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MAXONIA, A NEW GENUS OF TROPICAL AMERICAN FERNS

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While working with the genus *Dryopteris* I have had for examination several specimens of a fern which in my Index Filicum was called *Polystichum apiifolium* (Swartz) C. Chr. and later was referred to *Dryopteris* by Maxon.[1] Considering, however, that it differs widely from the common type of *Dryopteris*, Maxon placed it in a special subgenus, for which he created the new name *Peismapodium*. To me it was evident, upon very slight examination of a full-grown fertile specimen, that this fern should certainly not be placed in *Polystichum*, although in some respects it resembles *P. adiantiforme;* its proper place seemed to be in the genus *Dryopteris* and its alliance with such species as *D. amplissima, D. macrostegia, D. ochropteroides,* and a few others, which together form a very distinct group of *Dryopteris* characterized by a certain polystichoid habit and, generally, leathery leaves. On closer examination I have found, however, that in essential characters *P. apiifolium* is very different from the species mentioned, and that it represents an apparently monotypic genus of very great interest, since it is, in fact, a connecting link between *Polybotrya* and the group of *Dryopteris* species just mentioned.

The plant under discussion usually has decidedly dimorphic leaves, as has *Polybotrya*. They are borne on a very thick rhizome (2 to 3 cm. in diameter), which is clothed throughout with long, narrow, rufous scales and which climbs on trees (and cliffs?) as do those of *Polybotrya osmundacea, Polystichum adiantiforme,* and *Davallia canariensis*. Within the genus *Dryopteris* a similar rhizome is unknown, although that of *D. amplissima* has a certain resemblance to it. The sterile leaves are tri-quadripinnate, leathery, and of the same general habit as those of the species with which I have compared *P. apiifolium*. They are destitute of scales and hairs on the

[1] Contr. U. S. Nat. Herb. **13**: 39. 1909.

surfaces, while the axils of the secondary and tertiary rachises and the narrow furrows of the vascular parts above are more or less filled with a short rufous pubescence consisting of short, few-celled articulate hairs; a few similar hairs are found on the veins beneath. Thus, in pubescence the leaves agree perfectly with those of *Polybotrya osmundacea*, while the leaves of the species of *Dryopteris* and *Polystichum* above mentioned are scaly or differently hairy.

The fertile leaves also are very different from those of *Polystichum adiantiforme* and all species of *Dryopteris*. Their leafy parts are often so greatly contracted that the whole leaf resembles a mere skeleton consisting only of the vascular parts, which bear the sori. Thus the fertile leaf resembles not a little that of *Polybotrya osmundacea*, although usually it is not so much contracted. There is, however, a very important difference. The sori are confined to the veins and are indusiate, whereas in *Polybotrya* the sporangia are borne on almost the whole under surface of the fertile lobes and are not covered by an indusium. Most specimens seen have the leaves strongly dimorphous, but this character is not a stable one. I have two specimens, for example, in which certain parts of the leaves (mainly the upper half) are fertile, while the lower part is sterile; the fertile segments are not nearly so much contracted as is the case in the entirely dimorphous form.

The indusium of *P. apiifolium* is very peculiar, and unique in its development. This is seen very beautifully in a specimen from Jamaica (*Maron* 2284a). In its first state the indusium is seen as a little protuberance on the back of a vein, sometimes immediately below its apex. This protuberance elongates toward the vein-tip and forms a pale linear body, parallel to the vein and raised above it. It soon broadens at its outer part, becoming spatulate; and as growth proceeds the margins bend downward and finally are firmly appressed to the parenchyma of the vein. In this state the indusium resembles much that of *Cystopteris* or sometimes that of *Davallia;* and now the first traces of the sporangia are seen on the vein immediately above the base of the indusium. This, however, continues its growth at the sides, scarcely at the apex, and thus soon becomes rounded at the outer edge, its shape being now nearly circular, with a short, cuneate base, its pedicel. Next the basal part of each side grows out into a rounded lobe, directed backward. The indusium has now become reddish brown, subreniform (the basal sinus being low only), and highly vaulted over the sporangia, around which it is

appressed firmly to the parenchyma, while the edges themselves are bent upward. The two basal lobes now grow inward also and soon reach each other or, even, one may widely overlap the other. The now full-grown indusium is circular, apparently peltate, glabrous or with a few glands along the edges, and very persistent.

The characters mentioned—dimorphism, peculiar rhizomes, and the unique development and morphology of the indusium—are to me more than sufficient upon which to erect a new genus, which must stand between *Polybotrya* and certain species of *Dryopteris* grouped with *D. amplissima.* Granting that isomorphism is a more primitive character than dimorphism, the new genus represents a more recent type than *Dryopteris,* although it has not progressed so far as *Polybotrya,* with which genus it has most characters in common. It still shows such dryopteroid characters as having indusia and sporangia confined to the back of the veins. In its evolution from *Dryopteris* toward a more specialized type it has not progressed so far that all characters have become fixed. Thus the dimorphism generally ascribed to the species is, as mentioned, not a stable character. The occasional subdimorphous leaves point definitely to dryopteroid ancestors with isomorphous leaves.

It is a special pleasure to me to have got permission to dedicate this interesting new genus to Mr. William R. Maxon, Associate Curator of the U. S. National Herbarium, who has contributed very much to our knowledge of the ferns of tropical America by his excellent collections of these plants in Jamaica, Cuba, and Central America, and by numerous papers in which he has succeeded in unraveling with acumen several intricate groups of that difficult division of plants.

MAXONIA C. Chr., gen. nov.

TYPE: *Dicksonia apiifolia* Swartz, the only species known.

MAXONIA APIIFOLIA (Swartz) C. Chr., comb. nov.

Dicksonia apiifolia Swartz, Journ. Bot. Schrad. 1800[2]: 91. 1801.

Dryopteris apiifolia Kuntze, Rev. Gen. Pl. 2: 811. 1891; Maxon, Contr. U. S. Nat. Herb. 13: 39. 1909.

Aspidium ascendens Hew. Mag. Nat. Hist. II. 2: 463. 1838; Hook. Sp. Fil. 4: 32. *pl. 224.* 1862.

Polystichum apiifolium C. Chr. Ind. Fil. 578. 1906.

The type specimen of this species (Herb. Stockholm) was collected in Jamaica by Swartz and consists of sterile leaves only. Other specimens studied are:

JAMAICA: Hollymount, Mount Diabolo, alt. 750 meters, *Maxon* 2284, 2284a, 2284b. Near Troy, alt. 600—660 meters, *Maxon* 2822; *Underwood* 2862, 2934. (All in U. S. Nat. Herb.)

CUBA: Ramón de la Sagra. (Herb. Berol.)

While the Cuban specimens are fully identical with subdimorphous ones from Jamaica, a plant from Guatemala is somewhat different. Still the differences are rather small and the plant must be regarded provisionally as a variety of this species:

MAXONIA APIIFOLIA DUALIS (Donn. Sm.) C. Chr., comb. nov.

Nephrodium duale Donn. Smith, Bot. Gaz. 15: 29. *pl. 4.* 1890.

This differs from the typical Jamaican plant in its very thick (4 cm.) rhizome, which is very densely covered with glossy, silky, rufous scales that are quite entire, while in the Jamaican plant the rhizome scales are finely toothed, especially toward their threadlike apex. The continental plant is, as a whole, of larger growth, and the fertile leaf is greatly contracted, with very large, distinctly reniform, pale brown indusia.

GUATEMALA: Pansamalá, Dept. Alta Verapaz, *von Türckheim;* distributed by John Donnell Smith as no. 1408. (The type specimens, U. S. Nat. Herb. nos. 831030, 831031.)

COPENHAGEN, April 10, 1916.