

WILLIAM ROXBURGH'S FERN TYPES

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This paper originally was titled "William Roxburgh, His Life, Collections, and Fern Types," but at the time of his death, in 1972, Mr. Morton left as complete only that portion of the paper dealing with Roxburgh's fern types. Although he had gathered some materials and references on Roxburgh's life and collections, time did not permit him to write about them.

At those few points in the manuscript where Mr. Morton queried what he had written or where he intended to double-check information, I have done so and thus have removed any ambiguity. Fortunately, almost none of these cases proved doubtful. I would like to acknowledge the help of Drs. F. M. Jarrett and R. E. Holttum, who helped Mr. Morton by letter and during his visits to Kew and who also submitted comments on portions of the manuscript.—D. B. Lellinger.

1. ACROSTICHUM ALATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:480. 1844.
= *Bolbitis appendiculata* (Willd.) K. Iwatsuki, Acta Phytotax. Geobot. 18:48. 1959.

TYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photographs 5055 and 19999, right-hand plant). Native of the Malay Islands according to Roxburgh, which means either Penang Island or the Molucca Islands, where all of Roxburgh's specimens came from.

In the "Index Filicum," *A. alatum* Roxb. is referred to *Stenochlaena sorbifolia* var. 3, i.e., *Lomariopsis cochinchinensis* Fée, with which the type of *A. alatum* has nothing to do; also Roxburgh's description indicates that his species is not *L. cochinchinensis*. The sheet cited above is the only one found in any herbarium bearing the name *A. alatum* in the hand of Roxburgh, and the plant at the right agrees with Roxburgh's description of the fertile fronds. This has been identified in Baker's hand as *Lomaria alpina* Spreng., but it is not that. Roxburgh also describes the sterile fronds, but these have apparently been lost. The other plant on the type sheet is a sterile

plant marked "Acrosticum [sic] native place and species undetermined" not in Roxburgh's hand. This plant appears to have been added at a later date. It does not agree with Roxburgh's description of the sterile leaves of his *A. alatum* and is to be eliminated from consideration. Since this plant is poor, sterile, and without locality or collector, it is a bit hard to place, but it may be *Blechnum aggregatum* (Colenso) Tindale from New Zealand.

2. *ACROSTICHUM EMARGINATUM* Buchanan-Hamilton ex Roxburgh, Calcutta Journ. Nat. Hist. 4:480, t. 27, f. 2. 1844 = *Acrostichum aureum* L. Sp. Pl. 1069. 1753.

LECTOTYPE: A specimen in the Delessert Herbarium, Geneva, with the tag "India Orient. Dr. Roxburgh" and the name *Acrostichum emarginatum* R. in the hand of Roxburgh; the sheet has a tag "Typus" (Morton photograph 16774). The locality is "Delta of the Ganges," India, according to Roxburgh. Roxburgh (Hort. Beng. 75. 1814) stated that it was collected in 1796 and grown in the Calcutta Botanical Garden.

A Roxburgh drawing in Kew (no. 1743) represents the same plant (Morton photograph 15852), and a specimen is reported to be in Brussels.

This species was presumably considered distinct, as indicated by the epithet chosen, on the basis of the pinnae being emarginate at the apex, i.e., somewhat cut in at the apex and with the midrib extending out as a short mucro in contrast with the generally rounded apices of the pinnae. This is a common variant, however, occurring in both the Old and New World, and is perhaps teratological; at least it does not appear to have taxonomic importance.

3. *ACROSTICHUM RADIATUM* Koenig ex Roxburgh, Calcutta Journ. Nat. Hist. 4:479. 1844. = *Actiniopteris radiata* (Swartz) Link, Fil. Sp. 80. 1841.

LECTOTYPE, chosen by Pichi-Sermolli (Webbia 17:11. 1962): India, Koenig (S-PA). From a comparison with Koenig specimens in other herbaria that seem to be part of the type collection Pichi-Sermolli has determined that the material probably came from Tranquebar, Coromandel, India.

Roxburgh did not consider this a new species, but rather an unpublished combination based on *Asplenium radiatum* Swartz (1802). Swartz had cited *Acrostichum radiatum* Koenig as the basis for his new species, but he considered it an *Asplenium* rather than an *Acrostichum*. It was Roxburgh's intention to revert to Koenig's generic opinion. When Roxburgh was writing, probably prior to 1810, the name *A. radiatum* had not been published, but it was published subsequently as *Acrostichum radiatum* Koenig ex Poir. in Lam. Encycl. Méth. Suppl. 1:128.

1810. Roxburgh cited the same illustration as Swartz, viz. Vahl, *Symb. Bot.* 1:t. 25. 1790.

The typification of *Asplenium radiatum* Swartz offers some problems, since Swartz did not cite India as a locality, but rather Bourbon Island and Arabia. Since Vahl's illustration cited by Swartz did not represent the true *A. australe* L.f. as was intended, it must have been based on the other synonym cited by Vahl, namely *Acrostichum dichotomum* Forssk. There would thus be some reason to typify *Asplenium radiatum* on the basis of a Forsskål specimen from Arabia. According to Pichi-Sermolli, originally a specimen of this species was in the Forsskål Herbarium in Copenhagen, but it has now been lost and only an impression remains. Under the circumstances it seems that Pichi-Sermolli was right in assuming that Swartz accidentally omitted mention of the locality India, and therefore that a Koenig specimen is the proper lectotype. It is not quite to be expected that plants from India and Arabia would be conspecific, but in this case it appears that they are.

Only one specimen from Roxburgh has been seen, this in Oxford (Morton photograph 20200); it bears the date May 29, 1808. According to Roxburgh, it was collected in the mountains of Coromandel. There is a drawing by Roxburgh of this at Kew (no. 695, Morton photograph 15853); although stylized, the drawing is clearly identifiable as *A. radiata*.

4. ACROSTICHUM SEETACOOONSE Roxburgh, *Calcutta Journ. Nat. Hist.* 4:480.

1844. = *Bolbitis appendiculata* subsp. *vivipara* (Ham. ex Hook.) Hen-nipm. *Blumea* 18:146. 1970.

Polybotrya vivipara Hook. *Exot. Fl.* 2:t. 107. 1824.

Acrostichum viviparum Buch.-Ham. ex Spreng. *Syst. Nat.*, ed. 16, 4:36. 1827, non L. f., 1781.

Polybotrya nodiflora Bory in Bélanger, *Voy. Bot.* 2:17. 1833.

Egenolfia nodiflora Fée, *Gen. Fil.* 48. 1852.

TYPE: A specimen in the Brussels Herbarium with the name in Roxburgh's hand (Morton photograph 20016); the plant was collected according to Roxburgh in Chittagong, near the Burning Wells at Seetacoond, then in East Bengal and now in East Pakistan. Since this is the only specimen of this species found in Kew, British Museum, Geneva, or Brussels, it may be considered to be unique and therefore the holotype.

In his treatment of *Egenolfia*, Ching (*Bull. Fan Mem. Inst. Biol.* 2:304. 1931) confused the nomenclature of this species by citing the epithet *vivipara* as dating from "*Acrostichum viviparum* Hooker, *Exot. Flora* 2:t. 107. 1827," thus telescoping the citations for *Polybotrya vivipara* Hook. and *Acrostichum viviparum* Buch.-Ham. ex Spreng. Since *Acrostichum viviparum* was a later homonym, Ching rejected the epithet *vivipara*,

but *Polybotrya vivipara* Hook. was quite valid. Dr. E. Hennipman is currently revising the genera *Egenolfia* and *Bolbitis* in the Asiatic and Malaysian regions and may have a different disposition for this species eventually.

5. ACROSTICHUM SEMIPINNATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:480. 1844. = *Tectaria semipinnata* (Roxburgh) Morton, comb. nov.
Gymnogramme maingayi Baker in Hook. & Bak. Syn. Fil. ed. 2, 517. 1874. Type: Malacca, Malaya, *Maingay* in 1809 (presumably K).
Aspidium maingayi (Baker) Holttum, Gard. Bull. Str. Settl. 5:207. 1931.
Tectaria maingayi (Baker) C. Chr. Ind. Fil. Suppl. 3:182. 1934.

LECTOTYPE: A specimen in the British Museum with the name in the hand of Roxburgh and the number 2367 [or 2337?] (Morton photograph 6800). A native of the Malay Islands, according to Roxburgh, which in this case probably means Penang Island, since plants matching the lectotype closely have been found on Penang but do not occur in the Moluccas, the other locality referred to by Roxburgh as the "Malay Islands." A specimen matching the lectotype is in the Brussels Herbarium without any name or indication of collector; I feel sure that it is an isotype.

In the "Index Filicum," *Acrostichum semipinnatum* Roxb. is referred to *Leptochilus latifolius* (Meyen) C. Chr. with a query, doubtless on the basis of the original description only. The authentic specimen chosen as lectotype shows that this was an error, for the plant is clearly the Malayan species called *Tectaria maingayi* in Holttum's "Ferns of Malaya." A specimen in the U.S. National Herbarium from Penang, *Curtis* 577, matches the lectotype closely. Roxburgh referred his plant to *Acrostichum* and Baker his plant to *Gymnogramma* because of the sori not being round, as in Roxburgh's and Baker's "*Polyodium*," but extended along the veins irregularly and thus appearing acrostichoid or "gymnogrammoid." They are exindusiate, as might be expected. Strangely enough, Roxburgh described another species, this one called *Polypodium semipinnatum*, which represents the same species of *Tectaria*. He called attention to its resemblance to his *Acrostichum semipinnatum*.

Holttum (Gard. Bull. Str. Settl. 5:207-209. 1931) cites the extensive synonymy of this species, which includes *Polypodium heterosorum* Baker (1874), *Phegopteris subdecurrens* Luer. (1882), and *Campylogramme trollii* Goebel (1931). He also gives an interesting discussion of the ecology and variation in this species.

6. ADIANTUM CAUDATUM sensu Roxb. Calcutta Journ. Nat. Hist. 4:512, t. 34. 1844. = *Adiantum indicum* Ghatak, Bull. Bot. Surv. India 5:71, 74. 1963, at least pro parte.

I have seen a herbarium specimen in Brussels ("Ind. or.")

Roxburgh, Morton photograph 19885) identified by Roxburgh as *A. caudatum*; it agrees with Roxburgh's rather good description and with another specimen from Roxburgh, no. 364, June 8, 1808, at Oxford (Morton photograph 20198); these both represent the species recently segregated from *A. caudatum* L. sens. lat. as *A. indicum* Ghatak. The published Roxburgh drawing, op. cit., t. 34, and the drawing labeled *A. caudatum* preserved at Kew (Roxburgh drawing 1756, Morton photograph 15854) presumably also represent *A. indicum*, so far as one can judge from rather crude drawings. Roxburgh gave the range as "Hindoostan as well as Ceylon," and doubtless included the true *A. caudatum* L. from Ceylon in his concept. In the "Hortus Bengalensis," Roxburgh indicated that the plants cultivated in the Calcutta Botanical Garden had been collected by T. Colebrooke, Esq.

Nayar, in his account of *Adiantum* in India (Bull. Nat. Bot. Gard. Lucknow no. 52. 1961), described an "*A. caudatum* var. *assamicum*" (p. 7) and a "var. *flabellatum*" (p. 8), but these are not validly published, because they lack Latin diagnoses and also lack a citation of a type; in fact no specimens are cited of the new varieties. Judging from the description, it appears that "var. *assamicum*" is probably *A. indicum*. Although Ghatak does not mention "var. *assamicum*," he must have known of it. "Variety *flabellatum*" seems to represent *A. incisum* Forssk.

7. ADIANTUM MICROPHYLLUM Roxburgh, Calcutta Journ. Nat. Hist. 4:513. 1844, non Swartz, 1788. = *Adiantum venustum* D. Don, Prodr. Fl. Nepal. 17. 1825.

TYPE: In the published version of Roxburgh's *A. microphyllum*, *A. venustum* D. Don is cited as synonym. Roxburgh could not have added this synonym, since he was dead by the time Don's "Prodromus" was published, and so it must have been added by the editor Griffith; even so, the published work must be taken at face value, and so *A. microphyllum* was a superfluous change of name for *A. venustum*; this being so, it must have the same type, namely, Nepal, Wallich.

The only herbarium specimen found bearing the name *A. microphyllum* Roxb. is in the East India Company Herbarium at Kew (no. 81-4, Morton photograph 14709, the left-hand plant on the sheet); this specimen, authentic for Roxburgh's concept, agrees with *A. venustum* D. Don.

8. ADIANTUM PROLIFERUM Roxb. Calcutta Journ. Nat. Hist. 4:512. 1844. = *Adiantum incisum* Forssk. Fl. Aegypt.-Arab. 187. 1775.

Adiantum flagelliferum Wall. Num. List 61, no. 76-5. 1830, nom. nud. This is based on a Roxburgh specimen without locality (Morton photograph 14705) and is not the same as *A. flagelliferum* Wall. Num.

List. 4, no. 76. 1829, nom. nud., which is based on a plant collected by Wallich at Sylhet, Assam.

LECTOTYPE: "Ind. or.," Roxburgh Herb. 2423 (BR, Morton photograph 19888). According to the original description this species came from the Molucca Islands, where it was doubtless collected by Christopher Smith either in Amboina or Honimoa.

Adiantum incisum Forssk. has not usually been distinguished from *A. caudatum* L., but Pichi-Sermolli (*Webbia* 12:669-678. 1957) showed that it may be distinguished by characters of pubescence and cutting. The exact range of these species needs to be established. The three treatments of the group of *Adiantum caudatum*, all published within six years by Pichi-Sermolli (*Webbia* 12:669-678. 1957), Nayar (*Bull. Nat. Bot. Gard. Lucknow* No. 52. 1961), and Ghatak (*Bull. Bot. Surv. India* 5:71-77. 1963), came to different conclusions, and none of these papers referred to any of the others. I have not studied the original specimen of *A. flagelliferum* Wall., but it may, from the Assam locality, refer to *A. indicum* Ghatak, if that is distinct from the true *A. caudatum*; according to Ghatak, *A. caudatum* has the one-celled hairs of the lower leaf veins hamate [hooked or uncinata] at the apex, whereas these hairs in *A. indicum* have straight apices; this is very likely true but a bit hard to see in practice.

9. ADIANTUM TENERUM Roxburgh, *Calcutta Journ. Nat. Hist.* 4:513. 1844, non Swartz, 1788, non L. von Buch, *Abhandl. Akad. Wiss. Berlin* 1816-17:360. 1819. = *Adiantum capillus-veneris* L. *Sp. Pl.* 1096. 1753.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19871). According to Roxburgh, the species was collected at the northern boundary of Oude by A. Gott. An isotype is in the East India Company Herbarium, no. 73-9 (Morton photograph 15729).

In the "Index Filicum," *A. tenerum* Roxburgh is cited as though it were the same as *A. tenerum* L. von Buch., but Roxburgh's species was published independently with no mention of von Buch. The von Buch species apparently was a misidentification of *A. capillus-veneris* L. Roxburgh certainly did not intend his species as that of Swartz.

10. ASPLENIUM BIPINNATUM Roxburgh, *Calcutta Journ. Nat. Hist.* 4: 499. 1844. = *Diplazium esculentum* (Retz.) Swartz, *Journ. Bot. Schrad.* 1801(2): 312. 1803-4.

LECTOTYPE: A Roxburgh collection in the Brussels Herbarium mounted on two sheets, both named *bipinnatum* in Roxburgh's hand (Morton photographs 19607, 19608). There are two isotypes in Geneva, labeled "Amboina, Dr. Roxburgh" (Morton photographs 20626, 20627). According to Roxburgh

it is a native of Amboina and introduced into the Botanic Garden in Calcutta in 1798, according to Voigt (Hort. Suburb. Calcutt. 735. 1845). Another specimen in Brussels from the Roxburgh Herbarium is named *Asplenium hemionitis* by Roxburgh, which is probably the name first assigned by Roxburgh, who later realized that there already was an *Asplenium hemionitis* L., which is such an entirely different plant with a simple rather than bipinnate blade that Roxburgh could never have confused it with his own collection. A Roxburgh drawing at Kew (no. 2000) also represents this species (Morton photograph 15855).

Asplenium bipinnatum Roxburgh was referred wrongly to *Asplenium blumei* Bergsm. by Mettenius, presumably going only on the description, and correctly to *Callipteris ambigua* (Swartz) Moore [= *Diplazium esculentum*] by Moore.

11. *ASPLENIUM CICUTARIUM* Roxburgh, Calcutta Journ. Nat. Hist. 4: 500. 1844, non Swartz, 1788. =? *Asplenium tenuifolium* D. Don, Prodr. Fl. Nepalensis 8. 1825, fide Mett. Abhandl. Senckenb. Naturf. Gesell. 3:172. 1859.

TYPE: No herbarium specimen named *A. cicutarium* by Roxburgh has been found. Roxburgh's plant came from "mountains north of Rohilcund," i.e., the present Rohilkhand, Division of Agra, Northern United Provinces, India.

Roxburgh evidently did not consider this species as new, for he lists it as "*Asplenium cicutarium* Linn.," but there is no such Linnaean species. There is an *Asplenium cicutarium* Swartz, but there is really no reason to associate Roxburgh's species with that American species. Roxburgh does not mention Swartz in this fern work and probably did not know Swartz' work. Nor does Roxburgh's description match the description of *A. cicutarium* Swartz. Under the circumstances, it is best to consider *A. cicutarium* Roxburgh as a new species, as did Mettenius in the paper cited above, Moore in his "Index Filicum," and Christensen in his "Index Filicum."

The original description is as follows: "Shoots creeping, scaly. Stipes alternate, polished; fronds alternately subtripinnate, as broad as long (6-8 inches high); ultimate divisions subovate, with the anterior margins crenately-dentate, firm, and smooth on both sides."

As may be seen, this is one of Roxburgh's poorer descriptions, and his plant is not definitely identifiable from it. Mettenius' guess seems a possibility, for the segments in this are firm and smooth, they are toothed, although whether one could call them "crenate-dentate" is dubious; the fronds are subtripinnate, or usually fully tripinnate, and sometimes nearly as broad as long; the size too is within the size range of *A. tenuifolium*, which is

a common species in the area concerned. Moore guessed that Roxburgh's plant was *Asplenium praemorsum* Swartz, but this does not seem possible unless one assumes that Roxburgh intended "Pinnae as broad as long," rather than fronds as broad as long as stated in the description. Moore's identification was retained in Christensen's "Index Filicum." Roxburgh's description is so vague that it could possibly apply to a wholly different plant, some species of *Diplazium* or *Athyrium*, such as the *Athyrium spectabile* (Wallich) K. B. Presl of the "Index Filicum," which should perhaps be considered as a *Diplazium* rather than an *Athyrium*. It will be necessary to find a specimen from the Roxburgh Herbarium that agrees with the description in order to place this species definitely.

12. *ASPENIUM CORIACEUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:497. 1844, non Desv. 1827. = *Asplenium macrophyllum* Swartz, Journ. Bot. Schrad. 1800(2):52. 1802. Type: Mauritius, *Groendal* (presumably S-PA).

LECTOTYPE: A specimen in the Brussels Herbarium named *A. coriaceum* in Roxburgh's hand, with the number 2407 (Morton photograph 19989). An isotype is in Geneva, marked "India Orient. Malay Islands, *Dr. Roxburgh*" (Morton photographs 6539 and 16807). Another presumable duplicate is in the East India Company Herbarium, no. 191-3 (Morton photograph 15726, left hand; the right-hand plant is Dindang, *Buchanan-Hamilton* in 1822); the last-named specimen differs from the others in having six rather than three pairs of pinnae, but it is probably a part of the same collection, since this species varies considerably in the number of pinnae, six being about the maximum number and three the minimum. By "Malay Islands" Roxburgh usually intended Penang Island, which may be presumed to be the type locality for *A. coriaceum*, since the type specimens agree with material collected in Penang.

When Roxburgh named his plant *A. coriaceum* the name was available, but before its publication in 1844 it was a homonym twice over, the same epithet having been used by Desvaux in 1827 and by Bory in 1833 for different plants. It seems to have been a popular name, for both Fée and Baker used the same epithet again in 1852 and 1867, respectively, for still different species. In the original publication is cited "*Asplenium finlaysonianum* Wall. 63, No. 191 (quod nomen delendum)," but this was added not by Roxburgh but by the editor, Griffith, who intended (as shown by the cited page 63) the citation of Wallich List 191-3 (the specimen of *A. coriaceum* Roxburgh as indicated by Wallich) and not Wallich no. 191 on page 8, which is based on a different collection. Actually Wallich was wrong in placing Roxburgh's *A. coriaceum* under his own *A. finlaysonianum*, for the plants represent different species. In *A. finlaysonianum* the

veins are partly anastomosing, whereas in *A. coriaceum* Roxburgh they are all free.

13. *ASPLENIUM CRENATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:498. 1844, non Desv. 1827. = *Diplazium repandum* Blume, Enum. Pl. Jav. 2:191. 1828. Type: Java, Blume (holotype L, with the name in the hand of Blume, Morton photograph 979).

Diplazium crenatum (Roxburgh) Moore, Ind. Fil. 121, 329. 1859, non Poir. 1811.

LECTOTYPE: A specimen in Geneva labeled "India Orient. Malay Islands, Dr. Roxburgh," and "Typus" (Morton photographs 6538, 16914). There is a duplicate in Brussels from the Roxburgh Herbarium, no. 2412 (no. 2413 in the original description) (Morton photograph 19631) but with the wrong name tag "*Asplenium serrulatum*"; as noted under *A. serrulatum*, the name tags have become switched between Roxburgh's *A. crenatum* and his *A. serrulatum*. For this reason, I choose the Geneva specimen as lectotype, the specimen and the name that correspond with the described species. A Roxburgh drawing in the British Museum (Morton photograph 15761), labeled "Amboyna," fixes the type locality, which is stated by Roxburgh as merely "Malay Islands." It is likely that the specimen was collected by Christopher Smith, who provided Roxburgh with all his collections from Amboina.

The group of *Diplazium proliferum* (Lam.) DuPetit Thouars, recognized as the genus *Callipteris* Bory by Copeland, is in need of monographic study. It appears that the true *D. proliferum* from the Mascarene Islands is different from the Malaysian plants in its deeper and slightly different type of cutting of the pinnae. The Malaysian plants are usually all called *D. accedens* Blume, of which *D. repandum* Blume is considered a synonym. It may be so. Blume distinguished his *D. accedens* and *D. repandum* in the same way that Roxburgh characterized his *A. serrulatum* and *A. crenatum*, by the pinnae being remotely serrulate in the one and rounded-crenate in the other. I keep them separate tentatively, for in typical specimens they can be distinguished. However, there are many somewhat intermediate specimens that need further study.

In Mettenius' monograph of *Asplenium*, both *A. crenatum* Roxburgh and *A. serrulatum* Roxburgh are referred to *A. porrectum* Wallich, which is clearly wrong.

14. *ASPLENIUM CULTRIFOLIUM* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:498. 1844, non L., 1753. = *Asplenium polyodon* Forst. Fl. Ins. Austr. Prodr. 80. 1786.

AUTHENTIC SPECIMEN: A specimen in the Brussels Herbarium with the name "*Asplenium cultratum*?" in the hand of Roxburgh and the number 2408 (Morton photograph 19982). There is a matching specimen in the British Museum collected in Amboina by Christopher Smith from the Rox-

burgh Herbarium, and this is surely authentic. A Roxburgh drawing of a plant from Amboina, unnamed, is also in the British Museum (Morton photograph 15755), and this agrees well enough with the herbarium specimens mentioned.

Asplenium cultrifolium L. (Sp. Pl. 1081. 1753) has remained an unknown species. Linnaeus cited his "Hortus Cliffortianus" (p. 474, *Asplenium* no. 5) and a Plumier reference to a plant from Martinique. There is no specimen in the Linnean Herbarium in London, but if there is one in Clifford's Herbarium (BM), it ought to be the lectotype rather than a plant known to Linnaeus only from a literature reference. It would be possible to identify the herbarium specimen definitely with material collected in the wild, but the Plumier plate cited is so stylized and poorly drawn that it is scarcely identifiable except by guesswork. For this reason the name *Asplenium cultrifolium* L. has remained out of use in recent years. In the "Index Filicum," it is considered a *Diplazium*. Concerning the synonymy of *A. polyodon* Forst. see my paper on fern types (Contr. U. S. Nat. Herb. 38: 40, 41. 1967).

The query in "*Asplenium cultratum?*" means—as it does in the similar case of "*Polypodium ciliatum* Roxburgh?"—not that Roxburgh was doubtful about the identity of his *Asplenium cultratum*, but that he was doubtful about describing it as a new species under this name. In this case he abandoned the name *Asplenium cultratum* and instead referred the specimen in his final manuscript to *Asplenium cultrifolium* L.

15. *ASPENIUM HEMIONITOIDES* Roxburgh, Calcutta Journ. Nat. Hist. 4: 498. 1844. = *Diplazium tomentosum* Blume, Enum. Pl. Jav. 2:192. 1828. Type: Java, Blume (holotype L, a sheet with the name in Blume's hand and a hand-written description by Blume, Morton photograph 1012).

Diplazium burchardii Rosenst. Repert. Sp. Nov. Fedde 4:293. 1907. Type: Lalah Indragiri, between Tjinaco and Pakan Herun, Sumatra, 1906, Burchard (isotype L, Rosenstock Fil. Sumatr. Exs. no. 22, Morton photograph 1010). A reduction to *D. tomentosum* Blume was made by Rosenstock on the annotation label on this sheet in Leiden.

LECTOTYPE: A sheet in the Brussels Herbarium with the name in the hand of Roxburgh and the number 2409 (Morton photograph 19635). The locality was cited by Roxburgh as "Malay Islands." A duplicate specimen in Geneva (Morton photograph 16919) fixes the type locality as Amboina, where it may be presumed to have been collected by Christopher Smith.

Asplenium hemionitoides was reduced properly to the synonymy of *D. tomentosum* Blume by Moore in his "Index Filicum," without comment.

The lectotype is an unusually small specimen, less deeply cut, but it can be matched by other small specimens of *D. tomentosum*, which is rather distinctive by its hairy rhachis and the strongly deflexed lowest pinnae. The species appears to be very rare everywhere it occurs. Perhaps no one since Smith has found it again on Amboina. Roxburgh's name should perhaps have been spelled more properly "*hemionitoides*." Roxburgh's choice of this name is explained by his comment: "In the double lines and involucre, it approaches to Smith's character of *Hemionitis*," which shows clearly that Roxburgh did not know the character of *Diplazium*, which is to have the involucre double, i.e., back to back. *Hemionitis* has, of course, no "involucre."

16. *ASPLENIUM LINGUIFORME* Roxburgh, Calcutta Journ. Nat. Hist. 4:497. 1844. =? *Syngramma alismifolia* J. Smith, London Journ. Bot. 4:166. 1845. Lectotype: Singapore, *Lobb 11* (K, Morton photograph 20639).

TYPE: No Roxburgh material has been found, but it may be in Brussels filed as a *Syngramma*.

The original description is as follows: "Stipes long, and polished; fronds tongue-shaped, entire, smooth. Fructification in numerous, approximated lines, over the whole disk, and extending almost to the margin. (Involucre not visible in the dry specimen). *Nat. of the Moluccas*." As may be seen, this description is not quite adequate for a definitive determination. The long, shining stipe would exclude any simple-bladed species of *Asplenium* known in the Moluccas. In the "Index Filicum," *A. linguiforme* is referred with a query to *Polypodium feei* (Bory) Mett., probably on the basis of the description only, but in my opinion the description does not suggest this species very much. It does suggest greatly *Syngramma alismifolia* in the elongate, shining stipes, tongue-shaped blades, and exindusiate sori extending in close lines almost to the margin of the fronds. This species is not known from the Moluccas, but is expected there since it occurs as far east as the Solomon Islands.

The name *Syngramma alismifolia* is usually cited with the author (K. B. Presl) J. Smith, London Journ. Bot. 4:166. 1845, but this is incorrect. *Syngramma alismifolia* J. Smith was intended as a new species and *Diplazium alismifolium* K. B. Presl was excluded as a synonym, Smith believing Presl's species to be indusiate and different generically. It seems from Holttum's recent examination of Presl's type in Prague that *Diplazium alismifolium* is really exindusiate and is the same as *Syngramma alismifolia* J. Smith. Since Presl's *Diplazium*

alismifolium cannot now be transferred to *Syngramma* because that would create a later homonym, Smith's name *Syngramma alismifolia* J. Smith is the oldest and correct name for the species, unless *Asplenium linguiforme* Roxburgh proves to be the same, in which case Roxburgh's name will have a year's priority.

Incidentally, it may be mentioned that *Selliguea feei* Bory, the basionym of *Polypodium feei* (Bory) Mett., has a wrong citation in the "Index Filicum," which gives it as "Bory, Dict. Class. 6:587. 1824; 17:18, t. 41," which would seem to date it from 1824. The genus does date from 1824, but at that time the species name *Selliguea feei* was not proposed, nor was it in the subsequent discussion in Dict. Class. 15:344. 1829. The name appears only in the volumes devoted to the plates, and so it should be cited *Selliguea feei* Bory, Dict. Class. 17:18, t. 41. 1831; it is published here by a plate with analyses as well as by the reference to the previous descriptions of 1824 and 1829. Bory, in the 1829 paper, complains that Hooker had published the same species as a *Ceterach* (referring to *Ceterach pedunculata* Hook. & Grev. Icon. Fil. 1: t. 5. 1827) without mentioning his publication of 1824, but it turns out that Hooker and Greville's species is different from *Selliguea feei*.

17. **ASPLENIUM MIXTUM** Roxburgh, Calcutta Journ. Nat. Hist. 4:499. 1844.
 = **Diplazium mixtum** (Roxburgh) Morton, comb. nov.
Asplenium prescottianum Wallich, Num. List. no. 235. 1829, nom. nud.
 Based on Singapore, 1822, *Prescott* (presumably in E. Ind. Co. Herb., K).
Asplenium acuminatum Wallich, Num. List. no. 205. 1829, nom. nud.
 Based on Penang, *Porter* (Presumably in E. Ind. Co. Herb., K). A duplicate is in the E. Ind. Co. Herb. under no. 205B (Morton photograph 19583a, right-hand plant).
Diplazium prescottianum (Wallich) Moore, Ind. Fil. 156, 234. 1859, nom. nud.
Asplenium acuminatum Wallich ex Mett. Abhandl. Senckenb. Naturf. Gesell. 3:225. 1859, non Hook. & Arn., 1832. Type: Penang, *Porter* (Wallich no. 205) (isotype BR, Morton photograph 19625).
Asplenium prescottianum Wallich ex Hook. Sp. Fil. 3:251. 1860. Based on Wallich List no. 235, i.e., Singapore, *Prescott* in 1822. Hooker also proposed a var. β from Singapore, *Lobb* and a var. γ from Penang, *Norris*, but since these are considered varieties they cannot be considered as syntypes of the species, and therefore the holotype is *Wallich* no. 235, presumably in the Hooker Herbarium, K.
Diplazium silvaticum var. *prescottianum* (Wallich ex Hook.) Curtis, Journ. Str. Br. Roy. Asiat. Soc. 25:159. 1894. The species name is wrongly spelled "*sylvaticum*" and wrongly referred to Presl rather than (Bory) Swartz.

Diplazium prescottianum (Wallich ex Hook.) C. Chr. Ind. Fil. 237. 1905, wrongly attributed to Moore. Moore did propose *D. prescottianum* (Wallich) Moore, but since the basionym *Asplenium prescottianum* Wallich was at the time a nomen nudum, Moore's name is equally a nomen nudum and invalid; nevertheless, it has been accepted, e.g., by Holttum in his paper on *Diplazium* in Malaya (Gard. Bull. Str. Settl. 11:94. 1940).

Athyrium prescottianum (Wallich ex Hook.) Holttum, Ferns of Malaya 557. 1954.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19629). A second sheet in Brussels with the name *mixtum?* in a different hand agrees with the lectotype and is surely an isotype. Another isotype is in the East India Company Herbarium under the number 205B (Morton photograph 19583a, left-hand plant); it agrees with the specimens in Brussels. According to Roxburgh, this species was collected in Amboina, presumably by Christopher Smith.

In the "Index Filicum," *A. mixtum* was referred to *Diplazium silvaticum* (Bory) Swartz, following Moore's lead. Christensen here recognized *D. silvaticum* in a very broad sense as including plants from Asia, Polynesia, Australia, and Mauritius, and possibly tropical America. It is likely that the true *D. silvaticum* is confined to the Mascarene Islands; it differs from those confused with it in cutting and, I believe, in toothed scales. Roxburgh's type material seems to agree quite well with collections from Penang Island that were described as *Asplenium acuminatum* Wallich ex Mett. (an invalid later homonym that was overlooked in the "Index Filicum") and which are apparently currently referred by Holttum to *Diplazium prescottianum*. They represent the form of this without auricles on the pinnae, described from Penang Island as *Asplenium prescottianum* var. γ by Hooker. Whether these plants are different from the true *D. prescottianum* from Singapore remains to be determined, which would be done best by field study in Malaya. This might not be easy, however, since the species appears to be excessively rare. So far as I am aware, *D. prescottianum* has not been reported from Amboina or anywhere outside Malaya and Singapore, and consequently it is possible that *D. mixtum* is different; Roxburgh's plant is different in being smaller and slightly less cut. On the other hand, it is possible that Roxburgh was in error in stating that his plant came from Amboina, and that it really came from Penang, where many of his collections came from. This may be presumed if a search in herbaria and in the field for plants from Amboina of this type should be unsuccessful. In any case, however, the epithet *mixtum* would be older

than others of the group (except *silvaticum*), and so the combination *D. mixtum* would be a correct name.

18. *ASPLENIUM MONANTHEMOIDES* Roxburgh, Calcutta Journ. Nat. Hist. 4: 497. 1844. =? *Asplenium normale* D. Don, Prodr. Fl. Nepal. 7. 1825.

TYPE: No specimen of the species from the Roxburgh collections has been found, but one is said to be in Brussels.

The original description is as follows: "Stipes polished, round, with a groove; fronds (6-12 inches high) alternately-pinnate; leaflets delicate, smooth, trapeziform, very obtuse, anterior and exterior margins dentate-serrate; posterior entire. Fructifications in short lines, on both sides of the nerve; where the involucre expands they become round (as in *Polypodium*). *Nat. of Chittagong.*" In the "Index Filicum," *A. monanthemoides* is identified without doubt as *A. normale*, and this appears to be right. The description agrees well enough except for the statement that the sori are round when the indusia are expanded; the sori in *A. normale* are too long for that.

19. *ASPLENIUM MULTIFLORUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:499. 1844. = *Diplazium multiflorum* (Roxburgh) Moore, Ind. Fil. 147, 333. 1859.

TYPE: A specimen in the Brussels Herbarium labeled no. 7, *A. multiflorum*, in the hand of Roxburgh (Morton photograph 19622). Since no other specimen has been located in any herbarium named by Roxburgh and which agrees with the original description, this may be presumed to be a holotype. According to Roxburgh, it was collected in the "Malay Islands." Since the type agrees with other material from Malaya, it may be presumed to have been collected on Penang Island where most of Roxburgh's collections cited as Malay Islands came from. Very likely they were collected by William Roxburgh, Jr., and given to his father.

Diplazium multiflorum (Roxburgh) Moore is listed in the "Index Filicum" as a dubious species, and it has never been placed before. It is close to *D. malaccense* K. B. Presl as represented by the type material. Some recently collected material by Mrs. B. E. G. Molesworth-Allen and identified as *D. malaccense* appears as though it may represent something a little different, or this species may be quite variable.

There are in Copenhagen two specimens from the F. von Mueller Herbarium identified as *Asplenium multiflorum* Roxburgh, but not in Roxburgh's hand, that do not agree with the original description, since the frond is completely bipinnate and disagrees in other respects. Some years ago I identified these specimens as *D. dilatatum* Blume, which may or may not be right.

20. *ASPLENIUM NIDUS* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:496. 1844. = *Asplenium nidus* L. Sp. Pl. 1079. 1753.

AUTHENTIC MATERIAL: A Roxburgh specimen in the Brussels Herbarium (Morton photograph 19990), which very likely came from Amboina, collected by C. Smith in 1798 (cf. Hort. Bengal. 75. 1814). The species from Amboina are mostly represented by herbarium specimens in Roxburgh's herbarium now in Brussels, but many of the species from Chittagong and other parts of India are not.

Roxburgh evidently understood this species correctly from his description and from the specimen noted above. He recorded the species from "Chittagong, Malay Islands, etc."

21. *ASPLENIUM RETICULATUM* Roxburg, Calcutta Journ. Nat. Hist. 4:497. 1844. = *Loxogramme avenia* (Blume) K. B. Presl, Tent. Pterid. 215. 1836.

Grammitis avenia Blume, Enum. Pl. Jav. 2:117. 1828. Type: Java, Blume (holotype L, a sheet bearing a single frond, with the name in the hand of Blume, Morton photograph 1834).

Grammitis coriacea sensu Blume, Enum. Pl. Jav. 2:117. 1828, non Kaulf. *Loxogramme blumeana* K. B. Presl, Tent. Pterid. 215. 1836. Based on the description of *Grammitis coriacea* sensu Blume, non Kaulf. Type: Java, Blume (holotype L, a sheet with a single frond determined as *Grammitis coriacea* in the hand of Blume (Morton photograph 1833)).

LECTOTYPE: *Roxburgh*, East India Company Herbarium 10-2 (K, Morton photograph 14638, two right-hand plants; the left-hand plant is *Grammitis macrophylla* Wall. Num. List 10. 1829, nom. nud.). According to Roxburgh, his species occurs in the Malay Islands, which in this case probably means Penang Island.

The citation inserted after the name *Asplenium reticulatum*, namely "*Grammitis macrophylla* Wall. Cat. 61, No. 10," was inserted by the editor, Griffith, and does not mean that *A. reticulatum* was based on *G. macrophylla* Wall. but merely that Roxburgh's species is represented in the Wallich Herbarium under no. 10, actually 10-2. There is reported to be a specimen of *A. reticulatum* Roxburgh in Brussels, which, if found, should be the lectotype.

In the "Index Filicum," *A. reticulatum* Roxburgh is referred to *Polypodium scolopendrinum* (Bory) C. Chr., i.e., *Loxogramme scolopendrina* (Bory) K. B. Presl. From the characters given by Holttum in his "Ferns of Malaya," Roxburgh's species appears to be *L. avenia*, rather than *L. scolopendrina*, because it has the midrib raised above rather than beneath.

22. *ASPLENIUM SERRULATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:498. 1844, non Cav., 1801. = *Diplazium accedens* Blume, Enum. Pl. Jav. 2:192. 1828. Type: Java, Blume (presumably L, but not found by me in 1954).

Diplazium serrulatum (Roxb.) Moore, Ind. Fil. 167, 337. 1860, non Desv., 1827.

LECTOTYPE: A specimen in the Geneva Herbarium from "India Orient. Amboyna, Dr. Roxburgh" and marked "Typus" (Morton photographs 6537, 16918). An isotype is in the Brussels Herbarium with the wrong tag reading *Asplenium crenatum* and the number 2413 (Morton photograph 19602). Roxburgh cited the locality as "Amboyna and other Malay Islands."

Roxburgh described his *Asplenium serrulatum* as having the margins "remotely serrulate" and his *A. crenatum* with the margins "elegantly crenate." The specimens in the Brussels Herbarium have the name labels reversed, for the one with the serrulate pinnae is labeled *A. crenatum* and the one with crenate pinnae is labeled *A. serrulatum*. It seems clear that the name tags have been accidentally reversed, either by Roxburgh or some later botanist. This is clearly shown by the specimens in Geneva where the proper plants and names do correspond. For this reason I am designating the specimens in Geneva as lectotypes, rather than those in Brussels, as I do in most cases where the Brussels specimen has a name in Roxburgh's hand.

It is likely that *A. serrulatum* Roxburgh is typical *D. accedens* Blume, for Blume described his species as having serrate pinnae.

23. *ASPLENIUM TRAPEZIFORME* Roxburgh, Calcutta Journ. Nat. Hist. 497. 1844. = *Asplenium unilaterale* Lam. Encycl. Méth. 2:305. 1786. Type: Ile de France [i.e., Mauritius], Commerson (holotype P. Herb. Lam., Morton photograph 2771).

Asplenium trapeziforme Roxburgh ex Wallich, Num. List. no. 2213, nom. nud. This entry referred to a plant in "Herb. Roxb." and is the specimen now in Brussels.

LECTOTYPE: A specimen in the Brussels Herbarium determined as *A. trapeziforme* in the hand of Roxburgh, with the number 2408 and the locality "Malay Islands." The specimen had been named first "*Asplenium monanthemum*," and the epithet "*monanthemum*" crossed out (Morton photograph 19994). This lectotype is probably from Penang Island, a locality sometimes intended by Roxburgh when he wrote "Malay Islands"; the specimen agrees with plants collected in Penang.

This species never has been identified properly. In Moore's "Index Filicum," *A. trapeziforme* Roxburgh is recognized as a distinct species, with the range "Malay Islands; India (Bombay, Mahabeleshuar); Bourbon." In Christensen's "Index Filicum," the species is wrongly credited to Wallich (who merely published Roxburgh's name as it was indicated on the specimen he received, his number 2313) and referred to "*A. lunulatum* var.?" evidently going solely on Roxburgh's description. The African *A. lunulatum* Swartz is indeed not very close. In "Supplement III," Christensen referred *A. trapeziforme* to *A. inaequilaterale*

Willd., citing the description and illustration in Beddome's "Ferns of Southern India," p. 45, t. 134. Beddome identified the plant that he illustrated as *A. trapeziforme* Roxburgh only with a query; the plant described and drawn does apparently represent *A. inaequilaterale* Willd. but is quite different from the true *A. trapeziforme* Roxburgh. Alston saw and photographed in Brussels the type of Roxburgh's species and made a note accompanying his photograph that *A. trapeziforme* is "a good species near *A. camptorhachis* Kunze." I cannot agree with that; I have seen authentic material of *A. camptorhachis* from southern India, and it is quite different. It is possible that *A. trapeziforme* is indeed different from typical *A. unilaterale* Lam., which seems to have a more slender rhizome with scattered fronds, but Roxburgh's species is not different from material from Asia that is commonly referred to *A. unilaterale* (as in Holttum's "Ferns of Malaya"), as for instance the specimen Penang, Curtis 567 (US), in which the rhizome is thicker, the roots more numerous and thicker, and the fronds more numerous and congested (without being at all fasciculate). If this plant is really a different species, it is unlikely that Roxburgh's name is the oldest, for there are several reputed synonyms of *A. unilaterale* that are older, including several originally from Java, described by Blume. Sledge mentions *A. trapeziforme* in his discussion of *A. inaequilaterale* Willd. and excludes it from that species, remarking that "it also has an erect rhizome but photographs in the British Museum Herbarium of the type specimen, including enlargements of the pinnae, clearly show the veins running to the extremities of the marginal teeth. The fronds are also pinnate to the end, not terminating in a distal, lobed, pinnae-like extremity." These remarks apply to *A. unilaterale* Lam. sens. lat., except for the statement that the rhizome is erect, which is a wrong observation, due to having studied only a photograph.

24. *ASPLENIUM TRIPINNATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:500. 1844.

TYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh and the number 314 (Morton photograph 19988). Since no other specimen of this species has been found from the Roxburgh Herbarium, this may be presumed to be a holotype. Roxburgh indicated that his species was from the Moluccas, which means that he received it from Christopher Smith. There is a specimen in the British Museum collected in Amboina by Christopher Smith (Morton photograph 19511) that may well be authentic material; it is a more divided plant than the type but may be within the range of variation. If this is authentic, it would fix the type locality as Amboina.

In Moore's "Index Filicum," *Asplenium tripinnatum* is referred to *A. laserpitiifolium* Lam., and it does represent that species as it has usually been conceived in a very broad sense. Tardieu-Blot and Ching ("Revision des Espèces confondues avec l'*Asplenium laserpitiifolium* Lam. avec Description d'Espèces Nouvelles Asiaticques de ce Groupe," Notul. Syst. 5:134-154. 1936), however, showed that the true *A. laserpitiifolium* Lam. is apparently confined to the Seychelles Islands. Their illustration of the type shows that the species is not the same as *A. tripinnatum*. Tardieu-Blot and Ching described several species of this group from Indo-China—*A. confusum*, *A. sublaserpitiifolium*, *A. pseudolaserpitiifolium*, and *A. neolaserpitiifolium*—but none of these appears identical with *A. tripinnatum*. The common species of this alliance in Java, and perhaps also in Sumatra, New Guinea, and the Admiralty Islands, is *A. robustum* Blume (Enum. Pl. Jav. 2:189. 1828. Type: Salak, Java, Blume, holotype L, with the name in the hand of Blume, Morton photograph 543). This is a rather leafy plant, with the segments mostly obovate. *Asplenium tripinnatum* is more skeleton-like, with more distinct segments, these appearing oblanceolate or almost linear, due partly to the margins being somewhat inrolled. I am not sure that it is truly different from *A. robustum*, but it can stand as a distinct species tentatively.

25. *ASPLENIUM VARIUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:498. 1844.
 = *Diplazium crenatoserratum* (Blume) Moore, Ind. Fil. 325. 1859.
Diplazium roxburghii Moore, Ind. Fil. 176, 337. 1859.
Asplenium crenatoserratum Blume, Enum. Pl. Jav. 177. 1828. Type: Bantam Mountains, Java, Blume. Not located in Leiden in 1954. There is a specimen labeled *A. crenatoserratum* in Blume's hand (Morton photograph 960) which may be an isotype, but it lacks the locality "Bantam" and is sterile, whereas Blume clearly describes the sori; moreover, it does not agree very well with the description. Strangely enough, there is another specimen named *A. crenatoserratum* which was probably collected by Blume, but it is *Coniogramme fraxinea* (Morton photograph 771). It does not seem possible that Blume could have confused this widely different plant with an *Asplenium* (or *Diplazium*); it seems more likely that the labels have become mixed. A search should be made in Leiden under *Coniogramme* for a specimen of *Diplazium* agreeing with the description of *A. crenatoserratum* but with a label reading *Gymnogramma javanica* Blume or *Gymnogramma serrulata* Blume, the names under which *Coniogramme fraxinea* was originally described from Javan material.
Diplazium phanerotis Kunze, Bot. Zeit. 4:443. 1846. Type: Java, Zollinger 1491 (holotype G, Morton photograph 3830).
Diplazium roxburghii Moore, Ind. Fil. 176, 337. 1859. Based on *Asplenium varium* Roxburgh, non *Diplazium varium* Gaud., 1827. *Diplazium varium* Gaud. is also from the Moluccas and is still a dubious species. In

Christensen's "Index Filicum," *D. roxburghii* Moore is left in limbo, so to speak, neither accepted nor placed in italics as a dubious species. *Asplenium porrectum* Mett. Abhandl. Senckenb. Naturf. Gesell. 3:220. 1859. Based on *Asplenium porrectum* Wallich Cat. 204, *Asplenium porrectum* Wallich Cat. 224, *Asplenium multisorum* Wallich Cat., p. 63, *Asplenium polyodon* Wallich Cat., p. 63, *Asplenium cataractarum* Moritzi, and *Diplazium phanerotis*. The Wallich names were nomina nuda; *Asplenium cataractarum* must be considered as sensu Moritzi, non Blume, 1828; *Diplazium phanerotis* Kunze was a validly and previously published name. The epithet *phanerotis* was available under the genus *Asplenium*, and Mettenius should have adopted it and made the new combination "*Asplenium phanerotis* (Kunze) Mett." instead of taking up the nomen nudum *A. porrectum* Wallich. Therefore, *Asplenium porrectum* Mett. must be considered a superfluous name by Art. 63 of the Code and be typified by the type of the name that ought to have been adopted, namely, *Diplazium phanerotis*. (Type: Java, Zollinger 1491). Mettenius saw Zollinger 1491, but he wrongly cites it as from Malacca rather than Java. There are some other errors in Mettenius' treatment of this species. Wallich used the name *Asplenium porrectum* twice, first under no. 204 for a plant from Penang and Singapore (wrongly cited by Mettenius as from Nepal) and again under no. 224 for a plant from Mauritius which is utterly different. Wallich realized this later and rejected both of his *porrectum* names, on p. 63 of his List, renaming no. 204 as *Asplenium multisorum* Wallich (wrongly cited by Mettenius as *A. "multisorum"*) and no. 224 as *Asplenium polyodon* Wallich. The latter, *A. polyodon* Wallich [not *A. polyodon* Forst., 1786], is still a nomen nudum, considered a synonym of *A. protensum* Schrad.

TYPE: A specimen in the Brussels Herbarium with the name *A. varium* in the hand of Roxburgh and the number 2409 (Morton photograph 19600). According to Roxburgh it was collected in Amboina, which means probably by Christopher Smith. Since duplicates of this collection have not been seen in other herbaria, it is likely that this specimen is unique and a holotype.

26. ASPLENIUM WOODWARDIOIDES Roxburgh, Calcutta Journ. Nat. Hist. 4:500. 1844, non Bernh., 1803. =? *Diplazium maximum* (D. Don) C. Chr. Ind. Fil. 235. 1905 (as to basionym, excl. synonymy).

TYPE: Not determined. The type came from Chittagong, East Bengal (now East Pakistan), where it was collected by Buchanan-Hamilton. No specimen from the Roxburgh Herbarium determined as *A. woodwardioides* has been located nor any collected at Chittagong by Buchanan-Hamilton.

Don described two species from Nepal, *Asplenium latifolium* Don and *A. maximum* Don, both from collections made by Wallich. In the "Index Filicum," these were united under the name *Diplazium maximum*, but it is clear from Don's descriptions that there were two different species—*A. latifolium* D. Don (non Bory, 1803) having the pinnules merely toothed or slightly lobed (i.e., the same species or closely related to *D. dilatatum* Blume) and *A. maximum* D. Don with the pinnules deeply

pinnatifid (clearly related to *D. polypodioides* Blume). The holotypes of Don's species have not been located; they are seemingly not in the British Museum where they might be expected. Although Don's new species were based on his own collections, Wallich ignored Don's names and provided new names in publishing his own "A Numerical List." It will be necessary to examine closely the specimens of Wallich's collection in the East India Company Herbarium to decide which of Wallich's names apply to *A. maximum* D. Don; several are to be considered, especially *A. diversifolium* Wallich, *A. frondosum* Wallich, and *A. polymorphum* Wallich, and perhaps others. It seems clear, however, that Don's name applies to the plant of Nepal and northern India generally called *D. polypodioides* Blume (syn. *D. asperum* Blume). The true *D. polypodioides* of Java, Malaya, and southern India and Ceylon has a spiny stipe and rachis. The Himalayan plant is closely allied but, as pointed out by Sledge (Bull. Brit. Mus. Nat. Hist. Bot. 2:308. 1962), differs apparently constantly in having smooth rather than prickly stipes and rhachises. This Himalayan plant I take to be the true *D. maximum*. If it should prove to be the same as *D. polypodioides*, the name *D. maximum* has priority.

Roxburgh's description of his *A. woodwardioides* is "Stipes smooth; fronds (2 feet high), subovate, smooth, alternately-bipinnate; leaflets broad-ensiform; those of the inferior pinnae pinnatifid; of the upper more or less serrate. Fructifications in oblong spots along the nerve, but forming a sharp angle with it. Involucre separating towards the nerve. Found at Chittagong by Dr. Buchanan." As may be seen, Roxburgh stressed that both the stipe and the fronds were "smooth," not prickly or scaly, which agrees with *D. maximum*, and the identification with *D. maximum*, at least sens. lat., is confirmed by the description of the pinnules of the lower pinnae as "pinnatifid," which would exclude *D. dilatatum* Blume. Roxburgh's name is a later homonym, and therefore it can never be adopted to replace any other name that might be found to be identical with it.

A plant that appears to be a variety of *D. maximum*, rather than *D. polypodioides*, because of the nonspiny stipe and rhachis follows:

27. DIPLAZIUM MAXIMUM (D. Don) C. Chr. var. *vestitum* (C. B. Clarke) Morton, comb. nov.
Asplenium polypodioides var. *vestitum* C. B. Clarke, Trans. Linn. Soc. II, Bot. 1:501. 1880. Type: "Central Himalaya," with no specimens

cited. Lectotype: Darjeeling, 6500 ft alt, June 19, 1884, *Clarke* 35382D (K, Morton photograph 20640).

This variety, which may prove to be a distinct species, has the rhachis and rhachillas rather densely scaly and pubescent. I have seen two recent collections from Lebong Forest, Darjeeling: *Mehra* 7 (US) and *Bir* 121 (US). The other syntypes of var. *vestitum* are: Darjeeling, 6500 ft alt, Sept. 2, 1875, *Clarke* 27329 (K) and Rungbee, Darjeeling, 5500 ft alt, Aug. 17, 1869, *Clarke* 8646 (2 sheets, K, Morton photograph 20641).

28. *BLECHNUM ANGUSTIFOLIUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:501. 1844, non Willd., 1810. =*Taenitis blechnoides* (Willd.) Swartz f. *angustifolia* (Roxburgh) Morton, comb. nov.

TYPE: A specimen of the Roxburgh Herbarium from the Martius Herbarium in Brussels annotated by me as *B. angustifolium* Roxb. (Morton photograph 19830). According to the unpublished list of Roxburgh species represented in the Martius Herbarium, *Blechnum angustifolium* Roxburgh is present, and this collection is the only possible one, even though the name *B. angustifolium* is not written on the sheet; the specimen agrees with the original description, and since the plant is distinctive there cannot be any doubt. No other specimens of *B. angustifolium* have been found in Kew, the British Museum, or Geneva, and so this specimen may be presumed to be unique and therefore the holotype. The locality was stated by Roxburgh to be the Molucca Islands, where it was probably collected by Christopher Smith.

Taenitis blechnoides normally has pinnate blades. The juvenile blades are said to be simple, as is expected, but they are seldom collected. Roxburgh's specimen of *B. angustifolium* is, however, not juvenile, because it has mature sori; it represents a form with simple mature blades, evidently rare, because, although I have seen many typical specimens of *T. blechnoides*, this Roxburgh collection is the only one with simple mature blades. It is to be doubted, however, that this condition would be constant.

29. *BLECHNUM DECURRENS* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:502. 1844.

=*Blechnum finlaysonianum* Wallich ex Hook. & Grev. *Icon. Fil.* 2: t. 225. 1831. **TYPE:** Penang?, "Herb. Finlayson." Apparently this is not in the general herbarium at Kew, although there is an old collection without collector or locality that might be an isotype. There is an isotype—a fragment only—in the Greville Herbarium now in Edinburgh (Morton photograph 11560), and this can serve as lectotype until a better specimen is discovered. Wallich gave no locality, but Hooker and Greville guessed Penang.

Blechnum finlaysonianum Wallich, *Num. List* 65, no. 2172. 1830, nom. nud.

Asplenium penangianum Wallich, *Num. List* 8, no. 196. 1830, nom. nud.

Based on Penang, *Wallich* in 1822 (K, Morton photograph 11558).

TYPE: A specimen in the herbarium in Brussels with the name in the

hand of Roxburgh (Morton photograph 20002). This is the only collection found at Kew, Brussels, or Geneva, and so may be considered unique and the holotype. It came from Prince of Wales Island, i.e., Penang Island, Malaya, and was collected by Dr. Hunter, according to Roxburgh.

Blechnum decurrens has not been properly placed. In the "Index Filicum," it was referred doubtfully to *Blechnum orientale* L. It was properly determined as *B. finlaysonianum* by Bommer on an annotation slip with the type.

30. BLECHNUM GLABRUM Roxburgh, Calcutta Journ. Nat. Hist. 4:502. 1844. = *Taenitis blechnoides* (Willd.) Swartz, Syn. Fil. 24, 220. 1806. Based on *Pteris blechnoides* Willd. Phytogr. 13, t. 9, f. 3. 1794. Type: India, Klein (B, Herb. Willd.).

LECTOTYPE: Two sheets in Brussels with the name in the hand of Roxburgh (Morton photographs 19828 and 19829). An isotype is in the East India Company Herbarium ex Herb. Roxburgh, no. 141-2 (Morton photograph 20658). The only locality cited by Roxburgh is Prince of Wales Island, i.e., Penang Island, Malaya, and so these specimens may be presumed to be from there.

Another specimen is in the East India Company Herbarium Kew, no. 141-2 (Morton photographs 15722 and 19592b); this also has the name in the hand of Roxburgh and is doubtless a part of the same collection as the lectotype. The original description cites "*Taenitis blechnoides*. Sw. Wall. Cat. 62, No. 141," which refers to this specimen sent to Wallich by Roxburgh. The intent is *Taenitis blechnoides* sensu Wallich. In point of fact, Wallich did identify his no. 141 correctly as *T. blechnoides*.

Dr. Holttum has recently published "A Re-definition of the Fern-genus *Taenitis* Willd." (*Blumea* 16:87-95. 1968) in which *Taenitis* is enlarged to contain 15 species, including the types of the genera *Holttumiella* and *Platytaenia* and many species formerly referred to *Syngamma* and *Schizoloma*.

31. BLECHNUM MOLUCCANUM Roxburgh, Calcutta Journ. Nat. Hist. 4:502. 1844, non Desv., 1811. = *Blechnum orientale* L. Sp. Pl. 1077. 1753 (by typographical error as "*B. occidentale*," the epithets "*occidentale*" and "*orientale*" were accidentally reversed).

LECTOTYPE: A collection in Brussels with the name *Blechnum moluccanum* written in the hand of Roxburgh and with the date May 28 (Morton photograph 19997). Roxburgh cited "Prince of Wales Islands, Moluccas, etc." thus indicating that he had more than one specimen in hand. It cannot be determined if the specimen chosen as lectotype came from the Prince of Wales Island, i.e., Penang Island, or the Moluccas. There is another sheet in Brussels (Morton photograph 19998) which is doubtless a part of the same collection as the lectotype. A sheet in Geneva (Morton photograph 16837) is also a part of the Roxburgh Herbarium and bears the locality

"Moluccas"; however, I do not choose it as lectotype because the name is not in Roxburgh's hand.

The original description cites as a synonym "*Blechnum orientale*, Linn. Wall. Cat. 61, No. 57," but this does not mean that Roxburgh was renaming the Linnaean species. This citation was added by Griffith and was intended to mean that Roxburgh's species *B. moluccanum* was *B. orientale* sensu Wallich's Catalogue by no. 57 (actually no. 57-6, which is the Roxburgh collection sent to Wallich (Morton photograph 15728 taken at Kew).

32. *CYATHEA PINNATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:517. 1844.
= *Cyathea moluccana* R. Brown ex Desv. Mém. Soc. Linn. Paris 6:322.
1827. Type: Molucca Islands, *C. Smith* (holotype BM).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand and the number 2429 (Morton photograph 19853). There is also a duplicate in Brussels (Morton photograph 19854). Additional isotypes are in Geneva, with a ticket reading "Prince of Wales Island, Dr. Roxburgh" (Morton photograph 16876), and in the East India Company Herbarium, no. 179-2 (K, Morton photograph 15724). The locality stated by Roxburgh is Prince of Wales Island, i.e., Penang Island, Malaya, where it was collected by W. Roxburgh, Jr.

Holttum has this placed correctly as a synonym of *C. moluccana*; cf. *Flora Malesiana* II, 1(2):143. 1963, for a full synonymy.

33. *CYATHEA TRIPINNATIFIDA* Roxburgh, Calcutta Journ. Nat. Hist. 4:518.
1844.

LECTOTYPE: Holttum (*Fl. Males. II*, 1(2):156. 1963) cites the type as "Herb. Wallich n. 7076, Moluccas (CAL?; dupl. at K, BM) [*Wallich* 7076 was not collected by Wallich, but by Roxburgh]," but this can hardly be considered as a definitive choice of a lectotype, for Holttum seems to have thought that perhaps there was a holotype in Calcutta, but there are no Roxburgh specimens in Calcutta. Griffith, who published Roxburgh's fern species, commented that not a scrap of Roxburgh's material was left in Calcutta. The holotypes, where these can be determined, are in Roxburgh's personal herbarium now in Brussels. I designate two Roxburgh sheets in the Brussels Herbarium as lectotype (Morton photographs 4881, 4882, 19856, 19857), which are evidently parts of the same frond; one of the sheets bears the name in Roxburgh's hand. A duplicate, doubtless a part of the same frond, is in Geneva marked "Ind. Orient. Dr. Roxburgh" (Morton photographs 6536, 16893). Another duplicate is in the East India Company Herbarium, no. 7076 (Morton photograph 15724); in the general herbarium at Kew is a specimen labeled "Amboyna, Mr. Webb," which means that this is probably collected on Amboyna by C. Smith and received from Webb. It is doubtless an isotype. Another isotype is in the British Museum, as cited by Holttum.

According to Holttum's treatment in the "*Flora Malesiana*," this species is endemic in Amboyna. In the original description

Griffith added a reference to "*C. excelsa*, Sw. Wall. Cat. 63, No. 181 (sub nomine *C. bipinnatifidae*)," but this was only with a query.

It appears that a specimen in Geneva (Morton photograph 6536) is part of a specimen collected in Amboina by Christopher Smith (no. 3279).

34. *DAVALLIA ANGUSTIFOLIA* Roxburgh, Calcutta Journ. Nat. Hist. 4:513. 1844. = *Humata angustata* (Wall. ex Hook. & Grev.) J. Smith, Journ. Bot. Hook. 3:416. 1841. Type: Singapore, *Wallich* in 1822 (isotype in E. Ind. Co. Herb. no. 242, Morton photograph 15731, lower left-hand specimen).

Davallia angustata Wallich ex Hook. & Grev. Icon. Fil. 2: t. 231. 1831.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh, from Prince of Wales Island, i.e., Penang Island; it bears a field label in the hand of W. Roxburgh, Jr., reading: "Grows on the trunks of trees which are well shaded. It runs along this trunk for 6-8-12 feet and perhaps more. It is sent in the list you will receive." An isotype is in the East India Company Herbarium, no. 242-2 (Morton photograph 15731), two top plants; the lower right-hand plant is from Penang, collected by Wallich in 1822, which was not mentioned by Wallich or by Hooker and Greville, but was probably included in Wallich's original concept of his *Davallia angustata*.

The citation added to Roxburgh's original description by the editor, Griffith, "*D. angustata* Wall. Cat. 63, No. 242" does not mean that Roxburgh's species was intended as a renaming of *D. angustata* Wallich, but merely that Roxburgh's species was included by Wallich under his no. 242, actually no. 242-2, as shown by the reference to page 63.

Roxburgh's *Davallia angustifolia* is quite the same as *D. angustata* Wallich, which is a good species and not a synonym of *Humata heterophylla* as the "Index Filicum" has it. It differs in the leaves not being dimorphic and in the fertile ones not being lobed.

35. *DAVALLIA CORDIFOLIA* Roxburgh, Calcutta Journ. Nat. Hist. 4:514. 1844. = *Humata trifoliata* Cav. Descr. 273. 1802. Type: Marianna Islands, *Née*, according to Cavanilles; Christensen (Dansk Bot. Ark. 9(3):26. 1937) suggested that Née's plant may have come from the Philippine Islands, since the species had not been collected again in the Mariannas, and since it could be matched by Philippine specimens; however, unknown to Christensen, Hosokawa had reported it again the previous year (Trans. Nat. Hist. Soc. Formosa 26:121. 1936) from Alamagan, one of the smaller Mariannas Islands, under the synonymous name *Humata lepida* (K. B. Presl) Moore, as pointed out by Wagner (Occ. Pap. Bern. P. Bishop Mus. 19:85. 1948). Thus the original locality was correct, but the species must be very rare in the Mariannas.

Davallia serrata Willd. in L. Sp. Pl. ed. 4, 5:467. 1810. An illegitimate change of epithet in transferring *Humata trifoliata* to *Davallia*.

Humata serrata (Willd.) Desv. Mém. Soc. Linn. Paris 6:323. 1827. An illegitimate name, since the earliest available epithet *trifoliata* was not adopted.

TYPE: No herbarium specimen of *D. cordifolia* has been located. Roxburgh's type came from "mountains north of Rohilkund," i.e., the present Rohilkhand, in the Northern United Provinces, Division of Agra.

This species has had to be placed from description only. In the "Index Filicum," it is referred to *Humata repens* (L. f.) Diels, which was an aggregate as treated. *Humata repens* was based on *Adiantum repens* L. f. Suppl. 446. 1781. The type came from the Ile de France, i.e., Mauritius, and was collected by Sonnerat and transmitted by Thouin. The holotype is in the herbarium of Linnaeus fil. in the J. E. Smith Herbarium (no. 1635.21) in the Linnean Society, London (Morton photograph 20298). It is a good specimen, typical of the species as it grows in Mauritius, where the plants are small, long-stalked, not very divided, and not dimorphic. The plants from the Philippine Islands, Malaya, and India that have been called *H. repens* agree with *H. trifoliata* Cav., according to the study by Christensen (Dansk Bot. Ark. 8(3):26. 1937). Additional synonymy for *H. trifoliata* is given by Copeland in his Fern Flora of the Philippines (1:177. 1958). Copeland also maintains *H. repens* as a native of the Philippines, although with doubt.

Apparently true *H. trifoliata* occurs in Sumatra and Borneo. The larger and more divided plants of Java, New Caledonia, the Admiralties, and perhaps Fiji and Samoa (*Humata serrata* Brack., non Desv.) seem to be best called *Humata alpina* (Blume) Moore, Ind. Fil. XCII. 1857, as recognized in the "Index Filicum, Suppl. 3," which is based on *Davallia alpina* Blume (Enum. Pl. Jav. 2:231. 1828). As lectotype of *D. alpina*, I designate a specimen in Leiden from Mount Gedé, Java, collected by Blume and with the name "alpina" in Blume's hand (Morton photograph 1523). This probably is the actual holotype. A second sheet lacking the locality is in Leiden also, which probably represents an isotype (Morton photograph 1514).

36. *DAVALLIA LONGIFOLIA* Roxburgh, Calcutta Journ. Nat. Hist. 4:514. 1844, = *Grammitis alata* (Blume) Morton, comb. nov.

Davallia alata Blume, Enum. Pl. Jav. 2:230. 1828. "In fissuris rupium Javae," fide Blume. Lectotype: Raab, Java, Zippel (L. Morton photograph 845). Several other syntypes are at Leiden, collected by Blume.

Prosaptia alata (Blume) Christ, Ann. Jard. Bot. Buitenzorg 20:127. 1905.
Ctenopteris alata (Blume) Holtt. Fl. Malaya, Ferns 2:232. 1954.

TYPE: No specimen from Roxburgh has been located. The type was collected on Prince of Wales Island, i.e., Penang Island, by W. Roxburgh, Jr.

In the "Index Filicum," *D. longifolia* Roxb. was referred without doubt to *Davallia alata* Blume, and from the description it appears that this is surely right.

Prosaptia does not appear to differ from the species of *Grammitis* sect. *Cryptosorus* (cf. Morton, Contr. U.S. Nat. Herb. 38:90. 1967) that have sunken sori, except in having the sori submarginal. It could perhaps rank as a distinct section.

37. *DAVALLIA MOLUCCANA* Roxburgh, Calcutta Journ. Nat. Hist. 4:516. 1844, non Blume. = *Tapeinidium moluccanum* (Blume) C. Chr. Gard. Bull. Str. Settl. 4:399. 1929. Based on *Davallia moluccana* Blume, Enum. Pl. Jav. 237. 1828.

Davallia amboynensis Hook. Sp. Fil. 1:178, t. 56C. 1846. A renaming of *Davallia moluccana* Roxburgh, non Blume.

Tapeinidium amboynensis (Hook.) C. Chr. Ind. Fil. 631. 1906.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19825). There is an isotype in Brussels, with the name not in Roxburgh's hand (Morton photograph 19824), one in the British Museum marked "Amboyna, Chr. Smith" (Morton photograph 15589), and one in Geneva marked "Moluccas, Dr. Roxburgh" (Morton photographs 6533, 16747). Roxburgh indicated his species as from the Molucca Islands; these collections show that the species was collected in Amboina by Christopher Smith.

Roxburgh assigned the name *Davallia moluccana* to this species long before Blume chose the same name for one of his species. Hooker assumed (without having seen Blume's type) that the Roxburgh species was different and renamed it *Davallia amboynensis*, since Roxburgh's name although proposed in manuscript earlier than Blume's was not published until later, in 1844; from Hooker's extensive footnote, it appears that he had just received the Roxburgh publication while he was writing the account of *Davallia*; he cites it from a reprint rather than from the original Calcutta Journal. In addition to Roxburgh, Hooker cited collections from Amboina in "Herb. Banks" (i.e., British Museum) and in his own herbarium collected by "A. Smith" received from Webb. The specimen in the British Museum referred to is clearly C. Smith, i.e., Christopher Smith; Hooker's "A. Smith" is either a typographical error or an error on the part of Webb; I believe that Christopher Smith was the only Smith who collected in Amboina in the early years. In his recent revision of *Tapeinidium* (Blumea 15:545-556. 1967), Kramer indicated as lectotype of *D. amboynensis* this Kew specimen collected by "A. Smith." But as indicated above, *D.*

amboynensis, was a renaming of *D. moluccana* Roxburgh, non Blume, and so it must have the same type as Roxburgh's species. The Kew collection mentioned, although surely as isotype of Roxburgh's species, was doubtless not seen by Roxburgh and so it is not a suitable lectotype.

Kramer states that the type of *Davallia moluccana* Blume is a *Saccoloma* rather than a *Tapeinidium*, following Mettenius. But as indicated by Christensen (Gard. Bull. Str. Settl. 4:399. 1929), Mettenius obtained his concept from a specimen in Leiden that had been identified as *Davallia moluccana* Blume by Blume only with a query. The specimen I take to be the holotype, or at least the most suitable lectotype, is one in Leiden with the name *Davallia* "*moluccensis nobis*" in Blume's own hand; it is from Amboina, collected by Reinwardt (Morton photograph 2281); Blume changed "*moluccensis*" to *moluccana* in his publication. This type shows that Blume's species is indeed the same as Roxburgh's *Davallia moluccana*, both authors having hit upon the same specific epithet independently.

38. *DAVALLIA MULTIFLORA* Roxburgh, Calcutta Journ. Nat. Hist. 4:515, t. xxxi, left hand. 1844. = *Nephrolepis multiflora* (Roxburgh) Jarrett ex Morton, comb. nov.

LECTOTYPE: A specimen in the Brussels Herbarium originally named *Davallia* with a species name now mostly cut off, this subsequently changed to *Polypodium davallioides*, and identified later as *Nephrolepis exaltata* by Baker and *N. hirsutula* by Bommer (Morton photograph 19638). According to Roxburgh the species is native to "the interior parts of Bengal, Nepaul, etc." Judging from my photograph, the same species is represented in the herbarium of the East India Company at Kew, where it is filed as no. 1031, although it should be 1031-6, i.e., *Polypodium davallioides* Roxburgh (Morton photograph 19582). Griffith indicated that *Davallia multiflora* Roxburgh occurred under the name *Polypodium davallioides* also.

In the "Index Filicum," *Davallia multiflora* Roxburgh is said to "= *Humata gaimardiana* vel *Nephrolepis* sp. (*hirsutula*?)." This confusion was occasioned by the editor Griffith, who added to Roxburgh's manuscript a reference to "*D. parallela*, Wall. Cat. 63, No. 251," which is plainly an error. Griffith should have added this Wallich reference under *Davallia pectinata* Smith of Roxburgh's manuscript, since *D. pectinata* sensu Roxburgh is clearly the same as *D. parallela* Wallich, i.e., a species of *Humata*. Roxburgh's description and published illustration, as well as the unpublished painting at Kew, show that Roxburgh's plant was a *Nephrolepis* and not a *Humata*.

Roxburgh's description is fairly good, as is the published drawing (t. XXXI, left hand). The specimen selected as lecto-

type is believed authentic because it was originally determined by Roxburgh as a *Davallia*, and *D. multiflora* is the only species of *Nephrolepis* described as a *Davallia* by Roxburgh; the original species name has been mostly cut off leaving only the top of some of the letters visible, but they are consistent with the name *multiflora*. More importantly, the specimen agrees well with the original description, as for instance the crowded pinnae, which are indeed almost imbricate in this specimen, in the shape of the blades and pinnae, including the auricles, and in the indusia being submarginal, reniform and opening outwardly. Especially the apex of the blade and the basal, somewhat reduced pinnae are exactly like the published illustration. It is therefore likely that this lectotype is truly authentic and perhaps an actual holotype.

Indian specimens of this species have been generally identified as either *Nephrolepis exaltata* (L.) Schott or *N. hirsutula* (Forst.) K. B. Presl, but Dr. Jarrett regards them as distinct (both lack short hairs on the upper side of the pinna midribs). In the shape of the indusia and their submarginal position, the species appears to be closer to *N. exaltata* than to *N. hirsutula*, with which, however, it can be easily confused. Some of the material in cultivation as *N. hirsutula* is probably *N. multiflora*. New World specimens identified as *N. multiflora* are actually *N. exaltata*.

39. *DAVALLIA PECTINATA* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:514. 1844. = *Humata pectinata* (J. E. Smith) Desv. Mém. Soc. Linn. Paris 6:323. 1827.

AUTHENTIC MATERIAL: East Ind. Co. Herb., no. 251-2 (K, Morton photograph 15732, upper plant). This collection is named *Davallia multiflora* Roxburgh and is so cited in Wallich's "Numerical List," p. 63 under no. 251-2, but this was an error, the name having been transposed somehow to the wrong plant. This plant, no. 251-2, is Roxburgh's *D. pectinata*, which was not considered a new species but was credited to Smith, and not his *D. multiflora*. According to Roxburgh it was "found on the northern boundary of Oude by A. Gott," which refers to the area later known as the United Provinces of Agra and Oudh, India. The true *Davallia multiflora* Roxburgh is a *Nephrolepis*, as shown by the description and drawing.

Roxburgh identified his plant correctly, it appears, from his description and from this specimen. I am not sure that *Humata pectinata* has ever again been found in Oudh, but there is no reason that it could not occur there. It grows in Burma, as indicated by Beddome (under the synonymous name *Humata parallela*).

The type of *Davallia pectinata* J. E. Smith is in the J. E.

Smith Herbarium, no. 1635-19, in the Linnean Society, London (Morton photograph 20297, excluding the small plant at upper left, which is Malacca, June, 1796, *Christopher Smith*). The specimen is labeled "Ind. or. Soc. Unit. Frat. 1786" and according to Smith was collected by D. Hurloch, presumably a missionary. Smith also cited "eandem forte in Otheite legit Nelson. H. Banks." The word "forte" (=perhaps) indicates that this second specimen is not a type but was referred to the species with some doubt. This specimen is also in the J. E. Smith Herbarium (Morton photograph 20299, left-hand plant) marked as "Otaheite, Nelson ex hb. Banks." It is marked as "*D. pectinata* var." Smith described the lowest segments as "auriculatis semipinnatisve"; the "auriculatis" is true of the type, and the "semipinnatisve" came from this Nelson specimen from Tahiti, which may or may not be separable taxonomically. It is not definite where the type of *D. pectinata* may have come from, since in the eighteenth century the term "India orientalis" did not mean eastern India but what we might call the "East Indies," a sort of general term including Malay, Singapore, and Malaysian Islands, as well as India; since it agrees with plants from Singapore, it may well have come from there.

Hooker (Sp. Fil. 1:153. 1845) misunderstood Smith's *D. pectinata*, which he misapplied to the plant from Tahiti represented by the Nelson collection, and redescribed the true *D. pectinata* as *D. parallela* Wallich, the latter based in part on Wallich List no. 251 from Singapore, collected by Wallich in 1822 (East Ind. Co. Herb. no. 251, Morton photograph 15732, lower plant). However, since Hooker cited *Nephrodium gaimardianum* Gaud. as a straight synonym of *D. parallela*, the latter becomes a superfluous name, since the epithet "*gaimardianum*" was available in *Davallia* and should have been used. In fact, Presl had tentatively proposed *D. gaimardiana* in his "Tentamen" (1836), only to delete it in the errata at the end (p. 290) in favor of his *Nephrolepis gaimardiana*.

40. *DAVALLIA PILOSA* Roxburgh, Calcutta Journ. Nat. Hist. 4:515, t. 32 (right hand). 1844. =*Microlepis speluncae* (L.) Moore, Ind. Fil. XCIII. 1857, var. *speluncae*.

LECTOTYPES: A specimen in the Brussels Herbarium named by Roxburgh *Polypodium ciliatum?* and reidentified by Baker as *Davallia speluncae* (Morton photograph 19818).

No specimen named *Davallia pilosa* Roxburgh has been found. The reason for connecting the specimen chosen as lectotype is that Roxburgh indicated that his illustration was under the

name of *Polypodium ciliatum*, and this sheet does bear the name *Polypodium ciliatum*. The query present doubtless indicated Roxburgh's doubt about the species being truly a *Polypodium*. When he decided to describe it as a *Davallia*, he changed the specific epithet from *ciliatum* to *pilosa*.

Roxburgh's published drawing and the copy at Kew are both poor, and one could not possibly identify the species from them. Roxburgh's description, however, is rather detailed; the lectotype chosen agrees with the description, and it may be considered truly authentic and very likely the actual holotype. According to Roxburgh, it came from the Delta of the Ganges, from where it was introduced into the Botanic Garden in Calcutta by Buchanan-Hamilton. It is most likely that no herbarium specimen was made of the plant in the wild and that the specimen at hand came from the plant cultivated in the Botanic Garden.

In Sledge's treatment *D. pilosa* is placed as a doubtful synonym of *M. speluncae* var. *pubescens* (Hook.) Sledge. The lectotype, however, shows that *D. pilosa* is typical *M. speluncae* as it grows in the type locality, Ceylon.

41. *DAVALLIA SERRATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:514. 1844, non Willd., 1810. = *Tapeinidium pinnatum* (Cav.) C. Chr. Ind. Fil. 213. 1905.
Type: Philippine Islands, *Née*.

TYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19916). Since this is the only specimen seen in any herbarium, it is likely unique and a holotype. It came from the Prince of Wales Island (i.e., Penang Island) according to Roxburgh, where it was collected by W. Roxburgh, Jr.

In the "Index Filicum," the citation "Hk. sp. 1:174. 1846 = *biserrata* Bl.," following the entry for *Davallia serrata* Roxburgh is an error. The "*Davallia serrata*" of Hooker at the place cited is not the same species as *D. serrata* Roxburgh, but an inadvertent error by Hooker for *Davallia biserrata* Blume, also a species of *Tapeinidium*, a somewhat dubious one but different from *T. pinnatum* (Cav.) C. Chr. A true synonym is *Davallia flagellifera* Wallich ex Hook. & Grev. Icon. Fil. 2: t. 183. 1830 [or 1831?], the type of which also came from Penang Island (Wallich in 1822, Num. List no. 243, isotypes BR, Morton photographs 19826, 19827); this species has been omitted from the "Index Filicum," except for the citation of the invalid nomen nudum "*D. flagellifera* Wall. List n. 243. 1828." Hooker and Greville gave a complete description and illustration.

42. *DAVALLIA TRAPEZIFORMIS* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:516. 1844. = *Microlepia pilosiuscula* (J. E. Smith) Morton, comb. nov.

Davallia pilosiuscula J. E. Smith in Rees, *Cycloped.* 11: *Davallia* no. 10. 1808. Syntypes: Honimoa, July, 1797, *Christopher Smith*, and Amboina, 1796, *Christopher Smith*. These two specimens are in the J. E. Smith Herbarium in the Linnean Society, London, nos. 1635-17 and 1635-18 (Morton photographs 20295 and 20296 respectively). I designate the specimen from Amboina as lectotype.

Microlepia trapeziformis Kuhn, *Chaeopt.* 27. 1882.

Microlepia speluncae var. *pubescens* (Hook.) Sledge, *Kew Bull.* 1956: 525, at least in part.

LECTOTYPE: A specimen in the Brussels Herbarium with the name *Polypodium saccatum* and the number 2404 in the hand of Roxburgh (Morton photograph 19819). The species came from the Moluccas according to Roxburgh.

The name "*Polypodium saccatum*" that Roxburgh originally applied to this species was based on the sorus, which Roxburgh described as "involucre . . . forming a pouch." When he reconsidered and decided to place the plant in the genus *Davallia* rather than *Polypodium*, he changed the specific epithet to *trapeziformis* (referring to his description of the leaflets as "subtrapeziform"), doubtless for the reason that all *Davallias* have the "involucre" somewhat pouchlike or saccate.

The lectotype is matched by a second specimen in Brussels also identified as *Polypodium saccatum*, although not in Roxburgh's hand (Morton photograph 19820). These specimens were undoubtedly collected for Roxburgh by Christopher Smith—like Roxburgh's other Molucca collections—and they match the lectotype above for *Davallia pilosiuscula*. Thus it appears that Roxburgh's species came from Amboina. J. E. Smith had a second collection of his *D. pilosiuscula*, that from Honimoa, which is slightly larger and more divided. Roxburgh had this too, and he annotated it as "not well ascertained, probably a luxuriant specimen of *saccatum* as it has the same involucre." This specimen was doubtless included in Roxburgh's description, for he wrote that the fronds were "alternately bipinnate and tripinnatifid," the bipinnate applying to the plant from Amboina and the tripinnatifid to the more divided plant from Honimoa. A duplicate of this larger plant also is in Brussels, which by comparison with the plants in the J. E. Smith Herbarium can be presumed to be from Honimoa collected by Christopher Smith.

Other specimens of this species were evidently collected by Smith in some quantity. One of these is in the East India Company Herbarium, no. 262-4 at Kew (Morton photographs 15734, 19583, at left), which agrees with the lectotype chosen;

undoubtedly it came from Amboina, collected by C. Smith. A similar specimen in Geneva, determined as *Polypodium saccatum* Roxb. (Morton photograph 16641), has only the locality "Ind. or." Another sheet of the same thing in Geneva, marked "Amboina, Christ. Smith," lacks the name *Polypodium saccatum* but is determined as *Davallia polypodioides* (Morton photograph 6531). Another specimen in Geneva from "Moluccas, Dr. Roxburgh" has been named *Polypodium dubium* wrongly by someone other than Roxburgh (Morton photograph 6543). Another specimen collected by C. Smith in the Moluccas is from Gilolo Island (i.e., the present Halmahera Island) and was probably not seen by either J. E. Smith or Roxburgh, and so is not authentic.

The group of species centering around *Microlepia speluncae* is exceedingly difficult to study from herbarium specimens. Alston in his paper on the ferns of the J. E. Smith Herbarium was the first to identify *Davallia pilosiuscula* J. E. Smith; he stated that the species was "probably conspecific with the type of *M. speluncae* from Ceylon in Hermann's herbarium" (Phil. Journ. Sci. 50:177. 1933). Material from Ceylon identified by Sledge as agreeing with the Hermann type is, however, rather different. The hairs on the rhachillas of the pinnae are elongate, and many-septate, with conspicuous cross walls; the hairs on the segments are few and coarse. The plants from Amboina and Honimoa, and probably also at least most of those from Java and Sumatra, are finely and densely pilosulous, the hairs of both the rhachillas and segments being short, horizontally spreading, and only one or two cells long. I feel that these plants can hardly be conspecific. I venture to propose a new combination because the name of Smith is long prior to any other name that might apply to these Malaysian plants, and so it will likely stand when these plants are monographically studied and better understood. Sledge based his *M. speluncae* var. *pubescens* on *Davallia polypodioides* var. *pubescens* Hook. Sp. Fil. 1:182. 1846, but did not typify this name. Hooker cited three different numbers of Wallich, and the localities of Singapore, Penang, Martaban, Assam, Mergui, Java, and Macalisberg in South Africa. Considering this geographically wide range, Hooker's var. *pubescens* is probably a mixture. The plant from Java likely included plants that I refer to *M. pilosiuscula*; however, I have not seen the collection cited—Zollinger 513.

It is clear from the above discussion that the name *Microlepia trapeziformis* (Roxburgh) Kuhn has been misused for an entirely different species, an identification of *D. trapeziformis* Roxburgh

as being synonymous with *D. rhomboidea* Wallich going back to Moore's "Index Filicum." Kuhn picked up the name, without discussing it or its type, and he was followed by Christensen in the "Index Filicum." The name has been generally accepted since, as by Holttum in his "Ferns of Malaya" and by Sledge (Kew Bull. 1956:526), without verification. The species, misidentified as *M. trapeziformis*, is, as shown by Sledge, quite different from *M. speluncae* in its pubescence; the hairs on the rhachillas of the pinnae are coarse, stiff, and antrorsely appressed; the segments are broader and more rounded, and the whole plant coarser in appearance. This species is widespread in Asia (in Ceylon, India, Thailand, Pahang, Tonkin, and Yunnan) and occurs also in Java and Sumatra. I doubt that it occurs in the Molucca Islands, however, where the type of *D. trapeziformis* came from. The proper name of this species appears to be *Microlepia rhomboidea* (Wallich ex Kunze) Prantl, Arb. Bot. Gart. Breslau 1:31. 1892, based on *Davallia rhomboidea* Wallich ex Kunze, Bot. Zeit. 8:158. 1850. The original *Davallia rhomboidea* Wallich, Num. List no. 257. 1829, was a nomen nudum.

These collections should be restudied, both at Kew, the Linnæan Society, and in Geneva, to make sure that I have them right. It may be that the two plants in the Smith Herbarium do represent different species, the one from Amboina being *M. trapeziformis* and the one from Honimoa being *M. dubia*.

43. *DICKSONIA MOLUCCANA* Roxburgh, Calcutta Journ. Nat. Hist. 4:517. 1844, non Blume, 1828. = *Cystodium sorbifolium* (J. E. Smith) J. Smith in Hook & Bauer, Gen. Fil. t. 96. 1841.

Dicksonia sorbifolia J. E. Smith in Rees, Cycl. 11: unpag. 1808. TYPE: Honimoa, Ceram, Indonesia, Christopher Smith, July, 1797 (Herb. Smith no. 1636.4, LINN, Morton photograph 20301).

LECTOTYPE: Honimoa, Christopher Smith 326 in 1797, BR (Morton photograph 19642). Roxburgh's *Dicksonia moluccana* was founded on a part of the same collection on which *D. sorbifolia* was based.

Two collections are in the British Museum. One is a single pinna from "Ins. Molucc." and one has parts of five pinnae matching the preceding marked as "Amboyna," both collected by C. Smith; these may be and probably are part of the same collection and thus isotypes, the "Amboyna" being an error for Honimoa (Morton photographs 6875 and 6633). A good illustration of this interesting monotypic genus is given by Holttum (Fl. Males. II, 1(2):163. 1963). An account of the gametophyte was given by Lenette R. Atkinson (Amer. Fern Journ. 55:32-35. 1965) and of the anatomy by Sen and Mitra (Amer. Fern Journ. 56: 97-101. 1966).

Another specimen in Kew (Morton photograph 15652) is noted as "Moluccas, *Wallich*"; this agrees wholly with the other specimens seen and is surely a part of the same collection of Christopher Smith given to Wallich by either Roxburgh or J. E. Smith, for Wallich did not collect in the Moluccas.

The reference added by Griffith was to Wallich's List no. 2173, which was a typographical error for no. 2174, a specimen of *D. moluccana* Roxburgh doubtless entered from the lectotype indicated above. There is no specimen now under no. 2174 in the East India Company Herbarium.

44. *EQUISETUM DEBILE* Roxburgh ex DC. in Vaucher, Mem. Soc. Phys. Hist. Nat. Genève 1:387. 1822 or 1821); Calcutta Journ. Nat. Hist. 4:468, t. 26 (middle plant). 1844. = *Equisetum ramosissimum* Desf. subsp. *debile* (Roxburgh) Hauke, Amer. Fern Journ. 52:33. 1962.

LECTOTYPE: A plant in the J. E. Smith Herbarium, Linnean Society, London, no. 1648-1, from Calcutta, India, collected by Roxburgh (Morton photograph 20335). A similar plant, but lacking strobiles, is in the British Museum (Natural History) (Morton photograph 7775). Because of the close similarity, a drawing by Roxburgh at Kew (no. 1921, Morton photograph 15887) might have been made from the plant in the Smith Herbarium, with some artistic rearrangement.

In his treatment of *E. debile* in his "A Taxonomic Monograph of the Genus *Equisetum* Subgenus *Hippochaete*" (Nova Hedwigia Beih. 8:1-123. 1963), Hauke cites the type as being in the DeCandolle Herbarium in Geneva, collected at Serampore, near Calcutta, by Griffith (no. 919), but this is obviously impossible, since Griffith was only about 11 years old at the time *E. debile* was described in 1821 or 1822; he did not begin collecting in India until 1835. Alston searched in Geneva for a type unsuccessfully, but probably one is there, perhaps a specimen that is unlabeled or without the indication of Roxburgh as the collector. If a specimen is located eventually it will become the holotype, and the lectotype will be abandoned. According to the original description, Vaucher did see a specimen, but only part of a branch; the description was taken from a manuscript by DeCandolle.

45. *HEMIONITIS CORDATA* Roxburgh ex Hook. & Grev. Icon. Fil. 1: t. 64. 1828. = *Hemionitis arifolia* (Burm. f.) Moore, Ind. Fil. 114. 1859. *Asplenium arifolium* Burm. f. Fl. Ind. 231. 1768. Type: India, Burmann. Morton photo 3863, which is labeled TYPUS, is not *Hemionitis* but has been determined by Alston as *Acrostichum aureum* L., of which it is a juvenile specimen with a simple blade. If this really is the type, then the correct name for *H. arifolia* will be *Hemionitis cordata* Roxburgh ex Hook. & Grev.

Hemionitis cordifolia Roxburgh. See entry 46.

Hemionitis hastata R. Brown ex Wallich, Num. List. 65, no. 2170. 1830, nom. nud. Based on Mysore, India, *Buchanan-Hamilton* (BM, Morton photograph 7501, upper right-hand plants).

Acrostichum trinerve Buchanan-Hamilton in sched. (BM, Mysore, India, *Buchanan-Hamilton*, Morton photograph 7501).

TYPE: Hooker and Greville cited three collections: one from "Ind. Orient," collected by Roxburgh; one from Madras by Shuter (K, probably the plant on the right mounted on the sheet with *Wight* 51, Morton photograph 20642); and one from low places near Calcutta "ad locis depressis veget. sub pluviis," collected by Wallich in 1820 (K, Morton photograph 20643). The Roxburgh specimen should be the lectotype, if one can be located at Kew or Edinburgh, considering that the species was attributed to Roxburgh.

46. HEMIONITIS CORDIFOLIA Roxburgh, Calcutta Journ. Nat. Hist. 4:500. 1844. = *Hemionitis arifolia* (Burm. f.) Moore, Ind. Fil. 114. 1859.

Hemionitis cordata Roxburgh ex Hook. & Grev. Icon. Fil. 1: t. 64. 1828.

LECTOTYPE: Herb. East India Company, no. 44 (K, Morton photograph 14670). This sheet contains three collections according to the label: (1) Bengal, 1807 [*Roxburgh*]; (2) Rangoon, 1827 [*Wallich*]; (3) "var. frond. fert. lobatis." The latter, which is not localized, is represented by a blade with the stipe cut off; it is not exactly "lobate" but rather irregularly sinuate. The middle plant on this sheet is the Roxburgh collection, since it matches a Roxburgh collection in the British Museum. The two plants at the sides are the Wallich collection. The isolectotype in the British Museum is marked "prope H. B. Calcuttae," i.e., near the Calcutta Botanical Garden (Morton photograph 15781). Copies of authentic Roxburgh drawings are at Kew (no. 1750) and the British Museum (Morton photograph 15770). According to Voigt (Hort. Suburb. Calcutt. 734. 1845), the Roxburgh specimen came from Serampore, Bengal.

In addition to the specimens cited above I have seen a Roxburgh specimen at Oxford determined as "*Acrostichum hastatum*," which has also been identified as "*Cyclophorus*" in some later hand (Morton photograph 20203). There is also a specimen in Brussels with the name *Hemionitis cordata* Roxburgh, from Madras, India, received from Hooker; this specimen cannot be a type, since it is from the wrong locality, but it may have been collected by Roxburgh while he was stationed in Madras prior to going to Calcutta.

47. HEMIONITIS RETICULATA Roxburgh, Calcutta Journ. Nat. Hist. 4:501. 1844, non Forst., 1768. = *Antrophyum callifolium* Blume, Enum. Pl. Jav. 111. 1828. TYPE: Java, *Blume* 95 (holotype L, Morton photograph 349; this sheet is the holotype because it is the only specimen labeled in Blume's hand and the only one collected by Blume).

LECTOTYPE: A sheet in the Brussels Herbarium collected in Honimoa, Ceram, Indonesia, Roxburgh Herb. 1174 (Morton photograph 19908). This sheet could be considered a holotype perhaps, since it is the only one seen with locality and with the name in the hand of Roxburgh. Roxburgh gave

the locality as "Moluccas," which includes the island of Honimoa. As other Roxburgh specimens from the Moluccas, this one was undoubtedly collected by Christopher Smith. Another sheet in Brussels, also from the Roxburgh Herbarium, has two detached fronds: the one at the left is identical with the lectotype and is doubtless part of the same collection; the smaller one at the right is different—longer stipitate blades and with a midrib that is not prominent and not black. I exclude this frond from the type collection. Very likely from my photograph the same plant is represented by the Roxburgh collection in the East India Company Herbarium no. 40-2 (Morton photograph 14668, two bottom plants), and this too is excluded as type material.

Hemionitis reticulata Roxburgh is omitted from the "Index Filicum," presumably because Christensen assumed that Roxburgh intended *H. reticulata* Forst. Roxburgh, however, does not mention Forster, and he puts an "R." after the species name, thus indicating himself as the author of the species, as he did with the others he described as new. He selected the epithet "*reticulata*" independently from Forster; it is a natural choice, considering the conspicuously reticulate venation of the blades. Roxburgh's species came from the Moluccas and Forster's was definitely indicated by Forster as from the Society Islands. The citation added to *H. reticulata* Roxburgh, "*Antrophyum reticulatum* Kaulf. Wall. Cat. 61, No. 40," was added by the editor Griffith, since Kaulfuss published his *A. reticulatum* long after Roxburgh's death, as did Wallich his "Catalogue"; Griffith intended merely to note that a Roxburgh collection was cited in Wallich's "Catalogue" under number 40; this collection, actually no. 40-2, is the one mentioned above as probably to be excluded from the type material.

The species of *Antrophyum* are by no means clear. Someone, possibly Bommer, has identified the Roxburgh lectotype as *A. semicostatum* Blume, but this is clearly wrong, for that species belongs to the group of species having clavate paraphyses, whereas *H. reticulata* Roxburgh has delicate, hairlike paraphyses. The nearest species appears to be *A. callifolium* Blume, although the midrib may be more prominent and darker than is usual in that species. This character may have been stressed too much in delimiting the species. The Roxburgh species is perhaps equally close to the true *A. reticulatum* (Forst.) Kaulf. from Tahiti. The latter may be based on a mixture. Christensen, in his "Ferns of Samoa," indicated that the Forster specimen he saw in the British Museum had two elements, one corresponding to *A. grevillei* Balfour (with elongate, narrow fronds with elongate, parallel sori) and one he took to be typical *A. reticulatum*. I have seen a different specimen in the British Museum (Morton photograph

7610) which also has two elements, one identified as *A. lessonii* Bory (with short, broad blades) and another I take to be typical *A. reticulatum*.

48. ISOËTES CAPSULARIS Roxburgh, Calcutta Journ. Nat. Hist. 4:470. 1844.
= *Vallisneria spiralis* L.

The original description is as follows:

"Capsules peduncled, 1-celled. Leaves linear flat.

"This plant grows in deep standing sweet water, with *Valisneria spiralis*, etc.

"Stoles creeping, jointed, tufts of filiform roots descend from each joint, and from 4 to 12 leaves ascend; they are like those of *Valisneria spiralis*, very delicate, 2-3 feet long, a quarter of an inch broad, and slightly serrated near the apex. From the alae of the leaves arise several diaphanous, cordate capsules standing on short peduncles; they consist of 1-cell, formed of two valves, opening from the apex, the seeds are numerous connected to a conical receptaculum in the centre.

"I have not seen the male flowers."

At first sight this is a truly amazing description, for this is a description of *Vallisneria spiralis* L., as shown by the description of the stolons as creeping and jointed (*Isoëtes* has a fleshy corm, not creeping, jointed stems), of the leaves as two to three feet long and serrate near apex (the leaves of *Isoëtes* are, at least usually, shorter than this and not serrate), and of the capsules as being pedunculate and bivalvate (*Isoëtes* has of course "capsules," i.e., sporangia, borne sunken within the bases of the leaves, and not pedunculate or valvate).

It seems likely that Griffith, the editor and publisher of Roxburgh's posthumous work, accidentally inserted a description of *Vallisneria* for the intended description of an *Isoëtes*. This is borne out by two facts. Roxburgh's published drawing, *op. cit.* t. 26, left-hand plant, is labeled *Isoëtes capsularis*, and it is truly and obviously an *Isoëtes*. Secondly, Griffith later published a description and discussion of *Isoëtes capsularis*, which is cited as being the *I. capsularis* of Roxburgh (Notul. ad Pl. Asiat. 2: 572-580. 1849; Icon. Pl. Asiat: t. 116-118. 1849), and Griffith's description and drawings are obviously truly *Isoëtes*, very likely *I. coromandelina* L. f.

Nevertheless, since the original description of *I. capsularis* Roxburgh applies altogether to *Vallisneria spiralis*, except the illustration, it seems that one is forced to consider it a synonym of *V. spiralis*, even though this may not have been Roxburgh's intent.

49. ISOËTES COROMANDELINA sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:470. 1884, prob. not L. =? *Isoëtes indica* Pant & Srivastava, Proc. Nat. Inst. Sci. India 28, B:246. 1962. Type: Ram Nai village, Rewa, Madhya Pradesh, India, *Pant* Pt. 2A (K, not seen).

AUTHENTIC MATERIAL: A specimen from "Ind. or." collected by Roxburgh in the J. E. Smith Herbarium, no. 1650.3, Linnean Society London (Morton photograph 20341). The plant came from the Circar Mountains, according to Roxburgh, i.e., in northern Madras Province, India.

The above specimen indicated as authentic does not bear the name *I. coromandelina* in Roxburgh's hand, but it agrees with Roxburgh's description. Roxburgh considered his plant the same as the Linnaean species and not as new, and he may have been right. The sporangia, however, are enormous (for *Isoëtes*) in these plants in the Smith Herbarium, about 2 cm. long, in which they seem to agree better with the recently described *I. indica* than with *I. coromandelina* L., which has the sporangia only about 12 mm. long. The identity with *I. indica*, however, would have to be proved by a comparison between the holotype at Kew and the specimen in the Smith Herbarium, something I have not done. *Isoëtes indica* has been known only from the type locality in Madhya Pradesh, in central India. According to the paper "The Genus *Isoëtes* in India," by Pant and Srivastava, it differs from *I. coromandelina* as follows:

Triradiate ridges of megaspores normally simple; ends of megaspore tubercles generally rounded; sterile cells absent; microspores smooth or rugose to papillate	<i>I. coromandelina</i>
Triradiate ridges in megaspores often branched; ends of megaspore tubercles generally tapering; sterile cells present in outer megasporangia; microspores tuberculate	<i>I. indica</i>

50. LINDSAEA BIPINNATA Roxburgh, Calcutta Journ. Nat. Hist. 4:511. 1844. = *Lindsaea parasitica* (Roxburgh) Hieron. Hedwigia 62:14. 1920.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the number 2242 and the names *Lindsaea* and *Vittaria* in Roxburgh's hand (Morton photographs 5152, 19914). I believe that this specimen is not only a suitable lectotype, but that it is actually the holotype. According to Roxburgh, the species was collected on Prince of Wales Island (i.e., Penang Island) by W. Roxburgh [Jr.]. There is a duplicate of this lectotype in Geneva, indicated as from the Prince of Wales Island, collected by Dr. Roxburgh (Morton photograph 6567).

Roxburgh usually wrote his specific names on the specimens in his own collection, but he was lax about doing this with his species of *Vittaria* and *Lindsaea*. There are four *Lindsaea* specimens in Roxburgh's collections in Brussels from Roxburgh's own personal herbarium, but only one of these (*V. lunulata*) has the name in Roxburgh's hand. The other three specimens, however, can be

matched up clearly with the described species. These four specimens represent the four species described from the Prince of Wales Island (Penang Island) for the collections of W. Roxburgh, Jr. Two of these (*V. parasitica* and *V. interrupta*) have labels in the hand of W. Roxburgh, Jr., giving something about the habitat. The remaining specimen, the one chosen above as lectotype of *L. bipinnata*, has no such label, but the plant corresponds with the description of *L. bipinnata*. Roxburgh remarked: "It is exceeding like *Vittaria parasitica*, and only a little larger, and more robust." This is the fact; the specimen is so much like *V. parasitica* that it does represent the same species, only the plant is a little larger and more robust than the type of *V. parasitica*. It probably represents the terrestrial state of this species described as *Lindsaea scandens* var. *terrestris* Holttum, but it appears doubtful that this terrestrial form ought to be given any taxonomic recognition. Holttum indicates that it is larger than the epiphytic plants, but this might be expected since terrestrial plants would have better soil and nutrients than epiphytic plants.

Roxburgh's reason for describing this same species in two different genera, *Vittaria* and *Lindsaea*, is that he misunderstood *Vittaria*. One has to remember that he was working in Calcutta only 10 or 15 years after the first publication of *Vittaria*, that he did not have Swartz' "Synopsis Filicum," of 1806 available, and that he had no authentic material of anything available for comparison. Roxburgh defined *Vittaria* as follows: "Fructifications in an uninterrupted marginal line. Involucre double, uninterrupted; one from the surface separating outwards; the other from the margin of the frond turned in, separating inwards." Following is J. E. Smith's original description of *Vittaria* in 1793: "Fructif. in linea marginali continua. Involucrum duplex, continuum; alterum superficialium, exterius dehiscens, aliud e margine ipsius frondis, inflexo, interius dehiscens." This description by Smith is highly misleading because it is completely wrong, and if we had only this description *Vittaria* would have to be listed as a dubious genus. The only way to identify *Vittaria* is by Smith's citation of *Pteris lineata* L., for we know that this plant belongs to the genus *Vittaria*. But *Pteris lineata* does not have marginal sori and it does not have any "involucrum" (i.e., indusium), let alone an inner and an outer indusium, such as is present in such genera as *Pteridium* and *Paesia*. Roxburgh did have a true *Vittaria*, which he referred to *V. lineata* incorrectly, but his other *Vittarias* are all *Lindsaeas*. Where the leaf margin appeared to be slightly recurved, Roxburgh considered this as an

outer indusium and consequently described the "involucre" as "double" and the species as *Vittarias*. However, in the case of his *Lindsaea bipinnata* he wrote: "I am not certain if ever the thin edge of the leaf is turned in (over the inner) involucre. I am rather inclined to think not; at least I have not been able to discover that it is," and therefore he described this species as a *Lindsaea*, remarking how much it resembled his *V. parasitica*. There is a good reason why Roxburgh was not able to find an outer indusium, because this "difference" is illusory. In no *Lindsaea* is there ever anything corresponding to an outer indusium. In *Lindsaea* the margins of the fertile pinnules are sometimes just a little thinner and perhaps slightly recurved, but they never approach anything that might be called an outer indusium.

51. *LINDSAEA ODORATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:511. 1844.
Lindsaea cultrata sensu auctt. (e.g., Hook. & Grev. Icon. Fil. 2:t. 144. 1829 or 1830), non *Adiantum cultratum* Willd., 1794.

LECTOTYPE: No herbarium specimen of this species has been seen. The drawing by Roxburgh at Kew, no. 2578 (Morton photograph 15860) was selected as lectotype by Kramer (Blume 15:567. 1967 [1968]). Roxburgh's plant came from the Garrow Hills, i.e., Garo Hills, Assam, India.

The illustration undoubtedly represents the species usually called *L. cultrata* incorrectly, as in the "Index Filicum."

52. *LYCOPODIUM ARISTATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:473. 1844, non Humb. & Bonpl. ex Willd., 1810. = ? *Selaginella tamariscina* (Palisot) Spring, Bull. Acad. Brux. 10:136. 1843.

Lycopodium aristatum Roxburgh, Hort. Bengal. 75. 1814, nom. nud. Cited is "Dill. Musc. t. 66, f. 7," which might seem to validate the publication of Roxburgh's name by this reference to Dillenius' pre-Linnaean book, but in this case it does not, for there is no "t. 66, f. 7" in Dillenius' work. This is a slip on Roxburgh's part. It is not certain which Dillenius figure Roxburgh really intended. In the manuscript as published in 1844, Roxburgh states: "It resembles most Dillenius's figure t. 66, f. 7," thus repeating the same erroneous citation, and showing also that Roxburgh never intended his *L. aristatum* to be based on a Dillenius figure.

?*Stachygynandrum tamariscinum* Palisot, Prodr. Aeth. 106. 1805. Type: East Indies (Isotype B, Willd. Herb. 19372-2, ex Palisot de Beauvois).

TYPE: No herbarium specimens have been located. According to Roxburgh: "From China this pretty little species was brought to the Botanical Garden in Calcutta in 1812, where it grows freely in a rich, shaded, moist soil." According to Roxburgh's "Hortus Bengalensis" (p. 75. 1814) it was collected by W. Kerr in China in 1812.

The original description is: "Patent (1-3 inches long), dichotomous. Leaves as well as the superficial scales alternate, bifarious, ovate-falcate; membrane margined, apex ending in a bristle or arista." In Reed's "Index Selaginellarum" (p. 25. 1968), *Lycopodium*

podium aristatum Roxburgh is equated to *Selaginella uncinata* (Desv.) Spring as though this were established. In conversation with Reed, it was stated that this disposition was taken from Alston's manuscript "Index." In this "Index," in card form in the British Museum, under *Selaginella aristata* (Roxburgh) Scott, Alston has merely written casually "cfr. *S. uncinata*," which is far from making a definite reduction to synonymy. It is apparent that Alston had not seen a specimen and that this was merely a guess from the description. I would not agree, for *Selaginella uncinata* is a rather large trailing species with blades often 12 inches long or more; also the leaves are not so conspicuously aristate that Roxburgh would have commented on it and even named his species "*aristatum*." Roxburgh says his species is "little," with the fronds only one to three inches long. This small size coupled with the conspicuously aristate leaves suggests at once *S. tamariscina*. I do not know where in China W. Kerr might have been, but from the early date (1812) it is likely that he was not too far from the coast, and indeed he might have been in Hong Kong, where *S. tamariscina* is common; this species does occur at other places along the China coast and lowlands of the interior.

Since Roxburgh's species is an illegitimate later homonym, its identification is not very important.

53. LYCOPODIUM CERNUUM sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:472. 1844. = *Lycopodium cernuum* L. Sp. Pl. 1103. 1753, sens. lat.

AUTHENTIC MATERIAL: Two specimens in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photographs 19965, 19966). A specimen in the East India Company Herbarium, no. 139-6 [or 130-6?] with the name in Roxburgh's hand (Morton photograph 19591 bis).

Roxburgh understood *L. cernuum* in its usual sense. This species is really rather uniform, considering its extensive range in both hemispheres, and it is hard to see how Nessel could have recognized some 43 varieties. The segregation of any subspecies or varieties will be difficult or impossible.

54. LYCOPODIUM FILIFORME Roxburgh, Calcutta Journ. Nat. Hist. 4:473. 1844, non Swartz, 1806. = *Lycopodium salvinoides* (Herter) Alston in Lecomte, Fl. Gén. L'Indo-Chine 7(2):553. 1951.

Urostachys salvinoides Herter, Bot. Arch., Königsberg 3:18. Jan. 15, 1923.¹ Type: Herter lists many syntypes; to my knowledge, no lectotype has ever been chosen.

¹ Republished in Phil. Journ. Sci. 22(1):67. Jan. 24, 1923, according to Herter (Ind. Lycopod. 102. 1944).

LECTOTYPE: A specimen in the Brussels Herbarium named in the hand of Roxburgh, the parts indicated by red letters as "c" and "d"; the fragment indicated as "e" has been considered different (Morton photographs 5218, 19976). The locality was indicated as Sumatra by Roxburgh. This and *L. rotundifolium* are the only species described by Roxburgh from Sumatra; there is no indication who may have supplied the material; so far as I am aware, Roxburgh never collected in Sumatra.

In some herbaria, as in the British Museum, *Lycopodium filiforme* Roxburgh is recognized under its own name as a distinct species. That can hardly be, however, since the name is an illegitimate later homonym. The type appears to represent a form of *L. phlegmaria* L. with rather small, spreading leaves and very elongate, slender spikes. The various varieties described by Blume are not clearly differentiated; it may be that Roxburgh's species would agree better with var. *pellucidum* Blume or var. *gracilescens* Blume than it would with var. *laxum*. I have not seen the types of any of these varieties.

55. *LYCOPODIUM FURCATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:475. 1844.
= *Selaginella atroviridis* (Wallich ex Hook. & Grev.) Spring, Flora 21:183. 1838.

Lycopodium atroviride Wallich ex Hook. & Grev. Icon. Fil. 1: t. 39. 1827.
Syntypes: Prince of Wales Island [= Penang Island, Malaya], Wallich and Herb. Hort. Soc. London. The Wallich specimen at Kew I designate as lectotype (Morton photograph 20656). The Wallich plants are the two upper and the center plants. The lower plant and perhaps the lower left-hand plant are from Tenasserim, collected by Griffith, and perhaps are a different species. An isosytype is in the East India Company Herbarium, no. 120 (K, Morton photograph 19588e). The collection of the specimen that Hooker and Greville first saw in the herbarium of the Royal Horticultural Society was without indication of collector; the collector could have been Wallich, in which case the two syntypes could have been part of the same gathering, or it is possibly a Roxburgh collection and an isotype of *L. furcatum* Roxburgh.

Lycopodium intermedium Blume, Enum. Pl. Jav. 2:269. 1828. Type: Java, Blume (not seen).

Selaginella intermedia (Blume) Spring, Bull. Acad. Brux. 10:144. 1843.

LECTOTYPE: *Roxburgh*, East India Company Herbarium, no. 120-2 right-hand plant with name in hand of Roxburgh (K, Morton photographs 15719, 19589). The left-hand plant on this sheet is Wall. Cat. 120-4, Herb. Finlayson (not a type). An isotype is in the Brussels Herbarium labeled *Lycopodium hymenophyllum* in the hand of Roxburgh. Evidently Roxburgh first assigned the name *L. hymenophyllum* and later changed it to *L. furcatum*. Contrary to my usual designation of specimens in the Brussels Herbarium as lectotypes, I choose rather the one in the East India Company Herbarium which has the name *furcatum* in Roxburgh's hand.

Alston in his treatment of the Indian species of *Selaginella* adopted the name *S. intermedia* (Blume) Spring for this species,

but he had the dates wrong. He indicated *L. intermedium* Blume as being published in 1830 and *L. atroviride* Wallich ex Hook. & Grev. in 1831, and if this were true then Blume's name would have priority. Actually *L. atroviride* was published in 1827 and *L. intermedium* in 1828. It is clear that *L. atroviride* was published prior to Blume's treatment, for Blume adopted the name *atroviride* for one of his species and cited the Hooker and Greville reference. This error has been perpetuated in Reed's "Index Selaginellarum," where also *S. atroviridis* is erroneously listed as "*S. atrovirens*."

56. LYCOPODIUM IMBRICATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:475. 1844, non Forssk., 1775. =*Selaginella bryopteris* (L.) Baker, Journ. Bot. Brit. & For. 22:376. 1884.

Lycopodium bryopteris L. Sp. Pl. 1103. 1753. Concerning the typification, see Alston, Journ. Bot. Brit. & For. 69:252. 1931.

TYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19955). There is according to Alston a Roxburgh specimen of *L. imbricatum* in the DeCandolle Herbarium in Geneva. These specimens have been identified as *Selaginella bryopteris* by Alston (Proc. Nat. Inst. Sci. India 11:221. 1945), doubtless correctly. Roxburgh received his specimens from H. Colebrooke, who collected them in Behar, now Bihar, India.

57. LYCOPODIUM LAEVIGATUM sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:474. 1844, non Lam. 1791. =*Selaginella plana* (Desv.) Hieron. in Engl. & Prantl, Nat. Pflanzenfam. 1(4):703. 1901.

AUTHENTIC MATERIAL: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19956). A fragment of apparently the same plant is in the East India Company Herbarium, Kew, mounted on the same sheet as *L. mimosoides*, no. 128-2 (Morton photograph 19591a); this small fragment, named *L. laevigatum* by Roxburgh, was probably overlooked by Alston in studying this sheet. Roxburgh indicated his material as from the "Malay Islands."

Roxburgh did not consider his species new, but cited Lamarck as the author. He, however, misidentified his plant, for *L. laevigatum* Lam. is a quite different plant from Madagascar, which is now properly *Selaginella pectinata* Spring [= *Selaginella laevigata* (Lam.) Baker, 1867, non *S. laevigata* (Willd.) Spring, 1840]; concerning the synonymy, see Alston in C. Chr., Dansk. Bot. Ark. 7:196. 1932.

58. LYCOPODIUM MIMOSOIDES Roxburgh, Calcutta Journ. Nat. Hist. 4:473. 1844. =*Selaginella wallichii* (Hook. & Grev.) Spring in Mart. Fl. Bras. 1(2):124. 1840.

Lycopodium elegans Wallich, Num. List. no. 128. 1829, non Desv. 1827. Based on a collection from Penang and Singapore, Wallich.

Lycopodium wallichii Hook. & Grev. in Hook. Bot. Misc. 2:384. 1831. Type: Penang and Singapore, Wallich List. no. 128.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh and the number 13 (Morton photograph 19958). According to Roxburgh, the species was collected in the Moluccas. An isotype is in the East India Company Herbarium, no. 128-2, with the name in Roxburgh's hand (K, Morton photographs 15721, 19591). Another isotype is in the British Museum (Morton photograph 19530).

This is a characteristic and easily recognized species. Roxburgh remarked that the branches "are exactly like the pinnae of a fine-leaved *Mimosa*," which is true and explains his choice of specific epithet. Alston (Gard. Bull. Str. Settl. 8:49. 1934) writes: "Roxburgh's specimens of *L. mimosoides* Roxb. in Hb. Brit. Mus. are labelled 'Ind. Orient.'; they were probably collected in Penang," and a note by Alston on the sheet in the British Museum referred to states that the "Moluccas" of Roxburgh included all the East Indies. This remark is not borne out by my studies. Roxburgh's "Moluccas" really are the Molucca Islands, from where he received collections made by his assistant Christopher Smith; they were mostly from Amboina, but a few were from other islands—Honimoa, Ternate, and Gilolo. *Selaginella wallichii* has not since been collected in the Moluccas, but it could be there, since it does grow in Sumatra, not so far away. It is possible that in this instance Roxburgh did inadvertently write "Moluccas" rather than "Malay Islands," the term he usually used for Penang Island.

59. LYCOPODIUM PECTINATUM sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:474. 1844, non Lam., 1791. = *Selaginella willdenovii* (Desv.) Baker, Gard. Chron. 1867:783, 950. 1867.

AUTHENTIC MATERIAL: A specimen in the Brussels Herbarium named in the hand of Roxburgh (Morton photograph 19959, left-hand specimen). According to Roxburgh a native of the Malay Islands. This sheet has a fragment of another species of *Selaginella* on it at bottom right, which is mounted here by mistake, for it is evidently a part of the authentic material of *L. laevigatum* sensu Roxburgh, i.e., *Selaginella plana* (Desv.) Hieron. Another authentic specimen of *L. pectinatum* sensu Roxburgh is in the East India Company Herbarium, no. 126-7 (K, Morton photograph 19590c), with the name in the hand of Roxburgh and annotated as *S. willdenovii* by Alston; the other specimens on this sheet are different; they are from Cortallum and represent *S. pouzolziana*, fide Alston.

Roxburgh did not intend this as a new species, but credited it to Lamarck. *Lycopodium pectinatum* Lam. was a mixture, based on plants from Mauritius and literature references to both East Indian plants and American plants. Desvaux (*in* Poiret *in* Lam. Encycl. Méth. Suppl. 3:540. 1813 [1814]) essentially selected a lectotype by restricting the Lamarck name to the specimen from

Mauritius and indicated that it was probably the same as *Lycopodium obtusum* Swartz, i.e., *Selaginella concinna* (Swartz) Spring, the type of which is also from Mauritius. This disposition has been generally accepted, but I do not know whether it has been actually verified. Swartz did not indicate any type for his plant, and so that will have to be determined by the consultation of Swedish herberia, first naturally Stockholm. However, *Stachygynandrum obtusum* Palisot (Prodr. Aethiog. 113. 1805), the type of which is from Mauritius, *Bory*, is generally considered to be the same, and since Palisot's name clearly has priority over Swartz', the proper name is *Selaginella obtusa* (Palisot) Spring, Bull. Acad. Brux. 10:228. 1843.

60. LYCOPODIUM PENDULUM Roxburgh, Calcutta Journ. Nat. Hist. 4:472. 1844. =*Lycopodium carinatum* Desv. in Lam. Encycl. Méth. Suppl. 3:555. 1813.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photographs 5207, 19961). The locality is given by Roxburgh as Amboina, and therefore the collector was Christopher Smith. Since no other specimen named *L. pendulum* by Roxburgh has been found, this may be presumed a holotype.

In Herter's "Index Lycopodiorum," *L. pendulum* is referred to *L. carinatum* Desv., and this appears to be correct. The type agrees with *Robinson* 1973 from Amboina (US).

61. LYCOPODIUM PHLEGMARIA sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:471. 1844. =*Lycopodium phlegmaria* L. Sp. Pl. 1101. 1753, sens. lat.

AUTHENTIC MATERIAL: Represented by a drawing at Kew, no. 1008 (Morton photograph 15885). No herbarium specimen has been seen. Roxburgh's material came from "the Sunderbunds, on old trunks of trees, in flower during the rains." The Sunderbunds are the present Sundarbans or Sundribuns, the swampy coastal region of the Delta of the Ganges in Bengal.

Lycopodium phlegmaria as currently recognized in Asia is obviously a mixture of several species. The Roxburgh drawing is poor, but seems to correspond with a collection from Khasia, 2,000 feet alt., of Hooker and Thomson (dupl. US). It is a plant with somewhat sparse, narrowish, spreading leaves and short, slender, mostly simple spikes. According to Prain (Rec. Bot. Surv. India 2:231-370. 1903), *L. phlegmaria* is the only species of *Lycopodium* known from the Sundribuns.

62. LYCOPODIUM PLUMOSUM sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:474. 1844, non L., 1753. =*Selaginella roxburghii* (Hook. & Grev.) Spring, Bull. Acad. Brux. 10:228. 1843.

Lycopodium plumosum Roxburgh ex Wallich, Num. List. no. 120-?3. 1830, nom. nud.

Lycopodium roxburghii Hook. & Grev. in Hook. Bot. Misc. 2:390. 1831.

Type: *Roxburgh* ex. Herb. Wallich. Although it is not annotated as *L. roxburghii* by Hooker or Greville, the specimen labeled *L. plumosum* in the hand of Roxburgh in the East India Company Herbarium, originally sheet 120-?3 but now filed under no. 122 (Morton photograph 15720, two small fragments at the lower right-hand bottom, indicated by Alston as "syn-type?") may be selected as lectotype until an undoubted holotype is found, which might be in the Greville Herbarium in Edinburgh. In Reed's "Index Selaginellarum" (p. 195) the type is indicated as "Dr. Wallich in Herb. Roxburgh, BM," but I have not found any such specimen in the British Museum, although there may be one there; in any case, Reed has the names reversed, for it should be "Dr. Roxburgh in Herb. Wallich," Roxburgh being the collector.

AUTHENTIC MATERIAL: A specimen in the Brussels Herbarium with the name *L. plumosum* in the hand of Roxburgh (Morton photograph 19957). The specimen in the East India Company Herbarium mentioned above as the lectotype of *L. roxburghii* Hook. & Grev. is also authentic for Roxburgh's *L. plumosum*.

In Reed's "Index Selaginellarum" and by Alston, *L. plumosum* is listed as though it were a new species of Roxburgh, but Roxburgh did not really consider it new. He did not place an "R" after the name, as he did with his truly new species, and he cited a reference to "*Dill. musc. t. 66, f. 10*," which is one of the references cited under *L. plumosum* L. It seems therefore that Roxburgh considered his plant to represent *L. plumosum* L. This agrees with Crantz' lectotypification of 1766, in which the Linnaean *L. plumosum* is restricted to Dillenius' *t. 66, f. 10*; according to this, *L. plumosum* L. is *Selaginella plumosa* (L.) K. B. Presl, a West Indian species, syn. *S. stolonifera* (Swartz) Spring. It is evident that Roxburgh misidentified his plants as *L. plumosum* L., but he still did not describe a new species. Roxburgh stated that the species was "Native in various parts of India. In Bengal it is found on rotten wood." I cannot reconcile this statement with the specimens mentioned above labeled *L. plumosum* by Roxburgh, for these plants represent *Selaginella roxburghii*, a rather characteristic species found in Malaya but not in India. In this instance Roxburgh likely used "India" to cover Malaya as well as India. From his comment about the species occurring in Bengal, it is clear that he included more than one species under his *L. plumosum*.

63. LYCOPODIUM ROTUNDIFOLIUM Roxburgh, Calcutta Journ. Nat. Hist. 4:473. 1844. = *Lycopodium nummulariifolium* Blume, Enum. Pl. Jav. 2:263. 1828. Type: Java, *Blume* (L., not seen).

TYPE: Sumatra, Roxburgh Herbarium (E-Herb. Greville). According to Hooker and Greville (Icon. Fil. t. 212. 1831), Roxburgh's collection is represented in the East India Company Herbarium under no. 2183, but it is not there now; it may have been misplaced. This collection does not appear to be in the general herbarium at Kew, nor at the British Museum, Brussels, or Geneva.

There is no doubt about the identification of *L. rotundifolium* Roxburgh, because Hooker and Greville's plate was drawn from an authentic Roxburgh specimen, and it is identical with the characteristic species *L. nummulariifolium* Blume. The collector who supplied Roxburgh with the type material from Sumatra is unknown.

64. MARATTIA PINNATA Roxburgh, Calcutta Journ. Nat. Hist. 4:519, 1844.
 = *Angiopteris pinnata* (Roxburgh) Morton, comb. nov.
Angiopteris ruttanii van Alderw. van Rosenb., Bull. Jard. Bot. Buitenzorg II, 28:6. 1918. Type: Boren Kaloa, Ceram, 150 m., Sept. 21, 1917, Rutten 177 (holotype prob. BOG; isotype L, Morton photograph 439).
 LECTOTYPE: A specimen in Brussels with the name in the hand of Roxburgh (Morton photograph 19951). Isotypes in Geneva (Morton photograph 16993), British Museum (Morton photograph 6529), and Kew (East Ind. Co. Herb. 187-7, consisting of two pinnules only, Morton photograph 15725).

This species has never been identified. In the "Index Filicum," it is referred with a query to *A. crassipes* Wallich ex K. B. Presl, but this is only on the basis of Wallich's having placed the single pinnule that Roxburgh evidently sent him under his *A. crassipes*. (The pinnules in this species are deciduous from the rhachilla; Roxburgh probably sent more material, but the pinnules fell off and Wallich retained only two.) The species appears to be different from the Indian and Nepalese *A. crassipes*, but it has priority, the Wallich species not having been published except as a nomen nudum until 1845, a year after Roxburgh's species. Bommer identified the lectotype as *A. dregeana* deVriese (1853), which is according to the "Index Filicum" a synonym of *A. javanica* K. B. Presl (1845). It does not appear that either of these can be the same as Roxburgh's species, since they belong in the subg. *Angiopteris*, whereas *A. pinnata* belongs in the subg. *Pseudangiopteris* K. B. Presl.

Angiopteris is the fern genus most in need of monographic study. More than a hundred species have been proposed, but why is something of mystery. They all look much alike and do not differ in obvious characters like most good species of ferns. There may be only a very few good species in the genus. I venture to transfer Roxburgh's species, however, because it is the

earliest species belonging to the subg. *Pseudangiopteris*, all the others having been proposed later by Presl, deVriese, and others. *Pseudangiopteris* may not really be a good subgenus, although the monographer DeVriese thought it was, but at least the character on which it is based—the absence of false veins—seems to be a good specific character. Roxburgh gave the locality as “Molucca Islands.” The collections available to him from the Moluccas were collected by C. Smith in Amboina, Ternate, or Honimoa (Ceram). The lectotype and isotype specimens that I have examined agree with the isotype of *A. ruttanii*, from Ceram, and so *A. pinnata* likely came from Honimoa.

65. MARSILEA QUADRIFOLIA sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:469. 1844. = *Marsilea quadrifolia* L. Sp. Pl. 1099. 1753. Type: Not determined; India was included within the original geographic range assigned by Linnaeus.

AUTHENTIC MATERIAL: A Roxburgh drawing in Kew (no. 1300) and a specimen in the herbarium at Edinburgh. Another specimen, determined as *M. dentata* Roxb. and dated 1809, should be at the British Museum (Natural History).

Roxburgh illustrated the sporocarp, and it corresponds with *M. quadrifolia* as delimited by K. M. Gupta in his book “*Marsilea*” (Council Sci. Industr. Res., New Delhi, Bot. Monog. 2:96. 1962). Roxburgh indicated that he had seen this plant in various parts of India, and that he had searched for *M. coromandelica* Burm. f. without success.

66. OPHIOGLOSSUM CORDIFOLIUM Roxb. Calcutta Journ. Nat. Hist. 4:475. 1844. = *Ophioglossum petiolatum* Hook. Exotic Fl. 1:56. 1823.
Ophioglossum cordifolium Roxb. ex Wall. Num. List., no. 47. 1828, nom. nud.

LECTOTYPE: A sheet in the herbarium in Brussels with the name in the hand of Roxburgh and the number 1199 (Morton photograph 19952). There is a comment by Roxburgh on the label: “Yet I now doubt if it differs specifically from *O. vulgatum*.”

Roxburgh’s description agrees with this herbarium specimen. The comment that it is native to “Bengal, Moluccas, etc.” indicates that Roxburgh had more than one specimen in hand, and that the sheet chosen as lectotype is thus not a holotype. The sheet of no. 47 in the herbarium of the East India Company at Kew (Morton photograph 14672) has several fronds on it. The three at the top left represent Wallich no. 47-1 from Viemora, Bengal, collected in 1808 (undoubtedly by Roxburgh) and are undoubtedly isosyntypes; the single frond at upper right

appears to be a part of the same collection. The one larger plant, the second from the right in the top row, has a label "Inter Mangiferas, H. B. C. Sept. 1825"; "H. B. C." refers to the Hort. Bot. Calcutta, and the collector was doubtless Wallich; this is not type material. The lower row of four plants are Wallich no. 47-2, collected in Courtallum by Heyne; they formed a part of Wallich's concept of *O. cordifolium* but not that of Roxburgh, although they do represent the same species. A duplicate specimen of Wallich 47-1 from Viemora, Bengal, *Roxburgh* is in US. In the "Index Filicum," *O. cordifolium* is wrongly referred to *O. pedunculatum* Desv.

There are drawings of *O. cordifolium* by Roxburgh in the British Museum (Morton photograph 15774) and at Kew.

67. OPHIOGLOSSUM FILIFORME Roxburgh, Hortus Bengalensis 75. 1814; Calcutta Journ. Nat. Hist. 4:476, t. 26, f. 3. 1844. = *Lygodium microphyllum* (Cav.) R. Brown, Prodr. Fl. Nov. Holl. 162. 1810.

Ugena microphylla Cav. Icon. Descr. Pl. 6:76, t. 595. 1801. Syntypes: Marianna Islands and Philippine Islands [near Nabua (Prov. Camarines Sur, Luzon), and Samboangan], *Née* (MA, not seen).

TYPE: In the Hortus Bengalensis there is no description, but Rheede, Hort. Malab. 12: t. 34, is cited, which is sufficient to validate the publication of the name *O. filiforme*. Rheede's poor illustration t. 34 is identified by Willdenow (in L. Sp. Pl. ed. 4, 5:78. 1810) as a sterile plant of the species that he calls *Hydroglossum scandens*, of which *Ugena microphylla* Cav. is cited as a synonym; Rheede's t. 34 is similarly identified with *L. scandens* by Prantl (Untersuch. Morph. Gefässkrypt. 2:82. 1881). A specimen from the Roxburgh Herbarium now in Brussels is labeled *O. filiforme* in Roxburgh's hand (Morton photograph 4764, 19945) and surely represents Roxburgh's concept and the species that he intended to describe. According to Roxburgh (Hort. Beng. 75. 1814) it was collected in Bengal by Dr. F. Buchanan and was cultivated in the Calcutta Botanical Garden. This specimen does represent *Lygodium microphyllum*, and so it appears that Roxburgh did interpret Rheede's plate correctly. This specimen also agrees with Roxburgh's published plate t. 26, f. 3 and with the authentic Roxburgh drawings labeled *O. filiforme* in the British Museum (Morton photograph 15572) and at Kew (no. 1741), which are indicated as having been collected at Chittagong by Buchanan-Hamilton; in Roxburgh's time Chittagong (now in East Pakistan) was included within Bengal. Thus there are no confused elements in this species.

This species is the one that has usually, at least since the time of Swartz' "Synopsis Filicum" (1806), been identified as *Lygodium scandens* (L.) Swartz, and it is too bad that its name must be changed. Alston and Holttum (Reinwardtia 5:12-14. 1959), however, showed that the original *Ophioglossum scandens* L. was based on several elements, none of which represent *L.*

scandens as interpreted by Swartz and succeeding authors. There were four literature citations, the one from the "Hortus Cliffortianus" representing *L. volubile* Swartz, the one from the "Flora Zeylanica" *L. flexuosum* L. (fertile), and the one from Breyne (copied by Morison) *L. venustum* Swartz, and finally the one from Rheede representing *L. flexuosum*. They concluded that since *L. venustum* and *L. volubile* already had received names, and generally accepted names, that *O. scandens* L. ought to be typified by the "Flora Zeylanica" reference and the corresponding specimen in the Hermann Herbarium (no. 474). Strangely enough, they make no mention of the Linnean Herbarium, in which there is a specimen (no. 1243.3 labeled *scandens* in Linnaeus' hand and also numbered "5," the number of *O. scandens* in the "Species Plantarum" (1753). It is generally agreed that when possible Linnaean species ought to be typified by specimens in the Linnean Herbarium rather than on literature citations, and in this case there is no obstacle. Fortunately for stability, this specimen in the Linnean Herbarium, which I designate as lectotype, does not represent *L. venustum* or *L. volubile*, but is clearly *L. flexuosum*, and thus *O. scandens* L. and *L. scandens* (L.) Swartz remain as synonyms of *L. flexuosum* (L.) Swartz, as indicated by Alston and Holttum.

68. OPHIOGLOSSUM FLEXUOSUM sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:477, t. 26 p.p. (lower sterile leaflet). 1844. = *Lygodium circinnatum* (Burm. f.) Swartz, Syn. Fil. 153. 1806.

The only herbarium specimen that I have seen determined by Roxburgh as *O. flexuosum* is one in Brussels, from Amboina, no. 320, collected in 1796 (Morton photograph 19941); although not stated on the label the collector was surely Christopher Smith. There is a duplicate at the British Museum (Morton photograph 20856). This is clearly *L. circinnatum* with twice-forked sterile pinnae. That this really represents Roxburgh's concept at least in part is shown by his description of the sterile pinnae as generally palmate. Roxburgh did, however, include other material also in his concept, for he cites the Bengal name as "Bhootraj" and cites "Valli-panna. Rheed. Mal. 12, t. 32. bad," the latter the same reference as cited by Linnaeus under his *Ophioglossum flexuosum* and cited also by Presl as his *L. salicifolium*.

69. OPHIOGLOSSUM FURCATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:478. 1844. = ?*Lygodium circinnatum* (Burm. f.) Swartz, Syn. Fil. 153. 1806.

No specimens of this species have been located. It was described from Pullo Pinang (i.e., Penang Island, Malaya). In the "Index

Filicum" it is referred to *L. circinnatum*, which is probably correct. The original description reads: "Scandent. Fronds dichotomous, ultimate divisions linear, very long, finely pinnatifid, with numerous minute spikelets."

70. OPHIOGLOSSUM SCANDENS Roxburgh, Calcutta Journ. Nat. Hist. 4:477, t. 26 p.p. 1844. = *Lygodium flexuosum* (L.) Swartz, p.p. and *L. salicifolium* K. B. Presl, p.p.

Roxburgh intended his *O. scandens* to be that of Linnaeus, and so it is, as now lectotypified by Alston and Holttum, i.e., a synonym of *L. flexuosum* (L.) Swartz. The published t. 26 (lower fertile pinnules) also represents *L. flexuosum*, as do three herbarium specimens that I have seen: Sin loc., Roxburgh (G, Morton photograph 6573), E. Ind. Co. Herb. 175-10 (K, Morton photograph 15723), and Amboina, Christopher Smith in 1797 (Linn. Soc., Smith Herb. 1647-7, Morton photograph 20333). It appears, however, that Roxburgh's concept was confused, because the specimen in Brussels (Morton photograph 19944) labeled *O. scandens* in Roxburgh's hand is *L. salicifolium* K. B. Presl. It appears that the drawing at BM (Morton photograph 15771) and at Kew (no. 1200) is a composite, the lower sterile pinnae being shown as forked somewhat as in *L. circinnatum* (Burm. f.) Swartz and the fertile pinnae pinnate as in *L. flexuosum*.

In the paper mentioned under *O. filiforme* by Alston and Holttum, these authors lectotypify *Ophioglossum flexuosum* L. on the basis of "Fl. zeyl. 375," i.e., a Hermann specimen from Ceylon, mistakenly stating that this is the only reference cited by Linnaeus, who in point of fact did cite another reference, namely Rheede, Hort. Malab. 12:6, t. 32. Since Linnaeus gives the locality as "India," and not Ceylon, it might be supposed that the Rheede reference could be chosen as lectotype; still he did cite the "Fl. zeyl." reference and so the "India" habitat is incomplete. There is a further complication not mentioned by Alston and Holttum, namely that there is a specimen in the Linnean Herbarium named by Linnaeus as *flexuosum* and also indicated as being species 6 of the "Species Plantarum." The Linnean specimen represents the Jamaican species later described as *Lygodium volubile* Swartz. Since Linnaeus did not cite Jamaica or any American locality for his *O. flexuosum*, but did cite India, the Linnean specimen must in this case be rejected as a type. It would be most unfortunate to transfer the application of the epithet *flexuosum* from a common Old World species to a common New World one.

Alston and Holttum (*Reinwardtia* 5:15. 1959) write that Singapore, *Cuming* 365 in Vienna is the type of *L. salicifolium* K. B. Presl, but this is an error, for Presl cited material from Penang, Singapore, Silhet, Irawaddi, Ava, Rajmahl, Monghur, Gualpara, Tavoy, Martaban, Nepal (all distributed by Wallich), Singapore (*Cuming* 365), and Java (*Drege* 20). The Cuming collection is thus just one of many syntypes, all of which are not conspecific; however, *Cuming* 365 is a suitable lectotype, although there is no reason to designate a specimen in Vienna; on the contrary, there is a specimen in the Presl Herbarium in Prague that should be, and is here, designated as lectotype (cf. Holttum, *Novit. Bot. Inst. Bot. Univ. Carol. Prag.* 1968:37. 1969).

71. *OSMUNDA LANCEOLATA* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:478, t. 27, 1844, non Gmelin, 1768. = *Leptochilus decurrens* Blume, *Enum. Pl. Jav.* 206. 1828. Lectotype: "Ad pedem montis Burangrang inter lapida ad rivulos," Java, *Reinwardt* (L, Morton photograph 1582). This specimen is probably the actual holotype, for it has the name in Blume's hand; it shows one frond with the blade long-decurrent and another with the blade less decurrent, but this variation is common in this species.

LECTOTYPE: The published drawing, t. 27, left-hand plant. No specimen named *Osmunda lanceolata* has been located in any herbarium. The drawing is good; it was a new species when Roxburgh described it (although he picked out a later homonym for his name), but the same plant was later described by Blume as *Leptochilus decurrens*. The published drawing has two sterile leaves and one fertile. Strangely enough, the other two drawings seen are different but represent the same species. The one at Kew (no. 694, Morton photograph 15865) has four sterile leaves and two fertile, and the one at the British Museum (Morton photograph 15753) has six sterile leaves and two fertile. If a specimen can be located, it will replace the drawing as lectotype. Roxburgh did not indicate a locality, but, according to Merrill, it is from Penang.

The genus *Leptochilus* has been studied by Sledge (*Ann. Mag. Nat. Hist.* XII, 9:865-877. 1956), and additional synonymy for *L. decurrens* is given in his paper.

72. *OSMUNDA ZEYLANICA* sensu Roxburgh, *Calcutta Journ. Nat. Hist.* 4:478. 1844. = *Helminthostachys zeylanica* (L.) Hook. in Hook. & Bauer, *Gen. Fil. t.* 47. 1844.

No specimen collected by Roxburgh has been seen, but none was searched for, since Roxburgh's use of the name *O. zeylanica* was surely correct. There is a drawing by Roxburgh (no. 1742) at Kew (Morton photograph 15866). According to Roxburgh

(Hortus Bengalensis 75. 1814), his specimen came from Amboina where it was collected by Christopher Smith.

73. *POLYPODIUM ACUMINATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:490. 1844, non Houtt., 1786, non D. Don, 1825. = *Thelypteris arida* (D. Don) Morton, Amer. Fern Journ. 49:113. 1959.
Aspidium aridum D. Don, Prodr. Fl. Nepal. 4. 1825. Type: Nepal, Wallich (BR? photograph BM).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19649). An isotype is in Geneva, indicated as "India orient. Dr. Roxburgh" (Morton photograph 16931). Roxburgh did not indicate a locality for this species.

This *Polypodium acuminatum* Roxburgh was based on Roxburgh's original manuscript and was published independently and without mention of *P. acuminatum* Roxburgh ex D. Don (1825). The latter was based on a Nepal collection of Wallich, whereas Roxburgh's own species was based on one of his own collections. Therefore, it seems better to regard these two species as nomenclaturally different and differently typified even though they do seem to be taxonomically equivalent. They are both later homonyms.

The lectotype is unusually large for *T. arida* and unusually glabrous. It seems to agree with material from Penang Island, and it may have been collected there by W. Roxburgh, Jr. There is another Roxburgh specimen in Brussels with a label by Roxburgh that reads: "agrees with *P. acuminatum*, but smaller" (Morton photograph 19650); Roxburgh's comment is true, for it does represent the same species, but it is a smaller, hairier, and more typical specimen of *T. arida*. Another Roxburgh collection in Brussels is labeled by Roxburgh and reads: "*Polypodium* undetermined; differs from *acuminatum* in being pubescent and having a larger and more lasting involucre"; this specimen too I identify as *T. arida*.

74. *POLYPODIUM ACUTUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:492. 1844, non Burm. f., 1768. = *Thelypteris subalpina* (v.A.v.R.) Reed, Phytologia 17:317. 1968.
Dryopteris subalpina v.A.v.R. Bull. Bot. Jard. Buit. III, 5:200. 1922.
 Type: North Foramadiahi, Ternate, 1200 m alt, Béguin 1496 (BO; isotype L, seen by Holttum).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand and the number 2390 (Morton photograph 19662). There is in Brussels also a sheet containing two pinnae only, doubtless a part of the same collection. According to Roxburgh, the species occurs in Amboina. An isotype is in Geneva marked as "Amboyna, Dr. Roxburgh," which has been identified (not by Roxburgh) as "*Polypodium cultratum*

Rox." There is no such species, and this is certainly an error for *P. acutum* Roxburgh (Morton photographs 6544, 16632). A specimen in the J. E. Smith Herbarium (no. 1622-75) in the Linnean Society, collected in Honimoa [Ceram] by Christopher Smith, April, 1797 (Morton photograph 20354), agrees with the lectotype and is probably an isotype; Roxburgh probably thought that all the Smith collections came from Amboina, but this one was likely among those that came from Honimoa.

The lectotype chosen was identified by Baker as *Nephrodium extensum*, but the specimen is by no means that species or nearly allied. The lowest pair of veinlets unite into an excurrent veinlet; the second pair reach the margin well above the sinus, which is necessarily almost true since the pinnae are deeply pinnatifid with only a narrow costal wing.

75. *POLYPODIUM AEMULUM* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:496. 1844, non Aiton, 1789. = *Hypodematum crenatum* (Forssk.) Kuhn, von Deck. Reise 3(3):37. 1879.

Polypodium crenatum Forsk. Fl. Aeg.-Arab. 185. 1775. Type: *Forsskal* (C not seen, photograph BM).

AUTHENTIC MATERIAL: A Roxburgh specimen in the British Museum, marked "*Polypodium aemulum?*" in Roxburgh's hand. According to Roxburgh, his material came from "mountains north of Rohilcund," i.e., the present Rohilkhand, Province of Agra, Northern United Provinces.

The description by Roxburgh is: "Fronds quadri-pinnatifid, smooth, and delicate; ultimate divisions narrow-trapeziform-oblong, sides pinnatifid, or gashed and denticulate at tip. Fructifications solitary on the segments. Involucre reniform, peltate and ciliate." Roxburgh surely did not know *Polypodium aemulum* Aiton at first hand, but only through a description. His plant might seem to resemble that by a brief diagnosis, but it was different. *Polypodium aemulum* is a species of *Dryopteris* from the Azores, and nothing like it is known in India. The identity of Roxburgh's plant required a little detective work. The description of the indusia as "ciliate" ruled out *Dryopteris*, *Polystichum*, and *Arachniodes*. The quadripinnatifid, delicate blades and hairy indusia suggested *Hypodematum*, and I did find a Roxburgh specimen under *H. crenatum* in the British Museum labeled by Roxburgh as "*P. aemulum?*" The query shows that Roxburgh had some doubt about the identity of his plant with that of Aiton. The indusium in *Hypodematum* is not truly peltate, as Roxburgh described it, although it might appear so to casual inspection; it is pubescent all over, rather than merely ciliate.

76. *POLYPODIUM ARBORESCENS* Roxburgh, Calcutta Journ. Nat. Hist. 4:495. 1844. = *Cyathea batjanensis* (Christ) Copel. Phil. J. Sci. 4C:45. 1909.

Alsophila batjanensis Christ in Warb. Monsunia 1:90. 1900. Type: Mt. Sibella, Batjan, Moluccas, 5000 ft alt, Warburg 17828 (P not seen; isotype B not seen).

Polypodium arboreum Roxburgh ex Wallich, Num. List no. 2226. 1830, nom. nud.

Alsophila latebrosa var. *batjanensis* Christ in Warb. Monsunia 1:89. 1900, nom. nud.

LECTOTYPE: A Roxburgh collection in the Brussels Herbarium with the name in Roxburgh's hand and the number 2406 (Morton photograph 19859). An isotype (probably the apical part of the same frond) is in Geneva, labeled as from "Honimoa, Dr. Roxburgh" (Morton photograph 6545). Roxburgh gave the locality as Honimoa, i.e., Ceram, where it was doubtless collected by Christopher Smith.

In the original description the editor, Griffith, added a reference to Wallich, Num. List no. 2226 with a query, a number undoubtedly referring to the present species, whose name was wrongly transcribed by Wallich as "*arboreum*" rather than *arborescens*. The specimen noted by Wallich was surely the lectotype specimen noted above from "Herb. Roxb.," which was at the time in the East India Company Herbarium under the custodianship of Wallich.

77. POLYPODIUM ATTENUATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:482. 1844, non Humb. & Bonpl. ex Willd., 1810. = *Polypodium lanceolatum* L. Sp. Pl. 1082. 1753.

Pleopeltis macrocarpa (Bory ex Willd.) Kaulf. Berlin Jahrb. Pharm. 21:41. 1820. See Pichi-Sermolli (*Webbia* 20:349-354. 1965) for additional comments on the nomenclature of *P. lanceolatum*.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium bearing the name *P. attenuatum* and a label "Typus" (Morton photograph 5007). A duplicate is in the British Museum (Morton photograph 7611). According to Roxburgh the species was collected in Pullo Pinang, i.e., Penang Island, Malaya.

From my photographs and notes on the type specimens, it seems that the plants are truly *P. lanceolatum* L., but that species has been recorded in Asia only from India and not from Penang Island or elsewhere in Malaya. Perhaps Roxburgh's locality was wrongly stated, and the specimens came from southern India.

78. POLYPODIUM CONFERTUM Roxburgh, Calcutta Journ. Nat. Hist. 4:493. 1844. = *Arcypteris irregularis* (K. B. Presl) Holttum, Reinwardtia 1:193. 1951.

Polypodium irregulare K. B. Presl, Rel. Haenk. 1:25. 1825. Type: "Mexico," Haenke (the locality Mexico is presumably wrong and the type probably came from the Philippine Islands; it is very likely in Prague).

Aspidium difforme Blume, Enum. Pl. Jav. 1:160. 1828. Type: "In regione Buitenzorg," Java, Blume (holotype L, with the name in Blume's hand, Morton photograph 2318).

Polypodium eximium Kunze, Bot. Zeit. 4:424. 1846. Lectotype: Two sheets in Geneva from Java, Zollinger 514A, the first sheet (the blade apex) with the name "*Polypodium eximium* Kze. n. sp." in Kunze's hand, the second sheet with part of the stipe and blade base (Morton photographs 3851, 3852). The other specimen cited by Kunze, Java, Zollinger 514, is also represented by two sheets in Geneva (Morton photographs 3853, 3854), but these do not have the name in Kunze's hand. The two above collections may indeed be the original specimens used by Kunze in drawing up his description, and there may never have been any specimens in Kunze's own herbarium, now destroyed.

Tectaria irregularis (K. B. Presl) Copel. Phil. Journ. Sci. 2C:416. 1907.

Polypodium macrodon Reinwardt, mss. Based on a specimen in Leiden marked "H. B. [i.e., Hort. Buitenzorg] *Polypodium macrodon* R." (Morton photograph 2317). The epithet was picked up and used by Presl as *Dictyopteris macrodonta* and by Fée under the same name, but for a species that proves to be different, a Philippine species typified by Cuming 9 [= *Arcypteris macrodonta* (Fée) Holttum, Reinwardtia 1:194. 1951]. The Reinwardt specimen with the pinnae (except the basal) very little lobed is matched by a specimen collected near Buitenzorg in 1909 (Palmer & Bryant 93, US).

Lectotype: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand (Morton photographs 5188, 19800); this is the basal part of a frond, with the pinnae almost fully again pinnate. A second specimen in Brussels is probably the apical part of the same frond (Morton photographs 5187, 19801). According to Roxburgh, this species came from Chittagong, in East Bengal, now East Pakistan.

In the "Index Filicum," this species was left as dubious; it has never been placed, except as Baker has correctly annotated the second sheet mentioned above as *Polypodium difforme* Blume. I follow Holttum with some hesitation in recognizing *Arcypteris* as a genus distinct from *Tectaria*. The characters need to be investigated further. Sinus teeth, the presence of which is stressed by Holttum, seem to be more often absent than present, at least on old, mature fronds, and also on fronds with the pinnae only very slightly lobed. Not enough is known about the pubescence of *Tectaria* in general to know if the characters mentioned are distinctive. Holttum's statement that the sori in *Arcypteris* are borne at the vein junctions is not borne out by his own figure 2, in which more sori are not at vein junctions than are. The character of sori irregularly scattered and ex-indusiate also occurs in various New World species.

79. *POLYPODIUM CONFLUENS* Roxburgh, Calcutta Journ. Nat. Hist. 4:494. 1844, non R. Brown, 1810. = *Ctenitis rhodolepis* (Clarke) Ching, Bull. Fan Mem. Inst. Biol. Bot. 8:300. 1938.

Nephrodium rhodolepis Clarke, Trans. Linn. Soc. II, Bot. 1:526, t. 72. 1880. Syntypes: "Sikkim, Assam, Khasia, alt. 5000-7000 feet; Chittagong, 150 feet, Clarke (very small form)." It is evident that Clarke

had several specimens in hand, which must be examined before a lectotype can be designated.

Dryopteris rhodolepis (Clarke) C. Chr. Ind. Fil. 288. 1905.

TYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh and a label reading "Typus" (Morton photograph 19722). According to Roxburgh, it came from Chittagong, in East Bengal, now East Pakistan. Since this is the only specimen found in any herbarium, it may be presumed to be a holotype.

In the "Index Filicum," *P. confluens* Roxburgh, a homonym several times over, is left as a dubious species. The type has been identified as *Nephrodium intermedium* Baker by Baker, which it doubtless is, but Baker's name is a later homonym. The type is quite the smallest specimen of this species that I have seen, and it evidently corresponds to the other specimen from Chittagong mentioned by Clarke in the original description of *N. rhodolepis* as a "very small form"; it is not only smaller but less divided, being bipinnate only at the very base. The large, thin, beautifully clathrate scales are characteristic of this species.

80. POLYPODIUM CORIACEUM Roxburgh, Calcutta Journ. Nat. Hist. 4:481, t. 28 (left). 1844, non Swartz, 1788. = *Pyrrhosia angustata* (Swartz) Ching, Bull. Chin. Bot. Soc. 1:49. 1935.

Polypodium angustatum Swartz, Syn. Fil. 27, 224. 1806. Type: Tranquebar, Rottler (prob. S-PA, not seen).

? *Niphobolus sphaerocephalus* Hook. & Grev. Icon. Fil. 1:t. 94. 1828. Type: Wallich (K-Hb. Hook., Morton photograph 20652), which was thought by Hooker and Greville to be perhaps from Nepal, but indicated properly by Wallich under his Num. List. no. 272. 1829, as from Singapore. Hooker and Greville described the sterile leaves as completely glabrous beneath, but this is not true for *P. angustata*. The sterile blades of the type do appear to be glabrous beneath, but they are old and the stellate hairs which were once present have fallen off, except for a few. Normally this species is not glabrescent; however, it is not clearly conspecific with *P. angustata* or with Wallich 272 in the East India Company Herbarium (Morton photograph 20657).

? *Polypodium sphaerocephalum* (Hook. & Grev.) Wallich, Num. List no. 272. 1829. Based on *Niphobolus sphaerocephalus* Hook. & Grev.

LECTOTYPE: Roxburgh in East India Company Herbarium, no. 272-3 (K, Morton photograph 15737, left-hand specimen). The center and right-hand specimens on this sheet are Wall. Num. List. no. 272-2, Herb. Finlayson, not a type. According to Roxburgh, his species came from "Malay Islands and Pullo Pinang, whence introduced into this Garden [Calcutta] by Mr. W. Roxburgh, Jun." This lectotype likely came from Penang Island, where the species is common, for it matches material from there. A probable duplicate of the lectotype is in US, marked as Penang, Dr. Wallich no. 272. Wallich's own no. 272, the type material of *Niphobolus sphaerocephalus* Hook. & Grev., came from Singapore [Hooker and Greville guessed Nepal wrongly in the original publication], and Wallich's only material of this

species from Penang would presumably have been received from Roxburgh, and so this specimen is doubtless collected by Roxburgh; it agrees with the lectotype cited above. A Roxburgh drawing at Kew (no. 1744, Morton photograph 15867) is labeled *Polypodium coriaceum* and is doubtless intended for this species; it shows the rhizome as too thick and is otherwise rather poor.

81. *POLYPODIUM CUSPIDATUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:491. 1844, non D. Don, 1825. = *Thelypteris repanda* (Fée) Morton, comb. nov.

Phegopteris repanda Fée, *Gen. Fil.* 251. 1852. Type: Penang, *Gaudichaud* (Hb. Webb-FI, not seen).

Polypodium urophyllum Wallich, *Num. List* 299. 1829, nom. nud. Based on Penang, *Wallich* in 1822, Assam, *Wallich* in 1827, and a var. *angusta* (nom. nud.), Penang, *Wallich* in 1822.

Goniopteris dalhousiana Fée, *Mém. Soc. Hist. Nat. Strasb.* 5(1):92. 1857. Type: Penang, *Lady Dalhousie* (isotype K, not seen).

Phegopteris urophylla Mett. *Abhandl. Senckenb. Naturf. Gesell.* 2:310. 1858. Syntypes: Nepal, *Wallich*; Borneo, *Meissner*; plus an unnamed variety, Borneo, *Meissner*. The locality "Nepal" is surely an error (although perhaps not Mettenius' error if the specimen that he had was erroneously labeled); Mettenius' description (in the sporangia being setose, the pinnae caudate, etc.) shows that he had a specimen of *Wallich* 299 from Penang, for his description agrees with that, and there are no *Wallich* specimens of this species from Nepal, where the species is not known to occur. I designate the *Wallich* specimen of this species (presumably under no. 299) in Berlin as the lectotype, if one is there; isotypes are *Wallich* 299 in Brussels (Morton photographs 19744) and in the East India Company Herbarium, no. 299 (K, Morton photograph 15740). The *Meissner* specimen from Borneo is presumably *T. urophylla* var. *nitida* (Holttum) K. Iwatsuki, *Acta Phytotax. Geobot.* 22:94. 1966.²

Polypodium urophyllum (Mett.) Hook. *Sp. Fil.* 5:9. 1864. Hooker wrongly attributed the species to *Wallich*, but *Wallich*'s name was a nomen nudum. Since the species was validly published only by Mettenius in 1858, long after *Wallich*'s death, *Wallich* cannot reasonably be said to have transferred it in 1864. Hooker cited *Phegopteris urophylla* Mett., but also some other synonyms erroneously, such as *Polypodium asperum* K. B. Presl.

Polypodium pinwillii Baker, *Ann. Bot.* 5:460. 1891. Type: Malacca, *Pinwill* (K, not seen).

Abacopteris urophylla (Mett.) Ching, *Bull. Fan Mem. Inst. Biol. Bot.* 8:251. 1938 (Ching cited the parenthetical author wrongly as "Wall.").

Thelypteris urophylla (Mett.) K. Iwatsuki, *Southeast Asian Studies* 3(3):81. 1965 (parenthetical author wrongly cited as "Wall. ex Hook.").

² *Thelypteris urophylla* var. *nitida* (Holttum) K. Iwatsuki was first proposed in *Acta Phytotax. Geobot.* 21:171. August, 1965, but the specific combination *T. urophylla* was not made until December, 1965; it is not possible to make a legitimate varietal combination in advance of the valid publication of its species combination.

Pronephrium repandum (Fée) Holttum, *Blumea* 20:109. 1972.

LECTOTYPE: Two Roxburgh specimens in the Brussels Herbarium, evidently a part of the same collection, the sheet with the apex with the name in the hand of Roxburgh and the date July 4, 1802 (Morton photographs 19742, 19743). According to Roxburgh, the species was collected in Pinang, i.e., Penang Island, Malaya, presumably by W. Roxburgh, Jr. Isotypes are in Geneva, indicated as from Prince of Wales Island, i.e., Penang Island (Morton photograph 16943) and in the East India Company Herbarium, no. 299-4 (K, Morton photograph 15739).

The reference given in the original description to *Polypodium urophyllum* Wall. Cat. 64, no. 299, was added by Griffith and was intended to indicate that *P. cuspidatum* Roxburgh was represented in the Wallich Herbarium by no. 299, more correctly 299-4 (as indicated by the page reference "64"), and not that Roxburgh's species was based on a Wallich collection; this would be impossible, since the Wallich collection of this species was made in 1822, many years after Roxburgh's death.

As indicated in the synonymy, most authors have wrongly attributed the epithet to "Wallich ex Hook.," but the first valid publication was by Mettenius, who must be cited as the author; Wallich's name will disappear in this connection, since his original *urophyllum* was a nomen nudum under *Polypodium*, and when it was first published by Mettenius it appeared under a different generic name, *Phegopteris*.

82. *POLYPODIUM DICHOTOMUM* sensu Roxburgh, *Calcutta Journ. Nat. Hist.* 4:493. 1844, non Houtt., 1783, non Thunb., 1784. = *Dicranopteris linearis* var. *montana* Holttum, *Reinwardtia* 4:276. 1957.

AUTHENTIC MATERIAL: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand (Morton photograph 19939). There is a Roxburgh drawing in the British Museum that represents the same plant rather well; it is indicated as being from Amboina.

According to Roxburgh, his plant came from the Molucca Islands. Holttum records var. *montana* from the Moluccas, but only from Ternate, where Roxburgh's plant may have been collected by Christopher Smith; however, it could very well grow also in Amboina. The specimen cited above agrees well with a plant from the Admiralty Islands identified as var. *montana* by Holttum. Roxburgh did not consider his plant as new but referred it to *P. dichotomum* Thunb. *Acrostichum furcatum* L. is added as a synonym, but whether by Roxburgh or by Griffith is uncertain; my guess is that Griffith added it and inserted it in the wrong place, intending to put it as a synonym of *P. furcatum* Roxburgh, assuming that Roxburgh's species was the same as the Linnaean one from having the same specific epithet; however, he was

wrong about that, for the Linnaean species is a quite different plant of the West Indies.

83. *POLYPODIUM DUBIUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:496. 1844.
= *Microlepia dubia* (Roxburgh) Morton, comb. nov.

Davallia polypodioides sensu D. Don. *Prodr. Fl. Nepal.* 10. 1825, as to description not type. In Sledge's treatment of *Microlepia*, *D. polypodioides* is listed and discussed as though it were a new species; however, Don clearly was making a new combination, based on his cited synonym *Dicksonia polypodioides* Swartz, and remarked that the reason for considering it a *Davallia* rather than a *Dicksonia* was because of the one-valved involucre. However, Don evidently misidentified *D. polypodioides* Swartz, for a specimen that is authentic for Don's concept is in the British Museum (Nepal, Wallich, Morton photograph 6896), and this does not represent *Dicksonia polypodioides* Swartz, but rather the species later described as *Polypodium dubium* Roxburgh and *Microlepia firma* Mett.

Davallia roxburghii Wallich, *Num. List.* 2218. 1830, nom. nud. Based on a Roxburgh specimen received as "*Pol. dub. vel Cyathea.*" Wallich evidently mistook the "*Pol. dub.*" to mean merely a dubious species of *Polypodium*, but as shown by his use of the name and his description Roxburgh intended it as a specific epithet, his *Polypodium dubium* (Morton photograph 15743).

Microlepia firma Mett. ex Kuhn, *Linnaea* 36:146. 1869. Syntypes: Mishmee, Griffith (K, Morton photograph 20646) and Bhoton, Griffith (K, Morton photograph 20645). I designate the latter as lectotype. There is a Griffith collection from Mishmee in the British Museum which is presumably an isosytype.

LECTOTYPE: East India Company Herbarium no. 2218 (K, Morton photograph 15743), collected by Roxburgh. Roxburgh indicated his plant came from the Molucca Islands, where it was surely collected by Christopher Smith. There is a specimen at Kew in the Hooker Herbarium from Amboina, Webb, which matches the lectotype Wallich 2218 exactly. Webb was never in Amboina, and so the specimen was merely sent by Webb to Hooker; similar specimens from Amboina sent by Webb were collected by Christopher Smith. This indicates that the type of *Polypodium dubium* came from Amboina. There is in Geneva a specimen from Amboina collected by Christopher Smith that is unidentified except for the name "*Trichomanes*" written in, not by Roxburgh, which seems to match the lectotype chosen above and which is undoubtedly another isotype (Morton photograph 6551).

In his most useful paper on *Microlepia* (*Kew Bull.* 1956:523-531), Sledge clearly delimited three species that were much confused in herbaria—*M. speluncae*, *M. trapeziformis*, and *M. firma*. He cited *Davallia roxburghii* Wall. as a synonym of *M. firma*, not adopting this name because it is a nomen nudum as published by Wallich and not realizing that *Polypodium dubium* Roxburgh was based on the same material. A variety of this species follows:

84. *Microlepia dubia* (Roxburgh) Morton var. *subglabra* (Sledge) Morton, comb. nov.

Microlepia firma var. *subglabra* Sledge, Kew Bull. 1956:527. Type: Ceylon, *Thwaites* C. P. 3272 (K, Morton photograph 20644, not annotated by Sledge).

Microlepia firma var. *hirta* (Clarke) Sledge (Kew Bull. 1956:527. 1956) was published as though *Davallia polypodioides* var. *hirta* was a new variety. It was not, however, but was based on the Hooker and Baker reference cited, on *Davallia hirta* Kaulf., which is from the Hawaiian Islands. Although it was not Sledge's intention, his var. *hirta* applies to the plants of the Hawaiian Islands, which are different from those of Sikkim and Bhotan.

85. POLYPODIUM ELATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:495. 1844. =*Pleocnemia leuzeana* (Gaud.) K. B. Presl, Tent. Pterid. 184, t. 7, f. 12. 1836 (as "*leuceana*").

Polypodium leuzeanum Gaud. in Freyc. Voy. Bot. 361, t. 6. 1827. Type: Pisang, Molucca Islands, *Gaudichaud*.

Aspidium leuzeanum (Gaud.) Kunze, Bot. Zeit. 4:474. 1846.

Tectaria leuzeana (Gaud.) Copel. Phil. Journ. Sci. 2C:417. 1907.

LECTOTYPE: A Roxburgh collection from Amboina in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photographs 5189, 19806). A second sheet in Brussels is very likely a lower pinna from the same collection; it is marked as *Polypodium elatum* herb. Roxb. Amboyna, 1796. Roxb., but not in Roxburgh's hand (Morton photographs 5190, 19805). A duplicate, very likely the apical part of the same frond, is in Geneva marked as "Amboyna, Dr. Roxburgh" (Morton photograph 16754). Another duplicate, surely a part of the same collection, is in the British Museum, collected in Amboina by Christopher Smith (Morton photograph 19529).

In the "Index Filicum," *Polypodium elatum* is left as a dubious species. The lectotype was identified by Baker as *Nephrodium giganteum*, a somewhat confused name. In recognizing *Pleocnemia* as a genus distinct from *Tectaria*, I am following Holttum (*Reinwardtia* 1:171-189. 1951), although with some reservations until the delimitation of *Tectaria* is better understood.

86. POLYPODIUM EXCAVATUM Roxburgh, Hortus Bengalensis 75. 1814; Calcutta Journ. Nat. Hist. 4:485, t. 30 right (wrongly labeled "*P. quercifolium*") 1844, non Bory ex Willd., 1810. =*Polypodium scolopendria* Burm. f. Fl. Ind. 232. 1768.

Polypodium phymatodes L. Mant. 306. 1771.

TYPE: This presents a unique problem. Some of Roxburgh's species were listed in his "Hortus Bengalensis" (1814) in advance of their intended publication in his "Flora Indica." There was probably no intention of publishing new species here, but some of them have to be considered valid by reason of the citation references to Rheede's "Hortus Indicus Malabaricus," Rumphius' "Herbarium Amboinense," or other pre-Linnaean publications. The

only fern published by reference to Rumphius is this one, for which Rumphius vol. 6, t. 35, f. 1 is cited. If this is taken at face value, *Polypodium excavatum* Roxburgh would become a synonym of *Stenosemia aurita* (Swartz) K. B. Presl, which this plate of Rumphius' represents. However, when Roxburgh's full manuscript was published, this reference was corrected to t. 35, f. 2, which represents *Polypodium scolopendria* Burm. f. That this was Roxburgh's real intent is shown by his description and published and unpublished drawings, as well as by two authentic specimens in the Brussels Herbarium named *excavatum* in Roxburgh's hand, for the description, the drawings, and the specimens all represent *P. scolopendria*, and are nothing like *Stenosemia aurita*. Therefore, common sense requires that we regard the original citation of "f. 1" as a typographical error for "f. 2." This means that the type of Roxburgh's species must be considered to be Rumphius' description and illustration of his *Polypodium indicum minus* Herb. Amboin. 6:80, t. 35, f. 2. According to E. D. Merrill's "An Interpretation of Rumphius' Herbarium Amboinense," this description and plate clearly apply to *Polypodium phymatodes* L., now correctly known as *P. scolopendria*.

Roxburgh's description indicates that he had two forms in hand, one with a nearly simple blade and one with deeply pinnatifid blades. The two authentic Roxburgh specimens in Brussels named by Roxburgh illustrate these forms. One (Morton photograph 19926) has a simple blade just slightly lobed; the other (Morton photograph 19927) has a deeply pinnatifid blade typical of mature specimens of *P. scolopendria*. This kind of variation is well known in this species. According to Roxburgh's "Hortus Bengalensis," his material came from the Moluccas, collected by Christopher Smith; it was cultivated in the Calcutta Botanical Garden.

In the "Index Filicum," *P. excavatum* Roxburgh is referred to *P. longissium* Blume without question, but the basis of this opinion, which is an obvious error, is not known.

Copies of Roxburgh's original drawing are at Kew (no. 1747, Morton photograph 15868) and the British Museum (Morton photograph 15779). These drawings agree closely with the published drawing t. 30, right, which is erroneously labeled *Polypodium quercifolium*, doubtless by the editor, Griffith. The true *P. quercifolium* was not illustrated by Roxburgh, so far as I know.

87. *POLYPODIUM FELINUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:496. 1844.
 = *Cyathea felinum* (Roxburgh) Morton, comb. nov.
Alsophila concinna Baker in Hook. & Bak. Syn. Fil., ed. 2, 439. 1874.
 Type: Louisiade Archipelago, MacGillivray.
Alsophila polyphlebia Baker, Journ. Linn. Soc. Bot. 15:104. 1876. Type:
 Aru Island, Molucca Islands, Mosley.
Alsophila sangirensis Christ in Warburg, Monsunia 1:90. 1900. Type:
 Sangihe Island, Molucca Islands, Warburg 16605.

Cyathea sangirensis (Christ) Copel. Phil. Journ. Sci. 4C:37. 1909.

LECTOTYPE: Amboina, *Roxburgh* (G, Morton photographs 6546, 16633). A duplicate closely agreeing and evidently a part of the same collection is in Brussels, with the name in Roxburgh's hand (Morton photograph 19858). Specimens that also agree, doubtless isotypes, are in the J. E. Smith Herbarium, Nos. 1625-74 and 1625-75 (LINN, Morton photographs 20226, 20227); they were collected in Amboina by Christopher Smith in 1797. Roxburgh cited the locality as Moluccas and Pullo Pinang; I have not located any specimens from Penang, which would be different, since this species is not known in Penang.

Cyathea sangirensis of Holttum's treatment in the "Flora Malesiana" is a rather characteristic species because of its large size and strongly toothed segments. Nevertheless, it has been repeatedly renamed, for in addition to the synonyms quoted above, Holttum lists seven additional specific synonyms. Apparently, this is one of the common species of the Moluccas. I have seen authentic specimens or photographs of many of these synonyms, and it appears that Holttum is correct in placing them all under a single species; the Roxburgh lectotype is quite in agreement with the other specimens. Roxburgh described his plant as being "scandent," which would be unusual in this species, but not impossible. At least a few species of *Cyathea* are said to be scandent, e.g., *C. biformis* (Rosenst.) Copel., which Holttum describes as "Stem 1-1½ cm. thick, climbing (clinging to supporting tree by its roots," and *C. scandens* (Brause) Domin is said to have a similar habit. However, Roxburgh may have been wrong about this; he did not know the plant in the field, since he never collected in Amboina, and probably not in Penang.

88. POLYPODIUM FERRUGINEUM Roxburgh, Calcutta Journ. Nat. Hist. 4:487. 1844, non Mart. & Gal., 1842. =? *Nephrolepis hirsutula* (Forst.) K. B. Presl, Tent. Pterid. 79. 1836. Type from the South Sea Islands, *Forster* (holotype or isotype BM, Morton photograph 6876); since this type specimen agrees altogether with plants from Tahiti, and since many of Forster's collections are known to have come from Tahiti, this may be presumed the type locality.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand. According to Roxburgh his species came from Amboina. There is an isotype from the Roxburgh Herbarium in Geneva, collected in Amboina by Christopher Smith (Morton photograph 6571). Another specimen that may be an isotype, although not named *P. ferrugineum*, is in the J. E. Smith Herbarium, no. 1622-104 in the Linnean Society (Morton photograph 20357).

I do not have the lectotype in hand or a photograph of it, but I did see it at Kew while it was on loan to Dr. Jarrett.

According to my notes made at the time, the pinnae are strongly rufescent-pilose, with very shallow lobes, the upper base rounded and not auriculate, the lower base very broad and rounded also; the midrib is scaly above. It has been identified as *Nephrolepis rufescens* (Schrad.) Wawra, which is considered in the "Index Filicum" as a synonym of *N. hirsutula*. Although most, but not all, specimens of *N. hirsutula* have the pinnae auriculate at the upper base, at least one collection from Amboina (C. B. Robinson 1957, US), identified as *N. hirsutula* by Merrill, agrees with the Roxburgh type.

89. *POLYPODIUM FLAGELLIFERUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:487, t. XXXI (right hand). 1844. = *Nephrolepis biserrata* (Swartz) Schott, Gen. Fil. ad t. 3. 1834.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19930a). According to Roxburgh the species is a native of Bengal, India. This type specimen was determined as *N. acuta* (Schkuhr) K. B. Presl by Baker, which is considered a synonym of *N. biserrata*.

A second specimen may be in the Brussels Herbarium, also with the name in Roxburgh's hand, for my notes indicate that one was on loan to Dr. Jarrett at Kew in 1969. It is the same as the one selected as lectotype. A painting at Kew (no. 1748) (Morton photograph 15869) agrees well enough, especially in the nearly medial sori, a characteristic of *N. biserrata*. In the "Index Filicum," *P. flagelliferum* is referred to *N. exaltata*, but this is clearly wrong from the position of the sori. The indusia are wrongly drawn in the painting as reniform; they are actually suborbicular with a narrow, closed sinus, as they should be in *N. biserrata*.

90. *POLYPODIUM FURCATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:493. 1844, non Swartz, 1802, non Desv., 1827. = *Gleichenia truncata* (Willd.) Spreng. in L. Syst. Nat. ed. 16, 4:25. 1827.

Mertensia truncata Willd. Kongl. Vet. Akad. Nya Handl. 25:169, t. V, f. A. 1804. Type: B-Hb. Willd. no. 19470, received from Jussieu; an isotype ought to be in the Jussieu Herbarium in Paris.

Mertensia laevigata Willd. in L. Sp. Pl. ed. 4, 5:75. 1810.

Gleichenia laevigata (Willd.) Hook. Sp. Fil. 1:10. 1844.

Sticherus truncatus (Willd.) Nakai, Bull. Nat. Sci. Mus. Tokyo 29:20. 1950.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand on a ticket overlying a stem (Morton photograph 4743). An isotype, also with a label in Roxburgh's hand, is also in Brussels and is essentially identical (Morton photograph 4744). According to Roxburgh, the species was collected in Pullo Pinang, i.e., Penang Island, Malaya, where it was doubtless found by W. Roxburgh, Jr., or W. Hunter.

In the "Index Filicum," *P. furcatum* Roxburgh is referred with a query to *Gleichenia glauca* (Thunb.) Hook., which is by no means the same and which does not even belong in the same subgenus. In Holttum's treatment of *Gleichenia* in the "Flora Malesiana," *P. furcatum* is omitted as a synonym.

91. *POLYPODIUM GLABRUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:482. 1844, non Burm. f., 1768. = *Polypodium polycarpon* Cav. Descr. 1:246. 1802. Type: Née, MA (not seen). Cavanilles ascribed the type to San Antonio, Ecuador, but this species does not grow in South America; many of Née's localities were mixed, and his plant doubtless came from either the Marianna Islands or the Philippine Islands, where Née did collect and where this species grows.

Acrostichum punctatum L. Sp. Pl. ed. 2, 1524. 1763.

Polypodium punctatum (L.) Swartz, Journ. Bot. Schrad. 1800(1):21. 1802, non Thunb., 1784.

Polypodium polycarpon Swartz, Journ. Bot. Schrad. 1800(1):21. 1802, non Cav., 1802. In the "Index Filicum," this is cited erroneously as "Cav.: Sw.," but Swartz did not mention Cavanilles in publishing this species, he chose the name independently. No specimens were cited, and so the species must be typified from Swartz' "Species Filicum," to which the account in Schrader's Journal was a preliminary. The "Synopsis," p. 227, cites Mauritius, Groendal and Java, Thunberg. A reference is added here to *Polypodium polycarpon* Cav. and no "Amer. merid.," but only with a query, showing definitely that Swartz had not based his species on that of Cavanilles. The Swartz name was cited as 1801 and was thought to be earlier, but Stafleu has shown that it was actually published in 1802, and so we can assume for convenience that the Cavanilles name is earlier, for it also was formerly cited as of 1801. The Swartz species must be lectotypified by either the Groendal or Thunberg specimens, and very likely the Groendal will be chosen, for it is probably in the Swartz Herbarium in Stockholm, and the Thunberg specimen is probably only in the Thunberg Herbarium. It has been generally assumed that the species is taxonomically the same as *P. polycarpon* Cav., but since they are from different geographic areas, they may not be identical.

Polypodium irioides Poir. in Lam. Enc. Méth. 5:513. 1804. Type: Ile de France [Mauritius], probably collected by Commerson (P-Herb. Lam., Morton photograph 2696).

Polypodium lingulatum Swartz, Syn. Fil. 30. 1806. A new name for *P. punctatum* (L.) Swartz, non Thunb.

Polypodium glabrum Roxburgh ex Wallich, Num. List. no. 281. 1829, nom. nud. Based on Wallich in 1826 from Amherst and Martaban, no. 281-1; *Herb. Roxburgh*, no. 281-2; and *Herb. Wright*, no. 281-3. The specimen from the Roxburgh Herbarium cited by Wallich is not in the East India Company Herbarium at present, and the reference was doubtless to the specimen then in the Roxburgh Herbarium in the India House, which is the same sheet that is in Brussels and cited as lectotype.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19930). According to Roxburgh it was "found near Calcutta on the trunks of large old trees, etc. where there is much shade and humidity." The "etc." locality mentioned refers at least in part to a collection from Silhet, by M. R. Smith (ex Herb. Roxburgh, BM, Morton photograph 20887). Roxburgh drawings of *P. glabrum* are at Kew, no. 1006 (Morton photograph 15870) and the British Museum (Morton photograph 15780); they are stylized, but probably do represent *P. polycarpon*.

In most herbaria and books this species has continued to be called *Polypodium punctatum* (L.) Swartz, even though Swartz recognized that this name was an illegitimate later homonym and renamed it *P. lingulatum*. An older name, however, appears to be *P. polycarpon* Cav. (but see the note above on *P. polycarpon* Swartz, which might have priority and which seemingly refers to the same species). Under *Microsorium*, the epithet *punctatum* is correct.

92. POLYPODIUM IMPUBER Roxburgh, Calcutta Journ. Nat. Hist. 4:494. 1844.
= *Cyathea alternans* (Hook.) K. B. Presl, Abhandl. K. Böhm. Gesell. Wiss. V, 5:347. 1848.

Polypodium alternans Wallich, Num. List. no. 329. 1829, nom. nud.

Hemitelia alternans Hook. Icon. Pl. 7:t. 622. 1844. Syntypes: Penang, Wallich, Dalhousie. In the "Flora Malesiana," Holttum indicates that the "type" is Wallich 329, but this was only one of two original syntypes; Holttum's designation of Wallich List. no. 329 as type must be considered as a lectotype, the natural choice but still a lectotype rather than a type.

LECTOTYPE: Amboina, Roxburgh (G, Morton photographs 6542, 16636), the apical part of a frond. The basal part of probably the same frond is in Brussels, with the name *P. impuber* in Roxburgh's hand (Morton photograph 19851). Although I usually choose the Brussels specimens as lectotypes, since they have the names in Roxburgh's own hand, I do not in this instance, since the Brussels specimen, consisting of basal pinnae only, is sterile, and the Geneva specimen is fertile. Roxburgh gave the locality as Amboina.

Cyathea alternans is a rather characteristic species by reason of its small, entire, glabrous, rounded pinnules, most of which, except the basal, are adnate. Holttum (Fl. Males. II, 1(2):145. 1965) suggests that it has the appearance of being a hybrid between *C. moluccana* R. Brown and either *C. squamulata* (Blume) Copel. or *C. ridleyi* (Baker) Copel., but this is not quite comprehensible since he considers *squamulata* and *ridleyi* to be synonyms. One of these suggested parents does grow in Amboina, *C. moluccana*, but *C. squamulata* is not reported from there, although it may well occur. Incidentally, Holttum cites the parenthetical authority for *C. alternans* as "Wall. ex Hook.,"

but this may not be, for Wallich used the epithet *alternans* under *Polypodium* (as a nomen nudum), but the first valid publication was under the generic name *Hemitelia* by Hooker, and therefore Wallich's name disappears as an authority. The synonym *P. impuber* was overlooked by Holttum, although it was cited as a synonym of *C. alternans* in the "Index Filicum," Suppl. 1:124. 1913.

93. *POLYPODIUM INVOLUCRATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:491. 1844. = *Tectaria crenata* Cav. Descr. 250. 1802. Type: Marianna Islands, Née (presumably MA).

Aspidium pachyphyllum Kunze, Bot. Zeit. 6:259. 1848. Lectotype: Java, Zollinger 580z (the fertile specimen, L, Morton photograph 2296). Since Kunze's herbarium is destroyed, it is necessary to designate lectotypes for his species; the present specimen is suitable, since it is marked "*Aspidium pachyphyllum* Kze n. sp." in Kunze's own hand; this may indeed be a holotype and there may never have been a collection in Kunze's own herbarium. There is a second sheet in Leiden of the same number also with the name in Kunze's hand, and it is undoubtedly a sterile part of the lectotype chosen above (Morton photograph 2294).

LECTOTYPE: A specimen of the Roxburgh herbarium in the Brussels Herbarium with the name in Roxburgh's hand; this specimen has a ticket in the hand of Christopher Smith reading "Amboyna, no. 333, 96," the "96" referring to the date 1796 (Morton photograph 5109, 19788). A duplicate of this collection is in Geneva with the data "Amboina, Dr. Roxburgh" (Morton photograph 16746). There is a specimen in the British Museum of this species collected in Ternate by Christopher Smith (Morton photograph 19528), and this may be a part of the type collection and the correct locality, since Roxburgh may have wrongly assumed that all of the Smith collections came from Amboina, as indeed most of them did, but perhaps this one did not.

In the "Index Filicum," *P. involucratum* is listed as a dubious species of *Dryopteris*. The brief original description is entirely consistent with the type cited above and not with any *Dryopteris* known from the Molucca Islands.

94. *POLYPODIUM LONGIFOLIUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:492. 1844, non Cav., 1802, non Presl, 1822. = *Thelypteris heterocarpa* (Blume) Morton, Amer. Fern Journ. 49:113. 1959.

Aspidium heterocarpon Blume, Enum. Pl. Jav. 2:155. 1828. Syntypes: Two Blume collections in Leiden; the one of these from Java with the name in Blume's hand I designate as lectotype (Morton photograph 2556), since it is a fine specimen with two complete plants with rootstocks. The other specimen from Boerengrang, Java, also with the name in Blume's hand (Morton photograph 1152) is a larger plant with a much longer stipe and fewer reduced basal pinnae; it lacks a rootstock.

Dryopteris heterocarpa (Blume) Kuntze, Rev. Gen. Pl. 2:813. 1891.

Cyclosorus heterocarpus (Blume) Ching, Bull. Fan Mem. Inst. Biol. Bot. 8:180. 1938.

LECTOTYPE: Two Roxburgh collections in the Brussels Herbarium, both evidently a part of the same frond, one with the name in the hand of Roxburgh (Morton photographs 19683, 19684). The locality is given as Amboina by Roxburgh. An isotype in Geneva bears the data "Amboyna, Dr. Roxburgh" and a label "Typus" (Morton photographs 6541, 16660).

I do not know that *T. heterocarpa* has been previously reported from Amboina, but there is no reason why it should not be there, for the species ranges as far east as New Guinea and the Bismarck Archipelago. It is rather easily recognizable among its numerous relatives by the large, glabrous, very persistent, vaulted indusia.

95. *POLYPODIUM LUCIDUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:486. 1844.
= *Polypodium cuspidatum* D. Don, Prodr. Fl. Nepal 2. Feb. 1, 1825. Neotype: Nepal, *Wallich* in 1818 (BM, Morton photograph 20885). This might be the holotype, but does not bear the name in Don's hand.

Polypodium leiorhizum Wallich, Num. List. no. 303. 1829, nom. nud.
Based on three collections: Nepal, *Wallich* in 1820, Kumaon, *R. Blinkworth*, and Sylhet Mountains, *DeSilva*.

Phymatodes leiorhiza K. B. Presl, Tent. Pterid. 196. 1836, nom. nud.

Drynaria leiorhiza J. Smith, Journ. Bot. Hook. 4:61. 1841, nom. nud.

Polypodium leiorhizum Wallich ex Mett. Fil. Hort. Bot. Lips. 39, t. 25, f. 7. May-June, 1856. Not formally described, but with sufficient description of sorus and venation plus the figure to validate the name. Fully described by Mettenius, Abhandl. Senckenb. Naturf. Gesell. 2:103. Oct., 1856. Also published in Hook. Fil. Exot. t. 24. 1857.
Type: Nepal, *Wallich* (presumably B).

Phymatodes cuspidata (D. Don) J. Smith, Cat. Cult. Ferns 10. 1857.

Pleopeltis leiorhizon (Wallich ex Mett.) Moore, Ind. Fil. 346. 1862.

Phymatodes lucida (Roxburgh) Ching, Contr. Inst. Bot. Nat. Acad.

Peiping 2:61. 1933. The type is wrongly stated to be Nepal, *Wallich*.

Microsorium lucidum (Roxburgh) Copel. Gen. Fil. 196. 1947.

Microsorium cuspidatum (D. Don) Tagawa, Fl. Eastern Himalaya 495. 1966.

TYPE: No herbarium specimens from Roxburgh of this species have been located. Therefore, a Roxburgh drawing at Kew, no. 1922 (Morton photograph 15871), is designated lectotype temporarily until a specimen can be located. The plant, according to Roxburgh, is a "Native of Nepaul, from thence introduced into the Botanic Garden [at Calcutta] by Dr. Buchanan in 1802." Roxburgh's description, which is rather full, was probably drawn up from living plants and no herbarium specimens may have been made.

I have given the synonymy in full, since this species is currently being filed under three specific epithets—*lucidum*, *leio-*

rhizum, and *cuspidatum*. *Polypodium cuspidatum* D. Don is clearly the earliest of these, but it was rejected in the "Index Filicum" in the belief that *Polypodium cuspidatum* K. B. Presl, Rel. Haenk. 1:20, t. 1, f. 3. 1825, had priority. However, from Stafleu's recent "Taxonomic Literature" it appears that Don's work was published Feb. 1, 1825, and Presl's between June and November 1825. This is another instance showing the importance of careful dating.

96. POLYPODIUM MUCRONATUM Roxburgh, Calcutta Journ. Nat. Hist. 4:490. 1844, non Swartz, 1806. = *Polystichum* sp.

TYPE: No authentic specimens seen. The species was described from plants collected in Sylhet (East Pakistan) by M. R. Smith in 1811 (Hort. Bengal. 75. 1814) and introduced in the Calcutta Botanical Garden in 1811 according to Voigt (Hort. Suburb. Calcut. 734. 1845).

The description is of a plant with simply pinnate fronds, with ensiform, acutely serrate, acuminate pinnae; the texture is hard and glossy, and the serrations very acute, i.e., mucronate as in the specific epithet chosen. This description indicates that the species is a *Polystichum*. It is possible that no herbarium specimens were ever made. By knowing which species of *Polystichum* grow in Sylhet, one could guess which species is meant. The matter is not of importance since Roxburgh's name is an illegitimate later homonym.

97. POLYPODIUM MULTIFLORUM Roxburgh, Calcutta Journ. Nat. Hist. 4:493. 1844, non Roth, 1797. = *Arcypteris irregularis* (K. B. Presl) Holttum, Reinwardtia 1:193. 1951.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand and the identification *Aspidium difforme* Blume by Baker (Morton photographs 5184, 19804). Two other specimens, surely isotypes, are also in Brussels and likely represent different parts of the same frond, a base and an apex (Morton photographs 5185, 5186, 19802). The species was collected in Amboina, according to Roxburgh, where it was doubtless obtained by Christopher Smith. Two isotypes are in Geneva, one labeled "Ind. orient., Dr. Roxburgh" (Morton photograph 6565) and one "Amboina, Dr. Roxburgh" (Morton photograph 16755).

For synonymy and comments on the genus *Arcypteris* see under *Polypodium confertum*. Roxburgh's descriptions of his *P. confertum* and *P. multiflorum* are almost identical; he may have been influenced by the geography—one came from India and one from the Molucca Islands—but this species has a broad range and occurs in both places in apparently indistinguishable forms. In the "Index Filicum," *P. multiflorum* Roxburgh is left as a dubious species.

98. *POLYPODIUM NUDATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:491. 1844.
 = *Thelypteris nudata* (Roxburgh) Morton, comb. nov.
Polypodium multilineatum Wall. ex. Hook. Sp. Fil. 5:11. 1863. Type:
 Wallich (K not seen).
Nephrodium moulmeinense Bedd. Ferns Brit. Ind. Suppl. 18. 1876. Type:
 Sylhet, Wallich 147 (K not seen).
Thelypteris multilineata (Wall. ex Hook.) Morton, Amer. Fern Journ.
 49:113. 1959.
Pronephrium nudatum (Roxburgh) Holttum, Blumea 29:111. 1972.

TYPE: Two Roxburgh specimens in the Brussels Herbarium, evidently a part of the same frond, the apical part with the name in Roxburgh's hand and the number 2395 (Morton photographs 19688, 19689). Since this is the only specimen found in any herbarium, it is presumably a holotype. According to Roxburgh, it is from Amboina, but this is surely an error. There is in the British Museum a specimen of the Roxburgh Herbarium—not named *nudatum*, however—that is *multilineata* and which agrees with the Roxburgh type of *nudatum*. It was collected in Sylhet by M. R. Smith (Morton photograph 20854). Presumably, Roxburgh had his material (doubtless unmounted at the time) in a cover with the name "Smith" on it, and since he had so many specimens from Amboina collected by Christopher Smith, he erroneously assumed that this one also was from Christopher Smith, rather than M. R. Smith. Therefore, the species is from Sylhet, and not from Amboina.

99. *POLYPODIUM PARASITICUM* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844. = *Thelypteris dentata* (Forsk.) E. St. John, Amer. Fern Journ. 26:44. 1936, sensu lato.
Polypodium dentatum Forst. Fl. Aegypt.-Arab. 185. 1775.

AUTHENTIC MATERIAL: Amboina, *Christopher Smith* 310, collected in 1796, with the name in Roxburgh's hand (BR, Morton photograph 19783). An apparent duplicate of this and probably the basal part of the same collection is also in Brussels,³ identified by Baker as *Nephrodium molle* var. *glabratum* (Morton photograph 19702). Roxburgh stated: "Nat. of various parts of India. The above definition is taken from Molucca plants."

Roxburgh did not attribute this species to Linnaeus, and Linnaeus was not mentioned. Griffith added "*Aspidium parasiticum*, Hb. Madras, Wall. Cat. 67, No. 2239?," but this is not equivalent to citing *Polypodium parasiticum* L. as a synonym, for it is only a reference to a particular sheet mentioned in the Wallich "Numerical List" on page 67, and this only with a query, which may not have anything to do with the Linnaean species and is surely not a type. Nevertheless, it seems reasonable that Roxburgh really did consider his plant the same as that of Linnaeus. The specific name could hardly have been chosen

³ It was the custom in the Roxburgh Herbarium not to transfer data to the second sheets, but to pin the sheets together. When they are not fastened, it is not usually difficult to match them, as quite often the second sheet is clearly the base or apex of the frond on the first sheet.

independently by Roxburgh, for it is peculiar in that it is so inappropriate; "parasitic" in the old days usually meant epiphytic, but this species is always terrestrial.

It is evident that Roxburgh had several collections in hand that he called *P. parasiticum*, which probably came from different places since they are not identical with each other. A collection named *parasiticum* by Roxburgh in Brussels (Morton photograph 19701) is probably correctly named, but it is a young frond with only immature indusia and sporangia; a probable duplicate is also in Brussels (Morton photograph 19700), determined as *Nephrodium molle* and with the indication "Ind. or. Hb. Roxb." These two specimens might be *T. contigua* (Rosenst.) Reed, according to Holttum. They do have smaller and narrower pinnae. In that case, they are doubtless from Penang. Another Roxburgh collection in Brussels has a label in Roxburgh's hand reading "Seems to differ too little from *P. parasiticum* to form a distinct species"; Roxburgh was probably right, for the specimen seems to be only a rather large, glabrate form; there is an apparent duplicate of this, without data, also in Brussels (Morton photograph 19674). These Holttum has identified as *Cyclosorus vestigiatus* (Copel.) Copel., with sessile, spherical glands. Another collection, perhaps slightly different, is represented by two sheets in Brussels, both identified as *Nephrodium molle*, with the indication "Ind. or., Roxburgh" (Morton photographs 19698, 19699); a similar specimen is in the British Museum, indicated as collected in the Moluccas by Christopher Smith (Morton photograph 20971). Some specimens that Roxburgh identified as *Polypodium sophoroides* appear to be rather *T. dentata* with only the basal veinlets fertile; these are in Geneva, from the Molucca Islands (Morton photographs 6561, 16661); a duplicate is in the British Museum, from Gilolo Island, *Christopher Smith*, November, 1801 (Morton photograph 20870). See my comment under *Polypodium sophoroides* sensu Roxburgh.

100. POLYPODIUM PERTUSUM Roxburgh ex Hook. Exot. Fl. 2:t. 162. 1825; Roxburgh, Calcutta Journ. Nat. Hist. 4:483, t. 29 (left). 1844. = *Pyrrisia lanceolata* (L.) Farwell, Amer. Midl. Nat. 12:245. 1931.

Acrostichum lanceolatum L. Sp. Pl. 1067. 1753. Lectotype: Chosen inferentially by Trimen (Journ. Linn. Soc. Bot. 24:152. 1886) as Ceylon, *Hermann* 380 (BM). Trimen considered this species erroneously to be the same as *Polypodium adnascens* Swartz, a somewhat similar species which, however, does not occur in Ceylon. According to a note by Alston quoted by Ching (Bull. Chin. Bot. Soc. 1:46. 1935) the lectotype of *A. lanceolatum* in the Hermann Herbarium matches *Polypodium*

spissum Bory ex Willd. better than Indian specimens that Ching referred to *P. adnascens*.

Niphobolus pertusus (Roxb. ex Hook.) Spreng. Syst. Veg. ed. 16., 4:44. 1827.

Cyclophorus lanceolatus (L.) Alston, Journ. Bot. Brit. & For. 69:102. 1931 (excl. syn).

TYPE: Hooker described *P. pertusum* Roxburgh from a Roxburgh specimen from the Delta of the Ganges transmitted to him by Wallich and from a plant cultivated in the Liverpool Botanical Garden from material received from the Royal Horticultural Society. The Roxburgh specimen that Hooker had in hand when he adopted Roxburgh's name was not found at the British Museum (Natural History) or in the Hooker Herbarium at Kew. A duplicate is in Brussels with the name in the hand of Roxburgh (Morton photograph 19936). Another duplicate is in the East India Company Herbarium, no. 267-5 (K, upper right, the other specimens on the sheet are Herb. Wight; Morton photograph 15735). An authentic Roxburgh drawing is at Kew, no. 1745 (Morton photograph 15872). The other specimen cited by Hooker, the one cultivated in Liverpool, was said to have come from China, and according to Ching represents *Pyrrrosia adnascens*; I have not seen it and probably neither did Ching.

Ching (Bull. Chin. Bot. Soc. 1:71. 1935) indicates that *P. lanceolata* is a common fern in "the whole of tropical Asia," and also cites Polynesia, but not the Mascarene Islands. He equates it with *Polypodium spissum* Bory ex Willd. and states that the type of that species came from "Insula Bourbon (or Malabar)," but this represents a misunderstanding. The type came from Bourbon, which is the present island of Réunion in the Mascarene Islands and not from Malabar in India. Whether *P. spissum* is really the same as the true *P. lanceolata* from Ceylon can be determined only from an examination of the type in the Willdenow Herbarium in Berlin, where it is mounted on two sheets under the number 19627.

101. POLYPODIUM PHYLLITIDIS Roxburgh, Calcutta Journ. Nat. Hist. 4:483. 1844, non L., 1753. = *Polypodium phyllomanes* Christ, Bull. Acad. Géogr. Bot. Le Mans 1902:210, figs. 1902.

Neocheiropteris phyllomanes (Christ) Ching, Bull. Fan Mem. Inst. Biol. 4:110. 1933.

Neolepisorus phyllomanes (Christ) Ching, Bull. Fan Mem. Inst. Biol. 10:14. 1940 (reference not seen).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with a label reading "*Polypodium an phyllitidis*, Feb. 2, Journ. p. 185" not in Roxburgh's hand, and a later annotation label "*Nephrodium (Sagenia) singaporianum* Baker," the right-hand specimen (Morton photograph 19810). According to Roxburgh his species was collected near Chittagong [East Pakistan] by Buchanan-Hamilton (Hort. Bengal. 75. 1814).

In the "Index Filicum," *P. phyllitidis* Roxburgh (non L.) is referred to *Aspidium singaporianum* Wallich ex Hook. & Grev.

with a query. This is based on the entry added to the original description by the editor, Griffith, reading: "*Aspidium Singaporianum* Wall. Cat. P. 64, No. 374?" Griffith may have been partly right, for the left-hand specimen on the sheet designated above as lectotype is actually *Tectaria singaporiana* (Wallich ex Hook. & Grev.) Copel. However, that this specimen was not Roxburgh's type is shown by the fact that *T. singaporiana*—a very distinct species of *Tectaria* by reason of its simple blade resembling that of a *Polypodium*—is known only from the Malay Peninsula (Thailand, Malaya, and Singapore) and from not near Chittagong where Roxburgh's plant came from. The fact that Roxburgh has a real *Polypodium* and not a *Tectaria* is also indicated by his statement "involucres obscure," which would indicate that he saw no indusia; the indusia in *Tectaria singaporiana* are conspicuous and persistent. The right-hand plant on the sheet mentioned above is a *Polypodium* and it agrees with Roxburgh's description, so far as that goes, which is not very far. It appears to me from my photograph that this specimen can be referred to *P. phyllomanes* Christ as a form with a cuneate base, but it deserves further study. The venation of the *Tectaria* and the *Polypodium* are subtly different.

102. *POLYPODIUM PHYMATODES* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:484. 1844, non L., 1771. = *Polypodium alternifolium* Willd. in L. Sp. Pl. ed. 4, 5:168. 1810.

AUTHENTIC MATERIAL: A Roxburgh specimen in Brussels identified as *Polypodium phymatodes* L. by Baker but without a name by Roxburgh (Morton photograph 19929). Roxburgh stated that his *P. phymatodes* was native in various parts of India. There is no proof that this specimen actually represents Roxburgh's concept of *P. phymatodes*, but the specimen agrees with Roxburgh's brief description and is likely the plant intended; it is one of the Indian plants generally identified as *P. phymatodes*.

In the "Index Filicum," *Polypodium alternifolium* Willd. is listed as a dubious species, said probably to equal *P. longissimum* Blume or *P. nigrescens* Blume. Since *P. alternifolium* has priority, it would displace one of these well-known names, but an examination of photographs of the type in the Willdenow Herbarium kindly supplied by Dr. D. E. Meyer shows that this species is neither of these species but is a close ally or possible synonym of *P. scolopendria* Burm. f. (*P. phymatodes* L.). The type is mounted on three sheets under the number 19637; it came from "India orientalis," and was collected by Klein. It differs from *P. scolopendria* in having narrower segments separated by broader sinuses. I have recently stated that *P. alternifolium* is the same as the recently described species *Phymatodes baner-*

jiana Pal & Pal, but I am not quite sure; that has the sori generally in two rows on each side of the midribs and *P. alternifolium* seems to have but one row; further investigation is indicated. Pal and Pal point out a number of minute differences in their *Phymatodes banerjiana* that cannot be seen in the photograph of *Polypodium alternifolium*.

103. POLYPODIUM PILOSUM Roxburgh, Calcutta Journ. Nat. Hist. 4:492. 1844, non Schkuhr, 1806. = *Tectaria fuscipes* (Wallich ex Bedd.) C. Chr. Contr. U. S. Nat. Herb. 26:290. 1931.

Aspidium fuscipes Wallich, Num. List. no. 361. 1829, nom. nud. Based on a plant from Chappendang Mountain, Tenasserim, India, Wallich in 1827.

Aspidium fuscipes Wallich ex Bedd. Ferns Brit. Ind. Suppl. 15, t. 366. 1876. Syntypes: "Himalayas, Birma . . . The plant figured was collected by Mr. Clarke at Cachar, but I have it from various parts of North India, the Birma plant is of softer texture more pubescent and greener in color when dried, and the anastomosis not so copious." Although Beddome attributed the name to Wallich, it is not clear that he actually drew his description from the Wallich specimen that was the basis of Wallich's original unpublished name; on the other hand, Beddome's illustration was specifically based on a Clarke collection from Cachar, and this I designate as lectotype; it is presumably in either Kew or the British Museum.

Ctenitopsis fuscipes (Wallich ex Bedd.) C. Chr. ex Tardieu & C. Chr. Notul. Syst. 7:87. Oct. 1938. The same combination was later published by Ching (Bull. Fan Mem. Inst. Biol. Bot. 8:813. Nov. 1938).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand (Morton photograph 5196, 19798). There is an isotype agreeing in all ways in Geneva, marked as "Chittagong, Dr. Roxburgh," but not in Roxburgh's hand (Morton photograph 16749). According to Roxburgh, his plant came from "Chittagong, near the Burning Wells," now in East Pakistan.

Roxburgh's plant is a small one for this species and shows only a few of the dark scales on the stipe that are characteristic of this species. However, there is no doubt as to its identity. This is one of the species poorly described by Roxburgh, and in the absence of the authentic material cited above, it would be hard to identify.

104. POLYPODIUM PROLIFERUM (Retz.) Roxburgh ex Wallich, Num. List. 312. 1829, non Kaulf., 1824. = *Thelypteris prolifera* (Retz.) Reed, Phytologia 17:306. 1968.

Hemionitis prolifera Retz. Obs. Bot. 6:38. 1791.

Dryopteris prolifera (Retz.) C. Chr. Ind. Fil. 286. 1905.

Ampelopteris prolifera (Retz.) Copel. Gen. Fil. 144. 1947.

This is an instance of a name validly published in Wallich's "Numerical List," since a basionym is cited, a reference to *Hemionitis prolifera* Retz. The name was attributed to Roxburgh, but this was very likely a distortion of Roxburgh's intent, for when Roxburgh published the name *Polypodium proliferum*, he attributed the species only to himself and did not mention Retzius. The epithet "*proliferum*" is apt and evidently occurred independently to Retzius and Roxburgh.

105. *POLYPODIUM PROLIFERUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:489, *t.* 32, left. 1844, non Kaulf., 1824, non Roxburgh ex Wallich, 1829.
= *Thelypteris prolifera* (Retz.) Reed, *Phytologia* 17:306. 1968.

TYPE: No herbarium specimens of this species have been located; therefore, the published plate is designated as lectotype temporarily until a specimen is found. A copy of the original plate is in Kew (no. 1007, Morton photograph 15873) identified as "*Polypodium radicans*," probably the name first chosen by Roxburgh and probably changed to *proliferum* because of the earlier *Polypodium radicans* Burmann f., which Roxburgh knew and treated on page 488 of the published paper. According to Roxburgh, his species is a "native of Bengal, and the more interior parts of India. Grows among brushwood, long grass, etc. in moist shady places about Calcutta; fructifies during the latter part of the rainy season." According to Voigt (*Hort. Suburb. Calcut.* 734. 1845), the species was native in Serampore (Bengal), the Khasia Mountains, Oude, and Nepal.

It is evident that Roxburgh knew this species well in the field, for he gives a rather detailed description. He indicates that the fronds may reach up to 12 feet long, which is longer than I have seen reported elsewhere, but which may indeed be possible. As mentioned under *P. proliferum* Roxburgh ex Wallich, Roxburgh intended his *P. proliferum* as a new species and not as a transfer of *Hemionitis prolifera*, as indicated by Wallich. The two species are taxonomically the same but have different types.

106. *POLYPODIUM QUERCIFOLIUM* sensu Roxburgh, *Calcutta Journ. Nat. Hist.* 4:484 (excl. *t.* 30, left). 1844. = *Drynaria quercifolia* (L.) J. Smith, *Journ. Bot. Hook.* 3:398. 1841.

AUTHENTIC MATERIAL: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19911). Roxburgh drawings at Kew (no. 1100 and Morton photograph 15874) and BM (Morton photograph 15767). According to Roxburgh, the species grows in various parts of India.

Roxburgh did not mention *Polypodium quercifolium* L., but he did cite a Rheede illustration that was one of the original citations of Linnaeus. And Roxburgh did not put the "R" after the species name, which he generally did when he was describing a new species. Therefore, it seems that Roxburgh really intended

the Linnaean species and was not considering his plant as new. The published illustration labeled *P. quercifolium* has been wrongly labeled, presumably accidentally by Griffith; it represents *P. excavatum* Roxburgh and not *P. quercifolium*.

107. *POLYPODIUM RADICANS* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:488. 1844. = *Nephrolepis radicans* (Burm. f.) Kuhn, Ann. Lugd. Bat. 4:285. 1869.

AUTHENTIC MATERIAL: "Ind. or.," Roxburgh (BR, Morton photograph 19917a); Malay Islands, Roxburgh (G, Morton photograph 6547). There is also a second specimen in Brussels with the name in Roxburgh's hand and the number 2390 (not photographed).

Roxburgh wrote "*P. radicans*, *Burm. Fl. In. 233, t. 66, f. 3*. is not unlike the sterile frond, and was most likely intended for the same plant," which shows that he had some doubt about the identity of his collection with Burmann's species. His specimens, however, are clearly the same as *Polypodium radicans* Burm. f., which is a characteristic species easily recognized by its scrambling habit and thick, elongate runners. Roxburgh gave his locality as "Malay Islands, etc." It may be that his plant came from Penang Island.

108. *POLYPODIUM RUPESTRE* Roxburgh, Calcutta Journ. Nat. Hist. 4:488. 1844, non R. Brown, 1810, non Blume, 1828. = *Polypodium taeniatum* Swartz, Journ. Bot. Schrad. 1800 (2):26. 1802. Type: Java, *Thunberg. Crypsinus taeniatus* (Swartz) Copel. Gen. Fil. 206. 1947.

TYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh and the number 22 (Morton photograph 19931) is designated as lectotype. A second Roxburgh specimen in Brussels without the name in the hand of Roxburgh (Morton photograph 19932) has fewer and somewhat larger pinnae but is probably an isotype. According to Roxburgh the species was collected in Pinang [i.e., Penang Island, Malaya] on mossy shaded rocks of granite; it was doubtless collected by W. Roxburgh, Jr.

In the "Index Filicum," *P. rupestre* Roxburgh was stated to be "*Nephrolepis* sp." but this was a very bad guess on the part of Christensen. The authentic specimen above designated as lectotype is clearly a *Polypodium* [*Crypsinus*]; it was identified as *Polypodium palmatum* Blume; although it is near that species, it is referable rather to *P. taeniatum* Swartz, which differs in having the blade fully pinnate rather than deeply pinnatifid, according to Holttum (*Ferns of Malaya* 194-196. 1954).

109. *POLYPODIUM SCABRUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:491. 1844, non Presl, 1822. = *Thelypteris ferox* (Blume) Tagawa & Iwat-

suki, Acta Phytotax. Geobot. 23:54. Aug. 1968. [Same combination made by Reed, Phytologia 17:276. Oct. 1968.]

Aspidium ferox Blume, Enum. Pl. Jav. 2:153. 1828.

Dryopteris ferox (Blume) Kuntze, Rev. Gen. Pl. 2:812. 1891.

Cyclosorus ferox (Blume) Ching, Bull. Fan Mem. Inst. Biol. Bot. 8:167. 1938.

LECTOTYPE: Two Roxburgh specimens in the Brussels Herbarium, evidently parts of the same frond, with a label in the hand of Christopher Smith reading "On the high mountains of Amboina, Nov. 1796, no. 319"; the second sheet does not have an original label (Morton photographs 19666, 19667). Isotypes are in Geneva, labeled "Ind. Orient. Dr. Roxburgh" (Morton photograph 16933) and the J. E. Smith Herbarium nos. 1625-68, 1625-69, and 1625-70, Linnean Society (Morton photographs 20220, 20221, 20222); these are indicated as having been collected in Amboina by Christopher Smith.

In the "Index Filicum," *P. scabrum* Roxburgh is correctly indicated as equivalent to *Dryopteris ferox*, one of the better known species of the sect. *Cyclosorus*, distinguished by its sub-arborescent habit, large size, glabrous pinnae, and especially by the abundant, dark, hairlike scales present on the stipes and rhachises.

110. POLYPODIUM SCARIOSUM Roxburgh, Calcutta Journ. Nat. Hist. 4:494. 1844. = *Polystichum scariosum* (Roxburgh) Morton, comb. nov.

Polystichum prolificans van Alderw. van Rosenb. Bull. Jard. Bot. Buitenzorg III, 2:170. 1920. Type: Deli, Bandar-baroe, Sumatra, 1200 m., June 16, 1918, Lörzing 5743 (isotype L, Morton photograph 2143).

LECTOTYPE: Two Roxburgh specimens in the Brussels Herbarium, the sheet with the rhizome and stipe base with the name in Roxburgh's hand, the other consisting of the balance of a complete frond (Morton photographs 19780, 19779). There is an isotype in Geneva, marked "Amboyna, Dr. Roxburgh" (Morton photographs 6563, 16642). Roxburgh gave the locality as Amboina.

Polypodium scariosum Roxburgh is clearly the same as *Polystichum prolificans*, which is fairly distinct among the numerous bipinnate *Polystichums* in the rounded, not at all mucronate or aristate, lobes on the distal margin of the pinnules, the fairly large pinnules, and the presence of a large bud on the lower side of the rhachis a short distance from the apex. This species must be rare. I have seen it only from Sumatra, Malaya, and from Amboina, but it may well grow elsewhere, since *Polystichums* have been little studied. However, this could be a case of a wrong locality, and the specimens could have come from Penang. This could be assumed if study of all Amboina collections does not reveal the species there.

111. *POLYPODIUM SEMIPINNATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:486. 1844. = *Tectaria semipinnata* (Roxburgh) Morton (see no. 5. *Acrostichum semipinnatum*).

TYPE: Two Roxburgh specimens in the Brussels Herbarium, the sterile one with the name in Roxburgh's hand, the fertile one not (Morton photograph 5111). Since no other specimens have been found in any herbarium collected by Roxburgh and named *P. semipinnatum*, these are doubtless the holotype. They were probably collected by W. Roxburgh, Jr. A native of the Malay Islands according to Roxburgh, surely from Penang Island, since the specimen agrees with material from there and the species does not grow in the Moluccas, the other area that Roxburgh perhaps sometimes referred to as the "Malay Islands."

Roxburgh described the same species twice and with the same specific epithet, once as *Acrostichum semipinnatum* and once as *Polypodium semipinnatum*. This was intentional and not a lapse, for under *P. semipinnatum* Roxburgh remarked "is very like my *Acrostichum semipinnatum*." It is indeed so like that species that it cannot be distinguished even specifically, let alone generically.

112. *POLYPODIUM SEMISAGITTATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:491. 1844. = *Thelypteris semisagittata* (Roxburgh) Morton, comb. nov.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19645). A very similar specimen and surely a duplicate of the lectotype is in Geneva, marked "India Orient. Dr. Roxburgh" (Morton photographs 6562, 16932). According to Roxburgh, his species is a native of the Delta of the Ganges, Chittagong, etc. The lectotype likely came from Chittagong, where it may have been collected by Buchanan-Hamilton, since it agrees with specimens from there. The lectotype was identified by Baker as *Nephrodium arbuscula* Desv., but it can hardly be the true *Thelypteris arbuscula* (Willd.) K. Iwatsuki (Acta Phytotax. Geobot. 2:170. 1965), the type of which is from Mauritius, and it may occur also in Ceylon and southern India.

This species is distinct from, but apparently allied to, *T. papilio* (Hope) Iwatsuki, which is much larger, does not have semisagittate lower pinnae, and has the pinnae more deeply lobed than in *T. semisagittata*.

In the "Index Filicum," *Polypodium semisagittatum* Roxburgh was referred without a query to *Dryopteris arida* (D. Don) Kuntze, but this species does not agree with Roxburgh's description or specimens. Roxburgh's specimen resembles in general but is not identical with a specimen from Chittagong, March, 1880, Gamble 7827 (US), which was originally identified as *Nephrodium truncatum* Presl, reidentified as *Cyclosorus subpubescens* (Blume) Ching by Ching, and recently as *Cyclosorus*

latipinna (Hook.) Tardieu by Iwatsuki. This species can hardly be the same as *Cyclosorus subpubescens*, as delimited by Holttum, or *C. sumatranus*. It does not agree with *C. latipinna*, which was described from Hong Kong as *Nephrodium molle* var. *latipinna* Benth. (Flora Hong Kong 455. 1861), which does not have numerous reduced, butterfly-like lower pinnae. Apparently, no lectotype has ever been proposed for var. *latipinna*. There were four original syntypes: Hong Kong, *Champion*, *Harland*, *Hance*; Little Hong Kong, *Wilford*; of these, I choose Hong Kong, *Hance* 135 as lectotype (K, Morton photograph 20647), for it is the best developed of the syntypes. None of the syntypes was annotated by Bentham, nor by Hooker. Rather curiously, all the authors who have discussed this species, such as Tardieu, Holttum, and Ching, have cited Hooker as the author of the basionym, but the epithet *latipinna* originated with Bentham, and Hooker merely raised Bentham's variety to specific rank.

113. POLYPODIUM SOPHOROIDES sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:489. 1844, non Thunb., 1794. = *Thelypteris sumatrana* (v. A. v. R.) Reed and *T. dentata* (Forsk.) E. St. John, sensu lato, both pro parte.

AUTHENTIC MATERIAL: Two Roxburgh specimens with the name *sophoroides* in Roxburgh's hand. The frond on the right of the sheet labeled "Ind. or. Roxb." (BR, Morton photograph 19696) is *Thelypteris sumatrana*. The left-hand plant is the basal part of the plant with apex only on the other sheet (BR, Morton photograph 19697). This plant is *Thelypteris dentata*, s.l. It is hairier and has persistent indusia, and the superior segments of the basal pinnae are toothed. The specimen of *T. sumatrana* is glabrate, the indusia are smaller, and the basal segments are not toothed. According to Roxburgh, his material came from the "Moluccas, etc.," which is true of the specimen of *T. dentata*, s.l. The specimen of *T. sumatrana* is probably from Penang, for it matches a specimen in the British Museum (Natural History) marked as from "Princes Island, Dr. Banks" (Morton photograph 20869). This means that the specimen was sent to Dr. Banks, who never was in Penang, by Roxburgh, for only Roxburgh called Penang "Prince of Wales Island"; other earlier collectors called it "Pullo Pinang."

That Roxburgh's concept of *P. sophoroides* was confused is shown by his description of the sori as "sometimes in a single line on each side of the nerve; sometimes they form a nearly continued line near the margins of the incisures." The former condition is shown by the specimens, cited above as authentic, that represent *T. sumatrana*, and the same condition obtains in the true *Polypodium sophoroides* Thunb. By the second kind of sori Roxburgh intended to describe a condition where the sori are present only near the sinuses between the segments, i.e., that only the lowest pair, or the lowest two pairs perhaps, of veinlets are fertile; this condition is shown by specimens in Geneva

(Morton photographs 6561, 16661), one of them with the name *sophoroides* in Roxburgh's hand; these specimens are matched by one in the British Museum from Gilolo Island, Moluccas, collected by Christopher Smith in November, 1801; these specimens with only the lowest veinlets fertile do not represent *T. sumatrana*, but appear to be forms of *Thelypteris dentata*, s.l.

Roxburgh's identification of his Penang material as *Polypodium sophoroides* is not far wide of the mark, for his specimens do resemble that species, which, however, has a more northern range in Japan and China, and which differs in having most of the pinnae with a somewhat elongate superior basal segment and in having the basal pinnae not reduced, among other characters, especially of pubescence. *Polypodium sophoroides* Thunb. is a taxonomic synonym of *Thelypteris acuminata* (Houttuyn) Morton. Strangely, in the fourth supplement of the "Index Filicum," the authority for this species is given as *Thelypteris acuminata* (Panz. in Christm. & Panz.) Morton, with the basionym *Polypodium acuminatum* Panz. in Christm. & Panz. Pflanzensyst. 13(1):204, t. 99, f. 2. 1786, which is entirely wrong for both author, book, and date; the author is properly Houttuyn, and the citation of the basionym is *P. acuminatum* Houtt. Nat. Hist. II, 14:181, t. 99, f. 2. 1783, as given by Merrill (Journ. Arn. Arb. 19:313. 1938) and as I gave it (Amer. Fern Journ. 49:139. 1958 [1959]).

114. *POLYPODIUM SQUARROSUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:494. 1844. = *Polystichum squarrosum* (D. Don) Fée, Gen. Fil. 287. 1852.
Aspidium squarrosum D. Don, Prodr. Fl. Nepal. 4. 1825. Type: Narainhetty, Nepal, Mar. 7, 1803, Buchanan-Hamilton (BM, Morton photograph 20886).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in Roxburgh's hand (Morton photograph 19777). There is an isotype in Geneva, with the label "Mountains of Sirinagur, Capt. Hardwicke" (Morton photographs 6560, 16703). According to Roxburgh, the species was "found by Captain Hardwicke on the tops of the mountains between Hurdwar and Sirinagur," now Hardwar, United Provinces, and Srinagar, Kashmir.

In the "Index Filicum," *P. squarrosum* Roxburgh is listed under *Polystichum lobatum* var. 4 as though it were a transfer of *Aspidium squarrosum* to *Polypodium*, but it obviously is not, for Don's species was published more than ten years after Roxburgh's death. Roxburgh's species was described as new, but taxonomically it appears the same as Don's later species with the same epithet, an apt epithet referring to the squarrose and conspicuous stipe scales. I have not seen the type of Don's species,

however, and cannot be sure that it is identical. The whole group of *Polystichum aculeatum* in India is in an inextricable tangle at present, and it will take monographic study to straighten it out. The name *P. squarrosum*, however, will likely remain as a correct name, since it is older than competing epithets other than *P. aculeatum* (L.) Schott, *P. setiferum* (Forssk.) Moore ex Woy-nar, and *P. lobatum* (Hudson) K. B. Presl; any one or all of these three may be correct for Indian species, although, all are founded on European types.

115. *POLYPODIUM TENERUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:490. 1844. = ?*Thelypteris sericea* (Scott ex Bedd.) Reed, Phytologia 17:313. 1968.

?*Lastrea sericea* J. Scott ex Beddome, Ferns Brit. India t. 308. 1867. Type: Chittagong, J. Scott (BM, Morton photograph 20859, marked as original for t. 308.)

?*Lastrea calcarata* var. *sericea* (J. Scott ex Bedd.) Bedd., Handb. Ferns Brit. India 237. 1883.

?*Dryopteris pseudocalcarata* C. Chr. Ind. Fil. Suppl. 3:95. 1934. Based on *Lastrea sericea* J. Scott ex Bedd., non *Dryopteris sericea* C. Chr. 1913.

TYPE: No specimens from the Roxburgh Herbarium have been located. The species was collected in Silhet, East Pakistan, by M. R. Smith in 1811, (cf. Hort. Bengal. 75. 1814), and was cultivated in the Calcutta Botanic Garden.

The original description is: "Fronds alternately-pinnate; pinnae linear-lanceolate, gash-serrate, acuminate. Fructification in a few spots on each side of the veins; involucre reniform. A native of Silhet. In the Botanic Garden at Calcutta, it grows to the height of from 12 to 18 inches, is of a delicate soft texture, and somewhat villous." This description seems surely to represent a species of *Thelypteris* sect. *Lastrea*, from the small size, simply pinnate blades, delicate texture, villous condition, and reniform indusia. The only species I have found that grows in the region of Silhet, which belongs in the region known as Chittagong formerly, is the one described as *Lastrea sericea* J. Scott ex Bedd. This species was growing in the Calcutta Botanic Garden as late as 1869, for C. B. Clarke collected it there on Nov. 15, 1869 (Clarke 10375, BM, Morton photograph 20860); Clarke reported that the cultivated plant had come originally from Chittagong. My guess is that the plant Scott collected and marked as from Chittagong, the type of *Lastrea sericea*, was actually collected in the Calcutta Botanic Garden, from the same plant or plants that served Clarke, and that these were the same plants or descendants of Roxburgh's original *Polypodium tenerum*. Many of

Roxburgh's plants did survive in the garden throughout the nineteenth century (and perhaps still do), but many lost their labels, if they ever had any. Thus Roxburgh's *P. tenerum*, an appropriate name for a plant of this delicate texture, and Scott's *Lastrea sericea*, also an appropriate name for a plant that is obviously pubescent, may have been based on the same material. I feel that this is true, and yet in the absence of any Roxburgh specimen I should hate to propose a new combination, even though Roxburgh's name has priority. Moreover, this plant belongs to a troublesome group of species that are perhaps not quite properly delimited by Ching in his paper on Sikkim-Himalaya *Thelypteris*. In particular, the species called by Ching *Thelypteris cana* (J. Smith) Ching is impossibly confused. The basionym cited is a nomen nudum, based on material from northern India, and all the references cited by Ching refer to plants from northern India, although Ching states that his species occurs only in southern India. He cites as "type" a Wight collection not mentioned in any of the cited synonyms. It seems that *Thelypteris cana* Ching must be treated as a new species, and since it was published after 1935 yet has no Latin diagnosis, it is invalid and can be disregarded. Still, it would be interesting to know what plant was intended.

116. *POLYPODIUM TOMENTOSUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:483, t. 29 (right). 1844, non DuPetit Thouars, 1804, non Bory, 1833.
 = *Pyrrosia flocculosa* (D. Don) Ching, Bull. Chin. Bot. Soc. 1:66. 1935.
Polypodium flocculosum D. Don, Prodr. Fl. Nepal. 1. 1825. Type: Narainhetty, Nepal, Buchanan-Hamilton (not seen).
Cyclophorus flocculosus (D. Don) C. Chr. Ind. Fil. 199. 1905.
Polypodium detergibile Hook. Sp. Fil. 5:49. 1864. Type: Based on various collections from Bhotan (*Griffith*), Nepal (*Wallich* as *P. vestitum* in Herb. Hook.), Simla (*Madden, Edgeworth*), Kumaon, and Sylhet and Assam (*Strachey & Winterbottom, Hooker f. & Thomson*). Of these I choose Kopkut, Kumaon, *Strachey & Winterbottom* 402 as lectotype (K, Morton photograph 20653). Hooker's comment "J.Sm.? vix Don?" is hardly comprehensible, since there are no species named *detergibile* by J. Smith or Don.

LECTOTYPE: A Roxburgh specimen in the East India Company Herbarium, no. 269-3 (Morton photograph 15736, upper left-hand plant). According to Roxburgh, this species was collected in "Hindoostan, on trunks of trees"; by Hindoostan Roxburgh was probably referring to West Punjab (now in Pakistan), East Punjab, or Rajasthan in northwestern India as distinguished from Bengal in eastern India. An authentic drawing by Roxburgh agreeing with the published illustration is at Kew, no. 1746 (Morton photograph 15875). On the sheet with the lectotype are two plants at the right hand representing *Polypodium mysureuse* Heyne ex Wallich, Num. List. no. 269. 1829, nom. nud. [= *Pyrrosia mollis* (Kunze) Ching]. The plant at the lower left is Herb. Wight, also *P. mollis*.

117. *POLYPODIUM TRIDENTATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:495. 1844. = *Thelypteris torresiana* (Gaud.) Alston, Lilloa 30:111. 1960.
Polystichum torresianum Gaud. in Freyc. Voy. Bot. 333. 1824. Type: Marianna Islands, Gaudichaud (Holttum, Blumea 17:27. 1969, states the type is in Paris, but it has not been located there; the holotype is in Geneva, according to Dr. F. R. Fosberg).
Macrothelypteris torresiana (Gaud.) Ching, Acta Phytotax. Sinica 8:310. 1963.

LECTOTYPE: A specimen (Morton photograph 19726) from the Roxburgh Herbarium in Brussels with the locality Banda, the number 327, and the date May, 1797; although not so indicated, the collector was surely Christopher Smith, who was collecting in the Molucca Islands in 1797. Two duplicates in Brussels are evidently a part of the same collection (Morton photograph 19727). An isotype is in Geneva, indicated as "Banda, Dr. Roxburgh" with a label reading "Typus" (Morton photographs 6559, 16648). A sheet in the J. E. Smith Herbarium (no. 1625-145) in the Linnean Society (Morton photograph 20246) is another probable isotype, for it agrees with the lectotype above completely, however, it is indicated as having been collected by Christopher Smith in Amboina in 1797; the locality "Amboina" is likely an error for "Banda," although it is quite possible that Smith did collect this species twice, once in Banda and once in Amboina.

Holttum (Blumea 17:25-32. 1969) has recently recognized *Thelypteris torresiana*, *T. setigera* (Blume) Ching, and seven other Asiatic and Malesian species as a genus *Macrothelypteris*, distinct from *Thelypteris*, following the lead of Ching, but he did not explain why it is necessary to recognize this or other groups as genera rather than as subgenera or sections. The only characters used to separate the genera *Macrothelypteris* and *Pseudophegopteris* are the presence generally of hair-pointed scales on the axes and the presence of multicellular, hyaline hairs in the former; *Pseudophegopteris* has scales (but not hair-pointed scales), and hairs (but these are unicellular). Such vegetative differences may be important and indicate relationships, but there is no necessary reason that they should be considered generic characters, rather than subgeneric. The characters mentioned have very recently been discussed by Pichi-Sermolli (*Webbia* 24:713-717. 1970), who has also indicated the type of *Macrothelypteris* as *Nephrodium oligophlebium* Baker correctly. Holttum proposed to change the designated type to another species, *Polystichum torresianum* Gaud., but this is not permissible.

118. *POLYPODIUM UNITUM* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:488. 1844, non L., 1759. = *Thelypteris totta* (Thunb.) Schelpe var. *hirsuta* (Mett.) Morton, Contr. U. S. Nat. Herb. 38:73. 1967 (with synonymy).

AUTHENTIC MATERIAL: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19682). A Roxburgh drawing at Kew (no. 1749) (Morton photograph 15876) labeled

Polypodium unitum is apparently not the same thing and must remain unidentified.

Roxburgh did not consider this a new species but referred it to Burmann, presumably Burm. f. Fl. Ind. 232. 1768, although not so stated, but Burmann merely quoted Linnaeus, who is the author of *Polypodium unitum*. Roxburgh cited "Burm. zeyl. t. 44, f. 1," which is one of the original citations by Linnaeus for this species. Roxburgh was not the only one to misapply the name *unitum* to *Thelypteris totta*, for this was the common opinion up until this century, and the matter is perhaps still not definitely settled.

119. PTERIS AMPLEXICAULIS Roxburgh, Calcutta Journ. Nat. Hist. 4:505. 1844.
= *Pteris vittata* L. Sp. Pl. 1074. 1753. Type: China, *Osbeck*.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19893). Roxburgh cited as locality: "Nat. of Bengal, in shady, moist places. Also among ruins of brick buildings. Is sometimes parasitical," which indicates that he had several specimens in hand; this is borne out by the specimens seen, all of which represent *P. vittata*, but they are not identical and were probably collected at different times and places. These syntypes are: "Ind. or.," *Roxburgh* in Herb. Mart. (BR, Morton photograph 19895); Bengal, *Roxburgh* (BM, Morton photograph 7563); without locality, *Roxburgh* (East Ind. Co. Herb. 112-4, K, with name in the hand of Roxburgh, Morton photograph 19587b); Botanical Garden [Calcutta], this sheet probably collected by Wallich, Dec. 11, 1814 (East Ind. Co. Herb. 112-4, K, Morton photograph 15718); drawing by Roxburgh (K, no. 1753, labeled *P. vittata* rather than *P. amplexicaulis*, Morton photograph 15883; same drawing BM, Morton photograph 15777).

As mentioned under *Pteris vittata* sensu Roxburgh, Roxburgh misidentified another species as *P. vittata* L. and redescribed the true *P. vittata* as a new species *P. amplexicaulis*.

120. PTERIS ANGUSTIFOLIA sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:503, t. 33 (left). 1844, non Swartz, 1788. = *Vittaria* sp.

No herbarium specimens have been seen, only the published drawing and two original drawings representing the same plant at Kew (no. 1751, Morton photograph 15878) and the British Museum (Morton photograph 15775). The Kew drawing was first named "*Pteris parasitica*," which was changed in a different hand to "*Pteris angustifolia* Roxb." The name "*P. parasitica*" was never published, and the name "*Pteris angustifolia*" appears in the printed work attributed to Swartz rather than Roxburgh. (Roxburgh's own species are, at least usually, indicated with an "R.") Therefore, *P. angustifolia* must be considered as a misidentification of *P. angustifolia* Swartz and not as a new species.

The true *P. angustifolia* Swartz might appear from a diagnosis to be the same, but that is a quite different species, now known as *Ananthacorus angustifolius* (Swartz) Underw. & Maxon. Roxburgh's plant was from "the Delta of the Ganges, where it is found growing on the trunks of trees, intermixed with mosses, etc. parasitic plants, of various kinds." It was collected in 1796, according to Roxburgh (Hort. Beng. 75. 1814), and cultivated in the Calcutta Botanical Garden.

From the description and drawing I am unable to identify Roxburgh's plant specifically. If one knew which species of *Vittaria* grew in the Delta of the Ganges, one could probably identify the species correctly, but I do not have this information. The plant is shown as having a rather broad blade, and so it may be *Vittaria amboinensis* Fée as treated by Ching (*Sinensia* 1:189. 1931) or a small form of *V. scolopendrina* (Bory) Thwaites.

121. *PTERIS BICOLOR* Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844.
= *Cheilanthes farinosa* (Forssk.) Kaulf. Enum. Fil. 212. 1824.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh and the number 2416 (Morton photograph 20004). The locality is given by Roxburgh as "mountains north of Rohilkund," i.e., the present Rohilkhand, in the Division of Agra, Northern United Provinces. Another specimen, an isotype, is in the East India Company Herbarium, no. 71-5 (K, Morton photograph 14698, upper and lower left-hand plants and the small plant upper center).

To the original description Griffith added the reference "*Cheilanthes dealbata* Wall. Cat. 61, no. 71," which does not refer to the main entry under no. 71 (which is *C. dealbata* Wall.) but to the entry on page 61, referring to no. 71-5, the Roxburgh collection; the meaning is not that *Pteris bicolor* is a renaming of *Cheilanthes dealbata* Wall. but merely a particular entry in the Wallich List, namely no. 71-5. In any case, *Cheilanthes dealbata* Wallich is a nomen nudum. It cannot be assumed that it is the same as *C. dealbata* D. Don, which is not mentioned; and the name *C. dealbata* is attributed to himself by Wallich. As a matter of fact, *Cheilanthes dealbata* D. Don (1825) is an illegitimate later homonym of *C. dealbata* Pursh, a quite different plant of North America, and so was in need of renaming. If *Pteris bicolor* Roxburgh is the same as *Cheilanthes dealbata* D. Don, and if this species is distinct from *C. farinosa*, then the epithet *bicolor* will be correct.

Pteris bicolor Roxburgh was correctly understood in the "Index Filicum." There is a drawing in the British Museum of *Cheilanthes farinosa* that might be by Roxburgh (Morton photograph 15758). A revision of the Asiatic species of this alliance

was published by Ching (Hong Kong Natur. 10:194-204. 1941), who, however, overlooked the name *Pteris bicolor* Roxburgh.

122. *PTERIS DAUCIFOLIA* Roxburgh, Calcutta Journ. Nat. Hist. 4:508. 1844. = *Onychium siliculosum* (Desv.) C. Chr. Ind. Fil. 468. 1906. Type: "America australis," Herb. Desvaux, P. (fide Ching); the locality is surely an error, since *Onychium* does not occur in South America, and the species represented by the type is exclusively Asiatic; Ching (Lingnan Sci. Journ. 13:493-501. 1934) suggested that the type came from the Philippine Islands, since a specimen collected by Gaudichaud in Manila matches it exactly.

TYPE: Manipur, Assam, India, *Roxburgh* (holotype BR, Morton photograph 20008). This is one of the few Roxburgh collections in Brussels bearing a definite locality; the original locality was stated as "eastern parts of Bengal," which included Assam in Roxburgh's time. Since this is the only collection seen in any herbarium, it may be presumed to be a holotype.

In the "Index Filicum," *Pteris daucifolia* is referred with a query to *Cheilanthes tenuifolia* Swartz, on what grounds I do not know. The description, although brief, clearly indicates *Onychium* rather than *Cheilanthes* in the character of the fertile segments being linear with the margins completely occupied by the fructifications.

123. *PTERIS DIMIDIATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844, non Willd., 1810. = *Pteris semipinnata* L. Sp. Pl. 1076. 1753.

LECTOTYPE: East India Company Herbarium, no. 97-3 (left-hand plant) (K, Morton photograph 14725). A duplicate is in the British Museum collected in Silhet by Smith, Herb. Roxburgh (Morton photograph 20853). Roxburgh stated that his plant came from Chittagong, where it was collected by M. R. Smith in 1811 (Hort. Bengal. 75. 1814). Silhet is in the region called Chittagong by Roxburgh and others in the early nineteenth century.

Pteris dimidiata Roxburgh is omitted in the "Index Filicum," probably because it was assumed the same as *Pteris dimidiata* Willd. (Sp. Pl. ed. 4, 5:381. 1810). However, Roxburgh did not cite Willdenow but himself as author, and indeed he does not mention Willdenow's fern volume of the "Species Plantarum" in any place, which he surely would have if he had seen it. Therefore, Roxburgh must have written his description and assigned the name *dimidiata* independently, which is not unlikely considering that the epithet *dimidiata* is a natural one for a plant with pinnae of this particular shape. Both Roxburgh's and Willdenow's species seem to be surely *Pteris semipinnata* L., and it is strange that they did not realize this.

After Roxburgh's name, Griffith added "*Pteris semipinnata* Linn. Wall. Cat. 62, No. 97," but this is not a reference to *P. semipinnata* L. of 1753, but only that Roxburgh's plant is *P.*

semipinnata sensu Wallich as to a plant listed on page 62 of his "List" under the number 97 (which should have been no. 97-3).

The other specimen mounted on no. 97-3 on the right-hand side was collected at Sylhet by Di Silva, a collection not listed by Wallich; it is a topotype of Roxburgh's species.

124. *PTERIS GRACILIS* Roxburgh, Calcutta Journ. Nat. Hist. 4:508. 1844, non Michx., 1803. = *Pteris ensiformis* Burm. f. Fl. Ind. 230. 1768.

LECTOTYPE: A Roxburgh specimen in the British Museum, collected in Silhet by Smith (Morton photograph 20852). Roxburgh stated that his plant came from Chittagong, the name of his time for the region in which Silhet is found. The collector was surely M. R. Smith, who collected other plants for Roxburgh in Silhet.

In the "Index Filicum," *Pteris gracilis* Roxburgh is referred without a query to *Cheilanthes tenuifolia* Swartz, but this is an obvious error, for the original description does not agree with that species. The description does agree in all particulars with *Pteris ensiformis*. Although the name *P. gracilis* does not occur on the specimen selected as lectotype, there can be no doubt that it does represent Roxburgh's species and is probably indeed the holotype, since no other Roxburgh specimen of this species has been found in other herbaria.

A Roxburgh specimen of *Cheilanthes tenuifolia* Swartz in Brussels (Morton photograph 20005) is not named by Roxburgh and does not agree with Roxburgh's description of his *P. gracilis*.

125. *PTERIS GRAMINIFOLIA* Roxburgh, Calcutta Journ. Nat. Hist. 4:502, t. 33 (middle). 1844. = ?*Vittaria elongata* Swartz, Syn. Fil. 109, 302. 1806. Type: "India orientalis," Rottler (holotype S-PA, Morton photograph 6105).

TYPE: Roxburgh t. 33 (middle plant). Since no herbarium specimens of this species have been located, the published illustration will have to stand as the type, pro tem. According to Roxburgh (Hort. Beng. 75. 1814), it was collected in Silhet [Sylhet] by M. R. Smith in 1811.

The entire original description is: "Parasitic. Fronds linear, very long (2-3 feet) entire pendulous. Nat. of the close dark forests of Silhet, where it is found suspended on trees, resembling long tufts of long, narrow-leaved grass." In the "Index Filicum," *P. graminifolia* is referred to *Vittaria elongata* Swartz, and this may be correct. If the discovery of a herbarium specimen should prove this wrong, the epithet "*graminifolia*," although legitimate, could never be transferred to *Vittaria*, because there already exists a valid and different species *Vittaria graminifolia* Kaulf. (1824).

126. *PTERIS LINEARIS* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:505. 1844, non Poir., 1804. = *Pteris vittata* L. *Sp. Pl.* 1074. 1753, sens. lat.

TYPE: Amboina, 1796, *Roxburgh* 310 (BR, Morton photograph 19892). The type was surely collected by Christopher Smith, who was in Amboina in 1796. The detached stipe on this type sheet is large and coarse and surely does not go with the type frond. It may go with another sheet in the Brussels Herbarium, also labeled *Pteris linearis* in the hand of Roxburgh, which bears the number 2415 (Morton photograph 19894). This second specimen is not marked as from Amboina, and it may conceivably represent a different species, since the blade is a good deal larger and the stipe thicker than that of *P. vittata*. Since it is not the type, the placing of it is not of importance. A specimen in the East India Company Herbarium, no. 111-7 (K, Morton photograph 15717), is determined as "*P. vittata* & *linearis* Hb. Roxb."; the small fragment at the upper right seems to agree with the lectotype of *P. linearis*, and the larger plant with the specimen in Brussels indicated above as larger and possibly different.

In the "Index Filicum," *P. linearis* Roxburgh is listed as a dubious species, with the notation "an Wall.?" referring to the preceding entry *Pteris linearis* Wall. *List.* no. 105. 1828. However, Roxburgh's species is by no means the same as that, which is considered to represent *Pteris tripartita* Swartz. *Pteris linearis* Roxburgh is a form of the common and variable *P. vittata* L., which may be an aggregate; it has a number of somewhat doubtful synonyms.

127. *PTERIS LOBATA* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:504. 1844, non Goldm. 1843. = *Polypodium scolopendria* Burm. f. *Fl. Ind.* 232. 1768.

TYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19928). According to Roxburgh the type came from the Moluccas, where it was doubtless collected by Christopher Smith in either Amboina, Ternate, or Honimoa. Since this is the only specimen seen with the name in Roxburgh's hand, this may be considered unique and a holotype.

In the "Index Filicum," *Pteris lobata* Roxburgh is listed as a dubious species, and with good reason, for the original description is merely "Petiole smooth, nearly as long as the thin, polished, 2 or 3 lobed fronds," quite the shortest and most inadequate of Roxburgh's descriptions. One could never guess the identity of the species if a type had not been located. Roxburgh's type was sterile, but even so his reference to *Pteris* rather than *Polypodium* must be considered a temporary aberration.

128. *PTERIS LUNULATA* sensu Roxburgh, *Calcutta Journ. Nat. Hist.* 4:506. 1844. = *Adiantum lunulatum* Burm. f. *Fl. Ind.* 235. 1768. Lectotype: A Burmann specimen in Geneva with the notations "Capillaris malab. non ramosa folio rotundodentato, Petiv. *Tab.* 59, f. 10. H. Mal. tom. 12 tab. 40" (Morton photograph 16782).

MATERIAL EXAMINED: A specimen in Brussels with the name *Pteris lunulata* Retz.? in the hand of Roxburgh (Morton photograph 19875); a specimen in the East India Company Herbarium, Kew, no. 77-8 (Morton photograph 15730, left-hand plant). Roxburgh did not localize his material, but stated that the species was common in most parts of India.

Roxburgh attributed his plant to "Retz. Obs. 2, No. 99, t. 4," and wrote "Common in most parts of India, sometimes the margin is broken, when it resembles an *Adiantum*, and is very likely *A. lunulatum*, but at all times sufficiently distinct." This shows a little confusion, for *P. lunulata* Retz. is based on *Adiantum lunulatum* Burm. f., and is thus taxonomically identical. Roxburgh was attempting to distinguish between plants with the indusial flaps elongate and unbroken, calling these a *Pteris*, and plants with several separate indusia, calling these an *Adiantum*. Both forms occur in typical *Adiantum lunulatum*, as shown by Mehra and Verma (Journ. Indian Bot. Soc. 42A:110-121. 1963). They have not been given distinctive names.

I am adopting the name *Adiantum lunulatum* Burm. f. rather than *A. philippense* L. in conformity with the arguments adduced by Verma (Nova Hedwigia 3:463-468. 1961). *Adiantum philippense* L. was based solely on a drawing by Petiver which is so poor as to be unidentifiable; the drawing cannot really be matched by any specimen, and so *A. philippense* L. ought to be regarded as a dubious and permanently unidentifiable species, for its identity as conspecific with *A. lunulatum* can be guessed at but never proved. On the other hand, *A. lunulatum* has a good type specimen extant, and its identity is definitely established. Mehra and Verma in the publication cited are able to identify the type with a collection that has been cytologically analyzed, and find that it is a sterile triploid, which is apparently the common form in much of India. Other forms do occur—apogamous and sexual diploids and sexual tetraploids—which may be distinguished morphologically somewhat, but no names have been applied to these.

129. *PTERIS MULTIFIDA* Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844, non Poir., 1804. = *Doryopteris ludens* (Wallich ex Hook.) J. Smith, Hist. Fil. 289. 1875. Basionym: *Pteris ludens* Wallich ex Hook. Sp. Fil. 2:210. 1858.

LECTOTYPE: A specimen in the British Museum collected by Roxburgh, without further data (Morton photograph 15786). The specimen does not have the name *P. multifida* written on it (except by me in 1967), but it does agree clearly with Roxburgh's description and is surely authentic. Since it is the only Roxburgh herbarium specimen seen of the species, it is designated the lectotype. If another specimen should be found with the name

written on it, that specimen can replace the present one as a lectotype. Roxburgh's plant came from Chittagong, East Bengal, now in East Pakistan.

It is fortunate that Roxburgh chose an epithet "*multifida*" that had already been used in *Pteris* for another species, or otherwise the rather well-known name *Doryopteris ludens* would have to be replaced. *Pteris ludens* Wallich appeared in Wallich's "Numerical List" as no. 88 in 1829, but only as a nomen nudum, and the name was not validated until the publication by Hooker in 1858, 12 years after the publication of Roxburgh's name. Tryon (Contr. Gray Herb. 143:60. 1942) stated that the type of *Pteris ludens* is "India, Wallich 88, Kew, not seen, photo G, seen," but this is not correct. When published, *Pteris ludens* Wallich ex Hook. contained no type but four syntypes. Tryon's designation of Wallich 88 as the type might be considered as a selection of a lectotype, except for the fact that Wallich List no. 88 consists of two different collections: one Scendnea, Irawaddy, Wallich in 1826, and the other Caves of the Mountain Nidan, Assam River, Wallich in 1827. Tryon cannot really be properly credited with having selected a lectotype, since that can hardly consist of two specimens from different localities. I designate the collection from Irawaddy in Kew as lectotype; this is presumably the one intended by Tryon, since it is the one represented by a photograph by Una F. Weatherby, in the Gray Herbarium.

130. *PTERIS PECTINATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844, non Cav. 1802, non Desv. 1811, non Don, 1825. = *Pteris longipinnula* Wallich ex Agardh, Rec. Gen. Pterid. 19. 1839. Types: Mountains of Penang, Wallich List no. 108 (K-Hb. Hook., Herb. Linn Soc. London—now K-E. Ind. Co. Herb. no. 108—Morton photographs 19586, 19586a). The two sheets in the East India Company Herbarium are designated lectotype.

TYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19896). Since this is the only specimen seen of this species from the Roxburgh Herbarium, it must be considered a holotype.

In the "Index Filicum," *P. pectinata* Roxburgh is listed as a dubious species. The type has been identified by Baker as *P. longipinnula* Wallich, which is correct. Roxburgh indicates the type as being from the Molucca Islands, which may very well be right; however, I have seen no other specimens from there. It may be that "Moluccas" was a slip and that the plant actually came from Penang, where *P. longipinnula* came from also. Holttum in his "Ferns of Malaya" describes (but does not name) three forms of the species as it grows in Malaya aside from the typical form. Roxburgh's *P. pectinata* (a homonym three times

over) agrees with the typical form. The other forms, which have basally forked lower pinnae, may represent hybrids, as Holttum remarks, possibly with *P. asperula* J. Smith ex Hieron. A variation of this kind (in mature plants) is hardly to be expected within a normal species.

The above identification of *P. pectinata* with *P. longipinnula* is a bit doubtful. The latter has three or four pairs of subopposite lateral pinnae. Only the basal pair of pinnae are present in the Roxburgh type; Roxburgh noted that the pinnae are few and opposite, and so it is likely that the species is similar to *P. longipinnula* in this respect. There are plants from Java and Sumatra, probably not specifically different from *P. longipinnula*, that seemingly have only a single pair of pinnae, with an elongate, subconform terminal apex ("pinna"). Such a one is *Pteris megaphylla* Mett. ex Miquel (Ann. Mus. Lugd. Bat. 4:96. 1868). I have seen a syntype—Sumatra, *Korthals* (L. Morton photograph 2178). This species was placed as a synonym of *P. biaurita* L. in the "Index Filicum," but it is not that, because the veins are free and not united into a costal arc. An extremely similar, if not identical, plant is *Pteris salakensis* van Alderw. van Rosenb. (Bull. Jard. Bot. Buitenzorg II, 7:26. 1912), the type of which was a cultivated plant in the botanical garden at Bogor, said to have been brought originally from Mount Salak, Java. I have seen an isotype (or the holotype?) in Leiden (Morton photograph 2160). The latter species was said in the third supplement of the "Index Filicum" to equal *P. reducta* Baker, but from Baker's description that hardly seems possible.

Much more distinct is *Pteris longipinnula* var. *hirtula* C. Chr. (Contr. U. S. Nat. Herb. 26:312. 1931), and it seems to me that this must represent a distinct species—*Pteris hirtula* (C. Chr.) Morton, comb. nov. In *P. longipinnula* the stipe and rachis are a shining olive green and are absolutely glabrous. *Pteris hirtula* has the stipe and rhachis stramineous, and both are obviously and strongly pubescent. The latter character is most unusual in *Pteris*. This species is still known only from the material seen by Christensen—the type from the valley of Meh Len, Keng Tung Territory, Burma, *Rock* 2133 and 2091 (both US). The type has three pairs of lateral pinnae, whereas the paratype has only a single pair, thus paralleling the difference between typical *P. longipinnula* and *P. megaphylla*, mentioned above.

131. *PTERIS PEDATIFIDA* Roxburgh, Calcutta Journ. Nat. Hist. 4:508. 1844.
 = *Pteris tripartita* Swartz, Journ. Bot. Schrad. 1800(2):67. 1802.
 Type (from Swartz, Syn. Fil. 293. 1806): Java, *Thunberg*.

Pteris intermedia Blume, Enum. Pl. Jav. 2:211. 1828. Type: Celebes, Reinwardt (holotype L, Morton photograph 2218).

LECTOTYPE: A sheet in the Brussels Herbarium with the name in the hand of Roxburgh and the number 2419 (Morton photograph 19904). Roxburgh gave the localities as Molucca Islands and Malay Islands; this lectotype presumably came from the Moluccas where it was presumably collected by Christopher Smith, since it agrees with a Smith collection from Honimoa, April, 1797, now in the herbarium of J. E. Smith, no. 1634-3 (LINN, Morton photograph 20285), which is an isosyntyple. Two other Roxburgh specimens in Brussels (Morton photographs 19905, 19906) are not localized and do not bear the name in Roxburgh's hand, but they are surely syntypes also. They are conspecific but just slightly differently dried, and so I judge that these are not duplicates of the lectotype chosen above but may represent the second locality cited by Roxburgh, namely "Malay Islands," which in this case surely means Penang Island, Malaya. The species does grow in the Moluccas and in Penang.

In the "Index Filicum," *Pteris pedatifida* Roxburgh is listed as a dubious species.

Another plant, *Pteris attenuata* Swartz (Journ. Bot. Schrad. 1800(2):66. 1802), was also collected in Java by Thunberg. In the "Index Filicum," this is given as a synonym of *P. tripartita*, but it may be different, judging by a fragment in the Swartz Herbarium in Stockholm (Morton photograph 6259) which shows a plant with the pinnules pinnatisect almost or quite to the costa and the segments elongate and almost linear. This fragment was probably removed by Swartz from the holotype in the Thunberg Herbarium, but there is some confusion, for it is labeled as being from "Cap B. Spei," i.e., the Cape of Good Hope, South Africa. It remains to be determined if the original Thunberg collection was from Java or from South Africa. If it is really from South Africa it may represent the later described *Pteris buchananii* Sim; if it is from Java it may be distinct from *P. tripartita*, sens. str., and probably the same as *P. tripartita* var. *dissoluta* van Alderw. van Rosenb. (Bull. Jard. Bot. Buitenzorg II, 23: 20. 1916), the type of which came from Benkoelen Lebong Tandai, Sumatra, Brooks 2238 [cited as 223/S] (isotype L, Morton photograph 2220).

132. *PTERIS PILOSELLOIDES* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:503. 1844. = *Drymoglossum piloselloides* (L.) K. B. Presl, Tent. Pterid. 227, t. 10, f. 5,6. 1836. Basionym: *Pteris piloselloides* L. Sp. Pl. ed. 2, 1530. 1763.

Roxburgh referred his *P. piloselloides* to Linnaeus and did not describe it as a new species. His description and drawing at Kew (no. 2576, Morton photograph 15880) show that his plant was indeed the Linnaean species. *Pteris piloselloides* L. came from

"India orientalis," but has not been typified. Christensen did not mention a type in his rather detailed account of *Drymoglossum* (Dansk Bot. Ark. 6(3):83-91. 1929). Since Linnaeus did not cite any literature references, it is clear that his species is based on a specimen. This is not in the Linnean Herbarium in London, and so should be sought elsewhere, first in Stockholm, Lund, and Uppsala. Roxburgh's drawing is not a bad illustration of this species. No Roxburgh herbarium specimens have been found. His plant came from Chittagong, now in East Pakistan, where it was collected by John Roxburgh in 1810 (Hort. Beng. 75. 1814).

133. *PTERIS QUADRIAURITA* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:507. 1844. = *Pteris quadriaurita* Retz. Obs. Bot. 6:38. 1791, sens. lat.

Roxburgh attributed the name *P. quadriaurita* to Retzius, rightly, and drew his description from a plant native in the Moluccas. The only specimen seen that is authentic for Roxburgh's concept is in the J. E. Smith Herbarium, no 1631-13 (LINN, Morton photograph 20275, left-hand plant). This specimen was collected on Honimoa, Ceram, by Christopher Smith in 1797. The right-hand plant on this sheet may have been a part of Roxburgh's concept also; it is from Amboina, Christopher Smith in 1797; it is not the same as the Honimoa plant, since the lower pinnae lack the basal fork that is characteristic of plants of *P. quadriaurita* and its allies. The proper names of the Malaysian species of this group can hardly be determined without a detailed monographic study.

134. *PTERIS SCANDENS* Roxburgh, Hort. Bengal. 75. 1814; Calcutta Journ. Nat. Hist. 4:505. 1844. = *Stenochlaena palustris* (Burm. f.) Underw. Bull. Torr. Bot. Club 33:38. 1906 (wrongly attributed to Beddome).
Polypodium palustre Burm. f. Fl. Ind. 234. 1768. Lectotype: Ceylon, *Burmann* (selected by Underwood, Bull. Torr. Bot. Club 33:38. 1906).

TYPE: Considered published in the "Hortus Bengalensis" by the citation of Rheede, Hort. Ind. Malab. 12:t. 35, which is thus the type. No Rheede specimens are presumed to exist. Roxburgh's concept is illustrated by two specimens from the Roxburgh Herbarium (BR, Morton photographs 19841, 19842); there is also an authentic drawing at Kew (no. 1752, Morton photograph 15881). These specimens and the drawing seemingly represent the same species as the Rheede illustration. According to Roxburgh they came from India.

There has been some confusion about this name, for in the "Index Filicum" it is cited under *Stenochlaena palustris* as though *P. scandens* Roxburgh were a transfer of *Onoclea scandens* Swartz (1806), but this is clearly wrong. Roxburgh did not cite this name of Swartz and probably did not even know of its

existence, for nowhere in his work does he refer to Swartz' "Synopsis Filicum" of 1806, the place where *Onoclea scandens* was published. The epithet "scandens" would be a natural one for this fern and was doubtless arrived at independently.

It might be thought that *Pteris scandens* Roxburgh is a superfluous name for *Polypodium palustre* Burm. f., because the illustration of Rheede, its type, was also cited by Burmann f. under his *Polypodium palustre*. This would not be right, however, because the Rheede illustration was only one of several elements included in *Polypodium palustre* Burm. f., and Roxburgh's *Pteris scandens* is technically a segregate, a name applied to one of the elements included in *Polypodium palustre* and not a renaming of that species.

Stenochlaena palustris has been passing with the author "(Burm. f.) Beddome, Ferns. Brit. Ind. Suppl. 26. 1876," as in the "Index Filicum," in Underwood's paper cited above, and in Holttum's paper on *Stenochlaena* (Gard. Bull. Str. Settl. 5:254. 1932), but I do not think this is correct. Beddome in the place cited listed the plant as "*Stenochlaena palustre* L. Ferns Southern India, tab. 201 (scandens)." There is no species "*Stenochlaena palustre* L.," obviously, since *Stenochlaena* was not published until 1841, many years after the death of Linnaeus, nor did Linnaeus publish this species under any genus or epithet. In the cited reference to the "Ferns of Southern India, tab. 201" one finds *Stenochlaena scandens* (J. Smith) and as a synonym *Lomaria scandens* Willd., but again no reference to Burmann or the epithet *palustre*. Therefore, it should not be assumed that Beddome really meant *Stenochlaena palustris* (Burm. f.) Beddome, when he wrote *Stenochlaena palustre* L. Diels (Nat. Pflanz. 1(4): 251. 1899) gave the authority as "*Stenochlaena palustris* (L.) Mett.," but this cannot be accepted either, for Mettenius never published such a combination and again the parenthetical authority "L." is incorrect. So far as I can determine, the first author to accept the name *Stenochlaena palustris* and cite *Polypodium palustre* Burm. f. as a synonym was Underwood, whose paper appeared a few months before Christensen's use of the same combination in the "Index Filicum." The incorrect association of this species with Linnaeus is attributable to Swartz (Syn. Fil. 112. 1806), who cited "*Polypodium palustre* Linn. Fl. Zeyl. p. 200" as a synonym of his *Onoclea scandens*. Linnaeus did describe this species in his "Flora Zeylanica," page 200, as species no. 425 "*Filix, fronde pinnata, pinnis lanceolato-ensiformibus integris striatis setaceo-serratis*," but he did not use the binomial *Polypodium palustre* (he was not using binomials in this

Flora) and in any case the Flora is of 1747, before the starting date for botanical nomenclature. For some reason, Linnaeus ignored or overlooked this species in his "Species Plantarum" and later works after 1753.

135. *PTERIS SUCCULENTA* Roxburgh, Calcutta Journ. Nat. Hist. 4:508. 1844.
= *Ceratopteris thalictroides* (L.) Brongn. Bull. Soc. Philom. 1821:186. 1821.

LECTOTYPE: A specimen from "Ind. or." collected by Roxburgh, in the J. E. Smith Herbarium, no. 1622-39 (LINN, Morton photograph 20348). A duplicate is in the same herbarium, no. 1622-38 (Morton photograph 20347). There is a presumable duplicate in the East India Company Herbarium, Kew, corresponding to Wallich, List no. 83-4. It is not indicated as collected by Roxburgh, but it agrees with the lectotype chosen above. There is no sheet indicated as 83-4, but this plant is where the Roxburgh collection might be expected, on the same sheet as 83-5 and 83-6 (Morton photograph 20664). Roxburgh did not cite a definite locality, merely "Nat. of various parts of India, in wet places." It was from Bengal, according to Voigt (Hort. Suburb. Calcut. 736. 1845). Roxburgh had a drawing of his *P. succulenta*, and copies of this are at Kew, no. 1754 (Morton photograph 15882) and the British Museum, marked as from Jungholy, Bengal, collected by J. Law (Morton photograph 15756). These drawings agree with the herbarium specimen chosen as lectotype.

In the original description is cited "*Acrostichum thalictroides et siliquosum*. Roxb. *Ceratopteris thalictroides*. Brongn. Wall. Cat. 61, No. 81." These entires were obviously added by the editor Griffith, since they refer to entries in Wallich's "Numerical List" published many years after Roxburgh's death. The first part refers to the entry in Wallich's Catalogue of "*Acrostichum thalictroides et siliquosum* Herb. Roxb." no. 83-4 (not "81" as stated by Griffith), and the "*Ceratopteris thalictroides* Brongn." to the main entry in Wallich under no. 83. There is now no Roxburgh specimen in the East India Company Herbarium under 83-4, unless it is misplaced. *Pteris succulenta* Roxburgh cannot be considered a superfluous name, since the synonyms "*Acrostichum thalictroides* and *siliquosum* Herb. Roxb." mean only that the plant occurs under these names on a specimen in the Roxburgh Herbarium, i.e., sensu Roxburgh, with no indication that they are the original *Acrostichum thalictroides* L. and *A. siliquosum* L. The matter is not of any importance unless it develops that the specimen chosen as lectotype of *P. succulenta* could be shown to be different from the original *Ceratopteris thalictroides* (L.) Brongn., which is not likely.

136. *PTERIS TRIPINNATIFIDA* Roxburgh, Calcutta Journ. Nat. Hist. 4:508. 1844.
= *Histiopteris incisa* (Thunb.) J. Smith, Hist. Fil. 295. 1875, sens. lat.

LECTOTYPE: A specimen from Honimoa, Ceram, no. 332, Roxburgh Herbarium (BR, Morton photograph 19907). This sheet does not bear the name *P. tripinnatifida*, but it does agree with Roxburgh's description, and it is the only sheet of Roxburgh's found that does agree. It may be presumed that the name tag has been lost and that this is truly the holotype; at least it is a suitable lectotype. Roxburgh gave the locality as merely "Moluccas," which can now be stated more definitely as Honimoa. The collector was surely Christopher Smith, who sent his Honimoa collections to Roxburgh.

Histiopteris incisa is a species of almost worldwide range as currently treated, but it may be an aggregate; however, lines on which it might be segregated are not clear.

137. *PTERIS VITTATA* sensu Roxburgh, Calcutta Journ. Nat. Hist. 4:504. 1844, non L. = *Pteris moluccana* Blume, Enum. Pl. Jav. 208. 1828. Type: Banda Island, Molucca Islands, *Reinwardt* (holotype L, 2 sheets, evidently part of the same plant, Morton photographs 2202, 2203).

AUTHENTIC MATERIAL: A sheet in the Brussels Herbarium with the Roxburgh number 1682 and the name *Pteris spinulosa* in Roxburgh's hand, the "*spinulosa*" crossed out by Roxburgh and *vittata* substituted (Morton photograph 19899). There is a drawing at Kew (no. 1105) by Roxburgh labeled *Pteris vittata* L., which is intended to represent the same species, as it probably does.

Roxburgh did not actually mention Linnaeus in his treatment of *Pteris vittata*, but it may be presumed that he surely intended this, since he mentions "Osbeck. It. t. 4," and the type of *P. vittata* L. was China, *Osbeck*. He gave a long careful description of *P. vittata* and a comparison with his own *Pteris amplexicaulis*. His observations are correct, but unfortunately he had the names wrong, for his *P. amplexicaulis* is the true *P. vittata*, and the plant that he identified as *P. vittata* was at the time an undescribed species that Blume later called *P. moluccana*. Roxburgh's *P. vittata* was stated to be a "Native of the Delta of the Ganges, etc. Fructifies in the Botanic Garden most part of the year." The plant mentioned above as authentic must have been a part of the "etc." of Roxburgh's localities, and it must have been cultivated in the Botanic Garden in Calcutta. It was doubtless brought or sent from the Moluccas by Christopher Smith and grown in the garden, for this species, *Pteris moluccana*, does not grow in the delta of the Ganges or elsewhere in India. Apparently, Roxburgh confused some plants that he had seen in the wild with the cultivated plant in the Botanic Garden. His description agrees with *Pteris moluccana* and not with any Indian species.

138. *SALVINIA CUCULLATA* Roxburgh ex Bory in Bélanger, Voy. Bot. 2:6. 1833. *Salvinia cucullata* Roxburgh ex Wallich, Num. List. no. 399. 1829, nom. nud.

LECTOTYPE: A specimen in the Geneva Herbarium marked "India Orient. Dr. Roxburgh," another label "*Marsilea cyathoides*, Mayo, 1276," and a tag reading "Typus" (Morton photograph 16731). Roxburgh indicates that all three of his species of *Salvinia* were found "floating on lakes, or pools of sweet water, throughout Bengal."

Bory gave a short but adequate description of this species prior to the publication of the name by Roxburgh (Calcutta Journ. Nat. Hist. 4:470. 1844). In addition to material by Roxburgh, Bory cited also Calcutta, *Wallich*, and Hooglie, Bengal, *Bélanger*. There are thus three syntypes. Since the name is credited to Roxburgh, it is natural to choose the Roxburgh specimen as lectotype. I have seen the Wallich collection from Calcutta in the British Museum (Morton photograph 7721), and it is the same as Roxburgh's plant. I have not looked for a specimen of Bélanger's collection, but it is presumably the same, since this is a rather characteristic species that has always been correctly understood. Griffith (Calcutta Journ. Nat. Hist. 5:255. t. XX, f. 21. 1845) gave a more detailed description of this species.

139. SALVINIA IMBRICATA Roxburgh, Calcutta Journ. Nat. Hist. 4:470. 1844.
 = *Azolla imbricata* (Roxburgh) Nakai, Bot. Mag. Tokyo 39:185. 1925.
Azolla pinnata var. *imbricata* (Roxburgh) Bonaparte, Notes Pterid. 7:130. 1918.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh. Roxburgh indicated that his species was common throughout Bengal, and so he may have had more than one specimen in hand. Isotypes or syntypes are in Geneva (2 sheets, one Morton photograph 17029, the other with the name "*Marsilea imbricata*") and in the British Museum (Morton photograph 7718).

Griffith provided a very detailed description and drawings of this species in his paper "On *Azolla* and *Salvinia*" (Calcutta Journ. Nat. Hist. 5:257, t. XV–XVI. 1845) under the name *Azolla pinnata*. They represent actually *A. imbricata*.

This species has sometimes been considered the same as *Azolla pinnata* var. *africana* (Desv.) Baker (Fern Allies 138. 1887), which is based on *A. africana* Desv. (Mém. Soc. Linn., Paris 6: 178. 1827). The proper disposition remains to be determined.

140. SALVINIA VERTICILLATA Roxburgh, Calcutta Journ. Nat. Hist. 4:469. 1844. = *Salvinia natans* (L.) All. Fl. Pedem. 2:289. 1785.

LECTOTYPE: A specimen in the Geneva Herbarium labeled "Ind. Orient. Dr. Roxburgh" and with another label "*Marsilea bengalensis*, 1270" (Morton photographs 6555, 16732). Since this is the only specimen seen of a Roxburgh collection, it may well be a holotype. According to Roxburgh it occurs in lakes and pools throughout Bengal, India.

Griffith described this species in detail (Calcutta Journ. Nat. Hist. 5:254, *t.* XVIII-XX. 1845). If the plant of India should prove to be different from that of Europe, the name *S. verticillata* Roxburgh will be available.

141. *SCOLOPENDRIUM LANCEOLATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:501. 1844. = *Polypodium pedunculatum* (Hook. & Grev.) Mett. ex Salom. Nomencl. Gefässkrypt. 312. 1883.

Ceterach pedunculata Hook. & Grev. Icon. Fil. 1:t. 5. 1827. Type: Sylhet, sent by Wallich and collected by "D. Smith."¹ The holotype at Kew shows that it was sent by Smith, but the label does not read "D. Smith," as Hooker and Greville did not use this form consistently. M. R. Smith, who collected ferns in Sylhet in 1812, was intended, the same Smith who sent specimens to Roxburgh.

Grammitis hamiltoniana Wall. Num. List. no. 9. 1829, nom. nud. Based on Sylhet, *Di Silva* (E. Ind. Co. Herb.-K, Morton photograph 14636).

Ceterach indivisa Hook. & Grev. ex Wall. Num. List no. 9-2, nom. nud. Based on Nibari, Nov. 26, 1808, *Buchanan-Hamilton*.

Selliguea hookeri Presl, Tent. Pterid. 216. 1836, an illegitimate renaming of *Ceterach pedunculata* Hook. & Grev., and so with the same type as that.

Selliguea hamiltoni K. B. Presl, op. cit., nom. illeg.

Gymnogramma hamiltoniana Hook. Sp. Fil. 5:160. 1864. An illegitimate renaming of *Ceterach pedunculata* Hook & Grev., and so with the same type as that (although intended to be based on *Grammitis hamiltoniana* Wall.).

TYPE: Chittagong, *Roxburgh* (G, Morton photographs 6554, 17027).

This Roxburgh specimen from Chittagong is probably a part of the same collection as the type of *Ceterach pedunculata*, for the locality Sylhet was referred to by Roxburgh as Chittagong, a sort of general name for this district, and many of Roxburgh's specimens from Chittagong were sent him by M. R. Smith; however, this cannot be proved. In any case *S. lanceolatum* Roxburgh is legitimate, based on a different collection and not on the holotype of *Ceterach pedunculata* Hook. & Grev., although the two are doubtless taxonomic synonyms.

This species, known as *Colysis pedunculata* (Hook. & Grev.) Ching by those who segregate *Polypodium*, appears to be somewhat variable. The Hooker and Greville type has the sterile blades broad and abruptly narrowed at the base, with the stipe slightly alate; the fertile fronds are small and exceed the sterile. The type of *Scolopendrium lanceolatum* has narrower blades that are gradually long-decurrent at the base, with the stipe alate; the fertile blades are shorter than the sterile. However, these differences are such as might occur within the same colony. On the

¹ Dr. Jarrett has pointed out that the "D." stands for "Dominus" (Master).

other hand, there may be some differences in the venation, that of *Ceterach pedunculata* is a little simpler in spite of the broader blades; in *S. lanceolatum* there are about four secondary areoles between the main lateral veins, each of these with one or two free included veinlets. The type of *S. lanceolatum* is closely matched by the following collection: middle elevation of Khao Chong, Pukat, Thailand, 600–1100 m., Jan. 27, 1966, *Tagawa, Iwatsuki & Fukuoka* 6805 (US), and there are several quite similar specimens at Kew.

142. *TRICHOMANES CAMPANULATUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:518. 1844.

Hymenophyllum campanulatum Wallich, *Num. List.* 66, no. 2199. 1830, nom. nud.

Didymoglossum plicatum van den Bosch, *Ned. Kruid. Arch.* 5(3):139. 1863. Syntypes: Malacca, Malaya, *Griffith* (K, Morton photograph 19028); Ceylon, *Thwaites* C. P. 2985 (K, not seen); and Sumatra, *Teysman* (not seen). The first is designated lectotype.

Trichomanes plicatum Bedd. *Ferns Brit. Ind. t.* 285. 1868.

LECTOTYPE: A specimen in the Brussels Herbarium with the name in the hand of Roxburgh (Morton photograph 19846). Roxburgh's description states that it was collected in Chittagong [East Bengal, now East Pakistan] by Buchanan-Hamilton. Isotypes are in the British Museum (Morton photograph 6576), in Geneva (Morton photograph 6550), and in Kew (East Ind. Co. Herb. 2199, Morton photograph 15746). All these represent the same species and seem clearly a part of the same collection.

In the "Index Filicum," *Trichomanes campanulatum* is listed as a dubious species. It was overlooked by Copeland in his monograph and by Holttum in his "Ferns of Malaya." It is a rather distinctive species, clearly the same as *T. plicatum* (van den Bosch) Beddome, as treated recently by Sledge in his "The Hymenophyllaceae of Ceylon" (*Journ. Linn. Soc. Bot.* 60:289–308. 1968). The species has passed generally as *T. latealatum* (van den Bosch) Christ, but the type of that (East Indies, *Griffith*, K, Morton photograph 19027) shows that *T. latealatum* does not have the densely pubescent stipe wing that is characteristic of *T. campanulatum*.

143. *TRICHOMANES CARUIFOLIUM* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:519. 1844. = *Trichomanes obscurum* Blume, *Enum. Pl. Jav.* 2:227. 1828.

Lectotype: "Ad terram Buitenzorg," Java, *Zippel* (L, Morton photograph 2457). Blume indicated for his material: "Crescit in sylvis montanis humidioribus Javae et Moluccarum." The only specimen from Java with the name in Blume's hand is the one selected as lectotype. The syntypes from the Molucca Islands are represented by two specimens collected by Reinwardt: one is indicated as "Sylvae elatiores montis Tidore," and the other has had a "Type" tag affixed and is a possible lectotype; but it is better to choose the one from

Java. The holotype of *T. obscurum* var. *adnatum* Blume (loc. cit) is Java, "crescit ad ripas fluvirum in sylvis Javae occidentalis," Blume, according to the original description (L, Morton photograph 2430). The holotype of *T. obscurum* var. *obtusiusculum* Blume (loc. cit) is Java, "crescit in Javae montis Salak," Blume, according to the original description (L, Morton photograph 2429). These varieties of Blume do not appear to differ significantly from the typical variety.

TYPE: A specimen in Brussels with the name *T. caruifolium* in the hand of Roxburgh and the number 2430 (Morton photograph 19848, right-hand plant). Since this is the only specimen seen in the herbaria at Kew, British Museum, Geneva, and Brussels, it may be considered a holotype. According to Roxburgh, it came from Prince of Wales Island, i.e., Penang Island, Malaya.

In the "Index Filicum," *T. caruifolium* is listed as a dubious species, and the name is ignored by Copeland in his monograph of *Trichomanes* and by Holttum in his "Ferns of Malaya." The type represents a small but typical plant of *T. obscurum* Blume, which is common in Malaya.

144. *TRICHOMANES LACINIATUM* Roxburgh, Calcutta Journ. Nat. Hist. 4:518. 1844.

Trichomanes asplenioides K. B. Presl, Hymen. 37. 1843, non Swartz, 1788.

Type: Philippine Islands, *Cuming* 184 (isotype US).

Cephalomanes asplenioides K. B. Presl, Abhandl. Boehm. Gesell. Wiss. V, 5:334. 1848. To be considered a new name for *T. asplenioides* K. B. Presl, non Swartz.

Cephalomanes asplenioides K. B. Presl, Abhandl. Boehm. Gesell. Wiss.

Type: Philippine Islands, *Cuming* 169 p.p. (holotype PRC, photograph by Holttum US; isotype L, Morton photograph 2420; other isotypes reported by Holttum in K and BM). The specimen at Leiden gives the locality specifically as South Camarines.

Trichomanes preslii Morton, Contr. U. S. Nat. Herb. 38:190. 1968.

Based on *Trichomanes asplenioides* K. B. Presl, non Swartz, 1788.

LECTOTYPE: A specimen in Brussels mounted on the same sheet as the type of *Trichomanes caruifolium* Roxb. (Morton photograph 19848). This sheet contains two species of *Trichomanes*, one of which agrees with the description of *T. caruifolium* and the other with the description of *T. laciniatum*. Since no specimen has been found labeled *T. laciniatum*, this is likely the holotype and the only material existing. According to Roxburgh, it was collected in the Molucca Islands, and doubtless was received by Roxburgh from Christopher Smith, who probably collected it either in Amboina, Ternate, or Honimoa. Amboina is likely, since most of Smith's collections came from there, and since there is a specimen from Amboina (Robinson 1964, US) that agrees with the lectotype in every way.

The lectotype has the involucre apical as described by Roxburgh, and it therefore agrees with *Trichomanes asplenioides* K. B. Presl as treated by Copeland in his monograph (Phil. Journ. Sci. 51:249. 1933). Although this species is mostly con-

ined to the Philippine Islands, Copeland did refer *Robinson* 1964 to it. *Trichomanes javanicum* Blume is supposed to differ in having the involucre borne along the distal margin rather than apically, but whether this is a true difference remains to be determined. Since *T. asplenioides* K. B. Presl (1843) is an illegitimate later homonym, the earliest name for the species is *T. laciniatum* Roxb., if it proves different from *T. javanicum*. The new name *Trichomanes preslii* Morton, proposed for *T. asplenioides* K. B. Presl, not Swartz, now proves to be a taxonomic synonym of *T. laciniatum*.

Another name that I did not consider when proposing *T. preslii* is *Cephalomanes oblongifolium* K. B. Presl. Presl stated that his *C. oblongifolium* differed from his *C. asplenioides* in fronds, pinnae, and sori, but he did not state the differences; from the isotype specimens examined, and the photograph of the holotype of *C. oblongifolium*, it does not appear that two species can be distinguished, and therefore *C. oblongifolium* also becomes a taxonomic synonym of *T. laciniatum* Roxb. The type of *C. oblongifolium* is *Cuming* 169 in part, the other part being the type of *Cephalomanes atrovirens* K. B. Presl, which is also close to *C. asplenioides*, but which is kept distinct by Copeland.

145. TRICHOMANES LUCIDUM Roxburgh, Calcutta Journ. Nat. Hist. 4:519. 1844. = *Davallia denticulata* (Burm. f.) Mett. ex Kuhn, Fil. von Deck. Reise 27. 1867.

Adiantum denticulatum Burm. f. Fl. Ind. 236. 1768. Type: Java, *Burmman* (holotype G, Morton photograph 16909).

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with the name in the hand of Roxburgh and the number 2431. According to Roxburgh, his plant came from the Prince of Wales Island, i.e., Penang Island, Malaya, where it was collected by W. Hunter. There is an isotype in the Geneva Herbarium from "India Orient. Dr. Roxburgh" and a label "Typus" (Morton photographs 6553, 16908). Another isotype is in the East India Company Herbarium, no. 253-3 (Morton photograph 15733, the small plant in the upper right corner).

The published account gives as a synonym "*Davallia elegans* Willd. Wall. Cat. 64, no. 253," a citation added by the editor Griffith, which was intended to mean *D. elegans* sensu Wallich as to page 64, no. 253 (actually no. 253-3, which is the Roxburgh collection), and not that *D. elegans* Willd. is a synonym; actually there is no species *D. elegans* Willd., only *D. elegans* sensu Willd. (Sp. Pl. ed. 4, 5:471. 1810), for the account of Willdenow is based on three cited synonyms and the epithet *elegans* derives from Swartz.

The type of *Adiantum denticulatum* Burm. f. in Geneva has the involucre rather short and broad and the lateral teeth rather blunt; the Roxburgh plant has the teeth sharper and the false veins more obvious, but it is doubtless conspecific with the Javan *D. denticulata*. The lectotype of Roxburgh's species has been identified as *D. elegans* var. *bidentata* Hook. There is in Brussels a second sheet of *T. lucidum* that has much broader segments that are only slightly toothed; it is doubtless a part of the same collection, for this species is subdimorphic, the sterile blades having broader segments.

146. TRICHOMANES MALAYANUM Roxburgh, Calcutta Journ. Nat. Hist. 4:519. 1844. = *Sphenomeris chinensis* (L.) Maxon, Contr. U. S. Nat. Herb. 17:159. 1913. Type: China, *Osbeck* (S). Concerning the nomenclature of this species, see F. R. Fosberg (Taxon 18:596. 1969). The species has sometimes been wrongly called *Sphenomeris chusana* (L.) Copel.

LECTOTYPE: Malay Islands, *Roxburgh* (G, Morton photograph 6552). This specimen is determined as "*Trichomanes sinense* Roxb.," but not by Roxburgh, and this may be assumed to be a reidentification, an error for *T. chinense* L., which this specimen does represent. Roxburgh may have intended to withdraw his *T. malayanum* in favor of *T. chinense*, but Griffith published the species anyway as *T. malayanum*. This lectotype agrees with Roxburgh's description, and so it is a suitable lectotype.

There is a specimen in the British Museum collected in Ternate by Christopher Smith that is labeled *T. malayanum* Roxburgh, but not by Roxburgh. It also represents *S. chinensis*, but is a small plant, hardly more than 25 cm. high, whereas Roxburgh described his species as four to five feet high. The lectotype in Geneva is a large plant that agrees better with this description.

147. VITTARIA DIVERGENS Roxburgh, Calcutta Journ. Nat. Hist. 4:510. 1844. = *Lindsaea divergens* Hook. & Grev. Icon. Fil. 2: t. 226. 1831. Type: "India orientali, Herb. Roxb." ex Wallich (presumably K, not seen). There ought to be an isotype in the East India Company Herbarium under no. 2191, but it is not there now; perhaps it has been misplaced. The specific locality was not known to Hooker and Greville; it is "Prince of Wales Island," i.e., Penang Island, where it was collected by W. Roxburgh, Jr.

Vittaria divergens Roxburgh ex Wallich, Num. List. no. 2191. 1830, nom. nud.

Isoloma divergens (Hook. & Grev.) J. Smith, Journ. Bot. Hook. 3:414. 1841.

Schizoloma divergens (Hook. & Grev.) Kuhn, Chaetopt. 346. 1882.

TYPE: Considered the same as the type of *Lindsaea divergens* Hook. & Grev., which is based on specimens of the same species sent to Wallich. No specimen in the Roxburgh collection in Brussels was located.

According to Holttum (*Ferns of Malaya*, ed. 2. 337. 1966), this is a peculiar species found only in Malaya and Borneo. Its characters seem to be well shown in the Hooker and Greville plate.

148. *VITTARIA INTERRUPTA* Roxburgh, *Calcutta Journ. Nat. Hist.* 4:511.

1844. = *Lindsaea interrupta* (Roxburgh) Morton, comb. nov.

Lindsaea interrupta Wallich, *Num. List* no. 2195. 130, nom. nud.

Lindsaea cambodgensis Christ, *Notul. Syst.* 1:58. 1909. Type: Cambodia, *Bouillod* 61 (P, 2 sheets, photograph Kramer, US).

LECTOTYPE: A specimen in the Brussels Herbarium first labeled "*Pteris*" by Roxburgh, this crossed out and *Vittaria* substituted (Morton photograph 19912). That this is authentic material and probably the actual holotype is likely. Of the eight species of "*Vittaria*" and *Lindsaea* described by Roxburgh, this is the only Roxburgh collection that agrees with the description of *V. interrupta* in having the sori "interrupted" by the breaks in the margin, described by Roxburgh as "gash-dentate." The other Roxburgh species of "*Vittaria*" have the margins entire and the sori continuous. That this is the type is further indicated by the handwriting of W. Roxburgh, Jr., on the label reading: "Grows on the ground in shady cool places. The roots are sent." This was quoted directly by Roxburgh in the original description of *V. interrupta* as: "Found by Mr. W. Roxburgh, growing on the ground, in shady cool places on Prince of Wales' Island."

149. *VITTARIA LINEATA* sensu Roxburgh, *Calcutta Journ. Nat. Hist.* 4:509.

1844, non Swartz. = *Vittaria ensiformis* Swartz, *Gesell. Naturf.*

Freunde Berlin Neu. Schr. 2:134, t. 7, f. 1. 1799, at least as treated by Holttum (*Ferns of Malaya* 613. 1954).

AUTHENTIC MATERIAL: A Roxburgh drawing, no. 1755, at Kew (Morton photograph 15884). No herbarium specimens have been noted, but not all herbaria were searched for this species. Roxburgh gave the locality as "Prince of Wales Island, from whence introduced into the Botanic Garden [Calcutta] by Mr. W. Roxburgh, Jun."

From the description, drawing, and locality, Roxburgh's plant could only be *Vittaria ensiformis* Swartz or *V. elongata* Swartz, as treated by Holttum in the "*Ferns of Malaya*." In the shape of the fronds and small size it agrees best with *V. ensiformis*. Whether this is the true *V. ensiformis*, the type of which is from the Mascarene Islands, remains to be determined.

The American species *Vittaria lineata* has usually been attributed to J. E. Smith in the original publication of the genus *Vittaria*, in 1793. But Smith merely indicated that *Pteris lineata* L. belonged in his genus and was in fact the only species in his genus, but he did not formally make the combination *V. lineata* (L.) J. E. Smith, as cited in the "*Index Filicum*" and elsewhere. I have not searched all the literature between 1793 and 1806, but it appears that the proper authority is *V. lineata* (L.) Swartz, *Syn. Fil.* 109. 1806.

150. *VITTARIA LUNULATA* Roxburgh, Calcutta Journ. Nat. Hist. 4:510. 1844.
= *Lindsaea parasitica* (Roxburgh) Hieron. Hedwigia 62:14. 1920
(simply pinnate form).

Lindsaea scandens Hook. Sp. Fil. 1:205. 1846. One of the syntypes is from Penang Island, *Dalhousie*. This represents the same simply pinnate form as *V. lunulata*.

TYPE: A specimen in the Brussels Herbarium with the name *lunulata* in Roxburgh's hand, the number 2121, and a label "Typus" (Morton photographs 5151, 19913). According to Roxburgh it was from Prince of Wales Island, i.e., Penang Island, where it was probably collected by W. Roxburgh, Jr.

The above identification follows the identification of K. Kramer, who wrote on the label: "There is no proof that this is a type." However, the evidence is clear that this is actually the holotype, for it is from Roxburgh's personal herbarium, first in the custody of the Linnean Society, London, purchased in 1863 by Martius, and later purchased by Brussels; the specimen agrees with the original description and is the only Roxburgh specimen found that does, and the name *V. lunulata* is in Roxburgh's own hand.

151. *VITTARIA PARASITICA* Roxburgh, Calcutta Journ. Nat. Hist. 4:510. 1844.
= *Lindsaea parasitica* (Roxburgh) Hieron. Hedwigia 62:14. 1920.

Lindsaea parasitica Wallich, Num. List. no. 2196. 1830, nom. nud. Based on *Vittaria parasitica* Roxburgh, in 1830, also a nom. nud.

LECTOTYPE: A Roxburgh specimen in the Brussels Herbarium with a label reading in Roxburgh's hand "between *Lindsaea* & *Pteris*," which was crossed out and "*Vittaria*" written in, and in the hand of Roxburgh's Jr.: "This is growing on part of the stem of a small tree I cut down. It grows for . . . 4-6 feet in cool shady places" (Morton photographs 5153, 19915). In the above quotation one word is illegible, but that is not important. This specimen does not bear the name *V. parasitica*, but it is surely authentic. There is a duplicate of this lectotype in Geneva marked "Prince of Wales Island, Dr. Roxburgh" (Morton photograph 6568).

Of Roxburgh's species of "*Vittaria*," this is the only one that agrees with the original description and the only one that is indicated in the description as being "parasitic"—the term used in the early days for "epiphytic"—an unusual character in *Lindsaea*, most of the species of which are strictly terrestrial. That this character struck Roxburgh too is indicated by his choosing the specific epithet "*parasitica*." Roxburgh obtained his information on the habitat from the label of Roxburgh, Jr., stating that he had collected the specimen 4-6 feet up on a small tree. From my general survey of Roxburgh's species, it seems that most of the species described definitely or probably from "Prince of Wales Island" (Penang Island) were collected by W. Roxburgh, Jr. There is no specimen in the East India Company Herbarium un-

der no. 2196, which is listed by Wallich as "*Lindsaea parasitica* Herb. Roxb. (sub *Vittaria*)," and it is likely that Wallich did not have a specimen, but saw this Brussels specimen, which was at the time in the Roxburgh Herbarium in the Linnean Society, London.

Lindsaea parasitica Wallich (Num. List. no. 2196. 1830) was a nomen nudum and based on *Vittaria parasitica* Roxburgh, which was also in 1830 a nomen nudum. Therefore Wallich's name cannot be correct. The first worker to take up and accept the name *Lindsaea parasitica* after the publication of *Vittaria parasitica* Roxburgh in 1844 was apparently Hieronymus in the publication cited above; however, Hieronymus wrongly gave Wallich as the authority for the combination. He did not mention Roxburgh, but his combination is indirectly connected with Roxburgh's *Vittaria parasitica* through Wallich's citation under his no. 2196. The valid combination *L. parasitica* (Roxburgh) Hieron. has been overlooked in the "Index Filicum." The question of the proper authority was discussed by Kramer (Blumea 15:570. 1967 [1968]), who came to the same conclusion.

152. VITTARIA RESECTA Roxburgh, Calcutta Journ. Nat. Hist. 4:510. 1844.
= *Lindsaea javensis* Blume, Enum. Pl. Jav. 219. 1829.

TYPE: No specimens have been found named *V. resecta* by Roxburgh nor any herbarium specimens of Roxburgh's collections agreeing with the original description. Roxburgh's plant came from Chittagong, East Bengal, now East Pakistan.

Unless Roxburgh herbarium specimens can be found agreeing with the original description, this species can be identified only from the description. Kramer (Gard. Bull. Singapore 26(1): 47. 1972) was unable to place the name definitely. The original description calls for a small plant only 12.5–25 cm. long, simply pinnate, with the pinnae subtrapeziform, obtuse, and the sorus in a continuous line on the anterior margin and around the apex.

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