

## Family 4. GLEICHENIACEAE

BY WILLIAM RALPH MAXON

Mainly xerophilous plants of tropical and subtropical regions, mostly with branched and creeping rhizomes (erect in *Stromatopteris*), the fronds circinate in vernation, continuous with the rhizome, distant or subfasciculate, rarely simple, mostly consisting of an erect or ascending primary leaf-axis of indeterminate growth bearing one or several pairs of opposite primary lateral branches in acropetal succession, these simple and determinate or 1 to several times dichotomous, the included (apparently terminal) buds dormant or developing secondary or tertiary leaf-axes similar to the primary, the ultimate branches (pinnae) usually in pairs, bipinnate, pinnate or deeply pinnatifid, the segments or pinnules mostly elongate and pectinate (or, in *Gleichenia*, minute, rounded or oval, and moniliform); veins free, once or several times forked (or, in *Gleichenia*, simple). Sori borne upon the under surface of the segments, dorsal upon the veins (or, in *Gleichenia*, terminal), superficial, non-indusiate; sporangia sessile, subglobose to pyriform, usually 2-6, radial from a slightly elevated roundish (or, in *Stromatopteris*, hippocrepiform) receptacle, or in a few species numerous and borne in more than one rank; annulus obliquely transverse, nearly complete, the sporangium opening by a vertical fissure on the side facing the center of the sorus; spores diplanate or triplanate, smoothish or sculptured. Prothallia flattish, green.

### 1. DICRANOPTERIS Bernh. Neues Jour. Bot.

Schrad. 1<sup>2</sup>: 38. 1806.

*Mertensia* Willd. Sv. Vet.-Akad. Handl. II. 25: 163. 1804. Not *Mertensia* Roth, 1793.  
*Mesosorus* Hassk. Obs. Bot. Fil. Bogor. 1: 2. 1856.

Characters of the family, excluding those assigned to the old-world genera *Gleichenia* and *Stromatopteris*.

Type species, *Polypodium dichotomum* Thunb. = *D. linearis* (Burm.) Underw.

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|---|------------------------------|
| Primary branches bipinnate, the rachis not forked.  | 1. <i>D. Bancroftii</i> .    |
| Primary branches mostly once or several times forked and wholly or partially pectinate, or rarely simple and pectinate.                         |                              |
| Internodes of primary branches naked normally.  |                              |
| A pair of accessory pinnae borne at all but the ultimate nodes.   | 2. <i>D. flexuosa</i> .      |
| Accessory pinnae wanting.   |                              |
| Primary branches bilaterally asymmetrical, a falsely sympodial secondary axis formed by the unequal production of the naked alternate branches. | 3. <i>D. pectinata</i> .     |
| Primary branches bilaterally symmetrical as to branches.  |                              |
| Primary branches once-forked, the terminal bud abortive; rachis flexuous; pinnules distant.   | 4. <i>D. retroflexa</i> .    |
| Primary branches 2-3-forked, a secondary leaf-axis often developed; rachis straight; segments close.  | 5. <i>D. pteridella</i> .    |
| Internodes (some or all) of primary branches at least partially pectinate.  |                              |
| Primary branches simple or once-forked, wholly pectinate.   |                              |
| Pinnules rigidly herbaceous, distant, conspicuously surcurrent.   | 6. <i>D. orthoclada</i> .    |
| Segments coriaceous or subcoriaceous, contiguous, slightly dilate.  |                              |
| Segments linear, 2.5-3.5 cm. long; veins 20-40 pairs.   | 7. <i>D. trachyrhizoma</i> . |
| Segments broader, 1-2.5 cm. long; veins 15-20 pairs.  | 8. <i>D. intermedia</i> .    |
| Primary branches mostly 1-4-forked, at least some of the internodes partially naked.  |                              |



- Primary internodes less than 2 cm. long. 9. *D. farinosa*.  
 Primary internodes 3 cm. or more long.  
 Segments wholly glabrous. 10. *D. bicolor*.  
 Segments, or at least the costae, not glabrous below.  
 Pinnae less than 3.5 cm. broad.  
 Small plants with ascending branches; pinnae not more than 13 cm. long. 11. *D. stricissima*.  
 Larger plants with divaricate branches; pinnae longer. 12. *D. costaricensis*.  
 Leaf-tissue rigidly coriaceous.  
 Leaf-tissue herbaceous.  
 Veins fibrillose-chaffy; leaf-tissue glabrous. 13. *D. Underwoodiana*.  
 Veins and leaf-tissue minutely glandular-puberulous. 14. *D. jamaicensis*.  
 Pinnae 3.5 cm. or more broad.  
 Segments closely tomentose below, rarely glabrate with age. 15. *D. bifida*.  
 Segments not tomentose below.  
 Veins 40-50 pairs to each segment; costae densely chaffy. 16. *D. furcata*.  
 Veins 20-35 pairs; costae lightly pubescent with stellate hairs.  
 Scales of the rachis and internodes mostly ferruginous, laxly long-ciliate. 17. *D. palmata*.  
 Scales of like parts mostly dark reddish-brown, rigidly spinescent-ciliate. 18. *D. mellifera*.

### 1. *Dicranopteris Bancroftii* (Hook.) Underw. Bull. Torrey

Club 34 : 252. 1907.

- Gleichenia Bancroftii* Hook. Sp. Fil. 1 : 5. 1844.  
*Mertensia Bancroftii* Kunze, Linnaea 18 : 307. 1844.  
*Gleichenia Brunei* Christ, Bull. Herb. Boiss. II. 5 : 13. 1905.  
*Dicranopteris Brunei* Underw. Bull. Torrey Club 34 : 253. 1907.

Rhizome creeping, epigeous or somewhat subterranean, flexuous, up to 6 mm. in diameter, muricate, sparingly covered with brownish to light-castaneous lanceolate long-acuminate scales up to 7 mm. long, glabrescent; primary leaf-axis stout, about 5 mm. in diameter, stramineous, naked, or at the base brownish and somewhat scaly, bearing a pair of large bipinnate pinnae, axial growth sometimes continued from the included bud, a second and third pair of primary pinnae thus produced in acropetal succession; terminal (axial) bud large, up to 2 cm. long, densely clothed with whitish to dull-yellowish ovate to deltoid-lanceolate entire long-acuminate scales; pinnae determinate, oblong, 1-1.5 m. long, 30-50 cm. broad, acuminate, the rachis stout, smooth, up to 4 mm. in diameter, delicately bicarinate above; pinnules very numerous, normally inserted 2-3 cm. apart, approximate or slightly imbricate (rarely much smaller, congested, 1-1.5 cm. apart, closely overlapping), divergent, sessile, linear, 15-25 cm. long, 3-4.5 cm. broad, cut to the costa; costa stramineous, with a few deciduous slender deeply lacinate or filiform yellowish scales; segments rigidly herbaceous, very brittle, numerous, linear-ligulate, 1.5-2.25 cm. long, about 2.5 mm. broad, mostly adnate and decurrent (or the lowermost unequally constricted, subsessile), green or yellowish-green, glabrous or nearly so, glaucous below, the costule conspicuously elevated, stramineous, glabrescent; veins apart, once-forked near the base, the branches widely divergent; sori inframedial, seated upon the anterior branch, 3-5-sporangiate, a tuft of small filiform yellowish scales beneath.

TYPE LOCALITY: Jamaica.

DISTRIBUTION: Jamaica, Guadeloupe, and Martinique; on the continent extending from Mexico to Colombia, Venezuela, Ecuador, and Bolivia, mainly at altitudes of from 1000 to 1800 meters.

ILLUSTRATIONS: Hook. *loc. cit.* pl. 4A; Bull. Herb. Boiss. II. 5 : 287. f. 13 (as *G. Brunei*).

### 2. *Dicranopteris flexuosa* (Schrad.) Underw. Bull. Torrey

Club 34 : 254. 1907.

- Mertensia flexuosa* Schrad. Goett. Gel. Anz. 1824 : 863. 1824.  
*Mertensia rigida* Kunze, Linnaea 9 : 16. 1834.  
*Gleichenia flexuosa* Mett. Ann. Lugd. Bat. 1 : 50. 1863.  
*Gleichenia rigida* Bommer & Christ, Bull. Soc. Bot. Belg. 35<sup>1</sup> : 174. 1896. Not *G. rigida* J. Smith, 1841.

A diffuse semi-erect plant with rigid branches; rhizome creeping, 2-5 mm. in diameter, light- to dark-brownish, slightly muricate from the detachment of very numerous decidu-



ous spreading castaneous articulate hairs; primary leaf-axis at first rigidly erect, stout, 2-4 mm. in diameter, firmly terete, light-brownish or somewhat stramineous, elongate; primary lateral branches several pairs, opposite, distant, repeatedly pseudodichotomous, a secondary leaf-axis invariably wanting, the internodes unequal, naked; primary internodes usually 6-8 (rarely 18) cm. long, the others successively shorter, the nodes stipulate at the upper side (the stipules narrow and subentire to deltoid and deeply pinnatifid), at the lower side provided with spreading or usually deflexed oblong-linear to lanceolate-oblong pectinate accessory pinnae, the larger ones 8-13 cm. long, up to 2.5 cm. broad, those of the upper nodes gradually smaller; pinnae sessile, ascending or somewhat divergent, variable, 12-23 cm. long, 2-6 cm. broad, attenuate, fully pectinate (the outer basal segments often prolonged and deeply pinnatifid), straight, subfalcate or slightly flexuous, linear to oblong-lanceolate, cut nearly to the rachis, glabrous throughout, light- or yellowish-green, glaucous below; segments variable in size, linear-oblong to linear, retuse, connected by a narrow wing at the dilatate base, the margins strongly revolute, sometimes meeting at the middle of the segment; veins 2-4-forked, close, elevated above, below deeply impressed; sori numerous if present, multisporangiate, borne upon the distal and sometimes additionally upon the proximal veinlet of each group.

TYPE LOCALITY: Brazil.

DISTRIBUTION: General in the Greater Antilles, not common in the Lesser Antilles; on the continent extending from southern Mexico (rare) to Brazil, mainly at low elevations, rarely ascending to 1500 meters.

ILLUSTRATIONS: Mart. Ic. Crypt. Bras. *pl.* 60, *f.* 1; Sturm, in Mart. Fl. Bras. 1<sup>2</sup>: *pl.* 17.

### 3. *Dicranopteris pectinata* (Willd.) Underw. Bull. Torrey

Club 34: 260. 1907.

*Mertensia pectinata* Willd. Sv. Vet.-Akad. Handl. II. 25: 168. 1804.

*Mertensia brasiliensis* Desv. Ges. Nat. Freunde Berlin Mag. 5: 329. 1811.

*Mertensia canescens* Kaulf. Enum. Fil. 38. 1824.

*Mertensia emarginata* Raddi, Pl. Bras. 1: 72. 1825.

*Gleichenia nitida* Presl, Rel. Haenk. 1: 70. 1825.

*Gleichenia brasiliensis* Spreng. Syst. Nat. 4: 27. 1827.

*Mertensia elata* Desv. Mém. Soc. Linn. Paris 6: 201. 1827.

*Gleichenia Hermannii* Hook. & Grev. Ic. Fil. 1: *pl.* 14 (excl. syn.). 1827. Not *G. Hermannii*

R. Br. 1810.

*Mertensia nitida* Presl, Tent. Pterid. 51. 1836.

*Gleichenia Hookeri* J. Smith, Lond. Jour. Bot. 2: 381. 1843.

A laxly ascending diffuse plant, forming extensive thickets; rhizome wide-creeping, 3-5 mm. in diameter, light brownish-castaneous, conspicuously scabrous from the persistent bases of numerous deciduous castaneous articulate hairs; primary leaf-axis at first erect, stout, 3-6 mm. in diameter, stramineous to light-brown, terete, elongate, eventually declining; primary lateral branches several pairs, opposite, stipulate, repeatedly and unequally pseudodichotomous, a falsely sympodial naked flexuous secondary axis formed by the alternate production of the unequal secondary branches, the shorter ones bearing a pair of pinnae or again unequally forked and bearing two pairs of pinnae; lower nodes of the lateral branches inconspicuously stipulate; included terminal bud of each dichotomy invariably abortive; pinnae variable, 10-25 cm. long, 1.5-6 cm. broad, sessile, fully pectinate (the outer basal segments often somewhat prolonged), subfalcate, unequally lanceolate or oblong-lanceolate to linear, attenuate, glaucous below (sometimes conspicuously so), glabrous to glabrate or (especially in narrow forms) having the costae and veins sparsely clothed with deciduous stellate or substellate slender ferruginous scales; segments variable in size, oblong to linear-oblong, connected by a narrow wing; veins 3-5-forked, slightly elevated below; sori numerous (or frequently altogether lacking), multisporangiate, nearly medial, invariably borne upon the distal veinlet of each group.

TYPE LOCALITY: Near Caracas, Venezuela.

DISTRIBUTION: Of wide distribution in tropical America; general in the West Indies; on the continent extending from Mexico to Ecuador and Brazil. Polymorphic.

ILLUSTRATIONS: Sv. Vet.-Akad. Handl. II. 25: *pl.* 4; Hook. & Grev. *loc. cit.*; Raddi, *loc. cit.* *pl.* 6.



4. *Dicranopteris retroflexa* (Bommer) Underw. Bull. Torrey  
Club 34 : 260. 1907.

*Gleichenia intermedia flexuosa* Baker, Jour. Bot. 25 : 24. 1887.

*Gleichenia retroflexa* Bommer; Bommer & Christ, Bull. Soc. Bot. Belg. 35<sup>1</sup> : 175. 1896. — Christ, Bull. Herb. Boiss. II. 5 : 15. 1905.

Rhizome short-creeping, freely but intricately branched, slender, 2 mm. or less in diameter, brown, bearing a few small caducous thick broadly ovate entire brown scales and numerous roots; fronds numerous, 30–65 cm. high, weakly ascending, closely entangled; primary leaf-axis slender, 1–1.5 mm. in diameter, reddish-brown, wholly glabrous (like the entire plant), continuous; primary branches 3–5 pairs, 12–15 cm. apart in large fronds (much closer in others), spreading, once-pseudodichotomous, the internode 1.5–3.5 cm. long, straight, naked, but provided with several relatively large incised foliaceous stipules at the base, the pinnae fully pectinate and similarly stipulate; pinnae 7–22 cm. long, 3.5–8 cm. broad, widely divaricate (90–120°), the rachis slender, stramineous to light-castaneous, conspicuously, sharply, and regularly flexuose, each angle bearing a strongly retrorse pinule (at an angle of about 45°); pinnules bright- or yellowish-green, distant, linear, slightly narrowed at the base and sometimes a little surcurrent, 2–5 cm. long, 2–4 mm. broad, obtuse or acutish, the margins entire or rarely somewhat undulate or sinuate, often revolute in drying, the costule stramineous, elevated; veins 20–35 pairs, elevated, distant, mostly once-forked, the branches divergent; sori 3–5-sporangiate, medial or nearly so, seated upon the anterior branch, commonly protected by the widely revolute margins.

TYPE LOCALITY: La Palma, Costa Rica.

DISTRIBUTION: Rather widely distributed in the interior mountain region of Costa Rica, at from 600 to 2000 meters elevation.

ILLUSTRATIONS: Bull. Herb. Boiss. II. 5 : 15. *f.*; 6 : 287. *f.* 3.

5. *Dicranopteris pteridella* (Christ) Underw. Bull. Torrey  
Club 34 : 260. 1907.

*Gleichenia pteridella* Christ, Bull. Herb. Boiss. II. 6 : 284. 1906.

Rhizome undescribed; primary leaf-axis elongate, rigidly ascending, terete, subflexuous, yellowish or dull greenish-brown, glabrate, 2.5–3.5 mm. in diameter, 50 cm. or more long, continuous above, bearing 2 or 3 pairs of spreading primary lateral branches about 12–16 cm. apart; lower primary branches with a continuous (secondary) slender naked axis bearing 2 (or rarely 1) pairs of lateral branches, the first internode 2–3 cm. long, with simple stalked pinnae or once-forked branches at the node above, the second internode elongate (up to 11 cm. long), with small mostly twice-forked lateral branches at the node above, these with mostly short naked internodes and stalked pinnae; tertiary lateral axes normally abortive, the buds (as in the minor dichotomies) sharply ovate in outline, the scales dark reddish-brown, oblong-ovate, acute, with whitish ciliate margins; upper primary branches usually once-pseudodichotomous, the internode 2.5–4 cm. long, naked, the pinnae stalked (or very rarely the segments descending to the upper part of the internode), 15–22 cm. long, 3.5–4.5 cm. broad, lanceolate, acuminate, pectinate, slightly or not narrowed at the base, the rachis (like the internodes) nearly glabrous or with a few small scattered appressed scales like those of the buds; segments rigidly herbaceous, close, spreading or slightly decurved, linear from a slightly dilatate base, 1.5–2.4 cm. long, about 3 mm. broad, acutish, dull yellowish-green, much paler below, the margins entire and lightly revolute, the costa prominent below, yellowish, glabrate; veins about 25–32 pairs, subimmersed below, slightly elevated and conspicuous above, once-forked near the base; sori inframedial, seated upon the anterior branch, 4–6-sporangiate; leaf-tissue whitish-granulose below, bearing also minute scattered whitish simple or mostly substellate gland-like scales, these sometimes dark-centered.

TYPE LOCALITY: Costa Rica.

DISTRIBUTION: Interior mountain region of Costa Rica, up to 1450 meters elevation.

ILLUSTRATION: Bull. Herb. Boiss. II. 6 : 287. *f.* 12, representing a young state in which a continuous secondary leaf-axis is not developed.



6. *Dicranopteris orthoclada* (Christ) Underw. Bull. Torrey  
Club 34 : 259. 1907.

*Gleichenia intermedia dissitifolia* Baker, Jour. Bot. 25 : 24. 1887.

*Gleichenia orthoclada* Christ, Bull. Herb. Boiss. II. 5 : 16. 1905 ; *loc. cit.* 6 : 282. 1906.

Rhizome short-creeping, closely branched, sparsely clothed with dark setaceous scales ; primary leaf-axes subfasciculate, slender, entirely glabrous (like the whole plant), shining, castaneous, 15–25 cm. long, continuous ; primary lateral branches 3–5 pairs, 5–8 cm. apart, simple or mostly once-pseudodichotomous, provided with foliaceous stipules at the base, pectinate throughout (including the internode, if present), 10–20 cm. long, 4–7 cm. broad, acuminate, narrowed at the base, the rachis yellowish, somewhat flexuous ; pinnules bright-green above, somewhat glaucous below, rigidly herbaceous, about 20–25 pairs, distant, 4–8 mm. apart, mostly at right angles (the lower ones somewhat reflexed), adnate, surcurrent, obtuse (or acute in drying), 2–3.5 cm. long, 3–4 mm. broad, the margins entire and often closely revolute, the costae yellowish, elevated ; veins 20–25 pairs, oblique, dark, evident upon both surfaces, forked near the base, the branches divergent ; sori mostly 3–5-sporangiate, casually 2- or 6-sporangiate, medial or supramedial, seated upon the anterior branch, apart from the costa ; receptacle slight, elevated.

TYPE LOCALITY : Costa Rica.

DISTRIBUTION : Known only from the interior mountain region of Costa Rica, at mid-elevations.

7. *Dicranopteris trachyrhizoma* (Christ) Maxon.

*Gleichenia trachyrhizoma* Christ, Bull. Herb. Boiss. II. 6 : 280. 1906.

Rhizome rather slender, finely tuberculate, densely clothed with rigid linear-lanceolate blackish-brown opaque divergent spinescent-ciliate scales ; primary leaf-axis elongate, rigid, subflexuous, at the base dark and somewhat tuberculate, above slender, together with the axes of the lateral branches sparsely and very minutely yellowish-furfuraceous and bearing a few thick deltoid acuminate spinescent-ciliate dark-brown scales, these subpersistent at the sides ; primary branches 2 pairs, about 10 cm. apart, the upper pair simple, sessile and fully pectinate upon both sides to the base ; lower pair once-pseudodichotomous (or sometimes simple), the internode 8–20 cm. long, fully pectinate upon both sides, both nodes provided with small deeply parted stipular segments 5–8 mm. long, the divisions of these slender and siliquiform in drying, the terminal bud small, abortive, clothed with small opaque deltoid-lanceolate dark reddish-brown spinescent-ciliate scales ; pinnae greatly elongate, up to 40 cm. long, 5–7 cm. broad, acuminate, slightly or not narrowed at the base, fully pectinate, the rachis light- or yellowish-brown, shining, sulcate above ; segments very numerous, subcoriaceous, fragile, spreading at right angles, separated by a broad sinus at the slightly dilatate base, linear, 2.5–3.5 cm. long, 1.5–2.5 mm. broad, dull-green, slightly glaucous below, the margins entire, unequally revolute, the costa very prominent, bearing a few minute roundish deeply fimbriate yellowish scales, glabrescent ; veins 20–40 pairs, dark, close, oblique, once-forked at an acute angle above the base ; sori mostly 3- or 4-sporangiate, medial, the receptacle yellowish and punctiform.

TYPE LOCALITY : Valley of the Rio Navarro, Costa Rica, altitude 1400 meters.

DISTRIBUTION : Costa Rica.

8. *Dicranopteris intermedia* (Baker) Underw. Bull. Torrey  
Club 34 : 258. 1907.

*Gleichenia intermedia* Baker, Jour. Bot. 25 : 24. 1887.

*Gleichenia axialis* Christ, Bull. Herb. Boiss. II. 5 : 14. 1905 ; *loc. cit.* 6 : 283. 1906.

Rhizome undescribed ; primary leaf-axis elongate, rigidly erect, stout, 3–5 mm. in diameter, yellowish to reddish-brown, sulcate (or above compressed, the edges sharply carinate), wholly glabrous (like the entire plant), continuous ; primary lateral branches 3–5 pairs, 4–6 cm. apart, ascending, often strict and crowded, 14–20 cm. long, mostly once-pseudodichotomous in the lower fourth (the internode 2–4 cm. long), cut to the rachis, fully pectinate throughout, provided with large deeply and irregularly incised foliaceous stipules



at the base; segments coriaceous, 1-2.5 cm. long, linear-oblong or linear-deltoid and acute in drying, contiguous at the base, there 3.5-4.5 mm. broad, the margins entire and strongly revolute, the costa yellowish, elevated; veins 15-20 pairs, evident (especially above), mostly once forked near the base, the lower ones rarely 2-3-forked; sori about 15 pairs, 3-6-sporangiate, normally 5-sporangiate, nearly medial, borne upon the anterior branch; receptacle small, slightly elevated.

TYPE LOCALITY: Costa Rica.

DISTRIBUTION: Known only from the interior mountains of Costa Rica.

9. *Dicranopteris farinosa* (Kaulf.) Underw. Bull. Torrey  
Club 34: 254. 1907.

*Mertensia farinosa* Kaulf. Wes. Farrenkr. 37. 1827.

*Mertensia subtrisperma* Fée, Mém. Foug. 11: 122. 1866.

*Gleichenia farinosa* Hook. Sp. Fil. 1: 9, in part. 1844.

*Gleichenia subtrisperma* Krug, Bot. Jahrb. 24: 78. 1897.

A small erect plant, 15-35 cm. high; rhizome 2-3 mm. in diameter, dark- or purplish-brown, shining, freely branched, tuberculate from the detachment of roots, deciduously paleaceous, the scales bright-castaneous, linear-lanceolate, ciliate; primary leaf-axis brownish, sparingly clothed with narrow yellowish-brown ciliate scales, glabrescent, bearing 2 or 3 pairs of mostly once-pseudodichotomous branches (the uppermost sometimes simple), the axis of the lowermost sometimes continued beyond the fork and bearing a second pair of simple pinnae; primary internodes 1-1.5 cm. long, pectinate upon the upper side, naked on the lower; pinnae 7-14 cm. long, 2-3.5 cm. broad, oblong-lanceolate, acuminate, incised nearly to the rachis; segments very coriaceous, slightly oblique, very close, linear-oblong, 1-1.8 cm. long, about 2.5 mm. broad, acute, glabrous above, below decidedly granulose, the particles subclavate, yellowish-white, persistent; rachises rather thickly clothed below with spreading linear-lanceolate deeply ciliate yellowish scales, the costae with a few dull-yellowish filiform scales; veins 20-25 pairs, once-forked near the costule, concealed, the overlying tissue elevated, the granular particles here elongate-clavate; sori 3- or 4-sporangiate, nearly medial, borne upon the anterior branch.

TYPE LOCALITY: Not known.

DISTRIBUTION: Guadeloupe and Martinique; not uncommon at altitudes of from 900 to 1450 meters. Ascribed also to Trinidad, probably with incorrectness.

ILLUSTRATIONS: Kunze, Anal. Pterid. pl. 3; Fée, loc. cit. pl. 32, f. 2.

10. *Dicranopteris bicolor* (Christ) Underw. Bull. Torrey  
Club 34: 252. 1907.

*Gleichenia bicolor* Christ, Bull. Herb. Boiss. II. 6: 279. 1906.

Rhizome flexuous, densely clothed with shining atropurpureous lanceolate-subulate scales 5 mm. long; primary leaf-axis continuous, stout, 6 mm. or more in diameter, elongate, the lower portion clothed with spreading rigid scarioso ovate-subulate dark-brown white-margined scales up to 5 mm. long and with other yellowish-white scales, the upper parts with a dense covering of spreading broadly ovate-acuminate shining silvery-white scales, these often purplish at the base; primary branches several pairs, very ample, 2 or 3 times pseudodichotomous, the primary internode 5-11 cm. long, naked, densely paleaceous, the bud from this usually not prolonged as a secondary axis; secondary internodes 5-8 cm. long, usually naked; tertiary internodes 6-13 cm. long, fully pectinate like the pinnae; pinnae up to 33 cm. long, 7-10 cm. broad, narrowly oblong to lanceolate, incised nearly to the rachis, glabrous; segments very coriaceous, usually somewhat revolute in drying, linear, acute, wholly glabrous, very glaucous below, 3.5-5 cm. long, 3-3.5 mm. broad, dilatate at the base (5 mm. broad), joined by a wing 1-1.5 mm. broad on each side of the rachis; veins 25-50 pairs, dark, immersed, oblique, once-forked near the base; sori numerous, normally 5-sporangiate (casually 3- or 4-sporangiate), slightly inframedial, borne upon the anterior branch.

TYPE LOCALITY: Valley of the Rio Navarro, Costa Rica, altitude 1400 meters.

DISTRIBUTION: Interior mountains of Costa Rica; reported also from Tovar, Venezuela.

[ILLUSTRATION: The text figure by Christ, Bull. Herb. Boiss. II. 6: 287, f. 9, is incorrect; the primary internodes of the lateral branches are naked, the secondary usually so.]



11. *Dicranopteris strictissima* (Christ) Underw. Bull. Torrey  
Club 34: 261. 1907.

*Gleichenia strictissima* Christ, Bull. Herb. Boiss. II. 5: 13. 1905.

*Gleichenia glaucina* Christ, Bull. Herb. Boiss. II. 6: 283. 1906.

A small slender plant, rarely more than 50 cm. high; rhizome very slender, about 1 mm. in diameter, dark-brown, widely creeping, branched, sparingly clothed with slender ciliate dark-brown scales; primary leaf-axis 1.5 mm. in diameter, dark-brown and similarly paleaceous, glabrescent, continuous, bearing 2 or more pairs of primary branches; lower primary branches about 20 cm. long, usually twice-pseudodichotomous, the primary internode about 3.5 cm. long and naked on the lower side, the secondary internode about 5.5 cm. long and fully pectinate, the pinnae about 10–13 cm. long, 1.5–2.5 cm. broad, lanceolate, falcate, long-acuminate, at the base somewhat attenuate, incised to within 0.5 mm. of the rachis; upper primary branches similar, the uppermost smaller, with the primary internodes usually pectinate upon the lower (as well as upon the upper) side nearly to the base; rachis glaucous, sparingly and deciduously paleaceous throughout, the scales divergent, lanceolate-subulate, ciliate, brownish or yellowish-brown, with reddish tips; segments coriaceous, oblique, close, deltoid-lanceolate, conspicuously so in drying, 8–13 mm. long, 3–4 mm. broad at the base, subacute, glabrous above, the margins subrevolute (or in drying sometimes strongly revolute), the under surfaces decidedly whitish-granulose (the particles subpersistent) and very sparingly setulose with scattered minute simple blackish hairs; veins 10–14 pairs, once-forked near the base, obscurely elevated; sori 9–12 pairs, 3–5-sporangiate, inframedial, borne upon the anterior branch; receptacle slightly elevated.

TYPE LOCALITY: Costa Rica.

DISTRIBUTION: Known only from the interior mountain region of Costa Rica, altitude 1300–1600 meters.

ILLUSTRATION: Bull. Herb. Boiss. II. 6: 287, f. 7.

12. *Dicranopteris costaricensis* Underw. Bull. Torrey  
Club 34: 253. 1907.

Rhizome undescribed; primary leaf-axis stoutish, rigidly erect, 3–4.5 cm. in diameter, continuous, the lower portion brownish-castaneous, glabrous and shining, the upper portions light-brownish and thickly clothed with deciduous spreading deltoid-lanceolate attenuate long-ciliate yellowish scales; lateral branches 1 or 2 pairs, spreading, normally three times pseudodichotomous (secondary and tertiary axes invariably wanting), the divisions widely divaricate; primary internodes 4–9 cm. long, arcuate, 2.5 mm. in diameter, with several crowded stipuliform segments at the base, otherwise naked, deciduously paleaceous; secondary internodes widely divergent, 3.5–6.5 cm. long, sometimes naked, more commonly pectinate (at least in the lower half), stipulate; tertiary internodes 3–5 cm. long, fully pectinate, these and the pinnae densely paleaceous below, the scales similar in form to those of the upper primary leaf-axis, but bright-ferruginous, persistent, wide-spreading; pinnae linear, 10–30 cm. long, 1.25–2.7 cm. broad, attenuate, cut to the rachis; segments close, thick and rigidly coriaceous, dull dark-green above, subglaucous below, 7–14 mm. long, 4–6 mm. broad at the base, oblong to deltoid-oblong, obtuse (often appearing deltoid and acute in drying), the margins entire and widely revolute, the costae elevated and deciduously paleaceous; veins 8–11 pairs, evident below, mostly once-forked above the base, together with leaf-tissue obscurely setulose; sori normally 5-sporangiate, medial or slightly suprasedial, apart from the costa, seated on the anterior branch.

TYPE LOCALITY: Volcan de Poas, Costa Rica, altitude 2600 meters.

DISTRIBUTION: Apparently confined to the upper slopes and summits of the high peaks of Costa Rica (volcanoes of Poas, Turrialba, Barba, and Irazú), altitude 2400–3000 meters.

ILLUSTRATION: Bull. Herb. Boiss. II. 6: 287, f. 6 (as *Gleichenia revoluta* H.B.K.).

13. *Dicranopteris Underwoodiana* Maxon, sp. nov.

A plant of medium size, 50–60 cm. high; rhizome wide-creeping, branched, 2–3 mm. in diameter, dark purplish-brown, lustrous, deciduously paleaceous, the scales reddish-brown, linear-lanceolate to deltoid-lanceolate, tortuous, rigidly ciliate; primary leaf-axis 2–3 mm. in diameter, slightly paleaceous at the base, reddish-brown, glabrate or (above the first



pair of branches) clothed with subpersistent narrow pale-rusty laxly spreading long-ciliate scales, these extending to the main vascular parts of the branches; primary lateral branches 2 pairs, about 14 cm. apart, twice pseudodichotomous, spreading, the primary internode 3-6.5 cm. long, slender, nearly naked, bearing one or several segments upon the upper side near the base and casually 1 or 2 at the base below; secondary internodes 3.5-10 cm. long, fully pectinate upon both sides, the included bud often conspicuous, rounded-oblong in outline, densely clothed with long-ciliate rusty scales; pinnae linear, slightly narrowed at the base, especially upon the inner side, 18-30 cm. long, 2.5-3.2 cm. broad, gradually attenuate, the rachises closely invested with short rusty chaff; segments 50-80 pairs, delicately herbaceous, dull dark-green above, paler and minutely granulose below, linear-oblong from a slightly broader base, scarcely joined, flattish, acutish or sharply apiculate in drying, the margins narrowly revolute, the costa relatively slight, clothed with deeply cleft rusty scales, the divisions slender; veins 12-15 pairs, dark-reddish and slightly elevated below, once-forked near the base, fibrillose with rusty stellate hair-like scales; sori mostly 4-sporangiate, casually 3- or 5-sporangiate, medial or slightly supramedial, seated upon the anterior branch, the receptacle relatively large.

Type collected at the border of forests, temperate regions of Chiapas, Mexico, 1864-1870, *Ghiesbreght* 271 (herb. D. C. Eaton).

DISTRIBUTION: Southern Mexico and the high mountains of Quiché, Guatemala.

#### 14. *Dicranopteris jamaicensis* Underw. Bull. Torrey

Club 34: 258. 1907.

A small erect freely branched plant; rhizome widely creeping, freely branched, about 3 mm. in diameter, dark brownish-castaneous, with numerous imbricate subovate brownish-castaneous short-ciliate scales; primary leaf-axis continuous, 25-60 cm. long, 3 mm. in diameter, brownish to castaneous, polished, deciduously paleaceous, with 2 or 3 pairs of spreading lateral branches; lateral branches usually 2 or 3 times pseudodichotomous, or a secondary leaf-axis sometimes developed and bearing a pair of lateral branches similar to the usual branches of the primary leaf-axis; primary internodes 3-9 cm. long, nearly naked, bearing a few segments at the upper side of the base (rarely both above and below), deciduously paleaceous; secondary internodes 3-9 cm. long, pectinate upon both sides, or sometimes only partially so; tertiary internodes and pinnae fully pectinate, the rachises (beneath) and all the internodes densely paleaceous, the scales ferruginous to castaneous, more or less deciduous, lanceolate to ovate, deeply fimbriate, the cilia divergent; pinnae 10-24 cm. long, 2-2.5 cm. broad, linear to linear-lanceolate, usually falcate; segments rigidly herbaceous, contiguous, elongate-oblong, subacute, 8-13 mm. long, nearly 3 mm. broad, the margins entire and usually revolute, the costa scantily and minutely fibrillose-paleaceous, glabrescent; veins dark, slightly elevated, 12-15 pairs, once-forked near the base, bearing a few short simple glandular hairs; sori 3- or 4-sporangiate, medial, borne upon the anterior branch; leaf-tissue granulose, slightly and minutely glandular-puberulous.

TYPE LOCALITY: Summit of Blue Mountain Peak, Jamaica, altitude about 2225 meters.

DISTRIBUTION: Known only from Jamaica; forming extensive low thickets upon the upper slopes of the Blue Mountains, altitude 1600 to 2225 meters.

#### 15. *Dicranopteris bifida* (Willd.) Maxon.

*Mertensia bifida* Willd. Sv. Vet.-Akad. Handl. II. 25: 168. 1804.

*Gleichenia bifida* Spreng. Syst. Veg. 4: 27. 1827.

*Mertensia fulva* Desv. Mém. Soc. Linn. Paris 6: 200. 1827.

*Gleichenia brevipubis* Christ, Bull. Herb. Boiss. II. 6: 280. 1906.

*Dicranopteris cubensis* Underw. Bull. Torrey Club 34: 253. 1907.

*Dicranopteris fulva* Underw. Bull. Torrey Club 34: 255. 1907.

A suberect or ascending diffuse plant, forming extensive thickets; rhizome wide-creeping, 3-4 mm. in diameter, light or dark reddish-brown, sparingly clothed with slender short-ciliate antrorse scales and more or less tuberculate from the persistent bases of roots; primary leaf-axis at first erect, eventually declining, elongate, light greenish-brown, or at the base darker and deciduously chaffy like the rhizome, above covered at first with pallid rusty ciliate scales, these extending to the main vascular parts of the lateral branches,



imperfectly deciduous; primary lateral branches 2 or several pairs, once- or twice-pseudodichotomous, a secondary axis very rarely developed; primary internode of the larger lateral branches 2.5-7 cm. long, wholly naked or usually imperfectly pectinate upon the upper side and naked below, the segments commonly much reduced, mostly appearing as short triangular lobes, the lower side almost invariably naked; secondary internodes 3.5-11 cm. long, sometimes naked on both sides, more commonly pectinate throughout upon both sides, the several pairs of basal segments frequently much reduced (especially upon the inner side) or rarely altogether wanting upon the outer side of the internode; pinnae linear to linear-lanceolate, variable, 30-55 cm. long, 3-7 cm. broad, usually somewhat arcuate, attenuate, fully pectinate or rarely naked for a distance of 1-2 cm. at the outer base, the included bud clothed with pale rusty or rarely somewhat castaneous scales, the rachises stramineous to light-castaneous, lustrous, chaffy, the scales rusty, spreading, imperfectly deciduous; segments mostly linear from a dilatate base, once or twice their width apart from an obtuse sinus, slightly connected, straight or subfalcate, acutish or obtuse, covered below with rusty tomentum, this usually quite obscuring the venation or with age whitish and densely matted, sometimes disappearing; margins entire, closely revolute; veins numerous, 18-35 pairs, once-forked at the base, the branches apart, elevated below, scarcely evident above; sori 3- or 4- (rarely 5-) sporangiate, inframedial, borne upon the anterior branch, appearing imbedded in the tomentose covering of the segments.

TYPE LOCALITY: Near Caracas, Venezuela.

DISTRIBUTION: Common and generally distributed throughout the West Indies; from Mexico to Panama, southward into South America.

ILLUSTRATION: Willd. *loc. cit.* pl. 5, f. 4.

16. *Dicranopteris furcata* (L.) Underw. Bull. Torrey  
Club 34: 257. 1907.

*Pteris dichotoma* L. Sp. Pl. 1076. 1753. Not *Dicranopteris dichotoma* Bernh. 1806.

*Acrostichum furcatum* L. Syst. Nat. ed. 10. 2: 1321. 1759.

*Mertensia furcata* Willd. Sv. Vet.-Akad. Handl. II. 25: 166. 1804.

*Gleichenia furcata* Spreng. Syst. Nat. 4: 25. 1827.

*Mertensia grandis* Fée, Mém. Foug. 11: 120. 1866.

Rhizome undescribed; primary leaf-axis erect, stout, 5-6 mm. in diameter, covered at first with numerous narrowly lanceolate fimbriate mostly yellowish scales, glabrescent, continuous, bearing 2 or 3 pairs of ample primary branches; primary branches once- or twice-pseudodichotomous, the primary internode about 3 cm. long, nearly naked, bearing only 2 or 3 small segments at the upper side of the node, deciduously yellowish paleaceous; secondary internodes up to 6 cm. long, fully pectinate upon both sides, up to 5 cm. broad, tapering somewhat toward the lower node; pinnae mostly divergent at an angle of about 60 degrees, fully pectinate, 15-25 cm. long, 4.5-8 cm. broad, lanceolate, attenuate, tapering slightly at the base, the rachis stout, brownish-stramineous, paleaceous, the scales like those of the primary leaf-axis; segments rigidly herbaceous, fragile, contiguous, linear, 2-4 cm. long, 3 mm. broad, the margins entire and closely revolute, the costa slightly paleaceous at the base, elsewhere lanose with deeply cleft long-ciliate yellowish scales; veins slightly elevated, 40-50 pairs, mostly once-forked, glabrous except for an occasional deeply ciliate minute scale; leaf-tissue below whitish-granulose, the particles unequally elongate; sori mostly 3-sporangiate, inframedial, borne on the anterior branch.

TYPE LOCALITY: Morne de la Calebasse, Martinique.

DISTRIBUTION: Martinique, Guadeloupe, and St. Kitts; upon the upper slopes of volcanoes at from 1200 to 1400 meters elevation.

ILLUSTRATION: Plumier, *Traité Foug.* pl. 28 (incorrect in showing the primary internode as fully pectinate above).

17. *Dicranopteris palmata* (Schaffn.) Underw. Bull. Torrey  
Club 34: 259. 1907.

*Mertensia palmata* Schaffn.; Fée, Mém. Foug. 9: 40 (32), nomen nudum. 1857.

*Gleichenia palmata* Moore, Index Fil. 380, nomen nudum. 1862.

An erect freely branching plant of medium size; rhizome widely creeping, branched, 4 mm. or more in diameter, dark-brown, sparingly tuberculate, clothed with copious decidu-



ous linear-lanceolate to lanceolate-attenuate spinescent-ciliate castaneous scales; primary leaf-axis continuous, 60 cm. or more long, chaffy below, above glabrate, greenish to olivaceous, opaque, with 2 or 3 pairs of primary branches, these divergent at right angles; primary branches usually 2-4 times pseudodichotomous (or infrequently a secondary leaf-axis developed), the primary internodes 4.5-8 cm. long, stipulate on the upper side at the lower node, otherwise naked; secondary internodes 3.5-4 cm. long, diverging at an angle of 60 degrees, with 1 or 2 reduced segments at the lower node, otherwise naked; tertiary internodes 4-6 cm. long, diverging at an angle of 30-40 degrees, fully pectinate throughout like the pinnae; pinnae 20-25 cm. or more long, 3-5.5 cm. broad, tapering gradually, cut to the rachis; rachises sparingly clothed beneath with deciduous laxly long-ciliate mostly ferruginous scales, the scales of the internodes smaller, darker, with pale borders, and appressed; segments herbaceous, fragile, very close, linear, subacute, 1.5-2.8 cm. long, 2.5-4 mm. broad, bright-green, the margins entire and scarcely revolute; costae, veins, and leaf-tissue lightly pubescent with whitish 3- or 4-parted (stellate) hairs; veins 20-28 pairs, once-forked near the base; sori few, 3-5-sporangiate, nearly medial, borne on the anterior branch.

TYPE LOCALITY: Moist woods, Orizaba, State of Vera Cruz, Mexico.

DISTRIBUTION: Mountains of the State of Vera Cruz, Mexico, and Alta Verapaz, Guatemala. Known also from eastern Cuba (rare) and the Blue Mountains of Jamaica, altitude 1000-1650 meters.

18. *Dicranopteris mellifera* (Christ) Underw. Bull. Torrey Club 34: 259. 1907.

*Gleichenia mellifera* Christ, Bull. Herb. Boiss. II. 6: 281. 1906.

Rhizome undescribed; primary leaf-axis stout, erect, 6 mm. or more in diameter, reddish-brown to olivaceous, with a thin deciduous covering of slender tortuous scales; primary branches several pairs, 2 or 3 times pseudo-dichotomous, the primary internodes 6-10 cm. long, naked, not prolonged into a secondary axis, the secondary internodes 4-5 cm. long, naked except for 1 or 2 pairs of reduced segments at the node, the included bud small, reddish-paleaceous; tertiary internodes 5-10 cm. long, divergent at an angle of 45-60 degrees, these and the pinnae fully pectinate; pinnae 20-40 cm. long, 3.5-6 cm. broad, long-acuminate, cut to the rachis; rachises below sparingly clothed with slender reddish or reddish brown rigid spinescent-ciliate subappressed scales, all the internodes similarly clothed; segments rigidly herbaceous, fragile, spreading at right angles, linear, subacute, 1.75-2.5 cm. long, 3 mm. broad, close, strongly concave in drying or widely revolute, the margins entire; costae, veins and leaf-tissue sparsely pubescent with whitish or rusty 3- or 4-parted (stellate) hairs; veins 25-35 pairs, once-forked near the base; sori sparse, 3-5-sporangiate, slightly inframedial, borne on the anterior branch.

TYPE LOCALITY: Valley of the Rio Navarro, Costa Rica, altitude 1400 meters.

DISTRIBUTION: Known only from the interior mountain region of Costa Rica, at from 1300 to 1400 meters elevation.

ILLUSTRATION: Bull. Herb. Boiss. II. 6: 287, f. 10 (a portion of a lateral branch; incorrect in showing the secondary internode as fully pectinate).

DOUBTFUL OR EXTRALIMITAL SPECIES

*Dicranopteris linearis* (Burm.) Underw. Bull. Torrey Club 34: 250. 1907. (*Polypodium lineare* Burm. Fl. Ind. 235. pl. 67, f. 2. 1768. *Gleichenia linearis* Clarke, Trans. Linn. Soc. II. Bot. 1: 428. 1880. *Polypodium dichotomum* Thunb. Fl. Jap. 338. pl. 37. 1784; not *P. dichotomum* Houtt. 1783. *Dicranopteris dichotoma* Bernh. Neues Jour. Bot. Schrad. 1<sup>2</sup>: 49. pl. 3, f. 13. 1806. *Gleichenia dichotoma* Hook. Sp. Fil. 1: 12, in part. 1844.) The types of both *Polypodium lineare* Burm. and *P. dichotomum* Thunb. (the latter an invalid name) are Asiatic, the former Malayan, the latter from Japan. The American plant of this alliance, *D. flexuosa*, has been listed frequently as *Gleichenia dichotoma* and more recently as *G. linearis*.

*Dicranopteris longissima* (Blume) Underw. Bull. Torrey Club 34: 249. 1907. (*Gleichenia longissima* Blume, Enum. Pl. Jav. 250. 1828.) One of a group of closely allied species common in Asia and the islands of the Pacific. The type is from Java. *D. Bancroftii* has been referred to frequently under this name.



*Gleichenia compacta* Christ, Bull. Herb. Boiss. II. 5 : 254. 1905. Apparently a valid species; known only from Costa Rica, the type from the vicinity of La Palma, altitude 1600 meters, *Wercklé*. Not seen by the writer.

*Gleichenia Mathewsii* Hook. Sp. Fil. 1 : 9. *pl.* 7, *B.* 1844. Described originally from Peruvian specimens and ascribed by Hooker and Liebmann to southern México. From description it appears to be a form of *D. bifida*. The Jamaican species wrongly described under this name by Jenman is *D. jamaicensis* Underw., a plant of wholly different vestiture.

*Gleichenia pennigera* (Mart.) Moore, Index Fil. 381. 1862. (*Mertensia pennigera* Mart. Ic. Crypt. Bras. 130. *pl.* 59, *f.* 1. 1834.) The type specimens are from the state of Minas Geraes, Brazil. Under this name have been listed in error (Bull. Soc. Bot. Belg. 32 : 105. 1893) specimens from Costa Rica, *Tonduz 3879*, which probably represent an undescribed species.

*Gleichenia revoluta* H.B.K. Nov. Gen. & Sp. 1 : 29. 1815. Described originally from the Quitensian Andes and probably confined to South America. The Costa Rican plant so reported is *D. costaricensis* Underw.

*Gleichenia tenuis* Presl, Rel. Haenk. 1 : 70. 1825. (*Mertensia tenuis* Presl, Tent. Pterid. 51. *pl.* 1, *f.* 7. 1836.) Described from specimens said to have been collected in Mexico and Martinique. Not identified.

*Mertensia gleichenioides* Liebm. Vidensk. Selksk. Skr. V. 1 : 296. 1849. (*Gleichenia Liebmanni* Moore, Index Fil. 379. 1862.) A remarkable form, accurately described by Liebmann from specimens collected by him near Cuaba, Vera Cruz, Mexico, and apparently not since collected. In general appearance the specimens differ widely from the usual type of *Dicranopteris* in the direction of *Gleichenia*, but not in venation and other characters. In minute characters they appear to represent a species not otherwise known, but in gross morphology the plant is almost certainly atypical and possibly indicates a reversion toward a general ancestral form. Plants similar in form, but very different in vestiture, have been collected in Jamaica by Professor Underwood and the writer; these were growing with *D. bifida* and from their minute characters must be reckoned a form of that species.

*Mertensia pubescens* H. & B.; Willd. Sp. Pl. 5 : 73. 1810. Described originally from Venezuela; according to Sturm and Underwood confined to South America. North American specimens of several species have often been listed under this name.