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Observations on Cultivated Ferns VI. The Ferns Currently Known as Rumohra

C. V. MORTON

In "Standardized Plant Names" (1942), Dr. Maxon and I assigned (or I should probably say invented) the common name "East Indian Holly-fern" to a plant that has usually been known as *Polystichum aristatum* (Forster) Presl. It is perhaps not uncommon in cultivation in greenhouses and in the open in southern California. A related species, which can conveniently be known as Standish's Holly-fern, was *Polystichum Standishii* (Moore) C. Christensen; it is less common, both in nature and in cultivation; it is however hardier, and I have a specimen at hand that is said by the collector, Mr. J. William Kingma, to have come from plants grown in the open in East Grand Rapids, Michigan.

These plants are rather large and coarse. They differ from *Polystichum* in some respects: The indusium is attached laterally, rather than peltately (i.e. centrally) as in *Polystichum*; the rhizome is creeping and the leaves are borne singly along it at intervals (rather close intervals, I might add), rather than being erect, with the leaves borne spirally in a crown as in *Polystichum*; the fronds are more or less broad and triangular, and

tripinnate to quadripinnate, with the basal pinnae enlarged on the basal side (i.e. basiscopically developed), whereas the fronds of *Polystichum* are mostly elongate (oblong to linear in outline), only once- or twice-pinnate, and the basal pinnae are not basiscopically developed. More importantly, the structure of the blade is anadromous throughout, that is, the first basal pinnule to arise is that facing the apex of the blade, and the first secondary pinnule to arise is that facing the apex of the pinnae, and so forth down to the ultimate veins. *Polystichum* (and true *Dryopteris* generally) is at least partly catadromous, some of the first pinnules either facing the base or being opposite the anterior pinnules. Taken altogether, these differences are significant.

R. C. Ching, in a paper entitled "A Revision of the Compound Leaved Polysticha and other Related Species in Continental Asia Including Japan and Formosa"¹ decided that these two species and their allies could be separated generically from *Polystichum*, and he chose for them the generic name *Rumohra* Raddi.² The type of this genus is *Rumohra aspidioides* Raddi, a Brazilian species which is considered, I imagine properly, to be a synonym of *Polystichum adiantiforme* (Forster) J. Smith, a common species occurring in many widely-separated parts of the world. In cultivation and in dealers' catalogues, *P. adiantiforme* is often listed as "leather fern" under the synonymous names *Polystichum capense* and *P. coriaceum*, or sometimes even under the old and entirely incorrect name *Aspidium capense*. Copeland, in his *Genera Filicum*, followed Ching in uniting *aristatum* and its allies with *adiantiforme*, and even emphasized the "naturalness" of the resulting genus, but nevertheless such a conclusion is highly debatable.

Rumohra adiantiformis is primarily an epiphyte, with a long, stout, densely scaly, dorsiventral rhizome that climbs on tree-trunks, or occasionally on rocks. It has a strictly peltate indusium as in true *Polystichum*. It is very likely not phylogenetically close to *aristatum* and its allies. Dr. R. E. Holttum, in

¹ *Sinensia* 5: 23-91. 1934.

² Raddi, *Opuse. Sci. Bologn.* 3: 290. *pl. 12, fig. 1.* 1819.

his fine paper on the classification of leptosporangiate ferns,³ came to the conclusion that true *Rumohra* is generically different from *aristatum*. He would ally it with *Davallia*, which seems a rather remote alliance. He states that the structure of the rhachis is of the davallioid type, that is that the two ridges of the rhachis are continuous with the leaf-margins. He may be right, for the structure does approach that of *Davallia*, but it is not quite so obvious; the ridges seem to arise from an intermediate area, neither from the margin as in *Davallia* nor from the margins of the costal groove as in *Polystichum*.

Rumohra should therefore be considered as a monotypic genus of uncertain alliance. Its geographic distribution shows that it is a very old type, for it occurs in widely separated parts of the world, as in New Zealand, South Africa, and Chile and Argentina; it has also spread far to the north. Its synonymy is as follows:

RUMOHRA ADIANTIFORMIS (Forster) Ching, *Sinensia* 5: 70. 1934.

Polypodium adiantiforme Forster, *Prodr. Fl. Insul. Austr.* 82. 1786.

Rumohra aspidioides Raddi, *Opusc. Sci. Bologn.* 3: 290. 1819.

Polypodium coriaceum Swartz, *Prodr. Fl. Ind. Occ.* 133. 1788.

Aspidium coriaceum Swartz, in *Journ. Bot. Schrad.* 1800¹: 36. 1801.

Aspidium capense Willd. in *L. Sp. Plant.* 5: 267. 1810, *non* Swartz, 1801.

Polystichum coriaceum Schott, *Gen. Fil. ad t. 9.* 1834.

Polystichum capense J. Smith, *Bot. Mag. Comp.* 35. 1846.

Polystichum adiantiforme J. Smith, *Hist. Fil.* 220. 1875.

Inasmuch as Holttum rejected *Rumohra* as an available name for *aristatum* and its allies, he was obliged to find another, and he chose *Polystichopsis*, calling the genus *Polystichopsis* (C. Chr.) Holttum, with a reference to Christensen in Verdoorn, *Manual of Pteridology* 543. 1938. Actually, Christensen recognized *Polystichopsis* as a genus at the place cited; it has a short description, and is listed in exactly the same manner as other genera discussed such as *Plecosorus* and *Papuapteris*. A reference is given to *Rumohra* of Ching, in part, and going back to Ching's paper we find the citation of *Dryopteris* subg. *Poly-*

³ *Journ. Linn. Soc. Bot.* 53: 137, 152. 1946.

stichopsis C. Chr., with a reference to Christensen's Monograph of the Genus *Dryopteris*, Part II.⁴ In tracing this citation back, we find that Christensen's subgenus was based on *Lastrea*, sect. *Polystichopsis* J. Smith.⁵ Therefore, the proper authority for the genus is *Polystichopsis* (J. Smith) C. Chr.

John Smith's section *Polystichopsis* was designed to include all the species of *Lastrea* (in his sense equalling *Dryopteris sens. lat.*) with decompound deltoid fronds, and thus included quite a number of species that may not be closely allied, such as *L. pubescens*, *L. hispida*, *L. decomposita*, and *L. funesta*. Christensen restricted the application of the name in his monograph to *L. pubescens* and its allies, and in Index Filicum, Supplementum Tertium,⁶ he definitely cited *Dryopteris pubescens* (L.) Kuntze as the type of the section *Polystichopsis* (J. Smith). The type of the genus *Polystichopsis* is therefore the same species, *D. pubescens*, for Christensen's choice of lectotype can not be changed or even challenged, for this is one of the original species and it agrees with the original brief characterization and therefore qualifies as a lectotype on all counts.

The determination of the lectotype is of some significance, because *D. pubescens* and its near allies *D. chaerophylloides* and *D. lurida* diverge in some respects from the group of *aristatum*. Christensen was content to leave *D. pubescens* and *D. aristata* in the same section, and Ching (and also Copeland) regarded them as unquestionably both *Rumohra*. Still, there are differences.

Polystichum and *Dryopteris* are characterized by the absence of hairs in the channels of the upper leaf surface (and also elsewhere, except as capitate glands may be called hairs and reduced scales may be hair-like, as in *D. Filix-mas*); the fronds are usually evergreen, and of a coriaceous texture, shining on the upper surface and with mucronate or aristate teeth; the stipe bases are densely scaly. In all these characters *aristatum* agrees with *Polystichum*. On the other hand, *Dryopteris pubescens* has

⁴ In Dansk. Vid. Selsk. Skr. Nat. Afd. VIII, 6: 101. 1920.

⁵ Hist. Fil. 217. 1875.

⁶ P. 7, 1934.

abundant, long, silky, septate hairs on the blades; the texture is soft-herbaceous and the teeth are scarcely aristate; the stipe bases are abundantly hairy, as well as sometimes scaly. It seems that consistency necessitates the generic separation of *pubescens* and *aristatum*; the latter is unquestionably a near ally of *Polystichum* and *Dryopteris*; the former must have its origin elsewhere.

The group of *aristatum* is lacking an available generic name. The following is proposed.

Byrsopteris Morton, gen. nov.

Rhizoma crassum hypogaeum repens dense paleaceum, paleis magnis fibrosis elongato-lanceolatis, attenuatis, non ciliatis nec pilosis nec fimbriatis, subintegris, dentibus remotis ex cellulis duobus compositis, cellulis elongatis, parietibus lateralibus brunneis translucentibus modice crassis, parietibus exterioribus hyalinis tenuibus; folia sparsa distantia vel subfasciculata decomposita, longe stipitata, stipitibus stramineis crassis glabris sulcatis basi valde paleaceis, fasciculis vasorum robustis tribus vel pluribus; foliorum laminae deltoideae vel pentagonae tripinnatae usque ad quinquepinnatae, rhachibus stramineis glabris paleaceis, paleis integris vel denticulatis interdum basi dilatatis et fimbriatis, pinnis primariis saepe paucis, duobus inferioribus maximis deltoideis basiscopice dilatatis, pinnula basali inferiore elongata; pinnulae omnes anadromicae, i.e. anteriores quam posteriores rhachibus costis costisque magis approximatae; frondium textura coriacea vel crasse papyracea, superficiebus nitidis glabris eglandulosis; segmenta ultima saepe deltoidea vel rhombica, marginibus saepe dentatis vel spinulosis; rhaches rachillae costaeque supra alte sulcatae, marginibus basiscopiceis canalium decurrentibus in marginibus sulcorum rhachium ordinum inferiorum; venae liberae anadromicae saepe depressae obscurae et ex parenchymate tectae, furcatae, marginem non attingentes, apice saepe in hydathodis terminantes; sori globosi in venis terminales vel dorsales indusiati, indusiis crassis coriaceis subrotundis lateraliter in sinu clauso affixis glabris integris saepe persistentibus, parietibus interdum incrassatis glandulosis; sporangia numerosa longe pedicellata, cellulis induratis annuli 13 vel 14; paraphyses nullae; sporae bilaterales magnae 43—61 μ longae, evidenter cristatae, cristis interdum spinulosis.

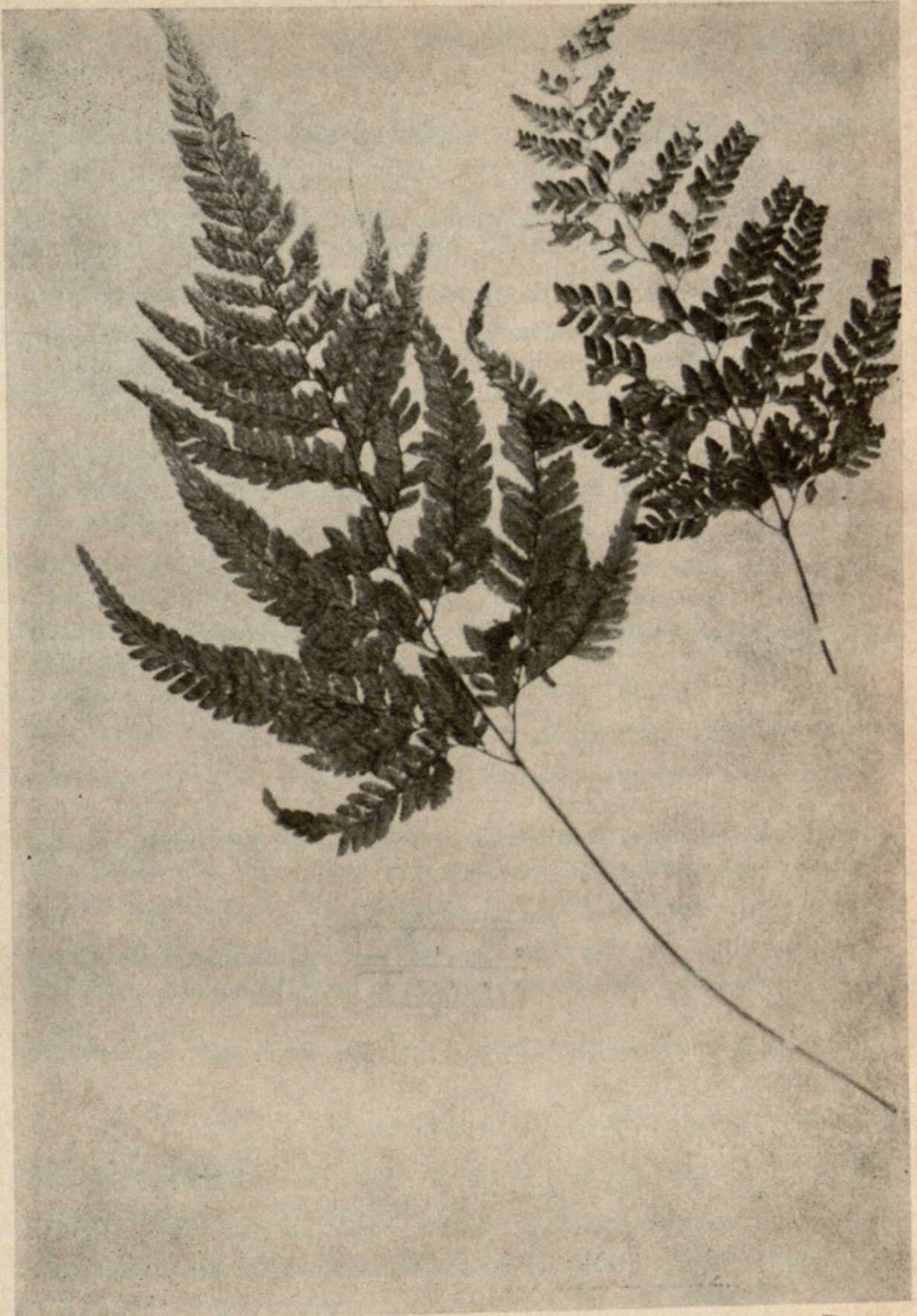
Rhizome thick, hypogaeus, creeping, densely scaly, the scales large, fibrous, elongate-lanceolate, attenuate, not ciliate, pilose, nor fimbriate, subentire, the teeth remote, composed of two adjacent cells, the internal cells of the scales elongate, with thick, brown, translucent, lateral walls and thin, hyaline, brownish exterior walls; leaves relatively few, distant or adjacent on the creeping rootstock but not fasciculate, long-stipitate, the stipes straw-colored, thick, glabrous, sulcate, strongly scaly at base, the vascular bundles three or more; leaf-blades decompose, deltoid or pentagonal, tripinnate to 5-pinnate, the rhachises straw-colored, glabrous, scaly, the scales entire or denticulate, sometimes dilated at the base and there fimbriate; primary pinnae often few, the two lowest the largest, deltoid in outline, enlarged on the lower side, the lowest basal pinnule elongate; pinnae, pinnules, and veins all anadromous, i.e. the one pointing toward the apex arising closer to the rhachis, costae, or costules than the one pointing toward the base; fronds leathery or thick-papery in texture, mostly shining, eglandular or at least glands very sparse; ultimate segments mostly deltoid or rhombic, the margins dentate or mostly subspinulose; rhachises, rhachillae, and costae deeply channelled on the upper (adaxial) side, the basisopic margins of the channels decurrent on the margins of the channels of the next lower order, these broken to receive them, the leaf-margins decurrent as wings and not as ridges; veins free, anadromous, furcate, mostly obscure and covered by parenchyma, not reaching the margins, terminating in rotund or elongate hydathodes; sori globose, terminal or dorsal on the veins, indusiate, the indusium thickly coriaceous, subrotund, laterally attached at a closed sinus and thus appearing centrally peltate, entire, the cell-walls thickened and sometimes apparently glandular; sporangia numerous, long-stalked, the annulus 13- or 14-celled; paraphyses none; spores monolete, large, 43-61 μ long,⁷ obviously crested, the crests spinulose in some species.

Typus: Polypodium aristatum Forster.

The two species that are known in cultivation may be distinguished as follows:

Scales of the rhachis and rhachillae dark, broadened and fimbriate at the base, abruptly attenuate to an elongate, filiform apex, one cell thick; sori terminal on the veins; blade

⁷ Not measured in all species.



BYRSOPTERIS ARISTATA (TYPE OF POLYPODIUM ARISTATUM FORST. BRITISH MUSEUM. PHOTOGRAPH BY C. V. MORTON.)

coriaceous, very thick in texture, with spinulose-toothed segments ----- B. *aristata*

Scales of the blade pale, not much broadened or fimbriate at base, gradually attenuate, but two-celled almost or quite to the apex; sori dorsal on the veins; blades papyraceous, the segments mucronate but hardly spinulose ----- B. *Standishii*

✓ **BYRSOPTERIS aristata** (Forster) Morton, *comb. nov.* (Plate 14).

Polypodium aristatum Forster, Fl. Insul. Austr. Prodr. 82. 1786.

Aspidium aristatum Swartz in Journ. Bot. Schrader 1800²: 37. 1801.

Polystichum aristatum Presl, Tent. Pterid. 83. 1836.

Dryopteris aristata Kuntze, Rev. Gen. Plant. 2: 812. 1891.

Rumohra aristata Ching, Sinensia 5: 50. 1934.

Polystichopsis aristata Holttum, Ferns Malaya 486. 1954.

BYRSOPTERIS Standishii (Moore) Morton, *comb. nov.*

Lastrea Standishii Moore, Gard. Chron. 1863: 292. 1863.

Dryopteris Standishii C. Chr. Ind. Fil. 587. 1906.

Rumohra Standishii Ching, Sinensia 5: 64. 1934.

The American species of *Byrsopteris* are:

BYRSOPTERIS denticulata (Swartz) Morton, *comb. nov.*

Polypodium denticulatum Swartz, Prodr. Fl. Ind. Occ. 134. 1788. Type from Jamaica, Swartz.

Dryopteris denticulata Kuntze, Rev. Gen. Plant. 2: 812. 1891.

Rumohra denticulata Copel. Gen. Fil. 114. 1947.

BYRSOPTERIS formosa (Fée) Morton, *comb. nov.*

Aspidium formosum Fée, Gen. Fil. 296. 1852. Lectotype: Cuba, *Linden* 2115, selected by Christensen, Dansk. Vid. Selsk. Skr. Natur. Afd. VIII, 6: 119. 1920.

Dryopteris formosa Maxon, Contr. U. S. Nat. Herb. 13: 17. 1909 (*ad nom., excl. descr.*)

BYRSOPTERIS leucostegioides (C. Chr.) Morton, *comb. nov.*

Dryopteris leucostegioides C. Chr. Dansk. Vid. Selsk. Skr. Nat. Afd. VIII, 6: 118. fig. 28. 1920. Type: Colombia, *Lindig* 234.

BYRSOPTERIS rigidissima (Hook.) Morton, *comb. nov.*

Nephrodium denticulatum var. *rigidissimum* Hook. Sp. Fil. 4: 148. 1862. Type: Jamaica, *Wilson*.

Dryopteris rigidissima C. Chr. Dansk. Vid. Selsk. Skr. Nat. Afd. VIII, 6: 118. fig. 27. 1920.

Some of the Old World species that I know are the following. A number of others which may or may not be distinct are recognized by Ching. Several species referred by Ching to *Rumohra* (*R. nipponica*, *R. sino-miqueliana*, *R. quadripinnata*, and *R. Miqueliana*) are variously hirsute. Examination of the rhachis structure in those species available to me for study (the two last named) shows that these species are not con-generic with *Rumohra* or *Byrsopteris*, as might be expected. Their real affinity (perhaps with *Ctenitis* ?) remains to be determined.

BYRSOPTERIS amabilis (Blume) Morton, *comb. nov.*

- Aspidium amabile* Blume, Enum. Pl. Jav. 165. 1828.
- Polystichum amabile* J. Smith, Ferns Brit. & For. 152. 1866.
- Dryopteris amabilis* Kuntze, Rev. Gen. Plant. 2: 812. 1891.
- Rumohra amabilis* Ching, Sinensia 5: 41. 1934.

BYRSOPTERIS assamica (Kuhn) Morton, *comb. nov.*

- Aspidium assamicum* Kuhn, Linnaea 36: 108. 1869.
- Dryopteris assamica* Rosenst. Med. Rijks Herb. Leiden 31: 6. 1917.
- Polystichum assamicum* Ching ex C. Chr. Ind. Fil. Sup. III: 162. 1934.
- Rumohra assamica* Ching, Sinensia 5: 47. 1934.

BYRSOPTERIS carvifolia (Kunze) Morton, *comb. nov.*

- Aspidium carvifolium* Kunze, Bot. Zeit. 1843: 283. 1843 (as *curvifolium pro err.*)
- Polystichum carvifolium* C. Chr. Ind. Fil. 580. 1906.
- Dryopteris carvifolia* C. Chr. Act. Hort. Goth. 1: 64. 1924.
- Rumohra carvifolia* Ching, Sinensia 5: 60. 1934.

BYRSOPTERIS coniifolia (Moore) Morton, *comb. nov.*

- Aspidium coniifolium* Wall. ex. Kunze, Linnaea 24: 293. 1851, non Presl, 1822. Type: Nepal, Wallich 341 (Isotype US).
- Lastrea coniifolia* Moore, Ind. Fil. LXXXVIII. 1857. A new name, by Int. Code Nomencl. (Art. 72, Nota)
- Rumohra Wallichii* Ching, Sinensia 5: 56. August 1934. Based on *Aspidium coniifolium* Wall.
- Polystichum himalayense* Ching ex C. Chr. Ind. Fil. Sup. III: 163. Oct. 1934. Based on *Aspidium coniifolium* Wall.

As shown above, Article 72 of the present International Code of Nomenclature allows the use of the well-known epithet *coniifolia*. This Article is an extremely important one in stabiliz-

ing nomenclature, since it often results in the retention of well-known epithets, with merely a change in the parenthetical authorities, a minor matter so far as general usage is concerned.

BYRSOPTERIS **Hasseltii** (Blume) Morton, *comb. nov.*

Polypodium Hasseltii Blume, Fl. Jav. Fil. 195. pl. 92. 1829.

Dryopteris Hasseltii C. Chr. Ind. Fil. 269. 1905.

Rumohra Hasseltii Ching, Sinensia 5: 61. 1934.

Polystichopsis Hasseltii Holttum, Ferns Malaya 487. 1954.

BYRSOPTERIS **Henryi** (Christ) Morton, *comb. nov.*

Polystichum Henryi Christ, Notul. Syst. 1: 36. 1909. Type: China, *Henry* 13351 (Isotype US).

Dryopteris Henryi C. Chr. Contr. U. S. Nat. Herb. 26: 282. 1931.

Rumohra Henryi Ching, Sinensia 5: 57. 1934.

BYRSOPTERIS **Maximowiczii** (Baker) Morton, *comb. nov.*

Nephrodium Maximowiczii Baker, in Hook. & Bak. Syn. Fil. ed. 2. 499. 1874. Type: Japan, *Maximowicz* 98.

Dryopteris Maximowiczii Kuntze, Rev. Gen. Plant. 2: 913. 1891.

Rumohra Maximowiczii Ching, Sinensia 5: 72. 1934.

BYRSOPTERIS **mutica** (Franch. & Sav.) Morton, *comb. nov.*

Aspidium muticum Franch. & Sav. Enum. Pl. Jap. 2: 240, 635. 1879. Type: Japan, *Savatier* 2418.

Dryopteris mutica C. Chr. Ind. Fil. 279. 1905.

Rumohra mutica Ching, Sinensia 5: 65. 1934.

BYRSOPTERIS **speciosa** (D. Don) Morton, *comb. nov.*

Aspidium speciosum D. Don, Prodr. Fl. Nepal. 5. 1825.

Polystichum speciosum J. Smith, Journ. Bot. 4: 195. 1841.

Dryopteris speciosa C. Chr. Act. Hort. Goth. 1: 63. 1924.

Rumohra speciosa Ching, Sinensia 5: 53. 1934.

Recently, Miss Mary D. Tindale⁸ has revived the genus *Lastreopsis* Ching, which had been reduced to *Ctenitis* by Copeland. She appears to be justified, for the type of *Lastreopsis*, *L. recedens*, and a number of allied species, differ from *Ctenitis* in the rhachis structure. In these species the two prominent ridges of the rhachis and rhachillae are continuous with the leaf-margin (davallioid type), whereas in *Ctenitis* the rhachises

⁸ Viet. Nat. 73: 180-185. 1957.

are either not ridged at all or the ridges run to the center of the pinnules and not to the margins. Unfortunately, Miss Tindale includes in her enlarged genus *Lastreopsis* the species *pubescens*, *chaerophylloides*, and *lurida*, the first of which is the type of *Polystichopsis*; if she is right, then the proper name is *Polystichopsis*, which has priority over *Lastreopsis*. The matter needs to be investigated further, but it is my present opinion that both genera may stand. *Polystichopsis* has a rhachis structure of the dryopteroid type rather than the davallioid like *Lastreopsis*.

Polystichopsis appears to be a small, exclusively American genus. The species, none of which are in cultivation, are:

POLYSTICHOPSIS pubescens (L.) Morton, *comb. nov.*

Polypodium pubescens L. Syst. Nat. ed. 10, 2: 1327. 1759.

Dryopteris pubescens Kuntze, Rev. Gen. Plant. 2: 813. 1891.

Rumohra pubescens Ching, Sinensia 5: 35. 1934.

Lastreopsis pubescens Tindale, Viet. Nat. 73: 185. 1957.

POLYSTICHOPSIS chaerophylloides (Poiret) Morton, *comb. nov.*

Polypodium chaerophylloides Poiret in Lamarek, Encycl. Meth. 5: 542. 1804.

Dryopteris chaerophylloides C. Chr. Dansk. Vid. Selsk. Skr. Nat. Afd. VIII, 6: 105. 1920.

Rumohra chaerophylloides Ching, Sinensia 5: 35. 1934.

Lastreopsis chaerophylloides Tindale, Viet. Nat. 73: 185. 1957.

POLYSTICHOPSIS lurida (Underw. & Maxon) Morton, *comb. nov.*

Dryopteris lurida Underw. & Maxon in Slosson, Bull. Torrey Club 40: 183. 1913.

Rumohra lurida Ching, Sinensia 5: 35. 1934.

Lastreopsis lurida Tindale, Viet. Nat. 73: 185. 1957.

POLYSTICHOPSIS ochropteroides (Baker) Morton, *comb. nov.*

Nephrodium ochropteroides Baker, Ann. Bot. 5: 325. 1891.

Dryopteris ochropteroides C. Chr. Ind. Fil. 280. 1905.

This is the only species of *Polystichopsis* occurring outside the West Indies; it occurs in Jamaica, Panama, Colombia, and Surinam, everywhere extremely rare and mostly collected only once in each disjunct area. Habitally, it is not very close to *P. pubescens* and the other species, all of which have the same facies.

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