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OCCASIONAL PAPERS


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NATURAL HISTORY)

VOLUME XIV

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**OCCASIONAL PAPERS**  
OF  
**BERNICE P. BISHOP MUSEUM**  
**HONOLULU, HAWAII**

Volume XIV

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Number 5

**Ferns of Southeastern Polynesia<sup>1</sup>**  
By **E. B. COPELAND**

INTRODUCTION

The material submitted for study consists of 629 collections, of which 2 are from Flint Island, 157 from the Society Islands, and 470 from the islands to the south and southeast of the Society Islands.

The ferns of the Society Islands were treated comprehensively in Bulletin 93 of Bernice P. Bishop Museum. Bulletin 102 by J. W. Moore added 12 species. The present collection adds:

- Dryopteris Haenkeana* (Presl) O. Kuntze
- Polystichum paleatum*, new species
- Lindsaya eximia*, new species

Moore's work and these additions increase the apparent endemism of this group from 30 percent to 35 percent. The fern flora of these islands needs no further discussion at this time.

Neither is any considerable discussion of the flora of southeastern Polynesia required. The general condition has already been depicted by Dr. and Mrs. F. B. H. Brown in Bulletin 89. The more ample collections now in hand from the Austral Islands, Rapa, Mangareva, and Pitcairn do not change their conclusions except in detail; and a general discussion of the Polynesian fern population should await a comprehensive collection of Polynesian fern flora. For an understanding of this flora as a whole, it is the islands to the far west which have still to provide the most needed information. The New Hebrides and New Caledonia are regarded as fairly well explored. The Solomon Islands are not so, and the considerable collection of their ferns which I have recently examined, made by Brass and Kajewski for the

<sup>1</sup> Mangarevan Expedition Publication 22.

Arnold Arboretum and Queensland Museum, demonstrates as a fact what was already almost sure: that they represent the path by which Malay-Papuan ferns reached Polynesia.

As a perfectly obvious preliminary statement, there are two original elements in the Polynesian fern flora, an Austral (Antarctic) and a Malay-Papuan. Leaving out of account the many rather local endemics when species are being considered, there has developed a small element of species widespread in Polynesia but peculiar to the region. This group of species is Austral rather than Malayan in general affinity. The Austral element of the flora is older here than the Malayan, and is probably being swamped by the latter.

We may picture the Austral immigration as coming by way of New Zealand (not, of course, from Australia, but from Antarctica), and the Malayan as coming by way of Papua. Both entered Polynesia far to the west of the region of this Expedition. In Polynesia, migration has been eastward, whatever its ultimate source. Step by step, eastward at least from Fiji, the evidence of direct connection with New Zealand grows progressively weaker.

The fern flora of southeastern Polynesia is now very well known. The fact that nearly all of the forty species accredited to Rapa in Bulletin 89 have been collected again by this Expedition is evidence that the collection is thorough. When I miss in this collection a fern supposed to have been described from Pitcairn, I suspect that the previous report was an error. Future exploration will reveal more novelties in Fiji and in the Society Islands than in the islands of the southeast.

As to endemism, the general conditions—its relation to area, age, altitude, and isolation—stand fairly independent of our attitude toward the concept of species. Bulletin 89 recognizes many varieties; I describe none, but with the same material we would draw approximately the same conclusions. With completeness of collection, the recognized proportion of endemics increases, because in general the endemics are the comparatively rare plants. With 56 species from Rapa instead of 40, I find 35 percent of endemism instead of 31 percent. A few years of more intensive collection have raised the recognized endemism in the Society Islands from 30 percent to 35 percent.

I continue to use *Sphenomeris* and *Campium* as generic names. Christensen, in the comprehensive Third Supplement to his Index,

posting Ching as responsible, rejects these in favor of *Stenoloma* and *Bolbitis*. In appreciation of the incalculable value of Dr. Christensen's Indices, it is the world's general practice to conform to his nomenclature. In publishing *Sphenomeris* and in reviving *Campium*, however, Dr. Maxon and I have presented good reasons for not adopting *Stenoloma* and *Bolbitis*, and I have not seen any refutation of these reasons by Ching or Christensen. If objection be made to *Campium* on the ground that it is imperfectly typified, the alternative name is *Cyrtogonium*. *Bolbitis* is an American genus derived from *Phlebodium* without a near relative in the Orient. When Ching restores *Colysis* as a genus, I can agree with him. When he and Christensen unite *Dendroglossa* with *Leptochilus*, I cannot agree, but the affinity is not very remote. But when they combine *Campium* (*Cyrtogonium* or *Heteroneurum*) with *Bolbitis*, it is no longer with me a matter of judgment, but one of fact. At this point, they are as completely and evidently wrong as when they persist in imputing a Dryopterid or Tectarid origin to any of these ferns.

This collection has been studied in and with the facilities of the herbarium of the University of California. The types of the new species are in the herbarium of the Bishop Museum; cotypes or type fragments are in the herbarium of the University of California. The collections are cited briefly under the collector's numbers. Numbers 11000 to 12172 were collected by F. R. Fosberg, and numbers 14106 to 17500 by H. St. John, either alone or assisted by Fosberg.

#### FILICINEAE

#### OPHIOGLOSSACEAE

##### **Ophioglossum reticulatum** Linnaeus.

Rapa, no. 15721; Mangareva, no. 14883.

Pantropic.

##### **O. pendulum** Linnaeus.

Tahiti, no. 17057; Raiatea, no. 17237; Tahaa, no. 17388; Meetia, no. 14180; Rurutu, no. 16651; Raivavae, no. 16057; Rimatara, no. 16787.

Westward to the Mascarenes.

MARATTIACEAE

**Angiopteris evecta** (Forster) Hoffman.

Huahine, no. 17203; Raiatea, nos. 17265, 17301; Raivavae, no. 15841; Rurutu, no. 11941.

Westward to Malaya.

**A. longifolia** Greville and Hooker.

Tahaa, no. 17355; Tubuai, no. 16445; Rapa, no. 15446.

*A. longifolia* Greville and Hooker was published as from "Pitcairn and Society Islands," which would make Pitcairn the type locality if the citation be accepted. DeVriese examined the material in Hooker's herbarium, collected "March to May, 1830," consisting of two specimens, "quae ad eandem pertinent frondem"; and gave a very complete description with figures (Monographie des Marattiacées, p. 19, pl. III, IV, fig. 2, 1853). Recent Tahitian collections represent it perfectly, and specimens from Rapa and Rarotonga (the latter variable) conform satisfactorily. It is my belief that the species was described from Tahitian material only and that it does not occur on Pitcairn.

**Angiopteris chauliodonta** Copeland, new species (pl. 1).

Trunco testibus lectoribus 0.5 m alto stipitibusque carnosis; stipite sicco 2.5 cm crasso, plumbeo, glabrescente; fronde usque ad 4 m longa; pinnis medialibus 75 cm longis, rhachi superne plumbea vel nigra, inferne straminea sparse flocculosa; pinnulis brevi-pedicellatis, usque ad 18 cm longis, 2 cm latis, basi truncatis vel acroscopice rotundatis vel late cuneatis, margine denticulatis, costa inferne et sparsius lamina ferrugineo-squamulosis, acumine 3-4 cm longo basi 6 mm lato argute serrato dentibus inflexis; venulis spuriiis ambabus faciebus et luce transeunte subconspicuis; soris vix 1 mm a margine remotis, 1-1.5 mm longis, sporangiis 7-10, apices versus pinnularum soris more Danaeae orbicularibus, haud ad acumina attingentibus.

Pitcairn: hills above Adamstown, wet wooded ravine, altitude 100 meters, Fosberg and Christian no. 11242, type; Garnets Ridge, moist woods, altitude 150 meters, St. John no. 14990. Local name, *nehe*.

The species is well characterized by the broad, sterile apices of the pinnules, with sharp, narrow, incurved teeth at their bases.

**Marattia cincta** Copeland.

Raiatea, no. 17266.

Endemic.

**M. Stokesii** E. Brown.

Rapa, no. 15354. Endemic.

Locules not rarely 12. This is ill distinguished from Tahitian *M. fraxinea*, but more than one species may still be included under that name.

HYMENOPHYLLACEAE<sup>2</sup>**Hymenophyllum polyanthos** Swartz.

*Hymenophyllum gracilius* Copeland.

Tahiti, nos. 17035, 17431.

Pantropic.

**H. cuneatum** Kunze.

Rurutu, no. 16750; Rapa, nos. 11386, 11564, and 15436.

Chile, Juan Fernandez.

Construing *M. polyanthos* as broadly as I do, *M. cuneatum* is not very distinct from it.

**Mecodium diversilabium** Copeland, new species (pl. 2).

Rhizomate filiforme vix 0.2 mm diametro; stipitibus filiformibus, 6-10 mm longis, vix ad basin alatis, atrocaneis, basi decidue piluliferis; fronde 2-3 cm longa, 1.5-2 cm lata, apice rotundata, tripinnatifida, compacta, segmentis uninerviis brevibus 1 mm latis rotundatis vel emarginatis, sordide viridibus, costis aut fuscis aut rubido-fuscis, ad bases sororum ramiferis; soris terminalibus, multis, involucri ca. 1-2 mm lato, paullo longiore, ad vel ultra medium fisso, labiis diversis, plerisque lobato-dentatis lobis ca. 3 rarius integris acutis, rarissime integris rotundatis, nonnullis profundius in segmenta involucri 3, 4 vel 5 divisus; receptaculo columnare valido vix ultra mediam longitudinem involucri extenso.

Austral Islands: Tubuai, northeast slope of Taitaa, in moist shaded crevices between basalt ledges, altitude 375 meters, St. John no. 16438, type; same locality, altitude 390 meters, St. John and Wight no. 16313.

Probably a derivative of the variable species here called *M. cune-*

<sup>2</sup>In a paper prepared before this one, but still awaiting publication in the Philippine Journal of Science, I recognize some thirty genera in this family. To avoid the use of unfamiliar names without the argument which would justify their use, I retain here *Trichomanes* and *Hymenophyllum* as names of old species and thus avoid new combinations. For new species, however, I am unwilling to pile up synonyms by using these generic names for species which do not properly belong in the genera. To validate the new generic names used here, the following brief references or diagnoses will serve:

*Mecodium* Presl is taken from Epimeliaceae (1851?), p. 258.  
*Callistopteris*: Rhizomate valido, stipitibus caespitosis setosis, frondibus magnis decompositis membranceis, involucri obconicis, receptaculo exserto. Type, *Trichomanes apifolium* Presl.  
*Macroglena* is used by Presl (Abh. Böhm. Gesell. Wiss., ser. 5, vol. 5, p. 333, 1848) as the name of a section of *Trichomanes*. I give it generic status, typified by *T. meifolium* Bory.

*atum* (Cavanilles) Copeland, but distinct from other local forms in aspect, as well as in the remarkable lips.

**Trichomanes humile** Forster.

Tahaa, no. 17356.

Westward to Sumatra and Formosa.

**T. Endlicherianum** Presl.

Raivavae, no. 16188; Rurutu, no. 16630. Rapa, nos. 11592, 15328, 15390.

New Zealand, Norfolk, Fiji, Samoa, Tahiti.

I have seen no specimen from Fiji or Tahiti except Brackenridge's types of *Trichomanes erectum* and *T. tenue* ascribed to these islands.

**Pleuromanes pallidum** (Blume) Presl.

Tahiti, no. 17053.

Marquesas to Ceylon.

**Trichomanes polyanthum** Hooker.

Tahiti, no. 17072.

Endemic in the Society Islands.

**T. Bauerianum** Presl.

Rurutu, no. 16751.

The specimen is too young for positive determination.

**Callistopteris calyculata** Copeland, new species (pl. 3).

Fronde 25-30 cm longa, 10-15 cm lata; pinnis basalibus paucis modo reductis, suprabasalibus 6-9 cm longis 2.5-3 cm latis; segmentis ultimis vix 1 mm latis; soris in segmenta fere abortiva immersis deinde alatis, late calyciformibus, indusio vix 1 mm longo, paullo latiore, tenuiter membranaceo et fragile, ore breviter bilobo, receptaculo tantum aequilongo.

Rapa: Kaimaru, south ridge of Mount Perahu, moist soil in dense woods on ridge, altitude 475 meters, St. John and Maireau no. 15522, type; also, west slope of Vairu, bottom of moist ravine, altitude 330 meters, Fosberg no. 11614. St. John and Maireau no. 15435, juvenile, is presumably this species.

This is another local insular species, characterized by the broad sori, with rounded, immersed base and shallowly bilabiate mouth. It is nearest to *C. polyantha*, but with smaller sori and less narrowed base of frond. *C. polyantha* is typically developed in Huahine and Raiatea, Tahiti specimens varying toward *C. calyculata*.



**Trichomanes dentatum** van den Bosch.

Tahiti, no. 17054; Raiatea, no. 17281; Tahaa, nos. 17343, 17365; Tubuai, no. 16427; Rurutu, no. 16753. Rapa, no. 15661.

Westward to New Caledonia.

**Macroglena truncata** Copeland, new species (pl. 4).

Rhizomate repente, 1 mm crasso, nigro, apice basibusque stipitum pilis atrocastaneis usque ad 1 mm longis mox deteris vestitis; stipitibus haud remotis 4-8 cm longis, ca. 0.7 mm crassis castaneis sursum viridescens; fronde usque ad 16 cm longa et 6 cm lata, tripinnatifida segmentis interdum furcatis, rhachi deorsum angustissime sursum rhachibusque pinnarum latius alatis, segmentis ca. 0.6 mm latis; cellulis utroque latere costae 3-4-seriatis, magnis, parietibus modo incrassatis obscuris, cellulis marginalibus parietibus tenuibus; soris paratactis a margine frondis remotis, involucre cylindrico 1.5 mm longo, 0.5 mm lato, basi alato, ore truncato haud expanso, receptaculo duplo quam involucre longiore.

Rapa: Mitiperu, in dense damp forest, altitude 350 meters, Fosberg no. 11573, type; Kaimaru, south ridge of Mount Perahu, on tree trunks, altitude 460 meters, St. John and Maireau no. 15527; Hiri Valley, south slope of Morongota, on trunks in dense forests, altitude 150 meters, Fosberg no. 11593, juvenile.

A relative of *M. caudata* (Brackenridge) Copeland, and like that species in having a better laminar development than is typical of *Macroglena*, but with the large cells typical of the genus; different from the smaller forms of *M. caudata* (*Trichomanes Milnei*) in having the involucre wingless except at the base, and the mouth not at all dilated. The gross appearance is that of *Trichomanes johnstonense* Bailey, which is near to *T. maxima*, ascribed to Rapa by Dr. and Mrs. F. B. H. Brown (Bishop Museum Bull. 89, p. 10, 1931), but the cellular structure is altogether different.

## SCHIZAEACEAE

**Schizaea dichotoma** (Linnaeus) Smith.

Raiatea, no. 17330; Huahine, no. 17201; Tahaa, no. 17374.

Westward to Madagascar.

**S. fistulosa** Labillardière.

Raiatea: Temehani Plateau, in high moor, altitude 600 meters, St. John no. 17300.

Collected in the Society Islands by Brackenridge (as *S. australis*, regarded as a variety of *S. fistulosa*), but overlooked in Bulletin 93.

I cannot distinguish *S. robusta* Baker, described from Hawaii and accredited to the Society Islands on the strength of the Brackenridge collection. The distribution is typically austral—Antarctic America, Norfolk, New Zealand, Tasmania, north to New Caledonia; reported also from Borneo and the Seychelles, and (evidently in error—see Christensen, Pteridophyta of Madagascar, p. 174) from Madagascar. The Borneo plant is probably *S. malaccana* Hooker—or *S. Copelandica* Richter if that be distinguishable.

**Lygodium reticulatum** Schkuhr.

Huahine, no. 17191; Tahaa, no. 17366.

Very common in western Polynesia and to Australia, but unknown farther east.

GLEICHENIACEAE

**Gleichenia Brackenridgei** Fournier.

Tahiti, nos. 16987, 17003, 17107.

Fiji, New Caledonia.

**G. tahitensis** Copeland.

Tahiti, no. 17107.

Endemic.

**G. linearis** (Burmah) Clarke.

Tahiti, nos. 14135, 17094; Tahaa, no. 12139; Rurutu, no. 16575; Tubuai, no. 16457; Raivavae, nos. 15830, 15840; Rimatara, no. 12045; Rapa, nos. 11377, 11425, 11443, 11479, 11566; Mangareva, nos. 14462, 14931; Pitcairn, nos. 11221, 14955.

MARSILEACEAE

**Marsilea polycarpa** Hooker and Greville.

Borabora: Turapuo, in swampy flat by shore, abundant, St. John and Fosberg no. 17414.

Tropical America, already reported from the Society Islands by Baker. I mistrust the identification, but cannot correct it.

POLYPODIACEAE

**Cyathea affinis** (Forster) Swartz(?).

Tahiti, no. 14145, sterile.

**C. tahitensis** (Brackenridge) Domin.

Huahine, no. 17155; Raiatea, no. 17269.

Endemic in Society Islands.

**C. societarum** Baker.

Tahiti, no. 14151.

Endemic (but see note under *C. rapensis*).

**C. Cumingii** Baker.

Rurutu, no. 16659; Tubuai, nos. 16332, 16361; Pitcairn, nos. 11241, 14978 (see note under *C. rapensis*).

**Cyathea rapensis** Copeland, new species (pl. 5).

Trunco teste lectore 6 m alto; stipite 30 + cm alto, castaneo, basi paleis lineari-acicularibus 25 mm longis margine deorsum breviter fimbriatis vestito, sursum minute tuberculato furfuraceo; fronde 120 cm longa, 90 cm lata, subtripinnata, rhachibus castaneis asperulis; pinnis infimis 40 cm longis recurvis, longe (5 cm) stipitulatis, medialibus brevius stipitulatis, 50 cm longis, 20 cm latis, abrupte acuminatis; pinnulis infimis paullo reductis stipitulatis, sequentibus 10.5 cm longis, 3 cm latis, subsessilibus, imbricatis, basi pinnatis rhachibus (et pinnarum) superne et pilis et paleis minutis angustis castaneis dense vestitis inferne sparsius furfuraceis; pinnulis II resp. segmentis usque ad 2 cm longis, 3-4 mm latis, acutis, majoribus crenatis, omnibus apices versus serrulatis, coriaceis, glabris, laete viridibus; venulis ca. 15-paribus, inferioribus bis dichotomis soris costularibus, indusio brunneo, vix 1 mm lato, oblique versus marginem dehiscente.

Rapa: Maungaeae, east of Mangaoa Peak, in dense moist woods, altitude 260 meters, St. John and Maireau no. 15355, type; Anarua Valley, southeast ridge of Mount Perahu, altitude 300 meters, Fosberg no. 11511, stipe 70 cm long, frond 80 cm long; Peatuakaviri, west of Mount Tautautu, altitude 210 meters, St. John and Maireau no. 15397, trunk 10 meters tall, fronds larger throughout than as described, axes more muricate and more scurfy, indusium opening almost upward. No. 15397 may be the Rapa plant identified by Mrs. Brown as *C. medullaris*, from which it differs in being much more scurfy. Its fruiting fertile pinnules are freely inciso-crenate, but crenation occurs in New Zealand also.

What I determine as *C. medullaris* occurs from New Zealand to Australia and the New Hebrides. All species from Tahiti east and south, except *C. decurrens* are its relatives. *C. societarum* and *C. Cumingii* are hardly distinguishable; since the latter name exists, I apply it to specimens from the Austral Islands and Pitcairn, but the covering of the dorsal surface by the sori, which Baker emphasized

and Mrs. Brown used as a key character is unlikely to be peculiar to anything except single specimens. *C. tahitensis* is well marked by the conspicuously one-sided indusium; but the tendency in all of these species is for the indusium to break down first on the most exposed side. Thus, on a single pinnule of *C. rapensis*, where the sori are on one side of the costa, they rupture almost upward, but where as is usual they are on both sides, the rupture shifts to the marginal side of the indusium.

If no. 15397 were from another island, I might describe it as another species, but I anticipate that when many Rapa specimens can be compared, they will be found to intergrade. The collection of this number is very ample otherwise, but wants the stipe. The basal scales of the other two collections are narrower and darker than in related species.

**Dryopteris sciaphila** Maxon.<sup>^</sup>

Raivavae, no. 15858; Rurutu, no. 16663; Rapa, no. 15245; Pitcairn, no. 14968.

Described from Tahiti.

**D. dicksonioides** (Mettenius) Copeland.

Tahiti, no. 17034.

**D. setigera** (Blume) O. Kuntze.

Raivavae, nos. 11672, 11777, 15087; Rurutu, no. 16578.

Native westward to India and to Japan.

**D. leucolepis** (Presl) Maxon.

Borabora, no. 17423; Raivavae, no. 11672; Rapa, no. 15717.

Westward to the Philippines.

**Dryopteris diversisora** Copeland, new species (pl. 6).

Rhizomate erecto, cum basibus stipitum vix 2 cm crasso; stipite erecto, 30 cm alto, fusco, dense breviter pubescente, deorsum paleis membranaceis brunneis 5 mm longis, 2 mm latis acutis aut integris aut sparsissime dentiferis sat dense vestito, sursum rhachique sparsius paleis decrescentibus vestitis; fronde usque ad 35 cm longa, 14 cm lata, acuminata, subbipinnata; pinnis infimis deflexis non reductis, pinnulis infimis reductis; medialibus horizontalibus, 7 cm longis, vix 2 cm latis, acutis, sessilibus basi haud angustatis, basi vel nullibi pinnatis alibi profunde pinnatifidis, rhachibus pubescentibus inferne cum paleis minutis pilis immixtis; segmentis 3-4 mm latis, apice rotundatis, crenulatis vel inferioribus crenatolobatis, herbaceis, costis utraque facie et margine setiferis; venis ca 6-paribus, infima rhachiscopica plerumque furcata; soris medialibus, indusio aut asplenioideo aut athyrioideo aut rarius symmetrice hippocretiforme bullato non glandulifero.

Rapa: Taratika, east side of Mount Perahu, rain forest on main ridge, altitude 620 meters, St. John, Fosberg and Maireau no. 15660, type; west ridge of Mount Perahu, rain forest, dense shade, altitude 630 meters, St. John and Fosberg no. 15723.

A relative of *D. viscosa*, from which it differs in having broader basal scales and fairly abundant smaller scales mixed with the pubescence of the rachises of frond and pinnae. *D. Quaylei* of the Marquesas is probably in the same group.

In general, the lower sori are dryopteroid and the distal ones asplenoid; the occasional dominance of the latter is shown by the field label of no. 15723, bearing the name "*Asplenium*".

***Dryopteris rurutensis*** Copeland, new species (pl. 7).

Rhizomate horizontale apice erecto, radicibus basibusque stipitum profunde immerso iisdemcumque 5 cm crasso; stipitibus fasciculatis, validis, sulcatis, stramineis, decidue puberulis; fronde usque ad 120 cm longa, 35 cm lata, pinnata, pinnis infimis sensim ad vestigia pauca remota reductis; pinnis medialibus 20 cm longis, 15-18 mm latis, sessilibus, basi truncatis acroscopice paullo dilatatis, apice sensim attenuatis, medio ad costam vel profundius pinnatifidis, herbaceis, costa superne pubescente excepta omnino glabris; segmentis 3-4 mm latis, obliquis, obtusis; venis 8-10-paribus, infimis prope costam anastomosantibus et costulam validam in dentem deflexum sinum complementem cum venis (non paribus) 1 vel 2 sequentibus connexum terminantem producentibus; soris ad venas fere omnes medialibus, indusio nullo vel stigiale.

Austral Islands: Rurutu, Moerai, on moist shaded stream bank, altitude 15 meters, St. John and Fosberg no. 16590.

Related to *D. Stokesii*, but with fewer anastomosing veinlets, larger, and less scaly at the base.

***D. Grantii*** Copeland.

Tahiti, no. 17111.

Local.

***D. Margaretae*** E. Brown.

Rapa, nos. 11429, 11544, 11549, 15710.

Endemic.

***D. gongyloides*** (Schkuhr) O. Kuntze.

Rurutu, no. 16683; Rimatara, no. 16933.

Pantropic.

***D. Stokesii*** E. Brown.

Rapa, nos. 11473, 11548, 15250.

Endemic.

The rhizome is creeping and, like the bases of the closely placed stipes, clothed with lanceolate to ovate fuscous paleae. The stipes may be 7 mm in diameter, but not 7 cm as described. In the specimens in hand, the transition from normal pinnae to tubercle-like rudiments is abrupt. A vestigial indusium can be detected before but not after the sporangia develop. The author of the species makes the indusium persistent in her key, but "absent, at least on mature fronds" in the description; and names it with a masculine genitive, presumably for Mrs. Stokes.

**D. *invisa*** (Forster) O. Kuntze.

Borabora, no. 12164. Raivavae, nos. 11682, 15837; Tubuai, no. 16490; Rimatara, no. 16941.

Marquesas to New Caledonia.

**D. *unita*** (Linnaeus) O. Kuntze.

Tahaa, on an islet in Haamene Bay, on open grassy slope, altitude 5 meters, Fosberg no. 12148; previously reported by Drake.

Westward to India and the Seychelles.

**D. *Haenkeana*** (Presl) O. Kuntze.

Tahaa, east side of Mount Purauti, moist woods, altitude 220 meters, St. John no. 17359.

This is the plant so named from Fiji and New Caledonia.

***Dryopteris dentata*** (Forskål) C. Christensen.

*D. nymphalis* (Forster) Copeland.

Mangareva Islands, nos. 14483, 14613, 14728, 14773, 14938; Pitcairn, nos. 11230, 11231, 14949, 14965; Raivavae, no. 11678; Rapa, nos. 11485, 15333.

With a limited number of specimens from Tahiti and Fiji, I have thought it possible to distinguish the Polynesian plants once called *D. parasitica*, *Aspidium molle*, etc., from those of Malaya, Africa, and America. With the more ample material now demanding identification, I find that a strict interpretation of *D. nymphalis*, in which sense only it can be distinguished from *D. mollis*, will exclude many nearly related specimens. These might then be described as other species, or given other old names; and at least in part these are indistinguishable from American forms which seem unsusceptible of specific distinction from *D. mollis*. Therefore, I am driven to the conclusion that the best course is to recognize the group as very variable in Polynesia and

to abandon the attempt to distinguish it from the likewise variable American species named (*Polypodium molle* Jacquin) a few years later. I do not know authentic *D. dentata*, but accept Christensen's use of the name.

The material now given this name is all somewhat hispid on both surfaces as well as on the veins and indusia; has one, or two pairs of anastomosing veinlets; the rhizome is creeping, moderately or very stout, sometimes erect at the tip; stipes fascicled or at any rate not very remote, with narrow dark entire scales at the base; the lowest pinnae usually but not invariably reduced.

The geographic varieties (of *D. parasitica*), *pitcairnensis*, *rapensis*, and *mangarevensis* E. Brown (Bishop Museum Bull. 89, p. 23, 1931), do not exist as fixed local forms. From each of the islands in question, we have specimens not fitting her descriptions. As small as Pitcairn Island is, the four collections from it might all be distinguished in words.

**D. sulphurea** E. Brown.

Rurutu, nos. 11937, 16636; Rimatara, no. 12053; also Meetia, no. 14189, which would be *D. subpectinata* if it bore basal abortive pinnae. The latter species is perhaps not constantly different.

Described from the Marquesas.

**Polystichum aristatum** (Forster) Presl.

Rurutu, no. 16673. Rapa, no. 15249. Pitcairn, nos. 11229, 11310, 14969.

Westward to Japan and Natal.

**P. rapense** E. Brown.

Rapa, nos. 11508, 11624, 15244, 15596.

Endemic. This was described from stunted specimens like no. 11624; our other collections have fronds 35 cm long, and no. 11508 is tripinnate.

**P. Stokesii** E. Brown.

Rapa, nos. 11604, 15366, 15524, 15673.

Endemic.

**Polystichum Australium** Copeland, new species (pl. 8).

Rhizomate adscendente 2 cm crasso, cum radicibus basibusque stipitum, 6 cm crasso; stipite 35 cm alto, deorsum paleis fuscis 2 cm longis, 3-5 mm latis acuminatis basi aut integris aut ramuliferis densissime, sursum sparsius paleis

stramineis 2-4 mm longis lanceolatis acuminatis margine leviter fimbriatis vestito; fronde 60 cm alta, 35 cm lata, tripinnata, rhachi straminea fibrillosa glabrescente; pinnis infimis patentibus paullo reductis, medialibus usque ad 22 cm longis, 5 cm latis acuminatis; pinnulis 3 cm longis, 8 mm latis, basi obliquis subauriculatis subcoriaceis, glabrescentibus, pallide viridibus; soris multis, parvis, submarginalibus, leviter immersis sed superne conspicue umbonatis, indusio sat grande integro.

Austral Islands: Raiavavae, Mount Taraia, south slope, woods at base of precipice, altitude 230 meters, St. John no. 16009, type; Raiavavae, Mount Muanui, south slope, dense woods at base of cliff, altitude 200 meters, Fosberg no. 11699; Tubuai, Taitaa, moist upper woods between basalt cliffs, altitude 370 meters, St. John no. 16439.

This species is a relative of *P. rapense*, more naked than the ample forest form of that species, with narrower pinnules, and the sori conspicuously embossed on the upper surface.

**Polystichum paleatum** Copeland, new species (pl. 9).

Rhizomate (test. lectoribus) erecto et 0.5 m. alta; stipite 50 cm alto, densissime paleaceo, paleis 10 cm supra basin stipitis 4 cm longis 5 mm latis sensim acuminatis fuscis margine brunneis integris vel basi imo ramuliferis, ad basim stipitis conformibus minoribus, sursum diversissimis maximis 18 mm longis, 8 mm latis cum aliis aequilongis lanceolatis et minoribus et minutis aut supra basin integris aut ubique ornatim dissectis mixtis; fronde 80 cm longa, 30 cm lata, subtripinnata, rhachi dense paleacea paleis laete brunneis, majoribus deorsum ovatis sursum lanceolatis decrescentibus basi ramuliferis cum minoribus plus dissectis et usque ad pila reductis mixtis; pinnis infimis deflexis 8 cm longis bipinnatifidis, medialibus 16 cm longis, 4 cm latis, rhachibus et paleis linearibus et pilis stramineis vestitis; pinnulis II inferioribus basi obliquis pinnatis alibi aut pinnatifidis aut incisis; soris parvis, indusiis minoribus fuscis margine leviter inciso-crenatis persistentibus.

Tahiti: Orofena, south ridge, dense upper rain forest, altitude 1600 meters, St. John and Fosberg no. 17014.

This must be the plant reported by Drake del Castillo (Flora Polyn. Franc., p. 297, 1893), as *P. aculeatum*, collected by Nadeaud. In Bulletin 93, p. 40, I listed this without seeing it, and printed the description of the Fiji species of the same group. As far as that description went, it is reasonably appropriate, but the Fiji plant is smaller and incomparably less scaly.

**Tectaria tenuifolia** (Mettenius) Maxon.

Tahiti, no. 17105; Tubuai, no. 16444.

Previously known from Tahiti only.



**T. tahitensis** Maxon.

Tahaa, no. 17401.

Endemic in the Society Islands.

**T. decurrens** (Presl) Copeland.

Tahiti, no. 14167.

Westward to Ceylon.

**Athyrium congruum** (Brackenridge) Copeland.

Tahiti, nos. 17036, 17080, 17126, all from Orofena, altitude 1,220-1,600 meters.

Samoa, Fiji, New Caledonia. This is presumably the plant cited as *A. japonicum* by Drake.**A. polyanthes** (Solander) Copeland (uncertain, in the absence of basal paleae).

Raivavae, no. 16003.

Society Islands, Marquesas, Rapa (see Bulletin 89).

**A. membranaceum** (Mettenius) Copeland, new combination.<sup>3</sup>*Asplenium membranaceum* Mettenius: in Kuhn, *Linnaea*, vol. 36, p. 103, 1869.

Rurutu, no. 16660; Rapa, nos. 11470, 15254, 15349, 15447.

Pitcairn, Coral Island, Samoa (?).

**Athyrium Sancti-Johannis** Copeland, new species (pl. 10).

Caudice erecto; stipite 80 cm alto, basi 15 mm crasso atropurpureo paleis nigris lanceolatis margine minute spinuliferis deciduis ornato, inerme sursum brunnescente; fronde 1.5 m. alta, 80 cm lata, basi vix angustata, tripinnatifida, rhachibus glabris, stramineis superne sulcatis; pinna mediale 45 cm longa, 20 cm lata, breviter (1 cm) pedicellata; pinnulis remotis, brevissime pedicellatis, usque ad 11 cm longis, 2-3 cm latis, acuminatis, profunde oblique pinnatifidis, herbaceis; segmentis 5-7 mm latis, subacutis, serrulatis; venulis remotis, 6-7-paribus, rectis, omnibus (in fructificatione plena) soriferis, soris e costa ad marginem protensis, angustis, infimo acroscopico diplazioideo, indusio angustissimo pallido persistente integro.

Austral Islands: Tubuai, northeast slope of Taitaa, in shaded cleft between basalt rocks, altitude 380 meters, August 20, 1934, St. John no. 16440.

Distinguished from *A. membranaceum*, as I construe that species, by being more ample throughout, with larger, fewer, and more oblique segments.

<sup>3</sup> Director Diels has compared these specimens with Mettenius' type and informs me that they are distinct, as is also the following species.

**Athyrium pitcairnense** Copeland, new species (pl. 11).

Caudice valido adscendente; stipite 35-40 cm alto, basi fusco paleis brunneis membranaceis et ovatis et lanceolatis usque ad 4 mm longis acuminatis fragilibus margine minutissime spinuliferis haud dense vestito, sursum rhachibusque stramineis nudis; fronde ca. 40-50 cm longa, 20-25 cm lata, acuminata, bipinnata; pinnis infimis plerumque deflexis 9 cm longis, 3 cm latis, medialibus 15-17 cm longis, 5-6 cm latis, caudatis, breviter (5 mm) stipitulatis, basi non angustatis; pinnulis liberis ca. 7-paribus, maximis 3 cm longis, 1 cm latis, sessilibus et plerisque adnatis, obtusis vel rotundatis, inferioribus inciso-serratis, aliis serratis, tenuiter papyraceis, olivaceo-viridibus; venis in lobis pinnatis, in dentibus furcatis vel simplicibus; soris patentibus, 2-3 mm longis, indusio angusto.

Pitcairn: Outer Valley, on steep wooded slope, altitude 220 meters, June 14, 1934, Fosberg and Clark no. 11308.

The large group of related species includes *A. ellipticum* of Tahiti, from which this species differs in being more dissected throughout.

**Athyrium tenuipaleatum** Copeland, new species (pl. 12).

Caudice suberecto, radicibus basibusque stipitum occulto; stipite 25-35 cm alto, basin versus nigrescente paleis atris 10-15 mm longis, 1 mm latis aciculari-protensis fere integris vestito, sursum stramineoviride, glabro; fronde ca. 60 cm longa, 40 cm lata, acuminata, bipinnata; pinnis infimis fere 20 cm, sequentibus 23 cm longis, valde acuminatis, 8 cm latis, stipitulis 7 mm longis; pinnulis liberis ca. 8-paribus, infimis sessilibus aliis plus minus adnatis, usque ad 4.5 cm longis, 1 cm latis, acutis vel obtusis, infimis inciso-lobatis, sequentibus inciso-serratis superioribus serratis, papyraceis, laete viridibus; soris 3-4 mm longis, patentibus, indusio brunneo.

Rapa: southeast slope of Mount Ororangi, dense forest on steep slope, altitude 265 meters, July 6, 1934, F. R. Fosberg no. 11415.

Very near to *A. pitcairnense*, from which it differs essentially in the basal scales; also, it is more ample, clear green, and with less reduced basal pinnae.

**Athyrium Fosbergii** Copeland, new species (pl. 13).

Rhizomate repente, 1 cm crasso, lignoso, basibusque stipitum paleis paucis, caducis onustis; stipitibus haud remotis, 60-70 cm altis, fuscis, nudis; fronde ca. 60 cm longa, ovata, acuminata, tripinnata; pinnis remotis, inferioribus 30 cm longis stipitulis 3 cm longis, 12 cm latis, acuminatis; pinnulis etiam remotis, infimis 4.5 cm longis stipitulis 2 mm longis, sequentibus 6.5 cm longis, 2.5 cm latis, subacuminatis, basi pinnatis pinnulis II leviter incisus, deinde pinnatifidis segmentis decurrenti-connexis 10-12 mm longis, 4-5 mm latis, integris apice rotundatis, papyraceis; venis furcatis vel triramiferis; soris costalibus, oblongis, ca. 2 mm longis, indusio laete brunneo persistente.

Rapa: Mitiperu, Maungaeae ridge among ferns, altitude 300 meters, July 18, 1934, F. R. Fosberg no. 11577.

Nearly related to *A. Grantii* of Tahiti, but more lax and less dissected.

**A. rapense** (E. Brown) Copeland, new combination.

*Diplazium rapense* E. Brown: Bishop Museum Bull. 89, p. 57,  
pl. 11, 1931.  
Rapa, no. 15672.  
Endemic.

**Athyrium subquadrupinnatum** Copeland, new species (pl. 14).

Caudice erecto, 20 cm alto, radicibus validibus basibusque stipitum frondium emortuarum profunde immerso: stipite 50-60 cm alto, basi 7 mm crasso, nigro, basi paleis paucis caducis onusto alibi glabro; fronde 70 cm longa, 60 cm lata, late ovata, fere quadripinnata, rhachibus fuscis nudis; pinnis inframedialibus maximis, 34 cm longis, 15 cm latis, breviter (15 mm) stipitulatis, brevi-acuminatis; pinnulis infimis 5 cm longis, medialibus 7.5 cm longis, 2.5-3 cm latis, acutis, stipitulis 5 mm longis; pinnulis II ca. 15 mm longis, vix 1 cm latis, apice rotundatis et dentatis, breviter (1 mm) pedicellatis, basi fere pinnatis, segmentis ca. 3-paribus, 2-4 mm latis, cuneato-ellipticis, infimis crenato-lobatis, membranaceis, inferne paullo pallidioribus; soris costalibus, ca. 1-5 mm longis, perisque rectis simplicibusque.

Austral Islands: Rurutu, north side of Moera, in shaded crevice between ledges of coral cliffs, altitude 10 meters, August 25, 1934, St. John no. 16640. The type consists of one complete frond mounted on five sheets.

**A. javanicum** (Blume) Copeland.

Tahiti, no. 17113.  
Westward to India.

**Blechnum orientale** Linnaeus.

Tahaa, no. 17334; Raivavae, no. 15833; Rurutu, no. 16570; Tubuai, no. 16338; Rimatara, no. 12054; Rapa, nos. 11374, 15246; Mangareva, nos. 11106, 14563, 14885. The field note of no. 12054 states that the erect caudex is 2 meters high.

Westward to India.

**B. capense** (Linnaeus) Schlechtendal.

Tahiti, nos. 17082, 17114; Rapa, nos. 11567, 11601, 11605, 15293.

**B. vulcanicum** (Blume) Kuhn.

Tahiti, nos. 11733, 16986; Rapa, nos. 11576 (variety *rapense* E. Brown), 11608; all being of the rather glabrous form already familiar in the Society Islands.

New Zealand to Java and Luzon; Marquesas.

**Blechnum venosum** Copeland, new species (pl. 15).

Lomaria, caudice adscendente, vero 1-1.5 cm crasso sed cum radicibus basibusque stipitum 5 cm crasso, apice paleis lineari-aciculatis 17 mm longis castaneis nitidis immerso; stipite frondis sterilis 15-20 cm longo, rigido, paleis atrocastaneis 10 mm longis basi 1.3 mm latis apice acicularibus densissime oblecto; fronde 30 cm alta, abrupte acuminata, basi truncata, dura et fragile, pinnata, rhachi paleis deorsum 6 mm longis dense vestita sursum glabrescente asperula; pinnis contiguus, horizontalibus, acutis vel acuminatis, margine cartilagineis, inferioribus 12 cm longis, 16 mm latis, basi basiscope rotundato-auriculatis supra rhachin imbricatis acroscopice (infimis uniparibus exceptis) adnatis, superioribus utroque latere adnatis, venis congestis superne in sulcis immersis, inferne praestantissime salientibus; fronde fertile longius stipitatis, pinnis usque ad 10 cm longis, cum indusiis elatis 5 mm latis.

Rapa: Taratika, east side of Mount Perahu, moist bank in rain forest, altitude 550 meters, St. John, Fosberg and Maireau no. 15051.

An isolated member of the group of *E. vulcanicum*, as shown by form of frond, attachment of pinnae, and roughness of stipe and rachis after the naturally persistent paleae are removed. The fronds and pinnae are so brittle that almost all are broken.

**B. attenuatum** (Swartz) Mettenius.

Tahiti, no. 17041; Raivavae, no. 16168; Rurutu, no. 16670; Tu-buai, nos. 16338, 16434; Rapa, nos. 11568, 11590, 11613, 15313, 15655—all alike in having the lowest normal pinnae reduced and deflexed, with truncate-flabellate rudiments on the stipe—11603, 15631 (abruptly contracted at base), 15530, 15659—base gradually narrowed.

Mauritius to South Africa; Australia; South America (?).

**B. Patersoni** (R. Brown) Mettenius.

Tahiti, no. 16997.

New Zealand to India.

**Doodia media** R. Brown.

Raivavae, nos. 11671, 11775; Rurutu, no. 16661; Rapa, nos. 11517, 11556, 15367, 15518, 15608; Pitcairn, nos. 11228, 14976.

The Rurutu specimen may be *D. marquesensis*. My present impression of Polynesian *Doodia* is that the local difference between individuals is greater than that between the considerable number of proposed species.

**Asplenium rapense** (E. Brown) Copeland, new combination.

*Asplenium Macraei*, variety *rapense* E. Brown (Bishop Museum Bull. 89, p. 65, 1931).

Ab *Asplenio Macraei* Hooker et Greville frondibus brevioribus uniformibus fere tripinnatis segmentis minoribus, stipitibus distinctum. Stipite castaneo, usque ad 7 cm alto deorsum paleis angustis 2.5 mm longis perspersis vestito; fronde 15-20 cm longa, 5 cm lata, membranacea.

The type is Stokes no. 224. Specimens in hand are from Rapa: St. John and Maireau no. 15417; Toutore, west end of Mount Vaitau, mossy rock in moist forest, altitude 240 meters, St. John and Anderson no. 15615; Maitua Valley, on shady, mossy rocks, altitude 230 meters, St. John and Maireau no. 15625, north slope of Mount Lekie, on moist basalt precipice, altitude 320 meters.

*A. Macraei* is very variable in dissection, at most being almost tripinnate, but then with larger and thicker segments. Its less cut forms approach *A. erectum* Bory. It does not appear to me that that is the affinity of *A. rapense*; *A. Hookerianum* of New Zealand is a more probable relative.

**A. lucidum** Forster.

Raivavae, nos. 15857, 16045; Tubuai, no. 16359; Rurutu, no. 16674; Rapa, no. 15566.

New Zealand, Tasmania, Marquesas.

**A. obtusatum** Forster.

Rurutu, no. 16642; Rapa, nos. 15493, 15547; Marotiri, no. 15689; Mangareva (Makaroa), no. 14743; Pitcairn, nos. 11291, 11343.

New Zealand, Chile, northward to Hawaii.

**A. falcatum** Lamarck.

Rapa, nos. 11439, 11507, 11515, 11557, 11615, 11633, 15263, 15630.

New Zealand and Polynesia to India and Africa.

**A. caudatum** Forster.

Tahiti, no. 17050.

**Asplenium indusiatum** Copeland, new species (pl. 16).

Rhizomate repente, 1 cm crasso, basibusque stipitum paleis castaneis anguste lanceolatis 7 mm longis striatis apice elongatis vestitis; stipitibus vix 1 cm inter se remotis, 30 cm altis, pallide viridibus sursum glabris; fronde 45-50 cm alta, 25 cm lata, basi truncata, pinnata, segmento apicale triangulare; pinnis

15-20-paribus, inferioribus 13 cm longis, 2 cm latis, sursum decrescentibus, acuminatis, basi basiscopica cuneatis acroscopica truncatis, leviter incisus vel tantum inciso-serratis, infimis rarius rhachin versus pinnatis pinnulis sessilibus 2 cm longis, 12 mm latis, apice rotundatis dentatis basi cuneatis, subcoriaceis, glabris, viridibus; venis obliquis, furcatis; soris obliquis, inferioribus 15 mm longis, indusiis conspicuis, persistentibus, aut ubique aut linea insertionis atrocantensis vel atris.

Mangareva: Mount Mokoto, upper forest, in moist old woods, altitude 320 meters, St. John no. 14854, type; also, Tubuai, Taitaa, dense upper forest, altitude 320 meters, St. John no. 16346.

All species of *Asplenium* are indusiate, but this specific name does not overemphasize the remarkably conspicuous indusia of this species. The group is that of *A. falcatum*. The pinnae of the Tubuai specimen are in form quite like those of *A. acutiusculum* Blume, but the sori are very different.

**A. horridum** Kaulfuss.

Raivavae, nos. 11891, 16010 (fronds 15-20 cm long), 16167 (frond 140 cm long, on long stipe); Tubuai, no. 16328; Rapa, nos. 11560, 15526.

Polynesia, described from Hawaii; westward range questionable.

**A. laserpitiifolium** Lamarck.

Raiatea, no. 17236; Tubuai, no. 16333.

Westward to the Seychelles.

**A. (Loxoscaphe) gibberosum** (Forster) Mettenius.

Tahiti, nos. 16999, 17038; Tahaa, no. 17403; Tubuai, no. 16334; Raivavae, nos. 11776, 16054; Rapa, nos. 15242, 15649; Mangareva, no. 14852; Pitcairn, nos. 11297, 14967, 15002.

Westward to Fiji.

**A. (Thamnopteris) Nidus** Linnaeus.

Borabora, no. 17416; Huahine, no. 17185; Meetia, no. 14233; Rimatara, no. 16875; Rurutu, no. 16638; Tubuai, no. 16360; Maria, nos. 12083, 12104, 12109, 16951; Raivavae, nos. 15855, 16164; Anaa, no. 14261; Rapa, nos. 11493, 15241; Mangareva, no. 14471; Pitcairn, no. 14970; Oeno, no. 15184; Henderson, no. 15088.

Westward to Africa.

**Lomagramma Wilkesiana** (Brackenridge) Copeland.

Rurutu, no. 16771; Raivavae, nos. 16004, 16037.

Society Islands, Rarotonga, New Caledonia, everywhere similarly polymorphous.

**Nephrolepis biserrata** (Swartz) Schott.

Rimatara, no. 16794; Tubuai, no. 16209; Maria, nos. 12098, 12107, 16954; Raivavae, nos. 16034, 16143; Mangareva, nos. 14458, (Aukeua) 14615; Henderson, nos. 11345, 15087, 15143.

Pantropic.

**N. exaltata** (Linnaeus) Schott.

My use of this name here is no more than conventional, and *N. biserrata* and *N. hirsutula* are hardly more strictly used. My impression is that these "species" hybridize here naturally and freely. With this explanation, specimens are assigned to *N. exaltata* as follows: Raivavae, no. 15862; Rurutu, no. 16574; Rapa, nos. 11565, 15439; Marotiri, no. 15686; Mangareva, no. 11356.

Pantropic.

**N. hirsutula** (Forster) Presl.

Borabora, no. 12165; Tahaa, nos. 12145, 17393; Meetia, nos. 14194, 14241; Rapa, no. 15248; Pitcairn, no. 11267.

Pantropic.

**N. Duffii** Moore.

Rurutu, in culture, no. 11905.

The comparatively well defined cosmopolitan species, *N. cordifolia*, has not been found east of Tahiti.

**Sphenomeris chusana** (Linnaeus) Copeland.

Tahaa, no. 17349; Rurutu, nos. 16667, 16779; Raivavae, nos. 16174, 16177.

Westward to Madagascar, and to Japan.

**Lindsaya decomposita** Willdenow.

Tahiti, no. 17029.

Marquesas to India; not known in southeastern Polynesia.

**L. propinqua** Hooker, variety **simplicior** J. W. Moore.

Raiatea, type locality, no. 17282.

Named following Moore.

**Lindsaya eximia** Copeland, new species (pl. 17).

Rhizomate repente, 2 mm crasso, paleis fuscis 1 mm longis persistentibus vestito; stipitibus proximis, 30 cm altis sulcatis, fuscis; fronde 30 cm alta, bipinnata, parte mediale elongata, pinnis pinnatis 2-6; pinnulis 3-3.5 cm longis, 1 cm latis, dimidiatis, apice obtusis vel rotundatis rarius subacutis, latere acroscopico leviter incisus, lobis brevibus latis fertilibus truncatis, venis anasto-

mosantibus series plerumque II areolarum includentibus; soris 4-7 pinnulae quaeque, elongatis, indusio angusto cum margine conterminante.

Society Islands: Huahine, Mount Matoereere, north ridge in woods, altitude 650 meters, October 1, 1934, St. John no. 17158.

Related to *L. propinqua* Hooker, which Moore restores as distinct from *L. decomposita*. *L. eximia* is conspicuously larger and coarser.

**Hypolepis punctata** (Forster) Bernhardi.

Rurutu, no. 16668; Tubuai, no. 16342; Raivavae, no. 16171; Rapa, nos. 11617, 15300; Mangareva, nos. 14893, 14899.  
New Zealand to China.

**Histiopteris incisa** (Thunberg) J. S. Smith.

Tahiti, no. 17066; Tubuai, no. 16326; Raivavae, no. 16175; Rapa, nos. 11435, 11446, 11474, 11580.  
Pantropic and southern.

**Pteris decussata** J. Smith.

Tahiti, no. 17106.  
Westward to Sumatra.

**P. tremula** R. Brown.

Raivavae, saddle between Mount Turivao and Mount Muatapu, altitude 180 meters, no. 11778. Quadripinnatifid at base; sterile distal part of segments sharply serrate; indusium crisped.

Common in New Zealand and in New Caledonia; reported in Tahiti.

**P. tripartita** Swartz.

Raiatea, no. 17331; Rurutu, no. 16664; Tubuai, no. 16464; Rapa, no. 15718.  
Westward to Africa.

**P. comans** Forster.

Raivavae, nos. 11781, 16026; Rapa, nos. 15253, 15256.  
Marquesas to New Zealand and Tasmania.

**Acrostichum aureum** Linnaeus.

Borabora, no. 17413; Rimatara, no. 16819; Tubuai, no. 16253; Rapa, no. 11400.

**Cheilanthes tenuifolia** (Burmam) Swartz.

Rapa, no. 15581; Marotiri, no. 15676.  
New Zealand to India.



**C. Arnottiana** J. W. Moore.

Raivavae, nos. 11774, 11796.

Society Islands, and probably westward (*Notholaena hirsuta*) to China.**Doryopteris concolor** (Langsdorff and Fischer) Kuhn.

Raivavae, nos. 11768, 15969.

Pantropic.

**Adiantum Capillus-Veneris** Linnaeus.

Rurutu, no. 16718; Mangareva, no. 11108.

Cosmopolitan.

**A. hispidulum** Swartz.

Rurutu, no. 16772; Tubuai, no. 16534; Pitcairn, no. 15031—these three almost typically setose; Raivavae, no. 15851; Mangareva, nos. 14452, 14520; Agakaitai, no. 14941—these four more glabrous, but still setose on surfaces and indusium.

New Zealand and Hawaii to Africa.

**Adiantum glabrum** Copeland, new species (pl. 18).

*A. hispidulo* Swartz simile, axibus hinc illuc minute pubescentibus haud setiferis, lamina utraque facie aut glabra aut pilis minutis debilibus sparsissimis subglabra, indusio omnino glabro distinctum.

Rapa: Toutore, west end of Mount Vaitau, on moist mossy rocks, in moist forest, altitude 240 meters, St. John and Maireau no. 15418, type; Motenaonao Point, 10 meters within cave, on damp loam, altitude 10 meters, St. John and Maireau no. 15495; moist ravine on southeast side of Mount Ororangi, altitude 200 meters, Fosberg no. 11410; the preceding three collections have the lamina glabrous. The following two collections have a few hairs on the nether surface, but none on the indusium; south slope of ridge between Mount Morongota and Mount Vaitau, in moist forest, altitude 150 meters, Fosberg no. 11606; watering place near Area, under trees by stream, altitude 5 meters, St. John and Fosberg no. 15231.

Brown and Brown (Bishop Museum Bull. no. 89, p. 77) have listed under *A. hispidulum* several other Rapa collections which they describe as glabrate. The indusium, at least, is glabrous in distinction to glabrate.

*A. hispidulum*, from Africa to Polynesia and New Zealand, is a

satisfactorily uniform species, and I am unwilling to refer to it so distinct a local derivative as this of Rapa. It may be noted that Tahitian specimens of *A. hispidulum* are less hispid than those of other lands—at least this is so of the eleven collections in hand; but the indusium is invariably distinctly bristly when young. The Society Islands are the ascribed source of *A. pubescens* Schkuhr (Krypt. Gew. 108, pl. 116), regarded as synonymous with *A. hispidulum* which Swartz ascribed to New Holland. Schkuhr's plate shows hairy lamina but naked indusium—probably in error.

**Oleandra Sibbaldii** Greville.

Tahiti, no. 17025.

Westward to the Philippines.

**Humata Banksii** Alston (*H. pectinata* of Bull. 93, not Desvaux).

Tahaa, nos. 12142, 17373; Raiatea, nos. 17243, 17323, 17327; Rurutu, nos. 16662, 16752, 16767.

The material is not in hand for a geographic delimitation of this species and *H. pectinata* (Smith) Desvaux.

**H. huahinensis** Copeland.

Huahine, no. 17200.

Endemic.

**H. Andersonii** Mettenius.

Tahiti, no. 17150.

Endemic.

**Davallia**—probably **D. epiphylla** (Forster) Sprengel.

Meetia, no. 14181, sterile.

Polynesia—at least Rarotonga.

**D. solida** (Forster) Swartz.

Tahiti, no. 14137; Raiatea, no. 17231; Borabora, no. 12163; Tahaa, nos. 12146, 17371; Rimatara, no. 16945; Rurutu, no. 16586; Tubuai, no. 16210; Raivavae, nos. 15809, 15859, 16101; Rapa, nos. 11409, 11450, 11609, 15369; Mangareva, nos. 14465, 14935; Akamaru, no. 14679; Aukena, no. 14607; Taravai, no. 14791; Pitcairn, nos. 11270, 15048; Henderson, no. 15108.

Westward to Burma. All Rapa specimens are notably dissected, approaching *D. fejeensis* Hooker.

**Hymenolepis revoluta** Blume.

Tahiti, nos. 14146, 17102.

New Caledonia to Annam.

**H. mucronata** Fée.

Raivavae, nos. 15985, 15990, 16044; Tubuai, nos. 16348, 16512.—the last, a stunted specimen, with the aspect of the next species, *H. minor*, but with far less spiny paleae.

**Hymenolepis minor** Copeland, new species (pl. 19).

Rhizomate 4 mm crasso, paleis atrocastaneis 3.5 mm longis, basi dilatata exsculpta 1.5 mm latis deinde angustatis caudatis margine conspicue et dense spiniferis parietibus cellularum validis immerso; stipitibus approximatis, 1-1.5 cm longis, gracilibus, brunneis; frondis parte sterile ca. 10 cm longa, 15 mm lata, deorsum attenuata, infra apicem fertilem ad 2 mm contracta, glabra, coriacea, venis inconspicuis, costa inferne prominente; parte fertile 2-4 cm longa, 3-4 mm lata, plerumque recurva, sporangiis cum paraphysibus parvis deciduis immixtis.

Austral Islands: Raivavae, south side of Mount Turivao, rock crevices in cliff, altitude 200 meters, August 11, 1934, Fosberg no. 11783, type; also, St. John and Fosberg no. 15807, in shade, with stipes up to 3 cm and sterile part of fronds up to 20 cm long, hardly at all coriaceous, with short fertile segments.

The paleae are the most spiny-ciliate known to me in the genus.

**Hymenolepis dura** Copeland, new species (pl. 20).

Rhizomate repente, 1 cm crasso paleis membranaceis 5 mm longis basi fere 2 mm latis deinde valde attenuatis margine spinulosis, parietibus cellularum magnarum tenuibus uniformibus immerso; stipitibus 1 cm inter se distantibus, 2 cm longis, fuscis; frondis parte sterile 10-15 cm longa, 2 cm lata, deorsum attenuata, infra apicem fertilem haud constricta, glabra, brunnescente, rigidissima, venis omnino occultis et costa vix conspicua; apice fertile usque ad 4 cm longa et 1 cm lata (plerumque minore), ubique dense fructifera, sporangiis primo paraphysibus peltatis clathratis spinoso-ciliatis obtectis, demum eisque immixtis.

Rapa: south side of Mount Lekie, ledges of highest basalt precipice, altitude 330 meters, July 20, 1934, St. John and Maireau no. 15621.

Of previously known species, the most similar is *H. Vaupelii* C. Christensen of Samoa, which has the mass of sporangia similarly protected while young, by peltate paraphyses.

**Cyclophorus macrocarpus** (Hooker and Arnott) Copeland.

Raivavae, nos. 15796, 15828, 16056, 16109; Rapa; Mangareva, no. 14845; Pitcairn, no. 14962.

Rarotonga, Tahiti.

This is not *C. angustatus* (Swartz) Desvaux. I have already noted (Bishop Museum Bull. 93, p. 60, 1932) that it is nearer to *C. blepharolepis*. With the accumulation of many specimens, I find it hardly possible to distinguish these two. However, it is not worth while to reduce the latter species until a check of Forster's type of *C. acrostichoides* may show that that is not the correct name of both.

**C. blepharolepis** C. Christensen.

Tahiti, no. 14148; Huahine, no. 17182; Meetia, no. 14237; Rimatara, no. 16848; Rurutu, no. 16556; Tubuai, no. 16505; Rapa, no. 15345; Mangareva, nos. 14453, 144455; Taravai, no. 14781; Henderson, nos. 15147, 15154. Fiji.

**Elaphoglossum Societarum** Copeland.

Huahine, no. 17163.

Endemic in the Society Islands.

**E. samoense** Brackenridge.

Tahiti, nos. 16992, 17028, 17051, 17069 (?); Rapa, nos. 11385, 11563, 15438.

Samoa.

**Elaphoglossum rapense** Copeland, new species (pl. 21).

Rhizomate breve, valido, adscendente; stipitibus caespitosis 15-18 cm longis, basi paleis castaneis linearibus aciculatis, sursum paleis paullo minoribus ferrugineis, omnibus minute ciliatis dense vestito; fronde usque ad 30 cm longa, 7 cm lata, acuta, basi rotundata vel late cuneata, papyracea, margine et costa densissime faciebus tantum sparsius paleis lineari-aciculatis ferrugineis minute ciliatis vestita; venis liberis; fronde fertile ca. 13 cm longa, 2.5-3.5 cm lata.

Rapa: Kaimaru, south ridge of Mount Perahu, on ground or fallen logs in rain forest, altitude 475 meters, St. John and Maireau no. 15529, type; also, Taratika, east side of Mount Perahu, altitude 620 meters, St. John, Fosberg and Maireau no. 15644.

One of the group of *E. hirtum*, but distinct from that species, from its variety *nitens*, and from *E. tovii* Brown, in having the paleae minutely ciliate.

**E. gorgoneum** (Kaulfuss) Brackenridge.

Tahiti, no. 17048; Huahine, no. 17160; Raiatea, no. 17270.

Hawaii, Rarotonga.

**Polypodium blechnoides** (Greville) Hooker.Raiatea, no. 17284, from the type locality of *P. minutissimum* J. W. Moore; Huahine, no. 17167.

Westward across Malaya.

**Prosaptia contigua** (Forster) Presl.

Tahiti, nos. 17026, 17117, 17429; Tahaa, no. 17387.

Very broadly construed, this ranges from the Marquesas to Ceylon.

**Grammitis subspathulata** (Brackenridge) Farwell.

Tahiti, nos. 17122, 17149.

Endemic.

**Grammitis Maireaui** Copeland, new species (pl. 22).

Rhizomate repente, cum paleis 5 mm crasso, paleis fuscis 3 mm longis, 1 mm latis, obtusis integris immerso; stipitibus approximatis 3-5 cm longis, setis atropurpureo-fuscis horizontalibus 1 mm longis dense vestitis; fronde usque ad 20 cm longa et 16 mm lata, utrinque angustata, integra vel rarius minute crispata, costa et margine minutius setiferis, firme papyracea, translucente, venis 3-4-furcatis, soris ad ramos infimos acroscopicos dorsalibus, subcostalibus, superficialibus orbicularibus sed receptaculis elongatis, sporangiis setiferis.

Rapa: Taratika, east side of Mount Perahu, on mossy trunk in rain forest, altitude 550 meters, July 15, 1934, St. John and Maireau no. 15553.

A relative of *Grammitis subspathulata* of Tahiti, distinguished by having superficial sori nearer to the midrib than to the margin; also, the paleae are darker, and the fronds thinner and broader.

**Grammitis miltiblepharis** Copeland, new species (pl. 23).

Rhizomate breve adscendente, paleis laete ferrugineis 2 mm longis basi 1 mm latis acutis integris membranaceis vestito; stipitibus caespitosis; aut usque ad 8 mm longis aut ob laminam decurrentem subnullis, setis vix 1 mm longis haud dense vestitis; lamina 4-5 mm longa, 3-3.5 mm lata, lineari-oblancoolata, obtusa subcoriacea, superficie sparsius costa et margine dense setis 0.3-0.4 mm longis rubido-castaneis vetustate fuscescentibus vestita; venis sterilibus plerisque simplicibus, intra marginem liberis, fertilibus furcatis; soris prope bases ramorum acroscopicorum fere costalibus, vix elongatis, sporangiis setiferis.

Marquesas: Nukuhiva, Ooumu, altitude 1100 meters, "epiphytic on mossy branches in damp forest", Mumford and Adamson no. 586 (mixed with *G. marginelloides*).

This is likely to be *Polypodium Hookeri* variety *rapense* E. Brown (Bishop Museum Bull. 89, p. 86, 1931). I do not take up the varietal name, because it would be inappropriate for a plant described from Nukuhiva, and because I am not sure of the identity. It differs from *Grammitis conformis* (Brackenridge) J. Smith as described, in smaller size and in bearing hairs on the surfaces; and from *Polypodium Hookeri*, in smaller size, thinner texture, and much shorter hairs. As a specific name, *G. conformis* has place priority over *P. Hookeri*, but Baker combined them under the latter name.

It seems best to describe this plant here, though it is of an earlier collection.

**G. trachycarpa** (Mettenius) Copeland, new combination.

*Polypodium trachycarpum* Mettenius: Linnaea, vol. 36, p. 127, 1869.

Huahine, no. 17166.

Endemic in the Society Islands.

**G. raiateensis** (J. W. Moore) Copeland, new combination.

*Polypodium raiateense* J. W. Moore: Bishop Museum Bull. 102, p. 10, 1933.

Raiatea, no. 17287.

Local.

**G. marginelloides** (J. W. Moore) Copeland, new combination.

*Polypodium marginelloides* J. W. Moore: Bishop Museum Bull. 102, p. 10, 1903.

Raiatea, no. 17292. Nukuhiva, Mumford and Adamson, no. 586 pro parte.

**Calymmodon orientalis** Copeland.

Tahiti, nos. 17060, 17070, the latter suggesting *C. Grantii*.

Endemic.

**Calymmodon rapensis** Copeland, new species (pl. 24).

Caudice breve erecto, apice paleis laete brunneis lanceolatis 3 mm longis acuminatis aut aristatis immerso; fronde sessile, usque ad 10 (saepius 6) cm longa, parte sterile 4, fertile 5 mm lata, ad alam costae pinnatifida, costa praecipue inferne pubescente, segmentis sterilibus 2 mm latis basibus contiguus, sparsissime ciliatis, fertilibus conduplicatis et ideo triangularibus.

Rapa: Taratika, east side of Mount Perahu, on mossy trunks on main ridge, altitude 620 meters, St. John, Fosberg and Maireau no. 15666, July 21, 1934, type; ibidem, altitude 550 meters, St. John and Maireau no. 15555.

Distinguished by the slender but not very lax fronds, with the costa much more hairy than the margin, and the large paleae. Of the two Tahitian species, this is like *C. orientalis* in its paleae, more like *C. Grantii* in compactness and different from both in pubescence.

**Loxogramme Parksii** Copeland.

Tahiti, nos. 17092, 17116; Rapa, nos. 15554, 15641.

Fiji. The fronds of Tahiti specimens are characteristically narrower than most of those from Fiji. Those of Rapa have short and stout, or obsolete stipes. It is only from Fiji that we have any wealth of collections; and as these vary considerably, it is inexpedient to undertake to distinguish the few collections from Tahiti and Rapa.

**Microsorium punctatum** (Linnaeus) Copeland.

Tahiti, no. 14149; Borabora, no. 17419.

Westward to Africa.

**M. vitiense** (Baker) Copeland, new combination.

*Polypodium vitiense* Baker: Journal of Botany, p. 298, 1879.

*P. euryphyllum* Brown: Bishop Museum Bull. 89, p. 90, not *C. Christensen*.

*P. societense* J. W. Moore: Bishop Museum Bull. 102, p. 9.

Rurutu, no. 16672; Tubuai, no. 16446. Raivavae, no. 15982; Rapa, nos. 15240, 15403; Mangareva, no. 14873; Pitcairn, nos. 11299, 11312, 14982.

Evidently common in woods at moderate altitudes, from Fiji to Pitcairn. I cannot recognize the geographic varieties named in Bulletin 89.

**M. maximum** (Brackenridge) Copeland, new combination.

*Drynaria maxima* Brackenridge: U. S. Expl. Exped., vol. 16, p. 51, pl. 7, 1854.

Tahaa, no. 17360; Huahine, no. 17205.

Endemic in the Society Islands.

**M. Scolopendria** (Burmah) Copeland.

Tahaa, no. 17354; Raiatea, no. 17226; Meetia, no. 14232; Rimatara, no. 16908; Rurutu, no. 11944; Tubuai, nos. 16252, 16383,

16406; Maria, nos. 12084, 12091, 12108, 16955; Raivavae, nos. 15836, 16128, 16146; Rapa, nos. 11447, 11531, 15548, 15607, 11626, 15302, 15360—the last three with narrow, undulate segments; Anaa, no. 14303; Hao, no. 14357; Tepoto, no. 14341; South Marutea, no. 14434; Mangareva, nos. 14457, 14906, (Makaroa) 14742, (Taravai) 14827, (Akamaru) 14687, (Tauna) 14751, (Aukena) 14645; Pitcairn, nos. 11260, 11305; Henderson, nos. 11347, 15095, 15139; 15125, 15138—these two quite abnormal, with broad segments, respectively simple fronds, and a tendency to produce main veins; Oeno, no. 15189; Flint, no. 17466; Timoe, no. 15204.

Westward across Africa.

**M. nigrescens** (Blume) Copeland, new combination.

*Polypodium nigrescens* Blume: Enumeratio, p. 126, 1828.

Tahiti, no. 17037; Tahaa, no. 17353.

Westward to India.

**Microsorium pitcairnense** Copeland, new species (pl. 25).

Phymatodes, rhizomate ad terram repente, 5 mm crasso, paleis atrocastaneis 4 mm longis acuminatis basi dilatatis 1.5 mm latis persistentibus vestito; phyllopodio 5 mm alto; stipite 30 cm alto, castaneo; fronde 30 cm alta et lata, ad alam costae 5 mm latam pinnatifida, basi brevi-decurrente; segmentis ca. 7-paribus, 17 cm longis, 17 mm latis, acuminatis, margine undulatis, viridibus, tenuiter papyraceis, venis dissolutis, areolas magnas 2-3-seriatis venulis re-currentibus et hamatis et ramosis efficientibus; soris utroque latere 2-3 mm intra marginem seriatis, 1 mm latis, valde immersis et e facie superiore praestantibus.

Pitcairn: Outer Valley on steep wooded slope, altitude 200 meters, June 14, 1934, Fosberg and Clark no. 11311.

A relative of *M. nigrescens* (Blume), from which it differs in the absence of distinct major areolae and in the relatively marginal sori. It must be more like *Polypodium Lenormandi* Baker, of New Caledonia, which I have not seen; but that species is described as pinnate with many pinnae.

I do not know whether *Microsorium* or *Phymatodes* is more likely to be regarded as the proper genus of this fern. It is, of course, a *Polypodium* in the usage of the past, but that usage has already endured too long.

**Selliguea feeioides** Copeland.

Tahiti, nos. 17027, 17247.

Westward to the New Hebrides.



**Campium lonchophorum** (Kunze) Copeland.

Tahiti, no. 14130; Rurutu, nos. 16654, 16768; Rapa, nos. 11471, 15331.

Westward to Queensland.

**Antrophyum reticulatum** (Forster) Kaulfuss.

Tahiti, no. 17337.

Westward to India.

**A. plantagineum** (Cavanilles) Kaulfuss.

Tahaa, no. 17337; Meetia, no. 14248; Tubuai, no. 16448; Rai-vavae, no. 16048.

Westward to India.

**Vittaria elongata** Swartz.

Tahiti, no. 14132; Tahaa, no. 17392; Tubuai, no. 16352; Rurutu, nos. 16728, 16770; Raivavae, nos. 11730, 11735, 11788, 15938; Rapa, no. 15413 and no number (Zimmerman); Pitcairn, nos. 11309, 14956.

Westward to Madagascar, in the broad sense in which the species is here construed.

**Vaginularia paradoxa** (Fée) Mettenius.

Tahiti, no. 17059.

Westward to Ceylon.

## LYCOPODINEAE

## PSILOTACEAE

**Psilotum complanatum** Swartz.

Raiatea, no. 17302; Tahaa, no. 17391.

Pantropic.

**P. nudum** (Linnaeus) Grisebach.

Borabora, no. 17422; Huahine, no. 17186; Meetia, no. 14196; Rimatara, no. 16869; Tubuai, no. 16517; Maria, nos. 12110, 16966; Raivavae, no. 15983; Rapa, nos. 15238, 15635; Anaa, no. 14289; South Marutea, no. 14448; Hao, no. 14382; Mangareva, nos. 14472, (Aukena) 14599; (Akamaru) 14678, (Agakauitai) 14937; Pitcairn, nos. 11225, 11269, 11318; Flint, no. 17475.

Pantropic.

**Tmesipteris tannensis** Bernhardt.

Tahiti, no. 17055.

Marquesas and New Zealand to the Philippines.

LYCOPODIACEAE

**Lycopodium serratum** Thunberg.

Tahiti, Orofena, south ridge, on mossy branch in upper forest, altitude 1,700 meters, St. John and Fosberg no. 17008.

Almost cosmopolitan; new to Tahiti.

**L. squarrosum** Forster.

Tahaa, no. 17386; Tahiti, no. 14165; Tubuai, no. 11810; Rapa, nos. 15400, 15617, and 15735.

Westward to India.

**L. Haeckelii** Herter.

Tahiti, no. 17079.

Endemic.

**L. cernuum** Linnaeus.

Tahiti, no. 17148; Tahaa, no. 17335; Huahine, no. 17193; Rurutu, no. 16679; Tubuai, no. 16339; Raivavae, no. 16027; Rapa, nos. 11393, 11476, and 11536; Mangareva, no. 11115.

Pantropic.

**L. venustum** Gaudichaud.

Rapa, no. 15571.

Tahiti, Hawaii.

**L. volubile** Forster.

Tahiti, no. 16993.

New Zealand to Sumatra.

**L. Phlegmaria** Linnaeus.

Tahiti, no. 14154; Tubuai, no. 16330.

Westward to Africa.

**L. phlegmarioides** Gaudichaud (?).

Tubuai, no. 16498; Raivavae, no. 16161.

Polynesia, Rawak.

**L. Ribourtii** Herter.

Tahiti, no. 17043.

Rarotonga.



PLATE 1.—*Angiopteris chauliodonta* Copeland.



PLATE 2.—*Mecodium diversilabium* Copeland.



PLATE 3.—*Callistopteris calyculata* Copeland.

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PLATE 4.—*Macroglena truncata* Copeland.

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PLATE 5.—*Cyathea rapensis* Copeland.

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PLATE 6.—*Dryopteris diversisora* Copeland.

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PLATE 7.—*Dryopteris rurutensis* Copeland.

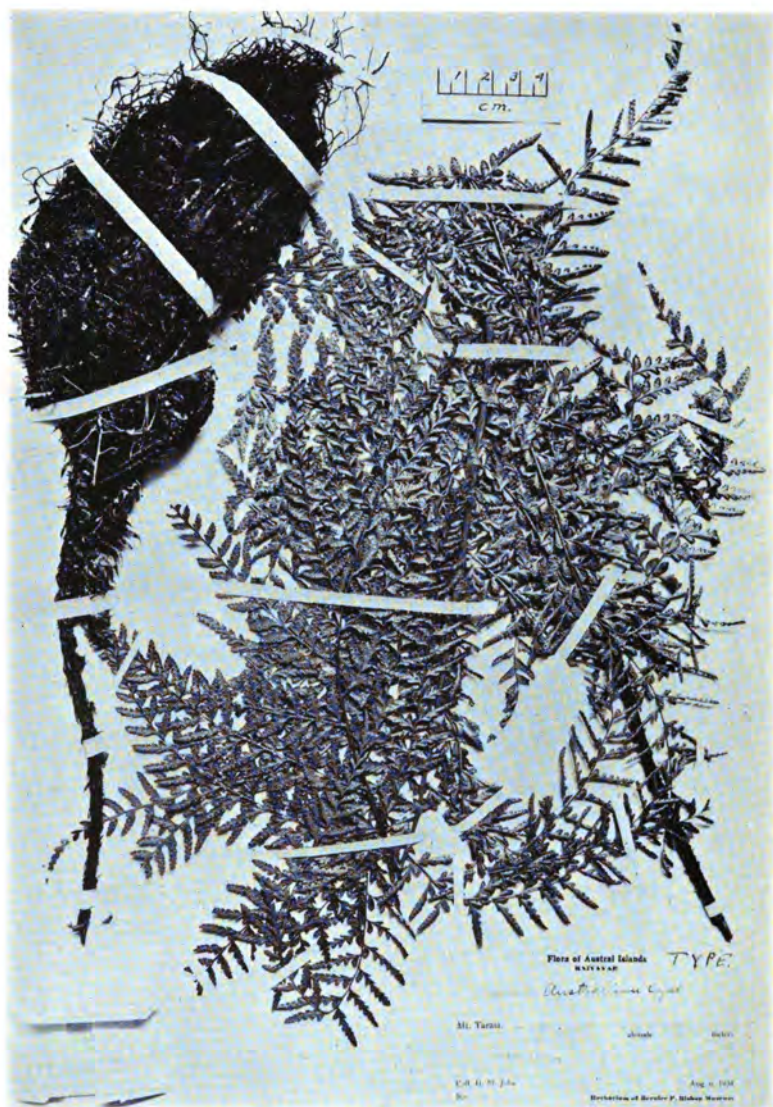


PLATE 8.—*Polystichum Australium* Copeland.

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PLATE 9.—*Polystichum paleatum* Copeland.



PLATE 10.—*Athyrium Sancti-Johannis* Copeland.



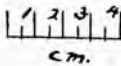
PLATE 11.—*Athyrium pitcairnense* Copeland.



PLATE 12.—*Athyrium tenuipaleatum* Copeland.



PLATE 13.—*Athyrium Fosbergii* Copeland.



Plants of Austral Islands  
1897

Moorea

altitude

collected by  
B. P. Bishop

No.

Herbarium of Bernice P. Bishop Museum

PLATE 14.—*Athyrium subquadripinnatum* Copeland.



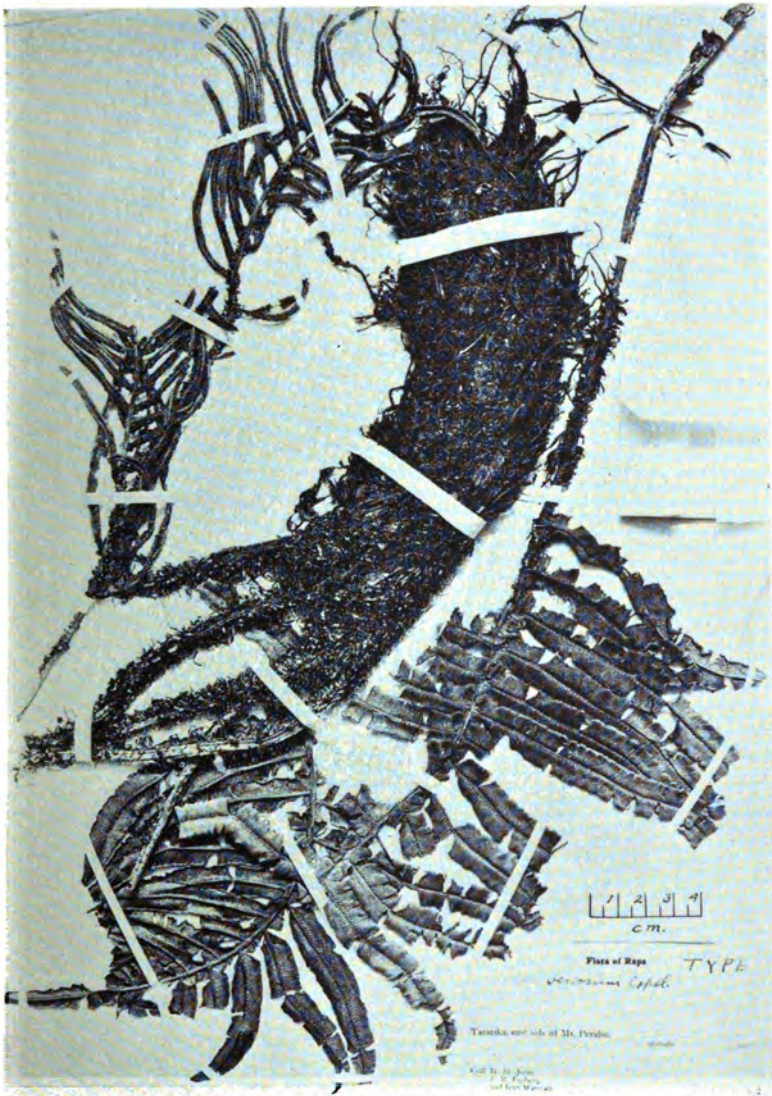


PLATE 15.—*Blechnum venosum* Copeland.

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PLATE 16.—*Asplenium indusiatum* Copeland.



PLATE 17.—*Lindsaya eximia* Copeland.

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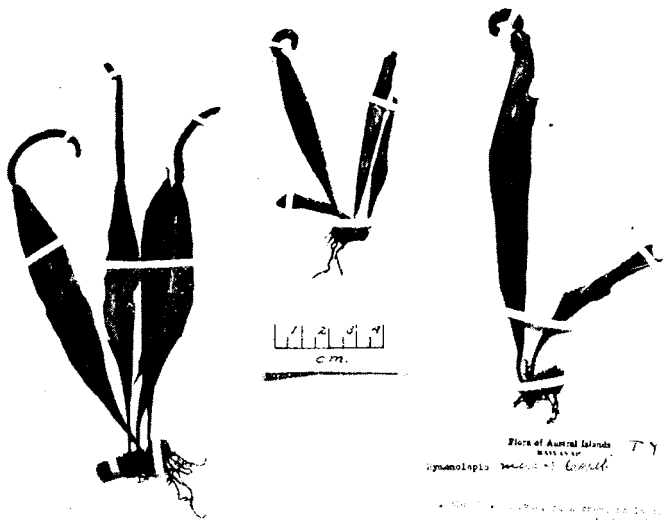
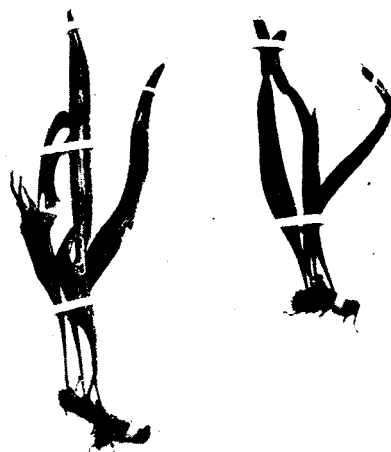
PLATE 18.—*Adiantum glabrum* Copeland.

Name  
 Locality  
 Date  
 Collector  
 No.

Div.  
 Marksmen No.  
 Grass  
 Altitude  
 Height

SPECIAL NOTES ON TREES

Date  
 Date first high



Flora of Austral Islands  
 HAWAII  
*Hymenolepis minor* Copeland  
 TYPE  
 No. 1000  
 Date  
 Collector

PLATE 19.—*Hymenolepis minor* Copeland.



PLATE 20.—*Hymenolepis dura* Copeland.



PLATE 21.—*Elaphoglossum rapense* Copeland.

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PLATE 22.—*Grammitis Maireau* Copland.

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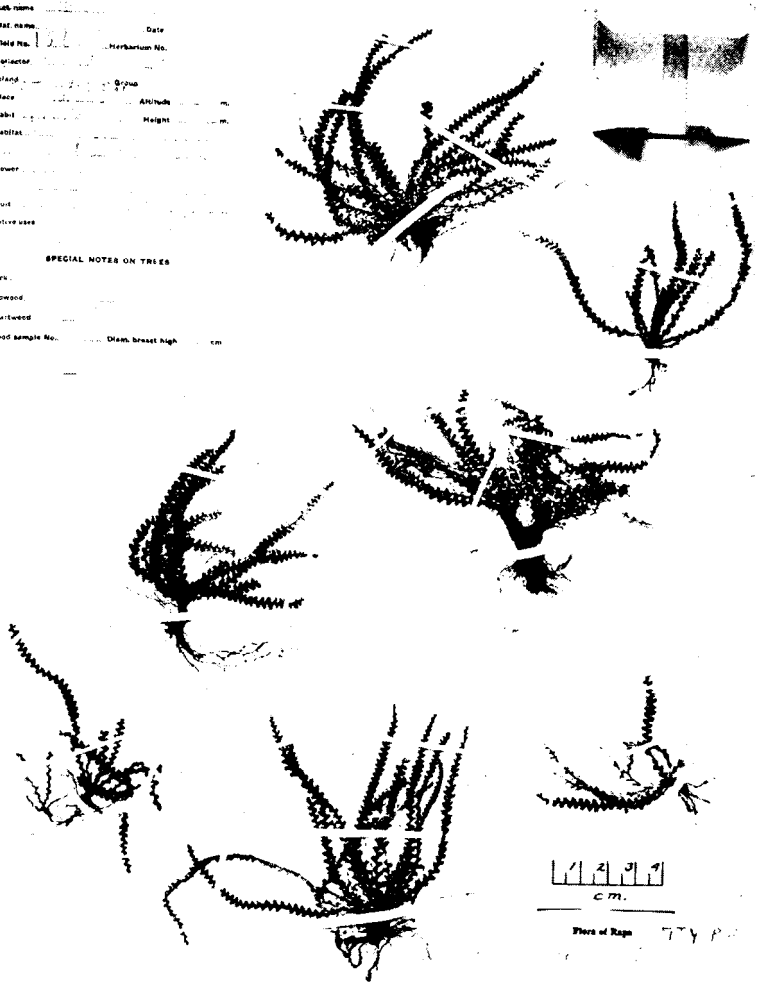




PLATE 23.—*Grammitis multiblepharis* Copeland.

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Latin name \_\_\_\_\_ Date \_\_\_\_\_  
 Bot. name \_\_\_\_\_  
 Field No. 222 Herbarium No. \_\_\_\_\_  
 Collector \_\_\_\_\_  
 Island \_\_\_\_\_  
 Place \_\_\_\_\_ Altitude \_\_\_\_\_  
 Habit \_\_\_\_\_ Height \_\_\_\_\_  
 Habitat \_\_\_\_\_  
 Flower \_\_\_\_\_  
 Fruit \_\_\_\_\_  
 Native uses \_\_\_\_\_  
 SPECIAL NOTES ON TREES  
 Bark \_\_\_\_\_  
 Sapwood \_\_\_\_\_  
 Heartwood \_\_\_\_\_  
 Wood sample No. \_\_\_\_\_ Diam. breast high \_\_\_\_\_ cm



Taroiki, east side of Mt. Parahi, \_\_\_\_\_  
 Collected by \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PLATE 24.—*Calymmodon rapensis* Copeland.

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PLATE 25.—*Microsorium pitcairnense* Copeland.

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