XLV.—On the Arrangement of the Brachiopoda.

By J. E. GRAY, Esq., F.R.S.

CUVIER established this class of Mollusca as an order when he published the dissection of *Lingula*, and it has been almost universally adopted.

Linnæus, Müller, Pallas, Poli, Blainville, Owen, Philippi and D'Orbigny have made us acquainted with the animals of the other recent genera, and showed how they differ from one another.

Mr. M'Coy in his work on the Fossils of the Carboniferous Limestone, Mr. King in the 'Annals of Natural History,' and more lately M. D'Orbigny in a paper transmitted to the Academy of Sciences, and published in the 'Annales des Sciences Naturelles,' have availed themselves of these materials and proposed an arrangement of the genera of this class into families.

Mr. M'Coy's paper illustrates both the fossil and recent genera, and was an important addition to our knowledge; Mr. King's corrected some of the synonyma of the genera and added some details; M. D'Orbigny's is clever and rapid, and he has evidently availed himself of the labours of both the above-named gentlemen and of Philippi, though, with his usual want of generosity, he has not mentioned their names in any part of his paper, and has given new names to several of his genera, though many of them have long been distinguished by preceding authors.

Not considering the arrangement proposed by these authors as quite satisfactory, I have ventured to suggest the following. Some may be astonished at my proposing to place what they have been in the habit of considering as species of the same genus in different orders and families, but the number of species and forms known appears to me to justify this proceeding. Bronn in his late work gives a list of more than 950 fossil species of this class, many of them having several named varieties.

Synopsis of the Orders.

- A. The oral arms recurved and affixed to fixed appendages on the disc of the ventral valve. Shell minutely and closely perforated. **ANCYLOPODA.**
1. **ANCYLOBRACHIA.** The oral arms affixed to calcareous plates, forming hoops attached to the hinge-margin of the ventral valve, and prominent in its cavity.
2. **CRYPTOBRACHIA.** The oral arms sunk into grooves in the convex centre of the inner surface of the ventral valve.
- B. The oral arms regularly spirally twisted when at rest. **HELICTOPODA.**

1. *Selaginopsis triserialis*, sp. n. (Pl. XVI. figs. 1, 2.)

Trophosome. Hydrocaulus straight, not angularly bent, broader than the branches. Branches arranged alternately and subspirally, springing from all sides, diminishing towards the apex, and ramifying several times. The hydrothecæ, almost entirely immersed in the axial tube and of a cylindrical form, a little narrowed towards the orifice (which is oval with two angles), are placed in three longitudinal series.

Gonosome. Not known.

Locality. Kamtschatka (*M. Kastelsky*).

This small species, which comes from Kamtschatka, is represented in the Academy's collection by only a single specimen (Pl. XVI. fig. 1), 37 millims. long. The lower extremity of the stem, with a small disciform enlargement, was not fixed to any object. The general form of the colony is conical; it diminishes very gradually, so that at its apex it is more or less pointed. The stem is straight, divided into internodes, each having from two to four branches, and bears annulations at its base. The branches, which are arranged on all sides of the principal stem, are excessively slender compared with those of all the other species of this genus, which is explained by the small number of series (three) in which the hydrothecæ are arranged; they are placed at an acute angle to the principal stem, and become shorter and shorter as they approach the apex; they may divide in their turn, usually two or three times, rarely more. The hydrothecæ are arranged in three regular series (Pl. XVI. fig. 2), and in such a manner that no two orifices of the three series come at the same level; this character of the arrangement of the hydrothecæ in three series is perfectly constant in the species in question. The hydrothecæ are almost entirely immersed in the axial tube, to which they are adnate; their orifices, which are compressed, oval, and furnished with two angles, alone project more or less, but in all cases very slightly, from the surface. The two angles are always distinct, although they are not produced into two distinct teeth as, for example, in *Selaginopsis mirabilis*. The form of the hydrothecæ is more or less cylindrical, narrowing a little towards the upper extremity. A small tube with its margins slightly reverted establishes the communication between the cavity of the hydrotheca and that of the axial tube, in the same manner as is described by me in *Selaginopsis Hincksii*, mihi.

Width of a branch 0.55 millim.; length of a hydrotheca 0.45, its maximum breadth 0.25.

This is a very characteristic species, and may be easily recognized by the triserial arrangement of its hydrothecæ, which produces the extreme fineness of its branches. In the mode of its ramification and the form of its hydrothecæ it does not differ greatly from the other species. As all the other species have 4, 6, 8, or more longitudinal series of hydrothecæ, *Selaginopsis triserialis*, having only three, must consequently be regarded as the simplest form.

It might be supposed that the number of series in the polyserial type had originated from the biserial type by the displacement of the hydrothecæ in the two series alternately to one side and the other, which would produce the division of one series into two, as indicated by *Selaginopsis fusca*, Norm., and *S. Allmani*, Norm., in which the series are arranged in pairs—which would be the most plausible and natural explanation. Unfortunately *Selaginopsis triserialis* only serves to throw the question into confusion; for this species can by no means be explained as having originated from the biserial type.

2. *Selaginopsis pinnata*, sp. n. (Pl. XVI. figs. 3, 4.)

Trophosome. Hydrorhiza in the form of a thin and continuous layer, not composed of hydrophytons. Hydrocaulus simple, straight, not angularly bent, annulated at the base, divided into regular internodes. Branches pinnate, straight, springing alternately from two sides, not divided into internodes. Hydrothecæ arranged in *four* regular series, almost entirely immersed in the tubular axis; they do not follow one another immediately in the same series, but leave a certain interval between them. Their form is cylindrical, a little narrowed at the end, with a very short neck, springing outward from the axis; aperture oval, very slightly angular at the two sides.

Gonosome. Unknown.

Locality. Port Ajan (*M. Wosnessensky*, 1848).

The hydrorhiza is formed by a thin layer covered with perisarc (Pl. XVI. fig. 3, *per*), and not composed of tubes united together, as described by me in *Sertularia albimaris*; here, on the contrary, the perisarc is continuous, covering, on shells, spaces sometimes of more than a square centimetre. The hydrocaulus is erect, stout, cylindrical, very long, divided into regular internodes about 8 millims. in length, broader than the branches; its colour is a darkish brown, becoming lighter towards the end, where the branches commence, which are also light brown. Usually only one half or one third, or sometimes even one fourth, of the stem is covered with branches, all the rest being entirely destitute of them (Pl. XVI.

3. SCLEROBRACHIA. The oral arms supported by a shelly plate arising from the hinge-margin of the ventral valve.

4. SARCICOBACHIA. The oral arms fleshy, without any shelly support.

C.? The animal unknown ; perhaps Conchifera.

5. RUDISTES.

Subclass 1. ANCYLOPODA.

The oral arms not extensile or only at the tip ; on fixed shelly supports, or in grooves in the under or ventral valve ; the mantle is adherent to the shell, the substance of the shell being pierced with numerous minute perforations, which are pervaded by the processes of the mantle.

Order I. ANCYLOBRACHIA.

The oral arms are attached to two shelly plates arising from the hinder or cardinal edge of the ventral valves ; they are recurved and convolute on the inner side of the lamina.

The animals are generally attached to marine bodies by a tendinous peduncle, which passes through a hole in the top of the umbo of the larger or dorsal valve ; this peduncle and the hole are sometimes obliterated in the older specimens.

The order only contains a single family.

Fam. 1. TEREBRATULIDÆ,

which is nearly synonymous with the smooth *Terebratula* of Sowerby, the perforated *Terebratula* of Carpenter, the genus *Epithyris* of Phillips and *Terebratula* of King, the family *Terebratulidæ* of M'Coy, and *Cyclothyridæ* of Phillips.

The animal has been described by Linnæus, Pallas, Owen, Blainville, Philippi, D'Orbigny and others.

In some genera the hoops are united together below by a transverse band which is attached to medial longitudinal ridges of the ventral valve, as in *Terebratula* of Retzius = the *Terebratella* of D'Orbigny, as *T. dorsata* ; and *Magas*, Sow. In others the hoop forms a ring and is free from the ventral valve, as *Gryphus*, Megerle = *Terebratula*, D'Orb., and *Terebratulina*, D'Orbigny, for *T. vitrea* and *T. caput serpentis*.

D'Orbigny indicates other genera under the names of *Terebrirostris* and *Fissirostris*.

Order II. The CRYPTOBRACHIA

have the oral arms entirely attached in the form of two or more lobed processes sunk into grooves in the disc of the ventral valve. They are generally thick shells. This order also only consists of a single family.

Fam. 1. THECIDÆADÆ.

The animals are described by Philippi and D'Orbigny. The genus *Argiope*, De Longchamps = *Megatheris*, D'Orb. (*Tereb. de-truncata*) is attached by a tendon passing out of a very large perforation below the beak of the dorsal valves; Philippi confounds this genus with his *Orthis*, which is different from the *Orthis* of Dalman. *Thecidæa* has the shell attached by the truncated apex of the dorsal valve, or it is free when the apex is produced and entire. De Longchamps, who established the genus *Argiope* in 1839, pointed out the affinity of this genus to *Thecidæa*.

Subclass 2. HELICTOPODA.

The oral arms are elongate, regularly spirally twisted when in repose. The mantle lobes are merely applied to the inner surface of the shell, and the substance of the valves is not pierced with minute perforations, though the surface is sometimes spinulose, the spines being only formed on the edge of the shell while it is being increased in size.

Order III. SCLEROBRACHIA.

The oral arms support a shelly band arising from the hinder or cardinal edge of the ventral valve.

Fam. 1. SPIRIFERIDÆ.

The oral arms very largely developed and supported the whole of their length by a thin shelly? or cartilaginous? spirally twisted plate.

These shells are only known in the fossil state, but the spiral supports of the arms are generally preserved, and may be discovered by sections of the fossil, and are often to be seen in the fractured specimens.

This family is equivalent to the genus *Spirifer* of J. Sowerby the father, the family *Delthyridæ*, M'Coy, who gave some excellent illustrations of the structure, and the *Spiriferidæ* of King. D'Orbigny proposed some genera under the names of *Spiriferina*, *Spirigera* and *Spirigerina*, according to the direction of the axis of the spiral cones, but it is doubtful if these genera are only new names to those already established.

The *Spirifer* of Sowerby, as reduced by M'Coy, and the *Martinia* of M'Coy, have the hinge as long or longer than the width of the shell. In *Atrypa*, Dalman, and *Athyris*, M'Coy, it is shorter and the shells oblong, rounder behind.

According to the description of Mr. King, the genus *Strigocéphalus* would appear to form the passage between this and the next family (Ann. Nat. Hist. xviii. 89).

fig. 3). The colony is regularly pinnate; the branches, springing at an acute angle, are arranged alternately; they are of moderate length, and only diminish towards the extremity. Usually each internode bears three pairs of branches. The branches are cylindrical, straight, with their surface smooth (which distinguishes them from those of *Selaginopsis mirabilis*), uniting with the hydrocaulus by a short constriction; their colour is of a very light brown, never becoming darker towards the end, as is always the case in *S. mirabilis*. Sometimes, although very rarely, a branch gives origin to a secondary branchlet near its extremity.

The hydrothecæ are arranged in two series upon the principal stem, and in four regular longitudinal series upon the branches; and this character is perfectly constant (Pl. XVI. fig. 4). Their form is not very characteristic; the hinder part, which is the widest, is rounded, and communicates with the tubular axis by a small tube with the margins slightly reverted. A little neck in the form of a very short tube is placed vertically to the surface of the stem and turned outwards; it terminates in an aperture, which is large, oval, and usually furnished with two angles, which, however, are scarcely, if at all, produced into teeth, as also in *Selaginopsis triserialis*; but here it sometimes happens that there is no angle and the orifice appears regularly oval or even round.

Length of the largest individual 180 millims. (it is therefore one of the largest species); breadth of the colony about from 30 to 35; length of the branches usually 20, sometimes 25; breadth of the hydrothecæ 0·27, of all the branches 0·5; length of the hydrothecæ 0·5; diameter of the aperture 0·14.

This fine species is represented in the collection of the Museum by several large specimens attached to fragments of *Modiola modiolus*; it most nearly approaches *Selaginopsis Hincksii*, mihi, by its mode of ramification, the fact that the surface of the branches is smooth, and the form of its hydrothecæ. But it differs therefrom essentially by its four series of hydrothecæ (*S. Hincksii* always has six), as also by the smaller length and breadth of its branches. At present I know five species of this genus which have colonies of a plumose form—namely, *S. mirabilis*, Verr., *S. Hincksii*, mihi, *S. Allmani*, Norm., *S. fusca*, Johnst., and *S. pinnata*, mihi; all the other species have branches springing not from two sides only of the principal stem, but from all sides, thus affecting a habit quite different from that of the above five species.

3. *Selaginopsis pacifica*, sp. n. (Pl. XVI. figs. 5-7.)

Trophosome. Hydrocaulus slightly curved, divided into regular internodes. Branches arranged alternately *on two sides of the principal stem*, two pairs on each internode, divided into five internodes, constricted at the point of attachment and at the internodes. Each branch bears one or two, rarely five, secondary branches. Hydrothecæ cylindrical, almost entirely immersed in the substance of the axial tube; aperture oval, with two angles (not teeth); hydrothecæ arranged *in four regular series*, and at the same time in a spiral, the hydrothecæ of each series following one another immediately without leaving any free space or interval.

Gonosome. Gonangia arranged in two or three series, of an oval form, narrowing gradually towards the base, and truncate at the apex. The surface is ribbed.

Locality. Metschigman Bay.

The hydrocaulus of this species, in the two specimens possessed by the Academy of Sciences, is not straight, but elegantly curved (Pl. XVI. fig. 5), which may be a constant character. The whole colony is of a light greyish-yellow colour, and, owing to the subdivision of the branches into secondary branches, it acquires a tufted character, which, however, is not produced by division in several planes; on the contrary, both the primary and secondary branches all originate in the same plane. The branches, moreover, become gradually shorter as they approach the apex. The branches usually have a strong constriction in the middle, so that the two internodes thus produced are united only by means of a very slender piece. The hydrothecæ are always arranged in four regular series (Pl. XVI. fig. 6); and it is only very rarely that we meet with a small branch having only three series, as in *Selaginopsis triserialis*. The hydrothecæ are cylindrical, rounded at their posterior part, which is furnished with a small tube to communicate with the cavity of the cylindrical axis. The orifice is oval, furnished with two angles (which, however, are never developed into teeth), and placed at the extremity of a small neck in the form of a very short tube. No two orifices of the four series of hydrothecæ are ever situated at the same level; in other words, we find a very evident spiral arrangement around the cylindrical axis, a character which, as will be shown, appears to be common to the whole genus. It must also be remarked that the hydrothecæ of each series follow each other almost always without interruption and without leaving any interval; on the contrary a part of the superior

Fam. 2. RHYNCHONELLIDÆ.

The oral arms are elongate, fleshy, supported at the base by two short, hard, diverging shelly laminæ arising from the hinge-margin of the ventral valve.

They are easily known from the *Terebratulidæ* by the cavity of the shell being without shelly plates, its substance not perforated, and its surface being generally radiately plaited.

Only one species, *T. psittacea*, is known in the recent state: its animal has been described by Prof. Owen.

The family is equivalent to the plaited *Terebratula* of the elder James Sowerby and Von Buch, the non-perforated *Terebratula* of Carpenter, the genus *Hypothyris* of Phillips, and part of the family *Terebratulidæ* of King.

It contains the genus *Rhynchonella* of Fischer and D'Orbigny = *Hypothyris*, Phillips; *Comerophoria*, King; *Uncites*, DeFrance; ? *Trigonofemus*, Koenig; *Rhyncora*, Dalman; *Pygope*, Link; *Delthiridæa*, M'Coy; *Pentamerus*, Sowerby.

Order IV. SARCICOBACHIA.

The oral arms fleshy to the base and without any shelly support, the lower valve without any processes on the hinge-margin or disc, or except sometimes a slight medial longitudinal elevation.

Fam. 1. PRODUCTIDÆ

consist entirely of fossil species, some much resembling those of the former family; but the shells are generally spinose; they are often attached to marine bodies by the surface of the ventral valve, as the genera *Productus*, Sow., *Stropholosa*, King, *Chonetes*, Fischer, *Leptæna* and *Orthis*, Dalman, *Strophonema*, Rafinesque, and *Calceola*, Lamk.

This family comprises Mr. King's *Productidæ*, *Strophomenidæ* and *Calceolidæ*.

Fam. 2. CRANIADÆ.

Nearly allied to the last, but the upper valve is simply conic like a *Patella*, and the animal is attached by the outer surface of the ventral valve.

The animal has been figured by Müller, Poli and others. It includes the recent genus *Crania* of Retzius, including the *Orbicula* of Lamarck, *Criopus* of Poli. The lower valve of the only recent species I am acquainted with varies greatly in thickness and form according to the position and habitation of the animal. This family in many particulars is allied to *Thecidæadæ*.

Fam. 3. DISCINIDÆ.

The upper valve is conical and patelloid, the lower orbicular, and is attached to marine bodies by a short tendinous peduncle, which passes out through a slit in the hinder part of the disc of the *ventral* valve.

The animal of this genus has been described by Mr. Owen under the name of *Orbicula*, Mr. G. B. Sowerby having some years ago confounded this shell with that genus, which has caused confusion which has existed to this day. The shell was first described by Schumacher as a section of the genus *Crania*: Mr. King, probably misled by this mistake, does not include it in his arrangement. This shell is peculiar, for being a horny rather than a shell texture, it is flexible when moist.

Fam. 4. LINGULIDÆ.

The valves are nearly equal, elongate, and supported by a thick peduncle which comes out between the beaks of the two valves. The shells are covered with a horny periostraca, and in some species the shelly matter is so very thin that the shells are flexible and nearly entirely cartilaginous.

The family contains only a single genus, *Lingula*.

Order V. RUDISTES.

This order has been placed by most modern authors with the Brachiopoda: the proofs of its belonging to this family are not very evident; but as there is no other to which they appear to be more nearly allied, they may as well be retained in this position.

Lamarck, Cuvier, Férussac, and some other authors have regarded some of the genera as belonging to Cephalopoda, and others as bivalves (Conchifera).

Deshayes regards them as more nearly related to *Chama*, the character of the family having been lost by the destruction of the inner coat of the shell during the fossilization of the specimen.

M. D'Orbigny has properly united them into one group under the name of Irregular Brachiopods or *Rudistes*, but he includes with them the genus *Crania*, which is a true Brachiopod.

They form three very distinct families:—

Fam. 1. RADIOLITIDÆ.

The lower valves more or less elongate-conical, fixed; the upper valve conical or spiral, free; the texture of the lower valve cellular or fibrous.

The *Radiolites* has the upper valve flat or conical and cap-like.

The *Caprina*, D'Orb., has a spiral and produced upper valve. The first of these genera has had many names applied to it, but

hydrotheca is covered by the little neck of the hydrotheca following it inferiorly, and it is rare to see a little space between them, whilst in the preceding species the interval always exists.

The gonophores (Pl. XVI. fig. 7) are in great numbers, oval, ribbed on the surface, furnished with a round aperture placed at the extremity of a very small cylinder; they are arranged in three series.

Length of the colony about 60 millims.; width of a branch 0.6; length of the hydrothecæ 0.5, their breadth 0.27; length of the gonangia 1.2, their breadth 0.55.

This pretty species is most nearly related to *Selaginopsis pinnata*, from which, however, it differs in habit, in the mode of ramification and, especially, the subdivision of the branches, as also in the absence of intervals between the hydrothecæ which follow each other in the same series.

4. *Selaginopsis thuja*, sp. n. (Pl. XVI. figs. 8-10.)

Trophosome. Hydrocaulus straight, angular, spiral, divided into internodes bearing branches which spring *from all sides of the principal stem* and are attached by means of a tubular process of the latter. Each branch divides at a certain distance from the point of attachment into two, each of which subdivides again into three branchlets, thus forming a *complex of six branches*. Hydrothecæ more or less conical, broad and round at the base, a little narrowed at the apex, *arranged in six or seven series*. Aperture without teeth or angles, round or oval.

Gonosome. Gonophores sparse, oval, truncate at the apex, and narrowing gradually to the base.

Locality. Northern Pacific Ocean.

In habit this species (Pl. XVI. fig. 8) is just like *Thujaria thuja*. The whole colony is cylindrical, only a little narrowed towards the apex. The hydrocaulus is divided into regular internodes by deep annulations, and bears on all sides short tubes, spirally arranged, to which the branches are attached. Each branch (Pl. XVI. fig. 9) divides only at a certain distance from its point of attachment, which is very characteristic of this species, and distinguishes it from *Selaginopsis decemserialis*, to which we shall refer hereafter. The branch first of all divides dichotomously into two parts, each of which is in its turn formed by three small branches nearly of equal length. Width of the branches moderate. Colour greyish brown; that of the principal stem dark brown. The hydrothecæ are arranged in several series, the number of which is not constant; but usually a branch has five series at its base,

then six, and finally seven series at its extremity; and I have very rarely met with cases in which the end of the branch had fewer than seven series. The form of the hydrothecæ is not cylindrical as in most species of the genus, but more or less conical (Pl. XVI. fig. 10) and rather elongate; this last character, however, is not very constant, and occasionally we meet with hydrothecæ having the ordinary, more or less cylindrical form. The aperture is oval or round, without any trace of teeth or even of angles. The hydrothecæ of each series are arranged so as to leave small intervals between them. The gonosome has nothing very characteristic about it, and scarcely differs in any way from the normal form; that is to say, it is oval, truncate above, and narrowed below.

Length of the entire colony 75 millims., breadth 15; width of the branches 0·7; length of hydrothecæ 0·45, maximum breadth 0·25; length of gonothecæ 0·7, their width 0·5.

The Academy of Sciences of St. Petersburg only possesses a single specimen of this species, the ticket belonging to which has been lost, so that the only locality I am able to give is the Northern Pacific Ocean; but it is very probable that the species comes from the sea of Ochotsk or from Kamtschatka. *Selaginopsis thuja* is distinguished by its mode of ramification (six branches), by the form of the colony, and by the form of the hydrothecæ and their arrangement in six or seven series.

5. *Selaginopsis ochotensis*, sp. n. (Pl. XVI. figs. 11, 12.)

Trophosome. Hydrocaulus straight, angular, bearing branches on all sides, which are attached by means of a cylindrical tube springing from the stem. Each branch divides at some distance from the point of attachment into six long and broad branchlets. Hydrothecæ arranged in several regular series, most frequently in eight or nine, and at the same time spirally; they are not entirely immersed in the substance of the axial tube, but their ends project. Aperture compressed, furnished with two large teeth.

Gonosome. Gonangia arranged along the whole length of the branches, pyriform, with a straight, not bent neck, and with the surface smooth.

Locality. Sea of Ochotsk (*M. Djuktshandran*, 1844).

This species, of which the Museum of the Academy possesses two specimens, is very characteristic, and quite distinct from all the others that I have just described. The hydrocaulus is broad and angular, and bears branches on all sides in such a fashion as to form in the whole the habit of *Thujaria thuja*, but much more robust than the latter in consequence of the greater breadth of the branches. At the apex of the

that given by Lamarck has the priority. It has been called *Sphærulites*, *Ostracites* and *Acardo*, and the cast of the interior cavity has been considered as a genus, under the name of *Birostris* and *Iodamia*.

Fam. 2. HIPPURITIDÆ.

The lower valve is elongate, tapering, subcylindrical, of a solid laminated texture; the upper valve is nearly flat, and pierced with peculiar pores radiating to the circumference with branches diverging to the upper surface.

This family only contains a single genus, *Hippurites*, Lamk., which has also had many other names applied to it, as *Cornucopia*, *Orthoceratites*, *Batolites* (or *Batholites*), *Raphanister*, and *Bitubulites*.

Fam. 3. CAPROTINADÆ.

The lower or fixed valve is conical and spirally twisted, and marked internally with prominent ridges or transverse septa; the dorsal or free valve is oblique or spiral. They differ from *Caprina* in the valves not being of a cellular or fibrous texture.

This family contains two genera:—

1. *Caprotina*, D'Orb., which has the cavity of the shell merely marked with internal ridges.

2. *Ichthyosarcolites* has the cavity of the large spiral or involute fixed valve divided transversely by a number of oblique septa; the upper valve is probably like an operculum, but this genus is very imperfectly known.

BIBLIOGRAPHICAL NOTICES.

The Ferns of Britain and their Allies; comprising Equisetaceæ, Filicaceæ, Lycopodiaceæ and Marsileaceæ. By R. DEAKIN, M.D., London. Pp. 139. 8vo. London, 1848.

A Handbook of British Ferns intended as a guide and companion in Fern Culture, and comprising scientific and popular descriptions, with engravings of all the species indigenous to Britain, with remarks on their history and cultivation. By THOMAS MOORE, Curator of the Bot. Garden of the Apothecaries' Company. Pp. 156. 16mo. London, 1848.

Owing chiefly, it is probable, to the publication of Mr. Newman's beautiful work 'A History of British Ferns,' the study of this tribe of plants has taken a firm hold upon the affections of British botanists, and we now hail with delight the appearance of two other illustrated works upon them, as they cannot but tend still further to popularize the subject and lead to a more complete and scientific knowledge of it.

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