

Hab. — ?

The nuclear whorls in this species are rather large in proportion to the size of the shell. The longitudinal ribs are but slightly developed, and at the first glance the surface appears nearly smooth.

XXXIX.—On a new Species of *Diphyphyllum*, and on a remarkable Form of the Genus *Lithostrotion*. By JAMES THOMSON, F.G.S.

THE object of the present communication is to describe a new species of the genus *Diphyphyllum*, Lonsdale, and a remarkable form of the genus *Lithostrotion*, Luidius. The discovery of the former is due to His Grace the Duke of Argyll, whose attention was directed to a remarkable boulder that was exhumed by a farmer while digging a drain in the boulder-drift on the farm of Carskey, near the south end of Kintyre, Argyllshire. Notably, amongst other erratics, there are numerous fragments and boulders of granite, traceable to the island of Arran, situated to the east. This boulder, so unlike the others, when more carefully examined, was found to be a mass of Carboniferous coralline limestone. This species of *Diphyphyllum** was noticed in my paper on that genus published in the 'Quarterly Journal of the Geological Society,' February 1887; it was not, however, included for reasons that will be noted further on.

The species of *Lithostrotion* I discovered at Blackridge, Dumfriesshire, since the publication of my paper on that genus ('Transactions of the Edinburgh Geological Society,' February 1887).

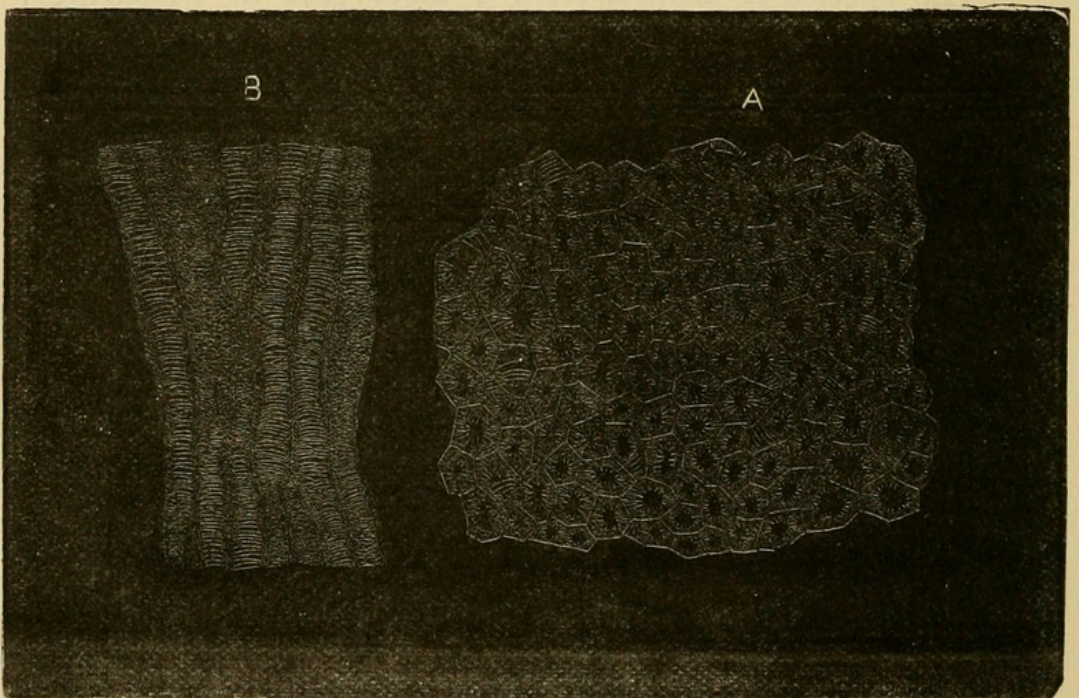
The genus *Diphyphyllum* was defined by Lonsdale in Murchison, Keyserling and de Verneuil's 'Geology of Russia and the Urals' (Appendix, p. 622). Lonsdale's definition was fully reviewed in the above-mentioned communication, and therefore need not be recapitulated. Briefly, he rests his definition of the genus principally upon the mode of reproduction, *i. e.* fissiparity, and the dichotomous branches. In the present species the mode of reproduction is by calicular gemmation, and the corallites are in dense masses and united—characters unlike those of any of the then-known species of the genus; consequently its publication was deferred, and the

* To His Grace I offer my thanks for permitting me to add it to the list of Carboniferous corals.

creation of a new genus for its reception was suggested. This, however, seems to be unnecessary. Subsequent investigations have revealed that reproduction in this and the accompanying genus *Lithostrotion*, *Luidius*, may be either by calicular gemmation or by fissiparity. Indeed, I hope by-and-by to demonstrate that we cannot restrict generic identity, not only in this but also in several other genera, by the mode of development. While the union of the corallites and consequent prismatic aspect is new to the genus, yet we cannot overlook the fact that our knowledge of the Carboniferous fauna is fragmentary and imperfect; but when more complete other forms will no doubt be discovered showing even a closer relation to its nearest ally *Lithostrotion*. A similar objection to the union of the cylindrical and prismatic varieties in the genus *Lithostrotion* was long accepted; but the generalization of those great masters Milne-Edwards and Jules Haime showed that external aspects so dissimilar were not incompatible with generic identity, and that we can define genera only from the internal structural characters—a decision which, from the enormous amount of evidence in my hands, I cordially endorse. All the other structural details being similar to those characteristic of the other species of the genus, we are justified in believing that the creation of a new genus on the union of the corallites would be adding an unwarranted synonym to the list of Carboniferous corals.

Diphyphyllum Argyllii, sp. nov.

Fig. 1.



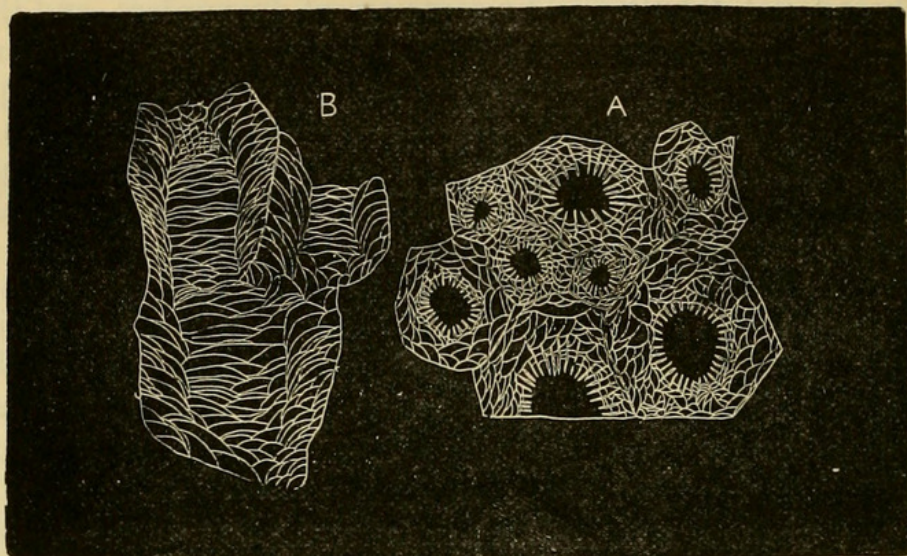
The corallum is in dense masses, prismatic from mutual pressure, and closely aggregated, with corallites of various sizes. Diameter of corallites from 3 to 5 millim. (fig. 1, A). Epitheca delicate; the calice is moderately deep, and the floor is occupied by broad flat tabulæ. The septa are of two orders, and their inner ends rest upon the superior face of the tabulæ. In a corallite 5 millim. in diameter there are thirteen primary septa, converging inwards for $1\frac{1}{2}$ millim., and these alternate with an equal number of secondary septa, which extend inwards fully half the length of the primary, and they are united by endothecal dissepiments. The septa are bilaminate, and there are minute interlamellar plates ("stereoplasm") inclining inwards and downwards. A fossula is indicated. In the longitudinal section (fig. 1, B) the tabulæ are numerous and broad; they occupy two thirds of the total diameter of the corallum, and are sometimes bent upwards in the centre, as in those species in which development is by fissiparity. Vesicular structure is present near the wall, in the interseptal loculi. Acicular plates are rare.

Locality. Found at Carskey, south end of Kintyre, Argyllshire, in boulder-drift, associated with boulders of Arran granite.

As regards the affinities of the genus *Diphyphyllum* as defined by Lonsdale, it presents characters of a distinct and fundamental nature, and is surrounded by genera which possess structural details and external resemblances which are combined and represented in it. In the type, *D. concinnum*, Lonsd., there is no columella; there are, however, occasional acicular plates, which here and there bisect the tabulæ. If such corallites were sectioned transversely, the plane of those acicular points would induce such to be regarded as belonging to the genus *Lithostrotion*, Luid., and in this respect this species indicates a transitional tendency and near relationship to the latter genus. There is another interesting character in *D. Argyllii*. In all the other species of the genus the septa extend inwards from the wall more or less into the centre of the corallum; there is, however, in some of the corallites of *D. Argyllii* a departure from that condition, as the septa are interrupted by vesicular tissue, and therefore do not reach the wall, in this respect indicating a transitional tendency in an opposite direction, and towards the genus *Thysanophyllum*, Thoms. & Nich. (fig. 2): in the latter the septa are intercepted and never reach the wall; in other respects the structural details are similar to those of the genus *Diphyphyllum*. The question presents itself, How are we to consider these modifications?—whether they are of sufficient

value to warrant this species being raised to the rank of a separate genus, or whether we should regard such modifi-

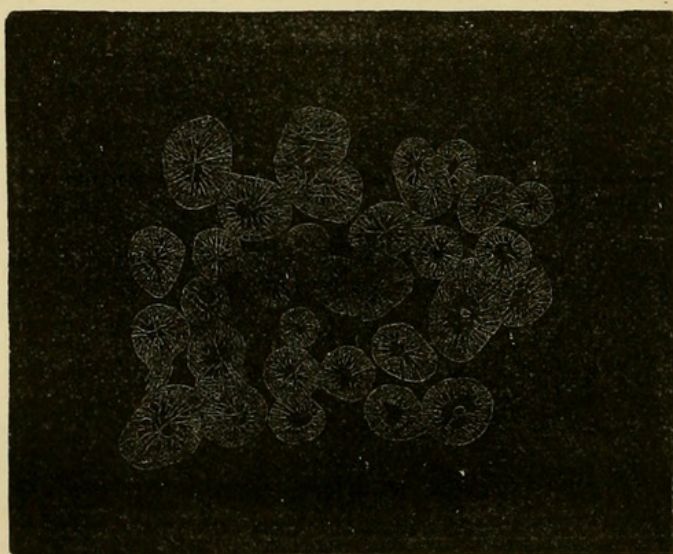
Fig. 2.—*Thysanophyllum orientale*.



cations as simply indicating an evolutionary tendency. With the latter view I cordially sympathize, and, as formerly stated, I hope at no distant date to show that other species occur in which there are structural characters equally distinct and differing as widely from the parent type, but which I do not feel warranted in raising to generic distinction.

Lithostrotion paradoxicum, sp. nov.

Fig. 3.



Corallum compound, cylindrical, and dichotomous. De-

velopment by fission and latero-calicular gemmation; the latter in the proportion of one to ten of the former. The epitheca is thin, and there are delicate encircling lines and shallow annulations of growth. The calice is moderately deep and its centre is occupied by a styliform columella in some corallites; in others a portion of the septa coalesce and extend inwards to the centre; there they unite with septa similarly arranged from the opposite side, and form a pseudocolumella, which is alone developed between each of the tabulæ, whilst in several of the corallites the columella is cylindrical. The septa are bilaminate and of two orders; the primary are variable in their inward extension, the secondary extend inwards half the length of the primary, and they are united by rectangular interseptal dissepiments. The corallites are unequal in diameter and the septa are variable in number. In a corallite 5 millim. in diameter there are nineteen primary alternating with an equal number of secondary septa. The tabulæ are slightly inclined upwards and occupy about half the total diameter of the corallum. A fossula is present, but is hardly recognizable.

Formation. Lower Carboniferous.

Locality. Blackridge, Dumfriesshire.

As regards the structural characters of the genus *Lithostrotion*, these are so varied and the vicissitudes which it has undergone are so numerous that it is desirable I should briefly refer to a few of the characteristics upon which generic identity is established. The name *Lithostrotion* was originally given by Luidius, 'Ichnographia' (1760), to a group of corallites figured on plate 23 of his work, and designated "*Lithostrotion* sive Basaltes minimus striatus et stellatus." There is, however, nothing to indicate its identity further than the excellent delineation of the external aspect.

In 1827 Dr. Fleming, in his 'History of British Animals,' adopted the generic name for three species of Carboniferous corals; as I have elsewhere shown*, two of his species cannot be identified as belonging to the genus. His *Lithostrotion floriforme* has been correctly referred to M'Coy's genus *Lonsdalia*.

Lithostrotion marginatum is not now in the collection; a reference to his description induces me to regard the two fragments referred to as belonging to the genus *Heterophyllum*, M'Coy. *Lithostrotion striatum* is still in the collection, and referred to by M.-Edwards and J. Haime as belonging to the same genus as Luidius's coral.

* 'Transactions of Edinburgh Geological Society,' 1887.

In 1836 Prof. Phillips, in his 'Geology of Yorkshire' (vol. ii. p. 2), noticed several species of corals. *Cyathophyllum basaltiforme*, which M.-Edwards and J. Haime subsequently relegated to the genus *Lithostrotion*, and the fasciculate species are referred to the genus *Lithodendron*.

Mr. Lonsdale in 1845 applied the name of *Lithostrotion* to four species; a reference to his figures and descriptions leaves no doubt that they belong to the genus *Lonsdalia*, M'Coy.

In 1849 M'Coy (Ann. & Mag. Nat. Hist. ser. 2, vol. ii.) described various corals and created several genera for their reception, but which cannot be separated from *Lithostrotion*.

In 1852 M.-Edwards and J. Haime still further expanded their definition of *Lithostrotion*, to which they then referred the genus *Stylaxis*, M'Coy (Brit. Foss. Corals, p. 191), and at the same time founded the genus *Petalaxis* for the corals which they had formerly described under the names of *Stylaxis M'Coyanum* and *S. Portlockii*.

In 1861 De Fromentel ('Polypiers Fossiles') restricted the name of *Lithostrotion* to those species of the genus which have an astræiform corallum, whilst he placed the fasciculate varieties under the genus *Diphyphyllum*, and further separated some of the astræiform species of *Lithostrotion*, together with the two species of *Petalaxis*, Edwards and Haime, and placed them under the revived genus *Stylaxis*, M'Coy, upon the mistaken ground that the septa are not continued into the external vesicular area, a condition which I have elsewhere suggested was probably due to the endemic tendency to variation*.

In 1872 Prof. de Koninck (Anim. Foss. Nouv. Rech. p. 26) defined the genus *Lithostrotion* in all the external points as done by Edwards and Haime. He correctly shows, however, that *Diphyphyllum*, Lonsdale, is to be separated from *Lithostrotion*.

The great diversity of generic names that have been applied to this group of corals, in which specific distinction is even sometimes difficult to define, is highly suggestive, inducing us to realize that the genus includes a series of varieties of an extremely varied character. Many of them are so dissimilar in their external aspects, and in their structural details approach so closely their nearest allies, that it becomes difficult to define the boundary of specific distinction. Some of the structural characters upon which specific identity has been accepted for several of the species are represented in different corallites in this little group at present under con-

* 'Transactions Phil. Soc. of Glasgow,' 1883, p. 404.

sideration. There are those in which the typical styliform columella is present; others in which the septa stop short and expose a broad tabulate area in the centre; in others the septa extend inwards along the superior face of the tabulæ, a portion of the septa coalesce and assume a more or less fasciculate aspect, and the central septum of each fascicle extends to the centre and unites with similarly arranged septa from the opposite side of the corallum to form a pseudo-columella, similar to the septal arrangement of *Lithostrotion junceum*, Ure. If the section exposed is on the plane of the tabulæ, the columella is not observable, demonstrating that the septa and columella are developed between the tabulæ in this variety. In some of the corallites on the same slab the columella is tubular, somewhat similar to the tubular columella which characterizes some of the species of the genus *Cyathaxonia*. Thus we have three distinct characteristics exemplified in the structural details of the central area in this group of corallites, each of which, if sectioned singly, would demonstrate structural characters which have been regarded as having specific distinction. In the type of the genus the compound corallum, the styliform columella, the tabulæ forming the floor in the central area, and the sparse vesicular tissue in the outer area are the distinguishing characteristics by which the genus can at all times be recognized.

In some of the corallites development is by fission, whilst in others it is by calicular gemmation, demonstrating that it is not only difficult to define specific distinction, but that we are not in a position to dogmatize as to specific identity, unless all the varieties can be examined and compared.

XL.—*Descriptions of new Species of Oriental Cicadidæ.*

By W. L. DISTANT.

ALL the species here described will be figured in my monograph of Oriental Cicadidæ.

Tosena depicta, n. sp.

Head and thorax above black; head with a spot at apex of front and a spot at each anterior angle of vertex, two central spots on anterior margin of pronotum, the posterior margin



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