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FROM PERU

(WITH TWO PLATES)

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SAFFORDIA INDUTA Maxon
(NATURAL SIZE)

SAFFORDIA, A NEW GENUS OF FERNS FROM PERU

By WILLIAM R. MAXON

(WITH TWO PLATES)

Among a small lot of ferns gathered in the mountains of Peru by Mr. W. E. Safford, in 1892, and presented by him to the U. S. National Museum, there are several sheets of the peculiar species here discussed. As may be seen from the accompanying illustrations the specimens have the habit and general outline of most species of *Doryopteris*, and at the same time the dense covering of closely imbricate scales which is characteristic of *Trachypteris*. Their venation, which is minutely areolate, without included veinlets, is almost exactly that of *Trachypteris*, yet the fronds differ materially in structure, particularly in being uniform rather than dimorphous, and otherwise indicate no immediate relationship to the species of that genus; nor were repeated efforts successful in associating the plants with any published species or group of species. Accordingly specimens were sent to Kew, to Georg Hieronymus in Berlin, to Dr. H. Christ, and to Mr. Carl Christensen, Copenhagen, for identification or for suggestions as to relationship. The replies elicited were alike in regarding this species as unpublished and as lacking any very near relatives, specifically. Further study having shown that it cannot properly be placed in any of the genera hitherto described, without unduly extending their limits, it is accordingly here recognized as the type of a new genus, a conclusion which Mr. Christensen also regards as correct.

The writer has had peculiar pleasure in dedicating this genus to its collector, whose ability and keen enthusiasm in the study of the natural sciences are hardly less notable than his researches in ethnology and his generous spirit of helpfulness to his associates.

SAFFORDIA Maxon, new genus

Fronds small, uniform, stiffly erect, fasciculate from a short densely paleaceous rhizome; stipes stout, firm, polished, densely paleaceous, the scales imbricate, deciduous; lamina deltoid-pentagonal, pinnately parted, the basal segments strongly basisopic, pinnately parted; leaf tissue rigid, densely appressed-paleaceous beneath, the scales closely

imbricate; venation wholly areolate, the meshes small, mostly hexagonal, without included veinlets, arranged in many rows, successively smaller outward, not attaining the margin: sporangia borne upon and immediately beyond the outermost row of areoles in a continuous slightly intramarginal band, partially concealed by the scales; indusia wanting.

Type species, *Saffordia induta* Maxon.

SAFFORDIA INDUTA Maxon, new species.

Plants 15 to 25 cm. high, the fronds numerous (6 to 14), rigidly erect, closely fasciculate; rhizome ascending or erect, short, 1 to 2 cm. in diameter, densely paleaceous, the scales closely tufted, light castaneous in mass, concolorous, flaccid, linear, 5 to 8 mm. long, with long slender tortuous subflexuous tips; stipes stout, 9 to 18 cm. long, 1.7 to 2 mm. in diameter, firm, terete, purplish-brown, lustrous beneath a dense covering of appressed imbricate deturgible scales, these light castaneous, lance-ovate, long-acuminate, sharply denticulate-fimbriate, variable in size, the largest ones about 7 mm. long; lamina 5 to 10 cm. long, 5 to 11 cm. broad, deltoid-pentagonal, pinnately parted to within 3 to 6 mm. of the costa, the basal pair of segments deltoid, inequilateral, coarsely and deeply lobed upon the broad proximal side, shallowly or not at all lobed upon the narrow distal side, thus strongly basisopic; other primary segments or lobes 2 or 3 pairs below the short-caudate apex, opposite or nearly so, linear to linear-oblong, oblique, straight or upwardly subfalcate, the margins entire, strongly involute at maturity; leaf tissue thick, rigidly herbaceo-coriaceous, glabrous above but scantily and deciduously squamulose along the partially concealed slender costæ, densely appressed-paleaceous beneath, the scales closely imbricate, persistent, similar to those of the stipes, completely covering the lower surface (including the costæ), extending beyond the margin and commonly recurved as a regular narrow border upon the upper surface; venation areolate, without included veinlets, the areoles small, mostly hexagonal, arranged in 5 or 6 rows upon each side of the costæ, the costal ones elongate and parallel to the costa, the others successively smaller, shorter, and more oblique, not extending to the margin; sporangia partially concealed by scales, densely crowded in a continuous slightly intramarginal band 1.5 to 2.5 mm. broad, borne partly upon the outermost row of areoles and partly upon the adjacent veinless area, about 0.5 mm. apart from the unchanged margin; indusia wanting; spores subglobose, obscurely triplanate, light brown, discontinuously areolate, the ridges very thin, vermiculate.

Type in the U. S. National Herbarium, No. 619807, collected along the Arroyo Railway, in the mountains back of Lima, Peru, March, 1892, by W. E. Safford (No. 989).

Saffordia need be compared only with *Trachypteris*, *Doryopteris*, and *Notholæna*. In its paleaceous vestiture and to a lesser extent in form it resembles certain species of *Notholæna*, as, for example, the Mexican *N. aurantiaca* D. C. Eaton; but from this genus it is excluded by its strictly areolate venation and by the position of its sori, which are borne in a rather broad continuous band, largely upon the leaf tissue, instead of upon the tips of the veins. The margin, moreover, is involute, instead of revolute, and has neither the form nor the function of an indusium.

Doryopteris, to which *Saffordia* has already been likened, is a small genus of world-wide distribution, a part of whose species not only resemble it in general form but have a very similar, though coarser, areolate venation. From these, which are devoid of scales upon the lamina, *Saffordia* departs widely in its dense paleaceous covering, in the absence of any indusium whatever, and in its more ample soriation.

Despite obvious differences in form and habit *Saffordia* is probably more closely related to *Trachypteris*. This little known South American genus, described in 1899, is currently regarded as consisting of a single species, *T. pinnata* (Hook. f.) C. Chr., first described (in 1847) as *Hemionitis pinnata* from specimens collected by Charles Darwin upon Charles Island of the Galapagos group, and again a few years later (in 1854) by the elder Hooker (upon other material from the same islands) as *Acrostichum aureonitens*, the name under which it has since been best known. Subsequently it was referred to several other genera and was finally (in 1899) placed by Diels as a new section (*Heteroglossum*) of *Elaphoglossum*, in the tribe *Acrosticheæ*. In the same year André's generic name, *Trachypteris*, was proposed for it by Christ, who regarded it as closely allied to *Elaphoglossum*. Meanwhile its range had been extended by the discovery of specimens in the Andes of Ecuador; also, another species had been described from Minas Geraes, in southern Brazil, as *Acrostichum Gillianum* Baker. The latter is placed by Christ as a form of *T. pinnata*, having ternately divided instead of pinnate sporophylls. Specimens with sporophylls of somewhat intermediate form, collected in Bolivia by R. S. Williams (No. 1177), were regarded by Underwood as representing an additional species. Without a critical study of all the material it is difficult to say whether one or several species are here involved. It is sufficient for the purposes of the present paper to point out that the

various forms are at any rate of the closest interrelation, that they are similarly dimorphic, and that their sterile fronds at least are scarcely distinguishable from each other.

The sterile fronds of *Trachypteris* being entire, subspatulate, exstipitate, and arranged in a rotate basal tuft are thus in shape, structure, and habit very dissimilar from *Saffordia*, which they resemble chiefly in venation and in the similarly dense paleaceous covering of the under surface. The fertile fronds are slender and very long-stipitate, the blades varying from ternately divided to pinnatifid (with 4 to 7 segments) to fully pinnate, with 3 or 4 pairs

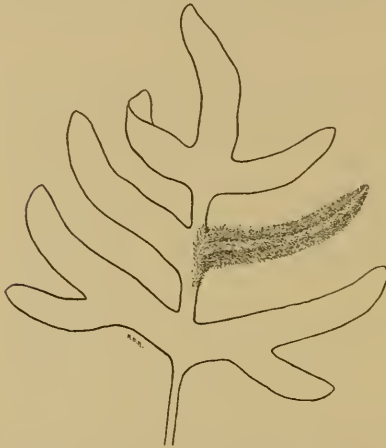


FIG. 1.—Blade of fertile frond of *Trachypteris* from Bolivia (*Williams 1177*), intermediate between the Brazil and Galapagos forms. Natural size.

of distant sessile segments. The basal segments may even be lobed upon the proximal side, the lobes more or less produced (as shown in Hooker's figure and in the Bolivian specimen at hand); and it is the basisopic form thus assumed which, together with the ultimate venation and the type of soriation, offers a suggestion as to a possible common origin of *Trachypteris* and *Saffordia*. The most notable differences between the two genera lie in the extreme dimorphism exhibited by *Trachypteris*—the complete

restriction of vegetative and reproductive activities to separate leaves. Thus, as might be expected, only the sterile fronds are persistent, the fertile fronds shrivelling after maturity; while in *Saffordia* the fertile and sterile fronds are alike and are stout, rigidly erect and long-persistent, characters consequent upon the parallel expression of both vegetative and reproductive functions in the same frond. Nearly all fronds of *Saffordia* are fertile and all are truly vegetative.

With respect to soriation there is a strong similarity between *Trachypteris* and *Saffordia*, the difference being in extent rather than in kind. The fertile fronds of *Trachypteris* have the sporangia nearly covering the under surface of the segments, only the costal row of areoles commonly being devoid of them; and thus, because of the narrowness of the segments, the two broad bands of sporangia nearly

meet at maturity. The sporangia then appear to have arisen from the whole lower surface, as has erroneously been stated to be the fact. In *Saffordia* the sporangia occupy less space actually and relatively and, from the greater size of the fronds, appear only as a broad, slightly intramarginal band.

Saffordia thus represents a new type of fern almost exactly intermediate between *Doryopteris* and *Trachypteris*, having the habit and general structure of the former and the scaly covering and soriation characteristic of the latter genus. It is clearly a member of the Pteridæ, as is *Doryopteris*, and must carry with it to that tribe the genus *Trachypteris*, which latterly has been placed among the *Acrosticheæ*.

The discovery of this new genus in a region relatively so accessible is interesting not only in itself but also as suggesting the probable richness and peculiarity of a fern flora as yet little known.



SAFFORDIA INDUTA Maxon
(ABOUT ONE-HALF NATURAL SIZE)