

THE AMERICAN SPECIES OF HYMENOPHYLLUM, SECTION SPHAEROCIONIUM

By C. V. MORTON

INTRODUCTION

My interest in the filmy ferns of the genus *Hymenophyllum* was first stimulated by an attempt in 1932 to identify a rather large series of Peruvian specimens collected by C. Bües, of Quillabamba, Peru. It was evident that the species centering around *H. sericeum* (Swartz) Swartz were in special need of revision. Hooker and Baker in their *Synopsis Filicum* had reduced to synonymy a number of species described by Sturm, Karsten, van den Bosch, and others, and although most of these had been given nominal recognition in Christensen's *Index Filicum*, they were still not well understood. Another group of species, including *H. elegans* Spreng., *H. trichophyllum* H. B. K., and *H. cruegeri* C. Müll., were confused by Hooker and Baker with *H. lineare* (Swartz) Swartz, the concept of which had been expanded by others to include also *H. pulchellum* Schlecht. & Cham. The original *H. lineare* was shown by Maxon to be a quite different species. Except for the publication in 1932 of *H. amabile*, my work on this group has remained in manuscript. Now, on taking it up again, I have expanded the treatment to include all the tropical American species of the section *Sphaerocionium*.

The Old World species of the section, which are much fewer (11 species only), have been carefully treated by Dr. E. B. Copeland.¹ The only species occurring in both the New and Old Worlds is the common *H. hirsutum*.

The present revision must be considered as tentative in some respects. It is regrettable that some of the type specimens have not been available for study, owing to the prevailing conditions abroad. For this reason several species have had to be listed as dubious, a few keyed and described on the basis of the original descriptions, and a few others placed in synonymy with a query. I do not anticipate, however, that when these species are definitely placed they will cause any considerable change in the nomenclature.


I am much indebted to the curators of the New York Botanical Garden and the Gray Herbarium of Harvard University for the loan of valuable specimens for study. All cited specimens lacking a "G" or "NY" are in the United States National Herbarium.

¹ Phil. Journ. Sci. 64: 164-176. 1937.

HISTORY OF THE GENUS

Since the original segregation of the genus *Hymenophyllum* from *Trichomanes* by J. E. Smith in 1793, conservative botanists have universally recognized it as a natural genus. K. B. Presl in 1843 attempted a segregation and described the genera *Meringium*, *Leptocionium*, *Myrmecostylum*, *Ptychophyllum*, *Sphaerocionium*, and *Hymenoglossum*, all of which were reduced to synonymy shortly after by Hooker. Van den Bosch, in his synopsis of the genus in 1861, recognized *Leptocionium* and *Hymenoglossum* but reduced Presl's other genera. Most subsequent botanists, including Prantl, Sadebeck, Christensen, Hieronymus, Rosenstock, Maxon, and Christ, have regarded the genus in an inclusive sense. Recently, however, Dr. Copeland has recognized 12 genera. These are distinguishable, but are based on characters which I regard as of no more than sectional importance.² The history of these genera is so fully discussed by Dr. Copeland that it is unnecessary to go into it further at this time.

DIAGNOSTIC CHARACTERS

The group here treated as section *Sphaerocionium* is characterized by having at least the margins of the fronds hairy and by having the receptacle included within the indusium. It may seem unusual that a character of presence or absence of pubescence be considered as of sectional importance, but it appears to be true of ferns in general that the presence and character of pubescence are of greater fundamental importance than in flowering plants. In the present instance, there is scarcely any doubt that the hairy *Hymenophyllums* do form a coherent group, the species being more closely related to each other than to any of the glabrous species. 

The type and distribution of the pubescence seem to be of primary importance in distinguishing the species. The section divides readily into two groups of 26 species each, here characterized as subsections, by the presence or absence of pubescence on the leaf surface between the veins. Although this character is usually obvious, in some cases a good deal of care must be taken by one unfamiliar with the species. For instance, *H. trichophyllum* and *H. pulchellum* (among others) are so densely pubescent that a high magnification is necessary to be sure that all the hairs arise on the veins and margins and none on the leaf surfaces. In addition, stalked stellate hairs of the veins and margins are easily broken off and may be lying on the leaf surfaces as if attached there. On the other hand, a few species, notably *H. sieberi*, have so few hairs on the leaf surfaces that they are apt to be placed in the subsection with glabrous surfaces unless a careful examination is made under a high magnification.

² See my review, Amer. Fern Journ. 32: 30-31. 1942.

Several types of hairs are found in the group: (1) Simple hairs, commonly 1-celled, but in some species with as many as four cells; (2) basally forked hairs, usually with two branches only, but occasionally with three, as in *H. tenerrimum*; sometimes the hairs appear to be merely paired without being actually joined at base, and it may be so in some cases; (3) forked hairs, that is, forked at some distance above the base; (4) stellate hairs, with a short or long stalk and three or more rays; the stalk and rays may be of more than one cell, particularly of the hairs borne along the stipe and rhachises; (5) twice-forked hairs, that is, forked at base and the branches (sometimes only one branch) again forked upwardly; (6) "bistellate" hairs, that is, forked at base, with the branches three to several-rayed at apex; and (7) "twice-stellate" hairs, that is, stalked hairs, the rays being forked or stellate at apex. Several types of hairs are usually found in the same species, often on different parts of the frond. These various types of hairs are diagrammatically illustrated in figure 1.

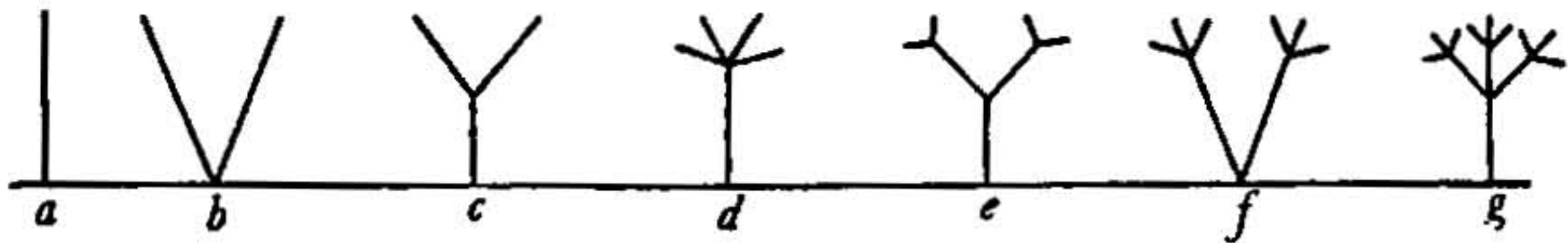


FIGURE 1.—*a*, Simple hair; *b*, basally forked hair; *c*, forked hair; *d*, stellate hair; *e*, twice-forked hair; *f*, bistellate hair; *g*, twice-stellate hair.

As is to be expected, the degree of dissection of the blade is also a character of major importance. Only a few species (e. g., *H. trichophyllum*), which have an entirely nonalate rhachis and petiolulate divisions, can be said to be truly pinnate, but for convenience the primary divisions of the frond are here termed "pinnae." Some species are truly pinnate at base and merely pinnatifid upwardly (e. g., *H. antillense*), but most are pinnatifid or pinnatisect throughout. The degree of development of the rhachis wing is a useful character in distinguishing species, as is also the presence or absence of a wing at the apex of the stipe.

The importance of the development of accessory wings not in the plane of the frond on the veins of the species allied to true *H. sericeum* was first pointed out by Karsten in his description of *H. fusugasugense* in his *Flora Colombiana*. In some species (e. g., *H. pyramidatum*) these wings are prominent and easily observed, but in one species (*H. plumosum*) they are very minute and a high magnification is necessary to see them, especially since they are overlaid with a dense covering of tomentum.

The indusia are similar in most species, being rounded, deeply 2-valved, and mostly a little immersed in the leaf tissue at base. The receptacles are similar in all the species, being short-columnar

and included within the indusia. No spore characters of value have been observed, although a detailed study of all the species might bring some to light.

There remains the difficult question of cell structure, which was so much emphasized by van den Bosch. Although differences in cell structure do exist in the Hymenophyllaceae in general, as witness the beautiful drawings in Copeland's revisions of the Old World species of *Trichomanes* and *Hymenophyllum*, in the section *Sphaerocionium* the cells seem to be relatively uniform. Some differences in thickness of cell walls and shape of cells have been found, but they are so vague as to be nearly indescribable and have therefore been omitted from the descriptions. A detailed study, accompanied by drawings, might bring out some points of interest as to the relationship of the species.

GEOGRAPHIC DISTRIBUTION

All the American species of *Hymenophyllum*, section *Sphaerocionium*, are exclusively tropical, with the exception of the Chilean *H. ferrugineum*. They are plants of wet forests and usually grow only in the higher mountains. Where they do grow they are abundant, often covering the tree trunks. Of the ten Cuban species four have been collected in Cuba only once and two others only two or three times. This is explained by the fact that all of them grow only or chiefly in the high Sierra Maestra of Oriente, which has been ascended by botanists only a few times and then mostly on the dry southern slopes where *Hymenophyllum* does not grow. The same condition prevails in Hispaniola, where our knowledge of the species depends chiefly on the fine collections of E. L. Ekman obtained from the higher mountains.

The Blue Mountains in eastern Jamaica are much more accessible, and consequently the species of *Hymenophyllum* have been abundantly collected, especially by Dr. William R. Maxon. They are well enough known to make it possible to assign rather definite altitudinal limits to the species, *H. hirsutum*, for instance, growing mostly at middle elevations, whereas *H. lineare*, *H. urbanii*, and *H. crispum* are known only from the higher elevations. The only Jamaican species of the section growing outside of the Blue Mountains is *H. hirtellum*, which is common throughout the eastern half of the island and does not reach elevations of more than 900 meters.

In Mexico seven species occur, all confined to the southern part of the country and for the most part very rare. They need to be much more extensively collected, for they mostly represent somewhat aberrant forms. On the other hand the genus is abundant in Guatemala, although chiefly confined to the Department of Alta Verapaz. The recent collections of P. C. Standley and J. A. Steyermark have extended the known ranges of several species. No species are known

from British Honduras or El Salvador, and only the wide-ranging *H. hirsutum* and *H. microcarpum* from Honduras and Nicaragua.

It is in the mountains of Costa Rica and the adjacent region of Volcán Chiriquí in Panama that the species of *Hymenophyllum* begin to reach their climax of development. Seventeen species are known from this region, six of them endemic. The best development of the genus occurs in the Andes from Colombia to Bolivia, where a good many interesting endemic species are found. Most of them grow at middle or high elevations, reaching as much as 4,000 meters in Peru, although one, here described as new, is found at only 200 meters in western Colombia. Brazil has several endemic species, some of them known to me from description only, as well as peculiar forms of several wide-ranging species. These widespread species (*H. hirsutum*, *H. crispum*, *H. microcarpum*, *H. elegans*, and *H. fragile*) are especially variable throughout their ranges, but it may be possible eventually to recognize some of the Brazilian forms as distinct.

The only notable examples of disjunct ranges are *H. pulchellum* (Mexico to Costa Rica, reappearing in southern Brazil), *H. antillense* (Jamaica and British Guiana), and *H. trapezoidale* (Mexico, Surinam, and Colombia).

The following is a tabulation of the species by countries:

CUBA: *elegans*, *elegantulum*, *fragile*, *hirsutum*, *hirtellum*, *lanatum*, *lineare*, *microcarpum*, *sericeum*, *urbanii*.

HISPANIOLA:³ *elegans*, *elegantulum*, *fragile*, *hirsutum*, *hirtellum*, *lanatum*, *microcarpum*, *sericeum*, *urbanii*.

JAMAICA: *antillense*, *crispum*, *fragile*, *hirsutum*, *hirtellum*, *lanatum*, *lineare*, *microcarpum*, *sericeum*, *urbanii*.

PUERTO RICO: *elegantulum*, *hirsutum*, *lanatum*, *lineare*, *microcarpum*, *sieberi*.

MARTINIQUE: *hirsutum*, *latifrons*, *sericeum*, *sieberi*, *valvatum*.

GUADELOUPE: *elegans*, *hirsutum*, *lanatum*, *latifrons*, *lineare*, *sericeum*, *sieberi*, *valvatum*.

GRENADA: *elegans*, *hirsutum*, *lanatum*.

ST. KITTS: *hirsutum*.

DOMINICA: *hirsutum*, *latifrons*.

MONTserrat: *hirsutum*.

ST. LUCIA: *hirsutum*.

ST. VINCENT: *hirsutum*, *lanatum*, *latifrons*.

TOBAGO: *hirsutum*.

TRINIDAD: *dependens*, *elegans*, *hirsutum*.

MEXICO: *crispum*, *elegantulum*, *fragile*, *hirsutum*, *pulchellum*, *sieberi*, *trapezoidale*.

GUATEMALA: *crispum*, *elegans*, *elegantulum*, *fragile*, *hirsutum*, *lanatum*, *lineare*, *mazonii*, *microcarpum*, *pulchellum*, *sieberi*.

HONDURAS: *hirsutum*.

NICARAGUA: *hirsutum*, *microcarpum*.

COSTA RICA:⁴ *consanguineum*, *crispum*, *dimorphum*, *elegans*, *elegantulum*, *fragile*, *hemipteron*, *hirsutum*, *horizontale*, *lineare*, *microcarpum*, *plumosum*, *pulchellum*, *semiglabrum*, *sieberi*, *subrigidum*, *trichophyllum*.

³ Also sp. dub. *H. diversilobum*.

⁴ Also sp. dub. *H. palmense*.

PANAMA: *consanguineum*, *elegans*, *elegantulum*, *fragile*, *hemipteron*, *hirsutum* (probably), *microcarpum*, *plumosum*, *semiglabrum*, *subrigidum*, *trichophyllum*.

VENEZUELA: *crispum*, *dependens*, *elegans*, *fragile*, *hirsutum*, *interruptum*, *karstenianum*, *lanatum*, *lindenii*, *microcarpum*, *trichophyllum*.

COLOMBIA: *crispum*, *dependens*, *elegans*, *elegantulum*, *fragile*, *fusugasugense*, *hirsutum*, *interruptum*, *karstenianum*, *lindenii*, *lobato-alatum*, *microcarpum*, *multialatum*, *plumosum*, *ruizianum*, *silvaticum*, *trapezoidale*, *trichophyllum*, *valvatum*.

ECUADOR:⁵ *amabile*, *crispum* (probably), *dependens*, *elegantulum*, *hirsutum*, *interruptum*, *karstenianum*, *lindenii* (?), *lobato-alatum*, *microcarpum*, *multialatum*, *plumieri*, *ruizianum*, *superbum*, *trichophyllum*, *valvatum*.

PERU:⁶ *adiantoides*, *amabile*, *crispum*, *elegans*, *elegantulum*, *fragile*, *hirsutum*, *interruptum*, *karstenianum*, *lobato-alatum*, *microcarpum*, *molle*, *multialatum*, *plumosum*, *pyramidatum*, *ruizianum*, *simplex*, *speciosum*, *tenerrimum*, *trichophyllum*, *valvatum*, *verecundum*.

BOLIVIA: *crispum*, *elegans*, *elegantulum*, *fragile*, *hirsutum*, *interruptum*, *microcarpum*, *plumosum*, *pyramidatum*, *ruizianum*, *speciosum*, *tenerrimum*, *trichophyllum*, *valvatum*, *verecundum*.

BRITISH GUIANA: *antillense*, *crispum* (?), *hirsutum*, *microcarpum*, *roraimense*, *trichophyllum*.

FRENCH GUIANA: *hirsutum*.

SURINAM: *trapezoidale*.

BRAZIL: *angustum*, *crispum*, *elegans*, *fragile*, *glaziovii*, *hirsutum*, *microcarpum*, *plumosum*, *prionema*, *pulchellum*, *rufum*, *sampaioanum*, *silveirae*, *valvatum* (?).

SYSTEMATIC TREATMENT

KEY TO SPECIES

Hairs lacking on the leaf surfaces, borne only on the veins and margins.

Subsect. CILIATA

Hairs present on the leaf surfaces, as well as on the veins and margins.

Subsect. LANATA

SUBSECTION CILIATA

Fronds caespitose.

Stipes not alate; ultimate segments 1.5 mm. broad..... 1. *H. silveirae*

Stipes alate; ultimate segments 0.5 mm. broad or less... 2. *H. dimorphum*

Fronds scattered.

Stipes delicate. not over 0.3 mm. in diameter, usually less, short, not over 5 cm. long, usually less.

Rhachis not alate to base.

Pinnae (at least the lower) petiolulate.

Hairs marginal, simple or forked at base; fronds ovate or oblong, determinate..... 3. *H. lineare*

Hairs borne on the veins as well as the margins, stellate; fronds linear, indeterminate.

Pinnae with 5-7 pairs of segments, the costa continuously winged on both sides.

Fronds skeletonlike, the segments distant; stipe hairs mostly simple, rarely forked..... 4. *H. molle*

Fronds not skeletonlike, the segments adjacent or imbricate; stipe hairs mostly stellate..... 5. *H. pulchellum*

Pinnae normally with only 1 to 3 pairs of segments, or some of them becoming elongate and frondlike.

⁵ Also sp. dub. *H. refrondescens*.

⁶ Also spp. dub. *H. crispatum*, *H. tomentosum*, and *H. trifidum*.

Costa not continuously winged on both sides. 6. *H. trichophyllum*
Costa continuously winged on both sides.

Pinnae 9 pairs or more, pinnatifid, the segments mostly more than 1 pair; ultimate segments mostly less than 1 mm. broad.

7. *H. urbanii*

Pinnae 8 pairs or fewer, simple, bifid, or with 1 (rarely 2) pairs of segments; ultimate segments 1–1.8 mm. broad.

8. *H. roraimense*

Pinnae sessile or adnate.

Hairs absent on the veins, the marginal ones mostly 3-forked at base, some of the branches sometimes again forked... 9. *H. tenerrimum*

Hairs present on the veins, the marginal ones not 3-forked at base.

Stipe hairs simple or forked; marginal hairs of the segments forked at base or mostly twice-forked, the branches and rays elongate; pinnae subflabellate or rarely simple or merely bifid, 4.5–8 mm. long, the segments mostly 1 or 2 pairs..... 10. *H. elegans*

Stipe hairs mostly stellate; marginal hairs of the segments mostly stellate or bistellate, or forked or twice-forked, the branches and rays short; pinnae subrhombic, 9–11 mm. long, the segments 3 or 4 pairs..... 11. *H. adiantoides*

Rhachis alate to base.

Marginal hairs of segments mostly stellate, bistellate, or twice-forked.

Pinnae simple or merely bifid at apex; stipe hairs simple.

10. *H. elegans* f. *minor*

Pinnae more dissected; stipe hairs mostly stellate. 12. *H. hirsutum*

Marginal hairs of segments mostly simple or forked at base.

Stipe not alate at apex.

Pinnules bifid or trifid; indusial lobes incised-lacerate.

13. *H. prionema*

Pinnules mostly simple and entire; indusial lobes subentire.

Ultimate segments 1.2–2 mm. broad; hairs present on veins of lower side; indusial valves 1 mm. broad; stipes 10–40 mm. long.

14. *H. semiglabrum*

Ultimate segments 0.8–1 mm. broad; hairs lacking on veins; indusial valves 0.8 mm. broad; stipes 1.5–4 mm. long. 15. *H. silvaticum*

Stipe alate at apex.

Segments not undulate-crispate; plants dwarf, not over 2.5 cm. long.

16. *H. sampaioanum*

Segments undulate-crispate; plants much larger... 17. *H. crispum*

Stipes stouter, 0.3 mm. in diameter or mostly more, the larger almost always 5 cm. long or more.

Rhachis alate to base.

Hairs lacking on veins of upper surface; marginal hairs simple or forked at base.

Segments undulate; plants light green, delicate... 18. *H. valvatum*

Segments not undulate; plants usually dark green, coarse.

Stipes alate at apex..... 19. *H. microcarpum*

Stipes not alate at apex..... 20. *H. consanguineum*

Hairs present on the veins of the upper surface; marginal hairs mostly stellate, bistellate, or twice-forked.

Blades linear-lanceolate, not more than 3 cm. broad. 21. *H. glaziovii*

Blades ovate to ovate-lanceolate or lanceolate, 2.5–7 cm. broad.

Stipe nearly nonalate; pinnae acuminate, the pinnules mostly pinnatifid..... 22. *H. hirtellum*

- Stipe obviously alate; pinnae obtuse to acute, the pinnules mostly simple or bifid, except the basal..... 23. *H. maxonii*
 Rhachis not alate to base.
 Hairs absent from veins of upper surface, those of the veins of the segments of the lower surface mostly simple or forked at base.
 24. *H. subrigidum*
 Hairs present on veins of both surfaces, those of the veins of the segments at least partly stellate.
 Lower pinnae subpetiolulate, tripinnatifid or almost completely bipinnate at base; fronds 9–17 cm. broad; pinnules of primary pinnae 9–12 pairs; stipes 0.7–1.6 mm. in diameter..... 25. *H. ruizianum*
 Lower pinnae slightly adnate, bipinnatifid, not at all bipinnate; fronds 2–6 cm. broad; pinnules of primary pinnae 4–7 pairs; stipes not more than 0.6 mm. in diameter..... 26. *H. trapezoidale*

SUBSECTION LANATA

Veins not winged on either side of the frond.

Stipes filiform, 0.2–0.25 mm. in diameter.

Hairs of stipe simple, elongate, 2- or 3-celled, or some forked, the rays elongate, 1- or 2-celled.

Rhachis conspicuously alate throughout; stipe alate at apex; leaf segments 2.5–3 mm. broad; marginal hairs mostly twice-forked, the primary rays elongate, 0.5–0.7 mm. long..... 27. *H. latifrons*

Rhachis not alate, except sometimes in depauperate plants; stipe not alate; leaf segments not over 1.5 mm. broad; marginal hairs stellate or bi-stellate, the stalks or primary rays less than 0.5 mm. long.

Ultimate segments mostly about 1 mm. broad; lowest pinnae petiolulate.

Segments of pinnae mostly 1 or 2 pairs; fronds elongate-linear; basal segments of pinnae 1-veined..... 28. *H. antillense*

Segments of pinnae mostly 3 pairs or more; fronds mostly ovate, rarely lanceolate; basal segments of pinnae with simple or once-forked veins..... 29. *H. hemipteron*

Ultimate segments mostly more than 1 mm. broad; lowest pinnae sessile or rarely petiolulate. Segments of pinnae mostly more than 3 pairs, the basal with dichotomous veins..... 30. *H. elegantulum*

Hairs of stipe mostly stellate (sometimes a few merely forked), the stipe and rays mostly 1-celled.

Pinnae mostly simple and linear; hairs of leaf surfaces and margins obviously stalked.

Rhachis not alate at base..... 31. *H. simplex*

Rhachis alate throughout; stipe alate at apex..... 32. *H. lanatum*

Pinnae mostly pinnatifid or, if sometimes simple or merely bifid, the hairs of the leaf surfaces and margins sessile.

Rhachis alate throughout; stipe alate at apex; segments of pinnae not over 3 pairs; plants not densely lanate; hairs of rhachis and veins simply stellate, the rays 1-celled.

Blades 10–25 mm. broad, 2–7 times as long as broad; pinnae 4–20 pairs.

33. *H. fragile*

Blades narrower, not over 11 mm. broad, 5–20 times as long as broad; pinnae 15–40 pairs. Ultimate segments 0.7–1 mm. broad

34. *H. angustum*

Rhachis and stipe non-alate; segments of pinnae 4–8 pairs; plants densely lanate; some of the hairs of rhachis and veins twice stellate or with 2-celled rays..... 35. *H. amabile*

Stipes stouter, 0.4–0.6 mm. in diameter.

Plants densely and closely tomentose; rhachis hardly at all alate.

Hairs of rhachis appressed, stellate, short-stalked; rhachis flexuous; pinnae elongate (4–8.5 cm. long); fronds elongate, up to 165 cm. long

36. *H. speciosum*

Hairs of rhachis not appressed, some of them long-stalked, some twice stellate; rhachis not flexuous; pinnae shorter, mostly 2–3.5 cm. long; fronds shorter, up to 50 cm. long.....

37. *H. karstenianum*

Plants pilose, sometimes densely so, but not tomentose; rhachis alate, except in some plants of *H. rufum*. Hairs of stipe mixed, i. e., simple, forked, and stellate.

Marginal hairs mostly 4–6-rayed, subsessile; rhachis normally nonalate to middle; lower pinnae sometimes slightly petiolulate..

38. *H. rufum*

Marginal hairs forked or stellate and mostly 3- or 4-rayed; rhachis normally alate throughout or nearly so (except in *H. interruptum*); pinnae all sessile or adnate.

Fronds of an ovate-oblong type, 6–14 cm. broad.....

39. *H. lindeni*

Fronds linear, 8 cm. broad or less.

Rhachis nonalate at base; blades gradually reduced downward; marginal hairs often merely forked, some 3-rayed or bistellate; blades with alternating sterile and fertile portions.

40. *H. interruptum*

Rhachis alate throughout, often the stipe alate at apex also; blades rather abruptly reduced downward; marginal hairs often stellate or bistellate; fertile portions of blades continuous.

Stipe 7.5–16 cm. long, nonalate or nearly so; hairs of leaf surfaces, veins, and margins short-stalked, the marginal mostly bistellate.

41. *H. superbum*

Stipe 8 cm. long or usually less, alate at apex.

Hairs of leaf surfaces numerous, obviously stalked; marginal hairs mostly bistellate. Pinnae rather distant, not imbricate.

42. *H. dependens*

Hairs of leaf surfaces few, subsessile; marginal hairs mostly stellate, only a few bistellate, or some merely furcate at base.

Segments of pinnae shallowly lobed, the ultimate segments 1 mm. long or less, less than 1 mm. broad. Pinnae close, mostly subimbricate.....

43. *H. sieberi*

Segments of pinnae rather deeply lobed, the ultimate segments 1–3 mm. long, more than 1 mm. broad..

44. *H. plumieri*

Veins winged on one or both sides of the frond.⁷

Rhachis alate, except sometimes at base.

Rhachis only slightly alate by the decurrent bases of the pinnae. Veins winged on both sides of the frond, the wings minute; stipe hairs mixed, i. e., simple, forked, and stellate.....

45. *H. sericeum*

Rhachis conspicuously alate.

Veins not winged on the upper side of the frond, inconspicuously winged on the lower side, the wings interrupted, distant.

Hairs of stipe simple or mostly forked; pinnae rounded at apex; stipes 0.3–0.4 mm. in diameter; indusia deeply immersed at base.

46. *H. horizontale*

Hairs of stipe mostly stellate, a few simple or forked; pinnae acuminate; stipes 0.4–0.7 mm. in diameter; indusia often rather shallowly immersed.....

47. *H. lobato-alatum*

⁷ I. e., with accessory wings not in the plane of the frond.

Veins winged on both sides of the fronds.

Stipes with mixed simple, forked and stellate hairs, alate to middle or more; pinnae linear-lanceolate, large (2.5–3.7 cm. long, 7–10 mm. broad at base), acuminate, with numerous segments.

48. *H. pyramidatum*

Stipes usually nearly glabrous (the hairs whitish, simple or forked), nonalate or slightly alate at apex only; pinnae ovate or ovate-oblong, smaller (up to 2.5 cm. long, not more than 8 mm. broad at base), obtuse or rarely acutish, usually with few segments.

49. *H. verecundum*

Rhachis nonalate throughout.

Wings of the veins narrow and very inconspicuous; blades finely appressed-tomentose, the hairs mostly sessile; stipe hairs mostly stellate.

50. *H. plumosum*

Wings of the veins broad, conspicuous; blades stellate-pilose; stipe hairs mostly simple or forked.

Leaf surfaces with scattered hairs only..... 51. *H. multialatum*

Leaf surfaces densely stellate-pilose..... 52. *H. fusugasugense*

1. *Hymenophyllum silveirae* Christ, in Schwacke, Pl. Nov. Mineiras 2: 14. 1900; Bull. Herb. Boiss. II. 2: 320. 1902.

Plants terrestrial, densely caespitose, 2–2.5 cm. high; stipes filiform, 1 cm. long, not alate, flexuous; blades oblong, 1–1.5 cm. long, 1 cm. broad, attenuate to base, bipinnatisect, the rhachis alate; pinnae ovate, deeply incised, the lobes flabellately disposed, simple, linear, 1.5 mm. broad near apex, ciliate near apex, the hairs subsimple; sori few, rotund, the segments contracted below the sori, the valves densely long-red-ciliate.

TYPE: Serra do Campestre, Brazil, *Silveira* 2332.

RANGE: Confined to southern Brazil.

ADDITIONAL SPECIMENS:

BRAZIL: Serra das Camarinhas, *Schwacke* 11085. Itacolumi, alt. 1,750 meters, *Schwacke* 12528.

The above description is adapted from the original. I am somewhat doubtful about this and the following species, for the character of caespitose fronds is hardly to be expected in this section of *Hymenophyllum*. Christ's descriptions are sometimes inaccurate and may be so in these cases. Even with this character, ignored, however, the two species do not fit into any of the recognized species, and so I am recognizing both provisionally.

2. *Hymenophyllum dimorphum* Christ, Bull. Herb. Boiss. II. 4: 941. 1904.

Rhizomes filiform; fronds caespitose, the stipes 2 cm. long, alate, the blades ovate-oblong, 3 cm. long, bipinnatifid; sterile fronds with the pinnae triangular, deeply flabellately lobed, broadly adnate to the alate rhachis, the segments falcate; linear, about 1 cm. long, 0.5 mm. broad, the lowest furcate at apex, ciliate, the hairs stellate; fertile fronds with pinnae and segments shorter and narrower, the segments nearly filiform, the upper ones all soriferous; plants firm in texture, blackish in drying; sori 1 mm. long, the valves ovate, spinulose with short, rigid hairs.

TYPE: Alto de Mano Tigre, Costa Rica, alt. 700 meters, *Pittier*.

RANGE: Known only from the type.

The present species is known to me by description only. It must be quite distinct.

3. *Hymenophyllum lineare* (Swartz) Swartz, Journ. Bot. Schrad. 1800²: 100. 1801.

Trichomanes lineare Swartz, Prodr. Veg. Ind. Occ. 137. 1788.

Didymoglossum lineare Desv. Mém. Soc. Linn. Paris 6: 331. 1827.

Sphaerocionium lineare Presl, Hymenoph. 34. 1843.

Hymenophyllum catherinae Hook. in Hook. & Baker, Syn. Fil. 67. 1867. Type from Catherine's Peak, Jamaica, *Wilson* 573 (fragment US).

Rhizomes creeping, filiform, about 0.2 mm. in diameter, sparingly hairy; fronds determinate; stipes 1–3 cm. long, filiform, 0.2–0.3 mm. in diameter, nonalate throughout, sparingly hairy, the hairs simple or forked, the stalk and branches 1-celled; blades ovate to narrowly oblong, 4–9 cm. long, 1.5–4 cm. broad, rounded or acutish at apex, the rhachis nonalate below, narrowly alate toward apex; pinnae 8–10 pairs, the lowest very short-petiolulate, the upper adnate, widely spreading, ovate, 7–18 mm. long, 3–9 mm. broad, deeply pinnatifid, the costa narrowly winged; segments 3–5 pairs, the lower two or three deeply bifid, the ultimate segments 0.5–0.8 mm. broad; hairs of the rhachis forked or mostly stellate, 3-rayed, long-stalked, lacking on the veins, those of the margins simple or forked at base; sori numerous, borne on most of the upper segments, the indusia much broader than the segments, the valves rotund, about 1 mm. long and broad, ciliate, the hairs all simple.

TYPE: Jamaica, *Swartz*.

RANGE: Cuba, Jamaica, Puerto Rico, Guadeloupe, Guatemala, and Costa Rica.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Loma del Gato, Sierra Maestra, alt. 1,000 meters, *Clément* 777.

JAMAICA: Blue Mountains, at elevations of 1,500 to 1,900 meters: *J. P.* 59; *Jenman*; *Hart* 5; *Webster & Goldberg* 149; *Orcutt* 5585; *Watt* 37; *Chrysler* 1809b; *Harris* 7105; *Clute* 274a; *Underwood* 517, 873; *Maxon* 1227, 9726.

PUERTO RICO: Catalina-Yunque Trail, *E. G. Britton* 7681. Alta de Bandera, *Chase* 6471b. Luquillo Mountains, *P. Wilson* 168.

GADELOUPE: *Duss* 4387; *Questel* 1102; *Stehlé* 1778.

GUATEMALA: Department of Alta Verapaz, at elevations of 600 to 1,200 meters: *H. Johnson* 361, 814, 922; *Cook & Doyle* 148.

COSTA RICA: La Palma, alt. 1,600 meters, *Standley* 33139. San Gerónimo, *Wercklé* 547.

The name *H. lineare* (often misapplied by earlier botanists) was restored to its proper application by Dr. Maxon (*Pterid. Porto Rico* 506. 1926). The *Duss* specimen from Guadeloupe cited above has fronds up to 22 cm. long and has been given a manuscript varietal name by Christ, but it does not seem to differ other than in size.

4. *Hymenophyllum molle* Morton, sp. nov.

Rhizoma repens; frondes pendulae, indefinitae, stipitibus non alatis, parce pubescentibus, pilis simplicibus vel raro furcatis; laminae lineares, rhachibus flexuosis, non alatis; pinnae numerosae, adscendentes, infimae breviter petiolulatae, pinnatisectae, costa flexuosa, anguste alata, pinnulis inferioribus 2–4-dichotomis, superioribus simplicibus, segments ultimis angustissimis; pili in rhachibus numerosi, appressi, stellati, breviter stipitati, 4–6-radiati, radiis subrectis, vel bis-stellati, in venis et marginibus numerosi, stellati, subsessiles, radiis plerumque 5 vel 6, elongatis, patentibus; sori parvi, indusiis subimmersis, quam segmentis angustioribus, valvis perspicue ciliatis, pilis stellatis.

Rhizomes creeping, 0.2–0.3 mm. in diameter; fronds pendent, indeterminate; stipes black, 3–6 cm. long, 0.2 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs simple, several-celled, or rarely forked; blades linear, 10–30 cm. long, 2–3.5 cm. broad, the rhachis flexuose, nonalate throughout; pinnae ascending, 10–25 pairs, 1–3 cm. long, 5–10 mm. broad, the lower short-petiolulate,

the middle and upper sessile, not decurrent, deeply pinnatisect, the costa flexuous, narrowly alate throughout, the wing about 0.25 mm. broad on either side; pinnales 5 or 6 pairs, the lower 2 to 4 times dichotomously divided, the upper bifid, the uppermost simple, the ultimate segments narrowly linear, up to 5 mm. long, 0.6–0.8 mm. broad; hairs of the rhachis numerous, appressed, stellate, short-stalked, 4–6-rayed, the rays suberect, or sometimes twice-stellate, those of the veins and margins very numerous, all stellate, subsessile, the rays mostly 5 or 6, elongate, spreading, 0.4–0.6 mm. long; sori very small, narrower than the segments, slightly immersed at base, the valves broader than long, about 0.5 mm. long, entire, long-ciliate, the hairs all stellate.

Type in the U. S. National Herbarium, No. 1831546, collected at the Achirayoc Inca Ruins, District of Vilcabamba, La Convención, Department of Cuzco, Peru, at an elevation of 3,000 meters, July 1934, by C. Bües (No. 2102).

RANGE: Known only from the Department of Cuzco, Peru, at elevations of 2,200 to 3,150 meters.

ADDITIONAL SPECIMENS EXAMINED:

PERU: Achirayoc, Bües 2115. Abra Mirador, Bües 2072. Huadquina, Bües 708. Huaguapata, Bües 1407.

The present peculiar species somewhat suggests *H. amabile* from the same region in its soft, dense pubescence, but it may be distinguished at once by its nonalate rhachis and more deeply dissected pinnae, in addition to the lack of hairs on the leaf surfaces. The closest relationship is doubtless with *H. trichophyllum*.

5. *Hymenophyllum pulchellum* Schlecht. & Cham. *Linnaea* 5: 618. 1830.

Sphaerocionium pulchellum Presl, *Hymenoph.* 34. 1843.

Hymenophyllum chrysothrix Sturm, in Mart. Fl. Bras. 1²: 298. 1859. Type from Serra da Estrella, Brazil, Martius. Placed here from description, and also from a notation on the label of Burchell 2259, "*H. pulchellum* = *H. chrysothrix*, fide Mettenius."

Hymenophyllum pannosum Christ, Bull. Herb. Boiss. II. 5: 250. 1905. Type from Costa Rica, Wercklé (isotype US). A dwarf, very densely pubescent form.

Hymenophyllum lineare var. *brasiliense* Rosenst. *Hedwigia* 46: 74. 1906. Type from Santa Cruz, Rio Grande do Sul, Brazil, Juergens 137 (Rosenst. exs. 157) (isotypes NY, US).

Hymenophyllum lineare var. *brasiliense* f. *tuberosum* Rosenst. loc. cit. Type from Rio Grande, São Paulo, Brazil, Wacket (Rosenst. exs. 175) (isotype US).

Hymenophyllum lineare var. *brasiliense* f. *pseudocarpum* Rosenst. loc. cit. Type from Rio Grande, São Paulo, Brazil, Wacket (Rosenst. exs. 176) (isotype US).

Rhizomes filiform, 0.15–0.3 mm. in diameter; fronds pendent, indeterminate; stipes filiform, 0.1–0.3 (rarely 0.5) mm. in diameter, terete, nonalate throughout, deciduously pubescent, the hairs stellate, short-stalked, mostly 4-rayed, the rays 1-celled; blades oblong to linear, extremely variable in size, 2–50 cm. long (normally 15–20 cm.), 1–4.5 cm. broad (normally 1.5–2.5 cm.), rounded at apex, the rhachis not at all alate or very rarely the uppermost pinnae slightly decurrent; pinnae ascending, 4 to many pairs (normally 15–25), all but the uppermost short-petiolulate, lanceolate, up to 2.5 cm. long and 1.4 cm. broad, pinnatifid, the costa continuously winged on both sides; segments (4) 5–7 pairs, the basal bifid or rarely quadrifid, the ultimate segments 0.7–1 (rarely 1.5) mm. broad; hairs of the rhachis stellate, mostly 6-rayed, partly sessile, the rays elongate, 1-celled, partly short-stalked, the rays very long and several-celled, those of the veins and margins numerous, all stellate, 3–6-rayed, sessile or short-stalked; sori borne on the apical segments of the pinnae only, the indusia scarcely immersed at base, not broader than the segments, the valves hemispheric, 0.7–1 mm. long, 0.9–1 (rarely 1.4) mm. broad, glabrous externally, long-ciliate, the hairs stellate.

TYPE: Jalacingo, Veracruz, Mexico, *Schiede*.

RANGE: Mexico, Guatemala, Costa Rica, and southern Brazil.

ADDITIONAL SPECIMENS EXAMINED:

MEXICO: Orizaba, Veracruz, *Pringle* 5591 (distributed as *H. lineare*). Chistla, *Liebmann* (distributed as *H. plumosum*). Mirador, Veracruz, *Purpus* 152.

GUATEMALA: Departments of Alta Verapaz, San Marcos, and Suchitepéquez, at elevations of 500 to 2,800 meters: *von Tuerckheim* 12, II. 1569, II. 1936; *Hatch & Wilson* 232, 372; *Cook & Griggs* 440; *Cook & Doyle* 57; *Donnell Smith* 1549; *Johnson* 368, 706, 928; *Steyermark* 35436, 36710, 37128.

COSTA RICA: Las Nubes to La Palma, *Knight* 29268, 29271. Pacayos, *Lankester* 648b.

BRAZIL: *Burchell* 3546 (G), 2259 (G, US); *Riedel* 34 (G), 47. Rio Grande, São Paulo, *Krieger* (NY). Serra do Mar, São Paulo, *Wacket* (Mus. Paulista 1296) (NY). Cajurú, São Paulo, *Luederwalt* (Mus. Paulista 1539) (NY). Hamburger Berg, Rio Grande do Sul, *Lindman* (Regnell A487). Caldas, Minas Gerais, *Regnell* III. 1485. Fortaleza, Paraná, *Dusén* 2935. Rio de Janeiro, *Brade* (NY). Ypiranga, Paraná, *Dusén* 6524 (NY, US). Lages, Santa Catherina, *Spannagel* 121 (NY).

6. *Hymenophyllum trichophyllum* H. B. K. Nov. Gen. & Sp. 1: 27. 1815.

Hymenophyllum procerum v. d. Bosch, Ned. Kruid. Arch. 4: 409. 1859 (*nom. nudum*). Based on *H. pulchellum* sensu Mett. Fil. Lechl. 1: 25. 1859, not Schlecht. & Cham., but Mettenius gives no description.

Hymenophyllum moritzianum Sturm in Mart. Fl. Bras. 1²: 295. 1859. Type from Mérida, Venezuela, *Moritz* 344 p. p.

Hymenophyllum eriophorum v. d. Bosch, Ned. Kruid. Arch. 5³: 180. 1863. Type from the "Andes of Quito," *Jameson* 82.

Hymenophyllum trichophyllum var. *contractum* Hieron. Hedwigia 45: 226. 1906. Type from Mount Tolima, Colombia, *Stuebel* 43.

Sphaerocionium trichophyllum Copel. Phil. Journ. Sci. 67: 32. 1938.

Rhizomes filiform; fronds pendent, indeterminate; stipes black, shining, filiform, about 0.25 mm. in diameter, nonalate throughout, slightly pilose, the hairs mostly simple, 2- or 3-celled, a few forked or stellate and 3-rayed; blades variable in outline, the rachis elongate, black, filiform, nonalate; pinnae many pairs, normally 10–15 mm. long, pinnate-pinnatifid (or some of them elongate and frondlike, bipinnate-pinnatifid), short-petiolulate; pinnules normally 2 or 3 pairs, decurrent but not forming a continuous wing along the costa, the basal superior ones usually with twice-dichotomous veins, the ultimate segments linear, 0.5 to rarely 1 mm. broad; hairs of rachis stellate, 6- or 7-rayed, subsessile, those of the veins and margins all stellate, 4–6-rayed, subsessile, the rays elongate; indusia slightly immersed at base, narrower than the segments, the valves densely ciliate, the hairs stellate, stalked.

TYPE: Between Cocollar and Guardia de San Augustin, Cumaná, Venezuela, *Humboldt*.

RANGE: Costa Rica, Panama, British Guiana, and Venezuela to Bolivia, at elevations of 1,800 meters and higher.

SPECIMENS EXAMINED:

COSTA RICA: Cerro Gallito, alt. 1,800 meters, *M. Valerio* 305. Cerro de Las Lajas, alt. 2,000–2,400 meters, *Standley & Valerio* 51525. Las Nubes, *Standley*, 38447, 38733.

PANAMA: Above El Boquete, Province of Chiriquí, alt. 1,650–1,800 meters, *Killip* 5273.

BRITISH GUIANA: Summit of Mount Roraima, *Tate* 453 (NY).

VENEZUELA: Cerro de Turumiquire, *Tate* 331. Colonia Tovar, *Fendler* 327 (G).

COLOMBIA: Departments of Norte de Santander, Cundinamarca, El Cauca, Tolima, Caldas, and Nariño, at elevations of 2,500 to 4,200 meters: *Stuebel* 237, 336; *Mutis* 3205; *Ariste Joseph* s. n., A518; *Killip & Smith* 20660; *Killip* 6705 (NY, US), 6720 (NY, US), 12140; *Killip & Hazen* 9478 (NY, US); *Pennell* 6989 (NY, US); *Pennell & Hazen* 9941 (NY, US), 10080 (NY, US); *Lehmann* 652, 6397; *Apollinaire Marie* 27.

ECUADOR: Provinces of Tunguragua and Carchi, at elevations of 3,200 to 4,000 meters: *Jameson* (G); *Couthouy* 67 (G); *Mille* s. n. (G, NY), 120; *Stuebel* 813; *Penland & Summers* 882.

BOLIVIA: Comarapa, alt. 2,600 meters, *Herzog* 1952. Yungas, *Pierre Jay*, June–July, 1893 (NY, distributed in the series "Mosses of Northern Bolivia").

The finely dissected fronds grow in large, densely intertangled pendent masses on tree trunks. *Hieronymus*' var. *contractum* is a reduced, densely hairy form, common in the higher mountains of Colombia. More distinct is the following:

6a. *Hymenophyllum trichophyllum* var. *buesii* Morton, var. nov.

A var. *typica* segmentis undulatis differt.

Differs from the typical variety in its obviously undulate segments.

Type in the U. S. National Herbarium, No. 1831537, collected at Abra Mirador, La Convención, Department of Cuzco, Peru, at an elevation of 3,150 meters, September 29, 1934, by C. Bües (No. 2076).

7. *Hymenophyllum urbanii* Brause, in Urban, Symb. Antill. 7: 484. 1913.

Rhizomes filiform, 0.2 mm. in diameter or less; fronds pendent, indeterminate; stipes 1–5 cm. long, filiform, less than 0.2 mm. in diameter, sparingly pilose, the hairs mostly simple, several-celled; blades linear, 4–15 cm. long, 1–2.5 cm. broad, the rhachis nonalate throughout; pinnae 9 to many pairs, petiolulate, 5–10 mm. long, 5–7 mm. broad (or some of them elongate and frondlike), obtuse, pinnatifid, the costa continuously winged on both sides (normally); segments 1–3 pairs, all simple and linear or the basal bifid, the ultimate segments 1.2 mm. broad or less; hairs of rhachis, veins, and margins numerous, all stellate, sessile, 4–6-rayed, the rays mostly 0.5 mm. long or more; sori small, the indusia immersed at base, narrower than the segments, the valves about 0.5 mm. long and broad, long-ciliate, the hairs stellate, stalked.

TYPE: Loma Rosilla, Dominican Republic, *Fuertes* 1817 (isotype US).

RANGE: Cuba, Hispaniola, and Jamaica.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Summit of Pico Turquino, Sierra Maestra, *Ekman* 14540; *León* 11116.

HAITI: Massif de la Selle, at 2,100 meters elevation, *Ekman* H 7687.

JAMAICA: Higher parts of the Blue Mountains, at elevations of 1,650 to 2,200 meters: *Hart* 65; *Jenman*; *J. P.* 63; *Maxon* 1383, 2666, 2719, 9733, 9750, 9877, 10016, 10034; *Orcutt* 5371; *Underwood* 1018, 1474; *Shreve*; *Stoudt* 800; *Maxon & Killip* 1176.

In the Pteridophyta of Porto Rico (p. 506) Dr. Maxon stated that *H. urbanii* was identical with *H. antillense*, but examination of authentic material of both shows this to be incorrect. The two differ fundamentally in the presence of hairs on the leaf surfaces in *H. antillense* and their absence in *H. urbanii*. *H. antillense* may be distinguished also by the fact that the rhachis is alate upwardly, whereas that of *H. urbanii* is nonalate throughout. As a matter of fact, *H. urbanii* is very closely allied to the continental *H. trichophyllum* H. B. K. and may be only a variety of that species.

8. *Hymenophyllum roraimense* Morton, sp. nov.

Rhizoma filiforme; frondes indefinitae, pendulae, stipitibus brevibus, filiformibus, parce pilosis, pilis plerumque simplicibus; laminae oblongae vel lineares,

breves, rhachibus flexuosis, non alatis; pinnae paucae, breviter petiolulatae, simplices, bifidae vel simpliciter pinnatifidae, costa ubique alata, segmentis 1- (vel raro 2-) jugis, latis; pili in superficiebus nulli, in rhachibus, venis et marginibus stellati, subsessiles, 3-6-radiati, radiis elongatis; indusia basi immersa, segmentis angustiora, longe ciliata.

Rhizomes creeping, filiform, about 0.15 mm. in diameter; fronds pendent, indeterminate; stipes filiform, 1 cm. long or less, about 0.15 mm. in diameter, nonalate throughout, deciduously pilose, the hairs mostly simple; blades oblong to linear, 3-5 cm. long, 10-15 mm. broad, obtuse, the rhachis wiry, flexuous, nonalate throughout, glabrate; pinnae ascending, 6-8 pairs, all short-petiolulate, 3-9 mm. long, 3-5 mm. broad, simple, bifid, or simply pinnatifid with 1 or rarely 2 pairs of segments, the costa winged throughout; segments 1-1.8 mm. broad, 1-veined; hairs lacking on the leaf surfaces, those of the rhachis, veins, and margins all stellate, subsessile, 3-6-rayed, the rays elongate, over 0.5 mm. long; indusia slightly immersed at base, narrower than the segments, the valves about 0.5 mm. long and broad, glabrous externally, long-ciliate, the hairs stellate, stalked.

Type in the U. S. National Herbarium No. 1858489, collected on the upper slopes of Mount Roraima, British Guiana, December 1884, by Everard F. im Thurn (No. 375).

RANGE: Known only from Mount Roraima.

ADDITIONAL SPECIMEN EXAMINED:

BRITISH GUIANA: Mount Roraima, *im Thurn* 203.

9. *Hymenophyllum tenerrimum* v. d. Bosch, Ned. Kruid. Arch. 5¹: 185. 1863.

Rhizomes filiform, 0.2 mm. in diameter; fronds determinate; stipes 0.5-1 cm. long, filiform, about 0.2 mm. in diameter, pilose, the hairs simple or forked, elongate, several-celled; blades ovate to linear, 3-5 cm. long, 0.8-1.5 cm. broad, the rhachis nonalate throughout; pinnae spreading, 7-13 pairs, sessile or the upper adnate, subflabellate, 4-9 mm. long, 4-5 mm. broad; segments 1 or 2 pairs, simple and 1-veined, about 1.5 mm. broad; hairs of rhachis forked or stellate, 3-rayed, long-stalked, absent from the veins, the marginal ones mostly 3-branched at base, the branches elongate (0.5 mm. long or more), sometimes forked at apex, or a few simple or once-forked at base; sori few, apical, slightly immersed at base, the valves rotund, 0.8 mm. long and broad, long-ciliate, the hairs simple or forked at base.

TYPE: Tarapoto, Peru, *Spruce* 4702.

RANGE: Peru and Bolivia.

SPECIMEN EXAMINED:

BOLIVIA: Songo, *Bang* (with 899 pp.) (NY).

This identification of *H. tenerrimum* depends on a note by Rusby on the label of the *Bang* specimen cited above, in which he states that the specimen is the same as *Spruce* 4702.

10. *Hymenophyllum elegans* Spreng. Syst. Veg. 4: 133. 1827.

Hymenophyllum cruegeri C. Müll. Bot. Zeit. 1854: 722. 1854. Type from Mount Tocuche, Trinidad, *Crueger* (fragment US).

Hymenophyllum delicatissimum Fée, Crypt. Vasc. Brés. 2: 83. pl. 105, f. 1. 1872-73. Type from the Organ Mountains, Brazil, *Glaziou* 3491 (isotype US).

Hymenophyllum caudatellum Christ, Bull. Herb. Boiss. II. 4: 939. 1904. Type from Costa Rica, *Wercklé* (isotype US).

Sphaerocionium elegans Copel. Phil. Journ. Sci. 67: 32. 1938.

Sphaerocionium cruegeri Copel. loc. cit.

Rhizomes creeping, filiform, about 0.2 mm. in diameter, sparingly hairy; fronds pendent, determinate; stipes 5-20 mm. long, filiform, 0.2 mm. in diameter,

nonalate, sparingly hairy, the hairs simple or forked; blades lanceolate to linear, 2-17 cm. long, 9-20 mm. broad, acuminate, the rhachis normally nonalate below, alate on one or both sides upwardly by the decurrent bases of the pinnae; pinnae spreading, 7-20 pairs, all sessile or adnate, subflabellate, 4.5-9 mm. long, 4-7 mm. broad, pinnatifid, the costa broadly winged; segments 1 or 2 (very rarely 3) pairs, all simple and 1-veined or the superior basal one bifid, the ultimate segments 1-1.5 mm. broad; hairs of the rhachis few, mostly forked, a few stellate, 3-rayed, long-stalked, the rays 1-celled, those of the veins few, mostly forked, those of the margins abundant, varied, mostly forked at base with elongate branches (0.5-0.8 mm. long) or twice-forked, a few simple, stellate, or bistellate; sori numerous, borne on all the upper segments of fertile fronds, the indusia scarcely immersed at base, not broader than the segments, the valves 0.7-1 mm. long, 1-1.4 mm. broad, conspicuously ciliate, the hairs mostly stellate, subsessile or a few long-stalked.

TYPE: Brazil, *Sello*.

RANGE: Cuba, Hispaniola, Guadeloupe, Grenada, Trinidad, Guatemala, Costa Rica, Panama, Colombia, Peru, Bolivia, and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Sierra de Cristal, alt. 1,325 meters, *Ekman* 6828. Crest of Sierra Maestra, between Pico Turquino and La Bayamesa, alt. 1,350 meters, *Morton & Acuña* 3708.

DOMINICAN REPUBLIC: Lagunas de Cenobí, alt. 1,100 meters, *Ekman* H 12753. Loma Guita-Espuela, alt. 1,100 meters, *Ekman* H 12286. San Francisco de Macorís, *Abbott* 2057, 2120, 2177.

HAITI: Le Borgne, Massif du Nord, alt. 1,150 meters, *Ekman* H 4775.

GUADELOUPE: *Duss* 4268.

GRENADA: *Sherring*.

TRINIDAD: Mount Tocuche, *Broadway* 5655, 7109; *Britton et al.* 1374.

GUATEMALA: Trail from Senahú to Actalá, Alta Verapaz, *Maxon & Hay* 3329.

COSTA RICA: Navarro, alt. 1,500 meters, *Torres* 193. South of Cartago, alt. 1,800 meters, *Maxon* 496. El Muñeco, *Standley* 33646. Volcán Turrialba, *Standley* 35189. La Palma, *Standley* 32902; *Maxon & Harvey* 7966. Volcán Barba, *M. Valerio* 48.

PANAMA: Vicinity of El Boquete, Prov. Chiriquí, alt. 1,500-1,800 meters, *Cornman* 1244; *Killip* 5340.

COLOMBIA: Mesa de los Santos, Santander, alt. 1,500 meters, *Killip & Smith* 15342 (NY, US). La Sierra, Antioquia, alt. 2,000 meters, *Archer* 1650. Angostura de Armada, Nariño, *André* 3338 (NY).

PERU: Mountains at 3,000 meters elevation, *Lechler* (NY, US).

BOLIVIA: Apolo, alt. 1,500 meters, *Williams* 1238 (NY, US). Hacienda Simaco, on road to Tipuani, alt. 1,400 meters, *Buchtien* 5199.

BRAZIL: *Burchell* 3721 (G); *Riedel*. Rio Grande, São Paulo, *Brade* 6618. Serra de Paranapiacaba, São Paulo, *Brade* 8358 (NY). Between Tijuca and Pico de Papagaio, Rio de Janeiro, *Brade* (Mus. Nac. Rio Jan. 20613) (NY). Serra Pintoba, Espirito Santo, *Luetzelburg* 7103, 7203 (NY). Serra do Mar, Paraná, *Dusén* 3362 (G). Lages, Santa Catharina, *Spannagel* (Rosenst. exs. 448) (NY). Serra da Estrella, *Spannagel* 317 (NY). Alta da Serra, São Paulo, *Chase* 10712.

Like many other species of *Hymenophyllum*, *H. elegans* is exceedingly variable. The form described below probably represents merely depauperate plants.

10 a. *Hymenophyllum elegans* forma minor Morton, f. nov.

A f. *typica* pinnis plerumque simplicibus vel apice bifidis, segmentis latis, rhachibus usque ad vel fere usque ad basin alatis differt.

Differs from the typical form in having the pinnae mostly simple or merely bifid at apex, the segments broad, and the rhachis alate to base or nearly so.

Type in the New York Botanical Garden, collected in Sierra del Líbano, Santa Marta Mountains, Department of Magdalena, Colombia, at an elevation of 1,650 meters, by H. H. Smith (No. 1100).

This form appears to be restricted to Colombia and Venezuela, although somewhat similar ones occasionally occur elsewhere. The following additional specimens are referred here.

VENEZUELA: Colonia Tovar, *Fendler* 457 (G).

COLOMBIA: Mesa de los Santos, Santander, alt. 1,500 meters, *Killip & Smith* 15334 p. p. (NY, US). This collection contains some fronds of more or less typical *H. elegans*.

11. *Hymenophyllum adiantoides* v. d. Bosch, Ned. Kruid. Arch. 5²: 184. 1863.

?*Hymenophyllum sprucei* Baker, in Hook. & Bak. Syn. Fil. 65. 1867. Type from Tarapoto, Peru, *Spruce*.

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, indeterminate; stipes 1–2 cm. long, filiform, 0.25 mm. in diameter, nonalate throughout, persistently pilose, the hairs mostly stellate, numerous, 3- or 4-rayed; blades linear, 4–10 cm. long, 1.5–2 cm. broad, acuminate at apex, the rhachis slender, black, narrowly alate upwardly, nonalate at base except for the slightly decurrent pinnae; pinnae spreading, 8–17 pairs, subrhombic, 0.9–1.1 cm. long, 0.5–0.7 cm. broad, obtuse, all adnate, the lowest free at lower base, pinnatifid; segments 3 or 4 pairs, the lower superior one or two bifid, the others simple, the ultimate lobes short, narrow, less than 1 mm. broad; hairs of the rhachis stellate, stalked, 5- or 6-rayed, or some of them twice-stellate, those of the veins stellate, stalked, 3–5-rayed, the marginal ones mostly stellate, stalked, mostly 3-rayed, or some bistellate, a few forked at base, the branches less than 0.5 mm. long; sori confined to the tips of the upper pinnae, slightly immersed at base, the valves ovate, obtuse, 1 mm. long or less, 0.7–1 mm. broad, glabrous externally, ciliate, the hairs partly simple, partly stellate.

TYPE: Tarapoto, Peru, *Spruce*.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED:

PERU: Tarapoto, *Spruce* (G, NY, US). These specimens are probably all isotypes. They bear the notation "conf. 4700," which may be the type number of *H. sprucei* Baker. No number was cited in the original description of either species.

12. *Hymenophyllum hirsutum* (L.) Swartz, Journ. Bot. Schrad. 1800²: 99. 1801, as to name.

Trichomanes hirsutum L. Sp. Pl. 1098. 1753.

Trichomanes ciliatum Swartz, Prodr. Veg. Ind. Occ. 136. 1788.

Hymenophyllum ciliatum Swartz, Journ. Bot. Schrad. 1800²: 100. 1801.

Sphaerocionium ciliatum Presl, Hymenoph. 34. 1843.

Sphaerocionium hirsutum Presl, loc. cit.

Sphaerocionium vestitum Presl, op. cit. 34, 58. Type from Rio de Janeiro, Brazil, *Beyrich*.

?*Sphaerocionium commutatum* Presl, op. cit. 34. Based on *Hymenophyllum boryanum* sensu Raddi, Pl. Bras. pl. 35, fig. 4. 1825, not Willd. 1810. This must be considered as a *nomen subnudum* at best, for Raddi's figure is too poor for positive identification.

Sphaerocionium grevilleanum Presl, loc. cit. Based on *H. ciliatum* sensu Hook. & Grev. Icon. Fil. 1: pl. 35. 1829, not Swartz, which was figured from a plant collected in St. Vincent by Guilding. The plate represents nearly typical *H. hirsutum*.

Hymenophyllum remotum v. d. Bosch, Ned. Kruid. Arch. 4: 413. 1859. Based on the same plate as *Sphaerocionium grevilleanum* Presl, and therefore a *nomen abortivum*.

?*Hymenophyllum commutatum* v. d. Bosch, op. cit. 414.

?*Hymenophyllum surinamense* v. d. Bosch, loc. cit. Based on *Sphaerocionium ciliatum* sensu Presl, Hymenoph. 34. 1843, as to plant of Weigelt from Surinam. A *nomen nudum*, placed here on the authority of Christensen.

Hymenophyllum gardnerianum Sturm, in Mart. Fl. Bras. 1²: 297. 1859. Based on Gardner 213, from Rio de Janeiro, Brazil. Placed here on the authority of Christensen. This is probably, but not certainly, the correct disposition.

Hymenophyllum vestitum v. d. Bosch, Ned. Kruid. Arch. 5²: 193. 1863.

Hymenophyllum gratum Fée, Mém. Foug. 11: 118. pl. 30, fig. 1-2. 1866. Type from Guadeloupe, L'Herminier in 1861. A large form, perhaps varietally distinct.

Hymenophyllum elegantissimum Fée, op. cit. 118. pl. 29, fig. 2. Type from Guadeloupe, L'Herminier in 1861.

Hymenophyllum microcarpon Fée, Crypt. Vasc. Brés. 1: 245. pl. 69, fig. 3. 1869, not *H. microcarpum* Desv. 1827. Based on Glaziou 2268 and 3356 from Rio de Janeiro, Brazil.

Hymenophyllum caulopteron Fée, op. cit. 197. pl. 97, fig. 3. Based on Glaziou 1713, 920, 2269, and 2270, from Brazil. A specimen of No. 920 is in the New York Botanical Garden.

Hymenophyllum fraseri Mett. ex Fourn. Mex. Pl. 1: 63. 1872. A *nomen nudum*, based on specimens collected at Chinantla, Mexico, by Liebmann. Placed here on the authority of Christensen, but it may very well be *H. trapezoidale* Liebm., which came from the same locality.

Hymenophyllum ulei Christ & Giesenh. Flora 86: 85. 1899; Bull. Herb. Boiss. II. 2: 320. 1902. Type from Santa Catharina, Brazil, Ule 4510.

Hymenophyllum elatius Christ in Schwacke, Pl. Nov. Mineiras 2: 13. 1900; Bull. Herb. Boiss. II. 2: 319. 1902. Type from Santa Catharina, Brazil, Ule 206.

Hymenophyllum ciliatum f. *tuberosum* Rosenst. Hedwigia 46: 74. 1906. Based on *H. ulei* Christ & Giesenh.

Hymenophyllum ciliatum var. *abbreviatum* Rosenst. op. cit. 56: 360. 1915. Type from Ribeira, São Paulo, Brazil, Brade 5169.

Sphaerocionium elegantissimum Copel. Phil. Journ. Sci. 67: 34. 1938.

Rhizomes wide-creeping, 0.2-0.3 mm. in diameter, red-pilose; fronds erect, determinate; stipes 1.5-3 (rarely 5) cm. long, 0.3 mm. in diameter near base, conspicuously alate, normally at least to middle and frequently nearly to base, sparingly pilose, the hairs stellate, stalked, 4-rayed or more, some of them twice-stellate; blades ovate to oblong or oblong-lanceolate, 3-9 (rarely 15) cm. long, 1.5-3 cm. broad or rarely more, acute at apex, not reduced at base, the rhachis broadly alate throughout; pinnae 6-12 pairs, spreading, ovate to ovate-oblong, 7-15 mm. long, 5-12 mm. broad, obtuse, deeply pinnatifid, the costa broadly alate throughout; primary segments 2-5 pairs, all simple or the basal one or two bifid, the ultimate segments linear, up to 4 mm. long, 1-1.3 mm. broad; hairs of the rhachis stellate, stalked, 3- or 4-rayed, some of them twice-stellate, those of the veins scattered, stellate, long-stalked, 3- or 4-rayed, the marginal ones bi-stellate or twice-forked, the primary branches about 0.25 mm. long, the rays 0.25-0.4 mm. long; sori borne on most of the segments, about as broad as the segments, the valves suborbicular, about 1.5 mm. long and broad, rounded, glabrous externally, long-ciliate, the hairs mostly furcate at base, or sometimes twice-forked.

TYPE: Based on *Filicula digitata* Plumier, Fil. Amer. 73, pl. 50B. 1703, presumably a plant from the West Indies.

RANGE: West Indies, and Mexico to Bolivia and Brazil.

SPECIMENS EXAMINED:

CUBA: Common in the Sierra Maestra, at elevations of 800 to 1,500 meters: *Wright* 956, 3937; *Ekman* 1694, 8861; *Shafer* 9030; *Eggers* 5337; *Morton & Acuña* 3524; *Hioram & Maurel* 6035; *Hioram & Clément* 6363: *León, Clément & Roca* 10502. The Cuban form is uniformly small, the pinnae having mostly only two pairs of segments, or sometimes being merely bifid.

HAITI: At elevations of 630 to 2,200 meters: *Ekman* H 4859; *Leonard & Leonard* 14501, 14577, 15161; *Curtis* 37.

DOMINICAN REPUBLIC: At elevations of 250 to 1,000 meters: *Ekman* H 11453, H 12395; *Abbott* 1386, 2023, 2046, 2104.

JAMAICA: Common in the Blue Mountains at elevations from 600 to 1,750 meters: *Maxon* 1081, 9018, 9188, 9205, 9257, 9444, 9569, 9725, 10551, 10579; *Skutch* 164; *D. S. Johnson* 3; *Hart* 206; *J. P.* 68.

PUERTO RICO: *Hess* 222; *Sintenis* 6353; *Blomquist* 13139; *Wagner*.

ST. KITTS: The Crater, alt. 750 meters, *Box* 253. Mount Misery, *Britton & Cowell* 779.

GUADELOUPE: At elevations of 165 to 810 meters: *Duss* 4269, 4274, 4281; *Questel* 1044, 1846; *Stehlé* 1222.

DOMINICA: At elevations of 750 to 1,400 meters: *Hodge & Hodge* 158, 159, 2825; *Cooper* 106a; *Haweis* 1;

MONTSERRAT: Chaner's Mountain, alt. 600 meters, *Shafer* 767, 768, 774.

MARTINIQUE: *Duss* 1514, 1516; *Stehlé* 5380.

ST. LUCIA: Roseau-Millette Ridge, alt. 750 meters, *Box* 519.

ST. VINCENT: *H. H. & G. W. Smith* 445; *Eggers* 6852 p. p., 6902.

GRENADA: *Murray & Elliott; Sherring.* Grand Etang, *Broadway s. n.*, 2535; *Miller*.

TRINIDAD: *Fendler* 86. Mount Tocuche, *Britton et al.* 1377, 1378, 1379, 1380; *Broadway* 5638. Mora Forest, *Britton & Hazen* 375. Morne Bleu, *E. G. Britton* 2289. Valencia, *Britton & Britton* 2109. Aripo, *Broadway* 9978. Blanchisseuse Road, *Broadway* 5811.

TOBAGO: Caledonia, *Broadway* 4541.

MEXICO: States of Puebla and Oaxaca, at elevations of 1,500 to 2,100 meters: *Barnes & Land* 497a; *Mexia* 9277 p. p.

GUATEMALA: Departments of Izabal, Chiquimula, and Alta Verapaz, from sea level to an elevation of 1,500 meters: *Maxon & Hay* 3212; *Cook & Doyle* 39; *von Tuerckheim* II. 1847, II. 1849, II. 1851, *Donn. Smith* 8031, 8805; *H. Johnson* 174, 362; *Hatch & Wilson* 18, 102; *Steyermark* 31568, 39378.

HONDURAS: Quebrada Mojanales, *Blake* 7475.

NICARAGUA: Sangsangta District, *Schramm* 24, 34, 39.

COSTA RICA: *Wercklé.* Between El General and Buenos Aires, *Pittier* 3552. Diquís, *Pittier* (Herb. Nat. Cost. 12109).

BRITISH GUIANA: *Jenman* s. n. (NY, US), *Schweinitz* (NY). Kamakusa, *de la Cruz* 2786 (NY, US). Kaieteur Falls, *Tutin* 532.

FRENCH GUIANA: Oyapok, *Leprieur* in 1836 (G, US).

VENEZUELA: Colonia Tovar, *Fendler* 37 (G, NY). Cerro Santa Ana, Paraguaná Peninsula, *Curran & Haman* 679 (G, NY, US). Imataca Mountains, *Thompson* 17. South of Santa Catalina, *Dort* (NY). Without locality, *Moritz* 266b (G).

COLOMBIA: At elevations of 5 to 900 meters: Panuré, *Spruce* 2974. Puerto Berrio, Santander, *Haught* 1795 (G, US). Barranca Bermeja, Santander, *Haught*

2078. Between Pueblo Viejo and San Miguel, Magdalena, *Seifriz* 329. Río Calena, El Valle, *Cuatrecasas* 16291a. Cerro Chiribiqueta, Vaupes, *Schulles* 5637.

ECUADOR: Canton Mera, Napo-Pastaza, *Mexia* 7021.

PERU: Departments of Cuzco, Loreto, and Huánuco, at elevations of 350 to 1,650 meters: *Mexia* 8145 (NY, US), 6288a (G, NY, US); *Killip & Smith* 28539 (NY, US); *Bües* 2139.

BOLIVIA: At elevations of 850 to 1,500 meters: Tumapasa, *Cárdenas* 1976 (NY, US). San Carlos, Mapiri, *Buchtien* 68 (NY). Hacienda Simaco, *Buchtien* 5212.

BRAZIL: Common in the states of Pará, Minas Gerais, Rio de Janeiro, and São Paulo: *Burchell* 3560 (G); *Webb* (NY); *Wacket* (Rosenst. exs. 327), 109 (NY); *Brade* 5225 (NY), 6283 (NY), 8326; *Glaziou* 4441, 7272 (NY); *Mexia* 4299 (G, NY, US); *Tanaii*, *Spruce* (G, US).

As may be judged from the extensive synonymy given above, this is one of the most variable species. A detailed monographic study of the variations might show that the large, robust form of southern Brazil, described as *H. caulopteron* Fée, *H. elatius* Christ, *H. ulei* Christ & Giesenh., and *Sphaerocionium vestitum* Presl, could be recognized at least varietally, but at present I am unable to separate it satisfactorily from the numerous other variants of this complex species. It is represented by the following collections (from Santa Catherina, São Paulo, Rio de Janeiro, and Paraná): *Schmalz* 174 (NY); *Brade* 5858 (NY); *Sampaio* 2566 (NY, US); *Ule* (Mus. Nac. Rio Jan. 200) (NY); *Dusén* 713, 3447 (NY); *Vauthier* 672 (G); *Burchell* 3720 (G); *Wilkes* Exped. 2 (G, NY, US).

A form occurs in the Galápagos Islands (Chatham Island, *Stewart* 898) that can be referred only to this species at present, although it has long stipes, only slightly alate at apex, and many of the marginal hairs simple.

It is exceedingly unfortunate that the well-known name *H. ciliatum* must be displaced, but there seems no help for it. For a discussion of the nomenclature see page 173.

13. *Hymenophyllum prionema* Kunze, in Mart. Fl. Bras. 1¹: 284. 1859.

Rhizomes capillary, 0.33 mm. in diameter, ferruginous-hairy; stipes filiform, 2.5–3.7 cm. long, 0.33 mm. in diameter, nonalate throughout; blades linear, 11–15 cm. long, about 2.5 cm. broad, the rachis flexuous, very narrowly alate; pinnae remote, 8–20 pairs, ovate-oblong, obtuse, up to 1.2 cm. long and 6 mm. broad, broadly adnate at upper base, decurrent at lower, deeply pinnatifid, the pinnules oblong, obtuse, bifid or trifid, 4 mm. long, 2 mm. broad, the ultimate segments linear, 2 mm. long, scarcely 1 mm. broad; hairs absent from leaf surfaces and veins above, those of the veins of the lower surface and margins simple, mostly 3-celled; sori borne in upper part of frond, the valves ovate, 2 mm. long, incised-lacerate.

Type: Marajo, Pará, Brazil, *Martius*.

RANGE: Known only from the type.

The above description has been compiled from the original.

14. *Hymenophyllum semiglabrum* Rosenst. Repert. Sp. Nov. Fedde 9: 67. 1910.

Sphaerocionium semiglabrum Copel. Phil. Journ. Sci. 67: 34. 1938.

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, determinate; stipes filiform, 1–4 cm. long, 0.25 mm. in diameter, nonalate throughout, sparingly pilose, the hairs all simple; blades ovate to ovate-lanceolate, 2–6 cm. long, 1–2 cm. broad, acuminate at apex, the rachis alate throughout or the base nonalate, not flexuous; pinnae 3–8 pairs, oblong, ascending, 1–1.7 cm. long, 5–8 mm. broad, deeply pinnatifid; segments all simple, or the basal superior one bifid, the ultimate segments linear, 1-veined, 1.2–2 mm. broad; hairs lacking on the upper side of

the frond, those of the rhachis and veins beneath simple or rarely forked at base, the marginal ones almost all simple, a few basally forked; sori mostly apical, scarcely immersed at base, the valves oval, 1.5 mm. long, 1 mm. broad, rounded, sparingly ciliate, the hairs simple.

TYPE: La Palma, Costa Rica, *A. & C. Brade* 395 (fragment US).

RANGE: Costa Rica and Panama, at elevations of 1,000 to 1,500 meters.

ADDITIONAL SPECIMEN EXAMINED:

PANAMA: El Boquete, region of Volcán Chiriquí, *Cornman* 1175.

15. *Hymenophyllum silvaticum* Morton, sp. nov.

Rhizoma repens, parce pilosum; frondes parvae, definitae, stipitibus perbrevis, non alatis, parce pilosis, pilis simplicibus vel furcatis; laminae linearilanceolatae, acuminatae, rhachibus fere usque ad basim alatis, ala angusta, ciliata, non undulata; pinnae infimae sessiles, alterae adnatae, pinnatifidae, segmentis 3 vel 4, omnibus simplicibus, linearibus, uninerviis; pili supra nulli, in rhachibus subtus pauci, furcati, in venis et superficiebus inferioribus nulli, in marginibus pauci, simplices, patentes; sori segmentis paullo latiores, basi subimmersi, valvis ovatis, acutiusculis, longe ciliatis, pilis simplicibus.

Rhizomes wide-creeping, about 0.25 mm. in diameter, sparingly pilose; fronds determinate; stipes very short, 1.5–4 mm. long, about 0.15 mm. in diameter, non-alate, sparsely pilose, the hairs simple or forked; blades linear-lanceolate, 2.5–5 cm. long, 1–1.5 cm. broad, acuminate at apex, truncate at base, the rhachis straight, alate nearly or quite to base, the wing narrow, about 0.25 mm. broad, not undulate; pinnae 7–16 pairs, slightly ascending, 3–8 mm. long, 2–4 mm. broad, obtuse, the lowermost sessile, the others adnate, deeply pinnatifid; segments 3 or 4, all simple, linear, 1-veined, up to 3 mm. long, 0.7–1 mm. broad; hairs lacking on the upper side of the frond, those of the rhachis beneath few, forked, lacking on the veins and leaf surfaces beneath, the marginal ones few, all simple, spreading, about 0.4 mm. long; sori borne on all the segments of fertile pinnae, the indusia a little broader than the segments, slightly immersed at base, the valves ovate, acutish, entire, about 1.2 mm. long, 0.8 mm. broad, glabrous on sides, long-ciliate, the hairs all simple, 1-celled.

Type in the U. S. National Herbarium, No. 1189915, collected along the Río Caballete, Santa Rosa, Department of El Valle, Colombia, in forest, at 200 to 300 meters elevation, September 22, 1922, by E. P. Killip (No. 11557). Isotype at the New York Botanical Garden.

16. *Hymenophyllum sampaioanum* Brade & Rosenst. Bol. Mus. Nac. Rio Jan.

7^o: 136. pl. 1, f. 2, pl. 3, f. 1. 1931.

Sphaerocionium sampaioanum Copel. Phil. Journ. Sci. 67: 33. 1938.

Rhizome capillary, about 0.1 mm. in diameter; fronds scattered, determinate; stipes capillary, 1–5 mm. long, 0.1 mm. in diameter, alate at apex, sparsely pilose, the hairs simple or forked; blades ovate or subflabellate, 0.5–1.5 cm. long, 5–8 mm. broad, rounded at apex, the rhachis broadly winged throughout; segments 3 or 4 pairs, all simple or the lowest bifid, very broad, about 1.5 mm. wide, not undulate; hairs of the rhachis few, forked or stellate, 3- or 4-rayed, subsessile, those of the veins few or none, simple, elongate or rarely forked, the stalk short, the rays elongate, the marginal ones few, simple or rarely forked at base, over 0.5 mm. long, all the hairs very delicate; sori apical, the indusia much narrower than the segments, slightly immersed at base, the valves suborbicular, 1.2 mm. long and broad, rounded at apex, long-ciliate, the hairs simple.

TYPE: Theresopolis, Rio de Janeiro, Brazil, alt. 1,450 meters, *Brade* 9881 (Herb. Mus. Nac. Rio Jan. 20559) (isotype NY).

RANGE: Known only from the type collection.

17. *Hymenophyllum crispum* H. B. K. Nov. Gen. & Sp. 1: 26. 1815.

Sphaerocionium schiedeanum Presl, Hymenoph. 60. 1843. Type from Mexico, Schiede. Placed here from description.

Sphaerocionium crispum Klotzsch, Linnaea 1: 537. 1844 (excl. var. *amoenum*).

Sphaerocionium crispum var. *pilosum* Klotzsch, loc. cit. (the typical variety).

Hymenophyllum schiedeanum v. d. Bosch, Ned. Kruid. Arch. 4: 414. 1859.

Hymenophyllum orbignianum v. d. Bosch, Ned. Kruid. Arch. 5³: 191. 1863.

Type from Youracares, Bolivia, *D'Orbigny* 304. Placed here from description.

? *Hymenophyllum divaricatum* v. d. Bosch, op. cit. 190. Type from Venezuela, Moritz.

Hymenophyllum crispum var. *brasilianum* Fée, Crypt. Vasc. Brés. 1: 195. pl. 71, f. 2. 1869. Type from the Organ Mountains, Brazil, *Glaziou* 3347.

? *Hymenophyllum kaieteurum* Jenman, W. Ind. & Guiana Ferns 15. 1898. Type from the Potaro River, British Guiana, *Jenman*. There does not seem to be a specimen in the Jenman Herbarium at the New York Botanical Garden.

Hymenophyllum constrictum Christ, Bull. Herb. Boiss. II. 4: 939. 1904. Type from Costa Rica, *Wercklé* (isotype US).

Hymenophyllum brasilianum Rosenst. Hedwigia 46: 73. 1906.

Mecodium constrictum Copel. Phil. Journ. Sci. 67: 25. 1938.

Hymenophyllum elegantissimum auctt., non Fée.

Rhizomes filiform, 0.2 mm. in diameter, sparingly hairy; fronds prostrate or pendent, determinate; stipes 0.5–5 cm. long, filiform, 0.2–0.3 mm. in diameter, narrowly and inconspicuously alate at apex, sparingly pilose, the hairs simple or a few forked, delicate; blades ovate to linear, 5–18 cm. long, 1.5–5 cm. broad, the lowest pinnae reduced, the rhachis alate throughout, the wing conspicuously undulate-crispate; pinnae 10–25 pairs, spreading or ascending, 1–2.5 cm. long, 5–12 mm. broad, deeply pinnatifid, the costa broadly alate, the wing undulate; segments 2–5 pairs, simple or the lower rarely bifid, 1–1.5 (rarely 2) mm. broad, conspicuously undulate-crispate; hairs of the rhachis few, forked or stellate, 3-rayed, stalked, those of the veins few, forked or stellate, 3- or 4-rayed, stalked, delicate, the marginal ones few, simple or rarely forked at base, elongate, 0.5 mm. long or more, very rarely the rays again forked at apex; indusia mostly as broad as or broader than the segments, scarcely immersed at base, the valves suborbicular, 1.2–1.5 mm. long and broad, long-ciliate, the hairs simple, mostly 2-celled, and geniculate.

TYPE: Silla de Caracas, Venezuela, *Humboldt*.

RANGE: Jamaica, Mexico, Guatemala, Costa Rica, and Venezuela to Bolivia and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

JAMAICA: Blue Mountains, at elevations of 1,500 to 1,950 meters: *Maxon* 2746, 2755, 9707, 9720, 9820, 9840; *Maxon & Killip* 965; *Couch*; *Webster & Goldberg* 248; *Johnson*; *Hart* 203, 372.

MEXICO: Teotepec, Guerrero, *Hinton* 14306a.

GUATEMALA: Department of San Marcos, at elevations of 1,800 to 3,000 meters: *Standley* 66242; *Steyermark* 36060, 36444, 36780.

COSTA RICA: Irazú, *Standley* 35403. Colinegro, *Zeledón*. Las Nubes, *Standley* 38830.

COLOMBIA: Santa Elena, Medellín, Antioquia, *Henri-Stanislas* 1685.

PERU: Department of Cuzco, at elevations from 2,100 to 3,000 meters, *Bües* 719, 1813.

BOLIVIA: Tocarano Valley, *Herzog* 3831. Pelichuco, alt. 2,700 meters, *Williams* 2606 (NY, US).

BRAZIL: States of Rio de Janeiro, Santa Catherina, and Rio Grande do Sul: *Juergens* 135 (NY), s. n. (Rosenst. exs. 255) (NY, US), s. n. (Rosenst. exs. 159); *Brade* 6432 (NY, US); *Spannagel* 123 (NY), s. n. (US); *Luetzelburg* 6363.

17a. *Hymenophyllum crispum* var. *bipinnatisectum* Morton, var. nov.

A var. *typica* pinnulis usque ad 8-jugis, infimis profunde pinnatisectis differt.

Differs from the typical variety in having the pinnules up to 8 pairs, the lower deeply pinnatisect rather than simple or merely trifid.

Type in the U. S. National Herbarium, No. 1515594, collected at Alturas de Sieve, Department of Cuzco, Peru, at an elevation of 3,000 meters, June, 1924, by C. Bües (No. 1580). An additional specimen, collected at the same locality, is Bües 1528.

The present species, because of its undulate-crispate blades, could be confused only with *H. valvatum*, which, however, is much less strongly undulate and has a much stouter stipe (0.5–0.7 mm. in diameter, rather than 0.2–0.3 mm.), normally nonalate at apex. The blade of *H. valvatum* is usually broad and subtruncate at base.

The name *H. crispum* has been misapplied frequently to a conspicuously crispate, glabrous, West Indian plant of the section *Mecodium*, the proper name of which is doubtful, whereas the true *H. crispum* has, following Jenman, been passing erroneously as *H. elegantissimum* Fée, which is only one of the numerous forms of *H. hirsutum*.

18. *Hymenophyllum valvatum* Hook. & Grev. Icon. Fil. 2: pl. 219. 1831.

Hymenophyllum francavillei v. d. Bosch, Ned. Kruid. Arch. 4: 411. 1859. Type from Guadeloupe, Perrotlet.

Hymenophyllum platylobum v. d. Bosch, op. cit. 5¹: 189. 1863. Type from San Gaván, Peru, Lechler 2498.

? *Hymenophyllum producens* Fée, Crypt. Vasc. Brés. 1: 196. pl. 71. f. 4. 1869.

Type from the Organ Mountains, Brazil, Glaziou 3349. Referred here by Christensen, but it seems a doubtful synonym. Fée's description and figure are too poor to be conclusive.

Sphaerocionium valvatum Copel. Phil. Journ. Sci. 67: 31. 1938.

Rhizomes wide-creeping, 0.3–0.4 mm. in diameter; fronds erect, determinate; stipes 2–7.5 cm. long, 0.5–0.7 mm. in diameter, normally nonalate but occasionally alate at apex, sometimes on one side only, sparsely pilose, the hairs simple or forked; blades ovate-lanceolate, 4–15 cm. long, 3–5 (or rarely 8?) cm. broad, acuminate, the rachis alate throughout, the wing 0.6–1 mm. broad, lightly undulate; pinnae spreading, 8–23 pairs, ovate, 1.5–2.5 cm. long, 1–1.5 cm. broad, deeply pinnatifid, the costa broadly winged; segments 4–6 pairs, the lower mostly quadrifid, the upper simple, the ultimate segments 1.2–1.5 mm. broad, undulate-crispate; hairs absent from the veins and costae above, those of the rachis simple or forked, those of the veins beneath few, simple or a few once-forked at base or upwardly, the marginal ones few, simple or forked at base; sori numerous, borne on both apical and basal pinnules, the indusia not immersed at base, broader than the segments, the valves ovate, acutish, about 1.5 mm. long, 1 mm. broad, sparingly ciliate, the hairs all simple.

TYPE: Esmeraldas, Ecuador, alt. 1,200 meters, Jameson.

RANGE: Guadeloupe, Martinique, Colombia, Ecuador, Peru, Bolivia, and Brazil (?).

SPECIMENS EXAMINED:

MARTINIQUE: Pitons du Corbet, alt. 900 meters, Stehlé 2248, 3405.

GADELOUPE: Rivière Dauriac, alt. 780 meters, Stehlé 2052. Massif Central, Questel 1028.

COLOMBIA: Cali, El Cauca, alt. 2,000 meters, *Lehmann* 1979. Río Margua, Norte de Santander, alt. 900–1,240 meters, *Cuatrecasas* 13390.

ECUADOR: At elevations of 1,400 to 1,800 meters: *Jameson* 12 (NY). Anque, *Lehmann* 124. Río Palora, *Rimbach* 13, 77. Río Toachi, *Sodiro*.

BOLIVIA: Hacienda Simaco, on road to Tipuani, alt. 1,400 meters, *Buchtien* 5200 (NY, US). Songo, *Bang* 897.

19. *Hymenophyllum microcarpum* Desv. *Mém. Soc. Linn. Paris* 6: 333. 1827.

Hymenophyllum beyrichianum Kunze, *Linnaea* 9: 108. 1834. Type from Pampayacu, Peru, *Poeppig*.

Hymenophyllum organense Hook. *Sp. Fil.* 1: 90. *pl.* 32B. 1844. Type from the Organ Mountains, Brazil, *Gardner* 210.

Hymenophyllum pteropodium v. d. Bosch, *Ned. Kruid. Arch.* 5¹: 187. 1863.

Cotypes from Quito, Ecuador, *Cuming* 23 and *Jameson* 109.

Hymenophyllum lindigii Mett. *Ann. Sci. Nat. Paris V.* 2: 197. 1864. Type from Fusugasugá, Cundinamarca, Colombia, *Lindig* 122.

Hymenophyllum notabile Fée, *Crypt. Vasc. Brés.* 1: 193. *pl.* 69. *f.* 2. 1869.

Cotypes from Brazil, *Glaziou* 1714 and 2271.

Hymenophyllum contractile Sodiro, *Crypt. Vasc. Quit.* 22. 1893. Type from Nanegal, Ecuador, *Sodiro* (fragment US).

Hymenophyllum angustifrons Christ, *Bull. Herb. Boiss.* II. 4: 940. 1904.

Cotypes from Costa Rica, *Pittier* (Herb. Nat. Cost. 10984) (US), and Colombia, *Lehmann* 6414 (US).

Mecodium microcarpum Copel. *Phil. Journ. Sci.* 67: 25. 1938.

Sphaerocionium microcarpum Copel. *op. cit.* 34.

Rhizomes creeping, 0.3–0.5 mm. in diameter; fronds erect, determinate; stipes 3–9 cm. long, 0.5 mm. in diameter or more, terete at base, broadly alate upwardly, pilose, the hairs stellate, 3- or 4-rayed, stalked, the stalks inflated; blades ovate to ovate-lanceolate, 7.5–20 cm. long, 4–10 cm. broad, acuminate at apex, subtruncate at base, the rhachis broadly alate throughout; pinnae spreading or ascending, 12–14 pairs, adnate, ovate-lanceolate, 2–5 cm. long, 9–18 mm. broad, deeply pinnatifid, the costa broadly alate; pinnules 4–8 pairs, usually deeply pinnatifid (rarely only bifid), the segments 2 or 3 pairs, the ultimate segments narrow, 1–1.5 mm. broad; hairs lacking on upper side of the frond, those of the rhachis stellate, 3–5-rayed, stalked, coarse, those of the veins beneath forked or stellate, 3-rayed, stalked or sessile, or often simple, those of the margins almost all simple, reflexed, a few basally forked; sori borne only on the upper pinnules, the valves ovate to oblong, 1.2–1.4 mm. long, about 0.8 mm. broad, acutish, entire or denticulate, naked or sparingly ciliate, the hairs short, simple.

TYPE: Hispaniola, without collector's name (photograph US).

RANGE: Greater Antilles; Guatemala to Bolivia and Brazil.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Sierra Maestra, at elevations of 1,200 to 1,725 meters: *Morton & Acuña* 3706; *Ekman* 7173; *Clément* 1398 p.p.

DOMINICAN REPUBLIC: Barahona, *Fuertes* 1448b, 1510 p.p.

HAITI: Mountains, at elevations of 1,150 to 1,450 meters: *Ekman* H 2547, H 4869, H 5452, H 7377; *Leonard* 4531; *Cook* 30.

JAMAICA: Blue Mountains, at elevations of 1,000 to 1,500 meters: *Hart* 248; *Maxon* 1233, 2779; *Orcutt* 5279; *D. S. Johnson* 1; *J. P.* 73; *Watt* 167; *Chrysler* 1746.

PUERTO RICO: Sierra de Naguabo, Mount Morales, and Alta de Bandera, at elevations of 600 to 1,000 meters: *E. G. Britton* 7680; *Shafer* 2329, 3312, 3355; *Britton & Marble* 1075; *Hess* 308; *Stevenson* 1552; *Chase* 6469b.

GUATEMALA: Department of Alta Verapaz, at elevations of 750 to 1,600 meters: *von Tuerckheim* 650, II. 1984, II. 1985; *Johnson* 151, 534, 811, 926;

Hatch & Wilson 91, 98, 183, 199, 269; *Standley* 71661; *Wilson* 216, 220, 233; *Pittier* 317; *Cook & Griggs* 60.

NICARAGUA: Omotepec, *C. Wright*.

COSTA RICA: Common at elevations of 1,100 to 1,900 meters: *J. J. Cooper* (Donn. Smith 6020); *Tonduz* (Herb. Nat. Cost. 13341); *Wercklé*; *Valerio* 42; *Torres* 94; *Maxon* 238; *Standley* 33639, 39692, 39744, 39750, 39875, 39881.

PANAMA: Region of Volcán Chiriquí, at elevations of 1,400 to 1,650 meters: *Maxon* 5566; *Killip* 5048, 5397.

VENEZUELA: Colonia Tovar, *Fendler* 33; *Moritz* 269 (NY).

COLOMBIA: Departments of Magdalena, Santander, Cundinamarca, Antioquia, El Cauca, El Valle, Tolima, El Chocó, and Caquetá, at elevations of 200 to 3,000 meters: *H. H. Smith* 2249; *Dawe* 323; *Killip & García* 35645; *Ariste Joseph*; *Henri-Stanislas* 1655; *Apollinaire & Arthur* 27 p. p.; *Archer* 1332; *Mutis* 3207; *Holton* 73 (NY); *Schlim* 857 (G); *Killip & Hazen* 11141, 11148 (NY, US); *Killip & Smith* 16143 (G, NY, US); *Killip* 7719, 11228 (NY, US), 35267; *Lehmann* 1978, 2210, 3055, B. T. 745 (NY); *Cuatrecasas et al.* 12449.

ECUADOR: At elevations of 360 to 2,100 meters: *Mexia* 6928, 6931 (G, US); *Skutch* 4461; *Rimbach* 78; *Jameson* 219 (G), s. n. (US).

PERU: Departments of Junín and Cuzco, at elevations of 1,300 to 2,700 meters: *Bües* 1911, 1913, 2018, 2035; *Herrera* 3010; *Schunke* 463, 1491, 1559, A 244; *Vargas* 3294.

BOLIVIA: At elevations of 1,100 to 1,800 meters: *Tate* 1061 (NY); *Rusby* 137 (G, NY, US); *Bang* 555 (NY); *Williams* 1234 (NY, US); *Buchtien* 3564, 5198 (G, NY, US), 5213, 5292, 5931.

BRITISH GUIANA: Mount Roraima, *im Thurn* 206, 371; *Tate* 499 (NY).

BRAZIL: States of Rio de Janeiro, São Paulo, and Paraná: *Brade* 8356 (NY); *Hoehne* 752 (NY); *Wacket* (Rosenst. exs. 65); *Dusén* 6773; *Rose & Russell* 20771 (NY, US).

The form of southern Brazil described as *H. notabile* and *H. organense* is large and has the stipe only slightly alate at apex, but it does not appear sufficiently distinct to merit recognition. Forms with nearly nonalate stipes occasionally occur elsewhere, e. g., *Schunke* 1491 and 1559, cited above.

19a. *Hymenophyllum microcarpum* var. *lanceolatum* Morton, var. nov.

A var. *typica* laminis lineari-lanceolatis, angustissimis, pinnis simplicioribus, inferioribus pinnatifidis, segmentis basalibus bifidis, alteris simplicibus differt.

Differs from the typical variety in having the blades linear-lanceolate, very narrow (15–22 mm. broad, 8–10 cm. long), the pinnae less divided, the lower simply pinnatifid, the basal segments bifid, and the others simple.

Type in the U. S. National Herbarium, No. 1643791, collected at Vara Blanca de Sarapiquí, on the north slope of the Central Cordillera, between Volcán Poás and Volcán Barba, Costa Rica, at an elevation of 1,340 meters, February 1938, by Alexander F. Skutch (No. 3639).

20. *Hymenophyllum consanguineum* Morton, sp. nov.

Rhizoma longe repens, crassum, dense ferrugineo-villosum; frondes erectae, definitae, stipitibus elongatis, nonalatis, parce pilosis, pilis simplicibus vel stellatis pauciradiatis; laminae ovatae vel ovato-lanceolatae, magnae, tripinnatifidae vel quadripinnatifidae, rhachibus ubique alatis; pinnae ovatae vel lanceolatae, sessiles, basi inferiore non alatae, pinnulis alte partitis, segmentis ultimis linearibus, angustis, interdum subundulatis; pili supra nulli, subtus in rhachibus simplices vel furcati, crassi, vel pauci stellati, 3-radiati, breviter stipitati, in venis simplices vel furcati, in marginibus pauci, simplices, reflexi; valvae ovatae, subacutae, glabrae vel parce ciliatae, pilis simplicibus.

Rhizomes long-creeping, 0.7–1 mm. in diameter, densely ferruginous-villous; fronds erect, determinate; stipes elongate, 5–10 cm. long, 0.6–1 mm. in diameter,

nonalate throughout, pilose, the hairs partly simple, coarse, partly stellate, few-rayed, stalked; blades ovate to ovate-lanceolate, 8–15 cm. long, 6–10 cm. broad, acuminate at apex, tripinnatifid to quadripinnatifid, the rhachis alate throughout, slightly flexuous; pinnae spreading, 9–15 pairs, ovate to lanceolate, 3–6 cm. long, 1.5–2.5 cm. broad, the lowest with nonalate lower base, the costa narrowly winged; segments 7–10 pairs, ovate to lanceolate, deeply once or twice parted, the ultimate segments linear, narrow, about 1 mm. broad; hairs confined to the lower side of the frond, those of the rhachis simple or forked, coarse, or a few stellate, 3-rayed, short-stalked, those of the veins simple or forked (either basally or upwardly), the marginal ones all simple or basally forked, coarse, reflexed; sori numerous, the valves ovate to oblong, acutish, 1.4–1.8 mm. long, glabrous or sparingly ciliate, the hairs all simple.

Type in the U. S. National Herbarium, No. 676067, collected along upper Caldera River, near "Camp I," Holcomb's Trail, above El Boquete, Province of Chiriquí, Panama, in humid forest between 1,450 and 1,650 meters elevation, March 22–24, 1911, by William R. Maxon (No. 5624).

RANGE: Costa Rica and Panama, at elevations of 1,450 to 2,268 meters.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Santa Clara de Cartago, *Maxon & Harvey* 8212.

PANAMA: Type locality, *Killip* 5268. Between Alto de las Palmas and top of Cerro de la Horqueta, Chiriquí, *Maxon* 5447a, 5453, 5470.

The present species is perhaps too closely allied to *H. microcarpum*, from which it may be distinguished chiefly by its nonalate stipes. Also, the lower pinnae are nonalate at the lower base. *Hymenophyllum surbrigidum* is also related, but it may be distinguished by the smaller, rounded indusia and the rhachis being nonalate toward base.

21. *Hymenophyllum glaziovii* Baker, in Hook. Icon. Pl. 17: pl. 1612. 1886.

Rhizomes filiform, 0.2–0.3 mm. in diameter; fronds pendent; stipes 2–7.5 cm. long, 0.2–0.4 mm. in diameter, very narrowly and inconspicuously alate toward apex, the wing 0.1 to rarely 0.4 mm. broad, sparingly pilose, the hairs mostly stellate, 3-rayed, or some merely forked; blades linear-lanceolate, 6–15 cm. long, 1.5–3 cm. broad, acuminate at apex, the rhachis narrowly alate throughout; pinnae ascending, 9 or 10 pairs, ovate-lanceolate, 1–3 cm. long, 3–12 mm. broad, narrowed to a petiole-like base, deeply pinnatifid, the costal wing about 0.4 mm. broad; segments 3 or 4 pairs, the lowest superior one up to 11 mm. long, simple on small plants, mostly bifid or quadrifid, the upper ones simple, the ultimate segments linear, up to 4 mm. long, about 1 mm. broad; hairs of the rhachis stellate, mostly 4-rayed, short-stalked, those of the veins few, stellate, 3- or 4-rayed, short-stalked, or a few forked, the marginal ones variable, mostly twice-forked or bistellate, the primary branches about 0.2 mm. long, the rays elongate, about 0.5 mm. long; sori borne on all segments of fertile pinnae, the indusia about as broad as the segments, deeply immersed at base, the valves suborbicular, 1.3–1.5 mm. long, about 1.5 mm. broad, glabrous externally, long-ciliate, the hairs mostly simple, 2-celled and geniculate, sometimes furcate.

TYPE: Rio de Janeiro, Brazil, *Glaziou* 7890.

RANGE: Brazil.

SPECIMENS EXAMINED:

BRAZIL: Santos, São Paulo, *Mosén* (Regnell 3101) (G, US).

22. *Hymenophyllum hirtellum* Swartz, Journ. Bot. Schrad. 1800²: 101. 1801.

Trichomanes hirtellum Poir. in Lam. Encycl. 8: 76. 1808.

Sphaerocionium hirtellum Presl, Hymenoph. 34. 1843.

Rhizomes wide-creeping, 0.4–0.5 mm. in diameter, densely red-pilose; fronds determinate; stipes 3–10 cm. long, 0.3–0.7 mm. in diameter, very narrowly and

inconspicuously alate at very apex, densely, conspicuously, and persistently pilose, the hairs forked or stellate and 3-rayed; blades ovate to ovate-lanceolate, 7–22 cm. long, 3–7 cm. broad, acute at apex, narrowed toward base, the rhachis narrowly alate throughout, the wing about 0.25 mm. broad; pinnae ascending, 7–16 pairs, ovate-lanceolate to linear-lanceolate, 2–7 (rarely 10) cm. long, 10–18 mm. broad, acuminate at apex, excavate at lower base, adnate at upper base, deeply pinnatisect; pinnules 5–10 pairs, ovate to oblong, 1–1.5 (rarely 2) cm. long, the lower deeply pinnatifid, with 2 or 3 pairs of segments, the ultimate segments linear, 2.5–5 mm. long, about 1 mm. broad; hairs of the rhachis stellate, stalked, 4- or 5-rayed, those of the veins scattered, forked or stellate and 3- or 4-rayed, stalked, the marginal ones mostly forked or twice-forked, the primary branches about 0.25 mm. long, the rays 0.25–0.35 mm. long, a few stellate, 3-rayed, or bistellate; sori numerous, borne on most of the segments of the pinnae, the indusia about as broad as the segments, not or scarcely immersed at base, the valves suborbicular, about 1 mm. long and broad, rounded, glabrous externally, long-ciliate, the hairs mostly forked at base, the branches simple, 2-celled and geniculate, or often furcate.

TYPE: Jamaica, *Swartz* (fragment US).

RANGE: Cuba, Hispaniola, and Jamaica.

SPECIMENS EXAMINED:

CUBA: At elevations of 750 to 1,000 meters, in the Trinidad Mountains and Sierra Maestra: Buenos Aires, Las Villas, *Jack* 8057. Arroyo Jiménez, Oriente, *Ekman* 14798. Loma del Gato, Oriente, *Clément* 1398 p.p.; *Hioram & Clément* 6510; *Ekman* 6987.

HAITI: Massif de la Selle, alt. 2,000 meters, *Ekman* H 1490.

DOMINICAN REPUBLIC: Loma la Vieja, Constanza, alt. 2,075 meters, *Ekman* H 14035. Barahona, *Fuertes* 1510 p.p.

JAMAICA: Parishes of St. Thomas, St. Catherine, Portland, and St. Andrew; at low elevations, 300–900 meters: *Maxon* 1543, 1565, 1915, 2247, 2430, 2433, 8845, 8856, 8959, 9061, 9119, 10583; *Maxon & Killip* 177, 773, 777; *Underwood* 1268; *Clute* 123; *Wilson*.

Although this species has been assigned a wide range by various authors, it appears to be restricted to the Greater Antilles.

23. *Hymenophyllum maxonii* Christ, in sched.

Fronde pendulae, indefinitae, stipitibus apice valde alatis, sparse pilosis, pilis elongatis, simplicibus vel furcatis, pluricellularibus; laminae ovatae vel oblongae, apice acutae, basi non reductae, rhachibus ubique alatis; pinnae imbricatae, adscendentes, subrhombae, acutae vel obtusae, alte pinnatifidae, pinnulis 4–8-jugis, basalibus pinnatifidis, segmentis ultimis linearibus, non undulatis; pili in rhachibus stellati, stipitati, 3–6-radiati, in venis paucis, plerumque furcati vel stellati, longe stipitati, 3–5-radiati, in marginibus plerumque bis-furcati, vel raro semel furcati, pauci stellati, 3-radiati; indusia basi leviter immersa, segmentis latiora, valvis suborbicularibus, externe glabris, longe ciliatis.

Rhizomes wide-creeping, 0.2–0.3 mm. in diameter, densely red-pilose; fronds pendent, determinate; stipes variable in length, 3–9.5 cm. long, 0.4–0.5 mm. in diameter, conspicuously alate at apex, sparsely pilose, the hairs elongate, simple or bifid, the stalk mostly 3 cells long, the rays 2 cells long; blades ovate to oblong, 6–13 cm. long, 2.5–4.5 cm. broad, acute at apex, not or scarcely reduced at base, the rhachis alate throughout, the wing not undulate; pinnae ascending, imbricate, 9–17 pairs, subrhombic, 1.5–2.5 cm. long, 8–13 mm. broad, adnate, acute or obtuse at apex, somewhat excavate at lower base, deeply pinnatifid, the costa broadly alate; pinnules 4–8 pairs, the basal ones pinnatifid, the superior basal one with the veins mostly twice-forked, the ultimate segments broadly linear, up to 6 mm. long,

1-1.5 mm. broad; hairs lacking on the leaf surfaces, those of the rhachis stellate, stalked, 3-6-rayed, those of the veins scattered, mostly forked or some stellate, long-stalked, 3-5-rayed, the marginal ones mostly twice-forked, the primary branches about 0.25 mm. long, the rays 0.25-0.5 mm. long, or some only once-forked, a few stellate, 3-rayed; sori borne on all or merely the apical segments, the indusia shallowly immersed at base, broader than the segments, the valves suborbicular, rounded, 1.2-1.5 mm. long and broad, glabrous externally, long-ciliate, the hairs forked at base or upwardly.

Type in the U. S. National Herbarium, No. 473307, collected on trail from Senahú to Actalá, Department of Alta Verapaz, Guatemala, on tree trunk in humid forest, January 17, 1905, by William R. Maxon and Robert Hay (No. 3326).

RANGE: Departments of Alta Verapaz and Chiquimula, Guatemala, at middle elevations.

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Type locality, *Maxon & Hay* 3328, 3335. Chicoyonito, *Donnell Smith* 1548. Montaña Tajurañ, Chiquimula, *Steyermark* 30787.

23a. *Hymenophyllum maxonii* var. *angustius* Morton, var. nov.

A var. *typica* frondibus plerumque longioribus et angustioribus, laminis lanceolatis vel linearibus, pinnis non vel vix imbricatis, simplicioribus differt.

Differs from the typical variety in having the fronds mostly longer (up to 20 cm. long) and relatively narrower, the blades lanceolate to linear, and the pinnae less divided, not or scarcely imbricate.

Type in the U. S. National Herbarium, No. 1081923, collected on road from Chamá to Cobán, Department of Alta Verapaz, Guatemala, at 900 meters elevation, August 1, 1920, by Harry Johnson (No. 532).

RANGE: Department of Alta Verapaz, Guatemala, at elevations of 900 to 1,200 meters.

ADDITIONAL SPECIMENS EXAMINED:

GUATEMALA: Cobán, *Johnson* 918, 923. Río Cobán, *H. Johnson* 705. Quebradas Secas, *H. Johnson* 817. Cerro Sillab, *Hatch & Wilson* 176, 181. Chicoyou, *Hatch & Wilson* 239; Finca Los Alpes, *C. L. Wilson* 339. Pansamalá, *von Tuerckheim* 647 p.p.

Hymenophyllum maxonii is a critical species, intermediate between *H. hirtellum*, *H. hirsutum*, and *H. trapezoidale*, but it can hardly be included in any of them without destroying their homogeneity. The most closely allied is probably *H. hirtellum*, under which name the present species has been passing.

24. *Hymenophyllum subrigidum* Christ, Bull. Herb. Boiss. II. 5: 260. 1905.

Hymenophyllum atrovirens Christ, Bull. Herb. Boiss. II. 4: 941, 1904, not Colla (1844), nor Fée (1866).

Sphaerocionium subrigidum Copel. Phil. Journ. Sci. 67: 34. 1938.

Rhizomes 0.5 mm. in diameter, densely red-pilose; fronds determinate; stipes 1.5-10 cm. long, 0.3-0.7 (1) mm. in diameter, nonalate throughout, red-pilosulous, the hairs simple or forked, several-celled; blades ovate to ovate-lanceolate, 4.5-23 cm. long, 3-10 cm. broad, the rhachis narrowly alate upwardly, nonalate at base; pinnae often reflexed, 9-14 pairs, ovate-lanceolate, 1.5-6.5 cm. long, 1-2 cm. broad, acuminate at apex, sessile, the lower adnate at upper base, not adnate at lower, deeply pinnatisect; pinnules 6-8 pairs, bipinnatifid, the ultimate segments short, narrow, 0.6-0.7 mm. broad; hairs of the rhachis forked or stellate, 3- or 4-rayed, short-stalked, absent on the veins and costae above, those of the veins and costae beneath simple or forked at base, coarse, the marginal simple or forked at base, mostly reflexed, coarse; sori numerous on the apical pinnae, not at all immersed at base, the valves semicircular, 1 mm. long and broad, rounded at apex, ciliate, the hairs all simple.

TYPE: Costa Rica, *Wercklé* s. n. (isotype US).

RANGE: Costa Rica and Panama, at elevations of 1,500 to 2,250 meters.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Cerro de las Caricias, *Standley & Valerio* 52270. San Gerónimo, *Wercklé* 585. Las Nubes to La Palma, *Knight* 29373. Cerro de la Carpintera, *Standley* 35659. Santa Clara de Cartago, *Maxon & Harvey* 8202, 8237; *Lankester* 708; *Torres* 204.

PANAMA: Río Piarnasta, Chiriquí, *Killip* 5404 p. p. East of Río Caldera, Chiriquí, alt. 1,650 meters, *Killip* 5495.

25. *Hymenophyllum ruizianum* (Klotzsch) Kunze, Bot. Zeit. 1847: 199. 1847.

Sphaerocionium ruizianum Klotzsch, Linnaea 18: 535. 1844.

Hymenophyllum pastoense Hook. in Hook. & Bak. Syn. Fil. 67. 1867. Type from Pasto, Nariño, Colombia, *Jameson*.

Rhizomes creeping, 0.6–1 mm. in diameter; fronds pendent, determinate; stipes 10 (rarely only 7)–16 cm. long, 0.7–1.6 mm. in diameter, nonalate, densely hairy, the hairs simple or forked, elongate, several-celled; blades ovate-oblong, 19–28 cm. long, 9–17 cm. broad, acuminate, the rhachis alate upwardly, nonalate toward base; pinnae spreacing or drooping, 10–13 pairs, ovate-lanceolate, 4.5–8.5 long, 1.5–4 cm. broad, the lower petiolulate, long-acuminate, tripinnatifid, divided at base nearly to costa; pinnules 9–12 pairs, the lower deeply twice-parted, the ultimate segments narrow, 0.5–0.7 mm. broad; hairs of the rhachis stellate, 3- or 4-rayed, short-stalked, those of the veins forked or stellate, 3–5-rayed, short-stalked, a few simple, the marginal ones simple or forked at base, reflexed; sori small, numerous on the apical segments of the pinnae, the valves 0.6–1 mm. long, 1–1.2 mm. broad, broader than the segments, glabrous externally, ciliate, the hairs simple, often 2-celled and geniculate.

TYPE: Peru, *Ruiz* 85.

RANGE: Colombia, Ecuador, Peru, and Bolivia, at elevations of 1,700 to 3,600 meters.

SPECIMENS EXAMINED:

COLOMBIA: Alto de Tabano, Nariño, *André* 2977. Páramo Rico, Santander, *Killip & Smith* 17787 (G, NY, US). Páramo de San Antonio del Bordoncillo, Putumayo, alt. 3,250 meters, *Cuatrecasas* 11700.

ECUADOR: *Spruce* 5421 (NY). Not typical.

PERU: Playapampa, Huánuco, *Macbride* 4516. Department of Cuzco, *Herrera* 2142, 2144; *Bües* 722, 819, 1544, 1576, 1918, 1942; *Vargas* 3295.

BOLIVIA: Kuriloma, Cochabamba, *Steinbach* 9260 (G, NY). Between Soratá and Mapiri, *Cárdenas* 1044 (G).

26. *Hymenophyllum trapezoidale* Liebm. Dansk. Vid. Selsk. Skrivt. V. 1: 293. 1849.

Hymenophyllum ciliatum var. *nudipes* Kunze, Linnaea 18: 351. 1844. Based on a plant collected at Cuesta Grande de Jalacingo, Veracruz, Mexico, by *Schiede*, and listed by *Schlechtendal* and *Chamisso* as "810: *Hymenophyllum* affine *ciliato* Sw."⁸ This variety was referred by *Fournier* to *H. hirsutum*, but that seems impossible from the brief description. The collection is probably the same as that on which *H. apterum* was based.

Hymenophyllum apterum v. d. Bosch, Ned. Kruid. Arch. 5: 194. 1863. Type from Cuesta Grande de Jalacingo, Veracruz, Mexico, *Schiede*.

Fronds pendent, determinate; stipes 1.5–18 cm. long, (0.3) 0.4–0.6 mm. in diameter, nonalate, sparsely pilose, the hairs simple or forked; blades linear or linear-lanceolate, 12–30 cm. long, 2–6 cm. broad, long-attenuate at apex, the rhachis alate above middle, nonalate below; pinnae ascending, 10–25 pairs, ovate-

⁸ Linnaea 5: 619. 1830.

lanceolate to subrhombic, 1-4 cm. long, 7-18 mm. broad, acuminate at apex, adnate at upper base, the upper adnate and decurrent at lower base, deeply pinnatifid; segments 4-7 pairs, the upper basal deeply pinnatifid, the veins 3 or 4 times dichotomous, the ultimate segments broadly linear, 1-1.5 mm. broad; hairs of the rhachis stellate, 3- or 4-rayed, stalked, those of the veins stellate, 3- or 4-rayed, or forked, a few simple or basally forked, the marginal ones variable, mostly forked or stellate, 3-rayed, or some twice-forked, or sometimes almost all simple or basally forked; indusia rather deeply immersed at base, the valves 1-1.4 mm. long, not broader than the segments, glabrous externally, long-ciliate, the hairs simple, often 2-celled and geniculate.

TYPE: Chinantla, Mexico, *Liebmann*.

RANGE: Mexico, Surinam, and Colombia.

SPECIMENS EXAMINED:

MEXICO: Jalapa, Veracruz, alt. 1,200 meters, *Pringle* 8157; *Johnson*. Mirador, Veracruz, alt. 1,000 meters, *Purpus* 164, 165, 166. Zacuapan, Veracruz, *Purpus* 1985. Sierra de Ocuila, Morelos, *Lyonnet* 2858. Mesón Viejo, Temascaltepec, Mexico, alt. 2,830 meters, *Hinton* 3268. Santa María, Choapam, Oaxaca, alt. 1,500 meters, *Mexia* 9277 p. p. Cerro de Cuhuatepetl, Puebla, alt. 3,800 meters, *Santos* 3351.

COLOMBIA: *Mutis* 3186, 3193. Páramo Rico, Santander, *Killip & Smith* 17220 (NY, US), 17839 (G, NY, US). Quebrada de Pais, Santander, *Killip & Smith* 18773 p. p. (NY). Cruz Verde, Cundinamarca, *Apollinaire & Arthur* 10. Usaquén, Cundinamarca, *Guevara A.* A34. Boquerón de San Francisco, near Bogotá, Cundinamarca, *Lehmann* 2442. Santa Elena, Medellín, Antioquia, *Henri-Stanislas* 1688c.

SURINAM: 2 km. south of East Ridge, Tafelberg, *Maguire* 24579.

The present species is close to *H. hirsutum*, but is a larger plant with stipe and lower part of rhachis essentially nonalate and with simpler marginal hairs. It is one of the few species showing a strikingly disjunct distribution.

27. *Hymenophyllum latifrons* v. d. Bosch, Ned. Kruid. Arch. 4: 407. 1859.

Rhizomes long-creeping, 0.2 mm. in diameter; fronds pendent; stipes filiform, 0.5-1.5 cm. long, 0.2 mm. in diameter, alate at apex, deciduously hirsute, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 1- or 2-celled; blades ovate to linear, 3.5-17 cm. long, 1.5-3 cm. broad, rounded or acutish at apex, the rhachis broadly alate throughout, the wing mostly 1.5 mm. broad on either side; pinnae ascending, 7-20 pairs, either all simple and linear, 2.5-3 mm. broad, or the lower bifid or sometimes shallowly pinnatifid, with two upper lobes and 1 lower; hairs of leaf surfaces and veins scattered, all stellate, long-stalked, 3-6-rayed, those of the margins stellate, 4-6-rayed, or bistellate, long-stalked, the stalk 0.5-0.7 mm. long; indusia narrower than the segments, scarcely immersed at base, the valves roundish, about 1.2 mm. long, 1.5 mm. broad, glabrous on the surfaces, ciliate, the hairs partly simple, mostly stellate, long-stalked.

TYPE: Guadeloupe, *Perrottet*.

RANGE: Guadeloupe, Martinique, St. Vincent, and Dominica, in rain-forests at elevations from 600 to 1,400 meters.

SPECIMENS EXAMINED:

GADELOUPE: Grande Découverte, *Duss* 4265.

DOMINICA: Morne Trois Pitons, at summit, *Hodge* 1412.

MARTINIQUE: Montagne Pelée, *Duss* 1519 (fide Hodge).

ST. VINCENT: Jenman Herb. (fide Hodge).

Dr. W. H. Hodge in his study of Dominica ferns gave a discussion and fine illustration of this species (*Amer. Fern Journ.* 31: 125-126. pl. 2. 1941).

28. *Hymenophyllum antillense* (Jenm.) Jenm. Bull. Bot. Dept. Jamaica 18: 6. 1890.

Hymenophyllum lineare var. *antillense* Jenm. Journ. Bot. 17: 258. 1879.

Sphaerocionium antillense Copel. Phil. Journ. Sci. 67: 32. 1938.

Rhizomes creeping, filiform; fronds pendent, indeterminate; stipes 3–4 cm. long, filiform, about 0.1 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 1- or 2-celled; blades linear, 11–24 cm. long, 12–22 mm. broad the rhachis straight, nonalate below, narrowly alate upwardly; pinnae 8–27 pairs, the lower distant, petiolulate, the middle sessile, the upper adnate, subcuneate in outline, 8–20 mm. long, 4–8 mm. broad, deeply pinnatifid, the segments mostly 1 or 2 pairs (or some pinnae merely bifid), linear, all 1-nerved, about 1 mm. broad; hairs few on leaf surfaces, abundant on veins and margins, all stellate (or some of the marginal bistellate), stalked, 3–6-rayed, the rays about 0.25 mm. long; sori narrower than the segments, the indusia deeply immersed, 0.6–0.7 mm. long and broad, rounded, entire, long-ciliate, the hairs stellate, stalked.

TYPE: Jamaica, *Jenman* 85 (fragment and photograph US).

RANGE: Jamaica and British Guiana.

ADDITIONAL SPECIMEN EXAMINED:

BRITISH GUIANA: Upper slopes of Mount Roraima, *im Thurn* 200.

No material quite matching the type has been seen, although the British Guiana specimen cited above agrees fairly well. The species is a critical one and much more material is needed to determine its real status.

29. *Hymenophyllum hemipteron* Rosenst. Repert. Sp. Nov. Fedde 22: 4. 1925.

Hymenophyllum hemipteron f. *acropteron* Rosenst. loc. cit. Type from La Palma, Costa Rica, *A. & C. Brade* 851 (fragment US).

Hymenophyllum hemipteron f. *minor* Rosenst. loc. cit. Type from San Gerónimo, Costa Rica, *A. & C. Brade* 620 (fragment US). An atypical, depauperate form.

Sphaerocionium hemipteron Copel. Phil. Journ. Sci. 67: 31. 1938.

Rhizomes creeping, about 0.15 mm. in diameter; fronds pendent, determinate; stipes 0.5–5 cm. long, filiform, about 0.2 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, elongate, 2- or 3-celled, a few forked, the branches elongate, 2- or 3-celled; blades ovate to lanceolate, 1.5–9 cm. long, 1.3–2 cm. broad, the rhachis nonalate at base or nearly throughout, not flexuous; pinnae 5–14 pairs, the lower petiolulate, deeply pinnatifid; segments 3–5 pairs, the lower simple or mostly bifid (rarely some of them trifid), the ultimate lobes 1 mm. broad or less; hairs of leaf surfaces, veins, and margins abundant, all stellate (or some of the marginal bistellate), stalked, 3–5-rayed; sori minute, narrower than the segments, the indusia slightly immersed at base, the valves about 0.5 mm. long and 0.6 mm. broad, stellate-pilose externally, long-ciliate, the hairs stellate, stalked.

TYPE: Tablazo, Costa Rica, *A. & C. Brade* 621 (fragment US).

RANGE: Costa Rica and Panama.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: La Palma, alt. 1,500 meters, *Jiménez* 593; *Knight*; *Brade* 852; *Standley* 33044. Vara Blanca, alt. 1,600–1,700 meters, *Maxon & Harvey* 8358. Santa Clara de Cartago, alt. 1,950 meters, *Maxon & Harvey* 8172, 8187, 8193, 8236, 8239; *Lankester* 664.

PANAMA: Region of Volcán Chiriquí, alt. 1,650–1,800 meters, *Killip* 5264, 5270, 5280; *Cornman* 1204.

30. *Hymenophyllum elegantulum* v. d. Bosch, Ned. Kruid. Arch. 4: 408. 1859.

Hymenophyllum pulchellum sensu Hook. Sp. Fil. 1: 91. 1846, p. p., not Schlecht. & Cham., and op. cit. pl. 33A. 1846.

Hymenophyllum buchtienii Rosenst. Repert. Sp. Nov. Fedde 5: 229. 1908.

Type from Unduavi, North Yungas, Bolivia, *Buchtien* 897 (isotype US).

Sphaerocionium elegantulum Copel. Phil. Journ. Sci. 67: 32. 1938.

Sphaerocionium buchtienii Copel. op. cit. 31.

Rhizomes creeping, filiform, 0.15–0.2 mm. in diameter; fronds pendent, indeterminate; stipes 2–6 cm. long, filiform, about 0.25 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, 2- or 3-celled, a few forked, the branches elongate, 2- or 3-celled; blades extremely variable, typically linear, 10–30 cm. long, 2–4 cm. broad, the rachis filiform, nonalate throughout or sometimes alate upwardly, sparingly pilosulous; pinnae 10–30 pairs, subsessile, sessile, or slightly adnate at base, normally rhombic-ovate, 1–2 cm. long, 8–13 mm. broad at base, obtuse or acutish at apex, deeply pinnatifid with 4–6 pairs of lobes, the basal superior lobes with twice-dichotomous veins, the upper ones with simple veins, the ultimate segments 1–1.5 mm. broad, or some of the pinnae elongate and frondlike, up to 17 cm. long, fully pinnate-pinnatifid, the rachises nonalate, the pinnules up to 11 pairs, these similar to normal pinnae; hairs of leaf surfaces, veins, and margins all stellate (or the marginal sometimes bistellate), stalked, 4–7-rayed; veins not winged on either side of the frond; indusia not or only slightly immersed, the valves broader than long, 1–1.5 mm. broad, stellate-pubescent externally, ciliate, the hairs rather long-stalked.

TYPE: Based on Hooker's plate 33A (Sp. Fil., vol. 1). No description was given by van den Bosch, but the species is validly published by the reference to a plate with analyses. Hooker's plate was based on a specimen collected by Jameson at Pillzhum, Ecuador (isotype NY).

RANGE: Cuba, Hispaniola, Mexico, Guatemala, Costa Rica, Panama, and Colombia to Bolivia.

ADDITIONAL SPECIMENS EXAMINED:

CUBA: Crest of Sierra Maestra, between Pico Turquino and La Bayamesa, alt. 1,350 meters, *Morton & Acuña* 3558.

DOMINICAN REPUBLIC: Valle Nuevo, Cordillera Central, alt. 2,400 meters, *Ekman* H 13834a, H 13834b. Sierra de Ocoa, alt. 2,300 meters, *Ekman* H 12004.

MEXICO: At elevations of 1,500 to 2,800 meters: Teotepec, Guerrero, *Hinton* 14306. Cuicatlan, Oaxaca, *Conzatti & Gonzalez* 720; *Conzatti & Gomez* 3477. Volcán Tacana, Chiapas, *Matuda* 2908.

GUATEMALA: Santa Elena, Chimaltenango, alt. 2,400–2,700 meters, *Skutch* 286. Todos Santos, alt. 3,000 meters, *Nelson* 3633.

COSTA RICA: Turrialba, alt. 2,600 meters, *Pittier* (Donn. Sm. 7490; Herb. Nac. Cost. 12359).

PANAMA: Region of Volcán Chiriquí, at elevations from 1,650 to 2,268 meters: *Mason* 5457, 5468, 5491, 5632.

COLOMBIA: Departments of Antioquia, Caldas, Cundinamarca, Santander, and Tolima, at elevations from 2,800 to 3,800 meters: *Ariste Joseph*; *Mutis* 3189, 3197, 3198, 3209; *Apollinaire & Arthur* 141; *Wallis*; *André* 1295 (G, NY, US), 2201 (NY); *Mayor* 73; *Killip & Hazen* 9458 (NY, US); *Pennell & Hazen* 10081 (NY, US).

ECUADOR: Papallacta, alt. 3,200 meters, *Mille* p. p. (NY). Oyacachi, *Sodirop* p. p. (NY). Pichincha, alt. 3,000 and 3,400 meters, *Mille*; *Heilborn* 700.

PERU: Michihuañunca, Cuzco, alt. 3,000 meters, *Bües* 720.

BOLIVIA: Unduavi, *Buchtien* 104 (G, NY), 2745 (G, US).

The West Indian specimens referred here are depauperate and atypical. Typical material of *H. elegantulum* can be distinguished from *H. antillense* and *H. hemipteron* by having the lower pinnae sessile. However, the following variety connects these species in this character.

30a. *Hymenophyllum elegantulum* var. *petiolulatum* Morton, var. nov.

A var. *typica* pinnis infimis petiolulatis differt.

Differs from the typical variety in having the lowest pinnae petiolulate.

Type in the U. S. National Herbarium, No. 1784437, collected at Jayuya, Puerto Rico, at an elevation of 1,200 meters, September 19, 1943, by F. H. Sargent (No. 3144).

RANGE: Puerto Rico and Costa Rica, and perhaps elsewhere.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: Volcán Barba, alt. 2,600 meters, *M. Valerio* 95. Volcán Turrialba, alt. 3,100 meters, *Torres* 6. Las Nubes, alt. 1,500–1,900 meters, *Standley* 38811.

31. *Hymenophyllum simplex* Morton, sp. nov.

Rhizoma repens, filiforme; frondes procumbentes, stipitibus elongatis, filiformibus, nonalatis, pubescentibus, pilis stellatis, stipitatis, 3–6-radiatis; laminae parvae, ambitu ovatae, rhachibus supra medium alatis, basi nonalatis; pinnae lineares, simplices, angustae, uninerviae; pili in superficiebus, venis, et marginibus omnes stellati, breviter stipitati, 5–7-radiati, radiis brevibus; indusia segmentis angustiora, basi subimmersa, valvis suborbicularibus, ciliatis.

Rhizomes creeping, filiform, about 0.15 mm. in diameter; fronds prostrate, determinate; stipes 3–4 cm. long, filiform, about 0.15 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs stellate, stalked, 3–6-rayed, the rays 1 cell long; blades ovate in outline, 2–3 cm. long, 7–13 mm. broad, the rhachis narrowly alate above the middle, the wing about 0.3 mm. broad on either side, nonalate at base; pinnae ascending, all simple, linear, 8–12 mm. long, about 1 mm. broad, not undulate, 1-veined; hairs of leaf surfaces, veins, and margins all stellate, very short-stalked, 5–7-rayed, the rays about 0.25 mm. long, 1-celled; indusia narrower than the segments, slightly immersed at base, the valves suborbicular, about 0.7 mm. long, ciliate, the hairs all stellate.

Type in the U. S. National Herbarium, No. 1629676, collected at Tambillo, Department of Huánuco, Peru, July 8, 1878, by C. de Jelski (No. 897).

The type specimen was determined by Dr. Christ as *H. hirsutum* (L.) Swartz [i. e., *H. fragile*], with which it has no near affinity. In its simple, linear pinnae and in pubescence it suggests *H. lanatum* Fée, but in that species the rhachis is alate throughout and the stipe alate at apex.

32. *Hymenophyllum lanatum* Fée, Mém. Foug. 11: 116. pl. 31, f. 3. 1866.

Sphaerocionium lanatum Copel. Phil. Journ. Sci. 67: 31. 1938.

Rhizome filiform, 0.2 mm. in diameter; fronds pendent, determinate; stipes filiform, 1–3 cm. long, 0.2 mm. in diameter, very inconspicuously alate at very apex, deciduously pubescent, the hairs stellate, stalked, 3- or 4-rayed; blades ovate to oblong-linear, 2–6 cm. long, 1–1.8 cm. broad, the rhachis narrowly alate throughout, the wing not over 0.7 mm. broad on either side; pinnae 7–20 pairs, ascending, almost all simple and linear (a few bifid at apex or rarely pinnatifid, with 2 pairs of segments), 8–11 mm. long, 1.5–1.7 mm. broad; hairs of leaf surfaces and veins abundant, stellate, obviously stalked, mostly 5- or 6-rayed, the marginal bistellate, short-stalked (0.25–0.3 mm.), mostly 3- or 4-rayed; sori not numerous, apical, the indusia cuneate and immersed at base, the valves about 1 mm. long and broad, rounded, stellate-pilose externally, ciliate, the hairs mostly stellate, long-stalked.

TYPE: Sainte-Rose, Guadeloupe, *L'Herminier* in 1861.

RANGE: Cuba, Hispaniola, Jamaica, Guadeloupe, Puerto Rico, Grenada, St. Vincent, Guatemala, and Venezuela.

SPECIMENS EXAMINED:

CUBA: Mountains, at elevations of 650 to 1,000 meters: *Wright* 905. Loma del Gato, *Hioram & Clément* 6517; *León, Clément, & Roca* 10258; *Clément* 2183. Sierra Moa, *Shafer* 8130. Sierra de Buena Vista, *Ekman* 3883.

DOMINICAN REPUBLIC: San Francisco de Macorís, alt. 900 meters, *Abbott* 2076.

JAMAICA: Blue Mountains, at elevations of 600 to 1,900 meters: *Maxon* 955, 959, 1075, 1297, 1732, 2714, 8943, 9017, 9021, 9027a, 9123, 9197, 9283, 9422, 9589, 9654, 9717, 9742, 10028, 10139, 10201, 10252; *Maxon & Killip* 670, 705, 1172; *Watt* 188bis; *E. G. Britton* 1129; *Johnson*; *Hart* 129; *Clute* 84.

PUERTO RICO: *Schwanecke* (Berlin), fide *Maxon* (Proc. Biol. Soc. Washington 46: 144. 1933).

GUADELOUPE: *L'Herminier*. Bains-Jaunes, *Questel* 1790; *Trelease* 21. Cone de la Soufrière, *Duss* 4267a.

GRENADA: *Sherring*. Above Grand Etang, *Miller*.

ST. VINCENT: *Eggers* 6903.

GUATEMALA: Alta Verapaz, at elevations of 1,000 to 1,350 meters: *Cook & Doyle* 150; *Maxon & Hay* 3334; *von Tuerckheim* II. 1938; *Hatch & Wilson* 100, 178.

VENEZUELA: Colonia Tovar, *Fendler* 387 (G).

33. *Hymenophyllum fragile* (Hedw.) Morton, comb. nov.

Trichomanes fragile Hedw. Fil. Gen. pl. [18]. 1802.

Trichomanes rigidum bis Hedw. op. cit. in text, not Swartz, 1788.

Trichomanes hirsutum sensu Hedw. op. cit. pl. [10], not L., 1753.

Trichomanes hispidum Poir. in Lam. Encycl. 8: 71. 1808. New name for *T. rigidum* Hedw., not Swartz.

Hymenophyllum intercalatum Christ, Bull. Herb. Boiss. II. 4: 942. 1904. Type from Turrialba, Costa Rica, *Pittier* (Herb. Nat. Cost. 13259 *ter*).

Rhizomes filiform, 0.2 mm. in diameter; fronds pendent, more or less determinate; stipes filiform, 0.5–2.5 cm. long, 0.25 mm. in diameter, alate at apex (sometimes very shortly), deciduously pubescent, the hairs partly forked, partly stellate; blades ovate to linear-lanceolate or linear, 3–15 cm. long, 1.2–2.5 cm. broad, the rachis broadly alate throughout, the wing 0.5–1 mm. broad on either side; pinnae ascending, 4–20 pairs, subflabellate, 5–15 mm. long, 4–12 mm. broad, pinnatifid, the costa broadly winged, the lobes usually 1 on the lower side and 2 on the upper side, sometimes the lowest with 2 lower lobes and 3 upper, the segments plane, broad, 1.5–2 mm. broad, all simple and 1-veined, or rarely the superior basal one bifid; hairs of the leaf surfaces and veins abundant, all stellate, short-stalked, mostly 5- or 6-rayed, those of the margins bistellate, the stalks very short (about 0.1 mm. long), the rays mostly 5 or 6; sori on the apical pinnae, the indusia narrower than the segments, the valves broader than long, about 1 mm. broad, rounded, densely stellate-pilose, ciliate, the hairs stellate.

TYPE: "America meridionalis."

RANGE: Cuba, Haiti, Jamaica, and Mexico to Bolivia and Brazil.

SPECIMENS EXAMINED:

CUBA: Summit of Punta de Palma Mocha, Sierra Maestra, alt. 1,400 meters, *Ekman* 5209.

HAITI: Massif de la Selle, alt. 2,200 meters, *Ekman* H 7721.

JAMAICA: Common in deep forest in the Blue Mountains, at elevations of 1,350 to 1,900 meters: *Swartz*; *Maxon* 1220, 1256, 9732, 9749, 10140, 10189, 10250, 10259; *Webster & Goldberg* 138; *Harris* 7113; *Chrysler* 1660; *Hart* 217; *Johnson*; *J. P.* 65; *Watt* 36.

MEXICO: Orizaba, Veracruz, *Pringle* 6079. Trinidad Iron Works, Hidalgo, *Pringle* 13255.

GUATEMALA: Department of Alta Verapaz, at elevations of 750 to 1,040 meters: *von Tuerckheim* 951; *Johnson* 813; *Hatch & Wilson* 216; *Maxon & Hay* 3327; *Cook & Griggs* 400. These represent a depauperate form with mostly undivided pinnae.

COSTA RICA: Common at elevations of 1,400 to 1,800 meters: *Wercklé*; *Maxon* 508, 519; *Maxon & Harvey* 8178; *Lankester* 752; *Standley* 34418, 35535, 35667; *Standley & Torres* 51062, 51360; *M. Valerio* A11, 151, 2349; *Torres* 117, 192; *Skutch* 3559; *Stork* 1176; *Brade*.

PANAMA: Common in the region of Volcán Chiriquí, at elevations of 1,500 to 1,900 meters: *Maxon* 5610, 5683; *Killip* 5226, 5282, 5283, 5395, 5399a; *Cornman* 1303.

VENEZUELA: Colonia Tovar, *Moritz* 266 (NY, US); *Fendler* 38 (G, NY, US).

COLOMBIA: At elevations of 1,500 to 2,350 meters: Micay Valley, El Cauca, *Killip* 7736 (NY, US). San Antonio, El Valle, *Killip & García* 33934. Farallones de Cali, El Cauca, *Lehmann* 1983. La Sierra, north of Medellín, Antioquia, *Archer* 1659. La Cumbre, El Valle, *Killip* 11294 (NY, US). Horqueta Mountain, Santa Marta Mountains, Magdalena, *H. H. Smith* 2600 (NY, US).

PERU: Alturas de Pintobamba, Cuzco, alt. 2,700 meters, *Vargas* 3262.

BOLIVIA: Polo-Polo, North Yungas, alt. 1,100 meters, *Buchtien* 3575; a depauperate form. Cargadera, *Williams* 1235 (NY, US).

BRAZIL: States of Rio de Janeiro, Santa Catherina, and Rio Grande do Sul): *Juergens* 136 (Rosenst. exs. 156) (NY, US); *Brade* 9573 (NY); *Brade* (Mus. Nac. Rio Jan. 21612) (NY); *Spannagel* 156; *Glaziou* 6410 (NY); *Riedel*; *Webb* (NY).

33a. *Hymenophyllum fragile* var. *venustum* (Desv.) Morton, comb. nov.

Hymenophyllum hirsutum sensu Raddi, Syn. Fil. Bras. 19. 1819; Pl. Bras. 66. pl. 79, f. 3. 1825, not Swartz, 1801.

Hymenophyllum venustum Desv. Mém Soc. Linn. Paris 6: 332. 1827. New name for *H. hirsutum* sensu Raddi, not Swartz, 1801.

Hymenophyllum raddianum C. Müll. Bot. Zeit. 1854: 723. 1854 (nom. abort.). New name for *H. hirsutum* sensu Raddi, not Swartz, 1801.

Sphaerocionium raddianum Copel. Phil. Journ. Sci. 67: 31. 1938 (nom. abort.).

Differs from the typical variety in having the pinnae mostly simple or merely bifid.

TYPE: Mandioca, Brazil, *Raddi*.

RANGE: Southern Brazil.

SPECIMENS EXAMINED:

BRAZIL: Theresapolis, Rio de Janeiro, *Brade* 9549 (NY); Jaraguá, São Paulo, *Brade* 5207 (NY). Rio Grande, São Paulo, *Brade* 8325. Joinville, Santa Catherina, *Schmalz* (NY). Organ Mountains, *Miers* 250. Near Rio de Janeiro, *Webb* (NY).

The present species has been known universally as *Hymenophyllum hirsutum* (L.) Swartz, based on *Trichomanes hirsutum* L. (Sp. Pl. 1098. 1753). There is no specimen of this species in the Linnaean Herbarium, and so the application of the name will depend on the original description, the synonyms cited, and the subsequent treatment of the species by Linnaeus. The original description and references are as follows:

Trichomanes frondibus pinnatis: pinnis alternis pinnatifidis pilosis.

Filicula digitata Plum. spec. 13 [error for 73]. fil. t. 50. t. B.

Darea americana major pubescens. Pet. mus. 762.

Dareae affinis digitata. Pet. fil. 105. t. 15. f. 5.

Habitat in America.

It is obvious that the description is applicable to most species of the section *Sphaerocionium*. It is taken wholly from Plumier, as are also the descriptions and figure of Petiver. However, Plumier's figure, although crudely drawn as usual, is obviously the plant described by Swartz as *Trichomanes ciliatum* [i. e., *Hymenophyllum ciliatum* Swartz]. The four to seven pairs of segments of the pinnae and the strongly winged stipe agree with that species, as does also Plumier's description of the blade as 2 inches broad. The present species, usually known as *H. hirsutum*, has only 1 or 2 pairs of segments (rarely 3), an inconspicuously winged stipe, and a blade never more than 1 inch broad. Also, Plumier's description of the pinnae as "fimbriate" agrees better with *H. ciliatum*, in which the marginal hairs are conspicuous. The marginal hairs are minute and inconspicuous in the present species.

It therefore appears that the original Linnaean concept was drawn wholly from Plumier and applied to the plant usually known as *H. ciliatum*. The same diagnosis and synonymy are repeated in all the editions of the *Species Plantarum* and *Systema Vegetabilium* that appeared during the lifetime of Linnaeus. There are no changes or emendations through Gmelin's edition of the *Systema* of 1794.

The first appearance of the use of the name *hirsutum* in its recent sense is in Hedwig's *Filicum Genera et Species* (1799-1803). Swartz, in his treatment in his *Prodromus*, ignored *Trichomanes hirsutum*. That Hedwig was somewhat confused is probably due to Swartz's description of *T. ciliatum*, for he illustrates that species and also gives two illustrations of the present species, once as *T. hirsutum*, and once as a new species, which it really was. Unfortunately, the name he chose for the plant described as new was *T. rigidum*, an epithet that had been previously used by Swartz for an entirely different species (a true *Trichomanes* in the modern sense), which, as a matter of fact, was also illustrated by Hedwig in his second plate. Hedwig apparently discovered that his name was a homonym, for although the name appears as *T. rigidum* in the text, on the plate it has been changed to *T. fragile*. Under the Rules, the name *T. fragile* may be considered validly published by the plate alone, for a characteristic habit drawing is given together with magnified details.

I am reluctant to propose such a confusing change in nomenclature as the replacement of the well-known name *H. ciliatum* by *H. hirsutum*, but it seems unavoidable. *Trichomanes hirsutum* cannot be considered a *nomen confusum*, for it was based on a single entity by Linnaeus and was confused only by subsequent authors.

All the names that have been applied to the present species are inappropriate. The plant is not hirsute, but rather minutely stellate-pilose, and the texture is delicate and elastic, rather than rigid or fragile. Poiret's name *hispidum* is especially inappropriate. It was evidently due to a misinterpretation of Hedwig's plate.

34. *Hymenophyllum angustum* v. d. Bosch, Ned. Kruid. Arch. 5³: 183. 1863.

Rhizomes long-creeping, filiform, 0.2 mm. in diameter; fronds pendent, indeterminate; stipes 0.5-2 cm. long, filiform, 0.25 mm. in diameter, alate toward apex only or nearly to base, deciduously pubescent, the hairs partly forked, partly stellate; blades linear, 5-21 cm. long, 8-11 mm. broad, acuminate at apex, the rachis alate throughout, the wing 0.5-0.6 mm. broad on either side; pinnae ascending, 15-40 pairs, subrhombic, 4-10 mm. long, 1.5-5 mm. broad at base, obtuse at apex, the lower side entire or subentire, the upper pinnatifid, with 1-3 segments, the basal one simple or bifid, the others simple, the ultimate segments 0.7-1 mm. broad; hairs of leaf surfaces and veins rather numerous, all stellate, rather short-stalked, the marginal mostly bistellate, the stalks 0.25 mm. long or less, the apical rays mostly 3; sori small, borne on most of the apical pinnae,

slightly immersed at base, the valves suborbicular, rounded, 0.6–0.7 mm. long and broad, sparingly stellate-pilose on the surfaces, ciliate, the hairs mostly stellate, long-stalked.

TYPE: San Gabriel de Cachoeiras, on Rio Negro, Amazonas, Brazil, *Spruce* (G, US).

RANGE: Known only from the type collection.

35. *Hymenophyllum amabile* Morton, Journ. Washington Acad. Sci. 22: 63. 1932.

Rhizomes long-creeping, 0.5 mm. in diameter; fronds pendent, indeterminate; stipes 2.5–12 cm. long, 0.5 mm. in diameter, terete, not at all alate, pubescent, the hairs all stellate, stalked, elongate, the stalk and rays mostly more than 1 cell long; blades linear, 10–35 cm. long, 2–4 cm. broad, the rhachis straight, terete, not alate; pinnae 20–40 pairs or more, ovate to oblong, up to 2.5 cm. long and 1.5 cm. broad, all sessile, a little decurrent, not at all surcurrent, pinnatifid; segments 4–8 pairs, all simple and linear, or the lower ones usually bifid or trifid, the ultimate segments oblong, up to 4 mm. long, 1 mm. broad; veins not winged; hairs of the rhachis mostly twice-stellate, the rays often more than 1 cell long, those of the leaf surfaces and veins very numerous and dense, stellate (or some of them twice-stellate), long-stalked, the rays mostly 6 or more, often more than 1 cell long, the marginal ones mostly bistellate; sori apical, not immersed at base, the valves broader than long, about 0.6 mm. long, 1 mm. broad, densely stellate-pilose on the surfaces, long-ciliate, the hairs stellate, stalked.

TYPE: Michihuafuncca, Huadquiña, Cuzco, Peru, *Bües* 715 (US).

RANGE: Ecuador and Peru, at elevations of 2,000 to 4,000 meters.

ADDITIONAL SPECIMENS EXAMINED:

ECUADOR: *Jameson* in 1845 (G); *Mille* s. n. (G). *Papallacta*, *Mille* (NY, US).

PERU: Department of La Convención, Cuzco, *Bües* 2108, 2109, 2110, 2148, 2150, 2168, 2170. *Tambo de Vaca*, Huánuco, *Bryan* 628.

36. *Hymenophyllum speciosum* v. d. Bosch, Ned. Kruid. Arch. 5: 181. 1863.

Hymenophyllum spectabile Mett. ex Kuhn, *Linnaea* 35: 392. 1868. Type from Yungas, Bolivia, *D'Orbigny* 175.

Sphaerocionium spectabile Copel. Phil. Journ. Sci. 67: 31. 1938.

Fronds pendent, indeterminate in growth; stipes up to 14 cm. long, about 0.5 mm. in diameter, terete throughout, deciduously pubescent, the hairs forked or stellate, a few simple, elongate, 3-celled; blades elongate-linear, up to 1.65 m. long (but sometimes only 25 cm.), normally 6–8 cm. broad, the rhachis nonalate throughout, flexuous, densely tomentose; pinnae 12 pairs or more (usually many), lanceolate to linear-lanceolate, 4–8.5 cm. long, 8–13 mm. broad at base, long-acuminate, cuneate at base, deeply pinnatifid, the basal superior lobes usually with the veins three times dichotomous, the ultimate segments narrowly linear, scarcely more than 0.5 mm. broad; hairs of rhachis numerous, appressed, all stellate, short-stalked, 5- or 6-rayed, those of the leaf surfaces and veins similar, the marginal stellate or bistellate, subsessile; veins not alate on either side of the frond; indusia slightly immersed at base, about 0.75 mm. long, the valves densely tomentose externally, ciliate.

TYPE: St. Gavan, Peru, *Lechler* 2246. An unnumbered specimen collected by *Lechler* at St. Gavan is in the New York Botanical Garden. It is doubtless an isotype.

RANGE: Peru and Bolivia, at elevations of 2,000 to 3,350 meters.

SPECIMENS EXAMINED:

PERU: *Sandillani*, *Pearce* s. n. (G, US). Department of Cuzco, *Bües* 576, 1341, 1343, 1535, 1808, 1817, 1821, 1933, 2068, 2136, 2143, 2178.

BOLIVIA: Pelichuco, *Williams* 2605 (NY, US). Cargadira, *Williams* 1233 (G, NY, US). Unduavi, *Buchtien* 2746. Camerapa, *Herzog* 1906.

The present species is the largest of Hymenophyllaceae, the fronds reaching a length of over 1.5 meters, It must be a beautiful plant growing.

37. *Hymenophyllum karstenianum* Sturm, Bot. Zeit. 17: 298. 1859.

Fronds pendent, indeterminate; stipes 1-4 cm. long, 0.4-0.5 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mixed (simple, forked, and stellate, the rays 2- or 3-celled); blades linear, 13-50 cm. long, 2.5-5 cm. broad, the rhachis nonalate throughout; pinnae 16 pairs or more, linear-lanceolate or lanceolate, 2-3.5 cm. long, 6-9 mm. broad at base, acuminate at apex, cuneate at base, not petiolulate, not adnate or decurrent, deeply pinnatifid; basal superior segments with twice-forked veins, the ultimate segments narrow, about 0.5 mm. broad; hairs of rhachis partly stellate, short-stalked, 5- or 6-rayed, partly long-stalked (the stalk and rays of more than 1 cell) or twice-stellate, those of the leaf surfaces and veins all stellate, numerous, short-stalked, 5- or 6-rayed, the marginal stellate or bistellate, subsessile; veins not alate on either side of the frond; indusia not immersed at base, the valves orbicular, less than 1 mm. long, densely hirsute.

TYPE: Mérida, Venezuela, *Moritz* 381 p. p.

RANGE: Venezuela, Colombia, and Peru, at elevations of 1,300 to 2,000 meters.

SPECIMENS EXAMINED:

VENEZUELA: Colonia Tovar, Aragua, *Fendler* 39 p. p. (G, US). Cano Negro, summit of Mount Duida, *Tate* 852 (NY, US). Without locality, *Moritz* (G).

COLOMBIA: Sierra del Líbano, Santa Marta Mountains, Magdalena, *H. H. Smith* 993 (NY). Mesa de los Santos, Santander, *Killip & Smith* 15358 (G, NY), US). Near Vigés, El Cauca, *André* 2684 (NY).

PERU: Tarapoto, *Spruce* 4694 (G, NY, US). Cerro Hatún, Cuzco, *Bües* 803.

This species has commonly passed as the West Indian *Hymenophyllum sericeum*, which differs in its decurrent pinnae and winged veins.

38. *Hymenophyllum rufum* Fée, Crypt. Vasc. Brés. 1: 198. pl. 70, f. 4. 1869.

Hymenophyllum rufum f. *pseudocarpum* Rosenst. Hedwigia 56: 360. 1915.

Type from Alto da Serra, São Paulo, Brazil, *Brade* 5853.

Sphaerocionium rufum Copel. Phil. Journ. Sci. 67: 31. 1938.

Rhizomes 0.4-0.5 mm. in diameter, densely rufous-pilose; fronds pendent, indeterminate; stipes 1-7 cm. long, 0.3-0.6 mm. in diameter, nonalate throughout, pubescent, the hairs mixed (simple and several cells long, forked, stellate and long-stalked, or twice-stellate); blades lanceolate to linear, 6-22 cm. long, 2.5-6 cm. broad, rounded or acutish at apex, the rhachis nonalate to middle, narrowly alate upwardly, not or scarcely flexuous; pinnae ascending, 10-20 pairs, lanceolate (or some elongate and frondlike), 2-4 cm. long, 0.6-1.5 cm. broad at base, obtuse, petiolulate or sessile, the upper adnate, deeply pinnatifid, the costa narrowly winged; primary pinnules 6-8 pairs, the lower pinnatifid with 3 or 4 pairs of segments (these simple or bifid), the ultimate segments narrow, 0.7-1.2 mm. broad; veins not winged; hairs of rhachis numerous, reddish, all stellate, 4-6-rayed, the rays sometimes 2-celled, those of the leaf surfaces mostly sessile, those of the veins and margins partly sessile, partly short-stalked, 4-6-rayed; sori small, apical on the pinnae, the indusia narrower than the segments, slightly immersed at base, the valves broader than long, 0.4-0.6 mm. long, 0.6-0.8 mm. broad, rounded, stellate-pilose externally, long-ciliate, the hairs stellate.

TYPE: Southern Brazil, *Glaziou* 2467.

RANGE: Southern Brazil.

SPECIMENS EXAMINED:

BRAZIL: Serra do Itatiaya, *Dusén* 164 (Mus. Nac. Rio Jan. 194) (NY);

L. B. Smith 1760 (G, US); *Rose & Russell* 20580 (NY, US). Pedro Assú, Rio de Janeiro, *Brade* 9510 (NY). Organ Mountains, *Luetzelburg* 395.

39. *Hymenophyllum lindenii* Hook. Sp. Fil. 1: 94. pl. 34c. 1844.

?*Hymenophyllum terminale* v. d. Bosch, Ned. Kruid. Arch. 5³: 186. 1863.

Type from Quito, Ecuador, *Cuming* p. p. (Herb. Berol.). This is placed here following Christensen in Index Filicum, although from the description it might equally well be a form of *H. plumieri*.

Rhizomes widely creeping, about 0.6 mm. in diameter, densely hairy; fronds pendent; stipes elongate, (4.5) 8–16 cm. long, nonalate throughout, 0.5–1 mm. in diameter, conspicuously pubescent. the hairs mixed (simple, forked, and stellate and long-stalked); blades ovate-oblong, 17–30 cm. long, 6–14 cm. broad, the rhachis nonalate below, alate upwardly; pinnae widely spreading, 15–20 pairs, all sessile or adnate, lanceolate or ovate-lanceolate, 3–7 cm. long, 1.5–2.5 cm. broad at base, acuminate at apex, deeply pinnatifid, the costa narrowly winged; pinnules 8–14 pairs, the lower deeply pinnatifid, with 3 or 4 pairs of segments, each with a simple (or occasionally forked) vein, the ultimate segments 0.7–1.4 mm. broad; hairs of rhachis stellate, subsessile or stalked, 3- or 4-rayed, the rays 1-celled, those of the leaf surfaces and veins scattered, stellate, subsessile, 3–5-rayed, those of the margins 3- or 4-rayed, subsessile, or some of them bistellate, the primary branches very short; indusia slightly immersed at base, the valves 0.4–0.7 mm. long, 0.3–1.2 mm. broad, equal, long-ciliate, most of the hairs stellate, stalked.

TYPE: Caracas, Venezuela, *Linden* 173.

RANGE: Venezuela, Colombia, and Ecuador (?), at middle and high elevations.

SPECIMENS EXAMINED:

VENEZUELA: Páramo de Aricagua, Mérida, alt. 2,700 meters, *Jahn* 1009.

COLOMBIA: At elevations of 1,700 to 3,600 meters: *Lehmann* 4932.* Between Pamplona and Toledo, Norte de Santander, *Killip & Smith* 19930 (G, NY, US). Salto de Tequendama, Cundinamarca, *Triana* 199 (NY, US). Pasca, Cundinamarca, *André* 1553 (NY), 1559 (NY, US). Boquerón de Bogotá, Cundinamarca, *André* 1559 bis (NY). Between Río Buez and Río Piedras, Antioquia, *Lehmann* 3128. Páramo de Moras, El Cauca, *Lehmann* 2656. Páramo de Buena Vista, El Cauca, *Pittier* 1192. La Cumbre, El Valle, *Killip* 11347 (NY, US). La Ceja, Tolima, *Lehmann* 6392 (G, US).

In general appearance the present species suggests *H. trapezoidale* and *H. ruizianum*, from which it is most easily separated by the presence of stellate hairs on the leaf surfaces.

40. *Hymenophyllum interruptum* Kunze, Linnaea 9: 107. 1834; Anal. Pter. 48. pl. 30. 1837.

Sphaerocionium interruptum Presl, Hymenoph. 34. pl. 10, f. C. 1843.

?*Hymenophyllum aequabile* Kunze ex Klotzsch, Linnaea 20: 438. 1847. Type from Mérida, Venezuela, *Moritz* 340 (isotype US). The specimen at hand is poor and may possibly not be referable here.

Rhizomes creeping, about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes up to 8 cm. long, about 0.5 mm. in diameter, nonalate or rarely with the lowest pinnae short-decurrent, deciduously hairy, the hairs mostly forked, some stellate, 3- or 4-rayed; blades linear, 13–40 cm. long, 3–7 cm. broad, the rhachis nonalate toward base, alate upwardly, the wings narrow, less than 1 mm. broad; pinnae 15 to many pairs, ovate to ovate-lanceolate,

*This is doubtless an erroneous number. According to the Lehmann field notebook, No. 4932 is a *Psychotria*.

often subfalcate, 2–5 cm. long, 8–14 mm. broad at base, acuminate at apex, deeply pinnatifid; segments 6–12 pairs, the lowest with mostly twice-dichotomous veins, the ultimate segments 0.5–2 mm. long, narrow, usually less than 1 mm. broad; hairs of leaf surfaces and veins few, stellate, 3–5-rayed, short-stalked, the marginal ones mostly forked, long-stalked, some twice-forked or stellate and 3-rayed; fronds interruptedly fertile, the groups of fertile pinnae separated by several sterile pinnae; sori immersed at base, the valves suborbicular, a little unequal, about as long as broad, usually about 1 mm. broad.

TYPE: Pampayacu, Huánuco, Peru, *Poeppig* 1104.

RANGE: Venezuela (?), Colombia, Peru, and Bolivia, at elevations of 750 to 2,500 meters.

SPECIMENS EXAMINED:

COLOMBIA: Quetamé, Cundinamarca, *Dawe* 324. Between Alto del Loro and Alto de Santa Inés, Norte de Santander, alt. 1,800–2,200 meters, *Cuatrecasas et al.* 12547.

PERU: Schunke Hacienda, above San Ramón, Junín, *Killip & Smith* 24850 (NY, US); *Schunke* A245. Chanchamayo Valley, Junín, *Schunke* 183. Porvenir, Pichis Trail, Junín, *Killip & Smith* 25899 (NY, US). Hatún, Sombreruyoc, Cuzco, *Bües* 801, 806, 813. Altura del Río Lachoc, Valle de Lares, Cuzco, *Bües* 1814, 1815, 1819.

BOLIVIA: Nairapi, between Soratá and Tipuani, *Cárdenas* 1277. Paradiso, *Williams* 1215 (NY, US). Yungas, *Bang* 349 (G), 436 (G, NY, US); *Rusby* 135 (NY, US). Songo, *Bang* 904 (NY, US). Mapiri, *Rusby* 183 (G, NY, US). Hacienda Simaco, above Tipuani, *Buchtien* 5290 (G, US). Polo-Polo, near Coroico, *Buchtien* 3568 (G, US), s. n. (G, NY). Incachaca, Cochabamba, *Steinbach* 9141 (G, NY). Comarapa, *Steinbach* 8373 bis (G).

This and the following four species could perhaps be considered a single collective species, the several subspecies more or less geographically isolated. However, the present treatment seems to accord equally well with the facts.

41. *Hymenophyllum superbum* Morton, sp. nov.

Stipites elongati, non vel vix alati; laminae pendulae, indefinitae, lineares, rhachibus ubique alatis, alis non undulatis, latis; pinnae numerosae, lanceolatae, apice acuminatae, pinnatifidae, segmentis numerosis, basalibus superioribus pinnatim venosis, medialibus cum venis furcatis ramis inaequalibus; pili in superficiebus et venis stellati, breviter stipitati, in marginibus plerumque bistellati, 2–4-radiati; indusia leviter immersa, suborbicularia, parva.

Rhizomes creeping, about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 7.5–16 cm. long, 0.5–0.6 mm. in diameter, not alate except sometimes slightly at apex by the decurrent bases of the pinnae, deciduously pilose, the hairs mostly stellate, long-stalked, 3–5-rayed, a few twice stellate or merely forked; blades up to 70 cm. long, 4.5–8 cm. broad, the rhachis alate throughout, the wings about 1 mm. broad; pinnae 20 pairs or more, lanceolate, ascending, 2.5–7 cm. long, 7–17 mm. broad at base, acuminate at apex, deeply pinnatifid; primary segments 9 pairs or more, the basal superior ones with subpinnate venation, the middle with furcate veins with unequal branches, the upper with simple veins, the ultimate segments short, about 1 mm. broad; hairs of rhachis, leaf surfaces, and veins all stellate, short-stalked, the marginal ones mostly bistellate, the rays few (2–4)-rayed; indusia shallowly immersed at base, narrower than the segments, the valves suborbicular, slightly less than 1 mm. long, ciliate, the hairs stellate.

Type in the U. S. National Herbarium No. 1616024, collected in the valley of the Río Palora, eastern slope of the Eastern Cordillera, Ecuador, at an elevation of 1,400 meters, by A. Rimbach (No. 12).

Collections with the same data as the type but with the addition of the date (November 1906) are in the National Herbarium, distributed by Rosenstock under the name *H. interruptum* as his Filices Ecuadorenses Exsiccatae No. 15. Other specimens from the same locality are *Rimbach* 19 and 19A.

42. *Hymenophyllum dependens* Morton, sp. nov.

Rhizoma repens; frondes pendulae, indefinitae, stipitibus brevibus, dense pilosis, apice alatis; laminae lineares, rhachibus late alatis; pinnae multae, patentes, acutae vel acuminatae, adnatae, leviter pinnatifidae, segmentis numerosis, venis bis- vel ter-dichotomis, non alatis, segmentis ultimis brevibus; pili in superficiebus et venis stellati, longe stipitati, 4-7-radiati, in marginibus plerumque bistellati; sori apicales, segmentis angustiores, vix immersi, valvis suborbicularibus.

Rhizomes wide-creeping, 0.3-0.4 mm. in diameter, densely ferruginous-hairy; fronds pendent, indeterminate; stipes 1.5-6.5 cm. long, 0.3-0.6 mm. in diameter, alate at apex, densely pilose, the hairs partly simple and several-celled, partly forked and long-stalked, the stalk and rays often 2 cells long or more, or stellate, 3- or 4-rayed, a few twice stellate; blades linear, normally 15-35 cm. long, 3-5.5 cm. broad, abruptly or rather abruptly reduced at base, the rhachis broadly alate throughout; pinnae 15-40 pairs, horizontally spreading, 1.5-3.5 cm. long, 7-11 mm. broad, acute or acuminate at apex, adnate at base, rather shallowly pinnatifid; segments 5-9 pairs, the lower with twice or three times forked veins, the ultimate segments short, 0.5-2 mm. long, 1-1.5 mm. broad, not undulate; hairs of rhachis stellate, long-stalked, or some twice stellate, those of the leaf surfaces and veins abundant, all stellate, 4-7-rayed, long-stalked, the marginal ones mostly bistellate, long-stalked, 4-rayed or more; sori borne chiefly on the apical segments of the pinnae, the indusia scarcely immersed at base, narrower than the segments, the valves suborbicular, about 0.8 mm. long, 0.8-1.2 mm. broad, long-ciliate, the hairs stellate or bistellate.

Type in the U. S. National Herbarium, No. 1043090, collected above Cascada Chorrón, south of Antizales, Department of Bolívar, Colombia, at an elevation of 2,000 to 2,500 meters, February 25, 1918, by F. W. Pennell (No. 4391). Isotypes in the Gray Herbarium and the New York Botanical Garden.

RANGE: Trinidad, Venezuela, Colombia, and Ecuador.

ADDITIONAL SPECIMENS EXAMINED:

TRINIDAD: Mount Tocuche, *Broadway* 7114. Cabueres de Aripo, April 27, 1862, Trinidad Bot. Gard. Herb. 306. Without locality, *Prestoe* (Trinid. Bot. Gard. Herb. 1200) (NY, US).

VENEZUELA: Colonia Tovar, *Fendler* 481 (G, US).

COLOMBIA: La Cumbre, El Valle, alt. 2,000-2,500 meters, *Pennell & Killip* 5799 (NY, US); *Killip* 11366 (NY, US). La Costa, El Tambo, El Cuaca, alt. 1,400 meters, *von Sneidern* 563.

ECUADOR: Río Blanco, alt. 1,600 meters, *Mille* s. n.

43. *Hymenophyllum sieberi* (Presl) v. d. Bosch, Ned. Kruid. Arch. 4: 414. 1859.

Sphaerocionium sieberi Presl, Hymenoph. 58. 1843.

Hymenophyllum wercklei Christ, Bull. Herb. Boiss. II. 4: 940. 1904. Type from Costa Rica, *Wercklé* 247 (isotype US).

Sphaerocionium wercklei Copel. Phil. Journ. Sci. 67: 31. 1938.

Rhizomes creeping, 0.3-0.5 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 1.5-8 cm. long, 0.4-0.5 mm. in diameter, conspicuously alate above middle, deciduously hairy, the hairs simple, forked, or stellate and 3-rayed; blades linear, 12-30 cm. long, 2.5-8 cm. broad, the rhachis alate through-

out, the wings less than 1 mm. broad; pinnae close, subimbricate, broadly lanceolate, 2-5 cm. long, up to 1.8 cm. broad at base, acuminate at apex, rather shallowly pinnatifid; primary segments 5-13 pairs, the lower with the veins subpinnately branched, the middle with forked veins with unequal branches, the upper with simple veins, the ultimate segments very short, 1 mm. long or less, less than 1 mm. broad; hairs of the leaf surfaces and veins few, stellate, 3-5-rayed, subsessile, the marginal ones forked or stellate and 3-rayed, rather long-stalked, a few bistellate; indusia slightly immersed at base, the valves longer than broad, subequal, about 1.5 mm long.

TYPE: Martinique, *Kohaut* (Sieber exs. 71).

RANGE: Puerto Rico, Martinique, Guadeloupe, Mexico, Guatemala, and Costa Rica, at elevations of 600 to 1,700 meters.

SPECIMENS EXAMINED:

PUERTO RICO: El Yunque, *Sargent* 323; *Blomquist* 12741.

MARTINIQUE: Mount Pelée, *Duss* 4574. La Calabase, *Duss* 1520. Vallée du Lorrain, *Stehlé* 3446.

GUADELOUPE: *L'Herminier* (sec. Christ).

MEXICO: Río Pedro, Chiapas, *Muench* 11.

GUATEMALA: Department of Alta Verapaz: *Cook & Doyle* 23c; *Pittier* 337; *Hatch & Wilson* 194; *Standley* 71622; *H. Johnson* 363, 593, 910, 911; *von Tuerckheim* 12a, 647 p.p., II. 1986, II. 2081. Some of the Guatemalan specimens are more or less aberrant.

COSTA RICA: *Cooper* 404a. Las Nubes to La Palma, *Knight*. La Palma, *Maxon & Harvey* 7979; *Brade*. San Gerónimo, *Wercklé* 565, 574. San Ramón, *Brenes* (Herb. Nac. Cost. 14211). Goat Island, Reventazón River, *Hatch* 119.

44. *Hymenophyllum plumieri* Hook. & Grev. Icon. Fil. 2: pl. 123. 1829.

Sphaerocionium plumieri Presl, Hymenoph. 34. 1843.

Hymenophyllum splendidum var. *apodum* Sodiro, Anal. Univ. Quito 6: 153. 1892; Crypt. Vasc. Quit. 22. 1893. Type from Volcán Cotacachi, Ecuador, *Sodiro*.

Rhizomes about 0.3 mm. in diameter, persistently hairy; fronds pendent, indeterminate; stipes 1-8 cm. long, 0.4-0.6 mm. in diameter, alate at apex, deciduously pubescent, the hairs mostly forked (the stalk and rays often 2 or 3 cells long), a few simple or stellate and 3-rayed; blades linear, 20-50 cm. long, 4-7 cm. broad, the rhachis broadly alate throughout; pinnae 15 to many pairs, spreading or a little ascending, 1.5-6 cm. long, 8-20 mm. broad, acute, deeply pinnatifid; primary segments 4-8 pairs, the lower with twice or three times dichotomous veins, the ultimate segments 2-3 mm. long, 1-1.5 mm. broad; hairs of leaf surfaces and veins few, stellate, short-stalked, 4- or 5-rayed, the marginal ones mostly stellate and 3-rayed, those toward the apices of the segments for the most part merely forked at base; sori borne on most of the segments of fertile pinnae, the indusia slightly immersed at base, narrower than the segments, the valves suborbicular, about 1 mm. long, 1.2 mm. broad, long-ciliate, the hairs mostly simple or forked.

TYPE: Western slopes of Mount Pichincha, Ecuador, *Jameson*.

RANGE: Ecuador, at elevations of 1,800 to 2,400 meters.

SPECIMENS EXAMINED:

ECUADOR: *Couthouy* 63 (G); *Jameson* 68 (NY), 73 (NY), 235 (G). Anque, *Lehmann* 125. Tandapi, *Mille* in 1921. Loja, *André* K105 (NY). Nono, Pichincha, *Sodiro* in 1899 (NY). Volcán Cotacachi, *Sodiro* (NY, US).

Hooker and Greville's description and plate were based on the Jameson specimen cited above as type. However, in addition they cited Plumier's plate 50B as representing their species, whence the specific name employed. This illustration

shows a quite different species, and is as a matter of fact the basis of *Trichomanes hirsutum* L., i. e., *Hymenophyllum hirsutum* (L.) Swartz (*H. ciliatum* Swartz).

45. *Hymenophyllum sericeum* (Swartz) Swartz, Journ. Bot. Schrad. 1800²: 99. 1801.

Trichomanes sericeum Swartz, Prodr. Veg. Ind. Occ. 136. 1788.

Phorobolus domingensis Desv. Mém. Soc. Linn. Paris 6: 291. 1837. Based on Plumier pl. 73.

Sphaerocionium sericeum Presl, Hymenoph. 34. 1843.

Hymenophyllum cubense Sturm, Bot. Zeit. 1859: 298. 1859. Type from Monte Verde, Oriente, Cuba, Wright 904 (isotype US).

Hymenophyllum fuertesii Brause, in Urban, Symb. Antill. 7: 484. 1913. Type from Provincia de la Vega, Dominican Republic, Fuertes 1772 (isotype US).

Rhizomes creeping, 0.2–0.3 mm. in diameter; fronds pendent, indeterminate; stipes 2–5.5 cm. long, 0.2–0.5 mm. in diameter, nonalate, deciduously pubescent, the hairs mixed (simple, forked, and stellate); blades linear, normally 10–30 cm. long (rarely only 5 cm. long, in depauperate plants), 2–3.5 cm. broad, rounded at apex, the rachis nonalate below, narrowly alate upwardly on alternate sides by the decurrent bases of the pinnae; pinnae normally 20–30 pairs, strongly ascending, ovate-lanceolate, 1.5–2.5 cm. long, 5–6 mm. broad at base, acute at apex, the lower petiolulate, the upper sessile or adnate, pinnatifid; segments 4 or 5 pairs, the superior basal one bifid, the others simple, the ultimate segments about 1 mm. broad; hairs of leaf surfaces, veins, and margins numerous, stellate, subsessile, 5- or 6-rayed, the rays elongate, about 0.5 mm. long, 1-celled; veins on both sides of the frond bearing 2 rather narrow, green wings; sori usually few, confined to the tips of the upper pinnae, the valves about 1 mm. long and broad, equal, slightly immersed at base.

TYPE: Jamaica, Swartz (fragment US).

RANGE: Cuba, Hispaniola, Jamaica, Martinique, and Guadeloupe, in wet, mountain forests.

SPECIMENS EXAMINED:

CUBA: Sierra Maestra, Sierra de Nipe, and Sierra Moa, at elevations of 400 to 1,350 meters: Morton & Acuña 3702, 4500; Ekman 1693, 6961, 14412; Hioram & Clément 6513; Clément 788; Acuña 9953; Shafer 3894, 8119, 8132.

DOMINICAN REPUBLIC: Loma Cana, Jicomé, alt. 650 meters, Valeur 359. Loma Marian Chicle, alt. 800 meters, Ekman H 14255.

HAITI: Morne la Selle, alt. 1,700 meters, Holdridge 1333. Furcy, alt. 1,300 meters, Leonard 4656.

JAMAICA: Blue Mountains, at elevations of 600 to 1,900 meters: Hart 8; J. P. 226; McNab; Wright; Clute 98; Harris 7108; E. G. Britton 1134; Watt 106; Mazon 909, 1063, 1303, 9644, 9716, 9729, 10555; Mazon & Killip 666, 1017.

MARTINIQUE: Mount Pelée, Duss 1517.

GADELOUPE: L'Herminier. Matouba, Duss 4266. Grandes Icaques, alt. 970–1,100 meters, Duss 4279.

Although the present species has been assigned a wide range in the American Tropics, it appears properly to be confined to the West Indies. As a matter of fact, the various South American species confused with it are not very closely allied.

46. *Hymenophyllum horizontale* Morton, sp. nov.

Fronde pendulae, indefinitae, stipitibus brevibus, apice alatis, pubescentibus, pilis simplicibus, elongatis, 2- vel 3-cellularibus, vel furcatis, stipitibus et ramis saepe 2-cellularibus; laminae lineares, apice acutae, basin versus angustatae, rhachibus ubique alatis; pinnae horizontales, oblongae vel oblongo-lanceolatae, apice obtusae, leviter lobatae, costa late alata, segmentis numerosis; venae subtus

alatae, alis valde inconspicuis, interruptis; pili in superficiebus et venis numerosi, stellati, longe stipitati, 4-7-radiati, in marginibus stellati et bistellati, 3- vel 4-radiati; sori numerosi, fere usque ad pinnarum basin dispositi, valvis immersis, suborbicularibus, stellato-pilosis et ciliatis.

Rhizome 0.3 mm. in diameter, densely red-hirsute; fronds pendent, indeterminate; stipes 1-4.5 cm. long, 0.3-0.4 mm. in diameter, alate at apex, pubescent, the hairs partly simple, elongate, 2- or 3-celled, partly forked, the stalk and branches often of more than 1 cell; blades linear, (7) 14-30 cm. long, (2.5) 3-6.5 cm. broad, acute at apex, narrowed toward base, the rachis alate throughout; pinnae many pairs, horizontally spreading, oblong to oblong-lanceolate, 1.5-3 cm. long, 0.6-1 cm. broad, obtuse at apex, shallowly lobed, the costa very broadly alate (the wing 2 mm. broad or more); segments 7-10 pairs, the lower superior ones with the veins 3 or 4 times dichotomous, the ultimate segments very short, not over 1 mm. long, about 1 mm. broad; veins winged on the lower side of the frond, the wings very inconspicuous, widely interrupted, present chiefly at the forks of the veins; hairs of rachis stellate, the stalks partly short, partly elongate and several cells long, 4- or 5-rayed, or partly twice-stellate, those of the leaf surfaces and veins abundant, all stellate (or sometimes twice-stellate), long-stalked, 4-7-rayed, the marginal ones stellate or bistellate, the stalk about 0.25 mm. long, the rays 3 or 4; sori numerous, borne nearly throughout the length of the pinnae, the indusia deeply immersed at base, orbicular, about 1 mm. long and broad, stellate-pilose externally, long-ciliate, the hairs all stellate.

Type in the U. S. National Herbarium No. 1215226, collected at La Palma, Province of San José, Costa Rica, at an elevation of about 1,600 meters, March 17, 1924, by Paul C. Standley (No. 38114).

RANGE: Costa Rica.

ADDITIONAL SPECIMENS EXAMINED:

COSTA RICA: La Palma, *Maxon & Harvey* 7978; *M. Valerio* III. 40. La Hondura, alt. 1,300-1,700 meters, *Standley* 36350. Orosi, *Standley* 39609.

The only other Costa Rican species suggesting the present one in habit is *H. sieberi*. From it *H. horizontale* may be distinguished by the presence of wings on the veins of the lower side, by its horizontal, shallowly lobed pinnae, soriferous nearly to base, and by the more abundant and complicated type of pubescence.

47. *Hymenophyllum lobato-alatum* Klotzsch, *Linnaea* 20: 438. 1847; Karsten, *Fl. Col.* 2: pl. 157, f. 5-7. 1862-69.

Sphaerocionium interruptum sensu Klotzsch, *Linnaea* 18: 535. 1844, not Presl, 1843.

Hymenophyllum lobato-papillosum Sadeb. in Engl. & Prantl, *Nat. Pflanzenfam.* 14: 110. 1899 (*sphalm.*).

Hymenophyllum pyramidatum var. *lobato-alatum* Hieron. *Bot. Jahrb. Engler* 34: 433. 1904.

Fronds pendent, indeterminate; stipes 2.5-5 cm. long, 0.4-0.7 mm. in diameter, terete throughout or rarely a little alate at apex, deciduously pubescent, the hairs mixed (simple and several-celled, forked, the stalk and branches often of several cells, and stellate, 3-rayed, long-stalked); blades linear, up to 60 cm. long or probably more, 5-6 cm. broad, the rachis alate throughout or rarely nonalate at base; pinnae many pairs, lanceolate, 2-4 cm. long, 9-16 mm. broad at base, acuminate at apex, rather deeply pinnatifid; pinnules 5-10 pairs, deeply emarginate or incised at apex, the veins mostly once-dichotomous; hairs of rachis all stellate, the stalks partly short, partly elongate and several-celled, 4-6-rayed, a few twice-stellate, those of the leaf surfaces and margins rather few, short- or long-stalked, 3-5-rayed, the marginal partly bistellate or twice-forked; veins winged on the lower side of the frond only, the wings broad, interrupted, rather inconspicuous; indusia as wide

as the segments, slightly immersed at base, the valves about 1 mm. long, sparingly pilose externally, long-ciliate, the hairs all stellate, stalked.

TYPE: Province of Panatahua, Peru, *Ruiz* 83.

RANGE: Colombia to Peru, at elevations of 300 to 1,600 meters.

SPECIMENS EXAMINED:

COLOMBIA: Monte Capiro, near La Ceja, Antioquia, *Daniel* 649. Savaneta, eastern highlands of Santa Rosa, Antioquia, *Lehmann* 7585.

ECUADOR: *Spruce* (G, NY). Sabatá, near Archidona, Napo-Pastaza, *Mezía* 7297. Puyo, Napo-Pastaza, *Mezía* 6926 (G, US).

PERU: Between Balsapuerto and Moyobamba, Pampayacu, Loreto, *Klug* 3248 (G, NY, US). Hacienda Exito to Puente Durand, Mount Santo Toribio, Churubamba, Huánuco, *Mezía* 8258 (G, NY, US).

48. *Hymenophyllum pyramidatum* Desv. Mém. Soc. Linn. Paris 6: 332. 1827.

Sphaerocionium pyramidatum Copel. Phil. Journ. Sci. 67: 30. 1938.

Fronds pendent, indeterminate; stipes 2.5–9 cm. long, about 0.5 (rarely up to 0.7) mm. in diameter, terete at base, alate upwardly, deciduously pubescent, the hairs mixed (simple and several-celled, forked, or stellate, 3-rayed, the stalk often elongate and 2- or 3-celled); blades linear, up to 60 cm. long or more, up to 5.5 cm. broad, the rhachis alate throughout; pinnae normally 50 pairs or more, often crowded and subimbricate, linear-lanceolate, the larger 2.5–3.7 cm. long, 7–10 mm. broad near base, acuminate at apex, adnate at base, rather shallowly pinnatifid, the costa broadly winged; segments normally 10 pairs or more, each 2-veined, deeply emarginate; hairs of rhachis stellate, the stalks partly short, partly elongate, several-celled, the rays 7–9, or some of them twice-stellate, those of the leaf surfaces and vein wings stellate, long-stalked, 4–8-rayed, the marginal forked or stellate, 3- or 4-rayed, long-stalked; veins winged on both sides of the frond, the wings conspicuous on the lower side, green, membranaceous, more or less continuous, sometimes rather obscure on the upper side; indusia confined to the tips of the pinnae, about one-half immersed, about 2 mm. long, long-ciliate, the hairs stellate, long-stalked.

TYPE: "Habitat in America calidiori." The type in the Desvaux Herbarium (photograph G, US) does not indicate the locality or collector. It was probably collected in Peru by Dombey.

RANGE: Peru and Bolivia, at elevations of 1,200 to 1,900 meters.

SPECIMENS EXAMINED:

PERU: Hacienda Schunke, above San Ramón, Junín, *Schunke* A241. La Merced, Junín, *Macbride* 5632. Chanchamayo Valley, Junín, *Schunke* 466, 926. Dos de Mayo, Pichis Trail, Junín, *Killip & Smith* 25869 (NY). Pampayacu, Huánuco, *Kanehira* 123 (G, US). "Peruvian Andes," *Mathews* 1090.

BOLIVIA: Hacienda Casana, Tipuani Valley, *Buchtien* 7065 p. p. Ticunhuaya, *Tate* 1053.

From the photograph, the type seems to be a mixture. The smaller frond at the left shows clearly the wings on the veins typical of the plant which has usually been called *H. pyramidatum*. This frond may be taken as the type. The larger frond on the right seems to lack wings on the upper surface and is probably referable to *H. lobato-alatum* Klotzsch. The illustration of this species by Karsten (Fl. Col. 2: pl. 157, f. 1–4) seems to represent *H. verecundum*. The material used for the illustration is not indicated, but it surely was not the Desvaux type.

49. *Hymenophyllum verecundum* Morton, sp. nov.

Frondes pendulae, indefinitae, stipitibus brevibus, teretibus vel raro apice paullo alatis, primo hirsutis, pilis albidis, simplicibus vel furcatis, elongatis; laminae lineares, angustae, rhachibus ubique alatis vel basi nudis; pinnae numerosae, ovatae vel ovato-oblongae, parvae, obtusae, leviter pinnatifidae, venis plerumque

simplicibus vel semel dichotomis, segmentis ultimis brevibus, latis; pili in rhachibus, superficiebus, et venis numerosi, albidi, stellati, stipitati, 5-7-radiati, vel pauci bis-stellati, in marginibus stellati, subsessiles, plerumque 5-radiati; venae utrinque perspicue alatae, alis viridibus, membranaceis, interruptis; indusia pauca, apicalia, orbicularia, immersa, valvis externe pilosis, ciliatis.

Fronde pendent, indeterminata; stipes 2-5.5 cm. long, 0.4-0.5 mm. in diameter, usually terete, rarely a little alate at apex by the decurrent bases of the pinnae, deciduously hirsute, the hairs whitish, simple or forked, elongate; blades linear, 12-45 cm. long, 1-3.5 cm. broad, the rhachis alate throughout or often nonalate at base, the wings about 1 mm. broad; pinnae 25 pairs or more, ovate or ovate-oblong, the largest about 2.5 cm. long and 8 mm. broad, obtuse or rarely acutish, shallowly pinnatifid, the costa broadly winged; segments 3-6 (8) pairs, the veins once-dichotomous or simple, the basal ones sometimes with twice-dichotomous veins, the ultimate segments short and broad, about 1 mm. broad, entire, not undulate; hairs of rhachis, leaf surfaces, and veins whitish, stellate, stalked, 5-7-rayed, some of them twice-stellate, the marginal stellate, subsessile, mostly 5-rayed; costae and veins winged on both sides of the blade (sometimes obscurely so above), the wings membranaceous, green, conspicuous, partially interrupted; indusia few, apical on the pinnae, immersed at base, the valves orbicular, about 1.2 mm. long, pilose externally, strongly ciliate, the hairs all stellate, stalked.

Type in the U. S. National Herbarium, No. 1706663, collected on trail from Puente Durand to Exito, crest of Santo Toribio, District of Churubamba, Department of Huánuco, Peru, on tree trunks in dense forest at an elevation of 600 meters, September 8, 1936, by Ynes Mexia (No. 8143a). Isotype at the Gray Herbarium.

RANGE: Peru and Bolivia, at elevations of 600 to 2,700 meters.

ADDITIONAL SPECIMENS EXAMINED:

PERU: Porvenir, Pichis Trail, Junín, *Killip & Smith* 25948 (NY, US). Hacienda Pintobamba, Abra de Chaupimayo, Cuzco, *Bües* 1943. Western slopes of the Andes, *Pearce* in 1861-63.

BOLIVIA: Locatal, *Herzog* 2268. Near Pararani, between Soratá and Mapiri, *Cárdenas* 1038 (G). Incachaca, Cochabamba, *Steinbach* 8895 (G). Between Incachaca and Chusi, Cochabamba, *Steinbach* 9142 (G, NY, US).

This species has been variously identified. The type collection was distributed as *Sphaerocionium sericeum*, a species entirely different in the shape and dissection of the pinnae and in its very narrow and inconspicuous vein-wings. The *Steinbach* specimens have been identified as *H. fusugasugense* Karst., which differs in its nonalate rhachises, among other characters. The *Herzog* specimen was distributed as *H. tomentosum* Kunze, a species which from description belongs to the group of species with nonalate rhachises. The *Pearce* specimen was distributed as *H. pyramidatum*, doubtless its closest ally, which differs in its alate stipes, and larger pinnae, these linear-lanceolate and acuminate, rather than ovate or ovate-oblong and obtuse.

50. *Hymenophyllum plumosum* Kaulf. Enum. Fil. 267. 1824; Karst. Fl. Col. 2: pl. 156, f. 1-4. 1862-69.

Sphaerocionium aureum Presl, Hymenoph. 34, 57. 1843. Type from Serra da Estrella, Brazil, *Beyrich*.

Sphaerocionium plumosum Copel. Phil. Journ. Sci. 67: 30. 1938.

Fronde pendent, indeterminata; stipes 2-6 cm. long, about 0.5 mm. in diameter, nonalate throughout, persistently pubescent, the hairs mixed (simple, forked, and stellate); blades linear, 17-60 cm. long, 3-6 cm. broad, the rhachis nonalate throughout; pinnae 25 pairs or more, often subimbricate, lanceolate, 2-4 cm. long, 7-12 mm. broad at base, acuminate at apex, cuneate at base, pinnatifid;

segments 7-12 pairs, the basal superior one with twice-dichotomous veins, the ultimate segments short, about 0.5 mm. broad; hairs of rhachis numerous, appressed, stellate, partly with short stalks, partly with elongate, several-celled stalks, 5-7-rayed, or some twice-stellate, those of the leaf surfaces, veins, and margins numerous, fine, appressed, ferruginous, stellate, subsessile, 4-7-rayed; costae and veins very minutely winged on both sides of the blade; indusia not immersed, usually broader than the segments, the valves about 1 mm. long, densely hirsute-tomentose.

TYPE: Brazil, *Chamisso*.

RANGE: Costa Rica, Panama, Colombia, Peru, Bolivia, and Brazil, in the Andes at elevations of 1,200 to 2,200 meters.

SPECIMENS EXAMINED:

COSTA RICA: Cerro del Gallito, *M. Valerio* A9. La Fuente, Peralta, *Lankester* 892. Volcán Barba, *Alfaro* 123; *M. Valerio* 93. La Palma, *Standley* 38115. Pacayas, *Lankester* 648. La Estrella, *Standley* 39388. Orosi, *Standley* 39653, 39864. Juan Viñas, *Tonduz* (Herb. Nat. Cost. 10141). Las Nubes, *Knight*.

PANAMA: El Boquete, *Killip* 5064; *Cornman* 1103; *Maxon* 5693. Cerro de la Horqueta, *Maxon* 5438. Bajo Mona, *Woodson & Schery* 589.

COLOMBIA: Cerro de la Vieja, near Sonsón, Antioquia, *Daniel* 1726a. El Santuario, Antioquia, *Daniel* 19. Savaneta, eastern highlands of Santa Rosa, Antioquia, *Lehmann* 7586. La Cumbre, El Valle, *Killip* 11327.

PERU: Schunke Hacienda, above San Ramón, Junín, *Killip & Smith* 24833, 24840 (NY, US). Pichis Trail, Eneñas, Junín, *Killip & Smith* 25733. Villacabamba, on Río Chinchao, Huánuco, *Macbride* 5146.

BOLIVIA: Yungas, *Rusby* 140 (NY). Hacienda Simaco, above road to Tipuani, *Buchtien* 5289 (NY, US).

BRAZIL: *Burchell* 2258 (G, US); *Sello* (G). Caxoeira, *Claussen* 100. Serra do Caparaó, Espírito Santo, *Mezia* 4051 (G, NY, US). Alto Macahé, Rio de Janeiro, *Glaziou* 4444 (NY, US). Serra da Estrella, Rio de Janeiro, *Riedel*. Caraca, Minas Gerais, *M. & N. Foster* 710a (G, US). Serra de Ouro Preto, Minas Gerais, *Ule* 252. Novo Friburgo, São Paulo, *Goebel* s. n. (NY).

This species closely resembles *H. karstenianum* and *H. speciosum* in cutting and pubescence but differs in the winged veins and the usually papillose leaf tissue. The wings are very minute and can be seen readily only under a rather high magnification.

51. *Hymenophyllum multialatum* Morton, sp. nov.

Fronde pendulae, indefinitae, stipitibus brevibus, non alatis, parce hirsutis, pilis plerumque simplicibus, 2-4-cellularibus, paucis furcatis vel triradiatis; laminae lineares, rhachibus rectis, non alatis; pinnae numerosae, infimae petiolulatae, superiores sessiles, patentes, saepe obtusae, pinnatifidae, segmentis plerumque semel furcatis; pili in rhachibus, superficiebus venisque stellati, multiradiati, stipitati, interdum bis-stellati, in marginibus stellati vel bistellati, stipitati, 3-4-radiati; venae utrinque alas interruptas virides conspicuas gerentes; indusii valvae suborbiculares, subtruncatae, externe parce pubescentes, perspicue ciliatae.

Rhizomes long-creeping, slender, about 0.4 mm. in diameter, densely hirsute; fronds pendent, indeterminate; stipes 5-10 cm. long, slender, about 0.5 mm. in diameter, not alate, sparsely hirsute, the hairs mostly simple, 2-celled or more, a few forked or stellate and 3-rayed; blades linear, up to 45 cm. long (or probably more) and 15 cm. broad, the rhachis straight, not alate even at apex; pinnae numerous, the lowest short-petiolulate, the upper sessile, spreading, normally linear-oblong (rarely elongate and frondlike), obtuse or acutish, deeply pinnatifid, the costal wing about 1 mm. broad; segments numerous, nearly all bifid, the ultimate segments about 1 mm. broad; hairs of rhachis stellate, brownish, numer-

ous, 5-8-rayed, partly with short stalks, partly with elongate, several-celled stalks, or some of them twice-stellate, those of the leaf surfaces and veins scattered, stellate, 3-6-rayed, long-stalked, the marginal stellate, or bistellate, 3- or 4-rayed; veins on both sides of the frond bearing numerous conspicuous, green wings (sometimes obscure above), these irregularly interrupted; sori on the apical lobes of the pinnae, the indusium scarcely immersed, a little broader than the segments, the valves suborbicular, 1.2-1.7 mm. long, subtruncate at apex, sparsely pubescent externally, long-ciliate.

Type in the U. S. National Herbarium, No. 1515591, collected at Alturas de Sieve, Provincia de la Convención, Department of Cuzco, Peru, at an elevation of 3,300 meters, June 1924, by C. Bües (No. 1575).

RANGE: Colombia to Peru, at elevations of 3,000 meters or more.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Páramo de Gúanacas, El Cauca, *Lehmann* 6398 p. p.

ECUADOR: Chuquiribamba, *André* K 111 (NY).

PERU (all from the Department of Cuzco): Camino del Cerro, Ampares, Alturas de Chaco, *Herrera* 2140. Alturas de Sieve, *Bües* 1557, 1578. Montaña de Calca, Valle de Lares, *Bües* 1916, 1919, 1923, 1932. Monte de Incienso, Huadquiña, *Bües* 724, 726. Tambohuaicco, Huadquiña, *Bües* 1345. Hacienda Amaybamba, Cerro San Marino, *Bües* 541. Cochapata, Valle de San Miguel, *Bües* 2180, 2183. Valle de San Miguel, *Bües* 2075, 2135.

The Lehmann specimen cited above was identified by Hieronymus (Bot. Jahrb. Engler 34: 433. 1904) as *H. pyramidatum* Desv. It is a mixture of the present species and *H. lobato-alatum* Klotzsch.

52. *Hymenophyllum fusugasugense* Karst. ex Sturm, Bot. Zeit. 1859: 297. 1859; Karst. Fl. Col. 2: 107. pl. 155, f. 1-8. 1862-69.

? *Hymenophyllum asterothrix* Kunze, Farnkr. 1: 160. 1844 (*nom. nud.*); v. d. Bosch, Ned. Kruid. Arch. 5³: 182. 1863 (*nom. abort.*). Kunze's plant was collected by Mathews in Peru. Van den Bosch took up the name in the sense of *H. fusugasugense*, perhaps erroneously.

Fronds pendent, indeterminate; stipes 2-9 cm. long, 0.5-0.6 mm. in diameter, nonalate throughout, deciduously pubescent, the hairs mostly simple, of several cells, a few forked; blades linear, 17-45 cm. long, 2-5 cm. broad, the rhachis nonalate throughout; pinnae 25 pairs or more, lanceolate to linear-lanceolate, 1.5-3.5 cm. long, 5-10 mm. broad at base, usually imbricate, obtuse to acuminate at apex, cuneate at base, all sessile, deeply pinnatifid; segments 4-8 pairs, the basal superior ones with twice-dichotomous veins, the ultimate segments very short; hairs of rhachises, leaf surfaces, and veins not appressed, numerous, stellate, 4-7-rayed, the stalks elongate, often of several cells, or some twice-stellate, those of the margins stellate, short-stalked, 3- or 4-rayed; veins alate on both sides of the frond (sometimes inconspicuously so above), the wings broad, membranaceous, toothed; indusia immersed at base, the valves 1.5-2 mm. long, suborbicular, densely hirsute-tomentose.

TYPE: Fusugasugá, Cundinamarca, Colombia, *Karsten*.

RANGE: Colombia, at elevations of 2,500 to 3,400 meters.¹⁰

SPECIMENS EXAMINED:

COLOMBIA (Departments of Santander, Cundinamarca, and Antioquia): *Mutis* 3202, 3203, 3208; *Killip & Smith* 18164 (NY, US); *Holton* 72 (G, NY, US); *Dawe* 178; *Cuatrecasas* 5403 (G, US); *Triana* 206 (NY), s. n. (US); *Schultze* 138; *Apollinaire Marie*; *Guevara A.* A35 (G, US); *Tomás* 415; *Ariste Joseph* A186, A204, s. n. (NY, US).

¹⁰ Reported from Venezuela by Sturm and from Ecuador by van den Bosch, but the records need to be verified.

52a. *Hymenophyllum fusugasugense* var. *aberrans* Morton, var. nov.

A var. *typica* venis supra non alatis differt.

Type in the U. S. National Herbarium, No. 1519255, collected at Tabay, Mucuntután, Mérida, Venezuela, at an elevation of 2,500 to 2,800 meters, October 20, 1930, by W. Gehriger (No. 584). Isotype at the Gray Herbarium.

ADDITIONAL SPECIMENS EXAMINED:

COLOMBIA: Without special locality, *Hartweg* 1506. Pinares, above Salento, Caldas, alt. 2,700–3,200 meters, *Pennell* 9248 (NY, US), 9399 (NY, US).

This variety, differing from the typical in having the veins nonalate on the upper side of the frond, is the plant treated by Karsten as *H. tomentosum* Kunze, mentioned below. However, it is not certain that Karsten saw authentic material of Kunze's species, which was described from Peru. The present plant is known to me only from Venezuela and Colombia. Since Kunze's description does not indicate this variety, I assign a new name and treat Kunze's species as dubious for the present, for it may very well represent an entirely different species. The variety *aberrans* is perhaps an artificial one only, for although typically *H. fusugasugense* has the veins conspicuously winged on both sides of the frond, some specimens have them only very inconspicuously winged on the upper side, and thus approach closely to the variety.

DUBIOUS SPECIES

HYMENOPHYLLUM CRISPATULUM v. d. Bosch, Ned. Kruid. Arch. 4: 412. 1859.

TYPE: Peru, *Lechler*.

From the unsatisfactory original description I am unable to identify this species. Sadebeck referred it to *H. hirtellum* Swartz, but this seems improbable.

HYMENOPHYLLUM DIVERSILOBUM (Presl) Fée, Mém. Foug. 11: 118. 1866.

Sphaerocionium diversilobum Presl, Hymenoph. 34, 59. 1843.

TYPE: Based on material of unknown origin, perhaps, according to Presl, collected in Hispaniola by Bertero.

The identity of this species has never been ascertained since Presl's time. None of the species here described answer to the description, which calls for a plant with linear-lanceolate blades, the lower pinnae with three pinnules, the middle with two, and the upper simple. The rhachis and stipe are alate. The hairs are confined to the margins and all are simple. If the description is correct, the species must come nearest to *H. crispum*.

HYMENOPHYLLUM PALMENSE Rosenst. Repert. Sp. Nov. Fedde 22: 5. 1925.

Sphaerocionium palmense Copel. Phil. Journ. Sci. 67: 31. 1938.

TYPE: La Palma, Costa Rica, *Brade* 600 (not seen).

From description I am unable to separate this species from *H. hemipteron* Rosenst. However, since Rosenstock described the two at the same time and did not compare them with each other, but *H. palmense* with *H. lineare* Swartz, and *H. hemipteron* with *H. pulchellum* Schlecht. & Cham., I hesitate to make a definite reduction.

HYMENOPHYLLUM REFRONDESCENS Sodiro. Rec. Crypt. Vasc. Quit. 2. 1883.

Hymenophyllum sericeum var. *refrondescens* Sodiro, Anal. Univ. Quit. 6: 230. 1892; Crypt. Vasc. Quit. 25. 1893.

TYPE: Santo Domingo de los Colorados, Ecuador, *Sodiro* (not seen).

From description I am unable to place this species satisfactorily. Elongate, frondlike pinnae are known in *H. trichophyllum*, *H. elegantulum*, and *H. rufum*, but from the strongly alate rhachis the present species is evidently not related to these.

HYMENOPHYLLUM TOMENTOSUM Kunze, *Linnaea* 9: 107.1834; *Farnkr.* 1: 160. *pl.* 69. 1844.

Sphaerocionium tomentosum Presl, *Hymenoph.* 34. 1843.

Dermatophlebium tomentosum Presl, *Epim.* 258. 1849.

TYPE: Pampayacu, Peru, *Poepping* (not seen).

See comment above under *H. fusugasugense* (p. 187).

HYMENOPHYLLUM TRIFIDUM Hook. & Grev. *Icon. Fil.* 2: *pl.* 196. 1831.

Sphaerocionium trifidum Presl, *Hymenoph.* 34. 1843.

TYPE: Esmeraldas, Ecuador, *Jameson*.

From the figure this species most closely resembles *H. tenerrimum* v. d. Bosch, but I am unwilling to take up the name without examining the type. It is one of the species referred by Hooker to his collective "*H. lineare*."

LIST OF NEW SPECIES, VARIETIES, AND COMBINATIONS

	Page
Hymenophyllum consanguineum	163
Hymenophyllum crispum var. <i>bipinnatisectum</i>	161
Hymenophyllum dependens	179
Hymenophyllum elegans forma <i>minor</i>	154
Hymenophyllum elegantulum var. <i>petiolulatum</i>	171
Hymenophyllum fragile	172
Hymenophyllum fragile var. <i>venustum</i>	173
Hymenophyllum fusugasugense var. <i>aberrans</i>	187
Hymenophyllum horizontale	181
Hymenophyllum maxonii	165
Hymenophyllum maxonii var. <i>angustius</i>	166
Hymenophyllum microcarpum var. <i>lanceolatum</i>	163
Hymenophyllum molle	149
Hymenophyllum multialatum	185
Hymenophyllum roraimense	152
Hymenophyllum silvaticum	159
Hymenophyllum simplex	171
Hymenophyllum superbum	178
Hymenophyllum trichophyllum var. <i>buesii</i>	152
Hymenophyllum verecundum	183

INDEX TO NUMBERED SPECIMENS CITED

ABBOTT, W. L.

1386. hirsutum.
 2023. hirsutum.
 2046. hirsutum.
 2057. elegans.
 2076. lanatum.
 2104. hirsutum.
 2120. elegans.
 2177. elegans.

ACUÑA, J.

9953. sericeum.

ALFARO, A.

123. plumosum.

ANDRÉ, E.

1295. elegantulum.
 1553. lindenii.
 1559. lindenii.
 1559bis. lindenii.
 2201. elegantulum.
 2684. karstenianum.
 2977. ruizianum.
 3338. elegans.
 K105. plumieri.
 K111. multialatum.

APOLLINAIRE MARIE, BRO.

27. trichophyllum.

APOLLINAIRE, BRO., and ARTHUR, BRO.

10. trapezoidale.
 27 p. p. microcarpum.
 141. elegantulum.

ARCHER, W. A.

1332. microcarpum.
 1650. elegans.
 1659. fragile.

ARISTE JOSEPH, BRO.

A186. fusugasugense.
 A204. fusugasugense.
 A518. trichophyllum.

BANG, M.

349. interruptum.
 436. interruptum.
 555. microcarpum.
 897. valvatum.

899. p. p. tenerrimum.

904. interruptum.

BARNES, C. R., and LAND, W. J. G.

497a. hirsutum.

BLAKE, S. F.

7475. hirsutum.

BLOMQUIST, H. L.

12741. sieberi.

13139. hirsutum.

BOX, H. E.

253. hirsutum.

519. hirsutum.

BRADY, A. C.

5207. fragile var. venustum.

5225. hirsutum.

5853. rufum.

5858. hirsutum.

6283. hirsutum.

6432. crispum.

6618. elegans.

8325. fragile var. venustum.

8326. hirsutum.

8356. microcarpum.

8358. elegans.

9510. rufum.

9549. fragile var. venustum.

9573. fragile.

9881. sampaioanum.

(Mus. Rio Jan. 21612). fragile.

(Mus. Rio Jan. 20613). elegans.

BRADY, A., and BRADY, C.

395. semiglabrum.

620. hemipteron.

621. hemipteron.

851. hemipteron.

852. hemipteron.

BRENES, A. M.

(Herb. Nac. Cost. 14211). sieberi.

BRITTON, E. G.

1129. lanatum.

1134. sericeum.

2289. hirsutum.

7680. microcarpum.

7681. lineare.

- BRITTON, N. L., and BRITTON, E. G.
2109. *hirsutum*.
- BRITTON, N. L., COKER, D., and ROWLAND, W. R.
1378. *hirsutum*.
1379. *hirsutum*.
1380. *hirsutum*.
- BRITTON, N. L. and COWELL, J. F.
779. *hirsutum*.
- BRITTON, N. L., and HAZEN, T. E.
375. *hirsutum*.
- BRITTON, N. L., HAZEN, T. E., and MENDELSON, W.
1374. *elegans*.
1377. *hirsutum*.
- BRITTON, N. L., and MARBLE, D. W.
1075. *microcarpum*.
- BROADWAY, W. E.
2535. *hirsutum*.
4541. *hirsutum*.
5811. *hirsutum*.
5638. *hirsutum*.
5655. *elegans*.
7109. *elegans*.
7114. *dependens*.
9978. *hirsutum*.
- BRYAN, G. S.
628. *amabile*.
- BUCHTIEN, O.
68. *hirsutum*.
104. *elegantulum*.
897. *elegantulum*.
2745. *elegantulum*.
2746. *speciosum*.
3564. *microcarpum*.
3568. *interruptum*.
3575. *fragile*.
5198. *microcarpum*.
5199. *elegans*.
5200. *valvatum*.
5212. *hirsutum*.
5213. *microcarpum*.
5289. *plumosum*.
5290. *interruptum*.
5292. *microcarpum*.
5931. *microcarpum*.
7065 p. p. *pyramidatum*.
- BUES, C.
541. *multialatum*.
576. *speciosum*.
708. *molle*.
715. *amabile*.
719. *crispum*.
720. *elegantulum*.
722. *ruizianum*.
724. *multialatum*.
726. *multialatum*.
801. *interruptum*.
803. *karstenianum*.
806. *interruptum*.
813. *interruptum*.
819. *ruizianum*.
1341. *speciosum*.
1343. *speciosum*.
1345. *multialatum*.
1407. *molle*.
1528. *crispum* var. *bipinnatisectum*.
1535. *speciosum*.
1544. *ruizianum*.
1557. *multialatum*.
1575. *multialatum*.
1576. *ruizianum*.
1578. *multialatum*.
1580. *crispum* var. *bipinnatisectum*.
1808. *speciosum*.
1813. *crispum*.
1814. *interruptum*.
1815. *interruptum*.
1817. *speciosum*.
1819. *interruptum*.
1821. *speciosum*.
1911. *microcarpum*.
1913. *microcarpum*.
1916. *multialatum*.
1918. *ruizianum*.
1919. *multialatum*.
1923. *multialatum*.
1932. *multialatum*.
1933. *speciosum*.
1942. *ruizianum*.
1943. *verecundum*.
2018. *microcarpum*.
2035. *microcarpum*.
2068. *speciosum*.
2072. *molle*.
2075. *multialatum*.
2076. *trichophyllum* var. *buesii*.
2102. *molle*.

2108. amabile.
 2109. amabile.
 2110. amabile.
 2115. molle.
 2135. multialatum.
 2136. speciosum.
 2139. hirsutum.
 2143. speciosum.
 2148. amabile.
 2150. amabile.
 2168. amabile.
 2170. amabile.
 2178. speciosum.
 2180. multialatum.
 2183. multialatum.

BURCHELL, W. J.

2258. plumosum.
 2259. pulchellum.
 3546. pulchellum.
 3560. hirsutum.
 3720. hirsutum.
 3721. elegans.

CÁRDENAS, M.

1038. verecundum.
 1044. ruizianum.
 1277. interruptum.
 1976. hirsutum.

CHASE, A.

6469b. microcarpum.
 6471b. lineare.
 10712. elegans.

CHRYSLER, M. A.

1660. fragile.
 1746. microcarpum.
 1809b. lineare.

CLAUSSEN, M. P.

100. plumosum.

CLÉMENT, BRO.

777. lineare.
 788. sericeum.
 1398 p. p. hirtellum.
 1398 p. p. microcarpum.
 2183. lanatum.

CLUTE, W. N.

84. lanatum.
 98. sericeum.
 123. hirtellum.
 274a. lineare.

CONZATTI, C., and GOMEZ, I. C.

3477. elegantulum.

CONZATTI, C., and GONZALEZ, V.

720. elegantulum.

COOK, O. F.

30. microcarpum.

COOK, O. F., and DOYLE, C. B.

23c. sieberi.
 39. hirsutum.
 57. pulchellum.
 148. lineare.
 150. lanatum.

COOK, O. F., and GRIGGS, R. F.

60. microcarpum.
 400. fragile.
 440. pulchellum.

COOPER, G. P.

106a. hirsutum.
 404a. sieberi.

COOPER, J. J.

(Donn. Smith 6020). microcarpum.

CORNMAN, MRS. L. R.

1103. plumosum.
 1175. semiglabrum.
 1204. hemipteron.
 1244. elegans.
 1303. fragile.

COUTHOUY, J. P.

63. plumieri.
 67. trichophyllum.

CRUZ, J. S., DE LA

2786. hirsutum.

CUATRECASAS, J.

5403. fusugasugense.
 11700. ruizianum.
 12449. microcarpum.
 12547. interruptum.
 13390. valvatum.
 16291a. hirsutum.

CUMING, H.

23. microcarpum.

CURRAN, H. M., and HAMAN, M.

679. *hirsutum*.

CURTIS, J. T.

37. *hirsutum*.

DANIEL, BRO.

19. *plumosum*.649. *lobato-alatum*.1726a. *plumosum*.

DAWE, M. T.

178. *fusugasugense*.323. *microcarpum*.324. *interruptum*.

DUSÉN, P.

164. *rufum*.713. *hirsutum*.2935. *pulchellum*.3362. *elegans*.3447. *hirsutum*.6524. *pulchellum*.6773. *microcarpum*.

DUSS, PÈRE

1514. *hirsutum*.1516. *hirsutum*.1517. *sericeum*.1519. *latifrons*.1520. *sieberi*.4265. *latifrons*.4266. *sericeum*.4267a. *lanatum*.4268. *elegans*.4269. *hirsutum*.4274. *hirsutum*.4279. *sericeum*.4281. *hirsutum*.4387. *lineare*.4574. *sieberi*.

EGGERS, H. F. A.

5337. *hirsutum*.6852 p. p. *hirsutum*.6902. *hirsutum*.6903. *lanatum*.

EKMAN, E. L.

1693. *sericeum*.1694. *hirsutum*.3883. *lanatum*.5209. *fragile*.6828. *elegans*.6961. *sericeum*.6987. *hirtellum*.7173. *microcarpum*.8861. *hirsutum*.14412. *sericeum*.14540. *urbanii*.14798. *hirtellum*.H1490. *hirtellum*.H2547. *microcarpum*.H4775. *elegans*.H4859. *hirsutum*.H4869. *microcarpum*.H5452. *microcarpum*.H7377. *microcarpum*.H7687. *urbanii*.H7721. *fragile*.H11453. *hirsutum*.H12004. *elegantulum*.H12286. *elegans*.H12395. *hirsutum*.H12753. *elegans*.H13834a. *elegantulum*.H13834b. *elegantulum*.H14035. *hirtellum*.H14255. *sericeum*.

FENDLER, A.

33. *microcarpum*.37. *hirsutum*.38. *fragile*.39 p. p. *karstenianum*.86. *hirsutum*.327. *trichophyllum*.387. *lanatum*.457. *elegans* f. *minor*.481. *dependens*.

FOSTER, M., and FOSTER, N.

710a. *plumosum*.

FUERTES, M.

1448b. *microcarpum*.1510 p. p. *microcarpum*.1510 p. p. *hirtellum*.1772. *sericeum*.1817. *urbanii*.

GARDNER, J.

210. *microcarpum*.213. *hirsutum*.

GEHRIGER, W.

584. *fusugasugense* var. *aberrans*.

GLAZIOU, M. A.

920. *hirsutum*.
 1713. *hirsutum*.
 1714. *microcarpum*.
 2271. *microcarpum*.
 2268. *hirsutum*.
 2269. *hirsutum*.
 2270. *hirsutum*.
 2467. *rufum*.
 3347. *crispum*.
 3349. *valvatum?*
 3356. *hirsutum*.
 3491. *elegans*.
 4441. *hirsutum*.
 4444. *plumosum*.
 6410. *fragile*.
 7272. *hirsutum*.
 7890. *glaziovii*.

GUEVARA A., BRO.

- A34. *trapezoidale*.
 A35. *fusugasugense*.

HARRIS, W.

7105. *lineare*.
 7108. *sericeum*.
 7113. *fragile*.

HART, J. H.

5. *lineare*.
 8. *sericeum*.
 65. *urbanii*.
 129. *lanatum*.
 203. *crispum*.
 206. *hirsutum*.
 217. *fragile*.
 248. *microcarpum*.
 372. *crispum*.

HARTWEG, C. T.

1506. *fusugasugense* var. *aberrans*.

HATCH, W. R.

119. *sieberi*.

HATCH, W. R., and WILSON, C. L.

18. *hirsutum*.
 91. *microcarpum*.
 98. *microcarpum*.
 100. *lanatum*.
 102. *hirsutum*.
 176. *maxonii* var. *angustius*.
 178. *lanatum*.
 181. *maxonii* var. *angustius*.

183. *microcarpum*.
 194. *sieberi*.
 199. *microcarpum*.
 216. *fragile*.
 232. *pulchellum*.
 239. *maxonii* var. *angustius*.
 269. *microcarpum*.
 372. *pulchellum*.

HAUGHT, O.

1795. *hirsutum*.
 2078. *hirsutum*.

HAWEIS, S.

1. *hirsutum*.

HEILBORN, O.

700. *elegantulum*.

HENRI-STANISLAS, BRO.

1655. *microcarpum*.
 1685. *crispum*.
 1688c. *trapezoidale*.

HERRERA, F. L.

2140. *multialatum*.
 2142. *ruizianum*.
 2144. *ruizianum*.
 3010. *microcarpum*.

HERZOG, T.

1906. *speciosum*.
 1952. *trichophyllum*.
 2268. *verecundum*.
 3831. *crispum*.

HESS, W. E.

222. *hirsutum*.
 308. *microcarpum*.

HINTON, G. B.

3268. *trapezoidale*.
 14306. *elegantulum*.
 14306a. *crispum*.

HIORAM, BRO., and CLÉMENT, BRO.

6363. *hirsutum*.
 6510. *hirtellum*.
 6513. *sericeum*.
 6517. *lanatum*.

HIORAM, BRO., and MAUREL, C.

6035. *hirsutum*.

HODGE, W. H.

158. *hirsutum*.
159. *hirsutum*.
1412. *latifrons*.

HODGE, W. H., and HODGE, B. T.

2825. *hirsutum*.

HOEHNE, F. C.

752. *microcarpum*.

HOLDRIDGE, L. R.

1333. *sericeum*.

HOLTON, I. F.

72. *fusugasugense*.
73. *microcarpum*.

JACK, J. G.

8057. *hirtellum*.

JAHN, A.

1009. *lindenii*.

JAMESON, W.

12. *valvatum*.
68. *plumieri*.
73. *plumieri*.
82. *trichophyllum*.
109. *microcarpum*.
219. *microcarpum*.
235. *plumieri*.

JELSKI, C. DE

897. *simplex*.

JENMAN, G. S.

85. *antillense*.

JIMÉNEZ, O.

593. *hemipteron*.

JOHNSON, D. S.

1. *microcarpum*.
3. *hirsutum*.

JOHNSON, H.

151. *microcarpum*.
174. *hirsutum*.
361. *lineare*.
362. *hirsutum*.
363. *sieberi*.
368. *pulchellum*.
532. *maxonii* var. *angustius*.

534. *microcarpum*.
593. *sieberi*.
705. *maxonii* var. *angustius*.
706. *pulchellum*.
811. *microcarpum*.
813. *fragile*.
814. *lineare*.
817. *maxonii* var. *angustius*.
910. *sieberi*.
911. *sieberi*.
918. *maxonii* var. *angustius*.
922. *lineare*.
923. *maxonii* var. *angustius*.
926. *microcarpum*.
928. *pulchellum*.

JUERGENS, C.

135. *crispum*.
136. *fragile*.
137. *pulchellum*.
(Rosenst. 159). *crispum*.
(Rosenst. 255). *crispum*.

KANEHIRA, R.

123. *pyramidatum*.

KILLIP, E. P.

5048. *microcarpum*.
5064. *plumosum*.
5226. *fragile*.
5264. *hemipteron*.
5268. *consanguineum*.
5270. *hemipteron*.
5273. *trichophyllum*.
5280. *hemipteron*.
5282. *fragile*.
5283. *fragile*.
5340. *elegans*.
5395. *fragile*.
5397. *microcarpum*.
5399a. *fragile*.
5404 p. p. *subrigidum*.
5495. *subrigidum*.
6705. *trichophyllum*.
6720. *trichophyllum*.
7719. *microcarpum*.
7736. *fragile*.
11228. *microcarpum*.
11294. *fragile*.
11327. *plumosum*.
11347. *lindenii*.
11366. *dependens*.
11557. *silvaticum*.
12140. *trichophyllum*.
35267. *microcarpum*.

KILLIP, E. P., and GARCÍA, H.

33934. fragile.
35645. microcarpum.

KILLIP, E. P., and HAZEN, T. E.

9458. elegantulum.
9478. trichophyllum.
11141. microcarpum.
11148. microcarpum.

KILLIP, E. P., and SMITH, A. C.

- 15334 p. p. elegans.
15334 p. p. elegans f. minor.
15342. elegans.
15358. karstenianum.
16143. microcarpum.
17220. trapezoidale.
17787. ruizianum.
17839. trapezoidale.
18164. fusugasugense.
18773 p. p. trapezoidale.
19930. lindenii.
20660. trichophyllum.
24833. plumosum.
24840. plumosum.
24850. interruptum.
25733. plumosum.
25869. pyramidatum.
25899. interruptum.
25948. verecundum.
28539. hirsutum.

KLUG, G.

3248. lobato-alatum.

KNIGHT, W.

29268. pulchellum.
29271. pulchellum.
29373. subrigidum.

KOHAUT, F.

- (Sieber 71). sieberi.

LANKESTER, C. H.

648. plumosum.
648b. pulchellum.
664. hemipteron.
708. subrigidum.
752. fragile
892. plumosum.

LECHLER, W.

2246. speciosum.
2498. valvatum.

LEHMANN, F. C.

124. valvatum.
125. plumieri.
652. trichophyllum.
1978. microcarpum.
1979. valvatum.
1983. fragile.
2210. microcarpum.
2442. trapezoidale.
2656. lindenii.
3055. microcarpum.
3128. lindenii.
4932. lindenii.
6392. lindenii.
6397. trichophyllum.
6398 p.p. multialatum.
6414. microcarpum.
7585. lobato-alatum.
7586. plumosum.
B. T. 745. microcarpum.

LEÓN, BRO.

11116. urbanii.

LEÓN, BRO., CLÉMENT, BRO., and
ROCA, PRE.

10258. lanatum.
10502. hirsutum.

LEONARD, E. C.

4531. microcarpum.
4656. sericeum.

LEONARD, E. C., and LEONARD, G. M.

14501. hirsutum.
14577. hirsutum.
15161. hirsutum.

LINDEN, J. J.

173. lindenii.

LINDIG, A.

122. microcarpum.

LINDMAN, C. A. M.

- (Regnell A487). pulchellum.

LUEDERWALT, H.

- (Mus. Paulista 1539). pulchellum.

LUETZELBURG, P. VON

395. rufum.
6363. crispum.

7103. elegans.

7203. elegans.

LYONNET, E.

2858. trapezoidale.

MACBRIDE, J. F.

4516. ruizianum.

5146. plumosum.

5632. pyramidatum.

MAGUIRE, B.

24579. trapezoidale.

MATHEWS, A.

1090. pyramidatum.

MATUDA, E.

2908. elegantulum.

MAXON, W. R.

238. microcarpum.

496. elegans.

508. fragile.

519. fragile.

909. sericeum.

955. lanatum.

959. lanatum.

1063. sericeum.

1075. lanatum.

1081. hirsutum.

1220. fragile.

1227. lineare.

1233. microcarpum.

1256. fragile.

1297. lanatum.

1303. sericeum.

1383. urbanii.

1543. hirtellum.

1565. hirtellum.

1732. lanatum.

1915. hirtellum.

2247. hirtellum.

2430. hirtellum.

2433. hirtellum.

2666. urbanii.

2714. lanatum.

2719. urbanii.

2746. crispum.

2755. crispum.

2779. microcarpum.

5438. plumosum.

5447a. consanguineum.

5453. consanguineum.

5457. elegantulum.

5468. elegantulum.

5470. consanguineum.

5491. elegantulum.

5566. microcarpum.

5610. fragile.

5624. consanguineum.

5632. elegantulum.

5683. fragile.

5693. plumosum.

8845. hirtellum.

8856. hirtellum.

8943. lanatum.

8959. hirtellum.

9017. lanatum.

9018. hirsutum.

9021. lanatum.

9027a. lanatum.

9061. hirtellum.

9119. hirtellum.

9123. lanatum.

9188. hirsutum.

9197. lanatum.

9205. hirsutum.

9257. hirsutum.

9283. lanatum.

9422. lanatum.

9444. hirsutum.

9569. hirsutum.

9589. lanatum.

9644. sericeum.

9654. lanatum.

9707. crispum.

9716. sericeum.

9717. lanatum.

9720. crispum.

9725. hirsutum.

9726. lineare.

9729. sericeum.

9732. fragile.

9733. urbanii.

9742. lanatum.

9749. fragile.

9750. urbanii.

9820. crispum.

9840. crispum.

9877. urbanii.

10016. urbanii.

10028. lanatum.

10034. urbanii.

10139. lanatum.

10140. fragile.

10189. fragile.

10201. lanatum.

10250. fragile.
 10252. lanatum.
 10259. fragile.
 10551. hirsutum.
 10555. sericeum.
 10579. hirsutum.
 10583. hirtellum.

MAXON, W. R., and HARVEY, A. D.

7966. elegans.
 7978. horizontale.
 7979. sieberi.
 8172. hemipteron.
 8178. fragile.
 8187. hemipteron.
 8193. hemipteron.
 8202. subrigidum.
 8212. consanguineum.
 8236. hemipteron.
 8237. subrigidum.
 8239. hemipteron.
 8358. hemipteron.

MAXON, W. R., and HAY, R.

3212. hirsutum.
 3326. maxonii.
 3327. fragile.
 3328. maxonii.
 3329. elegans.
 3334. lanatum.
 3335. maxonii.

MAXON, W. R., and KILLIP, E. P.

177. hirtellum.
 666. sericeum.
 670. lanatum.
 705. lanatum.
 773. hirtellum.
 777. hirtellum.
 965. crispum.
 1017. sericeum.
 1172. lanatum.
 1176. urbanii.

MAYOR, E.

73. elegantulum.

MEXIA, Y.

4051. plumosum.
 4299. hirsutum.
 6288a. hirsutum.
 6926. lobato-alatum.
 6928. microcarpum.
 6931. microcarpum.

7021. hirsutum.
 7297. lobato-alatum.
 8143a. verecundum.
 8145. hirsutum.
 8258. lobato-alatum.
 9277 p. p. hirsutum.
 9277 p. p. trapezoidale.

MIERS, J.

250. fragile var. venustum.

MILLE, L.

120. trichophyllum.

MORITZ, J.

266. fragile.
 266b. hirsutum.
 269. microcarpum.
 340. interruptum.
 344 p. p. trichophyllum.
 381 p. p. karstenianum.

MORTON, C. V., and ACUÑA, J.

3524. hirsutum.
 3558. elegantulum.
 3702. sericeum.
 3706. microcarpum.
 3708. elegans.
 4500. sericeum.

MOSÉN, H.

(Regnell 3101). glaziovii.

MUENCH, G.

11. sieberi.

MUTIS, J. C.

3186. trapezoidale.
 3189. elegantulum.
 3193. trapezoidale.
 3197. elegantulum.
 3198. elegantulum.
 3202. fusugasugense.
 3203. fusugasugense.
 3205. trichophyllum.
 3207. microcarpum.
 3208. fusugasugense.
 3209. elegantulum.

NELSON, E. W.

3633. elegantulum.

D'ORBIGNY, C.

175. speciosum.
 304. crispum.

ORCUTT, C. R.

5279. microcarpum.
5371. urbanii.
5585. lineare.

PENLAND, C. W., and SUMMERS, R. H.

882. trichophyllum.

PENNELL, F. W.

4391. dependens.
6989. trichophyllum.
9248. fusugasugense var. aberrans.
9399. fusugasugense var. aberrans.

PENNELL, F. W., and HAZEN, T. E.

9941. trichophyllum.
10080. trichophyllum.
10081. elegantulum.

PENNELL, F. W., and KILLIP, E. P.

5799. dependens.

PITTIER, H.

317. microcarpum.
337. sieberi.
1192. lindenii.
3552. hirsutum.
(Donn. Smith 7490). elegantulum.
(Herb. Nat. Cost. 10984). microcarpum.
(Herb. Nat. Cost. 12109). hirsutum.
(Herb. Nat. Cost. 13259^{ter}). fragile.

POEPPIG, E. F.

1104. interruptum.

PRESTOE, H.

- (Herb. Trinidad 1200). dependens.

PRINGLE, C. G.

5591. pulchellum.
6079. fragile.
8157. trapezoidale.
13255. fragile.

PURPUS, C. A.

152. pulchellum.
164. trapezoidale.
165. trapezoidale.
166. trapezoidale.
1985. trapezoidale.

QUESTEL, A.

1028. valvatum.
1044. hirsutum.
1102. lineare.

1790. lanatum.
1846. hirsutum.

REGNELL, A. F.

- III. 1485. pulchellum.

RIEDEL, L.

34. pulchellum.
47. pulchellum.

RIMBACH, A.

12. superbum.
13. valvatum.
19. superbum.
19A. superbum.
77. valvatum.
78. microcarpum.

ROSE, J. N., and RUSSELL, P. G.

20580. rufum.
20771. microcarpum.

RUIZ, H.

83. lobato-alatum.
85. ruizianum.

RUSBY, H. H.

135. interruptum.
137. microcarpum.
140. plumosum.
183. interruptum.

SAMPAIO, A. J.

2566. hirsutum.

SANTOS, J. V.

3351. trapezoidale.

SARGENT, F. H.

323. sieberi.
3144. elegantulum var. petiolulatum.

SCHLIM, L.

857. microcarpum.

SCHMALZ, A.

174. hirsutum.

SCHRAMM, E. E.

24. hirsutum.
34. hirsutum.
39. hirsutum.

SCHULTES, R. E.

5637. *hirsutum*.

SCHULTZE, A.

138. *fusugasugense*.

SCHUNKE, C.

183. *interruptum*.
 463. *microcarpum*.
 466. *pyramidatum*.
 926. *pyramidatum*.
 1491. *microcarpum*.
 1559. *microcarpum*.
 A241. *pyramidatum*.
 A244. *microcarpum*.
 A245. *interruptum*.

SCHWACKE, W.

11085. *silveirae*.
 12528. *silveirae*.

SEIFRIZ, W.

329. *hirsutum*.

SHAFFER, J. A.

767. *hirsutum*.
 768. *hirsutum*.
 774. *hirsutum*.
 2329. *microcarpum*.
 3312. *microcarpum*.
 3355. *microcarpum*.
 3894. *sericeum*.
 8119. *sericeum*.
 8130. *lanatum*.
 8132. *sericeum*.
 9030. *hirsutum*.

SILVEIRA, A.

2332. *silveirae*.

SINTENIS, P.

6353. *hirsutum*.

SKUTCH, A. F.

164. *hirsutum*.
 286. *elegantulum*.
 3559. *fragile*.
 3639. *microcarpum* var. *lanceolatum*.
 4461. *microcarpum*.

SMITH, H. H.

993. *karstenianum*.
 1100. *elegans* f. *minor*.

2249. *microcarpum*.2600. *fragile*.

SMITH, H. H. AND SMITH, G. W.

445. *hirsutum*.

SMITH, J. D.

1548. *maxonii*.
 1549. *pulchellum*.

SMITH, L. B.

1760. *rufum*.

SNEIDERN, K. VON

563. *dependens*.

SPANNAGEL, C.

121. *pulchellum*.
 123. *crispum*.
 156. *fragile*.
 317. *elegans*.
 (Rosenst. 448). *elegans*.

SPRUCE, R.

2974. *hirsutum*.
 4694. *karstenianum*.
 4702. *tenerrimum*.
 5421. *ruizianum*.

STANDLEY, P. C.

32902. *elegans*.
 33044. *hemipteron*.
 33139. *lineare*.
 33639. *microcarpum*.
 33646. *elegans*.
 34418. *fragile*.
 35189. *elegans*.
 35403. *crispum*.
 35535. *fragile*.
 35659. *subrigidum*.
 35667. *fragile*.
 36350. *horizontale*.
 38114. *horizontale*.
 38115. *plumosum*.
 38447. *trichophyllum*.
 38733. *trichophyllum*.
 38811. *elegantulum* var. *petiolulatum*.
 38830. *crispum*.
 39388. *plumosum*.
 39609. *horizontale*.
 39653. *plumosum*.
 39692. *microcarpum*.
 39744. *microcarpum*.

39750. microcarpum.
 39864. plumosum.
 39875. microcarpum.
 39881. microcarpum.
 66242. crispum.
 71622. sieberi.
 71661. microcarpum.

STANDLEY, P. C., and TORRES, R.

51062. fragile.
 51360. fragile.

STANDLEY, P. C., and VALERIO, J.

51525. trichophyllum.
 52270. subrigidum.

STEHLÉ, H.

1222. hirsutum.
 1778. lineare.
 2052. valvatum.
 2248. valvatum.
 3405. valvatum.
 3446. sieberi.
 5380. hirsutum.

STEINBACH, J.

8373bis. interruptum.
 8895. verecundum.
 9141. interruptum.
 9142. verecundum.
 9260. ruizianum.

STEVENSON, J. A.

1552. microcarpum.

STEWART, A.

898. hirsutum.

STEYERMARK, J. A.

30787. maxonii.
 31568. hirsutum.
 35436. pulchellum.
 36060. crispum.
 36444. crispum.
 36710. pulchellum.
 36780. crispum.
 37128. pulchellum.
 39378. hirsutum.

STORK, H. E.

1176. fragile.

STOUDT, H. N.

800. urbanii.

STUEBEL, A.

43. trichophyllum.
 237. trichophyllum.
 336. trichophyllum.
 813. trichophyllum.

TATE, G. H. H.

331. trichophyllum.
 453. trichophyllum.
 499. microcarpum.
 852. karstenianum.
 1053. pyramidatum.
 1061. microcarpum.

THOMPSON, S. A.

17. hirsutum.

THURN, E. F., IM

200. antillense.
 203. roraimense.
 206. microcarpum.
 371. microcarpum.
 375. roraimense.

TOMÁS, BRO.

415. fusugasugense.

TONDUZ, A.

(Herb. Nat. Cost. 10141). plumosum.
 (Herb. Nat. Cost. 13341). microcarpum.

TORRES R., R.

6. elegantulum var. petiolulatum.
 94. microcarpum.
 117. fragile.
 192. fragile.
 193. elegans.
 204. subrigidum.

TRELEASE, W.

21. lanatum.

TRIANA, J.

199. lindenii.
 206. fusugasugense.

TUERCKHEIM, H. VON

12. pulchellum.
 12a. sieberi.
 647 p. p. sieberi.
 647 p. p. maxonii var. angustius.
 650. microcarpum.
 951. fragile.

II. 1569. pulchellum.
 II. 1847. hirsutum.
 II. 1849. hirsutum.
 II. 1851. hirsutum.
 II. 1936. pulchellum.
 II. 1938. lanatum.
 II. 1984. microcarpum.
 II. 1985. microcarpum.
 II. 1986. sieberi.
 II. 2081. sieberi.
 (Donn. Smith 8031). hirsutum.
 (Donn. Smith 8805). hirsutum.

TUTIN, T. G.

532. hirsutum.

ULE, E.

206. hirsutum.
 252. plumosum.
 4510. hirsutum.
 (Mus. Rio Jan. 200). hirsutum.

UNDERWOOD, L. M.

517. lineare.
 873. lineare.
 1018. urbanii.
 1268. hirtellum.
 1474. urbanii.

VALERIO, M.

42. microcarpum.
 48. elegans.
 93. plumosum.
 95. elegantulum var. petiolulatum.
 151. fragile.
 305. trichophyllum.
 2349. fragile.
 A9. plumosum.
 A11. fragile.
 III. 40. horizontale.

VALEUR, E. J.

359. sericeum.

VARGAS, C.

3262. fragile.
 3294. microcarpum.
 3295. ruizianum.

VAUTHIER, M.

672. hirsutum.

WACKET, M.

109. hirsutum.
 (Mus. Paulista 1296). pulchellum.

(Rosenst. 65). microcarpum.
 (Rosenst. 175). pulchellum.
 (Rosenst. 176). pulchellum.
 (Rosenst. 327). hirsutum.

WATT, D.

36. fragile.
 37. lineare.
 106. sericeum.
 167. microcarpum.
 188bis. lanatum.

WEBSTER, R. N., and GOLDBERG, B.

138. fragile.
 149. lineare.
 248. crispum.

WERCKLÉ, C.

247. sieberi.
 547. lineare.
 565. sieberi.
 574. sieberi.
 585. subrigidum.

WILLIAMS, R. S.

1215. interruptum.
 1233. speciosum.
 1234. microcarpum.
 1235. fragile.
 1238. elegans.
 2605. speciosum.
 2606. crispum.

WILSON, C. L.

216. microcarpum.
 220. microcarpum.
 233. microcarpum.
 339. maxonii var. angustius.

WILSON, N.

573. lineare.

WILSON, P.

168. lineare.

WOODSON, R. E., Jr., and SCHERY, R. W.

589. plumosum.

WRIGHT, C.

904. sericeum.
 905. lanatum.
 956. hirsutum.
 3937. hirsutum.

INDEX

[Synonyms in *italics*. Page numbers of principal entries in **boldface**]

<i>Dermatophlebium tomentosum</i>	188	<i>Hymenophyllum gardnerianum</i> ..	156
<i>Didymoglossum lineare</i>	149	<i>glaziovii</i>	144, 145, 164
<i>Hymenoglossum</i>	140	<i>gratum</i>	156
<i>Hymenophyllum</i>	139,	<i>hemipteron</i>	143,
	140, 142, 143, 148		144, 146, 169 , 187
<i>adiantoides</i>	144, 145, 155	<i>forma acropteron</i>	169
<i>aequabile</i>	177	<i>forma minor</i>	169
<i>amabile</i>	139, 144, 146, 175	<i>hirsutum</i>	139,
<i>angustifrons</i>	162		142, 143, 144, 145, 155 , 161, 166,
<i>angustum</i>	144, 146, 174		168, 173, 174, 181.
<i>antillense</i> ... 141, 143, 146, 152, 169		<i>hirtellum</i>	142,
<i>apterum</i>	167		143, 145, 164 , 166, 187
<i>asterothrix</i>	186	<i>horizontale</i>	143, 147, 181
<i>atrovirens</i>	166	<i>intercalatum</i>	172
<i>beyrichianum</i>	162	<i>interruptum</i>	144, 147, 177
<i>boryanum</i>	155	<i>kaieteurum</i>	160
<i>brasilianum</i>	160	<i>karstenianum</i> ... 144, 147, 176 , 185	
<i>buchtienii</i>	170	<i>lanatum</i>	143, 144, 146, 171
<i>catherinae</i>	149	<i>latifrons</i>	143, 146, 168
<i>caudatellum</i>	153	<i>lindenii</i>	144, 147, 177
<i>caulopteron</i>	156, 158	<i>lindigii</i>	162
<i>chrysothrix</i>	150	<i>lineare</i> .. 139, 142, 143, 144, 149 , 187	
<i>ciliatum</i>	155, 158, 174, 181	<i>var. antillense</i>	169
<i>var. abbreviatum</i>	156	<i>var. brasiliense</i>	150
<i>var. nudipes</i>	167	<i>forma pseudocarpum</i> ...	150
<i>forma tuberosum</i>	156	<i>forma tuberosum</i>	150
<i>commulatum</i>	156	<i>lobato-alatum</i>	144,
<i>consanguineum</i> .. 143, 144, 145, 163			147, 182 , 183, 186
<i>constrictum</i>	160	<i>lobato-papillosum</i>	182
<i>contractile</i>	162	<i>maxonii</i>	143, 146, 165 , 166
<i>crispatum</i>	144, 187	<i>var. angustius</i>	166
<i>crispum</i> ... 142, 143, 144, 145, 160		<i>microcarpon</i>	156
<i>var. bipinnatisectum</i> ...	161	<i>microcarpum</i>	143,
<i>var. brasilianum</i>	160		144, 145, 156, 162 , 164
<i>cruegeri</i>	139, 153	<i>var. lanceolatum</i>	163
<i>cubense</i>	181	<i>molle</i>	144, 149
<i>delicatissimum</i>	153	<i>moritzianum</i>	151
<i>dependens</i>	143, 144, 147, 179	<i>multialatum</i>	144, 148, 185
<i>dimorphum</i>	143, 144, 148	<i>notabile</i>	162, 163
<i>divaricatum</i>	160	<i>orbignianum</i>	160
<i>diversilobum</i>	143, 187	<i>organense</i>	162, 163
<i>elatus</i>	156, 158	<i>palmense</i>	143, 187
<i>elegans</i>	139,	<i>pannosum</i>	150
	143, 144, 145, 153 , 154, 155	<i>pastoense</i>	167
<i>forma minor</i>	145, 154	<i>platylobum</i>	161
<i>elegantissimum</i>	156, 160, 161	<i>plumieri</i>	144, 147, 180
<i>elegantulum</i>	143,	<i>plumosum</i> .. 141, 143, 144, 148, 184	
	144, 146, 170 , 187	<i>prionema</i>	144, 145, 158
<i>var. petiolulatum</i>	171	<i>procerum</i>	151
<i>eriophorum</i>	151	<i>producens</i>	161
<i>ferrugineum</i>	142	<i>pteropodum</i>	162
<i>fragile</i>	143, 144, 146, 172	<i>pulchellum</i>	139,
<i>var. venustum</i>	173		140, 143, 144, 150, 170, 187
<i>francavillei</i>	161	<i>pyramidatum</i>	141,
<i>fraseri</i>	156		144, 148, 183 , 184, 186
<i>fuertesii</i>	181	<i>var. lobato-alatum</i>	182
<i>fusugasugense</i>	141,	<i>refrondescens</i>	144, 187
	144, 148, 184, 186 , 187	<i>remotum</i>	156
<i>var. aberrans</i>	187	<i>roraimense</i>	144, 145, 152

<i>Hymenophyllum rufum</i>	144,	<i>Sphaerocionium buchtienii</i>	170
<i>forma pseudocarpum</i>	147, 176, 187	<i>ciliatum</i>	155, 156
<i>ruizianum</i>	144, 146, 167, 177	<i>commutatum</i>	155
<i>sampaioanum</i>	144, 145, 159	<i>crispum</i>	160
<i>schiedeanum</i>	160	<i>var. pilosum</i>	160
<i>semiglabrum</i>	143, 144, 145, 158	<i>cruegeri</i>	153
<i>sericeum</i> ... 139, 141, 143, 147,	181	<i>diversilobum</i>	187
<i>var. refrondescens</i>	187	<i>elegans</i>	153
<i>sieberi</i>	140, 143, 147, 179	<i>elegantissimum</i>	156
<i>silvaticum</i>	144, 145, 159	<i>elegantulum</i>	170
<i>silveirae</i>	144, 148	<i>grevilleanum</i>	155
<i>simplex</i>	144, 146, 171	<i>hemipteron</i>	169
<i>speciosum</i>	144, 147, 175, 185	<i>hirsutum</i>	155
<i>spectabile</i>	175	<i>hirtellum</i>	164
<i>splendidum var. apodum</i>	180	<i>interruptum</i>	177, 182
<i>sprucei</i>	155	<i>lanatum</i>	171
<i>subrigidum</i> .. 143, 144, 146, 164,	166	<i>lineare</i>	149
<i>superbum</i>	144, 147, 178	<i>microcarpum</i>	162
<i>surinamense</i>	156	<i>plumieri</i>	180
<i>tenerrimum</i>	141, 144, 145, 153	<i>plumosum</i>	184
<i>terminale</i>	177	<i>pulchellum</i>	150
<i>tomentosum</i> ... 144, 184, 187,	188	<i>pyramidatum</i>	183
<i>trapezoidale</i>	143,	<i>rufum</i>	176
144, 146, 166, 167, 177	177	<i>ruizianum</i>	167
<i>trichophyllum</i>	139, 140, 141,	<i>sampaioanum</i>	159
143, 144, 145, 151, 152,	187	<i>schiedeanum</i>	160
<i>var. bucsii</i>	152	<i>semiglabrum</i>	158
<i>var. contractum</i>	151, 152	<i>sericeum</i>	181, 184
<i>trifidum</i>	144, 188	<i>sieberi</i>	179
<i>urbanii</i>	142,	<i>spectabile</i>	175
143, 145, 152, 156, 158	156, 158	<i>subrigidum</i>	166
<i>valvatum</i>	143, 144, 145, 161	<i>tomentosum</i>	188
<i>verecundum</i>	144, 148, 183	<i>trichophyllum</i>	151
<i>vestitum</i>	156	<i>trifidum</i>	188
<i>wercklei</i>	179	<i>valvatum</i>	161
<i>Leptocionium</i>	140	<i>vestitum</i>	155, 158
<i>Mecodium</i>	161	<i>wercklei</i>	179
<i>constrictum</i>	160	<i>Trichomanes</i>	139, 142
<i>microcarpum</i>	162	<i>ciliatum</i>	155, 174
<i>Meringium</i>	140	<i>fragile</i>	172, 174
<i>Myrmecostylum</i>	140	<i>hirsutum</i> ... 155, 172, 173, 174,	181
<i>Phorobolus domingensis</i>	181	<i>hirtellum</i>	164
<i>Ptychophyllum</i>	140	<i>hispidum</i>	172
<i>Sphaerocionium</i> ... 139, 140, 142,	174	<i>lineare</i>	149
<i>antillense</i>	169	<i>rigidum</i>	172, 174
<i>aureum</i>	184	<i>sericeum</i>	181