

Polypodium Californicum yet remains to be noticed, a fern of greater altitudinal range than any other of our region, extending from sea level to at least 8,000 feet above it. A range so great implies exactly reversed seasonal conditions at the upper and lower extremes. Accordingly at the lower altitudes it vegetates in Winter, starting up as soon as the soil is moistened by the first rains, and as it has a good supply of nutriment stored up in its thickened rhizomes, its growth is rapid and luxuriant. At its upper limit, where it is a rare and diminutive plant, its growth is made in Summer and its rest taken in Winter.

San Bernardino, Cal.

NOTES ON AMERICAN FERNS: I.*

BY WILLIAM R. MAXON,

POLYSTICHUM SCOPULINUM (D. C. Eaton.) (*Aspidium aculeatum*, var. *scopulinum* D. C. Eaton. Fern N. Am., 2: 125, Pl. LXII, fig. 8. 1880.) Rhizome stout, ascending, roots cord-like; fronds variable in length, from 9 to 17 inches; stipe 2 to 5 inches, densely chaffy at the base with both broad and narrow bright-brown scales; lamina from 6 to 12 inches long, decidedly narrow lanceolate or even linear, 1½ to 2½ inches broad, sub-coriaceous, the chaff largely deciduous from the rachis; pinnæ numerous, 7 to 15 lines long, 4 to 8 lines broad at base, ovate, obtuse, the basal portion pinnately lobed, the apical half serrate with pointed or aculeate teeth; pinnæ usually much reduced below; sori near the midvein; indusium peltate, large, somewhat lobed and glabrous.

Although the proper disposition of the large number of forms now included under *Polystichum aculeatum* is indeed a perplexing question, it appears to me that the so-called variety *scopulinum*, described and figured by Professor Eaton, is clearly entitled to specific rank. Its author considered it to be hardly nearer *aculeatum* than to our North American form of *P. mohrioides*,† and in the light of the material accumulated since, it now appears to stand about midway. Three specimens of this species are contained in the Eaton Herbarium. Upon these, which, through the courtesy of Professor A. W. Evans I have examined, and upon the specimens in the Columbia and National Herbaria the

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†Eaton, Ferns N. Am., 2: 254. 1880.

above description is based. The earliest specimens (Eaton Herb.), first determined by Professor Eaton as *Aspidium lonchitis*, were collected on the Hayden Yellowstone Expedition, in the Upper Teton Cañon of Eastern Idaho, July 28th, 1872. The present known range extends from Washington to Eastern Idaho, south to Utah and Southern California. It has also been collected on "Mount Albert, Lower Canada," 26 July, 1881, by O. D. and J. A. Allen (Eaton Herb.), a notable extension of range, and comparable to that of *Pellaea densa*. The "Mount Albert" mentioned is in Gaspé county, Quebec.

AZOLLA CAROLINIANA Willd. IN CENTRAL NEW YORK. Regarding the occurrence of this small and easily overlooked fernwort in New York State, Torrey, in his Flora, writes: "In slowly flowing waters, island of New York; floating on the waters of Lake Ontario (Pursh); Braddock's Bay (Dr. Bradley)." I am now able to report it from the interior of the State. Mr. Henry Warne, of Kenwood, N. Y., collected it several years ago upon one of the slow creeks at the eastern end of Oneida Lake; and the National Herbarium has lately received specimens from the same locality taken from the surface of the stagnant waters of Black Creek, which drains into Oneida Lake near Sylvan. They were collected by Mr. H. D. House, of Oneida, N. Y., August 8th, 1899. The species may well be looked for at other points along the lake.

POLYSTICHUM MUNITUM IMBRICANS (D. C. Eaton). (*Aspidium munitum*, var. *imbricans* D. C. Eaton. Ferns N. Am., I: 188, Pl. XXV, fig. 3. 1879). This variety is to be distinguished from the species by its smaller size, and by the crowded imbricated pinnæ which have long cuspidate tips and are set much more obliquely to the rachis than in the type. It is extremely chaffy at the *base* of the stipes, the scales being narrowly acuminate-lanceolate, often 10 lines long, and mostly of a rich glossy chestnut color. The greater portion of the stipe, however, and the lamina are nearly naked, in this respect differing materially from the species, which is usually chaffy throughout. The fronds are mostly heavily fruited, with the sori crowded in dense sub-marginal lines.

Having recently observed some excellent specimens of this variety, collected in Washington by Mr. J. B. Flett, and noticing Professor Eaton's remark that "it looks like a plant grown in a hot and dry place," I have asked Mr. Flett to describe its habitat and habit. He writes as follows: "It grew on a steep moun-

tain side in the talus and seams of moss covered rocks in company with *Selaginella rupestris*, a very large form of *Cryptogramma acrostichoides*, *Cheilanthes gracillima* and *Pellaea densa*. A forest fire had several years before swept off what timber there was along the mountain, but I do not think that there had ever been much where the ferns grew. The soil would not permit it. The rock was trachyte, with a southwest exposure, —little or no shade, occasionally a bush of *Ceanothus velutinus* and a manzanita. It grew in radiate tufts, something like *D. munita*, only more erect—very distinctly so—and perhaps a little denser than the type. The leaves are as densely crowded when growing as they appear when pressed. There was no water to be seen anywhere."

In the particular case mentioned above the visitation of the fire may have been the cause of the fern's variance from what is regarded as typical *munitum*; but it seems hardly likely, inasmuch as the three companion ferns were flourishing under the same conditions. Moreover, the herbarium material is so ample as to admit of no doubt that this is a generally distributed and fairly common form. The National Herbarium alone contains eleven specimens which are sharply distinct from the type. I am strongly inclined to think that subsequent study will prove it to be a distinct species.

PELLÆA GRACILIS IN ILLINOIS.

BY E. J. HILL.

HAVING found this fern in the valley of the Desplaines river, and once before, in 1874, in that of the Kankakee river, an account of the two stations will be of interest, since they are, as far as I am aware, the only ones recorded for Illinois. Both are quite far south for its range when the low altitude is considered, though it goes somewhat farther south at higher elevations. The latitude of Kankakee, near which it was found in one case, $41^{\circ} 10'$, and the altitude above the sea about 600 feet. That of Lemont, in the valley of the Desplaines, is $41^{\circ} 40'$, and the altitude about 650 feet. In both cases the ferns grew in damp, shaded ravines cut in the limestones by small streams. At Kankakee they were on shelves of the limestone in recesses where the layers of rock had been disintegrated along the line of contact by atmospheric agencies, so that hollows were left where an upper layer roofed over a cavity, on the floor of which the plants