

species have ranges of tolerance overlapping that of *R. maximum* only in the northern States.

We must conclude from this comparison of *Rhododendron maximum* colonies in 4 outlying parts of its range that 1. There is no single physiographic situation to which the species is confined so long as an abundance of moisture is available. 2. There is no such thing as a predictable association of species with which *Rhododendron maximum* is constantly to be found. 3. Within any particular climatic zone the rhododendron association is usually composed of essentially the same dominant species and often occupies similar physiographic situations. 4. The suggestion is made that Good's concept of tolerance suggests a reasonable explanation of the observed diverse character of the rhododendron association. — DEPARTMENT OF BOTANY AND DEPARTMENT OF HORTICULTURE, UNIVERSITY OF NEW HAMPSHIRE, DURHAM, NEW HAMPSHIRE.

TAXONOMIC FERN NOTES. I

ROLLA TRYON

1. *Adiantum humile* Kze.

The name *Adiantum humile* Kze., based on a Poeppig collection from Peru, has seldom appeared in the literature since it was first published and to my knowledge has never been treated in a definitive manner. Mettenius identified *Lechler 2319* and *2319a* (B!) from Peru as *A. humile* but he did not publish these identifications in *Filices Lechlerianae*; the specimens are *Adiantum terminatum* or a variant of it.

An authentic specimen of *Adiantum humile* is at Vienna and a photograph of this specimen and fragments from it were obtained for the British Museum (Natural History) by the late A. H. G. Alston. This specimen has a valid claim to represent the name since the holotype was presumably destroyed with the Herbarium at Leipzig and since it is perhaps the only authentic material now extant (I saw no type material at B, BM, K, L, LE, P, S-PA, or U). I studied this authentic material and it unquestionably represents the spe-

cies described by Maxon and Weatherby as *Adiantum Killipii*. Such specimens as *Guppy 6192*, *Tutin 366* and *Leprieur 145* (all BM) are substantially identical to the Poeppig collection.

The description of this species by Maxon and Weatherby (as *A. Killipii*) is an excellent one; it may be amplified by some comments about the variation of the indument. Narrow scales (these two or three cells broad at their base), as well as trichomes, often occur on the under surface of the segments. The scales or trichomes occur especially toward the base of the ultimate segments and as Kramer¹ has noted, they are more persistent on the fertile segments than on the sterile ones, which indeed, may be glabrate. In some specimens only trichomes are present on the under surface of the segments, in others there are trichomes and also a few scales and in yet others the scales are more abundant than the trichomes.

Adiantum humile occurs from British Honduras to Panama, east to French Guiana and Trinidad, south to the state of Amazonas, Brazil and to Peru. The only recent collection that I have seen from Peru is: Quimiri Bridge, La Merced, Dept. Junín, *Killip & Smith 24003* (NY, US).

Adiantum humile Kze. *Linnaea* 9: 80. 1834. Holotype: "In sylvis fl. Huallagae superior. Peruv. ad Mission Tocache, Jun. 1830", *Poeppig*, Herb. Kunze, LZ, destroyed. Authentic specimen: "Maynas, alto fl. silvis primaeva, Toache [Tocache], Maj. 1830", *Poeppig*, w, photograph and fragments BM!

Adiantum Killipii Maxon & Weath. *Amer. Journ. Bot.* 19: 166. 1932. Holotype: Ancón Hill, Canal Zone, Panama, *Killip 2752*, US! (15 paratypes are also cited).

2. *Adiantum lobatum* Presl (Plate 1255, fig. 1).

Two recent collections by D. S. Correll and E. E. Smith from the Department of Lambayeque, Peru, apparently represent this species which has been little, if at all, understood since it was published. These collections are rather similar to *A. brasiliense* and *A. curvatum* in the leaf-architecture

¹*Acta Bot. Neerland.* 3: 482. 1954.

and in the minute puberulence only on the upper surface of the rachis and lesser axes. However, in those two species the sori are oblong or oblong-lunate and the segments are strongly dimidiate. In the Peru material the sori are orbicular to suborbicular and although some segments are dimidiate (but not strongly so), others are subdimidiate or flabellate.

A photograph of the holotype of *A. lobatum*, a single rather small leaf, agrees closely with the Correll & Smith collections in characters of the ultimate segments, and also, allowing for the difference in the size of the leaves, with its characters of leaf-architecture. The lack of a rhizome in the holotype introduces an element of uncertainty in its identity. Also Presl described the leaves as glabrous while in the Peru material they are minutely puberulent on the upper side of the rachis and other axes of the lamina. Presl, however, might well have overlooked this small character. While it is by no means certain, then, that the present specimens represent Presl's species, they do not seem to belong to any other, and I think it is better to use Presl's name for them, albeit tentatively, rather than to describe them as new.

Adiantum lobatum Presl, Rel. Haenk. 1: 62, t. 10, f. 4. 1825. Holotype: Guayaquil, 1790, *Haenke*, PR, photograph GH! (Presl's illustration is a very accurate copy of the specimen; Presl gave the locality as Mexico but the label accompanying the photograph gives Guayaquil). *Adiantum lobatum* "(Poir.)" Steud. Nomencl. Bot. 2: 275. 1824, in synonymy of *Lindsaea lobata* Poir. is invalid.

Dept. Lambayeque, Peru: 27 km. from Olmos on road to Jaen, 1250 m., March 23, 1960, *D. S. Correll & E. E. Smith* P801 (GH,LL,US); 31 km. from Olmos on road to Jaen, 1400 m., March 23, 1960, *D. S. Correll & E. E. Smith* P808 (GH,LL).

The following description will serve to orient this species, as I interpret it, within the genus.

Rhizome rather slender, creeping, the petioles spaced but not distant, scales ca. 1-2 mm. long, long-triangular, acuminate to lanceolate-acuminate, wholly sclerotic, brown to atropurpureous; leaves to 60 cm. long, lamina deltoid to long-triangular, bipinnate to tripinnate at

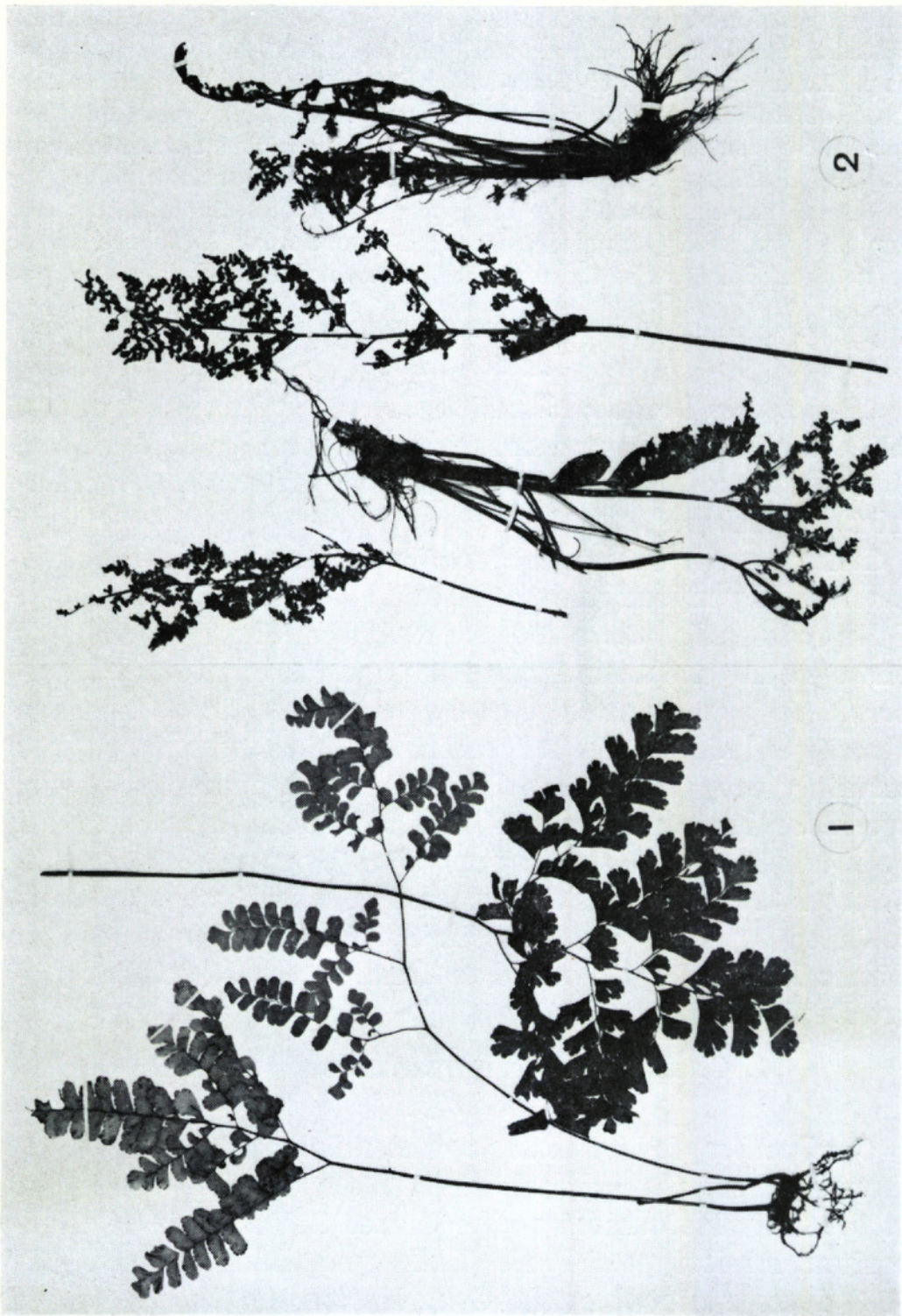


Plate 1255. Fig. 1. *Adiantum lobatum*, $\times 1/3$, Correll & Smith P801 (GH). Fig. 2. *Cheilanthes Orbignyana*, $\times 1/4$, Sagástegui 2937 (GH).

the base, bipinnate below the large conform terminal pinna, rachis subflexuous, it and the other axes faintly glaucous, minutely puberulent on the upper, darker colored surface, glabrous and lighter colored beneath; ultimate segments toward the apex of the pinna oblong to trapeziform, subsessile to short-stalked, those toward the base of the pinna subflabellate or flabellate, with longer stalks, the terminal ones flabellate-cuneate, all entire to usually sparingly and moderately incised (sometimes strongly so), non-articulate, the dark color of the stalk entering the base of the segment; sterile vein tips end between the indistinct marginal crenulations; sori orbicular to suborbicular, borne on all margins of the fertile segment except the lower one.

3. *Cheilanthes fractifera* Tryon, *Rhodora* 62: 7.

January, 1960

Cheilanthes Saundersii Alston, *Lilloa* 30: 110, t. 6. August, 1960. Holotype: Dept. Lima, prov. Huarochiri, dist. Surco, S. G. E. *Saunders* 350, BM; paratype: (from the same district) *Saunders* 219, BM! GH!

This recently recognized species has been independently described by myself and the late A. H. G. Alston. Although I did not see *Saunders* 350 at the British Museum, Alston's photograph (t. 6), his description and the citation of *Saunders* 219 (also a paratype of *C. fractifera*), all confirm the identity of his species with mine. Dr. Alston's paper was certainly prepared before I had seen any material of this species and it is unfortunate that its publication was delayed.

In addition to the collections cited by myself (*Correll & Smith* P169, *Saunders* 219) and by Alston, two specimens collected by *Rauh & Hirsch* in Peru were seen at Berlin: Rimac Valley, Dept. Lima, P143 and Cerros de Caldera desert, Dept. Arequipa, P570.

4. *Cheilanthes Orbignyana* Mett. ex Kuhn

(Plate 1255, fig. 2)

Cheilanthes Orbignyana is evidently a valid species although a very rare one; there is no previous material of it at the Gray Herbarium or the United States National Herbarium. An isotype at Paris (La Laguna, Bolivia, *D'Orbigny* 388) is represented in the Gray Herbarium by descriptive notes by Mr. C. A. Weatherby and a photograph taken by Mrs. Weatherby.

The following specimen, the first from Peru, compares very closely with these materials and I believe that its identification with them is reasonably certain: La Pampa, Guzmango, prov. Contumazá, Dept. Cajamarca, Peru, 2730 m., May 30, 1959, *Sagástegui 2937* (GH,US). This may be distinguished from the other Peruvian species that lack hairs or scales on the lamina by the following key.

Pinnules, or most of them, sessile; rhizome scales with a dark sclerotic central portion and pale, thinner margins. *C. Poeppigiana*.

Pinnules petiolulate or, at least most of them, on short broad stalks; rhizome scales entirely, but not always heavily, sclerotic.

Indusia extending along the segment stalks and pinna-rachises. *C. marginata*.

Indusia confined to the segments.

Rhizome short, erect, the petioles clustered; petiole, especially in the apical half, flat to convex between small lateral ridges. *C. Orbignyana*.

Rhizome short, creeping, the petioles rather spaced; petiole, especially in the apical half, sulcate between the prominent lateral ridges. *C. rufopunctata*.

5. *Costaricia* Christ (Plate 1256, figs. 3, 4)

The genus *Costaricia*, described by Christ in 1909 on the basis of a sterile fern collected by Wercklé in Costa Rica, has never been understood and Christensen listed it in *Index Filicum Suppl. 1* and again in *Suppl. 3* as a *genus valde dubium*. The type material at Paris consists of *Wercklé no. 238* mounted on two sheets; a photograph of one of them is given in fig. 3. This material is wholly sterile but while studying it some of its characters reminded me of two fertile collections from Costa Rica I had examined while working on *Dennstaedtia*. A later comparison of these with my notes and photographs of the Wercklé collection indicated that they were portions of fertile leaves of *Costaricia Werckleana* and that the original material represented a juvenile plant. On the basis of the fertile material (Fig. 4) it is now possible to draw a more satisfactory description of the genus (or species).

Rhizome (of juvenile plant) long-creeping, slender, pubescent with more or less moniliform trichomes, their short cells with clear whitish side and brown end walls, the leaves

borne singly at intervals; leaves probably to 1 m. or more tall, to tripinnate, acroscopic, herbaceous, bearing trichomes similar to those of the juvenile rhizome, especially on the upper surface in the grooves of the major axes and on each side of the costa of the penultimate segments; veins free, the sterile tips ending well back of the margin and not enlarged; pinnae and pinnules subarticulate; sorus terminal on a lobe, the receptacle, a continuation of the single vein, elongate within the rather cuneate, slightly bilabiate indusium which is formed of a more modified inner true indusium and a less modified outer opposed lobe of leaf tissue, these being almost wholly joined to the tissue of the lobe which extends well up on each side; sporangia developing in a basipetal sequence, paraphyses absent (although persistent stalks of previously maturing sporangia may simulate them), annulus vertical, or more or less displaced by crowding in the sorus, of 10-12 indurated cells, these extending from near the apex of the capsule down to the apex of the stalk.

The characters strongly suggest that *Costaricia Werckleana* is a species of *Dennstaedtia*, although if this is true, then it is not at all closely related to any other of the American ones. It was for this reason (as well as the absence of information about the rhizome) that I did not account for the fertile material in my paper on American *Dennstaedtia*. The most distinctive characters of *C. Werckleana* in comparison with American *Dennstaedtia*s are the subarticulate pinnae and pinnules and the leaf tissue that extends well up on each side of the sorus. These characters, however out of place among the New World species, are known in some of those of southeast Asia. For example, *D. ampla* (Bak.) Bedd., *D. glabrata* (Ces.) C. Chr. and *D. Elmeri* Copel. have articulate segments and *D. scabra* (Wall. ex Hook.) Moore sometimes has a substantially identical sorus. It is possible then, or perhaps probable, that *C. Werckleana* is a species of *Dennstaedtia*.

However, the rhizome of the adult plant, and especially its indument, must be known before it can be placed in *Dennstaedtia* with certainty. The adult rhizome may have a dif-



Plate 1256. *Costaria Werckleana*, Fig. 3. Holotype, ca. $\times 1/3$, Wercklé 238 (v).
Fig. 4. Two pinnae, $\times 1/3$, Brade 336 (NY).

ferent type of indument than the juvenile one as in *Sphenomeris* in which the adult rhizome may bear scales while the juvenile one may bear only trichomes. Until more adequate material of *Costaricia Werckleana* is available, the possibility that it represents an endemic genus can not be eliminated.

For the present, then, I prefer to retain *Costaricia* as a dubious genus rather than to reduce it to *Dennstaedtia* and make a new combination that may be taxonomically incorrect.

Costaricia Werckleana Christ, Bull. Soc. Bot. Genève II, 1: 229, fig. on 230. 1909. Holotype: Costa Rica, 1903, *Wercklé 238*, P! Other specimens examined: (all from Costa Rica) La Palma, 1400 m., 1909, *Brade 336* (NY, US ex Rosenst., US ex C); La Hondura, 1200 m. 1933, *Valerio 1815* (US).

6. Synonyms in *Dennstaedtia*

The examination of certain type or authentic specimens has enabled me to place some of the dubious names listed² in my recent paper on American *Dennstaedtia*.

Dennstaedtia divaricata (Sod.) C. Chr. = ***D. arborescens*** (Willd.) Ekman ex Maxon. Authentic specimen: Niebly, Ecuador, 1883, *Sodiro*, P!

Dennstaedtia erosa (Kze.) Moore = ***D. obtusifolia*** (Willd.) Moore. A probable isotype: "Pampayaco, Peru, July, 1829, *Poeppig 169*" (det. Kunze), B! is taken to represent this name since the holotype was presumably destroyed with the Herbarium at Leipzig. The data on the Berlin specimen are the same as those given by Kunze except that he cited "*Diar. 1127*" rather than "*no. 169*". A fragment (one pinnule) at K! (ex Kunze, det. Kunze) is also *D. obtusifolia* as are probable isotypes at LE! and P!

Dennstaedtia grandifrons Christ = ***D. distenta*** (Kze.) Moore. The type was not seen at Paris but an authentic specimen is *D. distenta*: *Münch 154* (Herb. Christ, det. Christ), P!

Dennstaedtia Munchii Christ = ***Hypolepis*** sp. The holotype, *Münch 137*, was not seen at Paris; a specimen at US

²Contrib. Gray Herb. 187: 52. 1960.

(ex Stanford) with this name but with number 76 is probably an isotype incorrectly numbered.

Dennstaedtia Orbignyana Mett. ex Kuhn = *D. obtusifolia* (Willd.) Moore. Holotype: *D'Orbigny* 278, (Herb. Mett.) B!; isotype, P!

Dennstaedtia vagans (Bak.) Diels = *D. arborescens* (Willd.) Ekman ex Maxon. The holotype, Andes of Quito, Ecuador, *Sodiro*, K! is evidently a juvenile leaf-form.

7. *Notholaena angusta*, spec. nov. (Plate 1257, fig. 5)

Rhizoma breve paleis rigidis obscuris scleroticis nitidis pectinatis. Folia 5-20 cm. alta, petiolus quam lamina brevior teres rubelle brunneus vel nigrescens fasciculo vasculari uno ceraceo-glandulosus glande plerumque longe cauliculatis trichomatibus paucis magnis brunneis modice paleaceus paleis eis rhizomatis similibus nisi brevioribus ad 1 mm. longis. Lamina linearis modice pinnato-pinnatifida vel pinnato-pinnatisecta, rhachis modice paleacea teres vel subteres trichomatibus multis circa 0.5 mm. longis eis petiolorum similibus. Pinnae ad 30-jugae oblongae obtusae plus minusve aequilaterales segmentis obtusis 2-3-jugis coriaceae pagina superiore modice albo-ceracea pagina inferiore dense albo-ceracea costa trichomatibus paucis magnis brunneis. Venulae 1-2-furcatae sporangia 64-sporis in apicibus gerentes, margem immutatus leviter revolutus.

Specimens examined (all from Hidalgo, Mexico): Holotypus: ca. 1 km. south of Tasquillo Bridge, Jan. 23, 1941, *T. C. & E. M. Frye* 3145 (US). Paratypi: Near Barranca de Veneado, 1800 m., Sept. 23, 1951, *E. Matuda & D. B. Gold* (Matuda Herb. no. 23571) (US); Near Tasquillo, 8000 ft., July 17, 1940, *C. L. Hitchcock & L. R. Stanford* 7249 (US); Río Tula, Puente Tasquillo, arid rocky slopes, March 8, 1937, *M. Broun* (PH).

This new species will key out with *Notholaena Schaffneri* in my revision of the American species of *Notholaena*³. It may be separated by the following key which modifies and amplifies my published one.

29. Lower surface of the lamina and the rachis with large, brown trichomes; rhizome scales dark sclerotic, rigid, strongly pectinate-ciliate. 29a.

29a. Lamina elliptic-lanceolate, bipinnate-pinnatifid; the larger scales of the petiole ca. 2-3 mm. long, the trichomes of the rachis ca. 1 mm. long. . . . 29. *N. Schaffneri*.

³Contrib. Gray Herb. 179: 11. 1956.

29a. Lamina linear, pinnate-pinnatifid to pinnate-pinnatisect; the large scales of the petiole ca. 1 mm. long, the trichomes of the rachis ca. 0.5 mm. long. . . . 29A. *N. angusta*.

Notholaena angusta is related to *N. Schaffneri* in characters of the indument: the long-stalked ceraceous glands generally distributed on the petiole and rachis, the scales on the rachis, and the large brown trichomes on the lower surface of the pinnae. It is related to *N. Ekmanii*, *N. cubensis* and *N. affinis* in its linear, pinnate-pinnatifid lamina. These three species differ from *N. angusta* in lacking scales on the rachis and trichomes on the pinnae. They also either lack long-stalked glands on the primary axis, or, if these are sometimes present (in *N. Ekmanii* and *N. affinis*), they are confined to the upper surface. *N. Ekmanii* also differs from *N. angusta* in having a sulcate rather than terete or flattened petiole and rachis.

In my treatment of *Notholaena*, I placed the Broun collection cited above in *N. affinis*, and later identified the Hitchcock & Stanford collection as the same species. It is now evident that all of this material from Hidalgo is a distinct species and that *N. affinis*, which occurs principally in Guatemala and Honduras, is known to occur in Mexico only in Oaxaca.

8. *Notholaena cantangensis*, spec. nov.

(Plate 1257, fig. 6)

Rhizoma breve paleis medio nigrescentibus scleroticis marginibus fulvis pectinato-serrulatis. Folia 10-15 cm. alta caespitosa, petiolus quam lamina brevior teres brunneus vel rubelle brunneus fasciculo vasculari uno decidue paleaceus paleis magnis fulvis concoloribus pectinato-serrulatis nisi eis rhizomatis similibus ad basem. Lamina lanceolato-elliptica bipinnato-pinnatifida, rhachis teres vel subteres, paleacea paleis eis petiolorum similibus. Pinnae ad 15-jugae oblongae vel leviter latiores ad basem obtusae aequilaterales pinnulis 5-8-jugis obtusis coriaceae pagina superiore parce pubescens trichomatibus brevibus subcrassis cellulis brevibus pagina inferiore paleis imbricatis anguste ovato-lanceolatis acuminatis vel ligulato-acuminatis. Venulae 2-3-furcatae sporangia 64-sporis in apicibus gerentes, margem leviter mutatus planus vel leviter revolutus, sporae rugosae.

Holotypus: Entre piedras, Cantange, ruta Celendín-Río Marañon, prov. Celendín, Dept. Cajamarca, Peru, 1450 m., 4 Junio 1960, A. López & A. Sagástegui 3366 (GH).

This new species, and the following one, belong to a small group (previously of two species) that have the lamina with both hairs and scales but lacking wax. *N. cantangensis* is closely related to *N. Hassleri* of Paraguay which also has similar rather sparse hairs only on the upper surface of the lamina. Following the description of the next species, a modification of the appropriate portion of my key to the American species is presented in which both new ones are incorporated. This will serve to compare the four species of this group and to bring out their most distinctive characters.

9. *Notholaena solitaria*, spec. nov. (Plate 1258, fig. 7)

Rhizoma ignotum. Folia circa 18-32 cm. alta, petiolus quam lamina brevior vel longior teres obscurus rubelle brunneus vel nigrescens fasciculo vasculari uno pubescens paleaceusve paleis angustis fulvis concoloribus nisi medio nigrescentibus scleroticis marginibus fulvis ad basem. Lamina anguste lanceolata vel anguste elliptica modice bipinnato-pinnatifida vel bipinnato-pinnatisecta, rhachis teres decidue paleacea paleis eis pinnarum similibus. Pinnae circa 10-15-jugae obtusae aequilaterales pinnulis anguste oblongis 6-9-jugis subcoriaceae pagina superiore tomentosa trichomatibus longis subcrassis cellulis longis pagina inferiore dense tomentosa sub paleis imbricatis anguste auriculatis vel cordatis marginibus vel tantum base longe ciliatis. Venulae 1-2 furcatae sporangia 64-sporis in apicibus gerentes, margem modice mutatus revolutus, sporae rugosae.

Holotypus: Surinam, *Hostmann 199* (Herb. Hook.-K)

Mr. C. A. Weatherby annotated this specimen in 1938 as probably a new species. It is closely related to *N. brachypus* (Mexico to Costa Rica) but is amply distinct in the characters of the scales at the base of the petiole, the complexity of the lamina and the scales on the under surface of the lamina.

N. solitaria is geographically isolated from other species of the genus. There are six species in Colombia and of these only two widely distributed ones, *N. aurea* and *N. sinuata*, extend eastward to (north-central) Venezuela. One would have expected that a *Notholaena* from Surinam would be one of these two species rather than an endemic with its affinities in Central America. This species and the previous one form with *N. brachypus* and *N. Hassleri*, a small group that lacks ceraceous indument but has both hairs and scales

on the lamina. These are distinguished in the following key which modifies and expands the one in my Revision of the American species of *Notholaena*⁴.

3. Indument of the lamina of both hairs and scales; spores rugose. 8.
8. Under surface of the pinnae densely tomentose beneath the imbricate scales, the upper surface tomentose with long hairs these with long cells. 8a.
- 8a. Rhizome scales and those of the petiole base concolorous or nearly so, or sometimes with a brownish sclerotic center; lamina pinnate-pinnatifid, hairs of the upper surface of the pinnae very slender, scales of the lower surface with smooth or irregularly dentate margins, the larger ones strongly auriculate; sporangium with 32 spores. Mexico to Costa Rica. . . . 6. *N. brachypus*.
- 8a. Rhizome scales not known, those of the petiole base with a blackish sclerotic central area and pale margins; lamina bipinnate-pinnatifid to bipinnate-pinnatisect, hairs of the upper surface of the pinnae rather stout, scales of the lower surface with long-ciliate margins (or the cilia confined to the base), usually narrowly auriculate or cordate; sporangium with 64 spores. Surinam. . . . 6A. *N. solitaria*.
8. Under surface of the pinnae paleate with imbricate scales, the upper surface sparsely pubescent with short thickish hairs, these with short cells, sporangium with 64 spores. 8b.
- 8b. Rhizome creeping, the petioles approximate to moderately spaced; pinnae inequilateral although not strongly so; scales of the under surface of the pinnae (especially of the pinna-rachis) predominantly ovate-acuminate to deltoid-acuminate; margins of the segments somewhat revolute, of broadly rounded lobes which have a hyaline border. Paraguay. . . . 7. *N. Hassleri*.
- 8b. Rhizome short-creeping, the petioles clustered; pinnae equilateral; scales of the under surface of the pinnae predominantly narrowly ovate-lanceolate and acuminate to ligulate-acuminate; margins of the segments flat to slightly revolute, very slightly modified. Peru. . . . 7A. *N. cantangensis*.

10. *Notholaena Stuebeliana* (Hieron.) Tryon, comb. & stat. nov. (Plate 1258, fig. 8)

Pellaea dealbata var. *Stuebeliana* Hieron. Hedwigia 48: 225, t. 12, fig. 15, 1909. Holotype: Sunibamba, valle Río Ut-cubamba, [Dept. Amazonas], Peru, 1800 m., *Stübel* 1048 (part), B!

Pellaea Stuebeliana Hieron. l.c., in synonymy.

⁴Op. Cit. 9.

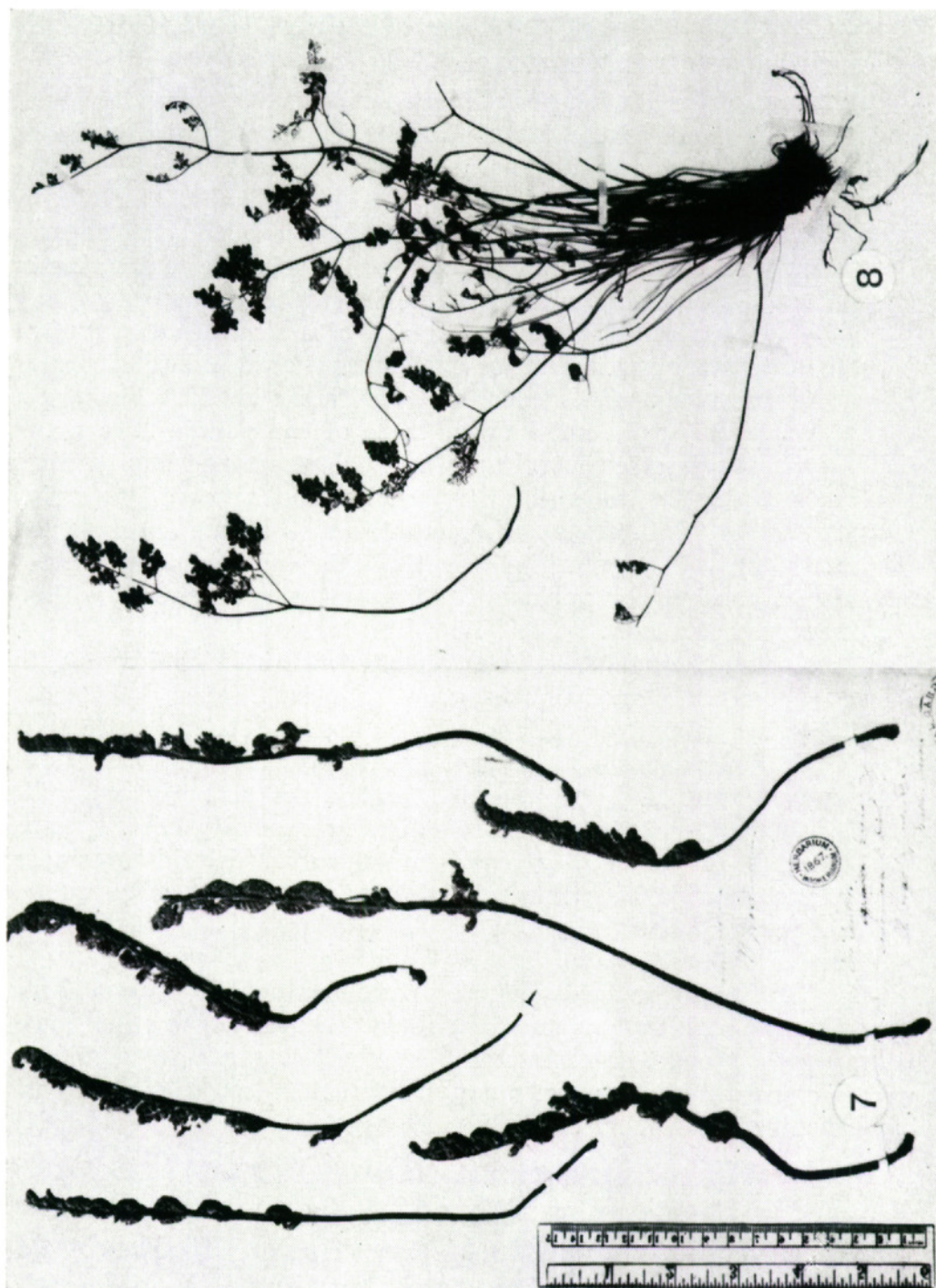


Plate 1258. Fig. 7. *Notholaena solitaria*, ca. $\times 1/3$, holotype, Hostmann 199 (K).
 Fig. 8. *Notholaena Stuebeliana*, $\times 4/10$, Correll & Smith, Ps47 (GH).

Hieronymus described *Pellaea dealbata* var. *Stuebeliana* on the basis of a single leaf presumably collected in Peru along with *Notholaena nivea* (Stübel 1048 proper). In my Revision of American *Notholaena*⁵ the name was cited as a synonym of *Notholaena dealbata* on the assumption that the specimen and the label had been erroneously associated with each other. Although Hieronymus did emphasize, in his description, the significant rounded ultimate segments, these were not brought out well in the illustration. Three recent collections from the same general region now verify the occurrence of this plant in Peru and the adequate material allows an assessment of it:

Cajamarca: Celendín, May 22, 1960, *López & Sagástegui* 3104 (GH); about 40 km. from Cajamarca on road to Chilete, March 24, 1960, *D. S. Correll & E. E. Smith* P841 (GH, LL, US). La Libertad: Camino de las Quishuas, Bolivar, May 31, 1960, *López & Sagástegui* 3288 (GH).

Notholaena Stuebeliana grows in rocky places in northern Peru at elevations of 2250 to 3000 m. It is most closely related to *N. limitanea* of Mexico and the adjacent southwestern United States; it is also closely related to *N. dealbata* of the central United States. The following key will serve to bring out the important characters of these three species, and to distinguish them; it amplifies the key to species in my Revision of American *Notholaena*⁶.

57. Petiole moderately stout (rarely slender), it and the rachis dark reddish-brown; ultimate segments coriaceous, the veins not visible; sporangium with 32 spores. 57a.

57a. Rhizome scales somewhat thickened, their cells evident, rather straight or occasionally somewhat sinuous, dry in appearance; terminal segments of the pinnae and pinnules oval to usually oblong. Southwestern United States and Mexico. . . . 51. *N. limitanea*.

57a. Rhizome scales thickened, their cells obscure, mostly strongly sinuous, oily in appearance (but not evidently viscid) (they may appear dry with age); terminal segments of the pinnae and pinnules (or their terminal lobe) orbicular, suborbicular, orbicular-deltoid or infrequently oval. Northern Peru. . . . 51A. *N. Stuebeliana*.

⁵Op. Cit. 87.

⁶Op. Cit. 14.

57. Petiole slender, it and the rachis bright chestnut-brown; ultimate segments subherbaceous, the veins usually visible; sporangium with 64 spores. Central to south-central United States. . . . 52. *N. dealbata*.

11. *Pteris Lechleri* Mett.

The species currently called *Pteris Killipii* Maxon has two earlier names. Mettenius described *Pteris Lechleri* (*Lechler* 2533) in 1859, a name that was seldom, if ever, used after its publication. In 1867 Baker described *Pteris vestita* (*Spruce* 4063) but the specimen was not annotated by him and later Maxon cited it as a paratype of *P. Killipii*. An examination of the holotypes of these three names shows that they all represent the same species and accordingly Mettenius' name must be reinstated for it. *Pteris Lechleri* grows on the moist eastern slopes of the Andes in Peru and Bolivia.

Pteris Lechleri Mett. Fil. *Lechler*. 2: 13, 1859. Holotype: Tatanara, [Valle Río San Gaban, prov. Carabaya, Dept. Puno], Peru, *Lechler* 2533, Herb. Mett.-B!, photo GH!

Pteris vestita Baker, Syn. Fil. 169. 1867. Holotype: (not annotated by Baker), near Tarapoto, Peru, *Spruce* 4063, K!, fragment ex K, US!, photo US.

Pteris Killipii Maxon, Amer. Fern Journ. 23: 107. 1933. Holotype: San Ramón, Dept. Junín, Peru, *Killip & Smith* 24697, US!; paratypes: *Killip & Smith* 23919, US!, *Killip & Smith* 23962, US!, *Spruce* 4063, K!

12. Recent fern collections from Peru

In the past few years several collectors have obtained material from Peru that is of unusual interest and it seems worthwhile to comment on some of the principal features of these collections. This will serve to emphasize the regions in which new discoveries of special importance are being made and at the same time will acknowledge the efforts of these collectors who have added to our knowledge. The ferns mentioned at this time, with one exception, are all members of the *Gymnogrammeae* and all are from the Andean region of Peru. The collections are those of P. Coronado in 1953 and 1955; D. S. Correll and E. E. Smith in 1958 and 1960; P. Hutchison in 1957; W. Rauh and G. Hirsch

in 1954, W. Rauh in 1956⁷; A. Sagástegui (sometimes with A. López) in 1953-1960; and S. G. E. Saunders in 1954. Five of the new or rare species from these collections have been discussed in the previous portions of this paper and these are omitted from the following list.

Adiantum alarconianum Gaud. — The first collections in Peru were made by Coronado (218, 228) in Tumbes in 1955.

Adiantum concinnum Willd. — The first collections in Peru were made by Coronado (222, 229) in Tumbes in 1955; it was collected again in Lambayeque, somewhat to the south, by Correll & Smith (P791, P794) in 1960.

Adiantum Henslovianum Hook. f. — The second collection in Peru is that of Correll & Smith (P807) from Lambayeque in 1960; the original collection by Matthews was probably made in northern Peru about 1835.

Adiantum Poiretii var. **hirsutum** (Hook.) Tryon — First collected in Peru on lomas in Arequipa by Coronado (33, 42) in 1953.

Cheilanthes notholaenoides (Desv.) Weath. — Known from Huánuco and Junín by two earlier collections, it was collected by Rauh & Hirsch (P1935) in Piura in 1954 and by Correll & Smith (P838) in Cajamarca in 1960.

Notholaena obducta (Mett. ex Kuhn) Baker — First collected in Peru by P. Hutchison (1425) in Cajamarca in 1957. The principal range of the species is from Paraguay to Bolivia; it is also known from several Colombian collections. The Peru locality is about half-way between these two areas.

Notholaena peruviana Desv. — This species has been known to occur in the Rimac Valley (Lima) and southward on coastal lomas. Three recent collections extend its range considerably northward: Sagástegui (2220) in Cajamarca in 1953, Sagástegui (2665) in La Libertad in 1958, and Correll & Smith (P822) in Lambayeque in 1960.

Saffordia induta Maxon — This monotypic genus has been the rarest of American fern genera being known only from the original collection made by Safford in 1892. However, it

⁷These collections were reported on by D. E. Meyer, *Willdenowia* 1: 642-653. 1956; 1: 704-708. 1957; 2: 23-26. 1958. I studied some of them at Berlin in 1960.

has now perhaps lost this distinction since four collections of it have been made in 1954-1959, and its range has been considerably extended beyond the type locality in the Rimac Valley. In 1954 it was collected by Rauh & Hirsch (*P186*) at Matucana (Lima) which is probably the type locality (Safford gave only "along the Arroya [La Oroya] Railway in the mountains back of Lima"). In the same year Saunders (*218*) collected it near Surco, also in the Rimac Valley, somewhat below Matucana. This collection was sent to the British Museum (Natural History) and spores from it were germinated at Kew where a number of mature plants are now growing. In 1958 Sagástegui (*205*) collected it in La Libertad (prov. Otuzco) and in 1959 (*2936*) in Cajamarca (prov. Contumazá) somewhat to the northwest. All of the collections are from the rather dry western slopes of the Andes at elevations between 1900 and 2900 m.; and they were all made in the months of February to May which corresponds to the "rainy" season in that zone.

Stylites andicola Amstutz emend. Rauh and **S. gemmifera** Rauh — This new genus of *Isoëtaceae*, from the borders of high lakes in central Peru, was first collected by Rauh & Hirsch (*P271b*) in 1954. It was collected again by Rauh (*P186/56*, *P384/56*) in 1956, by Amstutz (*2000*) in 1956 and by von Appen in 1958. The careful studies of W. Rauh and H. Falk⁸ and D. E. Meyer⁹ have presented an exceptionally detailed and complete account of this unusual plant.

Trachypteris pinnata (Hook. f.) C. Chr. — This rare fern was collected by Rauh & Hirsch (*P2160*) in Cajamarca (prov. Jaen) in 1954 and in the same province by Hutchison (*1424*) in 1957. — GRAY HERBARIUM, HARVARD UNIVERSITY.

A VARIEGATED FOLIAGE FORM OF COMMELINA. — During the summer of 1958, Mr. Joseph Monachino of our staff collected a specimen of *Commelina communis* L. var. *ludens* (Miquel) C. B. Clarke, which he found growing along the shore walk of the Palisades near the George Washington Bridge in New Jersey.

⁸Sitz. Heidelberg. Akad. Wissen. Math-naturwissen. Klasse 1959: 1-160.

⁹Willdenowia 2: 32-40. 1958.



Tryon, Rolla M. 1961. "Taxonomic fern notes." *Rhodora* 63, 70–88.

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