A MONOGRAPH

OF THE

BRITISH FOSSIL CORALS.

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AND

JULES HAIME.

FOURTH PART.

CORALS FROM THE DEVONIAN FORMATION.

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DESCRIPTION

OF

THE BRITISH FOSSIL CORALS.

CHAPTER XV.

CORALS FROM THE DEVONIAN FORMATION.

The British Corals appertaining to the Devonian Formation are in general so completely imbedded and filled up with extraneous calcareous matter, that it is difficult to distinguish them otherwise than by the study of polished sections; but these usually show their structural characters in a very satisfactory manner, and enable the Palæontologist to recognise their zoological affinities. In France and in Germany the corals belonging to the same geological period are, on the contrary, often met with in an excellent state of preservation, and show all the details of their exterior surface, as well as the most minute parts of their interior organisation; but in this Monograph we have only figured British specimens. For the more complete representation of some species, we must consequently refer to other works, such as the excellent publication of 'Goldfuss on the German fossils,' and our *Monographie des polypiers des terr. Palæozoiques.* The corals discovered in the Devonian Formation, in the different parts of the world, belong to about 150 well-defined species, 46 of which have been met with in England. To these British corals may be added 3 species that are very imperfectly known, casts only of them having been as yet found, and few specimens that have received names, but are not determinable zoologically. Almost half of the British species have not as yet been found in other countries; 22 have been discovered on the Continent; and we may also remark that most of the American species are not seen here, only 6 of the latter have been met with in England; among these, 5 are at the same time Continental. The corals belonging to the family of the Cyathophyllidæ are very predominant, and form 33 of the 46 above-mentioned species. The family of Favositidæ is represented by 10 species, and the three remaining species belong one to each of the three families Stauridæ, Milleporidæ, and Poritidæ; with the exception of one species of Poritidæ that we have not seen, all these fossils belong, therefore, to the two sub-orders *Zoantharia tabulata* and *Zoantharia rugosa*, one of which has no

representative in the actual Fauna, nor in the Tertiary and Secondary Formations. Three of these Devonian fossils exist also in the Silurian rocks, but all the others appear to be peculiar to the Devonian period.

The principal localities from which these corals have been obtained are Torquay, Plymouth, and Newton Bushel. The specimens described in this Monograph belong mostly to the collections of Dr. Battersby, Mr. Pengelly, Mr. Bowerbank, Mr. Phillips, and the Geological Society; some of the latter were more particularly valuable to us, being the type specimens of the species described in 1840 by Mr. Lonsdale in the memoir of Messrs. Sedgwick and Murchison, on the Devonian Formation of England.

Family MILLEPORIDÆ, (*Introd.*, p. lviii.)

1. *Genus* HELIOLITES, (*Introd.*, p. lviii.)

HELIOLITES POROSA. Tab. XLVII, figs. 1, 1*a*, 1*b*, 1*c*, 1*d*, 1*e*, 1*f*.

HELIOLITHE PYRIFORME, à étoiles d'une demi-ligne de diamètre, &c., *Guettard*, Mém. sur les Sc. et les Arts, vol. iii, p. 454, pl. xxii, figs. 13 and 14, 1770.

ASTREA POROSA, *Goldfuss*, Petref. Germ., vol. i, p. 64, tab. xxi, fig. 7, 1826.

HELIOPORA PYRIFORMIS, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 357, 1830; Manuel d'Actinologie, p. 392.

— — *Steininger*, Mém. Soc. Géol. France, vol. i, p. 346, 1831.

— INTERSTINCTA, *Bronn*, Leth. Geogn., vol. i, p. 48, tab. v, fig. 4, 1835.

PORITES PYRIFORMIS, *Lonsdale*, Geol. Trans., 2d series, vol. v, pl. lviii, fig. 4, 1840. (Not Lonsdale in Silur. System.)

— — *Phillips*, Palæoz. Foss., p. 14, pl. vii, fig. 19, 1841.

EXPLANARIA INTERSTINCTA, *Geinitz*, Grundr. der Verst., p. 568, 1845-46.

GEOPORITES POROSA and PHILLIPSII, *D'Orbigny*, Prodr. de Paléont., vol. i, pp. 108, 109, 1850.

HELIOLITES POROSA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 218, 1851.

PALÆOPORA PYRIFORMIS, *M'Coy*, Brit. Palæoz. Fossils, p. 67, 1851.

Corallum compound, forming generally a globular mass, which in some specimens is subgibbose, in others cylindrical; sometimes composed of very distinct superposed layers. *Calices* somewhat unequal in size, placed rather irregularly at distances equal to about two or three times their diameter, surrounded by a very thin rim, and slightly elevated above the general surface of the corallum. The calicular fossula large and rather deep. *Septa*, twelve in number, somewhat unequal in size alternately, almost straight, thick exteriorly, and extending almost to the centre of the visceral cavity. The pores of the *Cœnenchyma* small, almost equal in size and nearly regularly hexagonal; one eighth of a line in diameter. Calices almost half a line in diameter.

A vertical section of this corallum shows that the *Tabulæ* are horizontal, or slightly

oblique, and less closely set than in the other species. The laminæ of the tubes of the Cænenchyma are thin, but assume the appearance of vertical lines, much more strongly marked than those formed by the dissepiments. The latter appear to be quite independent of the adjacent tubes, and are not, in general, placed so as to correspond together horizontally.

Found at Torquay, Teignmouth Beach, Walcombe Beach, Woolborough Quarry, Babbacombe, Newton, Plymouth, and Marychurch; and also in Germany in the Eifel Mountains, and on the banks of the river Lahn.

Specimens are in the Museums of the Geological Society of London, of Practical Geology, and in the collections of Messrs. J. S. Bowerbank, Battersby, and Pengelly.

This coral has often been confounded with the *Heliolites interstincta*,[1] but differs from it by the calices being much less closely set, and by the Cænenchyma being more developed. In *H. Murchisoni*[2] the calices are also very distant, but in the above-described species the tabulæ are less numerous, and the dissepiments of the Cænenchyma are thinner than the vertical laminæ of the tubes of the same tissue, and do not correspond among themselves so as to constitute horizontal strata.

We have not adopted the name of *Pyriformis*, which Blainville, Mr. Lonsdale, and Mr. M'Coy apply to this species, as having been given to it by Guettard; because the French epithet *pyriforme* was given by Guettard himself to several other species, but not made use of as a specific name, and because Goldfuss had called it *Astrea porosa* before Blainville proposed employing the former designation.

We also see no reason for giving to the genus, to which this specimen belongs, the name of *Palæopora* in preference to that of *Heliolites*, the latter having been revived from Guettard's writings in 1846 by Mr. Dana, and the former having been introduced only in 1848 by Mr. M'Coy. The name of *Géoporites*, given more recently to the same group of corals by M. D'Orbigny, must also, in consequence of the law of priority, be rejected.

2. Genus Battersbyia.[3]

Battersbyia inæqualis. Tab. XLVII, figs. 2, 2*a*, 2*b*.

Battersbyia inæqualis, *Milne Edwards* and *Jules Haime*, Monogr. des Pol. Foss. des Terr. Palæoz., p. 227, 1851.

Corallum composite, massive. *Corallites* very unequal in size, with thick non-costulate walls, united together by a thin, spongiose, irregular Cænenchyma. *Calices* almost circular, never subpolygonal. *Septa* small but well defined, somewhat unequal in size alternately, rather thick towards the wall, but very thin inwardly; 26 of them in the large calices. *Tabulæ* appearing to be vesicular, and filling the visceral chambers. *Cænenchyma*

[1] *Astrea porosa*, Hisinger, Leth. Succ., p. 98, tab. xxviii, fig. 2, 1837.

[2] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 215, 1851.

[3] Milne Edwards and Jules Haime, Polyp. Foss. des Terr. Palæoz., pp. 151, 227, 1851.

as in the other Madreporites. Diameter of the large individuals rather above one and a half line; that of the young corallites less than half a line, and between these two extremes numerous differences.

This remarkable fossil cannot be placed in any of the generical divisions enumerated in the Introduction to this Monograph, and constitutes the type of a new division, which we have established in our work on the Corals of the Palæozoic formations. It is characterised by its spongy Cænenchyma, and its subvesicular Tabulæ.

Found at Teignmouth by Dr. Battersby.

We have dedicated this genus to Dr. Battersby, of Torquay, in commemoration of the liberality with which that gentleman has communicated to us, for description, a most valuable series of Devonian fossils.

Family FAVOSITIDÆ, (*Introd.*, p. lx.)

Sub-family FAVOSITINÆ, (*Introd.*, p. lx.)

1. *Genus* FAVOSITES, (*Introd.*, p. lx.)

1. FAVOSITES GOLDFUSSI. Tab. XLVII, figs. 3, 3*a*, 3*b*, 3*c*.

CALAMOPORA GOTHLANDICA (pars), *Goldfuss*, Petref., p. 78, pl. xxvi, figs. 3*b*, 3*c*, 1829. (Cœt. exclusis.)
FAVOSITES — *Phillips*, Palæoz. Foss., p. 16, pl. vii, fig. 21, 1841.
CALAMOPORA — ? *Ad. Rœmer*, Verst. des Harzgeb., p. 6, tab. iii, fig. 2, 1843.
FAVOSITES — ? *Lonsdale*, in Strzelecki's Description of New South Wales and Van Diemen's Land, p. 266, 1845.
— GOTHLANDICUS, *Steininger*, Verst. des Ueberg. geb. der Eifel, p. 9, 1849.
— GOLDFUSSI, *D'Orbigny*, Prodr. de Paléont., vol. i, p. 107, 1850.
— — *De Verneuil* and *J. Haime*, Bull. de la Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.
— — *Milne Edwards* and *J. Haime*, Pol. Foss. des Terr. Palæoz., p. 235, pl. xx, fig. 3, 1851.

Corallum composite, forming a convex globular, or pyriforme mass. *Calices* for the most part nearly of the same size, but sometimes intermingled with some very small ones. The inner surface of the *walls* rendered rugose by the presence of small points; their sides unequally developed, and presenting 1, 2, or 3 vertical rows of small pores or holes (almost always 2 rows), which are regularly circular, more closely set than in *F. gothlandica*, and sometimes alternate, but in other parts opposite. Diagonal of the large corallites somewhat more than a line.

Found at Barton, near Torquay, by Dr. Battersby. Mr. Phillips mentions its having been met with also at Shoreham Point, Plymouth, and Babbacombe. The same species is

found also at Nehou and Visé, in France; at Millar, in Spain; at Paffrath, in the Eifel and in the Hartz Mountains; in the Oural, in Russia; in the States of Indiana, Ohio, and Kentucky, in America; and (according to Mr. Lonsdale) at Yass plains, in New South Wales.

This fossil was, till of late, confounded with *F. gothlandica*,[1] to which it bears in fact great resemblance exteriorly; but it differs from it by the mural pores being more distant from each other, and arranged in two vertical lines on each side of the wall. In *F. alveolaris*[2] and *F. aspera*[3] these pores are always situated in the angles formed by the prismatic walls of the corallites, and in *F. basaltica*[4] and *F. polymorpha*[5] they only form a single line, placed in the middle of each side of the wall. In *multipora*[6] and *F. Troosti*,[7] on the the contrary, there are always three series of pores on each side of the wall. *F. parasitica*[8] and *F. Forbesi*[9] differ from *F. Goldfussi* by their calices being very unequal in size, and *F. Hisingeri* may be distinguished from the latter by the great development of the dissepiments. As to the ramose species of Favosites, they are sufficiently distinct from the above-described fossil, in consequence of their form.

2. Favosites reticulata. Tab. XLVIII, figs. 1, 1*a*, 1*b*.

Calamopora spongites (var. ramosa), *Goldfuss*, Petref. Germ., vol. i, p. 80, tab. xxviii, fig. 2*a*—*g*, 1829. (Cœt. excl.)

Alveolites reticulata, *De Blainville*, Dict., vol. lx, p. 369, 1830.—Man., p. 404.

Calamopora spongites, *Geinitz*, Grundr. der Verst., pl. xxiii a, fig. 13, 1845-46.

— — *Keyserling*, Reise in das Petsch., p. 178, 1846.

Alveolites spongites, *D'Orbigny*, Prodr. de Paléont., vol. i, p. 108, 1850. (Not *Steininger*.)

Favosites Orbignyana, *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.

— reticulata, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 241, 1851.

Corallum dendroid, composed of thick branches (from half a line to one line in diameter), which intermingle much, and often coalesce. *Calices* almost equal in size, with thick walls, and having somewhat less than half a line in diameter.

Found at Torquay in England, at Nehou and Brest in France, Palapaya and Ferrones in Spain, Eifel in Germany, and (according to M. Keyserling) at Uchta in Russia.

[1] *Calamopora gothlandica* (pars), Goldfuss, Petref. Germ., t. i, p. 78, pl. xxvi, figs. 3*a* and 3*e*, 1829.

[2] *Calamopora alveolaris* (pars), Goldfuss, ibid., p. 77, pl. xxvi, figs. 1*a*, 1*c*.

[3] Id. (pars.), Goldfuss, ibid., p. 77, pl. xxvi, fig. 1*b*.

[4] *Calamopora basaltica*, Goldfuss, ibid., p. 78, pl. xxvi, figs. 4*c*, 4*d*.

[5] *Calamopora polymorpha*, var. *tuberosa*, Goldfuss, ibid., p. 79, pl. xxvii, figs. 2*b*, 2*c*, 2*d*, 3*b*, 3*c*. (Cœt. excl.)

[6] Lonsdale, Silur. Syst., p. 683, pl. xix, bis fig. 5, 1839.

[7] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 238, pl. xviii, fig. 1.

[8] Tab. xlix, fig. 2.

[9] *Calamopora basaltica* (pars), Goldfuss, Petref. Germ., t. i, p. 78, tab. xxvi, fig. 4*b*, 1829.

We have, provisionally, admitted, as forming distinct species, various ramose Favosites, which have previously been described as such by Blainville, but which may probably, when better known, be found to be only varieties of the same species. Such are *F. reticulata*, *F. cervicornis*,[1] and *F. dubia*.[2] The latter differs, however, from the first by its branches not being coalescent, nor so closely set, and by the calices being rounded and obliquely placed on the surface of the branches. *F. cervicornis* has its calices more unequal in size, its walls thinner, and its branches larger and more irregular. All these have only a single line of pores on each side of the walls, and these pores are large and placed at a distance from each other.

3. FAVOSITES CERVICORNIS. Tab. XLVIII, fig. 2.

CALAMOPORA POLYMORPHA, var. RAMOSA DIVARICATA, *Goldfuss*, Petref., vol. i, p. 79, pl. xxvii, figs. 3*a*, 4*a*, 4*b*, 4*c*, 1829. (Cœt. exclus.)

ALVEOLITES CERVICORNIS, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 369, 1830.—Man., p. 405.

THAMNOPORA MILLEPORACEA (pars.), *Steininger*, Mém. Soc. Géol. de France, vol. i, p. 338, 1831.

CALAMOPORA POLYMORPHA, *Ad. Rœmer*, Verst. des Harzgeb., p. 6, tab. ii, fig. xvi, 1843.

FAVOSITES CRONIGERA and ALVEOLITES CELLEPORATUS, *D'Orbigny*, Prodr. de Paléont., vol. i, p. 107, 1850.

— — *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 102, 1850.

— CERVICORNIS, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 243, 1851.

— POLYMORPHA, *M'Coy*, Brit. Palæoz. Foss., p. 68, 1851.

Corallum subdendroid. *Calices* unequal in size; walls somewhat thick.

Found at Torquay, and, according to Professor M'Coy, at Newton Bushel, Teignmouth, New Quay, Plymouth, and Bedruthen Slope, St. Eual; at Mons in Belgium; near Brest in France; at Ferrones and Consejo de Llaviera in Spain; and in the Eifel, at Heiflerstein, Villmar, and Bensberg, in Germany.

This coral differs from *F. reticulata*[3] and *F. dubia*[4] by its branches being thicker and more irregular, its calices being more unequal in size, and its walls being thinner.

4. FAVOSITES DUBIA.

CALAMOPORA POLYMORPHA, var. GRACILIS, *Goldfuss*, Petref. Germ., vol. i, p. 79, tab. xxvii, fig. 5, 1829.

ALVEOLITES DUBIA, *Blainville*, Dict., vol. lx, p. 370, 1830.—Man., p. 405.

THAMNOPORA MADREPORACEA, *Steininger*, Mém. de la Soc. Géol., vol. i, p. 338, 1831.

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[1] Tab. xlviii, fig. 2.

[2] *Calamopora polymorpha*, var. *gracilis*, Goldfuss, Petref. Germ., t. i, p. 19, tab. xxvii, fig. 5, 1829.

[3] Tab. xlviii, fig. 1.

[4] *Calamopora polymorpha*, var. *gracilis*, Goldfuss, Petref. Germ., t. i, p. 19, tab. xxvii, fig. 5, 1829.

FAVOSITES POLYMORPHA, *Phillips*, Palæoz. Foss., p. 15, pl. viii, fig. 20, 1841.
ALVEOLITES CERVICORNIS, *Michelin*, Icon., p. 187, pl. xlviii, fig. 2, and pl. xlix, fig. 3, 1845.
— — *D'Orbigny*, Prodr. de Paléont., vol. i, p. 107, 1850.
FAVOSITES DUBIA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Pal., p. 243, 1851.

Corallum dendroid; its branches placed wide apart, not coalescent, and about half a line in diameter. *Calices* somewhat oblique, deep, with the exterior part of their edge rounded or subpolygonal; walls thick; some very small calices often situated between the large ones, which are about two thirds of a line in diameter; a single line of large pores on each side of the walls.

Found at Torquay, and, according to Professor Phillips, at Lee Quarry near Combe Martin; West Hagginton; Hillsborough near Ilfracombe; Babbacombe, Hope, Sharkham Point, Mudstone Bay; in France, at Ferques (Pas-de-Calais), Viré, Chassegrain (Sarthe); in Germany at Bensberg; in America at the Falls of Ohio, and in the Clarke county.

This coral differs from *F. reticulata*[1] and *F. cervicornis*[2] by the obliquity of its calices, —a character which gives it some resemblance to Alveolites.

The only British specimen of this species that we have seen belongs to the collection of the Geological Society, but is in too bad a state of preservation to be worth being represented in the plates joined to this Monograph.

5. FAVOSITES FIBROSA. Tab. XLVIII, figs. 3, 3*a*, 3*b*.

CALAMOPORA FIBROSA, var. TUBEROSA RAMOSA, *Goldfuss*, Petref. Germ., vol. i, p. 82, tab. xxviii, fig. 3*a*, 3*b*, 1829. (Cœt. excl.)
FAVOSITES MICROPORUS, *Steininger*, Mém. Soc. Géol. de France, vol. i, p. 337, 1831.
ALVEOLITES FIBROSA, *Lonsdale*, Sil. Syst., p. 683, pl. xv, fig. 1, 1839.
FAVOSITES FIBROSA (pars), *Lonsdale*, ibid., p. 683, pl. xv bis., fig. 6, 1839 (but not fig. 7).
— — *Phillips*, Palæoz. Fossils, p. 17, pl. ix, fig. 25, 1841.
CALAMOPORA FIBROSA, *Ad. Rœmer*, Verst. des Harzgeb., p. 6, pl. iii, fig. 4, 1843.
— — *Keyserling*, Reise in das Petschora land, p. 177, 1846.
ALVEOLITES FIBROSUS, *D'Orbigny*, Prodr. de Paléont., vol. i, p. 108, 1850.
FAVOSITES FIBROSA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Pal., p. 244, 1851.

Corallum massive, very convex; sometimes subpyriform or sublobate. *Corallites* prismatical, radiating from the base of the corallum to its surface; straight, or slightly flexuous, and almost equal in size. *Tabulæ* very closely set (12 or 15 in the space of a line). Mural pores large in proportion to the size of the corallites, closely set, alternating with the tabulæ, and arranged in single vertical lines at the angles of the prismatical walls. Diameter of the calices about one tenth of a line.

Found in the Devonian formation at Torquay, and, according to Mr. Phillips, at Darlington near Totness, Sharkham Point, and Babbacombe; in France, at Viré (Sarthe); in Germany in the Eifel and in the Hartz Mountains. Found also in the superior

[1] Tab. xlviii, fig. 1. [2] Ibid., fig. 2.

Silurian deposits at Storderley Edge (Upper Ludlow Rocks), Larden, and, according to Mr. Lonsdale, at Churn-bank, on Palmer's Kairn near Ludlow; in Ireland, according to Mr. M'Coy, in numerous localities of the counties of Galway, Kerry, Wexford, Kildare, Mayo, Tyrone, Waterford, and Wicklow; in Russia at Waschkina (according to Keyserling); in America at Casskill, and at Lexington, Kentucky (Goldfuss). Found in the inferior Silurian deposits at Landovery.

We are inclined to think that it is by mistake that Professor M'Coy mentions this species as having been met with in the carboniferous formation in Ireland, and presume that the fossil so alluded to by that geologist was the *Alveolites septosa.*

The above-described species is easily distinguished from all the other species of Favosites by the smallness of its calices. It resembles *F. alveolaris*[1] and *F. aspera*[2] by the angular position of its mural pores; but these two species differ from it by the calices being much more irregular in size, as well as much larger.

We have not remarked any material difference between the specimens found in the Devonian and the Silurian formations; but all these corals are so ill-preserved, that we are not inclined to attach much importance to that supposed specific identity.

2. *Genus* Emmonsia.[3]

Emmonsia hemispherica. Tab. XLVIII, figs. 4, 4*a*.

Favosites alveolaris, *Hall*, Geol. of New York, p. 157, No. 31, figs. 1, 1*a*, 1843. (No. 8 of Blainville.)

Favosites hemispherica, *Yandell* and *Shumard*, Contrib. to Geol. of Kentucky, p. 7, 1847.

Alveolites hemispherica, *D'Orbigny*, Prod. de Paléont., vol. i, p. 49, 1850.

Favosites hemispherica, *Jules Haime* and *Verneuil*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.

Emmonsia hemispherica, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 247, 1851.

Corallum composite, forming a subspherical mass, which becomes sometimes very tall, and composed of superposed layers. *Calices* irregular, polygonal, and varying in size. *Septa* (12) well developed, straight or slightly curved, and extending to the centre of the upper tabulæ. Mural *pores* large, placed at about a quarter of a line apart, and arranged in pairs on some of the sides of the wall, but forming single lines on others. *Tabulæ* very closely set, somewhat irregularly horizontal. In the visceral chambers, where they are broken down, they leave fragments adhering to the walls; and in general, above the space included between two of these fragments, a third fragment exists, so as to constitute an

[1] *Calamopora alveolaris* (pars), Goldfuss, Petref. Germ., t. i, pl. xxvi, figs. 1*a*, 1*c*, 1826.

[2] *Calamopora alveolaris* (pars), Goldfuss, ibid., tab. xxvi, fig. 1*b*.

[3] Milne Edwards and Jules Haime, Monographie des Polyp. Foss. des Terr. Palæoz.; Archives du Museum, vol. v, p. 246, 1851.

alternate mode of superposition. Great diagonal of the calices about half a line; the tabulæ are placed at about one tenth of a line apart.

Found in the Devonian formation at Torquay; in Spain at Contejo de Castrillon, near Aviles; in America at Caledonia, New York, at the Falls of Ohio, at Charleston Landing (Indiana), in the Isle of Mackinaw, and, according to Mr. Hall, at Williamsville, Erie county. Found also in the superior Silurian deposits at Springfield, Ohio, and in Perry county, Tennessee.

The genus Emmonsia contains two other species—*E. alternans*[1] and *E. cylindrica*.[2] The first differs from the species here described by the alternate arrangement of the mural edges, by the incomplete tabulæ being more regular, and by its calices being larger. *E. cylindrica* has calices still larger, and often circular; it is also characterised by the existence of four or five lines of pores on each side of the walls.

3. *Genus* Alveolites, (p. lx.)

1. Alveolites suborbicularis. Tab. XLIX, figs. 1, 1*a*.

Alveolites suborbicularis, *Lamarck*, Hist. des Anim. sans Vert., vol. ii, p. 186, 1816; 2d ed., p. 286.

— escharoides, *Lamarck*, Hist. des An. sans Vert., vol. ii, p. 186, 1816; 2d ed., p. 286.

Escharites spongites, *Schlotheim*, Petrefactenkunde, 1st part, p. 345, 1820.

Alveolites suborbicularis and escharoides, *Lamouroux*, Encycl. (Zooph.) pp. 41, 42, 1824.

Calamopora spongites, var. Tuberosa, *Goldfuss*, Petref. Germ., vol. i, p. 80, tab. ii, fig. 1*a*—*h*, 1829. (Cæt. excl.)

Alveolites escharoidea and suborbicularis, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 269, 1830.—Manuel, p. 404.

— spongites, *Steininger*, Mém. de la Soc. Géol. de France, vol. i, p. 334, pl. 20, fig. 4, 1831.

Calamopora — *Morren*, Descr. Cor. in Belg. Rep., p. 74, 1832.

Favosites — *Phillips*, Palæoz. Foss., p. 16, pl. viii, fig. 23, 1841.

Calamopora suborbicularis, *Michelin*, Icon., p. 188, pl. 48, fig. 7, 1845.

— squamosa or imbricata, ibid., p. 189, pl. xlix, fig. 15, 1845.

Favosites suborbicularis and Alveolites tuberosa, *D'Orbigny*, Prod. de Palæont., vol. i, pp. 107, 108, 1850.

Alveolites — *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 255, 1851.

Corallum composite, forming irregular incrustated masses, which are in general fixed on ramose favosites or on a cyathophyllum, and are composed of superposed layers,

[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 248, 1851.

[2] *Favosites cylindrica*, Michelin, Icon., p. 255, pl. lx, fig. 1, 1846.

terminated by an irregular or subgibbose surface. *Calices* very oblique, closely set (but unequally so), elongated transversely, subtriangular, and turned towards the edge of the corallum. The outer or under side of these calices bears interiorly a small elongated ridge, which appears to represent a septum, and is placed opposite to a small notch. Transverse diameter of the calices about two fifths of a line; small diameter about half that length.

Found in the Devonian deposits of Torquay, Tor Abbey, Babbacombe, Teignmouth, and, according to M. Phillips, at Hope.

Specimens are in the collections of the Geological Society, Messrs. Battersby and Pengelly at Torquay.

Alveolites Labechei[1] is a massive subgibbose species, very nearly allied to the above-described coral, but differs from it by the interior dentation of the calicular edge being but slightly developed, and by the calices being more irregular in size. In *A. Battersbyi*[2] the septum represented by this interior expansion is, on the contrary, formed by very strong spiniform processes, and the mural pores are very large.

In *A. compressa*[3] the calices are much more irregular, and the inner processes are very small.

The other species of this genus are not massive.

2. Alveolites Battersbyi. Tab. XLIX, figs. 2, 2*a*.

Alveolites Battersbyi, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 257, 1851.

Corallum forming a subspherical mass. *Calices* unequal in size, and somewhat irregular. Vertical and horizontal sections show that the *walls* are thin, and perforated by large circular pores rather closely set, and that in different places they give rise to strong ascending spiniform processes, which, by their superposition, represent unpaired septa. *Tabulæ* very thin and irregular.

Found at Torquay. Specimens are in the collections of Dr. Battersby and of Mr. Pengelly.

This species is remarkable for the slight obliquity of its calices, the large size of its mural pores, and more especially for the great development of its septal processes.

3. Alveolites vermicularis. Tab. XLVIII, figs. 5, 5*a*.

Alveolites vermicularis, *M'Coy*, Ann. and Mag. of Nat. Hist., 2d ser., vol. vi, p. 377, 1850.
— — *M'Coy*, Brit. Palæoz. Foss., p. 69, 1851.

Corallum dendroid, with slender, cylindrical coalescent branches that bifurcate at

[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 257.
[2] Tab. lxix, fig. 2. [3] Tab. xlix, fig. 3.

almost right angles. A vertical section shows that the corallites diverge from the centre towards the surface of the branches in an oblique ascendant direction, are somewhat flexuous, and terminate by a calicular margin that is prominent at its under part. The *walls* are thick. In some places the *tabulæ* appear closely set, but in most parts of the specimen submitted to our investigation they were completely destroyed. The indications of the mural pores were also obscure. Diameter of the branches about $1\frac{1}{2}$ line, that of the calices about $\frac{1}{5}$th of a line.

This Coral was found at Torquay by Dr. Battersby, and is known to us only by a polished specimen belonging to the collection of that palæontologist. We at first thought that it might be referred to the *Ceriopora Goldfussi* of Michelin, but Professor M'Coy, who appears to have had some better preserved specimens, has since that recognized the existence of triangular calices and a fissiparous mode of multiplication. He therefore places this fossil in the genus Alveolites, and after more ample investigation we have been led to adopt his opinion. Professor M'Coy adds that *Alveolites Vermicularis* is polymorphous and is met with at Teignmouth, at Newquay, and at Bedruthen Steps, St. Eual.

ALVEOLITES COMPRESSA. Tab. XLIX, fig. 3.

Corallum massive. *Calices* arranged in a circular manner round divers places on the surface of the corallum, compressed, elongated, and very unequal in size, the larger ones being about half a line across. *Walls* thick exteriorly, and convex. The three septal processes somewhat unequally developed; short, but quite distinct.

This species resembles *Alveolites orbicularis*[1] by its general appearance, but differs from it by the calices being much more unequal in size, arranged in circular lines, and provided with three septal processes that do not differ in size.

Found at Torquay by Mr. Pengelly.

Family PORITIDÆ, (p. lv.)

The singular fossil coral to which Goldfuss gave the name of *Pleurodictyum problematicum*[2] has been met with in the Meadsfoot Sands near Torquay, by Prof. Phillips;[3] but we have not as yet seen any British specimen of that species, and we must therefore refrain from describing it here. We hope to be able to have it figured in an appendix to our Monograph.

[1] Tab. xlix, fig. 1.

[2] Petref. Germ., vol. i, p. 113, pl. xxxviii, fig. 18. See also our Monographie des Polypiers Fossiles des Terrains Palæozoiques, p. 210, pl. xviii, figs. 3, 4, 5, 6.

[3] Palæozoic Fossils, p. 19, pl. xix, fig. 24.

Family STAURIDÆ, (p. lxiv.)

Genus METRIOPHYLLUM BATTERSBYI.

METRIOPHYLLUM BATTERSBYI. Tab. XLIX, fig. 4.

METRIOPHYLLUM BATTERSBYI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 318, 1851.

This species has been established by the study of a polished slab belonging to the collection of Dr. Battersby, and showing a transverse section made at a small distance below the calice. The quadrifascicular mode of arrangement of the septa is very distinct. The principal septa are forty-eight in number, somewhat thick, and extending to the centre of the coral; they alternate with an equal number of smaller ones which are also thinner; towards the middle of each group they are slightly flexuous, and towards the outer part they become shorter and somewhat oblique. Some dissepiments are also visible. Diameter about eight lines.

Found at Torquay.

This species differs from *Metriophyllum Bouchardi*[1] by its septæ being twice as numerous and slightly thickened near the centre.

Family CYATHOPHYLLIDÆ, (p. lxv.)

1. *Genus* AMPLEXUS, (p. lxvi.)

AMPLEXUS TORTUOSUS. Tab. XLIX, figs. 5, 5*a*.

AMPLEXUS TORTUOSUS, *Phillips*, Palæoz. Foss., p. 8, pl. iii, fig. 8, 1841.
— — *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 347, 1851.
— YANDELLI, (pars), *ibid.*, p. 344.
— TORTUOSUS, *M'Coy*, British Palæoz. Foss., p. 70, 1851.

Corallum elongate, cylindrico-conical, curved, and slightly tortuous; circular wrinkles well developed and irregular. *Epitheca* strong, and wrinkled transversely. *Calice* suboval, with 4 distinct septal fossulæ, (the one placed near the convex side of the corallum larger and deeper than the three others). *Tabulæ* not very closely set, irregular, and presenting in the centre a large smooth space. *Septa* (30 to 50 in the adult

[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 318, pl. vii, figs. 1, 2.

individuals) slender, but little developed, not very unequal in size; some rudiments of smaller septa between the former.

The specimens figured in this Monograph (tab. xlix, fig. 5) about 4 inches long, and about $1\frac{1}{2}$ inch wide. Professor M'Coy justly remarks that the specimens described by Mr. Phillips were young individuals, and mentions a gigantic specimen the diameter of which was 1 inch 9 lines.

The specimens here described were found at Torquay and Plymouth, and belong to the collections of Dr. Battersby and Mr. Pengelly. The same species exists at Barton and South Petherwin, according to Mr. Phillips, and at Newton Bushel according to Professor M'Coy.

This species resembles very much *Amplexus Yandelli*,[1] and *A. cornubovis*,[2] but differs from both by the septa being less numerous and almost equal in size, and by the existence of 4 septal fossulæ. *Amplexus coralloides*[3] differs also from *A. tortuosus* by not having the depressions on the tabulæ, and by the circular wrinkles being larger.

2. *Genus* Hallia, (p. lxvii.)

Hallia Pengellyi. Tab. XLIX, figs. 6, 6*a*, 6*b*.

Hallia Pengellyi, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Pal., p. 354, 1851.

The *calice* of this coral is almost circular, with 54 principal *septa*, which alternate with an equal number of small and thinner ones; the former are very thick, straight, and disposed in a regular radiate manner towards the circumference of the visceral chamber; towards their inner edge they are provided with a large and thin paliform lobe. The cristiform septum is not as large as in *Hallia insignis*,[4] and it is the lobes belonging to the principal septa situated near this that affect a pinnate mode of arrangement. The dissepiments are very slender and closely set. Diameter 1 inch or more; the area occupied by the paliform lobes forms an ellipse of about 9 lines long and 6 lines broad.

Found at Torquay, (Coll. of the Geological Society of London, and of Mr. Pengelly at Torquay). We are inclined to refer to this species some young corals from Pethervin, which are in a very bad state of preservation, and belong to the collection of the Geological Society. They have a strong epitheca.

In *Hallia Pengellyi* the characters of the generic type are not as distinct as in *H. insignis*,[5] the large septum being less developed, and the adjacent septa not assuming as regular a pinnate mode of arrangement; it is also to be remarked that in *H. insignis* all the septa are provided with a very large paliform lobe.

[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 344. pl. iii, fig. 2, 1851.

[2] Ibid., p. 343, pl. ii, fig. 1.

[3] Tab. xxxvi, fig. 1.

[4] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 353, pl. vi, fig. 3, 1851. [5] Ibid.

3. *Genus* CYATHOPHYLLUM, (p. lxviii.)

1. CYATHOPHYLLUM CERATITES. Tab. L, fig. 2.

CYATHOPHYLLUM TURBINATUM, (pars), *Goldfuss*, Petref. Germ., vol. i, p. 50, pl. xvi, figs. 8*c*, *d*, *f*, *g*, *h*, 1826. (Not *Madrepora turbinata*, Linné.)
— CERATITES, (pars), *ibid.*, pl. xvii, figs. 1, 2*f*, and perhaps also fig. 5.
— TURBINATUM, *Holl*, Hanb. der Petref., p. 416, 1830.
— CERATITES, *Deshayes*, Coq. cærvet. des Terr., p. 247, pl. xi, fig. 2, 1831.
— TURBINATUM, *D'Orbigny*, Prodr. de Palæont., t. i, p. 105, 1850.
— CERATITES, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 361, 1851.
— — *M'Coy*, Brit. Palæoz. Foss., p. 70, 1851.

Corallum, simple (sometimes two or three individuals are united by their bases, but their union is evidently accidental), turbinate, elongate, slightly curved, and presenting rather well marked growth swellings. *Epitheca* very strong. *Calice* deep and with a thin margin; one or two rudimentary septal fossulæ. *Septa* delicate, alternately larger and smaller but not differing much in size, narrow at their upper end, straight, and not extending quite to the bottom of the central fossula which, as well as the interseptal loculi, is somewhat vesicular. The number of the septa varies, according to the size of the corals, from 60 to 120. The large individuals are sometimes 6 inches wide, with the calice about 3 inches in diameter, and $1\frac{1}{2}$ or two inches deep, but most specimens are not more than two inches in diameter.

Found at Torquay, and according to Prof. M'Coy, at Newton Bushel. In the Eifel Mountains in Germany.

The only British specimen of this species that we have seen is the one figured in this Monograph; it is a young individual in a very indifferent state of preservation.

Cyathophyllum ceratites differs from the other simple species of the same generical group by the depth of its calice, its rudimentary septal fossula, and its septa being almost equally developed.

2. CYATHOPHYLLUM ROEMERI. Tab. L, fig. 3.

CYATHOPHYLLUM DIANTHUS, (pars), *Goldfuss*, Petref. Germ., vol. i, p. 54, tab. xvi, fig. 1*e*, 1826.
— ROEMERI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 362, pl. viii, fig. 3, 1851.

Corallum simple, conical, elongated, curved, and free. *Epitheca* presenting some prominent folds, principally on the side of the convex curve. *Calice* almost circular, large and deep, 74 or more. *Septa* alternately somewhat thicker or thinner, very closely set, not exsert, denticulated, narrow, slightly arched at their upper edge, and extending to

the centre of the visceral chamber, where they become slightly curved. Height 2 inches; diameter somewhat more than 1 inch; depth about 8 lines.

The specimen found at Torquay belongs to Dr. Battersby. This species is also met with at Bensberg and in the Eifel Mountains in Germany.

The type specimen of this species is from the Eifel Mountains, and has only 74 septa. The Torquay fossil that we consider as belonging to the same species, and have figured here, present more than 100 septa; but that difference evidently depends on an accidental multiplication of these laminæ in one part of the septal system where they are more closely set than elsewhere. The species most nearly allied to *C. Roemeri* is *C. Michelini*,[1] but the latter is adherent, its septal fossula is rudimentary, and its septa less closely set.

3. Cyathophyllum obtortum. Tab. XLIX, fig. 7.

Strombodes vermicularis, *Lonsdale*, Trans. of the Geol. Soc. of London, 2d ser., vol. v, pl. lviii, fig. 7, 1840. (Not *Cyathophyllum vermiculare* of Goldfuss.)

— — *Phillips*, Palæoz. Foss., p. 11, pl. vii, fig. 14, 1841.

Cyathophyllum obtortum, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 366, 1851.

Strephodes vermicularis, *M'Coy*, British Palæoz. Foss., p. 73, 1851.

Corallum simple, elongated, subcylindrical. *Calice* circular. Principal *septa* (32 or 34) very thin towards their inner edge and somewhat thicker exteriorly, much curved and twisted near the centre of the calice, and alternating with an equal number of others that are smaller and still thinner. Vesicular dissepiments well developed on the exterior part of the visceral chamber. Height about $2\frac{1}{2}$ inches; diameter of the calice, 1 inch.

Found at Torquay, Plymouth, and Newton Bushel, by Mr. Lonsdale; and at Darlington by Mr. Phillips.

Collections of the Geological Society, and of Prof. Phillips, at York.

This species is very remarkable on account of the septa being so strongly twisted near the centre of the visceral chamber,—a character which distinguishes it easily from *C. Michelini*[2] and *C. Roemeri*[3] that in other respects resemble it very much.

4. Cyathophyllum damnoniense. Tab. L, fig. 1.

Cystiphyllum damnoniense, *Lonsdale*, Geol. Trans., 2d ser., vol. v, p. 703, pl. lviii, fig. 11, 1840.

— — *Phillips*, Palæoz. Foss., p. 9, pl. iv, fig. 11, 1841.

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[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 366, 1851.

[2] Ibid.

[3] Tab. l, fig. 3.

CYATHOPHYLLUM DAMNONIENSE, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 371, 1851.
CYSTIPHYLLUM — *M'Coy*, Brit. Palæoz. Foss., p. 71, 1851.

Corallum simple, elongate, subturbinate, and almost straight. *Septa* (100 or more) somewhat unequal in size alternately, closely set, very slender exteriorly, thick towards their inner part, and slightly curved. *Dissepiments* very closely set, vesicular, somewhat irregular, smaller and more numerous towards the outer part of the visceral chamber. Some small *tabulæ* somewhat irregular, and very closely set, at the centre of the coral. Height sometimes 3 inches.

Found at Torquay, Newton Bushel, Plymouth, and also, according to Professor Phillips, at Sharkham Point and Babbacombe. Specimens are in the collections of the Geological Society of London, of Dr. Battersby, and Mr. Pengelly.

The fossil Coral designated by the name of CYATHOPHYLLUM CELTICUM,[1] and found in the Devonian deposits of Cornwall and Devonshire,[2] is as yet so imperfectly known that we are not able to characterize it in a satisfactory manner. The specimens met with are only natural casts from which the real coral has more or less completely disappeared; they show, however, that the *septa*, (to the number of 36 or 48), must have been alternately of unequal size, and that the principal ones extended to the centre of the visceral chamber, where they became somewhat twisted.

We have given the name of CYATHOPHYLLUM BUCKLANDI to a species which Professor M'Coy described under that of *Petraia gigas*,[3] but which is quite distinct from the *Cyathophyllum gigas*, previously described in MM. Yandell and Shumard's Paper on the Geology of Kentucky, and therefore could not retain the same name. It is a simple coral like the preceding ones, and is known only by the casts it has left in the surrounding rock. Till some better preserved specimens be met with, we therefore do not think it necessary to have this fossil figured in our Monograph.

[1] *Turbinolia celtica*, Lamouroux, Exp. Meth., p. 85, tab. lxxviii, figs. 7, 8, 1821. *Deslongchamps*, Encycl. (Zooph.), p. 761, 1824; Milne Edwards, 2d edit. of Lamarck, vol. ii, p. 362, 1836. *Petraia celtica*, Lonsdale, Geol. Trans., 2d. ser., vol. v, p. 697, pl. lviii, fig. 6, 1840. *Turbinolopsis celtica*, Phillips, Palæoz. Foss., p. 3, pl. i, fig. 1, 1841. *Cyathophyllum celticum*, D'Orbigny, Prod. de Palæont., vol. i, p. 105, 1850; Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 373, 1851. *Petraia celtica*, M'Coy, Brit. Palæoz. Foss., p. 74, 1851.

[2] Prof. Phillips mentions this fossil as having been found at South Petherwin, Saint Columb, Pobruan and Fowey in Cornwall; and at Combes, Mudstone Bay, Yealm, Torquay, and Brushford in Devonshire.

[3] *Petraia gigas*, M'Coy, Ann. and Mag. of Nat. Hist., 2d ser., vol. iii, p. 1, 1849; (not *Cyathophyllum gigas*, Yandell and Shumard). *Cyathophyllum Bucklandi*, Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 390, 1851. *Petraia gigas*, M'Coy, British Palæoz. Foss., p. 74, 1851.

Professor M'Coy describes this fossil in the following terms:—"*Corallum* elongate, conic, gradually increasing, (at an angle from the apex of about 30° externally), slightly oblique; section apparently elliptical, the axes in the proportion of 70 to 100; internal cast obtusely conic, expanding at an angle of about 50° in

The fossils described by Mr. Lonsdale under the name of *Turbinolopsis bina*[1] appear to belong also to the genus Cyathophyllum, but have as yet been found only in the form of casts which are scarcely determinable. They show in general 72 septa of unequal size, alternately denticulated, and slightly curved towards the centre of the visceral chamber. Prof. Phillips mentions the existence of this coral in the Devonian deposits of Combe, near Ashburton.[2]

The corals to which the names of *Turbinolopsis pauciradialis*,[3] *T. elongata*,[4] *T. rugosa*,[5] and *T. pluriradialis*[6] have been given by Prof. Phillips, appear to be specifically identical, or very nearly allied to the preceding species; but the specimens as yet known are so imperfect that we cannot lay before the reader any useful information concerning their structure.

8. CYATHOPHYLLUM HELIANTHOIDES. Tab. LI, figs. 1, 1*a*.

CYATHOPHYLLUM HELIANTHOIDES, *Goldfuss*, Petref. Germ., vol. i, p. 61, tab. xx, fig. 2*a*—*k*' and tab. xxi, fig. 1, 1826.
FAVASTREA HELIANTHOIDEA, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 341, 1830.—Man., p. 375.
TURBINOLIA HELIANTHOIDES, and ASTREA HELIANTHOIDEA, *Steininger*, Mém. Soc. Géol. de France, vol. i, pp. 344, 345, 1831.
MONTICULARIA AREOLATA, *Ibid.*, p. 346, pl. xx, fig. 10.
CYATHOPHYLLUM HELIANTHOIDES, *Morren*, Descr. Corall. Belg., p. 58, 1832.
— — *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 429, 1836.

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compressed specimens, its small end obtuse from the filling up of a considerable length of the base of the coral, by nearly solid sclerenchyme; external walls thick, dense; lamellæ averaging 74 in the adult cups; with the diameter of two and a half inches, the primary ones extending towards the centre, nearly straight for above one third the diameter, then abruptly diminishing in strength, and gradually convoluted spirally towards the broad central area; the secondary lamellæ much finer than the primary, extending about one fifth of the diameter towards the centre; *internal casts* with thirty-three to thirty-seven broad, flattened, smooth ribs, separated by deep smooth-edged sulci (representing the primary lamellæ); these sulci in some specimens, divided by connecting filaments of matrix, produced by perforation in the original plate; each rib divided in the middle by a very fine slit, not reaching quite to the narrow base, (representing the secondary lamellæ,) becoming nearly as strong as the primary towards the broad edge of the cup. No transverse vesicular laminæ. Lengths of imperfect casts about two and a half inches; width of same specimen pressed flat, nearly four and a half inches; width of ribs between the primary sulci at edge of cup varying from two to three lines. Very common in the fine grey Devonian slates of New Quay." (M'Coy, *l. c.*)

[1] *Turbinolopsis bina*, Lonsdale, in Murchison, Silur. Syst., p. 692, pl. xvi bis, fig. 5, 1839. *Turbinolopsis bina*? Ibid., p. 693, pl. xvi bis, fig. 6. *Petraia bina*, M'Coy, Syn. Sil. Foss. of Ireland, p. 60, 1846. *Streptelasmæ bina*, D'Orbigny, Prod. de Pal., vol. i, p. 47, 1850. *Cyathophyllum binum*, Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 374, 1851.

[2] Palæoz. Foss., p. 4, pl. i, fig. 2.

[3] Phillips, Palæoz. Foss., p. 5, pl. i, fig. 4. From Corffe Quarry, near Tawstock.

[4] Ibid., p. 6, pl. ii, fig. 68. From Horderley, May Hill, and Lickey Hill.

[5] Ibid., p. 7, pl. ii, fig. 7*c*. From Snowdon.

[6] Ibid., pp. 5, 6, pl. ii, figs. 5*a*, 5*β*. From Brushford, Linton, Pilton, and Fowey Harbour.

ASTREA HELIANTHOIDES, *Lonsdale*, Geol. Trans., 2d. ser., vol. v, p. 697, 1840.
DISCOPHYLLUM HELIANTHOIDES, *D'Orbigny*, Prod. de Paléont., vol. i, p. 106, 1850.
CYATHOPHYLLUM HELIANTHOIDES, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 375, pl. viii, fig. 5, 1851.
STREPHODES HELIANTHOIDES, *M'Coy*, Brit. Palæoz. Foss., p. 73, 1851.

Corallum simple or composite.

When simple this species is subturbinate, short, broad, with the edge of the calice reverted, so as to form an obtuse prominent ridge around the central fossula. Sixty or eighty equally-developed *septa*, slightly thickened towards the exterior by the granulations and striæ that arise from their lateral surfaces; almost all of these extend to the centre of the calice, where they become slightly curved, and present, in the well-preserved specimens, small but well-characterised paliform lobes, which, by their agglomeration, form a sort of crown near the centre of the calicular fossula. The edge of the calice is circular and slightly lamellate. The height of the corallum is usually about two inches, and in that case the diameter of the calice is about double, or somewhat more, and that of the paliform circles about four lines.

When composite this corallum assumes an astreiform appearance, and the corallites, which are united together side by side, are circumscribed by polygonal lines, usually not very prominent. The *calices* are in general smaller than in the simple specimens, very unequal in size, and not provided with as many septa. In a variety of this species, the calicular swelling is large and prominent. Vertical sections show that the central part of the visceral chambers is occupied by slightly-developed tabulæ, and the outer parts filled with numerous and somewhat regular vesicles.

Found at Plymouth, Teignmouth Beach, and Mudstone Beach; in France at Viré (Sarthe); in Germany, in the Eifel, Rokeskill, Blankenheim, Steinfeld, Luxembourg, Reinfeld, Sigmaringen; in America, at Harrisville, Ohio, and in the Isle of Mackinaw.

British specimens are in the collections of Mr. J. S. Bowerbank, Dr. Battersby, and Mr. Pengelly.

The species of cyathophyllum that most approximates *C. helianthoides* is *C. Regium*,[1] from the mountain limestone; but in the latter the simple corallites are more regularly turbinate, and the calice is not everted so as to assume the form of a mushroom; the septa are also more numerous and slender.

9. CYATHOPHYLLUM HEXAGONUM. Tab. L, figs. 4, 4*a*.

MADREPORA TRUNCATA? *Esper*, (Pflanz.) Petref., tab. iv; (not Linné).
CYATHOPHYLLUM HEXAGONUM, *Goldfuss*, Petref. Germ., vol. i, p. 61, tab. xx, fig. 1, 1826.
FAVASTREA HEXAGONA, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 340, 1830.—Man., p. 375.
ASTREA HEXAGONA, *Steininger*, Mém. Soc. Géol. de France, vol. i, p. 345, 1831.

[1] Tab. xxxii, figs. 1—4.

CYATHOPHYLLUM HEXAGONUM, *Morren*, Descr. Corall. in Belg. Repert., p. 57, 1832.
— — *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 429, 1836.
ASTREA ANANAS, *Ad. Rœmer*, Verst. der Harzegeb., p. 5, tab. ii, fig. 11, 1843.
CYATHOPHYLLUM HEXAGONUM, *Milne Edwards* and *Jules Haime*, Pol. Fos. des Terr. Palæoz., p. 382, 1851.

Corallum composite, astreiform; gemmation calicular and extracalicular. *Calices* polygonal, varying much in size, rather deep, and circumscribed by *walls* that are not very prominent, but quite distinct; thin, and always simple. Forty-six septa, alternately large and small, the twenty-three latter not extending far from the wall; the large ones thin, terminated by a denticulate edge, which is horizontal near the margin, but very strongly arched upwards and inwards, and presenting near the centre of the visceral chamber a small paliform lobe; these lobes form a very distinct crown round the centre of the calice. Height of the corallum about $2\frac{1}{2}$ inches, depth about 2 lines, and diameter of the circle of paliform lobes somewhat more than 1 line.

Found at Torquay; at Montignies, St. Christophe, and Chimay in Belgium; at Bensberg, Refrath, and Grund in Germany.

British specimen in Dr. Battersby's collection.

This species differs from *C. quadrigeminum*[1] by its calices being larger and shallower, and by the paliform lobes of the septa; it differs from *C. cæspitosum*[2] by these lobes being larger than in the latter and the septa more equally developed. In *C. boloniense*[3] the calices are larger, the septa less prominent and more developed, and the paliform lobes are quite rudimentary. In *C. marmini*[4] the calices are deep and the septa rather unequal. In *C. Sedgwicki*[5] the septa are less numerous than in the above-described species, and become thicker towards three fourths of their breadth.

10. CYATHOPHYLLUM CÆSPITOSUM. Tab. LI, figs. 2, 2*a*, 2*b*.

CYATHOPHYLLUM CÆSPITOSUM, *Golfuss*, Petref. Germ., vol. i, p. 60, tab. xix, fig. 2, 1826.
— HEXAGONUM (pars.), *Ibid.*, tab. xix, fig. 5*a*, *b*, *c*. (Cœt. excl.)
CARYOPHYLLIA DUBIA, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 311, 1830.—Man., p. 345.
CYATHOPHYLLUM CÆSPITOSUM, *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 428, 1836.
— — *Lonsdale*, Geol. Trans., 2d ser., vol. v, 3d part, pl. lviii, fig. 8, 1840.
— — *Phillips*, Palæoz. Foss., p. 9, pl. 3, fig. 10, 1841.
CLADOCORA GOLDFUSSI, *Geinitz*, Grundr. der Verst., p. 569, 1845-46.
DIPHYPHYLLUM CÆSPITOSUM, *D'Orbigny*, Prod. de Paléont., vol. i, p. 106, 1850.
CYATHOPHYLLUM — *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 384, 1851.
— — *M'Coy*, British Palæoz. Foss., p. 69, 1851.

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[1] Goldfuss, Petref. Germ., t. i, p. 59, tab. xix, figs. 1, 5*f*, and tab. xviii, fig. 6, 1826. Tab. li, fig. 2. [3] Tab. lii, fig. 1. [4] Tab. lii, fig. 4. [5] Tab. lii, fig. 3.

Corallum composite, fasciculated, or astreiform; tall; gemmations principally calicular. *Corallites* almost cylindrical, and presenting but slight growth swellings. *Calices* in general circular, sometimes agglomerated and polygonal; rather deep. Forty or fifty *septa*, somewhat unequal in size alternately, thin, narrow at the top, straight, and bearing a small paliform lobe near the centre of the calice. Diameter of the calices about 4 lines. *Tabulæ* well developed; interseptal vesicles small. In horizontal sections of this corallum the spot where the dissepiments cease has the appearance of an inner wall, placed at a small distance from the exterior one.

Found at Teignmouth Beach near Torquay, at Newton, and at Plymouth.

Specimens are in the collections of Mr. Bowerbank and of Dr. Battersby.

In a variety of this species found at Torquay, the calices are not more than 2 or $2\frac{1}{2}$ lines in diameter.

M. D'Orbigny has placed this coral in the genus *Diphyphyllum* of Mr. Lonsdale. As Professor M'Coy very justly remarks, some specimens appear so distinctly dichotomous that they evidently belong to this division, whereas in other specimens the gemmation is quite lateral, as in the common Cyathophylla.[1]

This species resembles *C. marmini*[2] by its general arrangement, being in some specimens fasciculate and in others astreiform; but in the latter fossil the calices are deeper, and the septa are not only less unequal, but also produce at their upper edge the appearance of an inner wall. The same variations in the general form of the composite corallum is sometimes met with also in *C. quadrigeminum*,[3] which, however, differs from *C. cæspitosum* by the septa being still more slender, and not bearing any paliform lobes.

11. Cyathophyllum boloniense. Tab. LII, figs. 1, 1*a*.

Montastrea boloniensis, ***Blainville***, Dict. Sc. Nat., vol. lx, p. 339, 1830.—Man., p. 394.

Cyathophyllum hexagonum, ***Michelin***, Icon. Zooph., p. 181, pl. xlvii, fig. 2, 1845. (Not *Goldfuss.*)

Lithostrotion arachnoides, ***D'Orbigny***, Prod. de Paléont., t. i, p. 106, 1850. (Not *Astrea arachnoides*, de France.)

Cyathophyllum boloniense, ***Milne Edwards*** and ***Jules Haime***, Pol. Foss. des Terr. Palæoz., p. 385, pl. 9, fig. 1, 1851.

Corallum composite, astreiform, forming a subcircular rather flat mass. *Calices* polygonal, very unequal in size, deep, and separated by thin, straight walls. Forty-two or forty-six *septa*, almost equal in size, very slender, striated laterally, delicately denticulated, and straight; half of them do not extend quite to the centre of the calice, the other

[1] It is surprising that after having recognized these variations the latter author should not have come to a similar result respecting the Diphyphyllum of the carboniferous formation which bear the same relation to Lithostrotions.

[2] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæozoiques, p. 386, pl. ix, figs. 2, 3, 1851.

[3] Goldfuss, Petref. Germ., t. i, p. 59, tab. xix, figs. 1, 5*f*, and tab. xviii, fig. 6, 1826.

advance a little more, and present a very small paliform lobe, which is in general rather indistinct. All the septa are broad, and their upper edge is somewhat oblique till at some distance from the wall, but becomes slightly convex further inwards. Diagonal of the large calices about 8 lines.

Found at Ogwell, Torquay; and at Ferques near Boulogne.

In the collection of Dr. Battersby, &c.

This species is very closely allied to *Cythophyllum hexagonum*,[1] but its septa are more similar in size, less prominent at a small distance from the walls, and have much smaller paliform lobes. It bears also great resemblance to *C. Sedgwicki*,[2] which differs from it principally by the septa becoming thicker at a small distance from the centre of the calice. *C. Davidsoni*[3] presents also the same aspect, but has the calices much smaller, and the septa smaller and less numerous.

12. CYATHOPHYLLUM MARMINI. Tab. LII, figs. 4, 4*a*.

CYATHOPHYLLUM PROFUNDUM, *Michelin*, Icon. Zooph., p. 184, pl. xlviii, fig. 1, 1849. (Not Geinitz.)

— CÆSPITOSUM, *Ibid.*, p. 184, pl. xlvii, fig. 5. (Not Goldfuss.)

LITHOSTROTION PROFUNDUM, *D'Orbigny*, Prod. de Pal., vol. i, p. 106, 1850.

CYATHOPHYLLUM MARMINI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 386, pl. ix, figs. 2, 3, 1851.

Corallum composite, subfasciculate or astreiform; gemmation almost always lateral. *Corallites* very unequal in size, circular when free laterally, polygonal when aggregated. *Calice* deep and broad. About 40 *septa*, more or less similar among themselves, thin, delicately denticulated, and extending for the most part to the bottom of the calicular cavity, where they present only rudimentary paliform lobes; at a short distance from the wall they are somewhat prominent, and assume there the appearance of an interior wall. Dissepiments numerous. Diameter of the calices 4 or 5 lines; depth about $2\frac{1}{2}$.

Found at Teignmouth and Torquay. (Collection of Dr. Battersby.)

This species differs from *C. cæspitosum*[4] by its calice being deeper, its septa less unequal, and more especially by its mode of gemmation, which is almost always lateral; and from *C. quadrigeminum*[5] by the septa being less regular and the existence of paliform lobes, which are absent in the latter species.

10. CYATHOPHYLLUM SEDGWICKI. Tab. LII, figs. 3, 3*a*.

CYATHOPHYLLUM SEDGWICKI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 387, 1851.

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[1] Tab. l, fig. 4. [2] Tab. lii, fig. 1.

[3] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 389. [4] Tab. li, fig. 2.

[5] Goldfuss, Petref. Germ., tab. i, p. 59, tab. xix, figs. 1, 5*f*, and tab. xviii, fig. 6, 1826.

Corallum composite, astreiform. *Calices* unequal in size, polygonal, and separated by nearly straight walls. Gemmation calicular as well as lateral. *Septa* (32 or 40) well developed, somewhat unequal in size; the smaller ones thin all along, the larger ones thin outwardly, but becoming thicker at about two thirds of their breadth, and again thin towards the centre of the calice, where they are slightly curved, and present a very small paliform lobe. The vesicular *dissepiments* are mostly small, but are rather unequal in size, and do not extend beyond the middle of the thick part of the principal septa. Great diagonal of the calices usually about 6 lines; diameter of the circle of paliform lobes about two thirds of a line.

Found at Babbacombe Beach, Torquay. (Collections of Mr. Bowerbank and Dr. Battersby.)

This species is intermediate between *C. hexagonum*[1] and *C. boloniense*,[2] but approximates most to the latter, from which it differs principally by the thickness of the principal septa at a small distance from the centre of the calice.

14. CYATHOPHYLLUM ÆQUISEPTATUM. Tab. LII, fig. 1.

CYATHOPHYLLUM ÆQUISEPTATUM, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 389, 1851.

Corallum composite, fasciculate. *Corallites* distant from each other, multiplying by lateral gemmation, surrounded by an epitheca, and appearing subcylindrical. *Calices* deep, and with a thin edge. *Septa* (about 36) very narrow upwards, not remarkably thin, and almost equal in size. Diameter of the corallites about 4 lines.

Found at Ilfracombe in Devonshire.

In the Collection of the Geological Society.

This species is remarkable for the equal development of all the septa.

We are inclined to consider the *Strephodes gracilis*[3] of Prof. M'Coy as belonging to the genus Cyathophyllum, but it may be a species of *Ptychophyllum*.

[1] Tab. I, fig. 4. [2] Tab. lii, fig. 1.

[3] *Strephodes gracilis*, M'Coy, Ann. and Mag. of Nat. Hist., 2d ser., vol. vi, p. 378, 1850; M'Coy, Brit. Palæoz. Foss., p. 72, 1851.

Professor M'Coy describes this fossil in the following terms:—"*Corallum* simple, very gradually tapering, irregularly twisted, averaging three inches long, and eight lines in adult diameter; *horizontal section*, outer wall very thick, solid; radiating lamellæ at the above diameter about 56, very thin, extending in a slightly irregular manner towards a large central space, which the primary ones fill with their irregular complicated extremities; secondary lamellæ as thick as the primary, of irregular lengths, but seldom extending one fourth the distance to the centre; transverse vesicular plates extremely delicate, rather few, irregular; vertical section showing in the middle a few irregularly flexuous delicate longitudinal lines (edges of the complicated ends of the vertical radiating lamellæ); sides occupied by very open vesicular tissue, composed of large, curved, delicate, oblique plates, forming about two rows of great cells on each side; outer wall very thick, forming a nearly smooth surface; when decorticated, the lamellar sulci average 5 in 2 lines; terminal cup deep, strongly radiated to the flattened centre. Locality; Newton Bushel."

4. *Genus* ENDOPHYLLUM.[1]

1. ENDOPHYLLUM BOWERBANKI. Tab. LIII, fig. 1.

ENDOPHYLLUM BOWERBANKI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Ter. Palæoz., p. 394, 1851.

Corallum composite, astreiform. *Corallites* more or less intimately united together by rudimentary exterior walls and an irregular vesicular tissue. Inner *walls* well constituted, circular, and often double. Principal *septa* (30 or 32) pretty well developed, rather slender, very flexuous inwardly, extending almost to the centre of the calice, and alternating with an equal number of smaller septa. They do not project much outside the wall, so as to form costal striæ, that soon disappear in the vesicular tissue. *Tabulæ* well developed and somewhat irregular. Diameter of the mural circles about 8 lines, distance between them 5 or 7 lines.

Found at Barton near Torquay.

In the Collections of Mr. Bowerbank, Dr. Battersby, &c.

The Genus ENDOPHYLLUM has been established since the publication of the Introduction to this Monograph, and is intermediate between *Cyathophyllum* and *Acervularia*, having most of the structural characters of the first, but presenting completely vesicular tissue exteriorly to well-defined walls. In Acervularia there is a well-developed epitheca, which does not exist in Endophyllum, and the septal system is much more developed in the space between the two mural investments.

Endophyllum Bowerbanki differs from *E. abditum*[2] by its outer walls being rudimentary, its inner walls being well constituted, and its septa thicker though still rather slender.

2. ENDOPHYLLUM ABDITUM. Tab. LII, fig. 6.

ENDOPHYLLUM ABDITUM, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 394, 1851.

Corallites more or less closely united by polygonal walls, which are rather strong. Inner walls thin, often double and rather irregularly circumscribed. The space comprised between the two walls is filled with large vesicles, on which some costal striæ may be recognised. Principal *septa* (34 to 40) very slender, especially inwardly, where they become much curved, an equal number of smaller septa alternating with the principal ones. Diagonal of the large calices almost 2 inches; diameter of the mural circle about 12 lines.

[1] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz.; Archives du Muséum, vol. v, p. 393, 1851.

[2] Tab. lii, fig. 6.

Found at Teignmouth Beach by Dr. Battersby.

This fossil differs from *E. Bowerbanki*[1] by its well-developed outer wall and its very slender septa.

5. *Genus* CAMPOPHYLLUM, (p. lxviii.)

The fossil described by Mr. Phillips under the name of *Cyathophyllum turbinatum*,[2] and found by that able geologist at Babbacomb, appears to be specifically identical with Goldfuss's *Cyathophyllum flexuosum*,[3] a coral, appertaining to our genus *Campophyllum*;[4] but we have seen as yet no British specimen of this species.

6. *Genus* PACHYPHYLLUM, (p. lxviii.)

PACHYPHYLLUM DEVONIENSE. Tab. LII, figs. 5, 5*a*.

PACHYPHYLLUM DEVONIENSE, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 397, 1851.

This species is known to us only from a polished slab, communicated to us by Dr. Battersby, but appears to be sufficiently characterised to authorise its admission in a methodical arrangement of the Devonian corals.

The *corallites* are not circumscribed, but their radii are not completely confluent. The exterior portion of each individual is principally formed by a vesicular tissue, through which well-defined but very slightly constituted costæ extend. At some distance from the centre of each corallite, a well-marked subcircular or elliptical zone is formed by a slight enlargement of the septa, and appears to represent a rudimentary wall. *Septa* (44 or 48) very slender, unequally developed alternately, the larger ones very slender inwardly, where they become somewhat flexuous and appear to have a paliform lobe, and extending only to a short distance from the centre of the calice. Breadth of the corallites about 8 lines; diameter of the mural zones about 4 lines.

Found at Torquay by Dr. Battersby.

This species differs from *P. Bouchardi*[5] by its septa being more numerous, more slender and unequal, and by the principal ones bearing a small paliform lobe.

[1] Tab. liii, fig. 1.

[2] Palæoz. Fossils, p. 8, pl. vii, fig. 9.

[3] Petref. Germ., vol. i, p. 57, tab. xvii, figs. 3*a*, 8.

[4] *Campophyllum flexuosum*, Milne Edwards and Jules Haime, Monogr. des Polyp. des Terr. Palæoz., p. 395, pl. viii, fig. 4.

[5] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 397, pl. vii, fig. 7, 1851.

7. *Genus* CHONOPHYLLUM, (p. lxix).

CHONOPHYLLUM PERFOLIATUM. Tab. L, fig. 5.

CYATHOPHYLLUM PLICATUM, *Goldfuss*, Petref. Germ., vol. i, p. 59, tab. xviii, fig. 5, 1826. (Not tab. xv, fig. 12.)
— — *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 431, 1836.
— PERFOLIATUM, *Goldfuss*, MSS. in Bonn Museum.
CHONOPHYLLUM PERFOLIATUM, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 405, 1851.

Corallum simple, straight, rather elongate. *Calice* not remarkably deep, and of a subconical form. *Septa* (60 to 74) equally developed, straight, and extending almost to the centre of the corallum. Some vestiges of a rudimentary septal fossula are visible. Height about 3 inches, diameter about 2 inches.

Found at Torquay. (Collection of Dr. Battersby.)

A fossil found at Wenlock, and belonging to the collection of M. D'Archiac, appears to belong also to this species.

C. perfoliatum differs from *C. elongatum*[1] by its general form being broader and less elongate, and by its tabulæ being less infundibuliform.

8. *Genus* HELIOPHYLLUM, (p. lxix.)

HELIOPHYLLUM HALLI. Tab. LI, fig. 3.

STROMBODES HELIANTHOIDES, *Phillips*, Fig. and Descr. of Palæoz. Foss., p. 10, pl. v, fig. 13*a*, 1841. (Not *Cyathophyllum helianthoides*, Goldfuss.)
— — *Hall*, Geol. of New York, 4th part, p. 209, No. 48, fig. 3, 1843.
CYATHOPHYLLUM TURBINATUM, *Ibid.*, No. 49, fig. 1. (Not Goldfuss.)
— — *Castlenau*, Ter. sil. de l'Amer. du Nord., pl. xvi, fig. 5, 1843.
HELIOPHYLLUM HALLI, *Milne Edwards* and *Jules Haime*, Brit. Foss. Corals, Introd., p. lxix, 1850.
— — *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 408, pl. vii, fig. 6, 1851.

Corallum simple, turbinate, or cylindro-conical, usually elongate, and slightly curved at its base, provided with an epitheca, and presenting slight circular swellings. *Calice*

[1] Milne Edwards and Jules Haime, Polyp. Foss. des Terr. Palæoz., p. 406, pl. viii, fig. 1, 1851.

circular, rather deep, with a small septal fossula. *Septa* (80 or even more) very thin, closely set, rather broad at their upper end, where they are arched and denticulate, alternately larger and smaller, slightly twisted near the centre of the visceral chamber. A vertical section shows that the lateral processes of the septa are arched and ascendant; those situated towards the upper end of the corallum terminate at the edge of the septa; those situated lower down unite near the centre of the visceral chamber, so as to constitute irregular *tabulæ*. The interseptal loculi are filled up with these lamellate processes, which are situated at about half a line apart, and united by closely-set simple dissepiments that form right angles with them. Diameter of the calice from 1 to 2 inches.

The specimen submitted to our investigation was found at Torquay. Prof. Phillips has also met with this fossil at Plymouth, Babbacombe, and Sharkham Point. The same species is found in North America.

9. *Genus* Acervularia, (p. lxx).

1. Acervularia Goldfussi. Tab. LIII, figs. 3, 3*a*.

Cyathophyllum ananas, *Goldfuss*, Petref., vol. i, p. 60, pl. xix, fig. 4*a*, 1826. (Not fig. 4*b*.)
— — *Hall*, Handb. der Petref., p. 416, 1830.
— — *Morren*, Descr. Corall. in Belgio Repert., p. 56, 1832.
— — *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 429, 1836.
Astrea basaltiformis, *Ad. Roemer*, Verst. des Harzgeb., p. 5, tab. ii, fig. 12, 1843.
Acervularia Goldfussi, *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 161, 1850.
Lithostrotion ananas, (pars), *D'Orbigny*, Prod. de Paléont., vol. i, p. 106, 1850.
Acervularia Goldfussi, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 417, 1851.

Corallum composite, massive, astreiform; the polygonal lines on its surface well marked and rather zigzagged. Great diagonal of the corallites about 3 lines. The inner wall well constituted, rather strong, with the septa somewhat exsert, and being only about 1 line in diameter. *Septa* (24 or 26) almost straight, very slender, and extending alternately more or less towards the centre. *Dissepiments* rather closely set.

Found at Torquay, by Dr. Battersby.

This species much resembles *A. coronata*[1] by the development of its inner and outer walls, but differs from it by the septa being somewhat unequal in size. The costo-septal radii are still more similar and closer set in *A. pentagona*,[2] the corallites of which are also much smaller. In *A. Roemeri*[3] these radii are very slender, and flexuous outwardly, and the outer walls are very vaguely indicated.

[1] Tab. liii, fig. 4. [2] Tab. liii, fig. 5. [3] Tab. liv, fig. 3.

2. ACERVULARIA CORONATA. Tab. LIII, figs. 4, 4*a*, 4*b*.

ACERVULARIA CORONATA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 416, 1850.

A polished section of this coral shows that the corallites are united by means of well-defined polygonal epithecal walls. The inner walls are also well constituted, and circumscribe a very small area comparatively to the breadth of the corallites. *Septa* (generally 28) very slender, somewhat thickened by lateral granulations near the outer wall, where most of them become slightly curved. In the space comprised between the two mural investments the septa are equally developed; but only one half of them penetrate into the visceral chamber, and extend almost to the centre of the corallite, where they bear a small but well-defined paliform lobe. *Exothecal dissepiments* very closely set. Diagonal of the corallites 5 or 6 lines.

Found at Barton near Torquay.

In the Collections of Dr. Battersby and Mr. Pengelly.

This species, by the development of its two mural investments, differs from *A. intercellulosa*[1] and *A. limitata*,[2] in which the inner wall is only indicated by a slight thickening of the septa; and from *A. Battersbyi*,[3] in which the exterior wall is rudimentary. In *A. Roemeri*[4] the septa are much more slender, and more curved outwardly. In *A. pentagona*[5] and *A. Goldfussi*,[6] the septa all reach very near to the centre of the visceral chamber, whereas in the above-described coral half of them do not extend beyond the inner walls.

3. ACERVULARIA INTERCELLULOSA. Tab. LIII, figs. 2, 2*a*.

ASTREA INTERCELLULOSA, *Phillips*, Palæoz. Foss. of Cornwall, &c., p. 12, pl. vi, fig. 17, 1841.
FAVASTREA — *D'Orbigny*, Prod. de Paléont., vol. i, p. 107, 1850.
ACERVULARIA — *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 417, 1851.

Corallites polygonal, unequal in size, circumscribed by well-marked zigzagged exterior walls. *Inner walls* rendered distinct by a thickening of the septa, and forming circles which are very large in proportion to the size of the polygones. *Septa* (40 to 44) slightly developed in the exterior parts of the corallites, where they become quite lost in the vesicular tissue; in the part corresponding to the inner wall they are thick, but they become slender again more inwardly, where one half of them reach almost to the centre of the corallite, and are provided with a paliform lobe. Great diagonal of the polygonal corallites about 6 lines; diameter of the calice about 4 lines.

[1] Tab. liii, fig. 2. [2] Tab. liv, fig. 1. [3] Tab. liv, fig. 2.
[4] Tab. liv, fig. 3. [5] Tab. liii, fig. 5. [6] Tab. liii, fig. 3.

Found at Torquay.

In the Collections of Dr. Battersby and Mr. Pengelly.

This species resembles *A. limitata*[1] in having the inner wall rudimentary, and indicated only by a thickening of the septa; it differs from it, as well as from the other Acervularia, by the great number of the septa.

4. ACERVULARIA PENTAGONA. Tab. LIII, figs. 5, 5*a*, 5*b*.

CYATHOPHYLLUM PENTAGONUM, *Goldfuss*, Petref. Germ., vol. i, p. 60, tab. xix, fig. 3, 1826.
FAVASTREA PENTAGONA, *De Blainville*, Dict. Sc. Nat., vol. lx, p. 340, 1830.—Man., p. 375.
CYATHOPHYLLUM PENTAGONUM, *Morren*, Desc. Corall. Belg., p. 56, 1832.
— — *Milne Edwards*, 2d ed. of Lamarck, vol. ii, p. 430, 1836.
ASTREA PENTAGONA, *Lonsdale*, Geol. Trans., 2d ser., vol. v, pl. 57, fig. 1, 1840. (Not fig. 1*a*.)
— — *Phillips*, Palæoz. Foss., p. 11, pl. vi, fig. 15, 1841.
ACERVULARIA PENTAGONA, *Michelin*, Icon., p. 180, pl. xlix, fig. 1, 1845.
— ANANAS, *Ibid.*, p. 180, pl. xlvii, fig. 1.
LITHOSTROTION PENTAGONUM, *D'Orbigny*, Prod., vol. i, p. 106, 1850.
ACERVULARIA PENTAGONA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 418, 1851.
— — *M'Coy*, Brit. Palæoz. Foss., p. 91, 1851.

Corallum forming an astreiform mass. *Corallites* somewhat unequal in size, polygonal, their great diagonal measuring in general about 2 lines, and the diameter of the inner walls about half a line. *Septa* (18 to 24) subequal, slender, and almost straight. The lines of demarcation between the corallites slightly zigzagged.

Found at Torquay and at Ogwell. Prof. Phillips mentions having met with this species at Newton Bushel, Sharkham Point, and Babbacombe. It is found also in the Eifel, and in the province of Limbourg.

In the Collections of Messrs. Bowerbank and Pengelly.

This is the smallest species of Acervularia known, and that in which the septa are the least numerous. *A. coronata*,[2] to which it bears most resemblance, differs from it by the great inequality of the septa.

5. ACERVULARIA LIMITATA. Tab. LIV, fig. 1.

ASTREA PENTAGONA (pars), *Lonsdale*, Geol. Trans., 2d ser., vol. v, pl. lviii, fig. 1*a*, 1840. (Not fig. 1.)
ACERVULARIA LIMITATA, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 419, 1851.

A polished slab of this coral shows that the corallites are circumscribed by well-marked zigzagged polgyonal lines. The inner walls are, on the contrary, but slightly marked,

[1] Tab. liv, fig. 1.

[2] Tab. liii, fig. 4.

and are principally indicated by a small thickening of the septa. In general 26 *septa*, rather slender, granulated on the sides, and often slightly curved in the space comprised between the two mural investments; half of them do not extend further than the inner wall, and those which penetrate into the central area do not appear to have any paliform lobes. Diagonal of the corallites 3 lines; diameter of the inner walls 1 line.

Found in Newton Quarry near Torquay.

In the Collections of the Geological Society and Dr. Battersby.

In this species the inner wall is rudimentary, as in *A. intercellulosa*,[1] but the septa are less numerous, and do not give rise to paliform processes.

6. ACERVULARIA BATTERSBYI. Tab. LIV, fig. 2.

ACERVULARIA BATTERSBYI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 419, 1851.

A horizontal section of this species shows that the Corallites are very closely united together and limited only by a very thin exterior wall, which form zigzags, is slightly marked, and constitutes polygonal divisions. The *inner walls* are, on the contrary, very thick, and circumscribe a central area, which is very small in proportion to the space occupied by the whole of each Corallite; they appear to be composed of a dense exothecal tissue. *Septa* (36), of equal size in the outer area, very slender, for the most part much curved, almost confluent, and slightly thickened, where enclosed in the inner wall; half of them extend almost to the centre of the visceral chamber, where they present a small paliform lobe. *Dissepiments* very abundant and closely set in the exterior area, but almost completely absent in the inner area. Great diagonal of the Corallites 6 or 8 lines; diameter of the calices 2 lines, or somewhat more.

Found at Torquay and at Newton.

In the Collections of the Geological Society and Dr. Battersby.

This species, by the feeble development of the outer walls and its subconfluent septa, leads to the genus *Phillipsastrea*. It differs from *A. Roemeri*, where the exterior wall is also but slightly developed, by the septa being more numerous and provided with a paliform lobe.

7. ACERVULARIA ROEMERI. Tab. LIV, fig. 3.

ASTREA HENNAHII, *Ad. Roemer*, Verst. des Harzgebirges, p. 5, tab. ii, fig. 13, 1843. (Not Lonsdale.)

— PARALLELA ? *Ibid.*, tab. iii, fig. 1.

PHILLIPSASTREA PARALLELA ? *D'Orbigny*, Prod. de Paléont., vol. i, p. 107, 1850.

[1] Tab. liii, fig. 2.

ACERVULARIA ROEMERI, *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.

— — *Milne Edwards* and *Jules Haime*, Polyp. Foss. des Terr. Palæoz., p. 420, 1851.

Corallum massive with an almost flat surface. *Corallites* prismatic, and intimately united together. Outer walls very slender, and often difficultly recognised in certain states of fossilization. Great diagonal of the Corallites 2 or 3 lines or more; diameter of the inner walls less than 1 line. 26 or 28 septa costal laminæ, very slender, and strongly curved or flexuous towards the centre of the Corallites.

Found at Torquay; at Grund in the Hartz; and at Puerto de las Volcas near Pola de Gordon, in the province of Leon in Spain.

In the Collection of Dr. Battersby.

Professor M'Coy mentions this species as having been met with also at Barton and Teignmouth; but he does not distinguish it from *Acervularia intercellulosa*.

This species differs from all the other Acervulariæ by its septa being much curved, and its outer walls rudimentary. *A. Battersbyi*[1] has the septa more numerous, more slender, and provided with a paliform lobe.

10. *Genus* SMITHIA.[1]

1. SMITHIA HENNAHII. Tab. LIV, fig. 4.

ASTREA HENNAHII (pars), *Lonsdale*, in Sedgwick and Murchison, Geol. Trans., 3d ser., vol. v, p. 697, pl. lviii, fig. 3, 1840.

— — *Phillips*, Palæoz. Foss., p. 12, pl. vi, fig. 16, 1841.

CYATHOPHYLLUM HENNAHII, *Bronn*, Index Paléont., vol. i, p. 368, 1848.

LITHOSTROTION HENNAHII, ACTINOCYATHUS HENNAHII, and PHILLIPSASTREA HENNAHII (pars), *D'Orbigny*, Prod. de Paléont., vol. i, pp. 106, 107, 1850.

SMITHIA HENNAHII, *Milne Edwards* and *Jules Haime*, Polyp. Foss. des Terr. Pal., p. 421, 1851.

ARACHNOPHYLLUM HENNAHII, *M'Coy*, Brit. Palæoz. Foss., p. 72, 1851.

A polished horizontal section of this compound astreiform corallum shows that the *mural circles*, although slender, are well characterised, and placed at a distance from each other, equal to 2, 3, or even 4 times their diameter, but varying sometimes very much in the same specimen. *Costal radii* (24 or 26 in a corallite) slender, appearing to be slightly granulated on their sides, and in general much more developed, more confluent and straighter in one direction than in the other, where they become irregular, flexuous, angular or geniculate; half of the radii do not extend beyond the wall; the others become somewhat thicker at that part, and pass on towards the centre of the visceral chamber, where some traces of small paliform lobes are seen. Diameter of the mural circles about $1\frac{1}{2}$ line.

[1] Tab. liv, fig. 2.

[2] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p 421, 1851.

A vertical section shows that the intercostal loculi are filled up with vesicles, which are very small and pretty regular. The *dissepiments* of the interseptal loculi are almost horizontal, and unite at the centre of the visceral chamber so as to form a series of small and very closely set *tabulæ*.

Found at Torquay, Plymouth, and Newton.

In the Collections of Mr. Bowerbank, Dr. Battersby, and Mr. Pengelly.

S. Pengelli[1] differs from the above-described species by its septa being more numerous and its walls rudimentary.

In *S. Bowerbanki*[2] the septa are less numerous and more vermiculate.

In *S. Boloniensis*[3] the calices are smaller, and costal radii completely confluent.

2. SMITHIA PENGELLYI. Tab. LV, fig. 1.

ASTREA HENNAHII, (pars), *Lonsdale*, in Sedgwick and Murchison, Geol. Trans., 2d ser., vol. v, 3d part, p. 697, pl. lviii, fig. 3*a*, 1840.

SMITHIA PENGELLYI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Pal., p. 422, 1851.

Mural circles not very distinct, and indicated principally by a slight thickening of the septa, which are placed at very unequal distances. *Costal radii* (not more than 40) alternately unequal in thickness, granulated laterally; in general larger and more confluent in one direction than in the other, where they are flexuous and even angular; half of them do not extend further than the wall; the others become somewhat thicker on that part, and, passing on, become very slender towards the centre of the visceral chamber, where they bear paliform appendices. Diameter of the mural circle 2 lines, or somewhat more. *Dissepiments* very closely set.

Found at Torquay and Plymouth.

In the Collections of the Geological Society, Mr. Bowerbank, Dr. Battersby, and Mr. Pengelly.

This species differs from the preceding one by its septa being more numerous, thicker, and closer set. It is also well characterised by its walls being rudimentary.

3. SMITHIA BOWERBANKI. Tab. LV, fig. 2.

SMITHIA BOWERBANKI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 423, 1851.

Mural circles well developed, and placed very widely apart, but at unequal distances. *Costal radii* (18 or 20) completely confluent, slender, larger, and straighter in one direction than in the other, but in general flexuous and vermiculate (the more so as they

[1] Tab. lv, fig. 1.

[2] Tab. lv, fig. 2.

[3] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palaeoz., p. 423, 1851.

extend farther from the calice), becoming somewhat thicker in the wall, where they also become unequal in size; the larger ones do not appear to extend quite to the centre of the visceral chamber, and show no traces of paliform lobes. *Dissepiments* very small. Diameter of the wall about two thirds of a line.

Found at Torquay by Dr. Battersby.

This corallum differs from all the other species of the same genus by the small dimensions of the calices and the considerable distance between them; it is also remarkable for the complete confluency of its costal radii.

11. *Genus* SPONGOPHYLLUM.[1]

SPONGOPHYLLUM SEDGWICKI. Tab. LVI, figs. 2, 2*a*, 2*b*, 2*c*, 2*d*, 2*e*.

SPONGOPHYLLUM SEDGWICKI, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Pal., p. 425, 1851.

Corallum composite, massive, astreiform. *Calices* polygonal, very unequal in size, and circumscribed by pretty strong walls. No *columella*. *Septal radii* (14 or 16) extremely slender, extending in general to a short distance from the centre of the visceral chamber, slightly flexuous, and often not very distinct in the midst of the vesicular tissue that fills the cavity of the corallites. These septa alternate with an equal number of rudimentary ones.

A vertical section shows that the outer parts of the visceral chambers are occupied by vesicles unequal in size, in general much elongated and rather irregular, but that in the centre there are small horizontal tabulæ. Diagonal of the large calices $2\frac{1}{2}$ or 3 lines.

Found at Torquay.

In the Collection of Dr. Battersby.

This fossil is the only known species of our genus *Spongophyllum*, which is characterized principally by the rudimentary state of the radial laminæ; these appear to form slight ridges on the surface of the vesicles, but not to pass through them, and resemble the costal system of the corals forming the genus *Lonsdalia*.

12. *Genus* SYRINGOPHYLLUM, (p. lxxii.)

SYRINGOPHYLLUM CANTABRICUM. Tab. LV, fig. 3.

PHILLIPSASTREA CANTABRICA, *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.

SYRINGOPHYLLUM? CANTABRICUM, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 451, 1851.

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[1] Milne Edwards and Jules Haime, Pol. Foss des Terr. Palæoz.; Archives du Muséum, vol. v, p. 425, 1851.

Corallum composite, forming almost flat masses. *Calices* slightly prominent and placed at unequal distances (in general about $1\frac{1}{2}$ their diameter). *Costæ* irregularly confluent, large, rather thin, equally developed, flexuous or geniculated, delicately crenulated, and closely set (about a quarter of a line apart); 15 or 16 principal ones slightly exsert, terminated by an arched edge, extending almost to the centre of the visceral chamber, where they become very slender, bearing a small paliform lobe and alternating with an equal number of small septa; *wall* well developed, rather thick. *Columella* appearing to be slightly compressed. Diameter of the calices $1\frac{1}{2}$ line; depth almost half a line.

Found at Torquay; and at Valcos in the province of Leon in Spain.

In the Collection of the Geological Society of London, &c.

This species differs from *S. organum*[1] and *S. Torreanum*[2] by the costal radii being more numerous and more confluent.

Family Cystiphyllidæ, (p. lxxii.)

Genus Cystiphyllum, (p. lxxii.)

Cystiphyllum vesiculosum. Tab. LVI, figs. 1, 1*a*, 1*b*.

Cyathophyllum vesiculosum, *Goldfuss*, Petref. Germ., p. 58, pl. xvii, fig. 5, and pl. xviii, fig. 1, 1826.
— secundum, *Ibid.*, p. 58, pl. xviii, fig. 2.
— ceratites (pars), *Ibid.*, pl. xvii, fig. 2*k*.
— — *Milne Edwards*, 2d edit. of Lamarck, vol. ii, p. 430, 1836.
Cystiphyllum vesiculosum, *Phillips*, Palæoz. Foss., p. 10, pl. iv, fig. 12, 1841.
— — *De Verneuil* and *Jules Haime*, Bull. Soc. Géol. de France, 2d ser., vol. vii, p. 162, 1850.
— secundum and vesiculosum, *D'Orbigny*, Prod. de Pal., vol. i, p. 106, 1850.
— vesiculosum, *Milne Edwards* and *Jules Haime*, Pol. Foss. des Terr. Palæoz., p. 462, 1851.
— — *M'Coy*, Brit. Palæoz. Foss., p. 71, 1851.

Corallum simple, very long, slightly bent, subcylindrical, provided with a very strong epitheca, and presenting rather strong subhorizontal circular wrinkles. *Calicular* cavity rather deep; the septal striæ, when visible, more distinct towards the outer part of the calice. Vesicules unequal in size; the largest occupying the centre of the visceral cavity and about 1 line in length. Height of the coral in general about 3 or 4 inches. We have seen in the collection of Mr. Pengelly a specimen that measured above 1 foot in length, and $1\frac{1}{2}$ inch in diameter.

The British specimens submitted to our examination were found at Torquay, Plymouth,

[1] *Sarcinula organum*, Hisinger, Leth. Succ., p. 97, tab. xxviii, fig. 8, 1837.

[2] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 452, 1851.

and Mudstone Bay; Prof. Phillips has met with the same species at Babbacombe, and Prof. M'Coy at Newton Bushel. It exists also in Spain at Millar, in the province of Leon; in Germany in the Eifel Mountains; and in North America at Corn Island, Falls of the Ohio.

This species differs from *C. lamellosum*[1] by its cylindroid form and its large transverse wrinkles. *C. cylindricum*[2] and *C. Siluriense*[3] are both easily distinguished from it by the existence of radiciform processes; and in *C. Grayi*[4] the vesicles are much more oblique towards the surface of the coral, and very irregular towards its centre.

[1] *Cyathophyllum lamellosum* and *placentiforme*, Goldfuss, Petref., tab. xviii, figs. 3, 4.

[2] Lonsdale, Silur. Syst., p. 691, pl. xvi bis, fig. 3, 1839.

[3] (Pars), Lonsdale, Ibid., pl. xvi bis, fig. 1.

[4] Milne Edwards and Jules Haime, Pol. Foss. des Terr. Palæoz., p. 465, 1851.

TAB. XLVII.

CORALS FROM THE DEVONIAN FORMATION.

HELIOLITES POROSA (p. 212).

Fig. 1. A vertical section made through a globular specimen found at Torquay, and belonging to the collection of Mr. Bowerbank; natural size.

1*a*, 1*b*, 1*c*. Portions of different transverse sections, showing the variations in the size of the calices. Figs. 1*a* and 1*c* are from different parts of the same specimen; natural size.

1*d*. A magnified view of part of the specimen figured in 1*a*, showing the structure of the cænenchyma and the septa.

1*e*. A magnified view of a portion of the vertical section, fig. 1, showing the tabulæ of the corallites and the dissepiments of the columnal cænenchyma.

1*f*. A specimen of the same species, in which the substance of the coral has been destroyed and the visceral chambers of the corallites filled up with extraneous matter, constituting small prominent cylinders. Found at Torquay by Mr. Pengelly.

BATTERSBYIA INÆQUALIS (p. 213).

Fig. 2. A transverse section polished; natural size. Specimen found at Teignmouth, and belonging to the collection of Dr. Battersby.

2*a*. A specimen showing the septa; natural size.

2*b*. The same, magnified.

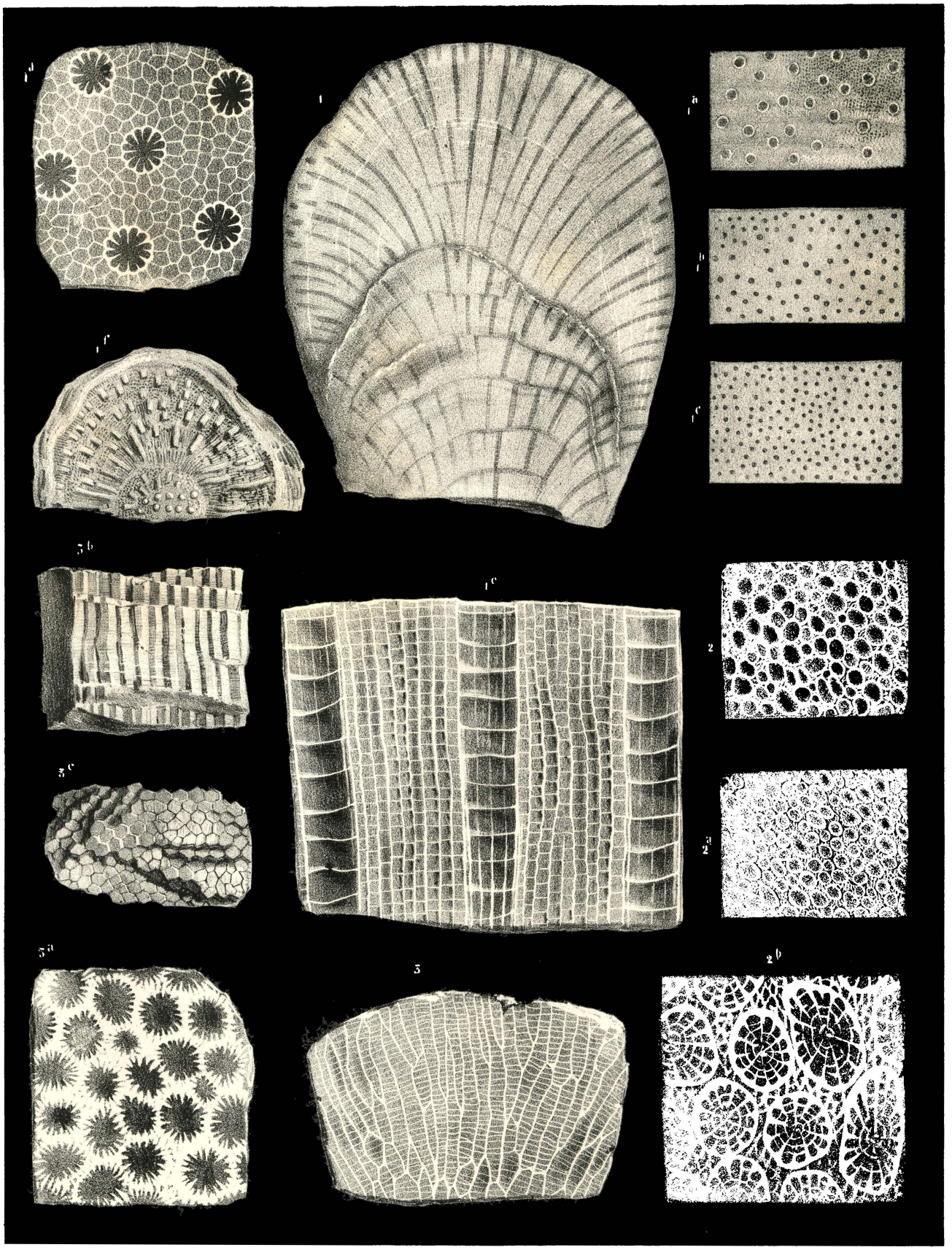
FAVOSITES GOLDFUSSI (p. 214).

Fig. 3. Vertical section polished; natural size. Specimen from Torquay, belonging to the collection of Mr. Bowerbank.

3*a*. Transverse section magnified, and showing some well-preserved calices with their septa.

3*b*. A fractured specimen, showing the prismatic form of the corallites; natural size. (Bowerbank collection.)

3*c*. The upper surface of the same specimen; natural size.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1a
1b
1f
1c
3b
1e
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3c
2a
3a
3
2b

TAB. XLVIII.

CORALS FROM THE DEVONIAN FORMATION.

FAVOSITES RETICULATA (p. 215).

Fig. 1. A specimen found at Torquay, and belonging to the collection of Dr. Battersby; natural size.

1*a*. A few calices of the same fossil, magnified.

1*b*. A vertical section of a specimen from Torquay, given to the Parisian Museum by Professor Milne Edwards.

FAVOSITES CERVICORNIS (p. 216).

Fig. 2. A vertical section of a specimen from Torquay, belonging to the collection of the Geological Society; natural size.

FAVOSITES FIBROSA (p. 217).

Fig. 3. Vertical section of a specimen from Torquay belonging to Dr. Battersby; natural size.

3*a*. A portion of the same, magnified, to show the septa and the visceral chambers of the corallites.

3*b*. A portion of the same, showing some calices that have been modified in their structure by the process of fossilization; magnified.

EMMONSIA HEMISPHERICA (p. 218).

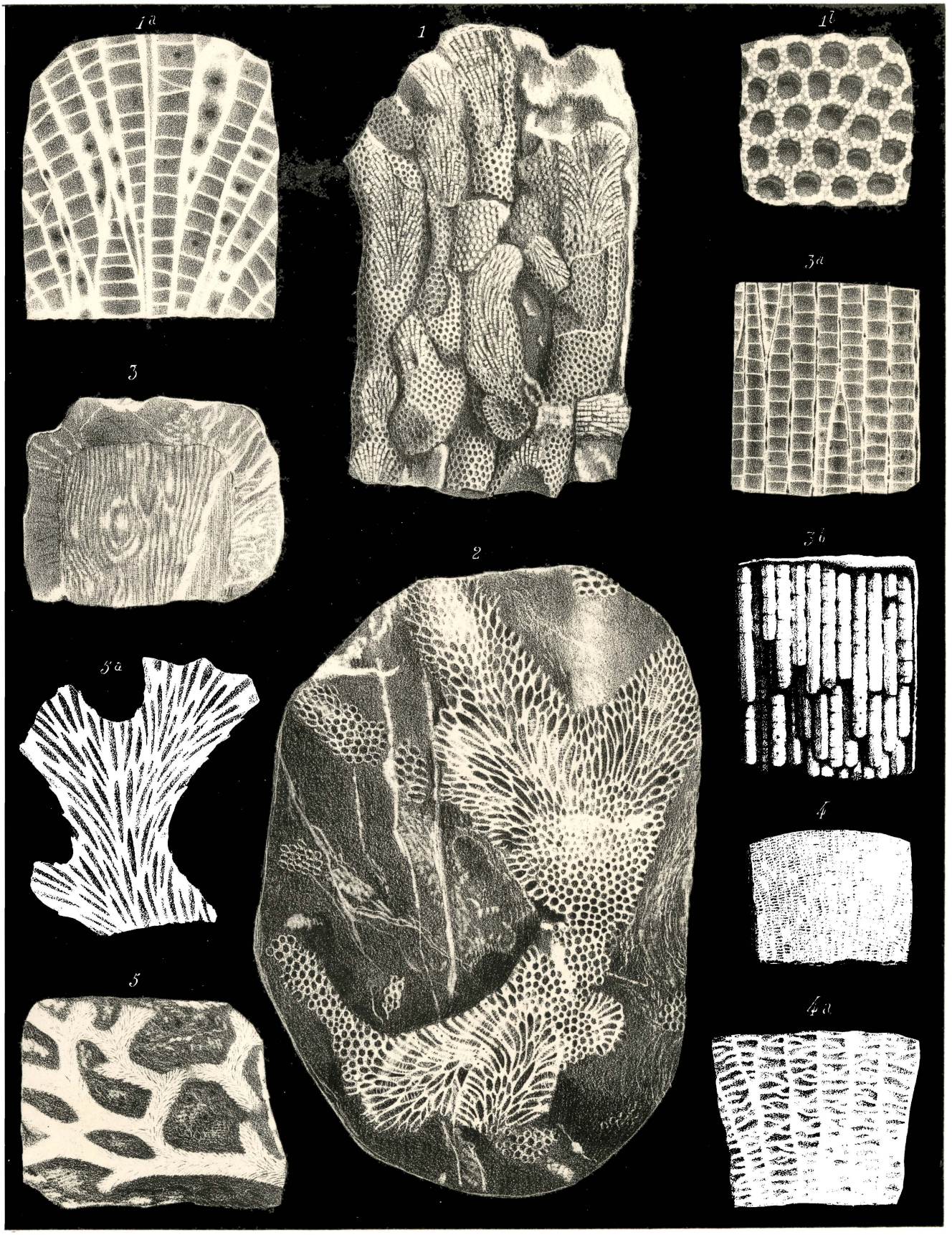
Fig. 4. Part of a vertical section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

4*a*. Part of the same, magnified.

ALVEOLITES VERMICULARIS (p. 220).

Fig. 5. Vertical section of a specimen from Torquay, belonging to the authors; natural size.

5*a*. Part of the same, magnified.


1a
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1b
3a
3
3b
2
5a
5
4
4a

TAB. XLIX.

CORALS FROM THE DEVONIAN FORMATION.

ALVEOLITES SUBORBICULARIS (p. 219).

Fig. 1. A polished vertical section of a specimen from Torquay belonging to Mr. Pengelly.

1*a*. An oblique section, magnified.

ALVEOLITES BATTERSBYI (p. 220).

Fig. 2. A vertical section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

2*a*. A part of the same, magnified, and showing the trabecular septa.

ALVEOLITES COMPRESSA (p. 221).

Fig. 3. Part of a transverse section of a specimen from Torquay, belonging to Mr. Pengelly.

METRIOPHYLLUM BATTERSBYI (p. 222).

Fig. 4. Transverse section of a specimen from Torquay, belonging to Dr. Battersby; double the natural size.

AMPLEXUS TORTUOSUS (p. 222).

Fig. 5*a*. Vertical section of a specimen from Plymouth, belonging to Mr. Pengelly.

HALLIA PENGELLYI (p. 223).

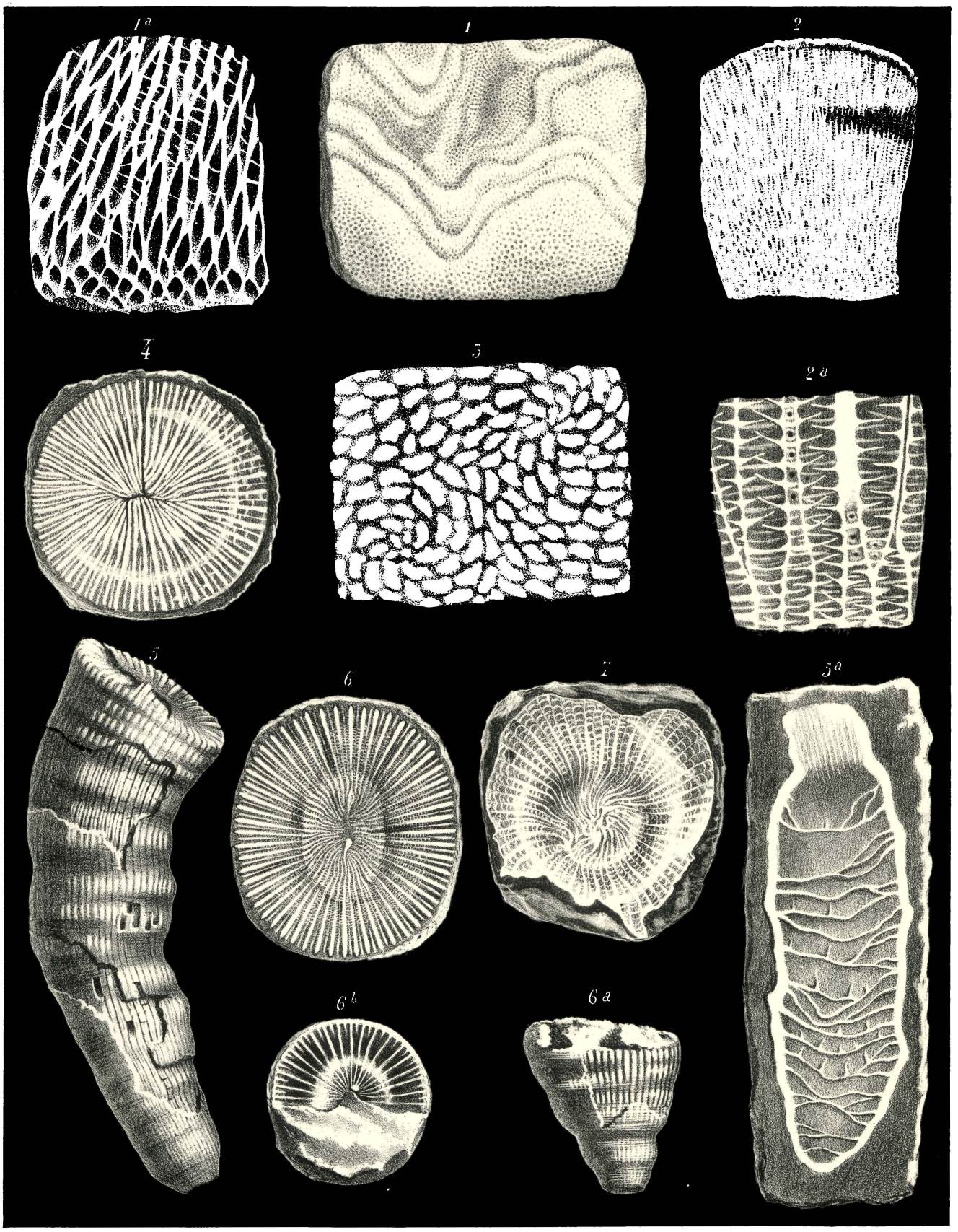
Fig. 6. Transverse section of a specimen from Torquay, belonging to Mr. Pengelly.

6*a*. A specimen from Petherwin, belonging to the collection of the Geological Society of London; natural size.

6*b*. A side view of the same.

CYATHOPHYLLUM OBTORTUM (p. 225).

Fig. 7. Transverse section of a specimen from Torquay, belonging to Professor Phillips; double the natural size.



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TAB. L.

CORALS FROM THE DEVONIAN FORMATION.

CYATHOPHYLLUM DAMNONIENSE (p. 225).

Fig. 1. An oblique section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

CYATHOPHYLLUM CERATITES (p. 224).

Fig. 2. A young individual from Barton quarry, near Newton, belonging to Dr. Battersby; natural size.

CYATHOPHYLLUM ROEMERI (p. 224).

Fig. 3. Transverse section of a specimen from Torquay, belonging to Dr. Battersby; double the natural size.

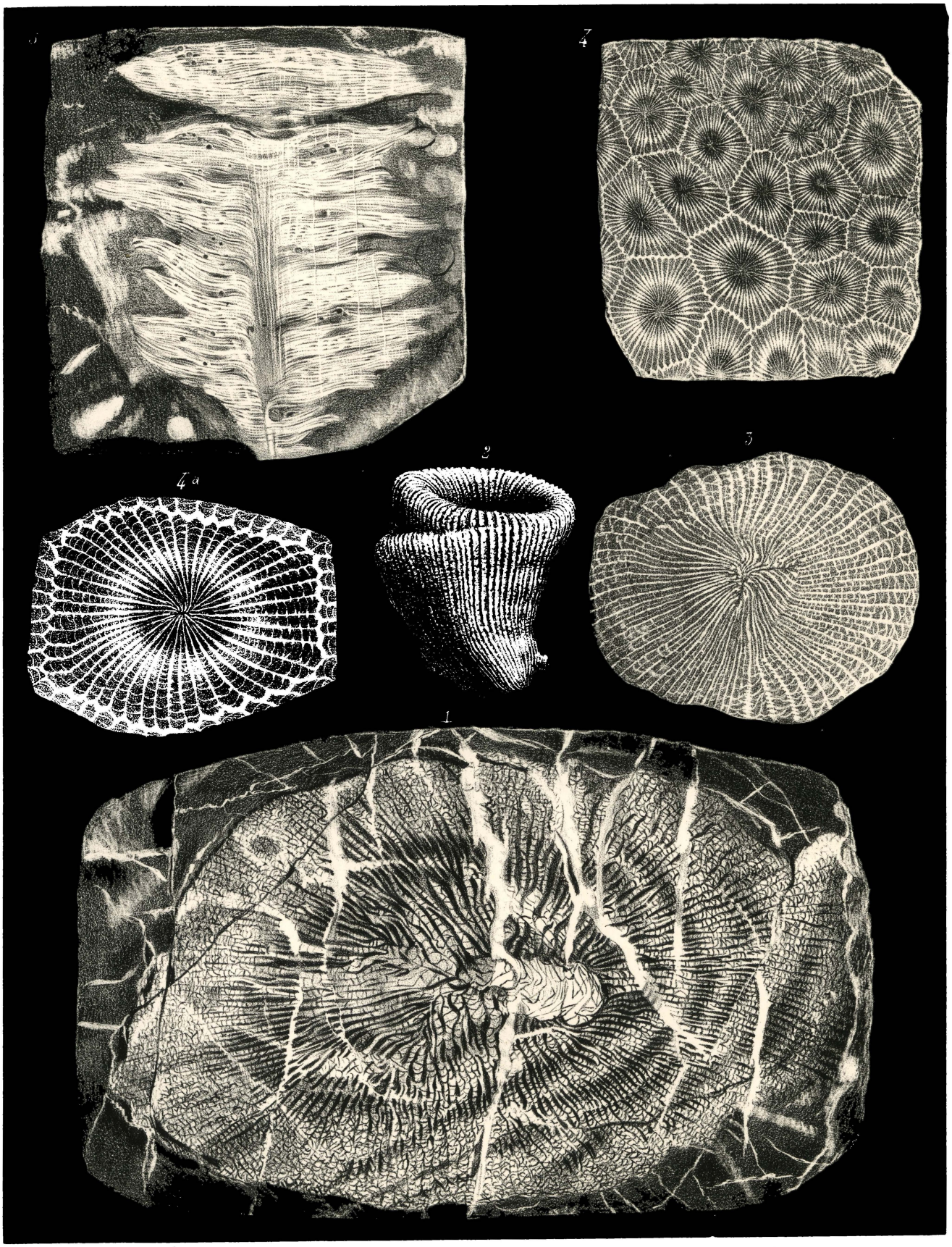
CYATHOPHYLLUM HEXAGONUM (p. 228).

Fig. 4. Transverse section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

4*a*. One of the above calices magnified.

CHONOPHYLLUM PERFOLIATUM (p. 235).

Fig. 5. Vertical section of an individual imbedded in extraneous matter, from Torquay; natural size. (Collection of Dr. Battersby.)


3
4
4a
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3
1

TAB. LI.

CORALS FROM THE DEVONIAN FORMATION.

CYATHOPHYLLUM HELIANTHOIDES (p. 227).

Fig. 1. Transverse section of a simple corallum, from Torquay, belonging to Dr. Battersby; natural size.

1*a*. Transverse section of a compound corallum, found at Plymouth by Mr. Pengelly; natural size.

CYATHOPHYLLUM CÆSPITOSUM (p. 229.)

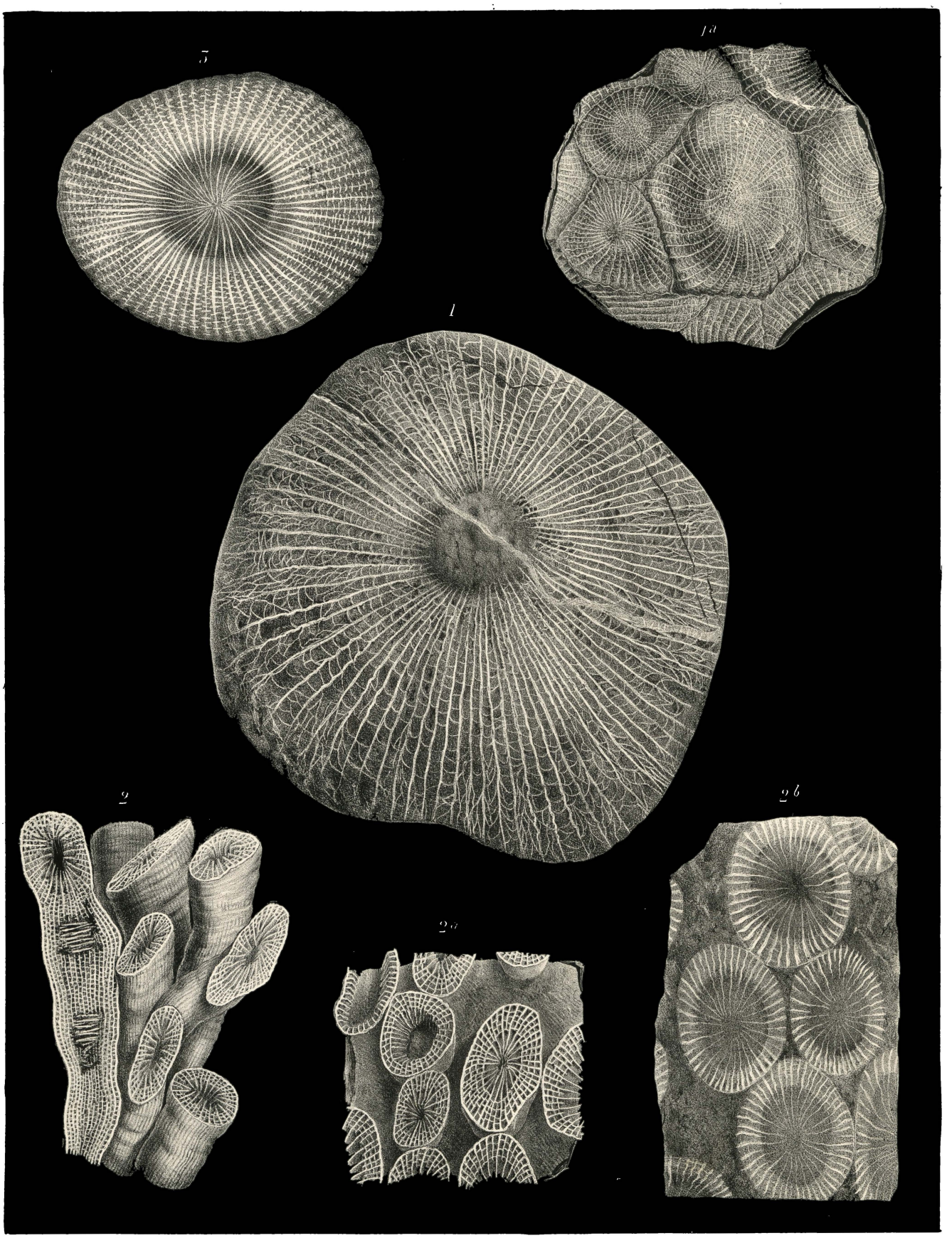
Fig. 2. A fractured specimen, showing the structural characters; natural size. From Torquay, Dr. Battersby's collection.

2*a*. A transverse section of some of the same corallites, somewhat magnified.

2*b*. A polished slab, showing a transverse section of a specimen from Teignmouth beach, belonging to the collection of Mr. Bowerbank.

HELIOPHYLLUM HALLI (p. 235).

Fig. 3. Transverse section of a specimen from Torquay, belonging to Dr. Battersby; double the natural size.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1a
1
2
2b
2a

TAB. LII.

CORALS FROM THE DEVONIAN FORMATION.

CYATHOPHYLLUM BOLONIENSE (p. 230).

Fig. 1. Upper surface of a specimen modified by fossilization; found at Ogwell by Dr. Battersby.

1*a*. Part of a transverse section of a specimen from Torquay, magnified. (Collection of Dr. Battersby.)

CYATHOPHYLLUM ÆQUISEPTATUM (p. 232).

Fig. 2. A specimen showing the calices of a few corallites imbedded in extraneous matter; found at Ilfracombe, and belonging to the collection of the Geological Society of London; natural size.

CYATHOPHYLLUM SEDGWICKI (p. 231).

Fig. 3. A polished slab, showing a transverse section of a specimen found at Torquay, and belonging to Mr. Bowerbank's collection; natural size.

3*a*. A part of the same, magnified.

CYATHOPHYLLUM MARMINI (p. 231).

Fig. 4. A polished transverse section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

4*a*. Part of the same, magnified.

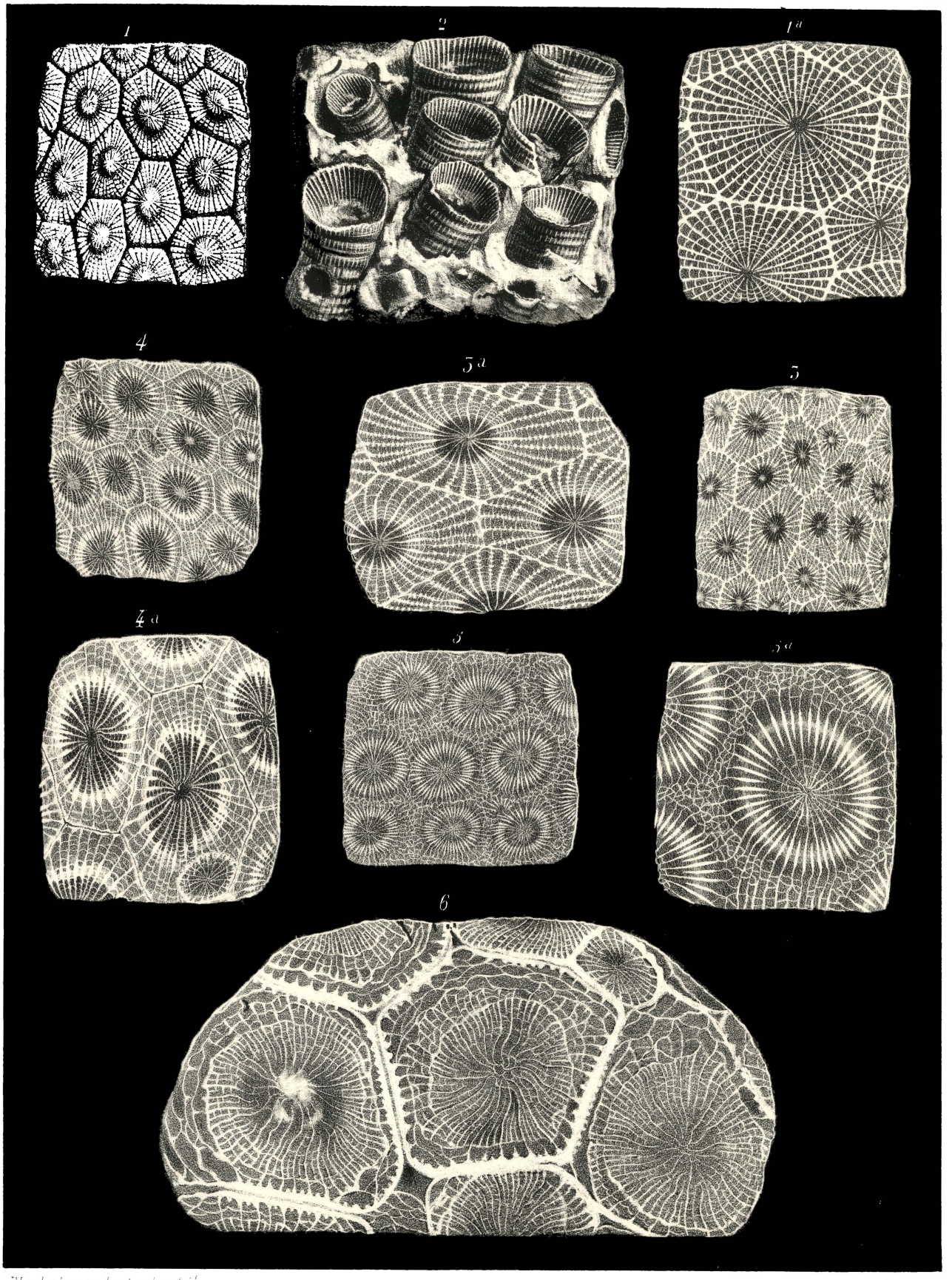
PACHYPHYLLUM DEVONIENSE (p. 234).

Fig. 5. A polished transverse section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

5*a*. Part of the same, magnified.

ENDOPHYLLUM ABDITUM (p. 233).

Fig. 6. Transverse section of a specimen from Teignmouth beach, belonging to Dr. Battersby; natural size.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4a
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5a
6

TAB. LIII.

CORALS FROM THE DEVONIAN FORMATION.

ENDOPHYLLUM BOWERBANKI (p. 233).

Fig. 1. A transverse section of a specimen found at Barton, and belonging to Mr. Bowerbank; natural size.

ACERVULARIA INTERCELLULOSA (p. 237).

Fig. 2. Upper surface of a specimen from Torquay, belonging to Mr. Pengelly natural size.

2*a*. Transverse section of another specimen from the same locality belonging to Dr. Battersby; magnified.

ACERVULARIA GOLDFUSSI (p. 236).

Fig. 3. Transverse section of a specimen from Torquay, belonging to Dr. Battersby; natural size.

3*a*. Part of the same slab, magnified.

ACERVULARIA CORONATA (p. 237).

Fig. 4. A specimen modified in its structure by the process of fossilization; from Torquay, and belonging to Mr. Pengelly; natural size.

4*a*. Transverse section of a specimen from Barton, belonging to Dr. Battersby; natural size.

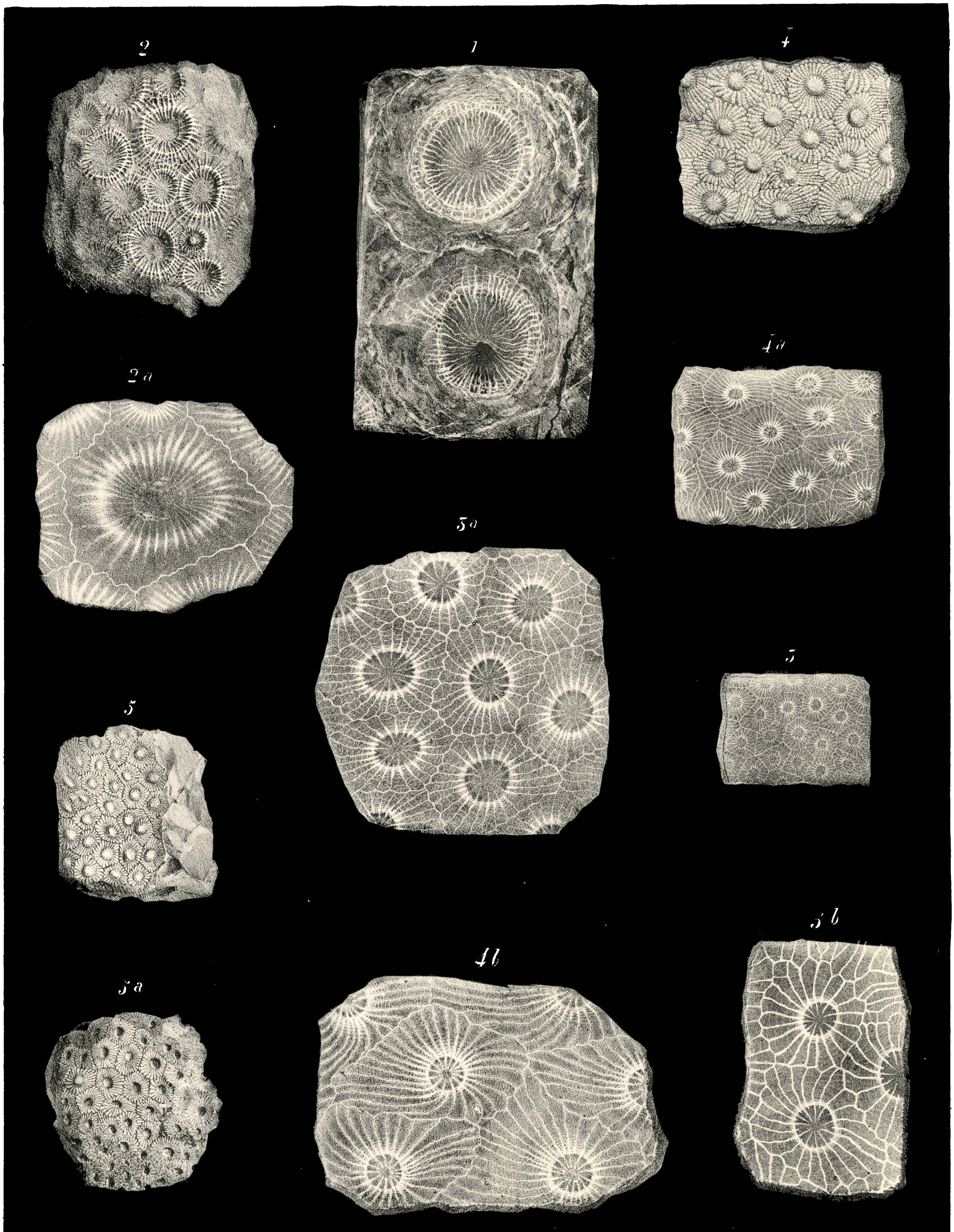
4*b*. A portion of the same section, magnified.

ACERVULARIA PENTAGONA (p. 238).

Fig. 5. A specimen modified by the process of fossilization; from Torquay, and belonging to Mr. Pengelly; natural size.

5*a*. A specimen from Ogwell, belonging to Mr. Bowerbank's collection; natural size.

5*b*. A portion of a transverse section of another specimen from the same locality; (Mr. Bowerbank's collection); natural size.



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TAB. LIV.

CORALS FROM THE DEVONIAN FORMATION.

ACERVULARIA LIMITATA (p. 238).

Fig. 1. Polished slab, showing a transverse section of a specimen from Newton, belonging to Mr. Pengelly; natural size.

1*a*. A part of the same, magnified.

ACERVULARIA BATTERSBYI (p. 239).

Fig. 2. Transverse section of a polished specimen from Torquay, belonging to Dr. Battersby; natural size.

2*a*. A part of the same slab, magnified.

ACERVULARIA RŒMERI (p. 239).

Fig. 3. Transverse section of a specimen from Torquay; natural size; Dr. Battersby's collection.

3*a*. Part of the same slab, magnified.

SMITHIA HENNAHI (p. 240).

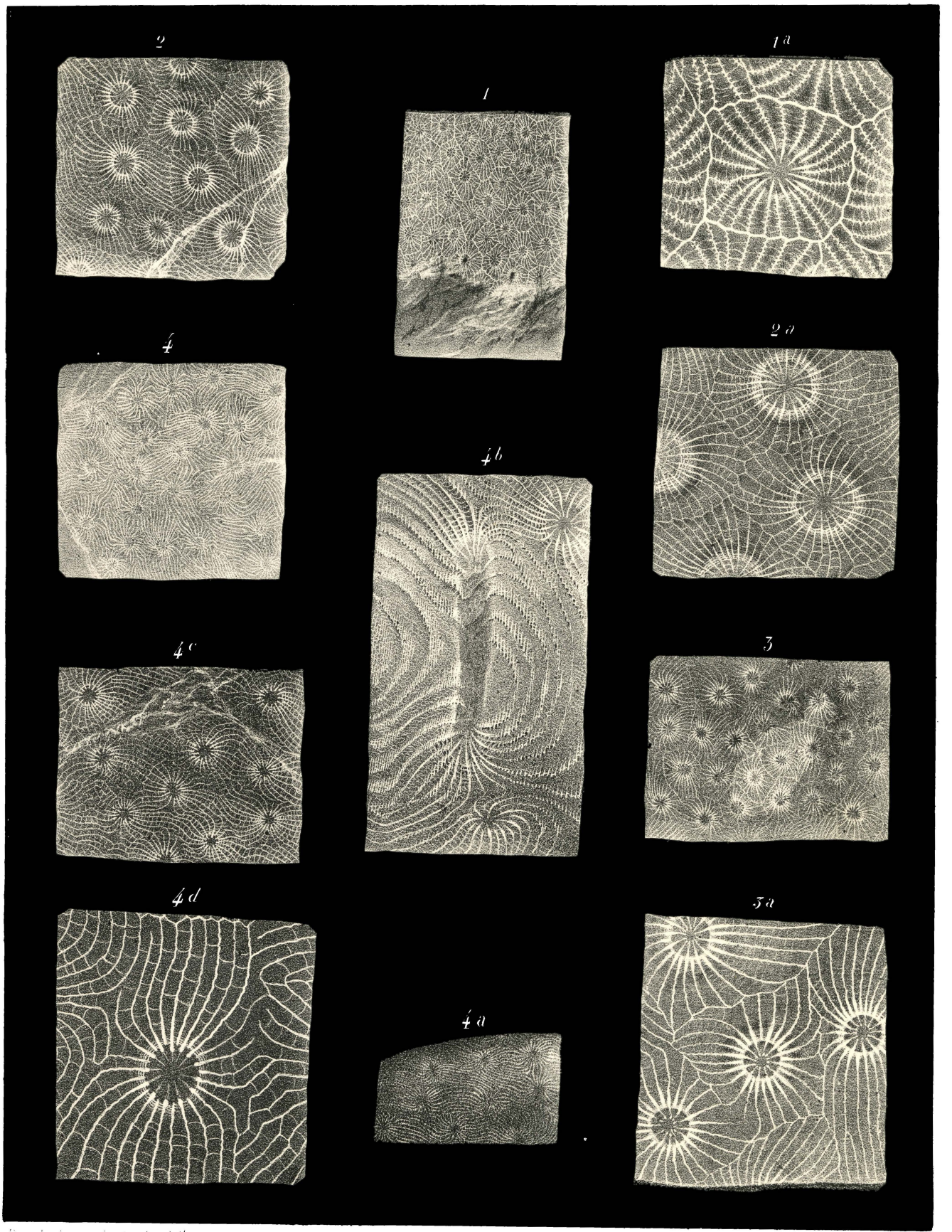
Fig. 4. Transverse section of a specimen from Teignmouth beach; natural size; (Dr. Battersby's collection).

4*a*. Another specimen from Torquay.

4*b*. An oblique section of a specimen from Torquay; somewhat magnified.

4*c*. Transverse section of another specimen from Torquay; natural size; (Dr. Battersby's collection).

4*d*. Part of the same slab, magnified.


2
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1a
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4b
2a
4c
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4d
4a
3a

TAB. LV.

CORALS FROM THE DEVONIAN FORMATION.

SMITHIA PENGELLYI (p. 241).

Fig. 1. Transverse section of a specimen from Torquay, belonging to Mr. Bowerbank; natural size.

1*a*. A part of the same, magnified.

1*b*. Another specimen, from the same locality.

SMITHIA BOWERBANKI (p. 241).

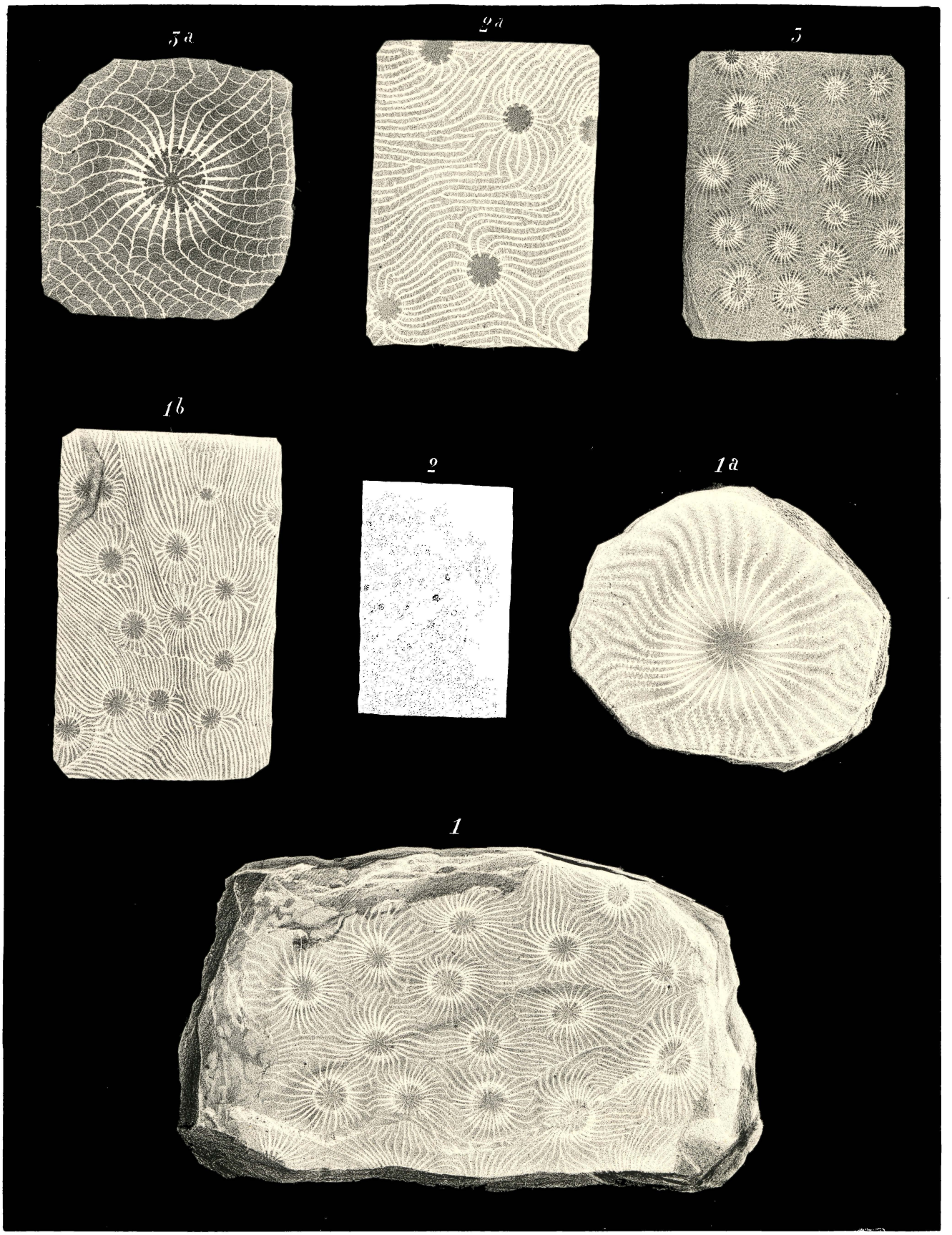
Fig. 2. A polished specimen from Torquay, belonging to Dr. Battersby; natural size.

2*a*. Part of the same, magnified.

SYRINGOPHYLLUM CANTABRICUM (p. 242).

Fig. 3. Transverse section of a specimen from Teignmouth, belonging to the collection of the Geological Society of London; natural size.

3*a*. Part of the same, magnified.


3 a
2 a
3
1 b
2
1 a
1

TAB. LVI.

CORALS FROM THE DEVONIAN FORMATION.

CYSTOPHYLLUM VESICULOSUM (p. 243).

Fig. 1. Side view of a coral from Torquay, belonging to Mr. Pengelly; natural size.

1*a*. A transverse section of another specimen from the same locality; natural size.

1*b*. Part of a vertical section of a specimen from Mudstone Bay, belonging to Dr. Battersby; natural size.

SPONGOPHYLLUM SEDGWICKI (p. 242).

Fig. 2. Transverse section of a specimen with thick walls, from Torquay; natural size.

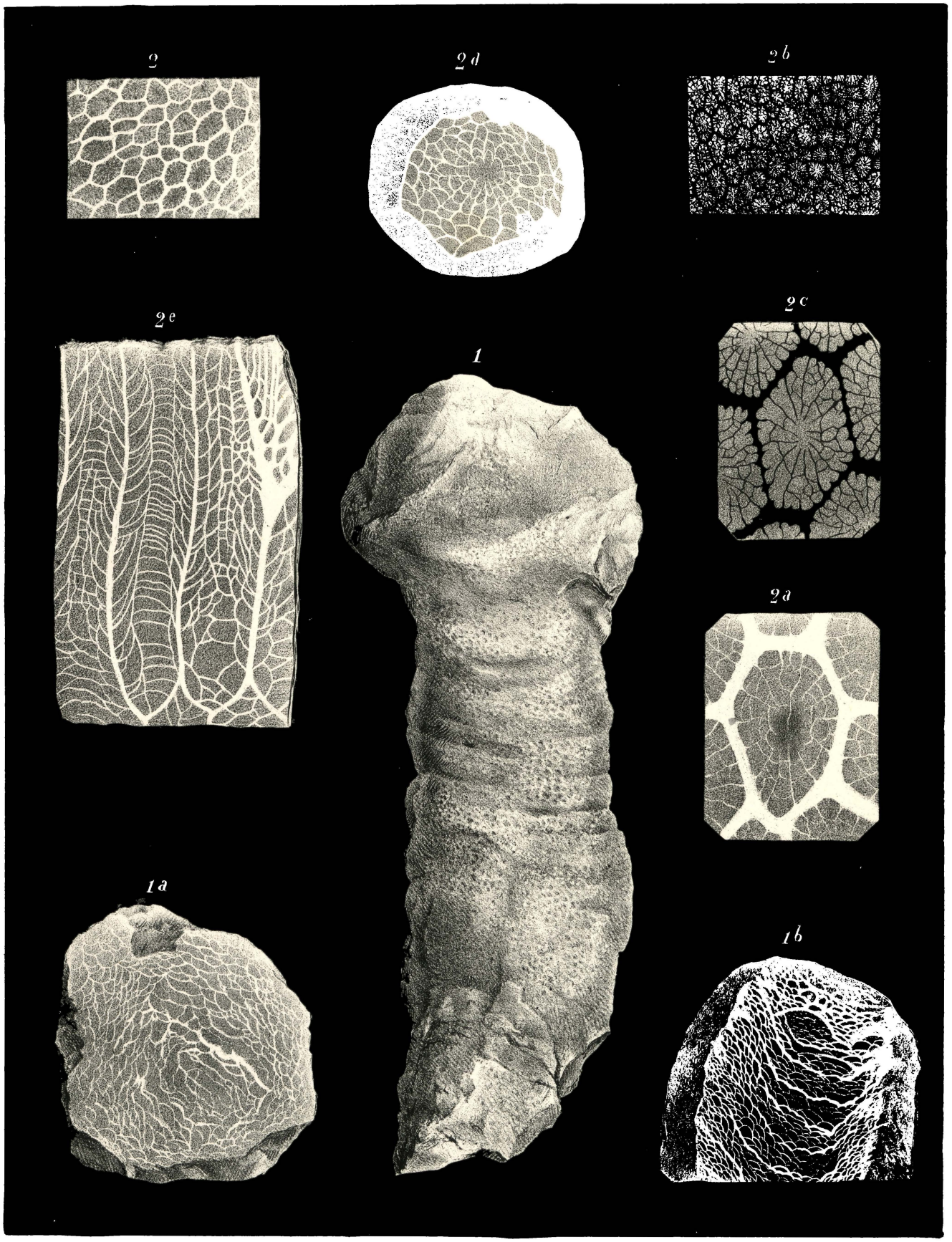
2*a*. Part of the same, magnified.

2*b*. Specimen with thin walls; natural size.

2*c*. Part of the same, magnified.

2*d*. Another specimen from Torquay, with walls still thinner, and the vertical dissepiments stronger than in the preceding ones, magnified.

2*e*. A vertical section magnified.



P. Parkinson ad nat. in lap. del.