# PTERIDOPHYTA

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## KEY TO THE FAMILIES

1. Leaves with an unbranched vein, small, simple, of an oval to linear type, or bifid, bearing the sporangia in their axils or near their bases; stems well developed, erect or pendulous . . . . . 2

   Leaves with a system of branched veins, bearing the sporangia on their abaxial (rarely also on their adaxial) surface or on their margin, rarely the sporangia enclosed in sporocarps; stems erect, more or less tree-like, or forming creeping or erect rhizomes (Filicinae) . . . . 4

2. Sporangia unilocular, borne on the base or in the axil of a simple leaf (Lycopodiinae) . . . . . 3

   Sporangia trilocular, borne on the base of a forked leaf (Psilotinae) . . . . . PSILOTACEAE (p. 84)

3. Leaves spirally arranged; spores of one kind; epiphytes . . . . . LYCOPODIACEAE (p. 78)

   Leaves in two planes, four-ranked, the two median ranks with smaller leaves; spores of two kinds; terrestrial plants . . . . . SELAGINELLACEAE (p. 81)

4. Stem erect, tree-like; sori borne on the abaxial surface of the lamina, round; scales of the lamina bullate . . . . CYATHEACEAE (p. 9)

   Stem forming a creeping, erect, or rarely slightly subarborescent rhizome; sori of various shape and variously arranged; scales, if any, not bullate 5

5. Sporangia enclosed in sporocarps; spores of two kinds . . . 6

   Sporangia not enclosed in sporocarps; spores of one kind . . . . 7

6. Leaves quadrifoliate, borne on rooting rhizomes; sporocarps thick-walled, each having spores of both kinds . . . . MARSILEACEAE (p. 15)

   Leaves simple, borne in whorls of three (one much dissected, submerged, root-like) on floating rhizomes; sporocarps thin-walled; each sporocarp with only one kind of spores . . . . SALVINIACEAE (p. 77)

7. Sporangia borne on modified lobes of the ultimate segments or on a modified basal part of the lamina . . . . . 8

   Sporangia not on modified parts of the lamina (rarely on an apical modified part), but the lamina sometimes dimorphic . . . . . 9

8. Sterile part of the lamina simple; veins reticulate; lamina glabrous . . . . . OPHIOGLOSSACEAE (p. 6)
   Sterile part of the lamina divided; veins free; lamina hairy . . . . . SCHIZAEACEAE (p. 13)

9. Leaves delicate, the leaf-tissue of only one layer of cells; sori marginal, with tubular, funnel-shaped, or bivalved indusium . . . . . HYMENOPHYLLACEAE (p. 16)
   Leaves firm, of several layers of cells; sori dorsal, or, if marginal, the indusium not funnel-shaped, tubular, or bivalved . . . . . 10

10. Pinnae forked and pectinately pinnate; sori dorsal, round, exindusiate . . . . . GLEICHENIACEAE (p. 7)
    Pinnae not forked (except sometimes the basal ones), or none; sori dorsal or submarginal, variously shaped, or the sporangia not assembled in sori . . . . . POLYPODIACEAE (p. 22)

## KEY TO STERILE MATERIAL (FILICINAE)

1. Plants floating, without roots; leaves in whorls of three, one much-dissected, rootlike, the other two simple . . . . SALVINIACEAE (p. 77)
   Plants otherwise . . . . . 2

2. Leaf-tissue of only one layer of cells . . HYMENOPHYLLACEAE (p. 16)
   Leaf-tissue of several layers of cells . . . . . 3

3. Primary pinnae at least once forked; leaves large, indeterminate or climbing . . . . . 4
   Primary pinnae (except sometimes the basal pair), if any, not forked 5

4. Rachis climbing; primary pinnae alternate; secondary rachises very short . . . . . *Lygodium* (p. 13)
   Rachis not climbing; primary pinnae opposite; secondary rachises well developed . . . . . GLEICHENIACEAE (p. 7)

5. Leaves simple . . . . . Group I
   Leaves lobed or pinnate . . . . . 6

6. Lamina lobed to pinnatifid or bipinnatifid, but not once fully pinnate . . . . . Group II
   Lamina once pinnate or more strongly dissected . . Group III

Group I. Lamina simple.

1. Veins free or connected by a submarginal commissure . . . 2
   Veins freely anastomosing, with free included veinlets . . . 4

2. Lamina in the upper part dentate-crenate *Asplenium serratum* (p. 73)
   Lamina entire or repand-crenate throughout . . . . . 3

3. Lamina narrowly linear; veins at a very small angle to the costa, with a submarginal commissure . . . . . *Vittaria* (p. 34)
Lamina relatively wider; veins departing from the costa under a larger angle, free or with an often incomplete submarginal commissure . . . . . *Elaphoglossum* (p. 65)

4. Lamina with a costa; plants with several leaves . . . . . 5
Lamina without a costa; plants with only one leaf *Ophioglossum* (p. 6)

5. Lamina with secondary veins, or, if without, the leaves not over 15 cm long, with regular tertiary venation . . . . *Polypodium* (p. 36)
Lamina without secondary veins; leaves mostly over 15 cm long, with irregular tertiary venation . . . . . *Paltonium* (p. 35)

Group II. Lamina lobed to pinnatifid or bipinnatifid, but not once fully pinnate.

1. Veins free . . . . . 2
Veins anastomosing . . . . . 5
Veins not visible; lamina, especially on the abaxial side, bearing numerous lanceolate bicolorous scales . . *Polypodium polypodioides* (p. 39)

2. Lamina glabrous . . . . . 3
Lamina bearing at least some scattered hairs . . . . . 4

3. Lamina of a pentagonal type; terrestrial ferns *Doryopteris* (p. 30)
Lamina of a lanceolate-linear type; epiphytes . . . . . *Xiphopteris serrulata* (p. 49)

4. Lamina widest at the base . . . *Asplenium pumilum* (p. 72)
Lamina with some reduced basal segments . *Polypodium* (p. 36)

5. At least some of the areoles with free included veinlets . . . 6
All areoles without free included veinlets . . *Hemionitis* (p. 32)

6. Rachis (costa) grooved on the adaxial side; petioles continuous . . . . . *Tectaria* (p. 59)
Rachis not grooved on the adaxial side; petioles articulate to the rhizome . . . . . *Polypodium* (p. 36)

Group III. Lamina at least once fully pinnate.

1. Veins quite free or with a submarginal commissure . . . . 9
Basal tertiary veins anastomosing, forming costal arches, the other veins free . . . . . 2
Veins copiously anastomosing . . . . . 5

2. Leaves simply pinnate, with entire pinnae, articulate to the rhizome . . . . . *Polypodium* (p. 36)

Leaves pinnate + lobed or pinnate + pinnatifid, continuous with the rhizome or trunk . . . . . 3

3. Costae of segments scaly on the abaxial side; tree-ferns . . . . . *Cyathea grandifolia* (p. 11)
Costae of segments not scaly; ferns without tree-like stems . . . 4

4. Lamina glabrous; basal pinnae forked . . *Pteris biaurtia* (p. 27)
Lamina hairy; basal pinnae not forked . . . *Thelypteris* (p. 49)

5. Lamina with four leaflets, inserted almost at the same point . . . . . *Marsilea* (p. 15)
Lamina of a pinnate type . . . . . 6

6. Free included veinlets all pointing towards the margin . . . 7
Free veinlets pointing in all directions . . . . . 8

7. Rachis adaxially with a hairy groove *Thelypteris reticulata* (p. 54)
Rachis adaxially glabrous, not grooved *Polypodium triseriale* (p. 42)

8. Rachis and costae adaxially with a reddish tomentum *Tectaria* (p. 59)
Rachis adaxially glabrous . . . . . *Bolbitis* (p. 63)

9. Lamina with articulate pinnae, simply pinnate . . . . . 10
Pinnae non-articulate, or, if articulate, the lamina more than once pinnate . . . . . 12

10. Rhizome scandent; pinnae glabrous . . . *Lomariopsis* (p. 64)
Rhizome not scandent; pinnae abaxially hairy, fibrillose, or scaly 11

11. Veins ending in conspicuous hydathodes; pinnae caducous . . . . . *Nephrolepis* (p. 24)
Vein-ends clavate, without hydathodes; pinnae not caducous . . . . . *Pteris longifolia* (p. 26)

12. Lamina simply pinnate, with entire or shallowly crenate pinnae . . 13
At least the basal pinnae more strongly dissected . . . . . 16

13. Veins united by a submarginal commissure . . *Polybotrya* (p. 61)
Veins quite free . . . . . 14

14. Basal pinnae more or less reduced; leaves articulate to the rhizome . . . . . *Polypodium* (p. 36)
Basal pinnae not reduced, often the largest; leaves continuous with the rhizome . . . . . 15

15. Pinnae unequal-sided, the basiscopic side of the base more narrowly cuneate than the often more or less auricled acroscopic side; most pinnae free, the upper ones confluent . . . . . *Asplenium* (p. 68)
Pinnae equal-sided or nearly so; lamina with a free terminal pinna, or, if the upper pinnae confluent, most pinnae adnate . . *Blechnum* (p. 74)

16. Ultimate segments articulate, cuneate . . . *Adiantum* (p. 33)
Ultimate segments non-articulate . . . . . 17

17. Lamina abaxially bearing waxy powder . . *Pityrogramma* (p. 30)
Lamina quite glabrous or bearing some fibril-like scales . . . . . *Asplenium* (p. 68)
Lamina hairy (sometimes only on the rachis), at least bearing some scattered hairs . . . . . 18

18. Lamina bearing bullate scales along the abaxial side of the costae . . . . . *Cyathea* (p. 9)
Lamina without bullate scales . . . . . 19

19. All hairs simple . . . . . 20
At least some of the hairs on the rachis forked or stellate . . . . . *Thelypteris* (p. 49)

20. Lamina not over 15 cm wide . . . . . 21
Lamina broader . . . . . 24

21. Petioles stramineous to pale brown . . . . . 23
Petioles dark brown to blackish . . . . . 22

22. Lamina at most pinnate + pinnatifid; petioles upwards marginate . . . . . *Asplenium pumilum* (p. 72)
Lamina at least bipinnate; petioles not marginate *Cheilanthes* (p. 29)

23. Pinnae rather irregularly lobed or cleft; lamina mostly not over 3 cm wide . . . . . *Anemia* (p. 14)
Pinnae regularly lobed or pinnatifid; lamina at least 5 cm wide . . . . . *Thelypteris* (p. 49)

24. Adaxial groove of costae with a reddish tomentum of articulate hairs 25
Adaxial groove without reddish articulate hairs . . . . . 26

25. Lamina at least bipinnate + bipinnatifid . . . *Ctenitis* (p. 58)
Lamina pinnate + pinnatifid . . . . . *Diplazium* (p. 62)

26. Veins reaching the margin . . . . . *Thelypteris* (p. 49)
Veins not reaching the margin . . . *Pteris laciniata* (p. 28)

# OPHIOGLOSSACEAE

Epiphytic or usually terrestrial ferns with a short fleshy rhizome bearing only one or a few, mostly fleshy, leaves, these erect, petiolate, continuous with the rhizome, the lamina usually divided into a sterile and a stalked fertile portion; veins free or reticulate. Sporangia with a wall composed of several layers of cells, opening with a slit, containing numerous trilete thick-walled subspherical spores of one kind.

Four genera, two monotypic, the others with about 60 species of almost world-wide distribution.

**Ophioglossum** L., Spec. Plant. 2: 1062, 1753

Sterile part of lamina simple, rarely lobed, with reticulate venation; sporangia in two rows, sunken in the tissue of the simple fertile segment.
About 30 species, of very wide distribution.

**Ophioglossum reticulatum** L.

LINNAEUS, Spec. Plant 2: 1063, 1753; FÉE, 11e Mém. 127, 1866; GRISEBACH, Catal. Pl. Cub. 272, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 146, 1897; DUSS, Fl. crypt. Ant. franç. 112, 1904; BOLDINGH, Fl. D.W.I. Isl. I: 11, 1909; UNDERWOOD & BENEDICT, N. Am. Fl. 16(1): 11, 1909; BOLDINGH, Fl. Ned. W. Ind. Eil. 107, 1913; URBAN, Symb. Ant. 9: 384, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 374, 1926; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 89, 1937; CLAUSEN, Mem. Torr. Bot. Cl. 19(2): 130, fig. 24, 1938; STEHLÉ, Caribb. For 4(1): 38, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 43, 1953; HODGE, Lloydia 17: 55, 1954.

Rhizome short-cylindrical, erect, usually with only one leaf. Petiole ca. 4—15 cm long. Sterile blade herbaceous or membranous, broadly ovate to deltoid, obtuse to subacute, the base truncate and shortly cuneate to broadly cordate, 2—8 cm long, 2½—7 cm wide, slightly longer than wide; venation lax, equal, with rather many free included veinlets. Fertile segment arising below the sterile, surpassing it considerably, up to ca. 20 cm long, the spike ca. 3—5 cm long, mucronate. Spores subspherical — ellipsoidal, hyaline, almost colourless, minutely rugose-verrucose, ca. 35—45 $\mu$.

Widely distributed in the warmer parts of both Hemispheres.
In clearings and open situations.

SABA: The Mountain (Suringar s.n., L; Stoffers 3226); road to The Mountain (Arnoldo 873).

# GLEICHENIACEAE

Terrestrial ferns, mostly of exposed habitats, with creeping, scaly or hairy, protostelic or solenostelic rhizomes. Leaves continuous, usually remote, uniform, indeterminate, climbing or straggling, mostly in various degrees pseudodichotomous, the branching-pattern of at least the ultimate pinnae pinnate, with dormant buds at the dichotomies, bearing branched hairs. Ultimate segments pinnately arranged, linear to roundish, with free, simple or forked veins. Sori dorsal, round, naked, with rather few sporangia, paraphysate or not; sporangia subsessile, globose or pear-shaped, with complete transverse annulus, opening by a longitudinal slit. Spores monolete or trilete, without perispore.

About 125 species in three genera, one monotypic, aberrant (disregarded in the family description), the other two of almost world-wide distribution, but largely wanting in north-temperate regions.

**Gleichenia** J. E. Smith, Mém. Acad. Turin 5: 419, 1793 [including *Sticherus* Presl, *Diplopterygium* (Diels) Nakai, and others].

Plants bearing stellate hairs and peltate fringed scales. Sori of 2—4 sporangia, with paraphyses. Spores trilete or monolete. Veins simple or once-forked.
Over 100 species, in both Hemispheres.

**Gleichenia bifida** (Willd.) Sprengel

Sprengel, Syst. Veget. IV: 27, 1827; Krug in Urban, Engl. bot. Jb. 24: 79, 1897; Duss, Fl. crypt. Ant. franç. 107, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 11, 1909; Fl. Ned. W. Ind. Eil. 106, 1913; Urban, Symb. Ant. 9: 377, 1925; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 85, 1937; Proctor, Bull. Inst. Jam. Sci. S. 5: 30, 1953. — *Mertensia bifida* Willdenow, Sv. Vet.-Ak. Handl. II. 25: 168, 1804. *Dicranopteris bifida* (Willd.) Maxon, N. Am. Fl. 16(1): 60, 1909; Pteridoph. Porto Rico & Virg. Isl. 384, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 42, 1929; Box & Alston, Jo. Bot. 75: 257, 1937; Stehlé, Caribb. For. 4(1): 39, 1942; Hodge, Lloydia 17: 57, fig. 37, 1954. *Sticherus bifidus* (Willd.) Nakai, Bull. Nat. Sci. Mus. Tokyo 29: 14, 1950. — *Dicranopteris cubensis* Underwood, Bull. Torr. Bot. Cl. 34: 253, 1907. *D. fulva* (Desv.) Underwood, Bull. Torr. Bot. Cl. 34: 255, 1907.

Rhizome creeping, clothed with castaneous narrowly lanceolate long-acuminate ciliate scales. Petioles pale to dark brown, clothed with deciduous ciliate scales, eventually smooth. Rachises similar, more persistently hairly and scaly. Ultimate pinnae 15—50 cm long, 2½—6 cm wide, gradually narrowed at the apex, slightly narrowed at the base, deeply pectinately pinnatifid or at the base pinnate, the penultimate axes usually also bearing segments, sometimes only on the inner side, the next to penultimate axes occasionally bearing some segments on the inner side. Segments alternate or the lower ones subopposite, linear, obtuse or subacute, connected by a very narrow wing at their bases or the basal ones free, spreading or slightly ascending, coriaceous and greenish- to dark brown when dry, 2—3 mm wide, the basal ones somewhat dilated; edges entire, often more or less revolute.

Abaxial surface covered with an indumentum of rusty very strongly fimbriate-ciliate scales. Veins immersed or abaxially somewhat elevated, mostly evident, once-forked at the base. Sori slightly inframedial, on the acroscopic branch, mostly with 3 or 4 subglobose sporangia. Spores monolete, bean-shaped, smooth, 30—35 × 18—23 $\mu$.

Greater and Lesser Antilles; widespread in tropical America.
In thickets and on exposed banks, at higher elevations.

SABA: The Mountain, 800 m (Suringar 6099, L; Boldingh 2227; Arnoldo 942).

# CYATHEACEAE

Terrestrial ferns of forests and clearings, the great majority with arborescent dictyostelic trunk, its surface often clothed with numerous interwoven adventitious roots, the apex bearing scales, a few with a hairy rhizome. Leaves usually very large and pinnate to decompound, the petiole at the base persistently scaly and often muricate, rarely hairy; lamina bearing bullate scales, often also hairs, sometimes naked; veins free or anastomosing in costal arches. Sori dorsal, round, naked or with a globose, cup-shaped, or scale-like inferior indusium, often paraphysate; sporangia short-stalked, the annulus slightly oblique, complete; spores trilete, without perispore.

Two monotypic genera in the warmer parts of the New World, and the following.

**Cyathea** J. E. Smith, Mém. Acad. Turin 5: 416, 1793 (including *Alsophila* R. Brown, *Cnemidaria* Presl, and *Hemitelia* R. Brown).

Trunk erect, mostly tree-like, scaly; leaves scaly and often variously hairy; axes pale or dark; pinnae sometimes articulate; sori often indusiate.
More than 800 species in the tropical and south-temperate parts of the whole world.

Key to the species:

1. Veins anastomosing to form a series of costal arches; lamina pinnate + pinnatifid . . . . . *C. grandifolia*
   Veins free; lamina more strongly dissected . . . . . 2
2. Segments linear; sori inframedial . . . . . *C. arborea*
   Segments lanceolate-ligulate; sori supramedial . . . *C. muricata*

**Cyathea arborea** (L.) J. E. Smith

J. E. Smith, Mém. Acad. Turin 5: 417, 1793; Fée, 11e Mém. 100, 1866; Grisebach, Catal. Pl. Cub. 281, 1866; Krug in Urban, Engl. bot. Jb. 24: 79, 1897; Jenman, W. Ind. Gui. F. 50, 1898; Duss, Fl. crypt. Ant. franç. 19, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 1, 1909; Maxon, N. Am. Fl. 16(1): 70, 1909; Urban, Symb. Ant. 9: 288, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 387, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 65, pl. 9 fig. 1, 1929; Acta Bot. Boh. 9: 93, 1930; Box & Alston, Jo. Bot. 75: 252, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 14, 1937; Stehlé, Caribb. For. 4(1): 39, 1942; Proctor, Bull. Inst. Jam. Sci. S. 5: 20, 1953; Hodge, Lloydia 17: 65, fig. 42, 1954. — *Polypodium arboreum* L., Spec. Plant. 2: 1092, 1753. — *Cyathea serra* Willdenow, Spec. Pl. 5: 491, 1810; Hooker, Spec. Fil. I: 17, pl. 9 A, 1844; Fée, 11e Mém. 101, 1866; Grisebach, Catal. Pl. Cub. 281, 1866; Krug in Urban, Engl. bot. Jb. 24: 80, 1897; Duss, Fl. crypt. Ant. franç. 19, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 1, 1909; Fl. Ned. W. Ind. Eil. 92, 1913; Stehlé, Caribb. For. 4(1): 39. 1942.

Trunk said to be up to 12 m tall; leaves said to be 2½—4 m long, the ovate acuminate lamina 2—3 m long. Petioles stramineous to fawn-coloured, tuber-

culate to obtusely muricate, especially at the base, the lower part bearing whitish to ochraceous lanceolate slightly erose scales with long filiform tip; primary and larger secondary rachises stramineous, with scattered small dark tubercles. Lamina herbaceous, medium green, tripinnate or bipinnate + deeply pinnatifid, with subopposite or alternate pinnae becoming smaller and simpler in structure towards the apex of the lamina. Pinnae spreading, oblong-lanceolate, acuminate, ca. 30—75 × 15—30 cm, with a petiolule up to 8 cm; secondary rachises naked; secondary pinnae sessile or the lower ones subsessile, spreading or somewhat ascending, ca. 20—30 to a side, alternate, lanceolate, acuminate, with more or less caudate serrate apex, the base truncate, the basiscopic side of the base often somewhat narrowed, up to 15 cm long and 2½ cm wide. Tertiary rachises stramineous to medium brown, minutely tuberculate, adaxially densely to sparingly strigose, abaxially bearing scattered whitish ovate bullate scales, especially at the junction with the costae. Ultimate segments linear, adnate (in the upper pinnae and towards their apices, rarely also at their bases, connected by narrow wings), close, alternate, with subacute sinuses, obtuse, subfalcate, ca 15—25 to a side, the upper ones gradually reduced; margin serrate, especially towards the middle of the segments, often revolute when dry. Costa prominulous; veins close, mostly once forked, immersed, adaxially sometimes bearing scattered bristles. Sori on the bifurcations of the veins, distinctly inframedial, in two close lines from the base to $^2/_3$ the distance to the apex, large, with capitate receptacle and membranous pale-brown saucer-shaped indusium. Spores hyaline, almost colourless, tetrahedral, smooth, ca. 32—35 $\mu$.

Greater and Lesser Antilles, Mexico, northern South America.
In elfin woodland, at higher elevations.

SABA: The Mountain (Boldingh 1765a, 2170; Burgers 516); top of The Mountain, 800—835 m (Stoffers 4207); slope of The Mountain, 800 m (Suringar 6111, L); road to The Mountain (Arnoldo 813, juv.); without loc., Lionarons s.n. (juv.). ST. EUSTATIUS: De Kant (Suringar 6117, L, 6118, L); crater of The Quill (Suringar 6112, L).
Island?: Suringar s.n.

**Cyathea muricata** Willdenow

WILLDENOW, Spec. Plant. 5: 497, 1810; KRUG in URBAN, Engl. bot. Jb. 24: 79, 1897, in part; DOMIN, Acta Bot. Boh. 9: 139, 1930; not of GRISEBACH, 1864. — *Hemitelia muricata* (Willd.) FÉE, Gen. Fil. 350, 1852; 11e Mém. 98, 1866; MAXON, Contr. U.S. Nat. Herb. 17(4): 419, pl. 22, 1914; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 76, pl. 16 fig. 1, 1929; BOX & ALSTON, Jo. Bot. 75: 252, 1937; STEHLÉ, Caribb. For. 4(1): 39, 1942; HODGE, Lloydia 17: 66, 1954. — *Alsophila aspera* auct. non (L.) R. Br.; BOLDINGH, Fl. Ned. W. Ind. Eil. 92, 1913.

Trunk said to be 4—6 m tall, with the leaves 2½—3½ m long, 1½ m wide or more. Petiole castaneous to fawn-coloured, bearing at the base some narrowly lanceolate long-acuminate lustrous fawn-coloured slightly erose scales and numerous straight spines up to 3 mm long, in addition some minute brownish deciduous squamules. Lamina chartaceous, brown when dry, darker above, bipinnate + pinnatifid, glabrous. Pinnae subopposite or alternate, ca. 40—60 × 15—20 cm, broadly lanceolate, shortly acuminate, petiolulate; secondary rachises medium brown, bearing scattered minute pale scales and small tubercle-like spines, strigose

in the adaxial groove, articulate at the junction with the primary rachis. Pinnules ca. 15—25 to a side, mostly alternate, patent, shortly petiolulate to subsessile, lanceolate, ca. 7—12 cm long, 1½—3 cm wide, ca. 4—5 × as long as wide, deeply pinnatifid, mostly long-acuminate, the costae brown, adaxially densely strigose, abaxially strongly elevated and bearing pale brown to castaneous ovate acuminate bullate scales. Segments ca. 15 to a side, subfalcately ascending, lanceolate, ca. 8—13 cm long, 4—6 mm wide, obtuse to subacute, with crenate outer margins, close, with acute sinuses, connected by wings 1—1½ mm wide in the basal part, more broadly connected towards the apices of the pinnules; basiscopic basal segments slightly reduced. Costules prominulous, adaxially naked or with a few linear scales, abaxially with small pale to medium brown bullate scales. Veins close, slightly elevated, ca. 5—10 to a side, once or twice forked, not quite reaching the slightly thickened margin. Sori on the bifurcations of the veins, 1—4 to a side, distinctly supramedial, the receptacle very prominent, setose, the leaf-tissue on the opposite side forming pits. Indusium ample, brown, cleft into a number of segments, eventually caducous. Spores tetrahedral, pale yellowish, minutely verrucose, ca. 65 $\mu$.

Lesser Antilles; reported by Urban (1925) from Hispaniola, probably in error. At higher elevations.

SABA: The Mountain, 600—835 m (Suringar s.n., L, U; Boldingh 2220; Stoffers 4250, juv.); without loc. (Suringar ?).

**Cyathea grandifolia** Willdenow

WILLDENOW, Spec. Plant. 5: 490, 1810. — *Hemitelia grandifolia* (Willd.) SPRENGEL, Syst. Veget. IV: 125, 1827; KRUG in URBAN, Engl. bot. Jb. 24: 80, 1897, in part; DUSS, Fl. crypt. Ant. franç. 21, 1904; MAXON, Contr. U.S. Nat. Herb. 16(2): 41, pl. 25, 1912; BOX & ALSTON, Jo. Bot. 75: 252, 1937; STEHLÉ, Caribb. For. 4(1): 39, 1942; HODGE, Lloydia 17: 66, 1954. *Hemistegia grandifolia* (Willd.) PRESL, Abh. Böhm. Ges. V. 5. 355, 1848; FÉE, 11e Mém. 99, 1866. — *Hemitelia imrayana* HOOKER, Icon. Plant. 7, pl. 669, 1844; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 68, 1929. *Cyathea antillana* DOMIN, Acta Bot. Boh. 9: 91, 1930. *Hemitelia horrida* auct. non (L.) R. Br.; BOLDINGH, Fl. D.W. Ind. Isl. I: 2, 1909; Fl. Ned. W. Ind. Eil. 92, 1913.

Trunk said to be up to ca. 5 m tall and ca. 10 cm in diam., bearing at the apex whitish lanceolate scales. Leaves said to be up to 1.7 m long, the lamina 1—1¼ m long, 60—80 cm wide, shortly acuminate. Petiole fawn-coloured, tuberculate, the base bearing lanceolate long-acuminate shining castaneous scales with pale erose margins. Rachis obscurely muricate, often bearing a few persistent scales. Lamina chartaceous, rather dark brownish-green when dry, glabrous, pinnate + pinnatifid. Pinnae ca. 12—15 to a side, patent, subopposite, subsessile, ca. 20—40 × 6—8 cm, acuminate, the base truncate, deeply pinnatifid or occasionally with some free basal segments. Costa stout, brownish, bearing scattered pale lanceolate acuminate scales with more or less pronounced castaneous central stripe and cordate base. Segments slightly falcately ascending, lanceolate, shortly acuminate or acute, rather close, ca. 20—30 to a side, subopposite or alternate, 3—5 cm long, 10—15 mm wide at the base, connected by a basal wing 1½—5 mm wide, wider towards the apex of the pinna, sometimes wanting in the basal part. Basal segments occasionally slightly reduced, especially on the basiscopic side. Edge of pinnae slightly revolute when dry, serrate, especially towards the apex.

Costules prominent, brownish, bearing pale bullate scales. Veins elevated, once or twice (rarely more times) forked, ascending, the lowest pair anastomosing below the sinus to form a costal arch with free branches running to the sinus or connivent to it. Sori slightly supramedial, forming a line from below the sinus almost to the apex of the segment, with capitate receptacle and membranous cup-shaped, often more or less lobed indusium. Spores tetrahedral, pale, yellowish, with three large pits in the middle of the sides when observed from the proximal or distal side, otherwise smooth, ca. 35 $\mu$.

Lesser Antilles, south to Martinique; reported from Margarita Island, Venezuela, possibly in error.
In elfin woodland, at higher elevations.

SABA: The Mountain (Boldingh 2221, 2225; Stoffers 4203, 4206, 4210 (juv.); Suringar 6098, L).

## SCHIZAEACEAE

Small to large, usually terrestrial ferns, often of rather dry habitats, with creeping or erect rhizome usually clothed with hairs. Leaves erect or twining, of very diverse form, non-articulate, usually hairy, mostly free-veined. Sporangia usually in two rows on modified lobes or segments of the lamina, naked or protected by a "false indusium" formed by reflexed marginal lobes, sessile or short-stalked, with a subapical transverse annulus, opening by a vertical slit. Spores trilete or monolete, without perispore.

About 170 species in 4 genera, a few in temperate regions.

Key to the genera:

Sporangia borne on modified lobes of the ultimate segments, each protected by a special flap; leaves climbing, the primary pinnae forked . . *Lygodium*

Sporangia borne on the modified basal pinnae, naked, or somewhat protected by the reflexed margin; leaves not climbing, pinnately divided . . *Anemia*

**Lygodium** Swartz, Schrad. Journ. 1800[2]: 106, 1801

Rhizome creeping, hairy. Leaves indefinite, the rachis twining, with alternate forked primary pinnae with short secondary rachises and dormant terminal bud. Ultimate segments usually lanceolate or palmate; veins mostly free. Sporangia in two rows on marginal lobes of segments which are sometimes contracted, each protected by an indusial flap; spores trilete.
About 40 species in tropical and (very locally) in temperate regions of both Hemispheres.

**Lygodium venustum** Swartz

Swartz, Schrad. Journ. 1801: 503, 1803; Fée, 11e Mém. 125, 1866; Krug in Urban, Engl. bot. Jb. 24: 145, 1897; Maxon, N. Am. Fl. 16(1): 34, 1909; Christensen, Dansk Bot. Ark. 9(3): 30, 1937; Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 86, 1937; Proctor, Bull. Inst. Jam. Sci. S. 5: 41, 1953. — *L. polymorphum* auct. non (Cav.) H.B.K.; Urban, Symb. Ant. 9: 379, 1925; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 41, 1929.

Rhizome short-creeping; petiole and primary rachis stramineous to pale brown, hairy, especially on the flattened or shallowly sulcate adaxial side. Secondary (paired) pinnae stalked, the stalk and the tertiary rachis densely hairy, narrowly marginate, the rachis almost straight. Ultimate segments herbaceous, bright- to brownish-green, alternate, 3—8 to a side, the lower ones stalked, the upper ones sessile, slightly reduced, the apical one often largest, usually cordate at the base, with one to several lateral lobes, the basal lobes smallest, the central one by far the largest, ca. 2—6 cm long, ½—1 cm wide; all margins deeply crenate-serrate, the lobes again serrate or denticulate, the apices of the lobes mostly obtuse. Costae of lobes elevated, hairy, especially adaxially; lateral veins prominulous, free, 1—3 times forked, often hairy, especially on the adaxial side. Fertile seg-

ments (not yet collected on Curaçao) often more deeply incised. Sporangia on solitary fertile spikes, these 1—5 mm long, the protecting flaps densely hairy. Spores tetrahedral, very pale yellowish, almost hyaline, minutely verrucose, ca. 80—95 $\mu$.

Widespread in tropical America, but uncommon and scattered in the West Indies.

CURAÇAO: Hill near Knip (Arnoldo 2145); Knip (Stoffers 1115).

**Anemia** Swartz, Syn. Fil. 6, 155, 1806

Rhizome creeping or ascending, hairy. Leaves pinnately incised, hairy, mostly free-veined. Sporangia borne on the stalked compound basal pinnae (rarely the leaves quite dimorphic), in two rows, naked or more or less protected by the reflexed margin. (Name often misspelled *Aneimia*).
About 90 species, with few exceptions in tropical and warm-temperate parts of the New World.

**Anemia hirsuta** (L.) Swartz

SWARTZ, Syn. Fil. 156, 1806; FÉE, 11e Mém. 124, 1866; GRISEBACH, Catal. Pl. Cub. 272, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 144, 1897; LINDMAN, Ark. f. Bot. 1: 259, pl. 12 fig. 3, 1903; MAXON, N. Am. Fl. 16(1): 43, 1909; URBAN, Symb. Ant. 9: 379, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 382, 1926; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 86, 1937; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 8, 1953; ARNOLDO, Zakflora fig. 115, 1954. — *Osmunda hirsuta* L., Spec. Plant. 2: 1064, 1753.

Rhizome short-creeping, densely clothed with rufous hairs. Petioles close, slender, stramineous, clothed with deciduous reddish hairs, subterete, adaxially channeled, 1—5 (—25) cm long, shortest in sterile leaves. Lamina herbaceous, bright-green, sparingly pilose on both sides, 2—5 (—8) cm long, $^1/_3$ the length to as long as the petiole, $1^1/_2$—3 (—5) cm wide, somewhat longer than to twice as long as wide, with 3—10 pinnae to a side. Pinnae patent, sessile, subopposite or alternate, oblong, ca. 3—6 mm wide, obtuse, at least the largest basal ones cleft to pinnatifid, the lobes crenate, obtuse, those of the basiscopic side larger and less oblique. Upper pinnae reduced, rather abruptly confluent into the lobed-cleft leaf-apex. Fertile leaves with the fertile pinnae inserted just below the basal sterile pinnae, the stalks of the fertile pinnae glabrescent, ca. 3—10 cm long, surpassing the sterile lamina. Fertile portion pinnate to bipinnate, linear, ½—3 cm long. Sporangia naked. Spores trilete, subglobose, pale brownish-yellow, with several protruding ridges on the faces parallel to the equatorial plane, ca. 45 × 60 $\mu$.

Greater Antilles, Trinidad and Tobago; widespread in tropical America.

CURAÇAO: Seroe Christoffel, ca. 300 m (Arnoldo 1027, 1795; Stoffers 1214); hills near Knip (Stoffers 1116); without loc. (Burgers s.n.).

# MARSILEACEAE

Small ferns of at least seasonally very moist habitats with creeping rhizome. Leaves distichous, alternate, petiolate, the lamina with 2 or 4 leaflets or wanting. Leaflets cuneate-flabellate, rarely lobed, with close, mostly reticulate venation without included veinlets and a submarginal commissure, often hairy. Sori included in globose or ovoid thick-walled sporocarps borne on stalks at the bases of or on the petioles, solitary or several together, subdivided into cells. Sori solitary in the cells, containing sporangia of two kinds. Megasporangia with one megaspore, microsporangia with numerous microspores, the sporangial wall a hyalinous sac, without or with a rudimentary subapical annulus.

About 75 species in three genera, one monotypic in South Brazil, the others very widely distributed.

**Marsilea** L., Spec. Plant. 2: 1099, 1753

Leaves long-petiolate, quadrifoliate, the leaflets in two pairs springing almost from the same point. Sporocarps usually with two teeth near the point of insertion, divided vertically into two cells, splitting into two valves at maturity. (Name often misspelled *Marsilia*).
Between 60 and 70 species of almost world-wide distribution, most numerous in the eastern part of the Southern Hemisphere.

**Marsilea ernestii** A. Braun

A. Braun, Monatsber. königl. preuss. Akad. Wiss. 1870: 746, 1871 (as *Marsilia ernesti*); Baker, Handb. Fern Allies 143, 1887; Knuth, Fedde Rep. Beih. 43(1): 88, 1926; Reed, Bol. Soc. Broter. 28 (2A Sér.): 25, 1954.

Rhizome long-creeping, ca. ½—1½ mm thick. Leaves scattered or crowed, the petioles greenish to fulvous, deciduously rusty-tomentose, adaxially canaliculate, ca. 2—20 cm long. Lamina circular in outline, the leaflets flabellate, the outer margin ¼-circular, entire, the base cuneate, the sides concave, ca. 5—20 mm long, 4—18 mm wide, mostly 1 mm longer than wide, firmly herbaceous, the surface bearing scattered whitish hairs. Veins close, slightly elevated, reticulate. Sporocarps solitary, seemingly axillary, decurved, 5—7 × 3—5 mm, ellipsoidal, very convex, very densely tomentose with rusty pluricellular hairs, glabrescent and fuscous with age, the peduncle ca. 4—7 mm long, bearing a small obtuse tooth at its point of junction with the sporocarp and a weakly developed knob just beyond. Sori 7—9 to a side. Macrospores whitish, ovoid to pear-shaped, almost smooth, ca. 500—530 × 300—330 $\mu$. Microspores brownish-yellow, globose, practically smooth, ca. 53 $\mu$.

Known only from Venezuela (vicinity of Caracas).
At lower elevation.

Bonaire: Sabana (Arnoldo 408, 497); Dam near Jatoe Bacoe (Stoffers 654).

# HYMENOPHYLLACEAE *

Mostly epiphytic ferns with creeping or erect rhizome. Leaves continuous, very variously incised, rarely simple, mostly not dimorphic. Laminal part, apart from the veins, nearly always of only one layer of cells, without stomata, sometimes clothed with simple or branched hairs. Veins free or nearly so, sometimes intermingled with elongate strands of supporting tissue („false veins"). Sori marginal, with tubular, infundibuliform, trumpet-shaped or more or less bivalved indusium opening outwardly. Receptacle in the prolongation of a vein, cylindric, densely beset with sporangia, with intercalary growth at the base, sometimes long-exserted. Sporangia sessile or subsessile, with complete oblique transverse annulus. Spores trilete.

Between 500 and 600 species, in two monotypic and two very polymorphic genera, sometimes classed in 30 or more genera, of almost world-wide distribution, but largely absent from north-temperate regions.

Key to the genera:

Indusium tubular, the receptacle eventually long-exserted *Trichomanes*

Indusium bivalved, the receptacle not or hardly exserted *Hymenophyllum*

**Trichomanes** L., Spec. Plant. 2: 1097, 1753 *)

Small to medium-sized, sometimes terrestrial ferns with erect or creeping rhizome and remote or clustered, conform or dimorphic, simple to variously incised leaves. Sori with tubular, infundibuliform, or trumpet-shaped indusium with truncate or more or less bilabiate mouth. Receptacle often strongly protruding.
200 to 300 species in both Hemispheres, mostly in the Tropics.

Key to the species:

1. Plants minute, liverwort-like; leaves borne singly on a wide-creeping densely matted rhizome, simple to variously lobed; margin bearing stellate hairs; indusium two-lipped at the mouth . . . . . 2

   Plants larger, distinctly fern-like; leaves clustered on a short-creeping or ascending rhizome, bipinnatifid; margin bearing forked hairs; indusium tubular . . . . . *T. alatum*

2. Venation distinctly pinnate; costa percurrent; involucres wholly immersed; lips bordered by a single row of dark cells . . . *T. angustifrons*

   Venation flabellate; costa wanting or not extending beyond the middle; involucres free, usually placed in sinuses, the lips broadly dark-edged . . . . . *T. punctatum*

*) With the collaboration of J. G. Wessels Boer.

**Trichomanes angustifrons** (Fée) Wessels Boer, comb. nov.

Basionym: *Didymoglossum angustifrons* Fée, 11e Mém. 113, pl. 28 f. 5, 1866; *Trichomanes muscoides* Swartz var. *angustifrons* (Fée) Krug in Urban, Engl. bot. Jb. 24: 87, 1897; Duss, Fl. crypt. Ant. franç. 11, 1904. — *T. setiferum* Baker in Jenman, Jo. Bot. 19: 52, 1881; Jenman, W. Ind. Gui. F. 17, 1898. — *T. pusillum* auct. non Swartz; Jenman, W. Ind. Gui. F. 20, 1898; Duss, Fl. crypt. Ant. franç. 12, 1904; Urban, Symb. Ant. 9: 282, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 497, 1926; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 47, 1929; Box & Alston, Jo. Bot. 75: 251, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 9, 1937; Stehlé, Caribb. For. 4(2): 93, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 69, 1953; Hodge, Lloydia 17: 59, 1954.

A very small epiphyte of tree-trunks with wide-creeping matted very slender tomentose rhizome. Leaves borne singly on the rhizome, usually close, dark green, membranous, of variable shape: suborbicular-cordate to ligulate or linear and cuneate, subentire or shallowly lobed to (especially in large fertile leaves) deeply 3- or more-lobed in the apical part, a few mm to 2 cm long, up to 5 mm wide (or, if deeply pinnatifid, broader), ca. 1—6 × as long as wide, the petiole virtually absent to 5 mm long, tomentose with root-hairs, the lamina often decurrent on it. Costa present, in lobed leaves sending branches into the lobes, percurrent, bearing the sorus at its end; lateral veins few, very oblique, simple, not reaching the margin, intermingled with very numerous divergent strands of supporting tissue without tracheal elements ("false" or "spurious" veins), some of these non-connected. Margin bearing rather numerous dark brown sessile stellate hairs with stiff branches, these usually 3—6 in number. Sori solitary on the leaf or its apical lobes, up to 4 per lamina; indusium ca. 1½—2 mm long, immersed for about $^2/_3$ in the leaf-tissue, the mouth two-lipped with suborbicular glabrous lips, the receptacle eventually exserted. Spores not seen.

Greater and Lesser Antilles, South America from Colombia to Paraguay.
On trunks of trees, at middle elevation.

St. Eustatius: De Kant, on *Cedrela* trunk (Suringar s.n., L).

**Trichomanes punctatum** Poiret

Poiret, Enc. Méth. Bot., VIII: 64, 1808; Hooker & Greville, Icon. Fil. II t. 236, 1831; Krug in Urban, Engl. bot. Jb. 24: 87, 1897; Jenman, W. Ind. Gui. F. 19, 1898; Lindman, Ark. f. Bot. 1: 51, f. 30 A, 31 A—C, 1903; Duss, Fl. crypt. Ant. franç. 12, 1904; Maxon, Pterid. Porto Rico & Virg. Isl. 496, 1926; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 9, 1937; Stehlé, Caribb. For. 4(2): 93, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 69, 1953; Hodge, Lloydia 17: 58, 1954. — *Didymoglossum punctatum* (Poir.) Desvaux, Mém. Soc. Linn. Paris 6: 330, 1827; Presl, Abh. böhm. Ges. Wiss. V, 3: 23, 1843; Copeland, Philipp. Jo. Sci. 67(1): 77, 1938.

A very small epiphyte of rocks and trees with wide-creeping thread-like rather loosely matted brown-radiculose rhizomes. Leaves roundish, reniform, broadly ovate, or rarely linear-oblong, 0.5—1.5 cm wide and 1—2 cm long, usually cuneate or sometimes rounded at base, coarsely crenate or with several obovate to linear obtuse lobes 1—5 mm long. Petiole rather long, ca. 1 cm, sometimes virtually absent. Costa distinct to about the middle or absent. Venation flabellate with the veins crowded and unequal in thickness, the larger ones running

to lobes or sori. Margin bearing stellate hairs; young leaves bearing two-celled glandular hairs contrasting by their yellow colour. Sori one to several, placed in sinuses or between lobes. Indusia immersed about half-way or exserted.

Greater and Lesser Antilles, Florida, Central and South America from Guatemala to Bolivia and South Brazil.
Epiphytic or terrestrial, in wet, densely shaded forests at lower and middle elevations.

In the Netherlands Antilles ssp. *punctatum;* leaves obovate or linear-oblong, crenate, dentate, or obliquely lobed. Lobes with costules of thick veins with pinnately arranged false veinlets; interspaces between two veinlets rather broad, usually of 5 or more rows of cells. Sori few, often solitary. Involucres wholly free, narrowly winged, with large, broadly dark-edged lips.

Lesser Antilles and Puerto Rico.

ST. EUSTATIUS: without loc. (Suringar s.n., L).

**Trichomanes alatum** Swartz

SWARTZ, Schrad. Journ. 1800[2]: 17, 1801; FÉE, 11e Mém. 108, 1866; GRISEBACH, Catal. Pl. Cub. 273, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 88, 1897; JENMAN, W. Ind. Gui. F. 27, 1898, in part; DUSS, Fl. crypt. Ant. franç. 15, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 1, 1909; Fl. Ned. W. Ind. Eil. 91, 1913; URBAN, Symb. Ant. 9: 282, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 501, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 50, pl. 2 fig. 4, pl. 3 fig. 3, 1929; BOX & ALSTON, Jo. Bot. 75: 251, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 10, 1937; COPELAND, Philipp. Jo. Sci. 67(1): 71, 1938; STEHLÉ, Caribb. For. 4(2): 94, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 67, 1953; HODGE, Lloydia 17: 60, 1954.

Rhizome short-creeping or ascending, clothed with long reddish or brownish multicellular hairs. Leaves crowded, erect or ascending, the petiole slender, ca. 4—10 cm long, $^1/_3$—$^2/_3$ the length of the lamina, winged except at the base, the wing upwards gradually wider, thinly clothed with forked hairs. Lamina herbaceous, brownish-green when dry, lanceolate, acuminate, ca. 10—30 cm long, 3—8 cm wide, about 3—5 × as long as wide, widest near the middle, slightly narrowed at the base, bipinnatifid. Rachis winged throughout (½—¾ mm), adaxially flattish or shallowly sulcate, abaxially rounded or keeled. Pinnae ascending, mostly not contiguous, subopposite or the upper ones alternate, lanceolate, mostly 3 × as long as wide, acuminate or acute, pinnately incised $^1/_2$ or $^2/_3$ the way to the costa. Segments oblique, toothed or shallowly lobed. Veins slightly elevated, several times subpinnately forked. Margin, rachis and veins clothed with forked hairs. Sori usually solitary on the larger segments, mostly absent from the basal ones. Indusium quite immersed, shortly dilatate-truncate at the mouth, glabrous. Receptacle eventually long-exserted. Spores hyaline, smooth, ca. 28—32 $\mu$.

Greater and Lesser Antilles.
Epiphytic or terrestrial in moist mountain-forests and in elfin woodland, at middle and higher elevations.

SABA: The Mountain, 800 m (Boldingh 2204, L, U, 2206); The Mountain, top (Arnoldo 937); The Mountain (Suringar s.n., L); without loc., Boldingh 2206a.

**Hymenophyllum** J. E. Smith, Mém. Acad. Turin 5: 418. 1793

Small terrestrial or usually epiphytic ferns with slender creeping rhizome. Leaves usually remote, mostly strongly dissected, petiolate. Rachis and petiole often winged. Lamina sometimes hairy. Ultimate segments mostly small and narrow, often lobed, usually single-veined. Sori with bifid or bipartite indusium, the receptacle included or slightly exserted.
About 275 species in the tropical and south-temperate regions of both Hemispheres, a few scattered in north-temperate regions.

Key to the species:

1. Petiole and lamina hairy with branched hairs . . . . *H. hirtellum*

   Petiole and lamina quite glabrous . . . . . 2

2. Larger pinnae tripinnatifid; ultimate segments numerous; receptacle included . . . . . *H. polyanthos*

   Larger pinnae pinnatifid or bipinnatifid; ultimate segments relatively few; receptacle often not quite included . . . . . *H. macrothecium*

**Hymenophyllum hirtellum** Swartz

Swartz, Schrad. Journ. 1800[2]: 101, 1801; Fée, 11e Mém. 118, 1866; Krug in Urban, Engl. bot. Jb. 24: 86, 1897; Jenman, W. Ind. Gui. F. 14, 1898, in part; Duss, Fl. crypt. Ant. franç. 8, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 1, 1909; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 11, 1937; Stehlé, Caribb. For. 4(2): 96, 1943; Morton, Contr. U.S. Nat. Herb. 29(3): 164, 1947; Proctor, Bull. Inst. Jam. Sci. S. 5: 37, 1953. — *H. ciliatum* auct. non (Swartz) Swartz; Boldingh, Fl. Ned. W. Ind. Eil. 91, 1913, p.p. mai.; and of other authors.

Rhizome long-creeping, wiry, ca. $^1/_2$ mm in diam., densely pale-reddish pilose. Leaves remote, the petioles $^1/_3$—$^3/_4$ mm in diam., $2^1/_2$—10 cm long, shorter than the lamina, dark, persistently pilose with patent forked or stellate hairs, the upper part narrowly and mostly inconspicuously winged. Lamina thinly herbaceous, dark or brownish-green when dry, ovate to lanceolate, ca. 4—20 cm long, 2—7 cm wide, 2—3 × as long as wide, the apex acute, the base somewhat narrowed and then truncate. Rachis clothed with stellate hairs, winged, the wings ciliate with similar hairs. Lamina bipinnatifid or usually tripinnatifid, with 4—15 pinnae to a side, these alternate, ascending, ca $1^1/_2$—7 cm long, 1—2 cm wide, ovate to lanceolate, obtuse to acuminate, decurrent and especially surcurrent on the rachis, deeply pinnatifid; upper pinnae reduced, confluent into a pinnatifid leaf-apex. Primary segments ascending, broadly joined by a wing along the secondary rachis, the basal ones pinnatifid, the upper ones once or twice forked or simple. Ultimate segments linear, 2—6 mm long, 1—$1^1/_2$ mm wide, the veins dark, clothed with forked or stellate hairs, the margin bearing once- or twice-forked hairs on small projections. Sori numerous, terminal on the ultimate segments, their indusia with suborbicular valves of ca. 1—$1^1/_2$ mm, about as wide as the segments, free, ciliate with once- or twice-forked hairs. Receptacle included. Spores hyaline, smooth, ca. 45—50 $\mu$.

Jamaica, Cuba, Hispaniola, Guadeloupe; reported from Martinique by Duss (1904). Epiphytic in elfin woodland, at higher elevations.

SABA: The Mountain, 600—800 m (Boldingh 1814, 1816, 2201; Suringar 6072, L, 6074, s.n., L); top of The Mountain (Arnoldo 934a, poor, doubtful; Stoffers 3464, 4213, 4631, 4633, 4634).

**Hymenophyllum polyanthos** (Swartz) Swartz

SWARTZ, Schrad. Journ. 1800[2]: 102, 1801; FÉE, 11e Mém. 116, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 85, 1897; JENMAN, W. Ind. Gui. F. 7, 1898; DUSS, Fl. crypt. Ant. franç. 6, 1904; URBAN, Symb. Ant. 9: 285, 1925 (as *polyanthum*); MAXON, Pteridoph. Porto Rico & Virgin Isl. 505, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 58, 1929; BOX & ALSTON, Jo. Bot. 75: 252, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 11, 1937; STEHLÉ, Caribb. For. 4(2): 95, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 38, 1953; HODGE, Lloydia 17: 63, f. 39, 1954. — *Trichomanes polyanthos* SWARTZ, Prodr. 137, 1788. — *Hymenophyllum ciliatum* auct. non (Swartz) Swartz; BOLDINGH, Fl. Ned. W. Ind. Eil. 91, 1913, p.p. min.

Rhizome long-creeping, wiry, $^1/_4$—$^1/_3$ mm in diam., clothed with spreading reddish or brownish hairs. Leaves remote, quite glabrous, the petioles dark brown, wiry, ca. $^1/_2$ mm in diam., 3—10 cm long, shorter than the lamina, upwards or for the greater part narrowly winged. Lamina thinly membranous, dark or brownish-green when dry, oblong-ovate to lanceolate, acute or acuminate, the base often slightly narrowed, ca. 4—20 cm long, $2^1/_2$—6 cm wide, ca. 2—3 × as long as wide, deeply tri- to quadripinnatifid. Rachis flexuous, winged. Primary pinnae alternate, spreading or laxly ascending, mostly subacute to acuminate, up to 7 cm long, oblong-lanceolate, with flexuous winged secondary rachis. Upper pinnae gradually reduced, confluent into a pinnatifid leaf-apex; basal pinnae often somewhat reduced and remote. Secondary pinnae alternate, ovate, obtuse, ascending, ca. $^1/_2$—1 cm long, once or twice pinnatifid. Ultimate segments linear, strongly ascending, when forked the branches but little divaricate, entire and obtuse or subacute, or emarginate at the apex, ca. $^1/_2$—1 mm wide. Veins not quite reaching the tips of the segments. Sori usually confined to the upper part of the lamina, the indusium suborbicular to ovate, bivalved, not immersed, slightly wider than the segment, the lips obtuse or subacute, entire; receptacle included. Spores brownish, smooth, ca. 45—50 $\mu$.

Throughout tropical America; Tropics of the Old World. A variable, perhaps inclusive species.
Epiphytic or on rocks, at higher elevation.

SABA: The Mountain, 800 m (Boldingh 1815).

**Hymenophyllum macrothecium** Fée

FÉE, 11e Mém. 115, pl. 31 fig. 2, 1866; DUSS, Fl. crypt. Ant. franç. 8, 1904; MAXON, Pteridoph. Porto Rico Virg. Isl. 505, 1926; STEHLÉ, Caribb. For. 4(2): 95, 1943.

Rhizome delicate, wiry, wide-creeping. Leaves remote, quite glabrous, petiolate, the petiole ca. $^1/_2$—5 cm long, much shorter than the lamina, wiry, upwards narrowly (or, in small leaves, more distinctly) marginate. Lamina membranous,

dark greenish-brown when dry, narrowly oblong to linear, ca. 3—6 cm long (occasionally longer), bipinnatifid to tripinnatifid. Rachis slightly flexuous, narrowly winged. Pinnae ca. 3—10 to a side, alternate, slightly ascending, oval to rhombic, deeply pinnatifid or bipinnatifid, unequal-sided, 1—$1^1/_2$ cm long, the basal ones often reduced. Ultimate segments relatively few, linear, often bifid, entire, obtuse, joined by wings equalling their width (1—2 mm). Sori very few per lamina, borne in its apical part. Indusial valves large, 2—3 mm long, oval-elliptic, mostly subacute, free except at the cuneate base on which the leaf-tissue is surcurrent, entire. Receptacle thick, often slightly protruding. Spores hyaline, minutely gemmate, ca. 60 $\mu$.

Puerto Rico, some of the Lesser Antilles.
At higher elevation, probably epiphytic.

SABA: top of The Mountain (Arnoldo 934).

# POLYPODIACEAE

Terrestrial or epiphytic ferns (rarely aquatic) of various habit, with creeping or erect, rarely more or less arborescent, rhizomes clothed with hairs or scales. Leaves very variable, simple to highly compound. Sporangia usually assembled in definite sori which are often protected by a true indusium or a reflexed part of the leaf-margin or sometimes naked, less often without definite arrangement and covering the whole fertile lamina or fertile portion of the lamina, long-stalked, with a vertical annulus with an interrupted series of indurated cells and a more or less developed stomium. Spores monolete or trilete, with or without perispore.

Several thousand species classed in ca. 220—250 genera (the number depending strongly on the author's generic concept), of world-wide distribution, often divided into a number of smaller families.

Key to the genera:

1. Sporangia assembled in definite sori or at least following the veins 5
   Sporangia not assembled in definite sori, covering the whole abaxial surface or its apical part (sometimes also part of the adaxial surface) . . 2
2. Veins of the sterile lamina free or connected by a submarginal commissure . . . . . 3
   Veins copiously anastomosing, the areoles with free included veinlets . . . . . *Bolbitis* (p. 63)
3. Lamina simple, undivided . . . . . *Elaphoglossum* (p. 65)
   Lamina lobed, the sporangia in confluent sori on the less incised apical part . . . . . *Xiphopteris* (p. 48)
   Lamina pinnate . . . . . 4
4. Rhizome scandent; pinnae articulate; fertile leaves once pinnate . . . . . *Lomariopsis* (p. 64)
   Rhizome terrestrial; pinnae non-articulate; fertile leaves bipinnate . . . . . *Polybotrya* (p. 61)
5. Sori indusiate . . . . . 6
   Sori exindusiate . . . . . 17
6. Sori dorsal . . . . . 7
   Sori submarginal . . . . . 13
7. Indusium round or kidney-shaped . . . . . 8
   Indusium oval to linear . . . . . 11
8. Pinnae articulate . . . . . *Nephrolepis* (p. 24)
   Pinnae non-articulate . . . . . 9

9. Veins free, or, if anastomosing, with all free veinlets pointing towards the margin . . . . . 10
Veins copiously anastomosing, with free veinlets pointing in all directions . . . . . *Tectaria* (p. 59)

10. Lamina bipinnate + bipinnatifid or more highly compound, with reddish articulate hairs in the adaxial grooves of the axes; veins free . . . . . *Ctenitis* (p. 58)
adaxial grooves of the axes; veins free or anastomosing . . . . . *Thelypteris* (p. 49)

11. Sori elongate, continuous, one on each side of and parallel to the costa, the indusia opening towards each other . . . . *Blechnum* (p. 74)
Sori shorter, divergent on lateral veins . . . . . 12

12. All sori simple . . . . . *Asplenium* (p. 68)
The sorus on the basal acroscopic vein mostly double, the indusia opening away from each other . . . . . *Diplazium* (p. 62)

13. Leaves simple; sori borne in a submarginal groove, more or less protected by the reflexed margin . . . . . *Vittaria* (p. 34)
Leaves divided; sori not borne in grooves . . . . . 14

14. Sporangia borne on the vein-ends or on a submarginal commissure, protected by the reflexed margin . . . . . 15
Sporangia borne on the vein-ends of a reflexed marginal flap . . . . . *Adiantum* (p. 33) *)

15. Lamina of a palmate-pentagonal type, glabrous *Doryopteris* (p. 30)
Lamina of a pinnate type, glabrous or hairy . . . . . 16

16. Sori short, each borne on the end of one or a few veins; petioles blackish . . . . . *Cheilanthes* (p. 29)
Sori elongate, mostly borne on many vein-ends; petioles stramineous to fawn-coloured . . . . . *Pteris* (p. 26)

17. Sori round or oval . . . . . 18
Sori elongate or following the veins . . . . . 20

18. Sori solitary on the ultimate segments . . *Xiphopteris* (p. 48)
Sori several on each ultimate segment, or the lamina simple . . 19

19. Leaves articulate to the rhizomes; lamina simple, or, if divided, the rachis adaxially not sulcate . . . . . *Polypodium* (p. 36)
Leaves continuous; lamina divided, with adaxially sulcate axes 9

20. Veins free; lamina much divided, abaxially covered with waxy powder . . . . . *Pityrogramma* (p. 30)

*) See also *Blechnum nesioticum*, p. 75, where the leaves are simply pinnate, the fertile pinnae strongly contracted, and the sori have sometimes seemingly marginal indusia.

Veins reticulate; lamina simple or once-pinnate, not bearing waxy powder . . . . . 21

21. Lamina simply pinnate, sparsely hairy *Thelypteris reticulata* (p. 54)
Lamina palmately incised, hairy . . . . *Hemionitis* (p. 32)
Lamina simple, entire, glabrous . . . . . 22

22. Lamina lanceolate; areoles with free included veinlets; sori submarginal in the upper part of the lamina . . . . . *Paltonium* (p. 35)
Lamina linear; areoles without free included veinlets; sori submarginal, in a groove parallel to the margin . . . . . *Vittaria* (p. 34)

**Nephrolepis** Schott, Gen. Fil. pl. 3, 1834

Mostly terrestrial medium-sized ferns with short erect or rarely long and scandent, dictyostelic rhizome with peltate, often ciliate scales, bearing long-creeping stolons and sometimes tubers. Petioles continuous, the lamina elongate, simply pinnate, with articulate, entire or lobed, often auriculate pinnae. Veins free, ending in conspicuous hydathodes. Sori terminal on the veins, laminal or submarginal, round or reniform, rarely linear; indusia reniform or subpeltate or rarely elongate, fixed at the base or at the sinus, opening towards the margin or towards the apex of the pinna. Spores monolete, without perispore.
About 30 species, most of them closely related and difficult to separate, in tropical and subtropical regions of both Hemispheres.

Key to the species:

Lamina rarely over 10 cm wide; pinnae mostly with an auricle at the acroscopic side of the base; leaf-tissue bearing minute deciduous brown scales on the abaxial side . . . . . *N. rivularis*
Lamina up to 20 cm wide; pinnae not or obscurely auricled at the acroscopic side of the base; leaf-tissue and costa abaxially thinly hirtellous *N. biserrata*

**Nephrolepis rivularis** (Vahl) Mettenius ex Krug

Mettenius ex Krug, Engl. bot. Jb. 24: 122, 1897; Urban, Symb. Ant. 9: 317, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 485, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 236, 1929; Box & Alston, Jo. Bot. 75: 254, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 44, 1937; Stehlé, Caribb. For. 4(2): 92, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 42, 1953; Hodge, Lloydia 17: 102, 1954. — *Polypodium rivulare* Vahl, Eclog. Amer. 3: 51, 1807. — *Nephrolepis exaltata* auct. non (L.) Schott; Boldingh, Fl. D.W. Ind. Isl. I: 4, 1909; Fl. Ned. W. Ind. Eil. 97, 1913.

Rhizome erect, terrestrial or epiphytic, ca. $^1/_2$—1 cm in diam., stoloniferous, densely clothed with narrowly lanceolate, long-acuminate, ciliate, pale brown scales. Petioles close, stramineous to fawn-coloured, rather lustrous, ca. 5—25 cm long, mostly considerably shorter than the lamina, adaxially, deeply sulcate, the lateral surfaces also more or less channelled, clothed with deciduous pale brown scales with fimbriate base and subulate apex, especially along the adaxial groove. Lamina firmly herbaceous to subcoriaceous, brownish-green when dry, linear,

up to ca. 50 cm long, 3—8 (—12) cm wide, simply pinnate. Rachis similar to the petiole, bearing numerous close alternate patent or arched-ascending pinnae. Pinnae lanceolate, obtuse or acute, sessile, $1^1/_2$—4 (—6) cm long, 0.4—1 cm wide, about 3—4 (—8) × as long as wide, the lower side of the base cuneate, the upper side mostly shortly auricled, the auricle subacute. Margins shallowly crenate or serrate towards the apex. Basal pinnae reduced, upper pinnae gradually reduced, confluent into a short pinnatifid leaf-apex. Leaf-tissue abaxially clothed with minute deciduous ovate-lanceolate scales. Costa percurrent, abaxially raised. Veins immersed, rather close, concavely arching towards the margin, once forked near the base, ending 1—2 mm from the margin, the round sori borne at the end of the acroscopic branch, rather close to the margin. Indusium suborbicular-subpeltate, attached at a point in the narrow sinus, the free side obliquely facing the margin. Sporangia spreading in all directions from below the edge of the indusium. Spores bean-shaped, medium brown, verrucose, ca. 30—32 × 18—20 $\mu$.

Widespread in tropical America.

In palm- and treefern-brakes and elfin woodland, at middle and higher elevations.

SABA: top of The Mountain, 600—850 m (Boldingh 1802, 2194, 2197; Suringar 5984, L; Stoffers 3465, 4208, 4218, 4629); The Mountain, near Hellsgate, 600 m (Boldingh 2285); between Hellsgate and Santa Cruz, 550 m (Stoffers 3446); Santa Cruz (Stoffers 4347a); Windwardside (Arnoldo 763); Under the Cliff, 680 m (Stoffers 3204).

ST. EUSTATIUS: De Kant (Suringar 5986, L); crest of the Quill (Suringar 5991, L); Quill (Suringar 5992, juv.).

Most specimens are smaller and more rigid than continental plants.

**Nephrolepis biserrata** (Swartz) Schott

SCHOTT, Gen. Fil. pl. 3, 1834; BOLDINGH, Fl. Ned. W. Ind. Eil. 97, 1913; BRITTON & MILLSPAUGH, Bahama Fl. 474, 1920; URBAN, Symb. Ant. 9: 317, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 486, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 237, 1929; ALSTON, Jo. Bot. 73: 37, 1935; BOX & ALSTON, Jo. Bot. 75: 254, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 44, 1937; SMALL, Ferns S.E. States 306, 307 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 92, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 42, 1953; ARNOLDO, Zakflora fig. 95, 1954; HODGE, Lloydia 17: 102, 1954; ARNOLDO, Gekw. en nutt. pl. Ned. Ant. 94, fig. 154, 1954. — *Aspidium biserratum* SWARTZ, Schrad. Journ. $1800^2$: 32, 1801.

Rhizome terrestrial, erect, ca. $^1/_2$ cm thick, densely clothed with narrowly lanceolate long-acuminate ciliate castaneous scales, stoloniferous. Petioles close, stramineous to pale greyish-brown, of similar structure and with a similar indumentum as the preceding species, up to ca. 20 cm long, $^1/_3$—$^1/_6$ the length of the lamina. Lamina herbaceous to chartaceous, pale or brownish-green when dry, simply pinnate, lanceolate-oblong, up to ca. 60 cm long and 20 cm wide, 3—4 × as long as wide. Rachis similar to the petiole, bearing patent alternate pinnae which are less close than in the preceding species, usually their width or more apart. Pinnae lanceolate-linear, acute or acuminate, subsessile, slightly or not narrowed at the base, the extreme base almost evenly cuneate, the basiscopic side less oblique, the upper base truncate or faintly and obtusely auricled, ca.

6—10 cm long and 8—16 mm wide, ca. 6—10 × as long as wide. Basal pinnae remote, reduced, upper pinnae reduced, a few confluent into a small pinnatifid leaf-apex. Margin crenate-serrate or biserrate, especially towards the apex. Costa strongly elevated on the abaxial side, percurrent, deciduously fibrillose-squamulose and hirtellous on the abaxial side, sometimes glabrescent. Leaf-tissue abaxially thinly hirtellous or sometimes glabrescent. Veins immersed, usually twice forked, ending slightly within the margin, the acroscopic branch of each pair or group shortened, bearing at its end the round distinctly supramedial sorus. Indusium as in the preceding species, often conceiled at full maturity. Spores as in the preceding species.

Widespread in tropical and subtropical America, usually in moist places. Often called pantropic; but the Old World plant is perhaps not conspecific.
No data extant from the Netherlands Antilles.

CURAÇAO: Seroe Christoffel (Arnoldo 1024; Stoffers 1279); Ronde Klip (Stoffers 1242).
ST. EUSTATIUS: Boven (Suringar 5972, L).

**Pteris** L., Spec. Plant. 2: 1073, 1753

Terrestrial, mostly large ferns with creeping or erect dictyostelic rhizome clothed with scales or sometimes with reduced hair-like appendages. Leaves close, continuous, simply pinnate or more highly compound, the ultimate divisions often large, rarely articulate. Veins free or anastomosing without free included veinlets. Sori on continuous submarginal receptacles uniting several vein-ends, usually absent from the apices of the divisions and from the sinuses of the incisions, protected by the reflexed altered margin, with paraphyses. Spores usually trilete, without perispore, usually sculptured.

Almost 300 species, largely tropical, a few in temperate regions.

Key to the species:

1. Lamina simply pinnate, with simple articulate pinnae *Pt. longifolia*
   Lamina more strongly dissected; pinnae non-articulate . . . . 2
2. Basal veins anastomosing, forming costal arches; lamina glabrous *Pt. biaurita*
   Veins free; lamina hairy . . . . . *Pt. laciniata*

**Pteris longifolia** L

LINNAEUS, Spec. Plant. 2: 1074, 1753; FÉE, 11e Mém. 22, 1866; GRISEBACH, Catal. Pl. Cub. 275, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 98, 1897; DUSS, Fl. crypt. Ant. franç. 66, 1904; URBAN, Symb. Ant. 9: 349, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 432, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 145, 1929; BOX & ALSTON, Jo. Bot. 75: 256, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 64, 1937; STEHLÉ, Caribb. For. 4(2): 84, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 54, 1953. — *Pycnodoria longifolia* (L.) BRITTON, Fl. Bermuda 418, 1918; BRITTON & MILLSPAUGH, Bahama Fl. 467, 1920.

Rhizome short-creeping, stout, 1—$1^1/_2$ cm thick, densely clothed with linear long-acuminate fibril-like light-castaneous to dark brown entire scales. Petioles close, ca. 10—over 50 cm long, $^1/_3$—$^1/_2$ the length of the lamina, stramineous, terete

with sulcate adaxial side, bearing similar scales, these deciduous except on the basal part, only the smallest, pale, hair-like scales persistent on petiole and rachis. Lamina chartaceous, mostly bright or brownish-green when dry, simply pinnate, elliptic or oblanceolate, ca. 25—75 cm long, 6—20 cm wide, ca. 3—5 × as long as wide. Rachis similar to the petiole. Pinnae numerous, subopposite or alternate, spreading or slightly ascending, sessile or very shortly petiolulate, articulate to the rachis but hardly caducous, narrowly lanceolate to linear, 3—10 cm long, $2^1/_2$—10 mm wide (the sterile somewhat wider than the fertile), usually acute or acuminate, broadly cuneate to subcordate at the base, evenly tapering in the upper third or half. Upper pinnae but little reduced, the terminal pinna large, non-articulate, often confluent at the base with one or a few lateral pinnae. Margin of sterile pinnae shallowly crenulate or denticulate; costa percurrent, elevated and stramineous on the abaxial side, bearing similar fibrils as the rachis, adaxially sulcate, glabrescent or glabrous. Veins immersed or slightly prominulous, evident, close, running to the margin at a large angle, free, once or twice forked, their clavate ends just within the margin. Sori continuous along the whole margin but usually absent from the apices of the pinnae; indusium pale, erose-denticulate, ca. $^1/_3$ mm wide. Paraphyses long, filiform, many-celled. Spores trilete, almost colourless, with a coarse reticulum of ridges enclosing roundish depressions except along the tetrad-figure which is represented by double ridges, ca. 44—52 $\mu$.

Widespread in tropical America from Mexico to Brazil, but most common in the Caribbean area.
In dry woods and on rocks, at middle elevations.

SABA: Castle Hill, seaside, 300 m (Stoffers 4155).

A closely related species, *Pteris vittata* L., introduced from the Old World, is now widespread in tropical America and may be found on the Windward Islands. It differs chiefly in its more strongly ascending, non-articulate pinnae.

**Pteris biaurita L.**

LINNAEUS, Spec. Plant. 2: 1076, 1753; FÉE, 11e Mém. 27, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 99, 1897; DUSS, Fl. crypt. Ant. franç. 67, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 7, 1909; Fl. Ned. W. Ind. Eil. 101, 1913; URBAN, Symb. Ant. 9: 351, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 434, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 146, 1929; ALSTON, Jo. Bot. 73: 38, 1935; BOX & ALSTON, Jo. Bot. 75: 255, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 65, 1937; STEHLÉ, Caribb. For. 4(2): 84, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 53, 1953; HODGE, Lloydia 17: 85, 1954.

Rhizome suberect, bearing at the apex some pale scales with darker centre. Petioles close, stramineous, smooth, rather shining, quadrangular, canaliculate, ca. 15—40 cm long, mostly about as long as the lamina. Lamina glabrous, herbaceous, yellowish- or pale brownish-green when dry, ovate or oblong, ca. 15—50 cm long, 10—30 cm wide, ca. $1^1/_2$ × as long as wide, simply pinnate with deeply pinnatifid lateral and terminal pinnae, the basal pinnae bipartite. Rachis similar to the petiole. Pinnae subopposite, ascending, sessile, lanceolate, ca. 10—25 cm long, $2^1/_2$—7 cm wide, widest somewhat above the base, thence slightly narrowed to the base, gradually and more strongly narrowed towards the apex, cut into

linear usually subfalcate obtuse or subacute segments which are $^3/_4$—4 cm long, 3—5 cm wide, those on the basiscopic side often longer, connected by a wing of ca. 2—3 mm, the sinus rounded, with a callose spot at the bottom, the segments about their width apart. Basal pinnae petiolulate, bearing on the basiscopic side above the base a secondary pinna shorter than the primary; upper pinnae somewhat reduced. Apex of pinnae abruptly linear, entire, acute-acuminate, up to 6 cm long. Costae and costules elevated, stramineous, adaxially sulcate. Veins evident, slightly prominulous, all springing from the costules, forming flat costal arches below the bottom of the sinus, otherwise free, mostly once forked. Sori absent from the apices of pinnae and segments, shortly and inconspicuously interrupted at the bottom of the sinus. Indusium thin, entire or wavy, ca. $^1/_3$ mm wide. Paraphyses long, filiform, many celled. Spores trilete, dark brown, strongly verrucose, with a smooth equatorial ridge, ca. 42—50 $\mu$.

Pantropical; very polymorphic, probably an inclusive species.
Probably at middle elevations.

SABA: Spring Bay Gut (Boldingh 2112); Gain Bay Gut (Suringar s.n., L); Peperpot (Suringar 5960, L, U); The Mountain near Hellsgate, 600 m (Boldingh 2283); without loc. (Boldingh s.n.).

**Pteris laciniata** Willdenow

WILLDENOW, Spec. Plant. 5: 397, 1810; FÉE, 11e Mém. 24, 1866; DUSS, Fl. crypt. Ant. franç. 68, 1904. — *Lonchitis hirsuta* L., Spec. Plant. 2: 1078, 1753; BOLDINGH, Fl. D.W. Ind. Isl. I: 7, 1909; Fl. Ned. W. Ind. Eil. 102, 1913, p.p. mai.; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 40, 1953. *Pteris hirsuta* (L.) J. SMITH, Jo. Bot. 4: 165, 1841, non Poiret, 1804. *Antiosorus hirsutus* (L.) KUHN, Chaetopt. 347, 1882; URBAN, Symb. Ant. 9: 353, 1925. *Anisosorus hirsutus* (L.) UNDERWOOD & MAXON in MAXON, Pteridoph. Porto Rico & Virg. Isl. 429, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 143, 1929; BOX & ALSTON, Jo. Bot. 75: 256, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 66, 1937; STEHLÉ, Caribb. For. 4(2): 1943; HODGE, Lloydia 17: 84, 1954.

Rhizome short-creeping, stout, ca. $1^1/_2$ cm in diam., bearing multicellular hairs grading into very narrow scales. Leaves close, succulent, the petioles stramineous to fawn-coloured, terete, adaxially flattened or sulcate, when young densely covered with whitish spreading multicellular hairs, more or less grabrescent with age, ca. 20 cm—1 m long, shorter than the lamina. Lamina thinly herbaceous, dark or brownish-green when dry, oblong-ovate or deltoid, up to ca. $1^1/_2 \times 1$ m, ca. $1^1/_2$—2 × as long as wide, pinnate + bipinniatifid or bipinnate + pinnatifid at the base, less compound towards the apex, with ca. 6—10 pinnae to a side; axes and veins densely covered with hairs similar to those of the petiole. Primary pinnae subopposite or alternate, laxly ascending, the lower ones short-stalked (up to 2 cm), the upper ones sessile, gradually confluent into a pinnatifid leaf-apex; largest pinnae ovate-oblong or lanceolate, shortly acuminate. Pinnules alternate, sessile or adnate, rather close, laxly ascending, lobed or deeply pinnatifid, oblong or broadly lanceolate, obtuse to short-acuminate, of rather variable size, the segments (lobes) very obtuse. Veins free, not close, the larger ones more or less raised. Margins entire or crenulate, ciliate, especially towards the apices of the lobes. Sori short, uniting a few vein-ends, confined to the lower parts of the sinuses, interrupted at the bottom or rarely continuous across it; indusium pale,

membranous, subentire, ovate to linear, ca. 1 mm wide. Paraphyses filiform, many-celled; spores trilete, medium brown, practically smooth, ca. 50—55 $\mu$.

Tropical America from Mexico and the West Indies to Bolivia.
In moist forests at middle and higher elevations.

SABA: The Mountain, 600—800 m (Boldingh 2218; Suringar 6170, L, s.n., L; Arnoldo 882); between Hellsgate and Santa Cruz (Stoffers 3450, juv.); without loc. (Boldingh 1826).

**Cheilanthes** Swartz, Syn. Fil. 126, 1806

Terrestrial, mostly rather small ferns with creeping or ascending, solenostelic or dictyostelic rhizome densely clothed with scales. Leaves continuous; petioles usually dark; lamina variously incised but never simple, hairy and/or scaly or covered with wax, the ultimate segments usually small and rigid. Veins free, bearing the sori at their broadened ends, these consisting of few sporangia, often more or less confluent, protected by the reflexed, more or less altered margin. Spores trilete, without perispore. About 130 species, widespread in both Hemispheres, most numerous in dry tropical and warm-temperate regions.

**Cheilanthes microphylla** (Swartz) Swartz

SWARTZ, Syn. Fil. 127, 1806; FÉE, 11e Mém. 28, 1866; GRISEBACH, Catal. Pl. Cub. 275, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 97, 1897; JENMAN, W. Ind. Gui. F. 108, 1899; DUSS, Fl. crypt. Ant. franç. 64, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 6, 1909; Fl. Ned. W. Ind. Eil. 101, 1913; Fl. D.W. Ind. Isl. II: 1, 1914; MAXON, Contr. U.S. Nat. Herb. 24(2): 52, 1922; URBAN, Symb. Ant. 9: 343, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 428, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 142, 1929; ALSTON, Jo. Bot. 73: 38, 1935; BOX & ALSTON, Jo. Bot. 75: 255, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 59, 1937; QUESTEL, Fl. Isl. St. Bartholomew 71, 1941; STEHLÉ, Caribb. For. 4(2): 84, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 1953; HODGE, Lloydia 17: 84, 1954; ARNOLDO, Zakflora fig. 93, 1954. — *Adiantum microphyllum* SWARTZ, Prodr. 135, 1788.

Rhizome short-creeping, clothed with reddish-brown, linear, filiform-tipped scales. Petioles close, erect, blackish, clothed with reddish fibrils, terete except for the flattened adaxial side, ca. 2—10 cm long. Lamina herbaceous, dark green, bipinnate or the basal part usually tripinnate, lanceolate acute, broadest at the base, ca. 5—20 cm long, 2—5 cm wide, 2—4 × as long as wide, $1^1/_2$—2 × as long as the petiole. Rachis often slightly flexuous, fibrillose. Pinnae patent or ascending, subopposite, the upper ones alternate, lanceolate, acute or the smaller ones obtuse, ca. 6—15 to a side. Pinnules patent, obtuse or acute, the larger ones of the basal pinnae pinnatifid or pinnate. Segments ovate-lanceolate, obtuse or subacute, up to ca. 3 × 6 mm, the terminal one often the largest, thinly clothed with small whitish septate hairs. Veins immersed, in the larger segments the costule abaxially with a blackish basal portion. Sori strongly confluent, more or less protected by the whitish, slightly modified margin. Spores subglobose, pale brown, the surfaces obscurely sculptured, nearly smooth, ca. 37—42 $\mu$.

West Indies, Mexico and Central America; southern United States.
On rocky banks and in open woods, at lower elevations.

BONAIRE: near Rooi Samboe (Boldingh 7387); near Rincón (Boldingh 7049, 7053); near Fontein (Stoffers 563); Seroe Grita Cabaai (Stoffers 859).

CURAÇAO: Santa Barbara (Stoffers 403); Grote Berg (Arnoldo 1918); St. Hyronymusberg (Arnoldo 37); hills near Hermanus (Boldingh 5647).
SABA: The Bottom (Suringar 6005, L); Ladder Gut, 100—200 m (Boldingh 1996; Stoffers 2774, 2801, 2805, 2809); seashore near Fort Bay landing (Boldingh 1651); between The Bottom and Mary's Point (Boldingh 1513); Booby Hill (Arnoldo 797).
ST. EUSTATIUS: along roads in Oranjestad (Boldingh 943 b; Suringar 6004, L); Cultuurvlakte (Suringar 6006, L); The Quill (Suringar 6003, L).

**Doryopteris** J. Smith, Jo. Bot. 4: 162. 1841; emend. Klotzsch, Linnaea 20: 342, 1847
Rhizome creeping or erect, solenostelic or dictyostelic, scaly. Petioles continuous, dark-sclerotic. Lamina simple or palmately divided, glabrous; veins free or anastomosing without free included veinlets. Sori submarginal on the veins-ends or on commissures, forming a more or less continuous line, the greatly modified margin reflexed, protecting the sorus. Paraphyses none. Spores trilete, with or without perispore.
30 species in the Tropics and southern Subtropics of both Hemispheres, most numerous in the New World.

**Doryopteris concolor** (Langsdorff & Fischer) Kuhn

KUHN in v. d. DECKEN, Reisen O. Afr. 33: 19, 1879 BOLDINGH, Fl. Ned. W. Ind. Eil. 101, 1913; Fl. D.W. Ind. Isl. II: 1, 1914; TRYON, Contr. Gray Herb. 143: 52, pl. 7 B, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 26, 1953. — *Pteris concolor* LANGSDORFF & FISCHER, Icon. Fil. 19, pl. 21, 1810. *Pellaea concolor* (Langsd. & Fisch.) BAKER in Martius, Fl. Bras. I²: 396, 1870; KRUG in URBAN, Engl. bot. Jb. 24: 98, 1897; DUSS, Fl. crypt. Ant. franç. 66, 1904.

Rhizome ascending, the scales subulate, dark-sclerotic with narrow hyaline margin. Petioles close, reddish-brown to black, rather dull, abaxially terete or subterete, adaxially in the upper part sulcate or wing-angled, ca. 3—20 cm long. Lamina herbaceous, rather light green, usually pentagonal in outline, deeply pinnatifid + lobed or bipinnatifid, ca. 4—15 cm long and broad, about as long as broad, the segments obtuse or acute, the veins free, ending in adaxial hydathodes. Spores subglobose, rather pale brown, with a perispore forming a wrinkled or crested outer layer, ca. 30—35 $\mu$.

In the New World only var. *concolor:* with the sori and indusia more or less continuous, usually broken at the sinuses.

Central America to Bolivia and Argentina, Jamaica, some of the Lesser Antilles; another variety in the Tropics of the Old World.
On open slopes and in scrub.

BONAIRE: Brandaris (Boldingh 7319, 7321; Stoffers 964, 974); Hobau (Stoffers 1027).
CURAÇAO: Seroe Christoffel, ca. 300 m (Arnoldo 1026, 1924).

**Pityrogramma** Link, Handb. d. Gewächs. 3: 19, 1833

Small to large, terrestrial ferns with short-creeping or ascending scaly dictyostelic rhizome. Leaves tufted, continuous, with dark polished petioles. Lamina usually much dissected, the abaxial side covered with waxy powder or less often hairy. Veins free. Sori along the veins, naked, elongate, confluent, in appearance often almost acrostichoid at full maturity. Spores trilete, with perispore.

About 35 species (possibly less, owing to the polymorphism of some of them), in the warmer parts of America, a few in Africa; naturalized elsewhere.

Key to the species:

| | |
|---|---|
| Abaxial side of lamina covered with yellow powder | *P. chrysophylla* |
| Abaxial side of lamina covered with whitish powder | *P. calomelanos* |

**Pityrogramma chrysophylla** (Swartz) Link

Link, Handb. d. Gewächs. 3: 19, 1833; Urban, Symb. Ant. 9: 339, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 438, 1926; Domin, Publ. Fac. Sci. Univ. Charles 88: 6, 1928; Mem. Roy. Cz. Soc. Sci. N.S. 2: 150, 1929; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 57, 1937; Stehlé, Caribb. For. 4(2): 85, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 44, 1953; Hodge, Lloydia 17: 86, 1954. — *Acrostichum chrysophyllum* Swartz, Schrad. Journ. 1800[2]: 14, 1801. *Ceropteris chrysophylla* (Swartz) Link, Fil. Hort. Berol. 143, 1841; Fée, 11e Mém. 30, 1866. *Gymnogramme calomelanos* (L.) Klf. var. *chrysophylla* (Swartz), Krug in Urban (incorr. ascr. to Hooker & Baker), Engl. bot. Jb. 24: 134, 1897. *Gymnogramme calomelanos* (L.) Klf. f. *chrysophylla* (Swartz), Duss (incorr. ascr. to Hooker & Baker), Fl. crypt. Ant. franç. 75, 1904.

Rhizome ascending or erect, bearing yellowish-brown narrowly lanceolate long-acuminate scales. Leaves close, 10—60 cm long, the petioles somewhat shorter to somewhat longer than the blades, castaneous to purplish, shining, scaly at the base, otherwise naked, terete, adaxially sulcate, marginate towards the apex. Lamina herbaceous, dark brownish-green when dry, oblong to lanceolate, acuminate, pinnate + pinnatifid, bipinnate, or bipinnate + pinnatifid, the rachis similar to the upper part of the petiole. Pinnae ca. 5—15 to a side, alternate or subopposite, short-stalked, more or less ascending, triangular to lanceolate, acuminate, the secondary rachis (costa) marginate. Upper pinnae gradually shortened, confluent into the leaf-apex. Segments more or less ascending, lanceolate, subacute or obtuse, entire, serrate, or variously cleft, of variable size, abaxially densely covered with golden-yellow powder. Sporangia at first conceiled by the powder, at full maturity not manifestly arranged in sori. Spores tetrahedral to subglobose, dark reddish-brown, the faces irregularly rugose, the edges smooth, ca. 42 $\mu$.

Widespread in tropical and subtropical America.
In thickets, on banks, at lower elevation.

Saba: Fort Bay Gut, between Promised Land and Thais Hill, 175—200 m (Stoffers 3422; depauperate, much smaller than usual).

**Pityrogramma calomelanos** (L.) Link

Link, Handb. d. Gewächs. 3: 20, 1833; Britton & Millspaugh, Bahama Fl. 469, 1920; Urban, Symb. Ant. 9: 338, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 438, 1926; Domin, Publ. Fac. Sci. Univ. Charles 88: 6, 1928; Mem. Roy. Cz. Soc. Sci. N.S. 2: 148, 1929; Alston, Jo. Bot. 73: 38, 1935; Box & Alston, Jo. Bot. 75: 255, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 57, 1937; Small, Ferns S.E. States 94, 95 (fig.), 1938; Questel, Fl. Isl. St. Bartholomew 71, 1941; Stehlé, Caribb. For. 4(2): 85, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 43, 1953; Hodge, Lloydia 17: 86,

1954. — *Acrostichum calomelanos* LINNAEUS, Spec. Plant. 2: 1072, 1753. *Gymnogramme calomelanos* (L.) KAULFUSS, Enum. Fil. 76, 1824; KRUG in URBAN, Engl. bot. Jb. 24: 134, 1897; DUSS, Fl. crypt. Ant. franç. 75, 1904. *Ceropteris calomelanos* (L.) LINK, Fil. Hort. Berol. 141, 1841; FÉE, 11e Mém. 30, 1866; MAXON, Contr. Gray Herb. 37: 180, 1909; BOLDINGH, Fl. Ned. W. Ind. Eil. 100, 1913. *Neurogramme calomelanos* (L.) DIELS in ENGLER & PRANTL, Nat. Pfl. 1[4]: 264, 1902; BOLDINGH, Fl. D.W. Ind. Isl. I: 6, 1909.

Rhizome shortly erect or ascending, bearing golden-brown narrowly lanceolate long-acuminate scales. Leaves tufted, of very variable size, up to 1 m long, the petioles as long as the lamina, otherwise as in the preceding species. Lamina membranous to subcoriaceous, adaxially dark brownish-green when dry, ovate, deltoid, or lanceolate, acuminate, usually bipinnate + pinnatifid, in smaller plants often less compound, the rachis similar to the petiole. Pinnae ca. 12—25 to a side, laxly ascending, lanceolate, acuminate, alternate or the lower ones subopposite, short-stalked, the basal ones largest, the upper ones gradually reduced and confluent into the leaf-apex. Secondary rachises marginate. Ultimate segments lanceolate or elliptic, of variable size, the base often unequal, the apex subacute to shortly acuminate, the margin entire, serrate, laciniate, or more deeply incised, often reflexed in dry condition. Abaxial surface more or less densely covered with whitish waxy powder which at first conceils the sporangia, these at full maturity not evidently arranged in sori. Spores as in the preceding species, ca. 41—49 $\mu$.

Tropical and subtropical America and Africa; naturalized elsewhere in the Tropics. A very variable species.
In dry woodland, in secondary growth, on open banks and barren slopes, at various elevations.

CURAÇAO: Old coppermine at Savonet Plantation (Arnoldo 2146).
SABA: near Sulphur Mines (Wagenaar Hummelinck s.n.; Stoffers 3125, 3134); The Mountain, 800 m (Boldingh 1795); ibid., near Windwardside, 600 m (Boldingh 2167, 2179); Crispine — Rendez Vous (Suringar 6160, L); Rendez Vous Hill, 600 m (Burgers 505); Ladder (Suringar 6157, L); Great Hill (Suringar 6158, L); Peperpot (Suringar 6159, L); Ladder Gut, 0—100 m (Stoffers 2830); gut south of St. John, 150—300 m (Stoffers 3005); Fort Bay (Stoffers 2899); Santa Cruz, 550—600 m (Stoffers 4347c); road from The Bottom to Windwardside (Stoffers 4603, 4605); Castle Hill, 300 m (Stoffers 4150); road to Hellsgate (Arnoldo 757); Fort Bay landing (Boldingh 1649); between The Bottom and Windwardside, 200 m (Boldingh 1302, 1367); Spring Bay Gut (Boldingh 2089); gut between Hellsgate and Mastic Gut, 300—400 m (Boldingh 2060, 2069); Saddle (Boldingh 1659); without loc. (Boldingh 1473, 2127, 1649, L); Saba? (Boldingh 1237A).
ST. EUSTATIUS: Top Panga (Suringar s.n., L); Boven (Suringar 6153, L); garden near Glass Bottle (Boldingh 1208); top of The Quill, 400 m (Boldingh 314); garden in Oranjestad (Boldingh 68); slope of The Quill near Bengalen (Boldingh 744); strand Westzijde (Suringar 6152, L); Great Gut (Suringar 6156, L); without loc. (Suringar s.n., v. Groll-Meyer 140).
ST. MARTIN: Mildrum Hill, 300—400 m (Boldingh 3177).

**Hemionitis** L., Spec. Plant. 2: 1077, 1753

Rhizome short, dictyostelic, scaly. Leaves close, continuous, hairy, with dark-sclerotic petiole, the lamina simple or pinnatifid, never elongate, subdimorphic, with anastomosing veins without included veinlets. Sori along the veins, elongate, naked, without paraphyses. Spores trilete.

About 8 species, one in south-eastern Asia, the others in tropical and subtropical America.

**Hemionitis palmata** L.

LINNAEUS, Spec. Plant. 2: 1077, 1753; FÉE, 11e Mém. 29, 1866; GRISEBACH, Catal. Pl. Cub. 276, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 137, 1897; DUSS, Fl. crypt. Ant. franç. 90, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 5, 1909; Fl. Ned. W. Ind. Eil. 100, 1913; URBAN, Symb. Ant. 9: 340, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 436, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 148, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 58, 1937; STEHLÉ, Caribb. For. 4(2): 85, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 36, 1953; HODGE, Lloydia 17: 86, 1954.

Rhizome erect ,the apex bearing pale brown, narrowly lanceolate long-acuminate non-clathrate entire scales. Petioles dark brown to blackish, rather shining, hairy, ca. 5—25 cm long (in sterile leaves often rather short), as long as to 3 × as long as the lamina. Lamina herbaceous, medium to brownish-green when dry, in sterile leaves pentagonal, ca. 5—10 cm long, slightly broader than long, deeply 3- or usually 5-lobed, the lobes broad, obtuse, shallowly crenate, hairy with pale brown pluricellular acicular hairs, especially on the margin; proliferous buds often present near the base of the terminal lobe. Fertile leaves similar but often longer-petioled and larger, more deeply lobed, the lobes narrower, acute, more regularly crenate, the veins on the abaxial side densely covered with sporangia. Spores tetrahedral, pale brown, densely beset with minute warts (perispore?), ca. 23—27 $\mu$.

Throughout tropical America, from Mexico and the Greater Antilles to Bolivia.
On open slopes and banks, at lower elevations.

ST. MARTIN: Mildrum Hill, 200—300 m (Boldingh 3118); mountain between Mont des Accords and Sentry Hill, 200—300 m (Boldingh 2893); Naked Boy Hill, 20—200 m (Boldingh 2716).

**Adiantum** L., Spec. Plant. 2: 1094, 1753

Terrestrial ferns with solenostelic or dictyostelic creeping or ascending rhizome bearing scales. Petioles continuous, dark, mostly polished. Lamina very variable, mostly pinnate to decompound, rarely simple, hairy, fibrillose, or ceraceous, most often naked. Ultimate segments often dimidiate or cuneate, sometimes articulate. Veins usually free. Sori along the distal parts of the veins on reflexed marginal lobes, without true indusium, sometimes spreading to the leaf-tissue between the vein-ends, without paraphyses. Spores trilete, without perispore.
About 200 species in the warmer and a few in temperate parts of both Hemispheres, most numerous in tropical America.

**Adiantum tenerum** Swartz

SWARTZ, Prodr. 135, 1788; FÉE, 11e Mém. 21, 1866; GRISEBACH, Catal. Pl. Cub. 274, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 96, 1897; JENMAN, W. Ind. Gui. F. 97, 1899; DUSS, Fl. crypt. Ant. franç. 63, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 7, 1909; Fl. Ned. W. Ind. Eil. 101, 1913; BRITTON & MILLSPAUGH, Bahama Fl. 467, 1920; URBAN, Symb. Ant. 9: 348,1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 425, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 140, 1929; ALSTON, Jo. Bot. 73: 38, 1935; BOX & ALSTON, Jo. Bot. 75: 255, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 63, 1937;

SMALL, Ferns S.E. States 121, 122 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 83, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 7, 1953; HODGE, Lloydia 17: 83, 1954.

Rhizome short-creeping, clothed with lanceolate acuminate shining dark brown scales with pale ciliate margins. Petioles close, ebeneous to dark brown, very lustrous, glabrous except for the deciduously paleate base, ca. 10—30 cm long, 1—2 mm thick, $^1/_2$—$1^1/_2$ × as long as the lamina. Lamina herbaceous to chartaceous, dark green, not rarely somewhat glaucous, ca. 12—50 cm long, 10—30 cm wide, ovate-oblong, mostly quadripinnate, the primary pinnae ascending, long-stalked, alternate; primary rachis flexuous. Axes of higher order similar to the petiole but more slender, those of the highest order wiry, not or hardly flexuous. Upper primary pinnae gradually less compound. Ultimate pinnules alternate, with a stalk of a few mm, glabrous, articulate with their stalks and caducous when dry, mostly 1—$1^1/_2$ cm long, $^3/_4$—1 cm wide, rhombic-oblong with cuneate base, the terminal pinnules more narrowly cuneate. Upper and outer margins rather irregularly and deeply or in fertile pinnules shallowly cleft or lobed. Veins close, flabellate, several times forked, immersed but visible as thin dark lines, in sterile pinnules running to small marginal teeth. Sori in larger pinnules 6—10, often two together on a lobe, separated by a shallow incision. Reflexed indusial lobes ca. $^3/_4$ mm wide, $^1/_2$—2 mm long, light to medium brown, glabrous, their marginal edge straight or shallowly convex. Sporangia borne on the vein-ends on the indusial lobes. Spores rather pale brown, tetrahedral, minutely verrucose, ca. 48—52 $\mu$.

Florida, West Indies to Trinidad, Mexico to northern South America.
In forest and shaded situations, at various elevations.

SABA: lower part of The Mountain, 250 m (Boldingh 1412); Parish Hill, 400 m (Boldingh 1373); Great Hill, 200—400 m (Suringar s.n.); ibid., 200 m (Suringar 6144, L); Gain Bay Gut (Suringar 6146, L); Ladder (Suringar 6141, L); Peperpot (Suringar 6142, L); road to Hellsgate (Arnoldo 755); Castle Hill, 300—350 m (Stoffers 4176); Great Rendez Vous, 450 m (Stoffers 3350); road from The Bottom to Crispine (Stoffers 2944).
ST. EUSTATIUS: Mountain N, 200 m (Suringar 6136, L); Miss Raders' Ravine (Suringar 6140, L); Bengalen (Suringar 6139, L); without loc. (Suringar s.n.).
ST. MARTIN: along roads from Cole Bay to Simson Bay (Boldingh 3247); hills above Colombier, 70—300 m (Proctor 18722).
Island?: (Wagenaar Hummelinck s.n.).

**Vittaria** J. E. Smith, Mém. Acad. Turin 5: 413, 1793

Epiphytic ferns with small rhizomes bearing numerous close narrow strongly clathrate scales. Leaves continuous, usually pendulous, close, simple, lanceolate to linear, glabrous, with a percurrent costa and reticulate veins without included veinlets, the areoles very oblique, usually in a single row, bordered by a continuous submarginal vein which bears the often immersed linear sorus. Sporangia mixed with paraphyses. Spores monolete or trilete, without perispore.

About 80 species (perhaps not all sufficiently distinct) in the Tropics and Subtropics of both Hemispheres.

**Vittaria lineata** (L.) J. E. Smith

J. E. SMITH, Mém. Acad. Turin 5: 413, 1793; FÉE, 3e Mém. 17, 1852; 11e Mém. 13,

1866; GRISEBACH, Catal. Pl. Cub. 275, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 136, 1897; DUSS, Fl. crypt. Ant. franç. 90, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 7, 1909; Fl. Ned. W. Ind. Eil. 102, 1913; BRITTON & MILLSPAUGH, Bahama Fl. 466, 1920; URBAN, Symb. Ant. 9: 355, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 403, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 113, 1929; ALSTON, Jo. Bot. 73: 39, 1935; BOX & ALSTON, Jo. Bot. 75: 256, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 67, 1937; SMALL, Ferns S.E. States 96, 97 (fig.), 1938; STEHLÉ, Caribb. For. 4(1): 42, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 70, 1953; HODGE, Lloydia 17: 73, 1954. — *Pteris lineata* LINNAEUS, Spec. Plant. 2: 1073, 1753.

Rhizome short-creeping, covered with a mass of densely tomentose roots and bearing iridescent linear long-attenuate entire clathrate scales. Leaves crowded, numerous, pendulous, chartaceous, dark to blackish green when dry, linear, 15 cm — over 1 m long, $1^1/_2$—3 mm wide, sessile, narrowed at the base, the apex shortly acuminate. Veins distant, immersed, forming a single row of longitudinal areoles. Sori sunk in a deep groove parallel to the margin of almost the whole lamina. Paraphyses branched, filiform, pluricellular, with clavate ends. Spores monolete, bean-shaped, pale yellowish, smooth, ca. 27—32 × 55—58 $\mu$.

Georgia, Florida, tropical America south to Uruguay and northern Argentina. Epiphytic on trees, at lower and middle elevations.

ST. EUSTATIUS: top of The Quill, 400 m (Boldingh 335; Stoffers 3957); The Quill (Suringar 5973, L); De Kant (Suringar 5974, L); without loc. (Boldingh 405, s.n.).

**Paltonium** Presl, Epimel. Bot. 156, 1849

A monotypic genus; characters of the species.

**Paltonium lanceolatum** (L.) Presl

PRESL, Epimel. Bot. 156, 1849; BOLDINGH, Fl. Ned. W. Ind. Eil. 102, 1913; BRITTON & MILLSPAUGH, Bahama Fl. 466, 1920; URBAN, Symb. Ant. 9: 358, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 406, 1926; CHRISTENSEN, Dansk Bot. Ark. 6(3): 70, 1929; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 118, 1929; ALSTON, Jo. Bot. 73: 39, 1935; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 68, 1937; SMALL, Ferns S.E. States 98, 99 (fig.), 1938; STEHLÉ, Caribb. For. 4(1): 42, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 43, 1953; HODGE, Lloydia 17: 74, 1954. — *Pteris lanceolata* LINNAEUS, Spec. Plant. 2: 1073, 1753. *Taenitis lanceolata* (L.) KAULFUSS, Enum. Fil. 130, 1824; GRISEBACH, Catal. Pl. Cub. 275, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 136, 1897; DUSS, Fl. crypt. Ant. franç. 92, 1904. *Neurodium lanceolatum* (L.) FÉE, 3e Mém. 28, 1852; 11e Mém. 14, 1866. *Heteropteris lanceolata* (L.) FÉE ex DIELS in ENGLER & PRANTL, Nat. Pfl. $I^4$: 305, fig. 161 E, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 7, 1909.

Rhizome short-creeping, dictyostelic, covered with a mass of densely tomentose roots and bearing lanceolate clathrate scales. Leaves close, articulate, with a winged petiole of one to a few cm. Lamina coriaceous, simple, lanceolate, obtuse to acuminate, ca. 15—35 cm long, 1—3 cm wide, 10 — over 25 × as long as wide, very gradually narrowed downwards, with entire cartilaginous margin. Costa protruding, percurrent; veins more or less prominulous, forming a network of oblique areoles, with included free veinlets pointing in all directions; fertile leaves conform. Sori naked, linear, submarginal, parallel to both margins in the upper part of the lamina, said to have some filiform paraphyses. Spores

monolete, bean-shaped, hyaline, without perispore, minutely tuberculate, ca. 45—52 × 25—32 $\mu$.

Florida, West Indies, scattered in Central and northern South America.
Epiphytic in forests, at middle elevations.

St. Eustatius: top of The Quill, 400 m (Boldingh 243, 316); slope of The Quill near Bengalen, 250 m (Boldingh 693).
St. Martin: Mount Paradise, 300—400 m (Boldingh 3231).

**Polypodium** L., Spec. Plant. 2: 1082, 1753

Small to medium-sized ferns with creeping dictyostelic rhizome bearing broad, often peltate scales, essentially epiphytic. Leaves articulate to the rhizome, the lamina simple to pinnate, rarely more highly compound, often scaly. Veins usually anastomosing, the pattern variable, mostly with free included veinlets, less often quite free, the free vein-ends often ending in hydathodes. Sori exindusiate, round or less often elongate, often paraphysate; spores monolete, without perispore.
Several hundred species of almost world-wide distribution, most numerous in warmer regions, often classed in a varying number of smaller genera.

Key to the species:

1. Lamina simple . . . . . 2
   Lamina pinnatifid or pinnate . . . . . 6
2. Leaves crowded, 20 cm — over 1 m long; sori in several rows between costa and margin . . . . . 3
   Leaves scattered on a long-creeping rhizome, up to ca. 15 cm long; sori in a single row between costa and margin . . . . . 4
3. Lamina with prominent secondary veins, the sori in a single row between them; free veinlets pointing in all directions; sporangia hairy *P. crassifolium*
   Lamina with weakly developed secondary veins, the sori often in double rows between them; most or all free veinlets pointing towards the margin; sporangia glabrous . . . . . *P. phyllitidis*
4. Lamina bearing numerous appressed lanceolate-linear scales *P. piloselloides*
   Lamina naked . . . . . 5
5. Most costal areoles with one or more free included recurrent veinlets; texture subcoriaceous or coriaceous . . . . *P. lycopodioides*
   Costal areoles flat, without included veinlets, or oblique, with one excurrent free veinlet; texture herbaceous to chartaceous . . *P. heterophyllum*
6. Lamina, expecially abaxially, bearing numerous bicolorous scales; veins not visible . . . . . *P. polypodioides*
   Lamina glabrous, hairy, or scaly along the rachis (costa); veins mostly evident . . . . . 7
7. Veins free . . . . . 8
   Veins anastomosing . . . . . 9

8. Abaxial side of rachis bearing small lanceolate scales; sori distinctly supramedial .. . . . . *P. plumula*

   Abaxial side of rachis not scaly; sori medial or slightly supramedial . . . . . *P. pectinatum*

9. Pinnae connected by wings $^1/_2$—1 cm broad; sori on the ends of two (rarely more) joining veins . . . . . *P. aurem*

   Pinnae free or connected by wings 1—2 mm broad; sori on the ends of single veins . . . . . 10

10. One or two rows of areoles between costa and margin; pinnae 6—12 mm wide . . . . . *P. loriceum*

    Three or four rows of areoles between costa and margin; pinnae $1^3/_4$—4 cm wide . . . . . *P. triseriale*

**Polypodium pectinatum L.**

LINNAEUS, Spec. Plant. 2: 1085, 1753; FÉE, 11e Mém. 46, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 128, 1897, at least in part; BOLDINGH, Fl. Ned. W. Ind. Eil. 105, 1913; URBAN, Symb. Ant. 9: 361, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 412, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 123, 1929; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 71, 1937; SMALL, Ferns S.E. States 75, 76 (fig.), 1938; STEHLÉ, Caribb. For. 4(1): 43, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 58, 1953; HODGE, 17: 78, 1954. — *P. plumula* auct. non H. B. Willdenow; BOLDINGH, Fl. D.W. Ind. Isl. I: 9, 1909, p.p. mai.

Rhizome short-creeping, ca. 4— 8 mm thick, densely covered with matted roots and bearing dark brown lanceolate scales. Petioles close, articulate to very short phyllopodia, very variable in length, usually up to ca. 15 cm, occasionally much longer, but always much shorter than the lamina, terete, usually olivaceous-brown or lead-coloured, thinly clothed with short whitish hairs, especially on the slightly flattened adaxial side, glabrescent, besides bearing small lanceolate very deciduous scales with long hair-like apex. Lamina thinly to firmly herbaceous, dark green or brown when dry, dull, lanceolate to linear, ca. 20—60 (or more) cm long, 2—11 cm wide, simply pinnate, in the apical part deeply pinnatifid, the rachis brown or lead-coloured, on both sides rather densely puberculous, non-paleaceous. Pinnae numerous, spreading, adnate, linear, ca. $1^1/_2$—$5^1/_2$ cm long, 3—6 mm wide just above the dilated base, contiguous or connected by a very narrow wing along the rachis, their width apart or closer, the upper pinnae gradually reduced, confluent into a short leaf-apex with pinnatifid base, the basal pinnae rather abruptly reduced, usually a few present as small wing-like appendages of the rachis. Costa brown or darker, percurrent, prominulous, especially on the abaxial side, slightly deflexed at the base (less than in P. plumula), puberulous, especially on the lower side where the leaf-tissue is also puberulous but often glabrescent. Veins immersed, rather obscure, free, once forked, the basal branch longer, often forked again, occasionally joined to the adjacent branch to form an areole; distal branch bearing the sorus at its end. Sori oval or round, naked, $^1/_2$—1 mm diam., in a single row, medial or slightly supra-medial. Some sporangia bearing hairs on the head. Paraphyses not seen,

said to be short, filamentous and branched. Spores oblong to bean-shaped, more or less lemon-coloured, densely verruculose, ca. 42—46 × 25—30 $\mu$.

Florida, tropical and subtropical America; a variable and probably inclusive species. Epiphytic and on boulders, in dry forests, at middle elevations.

ST. EUSTATIUS: The Quill (Suringar 6044, L; Burgers 197); slope of The Quill (Suringar 6043, L; s.n.); ibid., near Bengalen, 250 m (Boldingh 694); Bengalen (Suringar 6048, L); n.w. slope of The Quill, 350 m (Boldingh 406); top of The Quill, 400—450 m (Boldingh 222, 237, 311; Stoffers 3674, 3915, 3916); ibid., above Glass Bottle, 380—450 m (Stoffers 3567, 3570, 3578, 3595, 3684); bottom of The Quill, 250 m (Stoffers 3647); Mountain W, 200 m (Suringar 6047, L); crest (Suringar 6045, L).

**Polypodium plumula** Humboldt & Bonpland ex Willdenow

HUMBOLDT & BONPLAND ex Willdenow, Spec. Plant. 5: 178, 1810; FÉE, 11e Mém. 45, 1866; BOLDINGH, Fl. D.W. Ind. Isl. I: 9, 1909, p.p. min.; BRITTON, Fl. Bermuda 417, 1918; URBAN, Symb. Ant. 9: 361, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 412, 1926; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 72, 1937; SMALL, Ferns S.E. States 73, 74 (fig.), 1938; STEHLÉ, Caribb. For. 4(1): 43, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 49, 1953.

Rhizome short-creeping, ca. 2—3 mm in diam., enveloped in a dense mass of matted roots, bearing ferruginous to dark-brown lanceolate long-acuminate scales, their apices often lost on older parts of the rhizome. Leaves close, the petioles articulate to very short scaly phyllopodia, medium brown to blackish, dull, terete, thinly and deciduously puberulous, especially on the slightly flattened adaxial side, bearing a few appressed deciduous scales, usually a few (up to 10) cm long, much shorter than the lamina. Lamina chartaceous to coriaceous, usually dark brown when dry, dull, narrowly lanceolate to linear, ca. 15—40 cm (— over 1 m) long, 3—6 cm wide, deeply pinnatifid or in the basal part simply pinnate. Segments (pinnae) numerous, spreading or laxly ascending, linear, adnate, ca. $1^1/_2$—$2^1/_2$ cm long, 2—4 mm wide just above the dilated base, mostly obtuse or subacute, tapering from base to apex, their width apart, their bases contiguous or connected by a very narrow wing. Rachis dark, adaxially puberulous, abaxially thinly puberulous and bearing minute deciduous lanceolate brown scales. Upper segments gradually reduced, confluent into a short pinnatifid, occasionally caudate leaf-apex; basal segments somewhat, occasionally strongly reduced; all segments in dry condition strongly incurved towards the adaxial side. Margins entire, cartilaginous, ciliate. Costa stout, strongly elevated and dark on the abaxial side, percurrent, deflexed at the base. Leaf-tissue bearing scattered reddish hairs, these more numerous on the abaxial side of the midrib. Veins immersed, oblique, rather close, free, mostly once forked near the base, ending well within the margin, the acroscopic branch bearing the sorus on its end. Sori round, naked, small (ca $^1/_2$ mm), close to the margin, slightly protruding on the adaxial side. Some sporangia bearing hears on the head. Paraphyses filamentous, simple. Sporangia often bearing one or two few-celled hairs on one face near the apex. Spores oblong or bean-shaped, pale lemon-coloured, ca 44—47 × 32—35 $\mu$.

Florida, Bermudas, Greater Antilles, Trinidad; widespread in continental tropical and subtropical America.

Epiphytic and on rocks, at lower and middle elevations.

SABA: hill near The Bottom (Arnoldo 622); Ladder Gut, 100—200 m (Stoffers 2773, juv.); Crispine — Rendez Vous (Suringar 6049, L).

**Polypodium loriceum L.**

LINNAEUS, Spec. Plant. 2: 1086, 1753; GRISEBACH, Catal. Pl. Cub. 280, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 129, 1897; DUSS, Fl. crypt. Ant. franç. 49, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 8, 1909; Fl. Ned. W. Ind. Eil. 104, 1913; URBAN, Symb. Ant. 9: 362, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 414, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 129, 1929; BOX & ALSTON, Jo. Bot. 75: 256, 1957; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 73, 1937; STEHLÉ, Caribb. For. 4(1): 44, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 47, 1953; HODGE, Lloydia 17: 80, 1954. — *Goniophlebium loriceum* (L.) J. SMITH in HOOKER, Gen. Fil. t. 51, 1840; FÉE, 11e Mém. 67, 1866.

Rhizome wide-creeping, ca. 3—8 mm thick, often more or less glaucous, thinly clothed with appressed caducous roundish to broadly lanceolate brown clathrate scales. Petioles distant, naked, stramineous to castaneous, rather shining, articulate to short phyllopodia, terete except on the sulcate adaxial side, 3—30 cm long, considerably shorter than the lamina. Lamina very deeply pinnatifid or pinnate, oblong to broadly lanceolate, truncate at the base, shortly acuminate, herbaceous, brownish to blackish-green when dry, glabrous, ca. 15—50 cm long, 7—15 cm wide, 2—4 × as long as wide. Rachis similar to the petiole. Pinnae (segments) 15—40 to a side, spreading, subopposite, the upper ones alternate, about their width apart or closer, adnate, the leaf-tissue decurrent, especially on the acroscopic side, connecting the upper or sometimes all segments, the basal ones occasionally slightly shortened and somewhat reflexed, the lamina widest at or just above the base, upwards gradually narrowed, the upper segments strongly reduced, the leaf-tip consisting of a lanceolate segment slightly lobed at the base. Largest pinnae ca. $3^1/_2$—$8^1/_2$ cm long, 6—12 mm wide, 6—9 × as long as wide, subacute to acuminate, entire or slightly crenate towards the apex, the margin pale, slightly cartilagineous. Costa stramineous, elevated, percurrent. Secondary veins immersed or slightly elevated, arched-ascending; tertiary veins anastomosing, forming one or two rows of approximately isodiametric areoles, each with a free veinlet pointing obliquely upwards and bearing the sorus at its end, the marginal veins free. Sori in one or two rows between costa and margin, naked, round or elliptic, up to 2 mm in diam. Paraphyses not seen. Spores oblong to bean-shaped, bright lemon-coloured, densely verruculose, ca. 43—46 × 25—28 $\mu$.

Greater and Lesser Antilles; widespread in continental tropical America from Mexico to Bolivia.
Epiphytic in moist forests at higher elevations.

SABA: The Mountain, 800 m (Boldingh 2191; Stoffers 4208, 4215); ibid., 600—800 m (Suringar 6134, L).

**Polypodium polypodioides (L.) Watt**

WATT, Canad. Nat. ser. 2: 158, 1867; BOLDINGH, Fl. Ned. W. Ind. Eil. 105, 1913; MAXON, Contr. U.S. Nat. Herb. 17(7): 585, 1916; BRITTON & MILLSPAUGH, Bahama Fl.

470, 1920; URBAN, Symb. Ant. 9: 367, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 414, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 121, 1929; ALSTON, Jo. Bot. 73: 39, 1935; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 74, 1937; WEATHERBY, Contr. Gray Herb. 124: 28, 1939; QUESTEL, Fl. Isl. St. Bartholomew 71, 1941; STEHLÉ, Caribb. For. 4(1): 43, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 49, 1953; HODGE, Lloydia 17: 80, 1954. — *Acrostichum polypodioides* LINNAEUS, Spec. Plant. 2: 1068, 1753. *Marginaria polypodioides* (L.) TIDESTROM, Torreya 5: f. 1, 1905; SMALL, Ferns S.E. States 78, 79 (fig.), 1938. — *Polypodium incanum* SWARTZ, Prodr. 131, 1788; GRISEBACH, Catal. Pl. Cub. 280, 1866; KRUG in URBAN, Engl bot. Jb. 24: 130, 1897; DUSS, Fl. crypt. Ant. franç. 48, 1904. *Drynaria incana* (Swartz) FÉE, 11e Mém. 72, 1866. *Polypodium squamatum* auct. non L.; BOLDINGH, Fl. D.W. Ind. Isl. I: 10, 1909.

Rhizome wide-creeping, ca. 1—2 mm thick, densely clothed with appressed lanceolate acuminate scales with dark central portion and pale fimbriate margin. Petioles remote, erect, articulate to short knob-like scaly phyllopodia, ca. 3—15 cm long, usually as long as or shorter than the lamina, densely covered with ovate or lanceolate scales with dark centre and pale fimbriate margin of very variable size (up to $1^1/_2$ mm long). Lamina coriaceous, deeply pinnatifid, oblong, ca. 4—12 cm long, 2—5 cm wide, mostly 2—3 × as long as wide. Rachis abaxially with similar scales as the petiole. Segments ca. 8—15 to a side, subopposite or the upper ones alternate, spreading, the largest ca. 0.8—$2^1/_2$ cm long, 2—3 mm wide, linear or subspathulate, obtuse, entire, connected by a wing along the rachis up to 1 mm wide; lower segments sometimes slightly reduced and reflexed, the upper ones gradually reduced, the leaf-tip consisting of a few confluent or one reduced segment. Adaxial side of rachis and leaf-tissue thinly clothed with bicolorous peltate strongly fimbriate scales; abaxial side densely clothed with overlapping bicolorous scales. Veins immersed, not visible, once or twice forked, anastomosing, forming one or two series of areoles, or partly free. Sori close to the margin, round or elliptic, $^1/_2$—1 mm in diam., immersed in shallow pockets of leaf-tissue which protrude on the adaxial side. Paraphyses not seen.
Widespread in tropical and temperate America from the eastern United States to northern Argentina; a closely related species in South Africa.
In the Netherland Antilles only var. *polypodioides:* All scales with strongly fimbriate margins, those of the abaxial side of the lamina mostly ovate or lanceolate, not subulate. Spores oblong to bean-shaped, more or less lemon-coloured, obscurely verrucose, ca. 36—41 × 52—60 $\mu$.

Southern Mexico to Costa Rica, West Indies, Trinidad and Tobago and adjacent Venezuela, Margarita Island.
On rocks and walls and on the bases of tree-trunks, rarely in woods, at lower and middle elevations.
In dry condition the lamina is often curled up and the scaly abaxial surface is exposed.

SABA: The Mountain, 600 m (Boldingh 1771); between The Bottom and Windwardside, 200 m (Boldingh 1306); between The Bottom and Crispine, 200—350 m (Stoffers 3044); between The Bottom and Saddle, 325—350 m (Stoffers 3401, 3403); Windwardside, 400 m (Stoffers 4331); road to The Mountain (Arnoldo 767); The Mountain — Rendez Vous, 400 m (Suringar s.n. p.p., L); Hellsgate, 700 m (Burgers 519); Hellsgate Gut (Suringar 5998, L); Ladder Gut, 100—200 m (Stoffers 2155, 2806; Suringar 5997, L); Gain Bay Gut (Suringar 5996, L); Parish

Hill (Suringar 5993, L); Castle Hill, 250—300 m (Stoffers 4199); Booby Hill, 400 m (Stoffers 4307); Peperpot (Suringar 5994, L).
St. Eustatius: slope of The Quill near Bengalen, 50—200 m (Boldingh 643, 663); top of The Quill near Glass Bottle, 380—400 m (Stoffers 3589, 3594); bottom of The Quill, 250 m (Stoffers 3647).
St. Martin: mountain between Mont des Accords and Sentry Hill, 200—300 m (Boldingh 2856); French border (Suringar 5999, L).
Island?: (Boldingh 2231).

**Polypodium aureum** L.

Linnaeus, Spec. Plant. 2: 1087, 1753; Grisebach, Catal. Pl. Cub. 280, 1866; Krug in Urban, Engl. bot. Jb. 24: 130, 1897; Duss, Fl. crypt. Ant. franç. 30, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 8, 1909; Fl. Ned. W. Ind. Eil. 104, 1913; Fl. D.W. Ind. Isl. II: 1, 1914; Urban, Symb. An.t 9: 363, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 419, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 132, 1929; Alston, Jo. Bot. 73: 89, 1935; Box & Alston, Jo. Bot. 75: 256, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 73, 1937; Questel, Fl. Isl. St. Bartholomew 71, 1941 (excl. syn.); Stehlé, Caribb. For. 42(1): 44, 1942; Proctor, Bull. Inst. Jam. Sci. S. 5: 46, 1953; Hodge, Lloydia 17: 81, 1954; Arnoldo, Zakflora fig. 92, 1954. — *Chrysopteris aurea* (L.) Link, Fil. sp. Hort. Berol. 121, 1841; Fée, 11e Mém. 71, 1866. *Phlebodium aureum* (L.) J. Smith, Jo. Bot. 4: 59, 1841; Maxon, Contr. Gray Herb. 37: 179, 1909; Britton & Millspaugh, Bahama Fl. 470, 1920; Small, Ferns S.E. States 82, 83 (fig.), 1938.

Rhizome long-creeping, ca. $^1/_2$—1 cm in diam., densely clothed with golden-brown narrowly lanceolate long-acuminate to subulate denticulate-ciliate scales with darker bases. Leaves remote, the petioles articulate to short stout phyllopodia, yellowish to dark brown, rather shining, terete except for the sulcate adaxial side, ca. 5—60 cm long, less than half as long as to about equalling the lamina. Lamina chartaceous to subcoriaceous, dark (mostly brownish) green when dry, more or less glaucous, especially on the abaxial side, glabrous, trilobed or usually deeply pinnatifid, oblong to broadly lanceolate, ca. 8—50 cm (—over 1 m) long, 6—30 (—50) cm wide, with up to ca. 15 segments to a side and a conform terminal segment, this relatively large, particularly in small leaves. Segments lanceolate or ligulate, spreading or laxly ascending, subopposite or alternate, mostly about their width apart, connected by a wing ca. $^1/_2$—1 cm wide, narrowest on the basal side, with rounded sinus, mostly acute, ca. $^1/_2$—4 cm broad, the basal ones little or not shortened, the upper ones somewhat shortened. Margin cartilaginous, distantly and shallowly serrate to subentire; costa stout, elevated, especially abaxially; secondary venation uniform, immersed but readily visible, densely reticulate in a characteristic pattern: costal areoles short, broad, the other areoles long, narrow, oblique, one or two rows of large paracostal areoles, each with two (rarely more) included veinlets bearing the sorus at their junction, the outer areoles smaller, without free veinlets; in sterile leaves the pattern is more irregular and complicated. Areoles of the rachis-wing usually without free veinlets. Sori one or usually in two rows between costa and margin, round or oval, naked, up to 3 mm in diam. Paraphyses described as filiform. Spores oblong to bean-shaped, bright lemon-coloured, densely verrucose, ca. 44—47 × 27—29 $\mu$.

Throughout tropical and warm-temperate America from Florida to northern Argentina.

On banks and tree-trunks, often in woodland, at lower and middle elevations. Apparently common in the Windward Group.

CURAÇAO: Seroe Christoffel (Wagenaar Hummelinck s.n.; Arnoldo 24, 1965; Suringar 5975, L, 5977, s.n.; Burgers 19; Boldingh 5012, 5020; Stoffers 1188); ibid., top (Suringar 5978, L); Savonet (Suringar 5980, L, approaching var. *areolatum* [H. & B. ex Willd.] Baker).
SABA: Windwardside (Boldingh 1948); Windwardside — Hellsgate, 400—450 m (Boldingh 1661; Stoffers 3368); The Mountain, near Hellsgate, 600 m (Boldingh 2287); lower part of the Bottom Mountain, 300 m (Boldingh 1441, L, U); hill near The Bottom (Arnoldo 629); between The Bottom and Crispine, 250—350 m (Stoffers 2966, 2967, 2983); near Saddle, 350—400 m (Stoffers 4127); Castle Hill, sea side, 300—350 m (Stoffers 4140); Booby Hill, 400 m (Stoffers 4284); loc. illigib., 300 m (Suringar 6132, L).
ST. EUSTATIUS: Slope of The Quill near Bengalen, 250 m (Boldingh 698); without loc. (v. Grol 280; Boldingh ? s.n.).
ST. MARTIN: Mount Paradise, 300—400 m (Boldingh 3223, 3233, 3235; Stoffers 4532); mountain between Mont des Accords and Sentry Hill, 200—300 m (Boldingh 2903); Mildrum Hill, 300—400 m (Boldingh 3134).

**Polypodium triseriale** Swartz

SWARTZ, Schrad. Journ. 1800[2]: 26, 1801; STEHLÉ, Caribb. For. 4(1): 44, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 51, 1953; HODGE, Lloydia 17: 80, 1954. — *Polypodium brasiliense* POIRET, Encycl. Méth. 5: 525, 1804; KRUG in URBAN, Engl. bot. Jb. 24: 129, 1897; DUSS, Fl. crypt. Ant. franç. 49, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 8, 1909; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 131, pl. 23 fig. 1, 4, 1929; ALSTON, Jo. Bot. 73: 39, 1935; BOX & ALSTON, Jo. Bot. 75: 256, 1937. *Goniophlebium brasiliense* (Poir.) FARWELL, Am. Midl. Natural. 12: 295, 1931; SMALL, Ferns S.E. States 80, 81 (fig.), 1938. *Polypodium neriifolium* SCHKUHR, Krypt. Gew. 1: 14, 1806; GRISEBACH, Catal. Pl. Cub. 280, 1866. *Polypodium attenuatum* auct. non H. & B. ex Willd.; BOLDINGH, Fl. Ned. W. Ind. Eil. 103, 1913.

Rhizome short-creeping, stout, ca. $^3/_4$—1 cm thick, densely clothed with broadly lanceolate long-acuminate erose scales with clathrate dark brown centre and paler non-clathrate margins. Leaves rather close, the petioles articulate to short stout phyllopodia, ca. 15—40 cm long, about half as long as the lamina, rather stout, pale to medium brown, lustrous, naked, terete except at the sulcate adaxial side. Lamina firmly herbaceous or chartaceous, rather dark green or brownish when dry, glabrous, oblong-ovate, ca. 25—70 cm long, 15—40 cm wide, ca. $^1/_2$—$^3/_4$ × as wide as long, simply pinnate, the rachis similar to the petiole. Pinnae ca. 5—25 to a side, spreading or ascending, subopposite or the upper ones alternate, sessile, at least the upper ones adnate, the leaf-tissue more or less decurrent on the basiscopic side, the largest ca. 12—20 cm long, $1^3/_4$—4 cm wide, 6—10 × as long as wide, widest above the base or towards the middle, lanceolate, the base cuneate or rounded-narrowed, the apex usually shortly acuminate, the margin entire or slightly wavy, narrowly yellowish-cartilaginous. Basal pinnae little or not reduced, upper pinnae somewhat reduced, terminal pinna of the size of the upper ones, usually more or less connected at the base with one or two lateral ones. Costa stramineous or fawn-coloured, percurrent, elevated on both sides, not grooved; secondary venation evident, mostly at least near the costa slightly prominulous, the secondary veins parallel, rather patent, more

or less flexuous, not reaching the margin, giving off tertiary veins at regular intervals, these anastomosing in pairs under an open angle, sending a free excurrent veinlet towards the margin, thus each areole with one included veinlet, the costal ones springing from the basiscopic side of the areole; areoles in 3—4 series between costa and margin. Outer veins free, some reaching the margin. Sori round, naked, 1—2 mm in diam., terminal on the included veinlets, in 2 or 3 series between costa and margin, the outer series often incomplete. Paraphyses apparently wanting. Spores oblong to bean-shaped, bright lemon-coloured, densely beset with small rounded warts, ca. 41—45 × 27—32 $\mu$.

Florida, Cuba, Jamaica, some of the Lesser Antilles; widespread in continental tropical America. Epiphytic and on banks, at middle elevation.

SABA: between The Bottom and Windwardside, 200 m (Boldingh 1294); Parish Hill, 200—200 m (Suringar 6011, L, 6133, L).
ST. EUSTATIUS: top of The Quill, 400 m (Boldingh 291, 300 [juv.], 321); ibid., 340—450 m (Stoffers 3933); ibid., 400—500 m (Boldingh 485; Stoffers 3949); De Kant (Suringar 6008, L, 6010, L); without loc. (Suringar s.n.).
ST. MARTIN: Mildrum Hill, 300—400 m (Boldingh 3144).

**Polypodium phyllitidis L.**

LINNAEUS, Spec. Plant. 2: 1083, 1753; GRISEBACH, Catal. Pl. Cub. 281, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 131, 1897; DUSS, Fl. crypt. Ant. franç. 41, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 9, 1909; Fl. Ned. W. Ind. Eil. 105, 1913; URBAN, Symb. Ant. 9: 365, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 417, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 133, 1929; ALSTON, Jo. Bot. 73: 39, 1935; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 73, 1937; STEHLÉ, Caribb. For. 4(1): 44, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 49, 1953; HODGE, Lloydia 17: 81, 1954. — *Campyloneurum phyllitidis* (L.) PRESL, Tent. Pterid. 190, 1836; FÉE, 11e Mém. 69, 1866; BRITTON & MILLSPAUGH, Bahama Fl. 471, 1920; SMALL, Ferns S.E. States 85, 87 (fig.), 1938. — *Polypodium laevigatum* auct. non Cav.; BOLDINGH, Fl. Ned. W. Ind. Eil. 104, 1913.

Rhizome short-creeping or ascending, ca. $^3/_4$—1 mm thick, clothed with ovate acute entire light-brown clathrate scales and embedded in a thick mass of brown-tomentose roots. Leaves close, the petioles virtually absent to a few cm long, indistinctly articulate to very short phyllopodia, stramineous or light brown, deciduously paleate at the base, otherwise naked, adaxially canaliculate, gradually passing into the lamina which is very long-decurrent with wings. Lamina more or less glossy, herbaceous to subcoriaceous, bright or brownish-green when dry, glabrous, simple, lanceolate or linear, ca. 20 cm—1 m long, $2^1/_2$—9 cm wide, broadest near the middle, ca. 6—15 × as long as wide, the base very long-cuneate, the apex obtuse or mostly acute or shortly acuminate, the edge entire, cartilaginous, slightly revolute, the costa stout, pale, percurrent, abaxially strongly elevated. Veins more or less elevated, especially the secondary ones, these oblique, straight, not reaching the margin, connected by arcuate transverse veins, the areoles thus formed with two or three free straight clavate veinlets pointing to the margin, sometimes connected with the next transverse vein and subdividing the areoles, occasionally a few recurrent free veinlets present; costal areoles mostly with one free veinlet. Sori round, naked, without

paraphyses, on the excurrent veinlets, usually near their ends, one or two per areole. Spores bean-shaped, very pale yellowish, almost colourless, smooth, ca. 55—60 × 28—32 $\mu$.

Very widespread in tropical and subtropical America from Florida to Uruguay and northern Argentina.
Epiphytic or on banks or rocks, in seasonal and evergreen forests, at middle elevations; apparently common.

SABA: Spring Bay Gut (Boldingh 2109, juv.); Gain Bay Gut (Suringar 6064, L); The Mountain, 400—800 m (Suringar 6066, L); Windwardside — Hellsgate (Boldingh 1677); road to Hellsgate (Arnoldo 758); between The Bottom and Saddle, 300—400 m (Stoffers 3110); near Saddle, 350—400 m (Stoffers 4120); between Crispine and Small Rendez Vous, 300—400 m (Stoffers 2936).
ST. EUSTATIUS: The Quill (Suringar s.n.; Suringar 6063, L; Suringar 6135 [juv.], L); top of The Quill, 400—500 m (Boldingh 235, 320, 484, 507; Stoffers 3969); ibid., at Glass Bottle, 380—400 m (Stoffers 3568); slope of The Quill above Glass Bottle, 275—340 m (Stoffers 3840); Bengalen (Suringar 6062, L); slope of The Quill near Bengalen, 250 m (Boldingh 704, 705); inner slope of The Quill, 350 m (Boldingh 462); slope of The Quill (Suringar 6064, L); northern slope of The Quill, 240 m (Stoffers 3991); bottom of The Quill, 250 m (Stoffers 3625, 3646, 3648); without loc. (Mrs. v. Groll-Meyer 183).
ST. MARTIN: Mildrum Hill, 300—400 m (Boldingh 3138); French border (Suringar 6068, L).

**Polypodium crassifolium** L.

LINNAEUS, Spec. Plant. 2: 1083, 1753; GRISEBACH, Catal. Pl. Cub. 281, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 132, 1897; DUSS, Fl. crypt. Ant. franç. 42, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 9, 1909; Fl. Ned. W. Ind. Eil. 104, 1913; URBAN, Symb. Ant. 9: 366, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 418, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 134, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 75, 1937; STEHLÉ, Caribb. For. 4(1): 44, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 46, 1953; HODGE, Lloydia 17: 81, 1954. — *Pleuridium crassifolium* (L.) FÉE, Gen. Fil. 274, 1852; 11e Mém. 73, 1866. *Pessopteris crassifolia* (L.) UNDERWOOD & MAXON, Contr. U.S. Nat. Herb. 10: 485, 1908.

Rhizome short-creeping, stout, ca. 1—2 cm thick, densely clothed with lanceolate long-acuminate scales with dark brown clathrate centre and paler erose margins. Leaves remote, the petioles articulate to short stout phyllopodia, pale brown, ca. 5—25 cm long, the adaxial side with a thick-margined groove, upwards gradually winged by the long-decurrent base of the lamina. Lamina subcoriaceous to coriaceous, brown when dry, naked when mature, simple, elongate-oblong or ligulate, ca. 40 cm—over 1 m long, 5—15 cm wide, the base long-cuneate, the apex obutse, acute, or shortly acuminate, the margin entire, cartilaginous; costa stout, elevated on both sides, percurrent, adaxially sulcate. Secondary veins prominulous, oblique, straight, almost reaching the margin; tertiary venation immersed, obscure, forming a dense network of areoles with free included veinlets pointing in all directions, ending in hydathodes on the adaxial surface. Sori round or oval, naked, up to 4 mm in diam., in a single row between the secondary veins, up to ca. 12 rows between costa and margin, on the junctions of the tertiary veins, mostly confined to the upper part of the lamina. Most sporangia bearing several one- or two-celled hairs in the upper part, near the annulus; paraphyses

not seen, said to be filiform and fugacious. Spores oblong to faintly bean-shaped, very pale, almost colourless, smooth, ca. 45—50 × 28—38 $\mu$.

Widespread in tropical and subtropical America from Cuba and Mexico to Uruguay and northern Argentina.
Epiphytic and terrestrial, at higher elevations.

SABA: The Mountain, 600—800 m (Boldingh 2193 [juv.]; Suringar 6149, L, s.n.).

**Polypodium piloselloides L.**

LINNAEUS, Spec. Plant. 2: 1083, 1753; GRISEBACH, Catal. Pl. Cub. 280, 1856; KRUG in URBAN, Engl. bot. Jb. 24: 129, 1897; DUSS, Fl. crypt. Ant. franç. 39, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 9, 1909; Fl. Ned. W. Ind. Eil. 105, 1913; URBAN, Symb. Ant. 9: 368, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 413, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 122, 1929; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 74, 1937; STEHLÉ, Caribb. For. 4(1): 43, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 49, 1953; HODGE, Lloydia 17: 80, 1954. — *Craspedaria piloselloides* (L.) FÉE, Gen. Fil. 264, 1852; 11e Mém. 70, 1866.

Rhizome very widely creeping, filiform, $^1/_2$—1 mm thick, densely covered with lanceolate long-acuminate ferrugineous entire peltate scales with appressed bases and spreading tips. Leaves distant, articulate to short knob-like phyllopodia, chartaceous to coriaceous, usually brownish when dry, dull, both surfaces thinly beset with small appressed lanceolate-linear brown scales with pale-margined dilated base, the margin of the lamina entire, ciliate by the scales; lamina simple, more or less dimorphic: sterile lamina elliptic to ovate-oblong, sometimes broadly lanceolate or spathulate, broadly rounded to subacute at the apex, broadly cuneate at the base, ca. 1—5 cm long, $^1/_2$—$2^1/_2$ cm wide, 2—4 × as long as wide, the petiole virtually absent to 2 cm long, much shorter than the lamina, covered with similar scales; fertile lamina relatively narrower, lanceolate or linear, obtuse or subacute, the base more narrowly cuneate, ca $1^1/_2$—7 cm long, 3—10 mm wide, 3—9 × as long as wide, the petiole virtually absent to $2^1/_2$ cm long. Costa slightly elevated, not reaching the apex; veins immersed, obscure, obliquely ascending, partly anastomosing, forming a row of large oblique areoles along the costa, each with a free included excurrent veinlet springing from the basiscopic side of the areole, the outer veins free, ending within the margin, sometimes forming a second row of areoles without free veinlets. Sori large, up to 2 mm in diam., round, naked, in one row between costa and margin, on the ends of the included veinlets, in smaller fertile leaves confluent at full maturity, almost covering the whole abaxial surface. Sporangia intermingled with long very narrow scales, their greater part hair-like, considerably surpassing the sporangia. Spores shortly elliptic to weakly bean-shaped, hyaline, densely verruculose, ca. 36—50 × 54—60 $\mu$.

Guatemala, Greater and Lesser Antilles.
Epiphytic on trees, in moist forests, palm-brakes, and on banks and stone walls, at middle and higher elevations.

SABA: Booby Hill, 300 m (Boldingh 1581, L, U); St. Giles (Boldingh 1866); The Mountain, 800—835 m (Boldingh 1804; Stoffers 4236); ibid., near Windwardside, 600 m (Boldingh 2171); ibid., Rendez Vous side, 600—680 m (Stoffers

3249); Crispine — Rendez Vous, 400 m (Suringar 6096, L, s.n., p.p., L); Hellsgate Gut near Devilshand (Suringar 6097, L).
ST. MARTIN: Mount Paradise, 300—400 m (Boldingh 3218).

**Polypodium heterophyllum** L.

LINNAEUS, Spec. Plant. 2: 1083, 1753; URBAN, Symb. Ant. 9: 366, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 416, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 137, 1929; ALSTON, Jo. Bot. 73: 39, 1935; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 74, 1937; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 47, 1953. — *Phymatodes heterophyllum* (L.) SMALL, Ferns of Florida 81, 1931; Ferns S.E. States 91, 92 (fig.), 1938. — *Polypodium serpens* SWARTZ, Prodr. 131, 1788; GRISEBACH, Catal. Pl. Cub. 280, 1866; non Forster, 1786. — *Polypodium swartzii* BAKER, Syn. Fil. 357, 1868; KRUG in URBAN, Engl. bot. Jb. 24: 131, 1897. — *Polypodium exiguum* HEDWIG, Mag. Nat. Hist. n.s. 2: 458, 1838; URBAN, Symb. Ant. 9: 366, 1925; STEHLÉ, Caribb. For. 4(1): 44, 1942. *Phymatodes exigua* (Hedw.) UNDERWOOD, Torreya 3: 18, 1903; BRITTON & MILLSPAUGH, Bahama Fl. 471, 1920. — *Polypodium vacciniifolium* auct. non Langsd. & Fisch.; BOLDINGH, Fl. Ned. W. Ind. Eil. 106, 1913. *Polypodium lycopodioides* auct. non L.; BOLDINGH, Fl. D.W. Ind. Isl. I: 8, 1909, in part.

Rhizome very widely creeping, filiform, ca. $^3/_4$—2 mm thick, clothed with narrowly lanceolate long-acuminate ferrugineous or dull-brown entire peltate appressed or more or less spreading scales. Leaves distant, articulate to very short phyllopodia, herbaceous, usually rather dark green when dry, dull, simple, somewhat dimorphic: sterile lamina very variable, ovate or obovate to elliptic-lanceolate or narrowly lanceolate, ca. $1^1/_2$—15 cm long, 8—20 mm wide, $1^1/_2$—8 × as long as wide, entire, broadly rounded to subacute at the apex, the base cuneate (often narrowly), the petiole virtually absent to 15 mm long, usually much shorter than the lamina, glabrous, narrowly winged upwards or throughout; fertile lamina generally narrower, narrowly lanceolate to linear, mostly subacute, the base long and narrowly cuneate, the edges wavy or shallowly and remotely crenate, 3—13 cm long, 5—11 mm wide, 6—15 × as long as wide. Costa prominulous, almost percurrent; veins immersed but readily visible, oblique, anastomosing in a pattern similar to that of the preceding species but often with a discontinuous series of flat costal areoles without included veinlets, the included veinlets of the largest areoles then springing from the outer side of these costal areoles, otherwise from the basiscopic side of the larger areoles, short, sometimes prolonged and joining the next arch of veins, then the whole lamina occasionally without any included veinlets. Sori round or oval, naked 1—$1^1/_2$ mm in diam., in one row between costa and margin, on the ends of the free included veinlets. Sporangia intermingled with very narrow scales with long hair-like tips surpassing the sporangia. Spores monolete, bean-shaped, hyaline, densely and minutely tuberculate, ca. 48—55 × 28—32 $\mu$.

Florida, Bahamas, Greater and some of the Lesser Antilles.
On trunks and branches of trees, occasionally on rocks, at various elevations.

SABA: Spring Bay Gut (Boldingh 2094).
ST. EUSTATIUS: between Venus and Little Mountains, 40—100 m (Stoffers 4019).
ST. MARTIN: Mount Paradise, 200—400 m (Boldingh 3227, 3229, 3318); Naked Boy Hill, 200—265 m (Boldingh 2722, 2724); hills on e. side of Cul de Sac (Stoffers 2652); Sentry Hill (Suringar 6161, L).

**Polypodium lycopodioides L.**

LINNAEUS, Spec. Plant. 2: 1082, 1753; KRUG in URBAN, Engl. bot. Jb. 24: 132, 1897; DUSS, Fl. crypt. Ant. franç. 40, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 8, 1909, in part; Fl. Ned. W. Ind. Eil. 104, 1913; URBAN, Symb. Ant. 9: 366, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 417, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 136, 1929; ALSTON, Jo. Bot. 73: 39, 1935; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 74, 1937; STEHLÉ, Caribb. For. 4(1): 44, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 48, 1953; HODGE, Lloydia 17: 81, fig. 46, 1954. — *Drynaria lycopodioides* (L.) FÉE, Gen. Fil. 270, 1852; 11e Mém. 71, 1866.

Rhizome very widely creeping, 2—4 mm in diam., densely clothed with more or less appressed narrowly lanceolate peltate ciliate scales with spreading filiform apex, dark base and ferrugineous or reddish-brown apex becoming whitish with age. Leaves distant, articulate to very short densely scaly phyllopodia, chartaceous to coriaceous, usually dark brown when dry, dull, simple, naked, the margin slightly cartilaginous, often revolute, entire or faintly sinuous, slightly dimorphic: sterile lamina lanceolate, ligulate, or rarely almost linear, 2—15 cm long, 7—25 mm wide, 3— over 10 × as long as wide, the apex broadly rounded to acute, the base long-cuneate, the petiole virtually absent to 1 cm long, winged; fertile lamina narrowly lanceolate to linear, broadest at or below the middle, 3—12 cm long, 5—15 mm wide, 5—15 × as long as wide, usually acute or shortly acuminate, otherwise as the sterile. Costa elevated, percurrent; veins slightly prominulous, at least near the costa, anastomosing in a rather variable pattern: secondary veins departing from the costa under an open angle, usually forming a series of flat costal areoles with one or two recurrent free veinlets and a larger row of paracostal areoles with recurrent and/or excurrent free veinlets, sometimes with included smaller areoles or not separated from the costal row; the outer veins forming an incomplete third series of exappendiculate areoles, otherwise free, not reaching the margin. Sori large, 1—$1^1/_2$ mm indiam., round, naked, in a single row between costa and margin, on the ends or at the junction of the free veinlets of the paracostal areoles, slightly protruding on the adaxial side. Paraphyses filiform, multicellular, slightly branched, gland-tipped. Spores monolete, bean-shaped, hyaline, colourless, minutely tuberculate, ca. 37—35 × 25—28 $\mu$.

Throughout tropical America; tropical Africa. Several regional forms of this widespread species have been described.

Epiphytic and on rocks and walls, at lower and middle elevations.

SABA: hill near The Bottom (Arnoldo 619); Parish Hill, 400 m (Boldingh 1374; 6058, L); Parish Hill — Great Hill (Suringar 6060, L); between The Bottom and Mary's Point, 100—200 m (Boldingh 1499); Peperpot (Suringar 6057, L); between The Bottom and Crispine (Stoffers 2972, 3033); Crispine — Rendez Vous (Suringar 6059, L); Booby Hill, 400 m (Stoffers 4294); The Mountain (Suringar 6056, L, p.p.); ibid., 600 m (Boldingh 1743); ibid., near Hellsgate (Boldingh 2282); ibid., near Windwardside, 450 m (Stoffers 3332); Windwardside (Boldingh 1941, L, U, with several forked leaves); Windwardside (Stoffers 4332).

ST. EUSTATIUS: Bengalen (Suringar 6055, L); slope of The Quill near Bengalen, 200 m (Boldingh 692); slope of The Quill (Suringar 6050, L); n.w. slope of The Quill, 350 m (Boldingh 408); slope of The Quill between Glass Bottle and White Wall, 270 m (Stoffers 4073); top of The Quill, 350—500 m (Boldingh 266, 2591; Stoffers 3697, 3931, 3971); ibid., near Glass Bottle, 380 m (Stoffers

3580); Signal Hill, 200 m (Boldingh 1051); without loc. (Mrs. v. Groll-Meyer 179). St. Martin: mountain between Mont des Accords and Sentry Hill, 200—300 m (Boldingh 2902); Sentry Hill, 325 m (Stoffers 2745).

**Xiphopteris** Kaulfuss, Jb. f. Pharm. 35, 1820

Small epiphytic ferns with erect or ascending solenostelic or dictyostelic rhizome clothed at the apex with entire or ciliate scales. Leaves continuous, with short petiole and lanceolate or linear lobed or pinnate lamina, often clothed with unicellular hairs; segments small, entire or shallowly lobed, adnate, with a simple or forked vein. Sori round or elliptic, naked, on an elongate receptacle, usually on the acroscopic branch of the vein, with or without paraphyses. Sporangia mostly glabrous. Spores trilete, without perispore, containing chlorophyll.
About 50 species in tropical, subtropical, and south-temperate regions of both Hemispheres.

Key to the species:

Lamina glabrous; sori confined to the hardly incised apical part of the fertile lamina, confluent . . . . . *X. serrulata*

Lamina ciliate; sori distinct, on non-modified segments *X. taenifolia*

**Xiphopteris taenifolia** (Jenman) Copeland

Copeland, Am. Fern Jo. 42(3): 109, 1952. — *Polypodium taenifolium* Jenman, Bull. Bot. Dept. Jamaica 2(4): 114, 1897; Maxon, Contr. U.S. Nat. Herb. 17(7): 555, pl. 38, 1916; Urban, Symb. Ant. 9: 358, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 410, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 128, 1929; Box & Alston, Jo. Bot. 75: 257, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 69, 1937; Stehlé, Caribb. For. 4(1): 43, 1942; Hodge, Lloydia 17: 77, 1954. *Grammitis taenifolia* (Jenm.) Proctor, Bull. Inst. Jam. Sci. S. 5: 35, 1953. — *Polypodium trichomanoides* auct. non Swartz; Krug in Urban, Engl. bot. Jb. 24: 125, 1897, in part; Boldingh, Fl. D.W. Ind. Isl. I: 10, 1909; Fl. Ned. W. Ind. Eil. 106, 1913

Rhizome ascending or erect, slender, clothed with lanceolate ciliate brown scales; leaves tufted, the petioles terete, dark, densely clothed with stiff spreading reddish-brown or purplish hairs, ca. 1—5 cm long, much shorter than the lamina. Lamina subcoriaceous, brownish-green to to blackish-brown when dry, linear, ca. 8—20 cm long, $^1/_2$—1 cm wide, ca. 20 x as long as wide, narrowed at both ends, simply pinnate, with numerous sessile adnate mostly alternate oblong-ovate entire segments ca. $2^1/_2$—4 mm long and 1 mm wide, with broadly rounded apex, rather close but not contiguous, the upper segments confluent into a pinnatifid leaf-apex, the lower ones shortened and remote. Rachis and segments, especially on the adaxial side, clothed with long dark stiff spreading hairs. Veins simple, or, in fertile segments, forked at the base, the acroscopic branch bearing the single sorus, the segment then slightly gibbous on the acroscopic side, the vein-ends visible as hydathodes on the adaxial surface. Sori round, close to the rachis and at full maturity contiguous across it; sporangia glabrous. Spores subglobose, probably green when fresh, smooth, ca. 60—65 $\mu$.

Greater Antilles (except Cuba), Lesser Antilles, Colombia to Guiana.
In moist forests at higher elevations.

SABA: The Mountain, 800 m (Boldingh 1817, 1835, 1837); top of The Mountain (Arnoldo 941).

**Xiphopteris serrulata** (Swartz) Kaulfuss

KAULFUSS, Enum. Fil. 300, 1824; FÉE, 3e Mém. 36, 1852; 11e Mém. 14, 1866; GRISEBACH, Catal. Pl. Cub. 281, 1866; DUSS, Fl. crypt. Ant. franç. 57, 1904; COPELAND, Am. Fern Jo. 42(2): 48, pl. 3A, 1952. — *Acrostichum serrulatum* SWARTZ, Prodr. 128, 1788. *Polypodium serrulatum* (Swartz) METTENIUS, Fil. Hort. Lips. 30, 1856; KRUG in URBAN, Engl. bot. Jb. 24: 125, 1897; BOLDINGH, Fl. D.W. Ind. Isl. I: 10, 1909; Fl. Ned. W. Ind. Eil. 106, 1913; URBAN, Symb. Ant. 9: 359, 1925; non Swartz, 1801. *Grammitis serrulata* (Swartz) SWARTZ, Schrad. Journ. 1800[2]: 18, 1801; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 35, 1953. — *Polypodium duale* MAXON, Contr. U.S. Nat. Herb. 16(2): 61, 1912; Contr. U.S. Nat. Herb. 17(4): 399, fig. 8, 1914; Pteridoph. Porto Rico & Virg. Isl. 409, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 128, 1929; BOX & ALSTON, Jo. Bot. 75: 256, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 69, 1937; STEHLÉ, Caribb. For. 4(1): 43, 1942; HODGE, Lloydia 17: 76, fig. 43, 1954.

Rhizome ascending, often rather long, less than $^1/_2$ mm thick; scales pale brown, lanceolate, entire, ca. 2—3 mm long. Leaves rather close, ascending or erect, glabrous; petioles wiry, a few mm long, brownish at the base, upwards green and narrowly winged, passing into the lamina. Lamina firm, rigid, pale greenish or brown when dry, linear, subdimorphic: sterile lamina 1—2 cm long, $1^1/_2$—2 mm wide, lobed half-way tot the costa or beyond, the segments acute, tooth-like, ascending, simple-veined, reduced at the base of the lamina; fertile lamina longer, up to 5 cm, the greater basal part sterile, ca. 1 mm wide, with strongly reduced distant tooth-like segments, the basal ones even more reduced, and apical fertile part, often subfalcate, $^1/_2$—2 cm long, up to 2 mm wide, denticulate-sinuate, obtuse, with several parallel veins departing from the costa under a very small angle, suddenly bending outwards; abaxial side of the fertile portion along the costa densely covered with sporangia, the sori originally solitary on the bases of the veins, soon confluent. Sporangia small, glabrous. Spores globose, hyaline, smooth, 29—37 $\mu$.

West Indies, Mexico to South Brazil, tropical Africa, Madagascar, Mascarenes, New Amsterdam Island.
In moist forests, at higher elevation.

SABA: The Mountain, 400—800 m (Suringar s.n., L); ibid., 800 m (Boldingh 1834); ibid., top (Arnoldo 935).

**Thelypteris** Schmidel, Icon. Plant. 45, pl. 11, 1762. (*Lastraea* Bory; including *Glaphyropteris* Presl, *Cyclosorus* Link, *Meniscium* Schreber, and *Goniopteris* Presl).

Terrestrial, small to large ferns with creeping or erect dictyostelic rhizome clothed with non-clathrate, often hairy scales. Leaves continuous; lamina usually simply pinnate with lobed to pinnatifid pinnae, sometimes simple or more highly compound, often bearing simple unicellular hairs, these at least present in a groove on the adaxial side of petiole and rachis, sometimes branched hairs present besides. Veins free or anasto-

mosing, reaching the margin. Sori round or elongate, dorsal or less often terminal on the veins, exindusiate or with a reniform or round indusium, without paraphyses; spores monolete, mostly with perispore.
Between 800 and 900 species of almost world-wide occurrence, most numerous in the Tropics and in temperate Asia.

K e y to the species:

1. Veins free, the basal pair running to the sinus above its bottom; pinnae incised . . . . . 5
   Veins free, the basal pair or more connivent to the bottom of the sinus; or two or a few basal veins united, sending an excurrent branch to the bottom of the sinus; pinnae incised . . . . . 2
   Veins regularly anastomosing in pairs, sending short excurrent branches into the next outer areole; pinnae entire . . . . . *Th. reticulata*
2. Short branched hairs (lens !) present on the rachis and on the rhizome scales, sometimes also on other parts . . . . . 3
   All hairs simple . . . . . 4
3. Stellate hairs present on the leaf-tissue; lamina without conform terminal pinna . . . . . *Th. nephrodioides*
   Leaf-tissue glabrous; lamina with conform terminal pinna *Th. tetragona*
4. Basal veins free . . . . . *Th. patens*
   At least the majority of the basal pairs of veins united *Th. dentata*
5. Veins up to 7 to a side of a segment; pinnae up to 1 cm wide *Th. opposita*
   Veins mostly more than 10 to a side; pinnae usually over 1 cm wide 6
6. Veins 11—19 to a side (rarely less); sori medial or supra-medial; callose glands ("aerophores") at the bases of the pinnae small or wanting . . . . . *Th. sprengelii*
   Veins 25—40 to a side; large aerophores at the bases of the pinnae . . . . . *Th. decussata*

**Thelypteris opposita** (Vahl) Ching

Ching, Bull. Fan Mem. Inst. Biol., Bot. Ser. 10: 253, 1941. — *Polypodium oppositum* Vahl, Eclog. Amer. 3: 53, 1807. *Dryopteris opposita* (Vahl) Urban, Symb. Ant. 4: 14, 1903; Christensen, Vid. Selsk. Skr. VII. 4: 288, 1907; Smithson. Misc. Coll. 52(3): 375, 1909; Boldingh, Fl. D.W. Ind. Isl. I: 2, 1909, p.p. min.; Christensen, Vid. Selsk. Skr. VII. 10: 132, 1913; Maxon, Pteridoph. Porto Rico & Virg. Isl. 466, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 195, 1929; Box & Alston, Jo. Bot. 75: 253, 1937; Stehlé, Caribb. For. 4(2): 89, 1943; Hodge, Lloydia 17: 96, 1954; not of O. Kuntze, 1891 (based on *Aspidium oppositum* Klf.). — *Aspidium conterminum* Willdenow, Spec. Plant. 5: 249, 1810; Duss, Fl. crypt. Ant. franç. 99, 1904. *Aspidium rivoirei* Fée, Gen. Fil. 297, 1852; 11e Mém. 76, 1866. *Aspidium strigosum* Fée, 11e Mém. 78, pl. 22, fig. 2, 1866.

Rhizome erect, the apex bearing lanceolate brown scales. Leaves close, ca. 15 cm — over 1 m long, the petioles stramineous to pale brown, deciduously hairy with simple hairs, relatively short. Lamina herbaceous to chartaceous or subcoriaceous,

medium green, lanceolate to linear-lanceolate, very gradually narrowed at both ends, especially at the base, pinnate + pinnatifid, the rachis persistently hairy with simple hairs. Pinnae numerous, sessile, at least the lower ones subopposite, spreading or ascending under a large angle, narrowly lanceolate, acuminate, with a subhastate base, the largest ca. 5—10 cm long, 1/2—1 cm wide (apart from the broadened base), incised 1/2—3/4 to the costa into oblong to obliquely deltoid ascending segments, these obtuse or subacute, with rounded or subacute sinuses. Basal segments enlarged, parallel to the rachis. Upper pinnae gradually reduced, confluent into the pinnatifid leaf-apex; lower pinnae very gradually reduced, the lowermost ones remote, minute, auriculiform or glanduliform. Margin entire, ciliolate, often revolute. Costae and sometimes also costules thinly pubescent above, more densely so beneath; abaxial surface bearing numerous sessile reddish shining glands, rarely eglandular. Veins immersed or slightly elevated on the adaxial side, simple, 3—7 to a side. Sori somewhat (or, because of the revolute margins, strongly) supramedial, roundish, with a reniform glandular fugacious indusium. Spores bean-shaped, reather dark brown, densely and minutely verrucose by the perispore, ca. 47—53×30—32 $\mu$.

Widespread in the warmer parts of America from Mexico and Hispaniola to northern Argentina. Reported from Florida, probably in error.
At higher elevation.

SABA: The Mountain, Under the Cliff, 680 m (Stoffers 3205); without loc. (Boldingh 1798).

**Thelypteris sprengelii** (Kaulfuss) Proctor

PROCTOR, Bull. Inst. Jam. Sci. S. 5: 65, 1953. — *Aspidium sprengelii* KAULFUSS, Flora 365, 1823; FÉE, 11e Mém. 82, 1866. *Dryopteris sprengelii* (Klf.) O. KUNTZE, Rev. Gen. Pl. 2: 813, 1891; CHRISTENSEN, Vid. Selsk. Skr. VII. 4: 318, fig. 42, 1907; Smithson. Misc. Coll. 52(3): 387, 1909; Vid. Selsk. Skr. VII. 10: 145, 1913; URBAN, Symb. Ant. 9: 295, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 468, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 212, 1929; BOX & ALSTON, Jo. Bot. 75: 253, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 23, 1937; STEHLÉ, Caribb. For. 4(2): 89, 1943; HODGE, Lloydia 17: 98, 1954. — *Dryopteris opposita* auct. non (Vahl) Urb.; BOLDINGH, Fl. D.W. Ind. Isl. I: 2, 1909, in part. *Dryopteris patens* auct. non (Swartz) O. Ktze.; BOLDINGH, Fl. Ned. W. Ind. Eil. 96, 1913, in part.

Rhizome erect, bearing at the apex lanceolate brown scales. Leaves close, ca. 40 cm — 1.40 m long, the petioles stramineous to pale brown, at the base darker and deciduously scaly, thinly and deciduously pubescent, much shorter than their blades. Lamina herbaceous, medium to dark or brownish green when dry, oblong to lanceolate, 30 cm — over 1 m long, 15—30 cm wide, pinnate + pinnatifid; rachis thinly but usually persistently puberulous with simple hairs. Pinnae numerous, sessile, at least the lower ones subopposite, spreading or slightly ascending, (8—) 10—15 cm long, 1 1/4—2 cm wide (except for the broadened base), acuminate, truncate and broadened at the base, dissected close to the costa into linear segments. Upper pinnae gradually confluent into the pinnatifid leaf-apex; lower pinnae gradually reduced but much less so than in the preceding species, auriculiforum pinnae few. Segments numerous, close, patent or subfalcate to somewhat ascending, mostly subacute, with acute sinuses, the upper ones

gradually reduced; costae strigose above, thinly pilose to glabrescent beneath. Margin entire, often revolute, ciliate. Basal segments enlarged, parallel to the rachis. Small aerophores sometimes present at the bases of the pinnae. Costules and veins immersed, thinly puberulous to glabrous; leaf-tissue densely glandular beneath with reddish shining sessile glands. Veins simple, 11—18 to a side, the basal pair running to the sinus above its bottom. Sori round, medial or slightly supramedial, the indusia small, reniform, glandular, not visible at full maturity. Spores as in the preceding species, ca. 39—42×25—28 $\mu$.

Greater and Lesser Antilles, Trinidad and Tobago, Mexico to Venezuela and Ecuador. In woodland and ravines, at middle and higher elevations.

SABA: Gut near The Bottom (Boldingh 1434); Castle Hill, 300—350 m (Stoffers 4145, 4152); The Mountain (Boldingh 2285a); ibid., Under the Cliff, 680 m (Stoffers 4242); without loc. (Lionarons s.n.).

Depauperate specimens of this species are much like *Th. opposita.*

**Thelypteris decussata** (L.) Proctor

PROCTOR, Bull. Inst. Jam. Sci. S. 5: 59, 1953. — *Polypodium decussatum* L., Spec. Plant. 2: 1093, 1753; KRUG in URBAN, Engl. bot. Jb. 24: 123, 1897; DUSS, Fl. crypt. Ant. franç. 55, 1904. *Phegopteris decussata* (L.) METTENIUS, Fil. Lips. 83, 1856; FÉE, 11e Mém. 58, 1866. *Dryopteris decussata* (L.) URBAN, Symb. Ant. 4: 19, 1903; CHRISTENSEN, Vid. Selsk. Skr. VII. 10: 159, 1913; URBAN, Symb. Ant. 9: 296, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 469, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 213, 1929; BOX & ALSTON, Jo. Bot. 75: 252, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 26, 1937; MORTON, Jo. Wash. Acad. Sci. 28(12): 528, 1938; STEHLÉ, Caribb. For. 4(2): 89, 1943; HODGE, Lloydia 17: 98, 1954.

Rhizome ascending; scales not seen, said to be gelatinous. Leaves crowded, said to attain $3^1/_2$ m in length; petiole stout, up to 1.2 m long (fide Maxon), dark brown, deciduously scaly with large brown scales, very shortly puberulous, often muricate and bearing projecting thorn-like callose glands ("aerophores"). Lamina 1 m—over 2 m long, herbaceous, brownish when dry, pinnate + deeply pinnatifid, the rachis fawn-coloured, shortly puberulous, bearing aerophores at the places of insertion of the pinnae. Pinnae opposite or subopposite (not decussate), sessile, at right angles to the rachis, ca. 25—40 cm long, 3—4 cm wide, acuminate (often abruptly so), the base truncate, pinnatifid to a very narrow costal wing. Costa strigose above, the lower side thinly puberulous and beset with deciduous reddish glands. Segments numerous, close, ligulate-linear, ca. $1^1/_2$—2 cm long, 3—4 mm wide, slightly falcate, of almost equal width close to the rounded or subacute apex. Margin entire, ciliate; costules above thinly herbaceous, beneath puberulous; leaf-tissue beneath as the costae deciduously glandular. Veins simple, close, laxly ascending, 25—40 to a side, slightly elevated, the lowest pair ending above the bottom of the sinus. Sori inframedial, in a row extending almost to the apex of the segment, oblong or roundish, exindusiate, said to bear minute ciliate indusia when young. Sporangial stalks bearing stalked glands. Spores bean-shaped, hyaline, smooth, apparently without perispore, ca. 28 × 18 $\mu$.

West Indies, Central America to Guiana and Perú.
At higher elevation. A somewhat variable species.

SABA: The Mountain, 800 m (Boldingh 1830).

**Thelypteris patens** (Swartz) Small

SMALL, Ferns S.E. States 243, 244 (fig.), 1938; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 63, 1953. — *Polypodium patens* SWARTZ, Prodr. 133, 1788. *Aspidium patens* (Swartz) SWARTZ, Schrad. Journ. 1800[2]: 34, 1801; GRISEBACH, Catal. Pl. Cub. 279, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 114, 1897; DUSS, Fl. crypt. Ant. franç. 98, 1904. *Dryopteris patens* (Swartz) O. KUNTZE, Rev. Gen. Pl. 2: 813, 1891; CHRISTENSEN, Vid. Selsk. Skr. VII. 10: 176, 1913; BOLDINGH, Fl. Ned. W. Ind. Eil. 96, 1913, in part; URBAN, Symb. Ant. 9: 296, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 471, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 215, 1929; ALSTON, Jo. Bot. 73: 37, 1935; BOX & ALSTON, Jo. Bot. 75: 253, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 27, 1937; STEHLÉ, Caribb. For. 4(2): 90, 1943; HODGE, Lloydia 17: 98, 1954. — *Dryopteris opposita* auct. non (Vahl) Urban; BOLDINGH, Fl. D.W. Ind. Isl. I: 2, 1909, in part.

Rhizome erect, up to 4 mm thick, the apex clothed with large ovate acute bright-brown scales. Leaves close, the petioles stramineous, quadrangular with sulcate surfaces, deciduously whitish-pubescent, especially in the adaxial groove towards the apex of the petiole, deciduously scaly, ca. 20—30 cm long (occasionally much longer), shorter than the lamina. Lamina herbaceous to chartaceous, dark or brownish-green when dry, oblong to lanceolate, 30—60 cm long (or sometimes longer), 12—40 cm wide, ca. 2—3 × as long as wide, pinnate + pinnatifid; rachis similar to the petiole, thinly puberulous with spreading whitish hairs, at least adaxially, the abaxial side often glabrescent. Pinnae 15—50 (usually 20—30) to a side, subopposite, the upper ones alternate, sessile, their width apart or less, patent or laxly ascending, the lower ones often slightly deflexed, linear, long-acuminate, the largest ca. 6—25 cm long, 1—3 cm wide, widest throughout the lower third or half, thence gradually tapering to the apex, deeply pinnatifid. Lower pinnae little or not reduced, the upper ones gradually reduced, yet rather suddenly confluent into the pinnatifid leaf-apex. Costa stramineous, elevated, hairy, especially on the upper side. Segments triangular-oblong, oblique, not rarely subfalcate, subacute or acute, entire, ciliate, 3—12 mm long, connected by a costal wing of 1—2 mm, the sinus subacute or acute, slightly callose at the bottom; apex of pinnae protracted, subentire; basal segments elongate, more or less stipule-like, sometimes incised. Veins abaxially prominulous, hairy and microscopically glandular; a few scattered hairs often also on the leaf-tissue. Secondary veins 6—15 to a side, simple, the lowest pair connivent to the sinus. Sori slightly supramedial, often extending almost to the apex of the segments, with roundish — horseshoe-shaped bright brown ciliate very minutely glandular persistent indusium. Spores oblong to bean-shaped, pale brown, the perispore dark, forming numerous tubercles and spines, ca. 39—44 × 29—33 $\mu$.

Bermuda, West Indies, Mexico to northern Argentina.
On rocks and banks, in clearings and partly shaded situations, at higher elevation.

SABA: Fort Bay (Boldingh 1660a); Rendez Vous, 400—800 m (Suringar s.n., L); Crispine — Rendez Vous (Suringar s.n., L); The Mountain, Under the Cliff, 680 m (Stoffers 3206, 3207, 3220); The Mountain (Boldingh 1808, 2195; Suringar 6162, L); ibid., 600—800 m (Suringar 6163, L; 6164); without loc. (Boldingh 2151).

**Thelypteris dentata** (Forskål) E. P. St. John

E. P. ST. JOHN, Am. Fern Jo. 26(2): 44, 1936; SMALL, Ferns S. E. States 252, 253 (fig.),

1938; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 59, 1953. — *Polypodium dentatum* FORSKÅL, Fl. Aegypt. 185, 1775. *Dryopteris dentata* (Forsk.) C. CHRISTENSEN, Vid. Selsk. Skr. VIII. 6: 24, 1920; URBAN, Symb. Ant. 9: 298, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 470, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 216, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 27, 1937; STEHLÉ, Caribb. For. 4(2): 89, 1943; HODGE, Lloydia 17: 98, 1954. — *Polypodium molle* JACQUIN, Coll. 3: 188, 1789; non Schreber, 1771, nec Allioni, 1785. *Aspidium molle* (Jacq.) SWARTZ, Schrad. Journ. 1800[2]: 34, 1801; GRISEBACH, Catal. Pl. Cub. 279, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 119, 1897; DUSS, Fl. crypt. Ant. franç. 97, 1904. *Nephrodium molle* (Jacq.) R. BROWN, Prodr. Fl. N. Holl. 149, 1810; FÉE, 11e Mém. 89, 1866. *Dryopteris mollis* (Jacq.) HIERONYMUS, Hedwigia 46: 348, 1907; CHRISTENSEN, Vid. Selsk. Skr. VII. 10: 191, 1913; ALSTON, Jo. Bot. 73: 37, 1935. *Nephrodium quadrangulare* FÉE, Gen. Fil. 308, 1852. *Dryopteris quadrangularis* (Fée) ALSTON, Jo. Bot. 75: 253, 1937; HODGE, Am. Fern Jo. 31(4): 121, 1941. *Dryopteris parasitica* auct. non (L.) O. Kuntze; BOLDINGH, Fl. Ned. W. Ind. Eil. 95, 1913, in part.

Rhizome short-creeping or ascending, ca. $^3/_4$—1 cm thick, bearing brown narrowly lanceolate ciliate and minutely puberulous scales near the apex. Leaves close, the petioles stramineous, quadrangular with more or less channelled surfaces or abaxially rounded, scaly at the base, deciduously hairy with simple spreading whitish hairs, ca. 5—30 cm long, considerably shorter than the lamina. Lamina herbaceous, bright or dark green when dry, elliptic-lanceolate, ca. 25—50 (—80) cm long, 8—20 cm wide, 2—4 × as long as wide, pinnate + pinnatifid, narrowed at both ends, widest at or below the middle. Rachis similar to the petiole but more densely hairy, especially in the adaxial groove. Pinnae sessile, subopposite or alternate, spreading or ascending, the basal ones usually deflexed, lanceolate, 4—12$^1/_2$ cm long, 1—2 cm wide, widest at the base or throughout the lower half or $^2/_3$, acute or acuminate, truncate or broadly cuneate at the base, incised $^2/_3$ or $^3/_4$ the distance to the costa. Lower pinnae usually gradually reduced and more remote, upper pinnae also gradually reduced, confluent into an acuminate leaf-apex. Segments oblong-lanceolate, slightly oblique, entire or crenulate towards the apex, obtuse or subacute, close, separated by acute sinuses; basal segments, especially on the acroscopic side, enlarged and sometimes lobed. Both surfaces, especially on the veins, thinly or sometimes more densely pilose, the margins ciliate, the surfaces microscopically glandular. Costa and costules stramineous, elevated. Veins immersed, simple, 6—10 to a side, reaching the margin, free, but the basal pair anastomosing under an open angle, sending a common branch to the sinus. Sori medial or slightly supramedial, in a series reaching almost the apex of the segments, but often only present on the basal anastomosing veins, round, with a large subpeltate yellowish-brown hirsute indusium. Spores as in the preceding species, ca. 31—33 × 22—25 $\mu$.

Tropical and warm-temperate regions of both Hemispheres.
In moist, more or less shaded situations, at higher elevation.

SABA: road to The Mountain (Arnoldo 813a); The Mountain, Under the Cliff, 680 m (Stoffers 3221, 3222, 3224, 3230); without loc. (Boldingh s.n.).
ST. EUSTATIUS: without loc. (Boldingh s.n., local nos. 883, 1057).
Reported from St. Martin by Boldingh due to confusion with *Th. tetragona*.

**Thelypteris reticulata** (L.) Proctor

PROCTOR, Bull. Inst. Jam. Sci. S. 5: 63, 1953. — *Polypodium reticulatum* L., Syst. Nat.

10th ed. 1325, 1759. *Meniscium reticulatum* (L.) SWARTZ, Schrad. Journ. 1801[2]: 274, 1803; FÉE, 11e Mém. 44, 1866; GRISEBACH, Catal. Pl. Cub. 278, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 135, 1897; DUSS, Fl. crypt. Ant. franç. 104, 1904; SMALL, Ferns S. E. States 214, 215 (fig.), 1938. *Dryopteris reticulata* (L.) URBAN, Symb. Ant. 4: 22, 1903; BOLDINGH, Fl. D. W. Ind. Isl. I: 3, 1909; Fl. Ned. W. Ind. Eil. 96, 1913; URBAN, Symb. Ant. 9: 303, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 477, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 223, 1929; BOX & ALSTON, Jo. Bot. 75: 253, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 33, 1937; MAXON & MORTON, Bull. Torr. Bot. Cl. 65: 358, 1938; STEHLÉ, Caribb. For. 4(2): 90, 1943; HODGE, Lloydia 17: 100, 1954.

Rhizome short-creeping, 1—2 1/2 cm thick, the apex bearing appressed reddish-brown glabrous scales. Leaves close, simply pinnate with conform terminal pinna, oblong, chartaceous to subcoriaceous, dull brownish- or yellowish-green when dry, subdimorphic, the petioles stout, stramineous, dull, adaxially sulcate, thinly puberulous with whitish hairs, glabrescent; rachis similar, more densely and persistently puberulous. Sterile leaves with the petioles ca. 1/2—3/4 m long, the lamina 30—60 cm long, 15— 50 cm wide, imparipinnate with 5—12 pinnae to a side, these obliquely ascending, alternate or the lower ones subopposite, sessile or the lower ones very shortly petiolulate, lanceolate to narrowed-ligulate, acuminate, the base unequally cuneate (the acroscopic side more strongly cut away), the margin entire, slightly cartilaginous, ca. 15—30 cm long, 2 1/2—7 cm wide, 4—6 × as long as wide, widest above the base or in the lower third. Lower pinnae not reduced, the upper ones somewhat reduced. Costa strong, stramineous, percurrent, puberulous, adaxially sulcate; secondary veins arcuate towards the margin, close, parallel, reaching the margin, prominulous, thinly puberulous; tertiary veins close, glabrous, reticulate, the veins meeting under an acute angle, sending a free veinlet into the next outer areole; areoles shorter than wide, ca. 10—20 between costa and margin, the leaf-tissue glabrous. Fertile leaves with longer petioles and narrower lamina, the pinnae more strongly ascending, often narrower, 2—4 cm wide, 5—7 × as long as wide, the tertiary veins meeting under a very open angle, sometimes forming a continuously curved arch; sori elongate, originally two on each arch of tertiary veins, usually confluent into one, yellow or bright-brown, exindusiate, covering the greater part of the abaxial side of fully fertile laminas. Sporangial pedicels hairless. Spores oblong to bean-shaped, medium brown, densely beset with irregular warts, tubercles, and crests, formed by the perispore, ca. 44—49 × 31—35 $\mu$.

Florida, Greater and Lesser Antilles, Margarita Island; reported from Mexico and Central America, probably in error.
In moist forests, at higher elevation.

SABA: The Mountain, 600—800 m (Suringar s.n., L, juv.); ibid., near the top (Boldingh 1823, 2215; Arnoldo 883; Stoffers 4227, 4238).

**Thelypteris tetragona** (Swartz) Small

SMALL, Ferns S. E. States 256, 257 (fig.), 1938 [errore: (Link) Small]; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 65, 1953. — *Polypodium tetragonum* SWARTZ, Prodr. 132, 1788; GRISEBACH, Catal. Pl. Cub. 280, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 124, 1897; DUSS, Fl. crypt. Ant. franç. 51, 1904. — *Goniopteris tetragona* (Swartz) PRESL, Tent. Pterid. 183 1836; FÉE, 11e Mém. 62, 1866. *Dryopteris tetragona* (Swartz) URBAN, Symb. Ant. 4:

20, 1903; CHRISTENSEN, Vid. Selsk. Skr. VII. 10: 260, 1913; BOLDINGH, Fl. Ned. W. Ind. Eil. 96, 1913, in part; URBAN, Symb. Ant. 9: 302, 1925; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 220, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 32, 1937; not (Presl) O. Kuntze, 1891, based on *Nephrodium tetragonum* Presl. — *Polypodium subtetragonum* LINK, Hort. Berol. 2: 105, 1833. *Dryopteris subtetragona* (Link) MAXON, Pteridoph. Porto Rico & Virg. Isl. 473, 1926; ALSTON, Jo. Bot. 73: 37, 1935; BOX & ALSTON, Jo. Bot. 75: 254, 1937; HODGE, Lloydia 17: 99, 1954. *Thelypteris subtetragona* (Link) E. P. ST. JOHN, Am. Fern Jo. 26(2): 44, 1936. *Dryopteris parasitica* auct. non (L.) O. Kuntze; BOLDINGH, Fl. D.W. Ind. Isl. I: 2, 1909, in part; Fl. Ned. W. Ind. Eil. 95, 1913, in part.

Rhizome short-creeping (reported to creep on, not in the soil), ca. 1 cm thick, bearing brown lanceolate long-acuminate scales covered with branched hairs, similar scales on the bases of the petioles. Leaves close, the petioles stramineous, subquadrangular-sulcate, with a thin very short indumentum of spreading branched hairs, sometimes also bearing longer simple hairs, ca. 10—50 cm long, about as long as or shorter than the lamina, longest in fertile leaves. Rachis similar, more densely puberulous, especially in the adaxial groove. Lamina herbaceous, dark green, ovate—oblong, ca. 15—50 cm long, 10—30 cm wide, $^3/_4$—$^1/_3$ × as wide as long, the fertile often longest, pinnate + pinnatilobate or pinnatifid. Pinnae 6—12 to a side, spreading or the upper ones laxly ascending, the basal ones often deflexed, subopposite or the upper ones alternate, sessile or the lower shortly petiolulate, lanceolate-linear, the sterile ones 10—15 cm long, 2—3 cm wide, 4—7 × as long as wide, the fertile ones 7—17 cm long, $1^1/_2$—2 (—3) cm wide, 5—7 × as long as wide, the base truncate or in the lower pinnae long-cuneate, rather abruptly narrowed near the shortly acuminate apex, broadest at or just above the base, incised half-way or two-thirds to the costa into close entire acute or obtuse oblique or falcate segments, the sinuses acute, cartilaginous; upper pinnae reduced; terminal pinna more deeply incised, the base with one or two larger segments or confluent with one reduced pinna; basal pinnae slightly or not shortened. Costa stramineous, percurrent, elevated, adaxially usually with at least some branched hairs in the groove, abaxially with sparse spreading simple hairs. Costules elevated, with a similar indumentum. Teriary veins 8—12 to a side, simple, reaching the margin, immersed or slightly prominulous, glabrous or bearing scattered hairs; margin ciliate with simple hairs; leaf-tissue glabrous. Sori inframedial, round, naked, at least some of the sporangia bearing stiff unicellular hairs near the bow of the head. Spores bean-shaped, pale brown, the perispore darker, forming a reticulum of irregular crests, with the perispore ca. 38—47 × 28—31 $\mu$.

Florida, Greater and Lesser Antilles, Mexico to northern South America; var. *g.* in the Lesser Antilles and Jamaica.
In dry woodlands, clearings, palm-brakes, and plantations, at various elevations.

var. **tetragona**

Pinnae usually under 3 cm wide, often deeply incised, the basal pair of tertiary veins anastomosing, sending an excurrent branch to the sinus, less often only connivent or running close to each other to the sinus.

SABA: Gain Bay Gut (Suringar s.n., L); road to The Mountain (Arnoldo 782); road to Hellsgate (Arnoldo 754); Ladder Gut, 100—200 m (Stoffers 2775); road

from The Bottom to Crispine, 200—300 m (Stoffers 3029); without loc. (Boldingh s.n., local nos. 994, 2773, 18-7-4, 20-7-13).
St. Eustatius: slope of The Quill (Suringar s.n., L); n. slope of The Quill (Stoffers 4000); inner slope of The Quill, 350 m (Boldingh 463); slope of The Quill near Glass Bottle, 275—340 m (Stoffers 3841); The Quill (Suringar s.n., L); without loc. (Boldingh s.n., local nos. 843, 6616; Mrs. v. Groll-Meyer 258, 276, 284).
St. Martin: Sentry Hill (Suringar s.n., L); mountain between Mont des Accords and Sentry Hill, 200—300 m (Boldingh 2895); Mildrum Hill, 300—400 m (Boldingh 3182); Mount Paradise, 300—400 m (Boldingh 3239; Le Gallo 870); orchard near Bellevue (Boldingh 2832); Marigot Hill — Marigot, 0—200 m (Boldingh 2644); without loc. (Boldingh s.n., local nos. 28-8-14, 4-9-28, 14-9-40).

var. **guadalupensis** (Fée) Kramer

*Thelypteris tetragona* var. *guadalupensis* (Fée) Kramer, Acta Bot. Neerl. 9: 298, 1960. — *Goniopteris guadalupensis* Fée, 11e Mém. 64, pl. 17 fig. 2, 1866. — *Polypodium tetragonum* Swartz var. *guadalupense* (Fée) Krug in Urban, Engl. bot. Jb. 24: 124, 1897; Duss, Fl. crypt. Ant. franç. 52, 1904. *Dryopteris tetragona* (Swartz) Urban var. *guadalupensis* (Fée) C. Christensen, Vid. Selsk. Skr. VII. 10: 261, 1913; Vid. Selsk. Skr. VIII. 6: 26, 1920; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 220, 1929.

Pinnae 3—$3^1/_2$ cm wide, incised half the way to the costa or less; 2—3 pairs of anastomosing veins.

Saba: The Mountain, side of The Bottom, 450 m (Stoffers 3118).

**Thelypteris nephrodioides** (Klotzsch) Proctor

Proctor, Bull. Inst. Jam. Sci. S. 5: 61, 1953. — *Aspidium nephrodioides* Klotzsch, Linnaea 20: 370, 1847. *Dryopteris nephrodioides* (Klotzsch) Hieronymus, Hedwigia 46: 327, 1907; Christensen, Vid. Selsk. Skr. VII. 10: 247, 1913; Urban, Symb. Ant. 9: 302, 1925; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 220, 1929; Box & Alston, Jo. Bot. 75: 253, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 32, 1937; not of O. Kuntze, Rev. Gen. Pl. 2: 811, 1891. — *Nephrodium guadalupense* Fée, 11e Mém. 89, 1866 (not *Goniopteris guadalupensis* Fée, ibid. 64, 1866). *Aspidium guadalupense* (Fée) Christ, Bull. Soc. bot. Belg. 35: 210, 1896; Duss, Fl. crypt. Ant. franç. 98, 1904. *Dryopteris guadalupensis* (Fée) O. Kuntze, Rev. Gen. Pl. 2: 812, 1891; Maxon, Pteridoph. Porto Rico & Virg. Isl. 475, 1926; Ballard, Kew Bull. 1937: 347; Hodge, Lloydia 17: 99, 1954; not *Dr. guadalupensis* (Wikström) C. Christensen, Biol. Arb. tilegn. E. Warming 84, 1911, based on *Polypodium guadalupense* Wikström, 1826. *Dryopteris tetragona* auct. non (Swartz) Urban; Boldingh, Fl. Ned. W. Ind. Eil. 96, 1913, in part.

Rhizome ascending, stout, the scales bearing branched hairs. Leaves close, the petioles quadrangular, sulcate, stramineous, puberulous with very short stellate hairs, ca. 20—50 cm long, shorter than the lamina. Lamina herbaceous, dark green, oblong, 30—70 cm long, 20—50 cm wide, pinnate + pinnatifid, truncate at the base, acuminate. Rachis densely stellato-puberulous. Pinnae numerous, patent, alternate or subopposite, sessile or very shortly stalked, the largest ca. 10—20 × 2—3 cm, ca. 5—6 × as long as wide, narrowly lanceolate, shortly acuminate, truncate or the lower ones cuneate at the base; lower pinnae not reduced, upper pinnae shortened, rather abruptly confluent into a pinnatifid leaf-apex. Pinnae incised about $^2/_3$ of the way to the costa into close oblong

slightly falcate obtuse or subacute segments ca. twice as long as wide with entire ciliate margin, the sinuses narrow, acute; basal segments of lower pinnae reduced, upper segments reduced, confluent. Costa stout, percurrent, stramineous, densely stellato-puberulous; costules prominulous, stellato-pubescent; veins immersed, simple, 9—14 to a side, the basal pair connivent to the sinus or occasionally united below it, adaxially bearing scattered simple hairs, abaxially thinly stellato-puberulous. Leaf-tissue adaxially minutely, abaxially more conspicuously stellato-hirtellous, the hairs with several spreading branches appressed to the leaf-tissue. Sori small, round, approximately medial, with small persistent reniform stellato-pilose indusia. Sporangia glabrous. Spores as in the preceding species, ca. 44—48 × 30—33 $\mu$.

Greater and Lesser Antilles, Trinidad, north-western South America.

SABA: The Mountain, 600—800 m (Suringar s.n., L).
ST. EUSTATIUS: without loc. (Boldingh s.n., local no. 1160).

**Ctenitis** (C. Christensen) C. Christensen & Ching, Bull. Fan Mem. Inst. 8: 275, 1938

Terrestrial, medium-sized or large ferns with mostly ascending or erect dictyostelic scaly rhizome. Leaves continuous, pinnate + lobed or usually more highly compound, the axes adaxially grooved, the groove clothed with rufous multicellular hairs, the ridges bordering the groove not continuous with the edges of the segments, the axes often also scaly. Veins free, not reaching the margin. Sori dorsal, round, with a roundish indusium, or naked. Spores monolete, with perispore.

About 120 species in the Tropics and Subtropics of both Hemispheres.

**Ctenitis meridionalis** (Poiret) Ching

CHING, Sunyatsenia 5: 250, 1940. — *Polypodium meridionale* POIRET in LAMARCK, Encycl. Méth. 5: 553, 1804. — *Dryopteris meridionalis* (Poir.) C. CHRISTENSEN, Vid. Selsk. Skr. VIII. 6: 46, fig. 8, 1920; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 225, 1929; BOX & ALSTON, Jo. Bot. 75: 253, 1937; STEHLÉ, Caribb. For. 4(2): 90, 1943. — *Aspidium consobrinum* FÉE, 11e Mém. 85, 1866. *Dryopteris ampla* auct. non (H. & B. ex Willd.) O. Ktze.; BOLDINGH, Fl. Ned. W. Ind. Eil. 95, 1913.

Rhizome erect, stout, the apex bearing linear acuminate reddish or blackish brown scales. Petiole stout, bright-brown, rather shining, terete except for the sulcate adaxial side, up to ca. 50 cm long, shorter than the lamina, the base densely, the upper part very sparingly clothed with narrowly linear hair-pointed bright-brown entire scales, their points of insertion slightly tubercular. Lamina thinly herbaceous, dark green, bipinnate + bipinnatifid or tripinnate + pinnatifid (at the base), ovate, ca. 40—75 cm long, half as wide to almost as wide. Rachises reddish brown, the larger bearing linear long-acuminate reddish brown scales with broadened base, all axes in the adaxial groove densely covered with a tomentum of reddish articulate hairs. Pinnae subopposite, laxly ascending, acute, the largest ca. 15—30 cm long, stalked, the basal pair somewhat shortened; upper pinnae gradually reduced, forming a leaf-apex of gradually less complex structure. Pinnules laxly ascending, alternate or subopposite, subcontiguous, shortly acuminate, the basal basiscopic one or two of each pinna shortened, the largest ca. 5—8 × $1^1/_2$—$2^1/_2$ cm, deeply dissected into oblique decurrent segments. Seg-

ments subopposite, obtuse, 1—$1^1/_2$ × 0.3—0.5 cm, dentate to pinnatifid, the teeth subacute. Costae of pinnules abaxially bearing light-brown ovate subbullate scales; veins and costules of segments bearing small scattered glandular hairs on the abaxial side and scattered articulate hairs on the adaxial side. Veins simple or forked in the largest lobes, immersed, evident. Sori medial or inframedial, 4—8 per segment, round, with reddish caducous roundish or reniform indusia. Sporangia glabrous. Spores oblong, pale brown, the perispore forming prominent irregular spines, without the spines ca. 30—33 × 20—25 $\mu$.

Lesser Antilles.
In seasonal forests, at middle elevations.

> St. Eustatius: Bengalen (Suringar 6172, 6173, L); The Quill (Suringar 6175, 6176, s.n., L); inner slope of The Quill, 300 m (Boldingh 1223); bottom of The Quill, 250—300 m (Boldingh 436; Stoffers 3611); without loc. (Boldingh 912; v. Grol s.n.).

These specimens belong to var. *meridionalis*. Another variety, **Ctenitis meridionalis** var. **speluncae** (C. Chr.) Kramer, comb. nov. [basionym: *Dryopteris meridionalis* var. *speluncae* C. Christensen, Vid. Selsk. Skr. VIII. 6: 47, 1920], with less incised segments and finely glandular abaxial side, was described from Bermuda.

**Tectaria** Cavanilles, An. Hist. Nat. 1: 115, 1799

Medium-sized to large terrestrial ferns with short-creeping or erect dictyostelic rhizome clothed with scales. Petioles continuous, close, pale or dark. Lamina simple to decompound, mostly glabrous except on the adaxial side of axes and costae. Veins almost always anastomosing, usually with free included veinlets. Sori most often round, variously disposed, often dorsal on the veins, without or with round or reniform indusium, without paraphyses. Spores monolete, with perispore.

Over 200 species in both Hemispheres, mostly confined to the Tropics.

Key to the species:

Sori arranged in rows along both sides of the secondary veins; pinnae 3—10 pairs, the terminal not very large . . . . . *T. incisa*

Sori irregularly scattered between the secondary veins, sometimes some of them also indistinctly two-rowed; pinnae 1—3 pairs, the terminal comparatively very large, or the lamina only deeply lobed . . . . *T. trifoliata*

**Tectaria incisa** Cavanilles

Cavanilles, Descr. 249, 1802; Proctor, Bull. Inst. Jam. Sci. S. 5: 57, 1953. — *Aspidium martinicense* Sprengel, Anl. Gew. 3: 133, 1804; Boldingh, Fl. Ned. W. Ind. Eil. 96, 1913; Urban, Symb. Ant. 9: 309, 1925. *Tectaria martinicensis* (Spreng.) Copeland, Philipp. Jo. Sci. 2: 410, 1907; Maxon, Pteridoph. Porto Rico & Virg. Isl. 482, 1926; Domin, Mem. Roy. Cz. Soc. Sci. N.S. 2: 230, 1929; Alston, Jo. Bot. 73: 37, 1935; Box & Alston, Jo. Bot. 75: 254, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 38, 1937; Stehlé, Caribb. For. 4(2): 91, 943; Hodge, Lloydia 17: 101, 1954. *Aspidium macrophyllum* Swartz, Syn. 43, 239, 1806; Duss, Fl. crypt. Ant. franç. 95, 1904. *Cardiochlaena macrophylla* (Swartz) Fée, Gen. Fil. 315, 1852; 11e Mém. 91, 1866. *Aspidium trifoliatum* auct. non (L.) Swartz; Boldingh, Fl. D.W. Ind. Isl. I: 3, 1909.

Rhizome erect, stout, ca. 2 cm thick, the apex bearing lanceolate dark brown scales with paler, ciliate margins. Leaves close, the petioles stramineous to medium brown, rather lustrous, deciduously scaly, the adaxial side sulcate and clothed with a very short tomentum of reddish articulate few-celled hairs, especially in its upper part, a similar indumentum in the adaxial groove of the rachis, up to 60 cm long, about as long as the lamina. Lamina herbaceous, dark green, glabrous, oblong, up to ca. 70 cm long and 50 cm wide, acute or acuminate, truncate at the base, widest in the lower half or at the base, simply pinnate. Pinnae 3—10 to a side, usually subopposite, laxly ascending, lanceolate, ca. 12—35 cm long, 3—5 cm wide, about 5—7 × as long as wide, acute or usually acuminate, rarely coarsely and shallowly lobed, the edge more or less wavy, the base mostly unequally cuneate; upper pinnae sessile or adnate and more or less reduced, lower pinnae shortly petiolulate, the basal pair with a large basiscopic lobe at the base which may almost equal the rest of the pinna, a much smaller acroscopic lobe often also present, the pinnae above the basal pair sometimes with similar but smaller lobes. Terminal segment rather large, long-decurrent, sometimes with a proliferous bud at the base, usually trilobed, the middle shank with lobed margins. Veins, especially the larger ones, prominulous, the costa, notably on the adaxial side, clothed with a thin tomentum of reddish hairs; secondary veins distinct, curved towards the margin without reaching it; tertiary veins densely reticulate, with free included veinlets pointing in all directions. Sori in two rows, one on each side of the secondary veins, dorsal, not close, roundish, the receptacle slightly elongate, with persistent roundish indusia with deep sinus. Spores oblong-elliptic or bean-shaped, pale yellowish-brown, the perispore prominent, forming irregular crests and projections, with the perispore ca. 48—55 × 32—39 $\mu$.

Widespread in tropical and subtropical America, from Mexico and the West Indies to Bolivia and northern Argentina.
In moist shaded situations, often in forest, at various elevations.

SABA: Hellsgate Gut (Suringar 6033, L); Gain Bay Gut (Suringar 6030, L); Crispine — Rendez Vous, 400 m (Suringar 6028, 6029, L); without loc. (Boldingh 2286).
ST. EUSTATIUS: Bengalen (Suringar 6032, L); The Quill (Suringar 6031, L); bottom of The Quill, 250 m (Stoffers 3649); without loc. (Boldingh 427).
Island?: (Boldingh 1150a).

**Tectaria trifoliata** (L.) Cavanilles

CAVANILLES, Descr. 249, 1802; MAXON, Pteridoph. Porto Rico & Virg. Isl. 482, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 227, pl. 39 fig. 2, 3, 1929; BOX & ALSTON, Jo. Bot. 75: 254, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 38, 1937; STEHLÉ, Caribb. For. 4(3): 92, 1943; HODGE, Lloydia 17: 101, fig. 47, 1954. — *Polypodium trifoliatum* LINNAEUS, Spec. Plant. 2: 1087, 1753. *Aspidium trifoliatum* (L.) SWARTZ, Schrad. Journ. 1800[2]: 30, 1801; GRISEBACH, Catal. Pl. Cub. 279, 1866; DUSS, Fl. crypt. Ant. franç. 95, 1904; URBAN, Symb. Ant. 9: 310, 1925; not of Boldingh, Fl. D.W. Ind. Isl. I: 3, 1909. *Bathmium trifoliatum* (L.) LINK, Fil. sp. 114, 1841; FÉE, 11e Mém. 75, 1866. — *Aspidium plumieri* PRESL, Rel. Haenk. 1: 29, 1825; KRUG in URBAN, Engl. bot. Jb. 24: 113, 1897; DUSS, Fl. crypt. Ant. franç. 94, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 3, 1909; Fl. Ned. W. Ind. Eil. 97, 1913; URBAN, Symb. Ant. 9: 309, 1925. *Tectaria plumieri* (Presl) COPELAND, Philipp. Jo. Sci. 2: 410, 1907.

Rhizome erect, stout, ca. 1—2 cm thick, the apex bearing castaneous lanceolate long-acuminate subglabrous scales. Leaves close, the petioles stramineous to castaneous, rather lustrous, the base deciduously scaly, adaxiall sulcate, the upper part of the groove, as the rachis, with a short tomentum of reddish articulate hairs, as long as to ca. $1^1/_2 \times$ as long as the lamina. Lamina herbaceous, dark green, glabrous, broadly oblong to broadly lanceolate, ca. 12—40 cm long, 6—30 cm wide, as long as to twice as long as wide, acute or acuminate, simple and more or less deeply lobed, with cordate base, or usually simply pinnate, with 1—3 (—4) pairs of subopposite pinnae and a large terminal one, widest at the base or in the basal half. Pinnae ascending, broadly lanceolate, ca. 12—40 cm long and 4—8 cm wide, 2—3 × as long as wide (relatively wider than in the preceding species), acuminate, usually cuneate or subtruncate at the base, the lower ones shortly petiolulate, the upper ones sessile or adnate and decurrent; margins entire or sinuous. Terminal segment large, trilobed, sometimes with proliferous buds at the base, the basal lobes but little smaller than the median one. Lowest pinnae with a rather large basal basiscopic segment, a small acroscopic lobe sometimes present. Veins more or less elevated, especially the larger ones, these adaxially with a short rufous tomentum. Secondary veins arching towards the margin without reaching it, the tertiary venation freely reticulate, with free included veinlets pointing in all directions. Sori scattered between the secondary veins (in incompletely fertile leaves often more or less biseriate), dorsal, small, with a small deciduous reniform indusium. Stalk of the sporangium bearing one or a few apparently glandular hairs. Spores oblong, bean-shaped, pale brown, with a prominent perispore forming irregular wing-like crests, with the perispore ca. 48—53 × 34—39 $\mu$.

West Indies, Trinidad and Tobago, northern South America (Central America?).
In forests and shaded situations, at middle elevations.

SABA: The Mountain, 600—800 m (Boldingh 2199; Suringar 6131, L); ibid., top (Arnoldo 883); ravine between Island Gut and Santa Cruz, 600 m (Stoffers 3449); without loc. (Lionarons 220).
ST. EUSTATIUS: top of The Quill, 400 m (Stoffers 3690).

**Polybotrya** Humboldt & Bonpland ex Willdenow, Spec. Plant. 5: 99, 1810

Medium-sized or large, terrestrial or usually scandent ferns with dictyostelic rhizome covered with large non-clathrate scales. Leaves continuous, simply pinnate to tripinnate, dimorphic, the fertile leaves with reduced lamina, often more dissected than the sterile ones; sporangia not assembled in sori, covering the dorsal and sometimes also the ventral side of the fertile segments, without paraphyses; spores monolete, with perispore.

About 25 species in the American Tropics.

**Polybotrya cervina** (L.) Kaulfuss

KAULFUSS, Enum. Fil. 55, 1824; BOLDINGH, Fl. D.W. Ind. Isl. I: 3, 1909; Fl. Ned. W. Ind. Eil. 97, 1913; URBAN, Symb. Ant. 25: 314, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 458, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 189, pl. 33, 1929; BOX & ALSTON, Jo. Bot. 75: 254, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 42, 1937; STEHLÉ, Caribb. For. 4(2): 88, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 44, 1953; HODGE, Lloydia 17: 93, 1954. — *Osmunda cervina* LINNAEUS, Spec. Plant. 2: 1065, 1753. *Acrostichum cervinum* (L.) SWARTZ, Syn. Fil. 14, 200, 1806; KRUG in URBAN, Engl.

bot. Jb. 24: 142, 1897; Duss, Fl. crypt. Ant. franç. 37, 1904. *Olfersia cervina* (L.) KUNZE, Flora 1824: 312; FÉE, 2e Mém. 81, 1845; 11e Mém. 7, 1866; GRISEBACH, Catal. Pl. Cub. 276, 1866.

Rhizome creeping, stout, 1—$1^1/_2$ cm thick; scales numerous, linear, ca. 2 cm long, golden brown to castaneous, toothed in the upper part. Leaves close to remote, the petioles stout, stramineous to pale brown, the base bearing very narrow deciduous scales inserted on small warts, adaxially sulcate, otherwise terete or shrivelling and sulcate, up to 1 m long, about as long as the lamina. Sterile lamina herbaceous or subcoriaceous, pale to brownish-green, glabrous, simply pinnate, oblong to oval, with ca. 6—9 pinnae to a side and a conform terminal one, these alternate or the lower ones subopposite, ascending, mostly short-stalked, oblong to lanceolate, ca. 12—25 cm long, 3—6 cm wide, $3^1/_2$—7 × as long as wide, the margin cartilaginous, entire or sinuous, the apex acute to long-acuminate, the base unequally cuneate, the acroscopic side wider, sometimes almost rounded. Upper pinnae and terminal one mostly somewhat reduced. Costa elevated, percurrent; veins close, evident, immersed or slightly elevated, mostly rather oblique, once or twice forked near their bases, connected by an intramarginal strand. Fertile leaves with longer petioles, bipinnate with conform terminal pinna; pinnae short-stalked, narrowly lanceolate, ca. 10—15 cm long, 1—2 cm wide, strongly narrowed to the apex; pinnules linear, 3—12 mm long, 1—2 mm wide, their width or more apart, connected by a narrow barren wing, the abaxial and the greater part of the adaxial surface entirely covered with sporangia. Spores oblong, yellowish-brown, the perispore forming a very conspicuous wing which folds and wrinkles when the spore shrinks in drying, ca. 32—37 × 24—28 $\mu$, with the wing ca. 66—70 × 42—50 $\mu$.

Widespread in tropical America from Cuba and Central America to Bolivia.

Terrestrial in montane forests at middle and higher elevations.

SABA: The Mountain, 600—800 m (Suringar 6000, L, U; Boldingh 1819, 1824, 2202); ibid., top (Arnoldo 984); between Hellsgate and Santa Cruz, 550 m (Stoffers 3440, juv., 3455); without loc. (Boldingh 2224a, juv.).

**Diplazium** Swartz, Schrad. Journ. 1800[2]: 61, 1801

Medium-sized or large terrestrial ferns with creeping or erect, sometimes trunk-like dictyostelic rhizome bearing dark non-clathrate scales. Petioles continuous, with two or upwards only one semi-circular bundle. Lamina simple or mostly pinnately incised, often highly compound, mostly glabrous, often succulent, usually free-veined, the axes and larger veins adaxially sulcate. Sori elliptic to linear, dorsal on the veins, with conform indusium attached on one side along the vein, at least some of the basal acroscopic veins of pinna or segment with double sori which face each other along the line of attachment of the indusia; spores monolete, with perispore.

Between 350 and 400 species in the warmer parts of both Hemispheres.

Several recent authors unite this genus with *Athyrium* Roth.

**Diplazium striatum** (L.) Presl

PRESL, Tent. Pterid. 114, 1836; FÉE, 11e Mém. 41, 1866; BOLDINGH, Fl. D.W. Ind. Isl. I; 4, 1909; Fl. Ned. W. Ind. Eil. 97, 1913; URBAN, Symb. Ant. 9: 323, 1925; MAXON,

Pteridoph. Porto Rico & Virg. Isl. 442, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 160, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 48, 1937; STEHLÉ, Caribb. For. 4(2): 85, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 25, 1953; HODGE, Lloydia 17: 87, 1954. — *Asplenium striatum* LINNAEUS, Spec. Plant. 2: 1082, 1753; GRISEBACH, Catal. Pl. Cub. 278, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 109, 1897; DUSS, Fl. crypt. Ant. franç. 86, 1904.

Rhizome erect, stout, more or less trunk-like, said to attain $^1/_2$ m, the apex bearing lanceolate blackish-brown scales with paler margins. Leaves close, ascending, the petioles very stout, stramineous to medium brown, dull, adaxially sulcate, usually shorter than the lamina. Lamina herbaceous, dark green, oblong, up to $1^1/_2$ m long and $^1/_2$ m wide, simply pinnate + pinnatifid, the rachis similar to the petiole. Rachis, costae, and costules bearing a tomentum of very short reddish articulate hairs, these deciduous at length, persistent at least in the adaxial groove of the costae. Pinnae numerous, alternate, spreading, subsessile or short-stalked, lanceolate, ca. 12—25 cm long, 3—6 cm wide, 3—4 × as long as wide, deeply pinnatifid, the base truncate, the apex acuminate. Upper pinnae gradually reduced to a pinnatifid leaf-apex, lower pinnae not reduced. Segments close, spreading, oblong or ligulate, slightly narrowed and rounded or subtruncate at the apex, the margins distantly serrate or crenate, the sinuses acute or shortly rounded, the segments joined by a wing of 3—6 mm; basal segments often somewhat reduced, sometimes nearly free; upper segments gradually reduced, confluent into a pinnatifid pinna-apex. Costa percurrent, adaxially sulcate, on both sides shortly hirtellous, abaxially glabrescent; costules median, percurrent, glabrescent; veins close, free, once forked or in very large segments pinnately branched, reaching the margin, the basal vein usually simple, ending just above the bottom of the sinus; leaf-tissue glabrous. Sori linear, extending along the veins or their distal branches from the costule about $^2/_3$ the way to the margin, the sori on the basal acroscopic veins usually double; indusium membranous, brownish, minutely erose. Spores oblong or weakly bean-shaped, medium brown, with conspicuous pale perispore forming wrinkled crests and wings, ca. 50—55 × 28—32 $\mu$, with the perispore ca. 80 × 50 $\mu$.

Greater and Lesser Antilles, Mexico to northern and western South America.
In moist forests, at higher elevations.

SABA: The Mountain, 600—800 m (Suringar 6108, L, 6110, L; Boldingh 1833, 2203).

A polymorphic, possibly inclusive species.

*Diplazium semihastatum* (Kunze) C. Chr. was reported by BOLDINGH from St. Eustatius, Fl. D.W. Ind. Isl. I: 4, 1909, but omitted from his Fl. Ned. W. Ind. Eil., 1913. The identity of his material which has not been seen by the present author remains obscure.

**Bolbitis** Schott, Gen. Fil. pl. 14, 1834

Terrestrial or scandent ferns with mostly creeping, dictyostelic rhizome clothed with entire non-clathrate scales. Leaves continuous, the lamina usually simply pinnate, dimorphic, the pinnae sometimes articulate. Veins anastomosing, often with free included veinlets. Fertile pinnae contracted, the whole abaxial surface covered with sporangia, without paraphyses. Spores monolete (always?), with perispore.

About 90 species in the Tropics and Subtropics of both Hemispheres.

**Bolbitis cladorrhizans** (Sprengel) Ching

CHING in CHRISTENSEN, Ind. Fil. Suppl. III: 47, 1934; BOX & ALSTON, Jo. Bot. 75: 254, 1937; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 14, 1953. — *Acrostichum cladorrhizans* SPRENGEL, Nova Acta Leop. 10: 225, 1821. *Leptochilus cladorrhizans* (Sprengel) MAXON, Pteridoph. Porto Rico & Virg. Isl. 460, 1926; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 42, 1937; STEHLÉ, Caribb. For. 4(2): 88, 1943. — *Lonchitis hirsuta* auct. non L.; BOLDINGH, Fl. Ned. W. Ind. Eil. 102, 1913, p.p. min.

Rhizome short-creeping, the scales light-brown, lanceolate, long-acuminate, with some deciduous filiform marginal projections. Leaves close, the petioles stramineous, dull, deciduously paleaceous, sulcate, ca. 10—30 cm long. Sterile lamina herbaceous, bright green, glabrous, oval to oblong, ca. 15—40 cm long, 10—30 cm wide, ca. $1^1/_2 \times$ as long as wide, about as long as the petiole, pinnate + pinnatifid (or pinnate + bipinnatifid at the extreme base), with ca. 5—8 pinnae to a side, the basal ones more or less distinctly stalked, the middle and upper ones adnate and connected by a broad wing, gradually confluent into a pinnatifid leaf-apex, this sometimes protracted, flagelliform, proliferous. Pinnae subopposite, lanceolate, acuminate, ca. 2—6 cm wide, lobed or the upper ones crenate, the basal pair broader, asymmetric, with considerably larger basal basiscopic segments. Margins denticulate, some veins running into small teeth. Costae and costules slightly prominulous; tertiary veins evident, copiously anastomosing, nearly all larger areoles with free included veinlets pointing in all directions. Fertile leaves usually with a longer petiole, the pinnae contracted, less incised, with less evident venation, the abaxial surface densely covered with sporangia. Spores elliptic to subglobose, apparently monolete, medium brown, with very prominent perispore forming crests and ridges, ca. 36—42 × 28—32 $\mu$.

West Indies, Trinidad and Tobago, Mexico to northern South America.
In shady woods at middle elevation.

ST. EUSTATIUS: Bottom of The Quill, 250 m (Stoffers 3631, 3635, juv.); without loc. (Boldingh 440).

**Lomariopsis** Fée, 2e Mém. 10, 66, 1845

Large ferns with scaly scandent rhizome. Leaves continuous, naked, imparipinnate, with articulate pinnae, the terminal one continuous or aborted. Veins free, simple or forked. Fertile leaves usually dissimilar, with contracted pinnae, their abaxial side densely covered with sporangia. Spores monolete, with perispore.

About 40 species in the Tropics, half of them in the New World.

**Lomariopsis sorbifolia** (L.) Fée

FÉE, 2e Mém. 69, 1845; 11e Mém. 5, 1866; HOLTTUM, Kew Bull. 1939: 616, fig. 3, 617. — *Acrostichum sorbifolium* LINNAEUS, Spec. Plant. 2: 1069, 1753; KRUG in URBAN, Engl. bot. Jb. 24: 142, 1897, in part; DUSS, Fl. crypt. Ant. franç. 35, 1904. *Stenochlaena sorbifolia* (L.) J. SMITH, Jo. Bot. 4: 149, 1841; UNDERWOOD, Bull. Torr. Bot. Cl. 33: 600, 1906; BOLDINGH, Fl. D.W. Ind. Isl. I: 5, 1909; Fl. Ned. W. Ind. Eil. 100, 1913; URBAN, Symb. Ant. 9: 337, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 458, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 188, 1929; Box & ALSTON, Jo. Bot. 75: 255, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 56, 1937; STEHLÉ, Caribb. For. 4(2): 88, 1943; HODGE, Lloydia 17: 93, 1954.

Rhizome scandent, ca. 4 mm thick in full-grown plants, angular through the ridges formed by the decurrent leaf-bases, deciduously scaly, the scales close and imbricate at the apex of the rhizome, brownish-yellow, narrowly lanceolate, long-acuminate, ciliate. Leaves ascending, the petioles stramineous, ca. 12—15 cm long, scaly at the base, terete, channelled above. Lamina herbaceous, dark green when dry, glabrous, simply pinnate, ca. 20—50 cm long, 10—20 cm wide, with ca. 10—20 slightly ascending articulate pinnae to a side and a conform non-articulate terminal one; rachis narrowly or (in juvenile plants) rather broadly winged. Pinnae dimorphic, the sterile lanceolate, 6—12 cm long, $1^1/_2$—2 cm wide, with subequally cuneate base and acuminate or subcaudate apex; lower pinnae somewhat remote and reduced. Margin sinuate-dentate throughout, especially in leaves of juvenile plants, or repand, subentire in the basal part. Veins free, parallel, simple or mostly once forked, slightly prominulous. Fertile leaves (not yet collected in the Dutch West Indies) smaller, with stalked pinnae ca. 3 mm wide, abaxially covered by the sporangia. Spores not seen.

Hispaniola, Puerto Rico, Lesser Antilles south to Grenada.
Climbing on tree-trunks, at middle elevations.

St. Eustatius: bottom of The Quill, 300 m (Boldingh 453, U, L, 470); The Quill (Suringar 5968, L, 5970, 5971, L); Bengalen (Suringar 5967, L); without loc. (Boldingh 473a).

Reported from Saba by Boldingh (1909, 1913); no specimens seen by the author.

**Elaphoglossum** Schott ex J. Smith in Hooker, Jo. Bot. 4: 148, 1841

Small to rather large, usually epiphytic ferns with creeping to suberect dictyostelic rhizome bearing non-clathrate scales. Petioles mostly close, sometimes virtually absent, articulate to more or less developed phyllopodia; lamina simple, entire or rarely lobed or forked, more or less dimorphic, bearing scales or glabrescent, without hairs, the scales often fimbriate or substellate; fertile leaves more or less pronouncedly difform, often longer and/or narrower than the sterile ones, rarely shorter or almost conform, their abaxial surface covered by the sporangia; paraphyses wanting. Veins free, simple or forked, sometimes slightly anastomosing near the margin, very rarely reticulate without free included veinlets. Spores monolete, with perispore.

Between 400 and 500 species, mainly in the American Tropics, relatively few in the Old World, a small number reaching temperate latitudes.

Key to the species:

1. Vein-ends of sterile lamina arcuate, ± anastomosing; margin of sterile lamina often irregularly repand-erose . . . . . *E. longifolium*
   Vein-ends free; margin entire or remotely subrepand . . . . 2
2. Fertile lamina linear; sterile lamina at least abaxially distinctly (though minutely) scaly . . . . . *E. dussii*
   Fertile lamina lanceolate; sterile lamina hardly or not scaly on the abaxial side . . . . . 3
3. Sterile leaves distinctly petiolate, the lamina decurrent on the petiole but clearly distinct; fertile lamina much shorter than the petiole *E. martinicense*
   Sterile leaves obscurely petiolate to subsessile, the blade gradually passing into the winged petiole; fertile leaves distinctly petiolate, the lamina not less than $^2/_3$ the length of the petiole . . . . . *E. rigidum*

**Elaphoglossum martinicense** (Desvaux) Moore

MOORE, Ind. Fil. 11, 1857; MORTON, Am. Fern Jo. 38(4): 212, 1948; HODGE, Lloydia 17: 71, 1954. — *Acrostichum martinicense* DESVAUX, Berl. Mag. Ges. Naturf. Fr. 5: 309, 1811; KRUG in URBAN, Engl. bot. Jb. 24: 138, 1897, in part; not of Fée, 2e Mém. 45, pl. 16 fig. 3, 1845. — *Elaphoglossum underwoodianum* MAXON, Pteridoph. Porto Rico & Virg. Isl. 397, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 100, 1929; BOX & ALSTON, Jo. Bot. 75: 257, 1937; STEHLÉ, Caribb. For. 4(1): 41, 1942. *Elaphoglossum conforme* auct. non (Swartz) Schott; BOLDINGH, Fl. D.W. Isl. I: 10, 1909, in part; Fl. Ned. W. Ind. Eil. 106, 1913, in part.

Rhizome rather long-creeping, ca. 4 mm thick, with persistent phyllopodia of 1—2 cm, bearing pale-ferrugineous linear long-acuminate ciliate scales with dilated base. Leaves rather close, distichous, dimorphic. Sterile leaves with petioles ca. 5—15 cm long, about as long as the lamina (often somewhat shorter), stramineous to reddish-brown, dull, bearing a few small deciduous appressed scales, adaxially sulcate, upwards very narrowly marginate. Lamina coriaceous, dark green or brownish when dry, opaque, oblong-elliptic to broadly lanceolate, the base acuminate and shortly decurrent, the apex obtuse to shortly acuminate, broadest near the middle, ca. 7—25 cm long, 2—6 cm wide, 3—5 × as long as wide, with a few minute scattered appressed dot-like scales; costa stout, stramineous or reddish, percurrent, abaxially slightly raised; veins immersed, obscure, close, parallel, almost straight above the decurved base, once or twice forked, hardly enlarged at the apex, forming an almost right angle with the margin and nearly reaching it; margin entire, rigidly cartilaginous, subrevolute. Fertile leaves few in number, with longer petiole (up to 25 cm), the lamina narrowly lanceolate, ca. 10 × 1 cm, much shorter than the petiole, abaxially densely covered by the sporangia except at the costa. Spores oblong or bean-shaped, medium brown, the perispore prominent, forming irregular crests, ca. 42—45 × 28—32 $\mu$ (with the perispore).

Hispaniola, Puerto Rico, Lesser Antilles.

In forests and palm-brakes at middle and higher elevations; epiphytic or (?) terrestrial.

SABA: road to The Mountain (Arnoldo 860).
ST. EUSTATIUS: top of The Quill, 380—480 m (Boldingh 302, 384; Stoffers 3692, 3944a); crest of The Quill (Suringar 6102, L, 6107, L); top of The Quill (Boldingh 327, 363; Stoffers 3965; all juvenile, slightly doubtful).

**Elaphoglossum dussii** Underwood ex Maxon

UNDERWOOD ex Maxon, Pteridoph. Porto Rico & Virg. Isl. 398, 1926; BOX & ALSTON, Jo. Bot. 75: 257, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 80, 1937; STEHLÉ, Caribb. For. 4(1): 41, 1942; MORTON, Am. Fern Jo. 38(4): 210, 1948; HODGE, Lloydia 17: 71, 1954. — *Elaphoglossum viscosum* auct. non Swartz; DUSS, Fl. crypt. Ant. franç. 28, 1904. *Elaphoglossum petiolatum* auct. non (Swartz) Urban; BOLDINGH, Fl. D.W. Ind. Isl. I: 10, 1909; Fl. Ned. W. Ind. Eil. 107, 1913; URBAN, Symb. Ant. 9: 373, 1925, in part.

Rhizome short- to rather long-creeping, densely clothed with lustrous castaneous narrowly lanceolate long-attenuate scales with hair-like tips and a few stiff cilia along the margins. Leaves closely distichous, on stout phyllopodia, the sterile ones numerous, distinctly petiolate, the petioles stramineous to reddish-brown, adaxially canaliculate, otherwise terete, clothed with deciduos dark-

brown strongly dissected scales which when fallen often leave dark gland-like scars, a few very deciduos much larger narrowly lanceolate scales often also present at the base of the petiole, of very variable length, 1—12 cm, $^1/_6$—$^1/_2$ as long as the lamina. Lamina firmly herbaceous to subcoriaceous, brownish-green when dry, lanceolate, 6—30 cm long, 1—2 cm wide, 6—20 × as long as wide, the base long-cuneate yet distinct from the petiole, the apex acute or acuminate; margin entire, slightly cartilaginous, mostly more or less revolute; costa stout, stramineous or fawn-coloured, elevated on both sides, adaxially bearing some scattered pale-brown fimbriate scales; veins immersed but evident, oblique, close, mostly once-forked, terminating within the margin: adaxial surface of lamina bearing scattered whitish strongly dissected to substellate scales, abaxial surface bearing more numerous darker stellate scales which when fallen sometimes leave dark gland-like scars, the scales of both surfaces small, deciduous, the marginal scales somewhat larger. Fertile leaves few, equalling or often surpassing the sterile ones, the lamina linear, 12—20 cm long, 4—8 mm wide, attenuate at the base and especially at the apex, adaxially densely but deciduously clothed with pale fimbriate scales, abaxially densely covered with sporangia. Spores oblong-elliptic, pale, the perispore brown, forming irregular crests, with the perispore ca. 41—46 × 27—37 $\mu$.

Hispaniola, Puerto Rico, Lesser Antilles.
Epiphytic in dry evergreen forests at middle elevation.

St. Eustatius: crest of The Quill (Suringar 6103, L, s.n., L); top of The Quill, 400—480 m (Boldingh 248a; Stoffers 3944); ibid., 380—400 m (Stoffers 3683); ibid., 500 m (Boldingh 476); northern slope of The Quill, 350—400 m (Stoffers 3676); n.w. slope, 350 m (Boldingh 192a); De Kant (Suringar 6105, L); Bengalen (Suringar 6101, L).

**Elaphoglossum longifolium** (Presl) J. Smith

J. Smith, Curtis Bot. Mag. 72, Companion 17, 1846; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 83, 1937; Morton, Am. Fern Jo. 38(4): 211, 1948. — *Olfersia longifolia* Presl, Tent. Pterid. 234, 1836; based on: *Acrostichum longifolium* Jacquin, Coll. 2, 105, 1788, non Burmann, 1768. *Aconiopteris longifolia* (Jacquin) Fée, 2e Mém. 80, pl. 41, 1845; 11e Mém. 7, 1866. — *Elaphoglossum latifolium* auct. non (Swartz) J. Smith; Boldingh, Fl. D.W. Ind. Isl. I: 10, 1909; Fl. Ned. W. Ind. Eil. 107, 1913. *Elaphoglossum rigidum* auct. non (Aublet) Urban; Urban, Symb. Ant. 9: 374, 1925, quoad synon.; Maxon, Pteridoph. Porto Rico & Virg. Isl. 398, 1926; Stehlé, Caribb. For. 4(1): 40, 1942.

Rhizome short, creeping or ascending, stout, clothed with pale- or medium-brown ovate-lanceolate acuminate erose scales. Leaves crowded, the petioles stout, sulcate, upwards gradually winged, fawn-coloured, bearing deciduous lanceolate scales, ca. 8—15 cm long. Sterile lamina herbaceous to chartaceous, brown when dry, lanceolate, ca. 30—70 cm long, much longer than the petiole, ca. 4—9 cm wide, the apex acute or acuminate, the base long-cuneate, decurrent onto the petiole, the margin scarious, scarcely revolute, irregularly erose-repand to subentire. Costa stout, fawn-coloured, adaxially strongly sulcate; veins immersed but evident, close, but little oblique, once or twice forked, not reaching the margin, their ends arcuate, sometimes joined. Abaxial surface bearing scattered minute

fimbriate scales leaving dot-like scars and larger, fimbriate deciduous scales along the costa. Fertile leaves (not seen) few, with longer petioles, the lamina similar to the sterile but narrower. Spores not seen.

Greater Antilles (except Jamaica), some of the Lesser Antilles. The records from other parts of tropical America apply probably to related species.
At higher elevation.

SABA: The Mountain, 600—800 m (Suringar 6160, L; Boldingh 2208).

**Elaphoglossum rigidum** (Aublet) Urban

URBAN, Symb. Ant. 9: 374, 1925, as to type only; ALSTON, Kew Bull. 1932: 316; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 82, 1937; MORTON, Am. Fern Jo. 38(4): 210, 1948; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 29, 1953; HODGE, Lloydia 17: 71, 1954; not of Maxon, Pteridoph. Porto Rico & Virg. Isl. 398. 1926. — *Polypodium rigidum* AUBLET, Hist. Pl. Guian. fr. 2: 963, 1775. — *Acrostichum flaccidum* FÉE, 2e Mém. 35, pl. 7 fig. 2, 1845; 11e Mém. 2, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 138, 1897. *Elaphoglossum flaccidum* (Fée) MOORE, Ind. Fil. 356, 1862; MAXON, Pteridoph. Porto Rico & Virg. Isl. 396, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 102, 1929; STEHLÉ, Caribb. For. 4(1): 40, 1942. *Elaphoglossum conforme* auct. non (Swartz) Schott; BOLDINGH, Fl. D.W. Ind. Isl. I: 10, 1909, in part; Fl. Ned. W. Ind. Eil. 106, 1913, in part.

Rhizome short, ascending, the scales dark brown, lanceolate, long-acuminate, with some scattered filiform teeth at the margin. Leaves close, the sterile ones herbaceous to chartaceous, brownish-green when dry, lanceolate, up to ca. 50 cm long and $2^1/_2$—5 cm wide at or near the middle, 4—10 × as long as wide, gradually tapering to the acuminate apex, very gradually narrowed downwards, decurrent onto the petiole which is virtually absent or up to 5 cm long and narrowly winged to the base, articulate to a slender phyllopodium, clothed with deciduous bright-brown narrowly lanceolate scales. Costa stout, elevated, especially abaxially, pale to reddish-brown; veins rather close to close, mostly once forked, straight except at their decurved bases, almost reaching the entire or obscurely repand, slightly thickened, often somewhat revolute margin. Both surfaces of lamina naked or the abaxial side bearing a few very narrowly lanceolate long-attenuate pale brown scales along the costa. Fertile leaves more or less similar, more distinctly petiolate, the lamina shorter and often narrower, adaxially naked. Spores elliptic, rather dark brown, the perispore forming irregular protuberances and ridges, with the perispore ca. 28—32 × 25—27 $\mu$.
Greater and some of the Lesser Antilles, Trinidad, Venezuela, Guiana; reported from other parts of the American continent, possibly in error.
At higher elevation.

SABA: The Mountain, 800 m (Boldingh 1820).

The sole specimen has the leaves more distinctly petiolate and thicker in texture than usual in this species.

**Asplenium** L., Spec. Plant. 2: 1078, 1753

Terrestrial or epiphytic ferns of variable size with creeping or erect dictyostelic rhizome clothed with clathrate scales. Leaves close, continuous, the petioles usually with two vascular bundles merging into an X-shaped one; lamina very variable, simple to

decompound, usually glabrous or fibrillose-scaly, mostly free-veined. Sori ovate to linear, borne upon the veins on their exterior side (i.e. directed away from the place of forking), eparaphysate, with a conform indusium fixed along the vein; spores monolete, with perispore.
Between 600 and 700 species in nearly all parts of the world, most numerous in warmer regions.

Key to the species:

1. Lamina simple . . . . . *A. serratum*
   Lamina divided . . . . . 2
2. Lamina bearing whitish pluricellular hairs . . . . *A. pumilum*
   Lamina without hairs . . . . . 3
3. Petiole and rachis shining, dark brown to atropurpureous, with pale wings; sori mostly confined to the basiscopic half of the pinna *A. formosum*
   Rachis greenish to dull brown or lead-coloured, the petiole occasionally darker, both usually green-margined or -winged; sori on both sides of the costa . . . . . 4
4. Pinnae once or twice pinnate + pinnatifid . . . . *A. cristatum*
   Pinnae subentire to deeply pinnatifid . . . . . 5
5. Sori linear, with membranous brownish indusia; pinnae bicrenate or biserate . . . . . *A. abscissum*
   Sori relatively wider, with stiff pale-green or whitish indusia; pinnae (in the D.W.I.) usually deeply pinnatifid . . . . . *A. auritum*

**Asplenium cristatum** Lamarck

LAMARCK, Encycl. Méthod. 2: 310, 1786; BOLDINGH, Fl. D.W. Ind. Isl. I: 4, 1909; Fl. Ned. W. Ind. Eil. 98, 1913; URBAN, Symb. Ant. 9: 332, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 452, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 178, 1929; ALSTON, Jo. Bot. 73: 38, 1935; Box & ALSTON, Jo. Bot. 75: 254, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 54, 1937; SMALL, Ferns S.E. States 170, 172 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 87, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 10, 1953; HODGE, Lloydia 17: 60, 1954. — *Asplenium cicutarium* SWARTZ, Prodr. 130, 1788; FÉE, 11e Mém. 37, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 107, 1897; DUSS, Fl. crypt. Ant. franç. 84, 1904.

Rhizome erect, a few cm long, $^1/_2$—$^3/_4$ cm thick, the apex bearing narrowly lanceolate acuminate dark-brown scales. Leaves close, the petioles terete, dull brownish-green to light-castaneous or lead-coloured, the adaxial side in the upper part (or in small leaves throughout) with green wings, 5—30 cm long, mostly shorter than the lamina. Lamina bright-green, thin-herbaceous, glabrous, oblong to lanceolate, acuminate, narrowed or truncate at the base, ca. 10—30 cm long, 4—15 cm wide, 2—$3^1/_2$ × as long as wide, bipinnate + pinnatifid or occasionally tripinnate + pinnatifid. Rachis similar to the petiole, upwards, as the secondary rachises, paler and more broadly winged, sparingly clothed with deciduous fibril-like scales. Primary pinnae patent, alternate, sessile, lanceolate, 2—8 cm

long, 10—25 mm wide, subacute to acuminate, the base more or less overlapping the rachis; upper pinnae gradually reduced, confluent into a pinnatifid leaf-apex, a few basal pinnae often reduced and remote. Secondary pinnae ascending, alternate, ovate, ca. 5 × 3—12 × 7 mm, deeply pinnatifid or sometimes pinnate, incised from the acroscopic side and the apex; upper secondary pinnae gradually reduced, confluent into a pinnatifid pinna-apex, the lower ones not reduced. Segments oblong-lanceolate, mucronulate, 2—5 mm long, but little divergent, with acute sinuses, the largest often shallowly bifid, mostly 3—8 per secondary pinna. Veins pinnately branched, solitary in each segment, immersed but evident, not reaching the margin. Sori oblong to linear, solitary on each segment, inframedial, up to 3 mm long, the indusium membranous, pale, ca. 0.4 mm wide, subentire, reflexed and conceiled at full maturity. Spores oblong, medium brown, the perispore forming prominent crests and wings, with the perispore ca. 44—50 × 29 — 32 $\mu$.

Florida, West Indies, Mexico to Bolivia.
Terrestrial or on rocks, in forests, at middle elevations.

SABA: Spring Bay Gut (Boldingh 2111); Gain Bay Gut (Suringar 6023, L); Hellsgate Gut near Devilshand (Suringar 6024, L); hill nw. of The Bottom (Stoffers 3315).
ST. EUSTATIUS: The Quill (Burgers 196; Suringar 6016, L, s.n.); top of The Quill, 400 m (Boldingh 332, 333; Stoffers 3687); inner slope of The Quill, 350 m (Boldingh 419); bottom of The Quill, 250—300 m (Boldingh 451; Stoffers 3624, 3630, 3632, 3638, 4783); lower slope of The Quill near Bengalen (Boldingh 730); Bengalen (Suringar 6026, L, U); De Kant (Suringar 6021, L); Miss Raders' Ravine (Suringar 6020, L).
ST. MARTIN: Mount Paradise, 300—400 m (Boldingh 3230).
Island?: (Suringar s.n., Boldingh 224).

**Asplenium formosum** Willdenow

WILLDENOW, Spec. Plant. 5: 329, 1810; FÉE, 11e Mém. 36, 1866; GRISEBACH, Catal. Pl. Cub. 277, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 106, 1897; DUSS, Fl. crypt. Ant. franç. 82, 1904; BOLDINGH, Fl. Ned. W. Ind. Eil. 98, 1913; MAXON, Contr. U.S. Nat. Herb. 17(2): 146, 1913; URBAN, Symb. Ant. 9: 329, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 446, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 161, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 53, 1937; STEHLÉ, Caribb. For. 4(2): 86, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 10, 1953; HODGE, Lloydia 17: 88, 1954. — *Asplenium monanthes* auct. non L.; BOLDINGH, Fl. D.W. Ind. Isl. I: 4, 1909 (prob.).

Rhizome short, ascending, the apex bearing lanceolate fawn-coloured scales with dark sclerotic centre and erose margins. Leaves tufted, erect, the petioles dark reddish-brown to atropurpureous, shining, terete, adaxially with a flattened portion bordered by pale-brown or stramineous wings, ca. 1—4 (—8) cm long, much shorter than the lamina. Lamian herbaceous to chartaceous, bright or dark green when dry, ca. 10—30 cm long, $1^1/_2$—3 cm wide, widest near the middle, gradually narrowed the both ends, especially at the base, glabrous, simply pinnate. Rachis similar to the petiole. Pinnae numerous, their width apart or less, patent or the lower ones somewhat deflexed, ca. 7—15 mm long, 2—5 mm wide, about 3 × as long as wide, oblong, sessile, with unequally cuneate base, the basiscopic

side cut away at a very small angle, the acroscopic margin incised $^1/_2$ or $^2/_3$ the distance to the costa into acute or erect or slightly ascending teeth, the basal ones often once or twice cleft; basiscopic side with a few shorter strongly ascending teeth; apex obtuse or acute; margin often narrowly revolute. Upper pinnae reduced, rather abruptly confluent into a lanceolate-linear lobed acuminate leaf-apex; basal pinnae very gradually reduced and remote, the lowermost often auriculiform. Veins immersed, obscure, simple or forked. Sori mostly 1—3 per pinna, on the lobes of the basiscopic side, sometimes an additional sorus on the acroscopic side, ca. 2—3 × $^1/_2$—1 mm, the indusium pale, membranous, subentire. Spores oblong-elliptic, medium brown, the perispore not prominent, forming irregular ridges, with the perispore ca. 37—41 × 29—34 $\mu$.

Greater and some of the Lesser Antilles; very widespread in tropical and subtropical America, from Mexico to northern Argentina, and in India, Ceylon, and tropical Africa. No ecological data extant. In other regions mostly found on rocks along watercourses, at lower and middle elevations.

SABA: Mary's Point Gut (Suringar s.n., L).

**Asplenium auritum** Swartz

SWARTZ, Schrad. Journ. 1800[2]: 52, 1801; FÉE, 11e Mém. 35, 1866; GRISEBACH, Catal. Pl. Cub. 277, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 105, 1897; DUSS, Fl. crypt. Ant. franç. 83, 1904; BOLDINGH, Fl. D. W. Ind. Isl. I: 4, 1909; MAXON, Pteridoph. Porto Rico & Virg. Isl. 450, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 176, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 55, 1937; SMALL, Fens S.E. States 160, 161 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 87, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 9, 1953; HODGE, Lloydia 17: 90, 1954.

Rhizome ascending or erect, bearing remnants of old leaf-bases and at the apex some ovate acute pale-brown entire scales. Leaves close, the petioles greyish-green to pale lead-coloured (occasionally darker), dull, glabrous, adaxially green and sulcate to subalate, otherwise terete, ca. 5—20 cm long, mostly somewhat shorter than the lamina. Lamina herbaceous to subcoriaceous, pale to dark green, glabrous, ca. 10—40 cm long, oblong to lanceolate, truncate or often slightly narrowed at the base, acuminate, simply pinnate, with ca. 10—20 pinnae to a side; rachis greenish or darker, narrowly but distinctly winged. Pinnae alternate, the lower ones subopposite, subsessile to shortly petiolulate, spreading or ascending, very variable in size, shape, and degree of dissection, from oblong and subentire or auriculate to narrowly lanceolate and deeply pinnatifid, with strongly ascending lanceolate obtuse or subacute segments, the base very unequally cuneate (strongly anadromic), the apex obtuse to long-acuminate, the margins dentate-serrate. Veins mostly obscure, immersed or slightly elevated, very oblique, simple or once forked, not reaching the margin. Sori ca. $1^1/_2$—3 mm long, not reaching the margin; indusium pale green or whitish, stiff, entire or subentire, gradually narrowed at both ends. Spores rather dark brown, oblong to weakly bean-shaped, the perispore forming crests and ridges, with the perispore ca. 43—51 × 28—35 $\mu$.

Very widespread in the New World, from Florida and the West Indies to northern Argentina. The Old World species *A. sulcatum* Lam. is perhaps conspecific.
At middle elevation.

SABA: road to The Mountain (Arnoldo 877); The Mountain — Rendez Vous, 400 m (Suringer s.n., L).
ST. EUSTATIUS: top of The Quill, 350—450 m (Stoffers 3689, juv., somewhat doubtful); De Kant (Suringar s.n., L).
Island?: (Suringar 6169, L).

A very variable species; several infraspecific taxa have been described. The material from the Dutch West Indies may be referred to var. *rigidum* (Swartz) HOOKER, Spec. Fil. 3: 180, 1860 (basionym: *A. rigidum* Swartz), with deeply pinnatifid pinnae and usually rather firm texture.

**Asplenium abscissum** Willdenow

WILLDENOW, Spec. Plant. 5: 321, 1810; FÉE, 11e Mém. 35, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 104, 1897; DUSS, Fl. crypt. Ant. franç. 79, 1904; URBAN, Symb. Ant. 9: 329, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 499, 1926; DOMIN, Mem. Roy. Cz. Soc. Sci. N.S. 2: 163, 1929; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 52, 1937; SMALL, Ferns S.E. States 156, 157 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 86, 1953; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 9, 1953; HODGE, Lloydia 17: 89, 1954. — *Asplenium obtusifolium* auct. non L.; BOLDINGH, Fl. D.W. Ind. Isl. I: 4, 1909; Fl. Ned. W. Ind. Eil. 98, 1913.

Rhizome short, erect or ascending, the apex bearing a tuft of lanceolate acuminate blackish brown-margined scales. Leaves clustered, the petioles olivaceous to dull brown, naked, adaxially narrowly green-margined except at the base, $^2/_3$ as long as to equalling the lamina. Lamina herbaceous, dark green, glabrous, ca. 15—40 cm long, 6—15 cm wide, ca. $1^1/_2$—$2^1/_2$ × as long as wide, ovate to narrowly oblong, acuminate, truncate at the base, simply pinnate. Rachis narrowly marginate. Pinnae ca. 6—12 to a side, alternate or the lower ones usually subopposite, somewhat ascending, not close, the larger ones subpetiolulate, 3—8 cm long, 1—2 cm wide, 3—5 × as long as wide, widest somewhat above the base, subtrapezoidal or oblong to lanceolate, obtuse to shortly acuminate; upper base more or less truncate or occasionally subauriculate, lower base narrowly cuneate; margin bicrenate or biserrate. Lower pinnae not reduced, sometimes slightly deflexed, upper pinnae gradually and strongly reduced, rather abruptly confluent into a lanceolate leaf-apex with lobed base. Veins very oblique, not close, immersed, usually 1—3 times forked; costa pale, slightly elevated. Sori linear, concave, ca. $^1/_2$—1 cm long, with narrow membranous entire brown indusium. Spores oblong to weakly bean-shaped, rather pale brown, the perispore forming irregular crests and ridges, with the perispore ca. 32—37 × 23—25 $\mu$.

Widespread in the New World, from Florida, the Greater Antilles and Mexico to northern Argentina.
At middle elevation.

ST. EUSTATIUS: bottom of The Quill (Boldingh 441, 467).

**Asplenium pumilum** Swartz

SWARTZ, Prodr. 129, 1788; FÉE, 11e Mém. 33, 1866; GRISEBACH, Catal. Pl. Cub. 277, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 106, 1897; DUSS, Fl. crypt. Ant. franç. 81, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 5, 1909; Fl. Ned. W. Ind. Eil. 99, 1913; URBAN, Symb. Ant. 9: 331, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 447, 1926; DOMIN,

Mém. Roy. Cz. Soc. Sci. N.S. 2: 162, 1929; Alston, Jo. Bot. 73: 38, 1935; Box & Alston, Jo. Bot. 75: 255, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 53, 1937; Small, Ferns S.E. States 175, 176 (fig.), 1938; Stehlé, Caribb. For. 4(2): 86, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 11, 1953; Hodge, Lloydia 17: 89, 1954.

Rhizome ascending or erect, short, a few mm thick, the apex bearing small linear blackish-brown scales. Leaves close, the petioles dark brown, upwards green-margined, at the base deciduously scaly, with scattered hairs, $1^1/_2$—10 cm long, as long as — $1^1/_2$ × as long as the lamina. Lamina thinly herbaceous, pale to dark green, triangular or pentagonal to oblong, 2—10 cm long, $1^1/_2$—6 cm wide, as longs as to $1^1/_2$ × as long as wide, acute, deeply trilobed to pinnate + pinnatifid, the marginate rachis, the veins, and the margin thinly clothed with whitish septate hairs. Ultimate segments few, ovate to lanceolate, obtuse or acute (the terminal segments always acute), crenate-serrate or pinnately lobed, without or with a weakly developed costa; veins immersed, lax, the larger ones pinnately branched, the smaller ones forked, not reaching the margin, very oblique. Sori oblong to linear, up to ca. 1 cm long, medial or inframedial, with pale membranous subentire indusia ca. $^1/_3$ mm wide. Spores oblong-elliptic, dark brown, the perispore prominent, forming irregular wings and crests, with the perispore ca. 36—38 × 22—29 $\mu$.

Widespread in the New World, from Florida, the Greater Antilles and Mexico to northern Argentina; a variety or closely allied species in South Africa.
Terrestrial in shaded situations and woods at lower and middle elevations.

Saba: between The Bottom and Saddle, 220—300 m (Stoffers 3099); between Hellsgate and Mary's Point (Boldingh 2041); without loc. (Boldingh s.n.).
St. Martin: Mildrum Hill, 300—400 m (Boldingh 3178, 3181); Mount Paradise, 300—400 m (Boldingh 3213a).

**Asplenium serratum L.**

Linnaeus, Spec. Plant. 2: 1079, 1753; Fée, 11e Mém. 32, 1866; Grisebach, Catal. Pl. Cub. 277, 1866; Krug in Urban, Engl. bot. Jb. 24: 102, 1897; Duss, Fl. crypt. Ant. franç. 77, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 5, 1909; Fl. Ned. W. Ind. Eil. 99, 1913; Urban, Symb. Ant. 9: 326, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 445, 1926; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 161, 1929; Alston, Jo. Bot. 73: 98, 1935; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 51, 1937; Small, Ferns S.E. States 152, 153 (fig.), 1938; Stehlé, Caribb. For. 4(2): 86, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 12, 1953; Hodge, Lloydia 17: 68, 1954.

Rhizome short, erect, covered with a mass of tomentose roots, at the apex bearing a tuft of large dark-brown linear hair-pointed scales. Leaves close, almost sessile, simple, lanceolate, shortly acuminate, the base very long cuneate, passing into the short stout stramineous or brownish winged petiole; lamina medium green, herbaceous to chartaceous, 40 cm—1 m long, 6—12 cm wide, 5—8 × as long as wide, widest above the middel, glabrous, the edge slightly thickened, subentire-repand below, dentate-crenate above, with stout elevated stramineous percurrent costa; secondary veins immersed, close, oblique, simple or usually once-forked below the middle, not quite reaching the margin. Sori linear, usually only on the anterior branch of the vein, confined to the upper part of the lamina, extending

from near the costa up to ca. $^2/_3$ the way to the margin (mostly less), up to 4 cm long; indusium very narrowly linear, pale, entire. Spores pale yellowish, oblong to bean-shaped, the perispore forming irregular wrinkled crests, with the perispore ca. 47—50 × 32—37 $\mu$.

Widespread in the New World from Florida, the West Indies and Mexico to northern Argentina.
Epiphytic and on moist rocks and logs, at middle elevation.

ST. EUSTATIUS: The Quill (Suringar 6015, L); n.w. slope of The Quill, 350 m (Boldingh 387); bottom of The Quill, 250—300 m, (Boldingh 444, 450; Stoffers 3650); De Kant (Suringar 6013, L).
Reported from Saba by Boldingh (1909, 1913).

**Blechnum** L., Spec. Plant. 2: 1077, 1753 (including *Struthiopteris* Weiss, non Willd.)

Medium-sized to large ferns, usually terrestrial, with short-creeping or erect, sometimes trunk-like dictyostelic rhizome bearing scales, these often narrow and dark. Leaves usually close, non-articulate, the lamina most often pinnatifid or simply pinnate, the pinnae often narrow, sometimes articulate. Veins nearly always free or united by a marginal strand. Fertile pinnae not rarely much contracted, sometimes almost without a laminal part, then the leaves strongly dimorphic. Sori linear, on a vascular commissure on both sides of and parallel to the costa, the indusium attached along the commissure, opening towards the costa, in species with contracted fertile pinnae sometimes seemingly marginal. Spores monolete, without perispore.
Approximately 200 species, mainly in tropical, subtropical, and south-temperate regions.

Key to the species:

Leaves not dimorphic; most pinnae adnate; leaf-apex pinnatifid; rachis and costae without scales . . . . . *B. occidentale*

Leaves dimorphic, the fertile ones with very narrow pinnae; only the pinnae near the leaf-apex adnate; lamina imparipinnate; rachis and abaxial side of costae scaly . . . . . *B. nesioticum*

**Blechnum occidentale** L.

LINNAEUS, Spec. Plant. 2: 1077, 1753 (err.: *B. orientale*); FÉE, 11e Mém. 12, 1866; GRISEBACH, Catal. Pl. Cub. 275, 1866; KRUG in URBAN, Engl. bot. Jb. 24: 101, 1897; DUSS, Fl. crypt. Ant. franç. 88, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 5, 1909; Fl. Ned. W. Ind. Eil. 99, 1913; URBAN, Symb. Ant. 9: 335, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 456, 1926; DOMIN, Mém. Roy. Cz. Sci. N.S. 2: 185, 1929; ALSTON, Jo. Bot. 73: 38, 1935; BOX & ALSTON, Jo. Bot. 75: 255, 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 55, 1937; SMALL, Ferns S.E. States 138, 139 (fig.), 1938; STEHLÉ, Caribb. For. 4(2): 88, 1942; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 13, 1953; HODGE, Lloydia 17: 93, fig. 48, 1954.

Rhizome ascending or erect, stoloniferous, ca. $^1/_2$—$1^1/_2$ cm thick, bearing lanceolate attenuate bright-brown scales with dark central portion. Leaves close, the petioles stramineous to pale brown, dull, adaxially sulcate, clothed with lanceolate pale-brown-scales, ca. 10—40 cm long, approximately as long as the lamina. Lamina medium- or brownish-green when dry, firmly herbaceous to chartaceous, ovate to lanceolate, ca. 10—50 cm long, 4—25 cm wide, mostly 2—$2^1/_2$ × as

long as wide, acuminate, slightly narrowed or truncate at the base, simply pinnate below, pinnatifid above, scarcely or not dimorphic. Rachis stramineous, adaxially minutely pustulate. Pinnae ca. 10—25 to a side, patent or slightly falcately ascending, the lower ones usually subopposite, lanceolate or linear, the largest ca. 2—14 cm long, $^1/_2$—2 cm wide, 2—9 × as long as wide, the apex rounded or usually acute or acuminate, the base truncate or subcordate, the margin entire; lower pinnae somewhat remote and usually somewhat reduced, the middle and upper ones subcontiguous or contiguous, gradually reduced, confluent into a pinnatifid eventually entire lanceolate leaf-apex. Basal pinnae very shortly petiolulate or subsessile, the others sessile, adnate, widest at or just above the base or rarely towards the middle. Fertile pinnae sometimes slightly narrowed. Leaf-tissue glabrous or with some scattered hairs; costa percurrent, scarcely elevated, adaxially sulcate; secondary veins oblique, curved, close, once or twice forked, immersed. Sori continuous on a commissure on both sides of the costa, not reaching the apex of the pinna. Indusia linear, membranous, entire, brownish, at first meeting across the costa, reflexed and conceiled at full maturity. Spores pale brown, bean- to kidney-shaped, obscurely verrucose, ca. 45—50 × 28—32 $\mu$.

Widespread in the New World from Florida, the West Indies and Mexico to northern Argentina; Hawaii (introduced).
Terrestrial in rainforests, secondary rainforests and in groves, at various elevations.

SABA: Booby Hill, 400 m (Stoffers 4283, 4285, 4300); Peperpot (Suringar 6125, L); Castle Hill, seaside, 300 m (Stoffers 4157); near Saddle, 375 m (Stoffers 4130); Hellsgate (Boldingh 1689); road to Hellsgate (Arnoldo 756); Hellsgate — Santa Cruz, 500 m (Stoffers 3444, 3451); Santa Cruz, 550 m (Stoffers 4346, 4347 b); Spring Bay Gut (Boldingh 2113, 2114); The Bottom, 200 m (Boldingh 1449); The Bottom, 200 m (Boldingh 1449); The Bottom — Windwardside (Stoffers 4607); The Mountain near Windwardside, 600 m (Boldingh 2168, 2172); Mountain (Suringar 6123, L); The Mountain, Under the Cliff, slope of Mountain, 680 m (Stoffers 3225, 3229); Crispine — Rendez Vous (Suringar 6126, L; Stoffers 3064); Crispine — Small Rendez Vous, 300—400 m (Stoffers 3047).
ST. EUSTATIUS: n.w. slope of The Quill, 350 m (Boldingh 385); slope of The Quill (Suringar 6120, L); crest of The Quill (Suringar 6119, L); The Quill (?), 200 m (Suringar 6121, L); Bengalen (Suringar 6122, L).
ST. MARTIN: Mount Paradise, 300—400 m (Boldingh 3342); Marigot road near Marigot (Boldingh 2803).
Island?: (Boldingh 968, local no.).

**Blechnum nesioticum** Kramer

KRAMER, Acta Bot. Neerl. 9: 299, 1960. — *Onoclea striata* SWARTZ, Syn. Fil. 304, 1806. — *Lomaria striata* (Swartz) WILLDENOW, Spec. Pl. 5: 291, 1810; FÉE, 5e Mém. 66, t. 5 B fig. 3, 1852; 11e Mém. 11, 1866. *Blechnum striatum* (Swartz) CHRISTENSEN, Ind. Fil. 160, 1906; BOLDINGH, Fl. Ned. W. Ind. Eil. 99, 1913; HODGE, Lloydia 17: 92, 1954; non R. Brown, 1810. *Struthiopteris striata* (Swartz) BROADHURST, Bull. Torr. Bot. Cl. 39: 375, 1912; DOMIN, Mém. Roy. Cz. Soc. Sci. N.S. 2: 184, 1929; BOX & ALSTON, Jo. Bot. 75: 255, 1937; STEHLÉ, Caribb. For. 4(2): 87, 1943. — *Lomaria procera* auct. non Sprengel; DUSS, Fl. crypt. Ant. franç. 71, 1804.

Rhizome not seen, probably erect. Leaves fasciculate, dimorphic. Sterile leaves with very stout stramineous petiole, up to almost 1 m long; lamina chartaceous

to subcoriaceous, dark brownish when dry, ca. 40—70 cm long, ca. 30 cm wide, simply pinnate; rachis stramineous, bearing deciduous pale-brown lanceolate long-acuminate scales with filiform tip and some scattered fibril-like marginal appendages, besides smaller, more distinctly fibrillose scales passing into fibrils. Pinnae numerous, patent or ascending, alternate, rather close to subcontiguous, narrowly lanceolate to broadly linear, straight or slightly falcate, ca. 15—25 cm long, mostly $2^1/_2$ cm wide, widest near the base, sessile or the lower ones with a petiolule of a few mm, the base rounded or subcordate, only the upper ones adnate; apex rather abruptly short-acuminate, serrate-crenate, the edge otherwise sinuate-repand to subentire, membranous, revolute for ca. $^1/_2$ mm. Lower pinnae not reduced, upper pinnae gradually but not strongly reduced, the terminal pinna small, sometimes adnate to one or two lateral ones. Costa stout, prominent, especially abaxially, adaxially sulcate; veins very close, ascending, simple or once forked (usually near the base), not reaching the margin, abaxially slightly prominulous. Adaxial surface glabrous (glabrescent?), abaxial surface along the costa with narrowly lanceolate scales resembling those of the rachis, and pale very narrow fibril-like scales along costa and veins, these eventually deciduous. Fertile leaves (not yet found in the Dutch West Indies) with the petiole and rachis more densely and persistently scaly; lamina ca. 30—40 cm long, the pattern of dissection as in the sterile lamina. Pinnae laxly ascending, linear, ca. 15 × 0,4 cm, long-acuminate, adaxially glabrous, abaxially densely scaly along the very prominent costa with stramineous to pale-brown lanceolate very long-acuminate eventually caducous scales which at first more or less cover the sori; veins immersed, ending in adaxially conspicuous hydathodes. Indusia submarginal, dark, cleft into more or less regular lobes (often almost to the base), those of opposite sides of the pinna at first almost meeting across the costa. Sporangia covering the fertile pinnae on the abaxial side except at the costa; spores hyaline, bean-shaped, smooth, ca. 55—60 × 39—42 $\mu$.

Lesser Antilles from St. Kitts to Grenada.
In elfin woodland, at higher elevation.

SABA: The Mountain, 600—800 m (Suringar s.n., L); top of The Mountain, 800—835 m (Stoffers 4204); without loc. (Lionarons 181).

# SALVINIACEAE

Small floating aquatic ferns with horizontal siphonostelic rootless rhizome. Leaves in whorls of three, one strongly dissected and hairy, root-like, submersed, two roundish or oblong, often more or less boat-shaped and keeled, floating, bearing hairs which are often borne on papillae. Sporangia enclosed in sporocarps borne in clusters on the submersed leaves, each sporocarp containing sporangia of only one kind, the sporangia inserted on branched stalks. Megasporangia containing one megaspore, microsporangia containing 64 trilete microspores, both with a wall of one layer of cells, without annulus.

A single genus:

**Salvinia** Adanson, Fam. d. Pl. II: 15, 1763

Characters of the family.
About 10 species of very wide distribution, mostly in warmer regions.

ARNOLDO (Gekw. en nutt. pl. Ned. Ant. 118, fig. 216, 1954) reported *S. natans* as cultivated on the Leeward Group. A collection representing cultivated or escaped plants is Arnoldo s.n. from Pietermaai, Curaçao. It does not belong to *S. natans*, but seems to be closest to the African *S. nymphellula* Desvaux which has the hairs of the upper surface of the floating leaves in small groups but not borne on papillae.

# LYCOPODIACEAE

Small to medium-sized terrestrial or often epiphytic plants with more or less dichotomously branched, often trailing or pendulous stems with a protostele, often of complicated structure. Leaves non-articulate, usually small and narrow, 1-veined, mostly in several ranks, often close, sometimes dimorphic. Sporangia 1-celled, opening with two valves, in the axils or on the bases of sporophylls, these resembling the sterile leaves or modified, sometimes borne in strobili. Spores of one kind, numerous, trilete.

Two genera: *Phylloglossum*, with a single species, with a whorl of leaves on the apex of a tuber (Australia and New Zealand), and the following.

**Lycopodium** L., Spec. Plant. 2: 1100, 1753.

See the description of the family.
About 250 species of world-wide distribution, most numerous in temperate regions and on tropical mountains; classed by some modern authors in 2—4 genera.

Key to the species:

1. Leaves very narrow, not over $^1/_2$ mm wide . . . . . 2
   Leaves 1 mm wide or more . . . . . 3
2. Leaves 4—6 mm long, falcately ascending . . . . *L. setaceum*
   Leaves 1—2 cm long, spreading or falcately decurved . . *L. wilsonii*
3. Leaves lanceolate, $1^1/_2$—3 mm wide . . . . . *L. taxifolium*
   Leaves linear, 1 mm wide . . . . . *L. dichotomum*

**Lycopodium setaceum** Lam.

Lamarck, Encycl. Méthod. 3: 653, 1789; Underwood & Lloyd, Bull. Torr. Bot. Cl. 33: 108, 1906; Maxon, Pteridoph. Porto Rico & Virg. Isl. 512, 1926; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 31, 1929; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 92, 1937; Stehlé, Caribb. For. 4(2): 97, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 41, 1953; Hodge, Lloydia 17: 104, 1954; non Hamilton, 1825. — *Lycopodium verticillatum* auct. non L. f.; Fée, 11e Mém. 130, 1866; Grisebach, Catal. Pl. Cub. 272, 1866; Baker, Handb. Fern Allies 14, 1887, in part; Krug in Urban, Engl. bot. Jb. 24: 149, 1897; Duss, Fl. crypt. Ant. franç. 121, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 11, 1909; Fl. Ned. W. Ind. Eil. 108, 1913, p.p. mai. *Urostachys verticillatus* (L. f.) Herter sensu Herter, Beih. Bot. Centralbl. 39: 249, 1922; Fedde Rep. 19: 163, 1923; Urban, Symb. Ant. 9: 387, 1925.

An epiphyte with pendulous dichotomously branched very slender stems up to $^1/_2$ mm thick. Leaves alternate, sometimes almost in alternating whorls of 5, falcately ascending, very narrow, almost acicular, 4—6 mm long, ca. 0.2 mm wide, somewhat decurrent, acuminate, smooth, entire, bright-green. Costa immersed, usually evident at the base. Sporphylls conform but slightly broadened at the base, not assembled in strobili; sporangia suborbicular-reniform, ca. 0.8 mm; spores hyaline, almost colourless, densely reticulate-rugose, ca. 33—36 $\mu$.

West Indies; widespread in tropical America.
At higher elevation.

SABA: Behind The Mountain, top (Wagenaar Hummelinck s.n.); The Mountain, 650 m (Suringar s.n., L).

**Lycopodium wilsonii** Underwood & Lloyd

UNDERWOOD & LLOYD, Bull. Torr. Bot. Cl. 39: 111, 1906; MAXON, Pteridoph. Porto Rico & Virg. Isl. 512, 1926. — *Urostachys wilsoni* (Underw. & Lloyd) HERTER, Fedde Rep. 19: 163, 1923. — *Lycopodium verticillatum* auct. non L.f.; BOLDINGH, Fl. D.W. Ind. Isl. I: 11, 1909, and Fl. Ned. W. Ind. Eil. 108, 1913, p.p. min.

A spreading or recurved epiphyte, the stems dichotomously branched, ca. 1—2 mm thick, up to ca. 25 cm long. Leaves spirally arranged, narrowly linear, almost filiform from a broadened base, strongly spreading to more or less falcately recurved, ca. 1—2 cm long, ca. $^1/_2$ mm wide as the base, elsewhere about 0.3 mm wide, long-attenuate, entire, herbaceous, adaxially concave, abaxially with longitudinal wrinkles, keeled towards the base by the prominent costa, the keel decurrent. Sporophylls very numerous, conform, not assembled in strobili. Sporangia weakly reniform with shallow sinus, almost semi-elliptic, 1—1.5 mm wide. Spores not seen.

Puerto Rico, Guadeloupe, Colombia, St. Lucia, Suriname.
At higher elevation.

SABA: The Mountain, 650 m (Suringar s.n., L; fragm., mixed with *L. setaceum*).

**Lycopodium taxifolium** Swartz

SWARTZ, Prodr. 138, 1788; FÉE, 11e Mém. 129, 1866; GRISEBACH, Catal. Pl. Cub. 272, 1866; BAKER, Handb. Fern Allies 16, 1887; KRUG in URBAN, Engl. bot. Jb. 24: 148, 1897; DUSS, Fl. crypt. Ant. franç. 122, 1904; UNDERWOOD & LLOYD, Bull. Torr. Bot. Cl. 33: 109, 1906; BOLDINGH, Fl. D.W. Ind. Isl. I: 11, 1909, in part; Fl. Ned. W. Ind. Eil. 108, 1913, in part; MAXON, Pteridoph. Porto Rico & Virg. Isl. 514, 1926; DOMIN, Mém. Roy. Cz. Soc. Sci. N.S. 2: 31, 1929; BOX & ALSTON, Jo. Bot. 75: 258. 1937; CHRISTENSEN, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 97, 1937; STEHLÉ, Caribb. For. 4(2): 97, 1943; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 41, 1953; HODGE, Lloydia 17: 105, 1954. — *Urostachys taxifolius* (Swartz) HERTER, Fedde Rep. 19: 162, 1923; Urban, Symb. Ant. 9: 386, 1925.

An epiphyte with decurved or pendulous, dichotomously branched stems 1—3 mm thick. Leaves alternate, ascending or usually spreading, lanceolate, 1—2 cm long, $1^1/_2$—3 mm wide, not decurrent, acute, smooth, entire, dark or brownish-green when dry, chartaceous. Costa immersed but evident, often decurrent as a ridge on the stem. Sporophylls conform or slightly reduced, their base rather wider than in sterile leaves, not assembled in strobili. Sporangia reniform, $1^1/_2$—$2^1/_2$ mm wide; spores hyaline, very pale yellow, rugose, ca. 40—45 $\mu$.

West Indies, Mexico to northern South America.

SABA: without loc. (Boldingh 2200a).

**Lycopodium dichotomum** Jacquin

JACQUIN, Enum. Stirp. Vind. 314, 1762; FÉE, 11e Mém. 129, 1866; GRISEBACH, Catal. Pl. Cub. 272, 1866; BAKER, Handb. Fern Allies 16, 1887; KRUG in URBAN, Engl. bot. Jb.

24: 148. 1897; Underwood & Lloyd, Bull. Torr. Bot. Cl. 33: 111, 1906; Maxon, Contr. U.S. Nat. Herb. 17(4): 422, 1914; Pteridoph. Porto Rico & Virg. Isl. 513, 1926; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 33, 1929; Box & Alston, Jo. Bot. 75: 259, 1937; Christensen, Kungl. Sv. Vet.-Ak. Handl. S. 3, 16(2): 91, 1937; Small, Ferns S.E. States, 405, 406 (fig.), 1938; Stehlé, Caribb. For. 4(2): 97, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 40, 1953; Hodge, Lloydia 17: 105, 1954. *Urostachys dichotomus* (Jacq.) Herter, Beih. Bot. Centralbl. 39: 249, 1922; Fedde Rep. 19: 163, 1923; Urban, Symb. Ant. 9: 387, 1925. — *Lycopodium taxifolium* auct. non Swartz; Boldingh, Fl. D.W. Ind. Isl. I: 11, 1909, and Fl. Ned. W. Ind. Eil. 108, 1913, in part.

A more or less pendulous epiphyte, usually rather small, the stems dichotomously branched, 1—3 mm thick. Leaves alternate, ascending or spreading, linear, 1—2 cm long, 1 mm wide, somewhat decurrent, herbaceous to chartaceous, slightly narrowed towards the base, shortly acuminate, smooth, entire, the margin often slightly revolute, with evident decurrent costa. Sporphylls conform, not assembled in strobili. Sporangia reniform, $1^1/_2$—2 mm wide; spores rugose to reticulate-rugose, hyaline, almost colourless, ca. 29—32 $\mu$.

Widespread in tropical America.

St. Eustatius: without loc. (Boldingh 479 a).

# SELAGINELLACEAE

Small to medium-sized terrestrial or epiphytic plants with prostrate or ascending to suberect, sometimes articulate stems often bearing rhizophores at the nodes, freely dichotomously branched, sometimes only in the upper part, with a pinnate arrangement of the branches, rendering the plant fern-like in appearance; stele protostelic or siphonostelic. Leaves small, numerous, radially arranged and conform or of two kinds, dorsiventrally inserted in two planes, two lateral rows of larger and two median rows of smaller, ascending leaves, a third kind often present in the axils of the bifurcations of the stems; both kinds of arrangement sometimes found on one plant, the basal part bearing conform and spirally arranged, the apical part bearing difform and dorsiventrally arranged leaves. Leaves bearing a minute ligule inserted in a pit on the ventral side near the base of the leaf, not evident in mature leaves (except often in the sporophylls). Sporophylls borne in sessile terminal strobili, in four rows; sporangia axillary, one-celled, opening with a transverse slit, of two kinds, containing numerous microspores or (1—) 4 large megaspores, all spores trilete and often strongly sculptured; microsporophylls and megasporophylls often found in different parts of the same strobilus, sometimes dimorphic.

A single genus:

**Selaginella** P. Beauv., Prodr. Aetheog. 101, 1805

Characters of the family.
500—600 species of very wide distribution, most numerous in warmer regions.

Key to the species:

1. Stems erect or ascending, rooting only at the base . . . . . 2
   Stems prostrate, rooting throughout . . . . . *S. tenella*
2. Leaves of unbranched erect or ascending part of stem appressed, uniform; lateral leaves ciliate at base . . . . . *S. flabellata*

   Leaves of ascending part of stem dimorphic; lateral leaves denticulate . . . . . *S. substipitata*

**Selaginella flabellata** (L.) Spring

Spring, Flora 21: 198, 1838; Mém. Acad. Roy. Belg. 24: 174, 1849; Fée, 11e Mém. 134, 1866; Baker, Handb. Fern Allies 98, 1887, in part; Krug in Urban, Engl. bot. Jb. 24: 151, 1897; Duss, Fl. crypt. Ant. franç. 128, 1904; Boldingh, Fl. D.W. Ind. Isl. I: 11, 1909; Fl. Ned. W. Ind. Eil. 108, 1913; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 37, pl. 1 fig. 1, 1929; Box & Alston, Bull. Brit. Mus. (Nat. Hist.) Bot. 1(2): 31, 1952; Hodge, Lloydia 17: 107, fig. 52, 1954. — *Lycopodium flabellatum* Linnaeus, Spec. Plant. 2: 1105, 1753.

Stems with a creeping rooting and a stiffly erect part, the latter pale green or stramineous, 1—3 mm thick, the basal portion unbranched, terete, non-articulate, up to 25 cm tall, with uniform appressed four-ranked ovate acute or shortly acuminate broadly sessile leaves, their margins ciliate below. Upper part of the erect

stem 2—4 times pinnately branched, pentagonal to lanceolate in outline, more or less having the appearance of a decompound leaf, with dimorphic four-ranked leaves in two planes (except for the strobili). Ultimate branches with the leaves $3^1/_2$—$4^1/_2$ mm wide. Axillary leaves lanceolate, acute, sessile, not decurrent, densely ciliate in the basal part. Lateral leaves asymmetrically lanceolate, acute or subacute, the upper base strongly overlying the branch but neither auriculate nor decurrent, the base ciliate, especially acroscopically. Median leaves much shorter, more strongly asymmetrical, lanceolate, acuminate-aristate, neither auriculate nor decurrent, almost transversely attached, entire or minutely denticulate or the basiscopic side of the base bearing a few ciliae. Colour dark on the ventral, pale greyish-green on the dorsal side; texture membranous. Strobili solitary, quadrangular, up to 2 cm long, ca. 1 mm wide, the sporophylls ovate-lanceolate, acuminate, carinate, the microsporophylls in the proximal, the megasporophylls in the distal part, especially on the lower side. Megaspores whitish, rather obscurely rugose, ca. 210—230 $\mu$. Microspores pale orange, bearing obtuse spines on the distal surface, ca. 25—30 $\mu$.

Lesser Antilles from Saba to Grenada; St. Thomas (?).
In rainforest, elfin woodland, and palm- and treefern-brakes, at middle and higher elevations.

SABA: The Mountain, 600—800 m (Suringar 6069, 6070, s.n., L); top of The Mountain, 800—850 m (Arnoldo 798; Stoffers 3470, 4219, 4630 a); Santa Cruz, 575 m (Stoffers 4348); between Island Gut and Santa Cruz, 600 m (Stoffers 3168, 3445); between Hellsgate and Santa Cruz, 500—600 m (Stoffers 3167); slope of The Mountain at Rendez Vous-side, 600—680 m (Stoffers 3250); without loc. (Boldingh 1778a, 2201a, 2206a; Lionarons 214).

**Selaginella substipitata** Spring

SPRING, Bull. Acad. Brux. 10(1): 227, 1843; Mém. Acad. Roy. Belg. 24: 198, 1849; FÉE, 11e Mém. 135, 1866; BAKER, Handb. Fern Allies 58. 1887; KRUG in URBAN, Engl. bot. Jb. 24: 150, 1897; DUSS, Fl. crypt. Ant. franç. 127, 1904; BOLDINGH, Fl. D.W. Ind. Isl. I: 12, 1909; Fl. Ned. W. Ind. Eil. 109, 1913; DOMIN, Mém. Roy. Cz. Soc. Sci. N.S. 2: 37, 1929; BOX & ALSTON, Jo. Bot. 75: 258, 1937; STEHLÉ, Caribb. For. 4(2): 98, 1943; ALSTON, Bull. Brit. Mus. (Nat. Hist.) Bot. 1(2): 34, 1952; HODGE, Lloydia 17: 108, 1954. — *Selaginella portoricensis* A. BRAUN, Ann. Sci. Nat. V. Bot. 3: 288, 1865; MAXON, Pteridoph. Porto Rico & Virg. Isl. 519, 1926.

Stems creeping and rooting at the base, with stout rhizophores, ascending, stramineous, terete, non-articulate, branched throughout. Leaves dimorphic, upwards gradually closer; branches alternate, 2—3 × pinnately arranged, not leaf-like in appearance. Ultimate branches including leaves 4—6 mm wide. Axillary leaves ovate, acute, sessile, neither auriculate nor decurrent, minutely denticulate. Lateral leaves spreading, asymmetrically ovate, acute, sessile without auriculate or decurrent base, minutely denticulate, the upper base broadly overlying the branch, those of the ultimate branches contiguous or subcontiguous, on the larger branches larger and farther apart. Median leaves much smaller, elliptic, long-acuminate with plicate arista-like apex, minutely denticulate, almost transversely attached and pointing towards the apex of the branch, sessile without auriculate or decurrent base. Colour greyish to medium green, texture membranous. Strobili

solitary or in pairs, less distinct from the vegetative branches than in the preceding species, $^1/_2$—1 cm long, 2—3 mm wide, with ovate-lanceolate, acuminate, carinate, denticulate, often more or less spreading sporophylls, the microsporophylls rather few, in the basal part. Megaspores bright lemon-coloured, bearing little prominent elongate tubercles, ca. 310—320 $\mu$. Microspores pale orange, bearing on the distal side some mostly obtuse spines, ca. 28—33 $\mu$.

Hispaniola, Puerto Rico, Lesser Antilles, Trinidad.
In elfin woodland and palm-brakes, at upper elevations; less common than the preceding species.

SABA: Top of The Mountain, 800—850 m (Wagenaar Hummelinck s.n.; Stoffers 4217, 4630); The Mountain, 600—800 m (Suringar s.n., L); without loc. (Boldingh 1813a, 2210a, 2221a, 2227).

**Selaginella tenella** (P. Beauv.) Spring

SPRING, Bull. Acad. Sci. Brux. 10: 234, 1843; Mém. Acad. Roy. Belg. 24: 260, 1849; BOX & ALSTON, Jo. Bot. 75: 258, 1937; ALSTON, Bull. Brit. Mus. (Nat. Hist.) Bot. 1(2): 42, 1952; PROCTOR, Bull. Inst. Jam. Sci. S. 5: 56, 1953; HODGE, Lloydia 17: 108, 1954. — *Diplostachyum tenellum* PALISOT DE BEAUVOIS, Mag. Encycl. 9(5): 481, 1804. — *Selaginella albonitens* SPRING, Bull. Acad. Sci. Brux. 10: 139, 1843; Mém. Acad. Roy. Belg. 24: 80, 1849; BAKER, Handb. Fern Allies 72, 1887, in part; KRUG in URBAN, Engl. bot. Jb. 24: 150, 1897; URBAN, Symb. Ant. 9: 391, 1925; MAXON, Pteridoph. Porto Rico & Virg. Isl. 520, 1926; DOMIN, Mém. Roy. Cz. Soc. Sci. N.S. 2: 36, 1929. *Selaginella mollis* FÉE, 11e Mém. 133, pl. 34, 1, 1866; non A. Braun, 1865.

Stems very slender, creeping, stramineous, sulcate, non-articulate, rooting throughout with slender rhizophores, once or twice pinnately branched. Leaves everywhere dimorphic; ultimate branches including leaves 3—5 mm wide. Axillary leaves lanceolate, acute, sessile, neither decurrent nor auriculate, denticulate in the basal part. Lateral leaves spreading or slightly ascending, subcontiguous to nearly their width apart, asymmetrically oblong to broadly lanceolate, acute or subacute, not auricled or decurrent, the upper base broadly rounded, especially in larger leaves, sparingly and shortly ciliate, the lower base ciliolate-denticulate or in smaller leaves the margin only towards the base denticulate. Median leaves obovate, ciliolate or denticulate, with a conspicuous arista of at least half their length. Colour pale green, texture membranous. Strobili numerous, solitary or paired, ca. 3—7 mm long, 1—$1^1/_2$ mm wide. Sporophylls four-ranked, ovate-lanceolate, acuminate, denticulate, carinate. Megaspores pale, densely reticulate except around the tetrad-figure, ca. 200 $\mu$. Microspores orange, bearing scattered obtuse spines, ca. 28 $\mu$.

Greater Antilles, and some of the Lesser Antilles, south to St. Vincent.
At middle elevation.

SABA: Gain Bay Gut, ca. 500 m (Suringar 6071, s.n., L).

# PSILOTACEAE

Rather small, mostly epiphytic plants with simple or dichotomously branched, siphonostelic or dictyostelic stems with small, simple or forked, sometimes weakly differentiated leaf-like lateral appendages and creeping, rootless, protostelic rhizomes. Sporangia two- or three-lobed and -celled, thick-walled, opening by longitudinal slits, borne singly at the apex of short lateral appendages which bear at the base of the sporangium also once or sometimes twice forked sterile appendages, the sporangia therefore seemingly inserted near the ventral base of forked sporophylls; spores monolete.

Two genera: one (*Tmesipteris*) with one or a few closely related species in Australasia and Oceania, and the following.

**Psilotum** Swartz, Schrad. Journ. Bot. 1800: 109, 1801

Terrestrial or mostly epiphytic plants with clustered, elongate, flattened or three-angled stems. "Leaves" alternate, distichous or in three ranks, linear-subulate. Sporangia three-celled, greatly exceeding the "sporophylls".
Two species in the Tropics of both Hemispheres.

**Psilotum nudum** (L.) Grisebach

Grisebach, Abh. Ges. Wiss. Göttingen 7: 278, 1857; Krug in Urban, Engl. bot. Jb. 24: 149, 1897; Boldingh, Fl. D.W. Ind. Isl. I: 11, 1909; Britton & Millspaugh, Bahama Fl. 476, 1920; Urban, Symb. Ant. 9: 390, 1925; Maxon, Pteridoph. Porto Rico & Virg. Isl. 516, 1926; Domin, Mém. Roy. Cz. Soc. Sci. N.S. 2: 38, 1929; Alston, Jo. Bot. 73: 40, 1935; Box & Alston, Jo. Bot. 75: 258, 1937; Small, Ferns S.E. States 396, 397 (fig.), 1938; Stehlé, Caribb. For. 4(2): 98, 1943; Proctor, Bull. Inst. Jam. Sci. S. 5: 53, 1953; Hodge, Lloydia 17: 107, 1954. — *Lycopodium nudum* Linnaeus, Spec. Plant. 2: 1100, 1753. — *Psilotum triquetrum* Swartz, Schrad. Journ. Bot. 1800: 109, 1801; Spring, Mém. Acad. Roy. Belg. 24: 269, 1849; Fée, 11e Mém. 135, 1866; Grisebach, Catal. Pl. Cub. 272, 1866; Baker, Handb. Fern Allies 30, 1887; Krug in Urban, Engl. bot. Jb. 24: 149, 1897; Duss, Fl. crypt. Ant. franç. 124, 1904; Boldingh, Fl. Ned. W. Ind. Eil. 108, 1913.

Rhizome short-creeping; stems erect, spreading or pendulous, dark green, 3-angled, up to ca. 50 cm long, up to 3 mm thick, strongly branched in the upper part, the branches but little divergent. Sterile „leaves" 2—3 mm long; "sporophylls" confined to the smaller branches, ca. 1 mm long, deeply bifid; sporangia subglobose-trilobed, ca. $1^1/_2$ mm, yellow to pale brown; spores bean-shaped, hyaline, colourless, smooth, ca. 60—65 × 32—36 $\mu$.

Widespread in the warmer parts of both Hemispheres.
Mostly epiphytic on trunks of trees, in moist forests.

Saba: Road to The Mountain (Arnoldo 801); The Mountain (Suringar 6078, L); Great Hill (Suringar 6077, L); Parish Hill (Suringar 6076, L); Rendez Vous (Suringar s.n., L); without loc. (Boldingh 1761a, L, U).