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**NEW SPECIES AND NEW COMBINATIONS OF  
FERNS FROM CHIAPAS, MEXICO**

By

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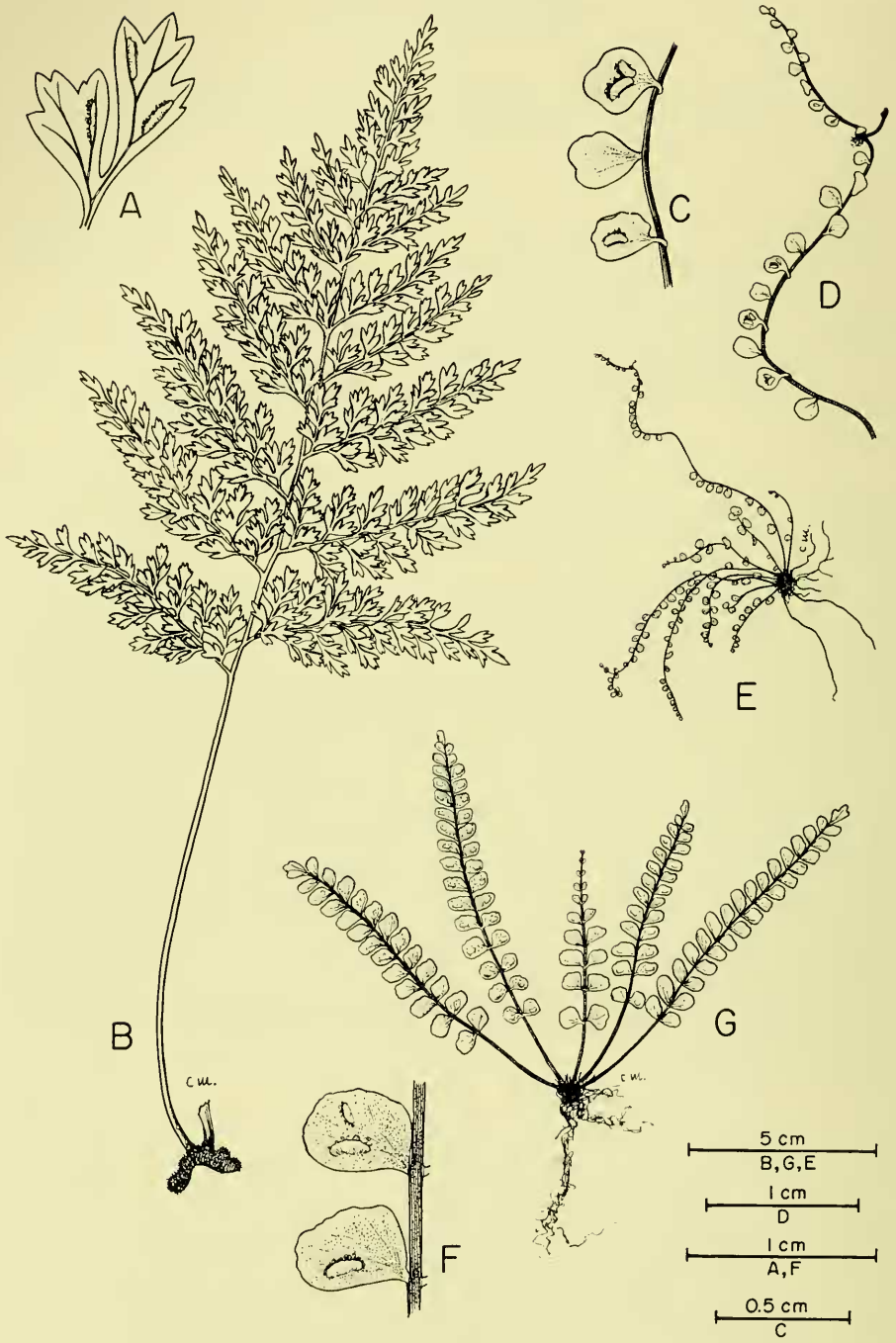
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In preparation for a pteridophyte flora of the state of Chiapas, Mexico, I find it necessary to describe the following new species and make several new combinations. Most of the new species were discovered after intensive field investigations by Dr. Dennis Breedlove and myself; these explorations have resulted in approximately 4000 new collections of pteridophytes, many from previously uncollected or poorly collected areas of Chiapas. In circumscribing the new species I have relied most heavily on herbarium holdings of Mexican and Central American ferns in Dudley Herbarium, Stanford University (DS), University of California Herbarium (UC), United States National Museum (US), New York Botanical Garden (NY), Philadelphia Academy of Science (PH), Field Museum of Natural History (F), and Universidad Nacional de México (MEXU). I thank curators of these herbaria for making their collections available for study. Isotypes and duplicates of Breedlove collections will be distributed to MEXU, NY, and US. I also thank Charlotte Mentges for preparing the illustrations.

***Asplenium breedlovei*** A. Reid Smith, sp. nov.

(Figure 1, A-B.)

Plantae terrestres; rhizomata breve repentia, ca. 4 mm. diametro, frondibus paucis (1-3) praedita; stipites atropurpurei vel atrobrunnei, impoliti, glabri, ca. 2 mm. diametro, laminas fere aequantes; rhachides leviter flexuosae, basi fuscatae, apicem versus viridescentes; frondes basi fere quadripinnatae, usque 35 cm. longae, 15 cm. latae, deltoideae, apicem versus gradatim reductae, non



proliferae; pinnae usque ca. 10-jugae, atrovirides, non articulatae, alternae, ascendentes, usque 10 cm. longae, 3 cm. latae, axibus virellis; segmenta penultima cuneiformia, maximam partem 2-5-loba; segmenta ultima usque 1.5 mm. lata, apice acuta vel subacuta; sori secus venas segmentorum ultimorum usque ca. 3 mm. longi; indusia integra vel leviter erosa, ca. 0.6 mm. lata, fulva.

HOLOTYPE. Mexico. Chiapas: municipio Villa Corzo, east base of Cerro Tres Picos near Cerro Bola, SW. of Colonia Agronimos Mexicanos, 1500-1800 m., *Breedlove 30041* (DS).

REMARKS. Superficially, this species resembles more dissected members of the *A. radicans* complex, but the stipe and rachis are dull, the lamina is deltoid, and the pinnae ascend at an angle of about 60° from a slightly flexuose, non-proliferous, non-flagelliform rachis. The relationship to *A. cristatum* Lamarck is perhaps closer, but the general architecture of the fronds and the creeping rhizomes of *A. breedlovei* adequately distinguish it from that species.

***Asplenium munchii*** A. Reid Smith, sp. nov.

(Figure 7, A-B.)

Plantae terrestres; rhizomata suberecta, basibus stipitum abscondita, caudices usque 1.3 cm. diametro; frondes numerosae, caespitosae, stipites 4-9 cm. longi, ca. 1 mm. diametro, brunnei vel plumbei, non lustrati, glabri; laminae tripinnatifidae, (17)25-30 cm. longae, (3.5)5-7 cm. latae, apicem versus attenuatae et proliferae; pinnae usque ca. 25-jugae, plerumque alternae, sessiles, maximae in medio, 4 cm. longae, 1.5 cm. latae, gradatim reductae sursum et deorsum (infimae deflexae), inaequilatae, pinnulis grandioribus acroscopicis; pinnulae ad angulum 45-60° costis, maximae profunde 5-lobae; segmenta ultima ca. 1 mm. lata, apice rotundata vel acutiuscula; laminae membranaceae, glabrae; sori secus venas segmentorum ultimorum positi, usque 3 mm. longi, indusiis 0.6 mm. latis, integris, fulvis.

HOLOTYPE. Mexico. Chiapas: San Pablo, *Munch 114* (DS).

PARATYPES. Mexico. Chiapas: municipio Tenejapa, sumidero of Yochib, paraje Koltol Te', *Breedlove 6222* (DS); 4 mi. N. of Jitotol, *Thorne & Lathrop 41783* (DS); municipio La Independencia, Las Margaritas to Campo Alegre, *Breedlove 33648* (DS).

REMARKS. Allied to *A. sessilifolium* Desvaux, but much more dissected than that species and occurring at lower elevations (1300-2300 m.). The

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FIGURE 1. A-B. *Asplenium breedlovei*, *Breedlove 30041*, DS: A, ultimate segment; B, plant. C-E. *Asplenium soleirolioides*, *Breedlove & Smith 31820*, DS: C, pinnae; D, frond apex; E, plant. F-G. *Asplenium olivaceum*, *Hatch & Wilson 149*, US: F, plant; G, pinnae.

blades of *A. munchii* are similar in dissection to large fronds of *A. myriophyllum* (Swartz) Presl, which always lacks buds and has less oblique pinnules.

***Asplenium olivaceum*** A. Reid Smith, sp. nov.

(Figure 1, F-G.)

Rhizomata compacta, frondibus numerosis erectis vel arcuatis praedita; stipites nigrescentes, glabri, nitidi, ca. 0.6 mm. diametro, laminis 0.2–0.6 plo breviores; frondes usque 15 cm. longae, 1.5 cm. latae, non proliferae, segmento ovali terminali; pinnae usque 15-jugae, olivaceae, articulatae, oppositae, oblongae, usque 8 mm. longae, 5 mm. latae, secus marginem superiorem integrae vel leviter undulatae, apice rotundatae; sori 1–2 per pinnam, 2–3 mm. longi, soro primario parallelo margini inferiori, interdum soro secundario secus venam acropetam; indusia plus minusve integra, usque 0.9 mm. lata, albida vel cinerascens.

HOLOTYPE. Guatemala. Alta Verapaz: Senahu, summit of Cerro Sillab, limestone cliffs, 6000 ft. [1800 m.], *Hatch & Wilson 149* (US).

PARATYPE. Mexico. Chiapas: municipio La Trinitaria, Lagos de Monte Bello, along Comitán River at its sumidero, limestone rocks, 1300 m., *Breedlove & Smith 22379* in part (DS).

REMARKS. Perhaps most closely related to *A. heterochroum* Kunze, which was collected with the paratype cited. It can be distinguished easily from that species by the peculiar olivaceous color of the fronds, number and placement of the sori, and the oblong, entire (or nearly so) pinnae.

***Asplenium soleirolioides*** A. Reid Smith, sp. nov.

(Figure 1, C-E.)

Rhizomata minuta, radicibus paleisque abscondita, frondibus numerosis arcuatis vel decumbentibus praedita; stipites rhachidesque castaneae, glabrae, nitidae, ca. 0.3 mm. diametro; frondes usque 9 cm. longae, 5 mm. latae, apicem versus proliferae et radicales; pinnae infra gemmam usque 15-jugae, subvirides, articulatae, plerumque alternae, rotundatae vel irregulariter ovaes, usque 2.5 mm. longae, 2 mm. latae, venis 2–3-jugis; sori 1–2 per pinnam, grandissimi secus venam inferioram in quoquo segmenta; indusia integra, usque 0.6 mm. lata, fulva.

HOLOTYPE. Mexico. Chiapas: municipio La Grandeza, 10 km. E. of El Porvenir along road from Huixtla to Siltepec, 2800 m., *Breedlove & Smith 31820* (DS).

REMARKS. Named after the monotypic genus *Soleirolia* (Urticaceae), which it resembles in habit and general shape of the segments.

I am unable to suggest close relatives for this peculiar species, but it is certainly a member of *A. trichomanes* group. The pinnae of *A. soleirolioides* are much thinner in texture than in most other species of this alliance.

**Ctenitis bullata** A. Reid Smith, sp. nov.

(Figure 2, E-H.)

Rhizomata suberecta, basibus stipitum et paleis abscondita, caudices ca. 2.5 cm. diametro; stipites usque ca. 40 cm. longi, 4 mm. diametro, brunneoli, basin versus paleis usque 1 cm. longis patentibus vel reflexis subulatis atrobrunneis nitentibus; rhachides paleis similaribus sed brevioribus; laminae atrovirides, usque ca. 45 cm. longae, 25 cm. latae, basi bipinnatae vel tripinnatifidae, sursum profunde bipinnatifidae; pinnae usque ca. 20-jugae, alternae vel suboppositae, basi latissimae, aequilaterae, usque ca. 13 cm. longae, 3.3 cm. latae, usque 6 mm. petiolulatae, pinnae distales sessiles; pinnulae usque 1 mm. petiolulatae, serratae, pinnulae pinnarum distaliorum sessiles serratae vel integrae; venae usque 10-jugae, simplices vel furcatae, margine terminatae; costae subtus paleis numerosis bullatis castaneis, pilis paucis longis (usque 0.7 mm.) articulatis, et pilis numerosis brevibus glandiferis (ca. 0.1 mm. longis); pagina laminarum super glandiferae, pilis articulatis costis venisque; pagina laminarum infra glabra; sori inframediales, ca. 1 mm. diametro; indusia persistentia, rotundato-reniformia, ca. 0.6-0.8 mm. diametro, glandifera, fulva, margine erosa vel glanduloso-ciliata.

HOLOTYPE. Mexico. Chiapas: municipio La Trinitaria, Lagos de Monte Bello, 1400 m., *Breedlove 25339* (DS).

PARATYPES. Same locality, 1600 m., *Breedlove 14968* (DS); same locality, 1300 m., *Breedlove & Smith 22331* (DS); same locality, *Breedlove 38909* (DS).

REMARKS. Most closely related to *C. strigilosa* (Davenport) Copeland, known from Veracruz (type) and Guatemala, but differing in its much larger fronds, eglandular tissue below, presence of long, articulate hairs on costae and costules below, larger indusia, and costal scales decidedly more bullate (scarcely bullate in *C. strigilosa*).

**Ctenitis baulensis** A. Reid Smith, sp. nov.

(Figure 2, I-K.)

Rhizomata suberecta, basibus numerosis stipitum veterum abscondita, caudices 2-3 cm. diametro; frondes caespitosae, stipites usque 20 cm. longi, ca. 2 mm. diametro, basi fuscati, sursum straminei vel viridi-straminei, dense squamosi, paleis usque 3 mm. longis, 1.5 mm. latis, complanatis usque subbullatis, fulvis (apicem versus fuscatis); laminae pinnato-pinnatifidae, usque 20 cm. longae, 13 cm. latae; pinnae usque ca. 10-jugae, sessiles, maximae 7 cm. longae, 2.5 cm. latae, fere ad costas profunde incisae; segmenta obliqua, maxima 12 mm. longa, 4.5 mm. lata, apicem obtusum vel acutiusculum versus integra usque denticulata, approximata vel etiam imbricata; paria basalia segmentorum leviter reducta pinnis infimis; venae usque 9-jugae, marginem supra sinum attingentes; costae infra parce glandiferae, dense squamosae, paleis basi fulvis

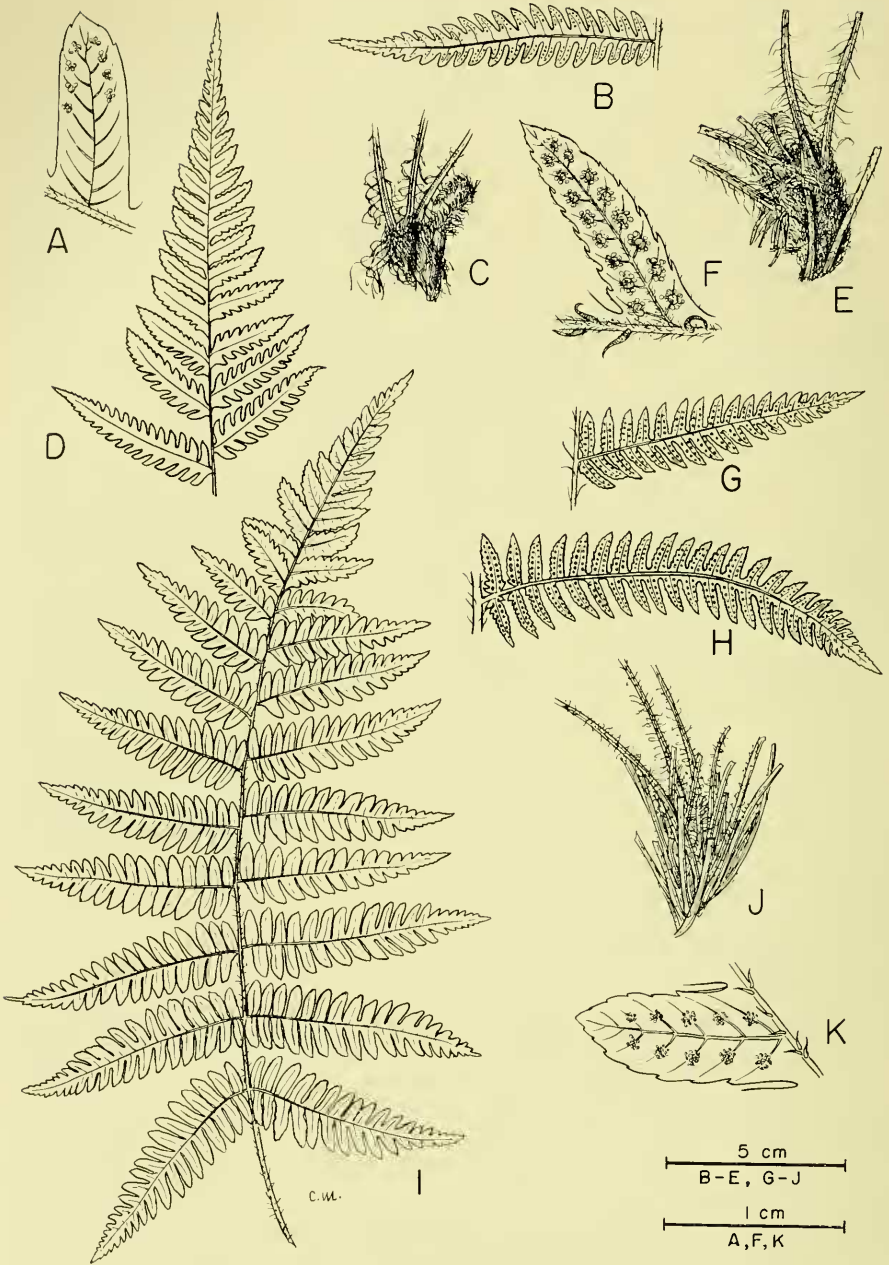


FIGURE 2. A-D. *Ctenitis thelypteroides*: A, segment, *Breedlove 33280*, DS; B, lower pinna, *Lundell 18115*, US; C, rhizome and stipe bases, *Breedlove 33280*, DS; D, frond apex, *Lundell 18115*, US. E-H. *Ctenitis bullata*: E, rhizome, *Breedlove & Smith 22331*, DS; F, frond, *Breedlove & Smith 22331*, DS; G, pinna, *Breedlove & Smith 22331*, DS; H, pinna, *Breedlove & Smith 22331*, DS. I, frond, *Lundell 18115*, US. J, rhizome, *Breedlove & Smith 22331*, DS. K, frond segment, *Breedlove & Smith 22331*, DS.

et manifeste bullatis, apice fuscatis et attenuatis, costae supra pilis densis *Ctenitidis* ca. 0.5 mm. longis; paginae laminarum utrinque glabrae vel infra pilis paucis appressis glandulosis; sori inframediales, exindusiati, usque 1 mm. diametro.

HOLOTYPE. Mexico. Chiapas: municipio Cintalapa, 16 km. NW. of Rizo de Oro, SE. of Cerro Baul, 1600 m., *Breedlove & Smith 21812* (DS).

PARATYPE. Same locality, *Breedlove & Smith 31328* (DS).

REMARKS. Most closely related to *Dryopteris touduzii* (Christ) C. Christensen, from Guatemala and Cost Rica, differing from that in the exindusiate, inframedial sori, approximate segments, and smaller, more decidedly bullate-scaly fronds. Also related to *C. nigrovenia* (Christ) Copeland, but differing in the more or less glabrous blade surfaces, inframedial sori, and approximate segments.

### *Ctenitis thelypteroides* A. Reid Smith, sp. nov.

(Figure 2, A-D.)

Rhizomata breve repentia vel oblique erecta, basibus stipitum maximam partem abscondita, usque 4 mm. diametro; stipites usque 28 cm. longi, 2 mm. diametro, basi paleis patentibus lanceolatis castaneis usque 5 mm. longis; rhachides paleis paucis similaribus; laminae pinnato-pinnatifidae, usque ca. 30 cm. longae, 16 cm. latae; pinnae usque 15-jugae, petiolulatae usque 2 mm., usque 9 cm. longae, 2 cm. latae, profunde incisae fere costis; segmenta obliqua ca. 3 mm. lata, apice acuta vel obtusa, serrulata, segmentis basilaribus quam segmentis distalibus leviter reductis et congestioribus; venae usque 8-jugae, infimae marginem 1-2.5 mm. supra sinum attingentes; costae infra glanduliferae, paleis dispersis lineari-lanceolatis castaneis non bullatis integris usque 1.5 mm. longis, supra pilis densis *Ctenitidis* usque 0.5 mm. longis; pagina laminarum infra glabra vel glandulis inconspicuis dispersis appressis tubularibus luteolis; sori usque 6-jugi, plerumque ad apices segmentorum limitati, 0.5-1.0 mm. diametro; indusia ca. 0.3 mm. diametro, fulva, persistentia.

HOLOTYPE. Mexico. Chiapas: municipio Las Margaritas, eastern side of Laguna Miramar E. of San Quintín, 366 m., *Breedlove 33280* (DS).

PARATYPES. Mexico. Chiapas: jct. of Río Perlas and Río Jataté at San Quintín, 200 m., *Sohns 1696* (US). Guatemala. Peten: ca. 4.5 mi. NEE. of Pucté on La Libertad trail, *Lundell 18115* (US).

REMARKS. Closely related to *C. nigrovenia* (Christ) Copeland, but distin-

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segment, *Breedlove 14968*, DS; G, upper pinna, *Breedlove 14968*, DS; H, lowermost pinna, *Breedlove 14968*, DS. I-K. *Ctenitis baulensis*: I, lamina, *Breedlove & Smith 21812*, DS; J, rhizome and stipe bases, *Breedlove & Smith 31328*, DS; K, segment, *Breedlove & Smith 21812*, DS.

guished by the smaller sori localized at the tips of the segments, the reduced basal pinna segments that are more crowded, and the habit of the rhizome.

**Ctenitis ursina** A. Reid Smith, sp. nov.

(Figure 3, C-E.)

Rhizomata ignota (probabiliter suberecta, ampla); stipites 50 cm. vel plures longi, usque ca. 1 cm. diametro, paleis patentibus lanceolatis integris vel parce denticulatis lustratis brunneis usque ca. 1 cm. longis, 1 mm. latis perdense vestiti; rhachides, costae costulaeque similes stipitibus, sed paleis parvioribus et minor densis et coloratis pallidioribus, denique paleis bullatis costis costulisque; laminae quadripinnatifidae, usque 75 cm. longae, 70 cm. latae, deltoideae; pinnae ca. 10-12-jugae, usque ca. 37 cm. longae, 13 cm. latae, aequilaterae; pinnulae usque ca. 20-jugae per pinnam, usque 7 cm. longae, 1.5 cm. latae, apicem versus pinnarum adnatae decurrentes, basin versus leviter reductae; segmenta profunde serrata vel integra; venae prae margine terminatae; axes supra pilis densis *Ctenitidis* ca. 0.5 mm. longis; paginae utrinque laminarum glabrae; sori ca. 1 mm. diametro; indusia persistentia rotundato-reniformia fulva, in centro leviter fuscata, ad marginem erosa vel glanduloso-ciliata.

HOLOTYPE. Mexico. Chiapas: municipio La Trinitaria, E. of Laguna Tzikaw, Monte Bello National Park, 1300 m., *Breedlove & Smith 32274* (DS —2 sheets).

PARATYPE. Same locality, *Breedlove 35261* (DS).

REMARKS. Most closely related to *C. melanosticta* (Kunze) Copeland, differing by the densely scaly, even shaggy, stipes and by the indusia not so distinctly bicolorous.

**Dryopteris futura** A. Reid Smith, sp. nov.

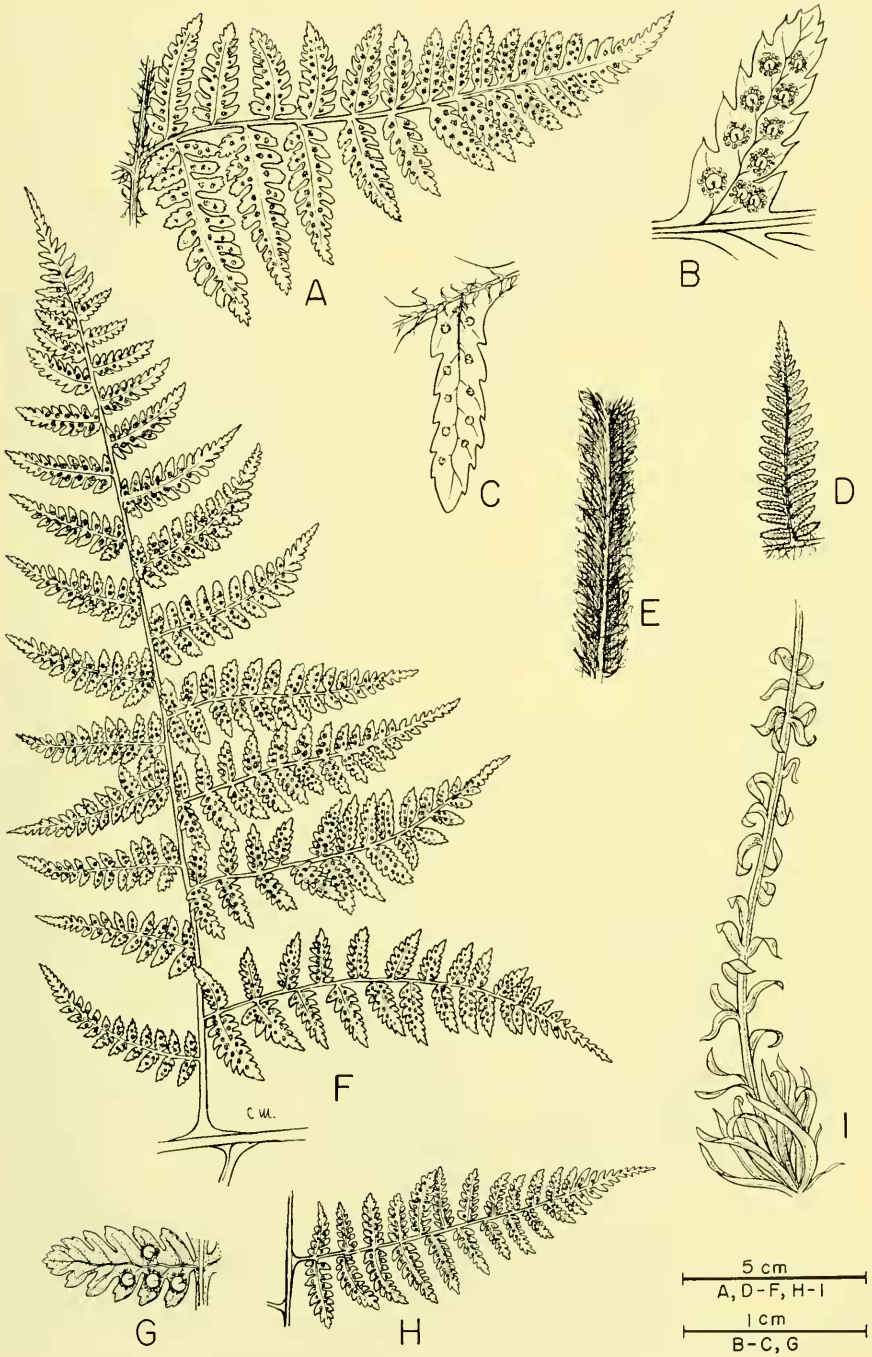
(Figure 3, F-I.)

Rhizomata non visa (probabiliter erecta, crassa); stipites usque 45 cm. longi, 5 mm. lati, basin versus dense paleacei, paleis ovato-lanceolatis, usque 2.5 cm. longis, 5 mm. latis, integris, brunneis (sursum fulvis), concoloribus sublustratis; rhachides stramineae, glabrae vel parce stipitato-glandulosae; laminae infra tripinnato-pinnatifidae usque 4-pinnatae, usque ca. 40 cm. longae, 30 cm. latae, deltoideae; pinnae oppositae usque suboppositae, ca. 12-jugae, ad

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FIGURE 3. A-B. *Dryopteris munchii*, *Münch 116*, DS: A, lowermost pinna; B, ultimate segment. C-E. *Ctenitis ursina*, *Breedlove & Smith 33274*, DS: C, ultimate segment; D, pinnule; E, stipe base. F-I. *Dryopteris futura*, *Breedlove & Smith 32058*, DS: F, lower most pinna; G, ultimate segment; H, fourth pinna from base; I, stipe base.





angulum 45–60° ascendentes, infimae deltoideae, usque 25 cm. longae, 15 cm. latae, petiolulatae usque 1.5 cm., basiscopicae, anadromae, ceterae catadromae sublanceolatae; pinnae secundariae suboppositae usque alternae, lanceolatae, leviter basiscopicae usque fere aequilaterae, infimae petiolulatae usque 5 mm.; pinnulae usque 12-jugae, pinnatae usque profunde pinnatifidae, segmentis ultimis denticulatis; laminae membranaceae, sine paleis, utrinque glabrae vel subtus stipitato-glandulosae (praesertim axibus); indusia orbiculari-reniformia, ca. 1 mm. diametro, persistentia, fulva, ad marginem stipitato-glandulosa;  $n = 41$ .

HOLOTYPE. Mexico. Chiapas: municipio El Porvenir, 3–4 km. W. of El Porvenir along road from Huixtla to Siltepec, 2800 m., *Breedlove & Smith 31772* (DS).

PARATYPE. Mexico. Chiapas: municipio San Cristóbal Las Casas, Cerro Huitepec (Muk'ta vits), 2700 m., *Breedlove & Smith 32058* (DS).

REMARKS. This species can be compared only to *D. nubigena* Maxon & Morton, from which it differs by the more densely scaly stipe bases, strongly ascending pinnae, the larger, more persistent indusia, and the less glandular, thinner-textured blades.

The paratype cited showed  $2n = 41$  II at meiotic metaphase.

### *Dryopteris munchii* A. Reid Smith, sp. nov.

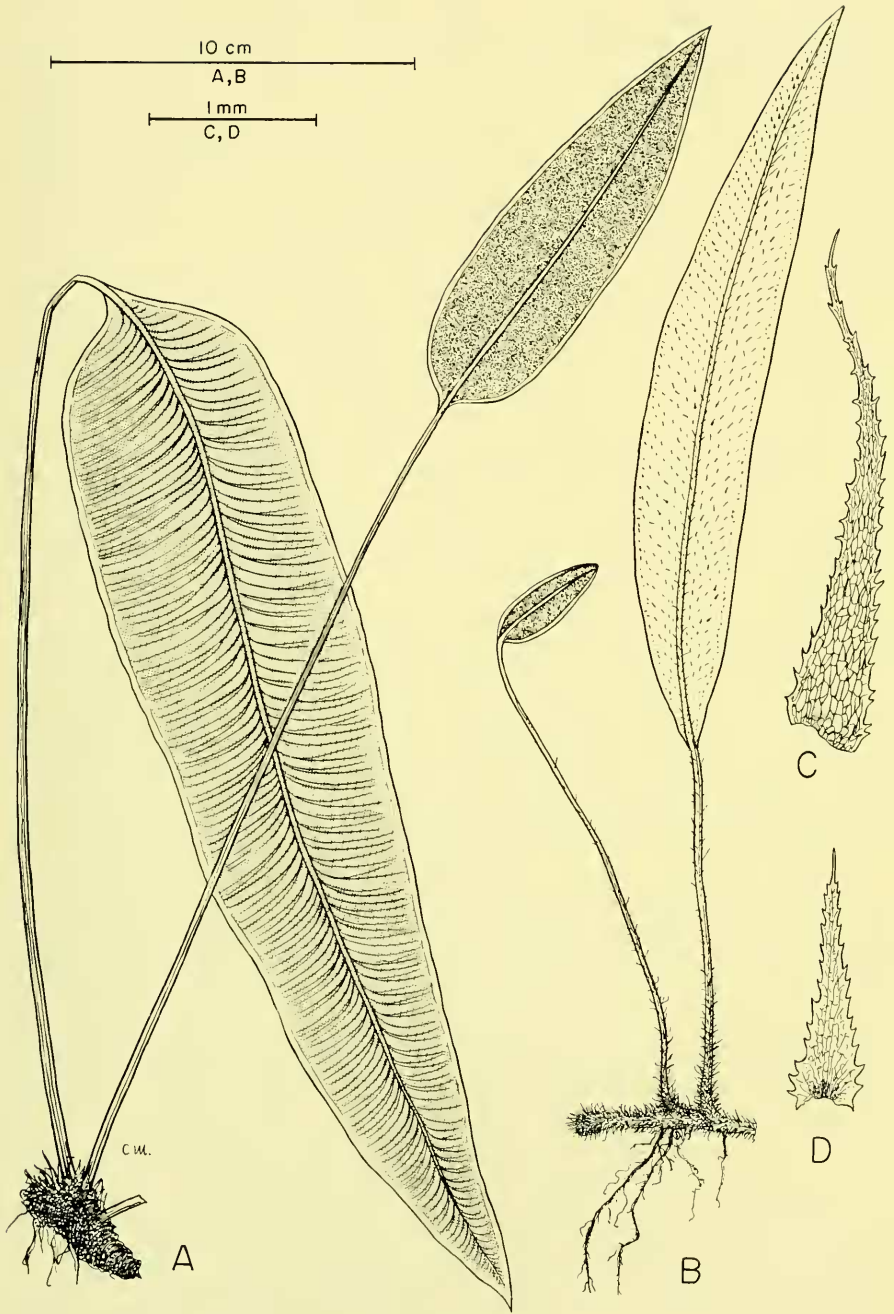
(Figure 3, A–B.)

Rhizomata ignota (probabiliter erecta); stipites usque 35 cm. longi, 5 mm. diametro, brunneoli, basin versus squamati, paleis anguste lanceolatis, usque ca. 10 mm. longis, 1(2) mm. latis, saepe bicoloribus, apice fulvis integris, basin versus denigratis dentatis, non lustratis; rhachides fulvae, eglandulosae, epilosae, paleis dispersis; laminae infra subtripinnatae, sursum bipinnato-pinnatifidae, ca. 45 cm. longae, 27 cm. latae; pinnae basi suboppositae, sursum alternae, ca. 16-jugae, ad angulum 60–80° ascendentes, infimae deltoideae, usque 15 cm. longae, 8.5 cm. latae, petiolulatae usque 6 mm., basiscopicae, anadromae, ceterae gradatim aequilaterae; pinnae secundariae oppositae usque alternae, patentes (ca. 90°), lanceolatae, fere aequilaterae, sessiles usque petiolulatae ca. 1 mm.; pinnulae usque ca. 10-jugae, apicem versus spinulosae; laminae chartaceae, in costis costulisque infra paleis minutis fulvis ovatis usque linearibus praeditae, alibi glabrae, eglandulosae; indusia orbiculari-reniformia, ca. 0.8 mm. diametro, persistentia, porphyrea, glabra.

HOLOTYPE. Mexico. Chiapas: Baduitz, *Münch 116* (DS).

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FIGURE 4. A. *Elaphoglossum albomarginatum*, plant, *Breedlove & Smith 31629*, DS. B–D. *Elaphoglossum chiapense*, *Breedlove & Smith 32649*, DS: B, plant; C, stipe base scale; D, laminar scale.



PARATYPE. Mexico. Chiapas: municipio Tenejapa, paraje Banabil, 2800 m., *Bredlove & Smith 22027* (DS).

REMARKS. Related to *Dryopteris rossii* C. Christensen from western Mexico (later treated by Christensen as a variety of *D. patula*), from which it differs by its larger, narrower, eglandular blades. From *D. patula* (Swartz) Underwood it differs in the smaller, bicolorous stipe scales, spreading, nearly equilateral secondary pinnae, and eglandular blades.

***Elaphoglossum albomarginatum* A. Reid Smith, sp. nov.**

(Figure 4, A.)

Rhizomata breve repentia, crassa, caudices ca. 1 cm. diametro, dense paleacei; stipites ca. 25 cm. longi, 2.5 mm. diametro, straminei, non nisi basi squamati, paleis lanceolatis, usque 2.5 cm. longis, 2 mm. latis, integris, fulvis, glabris, ascendentibus et flexilibus; laminae steriles ovato-lanceolatae, ca. 30 cm. longae, 7 cm. latae, basi rotundatae, apice acutae usque acuminatae, margine scarioso, albido, 0.8 mm. lato, chartaceae, utrinque glabrae; venae 1-2-furcatae plerumque liberae, prope apicem saepe bifurcatae, secus rhachim 3-4 mm. inter se distantes, prope marginem 1.3 mm. inter se distantes; laminae fertiles 13 cm. longae, 3.5 cm. latae, ambitu laminis sterilibus similes, margine albido-hyalino ca. 1.5 mm. lato.

HOLOTYPE. Mexico. Chiapas: municipio Unión Juárez, SE. side of Vol. Tacaná, above Talquian, 2100 m., *Bredlove & Smith 31629* (DS).

REMARKS. Related to *E. latifolium* (Swartz) J. Smith, but with a very broad scarios margin, wider-spaced veins, totally glabrous laminae, and very long, twisted stipe base and rhizome scales.

***Elaphoglossum chiapense* A. Reid Smith, sp. nov.**

(Figure 4, B-D.)

Rhizomata longe repentia (ca. 1 cm. inter bases stipitum), 2-3 mm. diametro, dense squamosa, paleis lanceolatis, 3-4 mm. longis, brunneis, lustratis, denticulatis, plerumque patentibus; stipites usque 15 cm. longi, 2 mm. diametro, straminei usque basin versus fuscati, paleis ca. 2 mm. longis, brunneis, patentibus; laminae steriles usque ca. 20 cm. longae, 3.5 cm. latae, apice acutae, basi cuneatae, chartaceae, utrinque in laminis, venis, rhachidibusque paleis appressis, lanceolatis, 0.7-1.5 mm. longis e basi circulari, minute denticulatis, fulvis; laminae fertiles 3.5 cm. longae, 1.2 cm. latae, oblongae, margine revolutae; venae simplices vel prope basin 1-furcatae, 1.5-2.0 mm. inter se distantes, hydathodis ca. 1 mm. intra marginem terminantes.

HOLOTYPE. Mexico. Chiapas: municipio Rayón, 10 km. above Rayón Mezcalapa along road to Jitotal, 1700 m., *Bredlove & Smith 32649* (DS).

PARATYPE. Same locality, *Bredlove & Smith 32429* (DS).

REMARKS. A very distinct species, seemingly related to the smaller *E. mathewsii* (Fée) Moore, of high elevations; also related to *E. alfredii* Rosen-

stock (type from Costa Rica), but differing from that species in the longer, narrower, darker, and more prominently toothed rhizome scales, the longer stipes of the sterile fronds, and the more persistently scaly blade surface and stipes.

**Grammitis margaritata** A. Reid Smith, sp. nov.

(Figure 5, D-E.)

Rhizomata breve repentia, crassa (caudices ca. 0.7 cm. diametro), squamata, paleis numerosis rigidis castaneis opacis anguste lanceolatis, usque 5 mm. longis, basi ca. 0.5 mm. latis, margine evidentiter ciliatis, ciliis 0.3 mm. longis, albidis, patentibus; stipites usque 14 cm. longi, 1 mm. diametro, brunnei, teretes, non alati, dense setosi, setis patentibus rigidis usque 3.5 mm. longis brunneis et pilis articulatis brevioribus; rhachides fuscae, setosae supra et infra; laminae subcoriaceae lanceolatae, basi pinnatisectae, ca. 11 cm. longae, 2.5 cm. latae; segmenta ca. 20-juga, usque 1.5 cm. longa, 4.5 mm. lata, margine leviter revoluta setosa, apice rotundata vel vix acuta, basi adnata, supra atro-viridia, infra pallide viridia, utrinque glabra, supra sine hydathodis calcareis; venae ca. 7-jugae, simplices; sori uniseriati mediales usque submarginales rotundi, glandulis stipitatis numerosis sphaericis albis mixti;  $n = 37$ .

HOLOTYPE. Mexico. Chiapas: municipio El Porvenir, 3-4 km. W. of El Porvenir along road from Huixtla to Siltepec, 2800 m., *Bredlove & Smith* 31801 (DS).

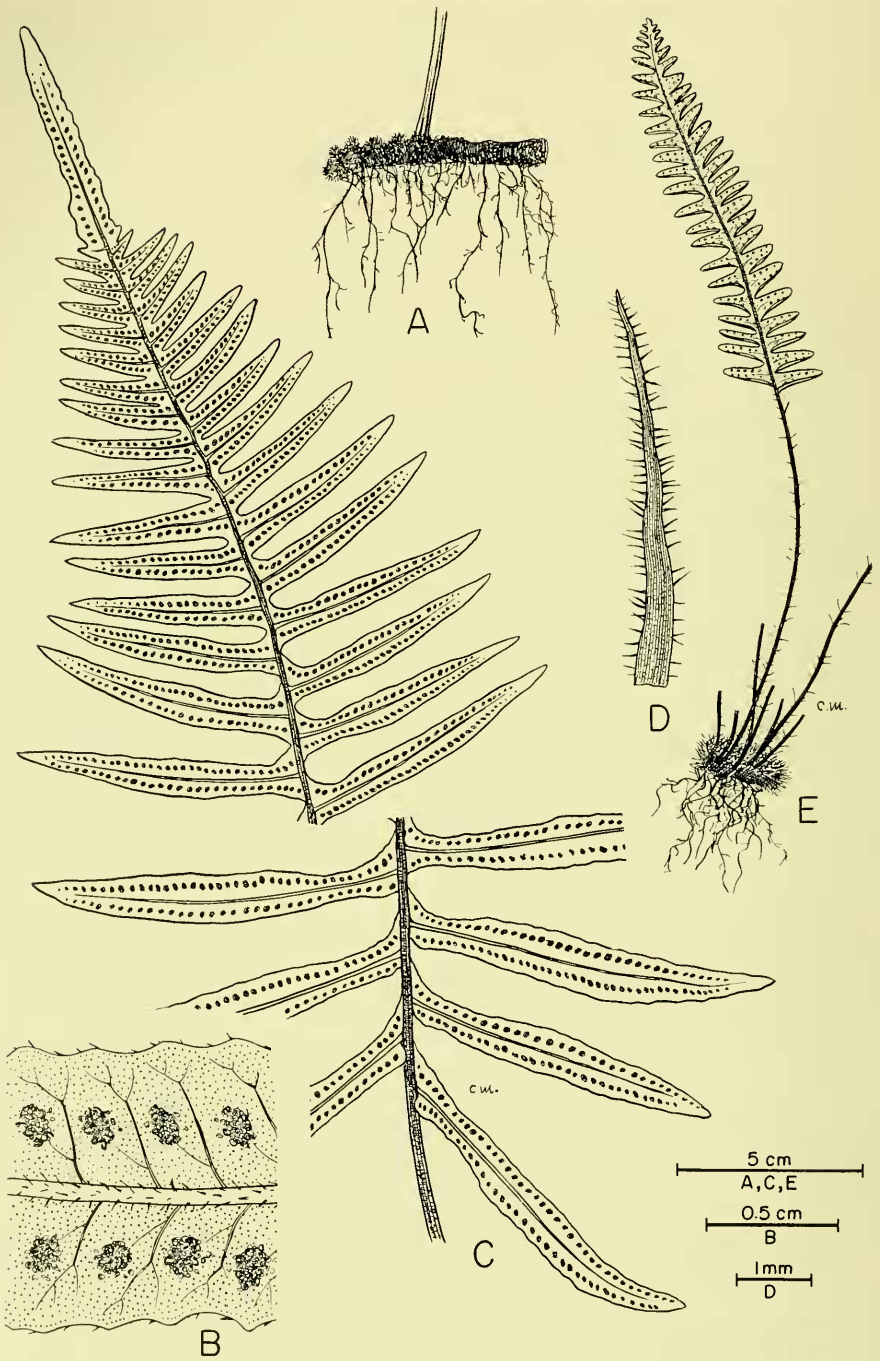
REMARKS. Known only from a single collection, growing on rocky ledge, in evergreen cloud forest (with *Quercus*, *Drimys*, *Clethra*, *Symplocos*). Most closely related to *Polypodium* (*Grammitis*) *meridensis* Klotzsch, but differing in the narrower, less deltoid laminae, the rounded (rather than acute) segments, and the darker, more rigid and stiffly ciliate rhizome scales. The holotype showed  $2n = 37$  II at meiotic metaphase.

The specific epithet recalls the pearly glands that adorn and nearly obscure the young sori.

**Hypolepis melanochlaena** A. Reid Smith, sp. nov.

(Figure 7, D-E.)

Rhizomata et stipites ignoti; rhachides infra fulvae usque brunneolae, supra secus sulcum pubescentes, pilis rufis pluricellularibus, minute et perparce aculeatae, aculeis 0.2 (0.5) mm. longis; laminae 3-pinnatopinnatifidae, plus quam 60 cm. longae (specimina incompleta), dissectae similes *H. repenti* (Linnaeus) Presl; pinnae alternae, maximae plus quam 35 cm. longae, 10 cm. diametro; segmenta ultima oblonga, apice rotundata, integra usque lobata ca. 0.5; laminae chartaceae, infra omnino glabrae in statu sicco viridi-brunneae, supra secus sulcos costarum costularumque pubescentes, in statu sicco nigrescentes; sori 1(2)-jugi per segmentum, indusiis ca. 1 mm.  $\times$  0.5 mm. semi-circularibus integris denigratis instructi.



HOLOTYPE. Mexico. Chiapas: without further locality, *Münch 35* (DS); probable isotype: *Münch s.n.* (DS).

REMARKS. This species differs from all other species of *Hypolepis* known to me by the glabrous, blackish indusia; additionally it differs from all other Mexican species of *Hypolepis* by the glabrous laminae below.

***Polypodium surcurrens*** A. Reid Smith, sp. nov.

(Figure 5, A-C.)

Rhizomata repentia, usque 6 mm. diametro, ca. 7 mm. inter bases stipitum, paleis appressis castaneis lustratis comosis vestita; stipites usque 30 cm. longi, 3 mm. diametro, laminis ca. 0.7 plo breviores, fulvi vel brunneoli; laminae usque 45 cm. longae, 25 cm. latae, basi pinnatisectae, apicem versus pinnatipartitae, denique segmento terminali usque 7 cm. longo, 1 cm. lato; pinnae usque 27-jugae, usque 14 cm. longae, 1.4 cm. latae, saepe arcuatae, apice acutae, medio latissimae, valde sursumcurrentes, infra pinnis infimis excisis, deflexis, marginibus undulatis pinnarum; venae discretae, 3-4-furcatae, venis primariis ca. 8 per 3 cm.; costae infra pilis ca. 0.2 mm. longis (pilis similaribus secus margines pinnarum), supra pilis densioribus *Ctenitidis*; paginae glabrae utrinque laminarum; sori mediales, elliptici, usque 2 mm. longi, 1.3 mm. latae, venula prima acroscopica venarum lateralium locati; sporangia glabra.

HOLOTYPE. Mexico. Chiapas: municipio Cintalapa, 16 km. NW. of Rizo de Oro, SE. of Cerro Baul on border with State of Oaxaca, 1600 m., *Breedlove & Smith 31311* (DS).

PARATYPES. Mexico. Chiapas: Cerro del Ocote, 1500 m., *Breedlove 28918* (DS); between Bochil and Simojovel, 1400 m., *Breedlove & Smith 32493* (DS); Ocotal Grande, 750 m., *Breedlove 33118* (DS); Cerro Baul, 1600 m., *Breedlove & Smith 21795* (DS). Veracruz: Mirador, *Galcotti 6414* (BR, photo US); Jalapa, *C. L. Smith 2207* (UC).

REMARKS. Apparently a relatively common species at middle elevations in Chiapas. *Polypodium surcurrens* is closely related to *P. longepinnulatum* Fournier, from which it differs in the strongly surcurrent pinnae.

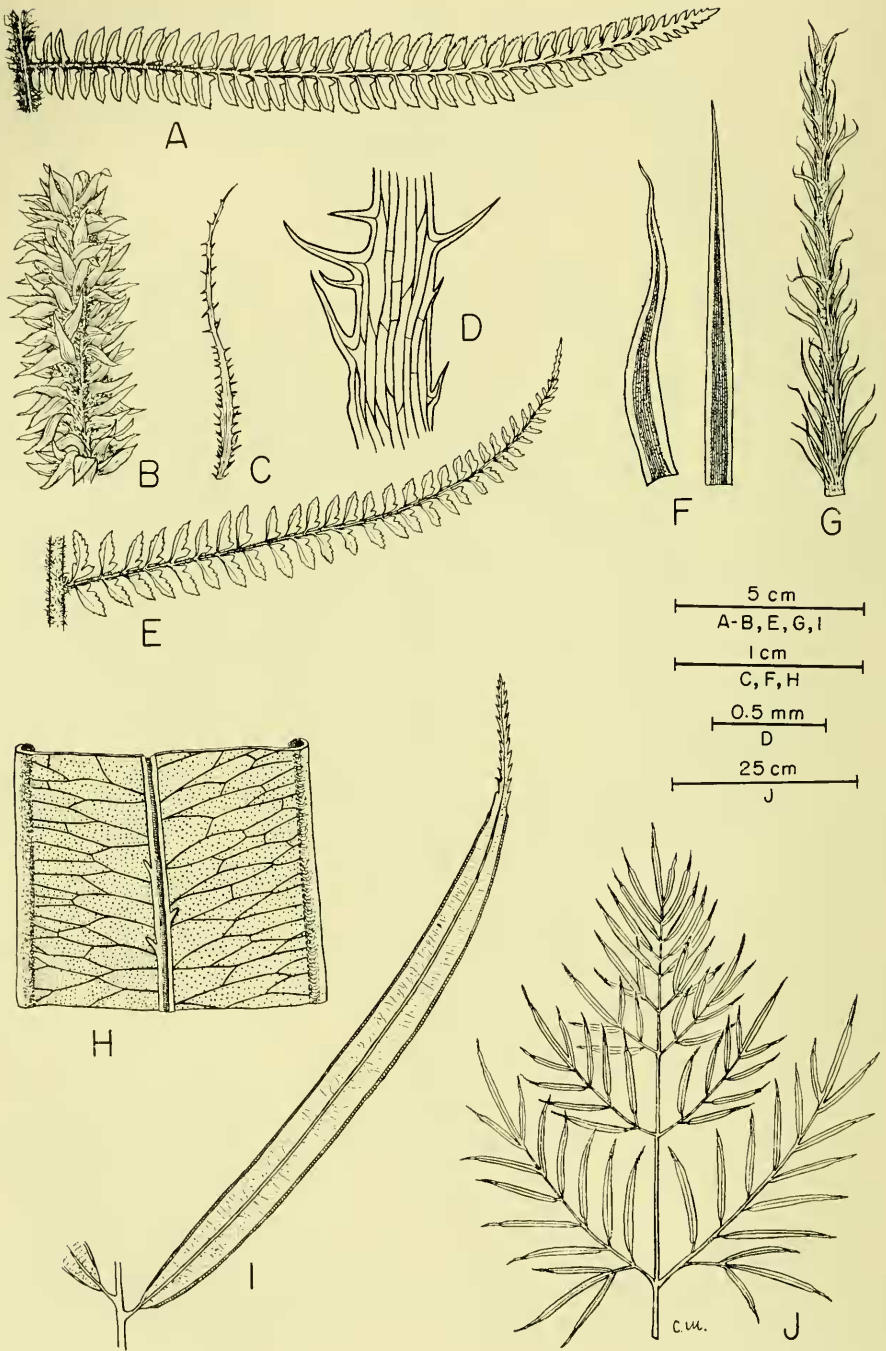
***Polystichum bicolor*** A. Reid Smith, sp. nov.

(Figure 6, E-G.)

Rhizomata erecta, caudices ca. 2 cm. diametro; stipites ca. 25 cm. longi, 5(8) mm. diametro, dense squamosi, paleis ascendentibus, anguste lanceolatis,

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FIGURE 5. A-C. *Polypodium surcurrens*: A, rhizome and stipe base, *Breedlove 33118*, DS; B, portion of pinna, *Breedlove & Smith 31311*, DS; C, lamina, *Breedlove & Smith 31311*, DS. D-E. *Grammitis margaritata*, *Breedlove & Smith 31801*, DS: D, rhizome scale; E, plant.





ca. 1.5 cm. longis, 1–2 mm. latis, integris, distincte bicoloribus, margine stramineis, in centro brunneis; rhachides non proliferae, minute squamosae, paleis plerumque 1–3 mm. longis, stramineis, integris sed basi dilatatis et minute fimbriatis; laminae chartaceae, bipinnato-pinnatifidae, usque 90 cm. longae, 28 cm. latae; pinnae usque 36-jugae, leviter inaequilatae, non imbricatae, lanceolatae, usque 15 cm. longae, 2.4 cm. latae, inferiores 5–8-jugae gradatim reductae (infimae  $\times$  0.3–0.6); pinnulae usque ca. 25-jugae, non congestae, maximae (basales) usque 1.5 cm. longae, 6 mm. latae, in latere acroscopico profunde lobatae usque crenatae, apice spinulosae; costae infra paleis dispersis stramineis similibus illis rhachidum vestitae, costulae venaeque glabrae: sori indusiis peltatis 0.5–0.8 mm. diametro, fulvis, brunnescentibus, margine irregularibus.

HOLOTYPE. Mexico. Chiapas: municipio Tenejapa, Colonia 'Ach'lum, *Ton 1987* (DS).

PARATYPES. Mexico. Chiapas: municipio Tenejapa, Colonia 'Ach'lum, *Ton 890* (DS); Vol. Tacana, 2100 m., *Matuda 2971* (NY); municipio San Andres Larrainzar, summit of Chuchil Ton, NE. of Bochil, *Breedlove 34686* (DS).

REMARKS. Distinguished from *P. ordinatum* (Kunze) Liebmann and *P. drepanoides* Fournier by the narrowly lanceolate, adpressed, distinctly bicolorous scales on the stipe bases, and by the reduced basal pinnae.

### *Polystichum erythrosorum* A. Reid Smith, sp. nov.

Rhizomata ignota, probabiliter erecta, crassa; stipites usque 60 cm. longi, 0.8 cm. diametro, dense paleacei, aliquot paleis ovato-lanceolatis, usque 2 cm. longis, 0.8 cm. latis, nigricantibus et lustratis, vel paleis bicoloribus margine angusto fulvo, sursum paleis concoloribus, fulvis, parvioribus: rhachides non proliferae, moderate squamosae, paleis plerumque lineari-lanceolatis, usque 0.7 cm. longis, 0.1 cm. latis, fulvis, parce denticulatis vel basin versus fimbriatis; laminae subcoriaceae, bipinnatae, usque 70 cm. longae, 40 cm. latae; pinnae usque 26-jugae, non imbricatae, lineari-lanceolatae, usque 26 cm. longae, 3.2 cm. latae, infimae deflexae vix reductae; pinnulae usque 30-jugae per pinnam, non congestae, maximae 1.6 cm. longae, 0.7 cm. latae, lobo parvo acroscopico praeditae, aliter integrae vel crenatae, apice spinulosae, margine basicopico arcuato; costae costulae venaeque infra paleis numerosis tortis fulvis capillaceis vestitae; sori indusiis peltatis 0.6–0.8 mm. diametro rubiginosis planis margine irregularibus.

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FIGURE 6. A–D. *Polystichum furfuraceum*: A, lower pinna, *Münch 113*, DS; B, stipe base, *Breedlove & Smith 31807*, DS; C–D, stipe scales, *Breedlove & Smith 31807*, DS. E–G. *Polystichum bicolor*, *Breedlove 34686*, DS: E, lower pinna; F, stipe base scales; G, stipe base. H–J. *Pteris chiapensis*, *Breedlove & Smith 22492*, DS: H, portion of ultimate segment; I, ultimate segment; J, lamina.

HOLOTYPE. Mexico. Chiapas: municipio Motozintla de Mendoza, road from Huixtla to El Porvenir and Siltepec, 3000 m., *Breedlove & Smith 22709* (DS).

PARATYPES. Mexico. Chiapas: Zontehuitz, *Münch 113* (US); Zontehuitz, *Mickel 1250* (US); Zontehuitz, 2800 m., *Breedlove & Smith 22047* (DS); municipio El Porvenir, 3–4 km. W. of El Porvenir along road from Huixtla to Siltepec, 2800 m., *Breedlove & Smith 31769* (DS).

REMARKS. Similar to *P. furfuraceum* A. Reid Smith in size and dissection and growing in similar habitats, but with numerous black stipe base scales, pinnae and pinnules less crowded, never imbricate, scales not setiform along the margin, and reddish indusia.

### ***Polystichum furfuraceum* A. Reid Smith, sp. nov.**

(Figure 6, A–D.)

Rhizomata ignota, probabiliter crassa, erecta; stipites ca. 30 cm. longi, 0.7 cm. diametro, perdense paleacei, aliquot paleis ovatis, usque 1.8 cm. longis, 0.9 cm. latis, ceteris anguste lanceolatis, ca. 0.3 cm. longis, paleis omnibus ferrugineis usque brunneis, concoloribus vel basin versus leviter fuscatis, margine manifeste setiformis, dentibus usque 0.4 mm. longis; rhachides non proliferae, perdense paleaceae, paleis lanceolatis usque ca. 1 cm. longis, 0.2 cm. latis, similibus illis stipitum; laminae subcoriaceae, bipinnatae, ca. 60 cm. longae, 24–38 cm. latae; pinnae usque 45-jugae, approximatae vel etiam imbricatae, lineari-lanceolatae, usque 20 cm. longae, 2 cm. latae, infimae deflexae et aliquantum abbreviatae ( $\times 0.7$ ); pinnulae usque 40-jugae per pinnam, approximatae vel imbricatae, maximae 1 cm. longae, 0.4 cm. latae, indivisae sed lobo parvo acroscopico praeditae, apice spinulosae, margine basiscopico arcuatae integrae vel apicem versus parce spinulosae; costae costulae venaeque infra paleis numerosis fulvis tortis capillaceis praeditae; sori indusiis peltatis 0.4–0.7 mm. diametro fulvis in centro depressis praediti.

HOLOTYPE. Mexico. Chiapas: Zontehuitz [Zontehuitz], *Münch 113* (DS 267622); isotype: DS 267621.

PARATYPE. Mexico. Chiapas: municipio El Porvenir, 3–4 km. W. of El Porvenir, 2800 m., *Breedlove & Smith 31807* (DS).

REMARKS. Distinguished from all Mexican and Central American species by the very densely scaly stipe and rachis, the approximate or imbricate entire pinnules, and by the scales' being prominently setiform. Perhaps most closely related to *P. erythrosorum* A. Reid Smith.

### ***Pteris chiapensis* A. Reid Smith, sp. nov.**

(Figure 6, H–J.)

Rhizomata erecta, caudices ca. 3 mm. diametro; stipites plus quam 30 cm. longi, ca. 8 mm. diametro, straminei, glabri; laminae chartaceae, ca. 60 cm. longae, basi bipinnatae usque tripinnatae, sursum bipinnatae, ultimo pin-

natae; pinnae infimae maximae, ca. 50 cm. longae, 35 cm. latae; segmenta ultima et pinnae distales usque 25 cm. longae, 1.5 cm. latae, basi anguste cuneatae et petiolatae usque 3 cm., integrae, apice sterili acute serratae; venatio areolata, areolis 2-3-seriatis, areolis costalis 2.0-2.5 mm. latis, brevissimis, margine areolis ca. 1 mm. latis; sori marginales continui (apice excepto).

HOLOTYPE. Mexico. Chiapas: municipio Ocozocoautla de Espinosa, 26-28 km. N. of Ocozocoautla, 700 ft. [213 m.], *Breedlove & Smith 22492* (DS—2 sheets).

REMARKS. Most closely allied to *P. mexicana* (Fée) Fournier, but differing from that species in the sharply serrate apices of pinnae and pinnules, the narrower and more elongate pinnae and pinnules, fewer rows of areoles, and marginal areoles mostly 1 mm. or more broad (rather than ca. 0.5 mm. broad).

### *Thelypteris blepharis* A. Reid Smith, sp. nov.

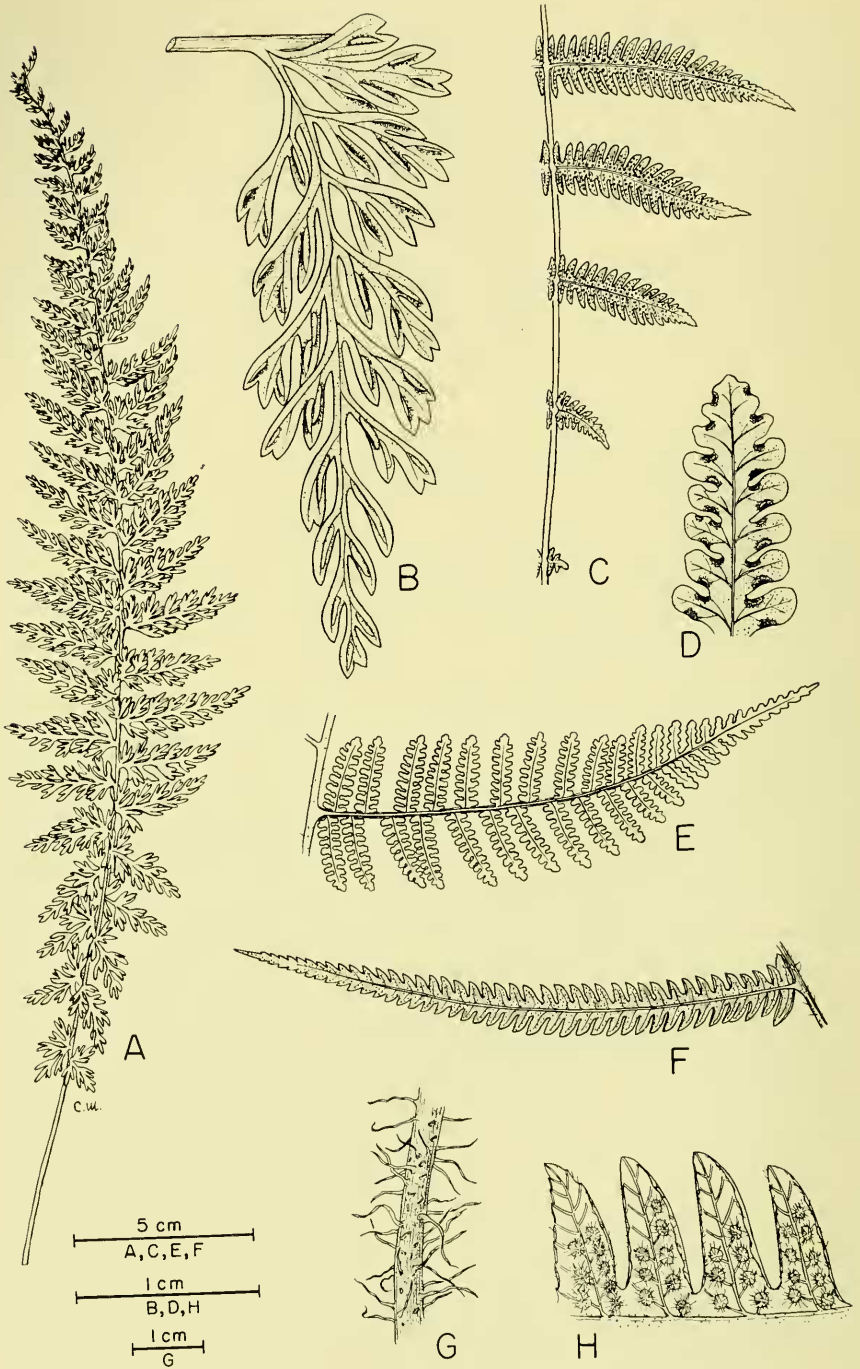
(Figure 7, F-H.)

Rhizomata repentia, 0.8 mm. diametro; stipites 20-40 cm. longi, 4-6 mm. diametro, brunneoli vel dilute purpurei, paleis numerosis patentibus linearilanceolatis usque 8 mm. longis, 1 mm. latis praediti, his glabris vel margine minute glandulosis, atrocastaneis, lustratis; rhachides fulvae, paleis paucis similaribus; laminae chartaceae usque subcoriaceae, atrovirides, 50-70 cm. longae, 30-36 cm. latae, apice gradatim decrescentes; pinnae 20-35 jugae, usque 19 cm. longae, 2.1 cm. latae, basi suboppositae, sursum alternae, fere costis incisae; segmenta obliqua, subfalcata, apice acuta vel obtusa, segmentis basalibus pinnarum infimarum leviter amplificatis, auriformibus; venae prominentes, usque 13-jugae, infimae marginem supra sinum attingentes; rhachides costae venaeque infra epilosae vel sparsim pubescentes, glandulibus minutis dispersis stipitatis luteolis, supra pilis usque ca. 0.5 mm. longis; paginae laminarum utrinque glabrae; sori mediales; indusia porphyrea, glandulifera, dense pilosa, pilis usque ca. 1 mm. longis.

HOLOTYPE. Mexico. Chiapas: municipio La Independencia, road from Las Margaritas to Campo Alegre, 2300 m., *Breedlove 33605* (DS).

PARATYPE. Guatemala. Huehuetenango: slope above San Juan Ixcoy, Sierra de los Cuchumantanes, travertine limestone, 2400 m., *Steyermark 49997* (F, GH).

REMARKS. This is one of the most distinct species in section *Cyclosorus*, differing from its relatives [*T. puberula* (Baker) Morton, *T. ovata* R. St. John, *T. tuerckheimii* (Donnell-Smith) Reed] by the narrow, dark, bristlelike scales on the stipes and by the densely long-hairy indusia but otherwise glabrous laminae. Its discovery reinforces my belief that southern Mexico-Guatemala is the center of evolution of section *Cyclosorus* in the New World (Univ. Calif. Publ. Bot. Vol. 59, pp. 1-136, 1971).



**Thelypteris nubigena** A. Reid Smith, sp. nov.

(Figure 7, C.)

Rhizomata suberecta; stipites usque 15 cm. longi, 3 mm. lati, puberuli, basi fuscati et parce squamulosi, paleis ovatis, fulvis, margine sparsim ciliatis; frondes usque 65 cm. longae, rhachidibus stramineis; pinnae ca. 25-jugae, infimae deinceps 1 mm., 1.5 cm., 4.0 cm., 7.0 cm. longae; pinnae maximae lanceolatae, ca. 7 cm. longae, 1.8 cm. latae, basi latissimae, ca. 0.9 costam versus lobatae; segmenta obliqua, subfalcata, usque 10 mm. longa, 2 mm. lata, apice subacuta; venae usque 10-jugae, marginem supra sinum attingentes; aerophora usque 1 mm. longa basi pinnarum inferiorum; rhachides costae costulaeque utrinque sine paleis, pilis dispersis interdum subfasciculatis ca. 0.2 mm. longis; glandes infra in venis costulis laminisque numerosa, aurantiaca, sessiles, glutinosa; sori mediales; indusia minuta, glandibus aurantiacis abscondita.

HOLOTYPE. Mexico. Chiapas: municipio San Cristóbal Las Casas, E. side of Zontehuitz near summit, 2800 m., *Breedlove & Smith 22057* (DS).

PARATYPES. Mexico. Oaxaca: Distrito Ixtlán, 19 km. N. of Ixtlán on Rte. 175, 2600 m., *Mickel 5533* (NY). Guatemala. Quezaltenango: Vol. Santo Tomás, *Steyermark 34709* (F).

REMARKS. This species can be compared only to *T. thomsonii* (Jenman) Proctor, but the hairs of *T. nubigena* are less obviously fasciculate, and the fronds are much smaller, the segments narrower and more acute. It occurs at perhaps a higher elevation than any other *Thelypteris* in Mexico.

**Ctenitis chiapasensis** (Christ) A. Reid Smith, comb. nov.

*Aspidium chiapasense* Christ, Bull. Herb. Boissier II, 5:727. 1905. Type: Mexico, Chiapas, Baduiz, *Münch 117* (isotype DS!).

**Ctenitis lanceolata** (Baker) A. Reid Smith, comb. nov.

*Nephrodium lanceolatum* Baker, Syn. Fil., second edition. 498. 1874. Type: Guatemala [Alta Verapaz], Cobán, *Salvin & Godman s.n.*

**Ctenitis lindenii** (Kuhn) A. Reid Smith, comb. nov.

*Aspidium lindenii* Kuhn, Linnæa 36:116. 1869. Type: Mexico, Tabasco, Teapa, *Linden 1489*.

**Grammitis blepharodes** (Maxon) A. Reid Smith, comb. nov.

*Polypodium blepharodes* Maxon, Contr. U.S. Natl. Herb. 17:407. 1914. Type: Costa Rica, La Palma, *Maxon 406*.

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FIGURE 7. A-B. *Asplenium munchii*, *Münch 114*, DS: A, frond; B, pinna. C, *Thelypteris nubigena*, lowermost five pinnae, *Breedlove & Smith 22057*, DS. D-E. *Hypolepis melanochlaena*, *Münch 35*: D, ultimate segment; E, pinna. F-H. *Thelypteris blepharis*, *Breedlove 33605*, DS: F, lower pinna; G, stipe base; H, portion of pinna.

**Grammitis harrisii** (Jenman) A. Reid Smith, comb. nov.

*Polypodium harrisii* Jenman, Gard. Chron. III, 27:241. 1900. Type: Jamaica, *Harris*.

**Grammitis leptostoma** (Fée) A. Reid Smith, comb. nov.

*Polypodium leptostomum* Fée, Mem. Foug. 7:58. 1857. Type: Mexico [Veracruz], near Orizaba, *Schaffner 210*.

**Microgramma nitida** (J. Smith) A. Reid Smith, comb. nov.

*Phlebodium nitidum* J. Smith, Bot. Mag. 72. Comp. 13. 1846. Type: cultivated specimen, originally from Honduras, introduced to Kew in 1844.

Maxon (Proc. Biol. Soc. Wash. Vol. 51, p. 38, 1938) discussed the identity of J. Smith's species. A synonym is *Polypodium palmeri* Maxon (Contr. U.S. Natl. Herb. Vol. 17, p. 600, 1917).

**Microgramma reptans** (Cavanilles) A. Reid Smith, comb. nov.

*Acrostichum reptans* Cavanilles, Anales Hist. Nat. 1:104. 1799. Type: Ecuador, Guayaquil, *Née s.n.* The type was seen and commented upon by Christensen [Dansk. Bot. Ark. vol. 9, no. 3, p. 9, 1937].

*Polypodium ciliatum* Willdenow [= *Microgramma ciliata* (Willdenow) Alston], the earliest name for this species in *Polypodium*, becomes a taxonomic synonym when *Microgramma* is recognized.

**Pleopeltis munchii** (Christ) A. Reid Smith, comb. nov.

*Polypodium munchii* Christ, Bull. Herb. Boissier II, 3:147. 1903. Type: Mexico, Chiapas, San Cristóbal Las Casas, *Münch 90* (isotype DS!).

**Pleopeltis revoluta** (Sprengel ex Willdenow) A. Reid Smith, comb. nov.

*Grammitis revoluta* Sprengel ex Willdenow, Sp. Pl. 5:139. 1810. Type: locality not stated.

This species has gone under a great many names, most notably *Polypodium astrolepis* Liebmann, which is the earliest name for this species in *Polypodium* (see Weatherby, Contr. Gray Herb. No. 65, pp. 3-14, 1922, for additional synonymy). However, the epithet *revoluta* is prior and available in *Pleopeltis*.