XVII. *Deſcription of a new Marine Animal. In a Letter from Mr.* Everard Home, *Surgeon, to* John Hunter, *Eſq. F.R.S. With a Poſtſcript by Mr.* Hunter, *containing anatomical Remarks upon the ſame.*

Read March 7, 1785.

TO JOHN HUNTER, ESQ. F.R.S.

DEAR SIR, Sept. 20, 1784.

I SENT you, about three years ago, a ſea animal from Barbadoes, which was unlike any one I had ever ſeen. From the want of books and other information in that iſland, I was unable at the time to find out, whether it was a new acquiſition, or had been deſcribed by any authors in natural hiſtory.

Since my arrival in England, I have examined the libraries of ſome men of ſcience for an account of this animal, and have made other enquiries among the naturaliſts, without ſucceſs. The ſpecimen I ſent you was found on a part of the coaſt which had undergone very remarkable changes, in conſequence of a violent hurricane. Theſe changes were indeed the means of its being diſcovered, and preſent a probable reaſon why it was not diſcovered before. The extraordinary circumſtances which brought it within our reach, and the ſilence of all the authors on natural hiſtory which I have been able to conſult, incline me to believe it to be a non-deſcript. As the peculiarities of its ſtructure may add to the knowledge of the natural hiſtory

hiſtory of other animals of this genus, at preſent ſo little underſtood, I have drawn out a more particular account of it; which, if you think it deſerves attention, you may preſent to the Royal Society.

This animal was found on the ſouth-eaſt coaſt of Barbadoes, cloſe to Charles Fort, about a mile from Bridge Town, in ſome ſhoal water, ſeparated from the ſea by the ſtones and ſand thrown up by the dreadful hurricane, which happened in the year 1780, and did ſo much miſchief to the iſland.

The wind, in the beginning of the ſtorm, which was in the afternoon, blew very furiouſly from the north-weſt, making a prodigious ſwell in the ſea; and in the middle of the night changing ſuddenly to the ſouth-eaſt, it blew from that quarter upon the ſea, already agitated, forcing it upon the ſhore with ſo much violence, that it threw down the rampart of Fort Charles, which was oppoſed to it, although thirty feet broad, by the burſting of one ſea. It forced up, at the ſame time, immenſe quantities of large coral rocks from the bottom of the bay, making a reef along this part of the coaſt for the extent of ſeveral miles, at only a few yards diſtance from the ſhore.

The ſoundings of the harbour were found afterwards to be intirely changed, by the quantity of materials removed from the bottom in different places. In the reef of coral was found an infinite number of large pieces of brain-ſtone, containing the ſhell of this animal; but the animals had either been long dead, or more probably deſtroyed by the motion of the rocks in the ſtorm: ſome few of the brain-ſtones, however, that had been thrown beyond the reef, and lodged in the ſhoal water, receiving leſs injury, the animals were preſerved unhurt.

The animal, with the ſhell, is almoſt intirely incloſed in the brain-ſtone, ſo that at the depth in which they generally lie,

they are hardly diſcernible, through the water, from the common ſurface of the brain-ſtone; but when in ſearch of food they throw out two cones, with membranes twiſted round them in a ſpiral manner, which have a looſe fringed edge, looking at the bottom of the ſea like two flowers; and in this ſtate they were diſcovered.

The ſpecies of Actinia called in Barbadoes the Animal Flower, and common to many parts of that iſland, although rarely before ſeen on this part of the coaſt, was now found in conſiderable numbers in this ſhoal water.

The animal was firſt obſerved by Captain HENDIE, the officer commanding Fort Charles, in looking for ſhells which were thrown up in great numbers from the bottom of the harbour. He found a piece of brain-ſtone containing three of them in different parts of it. Some little time after, I was lucky enough to find another brain-ſtone with two in it; one of them is the ſpecimen in your poſſeſſion; the other was deſtined for examination, of which the following is the account.

The animal, when taken out of the ſhell, including the two cones and their membranes, is five inches in length; of which the body is three inches and three-quarters, and the apparatus for catching its prey, which may be conſidered as its tentacula, about an inch and a quarter.

The body of the animal is attached to its ſhell, for about three-quarters of an inch in length, at the anterior part where the two cones ariſe, by means of two cartilaginous ſubſtances, with one ſide adapted to the body of the animal, the other to the internal ſurface of the ſhell: the reſt of the body is unattached, of a darkiſh white colour, about half an inch broad, a little flattened, and rather narrower towards the tail. The muſcular fibres upon its back are tranſverſe; thoſe on the belly

longitudinal, making a band the whole length of the body, on the edge of which the tranſverſe fibres running acroſs the back terminate.

The two cartilaginous ſubſtances by which the animal adheres to its ſhell, are placed one on each ſide of the body, and are joined together upon the back of the animal at their poſterior edges: they are about three-quarters of an inch long, are very narrow at their anterior end, becoming broader as they go backwards; and at their poſterior end they are the whole breadth of the body of the animal. Upon their external ſurface there are ſix tranſverſe ridges, or narrow folds; and along their external edges, at the end or termination of each ridge, is a little eminence reſembling the point of a hair pencil, ſo that on each ſide of the animal there are ſix of theſe little projecting ſtuds, for the purpoſe of adhering to the ſides of the ſhell in which the animal is incloſed. The internal ſurfaces of theſe cartilages are firmly attached to the body of the animal, in their middle part, by a kind of band or ligament; but the upper and lower ends are lying looſe.

From the end of the body, between the two upper ends of theſe cartilages, ariſe what I ſuppoſe to be the tentacula, conſiſting of two cones, each having a ſpiral membrane twining round it: they are cloſe to each other at their baſes, and diverge as they riſe up, being about an inch and a quarter in length, and nearly one-ſixth of an inch in thickneſs at their baſe, and gradually diminiſhing till they terminate in points. The membranes which twine round theſe cones alſo take their origin from the body of the animal, and make five ſpiral turns and a half round each, being loſt in the points of the cones; they are looſe from the cone at the loweſt ſpiral turn which they make, and are nearly half an inch in breadth; they are exceedingly

ingly delicate, and have at ſmall diſtances fibres running acroſs them from their attachment at the ſtem to the looſe edge, which gives them a ribbed appearance. Theſe fibres are continued about one-tenth of an inch beyond the membrane, having their edges finely ſerrated, like the tentacula of the Actiniæ found in Barbadoes: theſe tentacula ſhorten as the ſpiral turns become ſmaller, and are entirely loſt in that part of the membrane which terminates in the point of the cone.

Behind the origin of theſe cones ariſes a ſmall ſhell, which, for one-ſixth of an inch from its attachment to the animal, is very ſlender: it is about three quarters of an inch in length, becoming conſiderably broader at the other end, which is flat, and about one-third of an inch broad; the flattened extremity is covered with a kind of hair, and has riſing out of it two ſmall claws, about one-ſixth of an inch in length. If the hair, and mucus entangled in it, be taken away, this extremity of the ſhell becomes concave, is of a pink colour, and the two claws riſing out from its middle part have each three ſhort branches, not unlike the horns of a deer. The body of this ſhell has a ſoft cartilaginous covering, with an irregular but poliſhed ſurface: on this the cones reſt in their collapſed ſtate, in which ſtate the whole of the ſhell is drawn into the cavity of the brain-ſtone, excepting the flattened end with the two claws.

Before the cones there is a thin membrane, which appears to be of the ſame length with the ſhell juſt deſcribed. In the collapſed ſtate it lies between the cones and the ſhell in which the animal is incloſed; but, when the tentacula are thrown out, it is alſo protruded.

The ſhell of this animal is a tube, which is very thin, and adapted to its body: the internal ſurface is ſmooth, and of a

pinkiſh white colour: its outer ſurface is covered by the brain-ſtone in which it is incloſed, and the turnings and windings which it makes are very numerous. The end of the ſhell, which opens externally, riſes above the ſurface of the ſtone on one ſide half an inch in height, for about half the circumference of the aperture, bending a little forwards over it, and becoming narrower and narrower as it goes up, terminating at laſt in a point juſt over the center of the opening of the ſhell; on the other ſide it forms a round margin to the ſurface of the brain-ſtone. This part of the ſhell is much thicker and ſtronger than that part which is incloſed in the brain-ſtone: its outer ſurface is of a darkiſh brown colour; its inner of a pinkiſh white.

The animal, when at reſt, is wholly concealed in its ſhell; but when it ſeeks for food, the moveable ſhell is puſhed ſlowly out with the cones and their membranes in a collapſed ſtate; and when the whole is expoſed, the moveable ſhell falls a little back, and the membrane round each of the cones is expanded, the tentacula at the baſes of the cones having juſt room enough to move without touching one another. The thin membrane which lay between the cones and the incloſing ſhell is protruded in the form of a fold, and lies over the external ſhell which projects from the brain-ſtone.

The membranes have a ſlow ſpiral motion, which continues during the whole time of their being expanded; and the tentacula upon their edges are in conſtant action. The motion of the membrane of the one cone ſeems to be a little different from that of the other, and they change from the one kind of motion to the other alternately, a variation in the colour of the membrane at the ſame time taking place, either becoming a ſhade lighter or darker; and this change in the colour, while the

the whole is in motion, produces a pleaſing effect, and is moſt ſtriking when the ſun is very bright. The membranes, however, at ſome particular times appear to be of the ſame colour.

While the membranes are in motion, a little mucus is often ſeparated from the tentacula at the point of the cone. Upon the leaſt motion being given to the water, the cones are immediately, and very ſuddenly, drawn in.

This apparatus for catching food is the moſt delicate and complicated that I have ſeen; but I ſhall not trouble you with any conjectures upon what that food may be, as I have not attained ſufficient knowledge of the animal to ſpeak with the ſmalleſt certainty.

I have endeavoured to deſcribe the external appearances as I ſaw them; and have annexed two drawings of the animal in its two different ſtates, one in ſearch of food, and one while lying at reſt; theſe are a little magnified, to ſhow the parts more diſtinctly.

I ſhall not ſay any thing of the internal parts, or their uſes, as the animal is in your poſſeſſion, who are ſo much better able to explain its internal œconomy.

I am, &c.

EVERARD HOME

POST-

POSTSCRIPT,

BY JOHN HUNTER, ESQ. F. R. S.

ANIMALS which come from foreign countries, and cannot be brought to England alive, muſt be kept in ſpirits to preſerve them from putrefaction, which makes them leſs fitted for anatomical examination; for the ſpirits, which preſerve them, produce a change in many of their properties, and alter the natural colours, and texture of the parts, ſo that often the ſtructure alone of the animal can be aſcertained; and where this is not naturally diſtinct, it becomes frequently intirely obſcured, and the texture of the finer parts is wholly deſtroyed, requiring a very extenſive knowledge of ſuch parts in animals at large, to aſſiſt us in bringing them to light: this happens to be the caſe with the animal whoſe diſſection is the ſubject of this Poſtſcript.

The animal may be ſaid to conſiſt of a fleſhy covering, a ſtomach and inteſtinal canal, and the two cones with their tentacula and moveable ſhell, which laſt may be conſidered as appendages.

The body of the animal is flattened, and terminates in two edges, which are interſected by rugæ, the faſciculi of tranſverſe muſcular fibres which run acroſs the back being continued over them. Upon each of theſe edges is placed a row of fine hairs, which project to ſome diſtance from the ſkin.

The fleſhy covering conſiſts principally of muſcular fibres: thoſe upon the back are placed tranſverſely, to contract the body laterally;

laterally; thoſe on the belly longitudinally, to ſhorten the animal when ſtretched out, and to draw it into the ſhell.

The ſtomach and inteſtine make one ſtraight canal: the anterior end of this forms the mouth, which opens into the grooves made by the ſpiral turns of the tentacula round the ſtem of each of the cones; and the inteſtine at the poſterior end opens externally, forming the anus. From the contracted ſtate of the animal, the inteſtine is thrown into a number of folds.

On examining the cones and the tentacula, I at firſt believed that the ſpiral form aroſe from their being in a contracted ſtate; and that, when the tentacula were erected, the cone untwiſted, forming a longer cone with the tentacula ariſing from its ſides, like the plume from the ſtem of a feather; and that this ſtem was drawn in or ſhortened by means of a muſcle paſſing along the center, which threw the tentacula into a ſpiral line, ſimilar to the penis's of many birds; but how far this is really the caſe, I have not been able to aſcertain.

The internal ſtructure of this animal, like moſt of thoſe which have tentacula, is very ſimple; it differs, however, materially from many, in having an anus, moſt animals of this tribe, as the Polypi, having only one opening, by which the food is received, and the excrementitious part of it alſo afterwards thrown out; this we muſt have ſuppoſed, from analogy, to take place in the animal which is here deſcribed, more particularly ſince it is incloſed in a hard ſhell, at the bottom of which there appears to be no outlet; but as there is an anus this cannot be the caſe.

It is very ſingular, that in the Leach, Polypi, &c. where no apparent inconvenience can ariſe from having an anus, there is not one, while in this animal, where it would ſeem to be attended with many, we find one; but there being no anus

in

in the Leach, Polypi, &c. may depend upon ſome circumſtance in the animal œconomy which we are at preſent not fully acquainted with.

The univalves, whoſe bodies are under ſimilar circumſtances reſpecting the ſhell with this animal, have the inteſtine reflected back, and the anus, by that means, brought near to the external opening of the ſhell, the more readily to diſcharge the excrement; and although this ſtructure, in theſe animals, appears to be ſolely intended to anſwer that purpoſe, yet when we find the ſame ſtructure in the black Snail, which has no ſhell, this reaſoning will not wholly apply, and we muſt refer it to ſome other intention in the animal œconomy.

In this animal we muſt therefore reſt ſatisfied that the diſadvantageous ſituation of the anus, with reſpect to the excrement's being diſcharged from the ſhell, anſwers ſome purpoſe in the œconomy of the animal, which more than counter-balances the inconveniences produced by it.

It would appear, from conſidering all the circumſtances, that the excrement thrown out at the anus muſt paſs from the tail along the inſide of the tube, between it and the body of the animal, till it comes to the external opening of the ſhell, as there is no other evident mode of diſcharging it.

How the tube or ſhell is formed in ſtone or coral is not eaſily aſcertained. It may be aſked, whether this animal has the power of boring backwards as the Teredo Navalis probably does, or whether the ſtone or coral is formed at the ſame time with the animal, and grows and increaſes with it: and if we conſider all the circumſtances, this laſt would appear to be moſt probable, and agree beſt with the different phænomena; for the coral is lined with a ſhell, which could not be the caſe if the animal was continually increaſing this hole, both in length and

breadth, in proportion to its growth; but if the coral and the animal increaſe together, it is then ſimilar to the growth of all ſhells, whether bivalve or univalve.

The animal does not appear to have the power of increaſing its canal, being only compoſed of ſoft parts. This, however, is no argument againſt its doing it, for every ſhell fiſh has the power of removing a part of its ſhell, ſo as to adapt the new and the old together; which is not done by any mechanical power, but by abſorption.

The tribe of animals which have tentacula conſiſts of an almoſt infinite variety, and many of the ſpecies have been deſcribed. Of that kind, however, which has the double cones, I believe hitherto no account has been given. It is moſt probably to be found in the ſeas ſurrounding the different iſlands in the Weſt Indies; for I received an animal, ſome years ago, from Mr. OLIVER, ſurgeon, at Tenby in Pembrokeſhire, which he had procured from a gentleman at St. Vincent's; which, upon examination, proves to be the ſame animal with that above deſcribed, only that the moveable ſhell is wanting.

Since I began this Poſtſcript, I find there is a deſcription of a double-coned Terebella, publiſhed by the rev. Mr. CORDINER, at Bamf in Scotland, which was found upon that coaſt; in which the cones have their tentacula paſſing out from the end, and when erected they ſpread from the cone as from a center. This proves that the double-coned tentacula alſo have different ſpecies.

EXPLANATION OF THE FIGURES, TAB. XI.

FIG. I.

A drawing of the animal after death, as it appeared in ſpirits, a little magnified.

A. The under ſide of the body.

BB. The cartilages which attach the animal to the ſides of the cavity in which it lies.

C. One of the cones covered by its membrane in a collapſed ſtate.

D. The loweſt ſpiral turn of the membrane and its tentacula ſpread out.

EE. The cut edges of the divided membrane, which are turned on each ſide to ſhew the cone.

F. The cone as it appears in the intervals between the ſpiral turns of the membrane.

G. The moveable ſhell, with the ſmooth cartilaginous covering, in an outſide view.

H. The flattened end of the moveable ſhell, with hair upon it.

II. The two claws that ariſe from the ſurface of the flattened end of the moveable ſhell.

K. The anus, into which a hog's briſtle is introduced.

FIG. II.

A drawing of the animal, with its tentacula expanded in ſearch of food, as it appears in the ſea; taken from a ſketch made in Barbadoes, where no draughtſman could be procured

Fig. I.

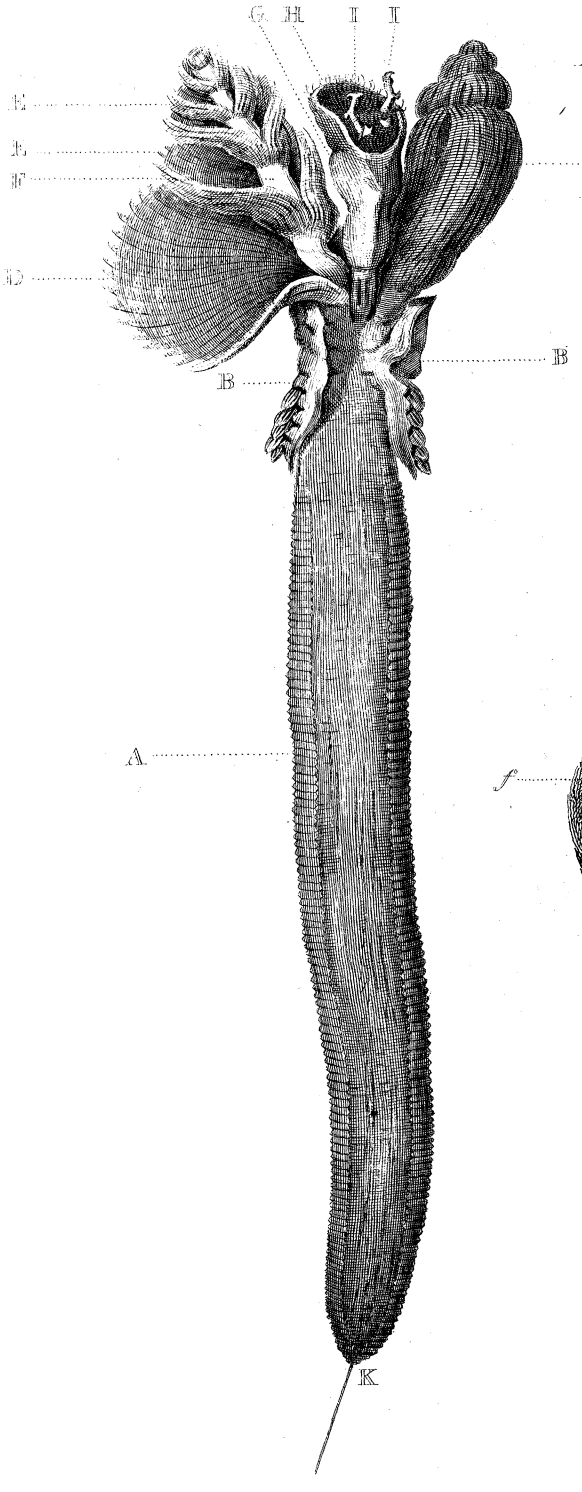
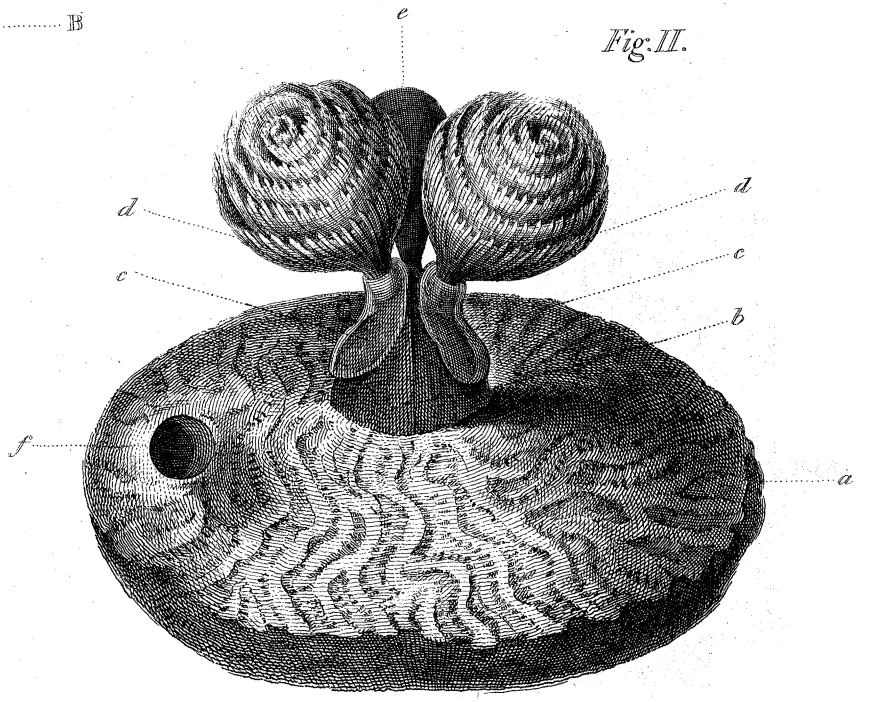


Fig. II.



while the animal was alive. This alſo is larger than the animal.

a. The ſort of brain-ſtone in which the animal was diſcovered.

b. The external prominent ſhell.

cc. The membrane which is protruded with the cones and moveable ſhell, and makes a fold over the edges of the prominent ſhell.

dd. The membranes and tentacula in a ſtate of expanſion.

e. The inner ſide of the moveable ſhell, as it appears when protruded.

f. The hole in the brain-ſtone as it appears when the prominent ſhell is broken off, and which may be ſeen in many ſpecimens of brain-ſtone.