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Objektyp: **Article**

Zeitschrift: **Candollea : journal international de botanique systématique = international journal of systematic botany**

Band (Jahr): **29 (1974)**

Heft 1

PDF erstellt am: **23.07.2024**

Persistenter Link: <https://doi.org/10.5169/seals-880140>

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The correct name of the alpine lady fern

HANS PETER FUCHS

RÉSUMÉ

Le binôme *Athyrium alpestre* (Hoppe) Milde employé en général pour l'*Athyrium* des Alpes jusqu'en 1956 est rendu illégitime par l'homonyme antérieur valide publié par De Clairville, représentant une forme de l'*Athyrium Filix-femina* (L.) Roth. Un nombre de binômes antérieurs ne peuvent être employés, soit qu'ils ne désignent pas ce taxon, soit qu'ils soient des homonymes postérieurs. Le premier binôme utilisable est *Athyrium distentifolium* Tausch ex Opiz.

SUMMARY

The binomial *Athyrium alpestre* (Hoppe) Milde, generally used to designate the alpine lady fern until 1956 is rendered illegitimate because of the existence of the earlier, validely published homonym of De Clairville, designating a form of *Athyrium Filix-femina* (L.) Roth. A number of older binomials sometimes applied to the alpine lady fern cannot be used either because they do not represent this taxon, or because they are later homonyms. The earliest available binomial to be applied is *Athyrium distentifolium* Tausch ex Opiz.

ZUSAMMENFASSUNG

Das Binom *Athyrium alpestre* (Hoppe) Milde, das allgemein bis 1956 für den Gebirgs-Frauenfarn verwendet wurde, wird zum jüngeren Homonym wegen des gleichlautenden, rechtsgültig publizierten Namens bei De Clairville, der eine Form von *Athyrium Filix-femina* (L.) Roth damit bezeichnete. Eine Anzahl älterer Binome können nicht verwendet werden, sei es, dass sie taxonomisch nicht hierher gehören, sei es, dass sie jüngere Homonyme sind. Das erste verwendbare Binom ist *Athyrium distentifolium* Tausch ex Opiz.

Introduction

The studies leading to the name-change of *Athyrium alpestre* have been made already in 1954 and 1955. The results have been communicated to the late Prof. Dr. E. Janchen (in litt. 12.1.1956), and the correct name has been published by Janchen (1956: 71/71), adnot. Although most subsequent works have adopted the correct binomial, mostly following Jermy in Tutin & al. 1964: 18, no. 2, it has been felt necessary to publish the result of our studies in full together with illustrations of the pertinent types, in view of the fact that some subsequent authors have expressed doubts as to the correctness of the name *Athyrium distentifolium*, e.g. Hess & al. 1967: 122, no. 2 stating that "Neuerdings wird für *A. alpestre* der Name *A. distentifolium* Tausch gebraucht; wir übernehmen den Namen nicht, da er uns nicht genügend gesichert erscheint." or have had difficulties in ascertaining the original publication of Ph. M. Opiz, e.g. Cronquist in Hitchcock & al. 1969: 63: "The name *A. distentifolium* is here adopted for the species, following Flora Europaea (1964), but I have not yet been able to examine to original reference."

The original studies were only possible thanks to the great help of various colleagues who communicated rare literature, checked type-specimens and made photographs of them available. The sincerest thanks are therefore expressed to the following: Prof. Dr. F. J. Widder, former director of the Institut für systematische Botanik der Universität Graz, Austria, Dr. H. H. Heine, now at Paris and Dr. H. Roessler, now at the Botanisches Museum in Berlin-Dahlem, both formerly at the Botanische Staatssammlung in München, the late Dr. H. U. Stauffer, formerly at the Botanischer Garten und Institut für Systematische Botanik der Universität Zürich, Dr. U. Tosco in Turin, Prof. Dr. A. Pilát, former director of the Botanical Section of the Národní Museum v Praze and Dr. I. Klášterský at the same institution as well as to Prof. Dr. H. Merxmüller, director of the Botanische Staatssammlung in München, Dr. W. Lippert of the same institution, the late P. Aellen, Basle and H. M. Burdet, Conservateur de la bibliothèque at the Conservatoire et Jardin botaniques de la Ville de Genève for additional information.

Nomenclature

The oldest specific epithet applied to the alpine lady fern is without any doubt the name "*rhaeticum*" from the binomial *Polypodium rhaeticum* Linnaeus: 1753: 1091, no. 40. This Linnean taxon is based on three different components.

The first is the descriptive phrase of Linnaeus himself: "40. POLYPODIUM fronde bipinnata: foliolis pinnisque remotis lanceolatis: serraturis acuminatis". This descriptive phrase may have been based on the dried specimen preserved in LINN¹

¹ Abbreviations of the various herbaria according to Lanjouw & Stafleu 1964.

(cf. pl. Ia); this specimen has been identified by Linnaeus himself as representing his "40 rhaeticum" and was already present in the Linnean Herbarium in 1753 according to Jackson 1912: 120. The single frond is accompanied by a label written by François Boissier de Sauvages De La Croix (1706-1767): "polypodium pinnis ramorum laxè pinnatis pinnulis acute dentatis Haller – filix rhaetica tenuissime denticulata J.B.", has most probably been collected by Pierre Magnol (1638-1715) as indicated by the letter "M." at the base of the specimen, and has been presented to Linnaeus probably in 1749 together with the entire collection of Sauvages (cf. Stearn 1957: 106). An additional indication that Magnol's specimen in the Linnean Herbarium may be regarded as a sort of type-specimen is the indication "Habitat in Gallia" given by Linnaeus 1753: 1091, no. 40.

The second component is the name-bringing synonym "*Filix rhaetica tenuissime denticulata*" J. Bauhin 1651: 740. This taxon illustrated by J. Bauhin by a wood-cut which may have been based on a plant collected by Johann Bauhin himself either in the Canton of Grisons in Switzerland on his collecting trip together with Conrad Gesner (1516-1565) from Zurich and Johann Fabricius Montanus (1527-1566), town-minister at Coire, capital of the Canton of Grisons, from Coire through the Domleschg valley across the Albula pass into the Engadine and across the Ofen- and Umbrail-pass to Bormio in 1561 (cf. Braun-Blanquet & Rübèl 1932: 1), or in Alsace on the Rossberg north of Masevaux in 1590 (cf. Kirschleger 1855: 385) when he was physician of the principality of Montbéliard (cf. Briquet 1940: 31-34).

The third component is the polynomial "*Filix fontana major, s. Adiantum album, filicis folio*" C. Bauhin 1623: 358, no. I (not 151 as cited by Linnaeus 1753: 1091, no. 40). This taxon of C. Bauhin is composed in itself by three different parts, namely apart from the descriptive phrase of C. Bauhin by two older synonyms, the "*Dryopteris candida*" Dodonaeus 1557: 275/276, and the "*Adiantum album Plinii*" De Lobel 1576: 361, the latter in part a name-bringing synonym.

Taxonomically the three components of the Linnean *Polypodium rhaeticum* belong to three different species.

The first component, the herbarium specimen from 1749 designated by Linnaeus himself to represent his *Polypodium rhaeticum* belongs to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth as recognized already by D. Don who annotated the specimen with "filix femina" (cf. D. Don 1837: 437 and J. E. Smith 1828: 296).

The second component, the reference to the name-bringing synonym of J. Bauhin may represent the taxon in discussion, although the alpine lady fern does not seem frequent neither along the route followed by J. Bauhin and his colleagues through the Canton of Grisons in 1561 (cf. Braun-Blanquet & Rübèl 1932: 26-27; Furrer & Longa 1915: 11 and Fornaciari 1952: 39), nor in the Vosgesian mountains where J. Bauhin collected or observed the plant in 1590 (cf. Kirschleger 1855: 385 and Issler & al. 1965: 18). The possibility that the taxon of J. Bauhin represents *Athyrium Filix-femina* (L., sub *Polypodio*) Roth can certainly not be excluded.

The third component, composed in itself by three parts, the reference to the synonym of C. Bauhin belongs without any doubt to *Cystopteris fragilis* (L., sub *Polypodio*) Bernh. The polynomial "*Filicula fontana major, s. Adiantum album, filicis folio*" can be identified by means of a herbarium specimen collected by C. Bauhin himself at the Wasserfalle, mountain in the Jura near the border of the two Swiss Cantons of Basle-Campagne and Soleure. This specimen preserved in the collections of BAS bears the label "I Adiantum folio filicis – Dryopteris candida

Dod. Lugd. — *Adiantû albû Plinis, Lob. — in petris longius ex Wasserfall*” in C. Bauhin’s handwriting (cf. Muralt 1710: 669). The two synonyms cited by C. Bauhin 1623: 358, no. I. can be identified by the two wood-cuts illustrating these synonyms. The plant illustrated by De Lobel 1576: 361 belongs to *Cystopteris fragilis* (L., sub *Polypodio*) Bernh. without any doubt; the illustration reproduced by Dodonaeus 1557: 276 may represent the same taxon or possibly *Carpogymnia Dryopteris* (L., sub *Polypodio*) A. & D. Löve.

In 1785 two other binomials were published which have been attributed by subsequent authors to the alpine lady fern. The first is *Polypodium molle* All. 1785: 287, no. 2406 regarded to represent the alpine lady fern first by A.-P. De Candolle in Lamarck & A.-P. De Candolle 1815: 242 and still by Britten & Rendle 1907a: 108, no. 516. The Allionian taxon is based on three older polynomials apart from plants collected or observed in Italy by Allioni and Bellardi: “Nascitur ad fontium scaturigines, & secus lente fluentes aquas. Secus *Padum* etiam reperit *Cl. Bellardi*”. This “Habitat”-indication already points to a taxon different from the alpine lady fern (cf. Ascherson 1896: 48-49; Schinz & Thellung 1907: 566-567, no. 38, 516), and a dried specimen in the Allioni-Herbarium at TO labelled “*Polypodium molle*” (cf. pl. Ib) clearly represents *Athyrium Filix-femina* (L., sub *Polypodio*) Roth.

The three polynomials, i.e. “*Polypodium pinnis pinnatis, pinnulis ovatis obtusis dentatis, dentibus imis bifidis*” Haller 1768: 14, no. 1703 (with a wrong reference “1733” to the number), the name-bringing synonym “*Filix mollis, seu glabra, vulgari (mari) non ramosae accedens*” J. Bauhin 1651: 738 with an additional reference to an illustration of this taxon published by Vaillant 1727: 53/t. 9, f. 3 (again with a wrong reference “Tab. 9. fig. 4” which represents a species of the family Apiaceae “*Foeniculum sylvestre annuum, Tragoselini odore, umbella alba*” Vaillant = *Seseli annuum* Linnaeus), and “*Filix non ramosa alpina foliolis, quae ad alas, rotundioribus, omnibus autem dentatis*” Pontedera 1718: 13, no. XIII and an additional reference to an illustration of this taxon by Seguiet 1754: 53/54, no. 2/t. 1, f. 1, p. 54. The synonyms referred to by Allioni are actually all copied from Haller 1768: 14, no. 1703 including the misprinted reference to Vaillant’s illustration.

Haller’s taxon can be interpreted as belonging equally to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth for the greater part. At the localities cited by Haller “*Minime infrequens in sylvis in der Hardt, in Combaniva &c.*” the alpine lady fern has never been found. The Hard is a relatively large forest east of Basle, extending along the Rhine at an altitude of around 280 m s.m. (cf. Binz 1905: 2), the Plan Sepey is a small mountain north of Gryon in the Swiss Canton of Vaud with its highest point at 1255.4 m s.m. (cf. Villaret 1956: [92]). The polynomial from J. Bauhin to which J. Bauhin 1651: 738 cites “*circa Tigurum legimus*” seems to belong equally to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth according to the wood-cut and the locality cited (cf. Rikli 1912: 15), and has been interpreted accordingly by Linnaeus 1737: 308, no. 386. Later, however, Linnaeus 1753: 1071, no. 21 interprets this polynomial of J. Bauhin as representing his *Acrostichum Thelypteris* (= *Thelypteris palustris* Schott), interpretation which cannot be contradicted entirely neither on the basis of the descriptive polynomial, nor on the basis of the general locality “*circa Tigurum*” (cf. Rikli 1912: 25). This holds equally for the plant and illustration of Vaillant 1727: 53, no. 3/t. 9, f. 3a, indicated as growing “*Elle est commune autour de l’Estang de la Garenne dans le parc de*

Meudon". The illustration of "*Filix mas non ramosa, pinnulis angustis, rarioribus profundé dentatis*" Gerarde 1636: 1130 no. 3 published by Plukenet 1692: t. 180, f. 4 who is cited by Vaillant as authority of the Gerardean polynomial indicated as growing "In palustribus, humidis & umbrosis non rarò invenitur" may equally represent the lady fern or possibly *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray. Morison 1715: 579, sect. XIV, no. 8/sect. XIV, t. 3, f. 8 to whome Haller 1768: 14, no. 1703 equally refers interpreted the Gerardean polynomial as representing *Athyrium Filix-femina* (L., sub *Polypodio*) Roth as can be seen from the herbarium-specimen labelled with this polynomial (cf. Vines & Druce 1914: 187). Mérat 1843: 405, however, correlates the Vaillantian polynomial with *Polypodium Thelypteris* (L., sub *Acrosticho*) Weis. This interpretation may be based on Linnaeus 1753: 1071, no. 21; Mérat 1836: 473, no. 6 apparently has not found the plant indicated by Vaillant around the pool of Garenne in the Meudon-Park, whereas he indicates (Mérat 1836: 473, no. 4) *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray as growing "Très commun dans les bois humides de montagne, à Meudon, etc." Haller's reference to the article published by Moehring 1743: 118-119. obs. VI, however, makes it clear that the attribution of the various polynomials to the taxon actually intended by Haller has always been a source of confusion, probably in part based on Haller himself; many of these polynomials have apparently been applied to *Thelypteris palustris* Schott and to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, but may equally represent in part *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray or *Oreopteris limbosperma* (All., sub *Polypodio*) J. Holub. The synonym *Polypodium* - - - O. F. Müller 1767: 193, no. 844, t. 2, f. 3 referred to by Haller, however, seems to belong entirely to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth. The last synonym referred to by Haller seems to be an entirely different taxon. This "*Filix non ramosa, alpina, foliolis, quae ad alas, rotundioribus, omnibus autem dentatis*" Pontedera 1718: 13, no. XIII as interpreted and illustrated by Seguier 1754: 53/54, no. 2/t. 1, f. 1 p. 54 based on plants collected "In profundis Baldi montis vallibus" seems to belong to *Dryopteris Villarii* (Bellardi, sub *Polypodio*) Woyнар ex Schinz & Thell. which occurs quite frequently in the gorges of the Monte Baldo (cf. Dalla Torre & Sarnthein 1906: 47).

In the same year 1785 another binomial was published which has been attributed to the alpine lady fern already by Hoppe 1805: 216, no. 11: *Polypodium crenatum* Schrank in Schrank von Paula & Moll 1785: 295, no. 426. Schrank von Paula included his new taxon in the list of plants of the surroundings of Berchtesgaden in Bavaria in his "Fünf- und zwanzigster Brief. — Burghausen, den 9 April 1784". The *Polypodium crenatum* is said to grow "Wohnt an steinernen Befriedigungen". The name-bringing synonym, the only reference cited by Schrank von Paula is the *Polypodium Filix femina* α *crenata* Weis 1770: 313. Weis himself refers in the description of this variety of the lady fern in the first instance to the same Hallerian polynomial also cited as the first reference to his *Polypodium molle* by Allioni. All other references to older polynomials cited by Haller with his "*Polypodium pinnis pinnatis, pinnulis ovatis, obtusis, dentatis, dentibus imis bifidis*" already discussed above are repeated by Weis. In addition to these, however, Weis 1770: 313 refers to the polynomial "*Polypodium ramorum pinnis obtusis ellipticis, crenis imis pinnarum bifidis*" Haller 1742: 139, no. 6 which is cited from the surroundings of Göttingue "In sylvis non infrequens" already by Haller 1753: 4. This Hallerian polynomial is originally based on plants from "In lapidosis subalpinis,

& circa Bernam locis sylvosis non infrequens”, and accompanied by a number of older polynomials. Despite the similarity of the descriptive polynomial in Haller 1742: 139, no. 6, and Haller 1768: 14, no. 1703, the latter belonging for its majority to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth as demonstrated above, the two Hallerian taxa do not seem to represent the same species. Although the polynomial “*Filix mollis sive glabra vulgari mari non ramosae accedens*” J. Bauhin cited by Haller 1742: 139, no. 6 already with the misprinted additional reference to Vaillant 1727: 53/t. 9, f. 4 instead of f. 3 has been shown above to represent most probably *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, the remaining polynomials referred to by Haller represent another taxon. The “*Filix petraea femina II*” Tabernaemontanus 1590: 793 (not 703 as cited by Haller) to which illustration Haller notes “non incommode” as well as the “*Filicula fontana latiori folio, ad inum solummodo ramosa*” Plukenet 1692: t. 180, f. 6/1696: 150 which according to Haller “omnino videtur”, and the “*Filix non ramosa major, pinnulis latiusculis longioribus, in profundiores denticulos divisis*” Morison 1715: sectio XIV, t. 3, f. 11, equally interpreted by Haller as “videtur omnino” all match *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray. The identity between this species and the Morisonian polynomial is even proven by herbarium specimens (cf. Vines & Druce 1914: 188, no. 579, 11), although Linnaeus 1753: 1090, no. 36 cites the Morisonian polynomial with his *Polypodium cristatum* (= *Dryopteris cristata* [L., sub *Polypodio*] A. Gray). Schrank von Paula’s *Polypodium crenatum* is thus the same mixtum compositum as Allioni’s *Polypodium molle* composed of *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, *Thelypteris palustris* Schott, *Dryopteris Villarii* (Bellardi, sub *Polypodio*) Woynar ex Schinz & Thell., *Oreopteris limbosperma* (All., sub *Polypodio*) J. Holub, and *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray, as regards the synonyms. The difference, however, lies in the fact that the nomenclatural type of this *Polypodium crenatum* in the herbarium of Franz Schrank von Paula (1747-1835) now at M clearly represents the alpine lady fern (cf. pl. Ic). Schrank von Paula’s binomial could therefore be applied as the oldest, validly published basionym for the alpine lady fern (excluding, however, the synonym of Weis), if it would not be rendered illegitimate because of the existence of the older validly published homonym of Forsskål 1775: 185, no. 6 (= *Dryopteris crenata* [Forsskål, sub *Polypodio*] O. Kuntze).

Twenty years later Hoppe 1805: 216, no. 11 published his *Aspidium alpestre* which formed the basis of the specific epithet applied for a long time to the alpine lady fern. The taxonomic position of Hoppe’s binomial has never been doubted, although Hoppe himself expresses some doubts about the specific difference between his *Aspidium alpestre* and *Athyrium Filix-femina* (L., sub *Polypodio*) Roth: “Ich halte sie von *A. Filix foemina* verschieden, ohngeachtet es möglich sein könnte, dass sie unter den obigen Varietäten begriffen wäre. Sehr wahrscheinlich ist es Herrn Schranks *Polypodium crenatum*, und Herrn Roths *Athyrium rhaeticum*.”, the former, as demonstrated above, taxonomically belonging to the alpine lady fern, the latter, however, clearly intended to designate a form of *Athyrium Filix-femina* (L., sub *Polypodio*) Roth by A. W. Roth 1799: 67, no. 7, possibly with exclusion of the var. β *minus*. Hoppe’s binomial *Aspidium alpestre* may be doubted nomenclaturally as to its legitimacy. The fact that Hoppe clearly states that his *Aspidium alpestre* is very probably Roth’s *Athyrium rhaeticum* may be interpreted as rendering the binomial *Aspidium alpestre* a superfluous name. A further discussion of this problem, however, seems unnecessary because of the other facts excluding

the application of Hoppe's specific epithet "*alpestre*" to designate the alpine lady fern.

The taxonomic position of Hoppe's plant is not at all so clear as it would seem from the fact that it has never been doubted. The first time Hoppe mentions this taxon is as a nomen nudum six years before its actual publication. Hoppe 1799: 137 reports an excursion to the Untersberg, mountain at the Austro-German border north of Berchtesgaden and south of Salzburg: "Dienstags den 4ten Aug. stieg ich wieder auf die Höhe des Untersberges, um mehrere *Polypodia* nun mit reifern Fructificationen zu hohlen, als: *Polypodium rigidum* Hoffm. *P. alpestre* mihi, *P. montanum* All. *P. lonchitis*, *Lycopodium selaginoides*". A specimen named "*Polypodium alpestre*" and collected "In monte Untersberg" is preserved in Hoppe's own herbarium now at GZU (cf. Pick 1872: 43, no. 3195) (cf. pl. IIa). This herbarium specimen clearly belongs to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, and corresponds perfectly with the description of *Aspidium alpestre* Hoppe 1805: 216-217: "11) *Aspidium alpestre*. – Mit eylanzettförmigem doppeltgefiedertem Laube, wechselseitigen länglichten Blättern, und wechselseitigen länglichten gefiedert zerschnittenen Blättchen, deren Einschnitte stumpf gezahnt sind. Der Strunk ist braun, hie und da mit einem Spreublättchen besetzt, und etwas hin und her gebogen. Die mittlern Fiedern sind sehr lang und dadurch bekommt die ganze Pflanze ein etwas dreieckiges Ansehen. Sie ist übrigens ganz dunkelgrün. Diese Art wächst auf dem Untersberge". At the same locality, however, Hoppe has apparently also collected the true alpine lady fern as can be concluded from a herbarium specimen of Hoppe preserved at M, and bearing the label "*Aspidium alpestre* Hoppe – in monte Untersb. prope Salisburgum". The question may therefore arise whether this or other specimens representing the true alpine lady fern collected by Hoppe on the Untersberg and distributed with his exsiccatae under the name "*Aspidium alpestre*" (cf. W. D. J. Koch 1845: 974, no. 5; Funck 1815: no. 408; Ph. M. Opiz 1820: 14, no. 41), or whether rather the specimen labelled "*Polypodium alpestre*" in Hoppe's own herbarium corresponding perfectly to the original description has to be regarded as the holotype typifying Hoppe's taxon. A discussion as to the probable holotype of Hoppe's taxon, however, seems to be equally unnecessary, at least as long as the alpine lady fern is regarded to belong to the genus *Athyrium* Roth, emend. Milde.

In 1811, or more likely in 1813 De Clairville 1813: 301 validly published a taxon which he named *Athyrium alpestre*: "*A. alpestre*. – 1703. F. bipinnées, pinnales pinnatifides serrates, pinnales étroites, molles, dentées. Les bois montagneux. Été. – N'est peut-être qu'une variété du précédent (= *Athyrium Filix-femina* [L., sub *Polypodio*] Roth), ainsi que le *fragrans* plus petit". The number "1703" preceding the short French description refers to Haller 1768: 14, no. 1703, thus for its greater part to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, for its lesser part to *Dryopteris Villarii* (Bellardi, sub *Polypodio*) Woynar ex Schinz & Thell., possibly also to *Thelypteris palustris* Schott and *Dryopteris dilatata* (Hoffm., sub *Polypodio*) A. Gray. De Clairville's publication of *Athyrium alpestre* has been regarded to represent the earliest combination of Hoppe's *Aspidium alpestre* with the generic name *Athyrium* Roth, emend. Milde, although De Clairville does not refer to Hoppe's basionym (cf. Chiovenda 1929: 26; Fiori 1943: 164, no. 2). The taxonomic position of this *Athyrium alpestre* Clairv., taxon entirely independent from *Aspidium alpestre* Hoppe, is proven by a specimen in De Clairville's own herbarium now at Z (cf. pl. IIb). This herbarium specimen is labelled in De Clairville's handwriting:

“*Athyrium alpestre* – *Polypodium*. Linn. – hall. no. 1703 – Les bois montagneux”, and belongs clearly to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth, as someone had recognized already earlier when annotating De Clairville’s specimen with the note “appartient à Aspl. filix-foemina”.

The name *Athyrium alpestre* Clairv. may possibly be regarded illegitimate, becoming a superfluous name because of the number reference to Haller, and thus designating exactly the same entities as *Polypodium molle* Schreber 1771: 70, no. 027 (pro recte 1027) and of Allioni 1785: 287, no. 2406, both authors equally referring to the Haller’ian polynomial alone. This possible illegitimacy, however, would not affect the inapplicability of the later combination *Athyrium alpestre* based on *Aspidium alpestre* Hoppe which becomes illegitimate being a later homonym because of De Clairville’s binomial. This solves automatically the problem of the author’s citation to this binomial which has caused so many discussions (Ascherson 1896: 44-46; Britten & Rendle 1907b: 445; Schinz & Thellung 1909: 515; Woynar 1913: 147-149; Fernald 1929: (165-)166; Mansfeld 1938: 205-206; Nylander 1945: 58).

The author’s citation to the illegitimate homonym *Athyrium alpestre* (Hoppe, sub *Polypodio*, resp. sub *Aspidio*) has frequently caused discussions in the past. It seems that Ascherson 1896: 44-45 has been the first to start this discussion. He consulted the thesis of Nylander to which author Milde 1867: 53, no. 2 referred, and pointed out that Nylander would never have made the combination *Athyrium alpestre*. Nylander 1844: 14-15, no. 32 only stated that: “32. *Polypodium rhaeticum* L. vix Polypodii species potius Athyrii. Qua nota differret Polypodium alpestre Hoppe, non liquet”. Milde 1867: 53, no. 2, however, clearly leaves the responsibility to Moore: “2. A. alpestre Nyland. teste Moore”. Ascherson 1896: 45 thereby assumed that Milde intended to refer to Moore 1856: p. innum (1), ad t. 7, at the same time implying a confusion on the side of Milde between the two author’s names Nylander and Rylands: “Augenscheinlich hat also Milde diese beiden in 5 aufeinander folgenden Buchstaben übereinstimmenden Namen mit einander verwechselt oder wohl gar den letzteren für einen Druckfehler statt des ersteren gehalten”. Schinz & Thellung 1907: 566, no. 38, 516 cited “*Athyrium alpestre* (Hoppe) Rylands in Moore Ferns Gr. Brit. and Irl. (1857), t. VII.”, but corrected this author’s citation (Schinz & Thellung in Schinz & Keller 1909: 3, no. 2) to “(Hoppe) Nylander ex Milde” after Britten & Rendle 1907b: 445, no. 516 had pointed out that “Moore, however, merely quotes the name in synonymy” (cf. Schinz & Thellung 1909: 515). H. Woynar 1913: 147 cites again “Rylands in Moore Ferns Gr. Brit. pl. VII, S. (1) (1857)” and expresses the opinion that “Es wäre übrigens wohl gar zu pedantisch, wenn man eine Stelle nicht gelten lassen wollte, weil der Autor nicht beide Namen nebeneinander hinstellt, obschon er sie nennt und nur diese Kombination machen kann und augenscheinlich auch will”. Fernald 1929: (165)-166 equally refers to Rylands who according to him “should stand as the undisputed author of *Athyrium alpestre*”. According to Moore 1856: p. innum. (1), ad t. 7 Rylands seems to have actually made the combination *Athyrium alpestre* in a letter to Moore: “Mr. Rylands, of Warrington, who regards the plant as an *Athyrium*, has communicated the result of some observations made in 1855”. The combination *Athyrium alpestre* Rylands, in litt., however, is cited by Moore merely as a synonym to *Polypodium alpestre*, and cannot, therefore, be regarded as a valid publication. The fact that Moore 1857: 59; Moore 1859: 76, and Moore 1860: 179 cited Nylander instead of Rylands seems to indicate that Moore’s intention was

not to indicate an actual author to the combination *Athyrium alpestre*, but rather to cite the earliest authority who had recognized that the particular taxon belongs to the genus *Athyrium* Roth. Thus, the first author to validly publish the combination *Athyrium alpestre*, based on *Aspidium alpestre* Hoppe 1805: 216, no. 11 seems to have been Milde 1867: 53, no. 2. The fact that Milde cited as author of this combination "Nyland. teste Moore", however, caused the difficulties of the correct author's citation leading to the long list of articles dealing with this problem. Nylander is in fact cited by Moore in his later publications (Moore 1857: 59; Moore 1859: 56; Moore 1860: 179) as author of the combination *Athyrium alpestre*, always listed, however, only as a synonym of the binomial *Polypodium alpestre* adopted by Moore as the correct and valid name of this taxon. It seems, however, that Moore had never seen the original reference of Nylander 1844: 14-15, no. 32. Moore 1859: 76 cites the binomial *Athyrium alpestre* F. Nyl. "according to Ledebour", thus indicating the source of his knowledge. Ledebour 1853: 510, no. 4, however, refers correctly under the binomial *P. (olypodium) rhaeticum* to "– F. Nyland. *Spicil. pl. fenn. II*, No. 32" as authority of the locality "(Lapponia [F. Nyland., Baer e Rupr.])", adding at the end the note: "Species quoad genus dubia, e sententia cl. F. Nylander Athyriis associanda". The combination *Athyrium alpestre* is thus clearly Moore's own responsibility (cf. the similar case of the combinations with the generic name *Allosorus* of all *Adianta spuria* of Swartz 1802: 84 where Moore 1860: 43 cited Bernhardt as author only because Bernhardt 1805: 36 stated that "vielleicht alle *Adianta spuria* Sw." belong to the genus *Allosorus*). The only author previous to Milde who made the combination *Athyrium alpestre* based on the basionym of Hoppe 1805: 216, no. 11, at least according to Moore 1856: t. innum (1), ad t. 7, is Rylands, in litt., cited by Moore in the synonymy to *Polypodium alpestre*. As, however, the publishing author Milde 1867: 53, no. 2 does not refer to (Rylands, in litt., ex) Moore 1856: p. innum. (1), ad t. 7 but to Nylander teste Moore, the most correct author's citation may be the one chosen by Nylander 1945: 58 "*Athyrium alpestre* (Hoppe) Milde, *Fil. Eur.* (1867), p. 53 (ubi pro auct. false cit. "Nyland. teste Moore").

In 1820 two other binomials, *Athyrium cordatum* Opiz 1820: 13, no. 40, attributed to the alpine lady fern by Beck von Mannagetta 1918: 59 (with reference to the later publication of Ph. M. Opiz 1828: 339, no. 380/409, no. 140), and *Athyrium distentifolium* Tausch ex Opiz 1820: 14, no. 41, attributed here by C. Christensen 1905: 140 and C. Christensen 1913: 97 were published. The original publication being rather rare, the descriptions of the two taxa may be reproduced on page 190 in full.

Both taxa are represented by authentic specimens in PR. *Athyrium cordatum* in both its varieties belongs to *Athyrium Filix-femina* (L., sub *Polypodio*) Roth according to these specimens (Opiz's authentisches Herbarium, No. 380 – Mai 14, 1825, and no. 381 – 14 Mai 1825), as correctly interpreted by C. Christensen 1905: 140 and C. Christensen 1913: p. innum (132) (cf. pl. IIc, IID).

Athyrium distentifolium, however, has to be attributed to the alpine lady fern according to the authentic material. The possible holotype of *Athyrium distentifolium* collected by Ignaz Friedrich Tausch (1792-1848) "auf dem Brunnberg am Riesengebirge unter Knieholz" according to Ph. M. Opiz 1820: 14, no. 41 bears the label in Tausch's handwriting "no. 1838. *Polypodium rhaeticum* L. Brunberg im Riesengeb.", and is a specimen clearly belonging to the alpine lady fern (cf. pl. IIIa). Another specimen equally belonging to the alpine lady fern and originating from

Nro. 40. *Athyrium cordatum*. O.

Herzförmiger Glasefarn. O. Puchýřnjk srdčitý. O.

Frondebis bipinnatis, pyramidatis, pinnis alternis, pinnulis cordato-oblongis acutiusculis, inferioribus pedicellatis, pinnatifidis, laciniis obtuse serrato-incisis, soris biserriatis. O.

α) approximatum. O.

pinnis, pinnulisque valde approximatis, stipite flexuoso. O.

β) distans O.

pinnis distantibus. O.

(α) In den Vorgebirgen des Riesengebirges Oz. bei Böhmischhaicha Pa. Stitin My. —

β) auf dem glazer Schneeberg. Oz.)

Anmerkung. Unterscheidet sich auf den ersten Anblick sehr leicht von der vorhergehenden Art, und ihren zahlreichen Abarten, durch die länglich = herzförmigen Fiedern, und stumpfe Sägezähne. O.

Nro. 41. *Athyrium distentifolium* Tausch.

Entferntblättriger Glasefarn. Puchýřnjk odlehlolistý. O.

Frondebis triplicato-pinnatis, pinnis alternis, adscendentibus, laxis, pinnulis pinnatifidis, laciniis remotiusculis, oblongis obtusiusculis, pinnatis serratis, serraturis obtusis vel acutis incurvis, rachi alata, soris in axillis serraturis, stipite paleaceo, paleis distantibus. O.

α) pinnis approximatis; O.

Aspidium filix foemina β rhaeticum Röhling fl. deut. 3. S. 27. (As. rigidum nach Sprengels Bestimmung!!) *

A. alpestre. Hoppe bot. Taschenb. 1805. p. 216.

A. rhaeticum Swarz syn. fil. p. 59?

A? alpestre Schkuhr. crypt. Gew. I. p. 58 *

Polypodium alpestre Hoppe. Funk crypt. Gew. 20. Nro. 408.*

P. rhaeticum Linn. syst. veg.?

Filicula rhaetica tenuissime denticulata J. Bauh. hist. 3. p. 752.

β) pinnis distantibus. O.

Filicula rhaetica tenuissime denticulata Chab. ic. p. 554.*

Abbild. α. Schkuhr. t. 60. (bona.)*

β. Chabr. ic. p. 554.*

Getr. Samml. α. Funk. crypt. 20. Nro. 408. (Exemplare von H. Hoppe).*

Auf hohen Gebirgen. Reift im Sommer 4. (auf dem Grunnberg am Riesengebirge unter Knieholz. Th. Nach Funk das gemeinste Farnkraut auf dem Riesengebirge: flora oder botanische Zeitung 1820 Seite 66.)*

the herbarium of Ph. M. Opiz is labelled in Opiz's handwriting "*Polypodium distentifolium* Tausch", a number reference "2839" followed by the latin description of the original publication, but without any indication of locality or collector (cf. pl. IIIb).

The synonyms cited by Ph. M. Opiz to the two varieties distinguished with his *Athyrium distentifolium*, however, belong only partly to the alpine lady fern. Most of these binomials and polynomials cited as synonyms have been copied from older authors, and are discussed already above. In contrast to previous authors, however, Ph. M. Opiz attributed a number of synonyms only with a question-mark to the alpine lady fern, and, furthermore, indicated by means of an asterisk the synonyms which he personally had checked. Thus only the illustrations of *Aspidium alpestre* in Schkuhr 1806: t. 60 and of "*Filicula rhaetica tenuissime denticulata*" in Chabraeus, 1677: 554, and the exsiccata collected by Hoppe and distributed by Funck 1815: no. 408 under the binomial *Polypodium alpestre* can be regarded to have been interpreted by Ph. M. Opiz as belonging to his *Athyrium distentifolium* without any doubt. The synonym *Aspidium alpestre* in Schkuhr 1806: 58 checked by Ph. M. Opiz according to the asterisk after the citation, bears a question-mark after the "A." (= *Aspidium*), possibly indicating some doubts on the side of Ph. M. Opiz as to the generic interpretation of the alpine lady fern by Schkuhr. Two other synonyms, *Aspidium alpestre* Hoppe 1805: 216 and the "*Filix rhaetica tenuissime denticulata*" J. Bauhin 1651: 740 (not 752, as cited by Ph. M. Opiz) are cited without a question-mark, but have not been checked by Ph. M. Opiz, an asterisk after the citation being absent. The three remaining synonyms attributed to his *Athyrium distentifolium* by Ph. M. Opiz are cited only with doubt. The *Aspidium Filix-femina* β *rhaeticum* Röhling 1813: 27 is excluded already by Ph. M. Opiz himself; this taxon is said to belong to *Dryopteris Villarii* (Bellardi, sub *Polypodio*) Woynar ex Schinz & Thell. according to Sprengel's identification (as to the identity between *Polypodium rhaeticum* L. and *Dryopteris Villarii* [Bellardi, sub *Polypodio*] Woynar ex Schinz & Thell. see above). *Aspidium rhaeticum* Swartz 1806: 59, no. 81 "*rheticum*" as well as the *Polypodium rhaeticum* L. with an unspecific reference "syst. veg." are cited as synonyms only with a question-mark. The taxon of Swartz belongs certainly to *Cystopteris fragilis* (L., sub *Polypodio*) Bernh., Linné's binomial, however, to various taxa as outlined above. Thus, the synonyms cited by Ph. M. Opiz as belonging doubtlessly to his *Athyrium distentifolium* represent the alpine lady fern either without any doubt (Schkuhr 1806: t. 60) or with the restrictions already mentioned above (J. Bauhin 1651: 740, and its unchanged republication by Chabraeus 1677: 554).

The last binomial attributed to the alpine lady fern is the *Athyrium polypodioides* (Schur 1858: 194, no. 6, pro syn. *Polypodii rhaetici*, ex) Schur 1866: 837, no. 4201. The taxonomic position of this species is demonstrated already by the description given by Schur 1858: 194, no. 6 to his *Polypodium rhaeticum* to which he cited as a synonym *Athyrium polypodioides* Schur, in litt.: "Im Habitus viel Aehnlichkeit mit *Athyrium Filix femina*, daher meine Benennung, um anzudeuten, dass dieser Farn eine intermediäre Stellung zwischen *Polypodium* und *Athyrium* einnimmt, und es gibt wenig Fälle, wo zwei Arten verschiedener Genera einander im Habitus so nahe ständen." The description of his *Athyrium polypodioides* published by Schur 1866: 837, no. 4201 is even more definite: "Habitus A. Filic. feminae fructificationes Polypodii. Soris subrotundis, disjunctis sparsis; indusium involucremque nullum." Simonkai 1887: 610, however, doubted the presence of

the alpine lady fern in the Transsilvanian Mountains, citing *Athyrium alpestre* Hoppe only without a running number, and with a cross, indicating that the particular species belongs to the "plantas cultas aut errore e Transsilvania publicatas" (Simonkai 1887: [VII]) (cf. Ascherson in Ascherson & Graebner 1896: 13, no. 3[2]). According to Soó 1940: 2, no. 19, however, the presence of the alpine lady fern in the Transsilvanian Mountains, at least in the Hargita mountain chain to which also the Búdüs, cited by Schur 1858: 194, no. 6 as locality of the alpine lady fern, belongs, cannot be doubted.

Synonymy

- Athyrium distentifolium*** Tausch, in sched. herb. Opiz, sub **Polypodio**, ex Opiz 1820, in Kratos, Zs. Gymn. 2(1): 14, no. 41 (post Februarium 1820), f.s.o.¹
- = *Polypodium rhaeticum* sensu auct. (e.g. Villars in Villars, Lauth & Nestler 1812, Précis voyage bot. Suisse: 12 [4 Junii 1812]; Nestler 1821, in Flora 4¹(3): 48 [21 Januarii 1821]), non Linnaeus 1753, Spec. plant., (ed. 1), 2: 1091, no. 40. (Augusto 1753) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth), sec. expl. herb. Linnaei, fide J. E. Smith 1828, Engl. Fl. 4: 296 (Martio 1828); D. Don 1837, in Transact. Linn. Soc., London 17: 437, et f.s.o., et syn. J. Bauhini in J. Bauhin & Cherler (ed. Chabraeus & A. Graffenried) 1651, Hist. plant. univ. 3: 740, pro parte (?), vel = *Cystopteris fragilis* (L., sub *Polypodio*) Bernh., sec. syn. C. Bauhini 1623, Pinax Theatri bot.: 151, f.s.o. herb. Bauhini, vel pro minima parte solum (?), quoad syn. J. Bauhini in J. Bauhin & Cherler (ed. Chabraeus & A. Graffenried) 1651, Hist. plant. univ. 3: 740.
- = *Aspidium rhaeticum* Swartz 1801, in J. Bot. (ed. Schrader) 1800 (2): 41 (Aprili 1801) "*rheticum*", pro parte, excl. basion. Linnaei, non Willdenow in Linné 1810, Spec. plant., ed. 5, 5(1): 280 (Februario 1810) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth, partim *Cystopteris fragilis* [L., sub *Polypodio*] Bernh.).
- = *Phegopteris rhaetica* Pérard 1869, in Bull. Soc. bot. France 16: 258, excl. basion. Linnaei.
- = *Asplenium rhaeticum* Gremler 1867, Exc. fl. Schweiz, (ed. 1): 382.; Bruegger 1874, in Nat. gesch. Beitr. Kenntn. Umgeb. Chur: 47, excl. basion. Linnaei.
- = *Athyrium rhaeticum* Gremler 1878, Exc. fl. Schweiz, ed. 3, 427; no. 2591 (post Aprilem 1878); Dalla Torre 1882, in Anl. wissensch. Beob. Alpenr. 5: 234, excl. basion. Linnaei, non A. W. Roth 1799, Tent. Fl. germ. 3(1): 67, no. 7 (inter Junium et Septembrem 1799) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth), nec Sadler 1820, Descr. plant. epiphyll. Hung.: 22 (quod = *Cystopteris fragilis* [L., sub *Polypodio*] Bernh.).
- = *Polypodium molle* sensu auct. (e.g. A.-P. De Candolle in Lamarck & A.-P. De Candolle 1815, Fl. franç., ed. 3, 5: 242 (8 Octobris 1815), non Allioni 1785,

¹f.s.o. = fide specimine auctoris (= trust the specimens of the original author), abbreviation already used by Milde 1867 to indicate that the taxonomic position of a binomial is proven by a checked herbarium specimen.

- Fl. pedem. 2: 287, no. 2406 (ad finem Julii 1785) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth, f.s.o.), nec Schreber 1771, Spicil. Fl. Lips. 70, no. "027" (pro recte 720!) (inter 9 Julii et 25 Octobris 1771) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth), nec N. J. Jacquin 1789, in Collect. Bot., Chem., Hist. nat. spect. (ed. N. J. Jacquin) 3: 188, no. CCCXXVI (Aprili 1789) (quod = *Cyclosorus dentatus* [Forsskål, sub *Polypodio*] Ching), nec (Bonpland, in sched., ex) Kunth (adjuv. Humboldt) 1816, Nova gen., spec. plant. 1(1/2): 8 (Januario 1816) (quod = *Polypodium pectinatum* L.), nec Roxburgh in Beatson 1816, Tracts relative Islds. St. Helena, App.: 315 (quod = *Dryopteris Dianae* [Hooker, sub *Polypodio*] C. Christensen), nec Mettenius 1857, in Abh. senckenb. natf. Ges. 2: 128, no. 261 (quod = *Pyrrosia mollis* [G. Kunze, sub *Niphobolo*] Ching).
- = *Aspidium molle* Loisel. 1807, Fl. Gall., Enum. plant. Gallia sponte nasc., (ed. 1), 2: 367 (ad finem Aprilis 1807), excl. basion. Allionii.
- = *Polypodium crenatum* Schrank in Schrank von Paula & Moll 1785, Nat. hist. Briefe Oesterr., Salzbg., Passau, Berchtesg. 2: 295, no. 426 (post Martium 1785), f.s.o., non Forsskål (ed. Niebuhr) 1775, Fl. Aegypt.-Arab.: 185, no. 6 (quod = *Hypodematium crenatum* [Forsskål, sub *Polypodio*] Kuhn); nec Swartz 1788, Nova gen. spec. plant.: 132 (Julio 1788) (quod = *Goniopteris Poiteana* [Bory, sub *Lastrea*] Ching); nec W. J. Hooker 1858, Fil. exot. (2): t. 84 (quod = *Goniopteris mollis* Fée = *Thelypteris Ghiesbreghtii* [Hooker, pro var. *Polypodii crenati*] C. V. Morton).
- = *Aspidium alpestre* Hoppe 1805, Neues bot. Taschenb. 1805: 216, no. 11, (inter Februarium et initium Maii 1805) pro parte solum fide expl. herb. Hoppei in GZU (quod ad *Athyrium Filix-femina* [L., sub *Polypodio*] Roth pertinet).
- = *Polypodium alpestre* (Hoppe 1799, Bot. Taschenb. 1799: 97/137 [inter Februarium et initium Maii 1799]), nomen nudum); (Hoppe, sub *Aspidio*) Spenner 1825, Fl. Friburg. 1: 12, no. 1.
- = *Pseudathyrium alpestre* (Hoppe, sub *Aspidio*) Newman 1851, in Phytol. 4(12): 370 (Decembri 1851).
- = *Phegopteris alpestris* (Hoppe, sub *Aspidio*) Mett. 1856, Fil. Horti bot. Lips.: 83 (inter Maium et Junium 1856).
- = *Asplenium alpestre* (Hoppe, sub *Aspidio*) Mett. 1859, in Abh. senckenb. natf. Ges. 3: 198, no. 245, t. 6, f. 1-6 (Septembri 1859).
- = *Athyrium alpestre* (Hoppe, sub *Aspidio*) (F. Nyl. 1844, Spic. plant. fenn. (2): 14-15, no. 32 [12 Junii 1844], sec. Ledebour 1853, Fl. ross. 4[14]: 510, no. 4, [Junio 1853] in Moore 1859, Octavo nat.-printed Brit. Ferns 1: 76, pro syn. *Polypodii alpestris*, ex) Milde 1867: 53, no. 2 (Novembri 1867), non De Clairville 1813, Man. Herboris. Suisse, Valais: 301 (?ante mensem Martii 1813) (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth, f.s.o.).
- = *Athyrium cordatum* Beck von Mannagetta 1918, in Oesterr. bot. Zs. 67(2/3): 59, (Februario-Martio 1918), non Ph. M. Opiz 1820, in Kratos, Zs. Gymn. 2(1): 13, no. 40 (post Februarium 1820); Ph. M. Opiz 1828, in Nat.tausch (11): 339, no. 380/409, no. 140 (quod = *Athyrium Filix-femina* [L., sub *Polypodio*] Roth f.s.o.).
- = *Athyrium polypodioides* (Schur, in litt., sec. Schur 1858, in Oesterr. bot. Wochenbl. 8(6): 194, no. 6, pro syn. *Polypodii rhaetici* [Junio 1858], ex) Schur 1866, Enum. plant. Transsilv.: 837, no. 4201 (Maio 1866).

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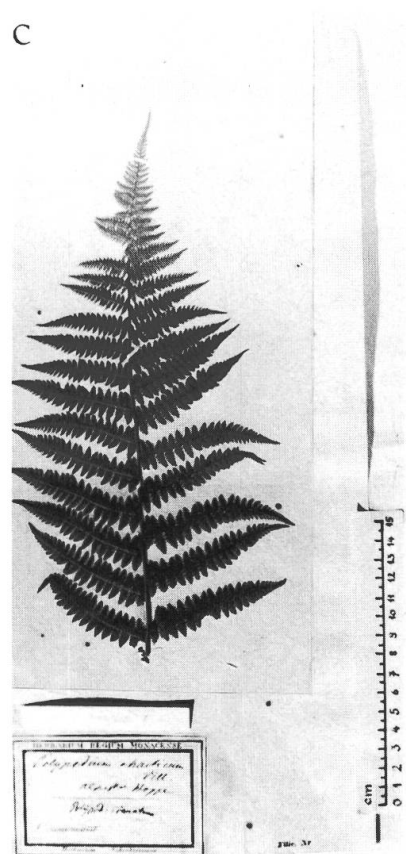
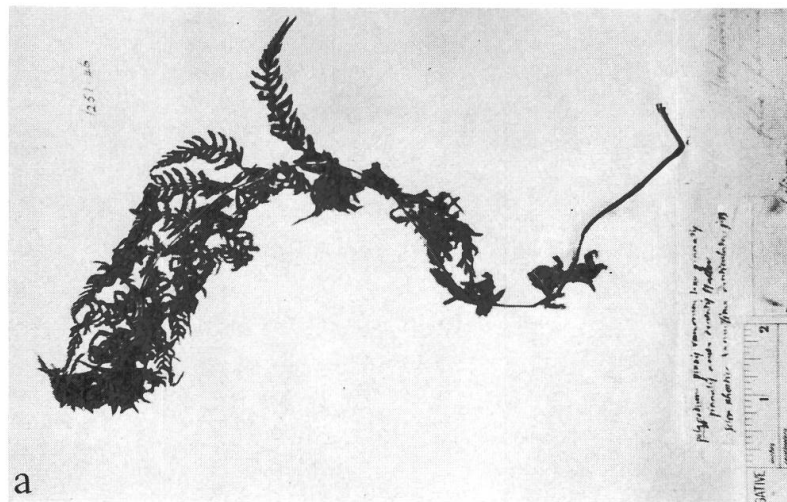
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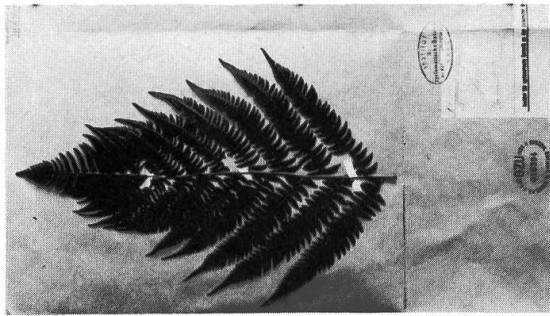
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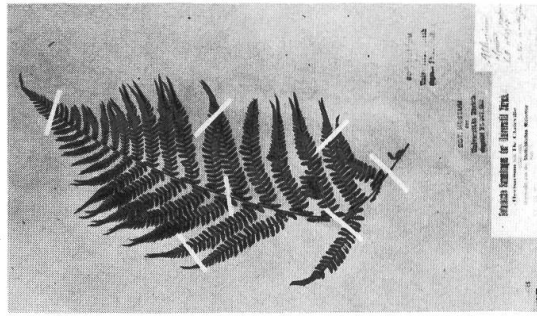
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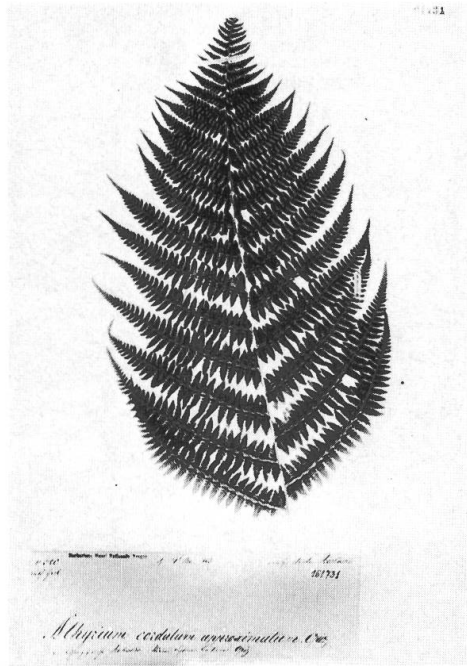
a, *Polypodium rhaeticum* L. – Specimen in the Linnean Herbarium in LINN [cf. Savage 1945: 187, no. 1251/46]. (Ph.: T. Heitz, Porrentruy).
 b, *Polypodium molle* Allioni. – Specimen in the Herbarium Allioni in TO. (Ph.: Dr. U. Tosco, Turin).
 c, specimen of *Polypodium crenatum* Schrank von Paula in Schrank von Paula & Moll. The small label with the name in Schrank von Paula's hand-writing.



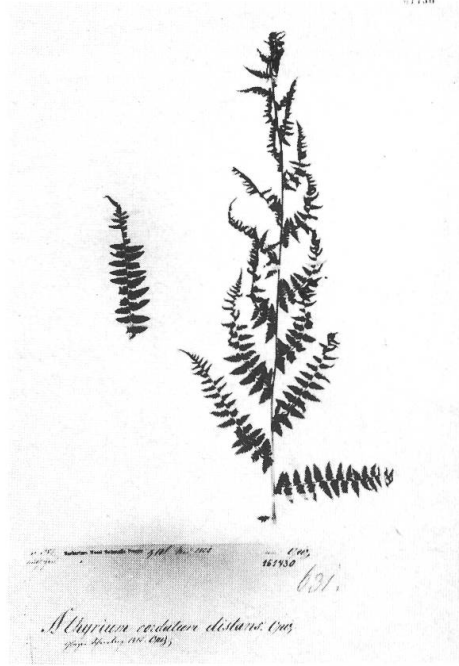
a



b



c



d

- a, *Athyrium cordatum* Opiz, var. *approximatum* Opiz. — Specimen in the Herbarium P. M. Opiz in PR. (Ph.: Courtesy of Dr. I. Klášterský, Prague).
- b, *Athyrium cordatum* Opiz, var. *distans* Opiz. — Specimen in the Herbarium P. M. Opiz in PR. (Ph.: Courtesy of Dr. I. Klášterský, Prague).
- c, “*Polypodium rhaeticum* L.” from the “Sprunberg im Riesengeb.” from the herbarium of Ignaz Tausch; label in Tausch’s hand-writing.
- d, *Athyrium distentifolium* Tausch ex Opiz. — Specimen in the Herbarium P. M. Opiz in PR. (Ph.: Courtesy of Dr. I. Klášterský, Prague).



a, *Polypodium alpestre* Hoppe. – Specimen in the Herbarium Hoppe in GZU [cf. Pick 1872: 43, no. 3195]. (Ph.: Courtesy of Prof. Dr. F. Widder, Graz).
 b, *Athyrium alpestre* Clairv. – Specimen in the Herbarium De Clairville, now in Z. (Ph.: Dr. H. U. Stauffer, Aarau).