatica, IV, 117  
 hermantiana, IV, 172  
 herrmannii, IV, 118  
 herrmannii flavicans, IV, 118  
 heteracantha, IV, 168  
 heteracentra, IV, 172  
 heteromorpha, III, 83; IV, 25  
 hevernickii, IV, 172  
 hexacantha, IV, 167  
 hexacentra, IV, 63  
 heyderi, IV, 75, 76, 167  
 heyderi applanata, IV, 76  
 heyderi hemisphaerica, IV, 75, 76  
 hidalgensis, IV, 88  
 hirschtiana, IV, 43  
 hirsuta, IV, 146  
 hochderferi, IV, 171  
 hoffmannseggii, III, 98  
 hopferiana, IV, 77  
 horripila, IV, 16  
 humboldtii, IV, 130  
 humilior, IV, 15  
 hybrida, IV, 122  
 hystrix, IV, 77, 79

Mammillaria—*continued*,

imbricata, IV, 121  
 impexicoma, IV, 36  
 inclinis, IV, 96  
 inconspicua, IV, 17  
 incurva, IV, 173  
 intertexta, IV, 134  
 intertexta rufocrocea, IV, 135  
 intricata, IV, 172  
 inuncinata, IV, 132  
 inuncta, IV, 121  
 irregularis, IV, 167  
 isabellina, IV, 118  
 jalappensis, IV, 105  
 joossensiana, IV, 167  
 jorderi, IV, 79  
 jucunda, IV, 173  
 karstenii, IV, 71  
 karwinskiana, IV, 95, 96, 97  
 karwinskiana centrispina, IV, 95  
 karwinskiana flavescens, IV, 95  
 karwinskiana virens, IV, 95  
 kewensis, IV, 104, 105  
 kewensis albispina, IV, 105  
 kleinii, IV, 173  
 kleinschmidtiana, IV, 91  
 klennerii, IV, 171  
 klugii, IV, 107  
 knippeliana, IV, 96  
 krameri, IV, 77, 94  
 krameri viridis, IV, 78  
 krauseana, IV, 93  
 kunthii, IV, 107  
 kunzeana, IV, 145, 146  
 lactescens, IV, 78  
 laeta, IV, 63  
 lamprochaeta, IV, 173  
 lamuligera, IV, 151  
 lanifera, IV, 113, 122, 123  
 lapaixi, IV, 172  
 lasiacantha, IV, 124, 128  
 lasiacantha denudata, IV, 129  
 lasiacantha minor, IV, 128  
 lasiandra denudata, IV, 129  
 lassauierii, IV, 167  
 lassonneriei, IV, 167  
 latimamma, IV, 41  
 latispina, III, 143  
 lehmannii, IV, 30, 31, 79  
 lehmannii sulcimamma, IV, 30  
 lenta, IV, 129, 130  
 leona, IV, 136, 137, 138  
 lesaunieri, IV, 167  
 leucacantha, IV, 30, 31  
 leucantha, IV, 31  
 leucocarpa, IV, 93  
 leucocephala, IV, 167  
 leucocephala, IV, 108  
 leucodasys, IV, 173  
 leucodictia, IV, 173  
 leucotricha, IV, 92  
 lewinii, III, 84  
 lindheimeri, IV, 76  
 linkeana, IV, 118  
 linkei, IV, 20  
 littoralis, IV, 138  
 livida, IV, 173  
 longihamata, IV, 22  
 longimamma, IV, 61, 62, 63  
 longimamma compacta, IV, 63  
 longimamma congesta, IV, 62, 63  
 longimamma cristata, IV, 63  
 longimamma gigantothele, IV, 62, 63  
 longimamma globosa, IV, 63  
 longimamma hexacentra, IV, 62  
 longimamma laeta, IV, 63  
 longimamma ludwigii, IV, 63

Mammillaria—*continued*,

longimamma luteola, IV, 63  
 longimamma malaena, IV, 63  
 longimamma major, IV, 63  
 longimamma melaleuca, IV, 63  
 longimamma pseudo-melaleuca, IV, 63  
 longimamma sphaerica, IV, 61  
 longimamma spinosior, IV, 63  
 longimamma uberiformis, IV, 63  
 longiseta, IV, 90  
 longispina, IV, 79, 107  
 loricata, IV, 168  
 ludwigii, IV, 76  
 lutescens, IV, 172  
 macdougallii, IV, 74  
 macdowellii, IV, 85  
 macracantha, IV, 79, 80  
 macrantha, IV, 80  
 macromeris, IV, 25, 26  
 macromeris longispina, IV, 25  
 macromeris nigrispina, IV, 25  
 macrothele, IV, 30, 31  
 macrothele biglandulosa, IV, 30  
 macrothele lehmanni, IV, 30  
 macrothele nigrispina, IV, 31  
 maelenii, IV, 8  
 magnimamma, IV, 41, 77, 128  
 magnimamma arietina, IV, 41  
 magnimamma lutescens, IV, 41  
 magnimamma spinosior, IV, 41  
 mainae, IV, 154  
 mallettiana, IV, 99  
 mammillaris, IV, 70  
 martiana, IV, 30  
 maschalacantha, IV, 92, 93  
 maschalacantha dolichacantha, IV, 93  
 maschalacantha leucotricha, IV, 92  
 maschalacantha xantotricha, IV, 93  
 mazatlanensis, IV, 138  
 megacantha, IV, 77  
 megacantha rigidior, IV, 77  
 meiacantha, IV, 84  
 meionacantha, IV, 84  
 meisneri, IV, 107  
 melaleuca, IV, 63  
 meianacantha, IV, 173  
 maianocentra, IV, 81  
 meonacantha, IV, 84  
 mercadensis, IV, 145  
 meschalacantha, IV, 93  
 micans, IV, 173  
 micracantha, IV, 71, 173  
 micrantha, IV, 71  
 microcarpa, IV, 155, 156  
 microceras, IV, 77  
 microdasys, IV, 172  
 micromeris, III, 92, 93; IV, 65, 109, 173  
 micromeris fulgifer, III, 93  
 micromeris greggii, III, 93  
 microthele, IV, 71, 108, 109  
 microthele brongniartii, IV, 109  
 minima, IV, 134, 135  
 miqueliana, IV, 172  
 mirabilis, IV, 118  
 missouriensis, IV, 51, 52, 53  
 missouriensis caespitosa, IV, 52  
 missouriensis nuttallii, IV, 53  
 missouriensis robustior, IV, 52

Mammillaria—*continued*,

missouriensis similis, IV, 52  
 missouriensis viridescens, IV, 53  
 mitis, IV, 175  
 monacistrina, IV, 148  
 monocentra, IV, 168  
 monoclova, IV, 37  
 monothele, IV, 172  
 montana, IV, 45  
 montsii, IV, 79  
 morini, IV, 172  
 moritziana, IV, 79  
 mucronata, IV, 173  
 muchlenpfordtii, IV, 112  
 multicolor, IV, 172  
 multiceps, IV, 125, 126  
 multiceps elongata, IV, 125  
 multiceps grisea, IV, 125  
 multiceps humilis, IV, 125  
 multiceps perpusilla, IV, 125  
 multiradiata, IV, 171  
 multiseta, IV, 173  
 multithamata, IV, 146  
 mundtii, IV, 112  
 mutabilis, IV, 92, 93, 94  
 mutabilis autumnalis, IV, 93  
 mutabilis laevior, IV, 93  
 mutabilis longispina, IV, 94  
 mutabilis xanthotricha, IV, 92  
 mystax, IV, 92, 94  
 napina, IV, 104  
 neglecta, IV, 123  
 neo-mexicana, IV, 45  
 nervosa cristata, IV, 168  
 nervosus cristatus, IV, 168  
 neumanni glabrescens, IV, 78  
 neumanniana, IV, 77  
 nicholsonii, IV, 168  
 nickelsae, IV, 35  
 nickelsi, IV, 172  
 nigerrima, IV, 172  
 nigra, IV, 171  
 nigricans, IV, 116, 117  
 nitens, IV, 132  
 nitida, IV, 165  
 nivea, IV, 98  
 nivea cristata, IV, 99  
 nivea daedalea, IV, 98  
 nivea longispina, IV, 99  
 nivea wendlei, IV, 99  
 nivosa, IV, 71, 72  
 nobilis, IV, 98, 99  
 nogalensis, IV, 28  
 nordmannii, IV, 79  
 notesteinii, IV, 53  
 nuda, IV, 168  
 numina, IV, 172  
 nuttallii, IV, 52, 53  
 nuttallii borealis, IV, 53  
 nuttallii caespitosa, IV, 52  
 nuttallii robustior, IV, 52  
 obconella, II, 102; IV, 79, 106, 107  
 obconella galeottii, IV, 105  
 obliqua, IV, 173  
 obscura, IV, 87  
 obscura galeottii, IV, 106  
 obvallata, IV, 174  
 ocamponis, IV, 145  
 octacantha, IV, 30  
 odieriana, IV, 121, 123  
 odieriana aurea, IV, 123  
 odieriana cristata, IV, 122  
 odieriana rigidior, IV, 122  
 odieriana rubra, IV, 122  
 oettingenii, IV, 91  
 olivacea, IV, 123  
 oliviac, IV, 135  
 olorina, IV, 174  
 oothele, IV, 102, 174  
 ottonis, IV, 26, 27  
 ottonis tenuispina, IV, 26  
 ovimamma, IV, 174  
 ovimamma brevispina, IV, 174  
 ovimamma oothele, IV, 174

- Mammillaria—continued,*  
 pachytele, IV, 78  
 painteri, IV, 151, 152  
 pallescens, IV, 88  
 palmeri, IV, 172  
 papyracantha, III, 91  
 parkinsonii, IV, 98  
 parkinsonii rubra, IV, 98  
 parkinsonii waltonii, IV, 98  
 parmentieri, IV, 171  
 parvimamma, IV, 70  
 parvissima, IV, 126  
 pazzanii, IV, 77  
 peacockii, IV, 110  
 pectinata, IV, 34, 35, 175  
 pectinata cristata, IV, 34  
 pectinifera, IV, 64  
 pentacantha, IV, 77  
 perbella, IV, 108, 111  
 perote, IV, 110  
 perpusilla, IV, 126  
 perringii, IV, 112, 113  
 persicina, IV, 174  
 petrophila, IV, 73  
 petterssonii, IV, 94  
 pfeifferana, IV, 39  
 pfeifferi, IV, 121, 123  
 pfeifferi altissima, IV, 121  
 pfeifferi dichotoma, IV, 121  
 pfeifferi flaviceps, IV, 121  
 pfeifferi fulvispina, IV, 121  
 pfeifferi variabilis, IV, 121  
 phaeacantha, IV, 116, 117, 122  
 phaeacantha rigidior, IV, 117  
 phaeotrica, IV, 174  
 phellosperma, IV, 60, 65, 156  
 phymatothele, IV, 76  
 picta, IV, 169  
 picturata, IV, 176  
 pilispina, IV, 14  
 plaschnicki, IV, 30  
 plaschnickii straminea, IV, 30  
 plecostigma, IV, 169  
 plecostigma major, IV, 169  
 plecostigma minor, IV, 169  
 pleiocephala, IV, 74  
 plinthomorpha, IV, 169  
 plumosa, IV, 123, 124  
 polia, IV, 172  
 polyacantha, IV, 117  
 polyactina, IV, 117  
 polycentra, IV, 117  
 polycephala, IV, 113  
 polychlora, IV, 18  
 polyedra, IV, 101, 102, 103  
 polyedra anisacantha, IV, 103  
 polyedra laevior, IV, 102, 103  
 polyedra scleracantha, IV, 102, 103  
 polyedra spinosior, IV, 102  
 polygona, IV, 101, 105  
 polymorpha, IV, 24, 30, 31, 174  
 polythele, IV, 88, 168  
 polythele aciculata, IV, 88, 132  
 polythele columnaris, IV, 88  
 polythele hexacantha, IV, 88  
 polythele latimamma, IV, 88  
 polythele quadrispina, IV, 88  
 polythele setosa, IV, 88  
 polytricha, IV, 102  
 polytricha hexacantha, IV, 102  
 polytricha tetracantha, IV, 102  
 pomacea, IV, 117  
 pondii, IV, 23  
 porphyracantha, IV, 174  
 poselgeri, IV, 22  
 poselgeriana, IV, 118, 119
- Mammillaria—continued,*  
 posteriana, IV, 79  
 potosiana, IV, 15, 24, 50  
 potosina, IV, 99  
 potosina longispina, IV, 99  
 pottsii, IV, 136, 137  
 pottsii vera, IV, 137  
 praelii, IV, 96  
 pretiosa, IV, 117  
 pretiosa cristata, IV, 118  
 principis, IV, 141  
 pringlei, IV, 115  
 prismatica, III, 80, 81  
 procera, IV, 174  
 prolifera, IV, 70, 124, 125  
 pruinosa, IV, 118  
 pseudofuscata, IV, 119, 120  
 pseudomammillaris, IV, 132  
 pseudoperbella, IV, 108, 109  
 pseudoperbella rufispina, IV, 109  
 pugionacantha, IV, 174  
 pulchella, IV, 132  
 pulchella nigricans, IV, 132  
 pulcherrima, IV, 117, 172  
 pulchra, IV, 121, 123, 169  
 pulvilligera, III, 81  
 punctata, IV, 174  
 purpuracea, III, 80  
 purpurascens, IV, 174  
 purpurea, IV, 174  
 purpusii, III, 90, 91  
 pusilla, IV, 57, 70, 71, 124, 125  
 pusilla caespititia, IV, 126  
 pusilla cristata, IV, 125  
 pusilla haitiensis, IV, 71, 124  
 pusilla major, IV, 124  
 pusilla mexicana, IV, 126  
 pusilla minor, IV, 124  
 pusilla multiceps, IV, 57  
 pusilla texana, IV, 125, 126  
 pycnacantha, IV, 34, 40, 41, 42  
 pycnacantha scepontocentra, IV, 41  
 pycnacantha spinosior, IV, 41  
 pyramidalis, IV, 122  
 pyrhracantha, IV, 172  
 pyrhracantha pallida, IV, 172  
 pyrhrhocrantha, IV, 121  
 pyrhrhocentra, IV, 123  
 pyrhrhocentra gracilior, IV, 123  
 pyrhrhocentra, IV, 99, 100, 102  
 pyrhrhocentra donkelaeri, IV, 99  
 pyrhrhocrantha, IV, 121  
 quadrata, IV, 175  
 quadrispina, IV, 88  
 quadrispina major, IV, 88  
 quehli, IV, 172  
 radians, IV, 28, 34, 36, 37, 39, 42  
 radians daemnoceras, IV, 36  
 radians echinus, IV, 42  
 radians globosa, IV, 36  
 radians impexicoma, IV, 5, 36, 37  
 radians sulcata, IV, 48, 49  
 radicanissima, IV, 15, 16  
 radiosa, IV, 43, 45  
 radiosa alversonii, IV, 46, 47  
 radiosa arizonica, IV, 45  
 radiosa borealis, IV, 45  
 radiosa chlorantha, IV, 43  
 radiosa deserti, IV, 46  
 radiosa neo-mexicana, IV, 45  
 radiosa texana, IV, 45  
 radliana, IV, 22  
 radula, IV, 122  
 ramosissima, IV, 51  
 raphidacantha, IV, 50, 51  
 raphidacantha ancistracantha, IV, 15
- Mammillaria—continued,*  
 rebuti, IV, 172  
 recta, IV, 108  
 recurva, IV, 31, 77  
 recurvata, IV, 27, 28  
 recurvispina, IV, 27, 28, 47, 51, 123  
 regia, IV, 174  
 retusa, III, 81; IV, 38  
 rhabdicantha, IV, 15, 16  
 rhabdicantha humilior, IV, 15  
 rhodacantha, IV, 133  
 rhodacantha pallidior, IV, 133  
 rhodantha, IV, 114, 117, 121, 122, 123, 176  
 rhodantha andreae, IV, 121  
 rhodantha aurea, IV, 123  
 rhodantha aureiceps, IV, 114  
 rhodantha callaena, IV, 122  
 rhodantha celsii, IV, 123  
 rhodantha centrispina, IV, 121  
 rhodantha chrysacantha, IV, 122  
 rhodantha crassispina, IV, 122  
 rhodantha cristata, IV, 123  
 rhodantha droegeana, IV, 10, 122  
 rhodantha fulvispina, IV, 122, 123, 176  
 rhodantha fuscata, IV, 122, 123  
 rhodantha inuncta, IV, 123  
 rhodantha major, IV, 121  
 rhodantha neglecta, IV, 121, 123  
 rhodantha odieriana, IV, 122  
 rhodantha pfeifferi, IV, 122, 123  
 rhodantha prolifera, IV, 121  
 rhodantha pyramidalis, IV, 122  
 rhodantha rubens, IV, 121  
 rhodantha ruberrima, IV, 122  
 rhodantha rubescens, IV, 122  
 rhodantha rubra, IV, 122, 123  
 rhodantha ruficeps, IV, 122, 123  
 rhodantha schochiana, IV, 123  
 rhodantha stenocephala, IV, 122  
 rhodantha sulphurea, IV, 122  
 rhodantha tentaculata, IV, 122  
 rhodantha wendlandii, IV, 121  
 rhodocentra, IV, 174  
 rhodocentra gracilispina, IV, 174  
 rigidispina, IV, 106, 107  
 robusta, IV, 121  
 robustispina, IV, 33, 34  
 roematactina, IV, 171  
 roessingii, IV, 172  
 roii, IV, 172  
 rosea, IV, 174  
 roseana, IV, 22  
 ruettii, IV, 115  
 ruficeps, IV, 121  
 rufidula, IV, 174  
 rufocrocea, IV, 134, 174  
 rungii, IV, 129  
 ruschiana, IV, 174  
 russea, IV, 122  
 rutila, IV, 113, 169  
 rutila octospina, IV, 169  
 rutila pallidior, IV, 169  
 salm-dyckiana, IV, 39, 40  
 salm-dyckiana brunnea, IV, 39
- Mammillaria—continued,*  
 salmiana, IV, 172  
 saluciana, IV, 171  
 sanguinea, IV, 118, 119  
 sartorii, IV, 82  
 sartorii brevispina, IV, 82  
 sartorii longispina, IV, 82  
 saxatilis, IV, 169  
 scepontocentra, IV, 41  
 schaeferi, IV, 112  
 schaeferi longispina, IV, 112  
 scheeri, IV, 17, 28, 29, 40, 51, 55  
 scheeri valida, IV, 28, 29  
 scheidweileriana, IV, 148  
 schelhasi, IV, 149  
 schelhasi lanuginosior, IV, 147  
 schelhasi rosea, IV, 149  
 schelhasi sericata, IV, 49  
 schelhasi truncinata, IV, 149  
 schiedeana, IV, 128  
 schlehtendalii, IV, 30  
 schlehtendalii laevior, IV, 30  
 schmerwitzii, IV, 169  
 schmidtii, IV, 78  
 schochiana, IV, 123  
 schumanniana, IV, 59  
 schumannii, IV, 57, 58, 59  
 scleracantha, IV, 103  
 scolymoides, IV, 18, 39  
 scolymoides longiseta, IV, 39  
 scolymoides nigricans, IV, 39  
 scolymoides raphidacantha, IV, 15  
 seegeri, IV, 118  
 seegeri gracilispina, IV, 118  
 seegeri mirabilis, IV, 118  
 seegeri pruinosa, IV, 118  
 seemannii, IV, 170  
 seideliana, IV, 144  
 seidelii, IV, 174  
 seitziana, IV, 83  
 semilonia, IV, 172  
 sempervivi, IV, 86, 87  
 sempervivi laeteviridis, IV, 86  
 sempervivi tetracantha, IV, 86  
 senckeana, IV, 83  
 senckei, IV, 83, 99  
 senilis, IV, 19, 20  
 senilis diguetii, IV, 20  
 senilis haseloffii, IV, 20  
 senilis linkei, IV, 20  
 senkii, IV, 99  
 sericata, IV, 128  
 setispina, IV, 22, 23  
 setosa, IV, 88  
 severini, IV, 174  
 similis, IV, 49, 52  
 similis caespitosa, IV, 52  
 similis robustior, IV, 52  
 simonis, IV, 172  
 simplex, IV, 53, 61, 70, 71  
 simplex affinis, IV, 71  
 simplex flavescens, IV, 166  
 simplex parvimamma, IV, 70  
 simpsonii, III, 90  
 solitaria, IV, 175  
 sororia, IV, 170  
 spaethiana, III, 91  
 speciosa, IV, 51, 174, 175  
 spectabilis, IV, 105, 174  
 sphacelata, IV, 138, 170  
 sphaerica, IV, 61, 62, 158  
 sphaerotracha, IV, 130  
 sphaerotracha rosea, IV, 130  
 spinaurea, IV, 170  
 spinii, IV, 133  
 spinosa, IV, 175  
 spinosior, IV, 79  
 spinosissima, III, 179; IV, 117, 118, 119, 164  
 spinosissima auricoma, IV, 118, 119

- Mammillaria—*continued*,  
 spinosissima aurea, IV, 118  
 spinosissima brunnea, IV, 118, 119  
 spinosissima eximia, IV, 118  
 spinosissima flavida, IV, 118  
 spinosissima haseloffii, IV, 118  
 spinosissima hepatica, IV, 118  
 spinosissima herrmannii, IV, 118  
 spinosissima isabellina, IV, 118  
 spinosissima linkeana, IV, 118  
 spinosissima mirabilis, IV, 118  
 spinosissima pruinosa, IV, 118  
 spinosissima pulcherrima, IV, 118  
 spinosissima rubens, IV, 118  
 spinosissima sanguinea, IV, 118  
 spinosissima seegeri, IV, 118  
 spinosissima vulpina, IV, 118  
 splendens, IV, 107  
 squarrosa, IV, 91  
 staurotypa, IV, 87  
 stella-aurata, IV, 134, 135  
 stella-aurata gracilispina, IV, 134  
 stella-aurata minima, IV, 135  
 stella de tacubaya, IV, 164  
 stellaris, IV, 124  
 stellata, IV, 124  
 stenocephala, IV, 121  
 stephani, IV, 172  
 stipitata, IV, 15  
 straminea, IV, 166  
 strobiliformis, IV, 17, 48, 54, 55  
 strobiliformis caespititia, IV, 54  
 strobiliformis durispina, IV, 54  
 strobiliformis pubescens, IV, 54  
 strobiliformis rufispina, IV, 54  
 stueberi, IV, 121, 123  
 suaveolens, IV, 170  
 subangularis, IV, 90, 91  
 subcirrhifera, IV, 91  
 subcrocea, IV, 134, 135  
 subcrocea anguinea, IV, 135  
 subcrocea intertexta, IV, 134  
 subcrocea rufescens, IV, 134  
 subcrocea rutilla, IV, 135  
 subcurvata, IV, 77  
 subchinata, IV, 134  
 suberecta, IV, 172  
 subpolyedra, IV, 101, 105  
 subtetragona, IV, 88  
 subulata, IV, 175  
 subulifera, IV, 174  
 sulcata, III, 82; IV, 48, 49  
 sulcimamma, IV, 30  
 sulco-glandulifera, IV, 15  
 sulcolanata, IV, 23, 37, 38, 51  
 sulcolanata macracantha, IV, 38  
 sulphurea, IV, 116, 121  
 supertexta, IV, 107, 108  
 supertexta caespitosa, IV, 108  
 supertexta dichotoma, IV, 113  
 supertexta rufa, IV, 134  
 supertexta tetraacantha, IV, 107, 108  
 tacubayensis, IV, 164  
 tecta, IV, 174  
 tellii, IV, 172
- Mammillaria—*continued*,  
 tentaculata, IV, 121, 123, 169  
 tentaculata conothele, IV, 123  
 tentaculata fulvispina, IV, 123  
 tentaculata picta, IV, 122  
 tentaculata rubra, IV, 123  
 tentaculata ruficeps, IV, 121, 123  
 tenuis, IV, 134, 135  
 tenuis arrecta, IV, 134  
 tenuis coerulescens, IV, 134  
 tenuis derubescens, IV, 134  
 tenuis media, IV, 134  
 tenuis minima, IV, 134  
 tetraacantha, IV, 79, 106, 107  
 tetracentra, IV, 77  
 tetrancistra, IV, 60  
 texana, IV, 125  
 texensis, IV, 76  
 thelocamptos, IV, 30  
 thornberi, IV, 162  
 toaldoae, IV, 98  
 tomentosa, IV, 175  
 tomentosa flava, IV, 173  
 tortolensis, IV, 72  
 triacantha, IV, 90  
 trichacantha, IV, 151  
 trigona, III, 81  
 trohartii, IV, 170  
 tuberculosa, IV, 53, 54, 55, 137  
 turbinata, III, 106, 107  
 uberiformis, IV, 63, 64  
 uberiformis gracilior, IV, 63  
 uberiformis hexacentra, IV, 62  
 uberiformis major, IV, 63  
 uberiformis variegata, IV, 63  
 uberimamma, IV, 78  
 uhdeana, IV, 118  
 umbrina, IV, 164, 166  
 uncinata, IV, 140  
 uncinata biuncinata, IV, 140  
 uncinata rhodacantha, IV, 140  
 uncinata spinosior, IV, 140  
 uniseta, IV, 170  
 urbaniana, IV, 48  
 utahensis, IV, 43  
 valida, IV, 28, 30, 34, 8,  
 varimamma, IV, 175  
 varimamma, IV, 172  
 venusta, IV, 58  
 verhaertiana, IV, 164  
 versicolor, IV, 77  
 vetula, IV, 130, 131  
 vetula major, IV, 131  
 villa-lerdo, IV, 172  
 villifera, IV, 89, 102  
 villifera aeruginosa, IV, 88  
 villifera carnea, IV, 88  
 villifera cirrhosa, IV, 88  
 villifera cirrosa, IV, 88  
 villosa, IV, 172  
 viperina, IV, 170, 171  
 virens, IV, 95  
 viridis, IV, 79, 96, 97  
 viridis praelii, IV, 96  
 viridula, IV, 166  
 vivipara, IV, 43, 44, 45, 48  
 vivipara neo-mexicana, IV, 48  
 vivipara radiosa, IV, 43, 45  
 vivipara radiosa neo-mexicana, IV, 45  
 vivipara vera, IV, 43, 44  
 voburnensis, IV, 100  
 vulpina, IV, 118  
 waltonii, IV, 98  
 webbiana, IV, 87  
 wegneri, IV, 175  
 wegneri cristata, IV, 172  
 wilcoxii, IV, 153, 154  
 wildiana, IV, 143
- Mammillaria—*continued*,  
 wildiana compacta, IV, 143  
 wildiana cristata, IV, 143  
 wildiana major, IV, 143  
 wildiana monstrosa, IV, 143  
 wildiana rosea, IV, 148  
 wildiana spinosior, IV, 143  
 wildii, IV, 143  
 wildii compacta, IV, 143  
 wildii cristata, IV, 143  
 williamsii, III, 84  
 winkleri, IV, 41  
 wissmannii, IV, 52  
 woburnensis, IV, 100  
 wrightii, IV, 152, 153, 154  
 xanthispina, IV, 172  
 xanthotricha laevior, IV, 93  
 xanthotricha, IV, 92  
 zegschwitzii, IV, 175  
 zephyranthiflora, IV, 160  
 zephyranthoides, IV, 159, 160  
 zepnickii, IV, 175  
 zeyeriana, IV, 171  
 zooderi, IV, 79  
 zuccariniana, IV, 89, 90  
 zuccarinii, IV, 80
- Mammillariae, IV, 23  
 Manca caballo, III, 175  
 Mandacaru, II, 9  
 Mandacaru de boi, II, 9  
 Mandacaru de penacho, II, 30  
 Martin's tail-cereus, II, 224  
 Matêare, I, 13  
 Matucana, III, 78, 102-104  
 haynei, III, 102, 103, 104  
 Mediocactus, II, 183, 210-212  
 coccineus, II, 211, 212  
 megalanthus, II, 211, 212, 213  
 Melocactus, II, 170; III, 91, 140, 166, 175, 186, 216, 220, 221, 226, 227, 229, 231, 234, 236, 237; IV, 41, 124, 281  
 aciculosus, III, 223  
 aciculosus aductus, III, 223  
 acutus, III, 188, 189  
 acutatus, III, 188  
 albispinus, III, 223  
 ambiguus, III, 72, 98  
 amoenus, III, 221, 232  
 angusticostatus, III, 222  
 appropinquatus, III, 223  
 approximatus, III, 222  
 arcuatus, III, 223, 224  
 argenteus, III, 222  
 argenteus tenuispinus, III, 222  
 armatus, III, 223  
 atrosanguineus, III, 230  
 atrovirens, III, 238  
 baarsianus, III, 223  
 bargei, III, 223, 224  
 besleri, III, 219, 220  
 besleri affinis, III, 142  
 bradleyi, III, 230  
 bradypus, II, 27  
 brongnartii, III, 225, 227  
 brongnartii, III, 225  
 buysianus, III, 223  
 caesius, III, 221, 233, 234  
 caesius griseus, III, 233  
 capillaris, III, 223  
 cephalenoplus, III, 221, 233  
 columna-trajani, II, 76  
 communiformis, III, 224, 225, 238  
 communis, III, 221, 224, 225, 226, 231, 232, 238  
 communis acicularis, III, 224  
 communis atrosanguineus, III, 230  
 communis bradleyi, III, 230  
 communis conicus, III, 226  
 communis croceus, III, 230
- Mammillaria—*continued*,  
 communis eustachianus, III, 230  
 communis grengeli, III, 230  
 communis havannensis, III, 230  
 communis hookeri, III, 230  
 communis joerdensii, III, 232  
 communis laniferus, III, 224  
 communis macrocephalus, III, 226  
 communis magnisulcatus, III, 224  
 communis oblongus, III, 226  
 communis ovatus, III, 230, 231  
 communis spinosior, III, 224  
 communis viridis, III, 230  
 compactus, III, 223  
 contortus, III, 223  
 cordatus, III, 223  
 cornutus, III, 221, 224  
 coronatus, III, 238  
 crassicosatus, III, 232  
 crassispinus, III, 226  
 croceus, III, 230, 231  
 curvispinus, III, 221, 229, 237  
 cylindricus, III, 223  
 delessertianus, III, 221, 229, 237  
 depressus, III, 176, 235  
 dichroacanthus, III, 224, 230  
 dilatatus, III, 223  
 eburneus, III, 223  
 elegans, III, 72  
 ellemetii, IV, 289  
 elongatus, III, 223  
 ernesti, III, 227  
 euryacanthus, III, 223  
 eustachianus, III, 230, 231  
 evertzianus, III, 222  
 excavatus, III, 237  
 exsertus, III, 223, 224  
 extensus, III, 223  
 ferox, III, 178, 221, 222, 238  
 ferus, III, 223  
 firmus, III, 223  
 flammerus, III, 223  
 flavispinus, III, 223  
 flexilis, III, 223  
 flexus, III, 222  
 fluminensis, III, 238  
 gardenerianus, III, 235  
 gilliesii, III, 75  
 gilvispinus, III, 223  
 gilvispinus planispinus, III, 223  
 gladiatus, III, 119, 120  
 goniacanthus, III, 235  
 goniodacanthus, III, 235  
 gracilis, III, 223  
 grandis, III, 223  
 grandispinus, III, 223  
 grengelii, III, 230  
 griseus, III, 221, 233  
 grollianus, III, 223, 224  
 guatemalensis, III, 227  
 harlowii, III, 232  
 havannensis, III, 221, 230, 232  
 hexacanthus, III, 222  
 hispanicolicus, III, 226  
 hookeri, III, 230  
 hookerianus, III, 238  
 humilis, III, 233, 234  
 hystrix, III, 237  
 incurvus, III, 222  
 inflatus, III, 223  
 ingens, III, 169  
 intermedius, III, 222  
 intermedius laticostatus, III, 223  
 intermedius rotundatus, III, 223  
 intermedius tenuispinus, III, 223

- Melocactus*—*continued*,  
 intortus, III, 230, 231  
 intricatus, III, 206  
 inversus, III, 223  
 koolijckianus, III, 222  
 koolijckianus adustus, III, 222  
 laciniatus, III, 182  
 lamarckii, III, 224  
 langsdorfii, III, 199  
 latispinus, III, 143  
 lehmanni, III, 221, 222, 224  
 lemarii, III, 226  
 leopoldii, III, 238  
 leucacanthus, III, 223  
 leucaster, III, 238  
 limis, III, 222  
 linkii, III, 230, 231  
 linkii trispinus, III, 231  
 lobelii, III, 238  
 lutescens, III, 223  
 macracanthoides, III, 230, 231  
 macracanthus, III, 222, 224, 226  
 macrocanthus, III, 230  
 mammillariaeformis, III, 221; IV, 41  
 mammillariiformis IV, 41  
 martialis, III, 223  
 maxonii, III, 227, 228  
 melocactoides, III, 235  
 melocactus, III, 224  
 meonacanthus, III, 224, 225  
 microcarpus, III, 223  
 microcephalus, III, 222, 224  
 microcephalus olivascens, III, 223  
 miqueli, III, 230, 231  
 monoclonos, III, 41  
 monvilleanus, III, 237  
 nanus, III, 222  
 negrii, III, 236  
 neryi, III, 236  
 nigro-tomentosus, III, 238  
 obliquus, III, 222  
 obovatus, III, 223  
 obtusipetalus, III, 221, 232  
 obtusipetalus crassicosatus, III, 232  
 octogonus, III, 238  
 oreas, III, 227  
 orthacanthus, III, 138  
 ovatus, III, 223  
 pachycentrus, IV, 289  
 parthoni, III, 235  
 parvispinus, III, 222, 224, 237  
 patens, III, 222, 224  
 pentacanthus, III, 223  
 pentacentrus, III, 235  
 peruvianus, III, 234  
 pinguis, III, 223  
 pinguis areolatus, III, 223  
 pinguis laticostatus, III, 223  
 pinguis planispinus, III, 223  
 pinguis tenuissimus, III, 223  
 placentifformis, III, 219  
 platyacanthus, III, 172  
 poliactanthus, III, 198, 199  
 portoricensis, III, 230, 231  
 pulvinosus, III, 223  
 pusillus, III, 222, 224, 225  
 pyramidalis, III, 222, 224  
 pyramidalis carneus, III, 222  
 pyramidalis compressus, III, 223  
 pyramidalis costis-angustroebus, III, 223  
 pyramidalis pumilus, III, 223  
 radiatus, III, 223  
 radiatus contortus, III, 223  
 retiusculus, III, 222  
 retiusculus angusticostatus, III, 222
- Melocactus*—*continued*,  
 recurvus, III, 141, 143  
 repens, III, 238  
 reticulatus, III, 223  
 reversus, III, 222  
 roseus, III, 222  
 rotatus, III, 223  
 rotifer, III, 223  
 rotifer angustior, III, 223  
 rotula, III, 224  
 rotula angusticostatus, III, 223  
 rotula validispinus, III, 223  
 rubellus, III, 222  
 rubellus ferox, III, 222  
 rubellus hexacanthus, III, 222  
 rubens, III, 221, 224, 225  
 rudis, III, 222  
 ruestii, III, 227  
 rufispinus, III, 225  
 salmianus, III, 222, 224  
 salmianus aciculosus, III, 223  
 salmianus adauctus, III, 223  
 salmianus contractus, III, 223  
 salmianus quadrispinus, III, 224  
 salmianus spectabilis, III, 223  
 salmianus trispinus, III, 224  
 salvador, III, 221, 228, 229  
 salvatoris, III, 229  
 san salvador, III, 228  
 schlumbergerianus, III, 230  
 sellowii, III, 188, 189  
 sordidus, III, 223  
 spatanginus, III, 222, 224  
 spatangus, III, 222  
 spina christi, III, 178, 238  
 stellatus, III, 223  
 stellatus dilatatus, III, 223  
 stellatus flavispinus, III, 223  
 stellatus inflatus, III, 223  
 stellatus sordidus, III, 223  
 stramineus, III, 222  
 stramineus trichacanthus, III, 222  
 tenuispinus, III, 196  
 tenuissimus, III, 223  
 tephracanthus, III, 188, 189  
 trachycephalus, III, 223  
 trichacanthus, III, 223  
 trigonaster, III, 223  
 trigonus, III, 223  
 tuberculatus, III, 170  
 uncinatus, III, 223, 224  
 violaceus, III, 235  
 viridescens, III, 140  
 wendlandii, III, 230  
 xanthacanthus, III, 230  
 zuccarinii, III, 222, 224
- Melocardus echinatus*, III, 225  
 Melon cactus, III, 228  
 Melon thistle, IV, 71  
 Melones, III, 221  
 Mescal button, III, 84; IV, 286  
 Mesembryanthemoides, IV, 220  
 Mesembryanthemum, IV, 222  
 Microgoni, III, 202  
 Mila, III, 77, 78, 211, 212  
 caespitosa, III, 211  
 Miqueliana, I, 44, 78  
 Mission cactus, I, 186  
 Monster cactus, III, 170, 171  
 Monvillea, II, 1, 21-25  
 amazonica, II, 21, 24  
 cavendishii, II, 21, 22, 118, 224; IV, 268  
 diffusa, II, 21, 24  
 insularis, II, 21, 22, 23  
 maritima, II, 21, 24, 25  
 phatnosperma, II, 21, 24  
 spegazzinii, II, 21, 23; IV, 268
- Muyusa, II, 160  
 Myrtillocactus, II, 1, 178-181  
 cochal, III, 179, 180; IV, 280  
 eichlamii, II, 179, 180, 181  
 geometrizzans, II, 179, 181; IV, 280  
 schenckii, II, 179, 180  
 Neoabbotia, IV, 280-282  
 paniculata, IV, 247, 280, 281, 282  
 Ñajú de Culebra, I, 19  
 Neobesseyia, IV, 3, 51-53  
 missouriensis, IV, 51, 53  
 notesteinii, IV, 51, 53  
 similis, IV, 51, 52  
 wissmannii, IV, 51, 52  
 Neolloydia, IV, 3, 14-18  
 beguinii, IV, 14, 16  
 ceratites, IV, 14, 16, 17  
 clavata, IV, 14, 15  
 conoidea, IV, 14, 15, 17, 131  
 horripila, IV, 14, 16  
 pilispina, IV, 14  
 texensis, IV, 14, 18  
 Neomammillaria, IV, 3, 65-76, 250  
 albicans, IV, 68, 138, 139  
 amoena, IV, 68, 120, 121  
 applanata, IV, 66, 76  
 arida, IV, 66, 73, 74  
 armillata, IV, 69, 157  
 aureiceps, IV, 67, 113, 114  
 barbata, IV, 69, 144, 145  
 bocasana, IV, 69, 147  
 boedeckeriana, IV, 69, 154  
 bombycina, IV, 69, 160, 161  
 brandegeei, IV, 66, 73, 74  
 camptotricha, IV, 68, 126, 127  
 candida, IV, 68, 130  
 carnea, IV, 66, 88, 89  
 carterii, IV, 69, 157, 160  
 celsiana, IV, 67, 112  
 cerralboa, IV, 68, 116  
 chinocephala, IV, 67, 100, 101  
 collina, IV, 67, 111  
 collinsii, IV, 67, 99, 101, 104  
 compressa, IV, 67, 90, 91, 102  
 confusa, IV, 67, 102  
 conzattii, IV, 67, 103, 105  
 crocidata, IV, 66, 87  
 dealbata, IV, 67, 102, 110  
 decipiens, IV, 68, 131  
 densispina, IV, 68, 119  
 denudata, IV, 68, 129  
 dioica, IV, 69, 158, 159  
 discolor, IV, 68, 131, 132  
 donatii, IV, 67, 111  
 echinaria, IV, 68, 136  
 eichlamii, IV, 67, 94, 95  
 elegans, IV, 67, 107, 108, 165  
 elongata, IV, 68, 133, 134  
 eriacantha, IV, 68, 127, 128  
 evermannia, IV, 67, 97  
 fasciculata, IV, 69, 162  
 fertilis, IV, 68, 131  
 flavovirens, IV, 66, 85  
 formosa, IV, 66, 90  
 fragilis, IV, 68, 133  
 fraileana, IV, 69, 157  
 galeottii, IV, 67, 105  
 gaumeri, IV, 66, 72  
 geminispina, IV, 67, 98, 99  
 gigantea, IV, 66, 85  
 glochidiata, IV, 69, 149, 150  
 goodridgei, IV, 69, 158  
 graessneriana, IV, 68, 116, 117  
 gummiifera, IV, 66, 74  
 haagena, IV, 67, 110  
 hamata, IV, 68, 140, 141  
 hemisphaerica, IV, 66, 73, 75, 76  
 heyderi, IV, 66, 73, 75, 76  
 hirsuta, IV, 69, 146  
 jaliscana, IV, 69, 160
- Neomammillaria*—*continued*,  
 johnstonii, IV, 66, 80, 81  
 karwinskiana, IV, 67, 95  
 kewensis, IV, 67, 104, 106  
 kunzeana, IV, 69, 145, 147, 152  
 lanata, IV, 67, 104, 105  
 lasiacantha, IV, 68, 128, 129  
 lenta, IV, 68, 128, 129  
 lloydii, IV, 66, 89  
 longicoma, IV, 69, 146, 147, 150  
 longiflora, IV, 69, 162, 163  
 maddougallii, IV, 66, 70, 74, 75  
 macracantha, IV, 66, 78, 79, 80  
 magnimamma, IV, 66, 77, 78, 94  
 mainae, IV, 69, 153, 154  
 mammillaris, IV, 66, 70, 71, 166  
 mazatlanensis, IV, 68, 137, 138  
 meiacantha, IV, 66, 84, 85  
 melanocentra, IV, 66, 81, 82  
 mercadensis, IV, 69, 145, 146  
 microcarpa, IV, 69, 152, 155, 157  
 milleri, IV, 69, 156, 176  
 multiceps, IV, 68, 125, 126  
 multiformis, IV, 69, 148  
 multihamata, IV, 69, 146, 152  
 mundtii, IV, 67, 110, 112  
 mystax, IV, 67, 92, 93, 95  
 napina, IV, 67, 104  
 nelsonii, IV, 69, 163  
 nivosa, IV, 66, 71, 72  
 nunezii, IV, 68, 119, 120  
 obscura, IV, 66, 87  
 occidentalis, IV, 69, 160, 161  
 olivaria, IV, 68, 135  
 ortegae, IV, 66, 83, 84, 250  
 painteri, IV, 69, 151, 152  
 palmeri, IV, 68, 140  
 parkinsonii, IV, 67, 96, 98  
 peninsularis, IV, 66, 85  
 perbella, IV, 67, 111  
 petrophila, IV, 66, 73  
 petterssonii, IV, 67, 93, 94  
 phaeacantha, IV, 68, 116  
 phymatothele, IV, 66, 75, 76, 77  
 plumosa, IV, 68, 121, 123  
 polyedra, IV, 67, 102, 103  
 polygona, IV, 67, 101  
 polythele, IV, 66, 86, 88  
 pottsi, IV, 68, 136, 137, 250  
 praelii, IV, 67, 96  
 pringlei, IV, 68, 115  
 prolifera, IV, 68, 124, 125, 166  
 pseudoperbella, IV, 67, 109  
 pygmaea, IV, 69, 142  
 pyrrocephala, IV, 67, 99, 103  
 rekoii, IV, 68, 136, 141, 142  
 rhodantha, IV, 68, 120, 121  
 ruestii, IV, 67, 114, 115  
 runyonii, IV, 66, 81  
 safordii, IV, 69, 149, 151, 160  
 sartorii, IV, 66, 82, 83  
 scheidweileriana, IV, 69, 148  
 schiedeana, IV, 68, 127, 128  
 schelldesi, IV, 69, 149  
 scrippsiana, IV, 66, 84, 85  
 seideliana, IV, 69, 144  
 seitziana, IV, 66, 82, 83  
 sempervivi, IV, 66, 86  
 sheldonii, IV, 69, 156, 157  
 slevinii, IV, 68, 139  
 solisii, IV, 68, 142, 143  
 sphacelata, IV, 68, 138  
 spinosissima, IV, 68, 117  
 standleyi, IV, 67, 96, 97



- Neomammillaria*—*continued*,  
 subpolyedra, IV, 67, 105, 106  
 swinglei, IV, 69, 158  
 tacubayensis, IV, 69, 164  
 tenampensis, IV, 67, 101, 104  
 tetracantha, IV, 67, 106, 108  
 trichacantha, IV, 69, 151  
 umbrina, IV, 69, 164  
 uncinata, IV, 68, 140  
 vetula, IV, 68, 130, 131  
 verhaertiana, IV, 69, 164  
 villifera, IV, 67, 102  
 viridiflora, IV, 69, 153  
 wilcoxi, IV, 69, 153  
 wildii, IV, 69, 141, 143  
 woburnensis, IV, 67, 96, 100  
 wrightii, IV, 69, 152, 153  
 xanthina, IV, 69, 164  
 yucatanensis, IV, 67, 114  
 zephyranthoides, IV, 69, 159,  
 164  
 zuccariniana, IV, 66, 89, 90  
*Neoporteria*, III, 59, 77, 94-  
 100; IV, 122  
 chilensis, III, 94, 97, 99  
 fusca, III, 94, 96, 99  
 jussieui, III, 94, 96, 97  
 nidus, III, 94, 95  
 nigricans, III, 94, 95, 96  
 occulta, III, 94, 95  
 subgibbosa, III, 94, 97, 203  
*Neoraimondia*, II, 3, 181-183;  
 IV, 281  
 macrostibas, II, 181, 182  
*Night-blooming cereus*, II, 113,  
 187, 188  
*Noble leuchtenbergia*, III, 108  
*Nocturna*, IV, 186  
*Nopal*, I, 34  
*Nopal cardón*, I, 184  
*Nopal de Castilla*, I, 224  
 silvestre, IV, 263  
*Nopalea*, I, 8, 24, 33-39, 43,  
 155, 216; IV, 253  
 angustifrons, IV, 253  
 auberi, I, 34, 37, 38, 39; IV,  
 253  
 coccifera, IV, 253  
 cochenillifera, I, 34, 181; IV,  
 253  
 dejecta, I, 34, 36, 37; IV, 253  
 gaumeri, I, 34, 37, 216  
 guatemalensis, I, 33, 34, 35  
 inaperta, I, 33, 34, 37, 38  
 karwinskiana, I, 34, 37, 38,  
 39  
 lutea, I, 33, 34, 35  
 moniliformis, I, 33, 206  
*Nopaleta*, I, 26  
*Nopalnochetzli*, I, 5  
*Nopalxochia*, IV, 177, 204-205  
 phyllanthoides, IV, 205  
*Notocactus*, III, 94, 187  
*Nyctocereus*, II, 1, 2, 108, 117-  
 120, 121  
 guatemalensis, II, 117, 118,  
 119, 120; IV, 276  
 hirschtianus, II, 118, 119  
 neumannii, II, 118, 119  
 oaxacensis, II, 118, 120  
 serpentinus, II, 20, 118; IV,  
 276  
*Obtusae*, II, 4  
*Ohulago*, I, 103  
*Olago*, I, 103  
*Old man cactus*, II, 27  
*Oleosi*, III, 23  
*Oligogoni*, II, 3, 77  
*Olneya tesota*, IV, 275  
*Ophiorhopsis*, IV, 208  
*Opuntia*, I, 8, 14, 24, 25, 30, 32,  
 33, 34, 38, 39, 40, 42-215,  
 217-225; II, 3, 92, 118,  
 156, 164; IV, 42, 186, 209,  
 214, 217, 220, 249, 250,  
 252, 253, 260, 264, 266  
 abjecta, IV, 257  
*Opuntia*—*continued*,  
 acanthocarpa, I, 56, 57; IV,  
 254  
 aciculata, I, 160, 165  
 acracantha, I, 91  
 aequatorialis, I, 110, 116,  
 219, 220  
 affinis, I, 169, 170  
 airampo, I, 161  
 albicans, I, 191; IV, 264  
 albicans laevior, I, 191  
 albiflora, I, 73, 74  
 albisetososa, I, 134  
 alcahes, I, 58, 67, 69, 70  
 alexanderi, IV, 256  
 alfagayucca, I, 185  
 alfayucca, I, 185  
 allairei, I, 126  
 alpicola, I, 214  
 alpina, I, 33  
 alta, I, 165, 166  
 amarilla, IV, 264  
 americana, I, 214  
 ammophila, I, 211; IV, 265  
 amyclaea, I, 112, 177, 181,  
 185  
 amyclaea ficus-indica, I, 177  
 anacantha, I, 107, 109, 110  
 anahuacensis, I, 169  
 andicola, I, 89, 90 IV, 255  
 andicola elongata, I, 89  
 andicola fulvispina, I, 89  
 andicola major, I, 89  
 andicola minor, I, 90  
 angusta, I, 101  
 angustata, I, 124, 129, 140,  
 142, 149  
 angustata comonduensis, I,  
 124  
 antillana, I, 110, 115, 163;  
 IV, 259  
 aoracantha, I, 90, 91; IV,  
 255  
 aquosa, I, 29  
 arborea, I, 209  
 arborescens, I, 43, 63, 64,  
 65; IV, 254  
 arborescens spinosior, IV,  
 254  
 arborescens versicolor, I, 62  
 arbuscula, I, 47, 50, 51  
 arechavaletai, I, 156, 158;  
 IV, 262  
 arenaria, I, 193, 194, 195;  
 IV, 264  
 argentina, I, 209, 211, 212  
 arizonica, I, 147, 148  
 arkansana, I, 128  
 articulata, I, 89  
 assumptionis, I, 159  
 atacamensis, I, 90, 94  
 atrispina, I, 140, 142  
 atropes, I, 169, 170  
 attulica, I, 214  
 auberi, I, 37; IV, 253  
 aulacothee, I, 95  
 aurantiaca, I, 101, 107  
 aurantiaca extensa, I, 107  
 australis, I, 87, 88  
 austrina, I, 45, 126, 130; IV,  
 265  
 ayrampo, IV, 261  
 azurea, I, 140, 143  
 bahamama, I, 202, 203, 204  
 bahaiensis, I, 209, 210, 211  
 balearica, I, 161  
 ballii, I, 137  
 barbata, I, 214  
 barbata gracillima, I, 214  
 bartramii, I, 181; IV, 265  
 basilaris, I, 118, 119, 120,  
 136; IV, 259  
 basilaris albiflora, I, 120;  
 IV, 259  
 basilaris coerulea, I, 120  
 basilaris cordata, I, 120; IV,  
 259  
*Opuntia*—*continued*,  
 basilaris cristata, I, 120  
 basilaris minima, IV, 259  
 basilaris nana, I, 120  
 basilaris nevadensis, I, 120  
 basilaris pferdorffii, I, 120  
 basilaris ramosa, I, 119, 120  
 basilaris treleasei, I, 119  
 beckeriana, I, 168; IV, 263  
 bella, I, 110, 111, 112  
 bentonii, I, 161, 163  
 bergeriana, I, 149, 152, 169;  
 IV, 262  
 bernardina, I, 57, 81  
 bernardina cristata, I, 57  
 bernhardinii, I, 214  
 betancourt, I, 214  
 bicolor, I, 214; II, 106  
 bigelovii, I, 58, 59; IV, 254  
 blakeana, I, 144, 145  
 boldinghii, I, 149, 155; IV,  
 262  
 boliviana, I, 71, 97, 98; IV,  
 256  
 bonaerensis, I, 156, 158; IV,  
 262  
 bonplandii, I, 160, 168, 223,  
 224  
 borinquensis, I, 102, 103, 104  
 brachyarthra, I, 193, 194;  
 IV, 264  
 brachyclada, I, 120  
 brachydelphis, I, 42; IV, 253  
 bradtiana, I, 215  
 brandegeei, I, 25, 28  
 brasiliensis, I, 209, 210, 211;  
 IV, 265  
 brasiliensis gracilior, IV, 265  
 brasiliensis minor, I, 210;  
 IV, 265  
 brasiliensis schomburgkii, I,  
 210  
 brasiliensis spinosior, I, 210  
 brasiliensis tenuifolia, I, 210  
 brasiliensis tenuior, I, 210  
 brunnescens, I, 149, 150  
 bulbispina, I, 79, 83; IV, 255  
 bulbosa, I, 131  
 burrageana, I, 67, 70  
 cacana, I, 165, 166; IV,  
 263  
 caeruleascens, I, 51  
 caesia, I, 144  
 caespitosa, I, 127  
 calacantha, I, 214  
 calacantha rubra, I, 214  
 calantha, I, 136  
 californica, I, 58; IV, 253  
 calmalliana, I, 60, 61  
 calva, I, 89  
 camanchica, I, 144, 145;  
 IV, 262  
 camanchica albispina, I, 144  
 camanchica luteo-staminea,  
 I, 144  
 camanchica orbicularis, I,  
 144  
 camanchica rubra, I, 144  
 camanchica salmonea, I, 144  
 campestris, I, 90, 99  
 camuessa, I, 191  
 canada, I, 160, 167, 168  
 candelabrifformis, I, 182  
 candelabrifformis rigidior, I,  
 182  
 canina, I, 107, 108  
 cantabrigiensis, I, 121, 160,  
 167; IV, 263  
 canterai, I, 159  
 caracassana, I, 110, 116, 219  
 cardenche, I, 64  
 cardiosperma, I, 156, 157, 158  
 cardona, I, 184  
 caribaea, I, 47, 48, 49; IV,  
 253  
 carolina, I, 214  
 carrizalensis, I, 79  
*Opuntia*—*continued*,  
 castillae, I, 185, 186  
 caticantha, I, 43, 208; IV,  
 264  
 cathocantha, IV, 264  
 cereiformis, I, 79, 215  
 cervicornis, I, 194  
 chaetocarpa, I, 182  
 chaffeyi, I, 30, 212, 213  
 chakensis, I, 158; IV, 262  
 chapistle, I, 27  
 chata, IV, 264  
 chavena, I, 184  
 chella, IV, 254  
 chihuahuensis, I, 144, 145  
 chlorotica, I, 142, 159, 160,  
 161; IV, 262  
 chlorotica santa-rita, I, 142  
 cholla, I, 60, 61, 62; IV, 254  
 chrysacantha, I, 167  
 ciliosa, I, 214  
 ciribe, I, 8, 59, 60  
 clavarioides, I, 72, 73; IV,  
 254  
 clavarioides cristata, I, 7;  
 IV, 254  
 clavarioides fasciata, I, 73  
 clavarioides fastigiata, I, 73  
 clavarioides monstruosa, I,  
 73  
 clavata, I, 79, 81, 215; II,  
 106, 107; IV, 255  
 clavellina, I, 52, 54; IV, 253  
 coccifera, I, 35  
 coccinea, I, 114  
 cochenillifera, I, 33, 34, 35  
 cochinelifera, I, 34  
 cochineria, I, 192  
 coerulea, I, 134  
 coindetti, I, 184  
 columbiana, I, 193  
 comonduensis, I, 118, 124  
 compressa, IV, 259  
 confusa, I, 147  
 congesta, I, 50  
 consoleana, I, 214  
 consolei, I, 214  
 convexa, I, 165  
 cordobensis, I, 188, 189  
 cornigata, I, 95  
 corotilla, I, 96  
 corrugata, I, 90, 95; III, 179;  
 IV, 256  
 corrugata monvillei, I, 95  
 costigera, I, 65  
 covillei, I, 140, 145, 146  
 crassa, I, 178, 179; IV, 262  
 crassa major, I, 178  
 cretochaeta, I, 183  
 crinifera, I, 159, 176; IV, 263  
 crinifera lanigera, I, 176  
 cristata, I, 64  
 cristata tenuior, I, 64  
 cruciata, I, 207  
 crystalenia, I, 193  
 cubensis, I, 163  
 cucumiformis, I, 97  
 cuija, I, 149, 167  
 cumingii, I, 77  
 curassavica, I, 102, 103, 112;  
 IV, 257  
 curassavica elongata, I, 102  
 curassavica longa, I, 102  
 curassavica major, I, 102  
 curassavica media, I, 102  
 curassavica minima, I, 102  
 curassavica minor, I, 102  
 curassavica taylori, I, 103  
 curvospina, I, 160  
 cyanea, IV, 264  
 cyanella, I, 165, 166  
 cyclodes, I, 147, 148  
 cycloidea, I, 128  
 cylindrica, I, 71, 75, 77; IV,  
 254  
 cylindrica cristata, I, 78; IV,  
 254

*Opuntia—continued,*

*cylindrica cristata minor*, I, 78  
*cylindrica monstrosa*, I, 78  
*cylindrica robustior*, I, 78  
*cymochila*, I, 131, 132  
*cymochila montana*, IV, 260  
*dactylifera*, II, 97, 98  
*darrahiana*, II, 102, 106  
*darwinii*, I, 88, 90, 93, 94, 97; IV, 256  
*davisii*, I, 52, 54, 55  
*deamii*, I, 181, 187  
*decipiens*, I, 63, 65; IV, 254  
*decipiens major*, I, 64  
*decipiens minor*, I, 65  
*decumana*, I, 157, 180, 181, 186  
*decumbens*, I, 111, 116, 117, 121, 218; IV, 259  
*decumbens irrorata*, I, 117  
*decumbens longispina*, I, 117  
*deflexa*, I, 157  
*dejecta*, I, 37  
*delaeitiana*, I, 149, 152  
*delicata*, I, 126, 132, 133  
*deltica*, I, 165  
*demissa*, I, 146, 147  
*demorenia*, I, 214  
*demoriana*, I, 214  
*depauperata*, I, 100, 101, 216, 217, 219  
*deppii*, I, 214  
*depressa*, I, 111, 117, 118  
*deserta*, I, 57, 58  
*diademata*, I, 89, 90; IV, 255  
*diademata calva*, I, 89  
*diademata inermis*, I, 89  
*diademata oligacantha*, I, 89  
*diademata polyacantha*, I, 89  
*dichotoma*, I, 214  
*diffusa*, I, 37  
*digitalis*, I, 72  
*diguettii*, I, 26, 29  
*dillei*, I, 147, 148  
*dillenii*, I, 106, 114, 115, 116, 159, 162, 163, 181, 222, 223; IV, 262, 263  
*dillenii minor*, I, 163  
*dillenii orbiculata*, I, 163  
*dimorpha*, I, 96  
*diplocantha*, I, 184  
*discata*, I, 140, 149; IV, 262  
*discolor*, I, 107, 109, 218, 219  
*distans*, I, 149, 155  
*diversispina*, IV, 262  
*dobbiana*, I, 181, 187, 224, 225  
*dolabriformis*, I, 207  
*domingensis*, IV, 259  
*dorffii*, IV, 259  
*drummondii*, I, 102, 104, 106; IV, 257  
*dulcis*, I, 165, 166  
*durangensis*, I, 169  
*eborina*, I, 214  
*eburnea*, I, 95  
*eburnispina*, IV, 260  
*echinocarpa*, I, 56, 57, 81; IV, 254  
*echinocarpa major*, I, 57  
*echinocarpa nuda*, I, 57, 58  
*echinocarpa parkeri*, I, 57, 58  
*echinocarpa robustior*, I, 57  
*effulgia*, IV, 264  
*eichlamii*, I, 181, 187, 188  
*elata*, I, 110, 156, 157  
*elata delaeitiana*, I, 152  
*elatiior*, I, 149, 153, 219; IV, 262  
*elatiior deflexa*, I, 157  
*ellemeitiana*, I, 75  
*ellisiana*, I, 165; IV, 263  
*elongata*, I, 179, 181  
*elongata laevior*, I, 180

*Opuntia—continued,*

*emoryi*, I, 80; IV, 255  
*engelmannii*, I, 140, 147, 148, 149, 164, 165, 167; IV, 262  
*engelmannii cristata*, IV, 262  
*engelmannii cuija*, I, 167  
*engelmannii cyclodes*, I, 147, 148  
*engelmannii discata*, IV, 262  
*engelmannii dulcis*, I, 165  
*engelmannii littoralis*, I, 165  
*engelmannii monstrosa*, I, 148  
*engelmannii occidentalis*, I, 146  
*eocarpa*, I, 144  
*erecta*, I, 214  
*erinacea*, I, 193, 195, 196; IV, 264  
*erythrocentron*, I, 174  
*exaltata*, I, 71, 75, 76, 77  
*expansa*, I, 147, 148  
*extensa*, I, 107  
*exuviata*, I, 63, 65; IV, 254  
*exuviata angustior*, I, 63  
*exuviata major*, I, 64  
*exuviata spinosior*, I, 63  
*exuviata stellata*, I, 63  
*exuviata viridior*, I, 63  
*ferox*, I, 206, 207  
*ferruginispina*, I, 165  
*festiva*, I, 214  
*ficus-barbica*, I, 177  
*ficus-indica*, I, 43, 156, 157, 177, 178, 181, 185, 189, 191; IV, 263  
*ficus-indica albispina*, I, 214  
*ficus-indica amyclaea*, I, 185  
*ficus-indica decumana*, I, 180  
*ficus-indica polyacarpa*, I, 180  
*filipendula*, I, 137, 138; IV, 262  
*flavicans*, I, 191  
*flavisipina*, I, 214  
*flexibilis*, I, 114  
*flexospina*, I, 165  
*floccosa*, I, 71, 86, 87; III, 102  
*floccosa denudata*, I, 86, 87  
*floribunda*, I, 74  
*foliosa*, I, 105, 106  
*folio minori*, I, 129  
*formidabilis*, I, 91, 92  
*fragilis*, I, 193, 194; IV, 264  
*fragilis brachyarthra*, I, 193; IV, 264  
*fragilis caespitosa*, I, 193  
*fragilis tuberiformis*, I, 193  
*fragilis frutescens*, I, 47  
*frustulenta*, I, 104, 105  
*frutescens*, I, 47, 48  
*frutescens brevispina*, I, 47, 48  
*frutescens longispina*, I, 47, 48  
*fulgida*, I, 67; IV, 254  
*fulgida mamillata*, I, 67  
*fuliginosa*, I, 149, 155  
*fulvispina*, I, 174  
*fulvispina badia*, I, 175  
*fulvispina laevior*, I, 175  
*furiosa*, I, 66  
*fuscoatra*, I, 126, 133  
*fusicaulis*, I, 191, 192  
*fusififormis*, I, 130, 131  
*galapageia*, I, 45, 149, 150, 151, 152  
*galeottii*, I, 6  
*geissei*, I, 78  
*gilliesii*, I, 91  
*gilva*, I, 163  
*gilvescens*, I, 149  
*gilvoalba*, I, 165, 166  
*glaberrima*, I, 178  
*glauca*, I, 178  
*glaucescens*, I, 200, 201  
*glauca laevior*, I, 214

*Opuntia—continued,*

*glaucophylla laevior*, I, 214  
*glomerata*, I, 87, 89, 90, 94, 96; II, 138; IV, 255  
*glomerata albispina*, I, 90  
*glomerata flavispina*, I, 90  
*glomerata minor*, I, 90  
*golziana*, I, 26  
*gomei*, I, 165, 166  
*gorda*, I, 191, 192  
*gosseliniana*, I, 140, 141, 151  
*gracilior*, IV, 262  
*gracilis*, I, 47  
*gracilis subpatens*, I, 48  
*grahamii*, I, 7, 83, 84  
*grandiflora*, I, 126, 127, 129  
*grandis*, I, 200, 201; IV, 264  
*grata*, I, 92, 94, 95  
*grata leoniana*, IV, 256  
*greggii*, IV, 255  
*greenei*, I, 131  
*gregoriana*, I, 147, 148  
*griffithsiana*, I, 165  
*grosseiana*, I, 107, 110  
*guanicana*, I, 208  
*guatemalensis*, I, 110, 113, 218, 219  
*guerrana*, I, 191, 192  
*guilanchi*, I, 173, 174  
*gymnocarpa*, I, 180  
*haematocarpa*, I, 166  
*haenquiana*, IV, 261  
*haitiensis*, I, 206  
*hanburyana*, I, 149, 153, 154  
*hattoniana*, I, 103  
*helleri*, I, 150, 152  
*hempeliana*, I, 86, 87; III, 101  
*hernandezii*, I, 181; IV, 263  
*heteromorpha*, I, 79  
*hevernickii*, I, 214  
*hickenii*, I, 90, 92, 93; IV, 255  
*hieronymi*, I, 211  
*hispanica*, IV, 264  
*hitcheii*, I, 214  
*hochderrferri*, I, 198  
*horizontalis*, I, 37, 90  
*horrida*, I, 162; IV, 263  
*humifusa*, I, 127, 128, 132; IV, 259  
*humifusa cymochila*, I, 128  
*humifusa greenei*, I, 128  
*humifusa macrorrhiza*, I, 128  
*humifusa microsperma*, I, 127  
*humifusa oplocarpa*, I, 128  
*humifusa parva*, I, 127  
*humifusa stenochila*, I, 128  
*humifusa vaseyi*, I, 146  
*humilis*, I, 113, 114; IV, 259  
*humistrata*, I, 120  
*hypophila*, I, 71, 72  
*hyptiacantha*, I, 176, 181, 183, 184  
*hystricina*, I, 193, 197  
*hystrix*, I, 65, 66  
*icterica*, I, 173  
*ignescens*, I, 90, 98  
*ignota*, I, 90, 99  
*imbricata*, I, 48, 55, 60, 63, 64, 65, 66; IV, 254  
*imbricata crassior*, I, 63  
*imbricata ramosior*, I, 64  
*imbricata tenuior*, I, 64  
*impedata*, IV, 257  
*inaequalis*, I, 128  
*inaequilateralis*, I, 181, 187, 188, 189  
*inamoena*, I, 121, 125  
*incarnadilla*, I, 185, 186  
*inermis*, I, 161, 162, 163  
*insularis*, I, 150, 152  
*intermedia*, I, 127, 128  
*intermedia prostrata*, I, 128  
*intricata*, I, 119  
*invicta*, I, 79

*Opuntia—continued,*

*involuta*, I, 87  
*irrorata*, I, 116, 117  
*italica*, I, 214; IV, 266  
*ithypetala*, I, 190  
*jamaicensis*, I, 110, 113  
*joconostle*, I, 214  
*juniperina*, I, 193, 197  
*jussieuii*, I, 214  
*karwinskiana*, I, 38  
*keyensis*, I, 159, 162, 163, 222, 223  
*kiska-loro*, I, 107, 108  
*kleiniae*, I, 47, 51, 64, 65  
*kleiniae cristata*, I, 51  
*kleiniae laetevirens*, I, 51  
*kunzei*, I, 80; IV, 255  
*labouretiana*, I, 180, 189; IV, 263  
*labouretiana macrocarpa*, I, 181  
*laevis*, I, 159, 161, 168; IV, 262  
*lagopus*, I, 86, 87, 88  
*lanceolata*, I, 177, 179, 203  
*lanigera*, I, 176; IV, 263  
*larreyi*, I, 191  
*lasiacantha*, I, 181, 182, 183, 184  
*lata*, I, 126, 220  
*laxiflora*, I, 165  
*ledienii*, I, 153  
*lemaireana*, I, 156  
*leonina*, I, 96; IV, 256  
*leptarthra*, I, 101  
*leptocarpa*, I, 166, 167  
*leptocaulis*, I, 47, 48, 49, 73, 213; III, 183; IV, 253  
*leptocaulis brevispina*, I, 47  
*leptocaulis laetevirens*, I, 48  
*leptocaulis longispina*, I, 47  
*leptocaulis major*, I, 48  
*leptocaulis stipata*, I, 47; IV, 253  
*leptocaulis vaginata*, I, 47  
*leucacantha*, I, 174, 175; IV, 253, 263  
*leucacantha laevior*, I, 175  
*leucacantha subferox*, I, 175  
*leucantha*, I, 175  
*leucophaea*, I, 96  
*leucostata*, I, 214  
*leucosticta*, I, 174  
*leucotricha*, I, 151, 174, 175; IV, 263  
*leucotricha fulvispina*, I, 174  
*ligostica*, I, 128  
*lindheimeri*, I, 44, 148, 160, 164, 165, 166; IV, 263  
*lindheimeri cyclodes*, I, 147  
*lindheimeri dulcis*, I, 165  
*lindheimeri littoralis*, I, 165  
*lindheimeri occidentalis*, I, 146  
*linguiformis*, I, 160, 163  
*littoralis*, I, 147, 160, 164, 165  
*lloydii*, I, 60, 63  
*longiclada*, I, 161  
*longiglochta*, I, 214  
*longispina*, I, 95  
*lubrica*, I, 118, 119  
*lucayana*, I, 106, 163  
*lucens*, I, 149  
*lucida*, I, 214  
*lurida*, I, 173; IV, 263  
*macateei*, I, 126, 133, 220, 221  
*macbridei*, IV, 261  
*macdougalliana*, I, 169, 170, 171  
*mackensenii*, I, 137, 138, 139  
*macracantha*, I, 187, 202, 203, 204, 205  
*macrarthra*, I, 126, 129  
*macrocalyx*, I, 118, 122  
*macrocentra*, I, 140, 141, 176; IV, 265

- Opuntia*—*continued*,  
*macrophylla*, I, 214  
*macrorrhiza*, I, 126, 127, 128, 130, 131, 139, 166; IV, 260  
*maculacantha*, I, 134; IV, 260  
*maelenii*, I, 134  
*magenta*, I, 142, 146  
*magna*, I, 64  
*magnarenensis*, I, 147  
*magnifolia*, I, 34  
*maidenii*, IV, 259  
*maihsuen*, I, 41  
*maldonadensis*, I, 75  
*mamillata*, I, 67, 68; IV, 254  
*maritima*, I, 162; IV, 262  
*maxillare*, I, 77  
*maxima*, I, 177, 180, 181; IV, 263  
*media*, I, 199, 200  
*mediterranea*, I, 128  
*megacantha*, I, 178, 181, 182, 185, 186; IV, 264  
*megacantha lasiacantha*, I, 182  
*megacantha tenuispina*, I, 184  
*megacantha trichacantha*, I, 186  
*megacarpa*, I, 145  
*megalantha*, I, 169  
*megalantha*, I, 192  
*megarhiza*, I, 137  
*mendocienses*, I, 65  
*mesacantha*, I, 127, 132; IV, 260  
*mesacantha cymochila*, I, 131  
*mesacantha grandiflora*, I, 129  
*mesacantha greenii*, I, 131  
*mesacantha macrorrhiza*, I, 130  
*mesacantha microsperma*, I, 127  
*mesacantha oplocarpa*, I, 131, 144  
*mesacantha parva*, I, 127, 128  
*mesacantha sphaerocarpa*, I, 144  
*mesacantha stenochila*, I, 132  
*mesacantha vaseyi*, I, 146  
*metternichii*, I, 176  
*mexicana*, I, 34  
*micrarthra*, I, 171  
*microcarpa*, I, 144, 206  
*microdasys*, I, 118, 120, 121, 122, 123, 136; IV, 259  
*microdasys laevior*, I, 120  
*microdasys minor*, I, 120  
*microdasys monstrosa*, IV, 259  
*microdasys rufida*, I, 122  
*microdisca*, I, 133, 135, 136  
*mieckthele*, I, 73  
*mieckleyi*, I, 156, 158  
*militaris*, I, 102, 104, 163  
*millspaughii*, I, 202, 204, 206  
*minima americana*, I, 102  
*minor*, I, 139  
*minor catilascens*, I, 102  
*miciuelii*, I, 78  
*missouriensis*, I, 199, 200; IV, 264  
*missouriensis albispina*, I, 199, 200  
*missouriensis elongata*, I, 214  
*missouriensis erythrostemma*, I, 214  
*missouriensis microsperma*, I, 199, 200  
*missouriensis platycarpa*, I, 199, 200  
*missouriensis rufispina*, I, 199, 200
- Opuntia*—*continued*  
*missouriensis salmonea*, I, 214  
*missouriensis subinermis*, I, 199  
*missouriensis trichophora*, I, 195  
*missouriensis watsonii*, IV, 264  
*modesta*, I, 67  
*mojavensis*, I, 140, 145  
*molesta*, I, 54, 60, 62, 66, 67  
*monacantha*, I, 127, 156, 157; IV, 262  
*monacantha deflexa*, I, 156  
*monacantha gracilior*, I, 156, 157; IV, 262  
*monacantha variegata*, I, 157; IV, 262  
*moniliformis*, I, 33, 202, 206, 207, 208; IV, 264  
*montana*, I, 214  
*montevidensis*, I, 107, 109  
*monticola*, I, 95  
*morenoi*, I, 214  
*morisii*, I, 128  
*mortolensis*, I, 47  
*multiflora*, I, 113, 114  
*myriacantha*, I, 150, 152, 214  
*nana*, I, 127, 217  
*napolea*, IV, 265  
*nashii*, I, 106, 163, 202, 203; IV, 264  
*nelsonii*, I, 172  
*nemoralis*, I, 102, 104  
*neorbuscula*, I, 50  
*nigricans*, I, 152, 153  
*nigrispina*, I, 90, 97  
*nigrita*, I, 183, 184  
*nopalilla*, I, 38  
*oblongata*, I, 173  
*obovata*, IV, 264  
*occidentalis*, I, 140, 146, 147, 153, 163, 165  
*ochrocentra*, IV, 262  
*oligacantha*, I, 89, 182  
*oplocarpa*, I, 132; IV, 260  
*opuntia*, I, 43, 126, 127, 128, 217; IV, 259  
*orbiculata*, I, 176; IV, 263  
*orbiculata metternichii*, I, 176  
*ottonis*, I, 214, 215; III, 195  
*ovallei*, I, 95, 214  
*ovata*, I, 90, 95, 96; IV, 256  
*ovata leonina*, IV, 256  
*ovoides*, I, 95  
*pachona*, I, 184  
*pachyarthra flava*, I, 214  
*pachyclada rosea*, I, 214  
*pachyclada spaethiana*, I, 214  
*pachypus*, I, 75, 77  
*pallida*, I, 60, 65, 66  
*palmdora*, I, 202  
*palmeri*, I, 161  
*pampeana*, I, 134  
*papyracantha*, I, 89, 90; IV, 255  
*paraguayensis*, I, 158  
*parishii*, I, 57, 79, 81, 82  
*parkeri*, I, 58  
*parmentieri*, I, 95  
*parote*, I, 214  
*parryi*, I, 56, 57, 58, 81; IV, 254  
*parva*, I, 161  
*parvispina*, I, 157  
*parvula*, I, 178  
*pascoensis*, I, 100, 101  
*patagonica*, I, 41  
*pelaguensis*, I, 90  
*penicilligera*, I, 135; IV, 261  
*pennellii*, I, 110, 115, 219  
*pentlandii*, I, 71, 72, 77, 90, 97, 98; IV, 256  
*perrita*, I, 65, 66
- Opuntia*—*continued*,  
*pes-corvi*, I, 104  
*pestifer*, I, 102, 103, 217, 218, 220; II, 19  
*phaeacantha*, I, 139, 140, 142, 144; IV, 262  
*phaeacantha brunnea*, I, 144  
*phaeacantha major*, I, 144; IV, 262  
*phaeacantha nigricans*, I, 144  
*philippii*, I, 41  
*phyllacantha*, I, 96  
*phyllanthus*, I, 215; IV, 187  
*picardae*, IV, 264  
*piccolomini*, I, 214  
*piccolominiana*, I, 191  
*pilifera*, I, 176, 177, 184  
*pintadera*, I, 176  
*pisciformis*, IV, 258  
*pittache*, I, 29  
*pittieri*, I, 181, 188, 189  
*platycantha*, I, 33, 89; IV, 255  
*platycantha deflexispina*, I, 89, 90  
*platycantha gracilior*, I, 89  
*platycantha monvillei*, I, 89  
*platyclada*, I, 214  
*platynoda*, I, 109  
*plumbea*, I, 126, 131  
*plumosa nivea*, I, 89, 90  
*poepigii*, I, 40, 41  
*pollardii*, I, 126, 221  
*polyacantha*, I, 193, 195, 196, 197, 199, 200; IV, 264  
*polyacantha albispina*, I, 199  
*polyacantha borealis*, I, 199  
*polyacantha microsperma*, I, 200  
*polyacantha platycarpa*, I, 199  
*polyacantha rufispina*, I, 200  
*polyacantha trichophora*, I, 195  
*polyacantha watsonii*, I, 199  
*polyantha*, I, 113, 114, 115; IV, 259  
*polymorpha*, I, 89; II, 138  
*porteri*, I, 28  
*pottsii*, I, 137, 138; IV, 262  
*praecox*, I, 214  
*prate*, I, 191  
*procumbens*, I, 160, 167  
*prolifera*, I, 61, 67, 69, 70; IV, 254  
*prostrata*, I, 128  
*prostrata spinosior*, I, 214; IV, 263  
*protracta*, I, 214  
*protracta elongata*, I, 214  
*pruinosa*, I, 191  
*pseudococcinifer*, I, 153  
*pseudotuna*, I, 184, 214; III, 238  
*pseudotuna elongata*, I, 214  
*pseudotuna spinosior*, I, 214  
*puberula*, I, 116, 117, 121, 122; IV, 259  
*pubescens*, I, 100, 101, 173; IV, 257, 259  
*pulchella*, I, 79, 82; IV, 255  
*pulverata*, I, 214  
*pulverulenta*, I, 78  
*pulverulenta miquelii*, I, 78  
*pulvinata*, I, 120  
*pumila*, I, 100, 101; IV, 256  
*purpurea*, I, 97  
*pusilla*, I, 102, 105, 106; IV, 255, 256  
*pycnacantha*, IV, 259  
*pycnantha*, I, 118, 123; IV, 259  
*pycnantha margaritana*, I, 123  
*pyriformis*, I, 160, 168  
*pyrocarpa*, I, 166
- Opuntia*—*continued*,  
*pyrrhacantha*, I, 97  
*quimilo*, I, 181, 190, 191  
*quipa*, I, 125  
*quitensis*, I, 149, 154, 224  
*rafinesquei*, I, 127, 128, 129; IV, 259, 260  
*rafinesquei arkansana*, I, 127, 129; IV, 259  
*rafinesquei cymochila*, I, 131  
*rafinesquei cymochila montana*, I, 131  
*rafinesquei fusiformis*, I, 130  
*rafinesquei grandiflora*, I, 129  
*rafinesquei greenii*, I, 132  
*rafinesquei macrorrhiza*, I, 131  
*rafinesquei microsperma*, I, 127, 199  
*rafinesquei minor*, I, 127, 128  
*rafinesquei parva*, I, 128  
*rafinesquei stenochila*, I, 132  
*rafinesquei vaseyi*, I, 146  
*rafinesquiiana*, I, 127, 129; IV, 259  
*rafinesquiiana arkansana*, I, 129; IV, 259  
*rahmeri*, I, 94  
*ramosissima*, I, 46, 48, 52; IV, 253  
*ramosissima cristata*, IV, 253  
*ramosissima denudata*, IV, 253  
*ramulifera*, I, 47  
*rastera*, I, 140, 149  
*rauppiana*, I, 90, 92  
*recedens*, I, 128  
*recondita*, I, 52, 53  
*recurvospina*, I, 144  
*reflexa*, I, 165  
*repens*, I, 102, 103, 104, 115, 116  
*reptans*, I, 214  
*reticulata*, IV, 264  
*retrota*, I, 107, 109, 218  
*retrospinosa*, I, 95  
*rhodantha*, I, 193, 197, 198; IV, 264  
*rhodantha brevispina*, I, 198  
*rhodantha flavispina*, I, 198  
*rhodantha pisciformis*, I, 198  
*rhodantha schumanniana*, I, 198  
*riparia*, I, 149  
*robusta*, I, 182, 191, 192; IV, 264  
*robusta viridior*, I, 191  
*rosea*, I, 17, 63, 65, 78; IV, 254  
*roseana*, I, 130  
*rositoria*, I, 78  
*rotundifolia*, I, 27; IV, 251  
*roxburghiana*, I, 156  
*rubescens*, I, 163, 202, 208, 209; IV, 264  
*rubiflora*, I, 133, 146  
*rubrifolia*, I, 144  
*rufescens*, I, 175  
*rufida*, I, 118, 119, 122  
*rugosa*, I, 145  
*russellii*, I, 90, 94  
*ruthei*, I, 64  
*rutila*, I, 196; IV, 264  
*sabinii*, I, 194  
*sacharosa*, I, 14  
*salicornioides*, I, 215; IV, 217  
*salmiana*, I, 73, 74; IV, 254  
*salmii*, I, 214  
*sanguinocula*, I, 131  
*santa-rita*, I, 140, 142  
*scheeri*, I, 159, 176; IV, 262  
*schickendantzii*, I, 74, 107  
*schomburgkii*, I, 214  
*schottii*, I, 79, 80, 81; IV, 255  
*schottii greggii*, I, 80; IV, 255  
*schumannii*, I, 90, 149, 155  
*schweriniana*, I, 199, 200; IV, 264

- Opuntia*—*continued*,  
 segethii, I, 75, 76, 79  
 seguina, I, 130  
 semispinosa, I, 147  
 senilis, I, 86, 159, 176  
 sericea, I, 134  
 sericea coerulesca, I, 134  
 sericea longispina, I, 134  
 sericea muelenii, I, 134  
 serpentina, I, 56, 57, 58, 69, 81; II, 224  
 setispina, I, 45, 137, 138  
 shaféri, I, 71, 72  
 shreveana, I, 142  
 sinclairii, I, 165, 166  
 skottsbergii, I, 90, 96, 97  
 soederstromiana, I, 149, 154, 221  
 soehrensii, I, 133, 134, 135; IV, 261  
 spathulata, I, 28, 29  
 spathulata aquosa, I, 30  
 speciosa, I, 214; IV, 205  
 spegazzinii, I, 73, 74  
 sphaerica, I, 90, 96; IV, 256  
 sphaerocarpa, I, 193, 198, 199  
 sphaerocarpa utahensis, I, 199  
 spinalba, I, 130  
 spinaurea, I, 214  
 spiniflora, I, 215; II, 106  
 spinosior, I, 52, 67, 68; IV, 254  
 spinosior neomexicana, I, 68  
 spinosissima, I, 103, 175, 202, 204, 205; IV, 264  
 spinotecta, I, 64  
 spinulifera, I, 178, 181, 182  
 spinuliflora, I, 214  
 spinulosa, I, 214  
 spirocentra, IV, 265  
 splendens, I, 199  
 squarrosa, I, 165  
 stanlyi, I, 79, 80; IV, 255  
 stapelia, I, 66  
 stapeliae, I, 65, 66; IV, 254  
 stellata, I, 64  
 stenarthra, I, 158  
 stenochila, I, 126, 132  
 stenopetala, I, 200, 201  
 stipata, IV, 253  
 straminea, I, 214  
 streptacantha, I, 181, 184, 185; IV, 263  
 stricta, I, 161, 178, 223  
 stricta spinulescens, I, 214  
 strigil, I, 136  
 subarmata, I, 165, 166; IV, 263  
 subferox, I, 175  
 subinermis, I, 214  
 subterranea, I, 90, 92  
 subulata, I, 71, 75, 76, 77, 79; III, 179; IV, 254  
 sulphurea, I, 133, 134, 150; IV, 260  
 sulphurea laevior, I, 134  
 sulphurea major, I, 134  
 sulphurea minor, I, 134  
 sulphurea pallidior, I, 134  
 superbospina, I, 144  
 syringacantha, I, 89  
 tapona, I, 124, 160, 164  
 tarapacana, I, 90, 94  
 tardospina, I, 140, 141  
 taylori, I, 102, 103  
 tenajo, I, 49  
 tenuispina, I, 137, 139  
 teres, I, 71  
 tesajo, I, 7, 48, 49  
 tessellata, I, 46  
 tessellata cristata, I, 46; IV, 253  
 tessellata denudata, IV, 253  
 testudinis-crus, I, 206  
 tetracantha, I, 52, 53, 54
- Opuntia*—*continued*,  
 texana, I, 165, 166  
 thurberi, I, 52, 53, 54  
 tidballii, I, 160  
 todari, IV, 265  
 tomentella, I, 173, 174  
 tomentosa, I, 173, 174; IV, 263  
 tortisperma, I, 131, 132  
 tortispina, I, 126, 128, 131, 194; IV, 260  
 toumeyii, I, 144; IV, 262  
 tracyi, I, 102, 105; IV, 257  
 treleasei, I, 118, 119  
 treleasei kernii, I, 119  
 triacantha, I, 110, 112, 113, 115, 204  
 tribuloides, I, 186  
 tricolor, I, 165, 166  
 trichophora, I, 193, 195  
 tuberculata, I, 214  
 tuberiformis, I, 92  
 tuberosa, I, 32, 33  
 tuberosa albispina, IV, 212  
 tuberosa spinosa, I, 89  
 tuna, I, 210, 113, 114, 116, 149, 157, 163; IV, 259, 262, 263  
 tuna humilior, IV, 259  
 tuna humilis, I, 114  
 tuna laevior, I, 114  
 tuna orbiculata, I, 114  
 tunicata, I, 60, 65, 66, 83, 121; IV, 254, 266  
 tunicata laevior, I, 66  
 tunoidea, I, 116, 162  
 tunoides, I, 116  
 turgida, IV, 265  
 turpinii, I, 89  
 turpinii polymorpha, I, 89  
 tweediei, I, 134  
 umbrella, I, 156  
 undosa, I, 177, 279  
 undulata, I, 65, 177, 179  
 ursina, I, 174, 195, 196, 197; IV, 264  
 ursus horribilis, IV, 264  
 urumbella, I, 157  
 utahensis, I, 298  
 utkilio, I, 107, 109, 110  
 vaginata, I, 47, 48; IV, 253  
 valida, I, 147  
 vaseyi, I, 140, 142, 145, 146  
 velutina, I, 169, 172  
 verschaffeltii, I, 44, 71, 72  
 verschaffeltii digitalis, I, 71, 72  
 versicolor, I, 44, 52, 54, 60, 62; IV, 254  
 vestita, I, 72, 72, 87; IV, 254  
 vexans, I, 64, 65  
 vilis, I, 79, 82, 83  
 violacea, I, 244  
 virgata, I, 47  
 viridiflora, I, 52, 55  
 vivipara, I, 52  
 vulgaris, I, 127, 128, 156, 157, 163, 177; IV, 259, 262  
 vulgaris balearica, I, 161  
 vulgaris major, I, 127  
 vulgaris media, I, 127  
 vulgaris minor, I, 127  
 vulgaris nana, I, 127, 129  
 vulgaris rafinesquei, I, 127  
 vulgo, I, 157  
 vulpina, I, 134  
 wagneri, I, 74  
 weberi, I, 84, 85  
 wentiana, I, 110, 116  
 wetmorei, IV, 255  
 whipplei, I, 32, 43, 52, 55, 68; IV, 253  
 whipplei laevior, I, 55  
 whipplei spinosior, I, 68  
 wilcoxii, I, 169, 172  
 winteriana, I, 166  
 wootonii, I, 147, 148  
 wrightii, I, 51
- Opuntia*—*continued*,  
 xanthoglochla, I, 130, 131  
 xanthostemma, I, 198; IV, 264  
 xanthostemma elegans, I, 198  
 xanthostemma fulgens, I, 198  
 xanthostemma gracilis, I, 198  
 xanthostemma orbicularis, I, 198  
 xanthostemma rosea, I, 198  
 xerocarpa, I, 198  
 youngii, I, 130  
 zeburina, I, 149, 155, 222  
 zacuapanensis, I, 183  
 zuniensis, I, 144
- Opuntiacae, I, 217  
 Opuntiae, IV, 252  
 Opuntiacae, I, 8, 24; IV, 252  
 Orbiculatae, I, 45, 176  
 Orchids, II, 42  
 Oreocereus, II, 2, 60, 108, 171-173; III, 77; IV, 274  
 celsianus, II, 171, 172, 173, 226; IV, 279  
 celsianus bruennowii, II, 171  
 lanatus, II, 61  
 Organito de vibora, II, 111  
 Organo, II, 48, 74; IV, 273  
 Oroya, III, 77, 102  
 peruviana, III, 102  
 Pachycereus, II, 2, 28, 68-76, 96  
 calvus, II, 69; IV, 271  
 chrysomallus, II, 69, 72, 73, 74; IV, 271  
 columna-trajani, II, 69, 76  
 gaumeri, II, 69, 71; IV, 271  
 grandis, II, 69, 72  
 lepidanthus, II, 69, 76; IV, 272  
 marginatus, II, 69, 74, 75, 92, 102; IV, 271  
 oectunii, II, 69, 70  
 pecten-aboriginum, II, 69, 70, 71, 72, 76; IV, 271  
 pringlei, II, 69, 70; IV, 270, 271  
 queretaroensis, II, 96  
 ruficeps, II, 69, 75  
 titan, II, 69; IV, 271
- Palmadora, I, 202  
 Palmadorae, I, 45, 201  
 Palmatoria, I, 202  
 Paradoxae, IV, 221  
 Pasacana, II, 133  
 Passiflora, II, 92  
 Pataquisca, I, 76  
 Pediacactus, III, 77, 90, 91, 109  
 simpsonii, III, 88, 90, 92; IV, 168, 286
- Peirescia, I, 9  
 Peireskia, I, 9  
 Pelecyphora, IV, 3, 59, 60, 64  
 aselliformis, IV, 8, 59  
 aselliformis concolor, IV, 59  
 aselliformis cristata, IV, 64  
 aselliformis grandiflora, IV, 59  
 aselliformis pectinata, IV, 64, 6  
 aselliformis pectinifera, IV, 64  
 fimbriata, IV, 59  
 micromerus, III, 93  
 pectinata, IV, 64, 65  
 pectinata cristata, IV, 65  
 pectinifera, IV, 64
- Pellote, III, 84, 107  
 Penca, IV, 260  
 Penca-chica, IV, 260  
 Peniocereus, II, 2, 112, 113  
 greggii, II, 112; IV, 275  
 johnstonii, IV, 275  
 Penquilla, IV, 260
- Pentapterae, IV, 221  
 Pentlandianae, I, 44, 90  
 Peote, IV, 59  
 Peotillo, IV, 59  
 Perescia, I, 9  
 Pereskia, I, 8-24, 25, 26, 40, 75; IV, 251, 252, 290  
 acardia, I, 10  
 aculeata, I, 10, 11, 14; IV, 251  
 aculeata lanceolata, I, 10  
 aculeata latifolia, I, 10  
 aculeata longispina, I, 10  
 aculeata rotunda, I, 10  
 aculeata rotundifolia, I, 10  
 aculeata rubescens, I, 10  
 affinis, I, 24  
 amapola, I, 14  
 amapola argentina, IV, 251  
 argentina, I, 14  
 autumnalis, I, 9, 11, 12; IV, 251  
 bahiensis, I, 9, 19, 20; IV, 252  
 bleo, I, 4, 9, 17, 18, 20; IV, 251  
 brasiliensis, I, 10  
 calandriniaefolia, I, 29, IV, 252  
 colombiana, I, 9, 17  
 conzattii, I, 9, 24  
 crassicaulis, I, 29  
 cruenta, I, 24  
 cubensis, I, 9, 22  
 foetens, I, 10  
 fragrans, I, 10  
 galeottiana, IV, 251  
 glomerata, I, 94  
 godseffiana, I, 10, 11; IV, 251  
 grandiflora, I, 24  
 grandifolia, I, 9, 18, 19, 20, 21; IV, 251  
 grandispina, I, 24  
 guamacho, I, 9, 15, 16; IV, 251  
 guatemalensis, IV, 251  
 haageana, I, 24  
 horrida, I, 9, 21, IV, 255  
 humboldtii, IV, 251  
 lanceolata, I, 10  
 longispina, I, 10  
 longispina rotundifolia, IV, 251  
 longispina rubescens, IV, 251  
 lychnidiflora, I, 9, 12, 13  
 moorei, I, 9, 15  
 nicoyana, I, 9, 13  
 ochnacarpa, I, 19  
 opuntiaeflora, I, 26, 27  
 panamensis, I, 17, 18  
 pereskia, I, 7, 9, 10; IV, 251  
 pflanzii, IV, 251  
 philippii, I, 41  
 pittache, I, 29  
 plantaginea, I, 24  
 poeppigii, I, 41; IV, 253  
 portulacifolia, I, 9, 22, 23, 24  
 recurvifolia, IV, 251  
 rosea, I, 17  
 rotundifolia, I, 27; IV, 251  
 sacharosa, I, 9, 10, 14, 15; IV, 251  
 spathulata, I, 28, 29; IV, 251  
 subulata, I, 75, 76; IV, 175, 254  
 tampicana, I, 9, 17  
 undulata, I, 10  
 verticillata, IV, 251  
 weberiana, I, 9, 15  
 zehntneri, I, 9, 13, 14; IV, 252  
 zinniaeflora, I, 9, 17, 20, 21; IV, 251
- Pereskiae, I, 8, 24; IV, 252  
 Pereskioopsis, I, 8, 14, 17, 24, 25-30, 43; IV, 252



- Pereskioopsis—continued*,  
*aquosa*, I, 25, 29,  
*autumnalis*, I, 11, 12; IV, 251  
*brandegeei*, I, 28  
*chapistle*, I, 25, 27; IV, 251  
*diguetii*, I, 25, 26, 27  
*kellermanii*, I, 25, 30  
*opuntiaeflora*, I, 25, 26, 27  
*pititache*, I, 25, 29; IV, 252  
*porteri*, I, 25, 28; IV, 251  
*recurvifolia*, IV, 251  
*rotundifolia*, I, 25, 27, 28;  
 IV, 251  
*scandens*, IV, 252  
*spathulata*, I, 25, 28; IV, 251  
*velutina*, I, 25, 26  
*Pereskioopuntia*, I, 25  
*Pertinato*, III, 232  
*Peruvianae*, II, 4  
*Pest pear*, I, 161, 163  
*Petaya*, III, 17  
*Peyote*, III, 84, 107, 184; IV, 59  
*Peyotillo*, IV, 59  
*Pfeiffera*, IV, 208, 209, 210, 211  
*cereiformis*, IV, 210, 211  
*ianthothele*, IV, 208, 210  
*riphsaloides*, IV, 209  
*Phaeacanthae*, I, 45, 136, 139,  
 141, 148  
*Phellosperma*, IV, 3, 60, 65, 156  
*tetrancistra*, IV, 60, 61  
*Phyllanthos*, IV, 205  
*Phyllanthus*, IV, 186  
*Phyllanthus*, IV, 186  
*Phyllocactus*, II, 3, 221, 222;  
 IV, 185, 186, 198, 200  
*ackermannii*, IV, 198  
*ackermannii hybridus*, IV, 200  
*ackermannii major*, IV, 200  
*acuminatus*, IV, 188, 189  
*acutifrons*, IV, 200  
*agatha*, IV, 200  
*alatus*, IV, 200  
*alatus major*, IV, 200  
*albus grandiflorus*, IV, 199  
*albus grandissimus*, IV, 200  
*albus perfectus*, IV, 200  
*albus superbiens*, IV, 200  
*albus superbissimus*, IV, 200  
*albus superbus*, IV, 199  
*alexandrinae*, IV, 200  
*amabilis*, IV, 200  
*amabilis perfectus*, IV, 200  
*amarantinus*, IV, 200  
*angularis*, IV, 192  
*anguliger*, IV, 191, 192  
*arnoldi*, IV, 200  
*atrosanguineus*, IV, 200  
*aurantiacus*, IV, 200  
*aurantiacus superbus*, IV, 200  
*belgicus*, IV, 200  
*bergei*, IV, 200  
*bergeri*, IV, 200  
*biformis*, IV, 202  
*billiardieri*, IV, 200  
*binderi*, IV, 200  
*blindlii*, IV, 200  
*boehmii*, IV, 200  
*boliviensis*, IV, 200  
*bolivillianus*, IV, 200  
*bothii*, IV, 200  
*bradei*, IV, 204  
*brongnartii*, IV, 200  
*buestii*, IV, 200  
*burmeisteri*, IV, 200  
*campannii*, IV, 200  
*caparti*, IV, 200  
*capelleanus*, IV, 200  
*carolus magnus*, IV, 200  
*cartagensis*, IV, 197  
*cartagensis refractus*, IV, 197  
*cartagensis robustus*, IV, 197  
*castneri*, IV, 200  
*caudatus*, IV, 190  
*caulorrhizus*, IV, 192  
*chiapensis*, IV, 203, 204  
*Phyllocactus—continued*,  
*chico*, IV, 200  
*coccineus*, IV, 200  
*colmariensis*, IV, 200  
*colombiensis*, IV, 200  
*cooperi*, IV, 199  
*costaricensis*, IV, 193  
*courantii*, IV, 200  
*crassulifolius*, IV, 200  
*crenato grandiflorus*, IV, 199  
*crenatus*, IV, 192, 193  
*crenatus amarantinus*, IV,  
 192  
*crenatus amarantinus*, IV,  
 200  
*crenatus caulorrhizus*, IV, 200  
*crenatus elegans*, IV, 192  
*crenatus erleri*, IV, 192  
*crenatus haageanus*, IV, 192  
*crenatus hirsutus*, IV, 200  
*crenatus lateralis*, IV, 200  
*crenatus lateritius*, IV, 192  
*crenatus latifolius*, IV, 200  
*crenatus luteus*, IV, 200  
*crenatus roseus*, IV, 192  
*crenatus ruber*, IV, 200  
*crenatus splendens*, IV, 192  
*crenatus superbus*, IV, 292  
*crenatus vogelii*, IV, 192  
*crispisii*, IV, 200  
*curtisii*, IV, 200  
*dangeli*, IV, 200  
*darrahii*, IV, 190, 191  
*decumbens*, IV, 200  
*delicatus*, IV, 179  
*demouline*, IV, 200  
*deveauxi*, IV, 200  
*dieffenbacchianus*, IV, 200  
*dolores*, IV, 200  
*dumouline*, IV, 200  
*edwardsii*, IV, 200  
*eichlamii*, IV, 203  
*elegans*, IV, 200  
*epirus*, IV, 200  
*erebus*, IV, 199  
*erectus perfectus*, IV, 200  
*erectus superbus*, IV, 200  
*ernesti*, IV, 200  
*erubescens*, IV, 200  
*fastuosus*, IV, 200  
*feastii*, IV, 200  
*felonis*, IV, 200  
*feltoni*, IV, 200  
*floribundus*, IV, 200  
*formosus*, IV, 200  
*franzii*, IV, 200  
*fuentii*, IV, 200  
*funkii*, IV, 200  
*gaertneri*, IV, 183, 184  
*gaillardae*, IV, 187  
*germanus*, IV, 200  
*gloriosus*, IV, 200  
*gordonianus*, IV, 200  
*grandidissimus*, IV, 200  
*grandiflorus*, IV, 200  
*grandiflorus albiflorus*, IV,  
 200  
*grandiflorus ruber*, IV, 200  
*grandilobus*, IV, 192  
*grandis*, IV, 188, 189  
*guatemalensis*, IV, 195  
*guebwillerianus*, IV, 200  
*guedenyi*, IV, 200  
*guentneri*, IV, 200  
*guyanensis*, IV, 188  
*haagei*, IV, 199  
*hamburgiensis*, IV, 200  
*hansii*, IV, 200  
*hauffii*, IV, 200  
*havermansii*, IV, 200  
*helenus*, IV, 200  
*hempeli*, IV, 200  
*hibridus*, IV, 200  
*hibridus gordonianus*, IV, 199  
*hibridus wrayi*, IV, 199  
*hildmanni*, IV, 199  
*hitchensis*, IV, 200  
*Phyllocactus—continued*,  
*hookeri*, IV, 197  
*ignescens*, IV, 200  
*incomparabilis miniatus*, IV,  
 200  
*jenkinsonii*, IV, 200  
*jenkinsonii superbus*, IV, 200  
*johnsonii*, IV, 200  
*jordanis*, IV, 200  
*kampmannii*, IV, 200  
*keithii*, IV, 200  
*kermesimus magnus*, IV, 200  
*kiardi*, IV, 200  
*kranzii*, IV, 200  
*krausei*, IV, 200  
*laarsenii*, IV, 200  
*laetingii*, IV, 200  
*laloyi*, IV, 200  
*latifrons*, IV, 188, 189  
*laudowi*, IV, 200  
*leopoldii*, IV, 200  
*lepidocarpus*, IV, 194  
*londonii*, IV, 189  
*longipes*, IV, 189  
*lorentzii*, IV, 200  
*lorenzii*, IV, 200  
*lothii*, IV, 189  
*ludmani*, IV, 200  
*ludwigi*, IV, 200  
*lunus*, IV, 200  
*macquianus*, IV, 189  
*macrocarpus*, IV, 193  
*macrolobus*, IV, 192  
*macropterus*, IV, 193  
*maelenii*, IV, 289  
*magnificus*, IV, 200  
*maigretii*, IV, 200  
*makoyi*, IV, 200  
*marginatus*, IV, 297  
*marsus*, IV, 199  
*mauritanus*, IV, 189  
*mayanus*, IV, 200  
*mexicanus*, IV, 189, 200  
*meyerianus*, IV, 200  
*muehlenpfordtii*, IV, 200  
*muellhousianus*, IV, 200  
*multiflorus*, IV, 200  
*nelsonii*, IV, 203  
*neubertii*, IV, 200  
*niedtii*, IV, 200  
*niger*, IV, 200  
*nitens*, IV, 200  
*nymphorea beata*, IV, 200  
*oxypetalus*, IV, 188, 189  
*paraguayensis*, IV, 200  
*pentneri*, IV, 200  
*pfersdorffii*, IV, 199  
*phyllanthoides*, IV, 200, 205  
*phyllanthoides albiflorus*, IV,  
 205  
*phyllanthoides striatus*, IV,  
 205  
*phyllanthoides striatus mul-*  
*tiflorus*, IV, 205  
*phyllanthus*, IV, 187, 188  
*phyllanthus boliviensis*, IV,  
 187  
*phyllanthus columbiensis*, IV,  
 187  
*phyllanthus paraguayensis*,  
 IV, 187  
*phyllantoides*, IV, 200  
*phyllantoides crenatus*, IV,  
 200  
*pittieri*, IV, 194  
*potstachianus*, IV, 200  
*poullertianus*, IV, 200  
*pressleri*, IV, 200  
*pulcherrimus*, IV, 201  
*pumilus*, IV, 185  
*purpureus*, IV, 200  
*purpusii*, IV, 188  
*quillardetti*, IV, 201  
*rebeaudii*, IV, 201  
*ravati*, IV, 201  
*reichei*, IV, 201  
*reinckii*, IV, 207  
*Phyllocactus—continued*,  
*roseus albus*, IV, 189  
*roseus carmineus*, IV, 201  
*roseus carneus*, IV, 201  
*roseus floribundus*, IV, 201  
*roseus grandiflorus*, IV, 199  
*roseus grandissimus*, IV, 199  
*roseus miniatus*, IV, 201  
*roseus splendidus*, IV, 201  
*roseus superbus*, IV, 189  
*roydii*, IV, 201  
*ruber*, IV, 201  
*ruber perfectus*, IV, 201  
*ruber violaceus*, IV, 201  
*ruelcheri*, IV, 200  
*ruettii*, IV, 199  
*russellianus*, IV, 184, 185  
*sarniensis*, IV, 201  
*schaffieri*, IV, 201  
*schallerianus*, IV, 201  
*schlimmi*, IV, 201  
*schmidtii*, IV, 201  
*selloi*, IV, 189  
*sellowii*, IV, 201  
*serratus*, IV, 191  
*smithii*, IV, 189  
*smoli*, IV, 189  
*specillimus*, IV, 201  
*speciosissimus*, IV, 201  
*speciosissimus feltonii*, IV,  
 200  
*speciosissimus grandiflorus*,  
 IV, 201  
*speciosus roseus*, IV, 201  
*splendens*, IV, 201  
*splendidus*, IV, 201  
*stenesi*, IV, 201  
*stenopetalus*, IV, 196, 197  
*strictus*, IV, 196  
*superbissimus*, IV, 201  
*superbus*, IV, 200  
*mayanus*, IV, 201  
*thomasianus*, IV, 193  
*tonduzii*, IV, 200  
*tricolor*, IV, 201  
*triumphans*, IV, 200  
*tuna*, IV, 200  
*ulbrechtii*, IV, 200  
*undiflorus*, IV, 201  
*vandesii*, IV, 201  
*victoria-regia*, IV, 200  
*vitellimus*, IV, 201  
*vogelii*, IV, 200  
*vonhoffini*, IV, 201  
*warszewiczii*, IV, 201  
*weingartii*, IV, 200  
*wippenmannii*, IV, 200  
*wittmackianus*, IV, 201  
*wrayi*, IV, 200  
*zarka*, IV, 200  
*Phyllocereus*, II, 221; IV, 185  
*Pilocereus*, II, 3, 13, 25, 44,  
 51, 52, 58, 59, 178, 181;  
 III, 60, 78; IV, 185, 186,  
 268, 271  
*acranthus*, II, 169  
*albisetosus*, II, 58; IV, 270  
*albispinus*, II, 59  
*albispinus crenatus*, II, 5  
*alensis*, II, 55  
*andryanus*, II, 59  
*angulosus*, IV, 268  
*arrabidae*, II, 42  
*auratus*, IV, 268  
*barbatus*, II, 50  
*bruennowii*, II, 171, 172; IV,  
 279  
*celsianus*, II, 171, 172, 226;  
 IV, 279  
*celsianus bruennowii*, II, 171,  
 172, 226  
*celsianus fossulatus*, II, 272  
*celsianus gracilior*, II, 171  
*celsianus lanuginosior*, II,  
 171, 172  
*celsianus williamsii*, II, 171  
*chrysacanthus*, II, 48

- Pilocereus—continued,*  
 chrysomallus, II, 59, 72; IV, 271  
 coerulescens, II, 5  
 columna, II, 59, 76  
 columna-trajani, II, 76  
 cometes, II, 52; IV, 269  
 consolei, II, 44  
 crenulatus, II, 49  
 curtisii, II, 44; IV, 269  
 dautwitzii, II, 61, 63, 225; IV, 270  
 dautwitzii cristatus, II, 63  
 divaricatus, II, 151  
 engelmannii, II, 164  
 erythrocephalus, III, 7  
 euphorbioides, II, 33  
 exerens, II, 42, 43; IV, 268  
 fimbriatus, II, 151  
 flavicomus, II, 52  
 flavispinus, II, 60  
 floccosus, II, 50  
 foersteri, II, 52  
 fossulatus, II, 171, 172; IV, 279  
 fossulatus gracilis, II, 171  
 fossulatus pilosior, II, 171  
 fouachianus, II, 50  
 foveolatus, II, 172  
 fulviceps, II, 72, 73; IV, 271  
 fulvispinosus, II, 50  
 ghiesbreghtii, II, 60  
 giganteus, II, 164, 167; IV, 279  
 glaucescens, II, 59  
 gounellei, II, 34  
 grandispinus, II, 87  
 haageanus, II, 62  
 haagei, II, 61  
 hagendorpi, II, 27  
 haworthii, II, 44  
 hermentianus, II, 58; IV, 270  
 hoogendorpii, II, 225  
 hoppenstedtii, II, 27, 28; IV, 268  
 houlettianus, II, 3; IV, 269  
 houlettianus leucocephalus, IV, 269  
 houlettianus niger, IV, 269  
 houletii, II, 52, 53; IV, 269  
 jubatus, II, 52  
 kanzleri, II, 171; IV, 279  
 kranzleri, IV, 279  
 lanatus, II, 61, 63; IV, 270  
 lanatus cristatus, II, 63; IV, 270  
 lanatus haagei, II, 61, 63  
 lanuginosus, II, 49  
 lanuginosus virens, IV, 269  
 lateralis, II, 27, 28  
 lateribarbatius, II, 76  
 leninghausii, III, 204, 205  
 leucocephalus, IT, 52  
 lutescens, II, 44  
 macrocephalus, II, 31  
 macrostibas, II, 18  
 marschalleckianus, II, 53  
 melocactus, II, 29, 30  
 militaris, II, 73  
 monacanthus, II, 155  
 moritzianus, II, 41  
 niger, II, 4; IV, 269  
 niger aureus, IV, 269  
 nigricans, II, 44  
 nobilis, II, 44  
 oligogonus, IV, 268  
 oligogonus houlettianus, IV, 268  
 oligogonus sublanatus, IV, 268  
 pasacana, II, 133  
 pentaedrophorus, II, 31  
 pfeifferi, II, 224  
 plumieri, II, 47  
 polyedrophorus, II, 31  
 polygonus, II, 47  
 polylophus, II, 32
- Pilocereus—continued,*  
 polyptychus, IV, 269  
 pringlei, II, 69  
 repandus, II, 17, 18  
 rhodacanthus, III, 7  
 robinii, II, 39  
 royenii, II, 50, 31  
 royenii armatus, II, 50  
 ruficeps, II, 75  
 russelianus, II, 33, 34  
 sargentianus, II, 177, 178; IV, 280  
 schlumbergeri, II, 47  
 schottii, II, 177, 178; IV, 280  
 scoparius, II, 41  
 senilis, II, 27; IV, 268  
 senilis cristatus, II, 27  
 senilis flavispinus, II, 27  
 senilis longispinus, II, 27  
 setosus, II, 34, 35  
 sterkmannii, II, 41  
 straussii, II, 171, 172, 226  
 strictus, II, 44, 60  
 strictus consolei, II, 44  
 strictus fouachianus, II, 50  
 sublanatus, IV, 268  
 swartzii, II, 47  
 terscheckii, II, 140  
 tetetzo, II, 76  
 tetetzo cristatus, IV, 272  
 thurberi, II, 97  
 tilophorus, IV, 268  
 trichacanthus, II, 44  
 ulci, II, 52  
 urbanianus, II, 43  
 vellozoi, II, 29  
 verheinei, II, 58  
 virens, II, 43  
 williamsii, II, 172; IV, 279
- Pin pillow, I, 102  
 Piptanthocereus, II, 3, 22  
 azureus, II, 15  
 beneckeii, II, 18; IV, 273  
 chalybaeus, II, 16  
 forbesii, II, 7  
 hankeanus, II, 7  
 labouretianus, II, 7  
 jamacaru, II, 8  
 jamacaru caesius, II, 15  
 jamacaru cyaneus, II, 8  
 jamacaru glaucus, II, 8  
 peruvianus, IV, 266  
 peruvianus monstruosus, IV, 266  
 spagazzinii, IV, 268  
 validus, II
- Pisciformes, IV, 258  
 Pisco colorado, II, 62  
 Pitahaya, II, 96, 98, 122, 165; III, 40; IV, 190  
 agre, II, 117, 122  
 agria, II, 117, 122  
 de San Juan, II, 122  
 dulce, II, 98, 122  
 Pitahayita, II, 111, 122  
 Pitajaya, II, 122  
 Pitajuaia, II, 122  
 Pitalla, II, 122  
 Pitaya, II, 122  
 Pitayita, II, III, 122  
 Pithaya, II, 122  
 Platanillo de monte, IV, 197  
 Platypuntia, I, 45, 73, 84, 92, 99, 100, 135, 211; IV, 180  
 Polar bear cactus, I, 87  
 Polyacanthae, I, 45, 193  
 Portulaca, I, 9  
 Prickly pear, I, 43, 212; IV, 250  
 Prismaticae, IV, 220  
 Pseudorhipsalis, IV, 208, 213-214, 243  
 alata, IV, 213, 214  
 himantoclada, IV, 213, 214  
 Pterocactus, I, 24, 30-33  
 decipiens, I, 32, 33  
 fischeri, I, 31  
 hickenii, I, 31
- Pterocactus—continued,*  
 kuntzei, I, 30, 32, 33; IV, 252  
 kurtzei, I, 32  
 pumilus, I, 31, 32  
 tuberosus, I, 31, 32, 33; IV, 252  
 valentinii, I, 88  
 Pubescentes, I, 141  
 Puipute, I, 13  
 Pumilae, I, 45, 100; IV, 256  
 Queen of the night, IV, 283  
 Quiabentia, IV, 252  
 Quiabentia zehntneri, IV, 252  
 Quiabento, I, 14; IV, 252  
 Quimilo, I, 190  
 Quipa, I, 125  
 Raho de raposa, II, 109  
 Rainbow cactus, III, 19, 27  
 Ramosissimae, I, 44, 46  
 Rat tail cactus, II, 218  
 Rathbunia, II, 2, 139, 169, 170  
 alamosensis, II, 117, 169, 170  
 kerberi, II, 169, 170  
 sonorensis, II, 169  
 Rebutia, III, 3, 45-48, 60, 176; IV, 285  
 deminuta, IV, 285  
 fiebrigii, III, 45, 46, 205  
 minuscula, III, 45, 46, 180; IV, 285  
 pseudominuscula, III, 45, 46, 47  
 pygmaea, III, 45, 47  
 steinmannii, III, 45, 47  
 Recurvatae, IV, 24, 51  
 Repandae, II, 4  
 Rhipsalidanae, II, 1; IV, 177, 206, 208  
 Rhipsalidopsis, IV, 208, 209  
 rosea, IV, 209, 247  
 Rhipsalis, I, 8; II, 3, 124, 209, 214, 222; III, 4; IV, 180, 208, 209, 210, 211, 212, 213, 214, 216, 219-247, 250  
 aculeata, IV, 221, 231  
 aethiopica, IV, 226  
 alata, IV, 213, 214, 241, 242, 243  
 alternata, IV, 237  
 anceps, IV, 215, 216  
 angustissima, IV, 241, 242  
 bambusoides, IV, 218  
 biolleyi, II, 215  
 boliviana, IV, 221, 240  
 brachiata, IV, 222  
 brevibarbis, IV, 215  
 bucheni, IV, 247  
 burchellii, IV, 220, 225  
 calmaiformis, IV, 231  
 campos-portoana, IV, 220, 224  
 capilliformis, IV, 220, 224  
 caripensis, IV, 227  
 carnosae, IV, 247  
 cassutha, IV, 219, 220, 225, 226, 233  
 cassutha rhodocarpa, IV, 226  
 cassutha, IV, 225  
 cassutha dichotoma, IV, 226  
 cassutha hookeriana, IV, 226  
 cassutha major, IV, 227, 234  
 cassutha mauritiana, IV, 226  
 cassutha mociniana, IV, 226, 227  
 cassutha pendula, IV, 226, 227  
 cassutha pilosiuscula, IV, 227, 234  
 cassutha rhodocarpa, IV, 226  
 cassutha swartziana, IV, 226  
 cassutha tenuior, IV, 227  
 cassuthoides, IV, 227  
 cassuthoides, IV, 226  
 cavernosa, IV, 215, 216  
 cereiformis, IV, 210  
 cereuscula, IV, 220, 222  
 chloroptera, IV, 243  
 chrysantha, IV, 236, 247  
 chrysocarpa, IV, 236
- Rhipsalis—continued,*  
 clavata, IV, 220, 223  
 clavata delicatula, IV, 223, 224  
 comorensis, IV, 226  
 conferta, IV, 227, 228  
 coriacea, IV, 221, 241, 242  
 crassa, IV, 243  
 cribrata, IV, 220, 225  
 cribrata filiformis, IV, 225, 247  
 crispa, IV, 243  
 crispa latior, IV, 245  
 crispa major, IV, 245  
 crispata, IV, 221, 245  
 crispata latior, IV, 245  
 crispimarginata, IV, 221, 244, 245  
 cuneata, IV, 221, 246  
 cylindrica, IV, 231  
 densiareolata, IV, 228  
 dichotoma, IV, 226  
 dissimilis, IV, 221, 236, 247  
 dissimilis setulosa, IV, 236  
 echinata, IV, 222  
 elliptica, IV, 220, 221, 242, 243  
 elliptica helioides, IV, 213  
 ensiformis, IV, 215  
 erythrocarpa, IV, 228  
 erythrolepis, IV, 228, 247  
 fasciculata, IV, 220, 227, 229  
 filiformis, IV, 247  
 floccosa, IV, 221, 227, 234  
 floribunda, IV, 228  
 foveolata, IV, 236  
 frondosa, IV, 247  
 funalis, IV, 231, 234  
 funalis gracilior, IV, 231  
 funalis gracilis, IV, 235  
 funalis minor, IV, 234  
 gibberula, IV, 221, 235  
 gonocarpa, IV, 221, 238  
 gracilis, IV, 217, 224  
 grandiflora, IV, 221, 231, 232, 233  
 grandiflora minor, IV, 234  
 hadrosoma, IV, 231  
 harrisii, IV, 2  
 heteroclada, IV, 220, 224  
 himantoclada, IV, 213  
 hookeriana, IV, 226  
 horrida, IV, 229  
 houlettiana, IV, 221, 238  
 houletii, IV, 238  
 ianthothele, IV, 210  
 itatiaiae, IV, 247  
 jamaicensis, IV, 221, 242  
 kegnelii, IV, 238  
 knightii, IV, 215  
 lagenaria, IV, 247  
 larmentacea, IV, 230  
 leiophloea, IV, 241  
 leucorhaphis, IV, 221, 232  
 lindbergiana, IV, 220, 228  
 linearis, IV, 221, 239  
 loefgrenii, IV, 221, 232, 233  
 lorentziana, IV, 221, 240  
 lumbricoides, IV, 220, 230  
 machahensis, IV, 247  
 macrocarpa, IV, 187  
 macropogon, IV, 215, 216  
 madagascarensis, IV, 229  
 madagascarensis dasycerca, IV, 229  
 megalantha, IV, 221, 232  
 mesembrianthoides, IV, 222  
 mesembrianthoides, IV, 220, 222  
 micrantha, IV, 221, 237, 239, 247  
 microcarpa, IV, 247  
 minutiflora, IV, 226, 227  
 miquelii, IV, 247  
 mittleri, IV, 216  
 monacantha, IV, 212, 213  
 myosurus, IV, 215, 216

- Rhipsalis—*continued*,  
 nevaesii, IV, 232  
 neves-armondii, IV, 221, 233  
 novaesii, IV, 232  
 oblonga, IV, 221, 246  
 oligosperma, IV, 247  
 pacheco-leonii, IV, 236  
 pachyptera, IV, 221, 243, 247  
 pachyptera crassior, IV, 243  
 pachyptera purpurea, IV, 243  
 paradoxa, IV, 221, 237  
 parasitica, IV, 226, 227, 229  
 pendula, IV, 225, 227  
 penduliflora, IV, 225  
 penduliflora laxa, IV, 225  
 pentagona, IV, 236  
 pentaptera, IV, 221, 236  
 peruviana, IV, 212  
 phyllanthus, IV, 187  
 pilocarpa, IV, 208, 209  
 pilosa, IV, 229  
 pittieri, IV, 221, 233  
 platycarpa, IV, 212, 221, 242  
 prismatica, IV, 220, 222  
 pterocarpa, IV, 239  
 pterocaulis, IV, 237  
 pulcherrima, IV, 230  
 pulchra, IV, 220, 229  
 pulvinigera, IV, 221, 227, 233, 234  
 puniceo-discus, IV, 221, 235, 247  
 purpureus, IV, 221, 241  
 radicans, IV, 215, 216  
 radicans anceps, IV, 215  
 radicans ensiformis, IV, 215  
 radicans rosea, IV, 215  
 ramosissima, IV, 216  
 ramulosa, IV, 214, 221, 240, 241  
 regnelliana, IV, 238  
 regnellii, IV, 238  
 rhombea, IV, 241, 244, 245, 247  
 rhombea crispata, IV, 245  
 riedeliana, IV, 247  
 rigida, IV, 233  
 robusta, IV, 231, 243  
 rosea, IV, 209, 210, 247  
 roseana, IV, 221, 246  
 rugulosa, IV, 234  
 russelli, IV, 221, 242  
 saglionis, IV, 222, 223, 247  
 saglionis rubrodiscus, IV, 222  
 salicorne, IV, 218  
 salicornioides, IV, 216, 217, 218, 222, 235  
 salicornioides bambusoides, IV, 218, 219  
 salicornioides gracilior, IV, 217  
 salicornioides gracilis, IV, 217  
 salicornioides ramosior, IV, 217  
 salicornioides stricta, IV, 217  
 salicornioides strictior, IV, 217  
 salicornioides viligera, IV, 218  
 salicornoides, IV, 222  
 sansibarica, IV, 226, 227  
 sarmientacea, IV, 230  
 sarmientosa, IV, 230  
 schottmuelleri, IV, 218  
 setulosa, IV, 236  
 shaferi, IV, 220, 228, 229  
 simmleri, IV, 220, 223  
 spatulata, IV, 247  
 squamulosa, IV, 215, 216  
 stricta, IV, 217  
 suarensis, IV, 222  
 suareziana, IV, 222, 245
- Rhipsalis—*continued*,  
 sulcata, IV, 221, 235, 236, 239  
 swartziana, IV, 213, 244  
 taglionis, IV, 247  
 teres, IV, 220, 227  
 tetragona, IV, 222  
 tonduzii, IV, 221, 239, 240  
 trigona, IV, 221, 237, 247  
 tucumanensis, IV, 221, 234  
 turpinii, IV, 247  
 undulata, IV, 226, 227  
 virgata, IV, 220, 227  
 warmingiana, IV, 221, 238  
 wercklei, IV, 240, 247  
 wettsteinii, IV, 247  
 zanzibarica, IV, 226
- Ringent-flowered cactus, IV, 178
- Robustae, I, 45, 191
- Sacacil, I, 214
- Sacamatraca, II, 111
- Sacasil, II, 111
- Sacharosa, I, 10, 14
- Sacred mushroom, III, 84
- Saguaro, II, 105
- Sahuaro, II, 165, 166
- Salmianae, I, 44, 73, 75
- Saman, II, 223
- Sandillon, III, 186
- Saramatraca, II, 111
- Scheerianae, I, 45, 159
- Schlumbergera, IV, 177, 182-185  
 epiphylloides, IV, 184  
 gaertneri, IV, 182, 183, 184  
 russelliana, IV, 182, 183, 184
- Sclerocactus, III, 78, 212-215  
 polyanctistrus, III, 212, 213, 214  
 whipplei, III, 212, 213
- Schucan, II, 81
- Selenicereus, II, 1, 58, 183, 195, 196-210, 221; IV, 249  
 boeckmannii, II, 197, 202; IV, 283  
 brevispinus, II, 197, 201, 202  
 coniflorus, II, 197, 198, 199; IV, 283  
 donkelaari, II, 197, 200  
 grandiflorus, II, 128, 196, 197, 198, 201, 210, 218; IV, 199, 283  
 hamatus, II, 196, 197, 203, 204; IV, 283  
 hondurensis, II, 197, 199  
 inermis, II, 197, 207, 208, 209  
 kunthianus, II, 197, 201  
 macdonaldiae, II, 196, 197, 202, 203; IV, 283  
 maxonii, II, 198; IV, 283  
 miravallensis, II, 213  
 murrillii, II, 197, 206  
 nelsonii, IV, 283, 284  
 pringlei, II, 199  
 pteranthus, II, 111, 196, 197, 200; IV, 283  
 spinulosus, II, 197, 207  
 urbanianus, II, 197, 198, 212; IV, 283  
 vagans, II, 197, 205, 206, 207  
 wercklei, II, 197, 208, 209
- Sempervivum tomentosum, I, 41
- Setispinae, I, 45, 136
- Sinita, II, 177
- Snake cactus, III, 90
- Snowy cactus, III, 232; IV, 7
- Solisia, IV, 3, 64, 65, 250  
 pectinata, IV, 64
- Soroco, II, 62
- Sowesa, IV, 270
- Spanish dildos, II, 87
- Spear-shaped opuntia, I, 179
- Spineless opuntia, IV, 253
- Spinosissimae, I, 43, 45, 201, 202, 203, 208; IV, 264
- Stenocactus, III, 109
- Stenocereus, II, 69, 85  
 stellatus, II, 92  
 stellatus tenellianus, II, 92  
 stellatus tonellianus, II, 92
- Stenogoni, III, 118, 123
- Stenopetalae, I, 45, 200
- Stenopuntia, I, 200
- Stetsonia, II, 2, 64, 65  
 coryne, II, 64, 65; IV, 270
- Strawberry cactus, III, 37
- Streptacanthus, I, 45, 112, 156, 177, 181, 192, 225
- Strigiles, I, 45, 136
- Stromatocactus, III, 80
- Stromboschoubyi, III, 82
- Strombocactus, III, 78, 106, 107  
 disciformis, III, 106; IV, 287
- Strophocactus, II, 183, 221, 222  
 wittii, II, 221, 222
- Suaharo, II, 165
- Subulatae, I, 44, 71, 75
- Sucker, I, 43, 103
- Suguro, II, 165
- Sulcatae, IV, 221
- Sulcolanatae, IV, 24
- Sulphureae, I, 45, 133; IV, 261
- Suwarro, II, 165
- Suwarrow, II, 165
- Tacinga, I, 24, 39, 40  
 funalis, I, 38, 39; IV, 266
- Tail of the fox, II, 109
- Tapuna pear, I, 192
- Tasajillo, I, 26, 30
- Tasajo, I, 43  
 macho, I, 63
- Tenuiores, II, 22
- Teonanactl, III, 84
- Tephrocactus, I, 42, 43, 44, 71, 72, 79, 84, 85, 90, 95, 97, 106, IV, 256  
 andicolus, I, 89  
 aoracanthus, I, 91  
 calvus, I, 89  
 diadematus, I, 43, 89  
 platycanthus, I, 89; IV, 255  
 polycanthus, IV, 255  
 pusillus, I, 106  
 retrospinus, I, 95; IV, 256  
 retrospinus, IV, 256  
 turpinii, I, 89
- Teretes, I, 71
- Thelocactus, III, 148; IV, 3, 6-13  
 buckii, IV, 6, 8, 9  
 bicolor, IV, 6, 11  
 fossulatus, IV, 6, 10  
 hexaedrophorus, IV, 6, 10, 11  
 leucacanthus, IV, 6, 8, 9  
 lloydii, IV, 6, 11  
 lophothele, IV, 6, 7, 8  
 nidulans, IV, 6, 9, 10  
 phymatothele, IV, 6, 7, 8  
 pottsii, IV, 6, 12  
 rinconensis, IV, 6, 7, 8  
 tulensis, IV, 6, 11
- Theloides, IV, 13
- Thurberianae, I, 44, 52
- Tomentosae, I, 45, 172
- Torch thistle, III, 237
- Tortispinae, I, 45, 104, 126, 130, 133, 136, 193; IV, 265
- Tortuosi, II, 77
- Toumeya, III, 77, 91, 92  
 papyracantha, III, 91
- Trichocereus, II, 2, 92, 130-146; III, 3, 60, 75; IV, 268  
 bridgesii, II, 130, 134, 136  
 candicans, II, 130, 134, 142; IV, 277  
 chiloensis, II, 130, 137, 138; IV, 266
- Trichocereus—*continued*,  
 coquimbans, II, 130, 138, 139; IV, 277  
 cuzcoensis, II, 130, 136  
 fascicularis, II, 64, 130, 141  
 huascha, II, 130, 141, 142; III, 57  
 lamprochlorus, II, 130, 132, 133  
 macrogonus, II, 130, 136; IV, 277  
 pachanoi, II, 130, 134, 135  
 pasacana, II, 130, 132, 133, 134, 140, 145, 225; IV, 277  
 peruvianus, II, 130, 136  
 schickendantzii, II, 130, 144; IV, 278  
 shaferi, II, 130, 144  
 spachianus, II, 130, 131, 132; IV, 277  
 strigosus, II, 130, 143, 144  
 terscheckii, II, 130, 140; IV, 277  
 thelegonoides, II, 130, 131  
 thelegonus, II, 130, 131
- Trigonae, IV, 221
- Tuna, I, 5, 43, 114, 181, 186; II, 66, 93; IV, 257  
 cardona, I, 184  
 colorado, II, 101  
 de agua, I, 30  
 de cohado, II, 84  
 de Espana, I, 224  
 elatior, I, 153  
 major, I, 163
- Tunae, I, 45, 110, 116, 148
- Tunilla, IV, 261
- Turk's cap, III, 221, 231
- Turk's head, III, 221, 231
- Utahia, III, 78, 215  
 sileri, III, 215
- Vanilla, IV, 219
- Vanilla claviculata, IV, 291
- Vestitae, I, 44, 71
- Visnaga, III, 131, 134
- Visnager, III, 170
- Weberianae, I, 44, 84
- Weberocereus, II, 183, 214-216  
 biolleyi, II, 214, 215  
 panamensis, II, 214, 215  
 tunilla, II, 214
- Werckleocereus, II, 183, 216, 217  
 glaber, II, 216  
 tonduzii, II, 216, 217; IV, 284
- West Indian gooseberry, I, 10
- Wilcoxia, I, 6; II, 2, 22, 110-112; III, 4  
 papillosa, II, 110, 112  
 poselgeri, II, 110, 111; IV, 274  
 striata, II, 110, 111; IV, 275  
 viperina, II, 110
- Wilmattea, II, 183, 195, 196  
 minutiflora, II, 195, 196, 216
- Wittia, IV, 177, 206, 207  
 amazonica, IV, 206  
 panamensis, IV, 206, 207  
 costancensis, IV, 213  
 panamensis, IV, 206, 207
- Woolly nipple-cactus, IV, 71
- Zacoub, II, 187
- Zamia pumila, I, 181
- Zanthoxylum, II, 92
- Zehntnerella, II, 2, 176, 177  
 squamulosa, II, 176, 177
- Zuwarrow, II, 165
- Zygocactus, I, 9; II, 22; IV, 177-180, 182, 183, 185, 200, 209  
 altensteinii, IV, 177, 178  
 candidus, IV, 182  
 delicatus, IV, 177, 180  
 obtusangulus, IV, 181  
 opuntioides, IV, 180, 181  
 truncatus, IV, 177, 178, 179, 183, 220





