

SMITH ON FERNS'

Historia Filicum; an Exposition of the Nature, Number, and Organography of Ferns. By Jno. Smith, A.L.S., Ex-Curator of the Royal Botanic Garden, Kew. With Thirty Lithographic Plates by Fitch. 8vo, 429 pp. (London: Macmillan and Co.)

THE main and most valuable part of this work is a full account of Mr. Smith's scheme of fern-classification, with a complete catalogue of all the known species, arranged according to his views and diagnostic characters of all groups of a higher grade. The author is the patriarch of living fern writers, having worked at ferns with unwearied perseverance and enthusiasm for now upwards of fifty years. In 1823, when he first took charge of the living collection at Kew, it contained only forty species. Sir Wm. Hooker also, as is well known, made ferns his favourite department of botany for the last twenty-five years of his life. In 1846 the living collection had increased to 400, and in 1857 to 600 species. In 1864, when in consequence of failing eyesight Mr. Smith was compelled to resign his appointment, he estimated the number of ferns in cultivation in the country at upwards of 1,000. The whole number of species now known in the world, taking a broad view of what constitutes a species, is not far short of 3,000, and during the last year, certainly not less than fifty new ones have been added to the list.

The great peculiarity in Mr. Smith's plan of fern-classification is that at the outset he divides ferns into two groups, which he calls *Desmobrya* and *Eremobrya*, an account of which will be found at p. 65. The difference between them depends mainly upon whether the stipes are continuous with the caudex, or jointed at the base, so that they become detached when the frond withers, like the leaf of one of our deciduous trees. The *Eremobrya*, which are comparatively few in number, are such ferns as *Polypodium vulgare*, and *Davallia canariensis*, in which the fronds are produced singly from the sides of a creeping rhizome, and are jointed at the base. The *Desmobrya*, which are perhaps three quarters of the family, and have unjointed stems, may have either the fronds produced in a crown from the summit of an erect caudex, as in the tree-ferns and *Nephrodium Filix-mas*, or produced alternately in a single series from a creeping rhizome, as in *Pteris aquilina* and *Nephrodium Thelypteris*. These last, which are comparatively few in number, are like the *Eremobrya* in habit, but want the joint.

The old Swartzian and Willdenerian genera, founded upon the shape and position of the sori, and the absence or presence and position of the indusium, fall many of them partly into one of these groups, partly into the other, and this holds good also with ferns in which sori and veining also coincide. So that there are substantially three plans of fern-classification and fern-nomenclature, each of which is represented by a recent work in this country, and their relation to one another is as follows:—All systematists agree in recognising a substantial difference in the shape and structure of the sporangia, the shape and position of the sori, and the absence or presence of an indusium as constituting a genus. In Hooker and Baker's "*Synopsis Filicum*," now in its second edition, only genera are admitted which rest on these characters, and their number is 76, *Polypodium*, containing about

400, and *Asplenium* about 300 species. There is great variation in the arrangement of the vascular bundles in the fronds of ferns. Sometimes they do not join again after once branching. In other cases they join and form meshes of various shapes. A second school, represented in Britain by Moore's "*Index Filicum*," regard any appreciable difference in veining as constituting a generic character, and this increases the number of genera between two and threefold. The total number of genera admitted by Moore is 178, and of these, twelve go into the *Polypodium* of Hooker. Mr. Smith's plan carries us a decided step further in the direction of subdivision, and by using the character already explained as a ground of generic separation, raises the number of genera admitted to 220. But in point of fact all the ferns in which the sporangium is surrounded by an incomplete vertical ring (*Polypodiaceæ*), which are three-quarters of the whole order, agree completely in the essential structure of their organs of nutrition and reproduction, so that a large proportion of the genera even of those that admit the fewest number are separated from one another by very unimportant characters, and the great difference that there is in the nomenclature of ferns according to the three different systems does not represent any deep-seated divergence of view, because the systematists of the first school willingly accept the further subdivisions of those that multiply the number of genera, as being the best possible groups that can be devised of subgeneric or sectional value. The book, therefore, is worthy of careful study by everyone who is interested in the subject; it is a complete gathering together in one view of the author's work in the field to which it relates. Remembering how the book has been written, no one can study it without strongly sympathising with the author in the difficulties under which he has rested in thus placing before the world the matured result of his labours, and admiring the energy with which he has achieved so difficult a task in such trying circumstances.

In the way of criticism we have two observations to make: the first, that whoever has undertaken the correcting for the press has done his work the reverse of well. Names of well-known genera, species, authors, and books are frequently misspelt. At p. 65 we have the essential character of *Desmobrya* made to depend upon venation, and at pp. 98 to 101 we have under both *Nipholobolus* and *Colysis* all the three genders represented in the adjectival specific names. Secondly Mr. Smith, frequently under a genus, compares the number of species as given in Hooker's "*Species Filicum*" with that given in Hooker and Baker's "*Synopsis Filicum*," as if the two numbers represented the same thing. Under *Adiantum*, for instance, he expressly says that where Sir W. Hooker has made 109 species Mr. Baker has reduced them to sixty-two. He has evidently forgotten that, as was fully explained in the preface to the later work, the plan of the two books is different—that the more condensed "*Synopsis*" only includes the species known with certainty by the authors; but the "*Species*," in addition those that have been described by others, but not identified, a large mass of doubtful plants in addition to those that are known fully and clearly, so that the two sets of figures cannot be fairly compared unless this be constantly borne in mind.

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