



T H E
N A T U R A L H I S T O R Y
OF MANY CURIOUS AND UNCOMMON
Z O O P H Y T E S,

COLLECTED FROM VARIOUS PARTS OF THE GLOBE

BY THE LATE JOHN ELLIS, Esq. F. R. S.
SOC. REG. UPSAL. SOC.

AUTHOR OF THE NATURAL HISTORY OF ENGLISH CORALLINES,
AND OTHER WORKS.

SYSTEMATICALLY ARRANGED AND DESCRIBED

BY THE LATE DANIEL SOLANDER, M. D. F. R. S. &c.

WITH SIXTY-TWO PLATES ENGRAVEN BY PRINCIPAL ARTISTS

L O N D O N :

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T O

S I R J O S E P H B A N K S, B A R T.

P R E S I D E N T O F T H E R O Y A L S O C I E T Y, &c. &c. &c.

T H E L I B E R A L P A T R O N O F S C I E N C E, A N D T H E E N L I G H T E N E D C U L T I V A T O R O F
N A T U R A L K N O W L E D G E

T H E S E S H E E T S, C O N T A I N I N G A C O N S I D E R A B L E P A R T O F T H E O B S E R V A T I O N S
A N D D I S C O V E R I E S I N N A T U R A L H I S T O R Y, O F T H E L A T E

J O H N E L L I S, E S Q., F. R. S.

A R E, W I T H T H E S T R I C T E S T P R O P R I E T Y, A N D T H E M O S T P R O F O U N D R E S P E C T,

I N S C R I B E D B Y

H I S M O S T O B E D I E N T

A N D M U C H O B L I G E D S E R V A N T,

T H E D A U G H T E R O F T H E A U T H O R,

M A R T H A W A T T.

A D V E R T I S E M E N T.

THE Public have a claim on the Editor of the following sheets, to account for the imperfect state in which they now make their appearance; and, at the same time, it is hoped that a short account of the endeavours of the Author to promote so curious and laudable a study, will not be deemed an impertinent intrusion on the patience of the reader.

Mr. *Ellis*, having discovered that several subjects, which had been arranged by Natural Historians under the title of Marine Vegetables, were in reality Animal Productions, published, in the year 1755, the result of the researches he had made in the investigation of that branch of knowledge, in a quarto work intitled, “An Essay towards a Natural History of British and Irish Corallines.” The approbation with which this work was received, gained the Author the acquaintance and patronage of many of the most respectable characters of the age: and an innate desire to dive deeper into the hidden treasures of nature, induced him to make those inquiries which produced several Memoirs, which were read at different times before the Royal Society, and published in the Philosophical Transactions; particularly those “on the animal nature of *Zoophytes*, called *Corallina*,” and “the *Aetinia Sociata*, or *Clustered Animal Flower*,” in the 57th volume, which gained him the honour of Sir *Godfrey Copley*’s medal from that learned body, delivered to him by the President, Sir *John Pringle*, on the 30th of November, 1768, together with a most flattering compliment in a speech from the chair, on the nature and utility of the discoveries of the Author.

See the annexed List.

See the Speech annexed.

Thus encouraged, Mr. *Ellis* became more anxious in the pursuit of his favourite study; and being then the king’s agent for the province

vince of *West Florida*; and agent for the island of *Dominica*; and in correspondence and intimacy with the learned *Dr. Linnæus*, and the most celebrated natural historians of the age; he was enabled to collect information from the most distant countries, which he pursued with unremitting ardour; and with the assistance of his inestimable friends, *Dr. Fothergill* and *Dr. Solander*, he intended to have laid before the public a complete history of *Zoophytes*. In this, however, he was unfortunately disappointed; his declining health preventing him from proceeding farther than the completion of these plates, which were all engraven under his immediate inspection, some at his own expence, and more by the munificence of the late *Dr. Fothergill*, whose love of science and ample fortune induced him to promote the laudable designs of many, whom a more limited situation restrained from carrying their pursuits to the extent of their wishes.

For the arrangement of the descriptions we are indebted to *Dr. Solander*; whose premature death prevented this and other valuable works from appearing in so complete a manner as they would otherwise have done: since it must be universally allowed that the world suffered in *Dr. Solander*, the loss of one of the greatest Natural Historians ever known; while his more intimate friends deplore that of an invaluable member of society.

These are the circumstances under which the following sheets are now published, at the request of *Sir Joseph Banks*, Bart. P. R. S. who has thought the work not unworthy of his attention, and permitted it to be dedicated to him; and it is presumed, that, even in its present state, it will meet with a favourable reception, since it throws many new lights upon a subject hitherto but slightly investigated.

Mr. Ellis's fondness for Natural History was not confined to any particular branch. Botany was likewise to him a source of infinite amusement; which he endeavoured to render useful to society in general, but more particularly to the West India islands and *America*. The historical account of Coffee, published by him in 1774, was designed to encourage the consumption of that article,

raised

raised by the planters in the *West Indies*: while the accounts of the *Mangostan* and *Bread Fruit Trees*, with directions for conveying seeds and plants from the most distant parts of the globe in a state of vegetation, were published with a view to introduce those, and many other plants into our own settlements, where they might become beneficial to the public for the purposes of medicine, agriculture and commerce. And his active mind was constantly employed in devising means for promoting the welfare of society, until the time of his death, which happened on the 15th of October, 1776.

*Papers of JOHN ELLIS, Esq. read at the Royal Society, and printed in
the Philosophical Transactions.*

Vol. XLVIII.
p. 115.

OBSERVATIONS on a remarkable Coralline, in a Letter to the Rev. *Thomas Birch*, D. D. Sec. R. S. Read March 17th, 1753.

p. 305.

A Letter to Mr. *Peter Collinson*, F. R. S. concerning a Cluster-Polype, found in the Sea, near the Coast of Greenland. Read November 8th, 1753.

p. 504.

A Letter to Mr. *Peter Collinson*, F. R. S. concerning a particular Species of Corallines. Read February 7th, 1754.

p. 627.

A Letter to Mr. *Peter Collinson*, F. R. S. concerning the animal Life of those Corallines, that look like minute Trees, and grow upon Oysters and Fuci all round the Sea-coast of this Kingdom. Read June 13th, 1754.

Vol. XLIX.
p. 449.

An Account of a curious, fleshy, coral-like Substance; in a Letter to Mr. *Peter Collinson*, F. R. S. with some Observations on it, communicated to Mr. *Collinson*. Read January 22d, 1756.

p. 806.

A Letter to *Philip Carteret Webb*, Esq. F. R. S. attempting to ascertain the Tree that yields the common Varnish used in China and Japan; to promote its Propagation in our American Colonies; and to set right some mistakes which Botanists appear to have entertained concerning it. Read November 25th, 1756.

Vol. L.
p. 189.

An Account of a Red Coral from the *East Indies*, of a very singular Kind: In a Letter to Mr. *Peter Collinson*, F. R. S. Read March 24th, 1757.

p. 280.

Remarks on Dr. *Job Baster's Observaciones de Corallinis*, &c. In a Letter to the *Earl of Macclesfield*, President of the Royal Society. Read June 9th, 1757.

Au

- An Answer to the preceding Remarks. Read January 19th, 1758. P. 44.
- An Account of several rare Species of Barnacles : In a Letter to Mr. *Isaac Romilly*, F. R. S. Read December 21st, 1758. p. 845.
- An Account of some Experiments relating to the Preservation of Seeds : In two Letters to the *Earl of Macclesfield*, President of the Royal Society. Read January 18th, 1759. Vol. LI. p. 206.
- The Method of making Sal Ammoniac in *Egypt*; as communicated by Dr. *Linnaeus*, from his Pupil Dr. *Hasselquist*, who had been lately in those Parts. Read January 31st, 1760. p. 504.
- An Account of the Plants *Halefia* and *Gardenia*: In a Letter to *Philip Carteret Webb*, Esq. F. R. S. Read November 20th, 1760. p. 929.
- An Account of an *Encrinus*, or *Star-fish*, with a jointed Stem, taken on the Coast of *Barbadoes*, which explains to what Kind of Animal those Fossils belong, called *Star-stones*, *Asteriæ*, and *Astropodia*, which have been found in many Parts of this Kingdom : In a Letter to Mr. *Emanuel Mendez da Costa*, F. R. S. Read December 17th, 1761. Vol. LIII. p. 357.
- An Account of the Male and Female Cochineal Insects, that breed on the *Cactus Opuntia*, or *Indian Fig*, in *South Carolina* and *Georgia* : In a Letter to *Peter Wyck*, Esq. Read December 23d, 1762. p. 661.
- An Account of the *Sea Pen*, or *Pennatula Phosphorea* of *Linnaeus*; likewise a Description of a new Species of Sea Pen, found on the Coast of *South Carolina*, with Observations on Sea Pens in general. In a Letter to the Honourable *Cote Molefworth*, Esq. M. D. and F. R. S. Read December 22d, 1763. Vol. LVII. p. 419.
- An Account of an Amphibious Bipes. Read June 5th, 1766. Vol. LVII. p. 189.
- Observations upon Animals, commonly called Amphibious. Presented by Dr. *Parsons*, F. R. S. Read June 26th, 1766. p. 193.
- An Account of some peculiar Advantages in the Structure of the *Asperæ Arteriæ*, or Wind Pipes of several Birds, and in the Land Tortoise. Read June 9th, 1766. p. 204.
- Extract of a Letter from *John Ellis*, Esq. F. R. S. to Dr. *Linnaeus*, of *Upsal*, F. R. S. on the Animal Nature of the Genus of *Zoophytes* called *Corallina*. Read July 9th, 1767. Vol. LVII. p. 404.

p. 423.

An Account of the *Actinia Sociata*, or clustered Animal Flower, lately found on the Sea-coasts of the new-ceded Islands: In a Letter to the Right Honourable the *Earl of Hillsborough*, F. R. S. Read November 12th, 1767.

Vol. LVIII.
P. 75.

A Letter to the President, on the Success of his Experiments for preserving Acorns for a whole Year without planting them, so as to be in a State of Vegetation, with a View to bring over some of the most valuable Seeds from the *East Indies*, to plant for the Benefit of our *American Colonies*. Read March 10th, 1768.

Vol. LIX.
P. 138.

Observations on a particular Manner of Encrease in the *Animalcula* of vegetable Infusions, with the Discovery of an indissoluble Salt arising from Hemp-seed put into Water till it becomes putrid. Read May 28th, 1769.

Vol. LX.
P. 518.

A Copy of a Letter from *John Ellis*, Esq. F. R. S. to Dr. *Linnaeus*, F. R. S. &c. with the Figure and Characters of that elegant American Ever-green Tree, called by the Gardeners the *Loblolly Bay*, taken from Blossoms blown near *London*; and shewing that it is not an *Hibiscus*, as Mr. *Miller* calls it; nor an *Hypericum*, as Dr. *Linnaeus* supposes it; but an intire new Genus, to which Mr. *Ellis* gives the Name of *Gordonia*. Read December 20th, 1770.

p. 524.

The Copy of a Letter from *John Ellis*, Esq. F. R. S. to Mr. *William Aiton*, Gardener to her Royal Highness the Princess Dowager of *Wales*, at *Kew*, on a new Species of *Illicium Linnaei*, or Starry Anniseed Tree, lately discovered in *West Florida*. Read December 13th, 1770.

Vol. LXVI.
P. 1.

On the Nature of the *Gorgonia*; that it is a real Marine Animal, and not of a mixed Nature between Animal and Vegetable: In a Letter to *Daniel Solander*, M. D. F. R. S. Read June 29th, 1775.

Copy of the President Sir JOHN PRINGLE's Speech, November 30, 1768, on delivering Sir GODFREY COPLEY's Prize Medal to JOHN ELLIS, Esq. F. R. S. for his Papers on Natural History read to the Royal Society in 1767.

MR. ELLIS,

YOU have obliged the Public in general, and this Society in particular, Sir, with so many judicious experiments, and accurate drawings; so many acute reasonings, and ingenious observations; and so many valuable improvements in natural knowledge, that it has been difficult to determine which of them are best intitled to those marks of approbation which the will of the late Sir Godfrey Copley has directed and enabled us to confer by an honorary distinction—In public acknowledgment of the merit and consequential encouragement of the prosecution of such laudable studies.

You have opened such a wonderful view of some of the most extraordinary productions of nature, and have pursued your discoveries with so much sagacity and judgment, that you might have reason to expect many of these testimonies of your successful labours in Natural History, if it were customary to repeat them.

But as it has only been usual for the Council to single out some one or two in particular, I am directed by them to deliver this Medal to you, as an express testimony of their approbation of your excellent papers of the year 1767, on the animal nature of the genus of *Zoophytes*, called *Corallina*, and the *Actinia Sociata*, or Clustered Animal Flower, lately found on the sea-coasts of the new-ceded islands, now published in the Transactions for the year 1767.

It would be impertinent in me, Sir, to pretend to expatiate on the
nature

SIR JOHN PRINGLE'S SPEECH.

nature of your discoveries, and the consequences that flow from them ; because it is not in my power, nor perhaps in any one's, to explain them with as much clearness and distinctness as you yourself have done. Therefore, instead of making any weak efforts to do so, I will only refer Gentlemen to the perusal of your own accounts of them, in those communications which the Committee of Papers have judged most deservedly worthy of a place amongst the Transactions of this Society.

It only remains, therefore, to put the Medal into your hands, as the most public mark that the Council can give of their high sense of the great accession which natural knowledge has received from your most ingenious and accurate investigations.

A N
 A R R A N G E M E N T
 O F
 Z O O P H Y T E S.

I. ACTINIA.

Animal se affigens basi, carnosum, oblongum, teres, contractile, viviparum.

Os terminale, dilatabile, tentaculis cinctum.

Apertura præter os nulla.

Obs. Ex basi tubulosa repente interdum prolifera.

I have some doubt, whether the animal, which I have called *Actinia sociata*, or Cluster'd animal flower, pro-

ANIMAL FLOWER.

This animal fixes itself by its base; it is of a fleshy substance, and a roundish oblong form, capable of extending or contracting itself; it produces its young alive through its mouth.

The mouth, which is in the middle of the upper part, is capable of great extension, and is surrounded by rows of claws or tentacles.

It has no other opening but that.

Obs. It sometimes produces its young from a creeping tubulous base.

B perly

perly belongs to this genus, as it produces its offspring from an adhering tubulous base, and the construction of the inner parts upon dissection seem to differ from the rest. At present I shall rank it as a species, till future discoveries inform us better.

1. *Actinia Cereus.*

Sea Torchbistle.

Actinia tentaculis denudatis numerosissimis, corpore longitudinaliter sulcato.

This animal flower has many claws, which it cannot contract; the body of it is striated or furrowed lengthways.

Hydra tentaculis denudatis numerosissimis, corpore longitudinaliter sulcato. Gærtner Phil. Transf. Vol. 52. pag. 78. tab. I. fig. I.

This animal was found on the coast of Cornwall by my worthy friend Joseph Gærtner, M. D. F. R. S. and is described by him in the Philosophical Transactions.

The claws are of a beautiful seagreen color, ending at the points in a lively rose color; the disk or center of the claws and the body are of a brown color.

2. *Actinia Bellis.*

Sea Daisy.

Actinia calyciflora, tentaculis retractilibus variegatis, corpore verrucoso.

This animal flower has a head like the calyx of a flower, having many variegated claws, which it draws in. Its body is covered with little warts.

Hydra calyciflora, tentaculis retractilibus variegatis, corpore verrucoso. Gærtner Phil. Transf. Vol. 52. pag. 79. tab. I. fig. 2.

This

This was likewise found by Dr. Gærtner in Cornwall.

The stem is quite smooth, and inclining to a carnation color. The outside of the cup and body of the animal is marked with white protuberances or warts, and from a flesh color changes insensibly towards the border of the cup, first into purple, then into a violet, and at last into a dark brown. The feelers that surround the disk are almost transparent, and of different lengths and colors; some of them are of a pale ash color with brown spots, others of a chestnut color with white spots. The disk or upper part is formed like a star, composed of variegated rays of a beautiful mixture of brown, yellow, ash color and white.

3. *Actinia gemmacea.* *Studded Sea Star-flower.*

Actinia disciflora, tentaculis retractilibus subdiaphanis, corpore miliaribus glandulis longitudinaliter striato.

This animal flower has a disk surrounded by semitransparent claws, which it has the power of drawing in. Its body is striated lengthways with thousands of little glands.

Hydra disciflora, tentaculis retractilibus subdiaphanis, corpore cylindrico miliaribus glandulis longitudinaliter striato. Gærtner Phil. Transf. Vol. 52. pag. 82. tab. 1. fig. 4.

This is likewise one of Dr. Gærtner's from the coast of Cornwall, and only to be met with in the fissures of the rocks.

The color of the stem is of a pale red near the base, the rest of a yellow mixt with grey ash color. The glands of the middle row are white, the rest of the same color with the stem. The feelers are of a whitish color, varied at the

upper part with several cross lines and brown spots, of an irregular figure, like the backs of some snakes.

4. *Actinia Mesembryanthemum.*

Sea Fig-marygold.

Actinia disciflora, tentaculis retractilibus, extimo disci margine tuberculato.

This animal flower has a disk surrounded by claws, which it has the power of drawing in; the outward margin of the disk has a row of tubercles.

Hydra disciflora, tentaculis retractilibus, extimo disci margine tuberculato. Gærtner Phil. Transf. Vol. 52. pag. 83. tab. 1. fig. 5.

Dr. Gærtner remarks, that the color of this animal is always red in the summer, and then changes about the latter end of autumn to a dusky green or brown. The feelers or claws are of various colors, as red, blue, white, and even sometimes variegated, and the hemispherical tubercles often vary as much as the feelers in color.

I have taken notice of this as the most common of all the *Actinias*; it is to be met with almost on all the rocky coasts of this kingdom, particularly in great abundance on the rocks a little to the eastward of Brighthelmstone in Suffex; what I have seen there has been of the color of a liver, but at Hastings further to the eastward there are a great variety of species of *Actinia* not yet described, or very badly.

In these 4 *Actinias*, called Hydras by Dr. Gærtner, I have made use of his descriptions, as thinking them expressive of the subject, and only changed his name of *Hydra* to that of Dr. Patr. Browne of *Actinia*.

The 4 following species were sent to the Earl of Hillsborough, by Mr. Greg from Dominica. They were preserved in spirits, so that their color and true appearance, when alive, cannot well be known, which occasions their descriptions, particularly the three last, to be less exact.

5. *Actinia sociata.*

Clustered Animal flower.

TAB. I.
FIG. 1, 2.

Actinia tenuis, tubæformis, capitulo subglobofo tentaculato, ex tubulo carnosof adhbærenti prolifera.

This animal flower is of a slender make and trumpet shape, with a roundish head furnished with circles of claws; from its base are produced fleshy adhering tubes, and from thence its progeny arises.

TAB. I. FIG. 1. 2.

Actinia sociata. Ellis Phil. Transf. Vol. 57. pag. 436. tab. 19. fig. 1. 2.

Though I have had the clusters of this animal drawn erect on a rock, I am persuaded from the slenderness of their make, their situation would be more natural, if they were inverted.

Perhaps these may be the clusters of Waterbottles, which Hughes in his Natural History of Barbadoes, p. 296. mentions to grow to the uppermost part of the rock, where his animal flowers are found. The natural size of a cluster of this animal flower may be seen in Plate 1. fig. 1. At A, one of them is expanding its claws. Fig. 2. expresses one of them dissected lengthways, and magnified to shew the structure of the inside. B in fig. 1. is the beginning of a young one growing up out of the tube at the base.

6. *Actinia*

6. *Actinia Aſter.**Sea Star-flower with a ſmooth ſtem.**Actinia ſtirpe crassa, carnoſa, ſubcylindrica, lævi, truncata, tentaculis radiata.*

This animal flower has a thick, fleſhy, ſmooth and almoſt cylindrical ſtem, ending abruptly at the top, which is furniſhed with circular rows of tentacles.

Actinia Aſter. Ellis Phil. Tranſ. Vol. 57. pag. 436. tab. 19. fig. 3.

This was ſent by John Greg, Eſq. from the ceded Iſlands in the Weſt Indies, to the Earl of Hillsborough.

7. *Actinia Anemone.**Sea Anemone.**Actinia carnoſa complanata, diſco ſubhexagono tentaculis plurimis cincto.*

This animal flower is of a roundiſh compreſſed form, with a diſk inclining to fix angles, ſurrounded by many rows of tentacles.

Actinia Anemone. Ellis Phil. Tranſ. Vol. 57. pag. 436. tab. 19. fig. 4. 5.

This was likewiſe ſent from the Weſt Indies to the Earl of Hillsborough by J. Greg, Eſq.

8. *Actinia Helianthus.**Sea Sun-flower.**Actinia carnoſa complanata hypocateriformis, diſco rotundo tentaculis plurimis prædito.*

This animal flower is ſhaped like a falver, of a flat round form, ſurrounded by a very great number of tentacles.

Actinia Helianthus. Ellis Phil. Tranſ. Vol. 57. p. 436. tab. 19. fig. 6. 7.

The tentacles or claws of all these animal flowers, that were preserved in spirits, are greatly contracted.

This elegant one was likewise sent from the West Indies to the Earl of Hillsborough, by Mr. Greg.

9. *Actinia Dianthus.*

Sea Carnation.

Actinia lævis subcylindrica, disco quinquepartito foliaceo, tentaculis exiguis albis ornato, osculo elevato striato.

This animal flower is smooth and somewhat cylindrical in its stem. The disk or upper part is divided into 5 leaf-like figures, which are adorned with many minutewhite claws, that surround its mouth, which is elevated and striated.

Actinia Dianthus. Ellis Phil. Transf. Vol. 57. pag. 436. tab. 19. fig. 8.

I found this animal flower in plenty adhering to the under part of some rocks, opposite to the town of Hastings in Suffex; it hangs downwards, and has the appearance, when the tide is out, of a slender longstalked yellow fig: but being put into a glass vessel of salt water upon its base, it sinks down and exhibits this form, as it is expanding its feelers.

10. *Actinia Calendula.*

Sea Marigold.

Actinia stirpe subturbinata, disco tentaculis petaliformibus cincto.

This animal flower has a topshaped stem, and its disk surrounded by tentacles or claws, something like the petals of a flower.

TAB. I.
FIG. 3.

TAB. I. FIG. 3.

The

The Animal Flower. Hughes's Hist. of Barbadoes, pag. 293. tab. 24. fig. 1.

This animal flower is described by Hughes in his History of Barbadoes, and the figure represented in the plate is taken from thence.

Mr. Hughes observes, that these animals on being disturbed sink into holes; which is very different from the rest of this genus: besides, he says he observed four dark colored threads, something like the legs of a spider, rise out from the center of what he calls the flower, with a quick spontaneous motion from one side to the other of the circular border of leaves: these in reality, he says, were so many arms or feelers, closing together in imitation of a forceps, as if they had hemmed in their prey, which the yellow border soon surrounded and closed to secure.

From the foregoing description, the animal should seem rather to be a particular species of Tubularia, with its tube in the hole of the rock; but this must be left to future observations; at present we shall call it an Actinia.

II. HYDRA.

FRESH WATER POLYPE.

Animal basi se affigens, vagum, gelatinosum, lineare, nudum, contractile.

Os terminale, cirrhis setaceis cinctum.

Prolibus lateralibus (autumno ovis) deciduis.

This animal fixes itself by its base; it is gelatinous, linear, naked, can contract itself, and change its place.

Its mouth, which is at one end, is surrounded by hair-like feelers.

It sends forth its young ones from its sides, which drop off; but in the autumn it produces eggs from its sides.

Though

Though there are several species of this genus, I shall mention but two of them, and these differ but little from each other, which is chiefly in the number and length of their feelers.

I should not have introduced this genus, but that the knowledge of the properties of this animal tends greatly to illustrate the nature of Zoophytes in general; as this alone belongs to the fresh water, and all the others are inhabitants of the sea.

1. *Hydra fusca.* *Longarmed fresh-water Polype.*

*Hydra tentaculis suboc-
tonis longissimis.*

This fresh-water polype has very long arms, often 8 in number, and several times longer than its body.

Ellis Corallin. tab. 28. fig. C. (The claws are here shortened, for the conveniency of introducing them within the size of the plate.)

Hydra fusca. Linn. Syst. Nat. Ed. 12. pag. 1320.

2. *Hydra vulgaris.* *The common fresh-water Polype
of the ditches.*

*Hydra tentaculis lon-
gioribus subseptenis, cor-
pore lutescente postice at-
tenuato.*

This fresh-water polype has longish arms, generally about 7, which are twice as long as its body; it is of a yellowish color, and smaller towards the bottom.

Fresh-water Polype. Phil. Transf. Vol. 57. pag. 430.
tab. 19.

Hydra grisea. Linn. Syst. Nat. Ed. 12. pag. 1320.

In August 1770, I found several of this kind of fresh-water polype, which I kept for some months, and found that they send forth 12 claws when they are in perfection.

For a further description of this extraordinary animal, with the remarkable experiments on its reproduction when cut in pieces, I shall refer the reader to a most curious treatise, wrote particularly by Mr. Abraham Trembley, F. R. S. on this subject; and likewise in the introduction to my Essay on Corallines, the reader will find a short description of its properties; as also in my letter to the Earl of Hillsborough, in the 57th Vol. of the Philosophical Transactions, upon the Actinia Sociata.

III. FLUSTRA.

THE SEA MATT

Animal *affixum, raro tubulis radicalibus.*

Is an animal that grows on other bodies, and sometimes, but rarely, it adheres by little radical tubes to them.

Stirps membranacea foliacea, ex seriebus cellularum multifidis et divergentibus coalita, quasi contexta.

The stem is a membranaceous leaf-like substance, consisting of many rows of cells united together, which spread out as they grow, and divide into many parts; the whole surface having the appearance of being wove like a matt.

Cellulæ *ringentes, ca-*

It sends forth through the
pitula

pitula Hydriformia fundo adnata exserentes.

mouth-like openings of its cells, suckers or feelers, shaped like the fresh-water polype; these are fixt at the bottom of each cell.

Ovaria: *bullulæ supra cellulas.*

The ovaries appear to be the pearl-like studs, which we find at the tops of the cells.

This genus was formerly called Eschara, before Dr. Linnæus changed it to Flustra. The criticks find fault with him for altering the old name; for my part, I think he has done it very properly. The name of Eschara signifying the crust on the flesh that proceeds from the wound of a burn, a term used in surgery, and therefore improper: but Flustra, being derived from *φλοός*, teges, a matt, is more descriptive of the appearance of these substances, which look as if they were woven like matts, and therefore much better adapted.

Besides it was necessary to separate the membranaceous from the stony substances, both of which were formerly under the name of Eschara: otherwise we might as well rank the soft, spongy and fleshy substance, called Alcyonium digitatum, or Dead-man's toes, as a Madrepora, there being nothing but the difference of their component parts that prevents it; the Madrepora being stony, and the Alcyonium spongy.

I. Flustra truncata.

Square-top'd Sea Matt.

Flustra foliacea dichotoma, laciniis linearibus truncatis, tubulis radicalibus instructa.

This Sea Matt grows in a subdivided manner, with narrow square-top'd leaves; the base is furnished with adhering root-like tubes.

Fucus marinus scruposus albidus angustior compressus, extremitatibus quasi abscissis. H. Ox. 3. pag. 646. sect. 15. tab. 8. fig. 17. Ray's Synopf. pag. 43.

Narrow-leaved Hornwrack. Ellis Corallin. pag. 69. tab. 28. fig. a. A. B.

Flustra truncata. Linn. Syst. Nat. Ed. 12. pag. 1300.

This Sea Matt is common on the sea coasts of this kingdom. The cells open on both surfaces, and are placed back to back, like the cells in a honeycomb. They are of an oblong square shape, with a little helmet-like figure on the top of each. Their color varies from a pale yellow to a yellowish brown.

TAB. 2.
FIG. 8.

2. Flustra foliacea.

Broad-leaved Sea Matt.

Flustra foliacea ramosa, laciniis cuneiformibus rotundatis.

This Sea Matt grows in branches, that divide into wedge-shaped forms, rounded at the top.

TAB. 2. FIG. 8.

Fucus telam lineam sericamve textura sua æmulans. Ray's Synopf. pag. 42.

Broad-leaved Hornwrack. Ellis Corallin. pag. 70. tab. 29. fig. a. A. B. C. E.

Frustula foliacea. Linn. Syst. Nat. Ed. 12. pag. 1300.

This is very common on all our sea coasts.

I have given a figure a little magnified in Tab. 2. fig. 8. to shew its manner of fixing to shells, and growing up into the form of a plant: but I have more particularly described it in my Essay on Corallines, pag. 70.

The trunk near the base is remarkably fortified with several layers of the same kind of cells, which have grown up from the shell, and fixt themselves one over another,

to strengthen the animal against the violence of the waves ; which is very different from any thing in the growth of vegetables.

3. *Flustra pilosa.**Hairy Sea Matt.*

Flustra foliacea varie ramosa, poris setaceis. Sea Matt with irregular ramifications and hairy cells.

Irregular spongy foliaceous Coralline. Ellis Corallin. pag. 73. tab. 31.

Flustra pilosa. Linn. Syft. Nat. Ed. 12. pag. 1301.

This hairy Sea Matt is found frequently incrusting the smaller fucus's on these coasts, and now and then rising up into irregular leaf-like forms, with cells on both sides.

4. *Flustra papyracea.**Paper Sea Matt.*

Flustra papyracea utrinque cellifera, summitatibus securis aciei instar truncatis. Sea Matt like paper, with cells on both sides, having the tops of its branches formed like the edge of an axe.

The cells of this Sea Matt are of an oblong square figure, swelling out a little in the middle of each side. The openings of the cells are defended by a helmet-like figure ; from hence the polype-shaped suckers extend themselves. This Sea Matt is of a slender and delicate texture, like thin semitransparent paper, of a very light straw color.

It was first found on the coast of Suffex, adhering to a shell. I have since met, on the same coast, about Hastings, in the year 1765, with several specimens, whose tops
were

were digitated, and others that were very irregularly divided.

TAB. 3.
FIG. 6. 7.

5. *Flustra carbafea.*

Lawn Sea Matt.

Flustra foliacea dichotoma, cellulis uno strato dispositis.

Subdivided Sea Matt, like lawn, with a single layer of cells.

TAB. 3. FIG. 6. 7.

This Sea Matt has larger cells than any of this genus that I have met with; they are egg-shaped at the top, the lower part of the sides are a little contracted, they then end abruptly at the base. The walls that surround the cells seem to be formed of a very slender tube.

The figure here represented was drawn from a small specimen, sent me by the ingenious Dr. David Skene from Aberdeen: since which, I have received a more complete specimen from my worthy friend Mr. Parsons, M. B. professor of chemistry, at Christ Church College, in Oxford, who collected it at Leith, near Edinburgh; this is regularly dichotomous, and is of a brownish yellow color; the middle of the cells are almost transparent.

TAB. 4.
FIG. b.
B. B 1.

6. *Flustra bombycina.*

Silken Sea Matt.

Flustrafrondescens, frondibus obtusis dichotomis et trichotomis confertis radicantibus, uno tantum strato cellulosis.

This Sea Matt has very delicate thin leaves, divided here and there at the extremities, sometimes in two, sometimes in three parts, growing together in tufts, sending forth radical tubes, and having but one layer of cells.

TAB. 4. FIG. b. B. B 1.

This

This was brought from the Bahama Islands by Mr. Mark Cateby, F. R. S.

I have some elegant specimens from the East Indies, that approach very near to this kind, but they have no radical tubes, and their sides bend inwards.

7. *Flustra verticillata.*

Basketwork Sea Matt.

TAB. 4.
FIG. a.
A.

Flustra adnata, sepe frondescentis, frondibus linearibus subcompressis basi attenuatis, cellulis turbinatis ciliatis, seriebus altera super alteram dispositis.

This Sea Matt grows on fucus's, often sending out flattish linear branches, narrow at the base. These consist of rows of top-shaped ciliated cells, disposed in whirls, one row above another.

TAB. 4. FIG. a. A.

This elegant little Sea Matt I found growing on a red pennated cartilagenous fucus, called *Fucus Nereideus*, from the Mediterranean Sea.

The cells when magnified appear surrounded by sharp denticles, with a bristle situated in the front of each cell, bending inwards like a horn: the mouths of the cells incline forward, and their whole semi-transparent substance appears full of small points. I am indebted for this, among many other rare sea productions, to my ingenious and worthy friend Dr. John Fothergill, F. R. S.

8. *Flustra dentata.*

Toothed Sea Matt.

Flustra plano-foliacea adnata, hinc cellulis subovalibus nitidis, osculis dentatis inclinatis.

This Sea Matt grows upon fucus's; the cells compose one single layer: they are nearly oval, and of a shining color,
like

like pearl. Their little openings are furrounded by sharp teeth bending inwards.

Ellis Phil. Transact. Vol. 48. pag. 630. tab. 22. fig. 4.
D. Corallin. pag. 73. tab. 29. fig. D. D 1.

This Sea Matt, when magnified, has a white semi-transparent appearance, full of little dots or points. It is found adhering to fucus's and shells all round the coast of these kingdoms. It is always brightest when taken in the greater depths of the sea. There are frequently little helmet-shaped bullæ on the tops of the cells, which are supposed to be the ovaries.

The figure at D. in tab. 22. vol. 48. Phil. Transf. was drawn for me by Mr. G. D. Ehret, F. R. S. when we were at Brighthelmstone, in Suffex, while it was alive in sea-water, in June 1754. Here the figures of the polypes are exactly represented as they appeared through the microscope.

9. Flustra bullata.

Studded Sea Matt.

Flustra adnata, cellulis ovatis extantibus albis, ofculis rotundis, spinulis armatis.

Sea Matt with projecting white egg-shaped cells, having little round mouths, armed with small spines.

Ellis Corallin. tab. 30. fig. d. D.

I have often met with this little Sea Matt upon fucus's, both on the coast of Suffex and Cornwall. Sometimes it is found furrounding their stems, at other times spread on their leaves.

10. Flustra arenosa.

Sandy Sea Matt.

Flustra crustacea arenosa lutosa, poris simplicibus subquincuncialibus.

This Sea Matt is formed of sand and slime into a crustaceous body, with small mouths placed almost in a quincunx order.

English sandy Millepora. Ellis Corallin. pag. 74. tab. 25. fig. e.

This sandy Sea Matt, of which but a small part is drawn at fig. e. tab. 25. Essay on Corallines, was sent me from Holyhead, in Wales.

Its form, when intire, was exactly like the upper semi-circular part of a colt's hoof. The surface of each of the cells was a little hollow in the middle, with a small hole in each : from the appearance it made, when I received it intire, I judged it to be what Imperatus calls his *Lorica Marina*.

There is a layer of sand and slime under as well as over the cells which compose it. It is very friable when dry.

Whether it belongs to this genus or not, I submit to the curious.

11. Flustra tubulosa.

Pipy Sea Matt.

Flustra adnata membranacea, cellulis simplicibus ovato-oblongis, osculis tubulosis erectis.

Membranaceous adhering Sea Matt, with a single layer of oblong-oval cells, and a tubulous erect opening to each.

This Sea Matt was sent by Mr. Greg, among many other curious sea productions, from Dominica, adhering to a fucus, and differs from all the rest of this genus, in

having a tubulous mouth to each of its cells. The whole is of a deep yellowish semi-transparent color, and of a membranaceous texture.

12. *Flustra membranacea.*

Chagrin Sea Matt.

Flustra plano-foliacea indivisa adnata, hinc cellulis quadrangulis oblongis, ad angulos superiores prominulis, mucronatis.

Membranaceous adhering Sea Matt, with oblong quadrangular cells, pointed at the upper projecting angles.

Flustra membranacea. Linn. Syft. Nat. Ed. 12. pag. 1301.

This Sea Matt was brought from Weymouth, in Dorsetshire, and was found adhering to the *Fucus digitatus*.

There are dispersed here and there, at regular distances over the surface, little transparent, short, erect tubes; but to what use I shall not pretend to determine, unless they are the ovaries.

IV. C E L L A R I A.

CELLEFEROUS CORALLINE

Animal *crescens plantæ habitu.*

Is an animal growing in the form of a plant.

Stirps crustacea, lapidescens, e cellulis seriatis composita, plerumque ramosa et articulata, tubulis adhærens.

The stem is crustaceous, inclining to stone, composed of rows of cells, for the most part jointed and branched, adhering by little tubes.

Capitula polypiformia e poro vel osculo singulæ cellulæ exserens.

It sends forth polype-like suckers from the little openings of each of its cells.

Ovaria

Ovaria incerta, nisi bullulas supra cellulas vocamus, quæ in nonnullis speciebus extant.

The ovaries are uncertain ; but most probably the little hemispherical covers, that appear over the cells, do that office.

Linnæus, in a note at page 1315 of his System of Nature, Ed. 12. remarks, that the vesicles which we observe in the ivory-tufted Celleferous Coralline, and in the Goat's-horn Coralline, seem to unite this genus in a natural order to the Vesicular Corallines.

This genus has likewise an affinity to those Flustras or Sea Mats that have but one layer of cells, particularly the Cellaria avicularia, or Bird's-head Coralline, where there are several rows of cells united together in one single layer.

In this species, and in the Cellaria ciliata, or Ciliated Celleferous Coralline, they have something singular projecting from their cells, which is little figures not unlike birds heads, particularly the former, the use of which is not yet known. In this species I have observed in the microscope while it was alive, in a watch-glass full of seawater, these birds heads opening and shutting their beaks all the time that the polypes were extending and contracting themselves in their cells.

The arrangement of the cells of the Cellaria loriculata, or Coat of Mail Coralline, obliges me to consider the Cellaria farciminoïdes, or Bugle Coralline, as belonging to this genus ; because the Cellaria loriculata has its cells placed back to back, which has the appearance of tending to the roundness of the Bugle Coralline.

I had formerly ranged the Bugle Coralline with the articulated Corallines : but the shape and disposition of the

cells, together with the radical tubes, bring it nearer to this genus. And yet both this and the *Cellaria Cereoides*, or Torchthistle Coralline, when they grow old, differ from the rest of this class; for then we see them approaching towards the genus of *Millepora*, by having additional ranges of cells surrounding their first cells, especially the former.

In my observations on this genus I cannot pass over the singularity of the *Cellaria neritina*, or Snail-bearing Coralline. The likeness to Nerits of its rows of little round adhering bodies, which are open on one side, together with their shell-like figure and pearly shining look, inclined me to believe at first that they were the young ones of such a small kind of shell-fish. But by comparing them with the figures of others of this genus, they appear rather to be what we have called Ovaries.

Or perhaps they are the young of the animal defended by a testaceous covering like a little shell-fish, which at the time of its maturity separates from its umbilical chord, by means of which the microscope discovers to us, that it has been connected to its cell, from whence it drops and soon adheres to a proper substance as a base, beginning to form a Coralline like the parent animal.

This seems more probable, than to consider each of them as an ovary, which usually contains many eggs of the same animal.

A late writer, who is a strong advocate for the vegetation of Zoophytes, supposes these little pearl-like figures, as also those like the heads of birds in the Bird's-head Coralline (or *Cellaria avicularia*) to be their Nectariums, analogous to what is so called in the flowers of some plants.

In some well preserved specimens of this species of Coralline, collected at the Bahama Islands by the Rev. Mr. Clarke, I have observed something very like testaceous little bodies at the extremities of their radical tubes: from these bodies the tubes have crept along till they have been properly fixt. The Coralline then begins to grow erect, and the polypes appear in the cells; after this the eggs or young ones appear, one at the side of each cell; it is then perfect. I have mentioned these three stages of the Coralline, because I think them something analogous to the different changes in most insects. In the Zoophyte, the various states are all connected together at length; but in the insect, these different states are brought about by different changes of the exterior surface of the same body.

I must, before I conclude these remarks, observe, that the advocates for vegetation in these bodies, call the wrinkled adhering tubes at the base, roots: but they should examine them strictly, and they would find them meer cylinders, and that they do not grow smaller towards their extremities, which is evidently the case with the roots of vegetables.

1. *Cellaria plumosa.*

Soft-feathered Celleferous Coralline.

Cellaria cellulis unilaterialibus alternis extrorsum acutis, ramis dichotomis erectis fastigiatis.

Celleferous Coralline with alternate sharp-pointed cells, looking one way, and ending at top in dichotomous branches.

Soft-feathered Coralline. Ellis Corallin. pag. 33. tab. 18.

Sertularia fastigiata. Linn. Syst. Nat. Ed. 12. p. 1314.
2. *Cellaria*

2. *Cellaria neritina.**Snail-bearing Coralline.*

Cellaria dichotoma ferruginea, cellulis alternis unilateralibus extrorsum mucronatis, ovulis subtestaceis nitidis interjectis, osculis margine subfusco cinctis.

This Coralline is of a reddish brown color and dichotomous, with alternate pointed cells, looking one way; having a little egg on the outside of each, with an opening surrounded by a dark-colored margin.

Ellis Phil. Transf. Vol. 48. pag. 115. tab. 5. fig. a. A. Corallin. pag. 35. tab. 19.

Sertularia neritina. Linn. Syft. Nat. Ed. 12. p. 1315.

3. *Cellaria avicularia.**Bird's-head Coralline.*

Cellaria latiuscula dichotoma erecta, cellulis unilateralibus alternis bifetis, ore galeato, appendiculis instar avium capitum marginalibus.

This cellediferous Coralline is somewhat broad, dichotomous, and erect: the cells are alternate and look one way, having a helmet-like figure over the opening, with two little spines on the top of each: on the outward margin of each is a little figure like a bird's head.

Bird's-head Coralline. Ellis Corallin. pag. 36. tab. 20. No. 2. fig. a. A.

Sertularia avicularia. Linn. Syft. Nat. Ed. 12. pag. 1315.

4. *Cellaria*

4. *Cellaria reptans.* *Creeping Celleferous Coralline.*

Cellaria repens dichotoma articulata, cellulis alternis unilateralibus, ofculis bifetis.

This creeping celleferous Coralline has dichotomous jointed branches, with its cells facing one way and placed alternately; their mouths have two little bristles.

Creeping Coralline. Ellis Corallin. pag. 37. tab. 20. No. 3. fig. b. B.

Sertularia reptans. Linn. Syst. Nat. Ed. 12. p. 1315.

This celleferous Coralline is very common on the English coast, and is generally found adhering to shells and fucus's.

There is one thing very remarkable in the radical tubes, by which some of this species adhere, and that is little hooks disposed along the sides of them, like those in briars. See fig. F. in plate 20. Essay on Corallines. This is very different from the roots of vegetables.

5. *Cellaria scruposa.* *Stony Angular-celled Coralline.*

Cellaria repens lapidosa dichotoma, cellulis angularis alternis unilateralibus.

This creeping celleferous Coralline is stony and dichotomous, having alternate cells looking one way, with an angle projecting on the outward side of each.

Creeping stony Coralline. Ellis Corallin. pag. 38. tab. 20. No. 4. fig. c. C.

Sertularia scruposa. Linn. Syst. Nat. Ed. 12. p. 1315.

6. *Cellaria*

6. *Cellaria ciliata.**Ciliated Celleferous Coralline.**Cellaria cellulis alternis ciliatis, ore obliquo patulo, ramis dichotomis erectis.*

This Coralline has alternate cells; the mouth of each is spread open and oblique; the branches are erect and dichotomous.

Ciliated Coralline. Ellis Corallin. pag. 38. tab. 20. No. 5. fig. d. D.*Sertularia ciliata.* Linn. Syft. Nat. Ed. 12. p. 1316.7. *Cellaria eburnea.**Tufted Ivory Cell. Coralline.**Cellaria cellulis alternis truncatis prominulis, ovariis gibbis rostratis, ramis articulatis patulis.*

This Coralline has alternate truncated cells, a little prominent, with roundish ovaries, that have a tubular opening on one side; the branches are spreading and jointed.

Tufted Ivory Coralline. Ellis Corallin. pag. 39. tab. 21. No. 6. fig. a. A.*Sertularia eburnea.* Linn. Syft. Nat. Ed. 12. p. 1316.8. *Cellaria loriculata.**Coat of Mail Cell. Coralline.**Cellaria cellulis oppositis oblique truncatis, ramossissima dichotoma articulata.*

This Coralline has its cells in pairs placed back to back, and opening oblique each way; it is very much branched; the branches are dichotomous and jointed.

Coat

Coat of Mail Coralline. Ellis Corallin. pag. 40. tab. 21. No. 7. fig. b. B.

Sertularia loriculata. Linn. Syst. Nat. Ed. 12. p. 1314.

9. *Cellaria Bursaria.* *Shepherd's-purse Cell. Coralline.*

Cellaria ramosa articulata, cellulis oppositis pellucidis carinatis, tubulo adnato subclavato auctis.

This Coralline is branched and jointed, and has opposite transparent keel-shaped cells, with a little tube, swelling at top like a tobacco-pipe, that appears to come out of them.

Shepherd's-purse Coralline. Ellis Corallin. pag. 41. tab. 22. No. 8. fig. a. A.

Sertularia Bursaria. Linn. Syst. Nat. Ed. 12. p. 1314.

10. *Cellaria cornuta.* *Goat's-horn Cell. Coralline.*

Cellaria vesiculifera ramosa articulata, cellulis simplicibus tubulosis curvatis altera super alteram, setâ ad osculum longissimâ.

This Coralline, which bears vesicles, is branched and jointed; it has single tubulous crooked cells arising out of each other, with a long bristle at the mouth of each.

Goat's-horn Coralline. Ellis Corallin. pag. 42. tab. 21. No. 10. fig. c. C.

Sertularia cornuta. Linn. Syst. Nat. Ed. 12. p. 1316.

11. *Cellaria chelata.* *Bull's-horn Cell. Coralline.*

Cellaria ramosa, cellulis simplicibus corniformibus

This Coralline is branched, having its cells shaped like
E *concatenatis*

concatenatis, ore marginato. horns, disposed like links together, with a margin round the mouth of each.

Bull's-horn Coralline. Ellis Corallin. pag. 42. tab. 22. No. 9. fig. b. B.

Sertularia loricata. Linn. Syft. Nat. Ed. 12. p. 1316.

12. *Cellaria anguina.* *Snake's-head Cell. Coralline.*

Cellaria cellulis simplicissimis, tubulis obtusis clavatis, apertura laterali. This Coralline has only single cells, of a blunt tubular club-shape, with an opening on one side.

Snake Coralline. Ellis Corallin. pag. 43. tab. 22. No. 11. fig. c. C. D.

Sertularia anguina. Linn. Syft. Nat. Ed. 12. p. 1317.

13. *Cellaria farciminoidea.* *Bugle Cell. Coralline.*

Cellaria articulata dichotoma, articulis subcylindricis, cellulis rhombeis obtectis. This Coralline is jointed and dichotomous; the joints are almost cylindrical, and covered on all sides with lozenge-shaped cells.

Bugle Coralline. Ellis Corallin. pag. 46. tab. 23.

Tubularia fistulosa. Linn. Syft. Nat. Ed. 12. pag. 1302.

TAB. 5. 14. *Cellaria cereoides.* *Torchbistle Cell. Coralline.*

FIG. b.

B. C. D.

E.

Cellaria articulata ramosa, articulis subcylindricis, This Coralline is jointed and branched, with joints almost
cis,

cis, osculis cellularum un-
dique prominulis.

cylindrical. The little mouths
of its cells on all sides are a
little prominent.

TAB. 5. FIG. b. B. C. D. E.

This erect cellular Coralline is about three inches high ; the larger joints are about three quarters of an inch long, of a dirty white color, and of a stony coral-like substance. It grows in erect tufts, irregularly joined together : the joints are united by little wrinkled tubes : these tubes frequently grow out of one of the cells on the side of the joints ; and it is particularly remarkable, that from the end of some of the tubes so situated, a joint grows full of cells, which are placed both above and below the tube, so that the joint, with its cells, is supported intirely by the little tube in the middle. This joint, thus suspended by the tube, is represented at fig. C. tab. 5. where it is magnified, with the upright and cross section E. and D.D. to shew the situation of the cells.

This was brought from Algiers, on the coast of Africa, in the Mediterranean Sea, and presented to me by Gustavus Brander, Esq.

15. *Cellaria tulipifera.*

Tulip Cell. Coralline.

TAB. 5.
FIG. a.
A.

Cellaria stirpe articu-
lata lapidea subdiaphana,
articulis clavatis, cellulis
ternis dentatis connexis ex
apicibus articularum exe-
untibus, et sæpe terminan-
tibus.

This Coralline has a semi-transparent, jointed, stony stem. The joints are club-shaped. From the upper part of the joints arise three little den- tated cells united together ; these are placed opposite to one another, and often at the end of the stem.

TAB. 5. FIG. a. A.

This elegant little celleferous Coralline grows on the *Fucus minimus denticulatus triangularis* of Sloane's History of Jamaica, tab. 20. vol. 1. and fastens itself by little adhering radical tubes. It is scarce half an inch high, but most beautifully formed, of a perfect white enamel. The three little tubular cells are so combined as to give a tolerable representation of a tulip. The fig. A. tab. 5. shews the magnified appearance of it, and fig. a. a. a. the natural size as it grows on the fucus.

It is found on this fucus near most of the West-India islands.

TAB. 4.
FIG. c.
C.

16. *Cellaria Flabellum.*

Cellaria lapidea articulata ramosa dichotoma, articulis subcuneiformibus unilaterè cellulosis.

Fan Cell. Coralline.

This Coralline is jointed, and of a stony consistence, having its branches regularly subdivided. The joints are almost wedge-shaped, and full of cells on one side.

TAB. 4. FIG. c. C.

This is one of the most elegant Corallines of this tribe: it is about two inches high, and is found in tufts, sending out many little tubes by which it adheres. Its milk-white cells being disposed in a flat and regular subdivision of its branches, gives it the appearance of so many little fans. The back-part of the joints are convex and striated, but the fore-part, where the mouths of the cells are, is flat. There are three rows of cells in each joint, two cells in each of the two lower rows, and three cells in the uppermost.

This

This was first discovered by Mr. Catesby in the Bahama Islands. I have seen a sort from the East Indies something like this, but the joints are curved and bent inwards at the sides: besides, they are longer in proportion, having a greater number of cells in each joint, which are disposed in two rows lengthways, and alternately placed with respect to one another; so that it is a different species from the American one.

Fig. c. and c 1. shew the natural size of both sides of the Celleferous Fan Coralline, and C. and C 1. the magnified appearance of the same.

17. *Cellaria cirrata.*

Curled Cell. Coralline.

TAB. 4.
FIG. d.
D.

Cellaria lapidea articulata ramosa dichotoma incurvata, articulis subciliatis, ovato-truncatis, unilaterale planis, celliferis.

This Coralline has jointed stony curled branches, regularly subdivided. The joints are a little ciliated, egg-shaped, and flattish at top; full of cells, and level on one side.

TAB. 4. FIG. d. D.

This beautiful little Coralline is about two inches high. It rises from a stem, formed of many pale-yellow little tubes, and looks like a bunch of curls of a cream color. It is formed of joints full of stony cells, which are connected together by flexible tubes. The back of the cells is striated and convex, the front is flat: on the sides of the joints are little hooked spines, and at the top a few small hairs. There are two rows of cells in each joint, three in the upper row and two in the under; the openings are oval.

I am indebted to Dr. John Fothergill for this specimen: he received it from the East Indies.

Fig. d. is the natural size, and D. and D1. the magnified figure of a piece of it.

18. *Cellaria ternata.*

Three-celled Cell. Coralline.

Cellaria ramosa dichotoma articulata repens, articulis angulatis subturbinatis, cellulis ternis unilateralibus.

This Coralline is branched, dichotomous, jointed, and creeping; the joints are nearly top-shaped, with angles at their sides; they have three cells in the front of each.

This little Coralline, which is of a stony semi-transparent nature, was sent from Aberdeen by the ingenious Dr. David Skene.

V. TUBULARIA.

PIPE CORALLINE.

Animal *tubulosum, corneum, simplicissimum, vel ramosum, gelatina viva præditum, habitu plantæ crescens, basi affixum; apice capitulum, tentaculorum duabus seriebus ornatum, sustinens; una medium cingens, altera ex ore sese exserens.*

This Pipe Coralline is an animal with a horny tube, or one branched into many, full of a living gelatinous substance, fixed by its base, and growing in the shape of a plant. On the top of these tubes are little heads furnished with two rows of claws: one row surrounds the middle of the heads, and the other is placed round the mouth.

Ovaria

Ovaria inter tentacula inferiora. The ovaries appear among the lower range of claws.

This genus approaches very near to the *Serpula* with its animal *Nereis*, especially those with single stems. I have never yet seen any more than the three following species, that belong properly to this genus.

1. *Tubularia indivisa.* *Oaten-pipe Coralline.*

Tubularia tubulis simplicissimis aggregatis, sursum leviter dilatatis, basi attenuatis implexis. This Pipe Coralline, with single tubes growing in clusters together, is wider upwards and narrower below, where they are interwoven one with another.

Tubular Coralline like oaten pipes. Phil. Transf. Vol. 48. tab. 17. fig. D. Ellis Corallin. pag. 31. tab. 16. fig. c.

Tubularia indivisa. Linn. Syst. Nat. Ed. 12. p. 1301.

2. *Tubularia Larynx.* *Pipe Coralline, like the wind-pipe.*

Tubularia tubulis simplicibus aggregatis, hinc inde annuloso-rugosis inferne attenuatis. This Pipe Coralline has many single tubes, wrinkled here and there, growing in clusters together, and are narrower at the bottom.

Tubular Coralline wrinkled like the wind-pipe. Phil. Transf. Vol. 48. tab. 17. fig. C. Ellis Corallin. pag. 30. tab. 16. fig. b.

Tubularia muscoides. Linn. Syst. Nat. Ed. 12. p. 1302.

3. Tubularia ramosa. *Branched Pipe Coralline.*

Tubularia tubulis ramosis, axillis ramulorum contortis. This Pipe Coralline is branched, and the infertions of the branches are twisted.

Small ramified tubular Coralline. Ellis Corallin. pag. 31. tab. 16. fig. a. tab. 17. fig. a. A.

Tubularia ramosa. Linn. Syst. Nat. Ed. 12. p. 1302.

I have often met with specimens of this Coralline that have been regularly branched in a doubly pinnated form; and when I was at Emfworth, on the borders of Suffex, I found a specimen of this Tubularia, with its ovaries placed in a circle round the lower part of its heads.

VI. SERTULARIA. VESICULAR CORALLINE.

Animal polycephalum, crescens habitu plantæ, basique affixum.

Stirps tubulosa, cornea, denticulis calyciformibus obfita, medullæ animalis continua capitula polypiformia emittentibus.

Ovaria: vesicule singulares, polypos majores, ova vel prolem vivam continentes.

This is a many-headed animal, growing in the shape of a plant, and fixt by its base.

Its tubulous horny stem is full of cup-shaped denticles, through which proceed little heads in the form of polypes, from the gelatinous medullary part, which is continued through the infide.

The ovaries are little bladders, either containing a larger kind of polype-head, which sends forth clusters of eggs, or (in other species) the young ones already formed and alive.

In

In my Essay on Corallines, page 32, I have taken notice that the branched tubular Coralline was like the Hydra, or fresh-water Polype; but with this difference, that on account of its exposed situation in the sea, nature had clothed it with a horny skin. And in this genus of Sertularia, nature has been still more favourable in providing little cup-like denticles to secure their many tender heads safe, when they are drawn in upon any alarm of danger; whereas the heads of the tubular Corallines have no such protection, for which reason they are not so often found in the turbulent parts of the ocean as in sheltered recesses of harbours.

It is well known, that the young of shell-fish are produced with the shell upon them; the young sea polypes have also their proper horny covering on, so that the following observations will appear agreeable to truth. The young animal discharged from its ovary adheres by its base, and with its claws quickly procures nourishment sufficient to increase its bulk: by this means, then, the stem advances, and many more heads with their claws come forth, and stretch themselves out for food; this causes a further increase of nourishment to be drawn in by these additional active organs, which circulates through the whole animal, and enables it, agreeable to the order of nature, to send forth from its base creeping adhering tubes full of the same living medullary substance with the rest of the body. These tubes not only secure it from the motion of the waves, but likewise from these rise other young animals or Corallines, which growing up like the former, with their proper heads or organs to procure food, send out other adhering tubes from below, with a further increase of these many-headed branched animals; so that in a short time a whole grove of vesicular Coral-

F lines

lines is formed, as we find them on oysters and other shell-fish, when we drag for them in deep water. Nothing can explain this extraordinary and wonderful proceeding of nature so clearly, of an animal produced by suckers like a plant, as the instance I have already given in the Philosophical Transactions, vol. 57. p. 436. of the increase of the clustered Animal Flower, or *Actinia sociata*, where the animal and its organs are large enough, without the assistance of a microscope, to convince us of the truth of this surprizing fact; and yet these organs are totally different from those of a plant. Here then we see branched animals formed as insects are, with a horny sheath to cover them, which answers the purpose of bones, while the softer parts are contained in the inside. When we view the different manner and various forms in which these Sertularias grow, we shall still find that, notwithstanding their external appearance, they all agree in the general character of this genus.

Some send out but few and short tubes from their base, and rise up into firm stiff single stems, growing thicker and also broader at their bottom as they grow old; such as we may observe in the *Sertularia argentea*, or Squirrel's-tail Coralline, *S. Thuja*, or Bottle-brush Coralline, *S. abietina*, or Sea-fir Coralline, and *S. Pinafter*, or Sea-pine Coralline, and many others. Some arise from little tubes ramified like a sponge; these enter into, and compose large stems, as in the *Sertularia antennina*, or Lobster's-horn Coralline, and the *S. Myriophyllon*, or Pheasant's-tail Coralline. Some send out tubes more remote, from whence arise shorter and more distant branches, as the *Sertularia pumila*, or Sea-oak Coralline, and the *S. geniculata*, or Knotted sea-thread Coralline: but the most singular are those which, from a congeries of little tubes, form stems and branches, not
1
unlike

unlike the outward appearance of the Gorgonias, such as the *Sertularia verticillata*, or Horse-tail Coralline; the *S. spinosa*, or Silk Coralline; the *S. halecina*, or Herring-bone Coralline; and the *S. frutescens*, or Shrubby Coralline; these seem to form the first or leading stem as a support for the next to climb up, so that in some old stems, particularly of the Herring-bone Coralline, I have observed the inner tubes of their stems have been rotted and destroyed, by being inclosed by so many others on their surface. See page 18, Essay on Corallines.

Some writers seem at a loss to account for the growth of these kind of Sertularias, whose stem and branches are thus composed of many capillary tubes, and therefore are of opinion, that their manner of vegetating is obscure, and that probably they grow not only in length and thickness, but likewise in substance and number of tubes, as plants do.

In order to account for the tubes sticking together, they suppose that they are provided with an intermediate substance, by which some are slightly glued together, others rendered more compact, and some even become solid and hard.

But it appears evidently on examination, that this gelatinous substance is common to all the genus, and is no other than what the radical parts of them all possess in common, in order to adhere firmly to their several stations.

So that instead of these radical tubes lying horizontally, and adhering in lines like the *Sertularia pumila*, or Sea-oak Coralline, on its fucus, and many others after the same manner, they raise themselves up from their bases (where these little tubes are first fixed) and support one another by this natural gluten in an erect form, making a stem

out of the continuation of these radical parts: from this stem so formed proceed their branches, furnished with denticles and polype-like heads, as we may observe in Phil. Transf. Vol. 47. tab. 17. fig. G. where there is a magnified representation of the *Sertularia halecina*, or Herring-bone Coralline, drawn as it was alive in sea-water.

1. *Sertularia tamarifca.* *Sea-Tamarisk Coralline.*

Sertularia alternatim ramosa, denticulis oppositis tubulosis crenatis, ovariiis ovato-truncatis bidenticulatis, ore tubuloso. This has alternate branches and opposite tubulous denticles, waved at top. The ovaries are of an oval form, cut off at the top, with two small points at the corners, together with a little tube for a mouth to each.

Sea-Tamarisk. Ellis Corallin. pag. 4. tab. 1. No. 1. fig. a. A.

Sertularia tamarifca. Linn. Syst. Nat. Ed. 12. p. 1307.

This is the largest kind of *Sertularia*, and but rarely found on these coasts. I have received it lately from Dr. David Skene, of Aberdeen. The figure was taken from one found in Ireland; where in the winter season they are full of vesicles, one inserted at the bottom of each pair of denticles. The ovaries of those from Scotland had no points; but this might be owing to their being young.

2. *Sertularia abietina.* *Sea-Fir Coralline.*

Sertularia alternatim pinnata, denticulis suboppositis The Sea-Fir Coralline is alternately pinnated with denticles

positis ovato-tubulosis, ovarii ovalibus. cles placed almost opposite, of an oval tubulous shape. Their ovaries are of an oval form.

Sea-Fir. Ellis Corallin. pag. 4. tab. 1. No. 2. fig b. B.

Sertularia abietina. Linn. Syft. Nat. Ed. 12. p. 1307.

This elegant Coralline is frequently found on our coast, adhering by its vermicular tubes to most kind of shells: it grows very erect, and is frequently infested with little minute shells called Serpulas. The side branches are often pinnated. In the winter the ovaries are in such abundance as almost to cover the denticles, but placed in a very regular order. In this state I have received them from Brighthelmstone, in Suffex.

3. *Sertularia polyzonias.* *Great Tooth Coralline.*

Sertularia sparse ramosa, denticulis ovatis alternis, ovarii obovatis transverse rugosis. This Coralline is loosely branched, having alternate denticles; the ovaries are nearly egg-shaped and wrinkled across.

Great Tooth Coralline. Ellis Corallin. pag. 5. tab. 2. No. 3. fig. a. b. A. B.

Sertularia polyzonias. Linn. Syft. Nat. Ed. 12. p. 1312.

We find this Coralline often growing erect, and sending out loose spreading branches. A variety is found climbing up other Corallines. I received some specimens from the Isle of Wight, where there were many young ones climbing up the first stem by radical tubes, and forming a firm strong trunk with long alternate branches; these specimens were about three or four inches high.

Others I have met with that have grown loofely and unconnected into complicated mafles of a femi-transparent pale yellow color; the ovaries, as in the other, were wrinkled tranfverfely.

4. *Sertularia argentea.* *Squirrel's-tail Coralline.*

Sertularia denticulis suboppositis mucronatis, ovariis ovalibus, ramis alternis paniculatis.

This Coralline has nearly oppofite and fharp-pointed denticles, oval ovaries, and alternate tufted branches.

Squirrel's Tail. Ellis Corallin. pag. 6. tab. 2. No. 4.
Sertularia argentea. Linn. Syft. Nat. Ed. 12. p. 1308.

5. *Sertularia cupressina.* *Sea-Cyprefs.*

Sertularia denticulis suboppositis oblique truncatis, ramis paniculatis sparsis longioribus, ovariis obovatis.

This has nearly oppofite and oblique blunt denticles, with long loofe branches in panicles. The ovaries are nearly oval.

Sea-Cyprefs. Ellis Corallin. pag. 7. tab. 3. No. 5. fig. a. A.

Sertularia cupressina. Linn. Syft. Nat. Ed. 12. p. 1308.

These two laft Corallines, though fuppofed by Linnæus to be the fame, when they come to be compared, have quite a different habit and manner of growing. The latter, or Sea-Cyprefs, is always found in very deep water, and the fide branches often as long again as the Squirrel's Tail, befides the difference of their denticles and ovaries. I have feen, indeed, varieties of the Squirrel's-tail Coralline, but they are eafily known. We find this is the commoneft of all the Veficular Corallines round
the

the coast of these kingdoms, especially at the Isle of Sheppey; but the Sea-Cypress is chiefly found in deep water on the coast of Yorkshire, Scotland, and the north of Ireland, and not to be had in such plenty.

6. *Sertularia operculata.**Sea-Hair Coralline.*

Sertularia denticulis oppositis suberectis, ovariis obovatis operculatis, ramis alternis.

This Coralline has pointed denticles, which are opposite; the points bend upwards. The ovaries are egg-shaped, and have a cover to each. The branches are alternate.

Sea-Hair. Ellis Corallin. pag. 8. tab. 3. No. 6. fig. b. B.

Sertularia operculata. Linn. Syst. Nat. Ed. 12. p. 1307.

There are besides the two larger points to each denticle, two little bristles on each side of each denticle, which may be seen in the microscope by a side view. This was omitted in the figure, as not being placed in a side view for the painter when it was drawn.

7. *Sertularia rofacea.**Lily flowering Coralline.*

Sertularia denticulis oppositis tubulosis truncatis, ramis alternis, ovariis coronato-spinosis.

This Coralline has opposite tubulous truncated denticles, alternate branches, and ovaries crowned with little spines.

Pomgranate flowering Coralline. Ellis Phil. Transf. Vol. 48. tab. 23. fig. 5.

Lily or Pomgranate flowering Coralline. Ellis Corallin. pag. 8. tab. 4.

Sertularia rofacea. Linn. Syst. Nat. Ed. 12. p. 1306.

This

This most delicate white tender Coralline is often found growing on shells, and often climbing up other Corallines. The ends of some of the branches turn into little radicles, as if it were going to climb up other substances, as is expressed at fig. B. Essay on Corallines. The ovaries are most exactly represented through the microscope; those that are unexpanded are in the younger state, and in this form I have now whole branches most beautifully adorned with regular rows of them; those with the points sticking out appear to be in this state, when they have discharged their spawn. This object affords great entertainment in the solar microscope, from the beautiful blossom-like appearance of its ovaries, before they are expanded, where they look like so many double flowers.

8. *Sertularia pumila*.*Sea-Oak Coralline.*

Sertulariadenticulisoppositis mucronatis recurvatis, ovariis subrotundis.

This Coralline has opposite denticles pointed and bent back; the ovaries are roundish.

Sea-Oak Coralline. Ellis Phil. Transf. Vol. 48. tab. 23. fig. 6. F. F. and Vol. 57. tab. 19. fig. 11. Corallin. pag. 9. tab. 5. No. 8. fig. a. A.

Sertularia pumila. Linn. Syst. Nat. Ed. 12. p. 1306.

This is met with on several species of fucus, but oftener on the *Fucus ferratus*, or Sea-Oak with ferrated leaves; and, as it is often found on the shore on the going out of the tide, adhering to the broad leaves of that large remarkable *Fucus*, it affords us the more frequent opportunities of seeing this animal alive, extending its claws, provided it is immediately, while moist, put into some clean sea-water. In this state it may be kept for
some

some days by renewing the water; we may then cut off small pieces, and put them in a watch-glass full of sea-water, and in a little time they may be examined in the aquatic microscope. See the figure in the Phil. Trans. Vol. 48. tab. 23. fig. b. F. F. where it is most exactly represented, as it appeared alive. This to persons not acquainted with the nature of Zoophytes will appear a most surprizing as well as a most agreeable scene of entertainment, as I have frequently experienced with persons, who have accompanied me to the sea side: the properest and most portable microscope for this purpose I have given a very good figure of in my Essay on Corallines.

9. Sertularia Thuja.

Bottle-brush Coralline.

Sertularia denticulis distichis alternis appressis, ovariiis ovatis marginatis, caule angulato rigido paniculato, ramulis creberrimis dichotomis attenuatis.

This Coralline has two rows of denticles, closely adhering alternately to both sides of the branches. The ovaries are oval, with a margin or rim about their openings. The stem is waved and very stiff: on the upper-part is a tuft of dichotomous little branches, which grow smaller at the ends.

Sibbald Scot. Illustr. tab. 12.

Bottle-brush Coralline. Ellis Corallin. pag. 10. tab. 5. No. 9. fig. b. B. and in the frontispiece.

Sertularia Thuja. Linn. Syst. Nat. Ed. 12. p. 1308.

10. Sertularia Lonchitis.

Sea Spleenwort.

Sertularia articulata pinnata, denticulis alternis distichis appressis, ovariis ovatis operculatis.

This Coralline has a jointed and pennated stem, with two rows of alternate denticles adhering closely to it. The ovaries are oval, and have a cover to each.

Sea Spleenwort or Polypody. Ellis Corallin. pag. 11. tab. 6.

Sertularia Lichenastrum. Linn. Syft. Nat. Ed. 12. pag. 1313.

I have received specimens from the East Indies of a Sertularia very like this in appearance, but smaller, where both the denticles and branches are exactly opposite, and the joints both on the stem and branches much closer together. The S. Lonchitis was found in the harbour of Dublin.

11. Sertularia falcata.

Sickle Coralline.

Sertularia denticulis secundis imbricatis truncatis, ovariis ovato-oblongis, ramis pinnatis alternis, caule flexuoso.

This Coralline has a waved stem, and branches alternately pennated; these are furnished with a single row of blunt denticles, lying close one behind the other. The ovaries are of an oblong oval shape.

Sickle Coralline. Ellis Corallin. pag. 12. tab. 7. No. 11. fig. a. A. and the center of the frontispiece.

Sertularia falcata. Linn. Syft. Nat. Ed. 12. pag. 1309.

In

In the center of the frontispiece to my Essay on Corallines I have given a figure of this beautiful Coralline, as it appears alive in the sea. The figure in tab. 7. was drawn from a dried specimen.

12. Sertularia Pluma.

Podded Coralline.

Sertularia denticulis secundis imbricatis campanulatis, ovariis gibbis cristatis, furculis pinnatis lanceolatis alternis.

This Coralline has bell-shaped denticles, lying close above one another; the ovaries are gibbous and crested; the little sprigs rise alternately, and are pinnated.

The Podded Coralline. Ellis Corallin. p. 13. tab. 7. No. 12. fig. b. B.

Sertularia Pluma. Linn. Syst. Nat. Ed. 12. pag. 1309.

This neat feathered Coralline is generally found climbing up, and surrounding fucus's, particularly the podded Fucus. Its little tubulous radicles are disposed in circles round the stem of the Fucus in such a manner, by uniting together, that the force of the sea cannot separate it without tearing the Fucus to pieces. The side branches that support the denticles are jointed; and the denticles, whose margins are serrated, are supported in the front of each by a little projecting hollow spine, which, in the Sertularia Pennatula, one of this tribe, is longer and more distinct, but cut off at the end, as will appear in tab. 7. fig. 1. 2. This little spine does not appear in our figure, on account of the painter's drawing the Coralline from an oblique back view of the branches. See the figure in Essay on Corallines, tab. 7. The pods or ovaries have generally five cristated ribs, pointing obliquely upwards,

and proceeding from the back tube. This Coralline is common on the British coast.

I have lately received from Dominica, some very large specimens of this kind, six inches high, that are loosely branched, and grow erect on shells. The ovaries of these are more oblong, and resemble those of a bean-pod, and have eight or nine surrounding cristated ribs.

Besides these, we often meet with a very minute variety on the *Fucus natans*, or Gulph-weed, and some other varieties from the Mediterranean and the East Indies.

13. *Sertularia Myriophyllum*.

Pheasant's-tail Coralline.

Sertularia pinnata, pinnis alternis, rachi nodosa, nodulis externe arcuatis distantibus; denticulis secundis truncatis stipulatisque.

This Coralline, with feather-like branches alternately disposed on the front of the mid-rib or stem, the back of which has arched knots, placed at a distance from each other; the denticles are even at top, each like a cup supported by a socket, with a short spine in front, and are placed in a row above one another on the under part of the little feather-like branches.

Pheasant's-tail Coralline. Ellis Corallin. pag. 14. tab. 8.

Sertularia Myriophyllum. Linn. Syst. Nat. Ed. 12. pag. 1309.

The

The form of the stem of this Sertularia is different from all the kinds hitherto known, on account of the arched knots on its stem: when it is put into water, the two rows of little branches, or pinnæ, become nearly straight, or incline a little at their ends, with their denticles towards each other. I have never yet seen their ovaries, nor any other specimen, but that which was collected near the harbour of Dublin, part of which is very exactly represented in my Essay on Corallines. An elegant specimen of this is preserved among my other Zoophytes in the British Museum.

14. Sertularia antennina.

Lobster's-born Coralline.

Sertularia furculis simplicibus verticillatis, setulis denticulis secundis calyciformibus, ovariiis axillaribus pedunculatis oblique truncatis.

This Coralline has single stems, but there is a variety that is branched. These are surrounded with whirls of bristle-like small branches, which have on the upper side rows of cup-shaped denticles; their ovaries have foot-stalks, and are obliquely open towards the stem: these are placed round it at the insertion of the branches.

Lobster's-born Coralline, or Sea-Beard. Ellis Corallin. pag. 15. tab. 9.

Sertularia antennina. Linn. Syst. Nat. Ed. 12. p. 1310.

The branched variety of this Coralline is represented in the Philosophical Transactions, Vol. 48. tab. 22. as it appeared alive in sea-water; and was, in June 1754,
most

most accurately drawn at the sea side at Brighthelmstone, by my late worthy friend Mr. G. D. Ehret.

15. *Sertularia halecina.*

Herring-bone Coralline.

Sertularia ramosa pinnata, ramulis alternis, denticulis tubiformibus biarticulatis, ovariis ovalibus, pedunculis lateraliter coadunatis.

This Coralline is alternately branched and pinnated; the denticles are formed like tubes with two joints: the ovaries are oval, each united along the side to a little tubular stalk.

Herring-bone Coralline. Ellis Phil. Transf. Vol. 48. tab. 17. fig. E. F. G. Corallin. pag. 17. tab. 10.

Sertularia halecina. Linn. Syft. Nat. Ed. 12. pag. 1308.

This Coralline is particularly described in my Essay on Corallines, and likewise in the Philosophical Transactions, Vol. 48. tab. 17. in both which places it is represented as it is alive in the sea.

16. *Sertularia pinnata.*

Jointed Sea-bristle Coralline.

Sertularia simplex pinnata et articulata, pinnis alternis arcuatis, denticulis semicampanulatis secundis, ovariis ovatis confertis ore coronatis.

This Coralline has a single pinnated stem; the little branches are placed alternately, and expand themselves like an arch on each side: the denticles are on one side, and half bell-shaped: the ovaries are oval, coming out in clusters along the stem; their openings look like little crowns.

Sea

Sea Bristles. Ellis Corallin. pag. 19. tab. 11. No. 16. fig. a. A.

Sertularia pinnata. Linn. Syft. Nat. Ed. 12. p. 1312.

This Coralline differs very much from the fetacea, or small bristle: it is three inches high, twice as big every way as the other; and differs not only in being jointed, but the denticles are half bell-shaped, and much nearer together; besides, the ovaries are in clusters all along the upper side of the stem, and when the young ones are ready to come out, the tops of the ovaries are divided like a coronet. This description is taken from a very good specimen, preserved in spirits, with its polypes and ovaries perfectly distinct.

17. *Sertularia fetacea.*

Little Sea-bristle Coralline.

Sertularia simplex pinnata, pinnis alternis subincurvatis, denticulis obsoletis remotissimis secundis, ovariis oblongo-tubulatis axillaribus.

This Coralline has a single pennated stem; the pinnæ, or small side branches, are alternate and a little bent: the denticles are but just visible; they are on the upper side of the little branches, and very remote from each other: the ovaries come out just above the insertion of the little branches, and are of an oblong tubulous shape.

Sertularia pinnata β. Linn. Syft. Nat. Ed. 12. p. 1312.

This little beautiful Coralline, which is about one inch and an half high, is more frequently met with than the former.

18. *Sertularia spinosa.**Silk Coralline.*

Sertularia mollis ramosa pellucida, ramulis creberrimis teneris dichotomis, spinis terminantibus, denticulis obsoletis secundis distantibus, ovariis vesiculiformibus.

This Coralline is smooth, transparent, and branched; the smaller branches are very tender, many, dichotomous, and gradually end in points; the denticles are but just visible, and placed at a distance from each other on the same side, from whence the ovaries that are like vesicles proceed.

Silk Coralline. Ellis Corallin. pag. 20. tab. 11. No. 17. fig. b. d. B. C. D.

Sertularia spinosa. Linn. Syst. Nat. Ed. 12. p. 1312.

This Coralline has something very singular in it, each polype-head being inclosed in a vesicle, which falls off when the head decays: whether these are the ovaries as well as mouths to supply the animal with food, future observations must explain to us, but at present it seems most probable.

19. *Sertularia dichotoma.**Sea-thread Coralline.*

Sertularia longissima ramosa dichotoma, denticulis campanulatis, pedunculis annulosis, ovariis ovatis axillaribus, pedunculis contortis.

This Coralline is very long, and branched in a subdivided manner; it has bell-shaped denticles, supported by stalks full of rings: the ovaries are oval, and sit upon twisted foot-stalks at the insertion of the branches.

Sea-

Sea-thread Coralline. Ellis Corallin. pag. 21. tab. 12. No. 18. fig. a. c. A. C.

Sertularia dichotoma. Linn. Syft. Nat. Ed. 12. p. 1312.

It is found on the Suffex coast, but in greater plenty on the coast of Holland.

20. *Sertularia geniculata.* *Knotted Sea-thread Coralline.*

Sertularia denticulis alternis calyciformibus, pedunculis contortis, ovariis ovato-truncatis axillari- bus.

This Coralline has alternate cup-shaped denticles, with twisted stalks; the ovaries are oval, and flattish at top.

Knotted Sea-thread Coralline. Ellis Phil. Transf. Vol. 48. tab. 22. fig. 1. Corallin. pag. 22. tab. 12. No. 19. fig. b. B.

Sertularia geniculata. Linn. Syft. Nat. Ed. 12. p. 1312.

This creeping little Coralline has but few branches, and they are alternate: it is found adhering by little tubes to the podded Fucus, and sometimes to the Sea-Oak Fucus. I have met with it on the coast of Suffex, growing upon the *Ascidia intestinalis* of Linn. Syft. Nat. Ed. 12. p. 1087. which is a soft, white, membranaceous animal, nearly egg-shaped, that fixes itself by its base to rocks and shells; has two openings, one at the top and the other a little lower, from whence it squirts out the water. On this the Knotted Sea-thread *Sertularia*, or Coralline, sends forth its root-like tubes, nearly in straight lines; from whence arise, at a small distance from each other, young sprigs about an inch high, properly furnished with their denticles and polype-heads, so as to

H

form

form a beautiful little grove-like figure of this animal. This most elegant specimen I have preserved in spirits.

The figure of this animal, without its ovaries, was drawn by Mr. Ehret, in June 1754, at Brighthelmstone, and is represented in the Philosophical Transactions, Vol. 48. tab. 22. No. 1. A. to shew the medullary part of this animal in the stem, united to the several heads in their cup-like denticles. This is a most exact figure of one of those on the Ascidia before mentioned, when viewed through the microscope in sea-water. The figure at tab. 12. fig. B. Essay on Corallines, has the ovaries, but not the cup-shaped denticles: this was taken from a dried specimen, where the joints are very much shrunk, so as to look knotty.

21. *Sertularia verticillata.*

Horse-tail Coralline.

Sertularia subramosa, denticulis campanulatis pedunculatis margine denticulatis suberectis verticillatisque, ovariis ovato-tubulosis.

This Coralline is loosely branched; the denticles are bell-shaped, indented on the margin, sit on foot-stalks, and are placed in whirls at regular distances round the stem. The ovaries are egg-shaped, and end in a tube.

Horse-tail Coralline with bell-shaped cups. Ellis Corallin. pag. 23. tab. 13. No. 20. fig. a. A.

Sertularia verticillata. Linn. Syst. Nat. Ed. 12. p. 1310.

Since I published my Essay on Corallines, I have met with some specimens, with their ovaries, which were of an oval figure, ending in a tubular mouth.

This Coralline is remarkably tender and brittle, and the bell-shaped denticles are so glutinous, that it is very difficult

difficult to separate them from the paper when they are expanded. The stalks that support them are very elegantly twisted, like the stems of some modern drinking glasses.

22. *Sertularia volubilis*.*Climbing Bell Coralline.*TAB. 4.
FIG. c.
f. E. F.

Sertularia denticulis campanulatis dentatis alternis, pedunculis longissimis contortis, ovariiis ovariis interdum tranverse rugosis.

This Coralline, with bell-shaped denticles, indented on the margin, grows alternately; the denticles are supported by very long twisted footstalks; the ovaries are egg-shaped, and sometimes wrinkled across.

TAB. 4. FIG. c. f. E. F.

Climbing Coralline with bell-shaped cups. Ellis Phil. Transf. Vol. 48. tab. 22. fig. 2.

Small climbing Coralline with bell-shaped cups. Ellis Corallin. pag. 24. tab. 14. No. 21. fig. a. A.

Sertularia uniflora. Ellis Phil. Transf. Vol. 57. pag. 437. tab. 19. fig. 9.

Sertularia volubilis. Linn. Syst. Nat. Ed. 12. p. 1311.

There are different varieties and sizes of this twining bell-shaped Coralline, from one quarter to three quarters of an inch long; particularly the branched sort in tab. 4. fig. c. f. E. F. which is very rarely met with. This has wrinkled ovaries, but most of the others are smooth. These are all found climbing up and growing upon other vesicular Corallines; most of them are to be met with on the coast of Sussex.

23. *Sertularia repens.**Creeping Coralline.*

Sertularia denticulis cylindricis oblique truncatis alternis, pedunculis contortis denticulis brevioribus, ovariis - - - -

This Coralline has alternate cylindrical denticles, opening obliquely; with twisted stalks, shorter than the denticles; the ovaries are unknown.

Ellis Corallin. pag. 25. tab. 14. fig. b. B.

Sertularia Syringa. Linn. Syft. Nat. Ed. 12. p. 1311.

24. *Sertularia rugosa.**Snail-trefoil Coralline.*

Sertularia denticulis alternis rugosis, ramis vagis, ovariis rugosissimis tridentatis.

This Coralline has alternate wrinkled denticles and irregular branches; the ovaries are very much furrowed, and have three erect points at the opening of each.

Snail-trefoil Coralline.
15. No. 23. fig. a. A.

Sertularia rugosa. Linn. Syft. Nat. Ed. 12. p. 1308.

These Corallines grow upon others on the British coast.

25. *Sertularia lendigera.**Nit Coralline.*

Sertularia articulata subdichotoma implexa, denticulis cylindricis secundis parallelis ad genicula minoribus, ovariis - - - -

This Coralline is jointed; the branches are subdivided and irregularly interwoven; they have cylindrical parallel denticles coming out on one side, and growing less at the joints; the ovaries are unknown.

Nit

Nit Coralline. Ellis Corallin. pag. 27. tab. 15. No. 24. fig. b. B.

Sertularia lendigera. Linn. Syft. Nat. Ed. 12. p. 1311.

26. *Sertularia Uva.*

Grape Coralline.

Sertularia subramosa, denticulis obsoletis, ovarii ovatis racemosis.

This Coralline has but few branches; the denticles are scarce to be distinguished; the ovaries are oval, growing in clusters.

Grape Coralline. Ellis Corallin. pag. 27. tab. 15. No. 25. fig. c. C. D.

Sertularia Uva. Linn. Syft. Nat. Ed. 12. pag. 1311.

These two last are parasite Corallines, growing on *Fucus*'s and other Corallines, on the British coast.

27. *Sertularia Cuscuta.*

Dodder-like Coralline.

Sertularia denticulis obsoletis, ovarii ovatis axillaribus, ramis oppositis simplicibus.

There is no appearance of denticles on this Coralline; the ovaries are oval, and placed at the inside of the insertion of the branches; the branches are single and opposite.

Climbing Dodder-like Coralline. Ellis Corallin. p. 28. tab. 14. No. 26. fig. c. C.

Sertularia Cuscuta. Linn. Syft. Nat. Ed. 12. p. 1311.

This was sent me among other sea productions from the west coast of England, adhering to and creeping up the *Fucus filiquosus*.

28. *Sertularia*

28. *Sertularia pustulosa.**Pimpled Coralline.*

*Sertularia articulata
sparsim et alternatim ra-
mosa, geniculis superne
obsolete denticulatis, ova-
riis - - -*

This Coralline is jointed, and alternately, but thinly branched: the appearances of the denticles which lie along the upper part of the joints, are but just visible.

Dichotomous tubular Coralline. Ellis Corallin. pag. 54. tab. 27. fig. b. B.

This Coralline was brought to me from the Isle of Wight. The specimen from whence the figure was taken was an imperfect one; since then, I have from the same place received several perfect ones, four inches long. It consists of very delicate tender branches, which arise from adhering tubes. Several of the tubes are united loosely near the base, like the Silk Coralline; from thence they rise up into long branches, sending forth alternate short branches, forming a joint at every branch: towards the upper part of every joint are several shallow denticles, having a little circular rim with a point in the middle of each, not unlike a pimple or pustule: as they are most exactly drawn in the Essay on Corallines, at tab. 27. fig. B. through the microscope.

I am persuaded many people, from the description of this, as well as the Dodder Coralline, without examining them in the microscope, would take them for decayed Confervas; but they are true Sertularias, as the specimens shew.

29. *Sertularia*

29. *Sertularia frutescens.**Shrubby Coralline.*TAB. 6.
FIG. a.
A.

*Sertularia ramosa tubu-
losa pinnata, pinnulis se-
taceis alternis arrectis,
denticulis secundis cylin-
drico-campanulatis, ova-
riis - - -*

This Coralline has a stem full of small united little tubes, from whence come forth rows of small branches disposed alternately in a pinnated order, bending upwards; the denticles are of a cylindrical bell-shaped form, placed one above another on the same side; the ovaries are unknown.

TAB. 6. FIG. a. A.

This Coralline was found at Scarborough, in Yorkshire. The stem is black and hard, the branches of a dark brown: it is more firm and woody than any of this genus, and appears to be the very same species with that which Dr. Pallas sent me from Holland, incrustated with an Alcyonium, by the name of *Sertularia Gorgonia*. See tab. 9. fig. 1. 2.

30. *Sertularia Pinafter.**Sea-Pine Coralline.*TAB. 6.
FIG. b.

*Sertularia simplex pin-
nata, pinnis alternis, den-
ticulis oppositis basi cauli
appressis, apice tubulosis
incurvis, ovaris secundis
majoribus ovato-quadran-
gulis, angulis mucrona-
tis, ore tubuloso.*

This Coralline has a single pinnated stem; the little branches are alternate, with opposite denticles, the bottom of which adheres close to the branch, but the top part is tubular, and bent upwards; the ovaries are large and ranged on one side; they are
of

of an oval form with square sides, the angles end in points at the corners on the top; in the middle of each is a little tubulous opening.

TAB. 6. FIG. b. B.

TAB. 7. 31. Sertularia Pennatula.
FIG. 1. 2.

Sertularia simplex pinnata, pinnis incurvis articulatis, denticulis secundis campanulatis corniculo truncato suffultis, marginibus crenatis spinis duobus oppositis instructis, ovariiis - - - -

Sca-Pen Coralline.

This Coralline has a single pennated stem; the pinnæ or side small branches are jointed and curvated; the denticles are ranged on one side, each supported by a little horn-like tube; they have a crenated margin, with a little spine on each side, opposite to each other; the ovaries are not known.

TAB. 7. FIG. 1. 2.

This Coralline is as remarkable for the elegance of its form, as its likeness to the feather of a pen. It is of a yellowish-brown color, about five or six inches high. There are many of them rise together from the same adhering tubes, with stiff jointed stems. The little crooked tubes that support the denticles are longer in this species than in any of the like kind, being twice as long as the denticles.

It is not uncommon among the islands in the East Indies.

32. Sertularia

32. Sertularia Filicula.

*Fern Coralline.*TAB. 6.
FIG. c.
C.

Sertularia ramosissima pinnata, stirpe flexuosa, ramulis ex angulis alternis, denticulis ovato tubulosis; singulo ad axillam arrecto; ovarii obverse ovatis apice tubulatis.

This Coralline is very much branched and pinnated; the stem is bent to and fro into alternate angles; the little branches are produced from the angular points; these are furnished with opposite oval-tubulated denticles: in each axilla, or part where the little branches come out, is an erect single denticle.

TAB. 6. FIG. c. C.

This is one of the most delicate species of our English vesicular Corallines. It has been taken by some authors and collectors of these substances, for a lesser species of the *Sertularia abietina*, or Sea-Fir: but the singularity of its waved stem, with its erect single denticle at the insertion of the branches, together with the single pair of denticles on each part of the stem, that form the angles, make it a very distinct species from any of this genus. It is commonly found upon the coast of Scarborough, in Yorkshire.

33. Sertularia quadridentata.

*Four-toothed Coralline.*TAB. 5.
FIG. g.
G.

Sertularia simplex articulata repens, denticulis quaternis oppositis ventricosis, articulis subturbina-

This creeping Coralline sends forth single stems, that are jointed; the joints have generally four denticles of the

tis basi contortis, ovariis figure of the stomach, each
 ----- opposite to the other; the articulations are nearly top-shaped, and twisted at the base; the ovaries are unknown.

TAB. 5. FIG. g. G.

I found this little Coralline adhering by its radical tubes to a species of Fucus, called by Linnæus, Fucus lendigerus. In the plate I have given a figure of the Fucus with the Coralline creeping up it, of its natural size. It was taken up at sea by an East-India ship on the coast of Africa, not far from the island of Ascension.

34. Sertularia spicata.

Spiked Coralline.

Sertularia stirpe tubulosa paniculata annulata, ramulis creberimis trichotomis ad annulos verticillatim dispositis, denticulis ternis cylindricis cæcisque terminalibus, ovariis ovalis axillaribus.

This Coralline has a tubulous stem, surrounded by rings, and ending in a panicle, consisting of many close-set branches, which are subdivided in a threefold order; these are inserted in whorls round the rings, and end in three cylindrical denticles, whose openings are very small; the ovaries are oval, and inserted in the angles of the branches.

35. Sertularia Evansii.

Evans's Coralline.

Sertularia ramosa, ramis oppositis, denticulis

This Coralline has opposite branches, and short denticles
brevibus

brevibus oppositis, ovariis ramosis lobatis oppositis ex tubulo reptanti enascentibus.

placed opposite to each other; the ovaries are lobated, and arise from opposite branches, which proceed from the creeping adhering tube.

This Coralline is about two inches high, very slender, and of a bright yellow color. It creeps on fucus's. The ovaries differ from all the rest of the genus: they are lobated, and the lobes are placed opposite to one another: these appear to be full of spawn, of a deep orange color, which is sent forth from holes at the end of the lobes.

This was first discovered by Mr. John Evans, a sea-officer in the East-India Company's service, among some sea productions brought from Yarmouth, in Norfolk, in the year 1767.

36. *Sertularia muricata.*

Sea Hedge-Hog Coralline. TAB. 7.
FIG. 3.

Sertularia articulata, denticulis pedunculatis ex singulis articulis alternis, ovariis subglobosis cristatis muricatis pedunculatis, ex tubulis radiciformibus enascentibus.

This Coralline has a jointed⁴ stem, with denticles on foot-stalks proceeding alternately from the joints; the ovaries are globular, full of points from crested ribs; they sit on foot-stalks, and arise from root-like tubes.

TAB. 7. FIG. 3. 4.

Dr. David Skene, of Aberdeen, first discovered this Coralline. The specimens he sent me were imperfect, as wanting the denticles; they seem to be, by what I could judge of the stalks and imperfect pieces, not un'like the

knotted Sea-thread ; but differ remarkably in having their echinated ovaries arise from the adhering tubes.

VII. PENNATULA.

S E A - P E N

Animal *natans, liberum, multiforme, osciculo suffultum,*

Polypos tentaculis radiatis oviparis a parte superiori exserens.

Basis nuda.

Is an animal that swims freely about in the sea, of many shapes, having a bone in the inside to support it.

It sends forth from the upper part of its stem, polype-like mouths surrounded by claws ; through these it produces its eggs.

The lower part of the stem is bare.

This genus of animals differs remarkably from all the other Zoophytes by their swimming freely about in the sea, and many of them having a muscular motion as they swim along. I know of none of them that fix themselves by their base, notwithstanding what has been wrote. They have no opening at the bottom, as was formerly thought, nor any other passage but through their polype mouths ; by these they take in their food, and through these they produce their eggs, as in most Zoophytes. They have the remarkable property of sending forth a strong phosphoreal light in the sea.

When we compare them to the other Zoophytes, they approach nearest to the Gorgonia, as having a bone in the inside like them, which is covered with flesh, and their upper parts full of polype-like mouths.

Nothing

Nothing can be a stronger proof that the Gorgonias are single animals with many heads, than their near affinity to the pen-shaped animals of this genus.

1. Pennatula Britannica.

The British Sea-Pen.

Pennatula stirpe carnosa tereti, rachi scabra, polyptis tentaculatis ordine simplici.

This Sea-Pen has a round fleshy stem; the midrib between the fins rough, with minute scales, and single rows of tentaculated suckers on each fin.

Pennatula phosporca. Phil. Trans. Vol. 53. tab. 19. fig. 1—5. Linn. Syst. Nat. Ed. 12. p. 1322.

I call this the British Sea-Pen, to distinguish it from the following, which I call the Italian Sea-Pen, and because it is found in great plenty sticking to the baits on the fishermen's lines, round the coasts of this kingdom; especially when they make use of muscles to bait their hooks. Great numbers have been taken on the coast of Scotland, especially near Aberdeen.

They are of a bright red color, and have the property, with the rest, of shining in the dark, in a most remarkable manner, like the Italian Sea-Pen.

2. Pennatula Italica.

Italian Sea-Pen.

Pennatula stirpe carnosa tereti, rachi patula verrucosa, spinâ brevi ad basem dorsi cujusque pinnae.

This Sea-Pen has a round fleshy stem; the midrib is broad and full of warts, and on the back of the fins, at the base, there is a short spine in each.

Red

Red Sea-Pen. Phil. Transf. Vol. 53. tab. 21. fig. 1. 2.

Pennatula rubra. Linn. Syst. Nat. Ed. 12. pag. 1322.

The Italian Sea-Pen differs from the British so much, that there is no room to doubt but they are very different species. The British is much longer, more slender, and not so fleshy as the Italian; but the broad, warded, midrib and spiny fins of the latter, distinguish it plainly; besides, the denticles are placed so thick as to appear like a double row. This varies in color from a deep red to a pale red. Doctor Shaw observes of this, that on the coast of Algiers it sends forth so great a light in the night, that the fishermen can distinguish the fish as they swim by it, so as to know where they cast their nets. This was brought from the coast of Italy. I am indebted to my learned friend Thomas Pennant, Esq. F. R. S. for the curious specimen represented in the Philosophical Transactions.

3. *Pennatula spinosa.*

The Thorny Sea-Pen.

*Pennatula stirpe car-
nosa, rachi lævi, pinnis
imbricatis plicatis spino-
sis.*

This Sea-Pen has a fleshy stem, a smooth midrib, and thorny fins folded one over another.

Penna grisea. Bohadsch mar. 109. tab. 9. fig. 1—3. Phil. Transf. Vol. 53. tab. 21. fig. 6—10.

Pennatula grisea. Linn. Syst. Nat. Ed. 12. pag. 1321.

I have changed Bohadsch's name of *grisea* to *spinosa*, as being more descriptive of its character, the fins differing from any of the species yet known by their long spines. The suckers, which I have carefully examined, and had drawn

drawn from the microscope, have the appearance of an elegant flower. This was brought from Italy, and sent to me by Thomas Pennant, Esq. F. R. S.

4. *Pennatula mirabilis.*

The Strange Sea-Pen.

Pennatula stirpe filiformi, rachi distiche pinnata, pinnis lunatis remotis alternis.

This Sea-Pen has a long slender stem, whose midrib is pennated on both sides; the pinnæ or fins are placed alternate, and at a distance from each other, and shaped like a half-moon.

Polypus mirabilis. Mus. Ad. Fred. pag. 96. tab. 19. fig. 4.

Pennatula mirabilis. Phil. Transf. Vol. 53. tab. 20. fig. 17. Linn. Syst. Nat. Ed. 12. pag. 1322.

This Sea-Pen, whose figure I have taken from Dr. Linnes's Museum Adolph. Fred. seems not properly to belong to this genus, or is only a part of one, and wants the fleshy base.

I have a specimen sent me from Holland with a fleshy base, whose pinnæ or fins answer to his description; but some of the upper part of it being broken off, prevented my giving a figure of it.

5. *Pennatula antennina.*

The Peacock-fish Sea-Pen.

Pennatula stirpe simplicis, rachi quadrangulari, lateribus tribus polypifera.

This Sea-Pen has a single stem; the midrib is square, and full of polype-like suckers on three sides.

Penna del pesce pavone. Bohadsch mar. 112. tab. 9. fig. 4. Phil. Transf. Vol. 53. tab. 20. fig. 3.

Pennatula.

Pennatula antennina. Linn. Syft. Nat. Ed. 12. p. 1323.

This extraordinary Sea-Pen was discovered by Dr. Bohadsch, of Prague, while he was at Naples in the year 1757. He says, when it was brought to him, it was two feet ten inches long, and very possibly had been much longer, as it was broke off at the base.

The bone, which was square, was covered over with a yellowish membrane, and three sides of the upper part of the trunk were covered with tentacles, the fourth, bare. He says, he numbered them, and found 1310, and that these tentacles are not drawn in, as in the other Sea-Pens. Other authors mention, that the tentacles are only on one side; but Dr. Bohadsch had an opportunity of seeing it as it was taken out of the sea.

6. *Pennatula Sagitta*.

The Arrow Sea-Pen.

Pennatula stirpe filiformi, rachi utrinque approximate pinnata, apice nudo.

This Sea-Pen has a very slender stem; the midrib is closely pinnated on both sides, and the base naked.

Pennatula Sagitta. Phil. Transf. Vol. 53. tab. 20. fig. 16. Linn. Syft. Nat. Ed. 12. pag. 1322.

This very small animal, according to Dr. Linnaeus, is found sticking in the fish, called by him *Lophius Histrio*, having its stem pierced into their sides.

The figure in the Philosophical Transactions is copied from Linnaeus's *Amœnitates*, Vol. 4. tab. 3. fig. 13. having never seen it myself. For my own part, I am doubtful whether it belongs to this genus.

7. *Pennatula*

7. Pennatula Cynomorion.

The Finger Sea-Pen.

Pennatula stirpe brevi rugosa acuta, rachi crassa cylindrica granulosa undique polypifera.

This Sea-Pen has a short, rough, striated and pointed stem; the midrib is cylindrical and fleshy, with its skin like shagreen, producing polype suckers all round it.

Malum insanum marinum. Rondel. pisc. 2. pag. 130.

The Finger-shaped Sea-Pen. Phil. Transf. Vol. 53. tab. 21. fig. 3. 4. 5.

Alcyonium Epipetrum. Linn. Syst. Nat. Ed. 12. p. 1294.

Since I have described this Sea-Pen in the Philosophical Transactions, it has been mentioned by some curious persons that have wrote on natural history, that this Sea-Pen had no bone in it; but being so fortunate, by the friendship of Thomas Pennant, Esq. F. R. S. as to have two specimens, Dr. Solander, in order to be satisfied of the truth of the assertion, desired to dissect one of them, in which we found a bone, as in the others.

8. Pennatula reniformis.

The Kidney-shaped Sea-Pen.

Pennatula reniformis, stirpe lumbrici facie, altero latere polypifera.

This Sea-Pen has its upper part shaped like a kidney, and its stem like a worm; one side of the upper part of it is full of polype suckers.

The Kidney-shaped purple Sea-Pen. Phil. Transf. Vol. 53. tab. 19. fig. 6—10.

This beautiful purple Sea-Pen was found on the coast of South Carolina, by John Greg, Esq. of Dominica.

It is remarkably different from all this kind. From the stiffness of its stem, it is very probable, it is supported by a bony substance. The under side of its kidney-shaped body is flat and full of ramifications, which correspond with the polype mouths on the upper side, which is a little convex: there are but six claws to each polype sucker, which proceed from hexangular cells. Dr. Solander, in his letter to me from Rio Janeiro, on the coast of Brazil, mentions, that whenever the fishermen brought them any shrimps, they were sure to find three or four of these among them.

TAB. 8. 9. *Pennatula argentea.*

FIG. 1. 2.

3. *Pennatula lanceolata pennæ facie, stirpe lævitereti, pinnis creberrimis imbricatis dentatis virgatis.*

The Silver Sea-Pen.

This Sea-Pen has much the appearance of a writing pen; it is of a long spear shape, with a round smooth stem; the upper part is very close set with fins, which lie one upon the other; they are dentated and striped.

TAB. 8. FIG. 1. 2. 3.

This curious animal was brought from Batavia by William Webber, Esq. F. R. S. Its fins are not unlike those of a bat, with several sharp points. They are striped black and white, with a shining surface, not unlike silver: they are often found above a foot long, and are said to be very luminous in the sea at night. There is one of them in the British Museum near eighteen inches long.

In the figure here represented, the bone appears to be burst through the bottom, and one of the fins are magnified, to shew it more distinctly.

10. *Pennatula*

10. Pennatula Encrinus.

Great cluster Sea-Polype.

Pennatula stirpe quadrangulari attenuata longissima ossea membrana callosa vestita, polypis oviparis apice in umbellam congestis.

This Sea-Pen has a very long, square, bony stem, which grows very small towards the top, and is covered with a callous membrane: it sends forth from the top, in form of an umbell, a cluster of polypes, from whence the eggs or spawn is produced.

Cluster-Polype. Ellis Phil. Transf. Vol. 48. pag. 305. tab. 12. Corallin. pag. 96. tab. 37.

Vorticella Encrinus. Linn. Syst. Nat. Ed. 12. pag. 1317.

The ingenious Dr. Bohadsch, of Prague, has very properly placed this curious animal among the Sea-Pens.

The twisting of the bone in the stem seems to be an accident, and not the character of the animal.

VIII. G O R G O N I A.

THE G O R G O N

Animal *crescens plantæ facie.*

Os (*sive fulcrum*) *variatur consistentiâ in diversis speciebus, et est vel coriaceum, suberosum, lignosum, corneum, osseum, testaceum, fibris vitreis contextum vel lapideum; stri-*

Is an animal that grows with the appearance of a plant.

The bone, or inward support, varies in different species in its consistence, and is either like leather, cork, wood, horn, bone, shell, made of glassy fibres, or like stone; it is striated, grows smaller at

atum, attenuatum basi que explanatum, tectum carne molliori vasculosa et cellulosa (sed exsiccata, consistentiâ spongiosa et friabili;)

Osculis polypiferis nutrimentum sorbentibus, oviparisque, instructum.

the ends, as it rises upwards, and spreads out at the base. This bony or hard part is covered with a softish flesh, full of small vessels and cells, which, when dry, becomes of a spongy and friable consistence.

These cells are furnished with little mouths, out of which the polypes extend themselves to procure nourishment, and send forth their spawn.

This genus of Zoophytes, being the most remarkable for its size, as well as the variety in the consistence of its internal hard part in several different species, it becomes more necessary to be particular in explaining how the growth and structure of it departs from that of vegetables; especially as the generality of mankind are strongly prepossessed, from their external ramified appearance and other circumstances, that they are really true marine vegetable shrubs; others, that they are of a mixt nature, between animals and vegetables.

In my Essay on Corallines, I have called this genus by the name of Keratophyton; but as the name of Gorgonia, from Pliny, has been substituted by the celebrated Linnæus instead of it, I shall adopt it accordingly.

My former description of this animal, Essay on Corallines, pag. 59. was taken from dried specimens, and was as well as their shrivelled and friable situation would admit. Since that time, I have had frequent opportunities

ties of examining many species perfectly well preserved, which I had desired might be immersed in spirits the instant they were taken out of the sea: by this means, I became possessed of many curious ones, both from the Mediterranean and West-India seas. So that what formerly appeared to me to be a friable calcareous matter, I now find to be a real fleshy substance; and that the internal hard part is of the same use to these animals, as bones are to other animals, that are cloathed with flesh. Such of these animals as were carefully preserved in spirits, appeared as if they were alive, with their polype-like suckers extended in the action of catching their food, and afforded me great pleasure to be able to examine them with some exactness.

I first dissected them longitudinally, and perceived that their flesh was furnished with an infinite number of minute muscles and tendons, contrived in such a manner, that, at the will of these animals, they might extend the openings of their cells on the outward surface, in order to send forth their polype-like suckers, to stretch out their arms in search of food, or contract the same openings suddenly, the instant the polype suckers were drawn back into their cells, the better to secure these tender parts from external injury.

Proceeding thus far, I was led on to observe, what kind of communication there was between the suckers and the bone of the animal; for this end I examined several specimens, both dry, as well as those that were preserved in spirits, with good magnifying glasses, and could distinctly trace an infinite number of minute winding canals, that lead from the suckers through the flesh into those parallel longitudinal tubes, which closely surround the bone or solid part on all sides; perhaps these may not improperly
be

G O R G O N I A.

be called the perioftium; for all along that fide of thofe tubes by which they adhere to the bony part, I could difcover the pores very plainly from whence the juices flow, that fupply it with proper materials to anfwer this great end. It is to thefe longitudinal tubes, that the bony parts of thefe animals owe their ftriated or channelled appearance, when they are ftript of their flefh, particularly the red Coral, the verticillated Sea-Feather, and many others; but more remarkably in their kindred genus the Ifis, particularly that fpecies, called the Ifis Hippuris, or black and white jointed Coral, as I fhall fhew hereafter.

I fhall now proceed to relate the feveral obfervations that I have made on them, from time to time, and endeavour to anfwer the arguments that have been advanced by late writers to prove their being of a mixt nature; that is, that they are animals, vegetating in the manner of plants with flowers, bark, and wood. As to their firft beginning, thefe animals produce their eggs through their polype-like mouths, as I have fhewn in the diffection of the *Alcyonium manus marina*; Phil. Tranf. Vol. 53. tab. 20. fig. 11.

In all the fpecimens which I have received preferved in fpirits, I have found eggs; but after thefe eggs are produced, the manner of their firft growing has only been obferved by Donati, (fee Phil. Tranf. Vol. 47. pag. 104. tab. 3. fig. H I K L) who examined them alive at the fea-fide. He fays,

“ Whilft the firft cellule is fhut up, or the egg of the
“ Coral is in its fubftance, we do not find any one hard
“ part in it like bone or marble; it is all foft: but af-
“ terwards, when the cellule opens, we begin to ob-
“ ferve fome hard lamellæ; and when it is grown bigger,
“ and

“ and arrive at the height of about a line and a half (the eighth part of an inch) it widens at bottom and at the top, and grows narrower in the middle, assuming the proper consistence and hardness of coral; and as this grows, the polypi are multiplied, and new branches of coral are formed.” So that we see, as soon as the Polype from the eggstate extends itself, and draws in nourishment, its hard part, or bone, appears even before it is one-eighth of an inch high.

The stems then of these animals, when they first grow up, are always full of cells with their polypes, even down to the base; but as they advance towards their full size, instead of so many polype mouths (in some particular species) we find the fleshy part of the trunk and base composed of organs full of parallel connected tubes; these spread themselves downwards, over rocks or shells in various directions, drawing nourishment from the polype mouths above, to secure the animal more firmly in its station; for from under these tubes, as in the stem, proceeds and is formed a hard or bony part, which adheres most strongly to the rocks, &c. and enables the animal to resist the violence of the waves. As the tubes on the base consist of the same fleshy organical parts with those of the stem and branches, they must undoubtedly receive their supply of animal juices from the nourishment drawn in by the polype mouths above them: this will appear clear to us, when we consider they are real Polypes, only with the addition of a bony part: and it is well known in experiments made on the Hydra, or fresh-water Polype, when it has many heads, that if one of them only is fed, all the rest will receive nourishment, and grow; that is, new heads will arise from the sides, and there will be a circulation of vital juices through the whole to the base, which

which circulation is not so easily demonstrated in vegetables.

From these connected radical and fleshy tubes belonging to the base of the Gorgonia, many young stems of the same species frequently rise, which are surrounded with little mouths; so that when we consider them to be a kind of Polype, we shall not be surprized at this manner of increase, no more than we are at present at the clustered Animal Flower, or *Actinia sociata*, described in the Philosophical Transactions, Vol. 57. tab. 19. where the young ones are produced from the adhering fleshy tube, that proceeds from the base of the old ones.

Besides, if we consider them to have the same properties with the Hydra, or fresh-water Polypes, which repeated experiments prove to us are so soon reproduced, after they are either cut in pieces or maimed, we shall not be so much amazed, when we meet with instances of the flesh of the trunk and stem of the Gorgonia, which by some accident has mortified, and the surface of its bone become rotten, and now the receptacle of many kinds of extraneous marine animalcula, and yet find the branches at top with all their mouths alive and in vigour. This bony part so decayed now grows no more than the shell of the oyster, when the fish is dead. It becomes only a basis during the time it has strength left to support the living part above, as the shell or rock that supports them both below. But it often happens that the living part above grows downwards, by pushing forth connected radical tubes and polype mouths on the dead part, as it would on a rock, or any other firm basis, to secure itself the better, forming at the same time a new layer of bone, or hard part, on the decayed flesh; and this is the reason why in making cross sections of some of the stems of the
larger

larger Gorgonias, we frequently meet with layers of calcareous matter inclosed between the circles, which is evidently nothing else but the decayed flesh of the animal, which has been covered and inclosed by the subsequent growth of the same animal. This is totally different from any thing that we know of in the growth of trees.

To explain the difference between the concentric circles in a cross section of the horny part of a Gorgonia, and those of wood, I have given in plate 2. fig. 6. 7. a figure of a cross and upright section of a piece of wood (*lignum fantalum*) magnified to shew the utricular vessels, that interweave the upright longitudinal vessels, proceeding horizontally from the pith in the center through all the circles to the bark on the outside. In the same plate, at fig. 2. 3. is a horizontal section of a Gorgonia ceratophyta, where the several waved laminae are seen adhering together, but no appearance of cross fibres.

Dr. Donati, who was remarkably careful in examining the Red Coral, or Gorgonia pretiosa, tells us in the Philosophical Transactions, Vol. 47. pag. 97. “ That he has
 “ observed transverse sections of some pieces of this Co-
 “ ral, which exhibit different lines, or annual bands,
 “ whereof one part is of a rose color, others yellowish,
 “ others white, and others more or less charged with co-
 “ lor, which form concentric circles like the coats of an
 “ onion.”

It is evident from hence, that there can be no circulation of juices, or the colors would have been the same. It is not improbable that those different colors may be owing to the difference of food at particular seasons; for we know that those animals with polype-like mouths on their fleshy outsides have their appointed seasons of growing, which happen when they find more plenty of food

at one time of the year than another, and in proportion to a certain temperature of the air, like other fixt animals; for instance, oysters, which we observe at certain seasons producing a new shelly stratum, or layer, next to the flesh in the inside of their upper and under shell: indeed, in many of the Gorgonias their several layers of hard parts, or bone, are very like those of shells both in their consistence and polished shining quality. This is remarkable in the *Gorgonia verticillata*. See Tab. 2. fig. 4. where there is a small trunk of its natural size, and the top of it magnified at fig. 5. to shew the shell-like disposition of the laminae.

As I have endeavoured to prove that there is no communication between the circles in the bony part of the *Gorgonia*, so it is evident there is none between the laminae or layers of the oyster-shell; because we often find them bored all over by sea insects, and yet if the innermost lamina next to the fish is found, the animal is found to be in perfect health and vigorous, as I have often experienced.

But perhaps the formation of the bony part of the *Gorgonia*, and the nature of the connection of the different circles of laminae, of which they are composed, may be more naturally and satisfactorily illustrated by examining the bony part of the *Pennatulas*, or Sea-Pens, a genus of Zoophytes not far removed from the *Gorgonias*, on account of their polype mouths, as well as having a bone in the inside, and flesh without. One of the chief differences is, that as the *Gorgonias* are always fixt, there is a necessity, that in order to keep them firm in their places they should be spread out at the base, both in the bony as well as fleshy parts; whereas the *Pennatula*, or Sea-Pen, which is made for swimming about in the sea, has its

bone formed small at the base, and the flesh thicker, yet tapering to the end. The Pennatula Encrinus, which I had described some years ago under the title of Hydra arctica, or Great Greenland Polype (see Essay on Corall. tab. 37. and Phil. Transf. Vol. 48. tab. 12. pag. 305.) will illustrate the nature of the bony part of these animals, where at fig. H. a cross section of the bone magnified represents the different laminae, shewing the manner of their increase in proportion to the growth of the animal and the square form of the bone.

There is something amazing in the manner that the Gorgonias take to fix themselves to rocks and other hard bodies in the sea, to be able to withstand the impetuosity of the waves. This wonderful contrivance of Nature is certainly instinct in this low order of animals. How pleasing it is to view the various turns and windings of the beautiful, thin, spread, scarlet base, formed by the bone and flesh of the Gorgonia pretiosa, or common Red Coral.

In the Philosophical Transactions, Vol. 50. tab. 34. fig. 10. is the figure of a remarkable groupe of Red Barnacles, called the Tulip Barnacle, covered partly with the base of a *G. pretiosa*, or Red Coral. This red appearance of the Barnacles suggested to me, when I wrote that Memoir, that the fine red tint of the Coral might have been communicated to the Barnacles, as they both grew together. This rare specimen is in the curious cabinet of Dr. J. Fothergill, F. R. S.

Every good collection of Red Coral from the Mediterranean is full of examples, where not only Barnacles and Wormshells, but even small branches of the white Madreporae are totally covered over with the bone or hard part of the Red Coral.

I have made an observation before on the cause why the circles of calcareous matter are now and then to be found in the horizontal sections of the stems and trunks of the horny Gorgonias. I shall now give another example in what manner this may happen, to confirm what I have said before.

Let us examine fig. 1. pl. 2. and we shall observe distinctly the bone of one Gorgonia inclosing, and formed over that of another of the same kind. The Tree Oysters and Wormshell at A. had certainly fixt to the first or innermost branch, so that this mass of shells appears to have killed its fleshy part. The succeeding Gorgonia spreading itself over and round the first, extends itself likewise over a great part of the shells, and when it had almost reached the ends of the branches of the first, it was torn off and thrown on shore, in which bare situation, divested of its flesh, I received it from the West Indies. This shews us plainly how the calcareous matter or dead flesh of the one may be inclosed by the bone of the other, and form those loose calcareous circles which we so often meet with in cross sections of these bodies.

If then the bark of the Gorgonias is insisted on to be similar to the bark of trees, this question will naturally arise: Is it the nature of trees to inclose their outward bark, so that their rough bark may be distinguished some years after among their regular annual circles, when the tree is cut horizontally? This I believe has scarce been seen by the most diligent investigator of nature.

In my Essay on Corallines, pag. 61. tab. 26. I have given an account of the singular growth of the Gorgonia Flabellum. This account was introduced there to shew that the friable calcareous part was not formed of accidental insects, such as might and do infest sea-plants; but

but that it belonged to, and fabricated, or rather produced, the horny part of the animal, as being both one and the same body. At that time one could not so clearly, for want of recent well-preserved specimens, judge exactly whether these bodies were composed of one or many animals. However, according to later observations, this specimen clearly shews, that the animal *Gorgonia* has with its tubes and mouths, in order to strengthen and repair the broken part at B and D, covered over the side reticulated part with a new layer of flesh and bone, continuing it in a semicircular form, thereby strengthening and connecting the upper and under parts of the stem, very different from any thing I have yet seen among vegetables.

On the upper part of the same *Gorgonia*, at C. is still a more remarkable instance of the growth of these animals. Here the animal having met with some interruption in its growth, probably from some impending rock, it evidently has grown downwards, and spread over its own reticulated branches, so as to have covered all their openings.

Who would expect, on the strictest view of the *Gorgonia*, to find it clothed with scales of different forms? and yet the case is so. Examine the mouths of the *G. Placomus* and the *G. muricata*, and see how well they are defended by glassy spiculæ ranged in order. View the *G. exserta* and the *G. verticillata*, these we shall find to have remarkable scales; but the *G. lepadifera* exceeds all the rest in having its mouths fortified by scales of various sizes and shapes, well adapted to protect these tender parts. When we examine with the microscope the scales that cover their other fleshy parts, we find them still of a different shape, so that we are induced to think, from these

these observations, that the figures of their scales are adapted by nature to suit particular parts, as they are in snakes, lizards, and fish.

Besides the application of these scales, or vitreous corpuscles, to the use of an outward covering, Nature seems to have adapted some kinds of them to the forming the harder parts within, as for instance in the red Coral, where, upon magnifying the fleshy part that was preserved in spirits, I found it full of these vitreous red corpuscles, represented highly magnified at fig. A. tab. 35. Essay on Corallines; but these were solid, and not hollow, as I took them to be at that time. This hint I received from Dr. Donati, who observes, that the corpuscles, which we find in the flesh of Red Coral, compose the hard part of it; being deposited on it by means of a pellicle full of minute vessels that lies upon it, which contain a whitish juice. See Phil. Transf. Vol. 47. p. 99.

In the Gorgonia Briareus the hard part, or bone, is composed of beautiful purple glassy spiculæ, lying lengthways almost parallel to each other, and united into a solid mass; and if we examine the fleshy part, we shall find the same kind of spiculæ lying irregularly and thinly dispersed through the soft substance of it, most probably for the same purpose as in the Red Coral. The figures of these corpuscles, when magnified, are not unlike caterpillars with many feet; see Pl. 14. fig. 2. As the Gorgonias, whose hard parts are like wood, horn, or stone, deposit or produce a similar substance (which is their bone) when they spread their bases on rocks and shells; so this G. Briareus deposits a layer under its flesh, consisting of these vitreous purple spiculæ, which prove it evidently to belong to this genus of Gorgonia, and not to the Alcyonium, which contains no hard or bony parts.

The

The last thing which I shall offer against their growing like vegetables, is the situation and growth of the medulla, which is observed in some particular species of these animals. This, had it been similar to the pith in the young branches of trees, would have been a very strong argument in favour of their partaking of a vegetable nature: but the case is otherwise. For instance, let a young branch of a *Gorgonia ceratophyta* be dissected longitudinally, so as to shew the course of the medulla in the leading branch, as well as the side branches, tab. 9. fig. 5. 6. Divide, at the same time, and in the same manner, a young sprig of any common tree, a lime-tree, for instance, fig. 7. 8. In the lime-tree we shall observe a free communication of the pith between the leading branch and the side branches; but in the *Gorgonia* the pith or medulla of the leading branch has no communication in the least with the side branches. The primary branch being surrounded with a horny tube to the extremity, and when it is longitudinally dissected, we plainly discover the septum, that is, the continued side of the tube, which prevents any communication. The branches here arise on the side of the leading branch, each forming or producing a medulla proper to itself, without any communication with the medulla of the primary branch. It is exactly the same in the genus of *Antipathes*. The medulla in these species of *Gorgonias* consists of certain white membranes, placed at distances nearly equal to their diameter, crossing the little tube that contains them, like so many diaphragms; whereas the medulla of young branches of trees consists of spongy shining globules, closely compacted together.

1. *Gorgonia*

TAB. 10. 1. *Gorgonia Umbraculum.**The Screen-like Gorgon.*

Gorgonia flabelliformis subreticulata, ramis creberrimis teretibus divergentibus, carne rubra verrucosa obductis.

This Gorgon appears to be reticulated, and is shaped like a fan; it has many round diverging branches, covered with a reddish flesh, full of little warts or mouths.

TAB. 10.

This little Sea-Fan is of a reddish brick color. It sends forth two or three thick branches from its short stem, which arises from a broad base. These branches support many long slender ones, all tending to the circumference; these are united here and there by little side branches, forming together a kind of net.

It was brought from Batavia by William Webber, Esq. F. R. S.

TAB. 11. 2. *Gorgonia flammea.**The fiery Red Gorgon.*

Gorgonia compressa ramosa subpinnata, osse complanato corneo, carne miniata, osculis creberrimis parvis notata.

This Gorgon grows very flat, and branches out; some of the branches are pinnated. The bone, or inner part of it, is of a horny texture, and very much compressed; this is covered over with a scarlet flesh, full of small mouths.

TAB. 11.

This species of Sea-Feather is brought to us by the East-India ships from the Cape of Good Hope, and is the

the brightest colored of all this genus, not unlike fire; but the flesh as it becomes dry is apt to fall from the bone; the main stems grow up a little, waving as they tend towards the tops. The mouths are oblong; they are larger and fewer on the main stems, than on the small side branches, where they are in great abundance.

3. *Gorgonia juncea.**Rust-like Gorgon.*

Gorgonia simplicissima
tercè utrinque attenuata,
osse corneo fusco, carne
ochracea bisulcata, osculis
crebris linearibus notata.

This Gorgon has a single round stem, smaller at each end. The bone is of a dark-colored horny consistence; this is covered with an orange-colored flesh, full of longish little mouths.

This orange-colored Sea-Whip was found by Mr. Greg in the new ceded islands, growing on a shell, and is very flexible when alive, and about three feet long. There are two small furrows, one on each side, which are continued the whole length of the animal: these are the tubes, sunk in, with which the suckers and mouths did communicate, when the animal was alive.

4. *Gorgonia ceratophyta.**Horned Gorgonia.*TAB. 12
FIG. 2.

Gorgonia dichotoma,
axillis divaricatis, ramis
virgatis ascendentibus bi-
fulcatis, carne purpurea,
polypis niveis octotentacu-
latis distiche sparsis, osse
atro corneo suffulta.

This Gorgon grows in a subdivided manner; the branches stand asunder, and grow erect, like twigs. These have two furrows on them; their flesh is of a purple color, and their polypes snow white, having
M eight

eight claws each. They are placed in irregular rows on each side. It is supported by a black horny bone.

TAB. 12. FIG. 2. 3.

This Sea-Shrub grows a foot high, and makes a most beautiful appearance with its bright purple flesh and white polypes. It was taken up alive, and immersed in spirits by John Greg, Esq. of Dominica, and sent in this state to the Earl of Hillsborough, who did me the honor to present it to me.

TAB. 12.
FIG. 1.

5. *Gorgonia viminalis*.

Spanish Broom Gorgon.

Gorgonia ramis subtortibus divaricatis setaceis sparsis erectis, carne flava, polypis albis octotentaculatis distichis.

This Gorgon has loose, roundish, slender, and erect branches, with yellow flesh, and polypes with eight claws in rows on both sides.

TAB. 12. FIG. 1.

This slender Sea-shrub-like animal was found near the harbour of Charlestown, in South-Carolina, by J. Greg, Esq. who sent it to me preserved in spirits about the year 1762. It grows about a foot high or more; the bone is of a black horny texture.

6. *Gorgonia muricata*.

Sea Hedge-Hog Gorgon.

Gorgonia compressa ramosa dichotoma, carne crassa subalbida, osculis cylindricis arrectis muricatis,

This Gorgon has compressed subdivided branches, covered with a firm whitish flesh, full of cylindrical little mouths,

tis,

tis, osse ancipiti cornco nigricante.

which stand erect, and are defended by stony spiculæ, or spines. The bony part is flatfish, with two edges, of a horny nature and blackish color.

This is very common all about the American islands in the West Indies. The polypes have eight claws, and are protected by these spines. This is one of Mr. Greg's collection; and upon dissecting it, I first discovered the spawn, which consists of round white eggs, like those described in the *Alcyonium digitatum*, or Dead Man's Toes, and when it is sent forth, it passes through the polypes as it does in the *Alcyonium*.

7. *Gorgonia verticillaris.*

Sardinian White Gorgon.

Gorgonia teres pinnata ramosa, ramulis alternis parallelis, osculis verticillatis incurvatis, carne squamulis albidis vitreis oblecta, osse elaminis subtestaceis nitidis composito.

This Gorgon has round pinnated branches; the little side branches are alternate and parallel, with mouths bending inwards, and placed in whirls about the stem and branches. The flesh is covered with little white glassy scales, and the bone is composed of layers of a shining pearl-colored shelly substance.

Sea-Feather. Ellis *Corallin.* pag. 60. tab. 26. fig. S. T. V.

Gorgonia verticillaris. Linn. *Syst. Nat.* Ed. 12. p. 1289.

This species of Sea-Feather exceeds all the rest of this genus both in neatness and elegance of form. It is found near Sardinia, in the Mediterranean Sea, and grows to two and three feet high. The flesh is full of parallel tubes, that grow close round the bone. In the younger branches the bone is very brittle, and of a pale yellow color; as the number of layers increase, the surface of each layer has a shining pearl-like look, very like some kind of sea-shells. See plate 2. fig. 4. 5.

TAB. 13. 8. *Gorgonia lepadifera.*

FIG. 1.

2.

*Gorgonia dichotoma, of-
culis confertis reflexis cam-
panulatis imbricatis, carne
squamulis albis obducta,
osse in ramulis majoribus
testaceo, in minoribus cor-
neo.*

Barnacle-bearing Gorgon.

This Gorgon is dichotomous: it is almost covered with mouths, which are placed close together, hanging over one another; they are bell-shaped, bent downwards, and full of small scales. The flesh is covered with minute whitish scales. The bone in the larger branches is testaceous, or rather like bone, and in the smaller ones horny.

TAB. 13. FIG. 1. 2.

Planta marina Resedæ facie. Clusii Exot. p. 122.

Gorgonia lepadifera. Linn. Syst. Nat. Ed. 12. p. 1289.

This *Gorgonia* is found on the coast of Norway: the specimen figured here was brought from Archangel, and presented to me by Dr. Solander.

This very curious animal rises usually to eighteen inches high. The heads and mouths bend downwards,
and

and have the appearance of some species of Barnacles ; they are covered with white scales of different sizes, placed one over the other. The opening of each mouth is surrounded by eight little pointed valves or scales, which close together in the dried specimens. If we compare the scales of the Coluber Ceraſtes (of which there is a moſt elegant figure in the Philoſophical Tranſactions, Vol. 56. tab. 14.) we ſhall obſerve ſomething ſimilar in the ſcales on the mouth of that animal, to thoſe on this Gorgonia, but varying in ſhape according to the form of their mouths : we may likewiſe ſee what a variety of ſhapes the ſcales are of on the reſt of the body of this viper, to ſuit the various turnings and twiſtings of this active animal : in this Gorgonia, which is a fixt animal, the ſcales on the ſtem and branches, which do not move, are much of one form, differing greatly from thoſe on the heads, which are always in motion, while the animal is alive and catching its food.

9. *Gorgonia pectinata.*

The Comb-like Gorgon.

Gorgonia teres, ramulis ſecundis parallelis aſcendentibus, carne rubra, oſculis creberrimis rotundis prominulis, oſſe duro albo fragili.

This Gorgon is round ; its ſmall branches come out parallel, and only on one ſide, and grow erect. The fleſh is reddiſh ; the mouths are round, numerous, and project a little. The bone is white within, hard and brittle.

Seb. muſ. 3. tab. 105. fig. 1. a.

Gorgonia pectinata. Linn. Syſt. Nat. Ed. 12. pag. 1292.

This

This curious Sea-Feather has been lately introduced from the East Indies. There is an elegant specimen of it in the British Museum, lately presented by Lord Pigot. In the specimen which I have, there are little mouths on all the branches down to the base: those on the larger branches are much bigger, and project more, than those on the erect small branches.

10. *Gorgonia Placomus.*

Great Norway Gorgon.

Gorgonia plana dichotoma, ramis flexuosis rarius anastomosantibus, oculis conicis setaceis eminentibus, osse substantiâ fere lignosâ.

This Gorgon has its branches disposed in a dichotomous order and a flattish form; they bend irregularly towards one another, but rarely unite. Their mouths are conical, project, and are surrounded at top by little spines. The bone or support is nearly of the substance of wood.

Warted Sea-Fan. Ellis Corallin. pag. 67. tab. 27. fig. a. A. A 1. A 2. A 3.

Gorgonia Placomus. Linn. Syst. Nat. Ed. 12. pag. 1290.

This Sea-Fan is of a reddish brown color; it grows on the coast of Norway, to a very large size, several feet high; it is now and then found on the coast of Great-Britain. There is a good specimen of it in the British Museum, which was sent to me from Stavanger, in Norway, in the year 1755. I have two varieties of this species from the East Indies; one very small, three inches long, with its flesh and mouths covered with reddish glassy spines; the other of a cinereous color, with its internal part very like the

the consistence of leather; this is about five inches high.

11. *Gorgonia pinnata.* *West-India pinnated Gorgon.* TAB. 14.
FIG. 3.

Gorgonia ramosa pinnata, ramulis suboppositis compressis, osculis polypteris in marginibus seriatim dispositis, carne albidoflavescente intus purpurascente, osse corneo.

This Gorgon is branched and pinnated; the small branches are compressed and nearly opposite. The polype suckers come out of the mouths in regular rows on each margin. The flesh is yellowish, with some appearance of purple on the inside. The bone is horny.

TAB. 14. FIG. 3.

This elegant Sea-Feather is very common in the West Indies. It is often found of a fine purple color, at other times yellow. This specimen was sent in spirits, with all the polype suckers extended, by Mr. Greg, who was very attentive, in his collecting them, to shew in what manner they appeared alive. It is often confounded by authors with the *G. fetosa* of Linnæus, or Sea-Feather of Sir Hans Sloane.

12. *Gorgonia exserta.* *Bareheaded Gorgon.* TAB. 15.
FIG. 1.

Gorgonia teres sparse ramosa, ramulis alternis, osculis octovalvulis alternis, polypis octotentaculatis exsertis, carne squamulis albis vestita, osse subfusco corneo.

This Gorgon is round, thinly branched, and the branches alternate. The mouths, or cells, are placed alternately; these have eight valves, and the polypes have as many claws, and appear on the outside

side of the cells. The fleshy part is covered with very minute white scales. The bone is of a dark-color, and horny.

TAB. I 5. FIG. I. 2.

This elegant Sea-Shrub is about two feet high, very loosely branched, with long slender white branches. The suckers standing out uncovered, when dry, occasioned my calling it the Bareheaded Gorgon.

It was brought from the West Indies, and is at present in the superb cabinet of her Grace the Dutchess Dowager of Portland, who was so obliging as to give me the specimen represented in the plate, where one of the cells and the polype is magnified.

TAB. I 5. FIG. 3.
4. 13. *Gorgonia patula.*

*Gorgonia compressator-
tuose ramosa subpinnata
ruberrima, osculis distichis
subrotundis halone subal-
bido inclusis, osse subfusco
corneo.*

Flat Gorgon.

This flat Gorgon has branches growing waved and partly pinnated; it is of a very bright red color. It has two rows on each side of little round mouths, included in whitish circles. The bone is of a darkish color, and horny substance.

TAB. I 5. FIG. 3. 4.

This beautiful crimson Sea-Feather was brought from the Mediterranean. The celebrated Donati sent me a piece of this species, preserved in spirits, with its polypes extended, which is expressed in the plate at fig. 4.

14. *Gorgonia.*

14. *Gorgonia verrucosa.**Warted Gorgon.*

Gorgonia in plano ramosa flabelliformis, ramis teretibus flexuosis, osculis prominulis papillofis albidis, osse tereti substantia lignoso-cornea.

This Gorgon grows with round irregular branches in a flat fan shape. The mouths are like white prominent warts. The bony part is of a substance between wood and horn.

Phil. Transf. Vol. 50. tab. 34. fig. 19. a.

Gorgonia verrucosa. Linn. Syst. Nat. Ed. 12. p. 1291.

There are various species of this warted Sea-Fan in the West Indies, the Mediterranean, and on the coast of Cornwall. There are some of them, whose warts are more prominent and closer together than others. This Sea-Fan, when dry, is of a dirty white or cinereous color. The specimen which I have quoted from the Philosophical Transactions, is incrusting the *Lepas calceolus*, or Slipper Barnacle.

15. *Gorgonia anceps.**Sea-Willow Gorgon.*

Gorgonia ramosa subdividiotoma, carne depressa-ancipiti, marginibus osculosis, osse subtereti attenuato substantia corneo-subcoriacea.

This Gorgon is branched nearly in a subdivided manner. The flesh is flat on each side, with a row of little mouths along both the margins. The bone is roundish, and small at the ends, of a horny nature, inclining to leather.

Sea-Willow. Ellis Corallin. pag. 68. tab. 27. fig. g.

Gorgonia anceps. Linn. Syst. Nat. Ed. 12. pag. 1292.

Of this sea-shrub there are several varieties. The largest kind, which is figured in Sloane's H. Jam. is dichotomous; there are many of the smaller kinds that are more diffused in their manner of growing. When they are recent from the sea, they are of a fine violet color; but when we receive them, some are yellow, others white. They are now and then found on the coast of Great-Britain and Ireland; but not frequently.

TAB. 13. 16. *Gorgonia pretiosa.*

True Red Coral.

FIG. 3.
4.

Gorgonia in plano ramosa dichotoma subatenuata, carne miniatella lubrica molli vasculosa, osculis octovalvibus conicis subbiantibus sparsis, polypus albidus octotentaculatos bifariam cirratos exsertentibus, osse lapideo ruberrimo extus striato et foveolato.

This Gorgon grows spread flat, with dichotomous branches that lessen towards their extremities. The flesh is of the color of red lead, soft, slippery, and full of minute vessels. The mouths are irregularly placed on the surface, and rise up in a conical form, consisting of eight valves just opening, from whence proceed polypes of a white color with eight claws; each claw has a double row of fibres on both edges. The bone is stony, and of the brightest red, marked with minute furrows on the outside, and with little hollow places here and there, that have corresponded with the cells.

TAB. 13. FIG. 3. 4.

Red

Red Coral. Ellis Corallin. pag. 93. tab. 35. fig. 3.

Isis nobilis. Linn. Syft. Nat. Ed. 12. pag. 1288.

The characters of this most valuable, as well as beautiful animal, have been fully described by the celebrated Donati, in the Philosophical Transactions. He was so kind as to send me a specimen, with the polypes extended, preserved in spirits; it was from this, that I have had the figure drawn in tab. 13. fig. 4. In another specimen which he sent me I discovered the eggs, in dissecting the cells, which are small round bodies, as in the other Gorgonias.

Though Dr. Linnæus has called this animal an Isis, he informs me, that I have more properly ranged it among the Gorgonias. The genus of Isis is sufficiently distinguished by its joints, as I shall shew hereafter.

17. *Gorgonia crassa.*

Fleshy Gorgon.

Gorgonia teres dichotoma, ramis crassis virgatis divaricatis ascenduntibus, carne violacea crassa, osculis prominulis æquidistantibus, polypos octotentaculatos marginibus cinctis exsertentibus, osse subfusco cornco.

This Gorgon is round and dichotomous, with long fleshy branches, which bend a little out, and then grow upright. The flesh is of a violet color, plump, and full of little rising mouths, disposed on the surface near one another at equal distances: these send forth polypes with eight claws, that have small fibres on each side. The bone is of a dark brown color, like horn.

Lithophyton Americanum, maximum, cinereum, cortice punctato. Act. Par. 1700. pag. 34. tab. 2.

Hughes Hist. Barbadoes, tab. 27. fig. 1.

This Gorgon was sent by Mr. Greg, preserved in spirits, to the Earl of Hillsborough.

The flesh is very thick, and the bone very small at the extremities: in large old specimens the bone is very black, and like horn.

18. Gorgonia Flabellum.

Venus's Fan.

Gorgonia reticulata, ramis interne compressis, carne flava (interdum purpurea) osculis minutis sparsis, polypis octotentaculatis, osse nigro corneo, in ramis majoribus tenuiter striato.

This Gorgon grows in form of a net, with its branches compressed inwardly. The flesh is yellow, sometimes purple, with small mouths, placed irregularly, having polypes with eight tentacles. The bone is black, horny, and slightly striated on the larger branches.

Flabellum Veneris. Ellis Corallin. pag. 61. tab. 26. fig. A.

Gorgonia Flabellum. Linn. Syst. Nat. Ed. 12. p. 1293.

Both the trunk and branches of this Sea-Fan are pinnated, and by the means of the small branches crossing each other and blending together, they compose this elegant reticulated form. Mr. Greg has likewise sent over many small specimens of this Sea-Fan preserved in spirits, with the polypes extended, which have eight claws.

This elegant Sea-Fan is found principally in the American seas, where they grow to three and four feet high. They

They are likewise brought from the Mediterranean and the East-Indian seas.

19. *Gorgonia suberosa.**Cork-like Gorgon.*

Gorgonia ramosa subdivotoma, ramis longioribus crassis teretibus ascendentibus, carne minia- cea spongiosa, osculis sub- stellatis in quincunxes fere dispositis, osse pallide ru- bro suberoso.

This Gorgon is branched in a subdivided manner, with very long upright, round, thick branches. The fleshy part is of the color of red lead, and spongy; the mouths are like little stars disposed almost in a quincunx order. The bone, or inward hard part, is of a pale red, and of the substance of cork.

Ellis Corallin. pag. 63. tab. 26. fig. P. Q. R.

This soft spongy Coral-like Gorgon is evidently one of this genus, from the different hardness of the inner substance or bone of the animal, compared with the fleshy part on the surface; where the flesh is rubbed off the inner part, it is striated as in others of this genus. I have seen specimens of it eight or nine inches long. The branches are nearly cylindrical, growing a little slenderer towards the top: they are in thickness about the size of a large goose-quill; and are found on the coast of South-Carolina and the Bahama Islands.

20. *Gorgonia Briareus.**The Gorgon Briareus.*

TAB. 14.
FIG. 1.

Gorgonia subramosa teres crassa, basi supra

This Gorgon rises with very² few, thick, succulent branches,
rupes

rupes late explanata, carne interne subalbida externe cinerea, polypis majoribus octotentaculatis cirratis, osse ex aciculis vitreis purpureis inordinate sed longitudinaliter compactis composito.

from a broad base that is spread upon rocks. The flesh is of a whitish color within, and a pale ash color without, furnished with large polypes, that have each eight fringed claws, and come out on the surface in a quincunx order. The bone, or hard inward part, consists of a number of little purple, glassy needles, irregularly but closely put together lengthways.

TAB. I 4. FIG. I. 2.

This soft Coral has been reckoned by some authors an Alcyonium. But having received many elegant specimens of it, well preserved in spirits, from the Earl of Hillsborough, which were collected by Mr. Greg in the West Indies; they have afforded me an opportunity of placing it with its proper genus.

The firm purple glassy inside appears so distinct from the pale white fleshy part on the outside, that as soon as I had discovered this, I did not hesitate to remove it to its proper genus: besides, the stems being the largest in diameter of all this genus clearly explain to us, what we are obliged in the other species to make use of magnifying glasses to discover, particularly the various vessels of the organical parts that serve to extend and contract the polype-like suckers, which supply the animal with proper nourishment for its support and further extension. One thing is remarkable in the more solid or bony part of this animal, that we may easily distinguish
certain

certain fine yellow ramified fibres, or vessels, that are interwoven among the glassy hard parts, analogous perhaps to such-like vessels in the harder and softer parts of the bones of more perfect animals. Further, where the animal spreads its fleshy base on the rocks, we find the bony or vitreous purple part adhering to the rocks, as we do the horny or stony hard parts in the base of the other Gorgonias.

21. *Gorgonia calyculata.**Cup-mouth Gorgon.*

Gorgonia dichotoma, ramulis crassis arrectis, papillis truncatis, carne cinerascente intus purpurea, osculis majoribus calyciformibus confertis sursum spectantibus, polypis octotentaculatis cirratis, esse subfusco corneo.

This Gorgon grows in a subdivided order, having erect thick branches, with truncated papillæ. The flesh is ash-colored without, and purple on the inside, furnished with large cup-shaped mouths, disposed close together in a quincunx order, and looking upwards, having polypes with eight fringed claws extending themselves from them. The bone is of a dark brown color, and horny nature.

This sea-shrub sends forth round white eggs, larger than any of the genus. It was collected and preserved in spirits by Mr. Greg.

22. *Gorgonia abietina.**Fir-like Gorgon.*

TAB. 16.

Gorgonia ramosa pinnata, carne flava, osculis

This Gorgon is full of branches which are pinnated.
purpureis,

purpureis distichis, osse corneo flavescente. The flesh is of a pale yellow color, with rows on both sides of purple mouths. The bone is horny and yellowish.

TAB. 16.

Plukenet amalth. tab. 452. fig. 3.

This beautiful Sea-Feather was sent me from Cape Coast Castle, in Africa.

It grows flat, about a foot high; the stem is often full of small barnacles, which it covers over. The old branches are irregular, but the young branches are pinnated, like the *Sertularia abietina*, or Sea-Fir vesicular Coralline.

23. *Gorgonia elongata.*

Forked Gorgon.

Gorgonia dichotoma divaricata, ramis longioribus ascendentibus, carne tetragona rubra crassa, osculis erectis secundum angulos subimbricatis, osse tenui corneo flavescente.

This Gorgon has long erect branches, which are subdivided and divaricated. The flesh is of a vermilion color, very plump and square; the little mouths are placed along the corners; they are erect, and disposed something like tiles by one another. The bone is of a horny consistence, very slender, and of a yellowish color.

Gorgonia elongata. Linn. Syst. Nat. Ed. 12. p. 1291.

This scarlet Sea-Shrub was brought from the West Indies. My specimen is about eighteen inches high. The flesh is full of little warts, with points looking upwards; these

these are disposed in rows on the angles of the branches, and seem to bend one over the other.

IX. ANTIPATHES.

ANTIPATHES, commonly called
Black Coral,

Animal crescens plantæ facie.

Stirps intus cornea, spinulis exiguis obsita, basi explanata, extus carne gelatinosa, verrucis polypiferis obdueta.

Ovaria incerta, nisi ovula ex polypis, sicut in Gorgoniis, Alcyoniis, &c.

Is an animal growing in the shape of a plant.

The stem is horny in the inside, beset with very small spines, and spread out at the base. The outside is covered with a gelatinous flesh, full of warts, from whence the polypes extend themselves.

The ovaries are uncertain, unless the little eggs proceed from the polypes, as in the Gorgonias, Alcyoniums, &c.

It appears from the old botanical writers, that the several sorts of Black Corals were formerly called by the name of Antipathes; but as the characters of those marine bodies were not so exactly looked into then, as they are now in this present inquisitive age, some of the Gorgonias, whose horny internal parts are black, were probably included amongst them.

That they were not only used as sceptres for princes, but likewise for divining rods, and other such purposes, is clear from Salmasius's remarks to Solinus, wherein he says, that Antipathes denotes something proper to resist incantations, and that they were used for that purpose by

several Indian nations. See Rumph. Herb. Amboin. Book xii. ch. 2.

There is certainly a great affinity between the Antipathes and the Gorgonia; but yet there is so much difference, as with great propriety to constitute a new genus, and though the name is not new, yet it is well adapted. The spines in the bony part, and the gelatinous fleshy covering, distinguish this genus remarkably.

That they are covered with polype heads, or something very like them, appears from examining in the microscope some of the warts that covered a specimen of the Antipathes spiralis, lately brought from the East Indies, and soaked for some time in warm water, from which in tab. 19. fig. 4. 5. the mouths and claws are exactly represented highly magnified. And it is much more probable, that they produce their eggs through those mouths, as the Gorgonia, Isis and Aleyonium do, than from those imaginary ovaries that are seen scattered here and there on some species, both on account of the irregularity of their shapes, as well as their different situations on the same animal. Those figures being no more than the remains of the cover of some extraneous bodies that have adhered to them, having myself seen and examined many of them. One of the arguments used, that these are ovaries, is, that the substance of the bony part of the stem forms part of them; but the very same substance, with all its spines, likewise covers all the small kinds of Barnacles, and other foreign substances that adhere to them. If we examine the ovaries of the Sertularias, to which they are compared by some, we shall soon be convinced that there is no similarity between them; in one, there is form and order; in the other, irregularity of situation, and no certainty of shape.

Count Marfigli, in his *Histoire Physique de la Mer*,
2
has

has given us a figure of one of these Antipathes, tab. 40. fig. 179. No. 1. 2. 3. where there seems to be on the smallest branches regular rows of polype-like mouths, with two arms to each, fitting on little foot-stalks, as at A. A. No. 3. These the Count takes to be of the same substance and use as the flowers in the Coral: but we must wait for further information, before we can conclude any thing from his observations, as his figures are but rude.

Some people imagine the Antipathes grows like a vegetable; but they have not observed, that when we break their stems obliquely across, we find the spines regularly disposed in the inside layers as well as the outside, as I have expressed it in fig. 6. tab. 19; whereas, in trees and shrubs that are covered with spines, when we cut or break them obliquely across, we have not yet been able to discover the spines in the internal annual circles of the wood.

Another material argument has not been yet noticed, which is, that the medulla or pith-like substance of the larger branches has no communication with the medulla of the lesser branches, being always separated by a septum, or bony partition of the same substance with the rest of the stem. It is quite otherwise in trees and shrubs; so that though they have an outward vegetable form, their anatomy as well as chemical principles, is quite different.

1. Antipathes spiralis.

Spiral Antipathes.

TAB. 19.
FIG. 1—6

Antipathes simplicissima
spiralis scabra.

Antipathes, or Black Coral, with a single twisted rough stem.

TAB. 19. FIG. 1—6.

Gorgonia spiralis. Linn. Syft. Nat. Ed. 12. p. 1290.

There are several fizes of this extraordinary animal; one of them is of the thicknefs of a writing pen, and about two feet long; this has grown naturally into a knot, as if it was tied, and is curled and twifted very remarkably; fee fig. 1. tab. 19. The fleshy part that covers the fpiry surface of the bone is full of little gelatinous wart-like figures, as at fig. 2.

When we have foaked these warts for some time in warm water, they appear to us not unlike some polypes with fix claws furrounding a cup in the center, which probably is their mouth: these figures are differently magnified at fig. 3. 4. 5. This specimen spreads itself with a broad base on a coral rock. The bone, or hard part, when broke obliquely, horizontally shews that the internal as well as external layers are full of little spines; see fig. 6. It is of a hard horny black shining substance, brittle almost as glafs.

I have another specimen not thicker at the base than the quill of a hen's feather; this is twifted spirally, but loofely and tapering to a point: it is seven feet long, very black, full of spines, and covered with a hardened thin gelatinous substance, and was found adhering by a broad base to a rock.

Both of these were lately brought from the East Indies; they are found in plenty about the spice islands.

TAB. 19. 2. *Antipathes Ulex.* *Furz-like Antipathes.*

FIG. 7. 8. *Antipathes ramosissima,* This *Antipathes* is very much
ramis sparsis patentibus bi- branched, with loose, spread,
spidissimis attenuatis. very rough, and pointed
branches.

TAB. 19. FIG. 7. 8.

This

This Antipathes is particularly full of small short spines: the branches stand out loose and irregular, and are remarkably black.

On this specimen, part of which is shewn at fig. 7. 8. there are many of those irregular hollow figures, supposed to be ovaries, several of which lie along the branches, and then are turned up like horns inverted; others turn sideways, others downwards, all of them vary in their shape and direction, and are placed irregularly here and there on the branches; they are of a brownish yellow color, and appear to be a part of the spiny surface of the Antipathes. The same kind of covering is found on the little Barnacles and other little animals that infest them.

This was brought from Batavia, in the East Indies, by W. Webber, Esq. F. R. S.

3. Antipathes subpinnata.

Feathered Antipathes.

TAB. 19.
FIG. 9.
10.

Antipathes ramosa pinnata hispida, pinnulis setaceis alternis, pinnulis aliis (sed raris) tranverse excuntibus.

This Antipathes is branched and pinnated; the little pinnæ are full of small spines, and disposed alternately on the branches: and at right angles, opposite to these, are a few other little pinnæ.

TAB. 19. FIG. 9. 10.

This specimen was brought from Gibraltar, and is supposed to be taken in the sea thereabouts. The spines are long and small, and of an amber color when magnified: the surface of the Antipathes appears to be an ash color.

4. Antipathes

TAB. 19.
FIG. 11.
12.

4. *Antipathes myriophylla.*

Yarrow-like Antipathes.

Antipathes incurva ramosissima pinnata, pinnulis hinc ramosis setaceis.

This *Antipathes* is full of pinnated branches that bend downwards; these pinnated branches have other little spiny branches on their upper side.

TAB. 19. FIG. 11. 12.

The form of this *Antipathes* is very elegant, from the bending of its many pinnated branches downwards all round it, which gives it the appearance of a fine shady little tree. The spines are but short in this, in proportion to the last. The color is of a yellowish brown.

It was brought from Batavia, and was collected near the spice islands.

5. *Antipathes alopecuroides.*

Foxtail Antipathes.

Antipathes ramosa, ramis arcte paniculatis hispidis setaceis.

This branched *Antipathes* has its young branches, which are full of spines and small prickles, disposed in close panicles.

The trunk of this *Antipathes* rises from a broad spread base, and divides immediately into several large branches of one-third of an inch diameter; as these rise up, one side of them appears flat, with a groove or channel along the middle of it, where there are the remains of many little branches that have grown in rows on each side of it. It then divides into branches, and often into other branches, all which are in form of close panicles, not unlike

like the foxtail-grass. These panicles are composed of very rough thorny minute branches, which are twice as long on one side of the stem as the other. The outside of this Antipathes is of greyish color; the inside is black and very brittle. It is near two feet high.

This was brought from South-Carolina, and presented to Corbyn Morris, Esq. F. R. S. and has not before been described.

6. Antipathes Cupressus.

Cypress Antipathes.

Antipathes simplex scabra paniculata, ramis recurvatis.

This Antipathes grows in the form of a single panicle, full of minute prickles, with the little branches bending upwards.

Gorgonia Abies. Linn. Syst. Nat. Ed. 12. pag. 1290.

Dr. Linnæus has classed this elegant sea production under his genus of Gorgonias, to which it is very nearly allied; but the flesh of this tribe is so remarkably gelatinous, and the whole bone, or hard part, is so covered with spines, which even are to be distinguished in the interior laminae, that there is sufficient reason for making it of another genus.

There is a most elegant specimen of this in the British Museum, and very good figures of it in Rumphius and Seba. It grows in the East-Indian ocean among the spice islands.

X. I S I S.

*Animal crescens plantæ
formâ.*

*Stirps lapidea, articu-
lata, articulis striis longi-
tudinaliter exaratis, sub-
stantia spongiosa vel cornea
connexis.*

*Caro mollior, porosa
atque cellulosa,*

*Osculis polypiferis, ten-
taculatis, oviparis obducta.*

ISIS, or JOINTED CORAL,

Is an animal growing in the form of a plant ;

whose stem is stony and jointed : the joints are furrowed longitudinally, and united together, in some by a spongy, in others by a horny substance.

It is covered over by a soft porous and cellular flesh, full of little mouths, from whence the polypes with their claws come forth, through whom the eggs are produced.

This genus of Zoophytes is very nearly allied to the Gorgonias, having a hard part within, which is the support or bone of the animal, and a softer part without, which is its flesh. This soft part is furnished with organs that serve both for nutrition and generation. These are its polype-like suckers, which are contained in, and extend themselves from its cells, when in search of food.

The difference between the Isis and Gorgonia is this, that the bony part of the Isis is jointed, which is not so in the Gorgonia. These joints are an admirable contrivance of Nature, to secure the brittle branches of these animals from being torn to pieces. Without this, they could not arrive to the height of which some of them are found, viz. of two or three feet : for by bending freely to and fro with these soft joints, they easily resist the violent motions of the sea. When the animals grow old, their stems have no more joints, that part being then
strong

strong enough to withstand the force of the waves. The soft geniculations then are only found in the slenderer parts of the branches.

1. *Ifis ochracea.**Jointed Red Coral.*

Ifis stirpe erosio-striata lapidea rubra dichotoma explanata ramosissima articulata, geniculis nodosis spongiosis fulvis, carne flavescente, osculis stellatis, polypos octotentaculatos obducentibus.

This *Ifis* has a stony stem, irregularly channelled, as if eaten into; the branches are many, dichotomous, and spread out; the joints are connected by deep yellow spongy knobs. The flesh is of a pale yellow, full of starry mouths, that cover polypes with eight claws.

Red Coral from the East Indies. Ellis Philos. Transf. Vol. 50. pag. 189. tab. 3.

Ifis ochracea. Linn. Syst. Nat. Ed. 12. pag. 1287.

This beautiful *Ifis* is found in the East-Indian Ocean among the spice islands. It is so very liable to fall to pieces, when dry, that good specimens of it are very rare. There is likewise a variety of it, whose stony part and flesh are quite white; but the spongy geniculations are of a brownish yellow.

2. *Ifis Hippuris.**Black and White jointed Coral.* TAB. 3.
FIG. 1-5

Ifis stirpe articulata lapidea, ramulis sparsis, ossibus articulis cylindricis lapideis albis sulcatis, internodiis corneis nigris constrictis

This *Ifis* has a jointed stony stem, which rises into many loose branches. The bone or support of the animal consists of white, cylindrical, stony,
P *connexis,*

connexis, carne subalbida porosa crassa, osculis in quincunces dispositis, polypos octotentaculatos obtegentibus.

channelled joints, connected together by black contracted horny intermediate ones. The flesh is whitish, plump, and full of minute vessels; the surface of it is full of the little mouths of the cells, which are disposed in a quincunx order, covering the polypes with eight claws.

TAB. 3. FIG. 1—5.

Isis Hippuris. Linn. Syst. Nat. Ed. 12. pag. 1287.

There are many varieties of this much admired *Isis*. Some are dwarfish, not above six inches high; others, from a foot to two feet and more. In some, the stony joints are longer, and the black horny joints very short: in others, the black horny ones are longer, but always more contracted, as may be seen in the 84th table of the 6th vol. of Rumphius's *Herb. Amboinense*, where it is excellently described.

In tab. 3. there are several sections of this Coral magnified, to shew the manner in which the Polypes from their cells draw in their nourishment, for the further extension and increase both of the bony as well as the fleshy part of the animal.

Fig. 2. is a longitudinal section of the trunk of this Coral without joints appearing on the outside; but in the middle of its inside is a small ramification, where both its horny and stony parts are covered over with layers of the stony part alone, which shews its growth to be different from that of shrubs. We likewise find that this Coral spreads its base on rocks, by various turnings and windings,

windings, both of its bony and fleshy part ; and likewise, as it rises, we find it inclosing shells and other extraneous substances, that stick to it, like the Gorgonias.

This beautiful Coral is often brought by our East-India ships from Prince's Island, in the Straits of Sunda, on the southern coast of Sumatra. Specimens with the flesh on them are rarely to be met with, as the sailors generally scrape off the flesh to shew the beauty of the black and white joints.

3. *Ifis coccinea.*

Dwarf Scarlet Ifis.

TAB. 12.
FIG. 5.

Ifis pumila varie ramosa, ramulis divaricatis, osse articulato lineari substriato ruberrimo, internodiis brevibus spongiosis fulvis, carne intus pallide rosea, extus cellulis elevatis verruciformibus coccineis, osculis minimis.

This little *Ifis* has its branches irregularly spread. Its bone is jointed, slender, very red, and a little striated ; the joints are united by short, spongy, yellowish geniculations. The flesh on the inside is of a pale rose color ; on the outside it is covered with little rising wart-like scarlet cells, each having a little mouth.

TAB. 12. FIG. 5.

This Dwarf *Ifis* differs from the Dichotomous *Ifis* of the Cape, in being much smaller, and irregular in its branches. Nothing can exceed the brightness of its scarlet color. It is about two or three inches high, and was collected on the coast of Mauritius, in the year 1767, and presented to Dr. J. Fothergill, with many other rare sea productions, by the surgeon of an East-India ship that

put in to refit there. At the fame time there was a variety of this fpecies found that was perfectly white.

XI. CORALLINA.

C O R A L L I N E

Animal *crescens habitu plantæ.*

Stirps fixa, c tubis capillaribus per crustam calcaream porosam sese exferentibus, composita.

Rami sæpe articulati, semper ramulosi, vel divaricati, liberi vel conglutinati et connexi.

Is an animal growing in the form of a plant ; whose stem is fixt to other bodies, and is composed of capillary tubes, whose extremities pass through a calcareous crust, and open into pores on the surface.

The branches are often jointed, and always subdivided into smaller branches ; which are either loose and unconnected, or joined as if they were glued together.

This genus has been thought by some late writers to belong entirely to the vegetable kingdom, and to differ but little from Fucus's and Conferva's : but as Dr. Linnæus observes, in a note on this genus in his System of Nature, p. 1304. "Corallinas ad regnum animale pertinere ex substantia earum calcarea constat, cum omnem calcem animalium esse productum verissimum sit." Or, that all calcareous substances are most truly of animal production ; therefore that Corallines, consisting of that substance, do belong to the animal kingdom.

What or where the link is that unites the animal and vegetable kingdoms of Nature, no one has yet been able

to point out ; some of these Corallines appear to come the nearest to it of any thing that has occurred to me in all my researches : but then the calcareous covering, though ever so thin, shews us that they cannot be vegetables. The white mealy surface of some of the Lichens would induce one to think them covered with a calcareous matter : but chemistry shews us it is no more of a calcareous nature than the mealy whiteness on the leaves and blossoms of the *Auricula urfi*.

The minuteness of the pores of Corallines, though as small as those of some plants, is no proof of their being vegetables ; because there may be suckers that come through these pores, which our glasses cannot discover ; or perhaps they may be like the pores of sponges, contrived in such a manner as to suck in and throw out the water. Let us observe the pores of the Millepores, and we shall find them equally as small in many species as those of the Corallines ; and yet these are universally allowed to be of the animal kingdom.

For a more particular enquiry into this subject, I shall refer the reader to the Philosophical Transactions, Vol. 57. pag. 404. where I have fully explained this matter, in a letter to Dr. Linnæus.

1. *Corallina tridens.**Trident Coralline.*TAB. 20.
FIG. 2.

*Corallina trichotoma
articulata, articulis com-
pressis planis trilobis.*

This Coralline is jointed, and branches out into a division of three; the joints are compressed, with three flat lobes.

TAB. 20. FIG. 2.

This was found by John Greg, Esq. on the coast of the new ceded Islands.

2. *Corallina*

TAB. 20. 2. Corallina Opuntia.
FIG. b.

Indian Fig Coralline.

Corallina trichotoma articulata, articulis compressis undulatis reniformibus. This Coralline is jointed; the branches divide into three. The joints are compressed, waved, and kidney-shaped.

TAB. 20. FIG. b.

Corallina opuntioides, ramulis densifloribus, et foliis magis sinuatis atque corrugatis. Sloan. Hist. Jam. I. pag. 57. tab. 20. fig. 2.

Articulated Coralline of Jamaica. Ellis Corallin. pag. 53. tab. 25. fig. b. B. B 1.

Corallina Opuntia. Linn. Syst. Nat. Ed. 12. p. 1304.

This is found on the Coast of Jamaica and the other West-India islands; and was lately found on the shore of Prince's Island, in the Straits of Sunda, by Doctor Badenach.

TAB. 20. 3. Corallina Monile.
FIG. c.

Necklace Coralline.

Corallina trichotoma articulata, articulis inferioribus compressis convexis cuneiformibus oblongis; superioribus subcylindricis. This Coralline is jointed, and branches out in a three-fold division: the lower joints are compressed, convex, wedge-shaped, and oblong; the upper ones are almost cylindrical.

TAB. 20. FIG. c.

This was found on the coast of Jamaica. There is a good specimen of this in the British Museum.

4. Corallina

4. Corallina incrassata.

*Fleshy Coralline.*TAB. 20.
FIG. d.

Corallina trichotoma articulata, articulis compressis convexo-planis cuneiformibus.

This Coralline is jointed, and the branches divide into three, with compressed, plano-convex, wedge-shaped joints.

TAB. 20. FIG. d. d 1—3. D 1—6.

Ellis Corallin. pag. 53. tab. 25. fig. A. a.

This is found very frequently cast on shore in the American islands, particularly Jamaica.

5. Corallina Tuna.

*Tuna Coralline.*TAB. 20.
FIG. e.

Corallina trichotoma articulata, articulis compressis planis subrotundis.

This Coralline is jointed, and the branches divide into three, with smooth compressed roundish joints.

TAB. 20. FIG. e.

Opuntia marina. Parkins. Theatr. p. 1294. fig. 12.
Marfigli Hist. de la Mer, pag. 65. tab. 7. fig. 31.

This is found in the Mediterranean Sea.

6. Corallina Rosarium.

*Rosary Coralline.*TAB. 21.
FIG. h.

Corallina dichotoma, articulis submoniliformibus; inferioribus cylindricis.

This Coralline grows with its branches divided in two, having round joints which are something like a necklace; the lower joints are cylindrical.

TAB. 21. FIG. h. H. H 1—3.

Corallina

Corallina nervo tenuiori, fragiliorique internodia longiora neſtente. Sloan Hiſt. Jam. I. pag. 58. tab. 20. fig. 3.

This is found among the American iſlands, particularly on the coaſt of Jamaica.

The upper part has joints remarkably ſmaller than the lower part.

7. *Corallina barbata.*

Bearded Coralline.

Corallina dichotoma, articulis cylindricis, ramulis apice barbatis.

Dichotomous Coralline with cylindrical joints, and the tops of the branches ending in tufts of filaments.

Rofary, or Bead-Coralline of Jamaica. Ellis Corallin. pag. 54. tab. 25. fig. c. C.

Corallina barbata. Linn. Syſt. Nat. Ed. 12. p. 1305.

Theſe two laſt Corallines ſeem to be near akin; they look like beads ſtrung on ſtrings; the tufts of filaments ſeem to be the infant ſtate of the joints, before they are covered with the calcareous part. This will probably be confirmed by future obſervations; at preſent this appearance makes a remarkable difference.

This was found on the ſea-coaſt of Jamaica.

TAB. 21. FIG. 8. *Corallina lapideſcens.*

Stony Coralline.

TAB. 22. FIG. 9. *Corallina dichotoma, articulis cylindricis villoſis.*

Dichotomous Coralline with cylindrical downy joints.

TAB. 21. FIG. 8. Tab. 22. FIG. 9.

There

There are two varieties of this Coralline, one that is always dichotomous, Tab. 22. fig. 9. and another that sends out three or more joints from the same place, Tab. 21. fig. g. The fine hair-like down, when magnified, looks like the beginning of a Byssus. In specimens lately received, preserved in spirits as they were taken out of the sea, these fine short reddish hairs come out in regular whirls, or circles, one above another, out of the pores in the calcareous surface of the Coralline.

If we examine the figures of the Coralline of the shops that are represented magnified, after the calcareous coat was taken off by vinegar (see fig. A. and C. tab. 24. Essay on Corallines) we shall find the same kind of circular rows of fibres, one above another, as in this; so that it appears as if this Coralline in its present state was producing another calcareous layer over its former one.

9. *Corallina obtusata.**Oval jointed Coralline.*TAB. 22.
FIG. 2.

Corallina dichotoma,
articulis oblongo-ovatis utrinque rotundatis subcompressis.

Dichotomous Coralline with joints that are of an oval oblong figure, rounded at both ends, and a little compressed.

TAB. 22. FIG. 2.

Many of these Corallines, when dried, become compressed; but from the appearance of many kinds which I have received in spirits just as they were taken out of the sea, they are perfectly round.

This was brought from the Bahama Islands.

Q

10. *Corallina*

TAB. 22. FIG. 10. *Corallina oblongata.*
FIG. 1.

Oblong jointed Coralline.

Corallina dichotoma,
articulis oblongis subcom-
presso-cylindricis.

Dichotomous Coralline with
oblong cylindrical joints, a
little compressed.

TAB. 22. FIG. 1.

This species seems to come between the *Corallina obtusata* and the *Corallina cylindrica* that follows. It differs from the first in being round at the top of the joints and not at the bottom; and likewise in being more slender, also growing thicker towards the top. It differs from the latter by the joints being a little compressed and more distant; it is also thicker and softer.

It is found among the West-Indian islands.

TAB. 22. FIG. 4. **II.** *Corallina cylindrica.*

Cylindrical jointed Coralline.

Corallina dichotoma,
articulis cylindricis sub-
æqualibus lævibus.

Dichotomous Coralline with
smooth cylindrical joints, near-
ly equal.

TAB. 22. FIG. 4.

This Coralline I lately received from Mr. Greg, preserved in spirits, from the West Indies; when it was shifted into clear spirits, there hung to it a clear gelatinous substance, which the internal part appeared to be full of. Upon opening some of the joints, they also were full of minutely branched tubes; so that the tubular hollow appearance, as described by authors, proceeds from their having dissected only dried specimens. The joints seem rather larger at top than at bottom in recent specimens.

12. *Corallina*

12. *Corallina marginata.**Bordered Coralline.*TAB. 22.
FIG. 6.*Corallina dichotoma,*
ramis subcontinuis lævi-
bis complanatis, margi-
*nibus subinflexis.*Dichotomous Coralline with
flat smooth branches, scarcely
jointed, and a raised border.

TAB. 22. FIG. 6.

Though this Coralline is found, when dry on the shore, more flat than the rest of this kind, it is very probable, when it is fresh taken out of the sea it is much rounder; the fibres in the inside are extremely delicate, which occasions its shrinking so much, when the gelatinous fluid is evaporated.

This was found on the shore of one of the Bahama islands.

13. *Corallina rugosa.**Wrinkled Coralline.*TAB. 22.
FIG. 3.*Corallina dichotoma,*
articulis annulato-rugulo-
sis subcontinuis cylindri-
*cis, apicibus compressis.*Dichotomous Coralline with
cylindrical joints, almost unit-
ed: these are wrinkled with
circular furrows, and the tops
of it are compressed.

TAB. 22. FIG. 3.

Corallina geniculata, mollis, Americana, segmentis latis
et compressis. Pluken. phyt. tab. 168. fig. 4.

Fucus marinus coralloides minor fungosus albidus teres
segmentis in summitate planis. Sloan. Hist. Jam. I. p. 61.
tab. 20. fig. 10.

This is found on the Jamaica coast.

Q 2

14. *Corallina*

TAB. 22. FIG. 8. 14. *Corallina lichenoides.*

Liverwort Coralline.

Corallina dichotoma, ramis continuis rugosiusculis superne complanatis.

Dichotomous Coralline with branches a little rugged and not jointed; the tops of them are flat.

TAB. 22. FIG. 8.

This Coralline is of a sea-green color, and much shorter than the foregoing. It is found on the coast of the Bahama islands.

TAB. 22. FIG. 7. 15. *Corallina indurata.*

Hardened Coralline.

Corallina dichotoma, ramis subcontinuis teretibus lævibus divaricatis.

Dichotomous Coralline with round, smooth and spreading branches, scarcely jointed.

TAB. 22. FIG. 7.

This was found with the former on the coast of the Bahama islands.

TAB. 22. FIG. 5. 16. *Corallina fruticulosa.*

Shrub-like Coralline.

Corallina dichotoma, ramis teretibus continuis furfuraceis, apicibus attenuatis.

Dichotomous Coralline with round branches, not jointed; these are covered with a mealy substance, and grow smaller towards the ends.

TAB. 22. FIG. 5.

There are many varieties of this species, which spread their branches more irregularly.

This was found on the Bahama coast.

17. *Corallina*

17. *Corallina pinnata.**Pennated Coralline.*

Corallina ramis pinnatis continuis furfuraceis.

Coralline with pennated branches, without joints, and covered with a mealy substance.

This was found on the coast of the Bahama islands.

18. *Corallina squamata.**Flat jointed Coralline.*

Corallina trichotoma, articulis stirpium rotundato-compressis cuneiformibus; ramulorum compressis planis; ultimis complanatis ancipitibus acutis.

Trichotomous Coralline with different shaped joints: those of the stem are roundly compressed, and wedge-shaped; those of the branches flatly compressed; those at the extremities are flattish, going off sharp on each side, like a two-edged sword.

Upright English Coralline, with Spear-like Heads and flat Joints. Ellis Corallin. pag. 49. tab. 24. No. 4. fig. c. C.

This is of a sea-green color, and was collected on the coast of Cornwall by the Rev. Dr. William Borlase. It has a very different appearance from the officinal Coralline, of which some authors, who have not seen it, would make it a variety.

19. *Corallina loricata.**Coat of Mail Coralline.*

Corallina trichotoma, articulis compressis cen-

This Coralline is trichotomous, with joints that are
vexiusculis

vexiusculis cuneiformibus : roundly compressed, and
lateribus angulatis ; wedge-shaped ; the sides an-
gularis : *lobis parvis* angular ; the joints at the ends
obtusis. are something like small obtuse
lobes.

This Coralline is much larger than the Coralline of the shops, being four times as big.

It was found in the Mediterranean Sea.

TAB. 21.
FIG. a.
A.

20. *Corallina palmata*.

Palmated Coralline.

Corallina trichotoma,
articulis compressis con-
vexiusculis cuneiformibus,
apice subcorniculatis, *arti-*
culis ultimis latis, *lobis di-*
gitiformibus instructis.

Trichotomous Coralline with
roundish-compressed, wedge-
shaped joints, having the ap-
pearance of horns on the tops ;
the upper joints are broad,
and furnished with short fin-
ger-like lobes.

TAB. 21. FIG. a. A.

This was found in the American seas, and is of a glossy white color.

TAB. 23.
FIG. 14.
15.

21. *Corallina officinalis*.

Coralline of the Shops.

Corallina trichotoma,
articulis stirpium subcom-
pressis subcuneiformibus,
ramulorum cylindricis ;
terminalibus nonnullis ca-
pitatis.

Trichotomous Coralline with
the joints of the stem a little
compressed, and not unlike a
wedge ; those of the branches
are cylindrical, and those of
the ends often terminating in
little knobs.

TAB. 23. FIG. 14. 15.

Coralline of the Shops. Ellis Corallin. pag. 48. tab. 24. No. 2. fig. a. A. A 1. A 2. B. B 1. B 2.

Corallina officinalis. Linn. Syst. Nat. Ed. 12. p. 1304.

This Coralline is particularly described in my Essay on Corallines, and the figure represented highly magnified, both with the calcareous substance taken off by vinegar, and before it was immersed, to shew its pores. A dissection of it is likewise magnified at fig. 15. in tab. 23: to shew how near the internal construction of its cells agrees with those of the *Millepora lichenoides*.

It is found on the sea-coast of these kingdoms, and varies in its color; it is found red, greenish, yellowish, and white.

22. *Corallina elongata.*

Trailing Coralline.

Corallina trichotoma, articulis stirpium subtereticuneiformibus; ramorum cylindricis; summis obtusiusculis; nonnullis capitatis.

Trichotomous Coralline with the joints of the stem of a roundish wedge-shape: of the branches of a cylindrical shape: of the tops a little blunt, and knobs on some of them.

Slender trailing English Coralline. Ellis Corallin. p. 49. tab. 24. fig. 3.

This Coralline was found on the coast of Cornwall, and is remarkably slenderer, longer, and smaller than the official Coralline, and of a reddish or purplish color.

23. *Corallina fubulata.*

Coralline with pointed branches. TAB. 21.

Corallina trichotoma, articulis stirpium ancipiti-

This Coralline is trichotomous; the joints of the stem

bus

FIG. b.

bus cuneiformibus, ex apice utriusque lateris proliferis: ramulis brevibus subulatis; articulis teretibus. are wedge-shaped and two-edged, sending out small pointed branches from the top of each of their sides, with round joints.

TAB. 21. FIG. b. B.

The appearance of this Coralline is very flat, white, slender and small, and looks as if it was very closely pinnated, or with fine white fibres coming out on each side, like a branched feather. It is the most delicate of all the tribe, and was lately brought from the West Indies.

TAB. 21. 24. *Corallina granifera.*
FIG. C.

Graniferous Coralline.

C. *Corallina trichotoma, articulis stirpium compressis cuneiformibus; ramulorum subteretibus, ovariis ovalibus pedunculatis oppositis interdum proliferis.*

Trichotomous Coralline with the joints of the stem compressed and wedge-shaped: those of the branches roundish; from these the egg-shaped ovaries with stalks grow opposite to each other, and are sometimes proliferous.

TAB. 21. FIG. c. C.

This differs from all the other trichotomous Corallines, in having proliferous ovaries, or branches growing out of them, bearing other ovaries. It is of a sea-green color and slender texture.

It was found on the coast of Africa, in the Mediterranean Sea.

25. *Corallina*

25. *Corallina corniculata.* *Coralline with horned Joints.*

Corallina dichotoma, articulis stirpium bicornibus; ramulorum teretibus.

This Coralline is dichotomous; the joints of the stems have two horns; those of the small branches are roundish.

White slender jointed Coralline. Ellis Corallin. pag. 50. tab. 24. No. 6. fig. d. D.

Corallina corniculata. Linn. Syst. Nat. Ed. 12. p. 1305.

This Coralline grows on fucus's, and is found in plenty in Cornwall. The younger joints, as they subdivide, are roundish. There is a variety of this kind from the West Indies with much larger joints, that all appear horned, the branches as well as those of the stems.

I have lately examined some specimens of this Coralline from Cornwall, and have found that they bear the same kind of ovaries at the angles of their upper divisions in the same manner with the two following species; so that it may be a variety of them, or perhaps one of them in another state of growth.

26. *Corallina cristata.* *Crested Coralline.*

Corallina dichotoma capillaris, articulis teretibus, ramulis fasciculatis cristatis, divisuris penultimis et extremis ovariferis.

Dichotomous hair-like Coralline, with round joints, having its branches disposed in crested bunches, with ovaries at the last but one and last division.

Crested or Cock's-comb Coralline. Ellis Corallin. p. 51. tab. 24. No. 7. fig. f. F.

R

This

This elegant little Coralline is about one inch to an inch and a half long, and is most commonly of a red color, sometimes green, and often white. It is easily known by being disposed into crest-like tufts; it differs from the following, by having shorter points at the ends of the branches, and growing much thicker together. It is found in great quantities about Weymouth and Penzance in the west of England, and generally adheres to fucus's. I am inclined to think, notwithstanding this difference, there is a great affinity between this, the *corniculata*, and the *spermophoros*.

27. *Corallina spermophoros*.

Seed-bearing Coralline.

Corallina dichotoma capillaris, articulis subtretibus, divisuris penultimis et ultimis ovariferis, corniculis terminalibus setaceis.

Dichotomous hair-like Coralline, with roundish joints, bearing ovaries at the last and last but one division, and ending at the top with long bristles.

Seed-bearing Coralline. Ellis *Corallin.* pag. 51. tab. 24. No. 8. fig. g. G.

This Coralline is very slender, and seldom above one inch long; it is generally found of a milk-white color, and never in the crested form with the foregoing, but more loose and spread. It adheres to fucus's, and grows in plenty near Penzance, in Cornwall.

In my Essay on Corallines, tab. 24. No. 9. fig. h. H. H 1. is a very small Coralline, which is milk-white, and I suppose is the beginning of the *C. spermophoros*.

28. *Corallina*

28. *Corallina rubens.*

Red Thread Coralline.

Corallina dichotoma filiformis, articulis stirpium teretibus; dichotomiæ claviformibus; inferioribus nonnullis bicornibus.

Dichotomous thread-like Coralline, with the joints of the stem round, of the divisions nail-shaped, and some of the lower joints have two little horns.

Reddish Hair-like Coralline. Ellis Corallin. pag. 50. tab. 24. No. 5. fig. e. E.

Corallina rubens. Linn. Syft. Nat. Ed. 12. pag. 1304.

This differs from the three foregoing Corallines in being much longer, and less subdivided at top. It is generally found two inches long, and of a red color, and is very common on the coast of Cornwall. There is a great affinity between this and the three preceding Corallines. I have introduced them here distinct, because their appearance is so.

The three last are the Corallines that Dr. Job Baster, in the Philosophical Transactions, Vol. 52. pag. 111. and 112. insists on it are true *Conservæ*.

29. *Corallina fragilissima.*

Brittle Coralline.

TAB. 21.
FIG. d.

Corallina dichotoma, articulis cylindricis æqualibus lævibus, ramis erectis.

Dichotomous Coralline with smooth, even, cylindrical joints, and erect branches.

TAB. 21. FIG. d.

Corallina fragilissima. Linn. Syft. Nat. Ed. 12. p. 1305.

This is found in the West-Indian Ocean, and is much larger and stiffer than the four preceding species. It is

of a milk-white color ; but being so brittle, it is rare to get perfect specimens of it.

TAB. 21. FIG. f. 30. *Corallina cuspidata.*

Spear-pointed Coralline.

Corallina subtetrachotoma, articulis cylindricis, geniculis tendinaceo-glutinosus, ramulis acutis.

Coralline with branches often dividing into four ; the joints are cylindrical, and united by a glutinous, tendinous substance ; the branches end in sharp points.

TAB. 21. FIG. f.

This Coralline is very brittle and white ; it grows in tufts about three inches high, and is found on the shores of the West-Indian islands.

TAB. 21. FIG. e. 31. *Corallina Tribulus.*

Caltrop Coralline.

Corallina subpentachotoma, articulis ancipitibus, geniculis tendinaceo-glutinosus.

Coralline with branches often divided into five ; the joints are two-edged, and united together by a glutinous, tendinous substance.

TAB. 21. FIG. e.

This Coralline is of a whitish color, and much thicker and larger than the preceding ; it is found on the coasts of the West-Indian islands.

TAB. 24. 32. *Corallina Flabellum.*

Fan Coralline.

Corallina stipite simplici incrustato, ramis omnibus

Coralline with a single incrusted stem, having the *conglutinatis,*

conglutinatis, fronde flabelliformi incrustata subundulata. branches glued together into a leaf, like a fan, covered with a calcareous crust, and somewhat waved.

TAB. 24.

This Coralline varies from the figure of a flat kidney-shaped leaf, an inch high, with a broad stalk, to a large subdivided, lobated and undulated one of five inches high and as many broad: at the bottom of the stalk is a tuft of fine hair-like tubes. There are many varieties of this curious Coralline brought to us from the West Indies; they are of different colors, from a greenish brown to a milk-white.

33. *Corallina conglutinata.**Conglutinated Coralline.*TAB. 25.
FIG. 7.

Corallina stipite simplici subincrassato, ramis dichotomis omnibus conglutinatis, fronde flabelliformi nuda.

Coralline with a single stem, slightly incrassated, with all its branches dichotomous and glued together, but not covered, forming a figure like a leaf of a fan-shape.

TAB. 25. FIG. 7.

We can plainly distinguish all the dichotomous branches of this Coralline on its surface, which are each of them separately covered with a thin calcareous substance full of pores; these, by growing so close to one another, become glued or united together by their covering.

This was found on the coast of the Bahama islands. It is of a sea-green color, and one inch and an half high.

34. *Corallina*

TAB. 25. 34. *Corallina Phœnix.*
FIG. 2-3.

*Corallina stipite simplici
incrustato, fronde oblonga,
ramis undique fascicula-
tis erumpentibus compla-
nato-connatis.*

Palm Coralline.

Coralline with a single in-
crustated stem; the upper
leafy part is of an oblong fi-
gure, and consists of small fas-
ciculated branches, which
come forth on all sides; the
lesser branches of these are so
united together, as to appear
quite flat.

TAB. 25. FIG. 2. 3.

This very singular Coralline was found on the coast of
the Bahama islands. It is of a milk-white color, and
about three inches and an half high.

TAB. 25. 35. *Corallina Penicillus.*
FIG. 4-6

*Corallina stipite simplici
incrustato, ramis fascicu-
latis fastigiatis dichotomis
filiformibus articulatis.*

Pencil Coralline.

Coralline with a single in-
crustated stem, and a tuft of
dichotomous thread-like joint-
ed branches at the top.

TAB. 25. FIG. 4—6.

Corallina Penicillus. Linn. Syst. Nat. Ed. 12. p. 1305.

This Coralline varies in the thickness of its branches,
as well as in its size; they are found from one inch to
four inches long; in some the stem is very short, in
others it is four times as long as the head. They are ge-
nerally white. The joints are easily distinguished where
the branches divide; the stem is composed of tubular fila-
ments, covered with a calcareous crust. They adhere to
shells

shells by the base of these filaments, and are often found in the West-Indian Ocean growing to shells, many of them together.

36. *Corallina Peniculum.*

Mop Coralline.

Corallina stipite simplici membranaceo ruguloso, ramis fasciculatis fastigiatis dichotomis articulatis.

Coralline with a single membranaceous wrinkled stem, on the top of which is a tuft of jointed dichotomous branches.

TAB. 7.
FIG. 5—8
TAB. 25.
FIG. 1.

TAB. 7. FIG. 5—8. TAB. 25. FIG. 1.

This is the most singular of all this genus, and differs from the rest by the regular wrinkles of the stem, which is small at the base, and grows wider as it rises, till it sends forth its branches at the top: from the base it sends forth branched tubes, like the *Sertularias*, by which it adheres: these tubes do not lessen as they extend, but have an equal diameter their whole length. When the branches at the top are magnified, their calcareous crust full of pores may be distinguished, which brings it to this genus.

This is found in the American seas, many growing together, particularly near the Bahama islands.

I should in this place have taken notice of the *Corallina terrestris*, mentioned by Linnæus, *Syst. Nat.* p. 1306. from other authors; but as I found it only a defective specimen of some one of the trichotomous *Corallines* already described, I must refer the reader to a full account, which I have already given of it in the *Philosophical Transactions*, Vol. 57. pag. 415. wherein the absurdity

TAB. 7.
FIG. 9.
10.

of

of a marine animal substance growing on a heath, many miles from the sea, is, I hope, fully demonstrated.

XII. MILLEPORA.

MILLEPORE CORAL.

Animal *crescens plantæ facie*.

Stirps *fixa, lapidea (corallium) plerumque ramosa, poris turbinatis vel cylindricis pertusa*;

Polypos *Hydræformes, modo tubæformes (Donati) exserens*.

This is an animal that grows in the form of a plant.

The stem is stony, like coral, and fixt by its base; it is most commonly branched, and full of top-shaped or cylindrical cells.

These send forth polype-like suckers, like the common fresh-water one, and some of them Polypos of a trumpet-shape (as Donati observes).

The great Linnæus has with propriety brought the stony Escharas of other authors to this genus, to which they naturally belong; and has constituted a genus for the soft membranaceous Escharas, under the title of Flustras, which I have called, in English, Sea-Matts, as having that appearance when magnified.

The particular structure of several species of this genus differs much from one another, as will appear from the following divisions:

1) Those that are almost solid, whose pores are scarcely visible without being highly magnified; but yet, on being broken across, discover plainly a cellular structure, as has been shewn in Vol. 57. of the Philosophical Transactions,

actions, in the *Millepora calcarea* and *Millepora lichenoides*.

2). Those that grow like the *Flustra* of Linnæus, or *Eschara* of some authors, which have their cells disposed regularly, either in single layers as in some, or in double layers as in others, which last are placed back to back, like the cells in the combs of bees; and these are either in irregular undivided forms, or divided into branches. The first are the *Millepora Spongites* and *M. foliacea*, and the second kind are the *Millepora tænialis* and *M. cervicornis*.

3). Those that are composed of clusters of cellular pores, irregularly arranged, as in the *Millepora pumicosa*, *M. tubulosa*, and *M. rubra*.

4). Those that have small vessels running through them lengthways in the inside, and which send out pores only on one side, as in the *Millepora foraminosa*, *M. reticulata*, and *M. tubipora*; or that send out their pores in a line on the margin, as in the *M. violacea*.

5). Those that grow with the same internal longitudinal vessels, and send out pores on all sides, as in the *Millepora truncata*, *M. alvicornis*, and *M. cærulea*.

This last *Millepora cærulea* has its pores larger than the rest, besides they appear a little inclined to a stellated form; so that it very properly joins this genus to the *Madrepora*, whose character is a Coral with radiated pores.

[1]. MILLEPORES THAT ARE ALMOST SOLID.

1. *Millepora calcarea*.

Chalky Millepore.

TAB. 23.
FIG. 13.

*Millepora ramosa albif-
fima solida dichotoma, ra-*

This Millepore is extremely
white, solid, and dichoto-
S *mulis*

ramulis attenuatis coalescentibus.

moufly branched; the little branches often unite together, and become smaller at the ends.

TAB. 23. FIG. 13.

This milk-white little Coral has a very different appearance from that called *M. polymorpha*, or the little English Coral of the Shops, which is found on the coasts of these islands. From the habit and manner of its growing, I shall consider it as different species.

This grows to four inches high; the branches become smaller towards the end, and are generally regularly subdivided. On breaking the branches slantways, the internal cellular structure may be seen in the microscope. It is found in the Mediterranean Sea.

2. *Millepora polymorpha.*

British officinal Coral.

Millepora fasciculata solida, ramulis difformibus tuberculatis.

This Millepore is in solid masses, irregularly ramose, and tuberculated.

Corallium pumilum album, fere lapideum, ramosum.
Ellis Corallin. pag. 76. tab. 27. fig. c.

Millepora polymorpha. Linn. Syst. Nat. Ed. 12. p. 1285.

This is the Coral of the Shops, and is found in great plenty in the seas round these islands, especially near Falmouth, and the Isle of Man. It is of very different colors, as red, yellow, greenish, ash-colored, but seldom white. It is used in many places for manure, particularly at Falmouth, according to Mr. Ray; and is supposed by some late authors, but with no degree of probability, to be driven by the wind and waves hither from
the

the American islands. It is often shaped like the kernel of a walnut, often in larger compressed masses, sometimes like a bunch of very small grapes, most frequently in tuberculated branches. It is found from one inch to three inches long. When it is taken out of the sea it is covered with a slime. The pores on the surface are very small, so that to see them it is necessary to wipe the slime very clean off, and to use a large magnifier.

3. *Millepora decussata.**Intersected Millepore.*TAB. 23.
FIG. 9.

Millepora cretacea lamellata, laminis varie decussantibus.

This Millepore is full of chalky, erect plates, or laminæ, which cross one another, and unite differently here and there.

TAB. 23. FIG. 9.

This has been supposed to be a variety of the following; but the singularity of its growth obliges me to make them two distinct species. This was found on the coast of Portugal, where it grows in large masses of five and six inches diameter.

4. *Millepora lichenoides.**Liverwort Millepore.*TAB. 23.
FIG.
10—12.

Millepora laminis tenuibus semicircularibus horizontaliter foliosa.

This Millepore has slender semicircular plates, or laminæ, that grow horizontally.

TAB. 23. FIG. 10—12.

This most delicate Millepore is of various colors, as red, purplish, yellow and whitish. It is found adhering to and covering the Coralline of the Shops, on the coast

of Cornwall. It is extremely thin and brittle: the semi-circular plates are of various sizes, and constantly grow horizontally; their margins bend over, which makes them convex on their upper sides, and concave underneath. This is remarkably full of the same shaped ovaries with the Coralline of the Shops. My learned and reverend friend Dr. William Borlase, of Ludgvan, in Cornwall, was so kind as to send me many varieties of this species. The pores on the under part are to be discovered by good glasses. The cellular structure of the internal part both of this and the officinal Coralline exactly agree, as may be seen in the figures I have given of them.

[2]. MILLEPORES THAT GROW LIKE THE FLUSTRA.

5. Millepora Spongites.

Sponge-Stone Millepore.

Millepora fragilissima, cellulis seriatis, lamellis simplicibus tubuloso-turbinatis varie coalescentibus.

This very brittle Millepore has rows of cells, in single layers, which are of a tubular top-shape, irregularly uniting together into masses.

Cellepora Spongites. Linn. Syst. Nat. Ed. 12. p. 1286.

This delicate Millepore is marked on the under side of the cells with lines between each row; the openings of the cells have a little margin round them, and there are frequently little round balls on the upper part of many of them, which probably are their ovaries. The cells in their lines are generally alternate to those that lie next to them. It is found in the Mediterranean Sea, of various sizes, from two to four inches diameter, and often much larger;

larger; sometimes of a milk-white, at other times of a grey color.

6. *Millepora foliacea.**Foliaceous Millepore.*

Millepora lamellosa flexuosa utrinque porosa.

Millepore with winding laminae, or plates full of cells on both sides.

Stony foliaceous Coralline. Ellis Corallin. p. 71. tab. 30. fig. a. A. B. C.

Millepora fascialis. Linn. Syst. Nat. Ed. 12. p. 1283.

This Millepore is very common on the sea-coast of the British islands, where it is found in masses from three inches to a foot long. We frequently observe it incrusting stones and shells, and like some of the Flustras, or Sea-Matts, it first forms a single layer of cells, and rises up with a double layer afterwards into twisted leaf-like stony masses, with cells on both sides, disposed in a quincunx order.

7. *Millepora tænalis.**Tape Millepore.*

Millepora plana angusta ramosa utrinque porosa, ramis flexuosis coalitis.

This Millepore is flat, narrow, and subdivided into branches; it has cells on both sides; the branches bend irregularly, and often unite together.

Porus Cervinus. Ellis Corallin. pag. 72. tab. 30. fig. b.

Millepora fascialis. Linn. Syst. Nat. Ed. 12. p. 1283.

This Millepore grows in very irregular masses, but always preserves the same habit of growing; that is, the branches are flat, narrow, and regularly subdivided: they coalesce, twist, and branch out again, leaving certain hollow spaces between them; their cells are much smaller, though of the same shape with the cells in the foliaceous Millepore. This Coral was brought from the Mediterranean Sea, and grows in large masses of six inches diameter.

There is a kind, something like this, found on the coast of Cornwall; but the branches are not so flat, and the cells have more elevated openings, liker to the following species. See Borlase Hist. Cornwall, tab. 24. fig. 7.

8. *Millepora cervicornis.*

Stag's-Horn Millepore.

*Millepora subcompressa
dichotoma utrinque celli-
fera, osculis tubulosis pro-
minulis.*

This Millepore is a little compressed, and dichotomous; it has cells on both sides, with tubular openings that project a little.

Marfigli Hist. de la Mer, tab. 32. fig. 152.

This Millepore exactly agrees with Marfigli's description and magnified figure, and likewise in the appearance of its surface; for it looks as if it was covered with varnish, by the time it is become from red to a yellowish brown. Its branches are very like a stag's horn, and it is probably what Imperatus calls *Porus Cervinus*, and not the *M. tænalis*, which I had formerly taken it for; it is very brittle, and much narrower than the Tape Millepore, but not so flat. I have observed some of the pores divided at the base, but they are not generally so, which makes

makes me doubt its being the *Millepora aspera* of Linnaeus. It grows to five or six inches high, and is found in the Mediterranean Sea.

9. *Millepora Skenei*.*Skene's Millepore.*

Millepora plano-compressa subramosa utrinque cellifera : cellulis seriatis alternis turbinatis galeatis : fauce biante, labio inferiori denticulo unico prædito.

This Millepore is much compressed, and beginning to divide into branches, with cells on both sides, disposed in regular rows: the cells are placed alternately, each has a helmet-shaped cover over its round gaping mouth; the under lip is furnished with one little tooth.

I received a small specimen of this Coral from my late ingenious and learned friend Dr. David Skene, of Aberdeen. It is of a bright shining white color, as if covered over with a silver varnish. It appears to be the beginning of an elegant kind of Millepore, and was found adhering to a rock in the sea near Aberdeen. It differs much from the *Millepora pumicosa*, which grows in irregular masses with a much smaller opening to its mouth.

[3]. MILLEPORES THAT ARE COMPOSED OF CLUSTERS OF CELLULAR PORES IRREGULARLY ARRANGED.

10. *Millepora pumicosa*.*Pumice Millepore.*

Millepora multiformis fragilis scaberrima, e cel-

This Millepore appears in many forms; it is brittle, very
lulis

lulis subglobosis mucronatis rough, and composed of sharp-
composita. pointed roundish cells.

Porous Eschara. Ellis Corallin. pag. 75. tab. 27.
fig. f. F.

This Millepore is often found incrusting many of the Sertularias in small irregular masses; when they are thrown on shore, the points of their cells are worn off.

I have lately received a specimen from Aberdeen, with compleat cells, that seems to be of this species. It has small cylindrical branches, each about half an inch long: the cells are placed round about in an alternate order; they are shaped like a helmet or head-piece just opening, with a hole in the middle; the under part is pointed, and projects like the lower part of a bird's beak; and at the bottom of each of the cells is a hole, which seems to belong to one of the cells that is covered by the last series.

II. Millepora tubulosa.

Tubular Millepore.

Millepora parasitica, cel- This parasitical Millepore
lulis tubuliformibus serie- has small tubular cells dis-
bis transverse dispositis. posed in rows across.

Small Purple Eschara. Ellis Corallin. pag. 74. tab. 27.
fig. e. E.

This little purplish Millepore is frequently found creeping up the Sickle Coralline (*Sertularia falcata*) which it adheres to, and surrounds with many united rows of little parallel tubes. These rows are frequently separated into narrow divisions, which bend a little back, and appear like so many small combs. These masses are found about half an inch, seldom above three quarters of an inch diameter.

meter. They are found in the Mediterranean Sea, as well as on our coasts.

12. *Millepora rubra.**Little Red Millepore.*

Millepora minima sublobata rubra, poris crebris minutis punctata.

This very small Red Millepore branches into little lobes, and is full of small pores.

Madrepora minima subverrucosa rubra. Brown Hist. Jam. pag. 391.

This beautiful little Coral is the smallest of the tribe, being seldom above one quarter of an inch high; the whole surface, when magnified, is full of minute white blind pores; but on the tops of the lobes we may observe several small holes, scattered here and there, that are surrounded by a margin; these are properly the little cells. It has a broad base by which it adheres to shells, corals, and rocks, and is found not only in the West Indies, but in the Mediterranean Sea and the East Indies.

13. *Millepora verrucaria.**Wart-like Millepore.*

Millepora limbo concavo tenui explanato subsfriato, disco convexo tubulis confertis radiato.

This Millepore has a round, thin, striated, concave base, with a convex disk full of little tubes disposed like rays.

Madrepora verrucaria. Linn. Syst. Nat. Ed. 12. pag. 1272.

This very little Millepore is described by some authors as a Madrepora, and reckoned as a variety of the *Madrepora verrucaria*; but the appearance of the tubular pores will convince the curious observer, that it is a Millepore;

T

and

and perhaps the beginning of some one already described, probably the *Millepora tubulosa*. It is about the size of a split pea, and found adhering to *Fucus*'s and *Flustras*, or Sea-Matts, in the British seas.

[4]. MILLEPORES THAT HAVE SMALL VESSELS RUNNING LENGTHWAYS THROUGH THEIR INSIDES, AND WHICH SEND OUT PORES ON ONE SIDE, OR ONLY IN A LINE ON THE MARGIN.

14. *Millepora foraminosa*.

Lace Millepore.

Millepora reticulata infundibuliformis inordinate undulato-plicata, latere superiori tantum porosa.

This Millepore is formed like a net, funnel-shaped, and irregularly waved, and plaited in the margin. It is full of pores only on one side.

Retepora eschara marina. Ellis Corallin. pag. 72. tab. 25. fig. d. D. F.

Millepora cellulosa. Linn. Syft. Nat. Ed. 12. p. 1284.

Though this elegant little Coral is found now and then on our coast, we cannot boast of those beautiful forms that we find in specimens from the Mediterranean Sea. Ours is generally funnel-shaped; but the foreign is more loosely folded and waved, and looks like open lace; the under part is quite smooth between the openings, but the upper surface is full of cells, which are disposed in a regular quincunx order.

15. *Millepora reticulata*.

Net Millepore.

Millepora ramosa in planum expansa, ramis

This Millepore is branched, and expands horizontally; the *dichotomis*

dichotomis bifariam anastomosantibus, supra scabris poris asperis; subtus lævibus.

branches are dichotomous, and grow together on both sides; the upper part is rough, with pointed pores, the under part smooth.

Millepora reticulata. Linn. Syft. Nat. Ed. 12. p. 1284.

This Coral is very rare, and was brought from the East Indies. It is very like the Frondipora of Imperatus, or the little Coral figured by Count Marfigli, in tab. 34. fig. 155. and 156. but more expanded; the little side branches diverge in an acute angle, and meeting with the opposite ones, grow together and form a net-like figure. These reticulated branches grow in an undulated manner, and coalesce here and there together. It is of a whitish color and brittle texture.

16. *Millepora tubipora.*

Tubulous Millepore.

Millepora proclinans in plano dichotoma, ramulis flexuosis subparallelis denticulatis, supra poris prominulis; subtus striatis.

This Millepore bends forward, in a flat dichotomous manner; the branches are waved, nearly parallel, and denticulated; the pores project on the upper side, and the under side is striated.

Ellis Corallin. pag. 95. tab. 35. fig. b. B.

Millepora lichenoïdes. Linn. Syft. Nat. Ed. 12. p. 1283.

I have already described this tubulous white Millepore in my Essay on Corallines, and in the Philosophical Transactions, to shew that many Corals are composed of united tubes. The specimen there represented is only the beginning of one of them, and not so compleat as I

have here described: for in this the tubular pores are more prominent, appearing on the sides like denticles, and the upper part is flat, and spread out in dichotomous branches. It makes a most elegant figure, when there is a group of them together, being milk-white, and growing to about three or four inches high.

17. *Millepora violacea.* *Violet-colored Millepore.*

Millepora in plano ramosa, ramulis ascendentibus flexuosis tereti-compressis, suturâ porosa marginem ambiente.

This flat branching Millepore has round, erect branches, a little compressed, and waved; there is a future with a line of pores encompassing the margin.

This Coral is of a fine violet-blue; it rises from a spread base about three inches high: besides the line of large pores that surrounds the margin, there are two rows of small pores, one on each side of it. The surface, when magnified, is rough, like chagreen, and here and there upon it are clusters of little warts, like studs or bullæ, which may probably be its ovaries. When the branches are broke across, there appears in the middle a row of three or four large pores, surrounded by small ones. I had formerly a specimen of this Coral from W. Webber, Esq. F. R. S. and very lately some complete ones from Mr. Banks and Dr. Solander, that the divers had fished up about the islands in the South Sea.

[5]. MILLEPORES THAT HAVE INTERNAL LONGITUDINAL VESSELS, AND SEND OUT PORES ON ALL SIDES FROM THEM.

18. *Millepora truncata*.

Truncated Millepore.

TAB. 23.
FIG. 1—3

Millepora caulescens dichotoma, ramis truncatis divaricatis, poris quincuncialibus operculatis.

This Millepore has a stem, which subdivides into wide spread, blunt branches, that have pores with a cover to each, placed in a quincunx order.

TAB. 23. FIG. 1—8.

Phil. Transact. Vol. 57. tab. 17. fig. 1—8.

Millepora truncata. Linn. Syst. Nat. Ed. 12. p. 1283.

This curious Millepore, called, by Donati, Miriozoon, is well described by him in the 47th volume of the Philosophical Transactions, where he has shewn the polype-like suckers extending themselves, and securing themselves in their retreat by a cover to each of their cells. I have further illustrated it in the Philosophical Transactions, Vol. 57. by giving a dissection of it, to shew the cells all round communicating with the longitudinal vessels, that pass through the center of the Coral.

19. *Millepora alcicornis*.

Elk's-Horn Millepore.

Millepora ramosa solida compressa erecta polymorpha, poris sparsis obsolete.

This Millepore is of many shapes; it is branched, solid, compressed, and erect, with many obsolete pores here and there on its surface.

Millepora.

Millepora alcicornis. Linn. Syft. Nat. Ed. 12. p. 1282.

The pores of this Millepore, as it is generally brought to us, are scarce visible; but when they come from the West Indies, preserved in spirits, they are very distinguishable, each appearing sunk in a little cavity: in the dried specimens they appear level with the surface, and of two sizes, larger and smaller. This is one of the commonest of the Corals in the West Indies, and used principally for burning into lime. It is found in a variety of forms, some with round irregular branches, others palmated, which end in taper figures, like fingers; as these branches grow up, they frequently unite together, forming new palmated branches that end in slender digitated forms. This Coral is often found investing the dead stems of the Gorgonias, where it appears like so many beads of a necklace.

Sir Hans Sloane, in his History of Jamaica, has given a figure of a bottle that was taken out of the sea incrufted with it. This is now to be seen among his curious collection of Corals in the British Museum.

TAB. 12. 20. *Millepora cærulea.*
FIG. 4.

Blue Millepore.

Millepora plana scabra, laminis crassis varie tortuosis subdivisa, apicibus sæpe lobatis, porisque substellatis cylindricis utrinque instructis.

This Millepore is flat, rough, and divided into thick plates, bending different ways; the tops of these are sometimes lobated, and both sides are furnished with cylindrical pores, almost like stars.

TAB. 12. FIG. 4.

This

This Coral grows in immense masses in the East-Indian Ocean; it is now and then brought us from Prince's Island, in the Straits of Sunda. The laminæ, or plates, are generally half an inch thick, and full of minute pores between the cellular starry cells, which both pass from each surface to the central longitudinal vessels in nearly a perpendicular direction, and with which they are united. The surface of this Coral, when magnified, is full of little sharp points between the small pores and round the larger; and when we examine the larger stellated pores, we find them furrowed on the inside to the bottom, which makes a proper transition from this genus to the Madreporæ.

XIII. TUBIPORA.

PIPE CORAL.

Animal *incognitum*.

The animal of the Pipe Coral is unknown.

Stirps lapidea (Coralium) dissepimentis transversis, tubulos perpendiculares connectentibus.

The stem is stony (that is coral) with transverse partitions, uniting together the perpendicular tubes.

Tubuli articulati, invicem communicantes, siphunculis continuis geniculatis, ad genicula radiatis.

These tubes are jointed, communicating with one another by means of geniculated pipes, which pass through each of them, and are radiated at their joints.

TAB. 27. I. *Tubipora musica*. *Red Organ-pipe Coral.*

Tubipora ruberrima, Deep Red Pipe Coral, with
septis transversis tubos per- transverse partitions, connect-
pendiculares connectentibus. ing perpendicular tubes.

TAB. 27.

Tubipora musica. Linn. Syst. Nat. Ed. 12. p. 1270.

There is but one species yet discovered of this genus ; but there are many varieties, that are to be met with in the cabinets of the curious. Some of these are composed of longer, and some of shorter tubes ; besides, the color sometimes varies from a deep red to an orange-color. They grow to the size of a foot, often to two, three feet or more diameter. The manner of their growth is much in the same form with the Astroite Madreporæ, or Star Stones ; they adhere to a shell or rock at first, and from a small beginning extend themselves into a hemispherical form, their tubes appearing like so many rays ; and as they increase in length, in order to fill up the space between the tubes, new tubes arise upon the transverse partitions. The diameter of their tubes is, at a medium, about one-tenth of an inch, and in length they vary from a quarter to half an inch between the horizontal partitions.

When Mr. Banks and Dr. Solander saw them in vast abundance on the coast of New South Wales, they appeared upon the tide of ebb covered over with a striated gelatinous substance, which was so extremely slippery, that it was dangerous to tread upon them. The animal that inhabits them appeared to fill both the tube and inner little pipe ; but they had not time to examine them
 alive

alive in sea-water, from the dangerous situation they were in themselves.

They are likewise found in great plenty in the Red Sea, and among the Molucca islands, where the natives call them, in the Malay language, *Batu-Swangi*, that is, the Magicians Stone; for the inhabitants of those islands think they have a magical virtue in them, and, for that reason, hang them on trees, to keep thieves from the fruit; it being a prevailing opinion among them, that those who attempt to steal, where they are hung up, will be seized with a breaking out full of red pimples. They are also careful not to sit on them for fear of the strangury. On the contrary, the people of Java and Malacca give both old and young the powder of this Red Coral against the strangury. The inhabitants of the Celebes put some of the powder on any wound that is made by a venomous creature, and for this purpose always carry a small piece of it about them.

XIV. MADREPORA.

MADREPORE CORAL.

Animal *modo simplex,*
modo ramoso-proliferum.

Stirps lapidea (Coralium) sæpe plantæ forma crescens, cellulosa, apice vel superficie terminata cavitatibus lamelloso-striatis, polypiferis.

The Madrepore is an animal sometimes single, sometimes sending forth its progeny in the form of branches.

The stem or mass is of a stony nature (Coral) often growing in the form of a plant, full of cells, which are either on the top or on its surface, and end in lamellated cavities, to which their polype-like animals belong.

U

By

By Madrepora Corals, we mean such Corals as have their cells disposed in a radiated form, like stars.

Imperatus was the first who had any idea of their belonging to the animal kingdom : this hint he took from the observations he had made at several times on the *Madrepora ramea*, or great branched Cinamon Coral, which at length fully confirmed his opinion.

Rumphius describes the animal of the *Fungus Saxeus*, or *Madrepora Fungites* Linn. so distinctly, that there remains no doubt but that he saw it very clearly. He says, while it is alive in the sea, it is covered with a thick viscid matter, like starch : that the more elevated folds or plaits have borders like the denticulated edges of needlework lace : that these are covered with innumerable oblong vesicles, formed of the same gelatinous substance, which appear alive under water, and may be observed to move like an insect : that as soon as the Coral was taken out of the sea, and exposed to the air, all the mucous part, with the little vesicles, shrunk in between the crest little plates, or lamellæ, and disappeared ; and, in a short time, like the *Medusa*, or Sea Jellies, melted away, leaving behind them a most disagreeable fetid smell ; so that it is clear from hence that he, before any of the late discoveries, was acquainted with the animal nature of the *Madrepores*. Besides, he has plainly told us, that not only the several Corals of the East Indies, but also all the other Zoophytes there, when they are fresh, are possessed by a gelatinous animal of a fishy nature.

Dr. Peysonell afterwards confirmed these discoveries, and considers the *Madrepora* Corals in particular as a meer aggregate of the shells of this animal, which he says is a species of the *Urtica marina* ; but it is probable he was mistaken in the animal, as will appear hereafter from the

more

more exact observations, and an accurate figure of the animal by Dr. Donati. Dr. Peyssonell has great merit in some things; but many of his discoveries seem to proceed more from general conclusions, taken for granted from some particular discoveries, than from judicious and careful experiments. In his account of Sponges, he first makes them the fabric of the *Urtica marina*; in another trial he makes them the fabric of little insects, that walk to and fro in the labyrinth of the tubes, and which taken out and placed near them, return into their holes again: but later experiments shew, that he was entirely mistaken in both. See the account of Sponges in the Philosophical Transactions, Vol. 55. pag. 280.

Dr. Donati has most clearly explained the nature and formation of one of this genus of Madreporæ by describing and delineating the animal, as we find it in Phil. Transf. vol. 47. p. 105. tab. 4. He observes, p. 106. that “as the figure of this animal bears no resemblance to the *Urtica marina*, he cannot see how one could class the polypus of the Madrepora with the *Urtica*.” Perhaps it may be necessary to observe, that as the internal structure of the cells of many species of this genus differs in the appearance and disposition of their lamellæ, so we may reasonably suppose, that the shape of the particular animals that form them, may vary from one another. But we must leave the particular figures of these animals to future discoveries.

Lastly, nothing can demonstrate more clearly the great affinity there is in the growth of Corals with that of shells, than to compare the circles of increase in the shell of the Limpet, or *Patella*, with those in the under part of the *Madrepora Fungites*. In the Limpet, the animal is under the shell; in the Coral, it is upon the shell. How absurd, then, is it to suppose that Corals

compounded of many of such animals, each upon its cell, do vegetate as plants, because they grow up together in ramified forms.

Peysonel and Linnæus are both of opinion, that the animals of the Lithophyta, or Corals, construct their own cells by depositing under them a coralline matter. See Syft. Nat. pag. 1270.

[1]. MADREPORÆ SIMPLICES.

Corallium simplex.

Stella unica.

TAB. 28.
FIG. 1—4

1. Madrepora Patella.

Madrepora simplex acaulis, lamellis latere muricatis subtrichotomis : tertiis indivisis majoribus.

TAB. 28. FIG. 1—4.

Lamellæ omnes margine denticulatæ, latere valde muricatæ, duæ trichotomæ : lamellula intermedia indivisa crassiuscula : tertia reliquis multo major, a centro ad marginem continua, indivisa. Juniores planæ, adultæ convexæ.

This little Coral is an inch and a half diameter, and a quarter of an inch thick : when I first saw it, I took it to be the *Madrepora Fungites* in its younger state ; but upon examining it strictly, and the manner of its growing, such as the regular subdivisions of its lamellæ at particular distances in a trichotomous order, together with their sides being remarkably granulated ; besides, the plates, or lamellæ, of the younger kinds of *Madrepora Fungites* from the East Indies are much more elevated, less numerous, smooth on their sides, and their edges dentated

dentated or crenated ; so that if it is not a distinct species, it is certainly a variety of the following.

This was found in the Mediterranean Sea.

2. Madrepora Fungites.

TAB. 28.
FIG. 5.
6.

Madrepora simplex acaulis convexa, lamellis latere subasperis indivisis : alternis minoribus subincompletis.

TAB. 28. FIG. 5. 6.

Madrepora Fungites. Linn. Syft. Nat. Ed. 12. p. 1273. Pall. Zooph. 281. n. 165.

Lamellæ omnes margine valde denticulatæ, latere autem vix exasperatæ ; tubercula enim minutissima sunt. *Lamellæ* majores continuæ a centro ad peripheriam ; minores sæpissime centrum non adtingunt. *Centrum* oblongum.

The animal of this curious Coral is described by Rumphius, who saw it alive, as I have already mentioned in my remarks on this genus. Dr. Linnæus observes, that Forskohl describes the animal of it to be of the Priapus (or Actinia) kind, and, in the same manner as a shell-fish, forms its shell under itself.

This Coral is met with in great abundance in the Red Sea, and the East-Indian Ocean ; it is frequently found of five or six inches diameter, and often of a milk-white color.

In many curious collections, such as those of the Dutchess Dowager of Portland and Dr. Fothergill, there are many young ones adhering to the old ones, with large rising lamellæ, as in the old ones.

3. Madrepora

TAB. 28.
FIG. 7.

3. Madrepora Cyathus.

Madrepora simplex clavato-turbinata, basi attenuata, stella obscura: centro prominulo exeso duplicato.

TAB. 28. FIG. 7.

Marfigl. Hist. tab. 28. fig. 128. No. 11.

Fungites seu Caryophyllus marinus. Planc. de conch. Ed. 2. pag. 128. tab. app. 18. fig. M.

Varietas corallio cylindraco, basi vix attenuata.

This Coral is dragged up in great abundance by the coral-fishers on the southern coast of France and Italy: it is always found single without branches, and generally adhering to a piece of Red Coral. It is of a white color, and very hard. The lamellæ are forty in number, with as many intermediate small ones; the latter extend to the margin, but do not reach to the bottom of the star, like the larger ones. The common or middle size of this Coral is about two inches long, and three quarters of an inch diameter in the broadest part.

This is taken by some authors to be the beginning of the *Madrepora ramea*; but the intermediate lamellæ of the latter in a cross section appear branched; besides the *M. ramea* is of a much looser texture, deeper channelled on the outside, and of a ferruginous color.

There are many other kinds of the Single Star Madrepores found fossil in England, France, and Sweden; but I shall confine myself to the description of only such as I have met with that are recent.

[2]. MADREPORÆ FASCICULATÆ.

Corallium ramosum.
Stellæ terminales.

4. Madrepora Anthophyllites.

TAB. 29.

Madrepora fasciculata, ramis clavatis corniformibus lævigatis subflexuosis hinc coalescentibus.

TAB. 29.

Anthophyllum saxcum. Rumph. amb. 6. pag. 245.
 tab. 87. fig. 4.

Habitat in Oceano Indiæ orientalis.

5. Madrepora fascicularis.

TAB. 30.

Madrepora fasciculata, ramis simplicibus clavatis distinctis fastigiatis basi coalitis; lamellis extra marginem productis.

TAB. 30.

Madrepora fascicularis. Linn. Syst. Nat. Ed. 12. p. 1278.
Madrepora cariophyllites. Pallas Zooph. 313. n. 183.

6. Madrepora flexuosa.

TAB. 31.
FIG. 5. 6.

Madrepora fasciculata, ramis cylindraccis striatis scabriusculis flexuosis hinc coalescentibus, stellis concavis, lamellis æqualibus.

TAB. 31. FIG. 5. 6.

Madrepora flexuosa. Pall. Zooph. 315. n. 184.

Madrepora cæspitosa. Linn. Syst. Nat. Ed. 12. p. 1278.

Madrepora flexuosa. Linn. Syst. Nat. Ed. 12. p. 1278.
 forte eadem margine stellarum in fossilibus detricto?

Centrum exesum.

7. Madrepora tibicina.

Madrepora fasciculata, ramis cylindraceis : ramulis subclavatis, stellis obconicis profundis, lamellis nonnullis latioribus.

Centra subsimplicia. Lamellæ quaternæ vel sexternæ reliquis multo latiores.

[3]. MADREPORÆ DICHOTOMÆ.

Corallium dichotomum.

A. *Stellæ* terminales.

TAB. 33.

8. Madrepora fastigiata.

Madrepora dichotoma subfastigiata, ramis subdistinctis, stellis omnibus terminalibus subregularibus : annotinis compresso-duplicatis.

TAB. 33.

Madrepora fastigiata. Linn. Syft. Nat. Ed. 12. p. 1280.
Pall. Zooph. 301. n. 175.

Habitat in Oceano Indiæ occidentalis.

Lamellæ in speciminibus completis denticulatæ sunt, parcius autem quam in *M. angulosa*.

9. Madrepora angulosa.

Madrepora subdichotoma subfastigiata, stellis omnibus terminalibus irregularibus sinuato-flexuosis, centrīs exesīs.

α. ramis erectis strictis muricatis fastigiatis,

Hæc fere regulariter dichotoma.

β. ramis divergentibus brevibus.

Madrepora angulosa. Pall. Zooph. 299. n. 174.

γ. ramis

γ. ramis superne dilatatis compressis sinuoso-flexuosis TAB. 34.
subconglomeratis.

TAB. 34.

Hæ non regulariter dichotomæ, sæpe trichotomæ, præcipue var. β.

10. Madrepora Carduus.

TAB. 35.

Madrepora dichotoma, ramis sulcato-muricatis, stellis simplicibus regularibus, lamellis serrato-dentatis.

TAB. 35.

Seb. mus. 3. tab. 109. fig. 2.

Juniores, omnino uti simplices apparent.

β. *Madrepora lacera.* Pallas Zooph. 298. n. 173.

B. *Stellæ e dichotomia apicibusque ramorum.*

11. Madrepora axillaris.

TAB. 13.
FIG. 5.

Madrepora dichotoma, ramis distinctis divaricatis, stellis terminalibus turbinatis; axillaribus compressis; centris dilatatis exesfis.

TAB. 13. FIG. 5.

Habitat in Oceano Indiæ orientalis.

Lamellæ infra medium quasi additamento annotino incrassatæ.

12. Madrepora prolifera.

Madrepora subdichotoma subprolifera, stellis axillaribus terminalibusque similibus, centris simplicibus, ramis subclavatis hinc coalitis.

Madrepora prolifera. Pall. Zooph. 307. n. 178.
Linn. Syft. Nat. Ed. 12. p. 1281.

X

α. ramis

α. ramis majoribus magis distinctis.

β. ramis minoribus magis coalitis.

Corallii officinalis fragmenta. Pall. Zooph. 309. not.

[4]. MADREPORÆ FRUTICULOSÆ.

Corallium caulescens, ramosum, striatum.

Stellæ distinctæ, laterales, remotæ.

TAB. 36.

13. Madrepora virginea.

Madrepora fruticulosa subdichotoma ramosissima, ramis tortuosis coalescentibus, stellis sparsis prominulis.

TAB. 36.

Madrepora virginea. Linn. Syst. Nat. Ed. 12. p. 1281.
Pallas Zooph. 310. n. 180.

Centrum latiusculum, exesum, planum.

14. Madrepora mammillaris.

Madrepora fruticulosa dichotoma, ramis attenuatis, stellis quincuncialibus eminentibus conicis regularibus extus striatis.

Centrum parvum, exesum.

15. Madrepora oculata.

Madrepora fruticulosa ramosissima subglabra, ramis flexuosis: flexuris exsertis stelliferis, stellis profundis.

Madrepora oculata. Linn. Syst. Nat. Ed. 12. p. 1281.
Pallas Zooph. 308. n. 179.

Habitat in Mari Mediterraneo et Oceano Indiæ occidentalis.

In congerie hujus corallii sæpe cavernæ subtubulosæ existunt. *Laminæ* extra margines stellarum decurrentes.

16. Madrepora hirtella.

TAB. 37.

Madrepora fruticulosa subdichotoma, ramis divaricatis, stellis subdistichis prominentibus, lamellis exsertis inæqualibus, centro convexo exeso.

TAB. 37.

Madrepora hirtella. Pall. Zooph. 313. n. 182.

17. Madrepora ramea.

TAB. 38.

Madrepora fruticulosa ferruginea, ramulis obliquis subpinnatis ascendentibus cylindræis stella terminatis.

TAB. 38.

Madrepora ramea. Linn. Syft. Nat. Ed. 12. p. 1280. Pall. Zooph. 302. n. 176.

18. Madrepora rosea.

Madrepora fruticulosa ramosissima rosea, ramis verruculosis attenuatis, stellis inæqualiter sparsis: inferioribus rarissimis.

Madrepora rosea. Pallas Zooph. 312. n. 181.

Habitat in Oceano Indiæ occidentalis ad insulam St. Domingo.

19. Madrepora purpurascens.

Madrepora fruticulosa ramosissima, ramis divaricatis subdistichis, ramulis rugulosis porosis, stellis distichis margine prominulis.

Habitat in Oceano circa Insulam Dominicæ (J. Greg).

20. Madrepora erubescens.

Madrepora fruticulosa ramosissima, ramis divaricatis distichis attenuatis, ramulis flexuosis striatis, stellis margine incrassatis exsertis.

Habitat in Oceano Indiæ occidentalis prope Insulam S^{ti}. Vincentii (J. Greg).

Specimina viva Gorgoniis adnata erant. *Rami inferiores crassi, cortice incarnato induti; ramuli autem albi.*

[5]. MADREPORÆ EXPLANATÆ.

Corallium indivisum, dilatatum, superne tantummodo stelliferum.

TAB. 39.

21. Madrepora aspera.

Madrepora foliacea explanata subaggregata, stellis elevatis subdistinctis, lamellis asperato-spinulosis, ambulacris concavis.

TAB. 39.

Habitat in Oceano Indiæ orientalis.

22. Madrepora scabrosa.

Madrepora foliacea explanata concatenata, lamellis lacertatis spinuloso-frondosis circa centra elevatis, ambulacris planiusculis.

Habitat in Oceano Indiæ orientalis.

Centra latiuscula, exesa, plana.

23. Madrepora

23. Madrepora undata.

TAB. 40.

Madrepora foliacea explanata concatenata, stellis serialibus, ambulacris intra stellas elevatis: carinis rotundatis crassis.

TAB. 40.

Corallium latum, planum, elegantissimum, album, subtus subtilissime striatum. *Stellæ* oblongæ: *centra* oblonga, subsoluta, elevata. *Ambulacra* extra stellas depressa, planiuscula, tandem intra seriem stellarum elevata in Carinas crassas rotundatas.

24. Madrepora ampliata.

TAB. 41.
FIG. 1. 2.

Madrepora foliacea explanata concatenata, ambulacris carinatis angustis acutiusculis, corallio subtus subdichotomo striato.

TAB. 41. FIG. 1. 2.

25. Madrepora cucullata.

TAB. 42.

Madrepora foliacea explanata concatenata, stellis subserialibus profundis, ambulacris acute carinatis subflexuosis.

TAB. 42.

Primo intuitu M. Licheni Similis, distinctissima autem quod subtus absque stellis subtilissime striata.

26. Madrepora cinerascens.

TAB. 43.

Madrepora subfoliacea explanata aggregata, subtus aceroso-scabrosa, stellis remotiusculis elevatis, ambulacris scabrosis.

TAB. 43.

Habitat

Habitat in Oceano Indiæ orientalis.

Corallium e cœruleo-cinerascens, crassius reliquis explanatis, facile dignoscitur ex tuberculis acerofis ambulacra et superficiem internam exasperantibus.

[6]. MADREPORÆ COMPOSITÆ.

Corallium undique adspersum
Stellis pluribus annexis, *Ambularo* præditis.

A. CONCATENATÆ.

Corallium indivisum.
Stellæ invicem conjunctæ.
Lamellæ sine Dissèpimento continuatæ.

TAB. 31.
FIG. 3. 4.

27. Madrepora cristata.

Madrepora foliaceo-cristata concatenata, stellis seriabilibus centro impressis, ambulacris explanatis planiusculis.

TAB. 31. FIG. 3. 4.

Madrepora Agaricites. β. Pallas Zooph. 288.

Habitat in Oceano pacifico, Indiæque orientalis.

TAB. 44.

28. Madrepora Lactuca.

TAB. 44.

Madrepora Lactuca. Pallas Zooph. 289. n. 168.

The figure was taken from a specimen in the British Museum.

29. Madrepora

29. Madrepora Ficoides.

Madrepora foliaceo-cristata concatenata, stellis sparsis, ambulacris lateralibus planiusculis; marginalibus acute carinatis, lamellis foliaceis.

Habitat in Oceano pacifico.

30. Madrepora acerosa.

Madrepora foliaceo-cristata concatenata, stellis sparsis, ambulacris lateralibus planis; terminalibus subcarinatis, lamellis acerosis.

31. Madrepora Pileus.

TAB. 45.

Madrepora oblonga convexa, centris omnibus dorsalibus concatenatis, lamellis majoribus abruptis; minoribus continuis subanastomosantibus.

TAB. 45.

Madrepora Pileus. Linn. Syst. Nat. Ed. 12. p. 1273.

Habitat in Oceano Indiæ orientalis.

In the furrow along the middle is a line of stars, with their lamellæ disposed on each side, like parallel pinnæ, or rays; under these on each side are other rows of stars, as it were, linked together, with their rays nearly parallel, and pointing upwards and downwards; the margin all round is terminated by sharp erect lamellæ.

32. Madrepora Agaricites.

Madrepora foliaceo-cristata concatenata, stellis flexuoso-subserialibus obconicis subangulatis, ambulacris acute carinatis rectiusculis hinc coalescentibus.

Madrepora

Madrepora Agaricites. Linn. Syft. Nat. Ed. 12. p. 1274.

This Coral is of a cinereous color, and is found, in irregular masses of five or six inches diameter, among the West-India islands.

33. Madrepora Lichen.

Madrepora foliaceo-cristata concatenata, stellis serialibus obconicis rotundatis, ambulacris carinato-foliaceis acutissimis subflexuosis obliquatis.

Habitat in Oceano pacifico.

B. CONGLOMERATÆ.

Corallium indivifum.

Stellæ conjunctæ, elongatæ, sinuoso-flexuosæ, dissepimento præditæ.

TAB. 46.
FIG. 3. 4.

34. Madrepora labyrinthica.

Madrepora conglomerata, anfractibus basi dilatatis longis, dissepimentis exesibus æqualibus latis, ambulacris simplicibus.

TAB. 46. FIG. 3. 4.

Madrepora labyrinthica. Linn. Syft. Nat. Ed. 12. p. 1274.

Madrepora meandrites. Pall. Zooph. 292. n. 171.

Habitat in Oceano Indiæ occidentalis. (J. Greg).

35. Madrepora sinuosa.

Madrepora conglomerata, anfractibus patulis flexuosis brevibus, dissepimentis inæqualibus exesibus, ambulacris subduplicatis, lamellis denticulatis.

Habitat

Habitat in Oceano Indiæ occidentalis. (*J. Greg.*)

Varietas anfractibus amplioribus et toto corallio profiore.

36. Madrepora areolata.

TAB. 47.
FIG. 4. 5.

Madrepora conglomerata, anfractibus dilatatis, dissepimentis exesivis subinæqualibus, ambulacris duplicatis: hinc dilatatis, lamellis denticulato-crenulatis.

TAB. 47. FIG. 4. 5.

Madrepora areolata. Linn. Syft. Nat. Ed. 12. p. 1274.
Pall. Zooph. 295. n. 171. β.

Varietas ambulacris angustioribus et magis elevatis.

37. Madrepora mæandrites.

TAB. 48.
FIG. 1.

Madrepora conglomerata, dissepimentis simplicibus subsolutis, lamellis incrassatis æqualibus remotis intus attenuatis subintegris.

TAB. 48. FIG. 1.

Madrepora mæandrites. Linn. Syft. Nat. Ed. 12.
p. 1274.

Madrepora labyrinthica. Pall. Zooph. 297. n. 172.

38. Madrepora exesa.

TAB. 49.
FIG. 3.

Madrepora conglomerata, stellis reticulato-concatenatis, intersitiis abruptis subconicis acutis.

TAB. 49. FIG. 3.

Madrepora exesa. Pall. Zooph. 290. n. 169.

Habitat in Oceano pacifico.

Y

39. Madrepora

TAB. 50.
FIG. 2.

39. Madrepora abdita.

Madrepora subconglomerata, anfractibus stelliformibus angulatis obconicis, ambulacris simplicibus, lamellis angustis crenulato-denticulatis.

TAB. 50. FIG. 2.

Forte varietas Madrepora favosæ.

TAB. 48.
FIG. 2.

40. Madrepora phrygia.

Madrepora conglomerata, anfractibus longissimis angustis, ambulacris perpendicularibus simplicibus, dissepimentis simplicibus laminosis lobulatis, lamellis remotiusculis.

TAB. 48. FIG. 2.

Habitat in Oceano pacifico.

Variat ambulacris rectis et flexuosis.

41. Madrepora repanda.

Madrepora conglomerata, ambulacris incrassatis, dissepimentis simplicibus subsolutis, lamellis numerosis: plurimis intus incrassatis.

42. Madrepora ambigua.

Madrepora conglomerata, anfractibus stelliformibus flexuosisque, ambulacris incrassatis, dissepimentis simplicibus crassiusculis, lamellis distantibus.

43. Madrepora

43. Madrepora dædalea.

TAB. 46.
FIG. 1.

Madrepora conglomerata, anfractibus profundis brevibus, dissepimentis subexesis laceris, lamellis serrato-dentatis, ambulacris perpendicularibus.

TAB. 46. FIG. 1.

Habitat in Oceano Indiæ orientalis.

44. Madrepora gyrofa.

TAB. 51.

Madrepora conglomerata cellulosa, ambulacris duplicatis foliaceis, dissepimentis simplicibus, lamellis foliaceis æqualibus.

TAB. 51.

Seb. Mus. 3. tab. 109. fig. 9. 10.

Corallium cæteris lævius, cellulis numerosis cavernosum.

45. Madrepora clivosa.

Madrepora conglomerata, anfractibus basi angustatis, dissepimentis subexesis æqualibus, ambulacris simplicibus crassiusculis, lamellis alternis abbreviatis.

Habitat in Oceano Indiæ occidentalis.

Corallium rotundatum, nodulis magnis inæquale.

46. Madrepora Cerebrum.

Madrepora conglomerata, anfractibus basi subrotundatis tortuosis longissimis, dissepimentis exesis æqualibus, ambulacris simplicibus angustis.

Corallium rotundatum, æquale.

Y 2

47. Madrepora

47. Madrepora involuta.

Madrepora conglomerata, anfractibus basi dilatatis brevibus, dissepimentis exesivis subæqualibus angustis, ambulacris simplicibus.

48. Madrepora implicata.

Madrepora conglomerata, anfractibus rotundatis subperpendicularibus, dissepimentis exesivis æqualibus latis, ambulacris duplicatis latis.

C. AGGREGATÆ.

Corallium plerumque indivisum, rarissime lobatum.

Stellæ distinctæ.

Ambulacra porulosa, tuberculosa.

49. Madrepora spongiosa.

Madrepora aggregata foliacea subexplanata, ambulacris confragosis supra obtusatis; subtus planis, stellis infundibuliformibus profundis inæqualibus.

TAB. 52.

50. Madrepora foliosa.

Madrepora aggregata foliacea subexplanata, ambulacris superne confragosis verruculosis; inferne planiusculis, stellis æqualibus parvis.

TAB. 52.

Madrepora foliosa. Pall. Zooph. 333. n. 196.

51. Madrepora

51. Madrepora poculata.

Madrepora aggregata, stellis obconicis, marginibus acutis, hinc inde remotis, interstitiis lævibus, lamellis undique granulosis.

Pall. Zooph. 319. n. 186. β.

Ellis Corallin. tab. 32. fig. A 1. A 3. mala e specimine detrito.

52. Madrepora stellulata.

TAB. 53.
FIG. 3. 4.

Madrepora aggregata, cylindris stellarum teretibus distantibus æqualibus margine elevatis, interstitiis planiusculis scabriusculis.

TAB. 53. FIG. 3. 4.

53. Madrepora Astroides.

Madrepora aggregata, stellis confertis impressis, interstitiis porosis, lamellis acerosis scabriusculis.

Madrepora Astroides. Linn. Syst. Nat. Ed. 12. p. 1276.

Madrepora radians. Pallas Zooph. 322. n. 190.

54. Madrepora nodulosa.

Madrepora aggregata, stellis confertis obconicis, interstitiis lamellisque acerosis scabriusculis, corallio subnoduloso.

Seba Muf. 3. tab. 112. fig. 18.

55. Madrepora musicalis.

Madrepora aggregata, cylindris stellarum striatis distantibus combinatis membranis transversis.

Madrepora

Madrepora muscicalis. Linn. Syft. Nat. Ed. 12. p. 1278.
Madrepora Organum. Pall. Zooph. 317. n. 185.

TAB. 49.
 FIG. 1.

56. *Madrepora denticulata*.

Madrepora aggregata, stellis inæqualibus, lamellis margine elevatis: majoribus basi processu auctis, interstitiis sulco exaratis.

TAB. 49. FIG. 1.

TAB. 53.
 FIG. 5. 6.

57. *Madrepora faveolata*.

Madrepora aggregata, stellis subangulatis multiradiatis, parietibus hinc inde subduplicatis.

TAB. 53. FIG. 5. 6.

TAB. 54.
 FIG. 3—5;

58. *Madrepora Retepora*.

Madrepora aggregata, stellis angulatis, lamellis filamentosis, parietibus reticulatis denticulatis.

TAB. 54. FIG. 3—5.

TAB. 55.

59. *Madrepora rotulosa*.

Madrepora aggregata, stellis cylindræis pauciradiatis, lamellis circa marginem erectis acutis: basi spinula erecta auctis.

TAB. 55.

60. *Madrepora*

60. Madrepora interstincta.

TAB. 56.

Madrepora aggregata, stellis cylindraceis profundis distinctis, interstitiis porosis, corallio subexplanato duplicato.

TAB. 56.

Madrepora interstincta. Linn. Syft. Nat. Ed. 12. pag. 1276.

Millepora cærulea. Pall. Zooph. 256. n. 158.

61. Madrepora favosa.

TAB. 50.
FIG. 1.

Madrepora aggregata conglomerata, anfractibus substelliformibus angulatis patulis, parietibus simplicibus, lamellis dentatis margine connatis elevatis.

TAB. 50. FIG. 1.

Madrepora favosa. Linn. Syft. Nat. Ed. 12. p. 1275.

Madrepora favites. Pall. Zooph. 319. n. 187.

62. Madrepora cavata.

Madrepora aggregata subconglomerata, anfractibus stelliformibus angulatis, parietibus simplicibus angustis, lamellis denticulatis.

Forte varietas *M. favosæ*.

63. Madrepora bulliens.

Madrepora aggregata, stellis distantibus teretibus oblongisve inæqualibus margine elevatis, interstitiis radiato-rugulosis concaviusculis.

TAB. 47.
FIG. 6.

64. Madrepora Ananas.

Madrepora aggregata, stellis subangulatis inæqualibus multiradiatis: marginibus convexis lamellofis, lamellis articulate-crenatis, interstitiis concavis.

TAB. 47. FIG. 6.

Madrepora Ananas. Linn. Syft. Nat. Ed. 12. p. 155.
Pall. Zooph. 321. n. 189.

65. Madrepora Hyades.

Madrepora aggregata, stellis subconfertis obconicis rotundis subangulatisque, parietibus crassis porosis, centrissimis planiusculis convexisque.

TAB. 49.
FIG. 2.

66. Madrepora fiderea.

Madrepora aggregata, stellis confertis rotundis subangulatisque, parietibus crassis convexiusculis, lamellis alternis margine subconnatis, centrissimis simplicibus.

TAB. 49. FIG. 2.

TAB. 47.
FIG. 7.

67. Madrepora galaxea.

Madrepora aggregata, stellis subconfertis impressis, parietibus crassis planiusculis subdistinctis, lamellis tenuissimis, centrissimis subexefis.

TAB. 47. FIG. 7.

Lamellæ quaternæ ad centrum extensæ, tres intermediae prope basin conniventes.

68. Madrepora

68. Madrepora Pleiades.

TAB. 53.
FIG. 7. 8.

Madrepora aggregata, stellis subteretibus, marginibus acutis elevatis, interstitiis concavis læviusculis hinc cavernosiusculis.

TAB. 53. FIG. 7. 8.

69. Madrepora annularis.

TAB. 53.
FIG. 1. 2.

Madrepora aggregata, stellis teretibus æqualibus margine elevatis, interstitiis plano-concavis radiatis.

TAB. 53. FIG. 1. 2.

Madrepora Astroites. Pallas Zooph. 320. n. 188.

Forte varietas minor *M. radiatæ*.

70. Madrepora papillofa.

Madrepora subaggregata, stellis cylindraceo-papillofis, marginibus incrassatis rotundatis obliquis.

Valde affinis *Madreporæ muricatæ*, et forte illius primordium; papillæ ejusdem figuræ, sed simplici ordine dispositæ et contiguæ.

71. Madrepora radiata.

TAB. 47.
FIG. 8.

Madrepora aggregata, stellis cylindraceis margine elevatis, interstitiis latis concavis sulcato-radiatis.

TAB. 47. FIG. 8.

Pall. Zooph. 321. n. 188. varietas e museo Dⁿⁱ. Cramer.

Z

Varietas

Varietas major marginibus stellarum valde elevatis, fulcis interstitiorum profundioribus.

72. Madrepora latebrofa.

Madrepora aggregata, stellis subteretibus multiradiatis margine elevatis, interstitiis radiato-sulcatis subcoarctatis inæqualibus.

Sloan. Jam. I. tab. 21. fig. 4.

D. RAMULOSÆ.

Corallium ramosum.

Stellæ distinctæ.

Ambulacra tuberculosa, porulosa.

73. Madrepora damicornis.

Madrepora ramulosa ramosissima, ramis attenuatis subdivisis, stellis sparsim crebris cæcis ciliatis.

Madrepora damicornis. Pall. Zooph. 334. n. 197. γ .

74. Madrepora digitata.

Madrepora ramulosa, ramis clavato-complanatis, stellis sparsis sexradiatis: margine superiore porrecto fornicato.

Seb. Muf. 3. tab. 109. fig. 11.

Madrepora digitata. Pall. Zooph. 326. n. 193.

Fornices stellarum sæpe detritæ.

Varietas et forte distincta species in interstitiis inter stellas lineam habet elevatam, quasi limites indignantem.

75. Madrepora

75. Madrepora seriata.

TAB. 31.
FIG. 1. 2.

Madrepora ramulosa, ramis attenuatis acuminatis, stellis longitudinaliter seriatis: margine superiore porrecto fornicato ciliato.

TAB. 31. FIG. 1. 2.

Madrepora seriata. Pall. Zooph. 336. n. 198.

76. Madrepora muricata.

TAB. 57.

Madrepora ramulosa, ramulis attenuatis, stellis prominentibus cylindraceis oblique truncatis.

TAB. 57.

Madrepora muricata. Linn. Syft. Nat. Ed. 12. p. 1279.
Pall. Zooph. 327. n. 149.

α. ramis longis acuminatis absque ullis ramulis parvis.

Corallium album porosum maximum muricatum. Sloan.
Jam. I. p. 51. tab. 18. fig. 3.

Seb. Mus. 3. tab. 114. fig. 1.

β. ramis divaricatis, ramulis sparsis brevibus acuminatis divergentibus.

γ. ramis ramulisque adscendentibus rectis subæqualibus cæspitosis.

δ. ramis inferioribus decumbentibus anastomosantibus, ramulis adscendentibus acutis brevibus.

Madrepora muricata β. Pallas Zooph. 1. c.

ε. ramis basi in palmam coalitis, ramulis divergentibus.

Madrepora muricata γ. Pallas Zooph. 1. c.

ζ. ramis ramulisque numerosis divergentibus, cylindris stellarum terbinatis margine incrassatis rotundatis.

Seb. Mus. 3. tab. 108. fig. 6.

Z 2

77. Madrepora

TAB. 47.
FIG. 1.

77. Madrepora porites.

Madrepora ramulosa, ramis clavato-complanatis, stellis contiguis (lamellarum loco) cuspidato-tuberculatis.

TAB. 47. FIG. 1.

Madrepora porites. Linn. Syst. Nat. Ed. 12. p. 1279.
Pall. Zooph. 324. n. 192.

78. Madrepora verrucosa.

Madrepora ramulosa ramosissima, ramis obtusatis, ramulis numerosissimis simplicibus verrucæformibus, stellis sparsis crebris cæcis ciliatis.

Madrepora damicornis. Linn. Syst. Nat. Ed. 12. p. 1279.
Pall. Zooph. 334. n. 197. α . β .

α . Ramis subteretibus.

β . Ramis dilatatis, lobatis.

79. Madrepora limitata.

Madrepora ramulosa, ramis subcomplanatis, stellis sparsis sexradiatis margine æqualibus.

Interstitia scabra. Lineæ in interstitiis subreticulatæ, limites inter stellas formant.

80. Madrepora Botryotes.

Madrepora ramulosa, ramis coacervatis crassis fastigiatis obtusis, ambulacris reticulato-confragosis.

81. Madrepora

81. Madrepora granosa.

Madrepora subramulosa cristata subdigitata, ramis obtusis, ambulacris omnibus acute carinatis undulatis, stellis acerosis irregularibus.

XV. ALCYONIUM.

A L C Y O N I U M

Animal *plantæ forma crescens.*

Stirps fixa, carnosa, gelatinosa, spongiosa vel coriacea.

Epidermis cellulosa, poris stellatis seu osculis pertusa,

Polypos tentaculatos oviparos exferentibus.

Is an animal growing in the form of a plant.

The stem is fixt, and is either fleshy, gelatinous, spongy, or a leather-like substance;

having an outward skin full of cells, with star-like openings, or little mouths, which send forth

Polype suckers, through which the eggs are produced.

Formerly many of those irregular marine masses, that could not properly be reduced to any genus, were called Alcyoniums; and these were supposed by old authors to be made up of the froth of the sea. Even in these more enlightened times many errors have crept into their arrangement, and several sponges have been very improperly placed under this title, for want of attending to the proper definition of the genus: for my part, I shall consider those only belonging to this genus that agree with the foregoing character, except one that is commonly called Alcyonium Schlofferianum, which, though it is covered

covered with stars on its outward skin, does not send out the polype suckers here described: but at present, till a new genus is constituted for it, I shall rank it with this. The reader, when he comes to consider this animal, and attend to the description, will be better able to judge of the propriety of this remark. In looking over the Alcyoniums of such authors as have lately wrote on the subject of Zoophytes, I find some of them more probably belonging to the Gorgonias, particularly such as have an internal harder part, which is undoubtedly the bone or support of the animal; and these are very nearly allied to the *Gorgonia suberosa* and *Gorgonia Briareus*, which I could not avoid on this account placing under that genus. The species that I mean are the *Alcyonium arboreum* Linn. or great Norway Sea Shrub, and probably the *Alcyonium exos* Linn. or *Manus Latronis* of Marfigli. If these are cut perpendicularly through the middle, I believe they will appear to have a harder part within, very different from the true character of the genus of *Alcyonium*. Others that are ranged among the *Alcyoniums* approach more to the genus of Sponges, particularly to those that are composed of small spiculæ, which are intimately blended with their gelatinous flesh; but these spiculæ in some are remarkably disposed on the surface, where they surround internally the openings or mouths of the animal. I believe no polype-like suckers have as yet appeared to proceed from these mouths, when the animal was alive, nor any remains when dry; nor have they those starry cells on the surface, which are a distinguishing character of this genus. Donati, who had an opportunity of examining most of these bodies alive, never discovered any polypes on the surface of either the *Alcyonium Lynceurium* Linn. or *Tethya spherica* Donat. Adriat. tab. 10. or the

Alcyonium

Alcyonium Cydonium Linn. or Alcyonium prim. of Donat. Adriat. tab. 9. The Ficus of Marfigli, which has been introduced as an Alcyonium, is evidently a Sponge. The form is like a fig, for which reason it was so called by him.

1. Alcyonium digitatum.

Dead Man's Toes

*Alcyonium albidum car-
noso-spongiosum lobatum,
osculis stellatis undique no-
tatum.*

Is a whitish substance between flesh and sponge, divided into lobes, the surface of which is covered with little mouths in the form of stars.

Dead Man's Hand, or Dead Man's Toes. Ellis Corallin. pag. 83. tab. 32. fig. a. A. A 2.

Alcyonium Manus marina. Phil. Transf. Vol. 53. tab. 20. fig. 10—13.

Alcyonium digitatum. Linn. Syst. Nat. Ed. 12. p. 1294.

Nothing can better illustrate the internal form and manner in which both the Astroite Madreporcs and the common officinal Sponge grow, than a perpendicular section of this Alcyonium. It is very commonly found on the Kentish coast, near the Isle of Sheppey, where likewise there is another variety, of a deep yellow color, which is frequently to be met with.

2. Alcyonium Pulmonaria.

Sea Lungs.

*Alcyonium pulposum li-
vidum lobato-compressum,
osculis stellatis minimis ob-
ductum.*

This is of a fleshy substance and deep yellowish color; it is divided into flattish lobes, which are covered with minute stars.

Sea-

Sea-Fig. Ellis Corallin. pag. 82. tab. 17. fig. b. B.
Alcyonium Ficus. Linn. Syft. Nat. Ed. 12. p. 1295.

The name of Sea-Fig was given to this substance by the fishermen on the coast of Kent (where I found it) on account of the internal structure, the cells and their contents looking like the seeds in the fig, and not from the external form, as I have already mentioned in my Essay on Corallines. This name of Sea-Fig has occasioned a mistake in some late authors, who have confounded it with the Sea-Fig of Count Marfigli, tab. 16. fig. 79. which is a true Sponge.

3. *Alcyonium gelatinosum.*

Pudding Weed.

Alcyonium luteum gelatinosum polymorphum.

This *Alcyonium* is of a yellowish color, and of a gelatinous substance. It is found in various irregular forms.

Sea ragged Staff. Ellis Corallin. pag. 87. tab. 32. fig. d. D.

Alcyonium gelatinosum. Linn. Syft. Nat. Ed. 12. p. 1295.

Fucus gelatinosus. Hudf. Flora Angl. pag. 471.

This is found at particular seasons full of minute papillæ, which send forth polypes, and properly comes under this class. In the month of August, 1752, there was so great a quantity of it driven near Sheerness, in the Isle of Sheppey, as to clog the fishermen's nets, and interrupt their fishing.

4. *Alcyonium*

4. *Alcyonium Schlofferi.**Schloffer's Alcyonium.*

Alcyonium carnosum
lividum asteriscis luteis,
radiis obtusis, ornatum.

This consists of a lead-colored fleshy substance, adorned with yellow stars, that have obtuse rays.

Uva marina. Rondelet. hist. aquatil. 2. pag. 130.

Phil. Transf. Vol. 49. pag. 449. tab. 14.

Borlase Nat. Hist. of Cornwall, pag. 254. tab. 25.
 fig. 1—4.

This most curious sea production grows on fucus's and stones on the coast of Cornwall and Wales.

We have but an imperfect figure and account of it in Rondeletius; but my worthy friend the late Dr. Schloffer has given us a very good figure and description of it in the Philosophical Transactions. The Rev. Dr. William Borlase, in his Natural History of Cornwall, has likewise given us a figure of two kinds; one with a hole at each end of the rays, besides the central hole in the epidermis; and one with only one hole in each ray, and that on the broad part, which he takes to be the same with Dr. Schloffer's; but I find that the two kinds, mentioned by Dr. Borlase, are one and the same animal, and this appears very clearly from a specimen sent me from North Wales, by my ingenious friend Thomas Pennant, Esq. where the stars on it answer to both kinds; for some of the rays have only one hole, which is on the obtuse end, but the greatest number of the stars have a small hole at the narrow end of the rays which turns up, besides the hole on the broad part: sometimes these holes at the small end join all together in a circle, and the opening of the outward skin, or

A a

epidermis,

epidermis, exactly covers them, as in the magnified figure at C. Phil. Transf. Vol. 49. tab. 14.

It appears from Dr. Borlase's account, that though there were fibres supposed to move in the great hole in the center, yet that the holes on the broad part of the rays were the mouths of the animal. From Dr. Schloffer's description it appears as if there were little fibres moving both in the holes on the broad part of the rays, which holes he likewise takes to be the mouths of the animal, and also fibres in the great opening of the epidermis in the center, which opening he observed to expand and contract at particular times with great alertness and velocity.

The number of rays in these stars is from five to twelve; eight is the most common number.

From the observations which I have already made on this substance in the Philosophical Transactions, Vol. 49. pag. 454. they don't appear to me to be polypes extending from starry openings on the surface, and consequently not to answer the character of an Aleyonium, but to be formed at different times with additional rays, which we may perceive endeavouring to thrust their pointed part towards the opening of the epidermis in the center, and unite with the rest; besides, the whole intermediate fleshy part is full of roundish bodies adhering to fibres, which as they approach the surface appear more pear-shaped, but lower down they are smaller and of a globular form: these all seem to be the young beginnings of future rays. In order to examine this substance more particularly, I have lately dissected several of these obtuse rays, which viewed sideways and separately, have the appearance of a stomach. In the inside of these, which was full of (rugæ) wrinkles, I perceived small eggs and a loose substance, as if the food digested. There is something

something singular in the contraction and dilatation of the opening of the outward skin over the holes at the smaller end of the rays. We cannot consider this as a mouth, when at the same time it is agreed that the holes on the broad end of the rays are mouths; so that the use of this central hole must be left to future observation, when it is suspected it will be found to be a new genus.

5. *Alcyonium mammil-
losum.*

Alcyonium with little Teats.

TAB. I.
FIG. 4. 5.

Alcyonium albidum coriaceum, mamillis convexis: centro cavo substellato, coadunatis.

This whitish leather-like *Alcyonium* is spread over rocks, with many convex teat-like figures, hollow in the middle, with a faint star-like appearance, and united close together.

TAB. I. FIG. 4. 5.

Lapidis Astroitidis sive stellaris primordia. Sloane Hist. Jam. Vol. I. tab. 21. fig. 1. 2. 3.

Sir Hans Sloane, who has given a figure of this and the following *Alcyonium* in his History of Jamaica, takes it to be the beginning of the *Astroite Coral*: but the softness of the substance, of which it is composed, shews it to be of a different genus. The West-India islands afford us several varieties of this kind. Each mamilla, or cell, has a polype within it, adhering to its base by twelve filaments, which answer to as many tentacula when they extend themselves.

Fig. 4. is the natural size of a piece of this *Alcyonium*; fig. 5. is the figure of two cells opened perpendicularly to

A a 2

shew

shew the polypes as they are first in them and contracted; fig. 7. represents one of the Polypes taken out of the *Alcyonium digitatum*, with its tentacula extended, to shew how each answers to its filament at the bottom, and gives us an idea of these when they open their cells and extend themselves.

TAB. I. 6. *Alcyonium ocellatum*.
FIG. 6.

Alcyonium with little Eyes.

Alcyonium ferrugineum coriaceum, cellulis subcylindricis rugosis, apicibus radiatis et ocellatis.

This coriaceous iron-colored *Alcyonium* has many wrinkled cylindrical cells united together; their tops are radiated, and each has the appearance of an eye in the center.

TAB. I. FIG. 6.

This is one of Sir Hans Sloane's first beginning of the *Astroite Corals*. Specimens of this and the former are in the British Museum.

I have received some specimens of this preserved in spirits from Mr. Greg, from Dominica; they are of a tough viscid nature, and appear to have some fine sand mixt in their texture. They spread over rocks with a single superficies of cells, as the *Flustra* does on fucus's and shells, but never rise into branched figures that I have yet seen. They have twelve rays.

7. *Alcyonium tuberosum*.

Tuberous Alcyonium.

Alcyonium flavescens tuberosum, apicibus saepe

This yellowish *Alcyonium* is full of knobs, many of *subdivisis*,

subdivisis, poris tubulosis confertis.

which are a little divided at top; the whole is covered over with tubulous pores, set very close together.

The substance of this Alcyonium, now it is dry, is more friable than leather, and not unlike the dried flesh of most of the Gorgonias. It is two inches and a half long, and one inch and a half high; it seems to have adhered to a rock. It was found on the coast of the Island of Mauritius, and presented to me by my worthy friend Dr. John Fothergill.

8. Alcyonium gorgo-
noides.

Gorgon-like Alcyonium.

TAB 9.
FIG. 1. 2.

Alcyonium cinereum arenoso-carnosum cellulis radiatis verruciformibus.

This Alcyonium is of an ash-color, and of a fleshy substance mixt with sand, having radiated wart-shaped cells.

TAB. 9. FIG. 1. 2.

The cells of this Alcyonium are much smaller than those of the *A. mamillosum* or *A. ocellatum* beforementioned, but are composed of the same number of rays, that is, twelve to each cell. It is often found incrusting rocks and corals; and in the specimen here figured, it is incrusting the *Sertularia frutescens*. I received this specimen from Dr. Pallas, who sent it to me to convince me that he had found a new *Sertularia*, which united the *Sertularias* with the *Gorgonias*, and gives it the name of *Sertularia Gorgonia* in his book on Zoophytes, pag. 158. It was brought from Curassoa, in the West Indies.

At

At fig. 2. is a magnified part of the stem of the Sertularia, with some of the wart-shaped cells of the Alcyonium upon it.

XVI. S P O N G I A.

Animal *fixum, flexile, polymorphum, torpidissimum, contextum vel e fibris reticulatis, vel e spinulis, gelatina viva vestitis;*

Osculis seu foraminibus superficiei aquam respirans.

S P O N G E

Is an animal that is fixt, flexible, and very torpid, growing in a variety of forms, composed either of reticulated fibres, or masses of small spines interwoven together, which are clothed with a living gelatinous flesh full of small mouths or holes on its surface, by which it sucks in and throws out the water.

As to the nature and formation of Sponges, I shall refer the reader to my letter on this subject, addressed to Doctor Solander, published in the Philosophical Transactions, Vol. 55. p. 280. I shall only add, that the texture of them is very different in different species; some being composed wholly of interwoven reticulated fibres, when others are composed of little masses of strait fibres of different sizes, from the most minute spiculæ to strong elastic shining spines, like small needles of one-third of an inch long; besides these, there is an intermediate sort between the reticulated and the finer fasciculated kinds, which seem to partake of both sorts.

But I must observe here, that those that are composed of the stronger and larger bundles of elastic fibres, like
needles,

needles, though they have been reckoned Alcyoniums by most authors, yet in my opinion it appears, from the accurate descriptions given us of these bodies, both by Count Marfigli and Dr. Donati, who had seen and examined them alive in sea-water, and who could never discover any polype suckers extending out of their pores, that they should not be reckoned among the Alcyoniums; for these polype suckers are the distinguishing character of that genus, as much as the pores without the polypes in these elastic fibrous bodies, is the character of the Sponges. These are the Alcyonium Lyncurium and Alcyonium Cydonium of Linn. Syft. pag. 1295. The Alcyonium Bursa Linn. also appears from the description given of it by Rondeletius to be one of the same kind. This is said by Mr. Ray to be found on our coasts, but I have never yet met with it. Count Marfigli calls it Aurantium Marinum, and says it appeared to have life in it, when he cut a piece of it with his scissars. That the surface was covered with a great number of glands that transmitted the water from the outside to the inside, which was crossed by a number of fine threads shining like silver; but he makes no mention of any polypes on the surface.

1. *Spongia officinalis.**Common Sponge.*

Spongia multiformis tenax porosissima lobata tomentosa.

This Sponge is found in a variety of forms; it is elastic, very full of holes; it grows into lobes, and is of a woolly consistence.

Common officinal Sponge. Phil. Transf. Vol. 55. p. 288. tab. 10. fig. D. E.

Spongia officinalis. Linn. Syft. Nat. Ed. 12. p. 1298.

This

This Sponge generally adheres to rocks by a very broad base. It is often found inclosing small stones and shells. Variety of marine animals pierce and gnaw it into irregular winding cavities; these appear on the outside by large holes raised higher than the rest; it varies in color from a pale to a deep yellow, and likewise in the consistence of the fibres. When we cut it perpendicularly, we find the internal part consisting of small tubes, which divide into branches as they approach the surface. These tubes, which are composed of reticulated fibres, extend themselves every way, by this means increasing the surface of the Sponge, and ending on the outside in an infinite number of small circular holes, which are the proper mouths of the animal: each of these holes is surrounded by a few erect pointed fibres, which appear as if wove in the form of little spines. These tubes, with their ramifications, in the living state of the Sponge, are clothed with a gelatinous substance properly called the flesh of the animal. This the fishermen, as soon as they are brought on shore, are obliged to squeeze out and wash the Sponge clean, to prevent its growing putrid. When they are first taken out of the sea they have a strong fishy smell, and when the Sponge is burnt, the smell soon discovers its animal nature. This kind, of which there are many varieties, is chiefly collected about the islands in the Archipelago, in the Mediterranean Sea, where it is a considerable article of commerce.

2. *Spongia oculata.**Branched English Sponge.*

Spongia ramosissima mollis, ramis compressiusculis ascendentibus sæpe

This Sponge is delicately soft, and very much branched; the branches are a very little
confluentibus,

confluentibus, poris prominulis bifarie dispositis.

compressed, and grow erect, often uniting together; they have rows of cells on each margin that project a little.

Branched English Sponge. Ellis Corallin. pag. 80. tab. 32. fig. f. F. Phil. Transf. Vol. 55. pag. 288. tab. 10. fig. B.

Spongia oculata. Linn. Syft. Nat. Ed. 12. pag. 1298.

This Sponge is of a pale yellow color, and grows from five to ten inches high; it is often dichotomous, and the branches end obtusely. The fibres are reticulated, and the gelatinous part or flesh is so tender, that when it is taken out of the water it soon dries away. It is found very common all round the sea coasts of these kingdoms.

3. *Spongia muricata.*

Shagg Sponge.

Spongia stirpe suberosâ ramosâ, ramis cylindricis fasciculis villosis undique muricatis.

The substance of the stem of this Sponge is like cork, and branched; the branches are cylindrical, and surrounded on all sides with obtuse little shaggy tufts.

Branched tuberculated Sponge. Phil. Transf. Vol. 55. pag. 288. tab. 11. fig. F.

Spongia muricata. Linn. Syft. Nat. Ed. 12. pag. 1298.

This curious Sponge was sent from our factory at Cape Coast Castle on the coast of Africa, where it grows in plenty on the rocks.

4. *Spongia cristata.**Cock's-Comb Sponge.*

Spongia plana compressa erecta mollis, poris prominulis superne seriatim dispositis.

This Sponge is flat, erect, and tender, growing in the shape of cocks-combs, with rows of little holes along the tops, which project a little.

Cock's-Comb Sponge. Phil. Transf. Vol. 55. pag. 288. tab. 11. fig. G.

This Sponge grows on the rocks to the eastward of Hastings, in Suffex, and may be easily discovered at low water. The common size of it is about three inches long, and two inches high; but this varies much in different specimens. It is of a yellowish color, and was found many together growing parallel to each other. When it was taken out of the sea and put into a glass vessel of sea-water, I perceived it to suck in and squirt out the water through the rows of holes or little mouths along the tops, giving evident signs of life.

5. *Spongia stuposa.**Tow Sponge.*

Spongia ramosa teres stuposa atque villosa.

Sponge with round branches, soft like tow, and covered with fine pointed hairs.

Downy branched English Sponge. Phil. Transf. Vol. 55. pag. 288. tab. 10. fig. C.

This little Sponge is of a pale yellow color, and about three inches high. It was found thrown on the shore at Hastings, in Suffex.

6. *Spongia*

6. *Spongia dichotoma.**Dichotomous Sponge.*

Spongia ramosa tenax, ramis dichotomis erectis teretibus suberosis subvillosis.

Stiff, branched Sponge, with round, upright, elastic branches, covered with minute hairs.

Dichotomous branched Sponge. Phil. Transf. Vol. 55. pag. 289. tab. 11. fig. I.

Spongia dichotoma. Linn. Syst. Nat. Ed. 12. pag. 1299.

This was found on the coast of Norway, and grows to five or six inches high; it is of a pale yellow color, and full of very minute pores.

7. *Spongia urens.**Stinging Sponge.*

Spongia multiformis porosa, spinulis intertextis, tenerrima mollis.

This Sponge is of many forms, full of pores, very brittle and soft, and interwoven with the minutest spines.

Sponge like Crumb of Bread. Ellis Corallin. pag. 80. tab. 16. fig. d. d 1. D 1. Phil. Transf. Vol. 55. pag. 288. tab. 10. fig. A.

Spongia tomentosa. Linn. Syst. Nat. Ed. 12. p. 1299.

The specimens, which I have met with of this Sponge, are full of papillæ, or small protuberances, with a hole in each, from whence they suck in and throw out the water, as through so many mouths. It is very common on the British coast, and is frequently found surrounding fucus's. It is also found on the coast of Africa, and in the East Indies. When it is fresh taken out of the sea, it is of a bright orange color, and full of gelatinous flesh;

but when it has lain for some time dry on the shore, it becomes whitish and very light, and has the appearance, when it is broke, of the crumb or soft part of bread.

If it is examined with a common magnified glass, we find it composed of an infinite number of minute spines, which if rubbed on the flesh will raise blisters like cow-itch. It is remarked, that if it is dried in an oven this peculiar property of stinging is much increased, especially that variety of it which is found on the sea coast of North America.

8. *Spongia Ventilabrum.*

Fan Sponge.

Spongia flabelliformis stuposa, venis lignosis reticulatis, obtectis poris favagineis.

This Sponge is shaped like a fan, of a tow-like substance, with woody reticulated veins, which are covered with pores like a honeycomb.

Sea-Fan Sponge. Phil. Transf. Vol. 55. pag. 289. tab. 11. fig. H.

Spongia Ventilabra. Linn. Syst. Nat. Ed. 12. p. 1296.

The size of the specimen, which I received from Stavanger on the coast of Norway, is but six inches high and five broad; but there are much larger found on that coast. It has the exact resemblance of a small Fan Gorgonia, only the pores are of angular shapes, and of a spongy nature; so that, as Dr. Linnæus remarks, it looks like a Gorgonia covered with a Sponge.

TAB. 58.
FIG. 7.

9. *Spongia tubulosa.*

Pipy Sponge.

Spongia tubulosa ramosa tenax, tubulis secundis

This Sponge is full of tubes; it is branched and elastic;
cundis

cundis arrectis, apicibus attenuatis. the tubes come out on one side of the stem; they are erect, and grow slender at the tops.

TAB. 58. FIG. 7.

Spongia tubulosa. Linn. Syft. Nat. Ed. 12. p. 1297.

This Sponge grows from four to six inches high; it is hollow through the whole inside. The reticulations on the surface are firm and elastic; it is of a deep yellow color, inclining to an orange. It was brought from Batavia by William Webber, Esq. F. R. S.

10. *Spongia palmata.*

Palmated Sponge.

TAB. 58.
FIG. 6.

Spongia palmata: digitis apice subdivisis, poris prominulis inordinate dispositis.

This Sponge is like a hand with fingers, which are a little divided at the top; the mouths are a little prominent, and irregularly disposed on the surface.

TAB. 58. FIG. 6.

This Sponge was found on the sea beach at Brighthelmstone, in Suffex. It is of a reddish color inclining to yellow, and of the same soft woolly texture with the common English Branched Sponge, or *Spongia oculata*.

11. *Spongia prolifera.*

Proliferous Sponge.

TAB. 58.
FIG. 5.

Spongia multoties ramoso-palmata: digitis distinctis.

This Sponge grows several times branched, one above another, in the form of hands, ending in distinct fingers.

TAB. 58. FIG. 5.

I received

I received a large mass of this Sponge from New Jersey; it grows in great bunches on that coast, but is not above five or six inches high. The pores are very small and numerous; the inside is composed of hard wiry reticulations, and the outside is full of minute spines.

TAB. 58.
FIG. 1-4

12. *Spongia botryoides.*

Grape Sponge.

Spongiatenenerrimaramosa quasi racemosa: racemis cavis uviformibus, apicibus apertis.

This Sponge is very tender, and branched, as if in bunches; the bunches are hollow, in the shape of grapes, and each is open at top.

TAB. 58. FIG. 1-4.

This beautiful little Sponge is of a bright shining white color. The bunches are made up of oblong oval figures, open at the end; these openings seem to be the mouths of the animal, to suck in and throw out the water. When the surface is highly magnified, it seems covered with little masses of triple equidistant shining spines, as represented at fig. 4.

This was found, among many other sea productions, in the harbour near Emsworth, between Suffex and Hampshire.

TAB. 58.
FIG. 8. 9.

13. *Spongia coronata.*

Coronet Sponge.

Spongia simplex tubulosa minima, apice spinulis radiatis coronata.

This minute single tubelike sponge is surrounded at top by a crown of little spines.

TAB. 58. FIG. 8. 9.

This

This little Sponge, when magnified, is covered all over with little rising points; it is hollow and open at the top: the rays that compose the little crown are of a bright shining pearl color; the body is of a pale yellow. It was found with the foregoing in the harbour of Emfworth.

EXPLA-

EXPLANATION of the PLATES.

TAB. I.

- Fig. 1. *Actinia fociata*, *pag.* 5. *n.* 5.
 A. one of the heads expanding its claws.
 B. a younger one proceeding from the end of the tube.
- Fig. 2. one of the animals dissected longitudinally to shew the inside magnified.
- Fig. 3. *Actinia Calendula*, *pag.* 7. *n.* 10.
- Fig. 4. *Alcyonium mammillosum*, *pag.* 179. *n.* 5.
- Fig. 5. two cells of the same magnified and dissected longitudinally to shew the polypes contracted.
- Fig. 6. *Alcyonium ocellatum*, *pag.* 180. *n.* 6.
- Fig. 7. One of the Polypes of *Alcyonium digitatum*, *pag.* 175. *n.* 1. with its tentacula extended.

TAB. 2.

- Fig. 1. *Gorgonia c eratophyta* divested of its flesh. This affords an instance of its bone growing over and surrounding one of its former branches, and afterwards covering, as at A. some Tree Oysters that have adhered to the first branch.
- Fig. 2. a quarter of a horizontal section of it.
- Fig. 3. the same magnified, to shew the different layers of its growth.
- Fig. 4. An old stem of *Gorgonia verticillata*, with scaly layers, shining and hard, like mother of pearl.
- Fig. 5.

- ig. 5. the top of it magnified.
 Fig. 6. A piece of red Saunders (Lignum Santalum) from the East Indies.
 Fig. 7. the same magnified, to shew the utricular vessels interwoven with the longitudinal tubes.
 Fig. 8. *Flustra foliacea*, pag. 12. n. 2. a little magnified.

TAB. 3.

- Fig. 1. *Isis Hippuris*, pag. 105. n. 2.
 A. the bone covered with the flesh, full of the cells from whence the polypes are extended.
 Fig. 2. a longitudinal section magnified, shewing the bone surrounded by the flesh, and the polypes contracted in their cells.
 Fig. 3. the flesh separated from the bone, to shew the tubes with the holes in them, that supply the bony part with increase.
 Fig. 4. the cross section shewing the white bone in the center with the tubes surrounding it, and the polypes in their cells on the margin: the intermediate flesh is full of organical parts, that serve to receive nourishment from the mouths, as well as to give them the power of extending their arms in search of it.
 Fig. 5. one of the polypes contracted; magnified.
 Fig. 6. *Flustra carbafea*, pag. 14. n. 5.
 Fig. 7. the same magnified.

TAB. 4.

- Fig. a. *Flustra verticillata*, pag. 15. n. 7.
 Fig. A. the same highly magnified.
 Fig. b. *Flustra bombycina*, pag. 14. n. 6.

C c

Fig. B.

- Fig. B. one of the leaves magnified, to shew the disposition of the cells that compose it, with their entrances.
- Fig. B I. the back view of the same leaf magnified.
- Fig. c. c I. *Cellaria Flabellum*, *pag.* 28. *n.* 16.
- Fig. C. the back-part of the cells magnified.
- Fig. C I. the fore-part of the same magnified.
- Fig. d. *Cellaria cirrata*, *pag.* 29. *n.* 17.
- Fig. D. the back-part of the cells magnified.
- Fig. D I. the fore-part of the same magnified.
- Fig. e. f. *Sertularia volubilis*, *pag.* 51. *n.* 22.
- Fig. F. the same magnified, with its ovaries at E.

T A B. 5.

- Fig. a. *Cellaria tulipifera*, *pag.* 27. *n.* 15. growing on a *Fucus* (H.)
- Fig. A. the same magnified.
- Fig. b. *Cellaria cereoides*, *pag.* 26. *n.* 14.
- Fig. B. some of the joints magnified, to shew the shape of the cells.
- Fig. C. some of the joints supported in the middle by a tube, from whence the cells grow downwards, as well as upwards.
- Fig. D. the cross section of a joint, to shew the connexion of the cells.
- Fig. E. the perpendicular section, to shew the disposition of the cells.
- Fig. g. *Sertularia quadridentata*, *pag.* 57. *n.* 33. adhering to the *Fucus lendigerus* Linn. (F.)
- Fig. G. the same magnified.

TAB. 6.

- Fig. a. *Sertularia frutescens*, pag. 55. n. 29.
 Fig. A. the branches magnified, to shew the denticles.
 A I. the stem composed of many tubes.
 Fig. b. *Sertularia Pinafter*, pag. 55. n. 30.
 Fig. B. part of the stem and branches magnified.
 B I. the ovaries.
 Fig. c. *Sertularia Filicula*, pag. 57. n. 32.
 Fig. C. part of the stem and branches magnified.
 C I. the ovaries.

TAB. 7.

- Fig. 1. *Sertularia Pennatula*, pag. 56. n. 31.
 Fig. 2. a piece of the same magnified.
 Fig. 3. *Sertularia muricata*, pag. 59. n. 36.
 Fig. 4. the same magnified, to shew the ovaries full of sharp points.
 Fig. 5. *Corallina Peniculum*, pag. 127. n. 36.
 Fig. 6. one magnified.
 Fig. 7. the top of the young tube, shewing how the branches rise out of the head of it.
 Fig. 8. one of the branches highly magnified, to shew the pores on the calcareous surface.
 Fig. 9. The supposed *Corallina terrestris*; see pag. 127.
 Fig. 10. the same magnified.
 a. a. a. a. a. supposed fructification, higher magnified at b. b. b. b. b.

TAB. 8.

- Fig. 1. 2. *Pennatula argentea*, pag. 66. n. 9.
 Fig. 3. one of the fins extended.
 Fig. 4. *Holothuria tremula*, *Linn. Syst. Nat.* 1090.
 C c 2 Fig. 5.

Fig. 5. one of the suckers that surround the head, magnified.

Fig. 6. A sea-animal found near the islands of Grenades.

TAB. 9.

Fig. 1. *Sertularia frutescens* surrounded by the *Alcyonium gorgonoides*, *pag.* 181. *n.* 8.

Fig. 2. the same magnified.

Fig. 3. 4. The bone of the stem of *Isis Hippuris* sawed asunder, to shew the inside growth.

Fig. 5. The inside of the *Gorgonia ceratophyta*, to shew that the medulla is stoppt at each branch by a septum.

Fig. 6. the same magnified, to shew the figure of the medulla.

Fig. 7. The inside of a sprig of a lime-tree, to shew that the medulla is continued.

Fig. 8. the same magnified, to shew the figure of the medulla.

TAB. 10.

Gorgonia Umbraculum, *pag.* 80. *n.* 1.

TAB. 11.

Gorgonia flammea, *pag.* 80. *n.* 2.

TAB. 12.

Fig. 1. *Gorgonia viminalis*, *pag.* 82. *n.* 5.

Fig. 2. *Gorgonia ceratophyta*, *pag.* 81. *n.* 4.

Fig. 3. one of the *Polypes* magnified.

Fig. 4. A piece of *Millepora cærulea*, *pag.* 142. *n.* 20.

Fig. 5. *Isis coccinea*, *pag.* 107. *n.* 3.

TAB.

TAB. 13.

- Fig. 1. *Gorgonia lepadifera*, pag. 84. n. 8.
 Fig. 2. the cell of one of the polypes, covered with
 scales, magnified.
 Fig. 3. *Gorgonia pretiosa*, pag. 90. n. 16. At the base,
 where it adheres to the rock, the flesh is taken
 off, to shew the form of the bone.
 Fig. 4. a specimen sent from Dr. Donati in spirits;
 magnified.
 Fig. 5. *Madrepora axillaris*, pag. 153. n. 11.

TAB. 14.

- Fig. 1. *Gorgonia Briareus*, pag. 93. n. 20.
 Fig. 2. the spiculæ of which the bone is composed;
 magnified.
 Fig. 3. *Gorgonia pinnata*, pag. 87. n. 11.

TAB. 15.

- Fig. 1. *Gorgonia exserta*, pag. 87. n. 12.
 Fig. 2. one of the polypes magnified.
 Fig. 3. *Gorgonia patula*, pag. 88. n. 13.
 Fig. 4. a piece of the same magnified.
 Fig. 5. *Lepas dorsalis*, testa quinquevalvi corpus tegente
 basi squamosa, valvulis lateralibus lævibus;
 dorsali rotundata transversim rugosa, stipite
 squamuloso.
 From the Musquito shore.
 Fig. 6. *Lepas fascicularis*, testa quinquevalvi lævi corpus
 tegente, valvula dorsali basi dilatata angulo
 acuto prominente, stipite nudo.
 From St. George's Channel.

Fig. 7.

Fig. 7. 8. *Balanus clavatus*, testa elongata clavata: orificio dilatato hiante.

From Newfoundland.

Fig. 9. 10. *Clio limacina*, nuda, corpore obconico.
Phipps's Voyage towards the North Pole,
pag. 195.

From Newfoundland.

TAB. 16.

Gorgonia abietina, pag. 95. n. 22.

TAB. 17.

Gorgonia reticulata.

TAB. 18.

No explanation of this plate was found in Mr. Ellis's papers.

TAB. 19.

Fig. 1. *Antipathes spiralis*, pag. 99. n. 1.

Fig. 2. the size of the little warts that are on the surface.

Fig. 3. the same soaked in water.

Fig. 4. 5. the same highly magnified.

Fig. 6. the cross section magnified.

Fig. 7. *Antipathes Ulex*, pag. 100. n. 2.

Fig. 8. a piece of it magnified.

Fig. 9. *Antipathes subpinnata*, pag. 101. n. 3.

Fig. 10. a small sprig magnified.

Fig. 11. *Antipathes myriophylla*, pag. 102. n. 4.

Fig. 12. a small sprig magnified.

TAB. 20.

- Fig. a. *Corallina tridens*, pag. 109. n. 1.
 Fig. b. *Corallina Opuntia*, pag. 110. n. 2.
 Fig. c. *Corallina Monile*, pag. 110. n. 3.
 Fig. d. *Corallina incrassata*, pag. 111. n. 4.
 Fig. d 1. a single joint of it.
 Fig. D 1. the same magnified.
 Fig. d 2. the inside.
 Fig. D 2. the same magnified, to shew the branched fibres that end in cells on the surface.
 Fig. d 3. the cross section of the joint.
 Fig. D 3. the same magnified, to shew the growth of the trumpet-like cells.
 Fig. D 4. part of the surface highly magnified, to shew the cavities of some of the cells, and some of their covers cracked.
 Fig. D 5. one of the polypes out of the cell.
 Fig. D 6. the surface of the Coralline, where the covers to the cells are intire.
 Fig. e. *Corallina Tuna*, pag. 111. n. 5.

TAB. 21.

- Fig. a. *Corallina palmata*, pag. 118. n. 20.
 Fig. A. part of the same magnified.
 Fig. b. *Corallina subulata*, pag. 119. n. 23.
 Fig. B. part of the same magnified.
 Fig. c. *Corallina granifera*, pag. 120. n. 24.
 Fig. C. part of the same magnified.
 Fig. d. *Corallina fragilissima*, pag. 123. n. 29.
 Fig. e. *Corallina Tribulus*, pag. 124. n. 31.
 Fig. f. *Corallina cuspidata*, pag. 124. n. 30.
 Fig. g. *Corallina lapidescens*, pag. 112. n. 8.

Fig. h.

- Fig. h. *Corallina Rosarium*, *pag.* 111. *n.* 6.
 Fig. H. two joints magnified, the upper to shew the form and disposition of the cells, and the lower the calcareous part broken open, to shew the inner great tube, with the branches of cells coming from it, that pass through the calcareous part, ending like trumpets on the surface.
 Fig. H 3. one of the branches highly magnified, to shew the figure of the cells, and ovary between them.
 Fig. H 2. the ovary.
 Fig. H 1. one of the eggs.

TAB. 22.

- Fig. 1. *Corallina oblongata*, *pag.* 114. *n.* 10.
 Fig. 2. *Corallina obtufata*, *pag.* 113. *n.* 9.
 Fig. 3. *Corallina rugosa*, *pag.* 115. *n.* 13.
 Fig. 4. *Corallina cylindrica*, *pag.* 114. *n.* 11.
 Fig. 5. *Corallina fruticulosa*, *pag.* 116. *n.* 16.
 Fig. 6. *Corallina marginata*, *pag.* 115. *n.* 12.
 Fig. 7. *Corallina indurata*, *pag.* 116. *n.* 15.
 Fig. 8. *Corallina lichenoides*, *pag.* 116. *n.* 14.
 Fig. 9. *Corallina lapidescens*, *pag.* 112. *n.* 8.

TAB. 23.

- Fig. 1. *Millepora truncata*, *pag.* 141. *n.* 18.
 Fig. 2. the top of a branch magnified.
 Fig. 3. a perpendicular section.
 Fig. 4. a horizontal section.
 Fig. 5. one of the polypes in its cell.
 Fig. 6. another view of a polype coming out of its cell.
 Fig. 7.

- Fig. 7. the operculum raised up.
 Fig. 8. the operculum closing the cell.
 Fig. 9. *Millepora decussata*, pag. 131. n. 3.
 Fig. 10. *Millepora lichenoides*, pag. 131. n. 4.
 Fig. 11. a small piece of it broken off.
 Fig. 12. the same magnified, to shew the ranges of the cells, as they are disposed over one another.
 Fig. 13. *Millepora calcarea*, pag. 129. n. 1.
 Fig. 14. *Corallina officinalis*, pag. 118. n. 21.
 Fig. 15. a joint cut through the middle, and magnified, to shew that the cells are nearly alike to those of the three foregoing species of Millepores.

TAB. 24.

- Fig. A. *Corallina Flabellum*, pag. 124. n. 32. in its first state.
 Fig. B. the same with three series of increase, as in the shells of Oysters, &c.
 Fig. C. the same much farther advanced, when it begins to divide into lobes, which fold over each other.
 Fig. D. the same beginning to branch from the stem.

TAB. 25.

- Fig. 1. *Corallina Peniculum*, pag. 127. n. 36. full grown.
 Fig. 2. *Corallina Phœnix*, pag. 126. n. 34.
 Fig. 3. one of the branches magnified.
 Fig. 4. *Corallina Penicillus*, pag. 126. n. 35.
 Fig. 5. a variety of the same, with larger branches.
 Fig. 6. one of the branches magnified.
 Fig. 7. *Corallina conglutinata*, pag. 125. n. 33.

TAB. 26.

No explanation of this plate was found in Mr. Ellis's papers.

TAB. 27.

Tubipora mufica, pag. 144.

TAB. 28.

- Fig. 1—4. *Madrepora Patella*, pag. 148. n. 1.
 Fig. 5. 6. *Madrepora Fungites*, pag. 149. n. 2.
 Fig. 7. *Madrepora Cyathus*, pag. 150. n. 3.

TAB. 29.

Madrepora Anthophyllites, pag. 151. n. 4.

TAB. 30.

- Fig. 1. *Madrepora fascicularis*, pag. 151. n. 5.
 Fig. 2. a piece of it magnified.

TAB. 31.

- Fig. 1. *Madrepora feriata*, pag. 171. n. 75.
 Fig. 2. a piece of it magnified.
 Fig. 3. *Madrepora cristata*, pag. 158. n. 27.
 Fig. 4. a piece of it magnified.
 Fig. 5. *Madrepora flexuosa*, pag. 151. n. 6.
 Fig. 6. a piece of it magnified.

TAB. 32.

No explanation of this plate was found.

Fig. 3—8. are copied from the Philosophical Transactions, Vol. 47. tab. 4.

TAB.

TAB. 33.Madrepora fastigiata, *pag.* 152. *n.* 8.TAB. 34.Madrepora angulosa γ . *pag.* 152. *n.* 9.TAB. 35.Madrepora Carduus, *pag.* 153. *n.* 10.TAB. 36.Madrepora virginea, *pag.* 154. *n.* 13.TAB. 37.Madrepora hirtella, *pag.* 155. *n.* 16.TAB. 38.Madrepora ramea, *pag.* 155. *n.* 17.TAB. 39.Madrepora aspera, *pag.* 156. *n.* 21.TAB. 40.Madrepora undata, *pag.* 157. *n.* 23.TAB. 41.Fig. 1. 2. Madrepora ampliata, *pag.* 157. *n.* 24.TAB. 42.Madrepora cucullata, *pag.* 157. *n.* 25.

E X P L A N A T I O N O F

TAB. 43.

Madrepora cinerascens, *pag.* 157. *n.* 26.

TAB. 44.

Madrepora Lactuca, *pag.* 158. *n.* 28.

TAB. 45.

Madrepora Pileus, *pag.* 159. *n.* 31.

TAB. 46.

Fig. 1. 2. Madrepora dædalea, *pag.* 163. *n.* 43.

Fig. 3. 4. Madrepora labyrinthica, *pag.* 160. *n.* 34.

TAB. 47.

Fig. 1. Madrepora porites, *pag.* 172. *n.* 77.

Fig. 4. 5. Madrepora areolata, *pag.* 161. *n.* 36.

Fig. 6. Madrepora Ananas, *pag.* 168. *n.* 64.

Fig. 7. Madrepora galaxea, *pag.* 168. *n.* 67.

Fig. 8. Madrepora radiata, *pag.* 169. *n.* 71.

TAB. 48.

Fig. 1. Madrepora mæandrites, *pag.* 161. *n.* 37.

Fig. 2. Madrepora phrygia, *pag.* 162. *n.* 40.

TAB. 49.

Fig. 1. Madrepora denticulata, *pag.* 166. *n.* 56.

Fig. 2. Madrepora fiderea, *pag.* 168. *n.* 66.

Fig. 3. Madrepora exesa, *pag.* 161. *n.* 38.

TAB. 50.

Fig. 1. Madrepora favosa, *pag.* 167. *n.* 61.

Fig. 2. Madrepora abdita, *pag.* 162. *n.* 39.

TAB. 51.

Madrepora gyrosa, *pag.* 163. *n.* 44.

TAB. 52.

Fig. 1. *Madrepora foliosa*, *pag.* 164. *n.* 50.

Fig. 2. a piece of it magnified.

TAB. 53.

Fig. 1. 2. *Madrepora annularis*, *pag.* 169. *n.* 69.

Fig. 3. 4. *Madrepora stellulata*, *pag.* 165. *n.* 52.

Fig. 5. 6. *Madrepora faveolata*, *pag.* 166. *n.* 57.

Fig. 7. 8. *Madrepora Pleiades*, *pag.* 169. *n.* 68.

TAB. 54.

Fig. 1. 2. *Spongia*.

Fig. 3. 4. 5. *Madrepora Retepora*, *pag.* 166. *n.* 58.

TAB. 55.

Madrepora rotulosa, *pag.* 166. *n.* 59.

TAB. 56.

Madrepora interstincta, *pag.* 167. *n.* 60.

TAB. 57.

Madrepora muricata, *pag.* 171. *n.* 76.

TAB. 58.

Fig. 1. *Spongia botryoides*, *pag.* 190. *n.* 12.

Fig. 2. one of the branches separated from the rest.

Fig. 3. the same magnified.

Fig. 4.

- Fig. 4. the spines which cover the surface; highly magnified.
- Fig. 5. *Spongia prolifera*, pag. 189. n. 11.
- Fig. 6. *Spongia palmata*, pag. 189. n. 10.
- Fig. 7. *Spongia tubulosa*, pag. 188. n. 9.
- Fig. 8. *Spongia coronata*, pag. 190. n. 13.
- Fig. 9. the same magnified.

TAB. 59.

- Fig. 1. 2. 3. Sponges from Otaheite.
- Fig. 4. Sponge called the Sea-Fig, from the Mediterranean.

TAB. 60.

The under side of *Asterias Echinites*. Star-fish with twenty rays, and two rows of suckers in each ray, furnished with many rows of large and small moveable spines, like an *Echinus*. It was brought from Batavia by Captain W. Weber, and is in the possession of Dr. Fothergill.

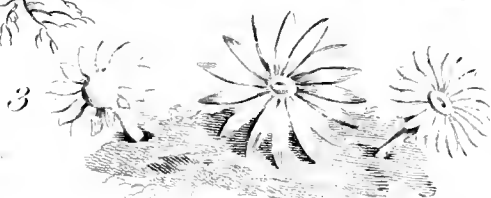
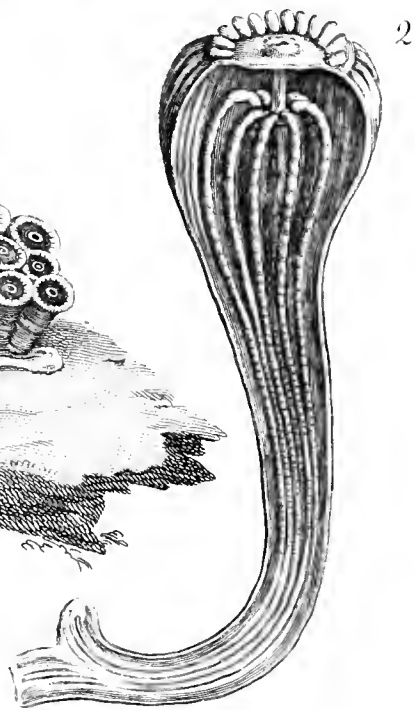
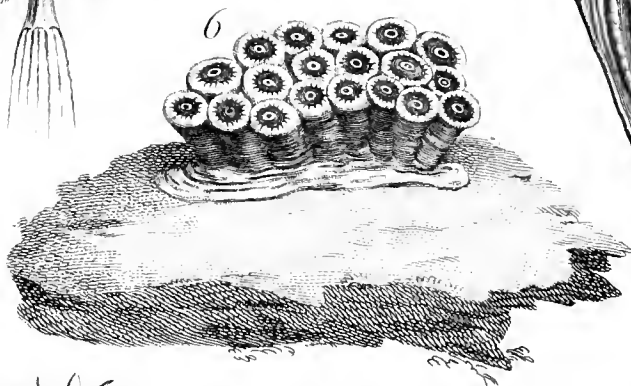
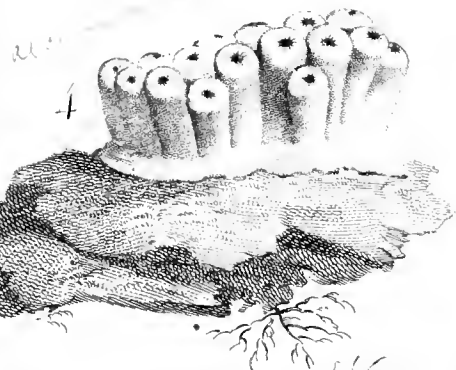
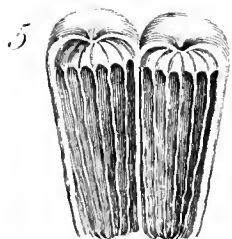
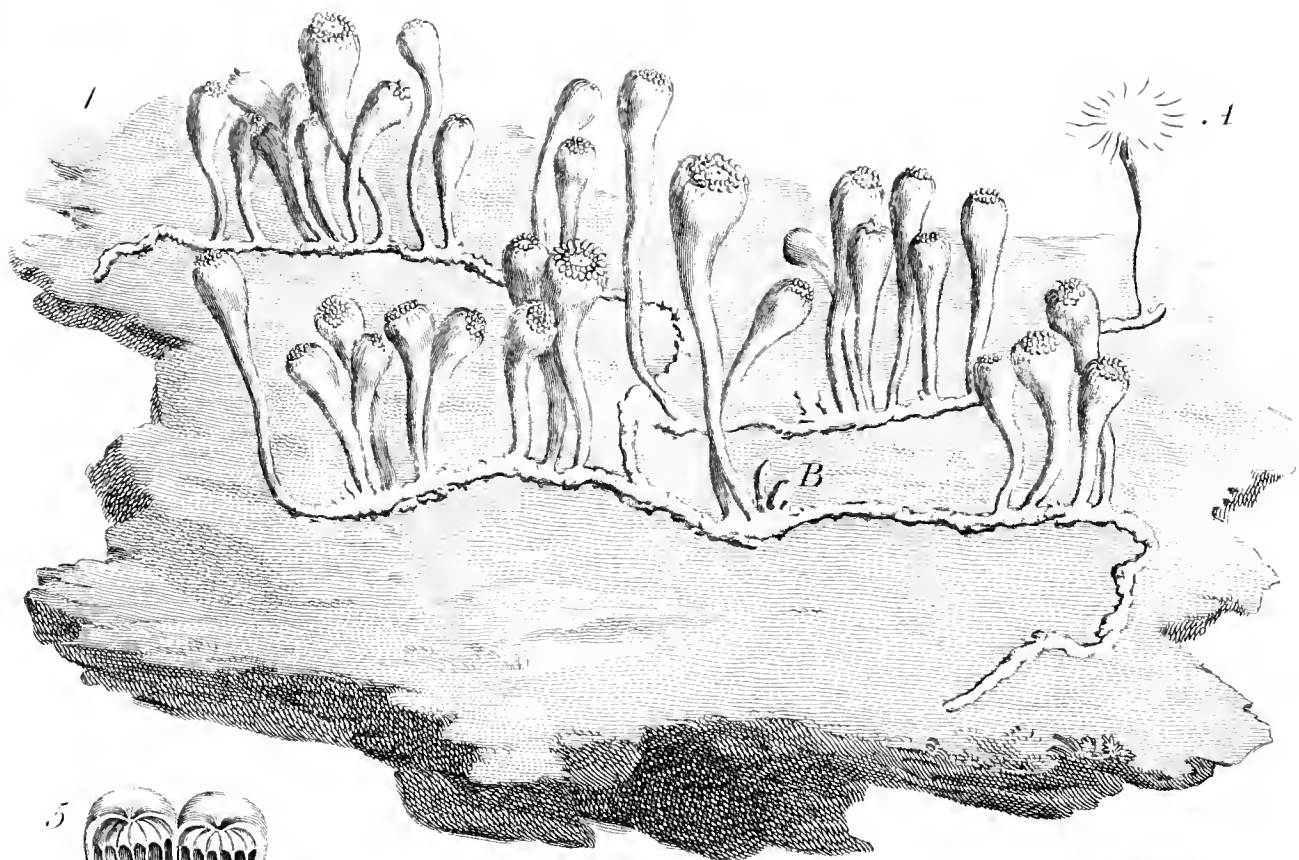
TAB. 61.

The back of the same.

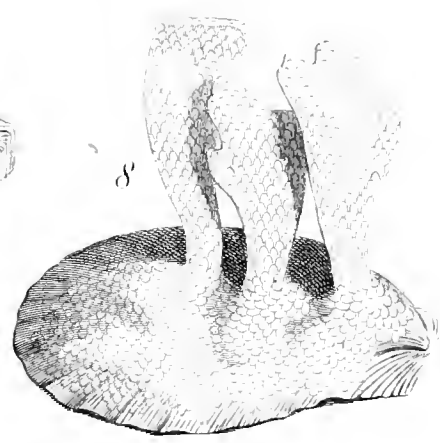
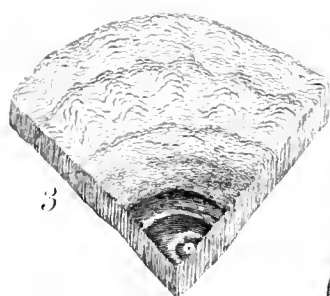
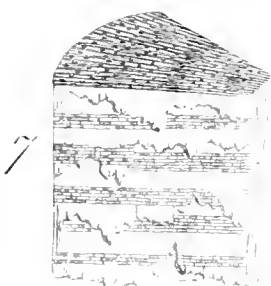
TAB. 62.

The end of one of the rays of the same, magnified, to shew the spines in their sockets.

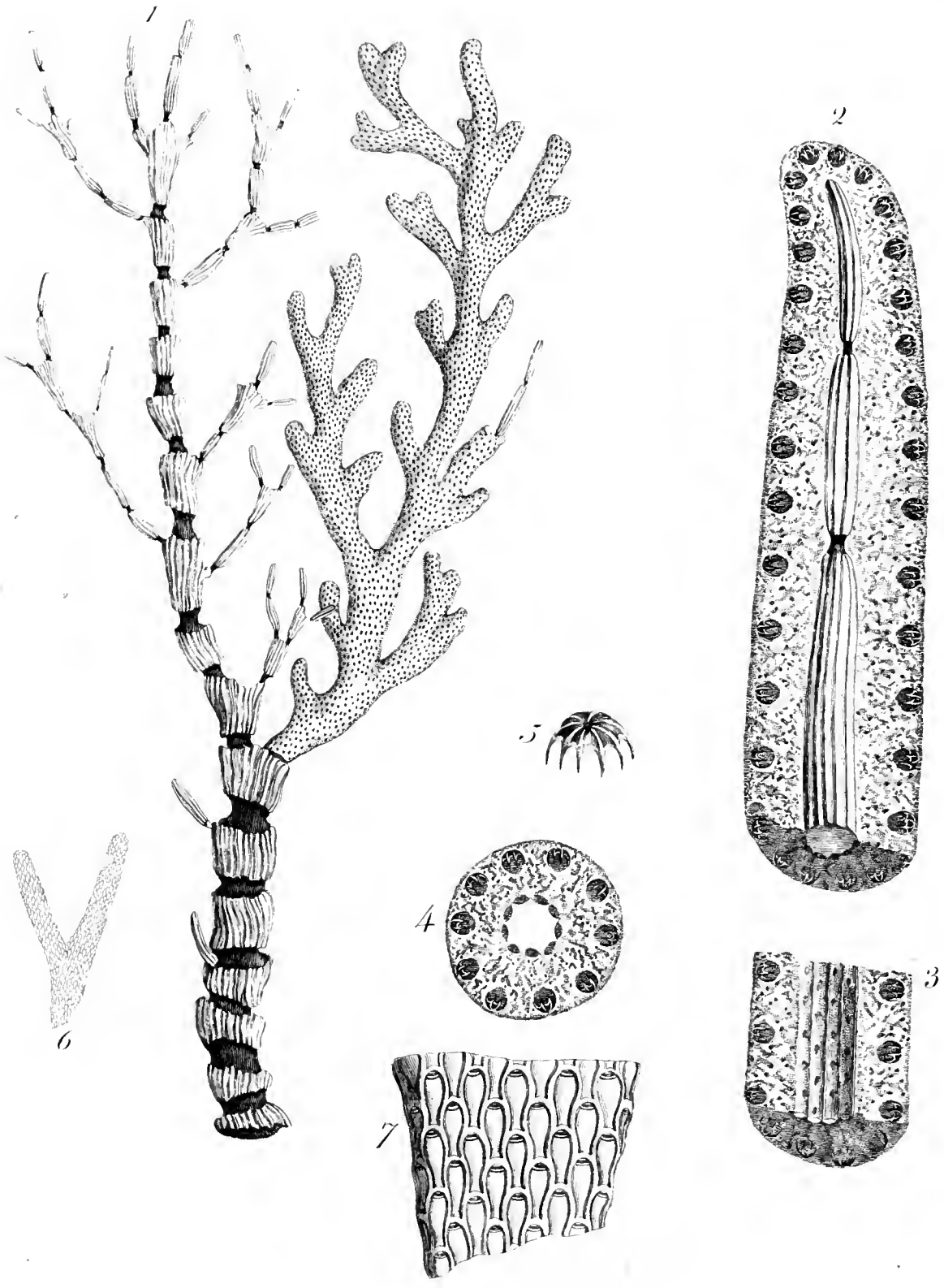
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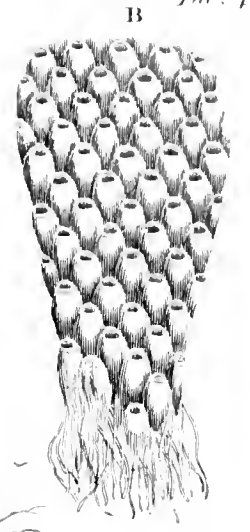
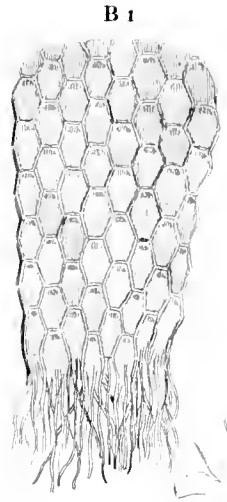
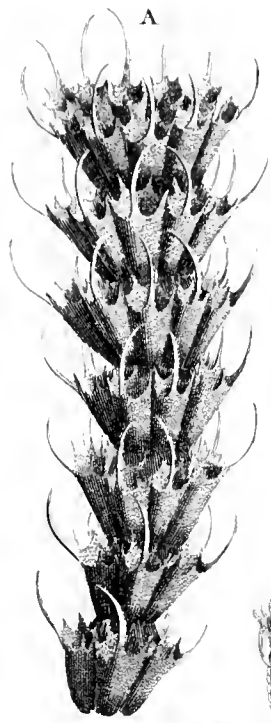
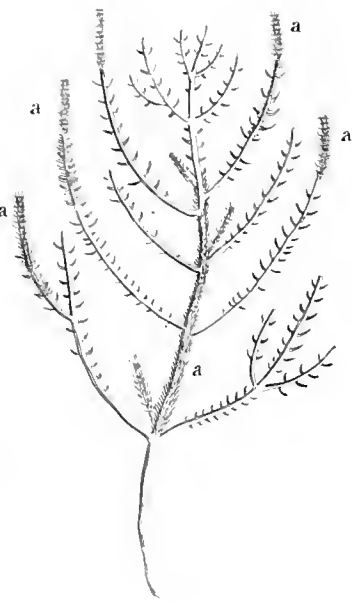




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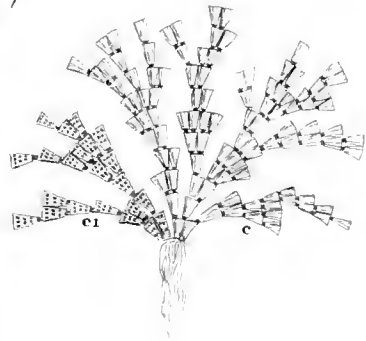
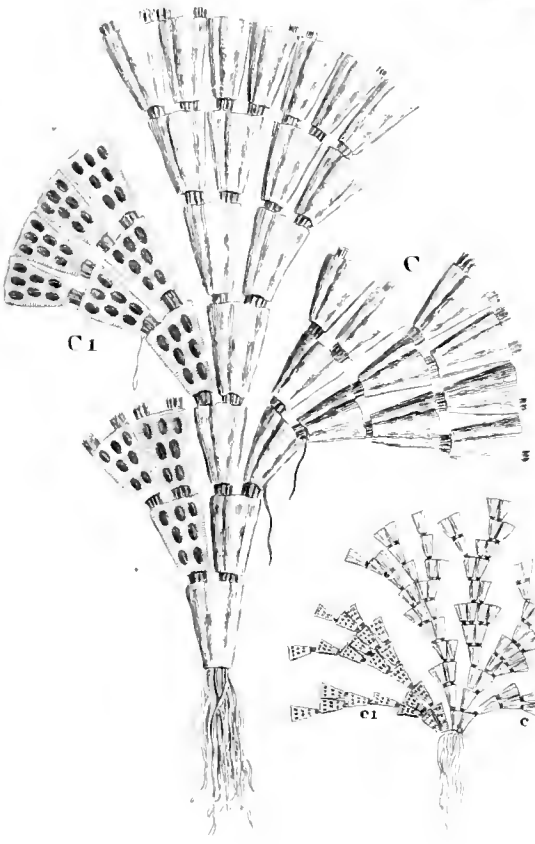
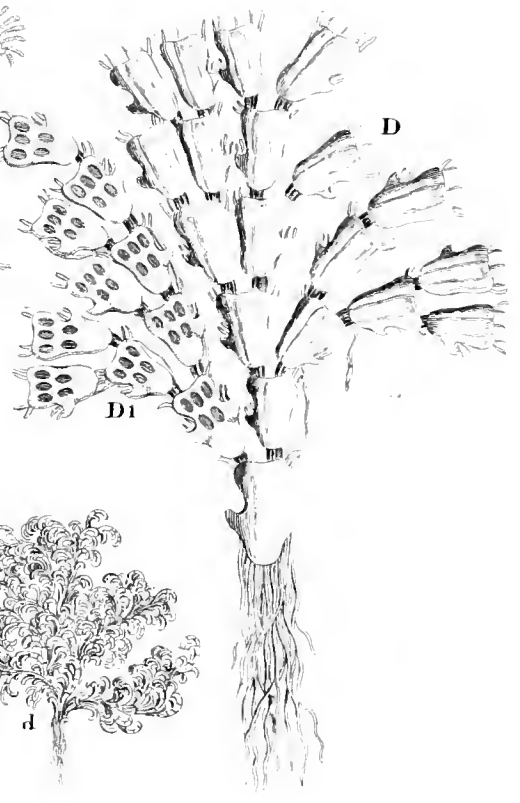


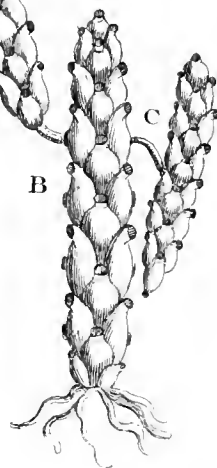
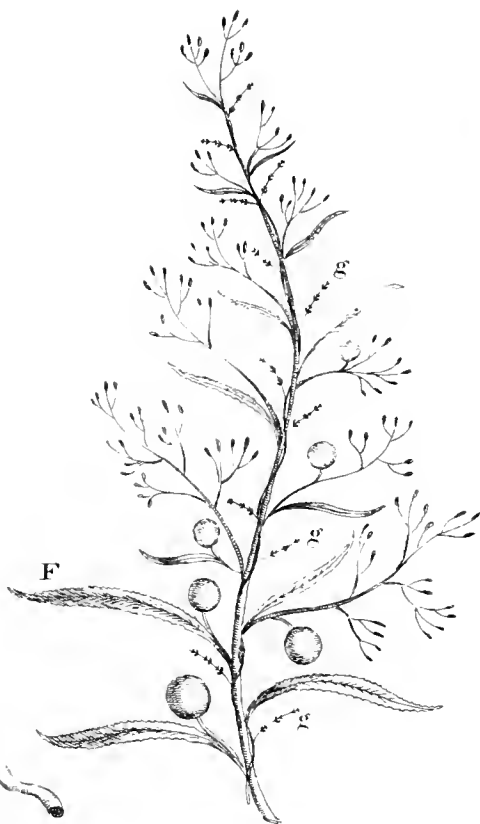
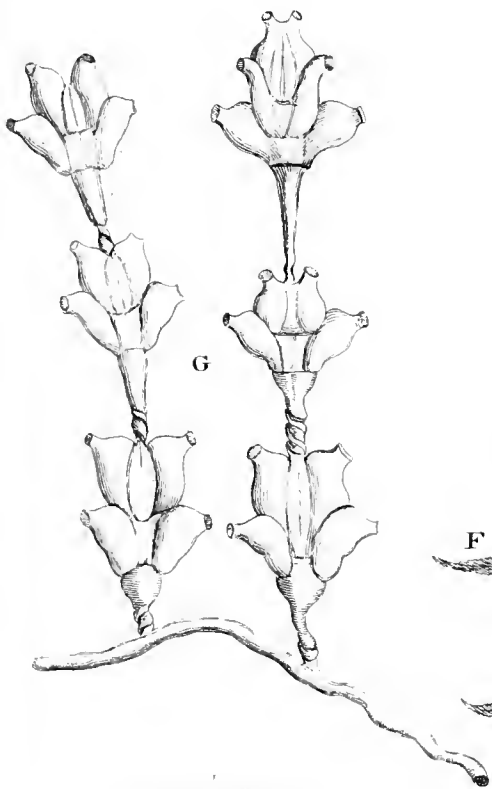
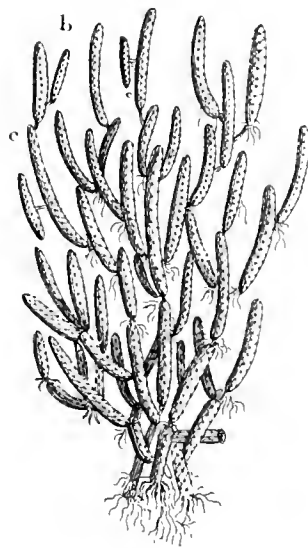
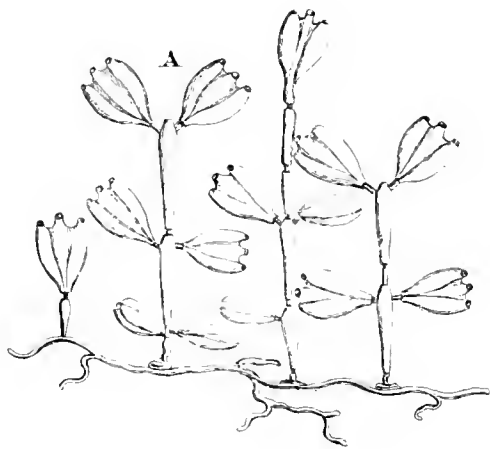
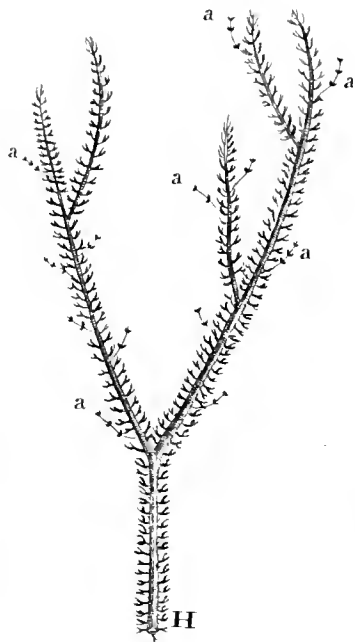
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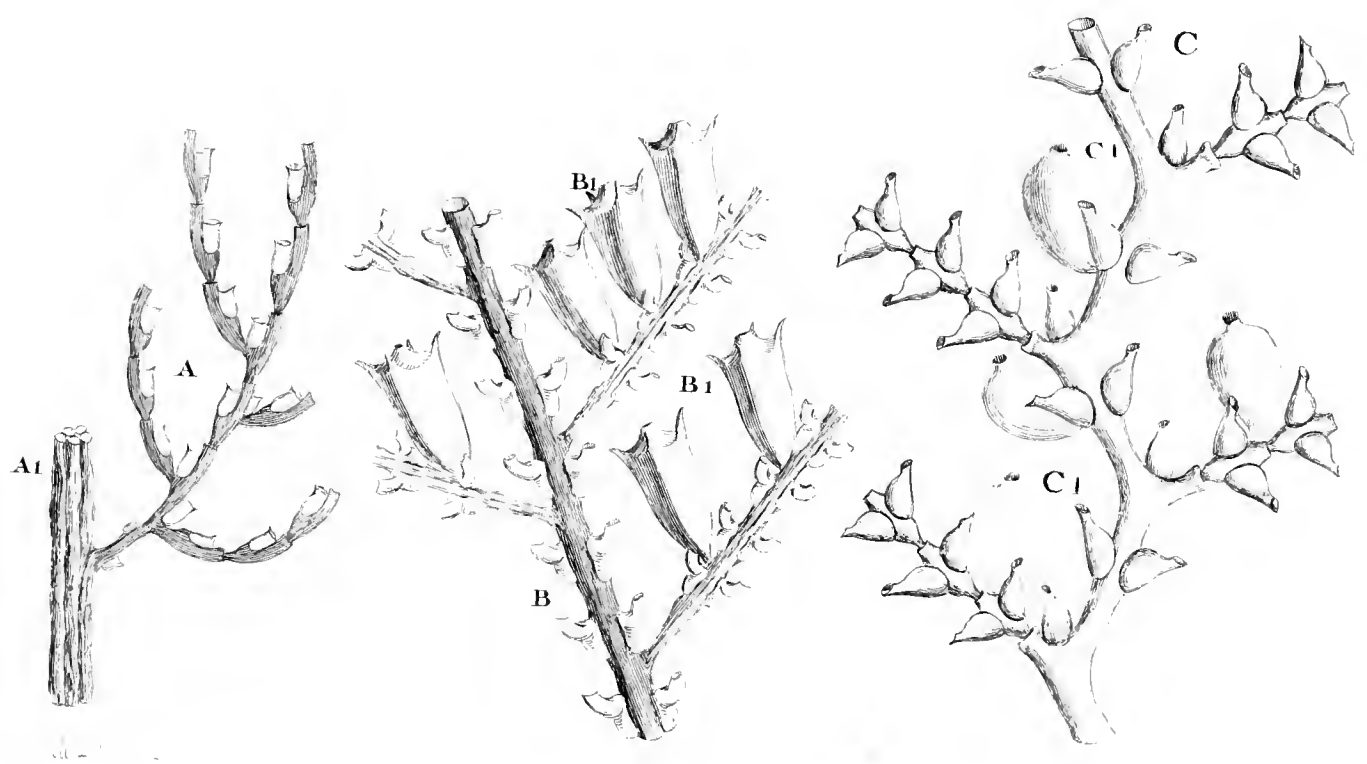


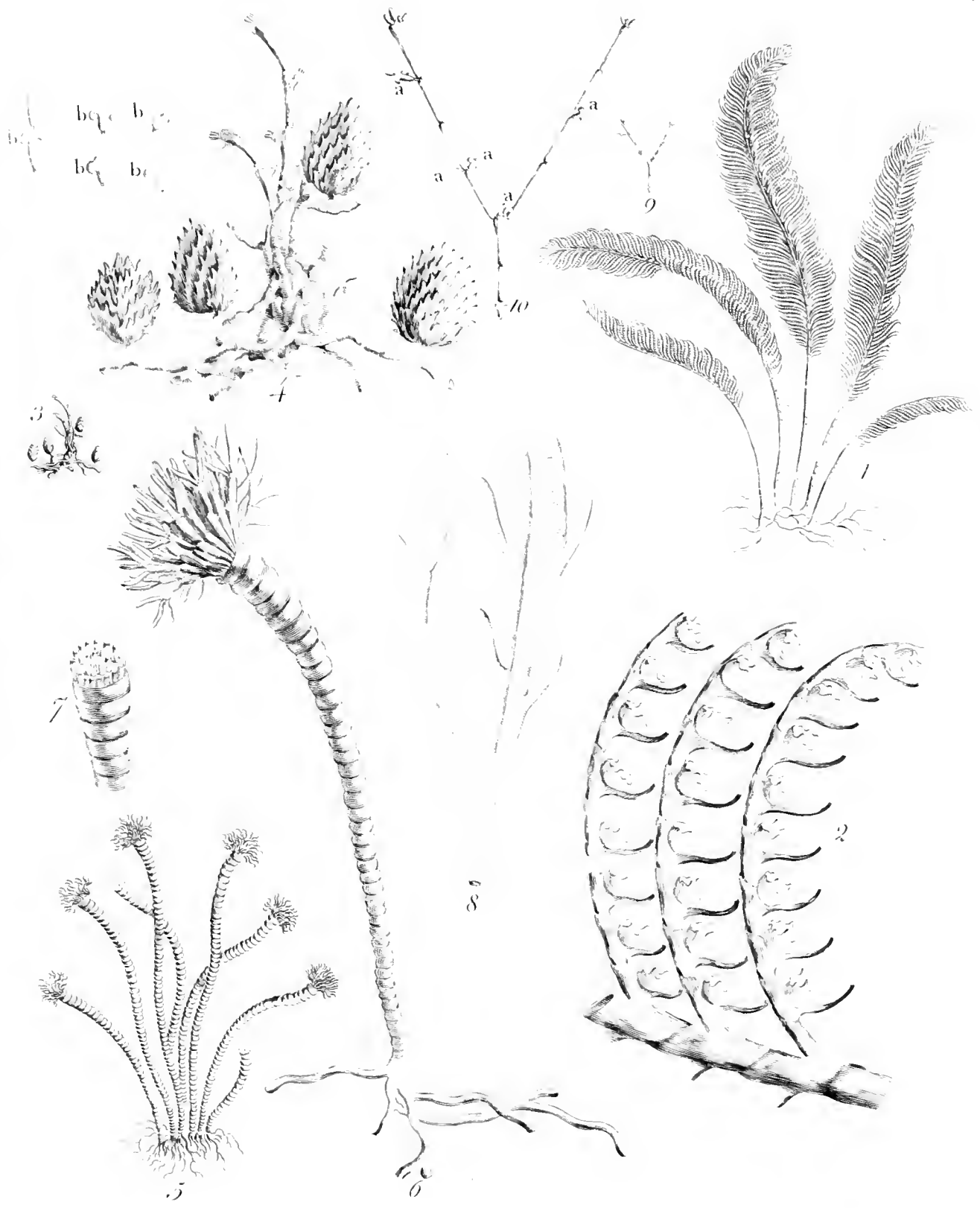
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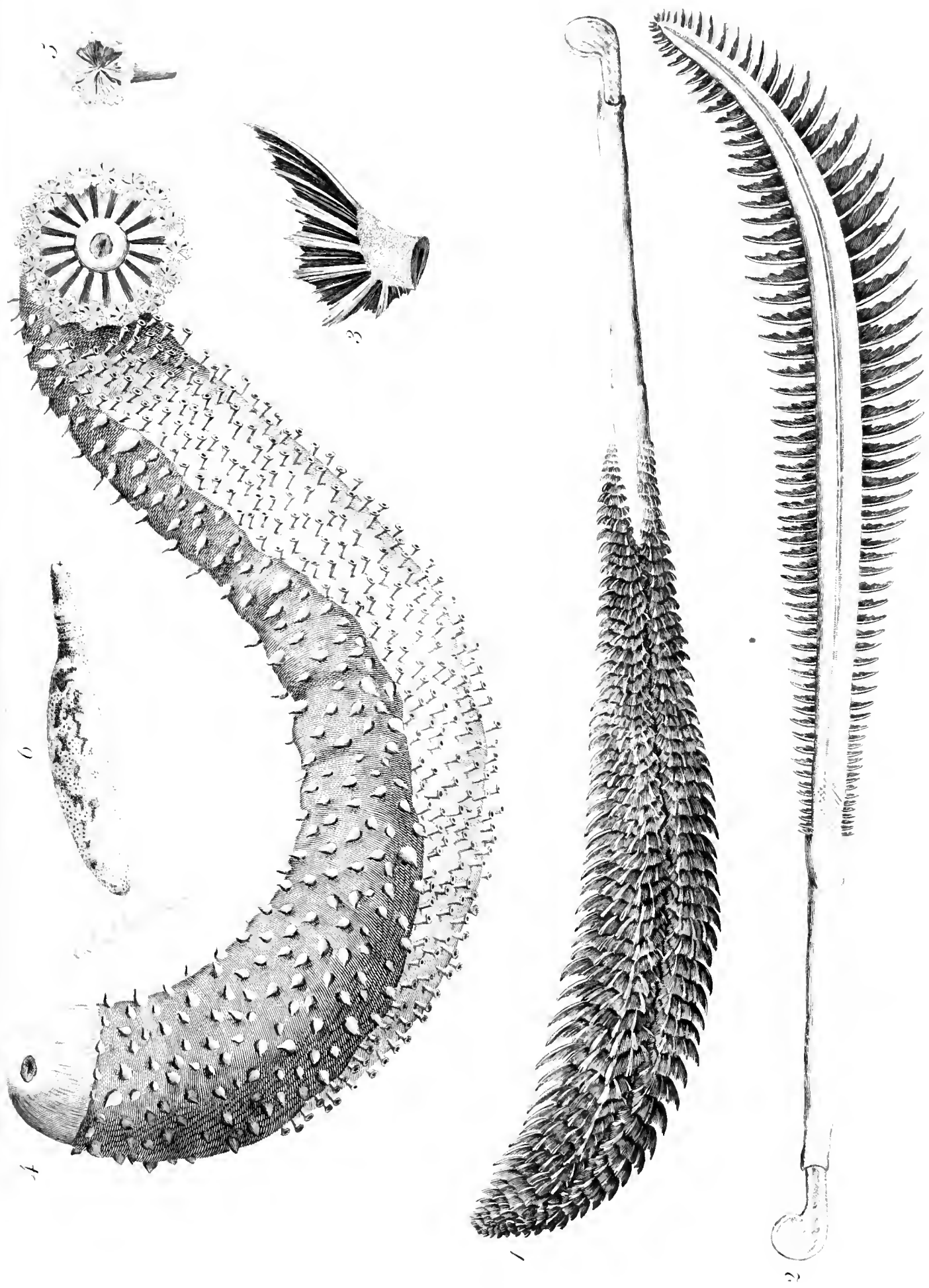
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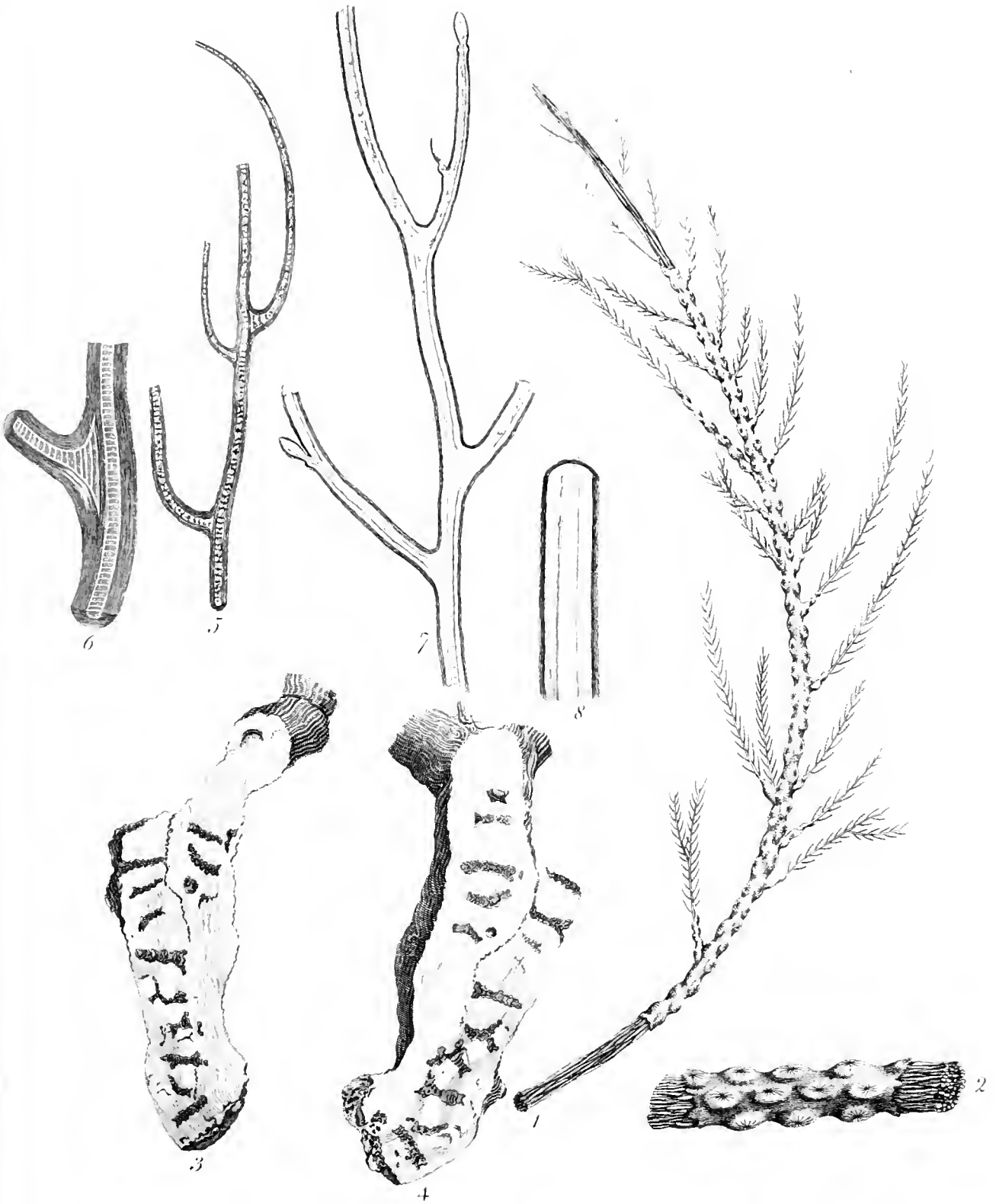


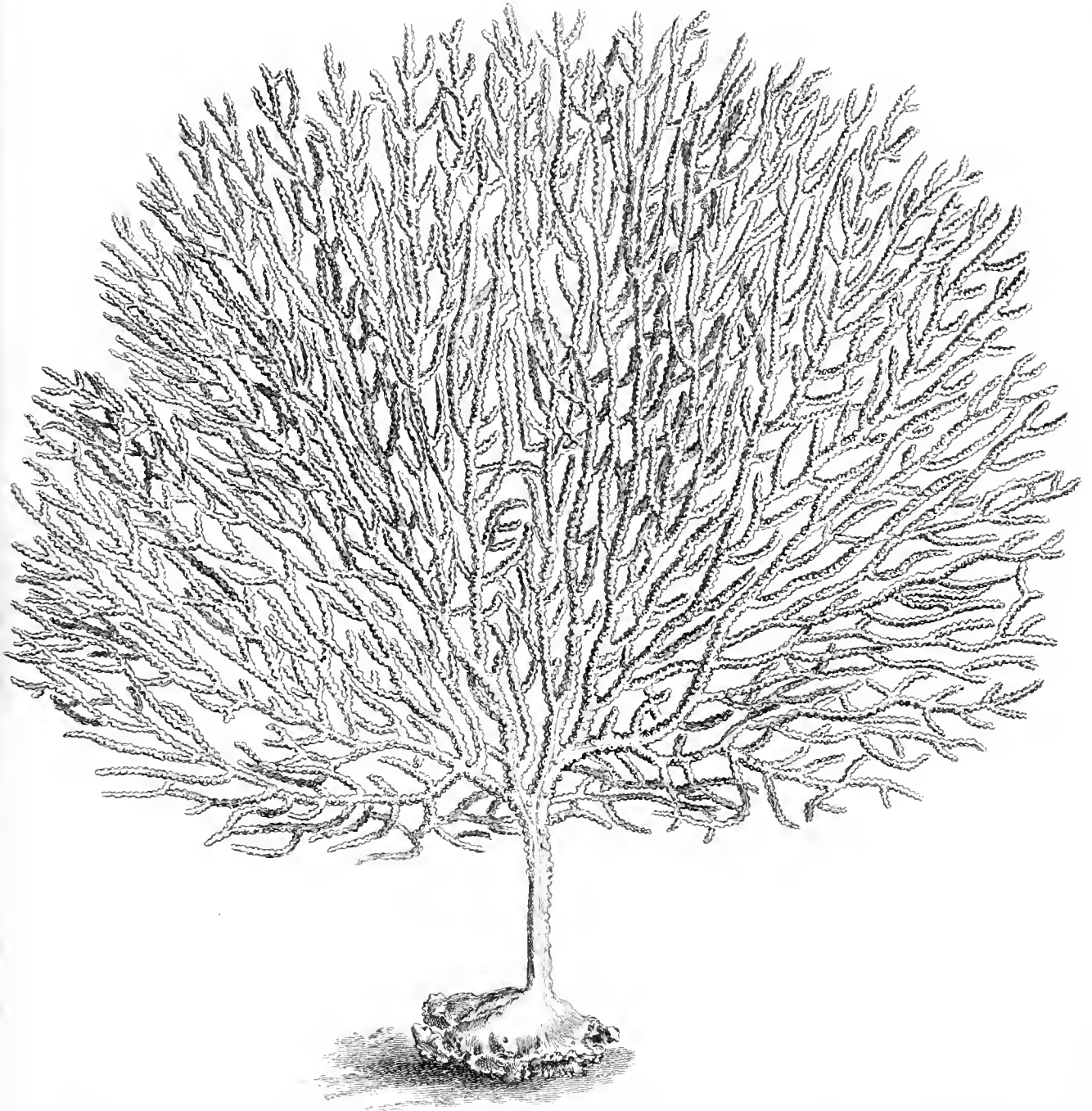


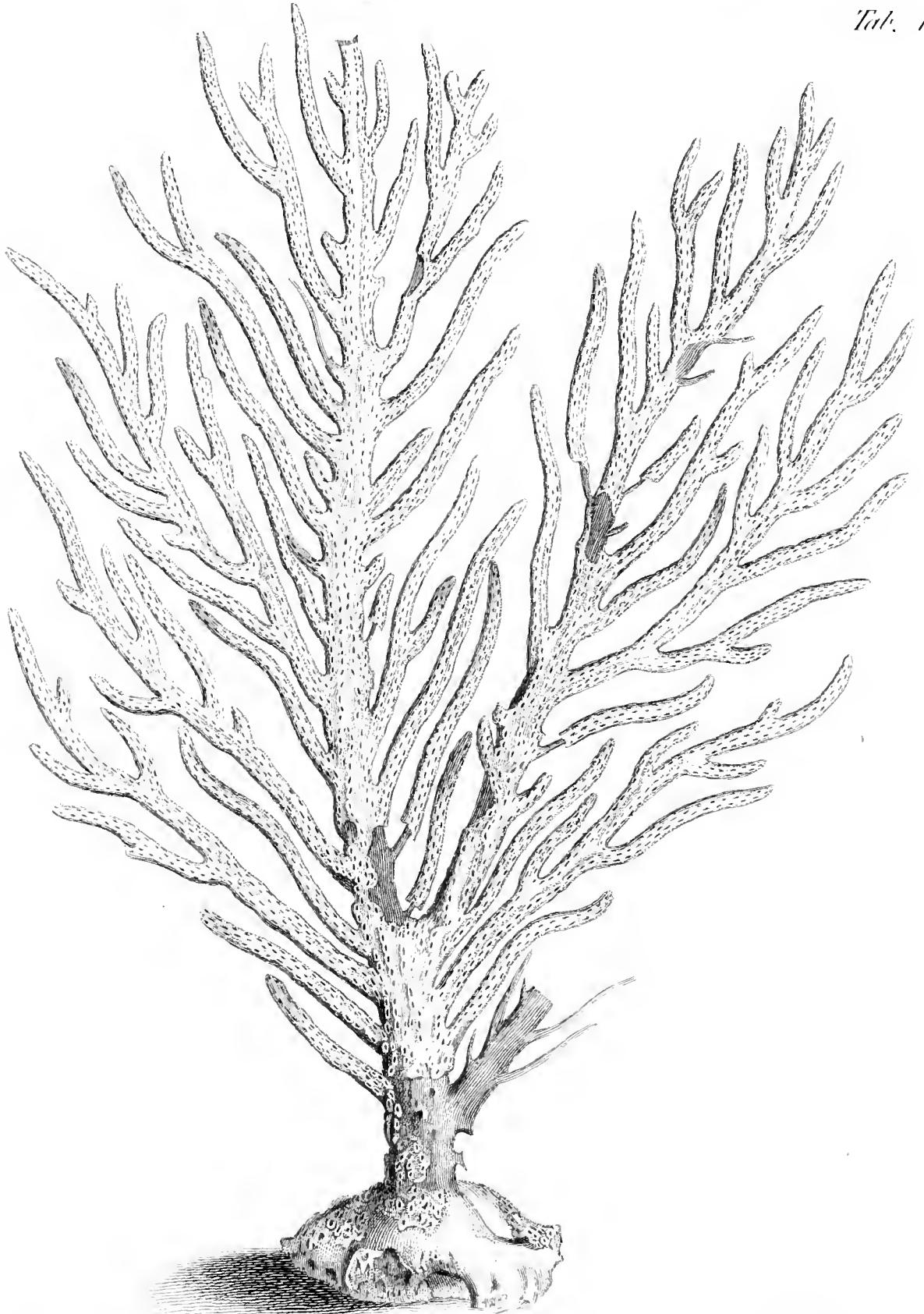


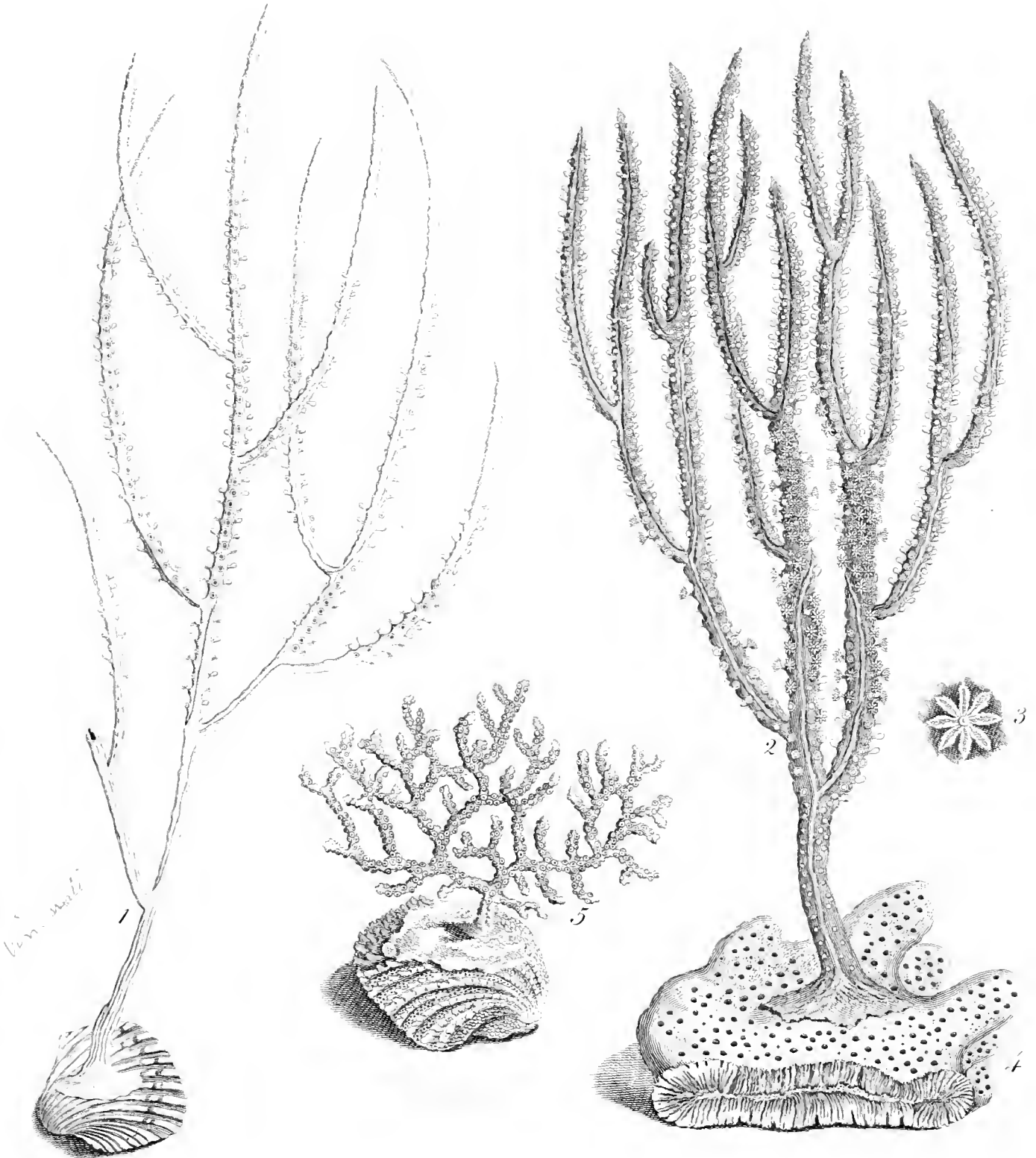














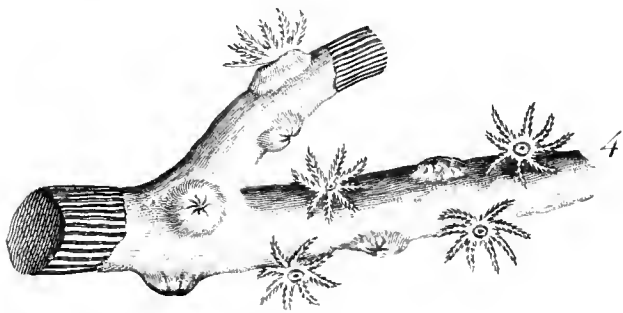
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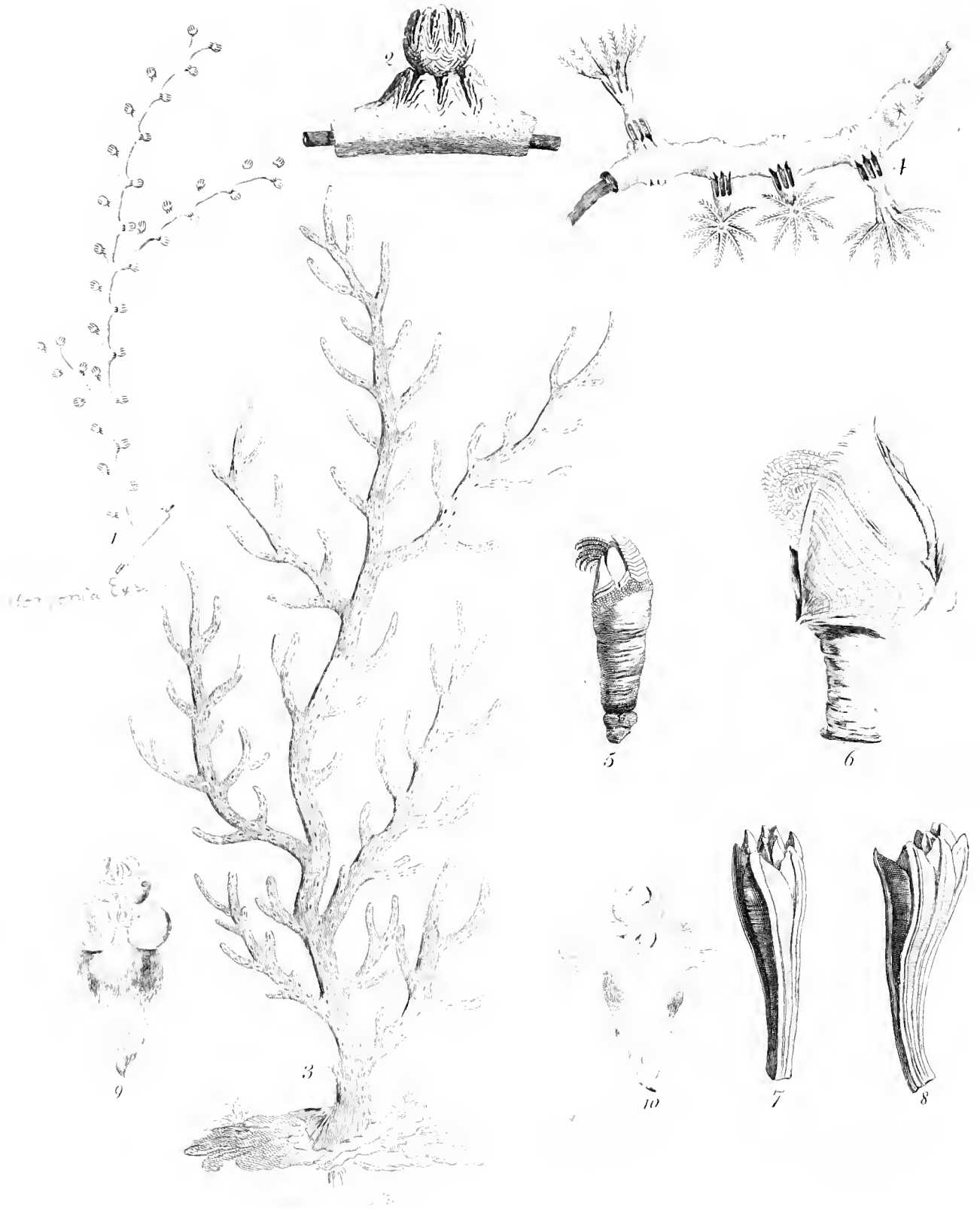


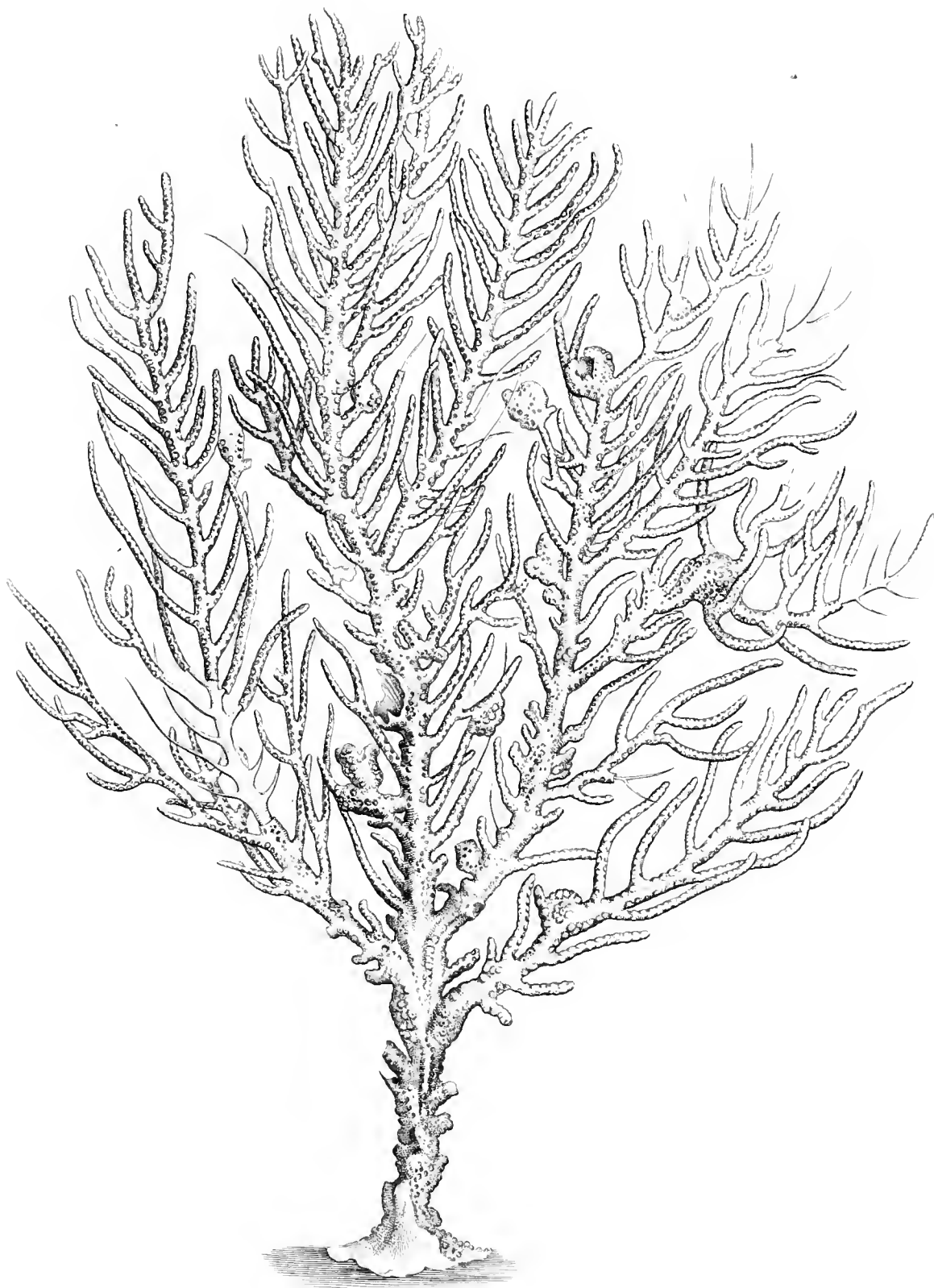
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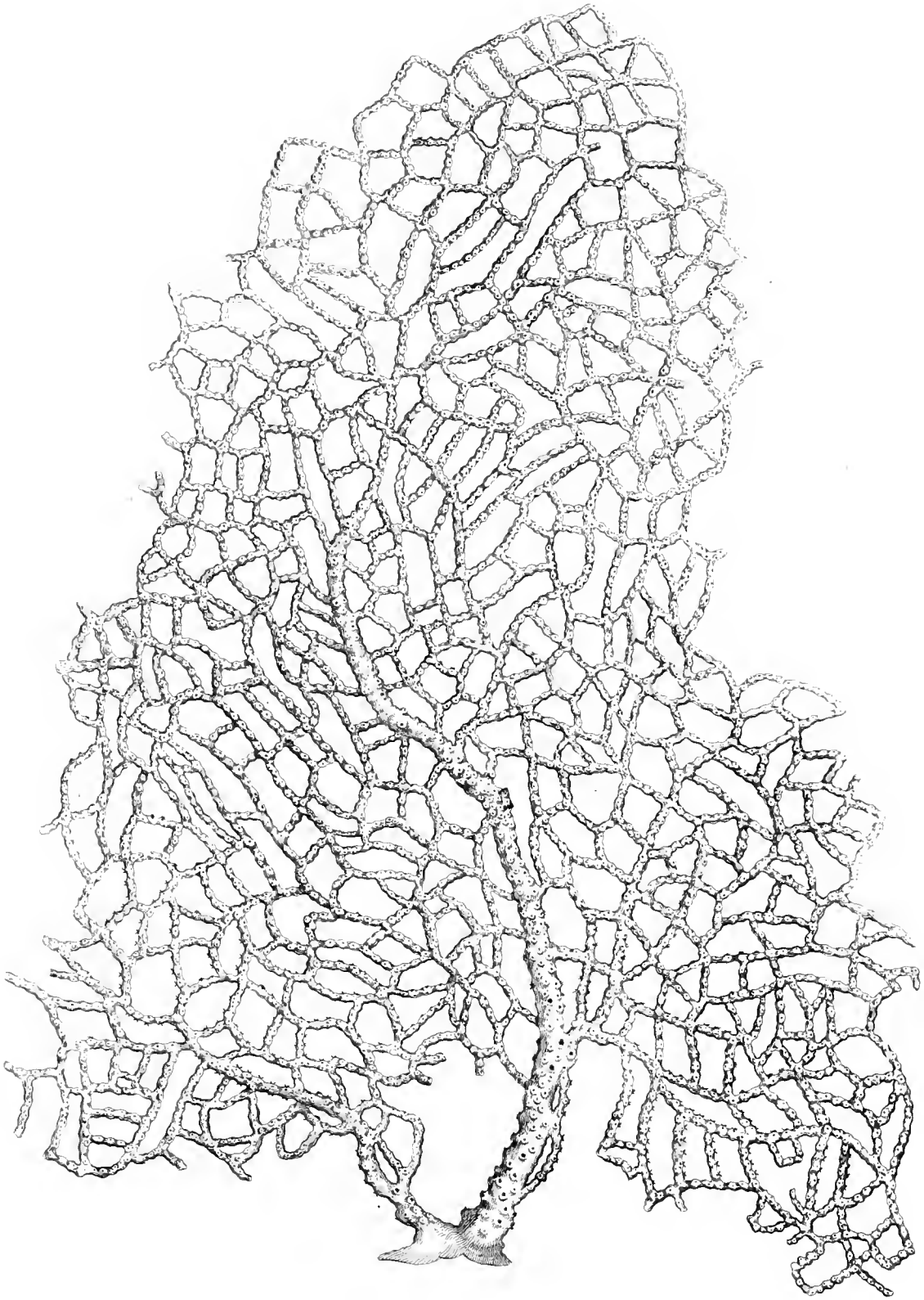


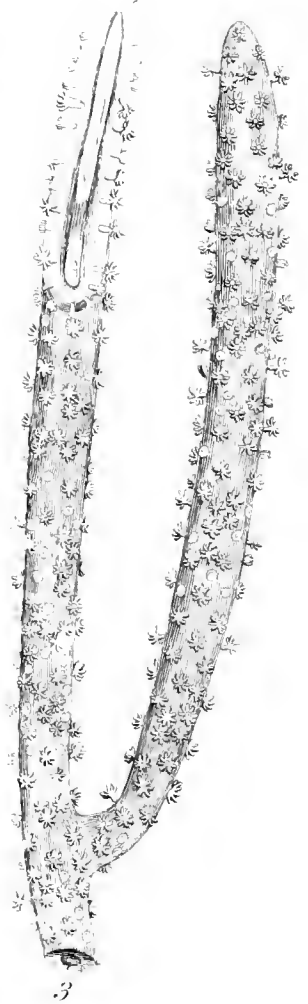
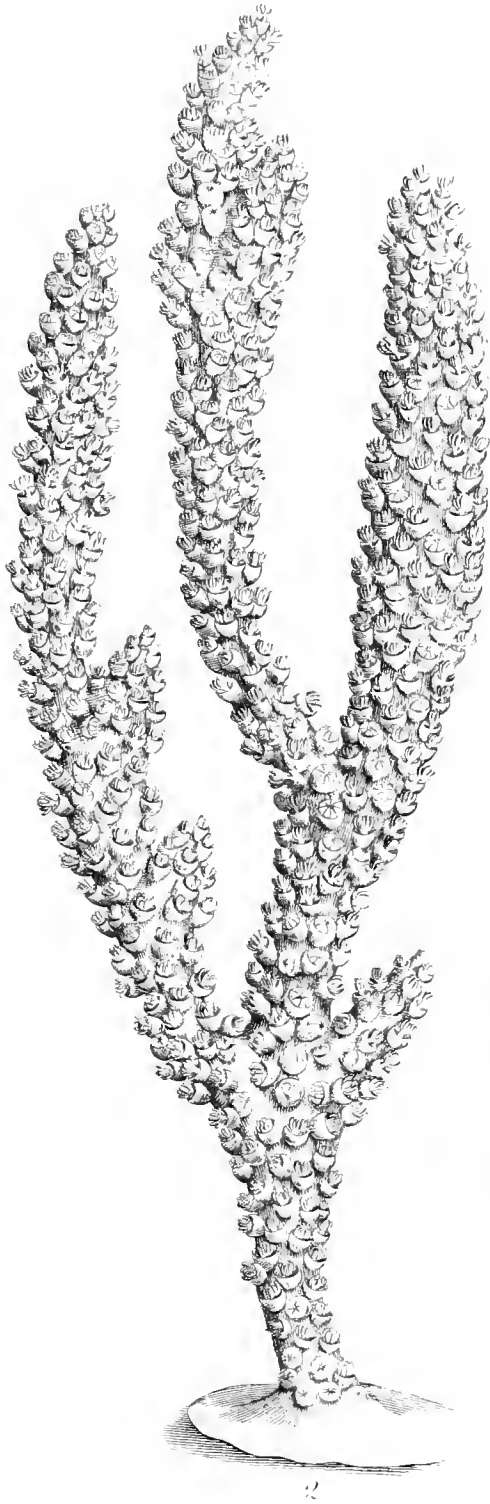
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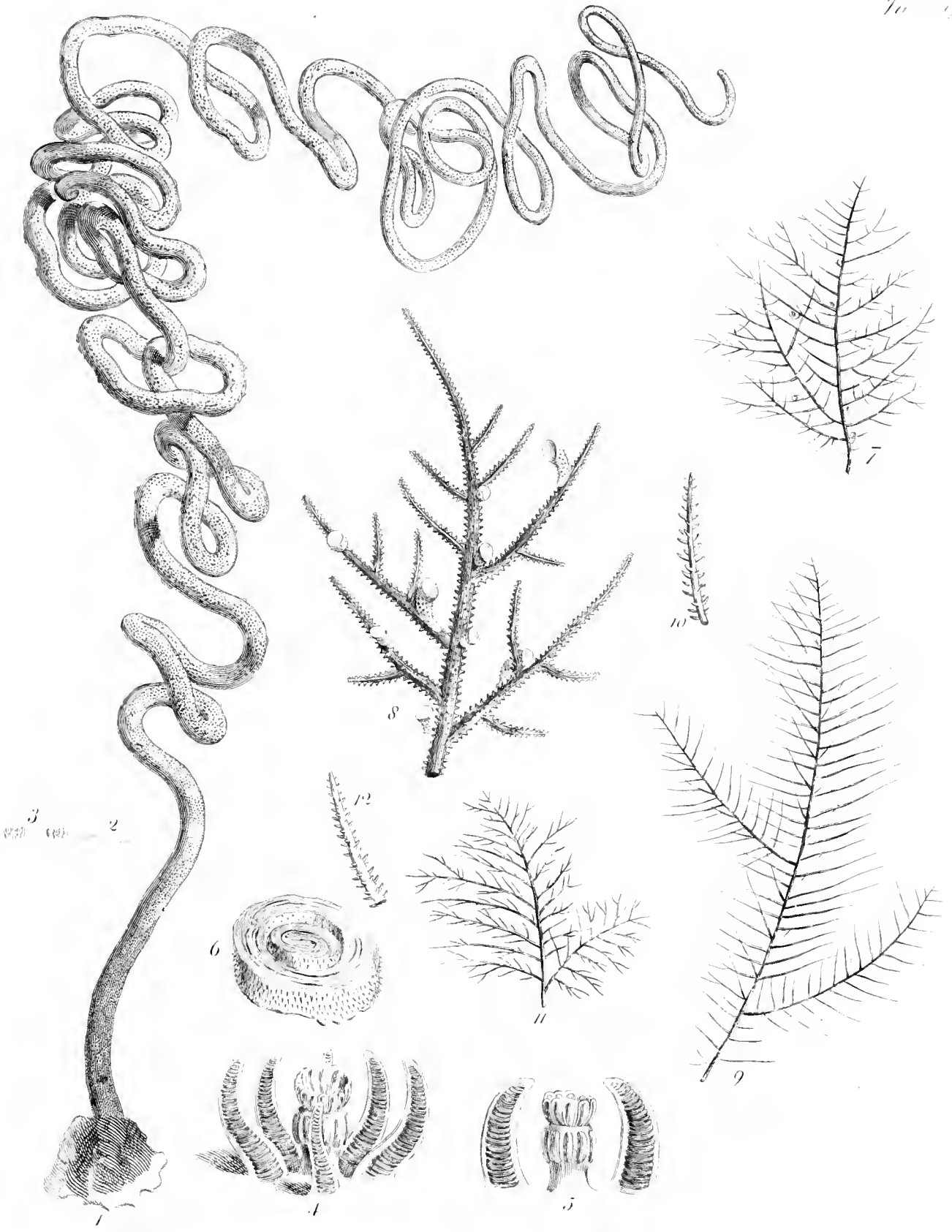
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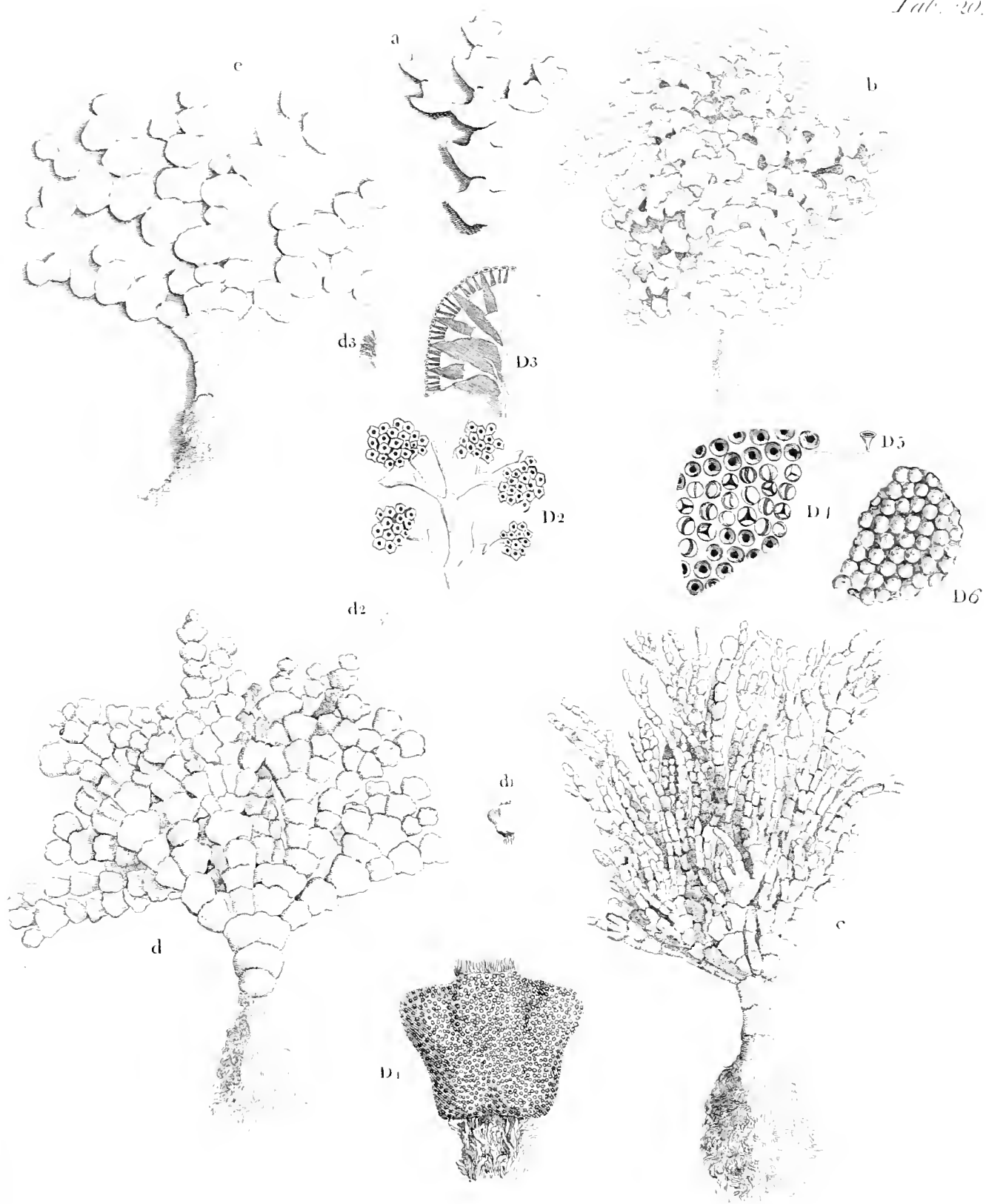


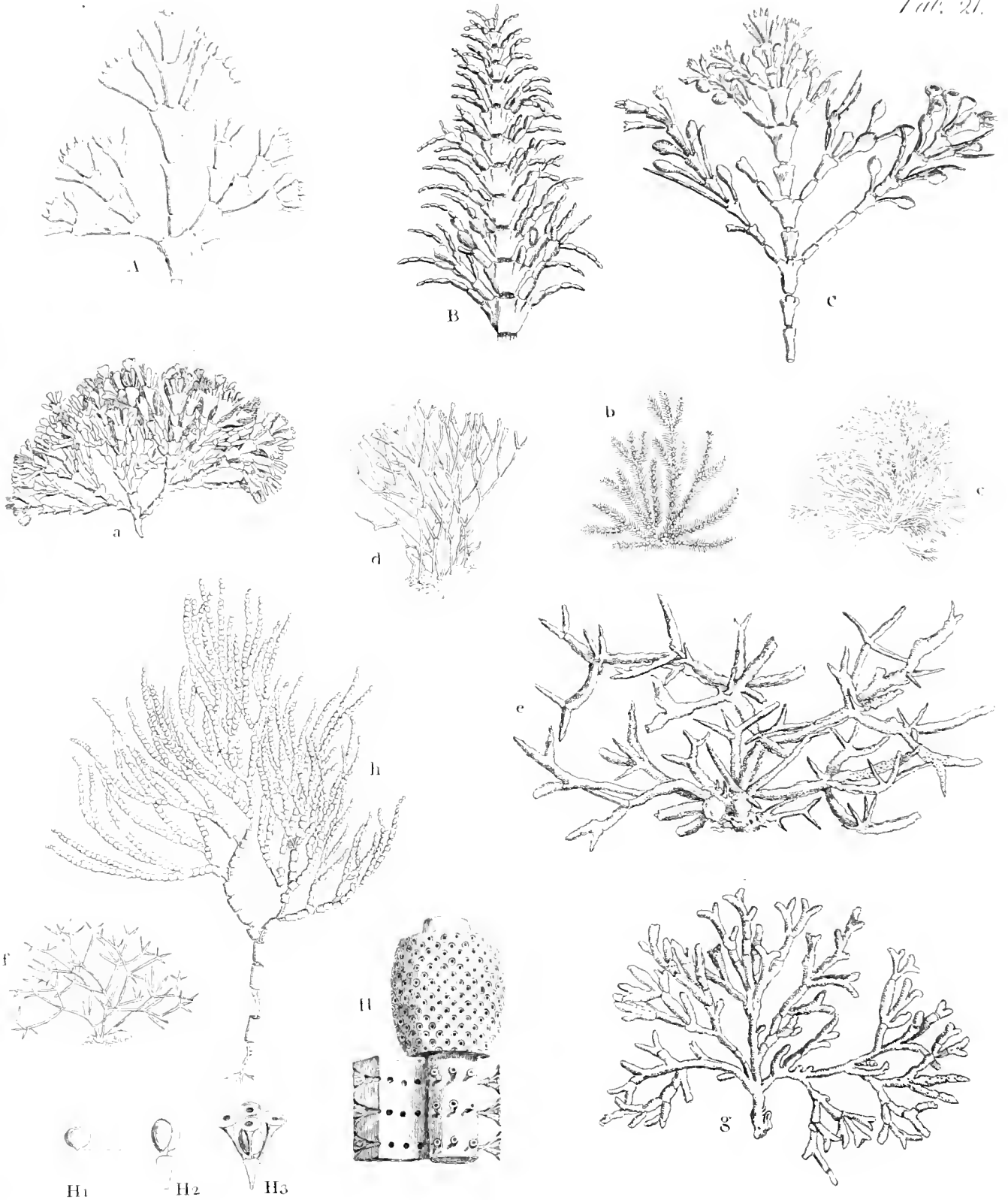


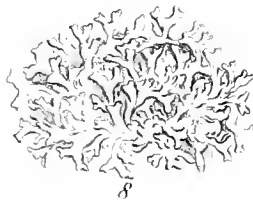
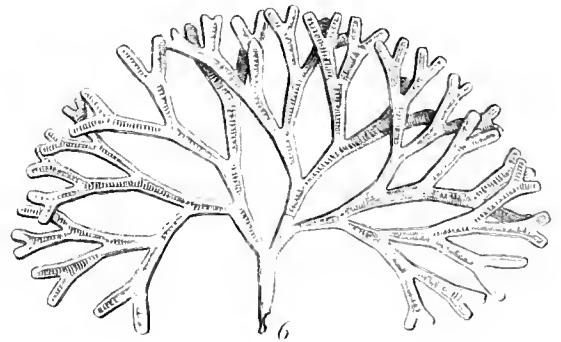
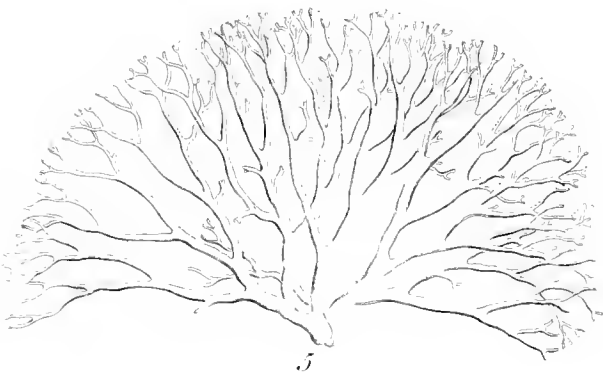
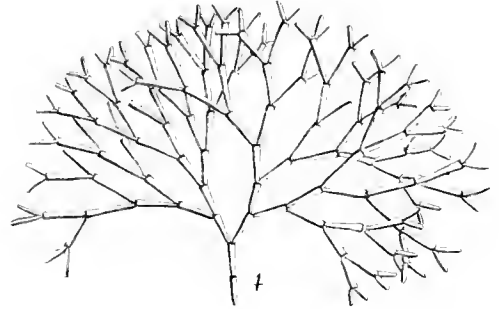
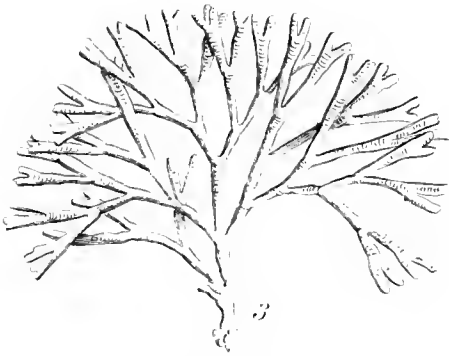
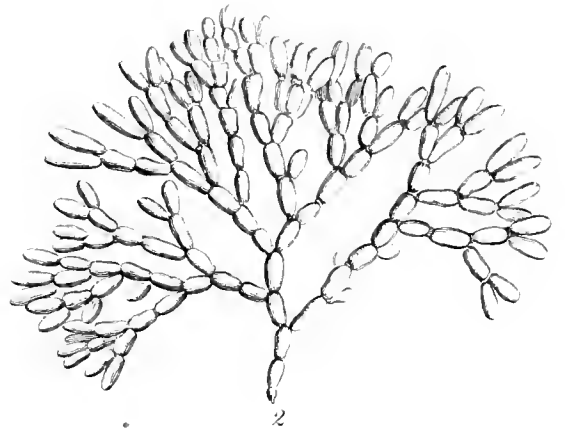
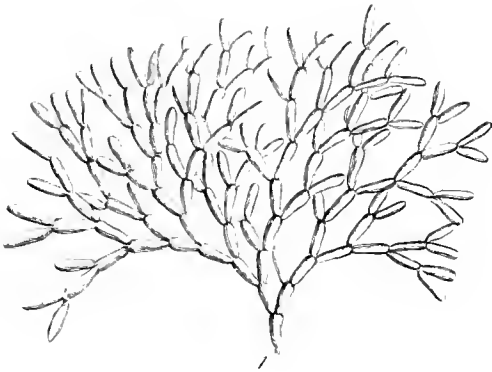




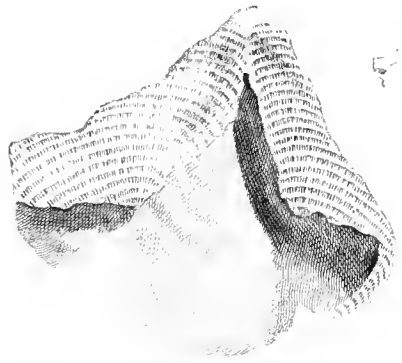
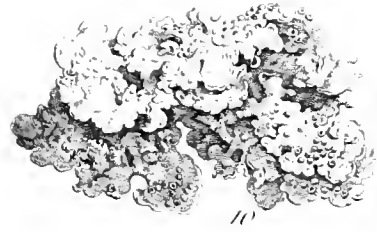
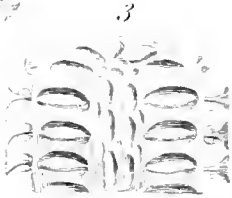
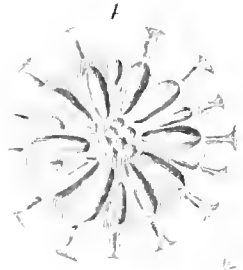










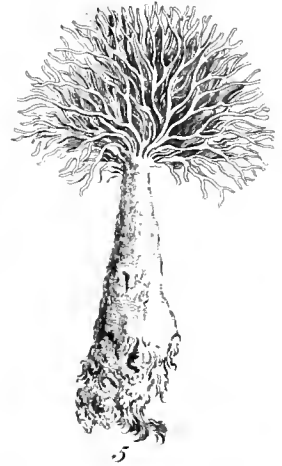
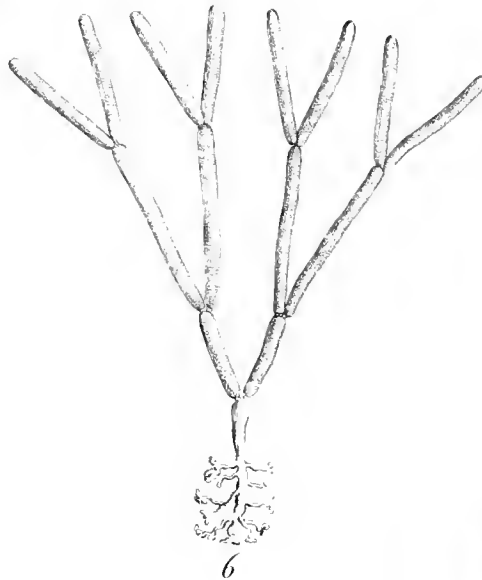
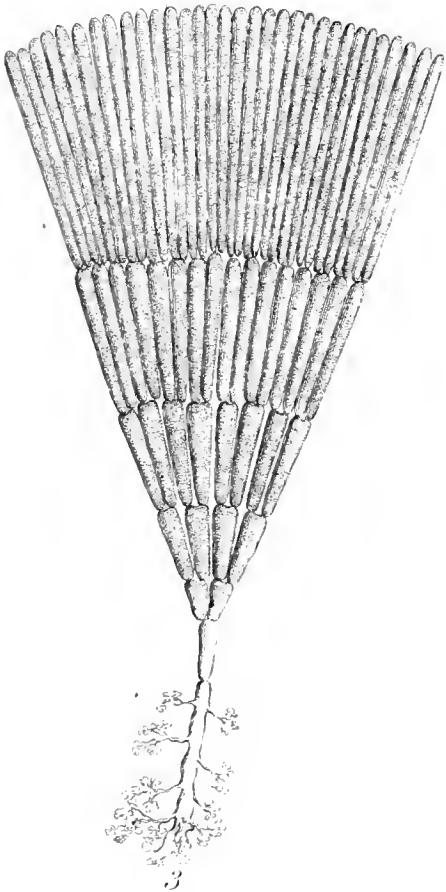
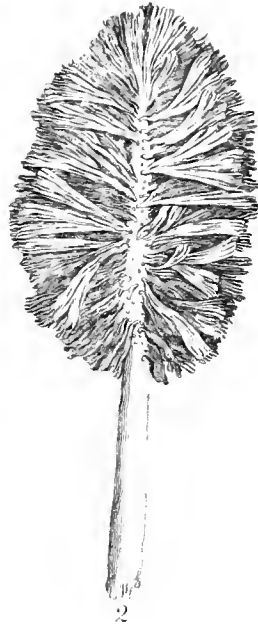


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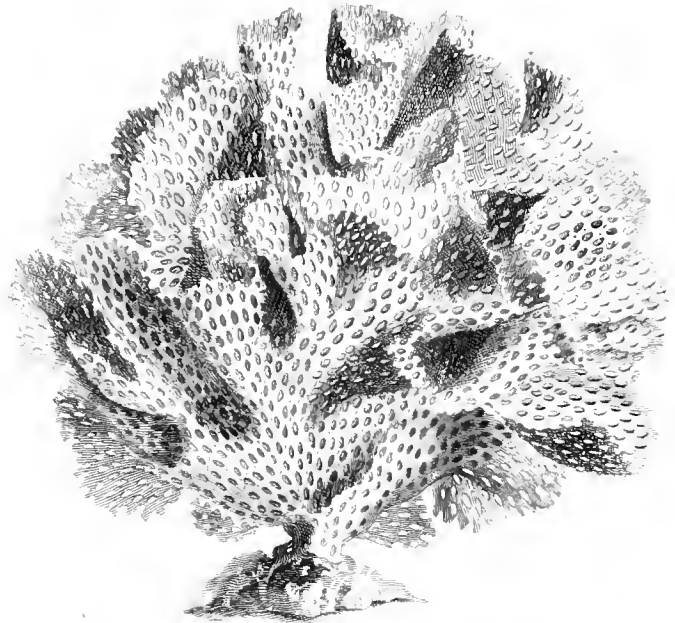
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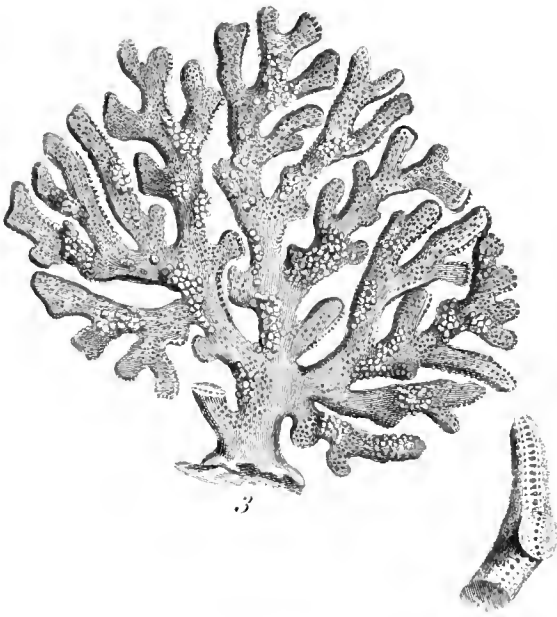




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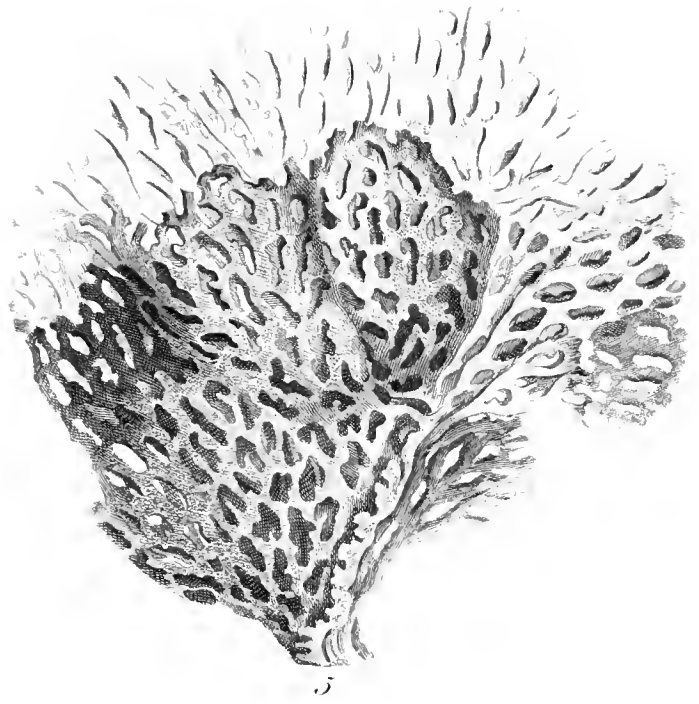


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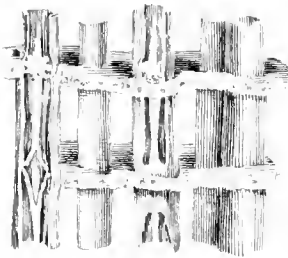
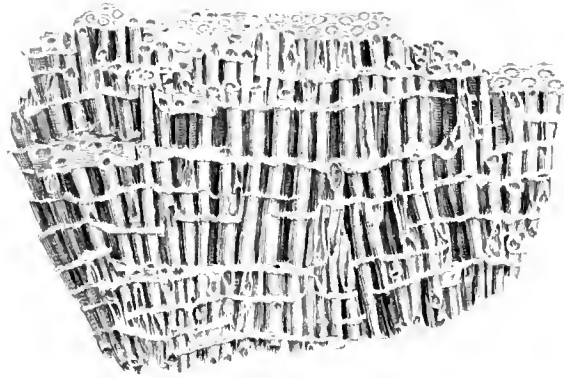
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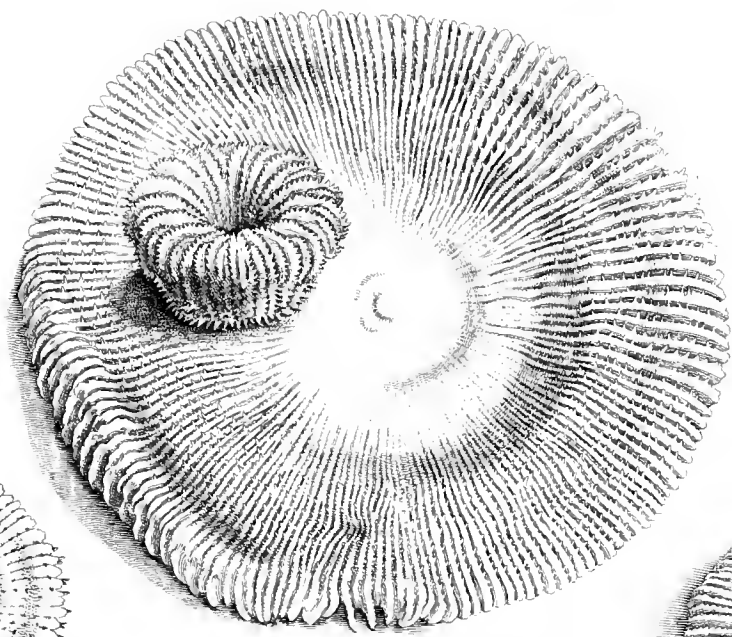
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Tab. 27.

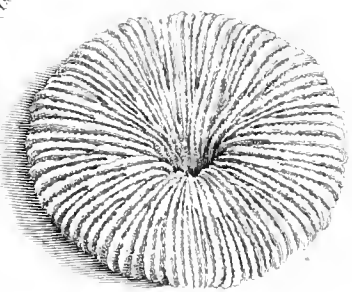




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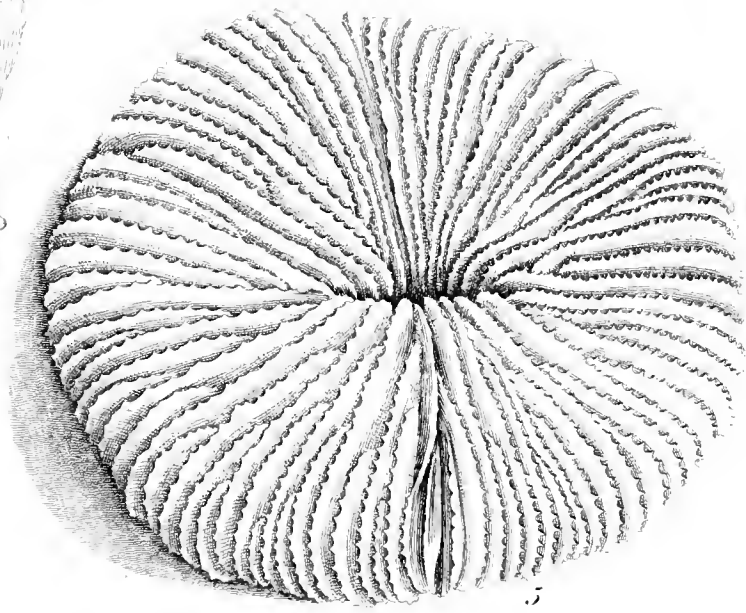
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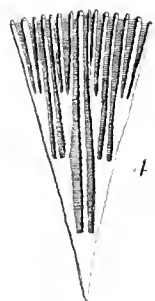
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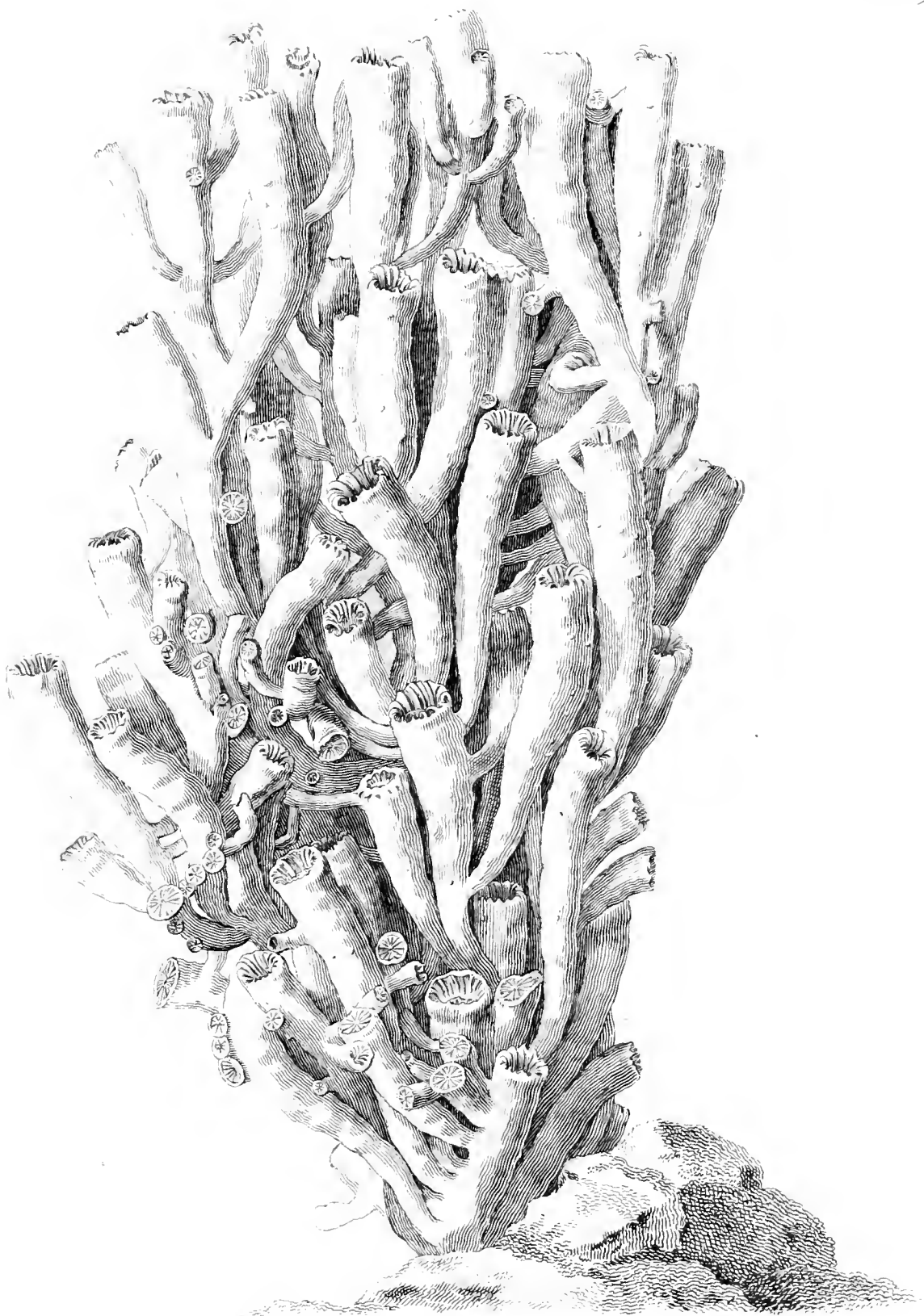


Fig. 1.

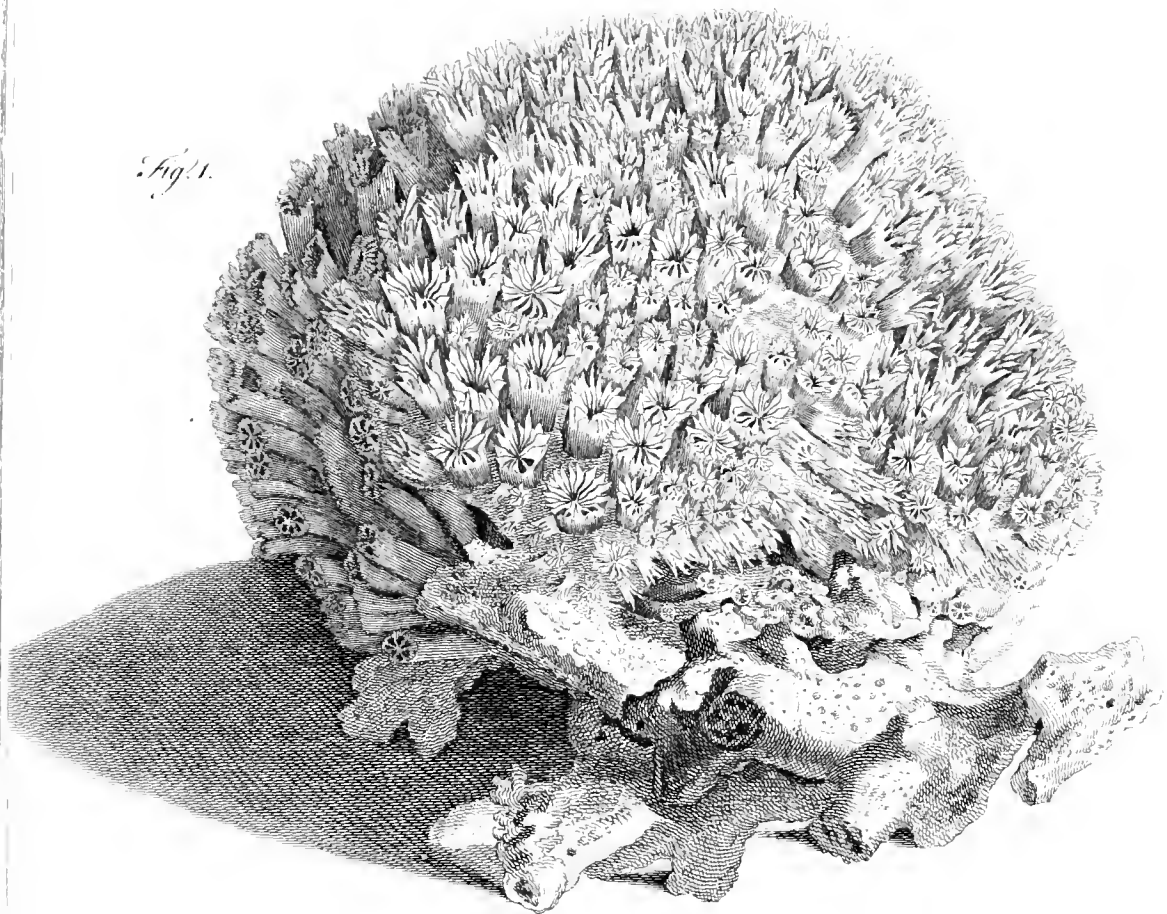
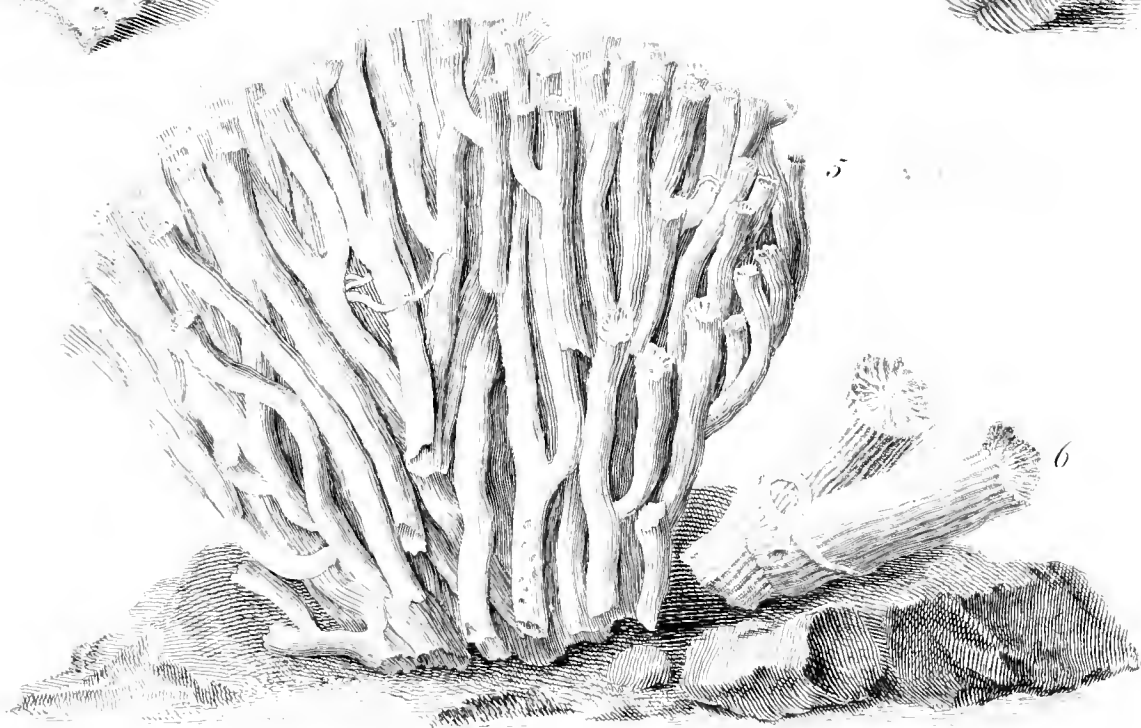
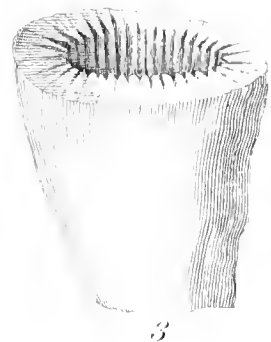
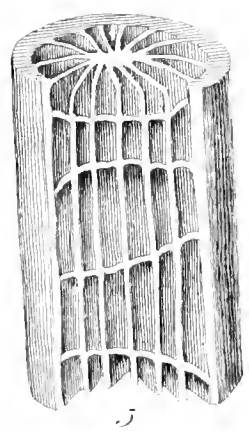
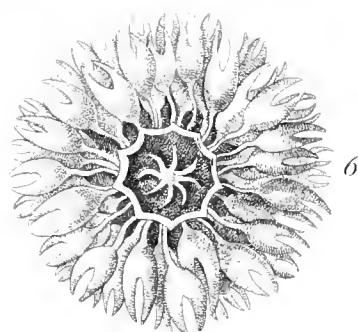
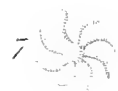
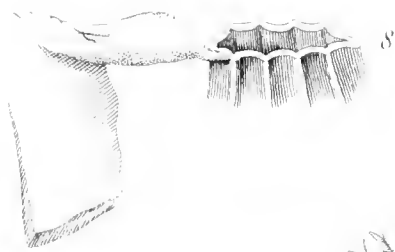
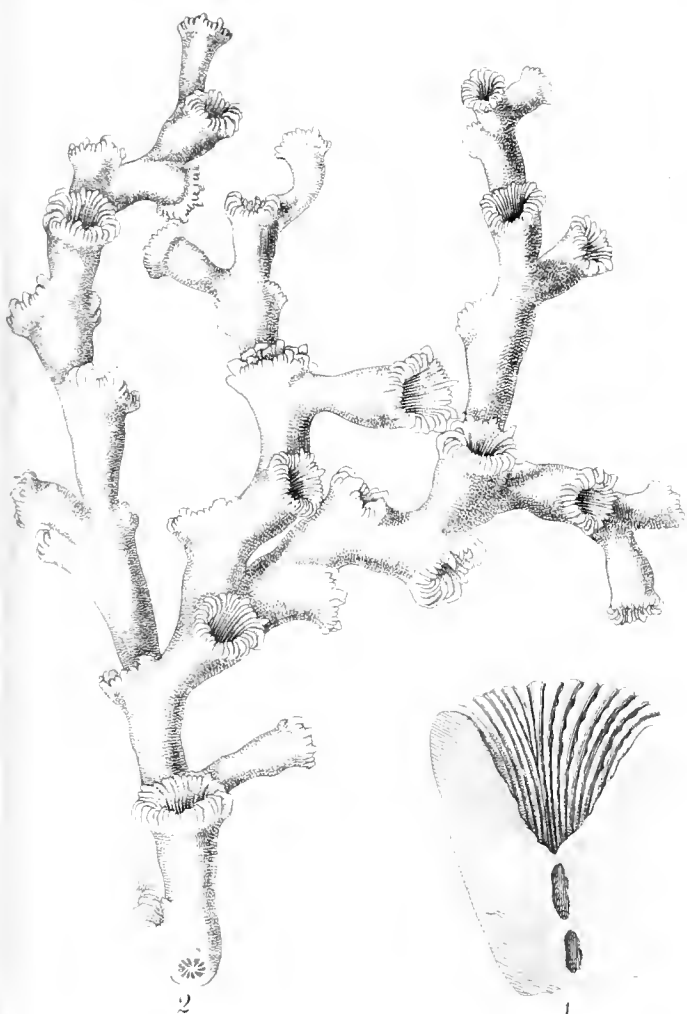
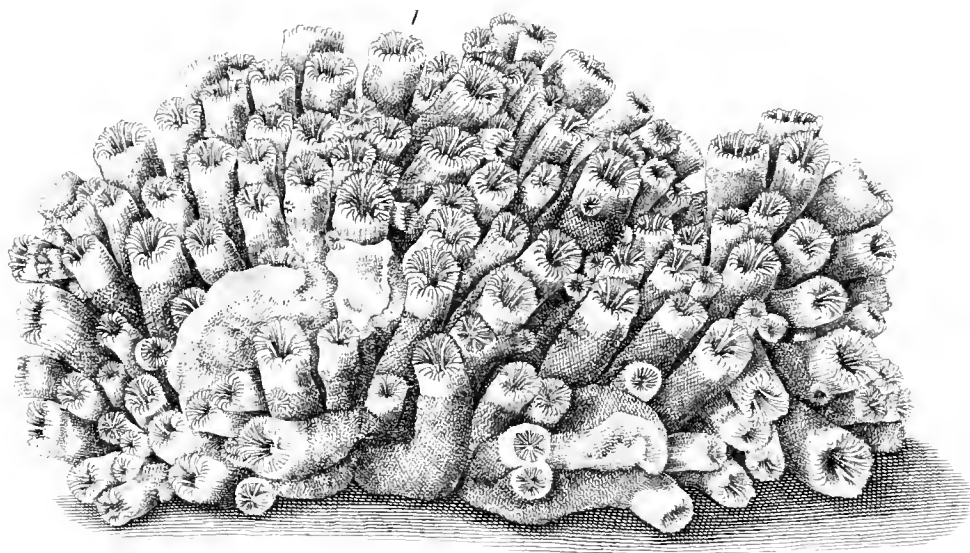


Fig. 2.







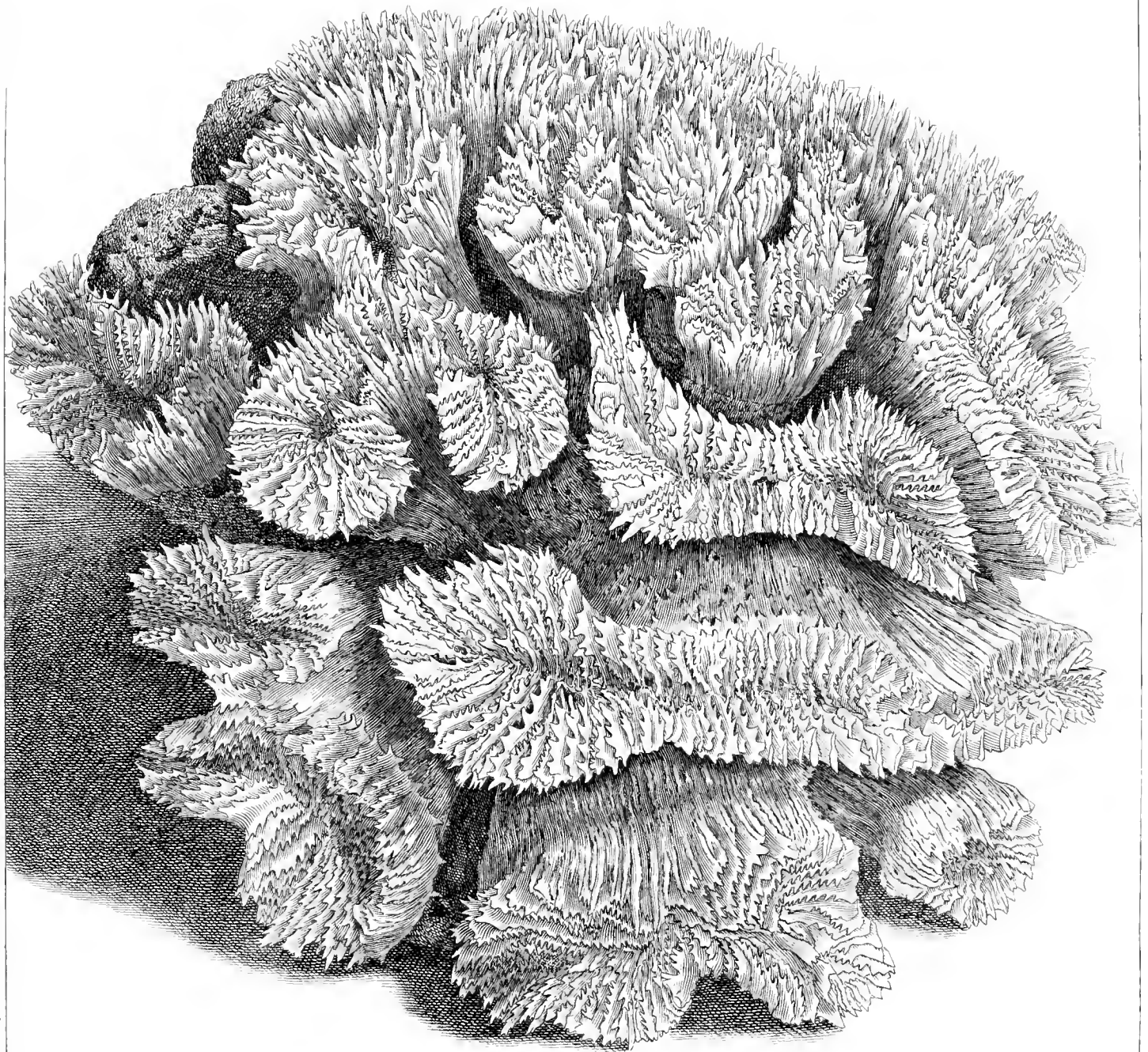
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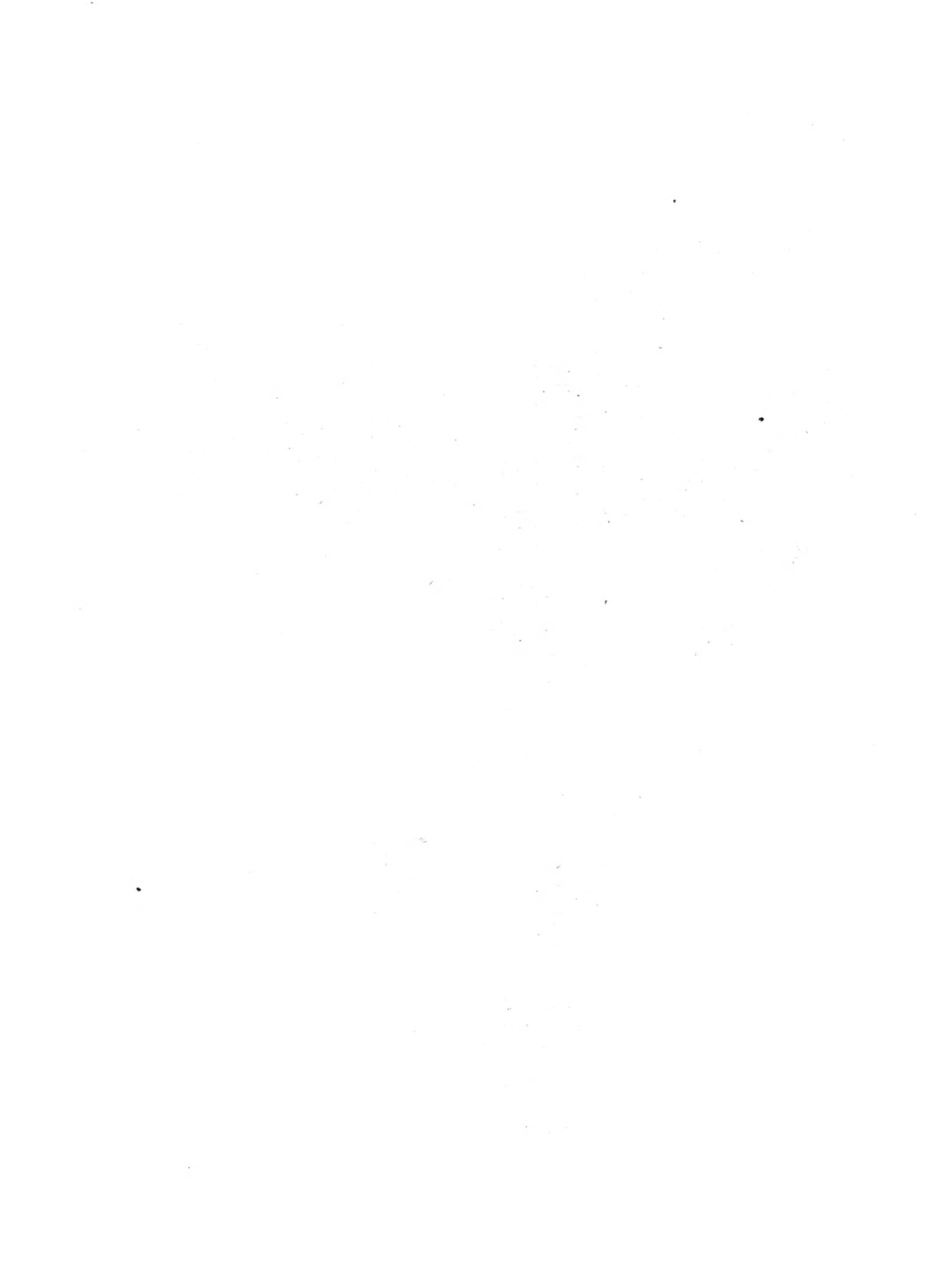
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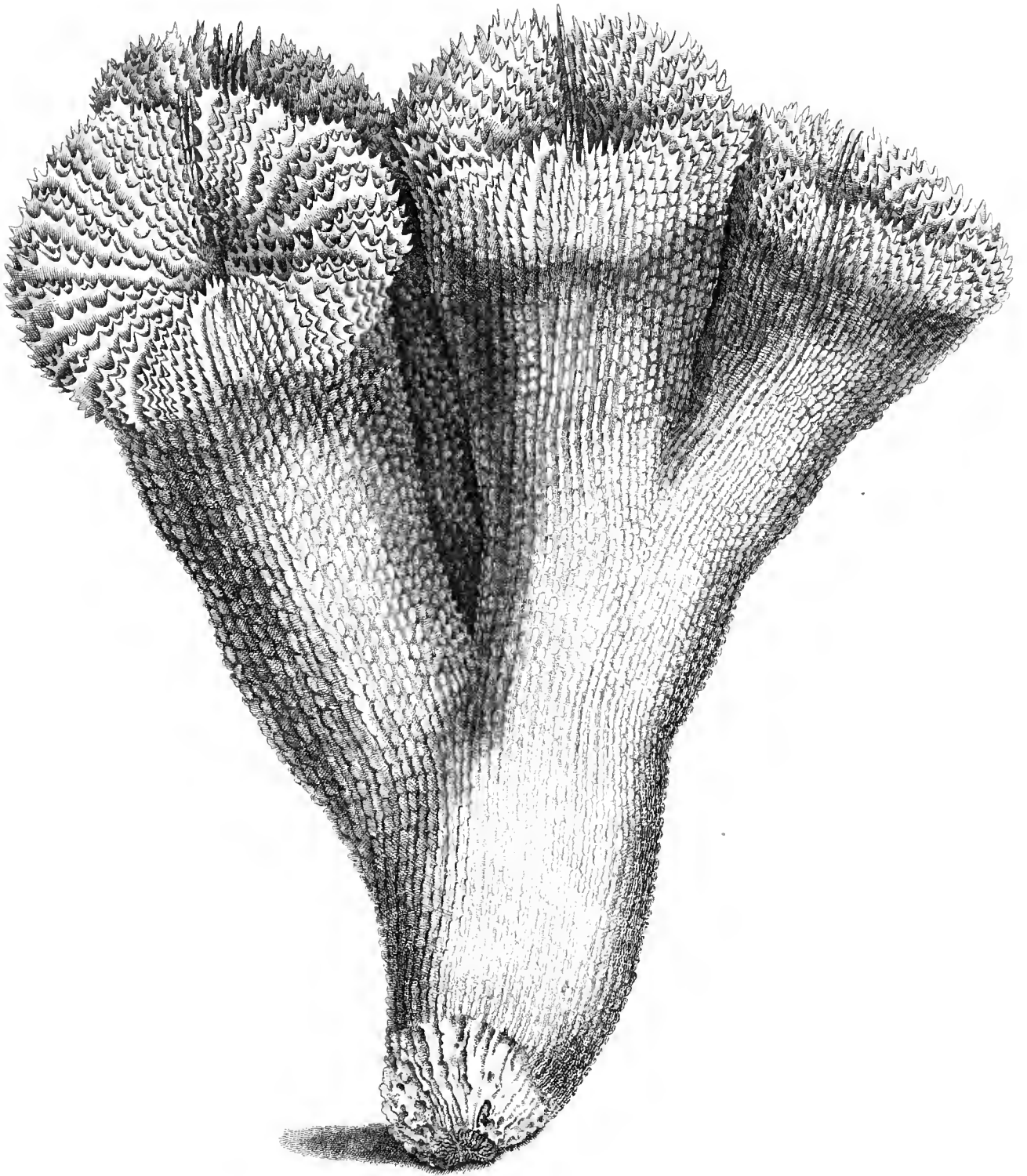
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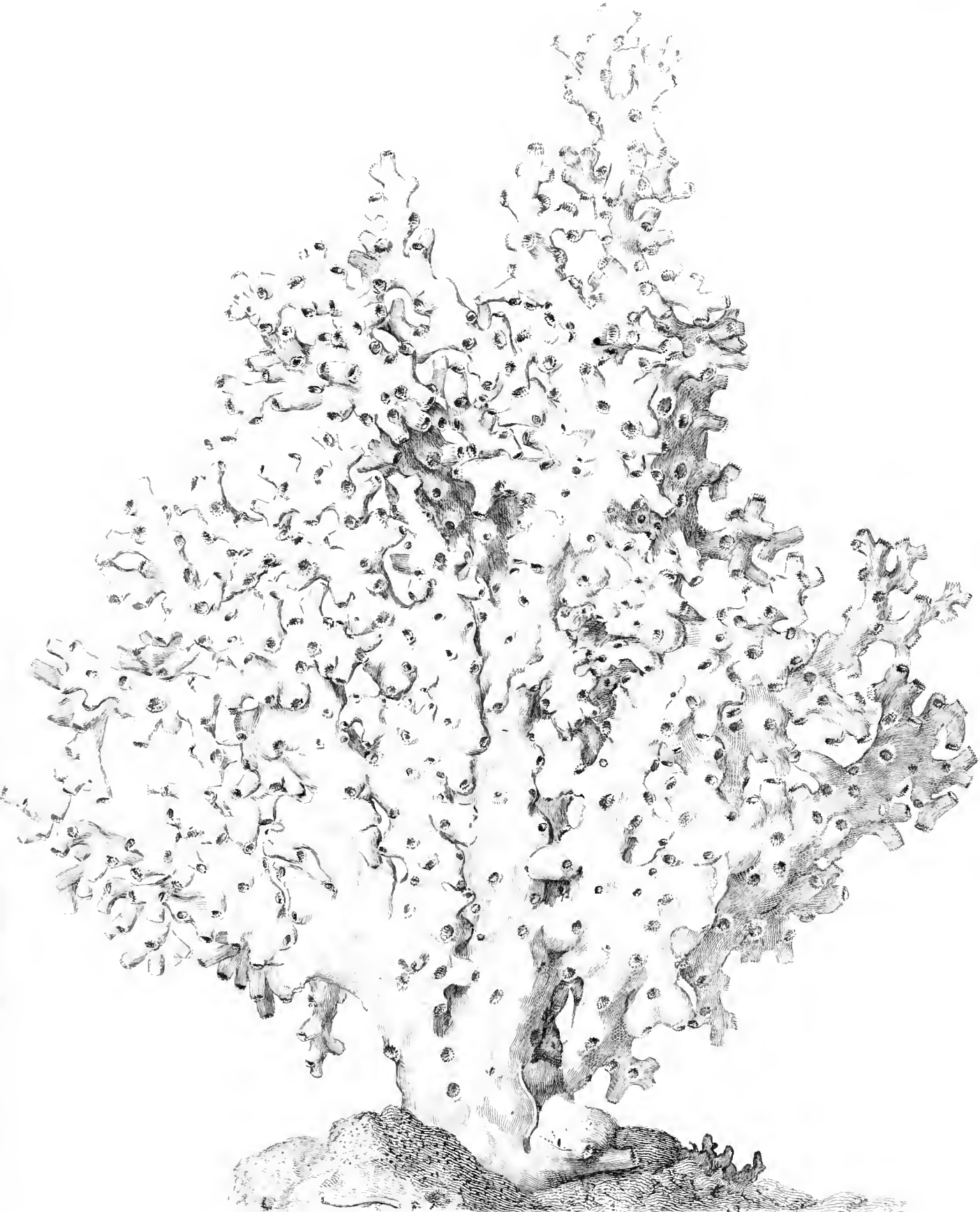
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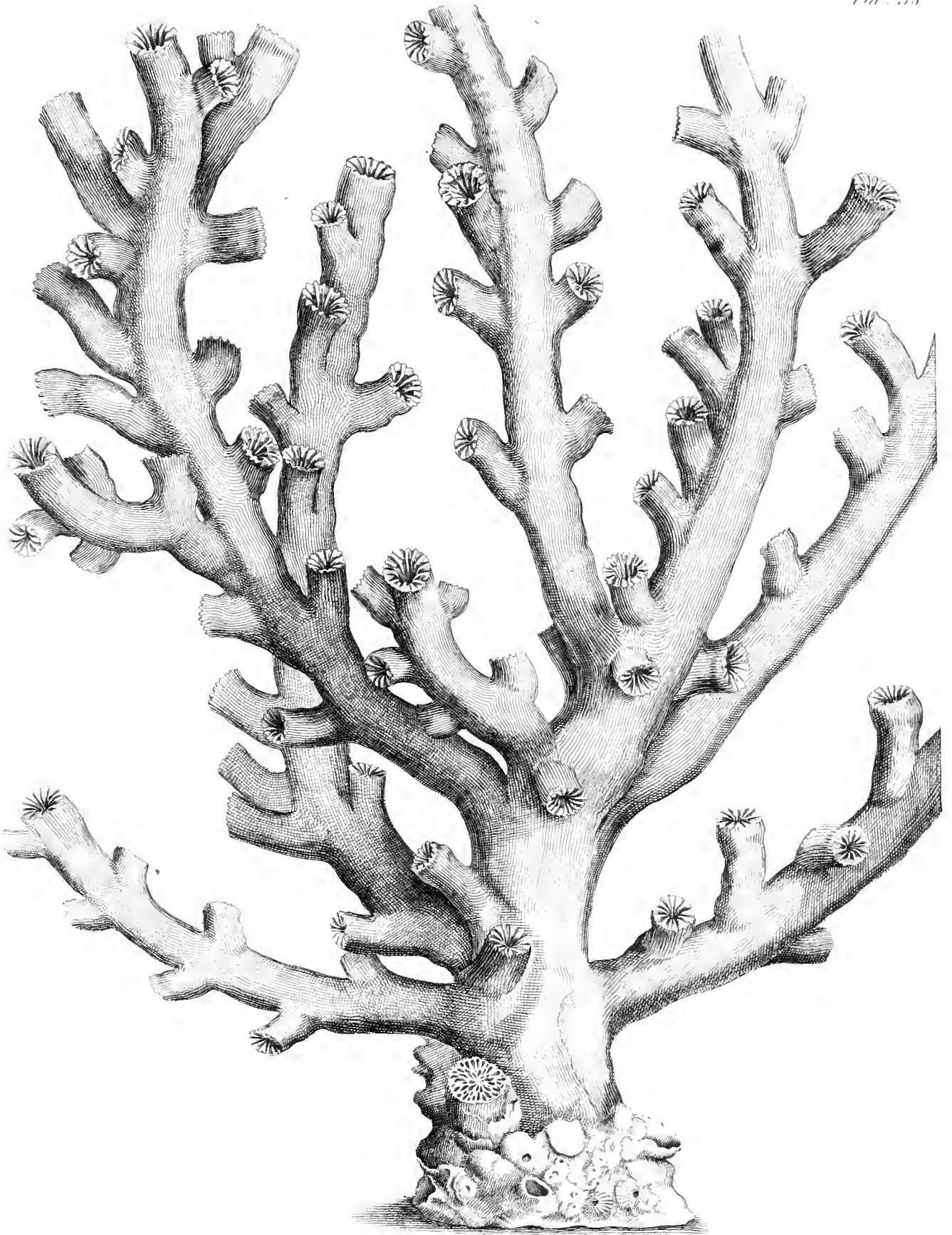


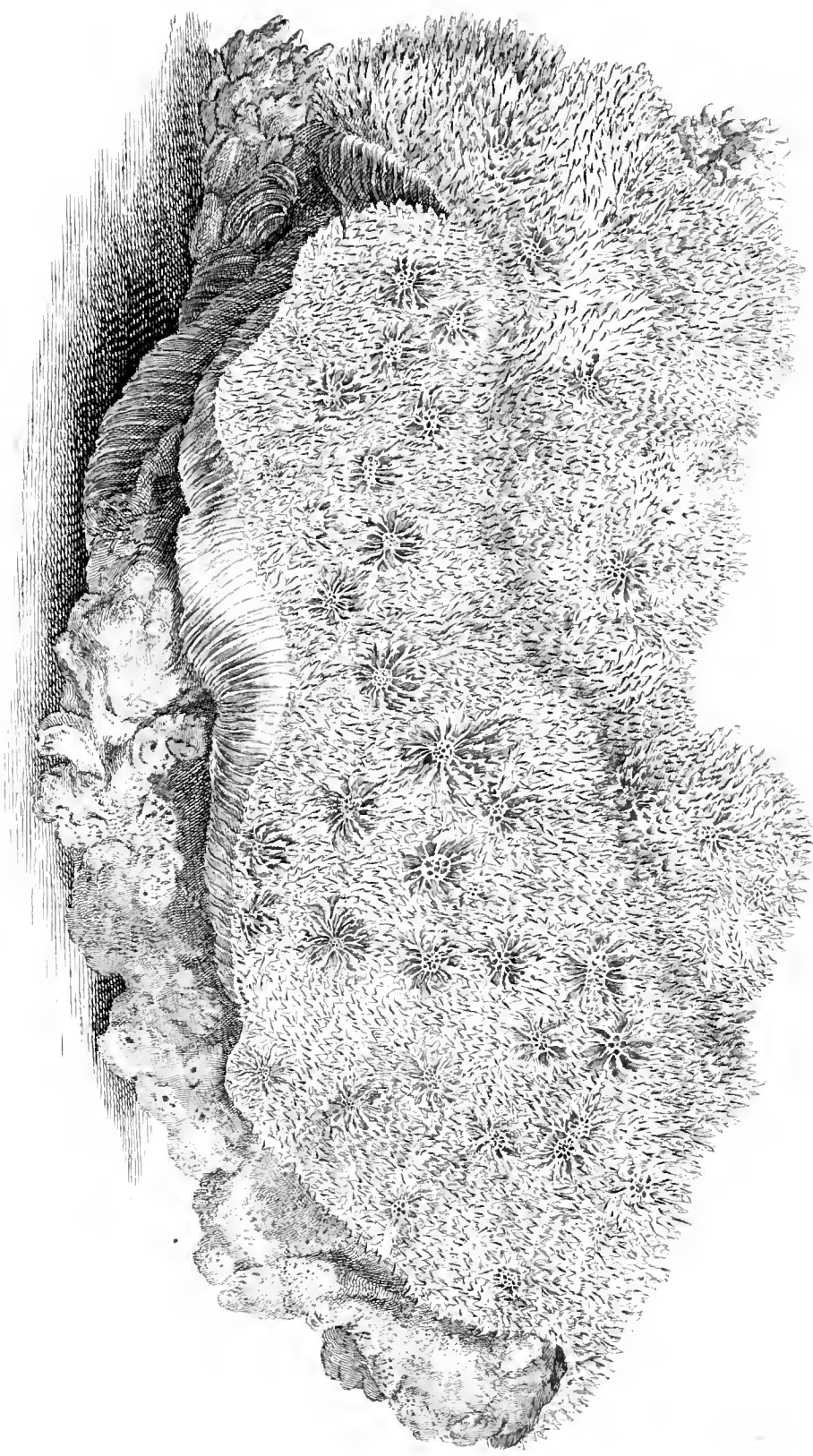






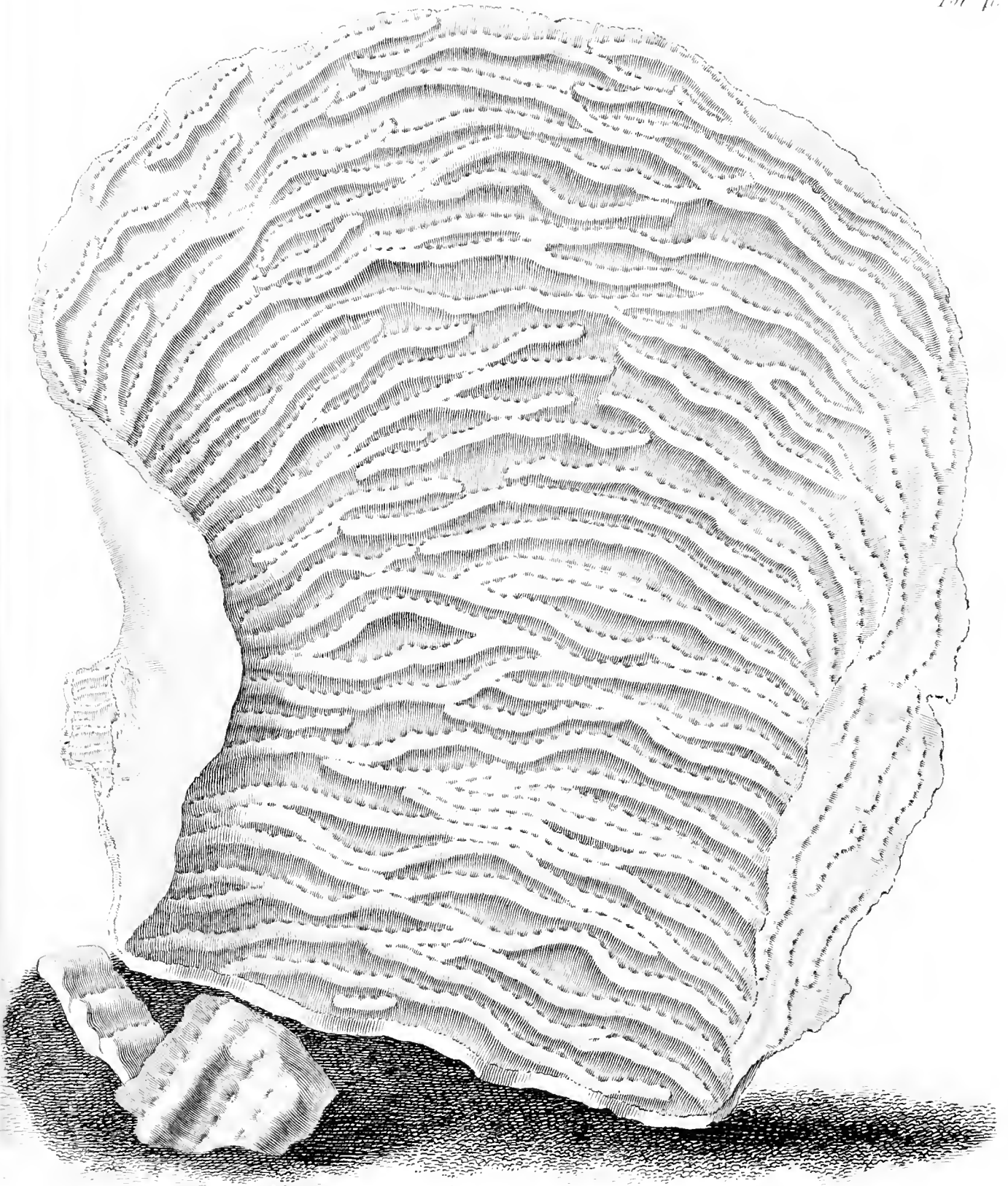


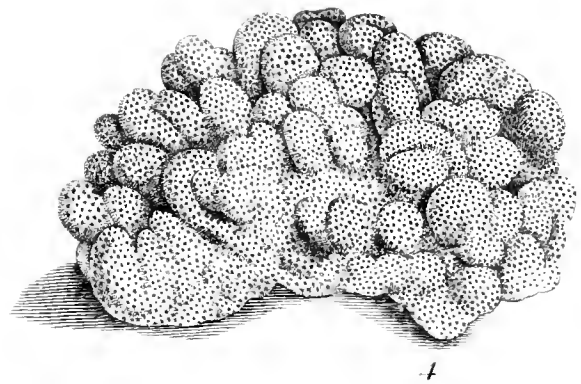
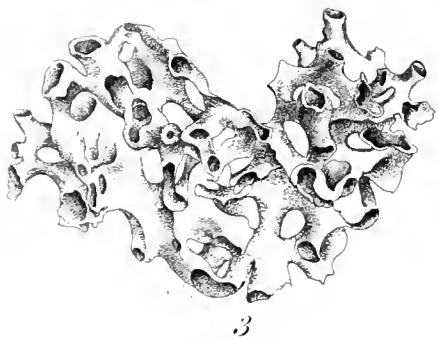
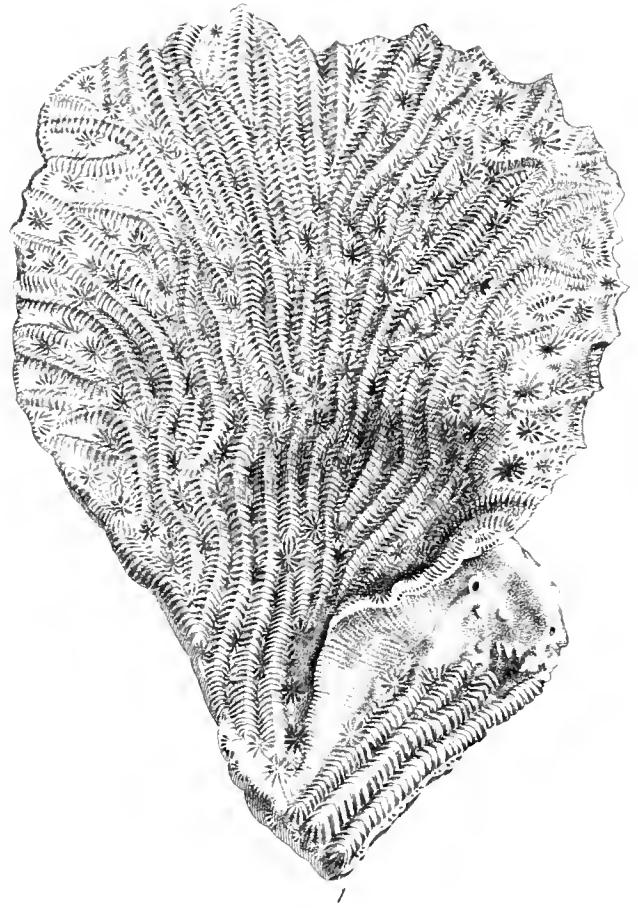
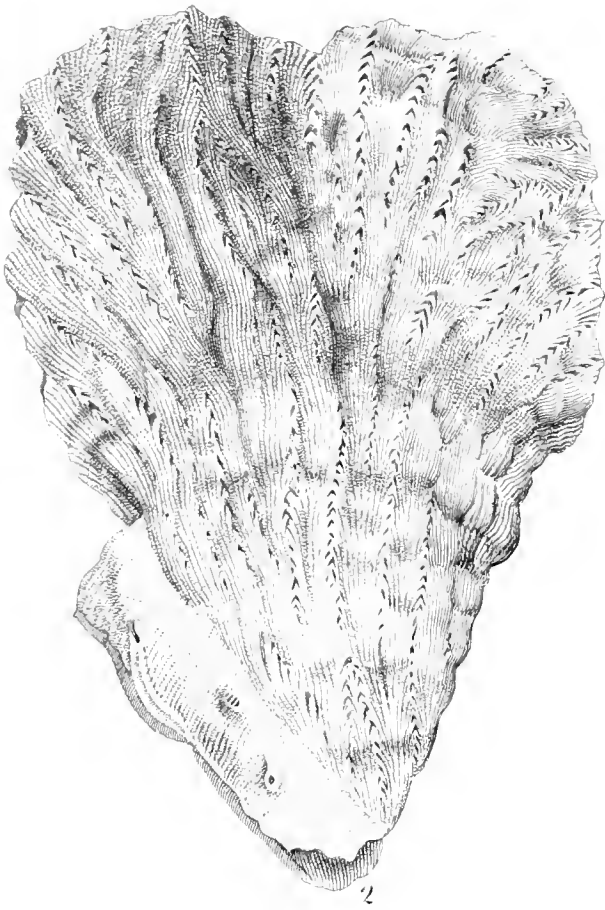


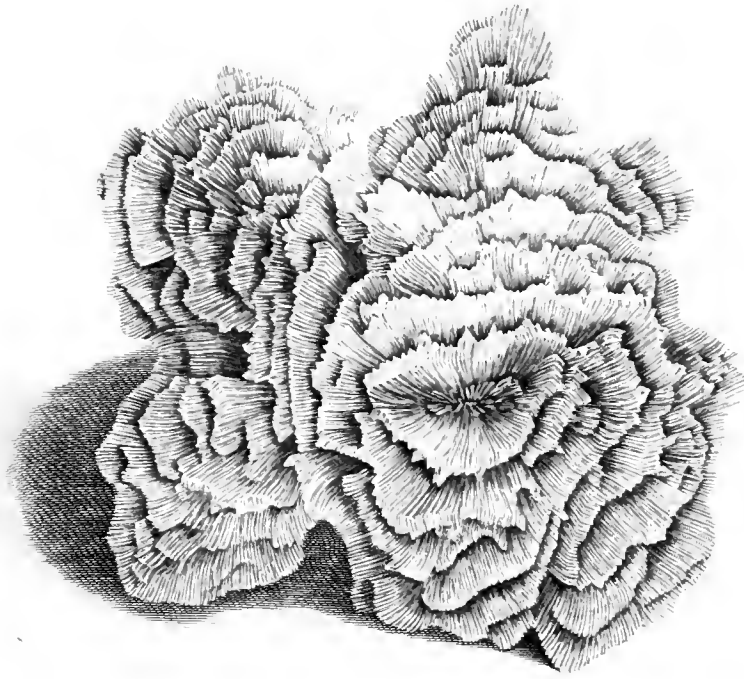


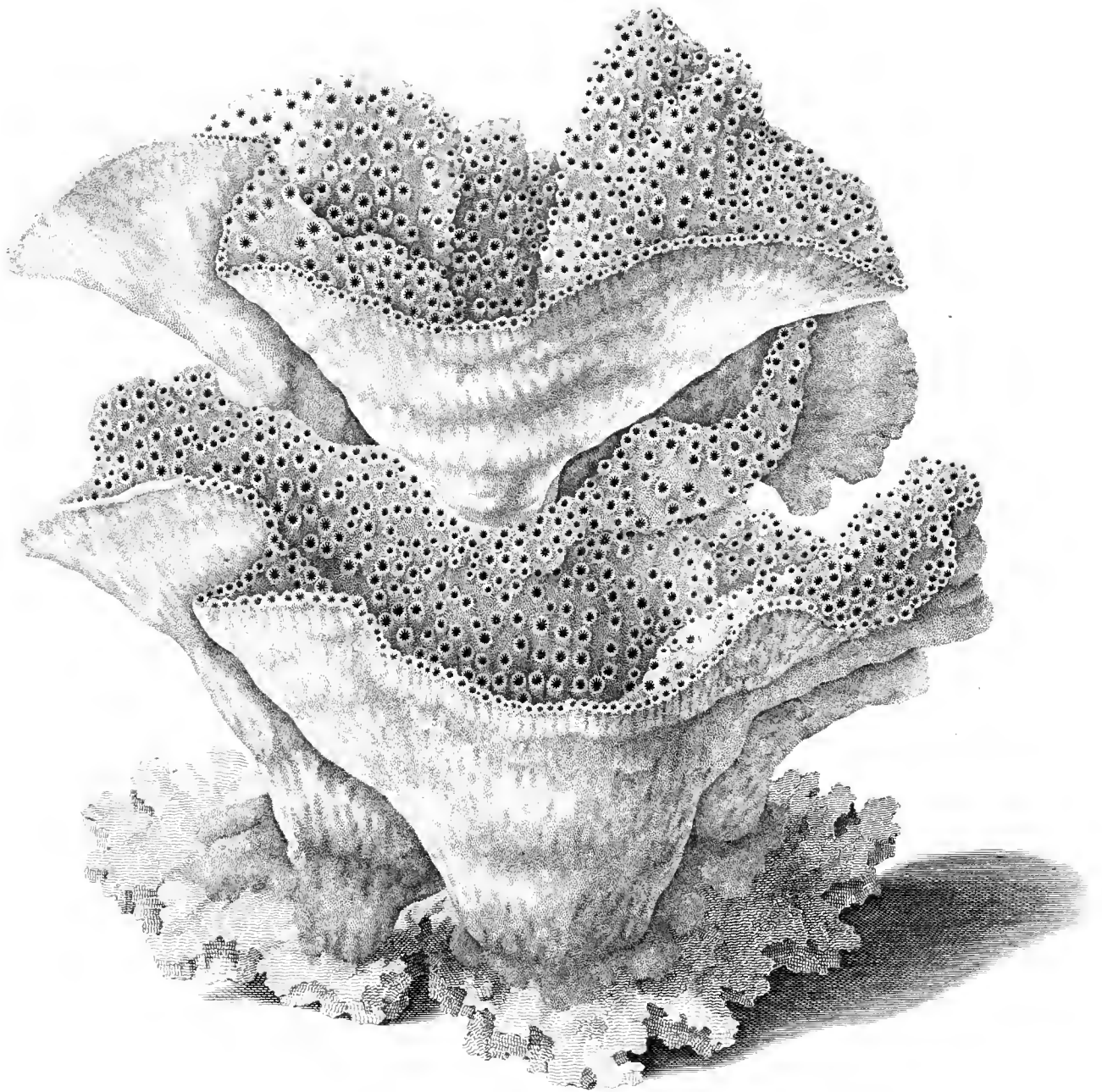
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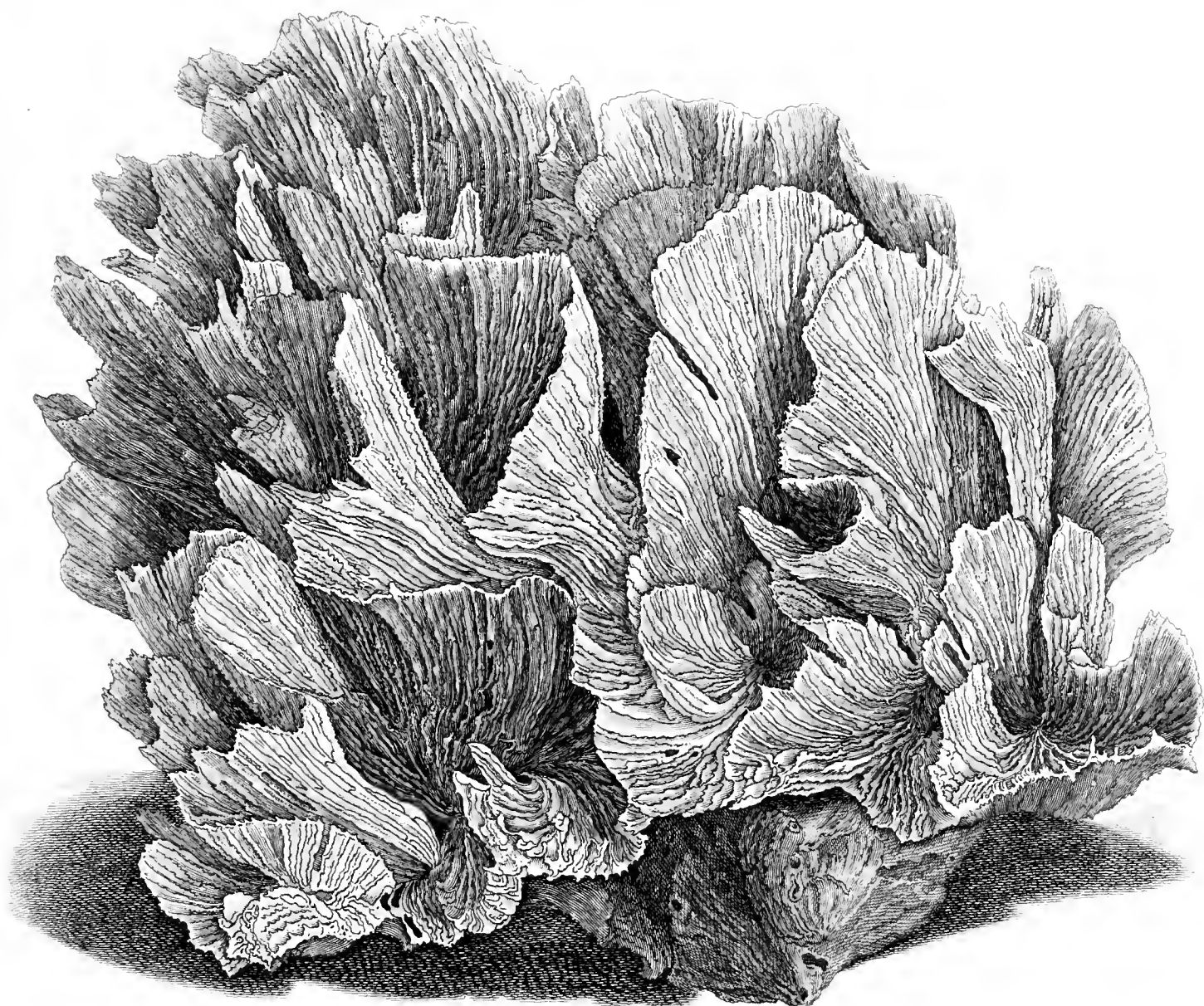
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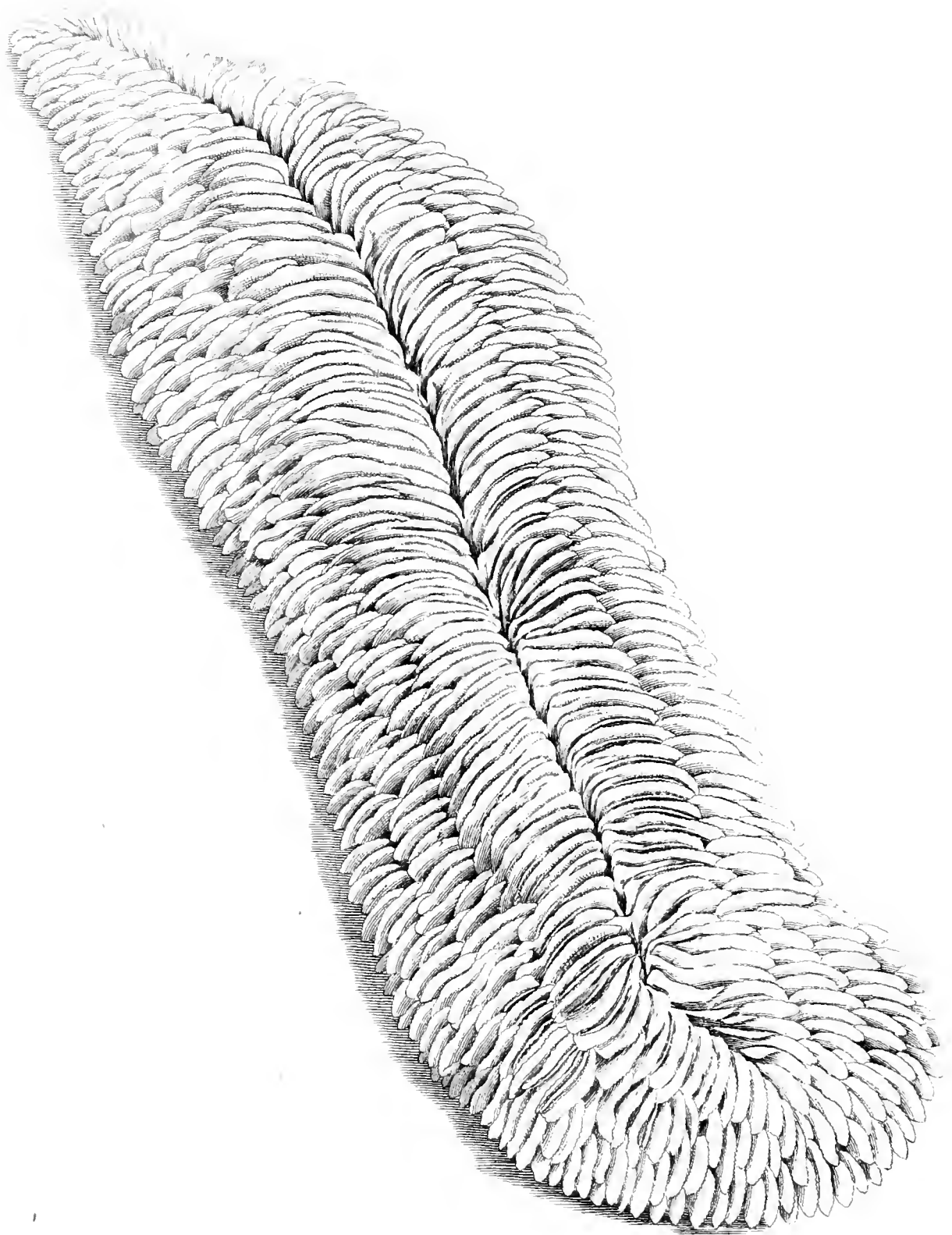


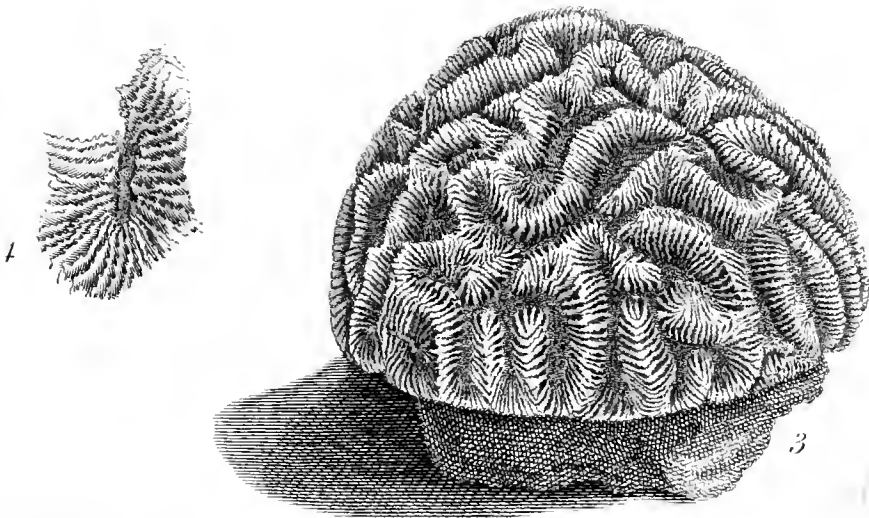
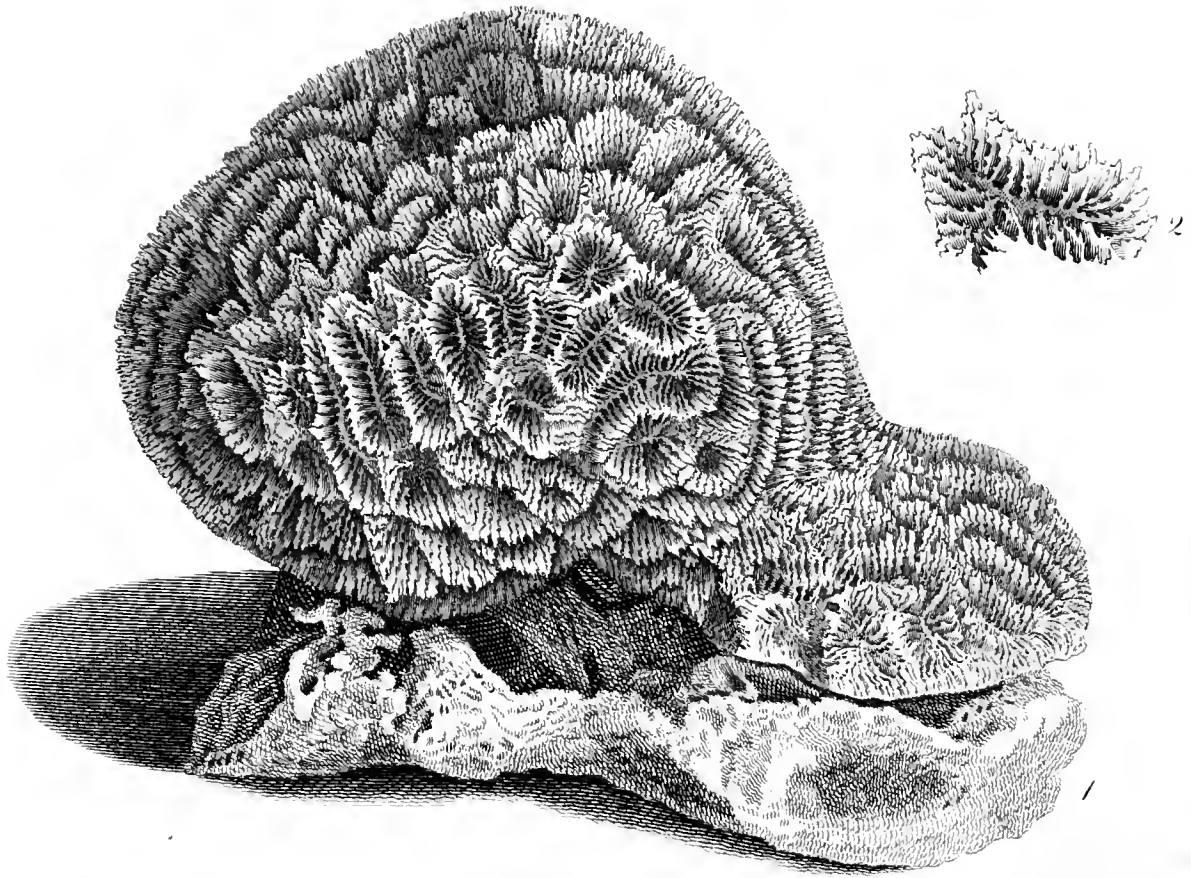


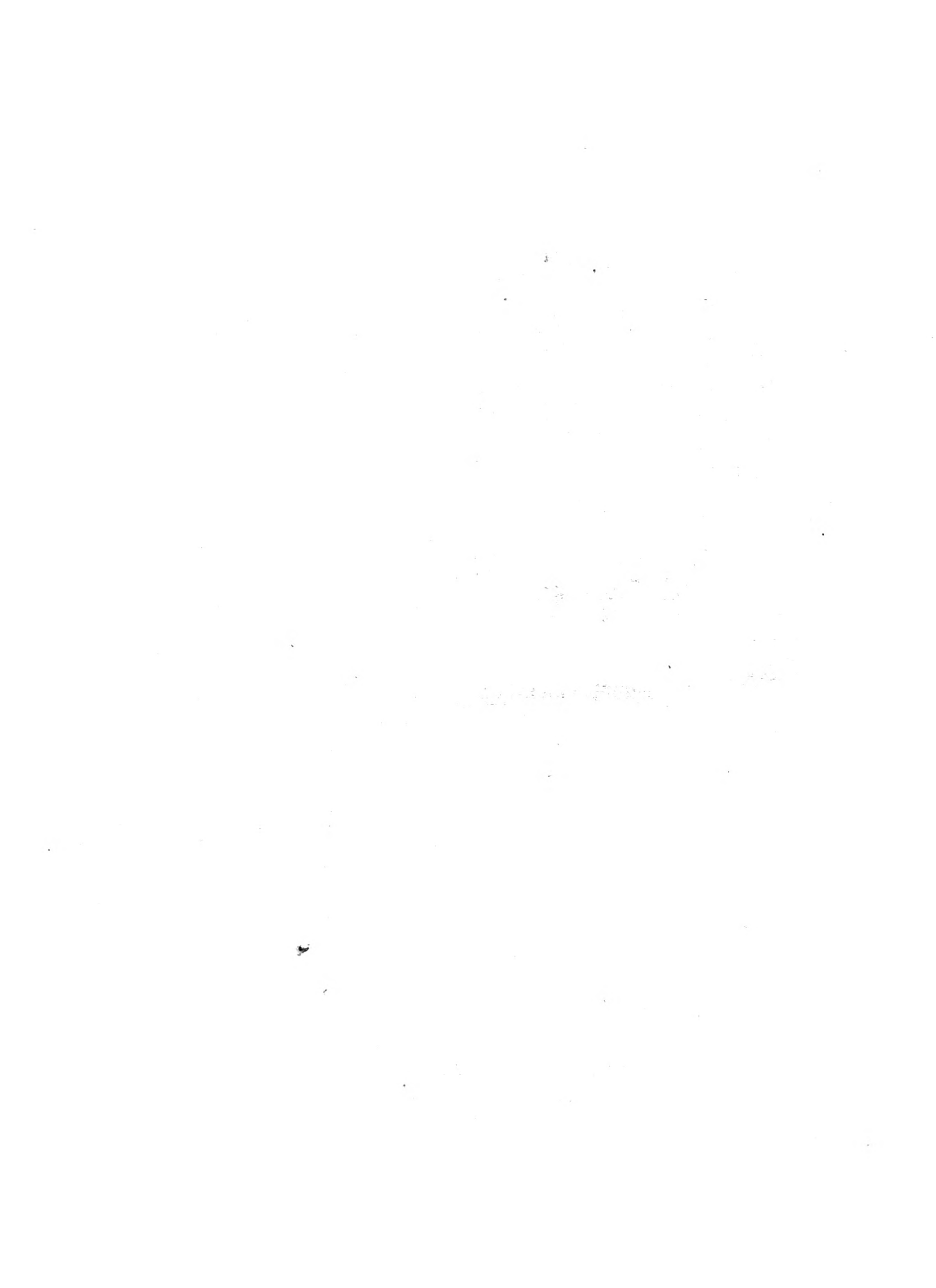


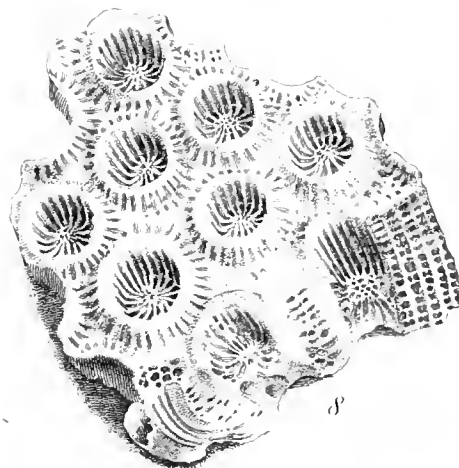
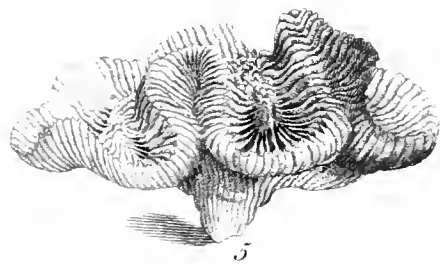
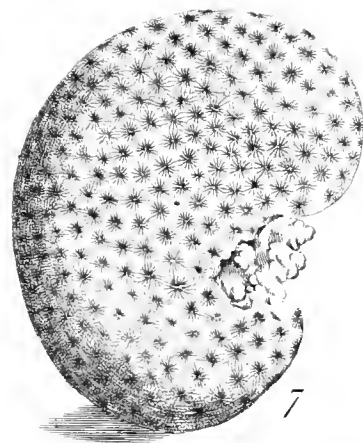
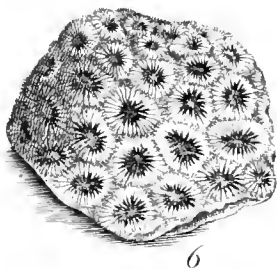
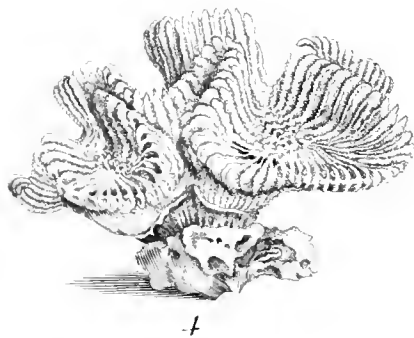
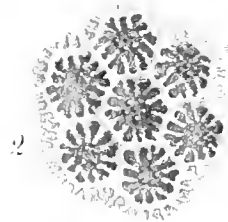
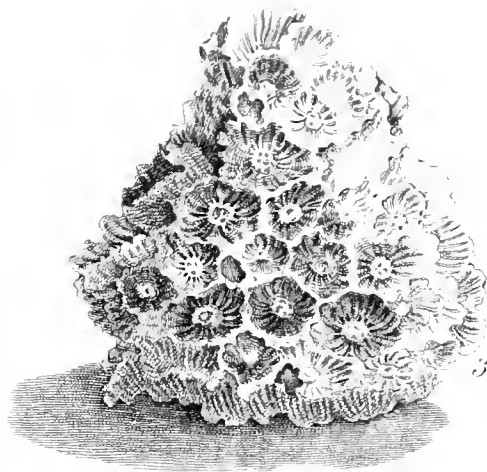
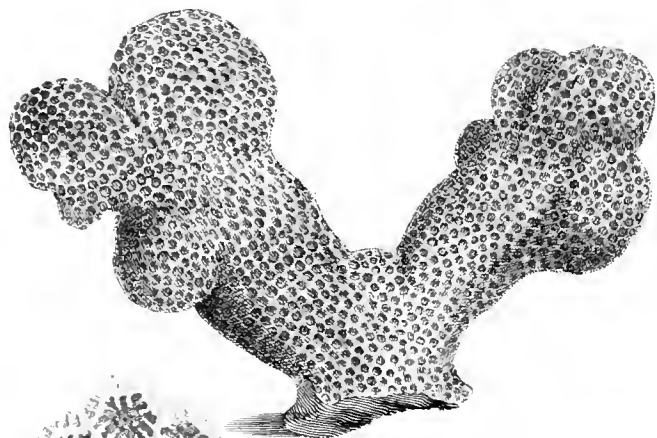


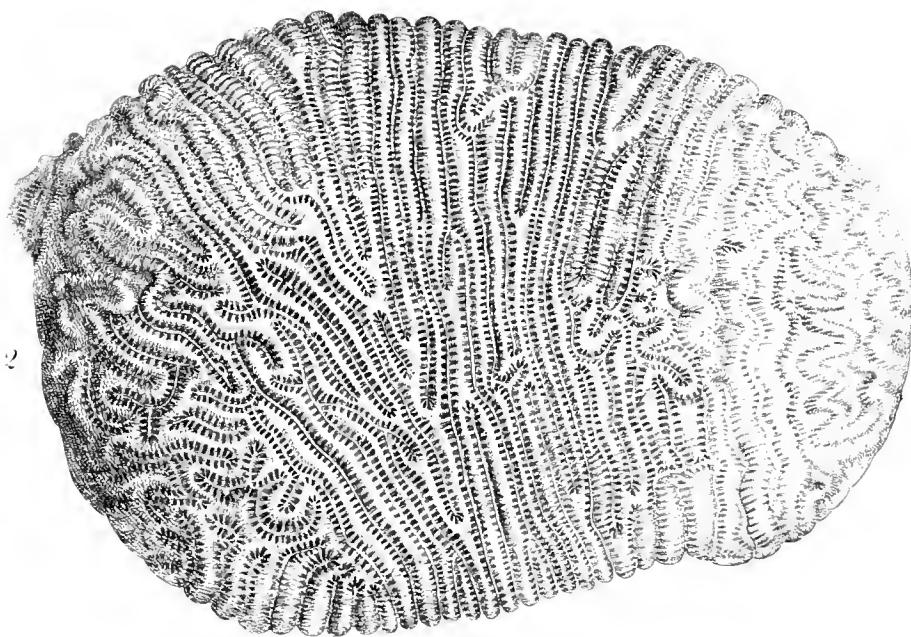
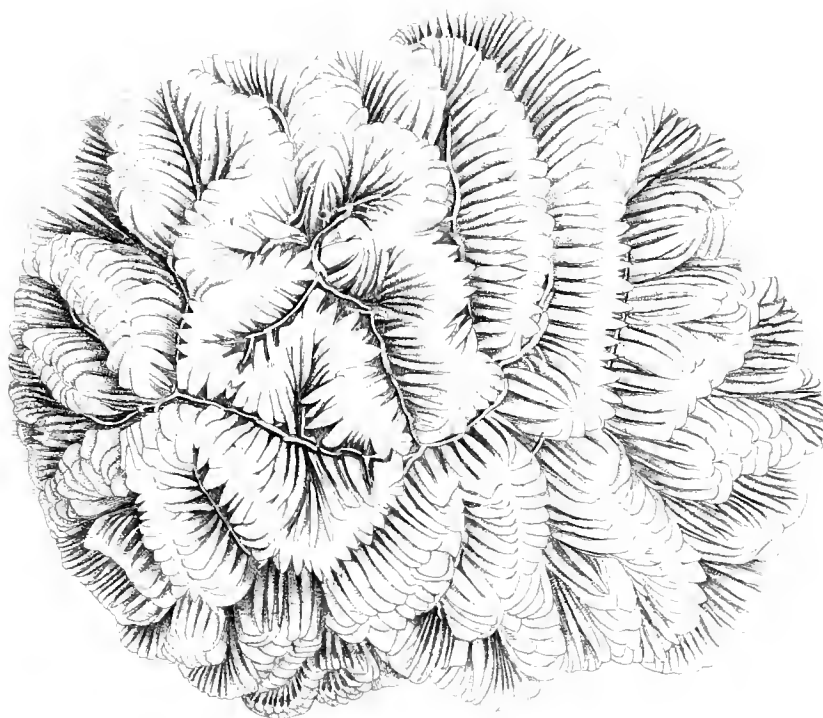




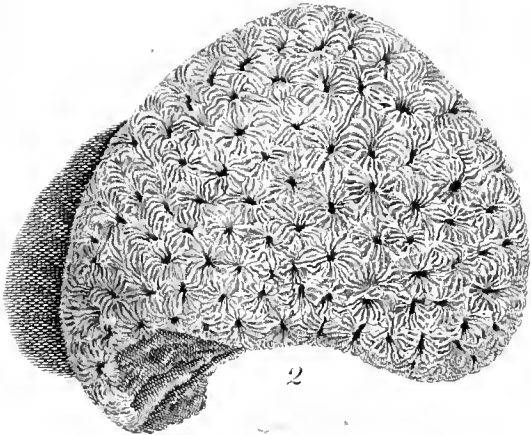
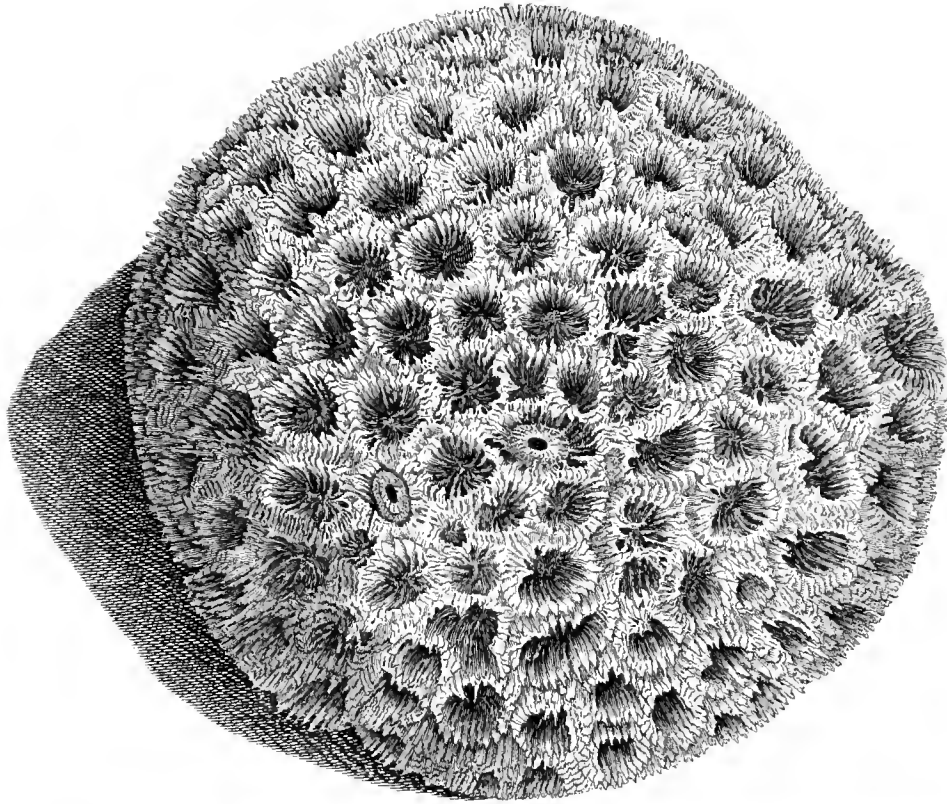




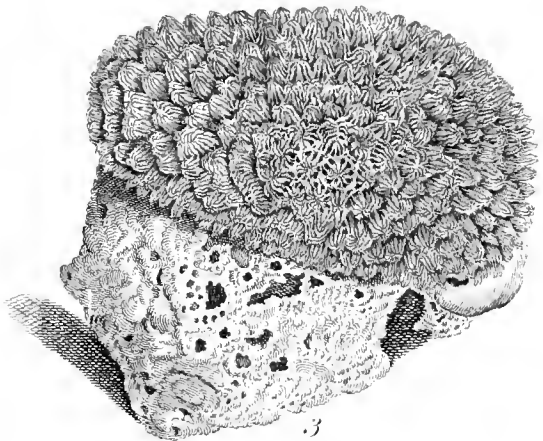




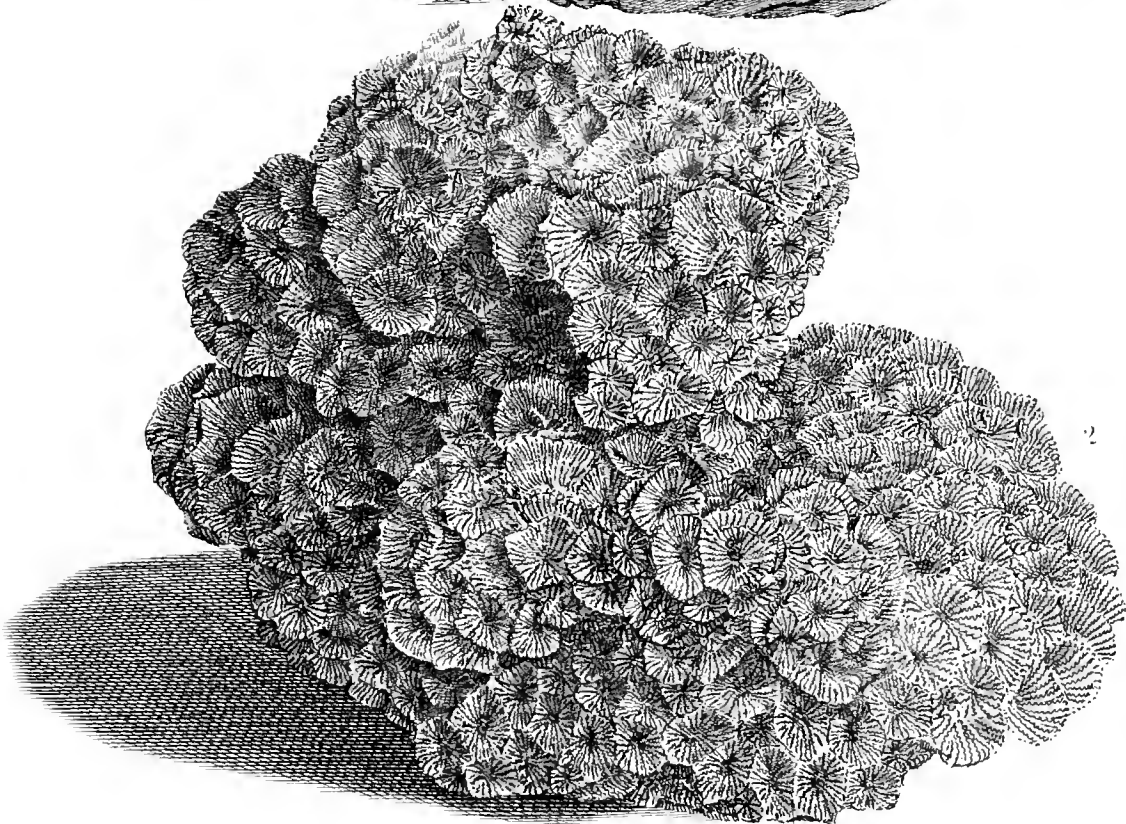
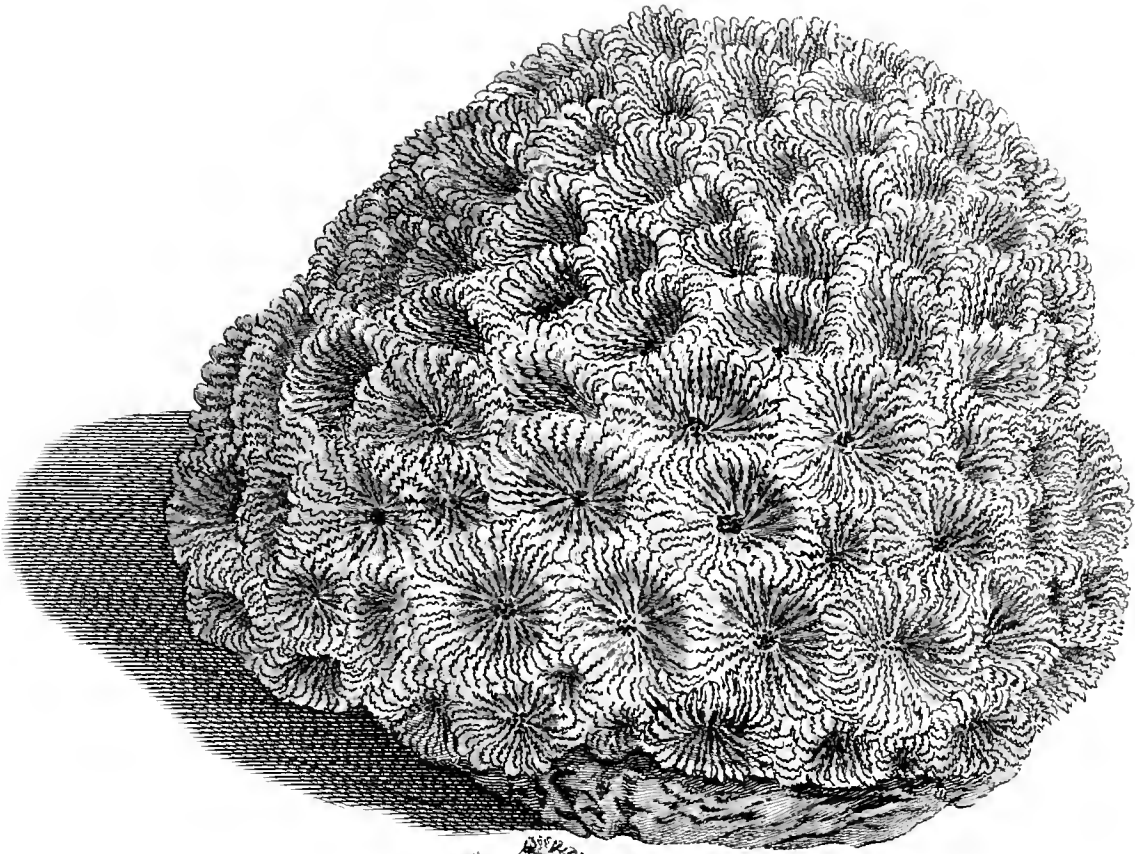


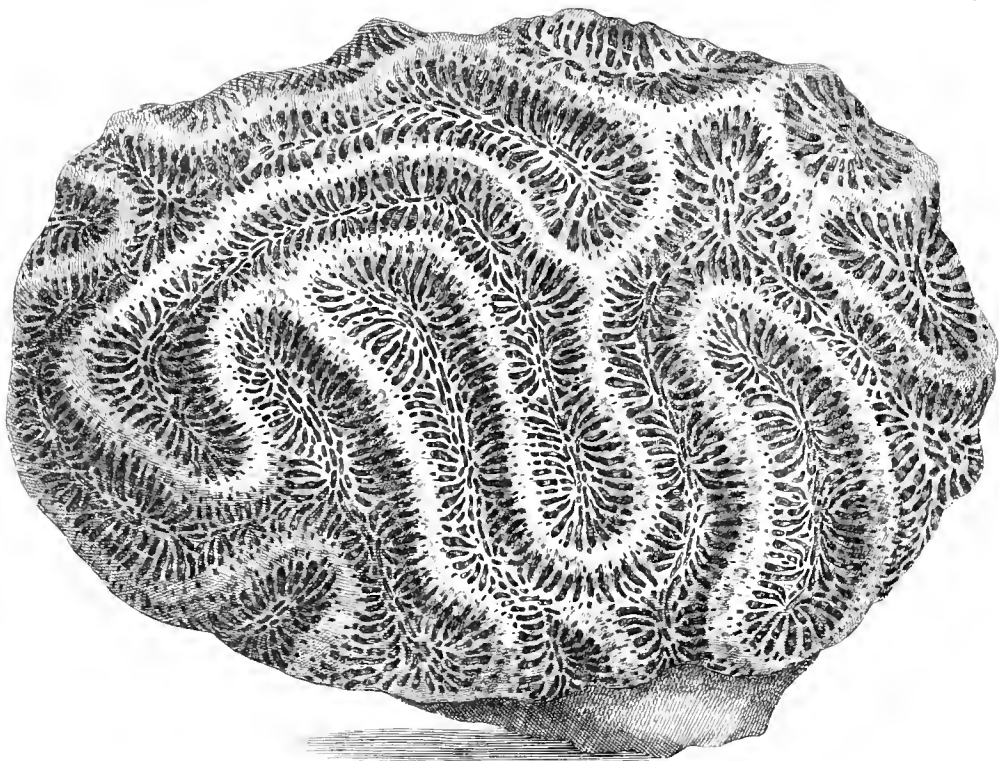
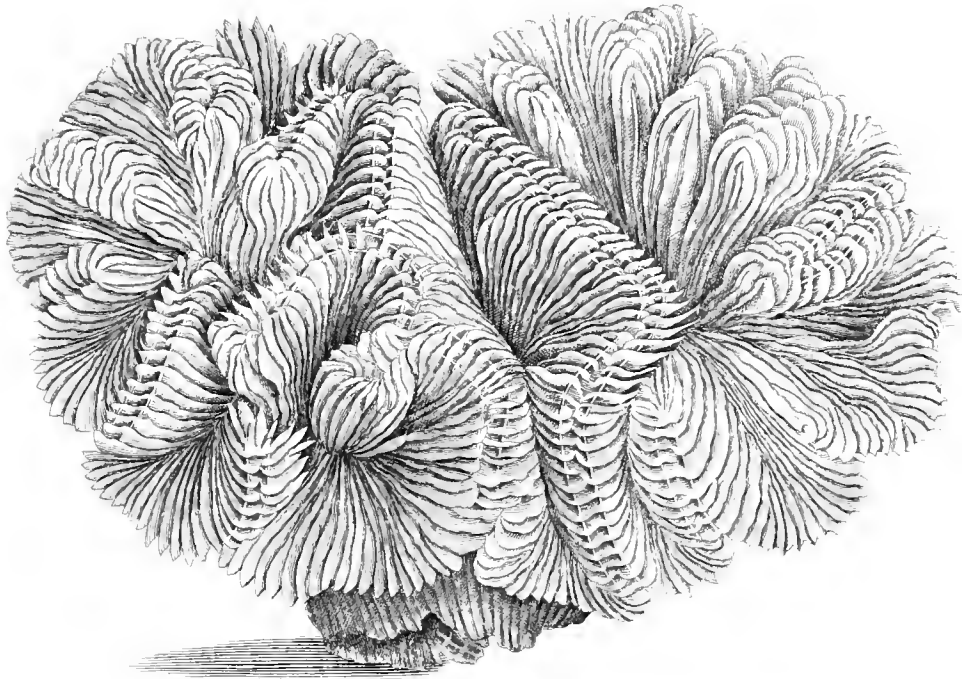


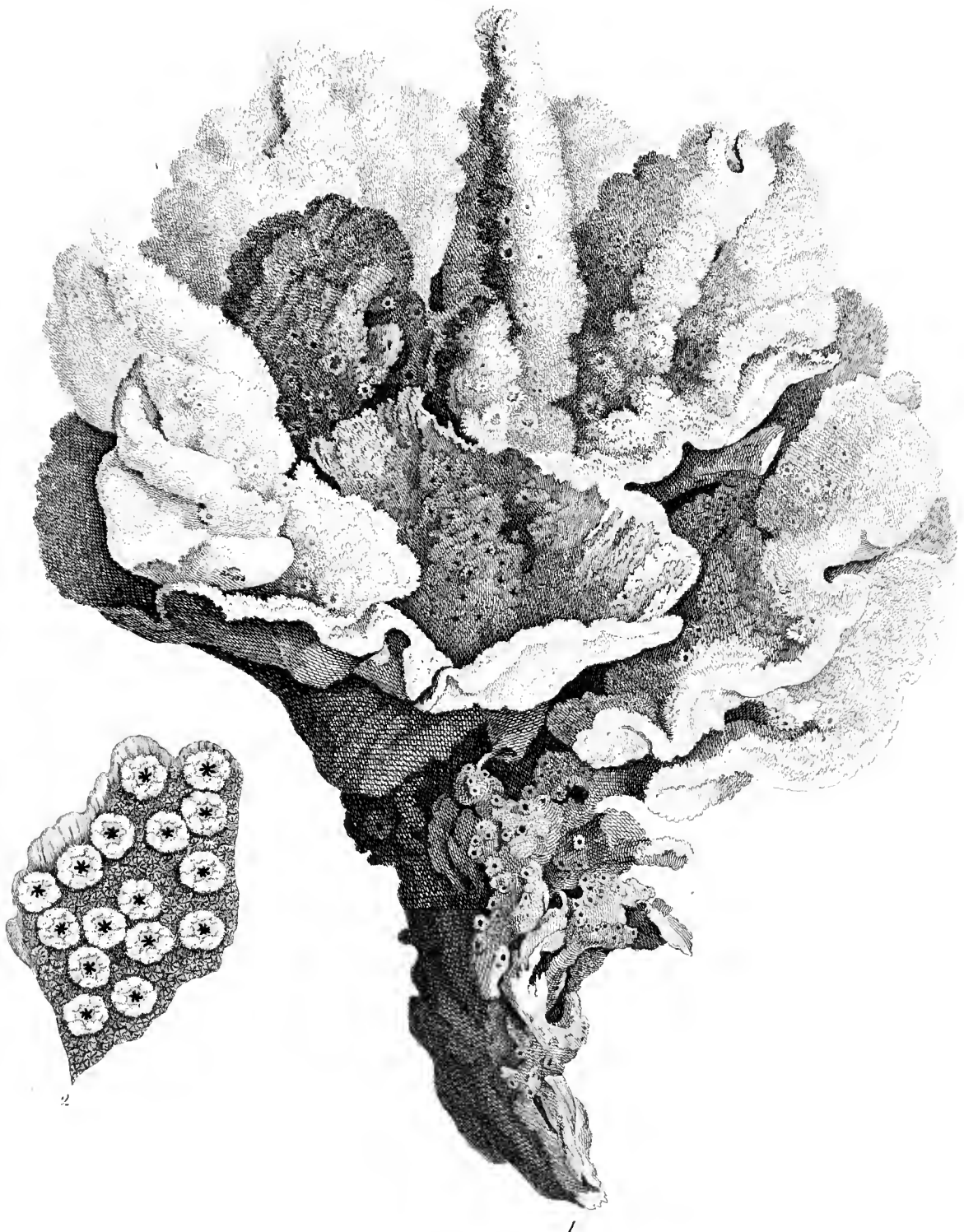
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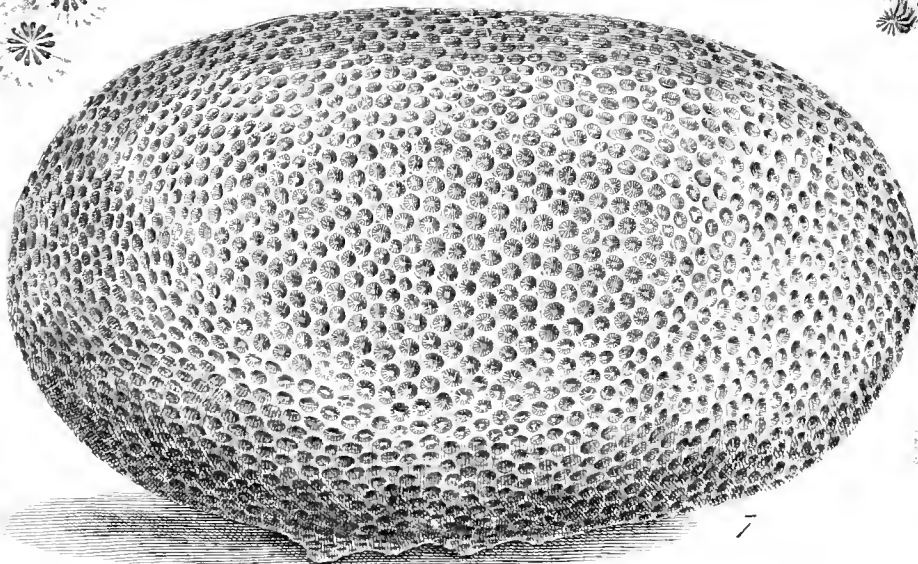
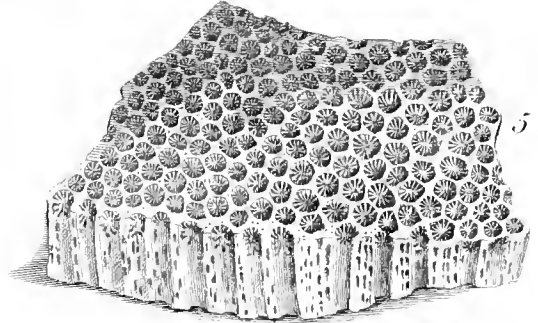
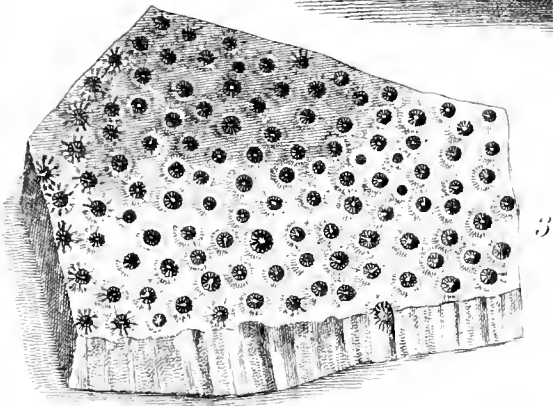
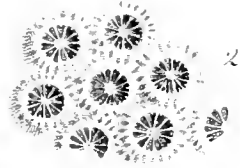
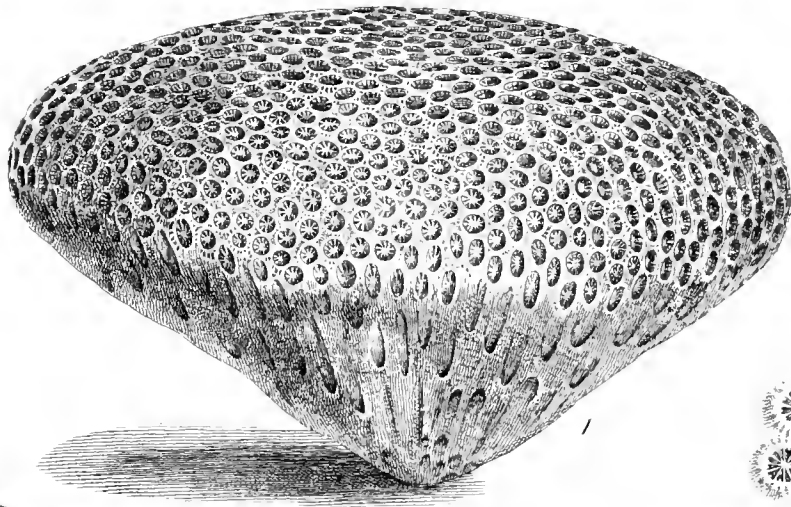


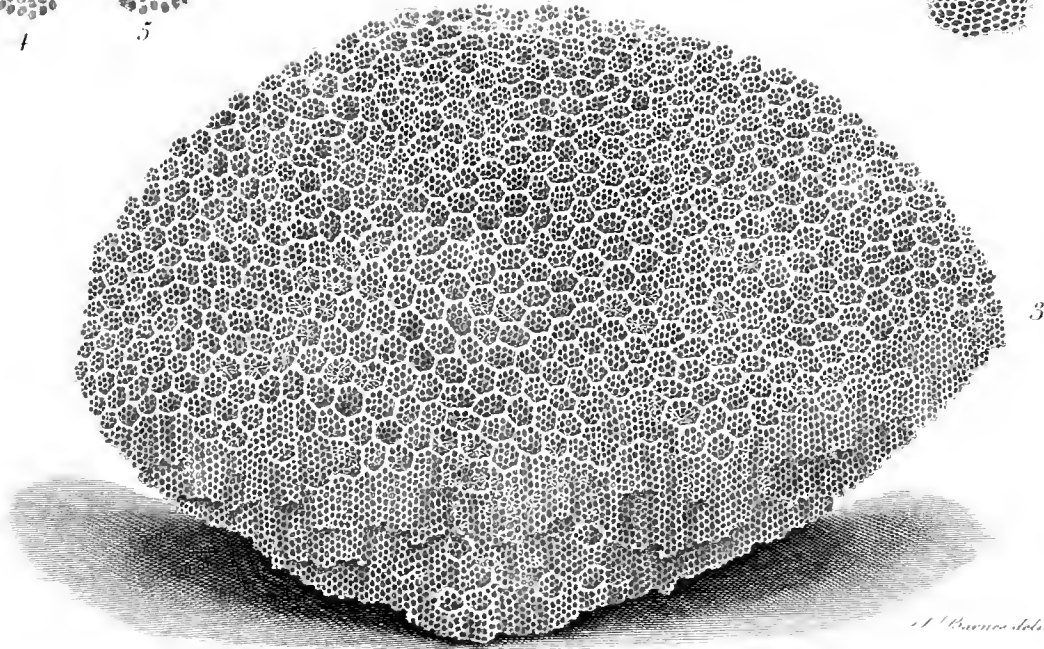
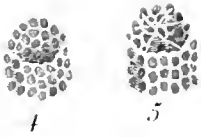
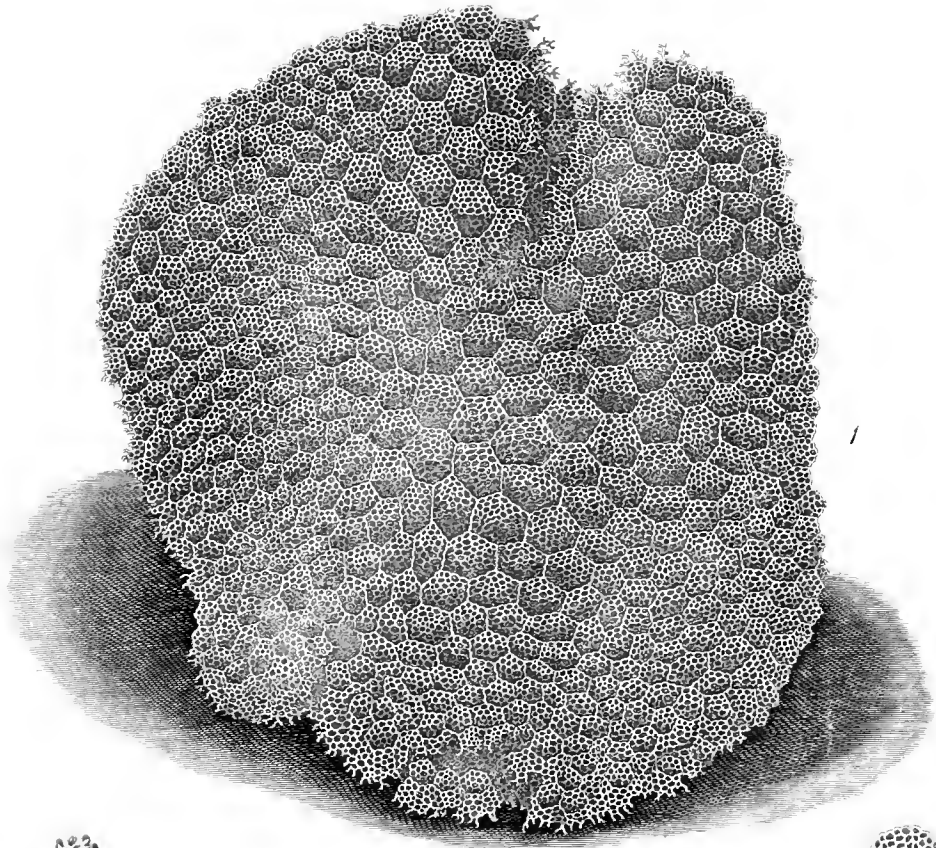
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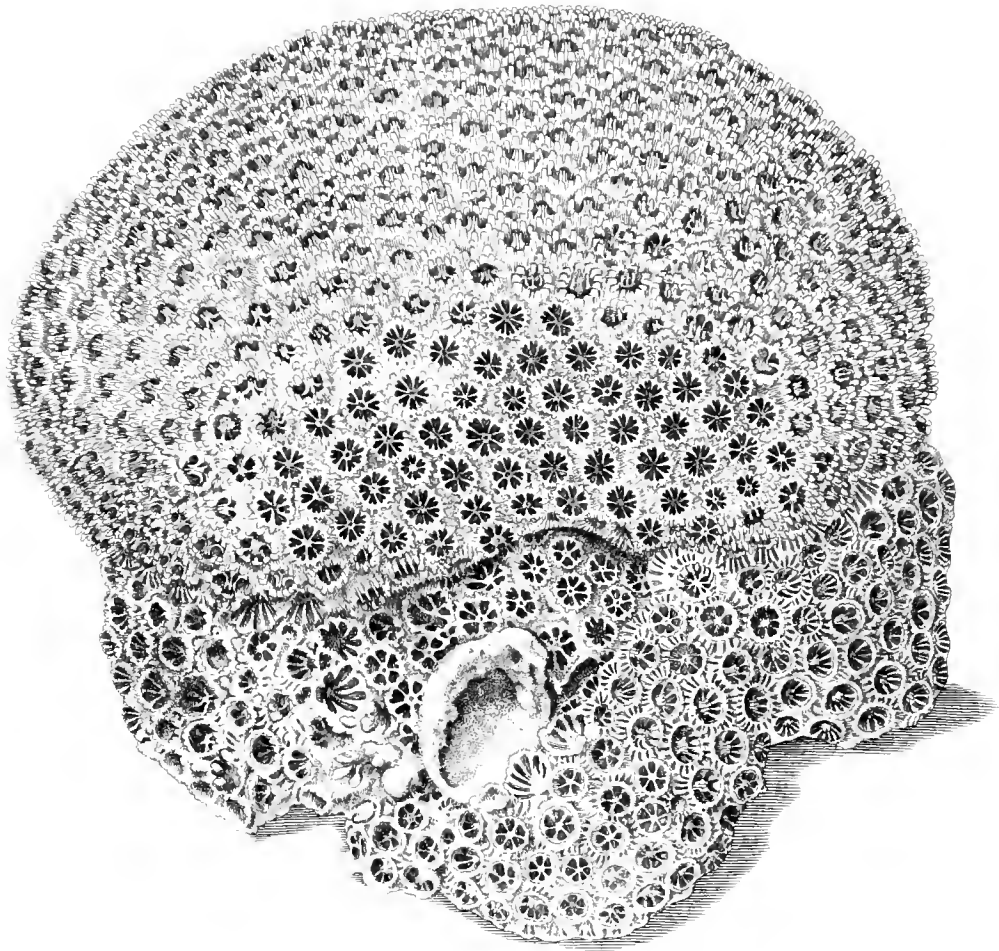












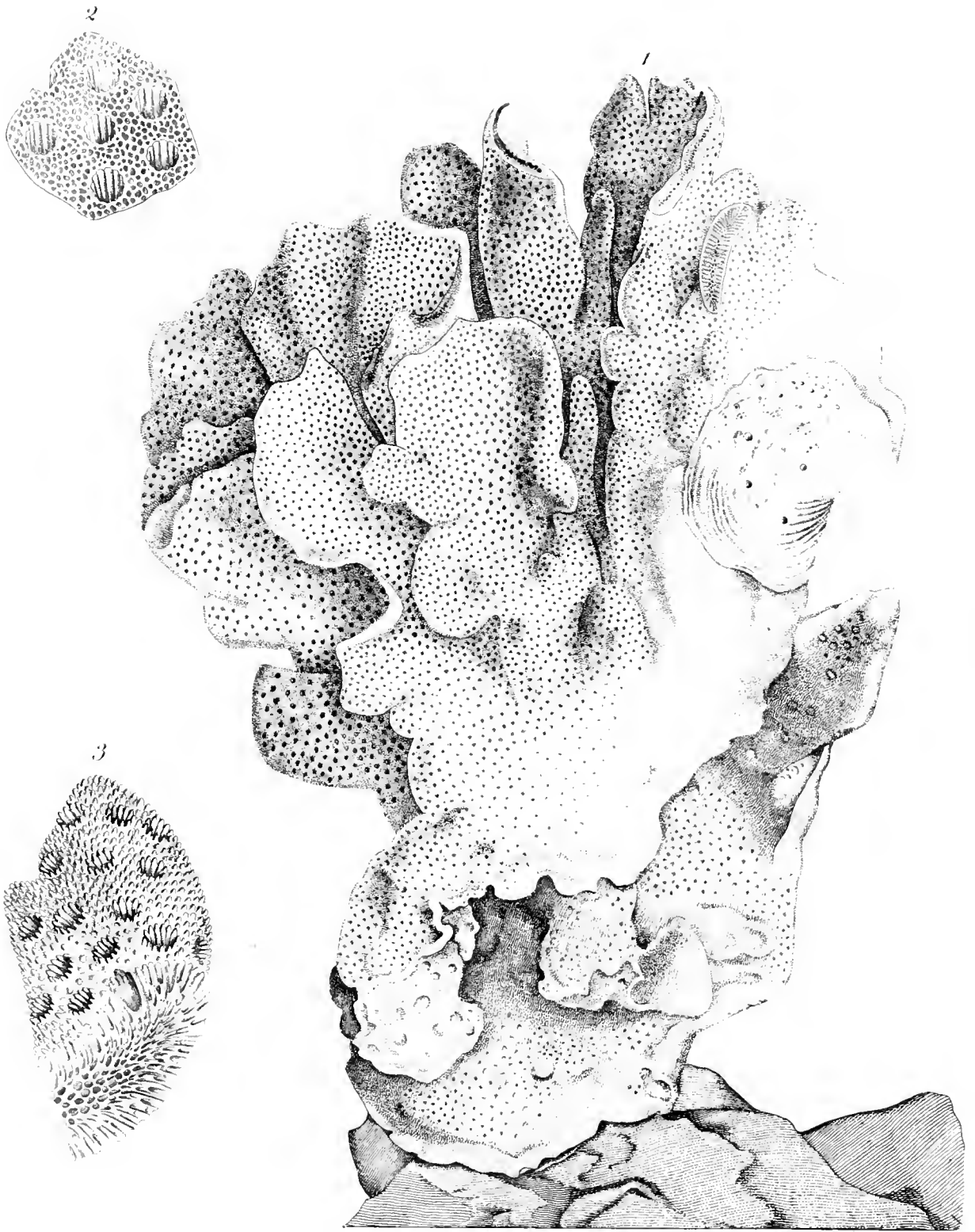
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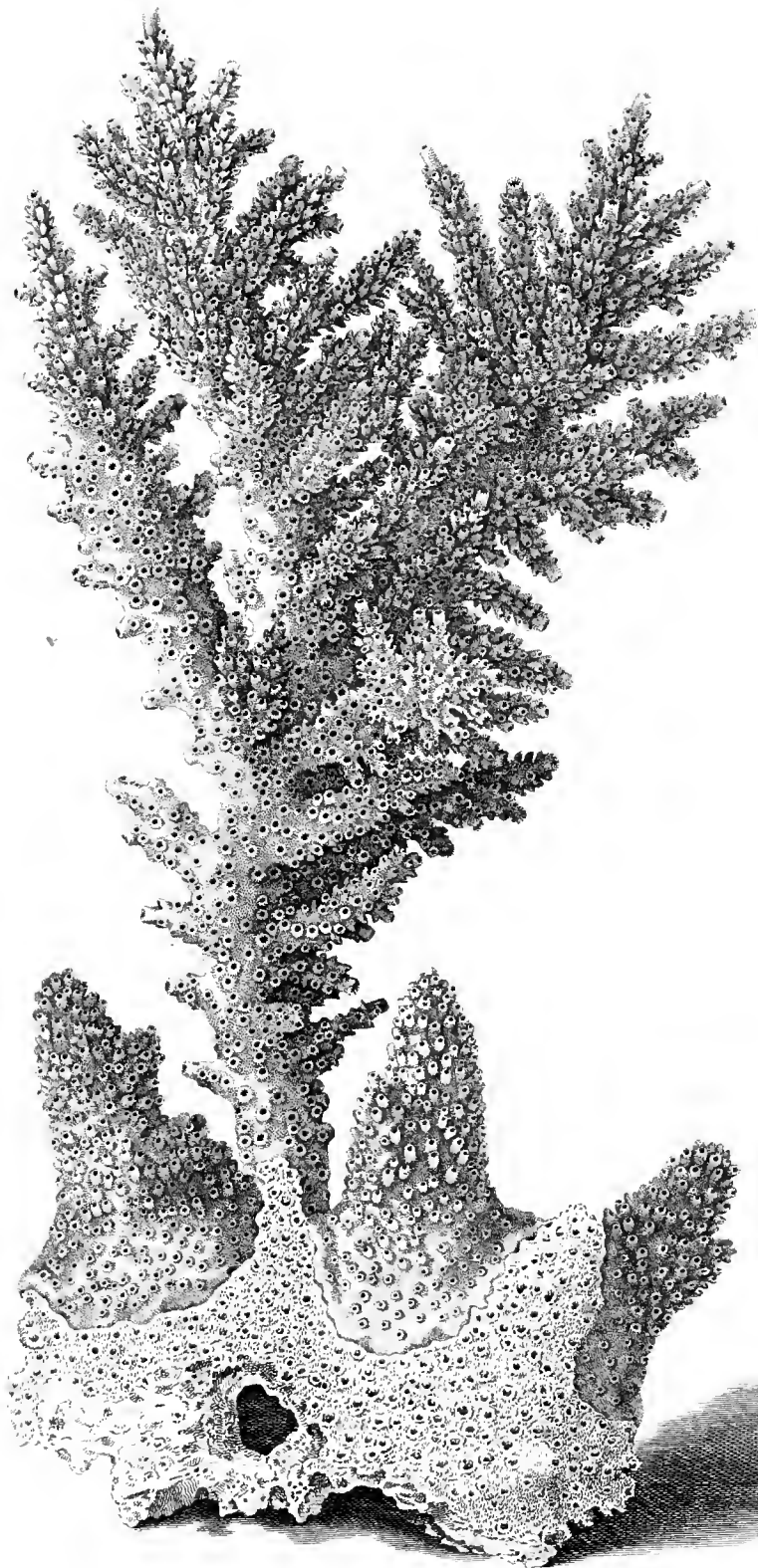


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S. Bournoni, ablesment et femp.

