GENERAL ZOOLOGY

or

SYSTEMATIC NATURAL HISTORY

by

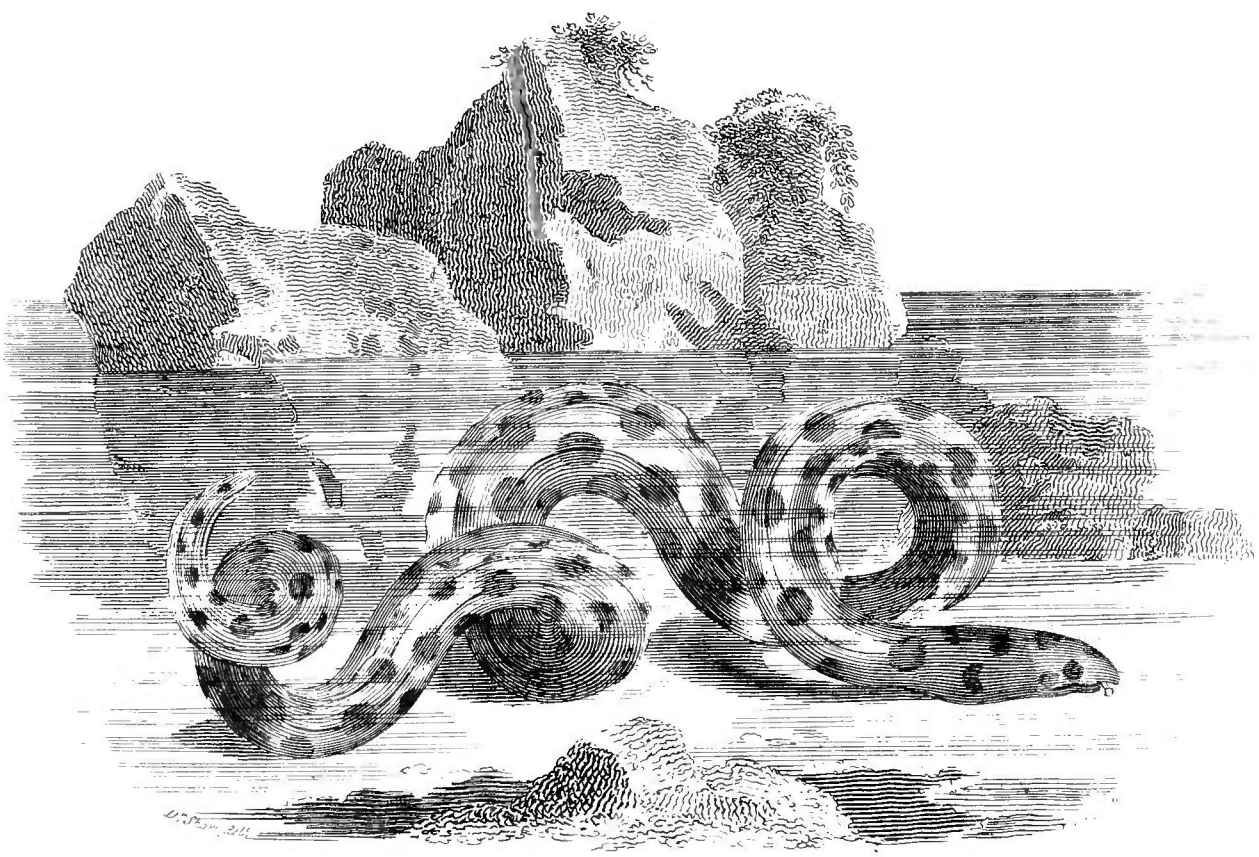
GEORGE SHAW, M.D. F.R.S &c.

WITH PLATES

from the first Authorities and most select specimens

Engraved principally by

MR. HEATH.



VOL. IV. Part I

P I S C E S.

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GENERAL ZOOLOGY.

VOLUME IV.——PART I.

PISCES.

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1803.

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ERRATA.—VOL. IV. PART I.

P. 22, l. 13, for *cauda* read *corpore.*
P. 23, l. 9, for *M. Ophis* read *M. Serpens*, and for *conspidata* read *acuta.*

*** *The fifth volume of this work, which will conclude the Natural History of Fishes, will be published early in the year* 1804.

PISCES.

THE general description both of the external and internal parts of Fishes, considered as a distinct tribe of animals, cannot be better detailed than in the works of the ingenious Dr. Monro, who observes that these animals have neither anterior nor posterior extremities, as quadrupeds and birds, their progression being performed in a different method. For this purpose they are provided with machines, properly consisting of a great number of elastic beams, connected to one another by firm membranes, and with a tail of similar texture. Their spine is moveable towards the posterior part, and the strongest muscles of their body are inserted there. Their tails are so framed as to contract to a narrow space when drawn together to either side, and to expand again when drawn to a strait line with their bodies; so that, by the assistance of the broad tail and the fins on the sides, the animals make their progression in the water in much the same way as a boat with oars at its sides, and a rudder at its stern: the perpendicular fins situated

on the superior part of the body keep them in equilibrio, hindering the belly from turning upwards, which it would otherwise easily do; the air-bag in the abdomen rendering that part specifically lighter than the back: but by the resistance which these fins meet with when inclined to either side, the animals are kept with the back uppermost. A more ample explanation of this particular may be found in Borelli's work *de motu animalium*.

Fishes have nothing which can properly be called a neck, since they seek their food in an horizontal direction, and can move their bodies either upwards or downwards, as they have occasion, by the contraction or dilatation of the air-bag. A long neck, as it would hinder their progression, would be very disadvantageous in the element in which they are destined to reside.

The teeth differ in the different tribes, but the generality of Fishes are unprovided with strong teeth, or such as are calculated for breaking and grinding the food, which usually consists of small fishes or other animals that need no trituration in the mouth, but spontaneously dissolve into a liquid chyle; their teeth rather serving to grasp their prey, and hinder it from escaping. For the same purpose the internal cartilaginous basis of the *bronchi* and the two round bodies situated in the posterior part of the jaws have a great number of tenter-hooks fixed into them, in such a manner as to permit any thing easily to get down, but to be prevented from returning; the superfluous water, which is necessarily received along with the food, passing between the

interstices of the bronchi and the flap which covers them. The compression of the water on the *bronchi* is of considerable use to the creature, as will afterwards appear.

The œsophagus or gullet is very short, and scarce to be distinguished from the stomach, since the food is retained almost equally in both. The stomach is of an oblong figure, and from the prey contained in it, which commonly preserves its natural form, though reduced to a gelatinous softness, it may be concluded that digestion is performed in it entirely by the dissolvent power of some peculiar menstruum, and not by any trituration.

The intestines are, in general, very short, making only three turns, the last of which terminates in a common outlet or vent, placed towards the middle of the lower part of the body. The appendicular or secondary intestines (coeca) are in these animals extremely numerous, composing a large groupe of worm-like processes, all ultimately terminating in two larger canals opening into the first intestine, into which they discharge their peculiar fluid.

The liver in Fishes is remarkably large, and commonly lies almost wholly on the left side: it contains a great proportion of oil or fat.

The spleen is placed near the back-bone, and at a place where it is subject to an alternate constriction and dilatation from the pressure of the air-bag which is situated in its neighbourhood.

The ova, in the females, are disposed into two large oblong bodies, one on each side of the abdo-

men; and the milt or soft roe, in the male, appears in a similar form in the same part.

The swimming or air-bladder is an oblong, white membranous bag, in which is contained a large quantity of elastic air: this organ lies close to the back bone near a red glandular substance, and has a strong muscular coat, by virtue of which it can occasionally contract itself, and, by condensing the contained air, cause the body to be specifically heavier than the water, so as to descend, or, by being again dilated, enable it to ascend by becoming specifically lighter, by which means the animal is enabled to swim in any height of water at pleasure* Some fishes, as the Flounder, and the whole tribe of flát-fish, are observed to be unprovided with this curious organ, and are in consequence obliged to remain always at the bottom of the waters they inhabit. From the anterior part of the bag pass out two processes or appendices, which, according to the anatomists of the French academy, terminate in the fauces: in some fishes the air-bag communicates with the œsophagus, and in others with the stomach.

The peritonæum, or membrane investing the contents of the abdomen, is thin, and of a blackish colour.

The heart is of a triangular form, with the base downwards, and the apex upwards: it consists of one auricle and one ventricle. The aorta sends out

* The complete theory of the operation of the air-bladder in fishes does not seem to have been yet explained by any physiologist.

numberless branches to the branchiæ or gills, on which it is distributed into subdivisions so small as to escape the eye, unless assisted by a glass. The blood is red, and the red particles are not round, as in the Mammalia, but oval as in the Amphibia.

The gills or branchiæ are seated beneath two large slits or openings on each side the head, and are analogous to the lungs in other animals. Their general form is semicircular, and they commonly consist of four double rows of fringed vascular fibrils attached to four bony arches. The gills are perpetually subject to alternate motion and pressure from the water: they are guarded externally by the gill-covers or opercula, constituting a pair of strong flaps on each side, and which are furnished with a lateral membrane, dilatable at pleasure by a certain number of bony radii or arches, in such a manner as to enable the animal either to open or close the gill-covers. The blood, after being thrown by the heart into the ramifications of the gills, is collected again by a vast number of small veins, somewhat in the same manner as in the Mammalia, but instead of returning to the heart again, these vessels unite and form a descending aorta without the intervention of an auricle and ventricle.

The absorbent system in Fishes is thus elaborately described by Dr. Monro, who gives the Haddock as a general example.

On the middle of the belly, immediately below the outer skin, a lymphatic vessel runs upwards from the vent, and receives branches from the sides of the belly and the fin below the vent: near the

head this lymphatic passes between the two pectoral fins, and having got above them, receives their lymphatics: it then goes under the juncture of the two bones which form the thorax, where it opens into a net-work of very large lymphatics which lie close to the pericardium, and almost surrounds the heart: this net-work, besides that part of it behind the heart, has a large lymphatic on each side, which receives others from the kidney, runs upon the bone of the thorax backwards, and when it has got as far as the middle of that bone, sends off a large branch from its inside to join the thoracic duct: after detaching this branch it is joined by the lymphatics of the thoracic fins, and soon after by a lymphatic which runs upon the side of the fish: it is formed of branches, which give it a beautiful penniform appearance. Besides these branches, there is another set lying deeper, which accompanies the ribs: after the large lymphatic has been joined by the above-mentioned vessels, it receives others from the gills, orbit, nose, and mouth: a little below the orbit another net-work appears, consisting in part of the vessels above described, and of the thoracic duct: this net-work is very complete, some of its vessels lying on each side the muscles of the gills, and from its internal part a trunk is sent out which terminates in the jugular vein.

The lacteals run on each side the mesenteric arteries, anastomosing frequently across those vessels: the receptacle into which they enter is very large in proportion to them, and consists at its lower part of two branches, one of which lies between the

duodenum and stomach, and runs a little way upon the pancreas, receiving the lymphatics of the liver, pancreas, lower part of the stomach, and the lacteals from the greatest part of the small intestines: the other branch of the receptacle receives the lymphatics from the rest of the alimentary canal. The receptacle formed by these two branches lies on the right side of the upper part of the stomach, and is joined by some lymphatics in that part, and also by some from the sound and gall-bladder, which in this fish adheres to the receptacle: the thoracic duct takes its rise from the receptacle, and lies on the right side of the œsophagus, receiving lymphatics from that part; and running up about half an inch, divides into two ducts, one of which passes over the œsophagus to the left side, and the other goes strait upon the right side, passing by the upper part of the kidney, from which it receives some small branches, and soon afterwards is joined by a branch from the large lymphatic that lies above the bone of the thorax, as formerly mentioned: near this part it likewise sends off a branch to join the duct of the opposite side; and then, a little higher, is joined by those large lymphatics from the upper part of the gills and from the fauces.

The thoracic duct, after being joined by these vessels, communicates with the net-work near the orbit, where its lymph is mixed with that of the lymphatics from the posterior part of the gills, and from the superior fins, belly, &c. and then from this net-work a vessel goes into the jugular vein just below the orbit. This last vessel, which may be

called the termination of the whole system, is very small in proportion to the net-work from which it rises; and indeed the lymphatics of the part are so large as to exceed by far the size of the sanguiferous vessels.

The thoracic duct from the left side, having passed under the œsophagus from the right, runs on the inside of the vena cava of the left side, receives a branch from its fellow of the opposite side, and joins the large lymphatics which lie on the left side of the pericardium, and a part of those which lie behind the heart, and afterwards makes, together with the lymphatics from the gills, upper fins, and side of the fish, a net-work, from which a vessel passes into the jugular vein of this side: in a word, the lymphatics of the left side agree exactly with those of the right. Another part of the system is more deeply seated, lying between the roots of the spinal processes of the back-bone. This part consists of a large trunk that begins from the lower part of the fish, and as it ascends receives branches from the dorsal fins and adjacent parts of the body: it goes up near the head, and sends a branch to each thoracic duct near its origin.

The brain in fishes is formed pretty much in the same way as in fowls; only we may observe that the posterior lobes bear a greater proportion to the anterior.

The organ of smelling is large, and the animals have a power of contracting and dilating the entry to it as they have occasion: it seems to be mostly by their acute smell that they discover their food,

for their tongue seems not to have been designed for a very nice sensation, being of a pretty firm cartilaginous substance; and common experience evinces that their sight is not of so much use to them as their smell in searching for their nourishment. If you throw a fresh worm into the water, a fish shall distinguish it at a considerable distance; and that this is not done by the eye is plain from observing that after the same worm has been a considerable time in the water, and lost its smell, no fishes will come near it; but if you take out the bait, and make several little incisions into it, so as to let out more of the odoriferous effluvia, it shall have the same effect as formerly. Now it is certain that had the animals discovered this bait with their eyes, they would have come equally to it in both cases. In consequence of their smell being the principal means they have of discovering their food, we may frequently observe them allowing themselves to be carried down with the stream, that they may ascend again leisurely against the current of the water: thus the odoriferous particles swimming in that medium, being applied more forcibly to their organs of smell, produce a stronger sensation.

The optic nerves in Fishes are not confounded with one another in their middle progress betwixt their origin and the orbit, but the one passes over the other without any communication; so that the nerve which comes from the left side of the brain goes distinctly to the right eye, and vice versa. Indeed it should seem not to be necessary for the optic nerves of fishes to have the same kind of con-

nection with each other as those of man have; for their eyes are not placed in the fore-part, but in the sides of the head; and consequently cannot look so conveniently at any object with both eyes at the same time.

The crystalline lens in Fishes is a complete sphere, and more dense than in terrestrial animals, that the rays of light coming from the water might be sufficiently refracted.

As Fishes are continually exposed to injuries in the uncertain element in which they reside, and as they are in perpetual danger of becoming a prey to the larger ones, it was necessary that their eyes should never be shut; and as the cornea is sufficiently washed by the element they live in, they are not provided with palpebræ: but, as in the current itself the eye must be exposed to several injuries, there was a necessity that it should be sufficiently defended; which, in effect, it is, by a firm, pellucid membrane, seeming to be a continuation of the cuticula stretched over it: the epidermis is very proper for this purpose, as being insensible, and destitute of vessels, and consequently not liable to obstructions, and thus becoming opake. In the eye of the skate tribe there is a digitated curtain which hangs over the pupil, and which may shut out the light when the animal rests, being somewhat similar to the tunica adnata of other animals.

Although it was formerly much doubted whether Fishes possessed the sense of hearing, yet there can be little doubt of it now; since it is found that they have a complete organ of hearing as well as other

animals, and likewise that the water in which they live is proved to be a good medium. Fishes, particularly of the skate kind, have a bag at some distance behind the eyes, which contains a fluid, and a soft cretaceous substance, and supplies the place of the vestibule and cochlea: there is a nerve distributed upon it, similar to the portio mollis in man: they have semicircular canals, which are filled with a fluid, and communicate with the bag: they have likewise a meatus externus, which leads to the internal ear. The cod-fish and others of the same shape, have an organ of hearing somewhat similar to the former, but instead of a soft substance contained in the bag, there is a hard cretaceous stone.

The cuticle in Fishes is strong and thick, and is defended by an armature of scales, closely laid over each other: the generality of Fishes have a particular line or series of small ducts running along each side of the body, and discharging a soft mucus or slimy substance, serving to lubricate the surface of the body.

The fins of Fishes are named from their situation on the animal, viz. *dorsal* or back-fin, *pectoral* or breast-fins, *ventral* or belly-fins, *anal* or vent-fin, and *caudal* or tail-fin.

The *ventral* fins are considered by Linnæus as analogous to the feet in quadrupeds, and it is from the situation, presence, or absence of these fins that the Linnæan orders of Fishes are instituted.

Such as are entirely destitute of ventral fins are termed *Pisces apodes*, being, as it were, apodal or footless Fishes. Those which have the ventral fins

placed more forward than the *pectoral* or breast-fins are termed *Jugulares* or Jugular Fishes. Those which have the ventral fins situated immediately under the pectoral ones are termed *Pisces thoracici*, or thoracic Fishes; while those which have the ventral fins situated behind or beyond the pectoral fins are termed *Pisces abdominales* or abdominal Fishes.

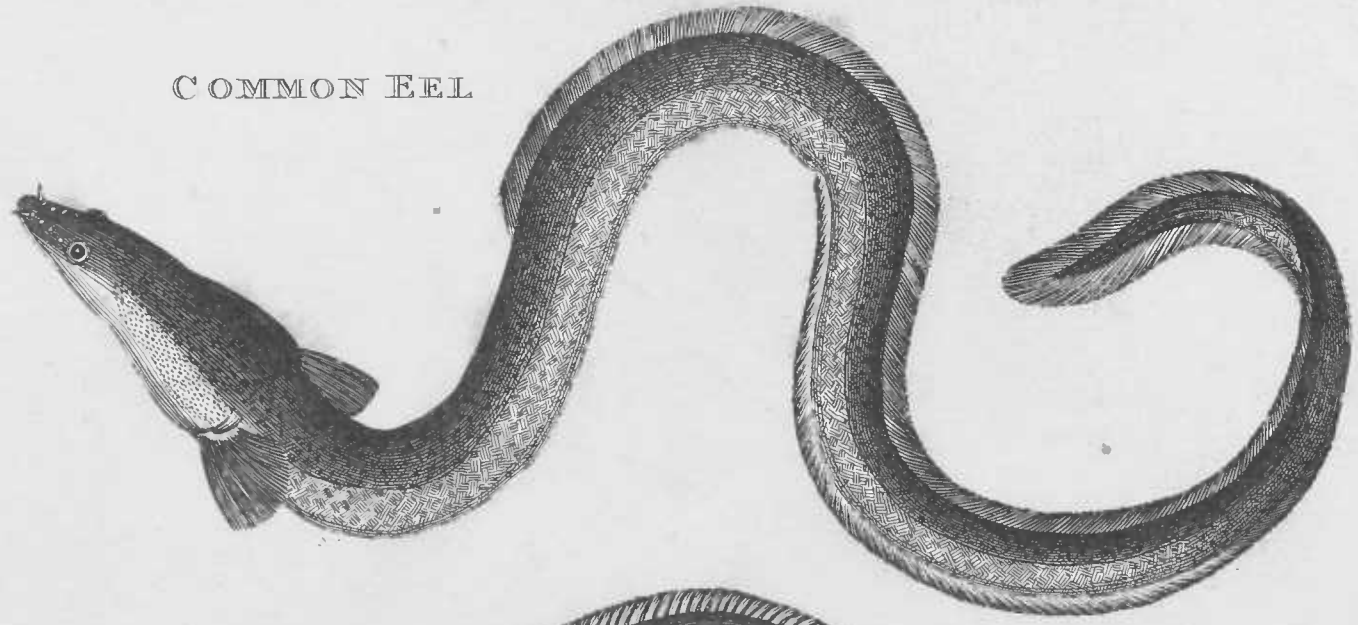
There still remains a particular tribe called Cartilaginous Fishes, *Pisces Cartilaginei*. This tribe was by Linnæus separated from the rest, and placed in the class Amphibia, where it constituted the order *Nantes*.

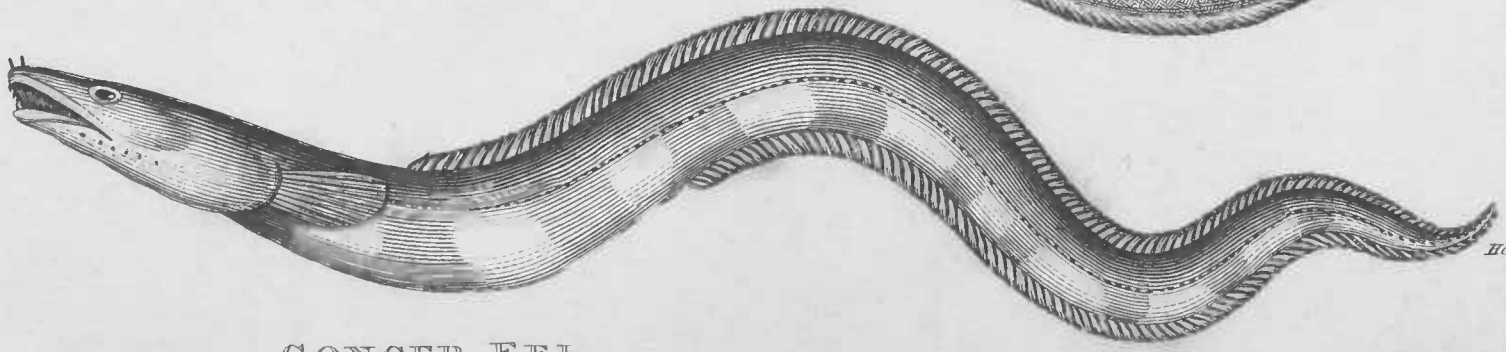
This particular distribution of the cartilaginous Fishes was made on a supposition of their being furnished both with lungs and gills; an idea which seemed confirmed by the observations of Dr. Garden of South Carolina, who, at the request of Linnæus, examined the organs of the genus *Diodon*, and found, as he conceived, both external branchiæ or gills, and internal lungs* This idea however has

* Branchiæ horum (*Nantium*) pectinatæ ut Piscium, sed adnatæ vasi arcuato cylindrico tubuloso, absque radio osseo, nec piscium similes, nisi externa figura; Branchiostegorum piscium propria structura, eorum larvæ singulares, foetus fere extra ovum, defectus pinnarum ventralium mihi persuasere literis, a D. D. Garden iu America habitante, petere, vellet dissecare Diodontis respirationis organa et inquirere numne pulmones haberent: stupefactus ipse dissecuit pisces, reperitque et branchias externas, et pulmones internos, quos descriptos et conservatos remisit, unde constitit eos annumerandos Nantibus.—*Lin. Syst. Nat. p.* 348.

been shewn by later physiologists to have been not strictly correct; the supposed lungs being in reality only a peculiar modification of gills. The cartilaginous fishes, as their name imports, differ from others in having a cartilaginous instead of a bony skeleton.

COMMON EEL





Heath sculp.

CONGER EEL

1803 July 1. London Publish'd by G. Kearsley Fleet Street.

FISHES.

ORDER

APODES.

ANGUILLA. EEL.

Generic Character.

Caput læve.	*Head* smooth.
Nares tubulosæ.	*Nostrils* tubular.
Oculi cute communi tecti.	*Eyes* covered by the common skin.
Membrana branchiostega radiis decem.	*Gill-Membrane* ten-rayed.
Corpus teretiusculum, lubricum.	*Body* roundish, smooth, mucous.
Pinna caudæ coadunata dorsali analique.	*Dorsal*, *caudal*, and *anal* fins united.
Spiracula pone caput vel pinnas pectorales.	*Spiracles* behind the head or pectoral fins.

COMMON EEL.

Anguilla Vulgaris. *A. olivaceo-fusca subtus subargentea, maxilla inferiore longiore.*

Olive-brown Eel, subargenteous beneath, with the lower jaw longer than the upper.

Muræna Anguilla. *M. maxilla inferiore longiore, corpore unicolore. Lin. Syst. Nat. p.* 426.

Muræna corpore immaculato, maxilla inferiore sublongiore. *Bloch.*

The common Eel.

THE Eel, which, in a natural arrangement of the animal world, may be considered as in some degree connecting the fish and serpent tribes, is a native of almost all the waters of the ancient continent, frequenting not only rivers but stagnant waters, and occasionally salt marshes and lakes: it is even found in the spring season in the Baltic and other seas. As a species it is distinguished by its uniform colours, but more particularly by the peculiar elongation of the lower jaw, which advances to some distance beyond the upper: the head is small, and pointed; the nostrils small and cylindric; and at a very small distance from each eye are a kind of additional pair, of a lengthened shape, but not cylindric: the eyes are small, round, and covered by a transparent skin united with the common integument of the body: the opening of the mouth is small, and both jaws and palate are beset with several ranges of small sharp teeth: on each side both of the upper and under jaw are observed several minute pores, through which exsudes a viscid mucus: the orifices of the gills are very small, of a lunated shape, and are seated close to the pectoral fins, which are small and of an ovate shape; the

back-fin commences at some distance beyond the head, and is continued into the tail-fin, which is also united with the vent-fin; the latter being continued as far as the vent, which is situated near the middle of the belly. The general colour of the Eel is olive-brown on the back, and silvery on the sides and beneath: the fins are slightly tinged with violet, and sometimes margined with pale red: the Eel is however occasionally seen of a very dark colour, with scarce any silvery tinge, and sometimes yellowish, or greenish: those are observed to be most beautiful which inhabit the clearest waters. The skin of the Eel is proverbially slippery, being furnished with a large proportion of mucus: it is also furnished with small, deeply-imbedded scales, which are not easily visible in the living animal, but are very conspicuous in the dried skin: their form is a long oval, their colour white, and their texture finely reticular: these scales appear to have been first observed, or at least described, by the celebrated Leewenhoek, who has figured them with great accuracy and elegance. The Eel is extremely tenacious of life, and may be kept many hours, or even days, out of water, provided it be placed in a cool situation: it is even affirmed that it voluntarily leaves the water at certain periods, and wanders about meadows and moist grounds in quest of particular food, as snails &c. it is also said to be fond of new-sown peas, which it has been observed to root out of the ground and devour during the night. If we may credit Albertus magnus, it has been known, during very severe frosts, to take refuge in adjoining hay-ricks:

several having been discovered coiled together in such situations. The usual food of the Eel consists of water insects, worms, and the spawn or eggs of other fishes: it will also devour almost any decayed animal substance which it happens occasionally to find in its native waters. The Eel is viviparous; producing its numerous young during the decline of summer: these at their first exclusion are very small. The errors of the ancients on this subject, and even of some modern writers, are too absurd to be seriously mentioned in the present enlightened period of science: it appears however that both eggs and ready-formed young are occasionally observed in the same individuals, as is known to be the case also with several other animals. It is pretended by several authors that the Eel cannot bear the water of the Danube, and is therefore never found in that river; but Dr. Bloch assures us that this is not strictly true; though it is but rarely found either in that river or the Volga.

During the day the Eel commonly lies concealed in its hole, which it forms pretty deep beneath the banks, and which is furnished with two outlets, in order to facilitate its escape if disturbed. During the winter it chiefly conceals itself beneath the mud, and in spring-time commences its excursions into rivers, &c. In some parts of Europe the Eel-fishery is of surprising magnitude. We are informed by Dr. Bloch that in some places near the mouths of the Baltic so great a quantity are taken that they cannot be used fresh, but are smoked and salted for sale, and conveyed by waggon-loads into Saxony,

Silesia, &c. In Jutland it is said that 2000 have been taken at a single sweep of the net. In the Garonne 60,000 are said to have been taken in one day by a single net. As a food the Eel is by the general run of medical writers rather condemned than recommended: it appears however to be highly nutritious, and is probably only hurtful when taken to excess*

The general size of the Eel is from two to three feet, but it is sometimes said, though very rarely, to attain to the length of six feet and to the weight of twenty pounds. It is a fish of slow growth, and is supposed to live to a very considerable age.

* That well-known old Manual the *Schola Saleraitana* declares the eating of eels to be hurtful to the throat.

† *Faucibus anguillæ pravæ sunt si comedantur:*
Qui physicam non ignorant hoc testificantur.

Which, (to reduce the translation to the same standard with the original), might be thus rendered.

Eating of eels is hurtful to the throat:
So say physicians of no common note.

† In many editions *vocibus.*

CONGER EEL.

Anguilla Conger. *A. fusca, subtus subargentea, linea laterali albo-punctata.*
Brown Eel, silvery beneath, with the lateral line speckled with white.
Muræna Anguilla. *M. maxilla inferiore longiore, corpore unicolore. Lin. Syst. Nat. p.* 426.
M. rostro tentaculis duobus, linea laterali ex punctis albida. Lin. Syst. Nat. Gmel. p. 1135.
Conger. *Will. ichth. p.* 111. *t. G.* 6.

THE Conger is so nearly allied in general appearance to the common eel that it might at first view be considered as the same species: it is however in general of a darker colour on the upper part, and of a brighter or more silvery tinge beneath; the whiteness on the sides being sometimes disposed into a kind of large beds or patches: the upper jaw is rather longer than the lower, and the lateral line is broad and whitish; being marked by a row of small white specks: the size of the Conger is also, when full grown, far superior to that of the common eel. This fish is an inhabitant of the Mediterranean and the Northern seas, as well as of those surrounding some of the American islands. It seems however to arrive at a larger size in the Mediterranean than elesewhere; specimens being sometimes taken of the length of ten feet, and of the weight of more than 100 pounds.

The Conger is only an occasional visitant of fresh waters, residing generally in the sea. In the winter

it is supposed to imbed itself under the soft mud, and to lie in an inactive state; but on the approach of spring it emerges from its concealment and visits the mouths of rivers. In the mouth of the Severn incredible quantities of young Congers are annually taken during the month of April under the name of Elvers: these are taken in a kind of sieve made of hair-cloth and fixed to the end of a long pole: the fisherman standing on the edge of the water during the tide puts in his net as far as he can reach, and drawing it out again takes multitudes at every sweep, and will take as many during one tide as will fill a bushel: they are dressed and reckoned very delicate.

The Conger in its full-grown state is also considered as a useful article of food in many parts of Europe, where it forms an article of commerce. Great numbers are taken on the coast of Cornwall, and are exported into Spain and Portugal, particularly to Barcelona: some are taken by a single hook and line, but because that method is tedious, and does not answer the expence of time and labour, they are chiefly caught by *bulters*, which are strong lines, five hundred feet long, with about sixty hooks, each eight feet asunder, baited with pilchards or mackrel: the bulters are sunk to the ground by a stone fastened to them, and sometimes such a number of these are tied together as to reach a mile: the fishermen are said to be very fearful of a large Conger, lest it should endanger their legs by clinging round them: they therefore kill them as soon as possible, which is said to be best done by striking

them on the belly: they are then slit and hung on a frame to dry in order to drain away the oil or fat which is extremely plentiful, insomuch that a Conger of a hundred weight is said to waste to twenty pounds during the process.

The Conger is a very voracious animal, preying on the smaller fishes, as well as on various kinds of crustacea, and particularly on the smaller kind of crabs during their soft state after having cast their shell.

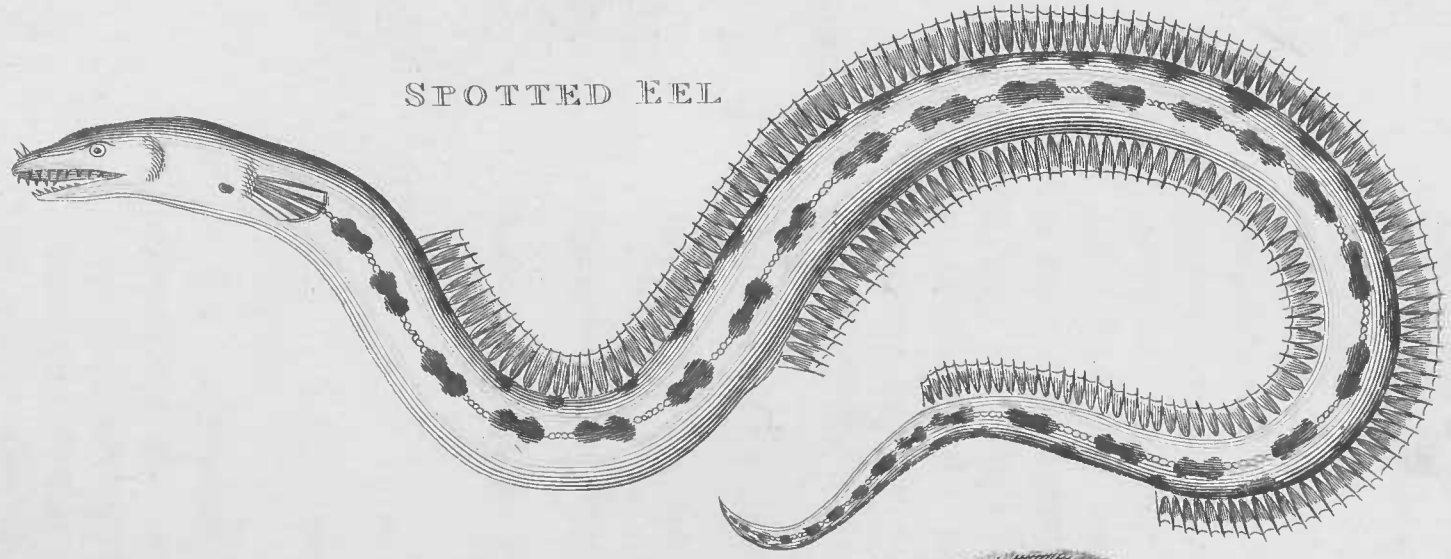
SPOTTED EEL.

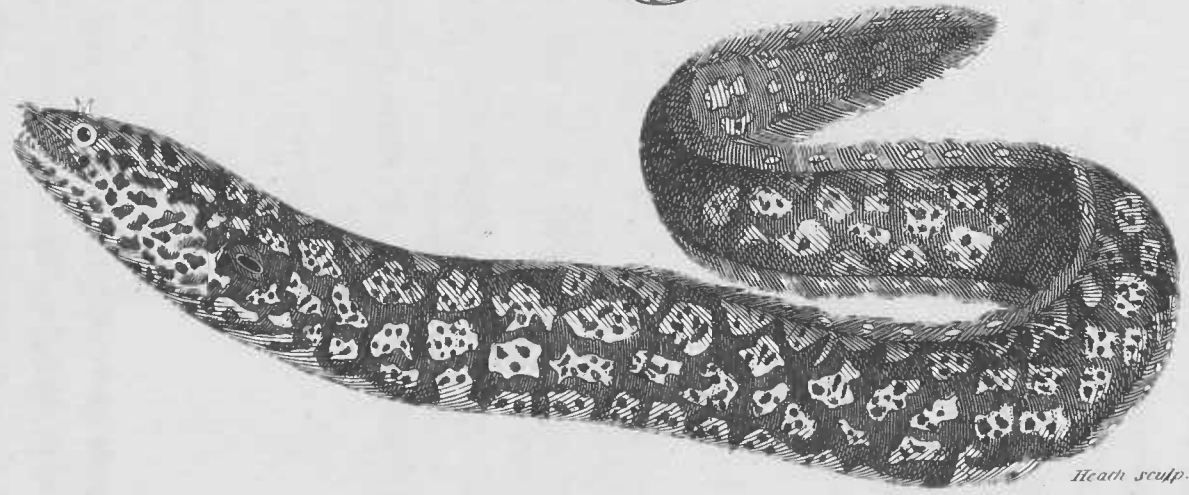
Anguilla Ophis. *A. alba, fusco maculata, cauda aptera.*
White Eel, spotted with brown, with finless tail.
Muræna Ophis. *M. cauda aptera cuspidata, cauda tereti. Lin. Syst. Nat. p.* 425.
Muræna maculata cauda aptera. *Bloch.* 5. *p.* 31. *t.* 164.
Serpens marinus maculosus. *Will. append. p.* 19. *t. G.* 9.

This species is readily distinguished from both the preceding by its remarkable colours, as well as by the more slender form of the body in proportion to its length: the fins are also much wider, and the tail is naked towards the tip; both dorsal and caudal fins terminating at some distance from that part: the whole body is of a silvery white colour, marked on the back and sides by a triple row of large dark-brown oblong spots or patches: the head is rather slender; the eyes of moderate size; the mouth wide, the teeth strong and slightly curved, and the pectoral

2.

SPOTTED EEL





Heath sculp.

ROMAN MURÆNA

1803 July 1. London Publish'd by G Kearsley Fleet Street.

fins small and white. This fish is chiefly found in the Indian seas, but is said to have been occasionally met with in the Mediterranean, &c. It is of the same predacious nature with the rest of this genus, and is said to arrive at a very considerable size, though the specimens usually brought into Europe seldom exceed two or three feet in length.

SNAKE EEL.

Anguilla Serpens. *A. albida rostro elongato, cauda aptera acuta, corpore tereti.*

Whitish Eel, with lengthened snout, finless sharp-pointed tail, and round body.

M. Ophis. *M. cauda aptera cuspidata, corpore tereti. Lin. Syst. Nat. p.* 425.

Serpens marinus. *Salvian? Gesn? Aldr? Will? t. G.* 4.

This species, which is of the same general form with the preceding, is a native of the Mediterranean and northern seas, where it often arrives at a very considerable size, and is commonly known by the title of sea-serpent or snake: the head is long and slender, and the gape very wide: the teeth very sharp, those in the front of the mouth being longer than those on the sides: the general colour of the animal is a very pale yellowish brown above, and bluish white beneath: the dorsal and anal fins are shallow, tinged with black toward the edges, and terminate at some little distance before the tip of the tail, which is not of a compressed

form, but round and sharp-pointed: the pectoral fins are small, oval, and furnished with sixteen rays. The habits of this species resemble those of the preceding, and it is said to swim with great vigour and activity. It seems to have given rise to the fabulous narratives recorded by some authors of the vast sea-serpents supposed to be sometimes seen in various parts of the northern ocean.

RONDELETIAN EEL.

Anguilla Myrus. *A. nigricans, rostro elongato.*
Dusky Eel, with elongated snout.
Muræna Myrus. *M. pinna ambiente alba, margine nigro. Lin. Syt. Nat. p.* 427.
M. rostro acuto lituris albis vario, margine pinnæ dorsalis nigro. *Arted. gen.* 24. *syn.* 40.
Myrus Rondeletii. ? *Gesn. Aldr. Will. p.* 109.

If the Muræna Myrus of Linnæus be the Myrus of Rondeletius, it is thus described by that author. It bears a greater general resemblance to a serpent than to an eel; having a long sharp snout, and a thin, round, blackish body, without either spots or scales: it has one branchial orifice on each side, and is furnished with two shallow fins of a skinny substance; one running from the neck to the tail, and the other from the vent to the same part; the border of both being black, as in the Conger: the sides, from the beginning of the neck, are marked with certain yellow specks, more apparent in the

living than in the dead animal: the flesh is tender, and has few or no spines. Linnæus observes that the head is attenuated in front, and that there are two short tentacula on the upper lip. This animal is a native of the Mediterranean, and a supposed variety, entirely of an ash-colour, is mentioned by Forskal as a native of the Red Sea.

MURÆNA. MURÆNA.

Generic Character.

Corpus anguilliforme.	*Body* eel-shaped.
Pinnæ pectorales nullæ.	*Pectoral* fins none.
Spiraculum utrinque ad latera colli.	*Spiracle* on each side the neck.

ROMAN MURÆNA.

Muræna Romana. *M. olivaceo-fusca, flavo variata.*
Olive-brown Muræna with yellow variegations.
Muræna Helena. *M. pinnis pectoralibus nullis. Lin. Syst. Nat. p.* 425.
Gymnothorax Muræna. *Bloch. ichth.* 12. *p.* 67. *& Muræna Helena.* 5. *p.* 28. *t.* 153.
Muræna omnium autorum. *Will. ichth. p.* 103. *t. G.* 1.

THIS fish, the celebrated favourite of the ancient Romans, who considered it as one of the most luxurious articles of the table, is found in considerable plenty about several of the Mediterranean coasts, where it arrives at a size at least equal, if not superior, to that of an eel. Its colour is a dusky greenish brown, pretty thickly variegated on all parts with dull yellow subangular marks or patches, which are disposed in a somewhat different manner in different individuals, and are generally scattered over with smaller specklings of brown; the whole

forming a kind of obscurely reticular pattern, as expressed in the annexed engraving: the head is rather small; the mouth moderately wide, and the teeth sharp: the dorsal and caudal fins, which are shallow, and covered by the common skin, are united, in the same manner as in the eel, and are of a dusky colour with whitish spots. The Muræna is capable of living with equal facility both in fresh and salt water, though principally found at sea. In its manners it much resembles the eel and the conger, being extremely voracious, and preying on a variety of smaller animals. The ancients, who kept it in reservoirs appropriated for the purpose, are said to have sometimes tamed it to such a degree as to come at the signal of its master in order to receive its food. Pliny records a most disgusting and barbarous instance of tyranny practised by one Vedius Pollio, who was in the habit of causing his offending slaves to be thrown into the reservoirs in which he kept his Murænæ; expressing a savage delight in thus being able to taste in an improved state their altered remains. The emperor Augustus, according to Seneca, honoured this man with his presence at one of his entertainments; when a slave happening to break a valuable chrystal vase, was immediately ordered to be thrown to the Murænæ; but the poor boy, flying to the feet of Augustus, requested rather to die any death than thus to be made the food of fishes. The emperor, being informed of this extraordinary mode of punishment, immediately ordered all the chrystal vessels in the house to be broken before his face, and the

ponds of the barbarous owner to be completely filled up; at the same time giving the slave his freedom, and sparing the life of the offender in consideration of former friendship.

SPOTTED MURÆNA.

Muræna Guttata. *M. glauca, guttis nigris, macula majori utrinque prope caput. Forsk. F. Arab. p.* 22. *No.* 1. *Lin. Syst. Nat. Gmel. p.* 1135.

Glaucous Muræna, bedropped with black, with a larger spot on each side near the head.

Observed by Forskal: native of the Red Sea: has a rising callus between the eyes, gold-coloured irides, upper lip shorter than the lower, and the dorsal and anal fins united at the tail.

CHAIN-STRIPED MURÆNA.

Muræna Catenata. *M. fusca maculis catenatis albis transversim fasciata.*

Brown Muræna, transversely fasciated with white chain-shaped spots.

Gymnothorax catenatus. *Bloch.* 12. *p.* 69. *t.* 415. *f.* 1.

Muræna seu Conger Brasiliensis. *Seb. mus.* 2. *t.* 69. *f.* 4.

This species, of which the individuals hitherto described appear to be of the size of a smallish eel, is of a brown colour, crossed by large chain-like

3.

CHAIN-STRIPED MURÆNA

Heath sculp.

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white bands, somewhat irregular in their form on different parts of the animal, and marked by numerous brown spots and freckles: the head and orifice of the mouth are small, and the jaws armed with numerous close-set small and sharp teeth: the tongue connate with the palate: the eyes small and blue: the nostrils small, simple, and placed very near the eyes: the snout furnished at the tip with two very small setaceous cirri or beards: the branchial orifices are very small: the lateral line scarce perceptible: the dorsal fin commences at a considerable distance from the head, and is continued round the tail where it meets the anal fin. This fish is a native of Surinam.

RETICULATED MURÆNA.

Muræna Reticulata. *M. albida, fasciis transversis fuscis, lateribus corporis fusco reticulatis, pinna dorsali longitudine trunci.*

Whitish Muræna, with transverse brown bands; the sides of the body reticulated with brown, and the dorsal fin as long as the body.

Gymnothorax reticularis. *Bloch.* 12. *p.* 71. *t.* 416.

In size and general form this resembles the preceding species, but differs in colours and in the disposition of the dorsal fin, which commences immediately at the back of the head, and is continued round the tail where it unites with the vent-fin: the head and mouth are small; the eyes rather large, and situated very near the upper lip: the jaws are

edged with sharp, distant teeth, of which those in front are longer than the rest: the colour of the animal is white, with a slight tinge of yellow, and marked throughout by transverse brown bands, continued across the fins: on the sides of the body the appearance of the bands is indistinct, on account of the numerous reticularly disposed variegations of light brown with which those parts are covered. Native of the Indian seas.

AFRICAN MURÆNA.

Muræna Africana. *M. fusca, albido marmorata, pinna dorsali longitudine trunci.*

Brown Muræna marbled with whitish variegations; the dorsal fin the length of the body.

Gymnothorax afer. *Bloch.* 12. *p.* 73. *t.* 417.

The colour of this species is brown, irregularly marbled with pale or whitish variegations in such a manner as to bear some resemblance to those of the common or Roman Muræna; these variegations are continued on the fins which are moderately broad in proportion to the body: the dorsal fin begins immediately behind the head, and is continued round the tail where it meets the vent-fin, as in others of this genus: the head is of moderate size; the eyes large; the mouth very wide, and armed with sharp, distant teeth, those in front exceeding the rest in size: in the palate are also situated three or four large teeth in a longitudinal

direction. This species is a native of the African seas, being found near the coasts of Guinea, where, though known to be a good food, it is not eaten by the negroes, who consider it as a kind of sea snake.

ZEBRA MURÆNA.

Muræna Zebra. *M. atro-fusca, fasciis transversis linearibus distantibus albis, subtus irregulariter concurrentibus.*

Blackish-brown finless Muræna, with transverse, linear, distant, white bands, meeting irregularly beneath.

Zebra Gymnothorax. *Naturalist's Miscellany. pl.* 322.

Serpens marina Surinamensis fœmina Murænis valde affinis. *Seb.* 3. *t.* 70. *f.* 3.

This species, which grows to the length of two or three feet, is a native of the American seas, and is readily distinguished by the strongly marked distribution of its colours; the rich brown, which constitutes the ground-colour, being surrounded, at considerable distance, by narrow, white bands, which on the lower part of the sides and under the abdomen unite or anastomose here and there, so as to form subtriangular markings in some parts and rounded or ocellated ones in others: the head is rather large or tumid, and the mouth and eyes small: there is no distinct appearance either of dorsal or caudal fins. This animal seems to have been first described by Seba. A beautiful specimen occurs in the Museum of Mr. John Hunter.

SOUTHERN MURÆNA.

Muræna Echidna. *M. fusca, nigro variegata, capite depresso, collo turgidissimo.*
Brown Muræna, with black variegations, depressed head, and very turgid neck.
Muræna Echidna. *M. pinnis pectoralibus nullis, capite depresso, corpore fusco nigroque vario, statim pone caput turgidissimo. Lin. Syst. Nat. Gmel. p.* 1135.

NATIVE of the Southern ocean: grows to a large size, measuring from four to five feet in length and being of a very considerable thickness: the head is small and depressed, but the neck immediately beyond the occiput swells into a very large size, and again diminishes at the commencement of the body: the eyes are small; the mouth wide, and furnished with numerous sharp teeth. The flesh is said to be excellent, but the animal has a peculiarly forbidding appearance on account of its colours and form.

SPECKLED MURÆNA.

Muræna Meleagris. *M. nigricans, maculis creberrimis albis irrorata.*
Blackish Muræna, very thickly speckled with white.
Muræna Meleagris. *Speckled Eel. Nat. Miscell. pl.* 220.

DESCRIBED from a specimen in the British Museum. Length about two feet: colour deep-brown,

very thickly beset on all parts with innumerable small round white spots, which are somewhat less regular or more confluent on the head and breast than elsewhere: eyes small; mouth wide; teeth sharp and numerous. Native of the Southern ocean.

COLUBRINE MURÆNA.

Muræna Colubrina. *M. corpore fasciis annulatis alternatim flavis nigrisque variegato.*
Muræna with the body variegated by alternate yellow and black bands.
Muræna Colubrina. *Lin. Syst. Nat. Gmel. p.* 1133.

Length about two feet: habit long and slender: colour pale, or yellowish-white: marked throughout by numerous equidistant widish bands of black or brown, passing through the fins: body said to be covered with very small scales: snout sharp-pointed; eyes very small. Native of the Indian seas.

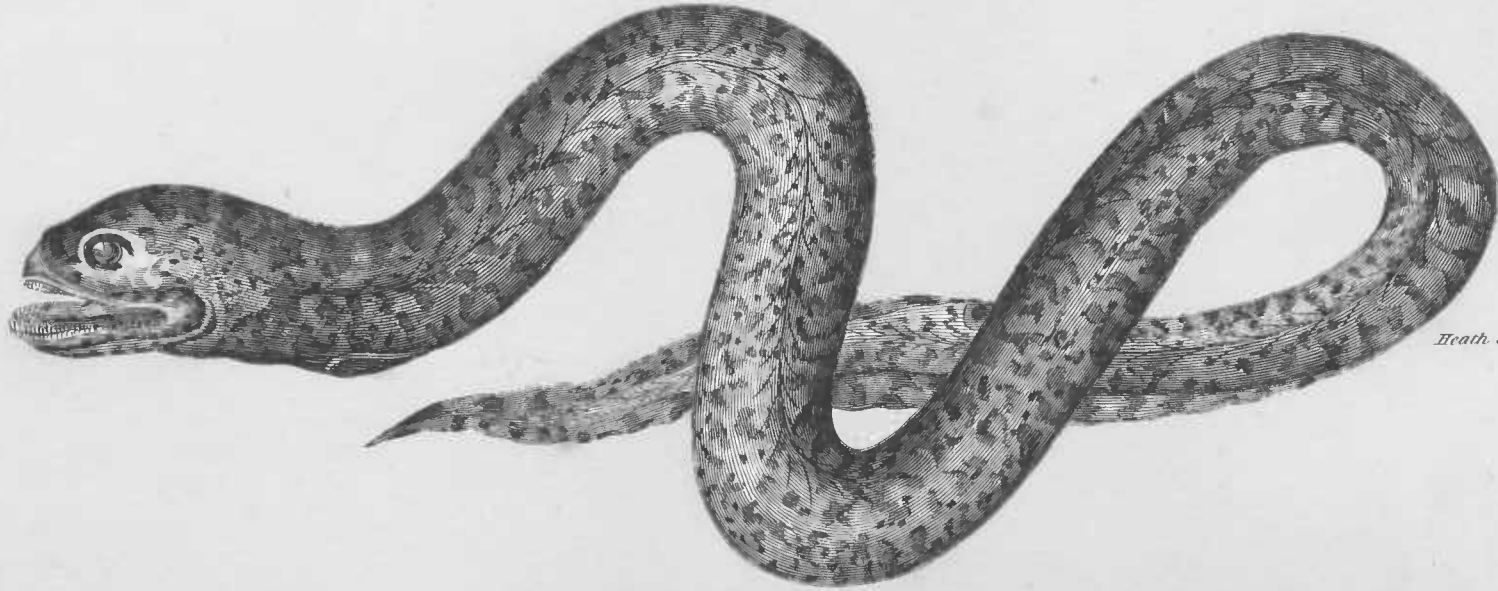
GREEN MURÆNA.

Muræna Viridis. *M. viridis, maculis creberrimis rufo-fuscis.*
Grass-green Muræna, with very numerous rufous-brown spots.
Serpens Marinus Americanus, &c. *Seb.* 3. *t.* 70. *f.* 2.

This, which is sufficiently described as to its general appearance by the specific character an-

nexed, is considered by Seba as a kind of marine snake, and is represented with a bifid or serpentine tongue; but this is probably an error of the engraver; the whole habit shewing it to be either of this genus or the following one.

MARBLED SYNBRANCHUS



Heath sculp.

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SYNBRANCHUS. SYNBRANCHUS.

Generic Character.

Corpus anguilliforme.	*Body* eel-shaped.
Pinnæ pectorales nullæ.	*Pectoral fins* none.
Spiraculum unicum sub collo.	*Spiracle* single, beneath the neck.

THIS genus differs from the preceding merely in the circumstance of the spiracle or branchial orifice being single, and situated beneath the throat.

MARBLED SYNBRANCHUS.

Synbranchus Marmoratus. *S. olivaceo-fuscus, maculis nigricantibus variatus, corpore subtus flavescente.*

Olive-brown Synbranchus, marbled with blackish spots; the body yellowish beneath.

Synbranchus marmoratus. *Bloch.* 12. *p.* 75. *t.* 418.

THE general appearance of the animal is that of a Muræna: its length about two feet and a half: head large, short, and thick: mouth moderately wide, and furnished with several rows of small conical teeth: tongue connate: lips fleshy: nostrils simple, seated near the eyes, which are blue: the

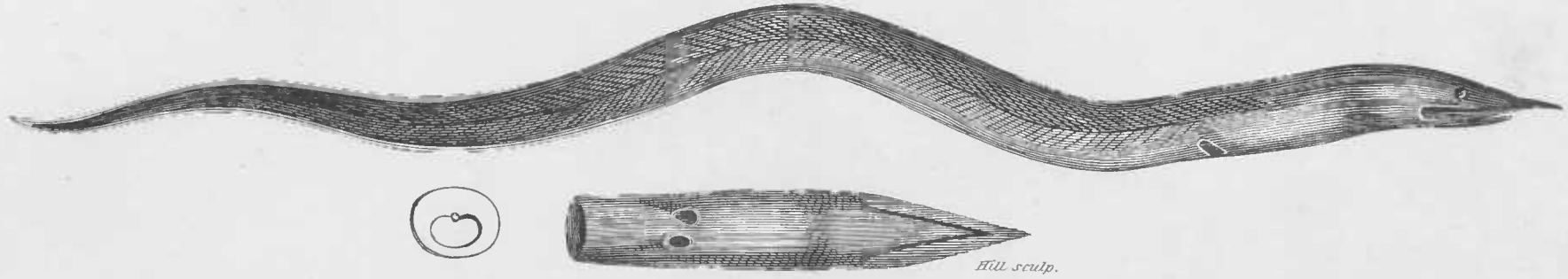
skin of the body is thick and loose: the back is of a deep olive-colour with dusky spots: the belly and sides are of a yellowish cast, and the spots on those parts have a tinge of violet: the dorsal, or rather caudal fin, is extremely remote from the head, and surrounding the tail unites with the vent-fin; the vent being situated at the distance of some inches from the end of the tail, which terminates acutely. Native of the fresh waters of Surinam.

PLAIN SYNBRANCHUS.

Synbranchus Immaculatus. *S. fuscus immaculatus.*
Synbranchus of a plain unvariegated brown colour.
Synbranchus immaculatus. *Bloch.* 12. *p.* 77. *t.* 419. *f.* 1.

This is much allied in general form to the preceding, but is considerably smaller, and very different in colour, being nearly of an uniform brown throughout, with the exception of a few very obscure subtransverse dusky shades across the body, and a few whitish marblings on the fins: like the former species it is a native of Surinam.

ROSTRATED SPHAGEBRANCHUS



Hill sculp.

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SPHAGEBRANCHUS. SPHAGEBRANCHUS.

Generic Character.

Corpus anguilliforme.	*Body* eel-shaped.
Pinnæ pectorales nullæ.	*Pectoral fins* none.
Spiracula duo sub collo.	*Spiracles* two, beneath the neck.

ROSTRATED SPHAGEBRANCHUS.

Sphagebranchus rostratus. *S. capite rostrato. Bloch.* 12. *p.* 79. *t.* 419. *f.* 2.

Sphagebranchus with the upper lip produced into a snout.

Muræna cœca. *M. apterygia, rostro acutiusculo. Lin. Syst. Nat. p.* 426.

THIS genus, which resembles the preceding, except in the circumstance of a double instead of a single branchial aperture beneath the neck, consists at present of a single species only. The specimen mentioned by Dr. Bloch, who appears to have been its first describer, measured about nine inches, and was supposed to be still in a young state: it is represented in its natural size on the annexed plate, and was of a cylindric form, destitute both of fins and scales: the upper jaw was considerably longer than the lower, being produced into a sharpened snout: the eyes were small; the teeth numerous, and the two spiracles or branchial orifices were situated at

about the distance of an inch beyond the mouth, immediately beneath the neck or fore-part of the body: the colour of the whole animal was a pale brown. It was received from Tranquebar.

The *Muræna coeca* of Linnæus, from the slight description given in the Systema Naturæ, seems so nearly allied to the above animal, that there is some reason for supposing it to be in reality the same*

* Corpus Anguillæ, absque omni pinna: caput in medio 7, anterius 8, ad occiput 7 punctis perforatum: mandibulæ acuminatæ, dentibus acerosis: sub rostro nares tubulosæ: sub collo aperturæ branchiarum: anus propior capiti quam caudæ.

E. Brander. *Lin. Syst. Nat. Gmel. p.* 1135.

MONOPTERUS. MONOPTERE.

Generic Character.

Corpus anguilliforme.	*Body* anguilliform.
Nares inter oculos.	*Nostrils* placed between the eyes.
Pinna caudalis.	*Fin* caudal.

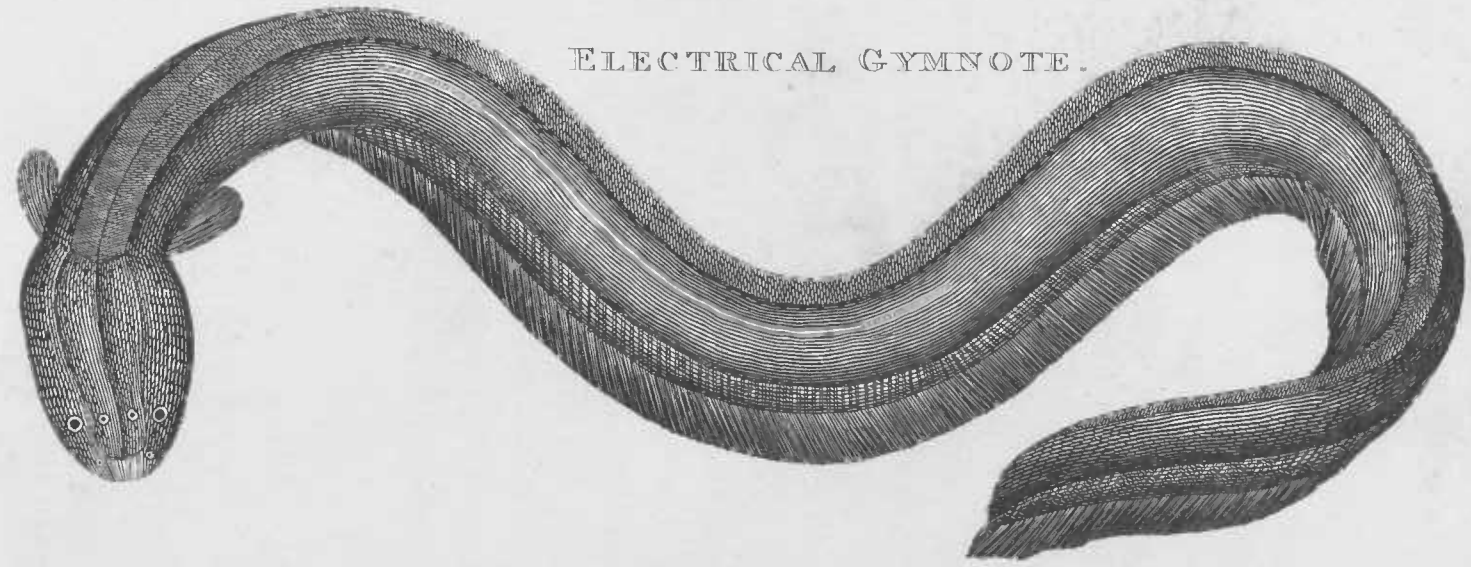
JAVAN MONOPTERE.

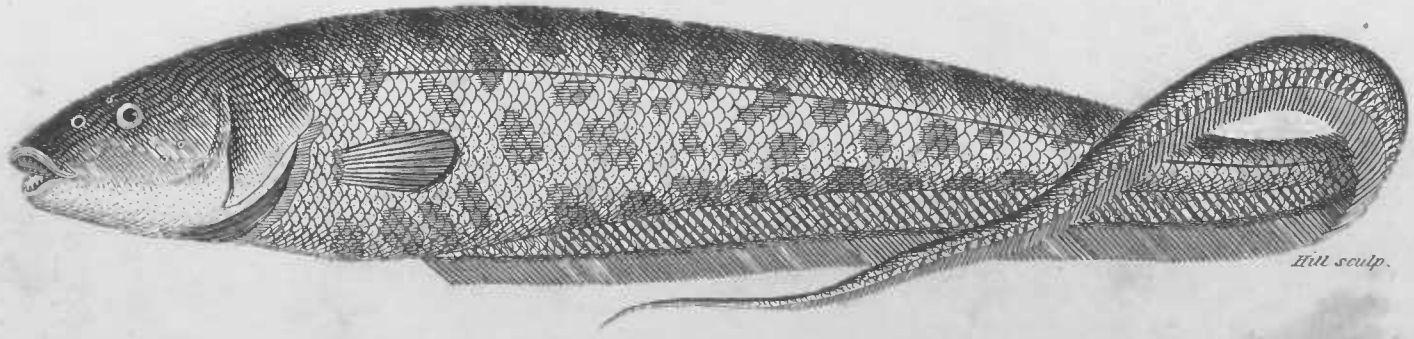
Monopterus Javanicus. *M. nigricans, cauda peracuta.*
Monopterus with very sharp-pointed tail.
Le Monoptère Javanois. *Cepede pisc.* 2. *p.* 139.

THE Monopterus Javanicus, the only animal of this genus hitherto discovered, is thus described by the Count de la Cepede, from the manuscripts of Commerson, by whom it was considered as a species of Muræna. The body is serpentiform, viscous, and destitute of conspicuous scales: the head thick, compressed, enlarging towards the back part, and terminated in front by a rounded muzzle: the gape is rather wide; the upper jaw scarce projecting beyond the lower; both being furnished with short close teeth, like those of a file: a row of similar teeth is also situated in the inside of the mouth around the palate: the base of the tongue, which is

cartilaginous, and hollowed above into a channel, is furnished with two whitish tubercles: the openings of the nostrils are not tubular, nor are they situated, as in most fishes, before the eyes, but above them: the gill-covers are soft and flaccid, appearing like a duplicature of the skin: the gill-membrane has only three rays, and the branchiæ are only three in number on each side: the bony arches which support them are but little bowed, and have no denticulated appearance or asperity: the caudal fin has no perceptible rays, and the tail itself being very compressed, resembles the shape of a two-edged sword-blade: the lateral line, which is nearer the back than the belly, extends from the gills to the extremity of the tail, and is almost of a gold-colour: the back is of a livid brown or blackish, and the sides have a similar tinge, with small transverse ferruginous bands: the belly is also of this colour: the general length of the animal is about seven decimetres; the circumference, in the thickest part of the body, one decimetre; and the weight more than a hectogramme. This fish is a native of the Indian seas, and is very common about the coasts of Java, where it is considered as an excellent food.

ELECTRICAL GYMNOTE.





Hill sculp.

CARAPO GYMNOTE

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GYMNOTUS. GYMNOTE.

Generic Character.

Caput operculis lateralibus.
Tentacula duo ad labium superius.
Oculi cute communi tecti.
Membrana branchiostega radiis quinque.
Corpus compressum, subtus pinna carinatum, dorso (plerisque) apterygio.

Head with lateral opercula.
Tentacula two on the upper lip.
Eyes covered by the common skin.
Gill-membrane five-rayed.
Body compressed, without dorsal fin (in most species), but carinated by a fin beneath.

ELECTRICAL GYMNOTE.

Gymnotus Electricus. *Gymnotus anguilliformis fuscus, cauda obtusa.*
Anguilliform brown Gymnote, with obtuse tail.
Gymnotus electricus. *G. nudus dorso apterygio, pinna caudali obtusissima anali annexa. Lin. Syst. Nat. p.* 427.
Gymnotus electricus. *Bloch. ichth. 5. p.* 38. *t.* 156.

THE peculiar species of electricity or Galvanism exerted at pleasure by this extraordinary animal is such as greatly to surpass that of the Torpedo, so long the subject of admiration both in ancient and modern times. The electric Gymnotus is a native of the warmer regions of Africa and America,

where it inhabits the larger rivers, and is particularly found in those of Surinam. In Africa it is said chiefly to occur in the branches of the river Senegal. It is a fish of a disagreeable appearance; bearing a general resemblance to a large eel, though somewhat thicker in proportion, and of a much darker colour, being commonly of an uniform blackish brown. It is usually seen of the length of three or four feet, but is said to arrive at a far larger size, specimens occasionally occurring of six, seven, or even ten feet in length. It was first made known to the philosophers of Europe about the year 1671, when its wonderful properties were announced to the French academy by Monsr. Richer, one of the gentlemen sent out by the academy to conduct some mathematical observations in Cayenne. This account however seems to have been received with a degree of cautious scepticism by the major part of European naturalists, and it was not till towards the middle of the late century that a full and general conviction appears to have taken place; the observations of Monsr. Condamine, Mr. Ingram, Mr. Gravesend, and others, then conspiring to prove that the power of this animal consists in a species of real electricity, being conducted by similar conducting substances, and intercepted by others of an opposite nature. Thus, on touching the fish with the fingers, the same sensation is perceived as on touching a charged vial; being sometimes felt as far as the elbows; and if touched by both hands, an electric shock is conveyed through the breast in the usual manner. Fermin, in par-

ticular, who, during his residence in Surinam, had frequent opportunities of examining the animal, demonstrated by experiment that fourteen slaves, holding each other by the hands, received the shock at the same instant; the first touching the fish with a stick*, and the last dipping his hand into the water in which it was kept. The experiments of Dr. Bancroft were equally satisfactory. After this, viz. about the year 1773, Mr. Williamson, in a letter from Philadelphia to Mr. Walsh, so celebrated for his observations relative to the electricity of the Torpedo, communicated his own highly satisfactory experiments on the Gymnotus. On touching the animal with one hand, in such a manner as to irritate it considerably, while the other was held at a small distance from it in the water, he experienced as strong a shock as from a charged Leyden vial. The shock was also readily communicated through a circle formed by eight or ten persons at once; the person at one extremity putting his hand in the water, near the fish, while the other touched the animal. It would be tedious to recite all the various modifications of these experiments, and it is sufficient to add, that all conspired to prove the genuine voluntary electricity of the animal; though occasionally exhibiting some variations from the phenomena of common electricity. It is by this extraordinary faculty that the Gymnotus supports its existence: the smaller fishes and other animals which happen to approach it, being instantly

* Probably a green or moist one.

stupified, and thus falling an easy prey to the electrical tyrant. So powerful is the shock which this fish, in its native waters, is capable of exerting, that it is said to deprive almost entirely of sense and motion those who are exposed to its approach, and is therefore much dreaded by those who bathe in the rivers it inhabits.

A very accurate description of the exterior form of the Gymnotus was drawn up by the late ingenious Dr. Garden of Charles Town in South Carolina, addressed to the celebrated Mr. Ellis; and an equally accurate description of its internal structure, and more particularly of its electric or Galvanic organs, is given by Mr. Hunter. Both these are printed in the 65th volume of the Philosophical Transactions.

"The largest of these fish," says Dr. Garden, was three feet eight inches in length, when extending itself most, and might have been from ten to fourteen inches in circumference about the thickest part of the body. The head is large, broad, flat, smooth, and impressed here and there with holes, as if perforated with a blunt needle, especially towards the sides, where they are more regularly ranged in a line on each side. The rostrum is obtuse and rounded. The upper and lower jaws are of an equal length, and the gape is large. The nostrils are two on each side; the first large and tubular, and elevated above the surface; the others small, and level with the skin, placed immediately behind the verge of the rostrum, at the distance of an inch asunder. The eyes are small, flattish, and

of a blueish colour, placed about three quarters of an inch behind the nostrils, and more towards the sides of the head. The whole head seems to be well supported; but whether with bones or cartilages I could not learn. The body is large, thick, and roundish, for a considerable distance from the head, and then gradually grows smaller, but at the same time deeper, or becomes of an acinaciform shape, to the point of the tail, which is rather blunt. There are many light-coloured spots on the back and sides of the body, placed at considerable distances in regular lines, but more numerous and distinct towards the tail. When the fish was swimming, it measured six inches in depth near the middle, from the upper part of the back to the lower edge of the fin, and it could not be more than two inches broad on the back at that place. The whole body, from about four inches below the head, seems to be clearly distinguished into four different longitudinal parts or divisions. The upper part or back is roundish, of a dark colour, and separated from the other parts on each side by the lateral lines; which, taking their rise at the base of the head, just above the pectoral fins, run down the sides, gradually converging, as the fish grows smaller, to the tail, and make so visible a depression or furrow in their course, as to distinguish this from the second part or division, which may be properly called the body, or at least, appears to be the strong muscular part of the fish. This second division is of a lighter and more clear blueish colour than the upper or back part, and seems to swell

out somewhat on each side, from the depression of the lateral lines; but towards the lower or under part, is again contracted, or sharpened into the third part or carina. This carina or keel is very distinguishable from the other two divisions, by its thinness, its apparent laxness, and by the reticulated skin of a more grey or light colour, with which it is covered. When the animal swims gently in pretty deep water, the rhomboidal reticulations of the skin of this carina are very discernible; but when the water is shallow, or the depth of the carina is contracted, these reticulations appear like many irregular longitudinal plicæ. The carina begins about six or seven inches below the base of the head, and gradually widening or deepening as it goes along, reaches down to the tail, where it is thinnest. It seems to be of a strong muscular nature. Where it first takes its rise from the body of the fish, it seems to be about one inch, or one inch and a half thick, and is gradually sharpened to a thin edge, where the fourth and last part is situated; viz. a long, deep, soft, wavy fin, which takes its rise about three or four inches at most below the head, and runs down along the sharp edge of the carina to the extremity of the tail. When it first rises it is not deep, but gradually deepens or widens as it approaches the tail. It is of a very pliable soft consistence, and seems rather longer than the body. The situation of the vent in this fish is very singular, being placed underneath, and being about an inch more forward than the pectoral fins, and consequently considerably nearer the rostrum.

There are two pectoral (if I may call them so) fins, placed one on each side, just behind the head, over the foramina spiratoria, which are small, and generally covered with a lax skin, situated in the axillæ of these fins. These fins are small for the size of the fish, being scarcely an inch in length, and of a very thin, delicate consistence, and orbicular shape. They seem to be chiefly useful in supporting and raising the head of the fish when he wants to breathe, which he does every four or five minutes, by raising his mouth out of the water. This shews that he has lungs and is amphibious, and the foramina spiratoria seem to indicate his having branchiæ likewise*; but this I only offer as a conjecture, not being certain of the fact. I must now mention the appearances of a number of small cross bands, annular divisions, or rather rugæ of the skin of the body. They reach across the body down to the base of the carina on each side; but those that cross the back seem to terminate at the lateral lines, where new rings take their rise, not exactly in the same line, and run down to the carina. This gives the fish somewhat of a worm-like appearance; and indeed it seems to have some of the properties of this tribe, for it has a power of lengthening or shortening its body to a certain degree, for its own conveniency, or agreeably to its own inclination. I have seen this specimen, which I have measured three feet eight inches, shorten himself to three feet two inches; but besides this power of lengthen-

* This proved an erroneous idea.

ing or shortening his body, he can swim forwards or backwards with apparently equal ease to himself, which is another property of the vermicular tribe. When he swims forwards, the undulations or wavy motions of the fin and carina begin from the upper part, and move downwards; but when he swims backwards, and the tail goes foremost, the undulations of the fin begin at the extremity of the tail or fin, and proceed in succession from that backwards to the upper part of the body: in either case he swims equally swift. Every now and then the fish lays himself on one side, as it were, to rest himself, and then the four divisions of the body above mentioned are very distinctly seen, viz. the vermiform appearance of the two upper divisions; the retiform appearance of the carina, and the last or dark-coloured fin, whose rays seem to be exceedingly soft and flexible, and entirely at the command of the strong muscular carina. When he is taken out of the water and laid on his belly, the carina and fin lie on one side, in the same manner as the ventral fin of the Tetraodon does, when he creeps on the ground. I have been the longer and more particular in the description of the external structure of this animal's body, because I think, as it is of a most singular nature, and endowed with some amazing properties, even the most minute circumstance I was able to observe relating to it should be mentioned. The power it has of giving an electrical shock to any person, or to any number of persons who join hands together, the extreme person on each side touching the fish, is its most singular and

astonishing property. The five we have here are possessed of this power in a very great degree, and communicate the shock to one person, or to any number of persons, either by the immediate touch of the fish with the hand, or by the intervention of any metalline rod. The keeper says that when first caught, they could give a much stronger shock by a metalline conductor than they can do at present. The person who is to receive the shock must take the fish with both hands, at some considerable distance asunder, so as to form the communication; otherwise he will not receive it; at least I never saw any one shocked from taking hold of it with one hand only: though some have assured me that they were shocked by laying one hand on him. I myself have taken hold of the largest with one hand often, without ever receiving a shock; but I never touched it with both hands, at a little distance asunder, without feeling a smart shock. I have often remarked, that when it is taken hold of with one hand, and the other hand is put into the water over its body, without touching it, the person received a smart shock; and I have observed the same effect follow, when a number joined hands, and the person at one extremity of the circle took hold of or touched the fish, and the person at the other extremity put his hand into the water, over the body of the fish. The shock was communicated through the whole circle as smartly as if both the extreme persons had touched the fish. In this it seems to differ widely from the Torpedo, or else we are much misinformed of the manner in which the benumbing

effect of that fish is communicated. The shock which our Surinam fish gives seems to be wholly electrical; and all the phænomena or properties of it exactly resemble those of the electric aura of our atmosphere when collected, as far as they are discoverable from the several trials made on this fish. This stroke is communicated by the same conductors, and intercepted by the interposition of the same original electrics or electrics per se, as they are called. The keeper of these fish informed me that he caught them in Surinam river, a great way up, beyond where the salt water reaches; and that they are a fresh water fish only. He says that they are eaten, and by some people esteemed a great delicacy. They live on fish, worms, or any animal food, if it is cut small, so that they can swallow it. When small live fishes are thrown into the water, they first give them a shock, which kills, or so stupifies them, that they can swallow them easily and without any trouble. If one of these small fishes, after it is shocked, and to all appearance dead, be taken out of the vessel where the electrical fish is, and put into fresh water, it will soon revive again. If a larger fish than they can swallow be thrown into the water, at a time that they are hungry, they give him some smart shocks, till he is apparently dead, and then endeavour to swallow or suck him in; but, after several attempts, finding he is too large, they quit him. Upon the most careful inspection of such fish, I could never see any mark of teeth, or the least wound or scratch upon them. When the electrical fish are hungry, they are pretty keen

after their food; but they are soon satisfied, not being able to contain much at a time. An electrical fish of three feet and upwards in length cannot swallow a small fish above three or at most three inches and a half long. I am told that the electrical fish is sometimes found in the river Surinam upwards of twenty feet in length, and that the stroke or shock proves instant death to the person who receives it."

Mr. Hunter's accurate description of the electric or Galvanic organs of this curious animal, is as follows:

" This fish, on the first view, appears very much like an eel, from which resemblance it has most probably got its name; but it has none of the specific properties of that fish. This animal may be considered, both anatomically and physiologically, as divided into two parts, viz. the common animal part, and a part which is superadded, viz. the peculiar organ. I shall at present consider it only with respect to the last; as the first explains nothing relating to the other, nor any thing relating to the animal œconomy of fish in general. The first, or common animal part, is so contrived as to exceed what was necessary for itself, in order to give situation, nourishment, and most probably the peculiar property to the second. The last part, or peculiar organ, has an immediate connexion with the first; the body affording it a situation; the heart nourishment; and the brain nerves, and probably its peculiar powers. For the first of these purposes the body is extended out in length,

being much longer than would be sufficient for what may be called its progressive motion. For the real body, or that part where the viscera lye, is situated, with respect to the head, as in other fish, and is extremely short; so that, according to the ordinary proportions, this should be a very short fish. Its great length, therefore, seems chiefly intended to afford a surface for the support of the peculiar organ: the tail-part, however, is likewise adapted to the progressive motion of the whole, and to preserve the specific gravity; for the spine, medulla spinalis, muscles, fin, and air-bladder, are continued through its whole length. Besides which parts, there is a membrane passing from the spine to that fin which runs along the belly or lower edge of the animal. This membrane is broad at the end next to the head, terminating in a point at the tail. It is a support for the abdominal fin, gives a greater surface of support for the organ, and makes a partition between the organs of the two opposite sides.

"The organs which produce the peculiar effect of this fish, constitute nearly one half of that part of the flesh in which they are placed, and perhaps make more than one third of the whole animal. There are two pair of these organs, a larger and a smaller; one being placed on each side. The large pair occupy the whole lower or anterior, and also the lateral part of the body, making the thickness of the fore or lower parts of the animal, and run almost through its whole length, viz. from the abdomen to near the end of the tail. It is broadest on the sides of the fish at the interior end, where

it incloses more of the lateral parts of the body, becomes narrower towards the end of the tail, occupying less and less of the sides of the animal, till at last it ends almost in a point. These two organs are separated from one another at the upper part by the muscles of the back, which keep their posterior or upper edges at a considerable distance from one another: below that, and towards the middle, they are separated by the air-bag; and at their lower parts they are separated by the middle partition. They begin forwards, by a pretty regular edge, almost at right angles with the longitudinal axis of the body, situated on the lower and lateral parts of the abdomen. Their upper edge is a pretty strait line, with small indentations made by the nerves and blood-vessels which pass round it to the skin. At the anterior end they go as far towards the back as the middle line of the animal; but in their approach towards the tail, they gradually leave that line, coming nearer to the lower surface of the animal. The general shape of the organ, on an exterior or side view, is broad at the end next to the head of the animal, becoming gradually narrower towards the tail, and ending there almost in a point. The other surfaces of the organ are fitted to the shape of the parts with which they come in contact: therefore on the upper and inner surface it is hollowed, to receive the muscles of the back. There is also a longitudinal depression on its lower edge, where a substance lies which divides it from the small organ, and which gives a kind of fixed point for the lateral muscles of the fin. Its most internal

surface is a plane adapted to the partition which divides the two organs from one another. The edge next to the muscles of the back is very thin, but the organ becomes thicker and thicker towards its middle, where it approaches the centre of the animal. It becomes thinner again towards the lower surface or belly, but that edge is not so thin as the other. Its union with the parts to which it is attached is in general by a loose, but pretty strong, cellular membrane; except at the partition, to which it is joined so close as to be almost inseparable. The small organ lies along the lower edge of the animal, nearly to the same extent as the other. Its situation is marked externally by the muscles, which move the fin under which it lies. Its anterior end begins nearly in the same line with the large organ, and just where the fin begins. It terminates almost insensibly near the end of the tail, where the large organ also terminates. It is of a triangular figure, adapting itself to the part in which it lies. Its anterior end is the narrowest part: toward the tail it becomes broader; in the middle of the organ it is thickest, and from thence becomes gradually thinner to the tail, where it is very thin. The two small organs are separated from one another by the middle muscles, and by the bones upon which the bones of the fins are articulated. The large and the small organ on each side, are separated from one another by a membrane, the inner edge of which is attached to the middle partition, and its outer edge is lost on the skin of the animal. To expose the large organ to view,

nothing more is necessary than to remove the skin, which adheres to it by a loose cellular membrane. But to expose to view the small organ, it is necessary to remove the long row of small muscles which move the fin. The structure of the organs is extremely simple and regular, consisting of two parts, viz. flat partitions or septa, and cross divisions between them. The outer edge of these septa appears externally in parallel lines, nearly in the direction of the longitudinal axis of the body. These septa are thin membranes, placed nearly parallel to one another. Their lengths are nearly in the direction of the long axis, and their breadth is nearly the semi-diameter of the body of the animal. They are of different lengths, some being as long as the whole organ. I shall describe them as beginning principally at the anterior end of the organ, although a few begin along the upper edge; and the whole, passing towards the tail, gradually terminate on the lower surface of the organ; the lowermost at their origin terminating soonest. Their breadths differ in different parts of the organ. They are in general broadest near the anterior end, answering to the thickest part of the organ, and become gradually narrower towards the tail: however they are very narrow at the beginning or anterior ends. Those nearest to the muscles of the back are the broadest, owing to their curved or oblique situation upon these muscles, and grow gradually narrower towards the lower part, which is in a great measure owing to their becoming more transverse, and also to the organ becoming thinner at that place. They

have an outer and an inner edge. The outer is attached to the skin of the animal, to the lateral muscles of the fin, and to the membrane which divides the great organ from the small; and the whole of their inner edges are fixed to the middle partition formerly described, as also to the air-bladder; and three or four terminate on that surface which incloses the muscles of the back. These septa are at the greatest distance from one another at their exterior edges near the skin, to which they are united; and as they pass from the skin towards their inner attachments, they approach one another. Sometimes we find two uniting into one. On that side next to the muscles of the back they are hollow from edge to edge, answering to the shape of those muscles; but become less and less so towards the middle of the organ; and from that, towards the lower part of the organ, they become curved in another direction. At the anterior part of the large organ, where it is nearly of an equal breadth, they run pretty parallel to one another, and also pretty strait; but where the organ becomes narrower, it may be observed that two join or unite into one; especially where a nerve passes across. The termination of this organ at the tail is so very small that I could not determine whether it consisted of one septum or more. The distances between these septa will differ in fish of different sizes. In a fish of two feet four inches in length I found them one twenty-seventh of an inch distant from one another; and the breadth of the whole organ, at the broadest part, about an inch and a quarter,

in which space were thirty-four septa. The small organ has the same kind of septa, in length passing from end to end of the organ, and in breadth passing quite across: they run somewhat serpentine; not exactly in strait lines. Their outer edges terminate on the outer surface of the organ, which is in contact with the inner surface of the external muscle of the fin, and their inner edges are in contact with the centre muscles. They differ very much in breadth from one another; the broadest being equal to one side of the triangle, and the narrowest scarcely broader than the point or edge. They are pretty nearly at equal distances from one another, but much nearer than those of the large organ, being only about the fifty-sixth part of an inch asunder: but they are at a greater distance from one another towards the tail, in proportion to the increase of breadth of the organ. The organ is about half an inch in breadth, and has fourteen septa. These septa, in both organs, are very tender in consistence, being easily torn. They appear to answer the same purpose as the columns in the Torpedo; making walls or butments for the subdivisions, and are to be considered as making so many distinct organs. These septa are intersected transversely by very thin plates or membranes, whose breadth is the distance between any two septa, and therefore of different breadths in different parts; broadest at that edge which is next to the skin, and narrowest at that next the centre of the body, or to the middle partition which divides the two organs from one another. Their lengths

are equal to the breadths of the septa between which they are situated. There is a regular series of them continued from one end of any two septa to the other. They appear to be so close as even to touch. In an inch in length there are about two hundred and forty, which multiplies the surface of the whole to a vast extent.

" The nerves in this animal may be divided into two kinds: the first appropriated to the general purposes of life; the second for the management of this peculiar function, and very probably for its existence. They arise in general from the brain and medulla spinalis, as in other fish; but those from the medulla are much larger than in fish of equal size; and larger than is necessary for the common operations of life. The nerve which arises from the brain, and passes down the whole length of the animal (which I believe exists in all fish), is larger in this than in others of the same size, and passes nearer to the spine. In the common eel it runs in the muscles of the back, about midway between the skin and spine. In the cod it passes immediately under the skin. From its being larger in this fish than in others of the same size, one might suspect that it was intended for supplying the organ in some degree; but this seems not to be the case, as I was not able to trace any nerves going from it to join those of the medulla spinalis, which run to the organ. This nerve is as singular an appearance as any in this class of animals; for surely it must appear extraordinary, that a nerve should arise from the brain to be lost in common parts, while there is

a medulla spinalis giving nerves to the same parts. It must still remain one of the inexplicable circumstances of the nervous system. The organ is supplied with nerves from the medulla spinalis, from which they come out in pairs between all the vertebræ of the spine. In their passage from the spine they give nerves to the muscles of the back, &c. They bend forwards and outwards upon the spine, between it and the muscles, and send out small nerves to the external surface, which join the skin near to the lateral lines. These ramify upon the skin, but are principally bent forwards between it and the organ, into which they send small branches as they pass along. They seem to be lost in these two parts. The trunks get upon the air-bladder, or rather dip between it and the muscles of the back, and continuing their course forwards upon that bag, they dip in between it and the organ, where they divide into smaller branches: they then get upon the middle partition, on which they continue to divide into still smaller branches; after which they pass on, and get upon the small bones and muscles, which are the bases for the under fin, and at last they are lost on that fin. After having got between the organ and the above-mentioned parts, they are constantly sending small nerves into the organs; first into the great organ, and then into the small one: also into the muscles of the fin, and at last into the fin itself. These branches, which are sent into the organ, as the trunk passes along, are so small that I could not trace their ramifications in the organs. In this fish as well as in the Torpedo, the nerves which

supply the organ, are much larger than those bestowed on any other part for the purposes of sensation and action; but it appears to me that the organ of the Torpedo is supplied with much the largest proportion. If all the nerves which go to it were united together, it would make a vastly greater chord than all those which go to the organ of this eel. Perhaps when experiments have been made upon this fish, equally accurate with those on the Torpedo, the reason for this difference may be assigned."

It has been affirmed that the Gymnotus electricus, even for some time after its death, cannot be touched without feeling its electric shock. This is by no means incredible, when we consider the effect of the Galvanic pile, so well known to modern philosophers.

CARAPO GYMNOTE.

Gymnotus Carapo. *G. unicolor, dorso apterygio, pinna ani longitudine caudæ attenuatæ, maxilla superiore longiore. Lin. Syst. Nat. Gmel. p.* 1136.

Brown Gymnote, with the vent-fin of the length of the attenuated tail, and the upper jaw longer than the lower.

Gymnotus macrourus. *G. macrourus, maxilla superiore longiore. Bloch.*

Gymnotus carapo. *G. nudus, dorso apterygio, pinna ani longitudine caudæ attenuatæ. Lin. Syst. Nat. p.* 427.

The head of the Carapo is of a compressed form, and the upper jaw projects beyond the lower: the tongue is short, thick, broad, and furnished like the jaws with a great many small sharp-pointed teeth:

the eyes are very small, and the front of the head is marked, as in the preceding species, by a number of small round pores: the body gradually decreases towards the tail, which is extremely slender, and terminates in a point. The colour of the whole animal is brown, marked by a few irregular spots or patches of a deeper cast: the scales are small, and the lateral line strait. This fish is a native of the American seas, and is said to be most frequent about the coast of Surinam. It is supposed to live chiefly on small fishes, sea insects, &c. Whether it possesses any electric power, like the former species, may be doubted; yet the structure of the lower part of the body seems to imply somewhat of a similar contrivance of Nature. The usual length of the Carapo is from one to two feet; but it is sometimes found of the length of three feet, and of the weight of more than ten pounds. It is considered as an esculent fish by the South-Americans.

VAR. ?

SHORT-TAILED CARAPO.

Gymnotus fasciatus. *G. nudus fasciatus, dorso apterygio, pinna ani longitudine caudæ attenuatæ, maxilla inferiore longiore.*
Naked-backed pale-brown Gymnotus, with darker transverse fasciæ, short tail, and lower jaw longer than the upper.
Gymnotus carapo. *G. brachyurus maxilla inferiore longiore. Bloch.*
Gymnotus fasciatus. *Lin. Syst. Nat. Gmel. p.* 137.

In general appearance this fish so much resembles the preceding that it has been considered both by Artedi and Linnæus as no other than a variety, differing principally in the shortness of the tail, and in the inferior size of the body. By Seba, however, it was regarded as a distinct species, and Dr. Bloch in his Ichthyology observes, that it not only differs from the former in the part above mentioned, but also in the contrary outline of the mouth; the lower jaw advancing beyond the upper: he also adds, that the number of rays in the vent-fin is different, and that the back is marked by a furrow, extending from the neck to the middle of the trunk. This fish inhabits the same seas with the preceding.

ROSTRATED GYMNOTE.

Gymnotus Rostratus. *G. rostro tubulato, pinna ani cauda breviore. Lin. Syst. Nat. p.* 428.

Spotted Gymnotus, with tubular snout, and vent-fin shorter than the tail.

Gymnotus varius rostro productiore. *Seb.* 3. *p.* 99. *t.* 32. *f.* 5.

In its general aspect this species is much allied to the Carapo, but is readily distinguished by the peculiar form of the head, which terminates in a narrow, slightly compressed, tubular snout, the jaws appearing in a manner connate: the colour of the body is pale reddish brown, variegated with differently sized spots of a darker colour, and which are much smaller, as well as more numerous, on the fin than on the other parts: the pectoral fins are round and rather small for the size of the animal: the eyes are very small: the scales, if any, are so small as to be not distinctly visible on a general view. This species is a native of Surinam, and seems to have been first described and figured by Seba.

WHITE GYMNOTE.

Gymnotus Albus. *G. albus, maxilla inferiore longiore, labio superiore utrinque lobulo notato.*
White Gymnotus, with the lower jaw longest, and the upper lip marked with a lobule on each side.
Gymnotus albus. *Pall. Spic. Zool. 7. p. 36.*
Gymnotus albus. *Lin. Syst. Nat. Gmel. p. 1137.*

Size and general habit of the Carapo and fasciatus; colour white or whitish; scales moderately large; tail naked for about an inch, and ending in a point, as in others of this tribe; pectoral fins very small; mouth furnished on each side the upper lip with a small lobule or abrupt cirrus, as it were, situated at about half the distance of the gape; eyes very small; head marked on each side by several pores. Native of Surinam.

WHITE-FRONTED GYMNOTE.

Gymnotus Albifrons. *G. dorso anteriore niveo. Lin. Syst. Nat. Gmel. p. 1139. Pall. Spic. Zool. 7. p. 35. t. 6. f. 1.*
Gymnote with the fore part of the back snow-white.

First described by Dr. Pallas: native of Surinam: head with wider mouth than the rest of its tribe, very obtuse, fleshy, and sprinkled over with small pores: upper lip very thick, including the lower, which is very high on each side: no tongue: palate beset with papillæ: gill-covers with a semilunar opening before the fleshy base of the pectoral

fins, which are black and prominent, with the first ray doubled by a small bone at the base: anal fin beginning from the throat: fore part of the back convex, with a soft, brown, fleshy process * behind the middle, beyond which it is destitute of scales: tail compressed, flat, with an ovate fin: from the tip of the lower mandible to the middle of the back runs a snow-white band.

NEEDLE GYMNOTE.

Gymnotus Acus. *G. nudus, dorso ventre caudaque apterygiis, pinna anali ante apicem caudæ terminata radiis sexaginta. Lin. Syst. Nat. Gmel. p.* 1140.

Naked Gymnotus, with finless tail and belly; the anal fin terminating before it reaches the tip of the tail.

This species is described by Brunnich, in his history of the fish of Marseilles. It is whitish, with reddish and brown spots, which cause a kind of clouded variegation on the back; while a blueish tinge prevails towards the under parts: on the back is a kind of projection, which may be rather considered as a rudiment of a fin than a perfect one: the

* This process, which is of considerable length, is, according to the observations of the Count de Cepede, attached also at its smaller or opposite extremity to the skin of the back, very near to the origin of the tail: it is also connected throughout its whole length by twelve short, oblique filaments, to the subjacent furrow into which it is received. In the specimen described by Dr. Pallas, it appears to have been imperfect, and is improperly called a cirrus.

whole animal is of a long, compressed, and attenuated form, and the mouth is destitute of tentacula. This is the only European species of Gymnote yet discovered, and is a native of the Mediterranean sea.

FIN-BACKED GYMNOTE.

Gymnotus Notopterus. *G. argenteo-inauratus, dorso pinnato pinnisque cinerascentibus. Lin. Syst. Nat. Gmel. p.* 1139. *Pall. Spic. Zool.* 7. *p.* 40. *t.* 6. *f.* 2.

Silvery Gymnote, with a gilt hue, with the dorsal and other fins of a pale ash-colour.

It must, no doubt, appear in some degree absurd to place a fish which is furnished with a dorsal fin in a genus distinguished by the want of that part: but since in every other respect the present animal agrees with the rest of the Gymnoti, I shall consider it as belonging to that tribe rather than institute for it a separate genus. It is a native of Amboyna, and is of the length of about eight or nine inches, though it probably arrives at a larger size. The head is short and obtuse: the eyes large, and above them is placed a small pore or foramen: the jaws are furnished with sharp teeth, those in the lower jaw being largest: besides these is a row of very minute teeth within the jaw: the palate is also edged with similar small teeth: the gill-covers are scaly, with a membranaceous edge: the scales on the body are very small: the anal fin at its origin is fleshy, and narrower than elsewhere.

ASIATIC GYMNOTE.

Gymnotus Asiaticus. *G. squamosus dorso pinnato. Lin. Syst. Nat. Gmel. p.* 1140.

Brownish Gymnote, with deeper bands, distinct scales, and finned back.

THIS, like the former, departs, in some degree, from the generic character: it is of a thickish form, and more than a span in length, and is covered both on the head and other parts with moderately large rounded scales: the head is depressed, smoothish, marked with five hollow dots, and by a small foramen in front: before the nostrils are two abrupt tentacula: the tongue is smooth: the teeth in both jaws small, and there is also a row of small teeth within the upper jaw, and a few hollowed points in the lower: the gill-covers have a wide opening: the body is subcylindric, compressed at the hind part: the dorsal fin commences a little behind the neck, and extends as far as the tail, and, together with the hind part of the body, is speckled with white: the lateral line is elevated and strait, but descends over the vent.

Generic Character.

Caput nudiusculum: dentes maxillis, palato, faucibus.

Membrana branchiostega radiis septem, patula.

Corpus ensiforme.

Head somewhat naked: teeth in the jaws, palate, and throat.

Branchiostegous membrane seven-rayed, patulous.

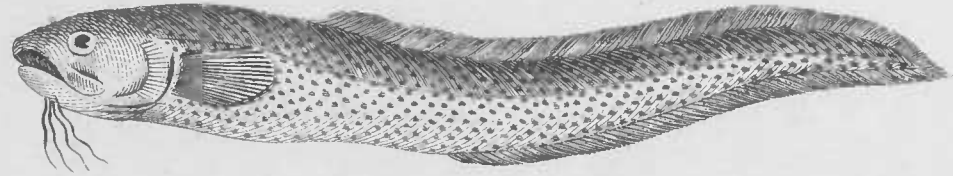
Body ensiform.

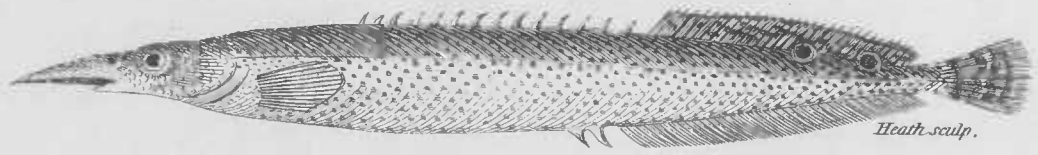
BEARDED OPHIDIUM.

Ophidium Barbatum. *O. cirro utrinque gulari duplici.*
Ophidium with a long double cirrus on each side the throat.
Ophidium barbatum. *O. maxilla inferiore cirris quatuor. Lin. Syst. Nat. p.* 431.
Ophidium cirris quatuor gularibus. *Bloch. 5. p.* 58. *t.* 159. *f.* 1.

THE head of this fish is small; the upper jaw rather longer than the lower, and both beset with a great many small teeth: the lips are strong and fleshy: in the throat are several small teeth: between the eyes and mouth are four small pores: the tongue is strait and short: beneath the throat are two long, bifid cirri, representing at first view four distinct ones: the body is long, moderately thick, and of a smooth surface: it is irregularly covered with small scales, resembling in their structure those of an eel, and attached to the skin by

BEARDED OPHIDIUM





Heath sculp.

ROSTRATED OPHIDIUM

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their middle or central part: the colour of the body is a subargenteous white, with a dusky cast above, reddish beneath, and spotted all over with small, oblong, dusky specks. It is commonly found of the length of eight or nine inches, and sometimes twelve or fourteen, and is met with in all parts of the Mediterranean sea, and in great plenty in the Adriatic. It is often taken by nets in Provence and Languedoc with other kinds of fish, and is most common during the summer season. It is not considered as an elegant fish for the table, the flesh being rather coarse. It feeds on small fishes, crabs, &c. &c.

In the Philosophical Transactions * we meet with some accurate observations on this fish by the ingenious Dr. Broussonet, who has considerably advanced the science of Ichthyology. The first author, according to Dr. Broussonet, to whom we are indebted for a description and figure of the Ophidium barbatum, is Bellonius, who seems to have been doubtful to what class to refer it, but has placed it among the Gadi, though of a very different family. Rondeletius, who wrote soon after Belon, has given a better description and a more accurate figure, though the cirri are very ill represented, and the whole fish appears without any spots, whereas in the Rondeletian representation it is spotted all over; and this difference caused Gesner and some others to consider the Belonian and Rondeletian animals as distinct species. Willoughby

* Vol. 71.

has described the scales, which are oblong, distinct, and disposed without regular order, and the difference between the figures of Rondeletius and Bellonius arises from the former having expressed the scales, which are omitted by the latter: yet Ray in his Synopsis follows Gesner in supposing two distinct species. Artedi has not noticed the spots, which, however, have been observed by Klein, who has mistakenly followed Rondeletius, in affirming that the fish has two cirri, while, on the contrary, Willoughby asserts that there are four; but it is easy to reconcile these descriptions, since though the cirri are only two, yet each being divided, they appear to be four.

BEARDLESS OPHIDIUM.

Ophidium Imberbe. *O. maxillis imberbibus, cauda obtusiuscula. Lin. Syst. Nat. p.* 431.

Ophidium with beardless jaws and rather obtuse tail.

Ophidion cirris carens. *Artedi gen.* 24. *Syn.* 42. *Gronov. Zooph.* 1. *p.* 131.

This species seems to be much allied to the former, but is described as altogether destitute of cirri or beards: the body is oblong and slender, gradually decreasing in thickness to the tail, and covered with very small pellucid scales: the head is short, a little flattened, very thick and rounded at the muzzle: the mouth large; the teeth numerous, sharp, and small, as in the former: the upper jaw rather longer than the lower; the gill-covers short,

and ending on the upper part in an angular manner, with a strong and sharp point lying over the valve: the gill-membrane furnished with seven rays: eyes large; irides broad and silvery: lateral line near the back: vent situated almost in the middle of the abdomen: scales on the body and gill-covers very small: dorsal, caudal, and anal fins united: dorsal beginning at a little distance beyond the head: tail sharp: vent-fin of equal length with the dorsal: pectoral fins rather large, and of a lanceolate shape. Native of the Mediterranean.

Ophidium Mastacembalus. *O. maxillis subacutis æqualibus.*
Ophidium with sharpish-pointed equal jaws.
Mastacembalus maxillis subacutis æqualibus. *Gron. Zooph.* 1. *p.* 132. *t.* 8. *a. f.* 1.
Mastacembalus. *Russel Alepp. ed.* 2. *Vol.* 2. *p.* 208. *pl.* 6.

The first description of this species seems to have been given by Dr. Alexander Russel, in his Natural History of Aleppo. It has so much the general appearance of an eel, that, according to Dr. Russel, it is considered as such by the Europeans resident at Aleppo, where it is often brought to table, and eats like an eel, though somewhat less fat. Its usual length is from a foot to eighteen inches or more: the head is oblong, subcylindric, narrower than the body, and contracted into a subacuminate snout in front: the eyes are small, situated on each side at no great distance from the tip of the snout:

the nostrils are seated at some distance before the eyes: the mouth is small; the jaws are equal, with lax, fleshy lips: the teeth of moderate size, and somewhat confusedly placed in both jaws: the tongue and palate are smooth: the gill-covers smooth, the branchial apertures opening widely beneath: the gill-membrane five-rayed: the body anguilliform, and marked down the back, as far as the beginning of the dorsal fin, by a row of about thirty-two small, sharp spines, set at equal distances, and each recumbent in a small furrow, from which it is erigible at the pleasure of the animal: the dorsal fin commences at about two thirds of the length of the body from the head, is of moderate width, and is continued into the tail and vent-fin in the manner of those of an eel; the vent-fin running beneath to about the same distance with the dorsal above: at the origin of the vent-fin are two strong, short spines, and at a little distance farther on the abdomen is a third: the pectoral fins are very small and rounded: the lateral line is pretty strongly marked, and runs from the top of the gills along the middle of the body to the tail: the whole body is covered with small scales, like those of an eel: the colour on the upper parts is a clouded variegation of whitish and rufous, the under parts being entirely white: it is principally taken in the river Kowick, near Aleppo.

ROSTRATED OPHIDIUM.

Ophidium Rostratum *O. rostro acuminato longissimo.*
Ophidium with extremely long sharp-pointed snout.
Ophidium aculeatum. *O. rostro acuminato. Lin. Syst. Nat. Gmel. p.* 1147.
Ophidium rostratum. *Block. 5. p. 60. t. 159. f. 2.*
Pentopthalmos. *Will. Ichth. Append. t.* 10. *f.* 1.

This species is much allied to the O. Mastacembalus, having a series of dorsal spines, and two or three immediately before the vent-fin. It is readily distinguished by the very great elongation of the upper lip, which terminates in a very sharp, slender snout: the head is small, and the body very long, and somewhat compressed: the gill-covers large, and the gill membrane lax: the lateral line is placed near the back: the dorsal fin commences at no great distance from the tail, but is not united with it as in the former species; the vent-fin is about the same length, and is situated in a correspondent manner beneath: the tail, which is distinct from both, is of an ovate form, and rather small: the pectoral fins are of moderate size, and of an oval shape: the number of dorsal spines is fourteen, and of those before the vent-fin two: the colour of this fish is rufous brown above, silvery on the sides and beneath: the dorsal fin is variegated with oblique dusky streaks, and is marked with from two to five round, black spots, each surrounded by a pale yellowish circle.

Generic Character.

Lamina longa, denticulata, mobilis utrinque maxillæ superiori adnata.

Membr. branch. radiis quinque.

Mouth furnished with a strong, moveable lamina or process on each side the upper jaw.

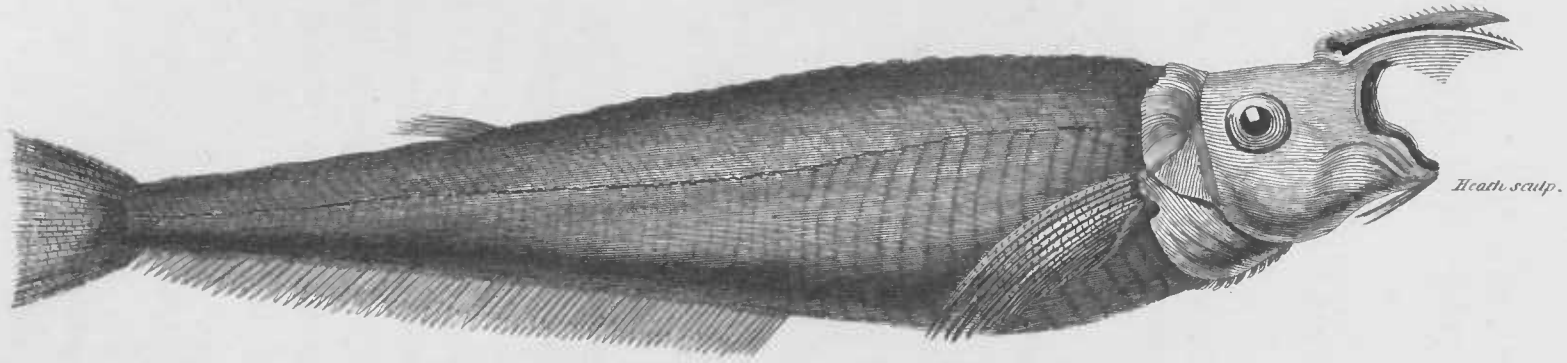
Gill-membrane five-rayed.

ACULEATED ODONTOGNATHUS.

Odontognathus abdomine aculeato.
Odontognathus with aculeated abdomen.
L'Odontognathe aiguillonné. *Cepede pisc. 2. p. 222.*

THE genus Odontognathus, instituted by Cepede, consists of a single species, of which the following is the description. The head, body, and tail are very compressed: the lower jaw, which is longer than the upper, is very much elevated towards the other when the mouth is closed, insomuch as to appear almost vertical, and is lowered somewhat in the manner of a drawbridge when the mouth is opened, when it appears like a small scaly boat, very transparent, furrowed beneath, and finely denticulated on the margins: this lower jaw, in the act of depression, draws forwards two flat, irregular laminæ of a scaly substance, a little bent at their posterior end, and

ACULEATED ODONTOGNATHUS



Heath sculp.

1803 July 1 London Publishd by G. Kearsley Fleet Street

larger at their origin than at their tips, denticulated on their anterior margin, and attached, one on one side, and the other on the opposite, to the most prominent part of the upper jaw: when the mouth is closed again, these pieces apply themselves on each side to one of the opercula, of which they represent the exterior denticulated border: in the middle of these jaws is placed the tongue, which is pointed and free in its movements: the gill-covers, which are composed of several pieces, are very transparent at the hind part, but scaly and of a bright silver-colour in front: the gill membrane is also silvery, and has five rays: the breast is terminated below by a sharp carina furnished with eight crooked spines: the carina of the belly is also furnished with twenty-eight spines, disposed in two longitudinal ranges: the anal fin is very long, and extends almost as far as the base of the tail-fin, which is of a forked shape: the dorsal fin is placed on the tail, properly speaking, at about three quarters of the whole length of the animal, but it is extremely small. The general length of this fish is three decimetres, and its colour, so far as may be conjectured from specimens preserved for some time in spirits, is a bright silver. It is a native of the American seas, and is common about the coasts of Cayenne, where it ranks in the number of edible fishes.

COMEPHORUS. COMEPHORUS.

Generic Character.

Caput grande, rostro depresso.
Os amplum, dentibus minutis.
Corpus elongatum, compressum.
Pinna dorsalis secunda radiis pluribus nudis elongatis.

Head large, with depressed snout.
Mouth large, with small teeth.
Body elongated, compressed: the second dorsal fin furnished with several long naked rays.

BAIKAL COMEPHORUS.

Comephorus Baikalensis. *C. pinna dorsali prima minima, secunda radiis cirrhiferis.*
Comephorus with the first dorsal fin very small, the second with many naked cirrhiform rays.
Callyonimus Baikalensis. *C. pinnis ventralibus nullis, dorsali prima minima, secunda radiis cirrhiferis. Lin. Syst. Nat. Gmel. p.* 1153. *Pall. it.* 3. *p.* 707.

THIS fish, arranged under the above-named genus by Cepede, was by Pallas described as a species of Callionymus, and referred somewhat improperly to the *Jugular Fishes.* Its length is about a span; its shape slender, compressed, and gradually decreasing to the tail: its flesh very soft, and oily: the head large, and the mouth wide: the eyes large and black: the gill-membrane lax, with very remote

cartilaginous rays: the pectoral fins lax, very long, reaching half down the body, and furnished with very slender, stiff rays: the first dorsal fin is very small; the second larger, and furnished with fifteen elongated bristle-like rays stretching beyond the membrane: tail bilobate, of a stronger nature than the fins: lateral line nearer the back than the belly. Native of the lake Baikal, where it was discovered by Dr. Pallas. From its conformation it appears to be capable of swimming swiftly, and, perhaps, of occasionally springing out of the water somewhat in the manner of a flying-fish.

TRIURUS. TRIPLE-TAIL.

Generic Character.

Rostrum cylindricum.	*Snout* cylindric.
Dens unicus in utraque maxilla.	*Tooth* single in each jaw.
Pinna dorsi anique ultra caudam extensa.	*Fin* dorsal and anal extended beyond the tail.

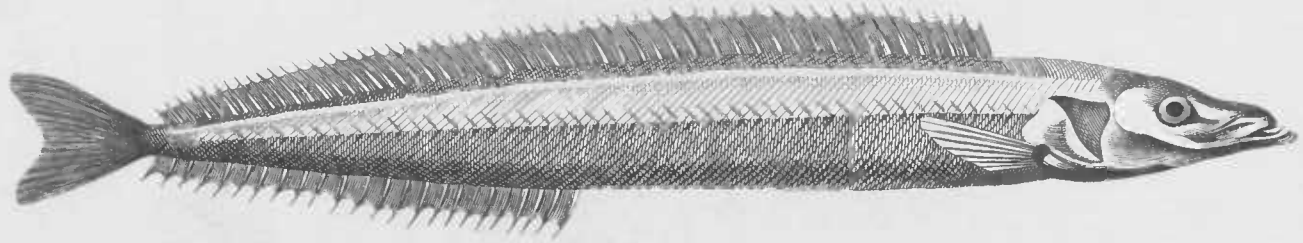
COMMERSONIAN TRIPLE-TAIL.

Triurus Commersonii. *T. orificio operculorum valvula clausili.*
Triple-tail with the branchial orifice closed at pleasure by a valve.
Le Triure Bougainvillien. *Cepede pisc.* 1. *p.* 201.

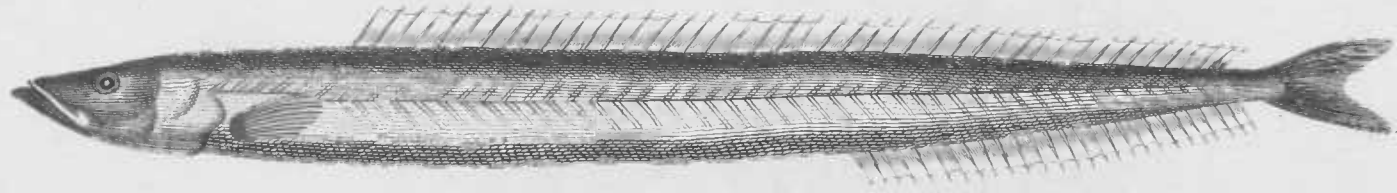
THE genus Triurus is instituted by Cepede from a remarkable fish discovered by Commerson in the Indian seas, and of which the following is the description. Its general appearance and size is that of a herring: the body is much compressed, and covered with scales, so small and deeply seated, that, at first sight, the animal appears destitute of any: the head, which is compressed as well as the body, and a little flattened above, is terminated by a very lengthened snout in form of a strait tube, at the end of which is a round hole by way of mouth, and which the fish has no power of closing: in the bottom of this tube are the two bony jaws, each composed

of a single incisive and triangular tooth, no others being observable either on the palate or tongue, which latter is very short, cartilaginous, but rather fleshy at the tip, which is rounded: the nostrils are very small, and placed nearer to the eyes than to the tip of the snout: the eyes are moderately large, slightly convex, not covered by the common skin, as in the Gymnotes and some other apodal fishes, and the irides are of a bright gold and silver colour: the gill-covers are situated beneath the skin, and are each composed of an osseous lamina in form of a sickle: the gill-membrane is five-rayed, and is attached to the head or body round its whole contour, in such a manner as to leave but a small orifice just beyond the snout; in which respect it appears analogous to the Syngnathi or Sea-Needles, as well as to the Callyonimi and some other fishes; but what renders the Triurus most remarkable is, a particularity of which we find no example in the whole class of Pisces: this consists in a soft, fleshy, lunated valvule, attached to the anterior edge of the branchial orifice, which it closes at the pleasure of the animal, by applying itself to the posterior edge: the body is not marked by any lateral line; the belly is terminated beneath by a sharp keel almost throughout its whole length, and the vent is situated at the extremity of the abdomen: the pectoral fins are small, delicate, transparent, of an almost triangular form when expanded, and have twelve or thirteen rays: the vent-fin has fifteen soft rays, and is directed backwards, its sharp end stretching almost as far as the posterior edge of the tail-fin, of

which it represents a continuation or appendix, and even seems to form a part: the dorsal fin is in the same manner a kind of auxiliary to the tail-fin: it is formed of an equal number of rays with the vent-fin, but is situated at a greater distance from the head, and is a third part longer, stretching backwards, not only as far as the tail, but beyond it; and as these two fins, viz. the dorsal and anal, reach that of the tail, it follows that the latter, at first view, appears as if composed of three distinct parts, and hence the name of Triurus, or Triple-Tail, applied to this fish by Commerson. In the mean time the real tail is so short that it appears more like a defective than a finished part, and is fringed at the edge by the terminations of the numerous, soft, divided rays of which it is composed. The colour of this fish is a brownish red, changing into silvery beneath the head, and into flesh-colour on the sides, belly, and tail, while a spot of clear white appears beyond the base of the pectoral fins. This curious genus was discovered by Commerson in the stomach of a species of Scomber; five individuals, perfectly uninjured by the action of the stomach, being taken out: several others were afterwards observed sporting on the surface of the sea. In some points this fish seems to bear a near alliance to the genus Centriscus.



SAND LAUNCE



Hill sculp.

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AMMODYTES. LAUNCE.

Generic Character.

Caput compressum, corpore angustius: labium superius duplicatum: mandibula inferior angusta acuminata: dentes acerosi.

Membrana branchiostega radiis septem.

Corpus teretiusculum squamis vix conspicuis: cauda distincta.

Head compressed, narrower than the body: upper lip doubled: lower jaw narrow, pointed: teeth small and sharp.

Gill-membrane seven-rayed.

Body long, roundish, with very small scales: tail distinct.

SAND LAUNCE.

Ammodytes Tobianus. *A. maxilla inferiore longiore.*
Launce with the lower jaw longer than the upper.
Ammodytes Tobianus. *Lin. Syst. Nat. p.* 430.
Ammodytes Gesneri. Sand-Eel. *Will. ichth. p.* 113.
Sand Launce. *Penn. Brit. Zool.* 3. *p.* 137. *pl.* 25.

THE Launce, so named from its shape, is a native of the northern parts of Europe, commonly frequenting the coasts, and lying imbedded in the sand, in which it conceals itself at the depth of about a foot, with its body rolled into a spiral form. In this situation it is either dug out, or drawn up by means of a hook contrived for that purpose,

and used by the fishermen as a bait: it is also considered as a delicate article of food. The general length of the Launce is from eight to ten inches: its form slightly square, being rather rounded on the sides, and somewhat flattened above and beneath: the head is small and taper, and the under jaw much longer than the upper: the mouth is destitute of teeth, but at the entrance of the throat are two rough oblong bones for retaining the prey: the openings of the gills are large, and the opercula consist of four laminæ: the nostrils are double, and placed midway between the eyes and the mouth: along the back runs a furrow, capable of receiving the dorsal fin: the lateral line is strait, running along the middle of the body, and besides this there is another near the back, and a third near the belly: the dorsal fin runs almost the whole length of the back, and is very narrow, and furnished with soft rays: the pectoral fins are small; the anal fin runs from the vent to the tail, and is narrow like that of the back: the tail is slightly forked, but the lobes rounded at their extremities: the general colour of the body is blue or greenish towards the back, and the sides and belly silvery, but sometimes of a yellowish cast, and over the whole fish are commonly seen numerous oblique fibres or markings on the surface of the skin. The Launce lives on worms, water-insects, and small fishes, and even occasionally on those of its own species, since Dr. Bloch informs us, that on opening two individuals, he found a young one of about two inches long in the stomach of each. It is itself preyed upon by the

larger fishes, and particularly by the Mackarel. The Launce spawns in the month of May, depositing its eggs in the mud, near the edges of the coast. It is remarkable that most of the older ichthyologists describe this fish as without scales, their small size apparently causing them to be overlooked. The swimming bladder is wanting, so that the animal is calculated only for a littoral residence.

LEPTOCEPHALUS. MORRIS.

Generic Character.

Caput parvum, angustum.	*Head* small, narrow.
Corpus tenuissimum, compressum.	*Body* very thin, compressed.
Pinnæ pectorales nullæ.	*Pectoral fins* none.

ANGLESEA MORRIS.

Leptocephalus Morrisii. *L. corpore tenuissimo.*

Leptocephalus. *Gronov. Zoophyl. No.* 409. *t.* 13. *f.* 3.
Anglesea Morris. *Penn. Brit. Zool.* 3. *p.* 139. *pl.* 25.

IT was in the British Zoology of Mr. Pennant that this small fish, the only one of its genus yet observed, made its first public appearance under the name of the Morris, having been first discovered on the coast of Anglesea by a gentleman of that name. Gronovius, to whom Mr. Pennant had some time before communicated it, distinguishes it by the title of Leptocephalus. The description given by Mr. Pennant is as follows: The length was four inches; the head very small; the body compressed sideways; extremely thin, and almost transparent; about the tenth of an inch thick, and in the deepest part about one third of an inch: towards the tail it grew more slender, and ended in a point: towards

10.

Heath sculp.

ANGLESEA MORRIS

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the head it sloped down, the head lying far beneath the level of the back: the eyes large; the teeth in both jaws very small: the lateral line strait; the sides marked with oblique strokes that met at the lateral edge: the aperture to the gills large: it wanted the pectoral, ventral, and caudal fins: the dorsal fin was extremely low and thin, extending the whole length of the back very near the tail: the anal fin was of the same delicacy, and extended to the same distance from the anus.

Gronovius observes, that on account of the extreme tenuity of the body, the joints of the vertebræ appear to project so distinctly along the sides that it might almost pass, on a cursory view, for a species of Tænia or tape-worm: the vertebral joints, in some measure, expressing the papillary foramina on the bodies of those animals.

STYLEPHORUS. STYLEPHORUS.

Generic Character.

Oculi pedunculati, seu cylindro crasso brevi impositi.

Rostrum productum, sursum spectans, versus caput membrana interjecta retractile.

Os terminale, edentulum?

Branchiæ trium parium sub jugulo sitæ.

Pinnæ pectorales parvæ: dorsalis longitudine dorsi: caudalis brevis, radiato-spinosa.

Corpus longissimum, compressum.

Eyes pedunculated: standing on a short thick cylinder.

Snout lengthened, directed upwards, retractile towards the head by means of a membrane.

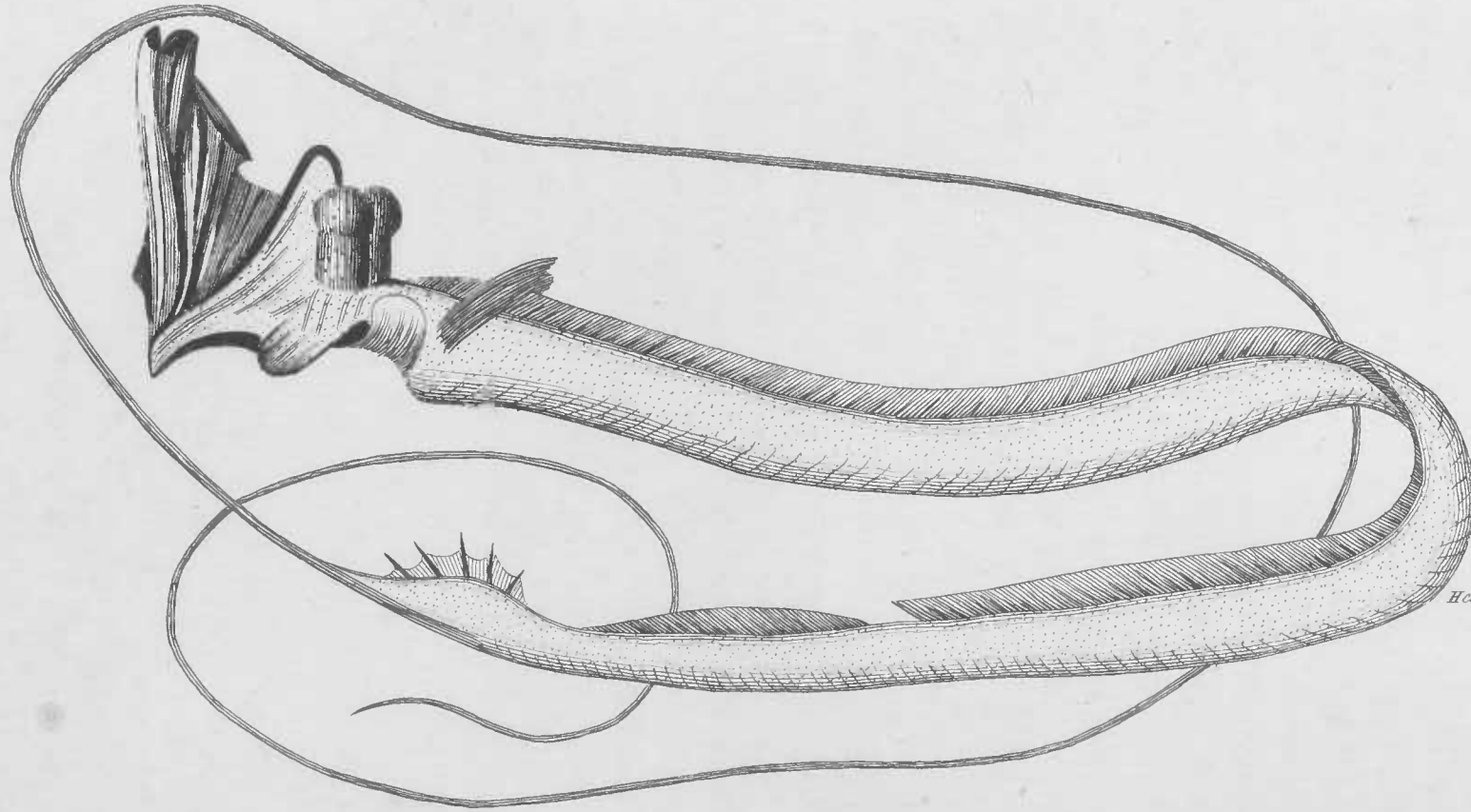
Mouth without teeth?

Branchiæ three pair beneath the throat.

Fins pectoral small: *dorsal* the length of the back; *caudal* short, with spiny rays.

Body very long, compressed.

THIS highly singular genus was first described in the year 1788, from a specimen then introduced into the Leverian Museum, and figured in the first volume of the Linnæan Transactions. I shall therefore repeat my former description from the above-mentioned work, and have only to add, that the genus still consists of a single species, no other having been yet discovered.



Heath sculp.

CHORDATED STYLEPHORUS

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CHORDATED STYLEPHORUS.

Stylephorus Chordatus. *S. argenteus, filo caudali longissimo.*
Silvery Stylephorus, with extremely long caudal thread.
Stylephorus chordatus. *Lin. Trans. vol.* 1. *p.* 90. *pl.* 6. *Naturalist's Miscellany, vol.* 8. *pl.* 274.

The head of this extraordinary animal bears some distant resemblance to that of the genus Syngnathus, and its true structure cannot so easily be described in words as conceived by the figure. The rostrum or narrow part, which is terminated by the mouth, is connected to the back part of the head by a flexible leathery duplicature, which permits it to be either extended in such a manner that the mouth points directly upwards, or to fall back, so as to be received into a sort of case formed by the upper part of the head. On the top of the head are placed the eyes, which are of a form very nearly approaching to those of the genus Cancer, except that the columns or parts on which each eye is placed are much broader or thicker than in that genus: they are also placed close to each other, and the outward surface of the eye, when magnified, does not shew the least appearance of a reticulated structure. The colour of the eyes, as well as of the columns on which they stand, is a clear chesnut brown, with a sort of coppery gloss. Below the head, on each side, is a considerable compressed semicircular space, the fore part of which is bounded by the covering of the gills, which covering seems to consist of a single membrane, of a moderately strong

nature. Beneath this, on each side, are three small pair of branchiæ. The body is extremely long and compressed very much, and gradually diminishes as it approaches the tail, which terminates in a string or process of an enormous length, and finishes in a very fine point. This string, or caudal process, seems to be strengthened throughout its whole length, or at least as far as the eye can trace it, by a sort of double fibre or internal part. The pectoral fins are very small, and situated almost immediately behind the cavity on each side the thorax. The dorsal fin, which is of a thin and soft nature, runs from the head to within about an inch of the tail, when it seems suddenly to terminate, and a bare space is left of about a quarter of an inch. I am, however, not altogether without my doubts whether it might not, in the living animal, have run on quite to the tail, and whether the specimen might not have received some injury in that part. From this place commences a smaller fin which constitutes part of the caudal one. The caudal fin itself is furnished with five remarkable spines, the roots or originations of which may be traced to some depth in the thin part of the tail. The general colour of this fish is a rich silver, except on the flexible part belonging to the rostrum, which is of a deep brown: the fins and caudal process are also brown, but not so deep as the part just mentioned. There is no appearance of scales on this fish. From the very singular figure and situation of the eyes I have given it the generic name of *Stylephorus*, and as the trivial name cannot be taken from any

circumstance more properly than from the extraordinary thread-like process of the tail, I have applied to it the title of *chordatus*. It is a native of the West-Indian seas, and was taken between Cuba and Martinico, near a small cluster of little islands about nine leagues from shore, where it was observed swimming near the surface. The whole length of this uncommon animal, from the head to the extremity of the caudal process, is about thirty-two inches, of which the process itself measures twenty-two. The plate represents it in its natural size.

TRICHIURUS. TRICHIURE.

Generic Character.

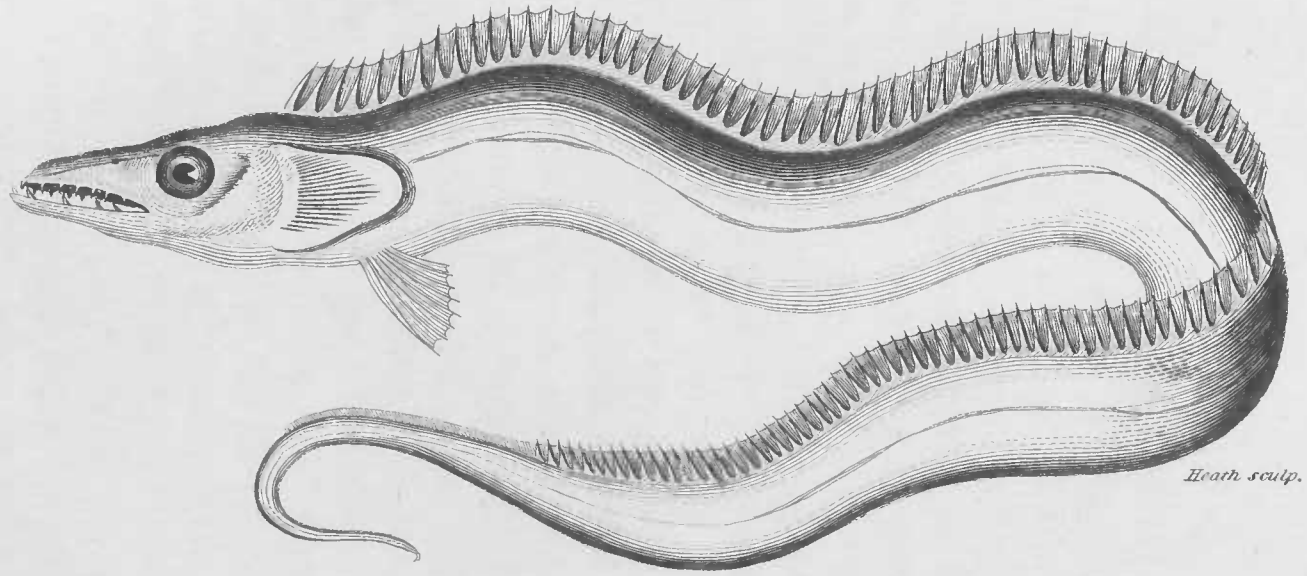
Caput porrectum, operculis lateralibus.	*Head* stretched forwards, with lateral gill-covers.
Dentes ensiformes, apice semisagittati.	*Teeth* ensiform, semisagittate at the tips.
Membrana branchiostega radiis septem.	*Gill-Membrane* seven-rayed.
Corpus compresso-ensiforme, cauda subulata aptera.	*Body* ensiform, compressed, with subulate, finless tail.

SILVER TRICHIURE.

Trichiurus Argenteus. *T. argenteus maxilla inferiore longiore.*
Silvery Trichiure, with the lower jaw longer than the upper.
Trichiurus Lepturus. *Lin. Syst. Nat. p.* 409.
Gymnogaster argenteus compressus, cauda attenuata impinna. *Brown Jam. p.* 444. *t.* 45. *f.* 4.
Trichiurus maxilla inferiore longiore, dentibus magnis. *Bloch. ichth.* 5. *p.* 55. *t.* 158.

THIS fish is equally distinguished by the singularity of its shape, and brilliancy of its colour: the body is extremely compressed, of a great length, and gradually tapers, as it approaches the extremity, till at length it terminates in a very fine point: the whole fish, except on the fins, is of the brightest silver-colour: the head is narrow; the mouth very

12.



Heath sculp.

SILVER TRICHIURE.

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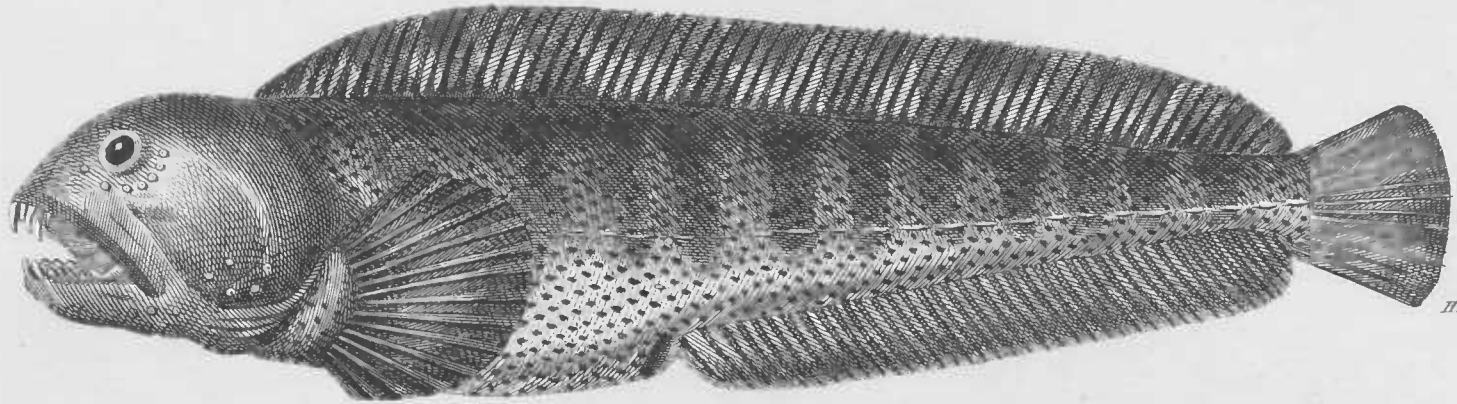
wide, the lower jaw longer than the upper, and furnished with differently sized teeth, the longest of which are barbed at the tips by a sharp descending process or hook on one side: the tongue is smooth, longish, and triangular: in the throat are two rough bones: the eyes are vertical, approximated, and large: the lateral line is of a gold-colour, and, commencing behind the gill-covers, is continued to the tip of the tail: the dorsal fin, which is of moderate width, transparent, and of a yellowish tinge, commences almost immediately behind the head, and runs to within a very small distance of the extremity of the tail, at which part it degenerates into a mere membrane, being strongly radiated in other parts: the pectoral fins are rather small, and of an ovate shape: there is, properly speaking, no direct vent-fin, but a series of very small naked spines or rays, to the number of about 110, are continued from the vent, which is situated about the middle of the body, to near the tip of the tail. The general length of this fish is from two to three feet: it is said to be of a very voracious nature, swims with rapidity, and in the pursuit of its prey sometimes leaps into small vessels which happen to be sailing by. It is a native of the rivers and larger lakes of South America, and is considered as an eatable fish. It is also said to be found in some parts of India, and in China.

ELECTRICAL TRICHIURE.

Trichiurus Electricus. *T. fuscus, mandibulis æqualibus.*
Brown Trichiure with jaws of equal length.
Trichiurus electricus. *T. mandibulis æqualibus. Lin. Syst. Nat. Gmel. p.* 1142.
Anguilla Indica. *Will. ichth. append. t.* 3. *f.* 3.

THIS species, which seems nearly equal in size to the preceding, differs not only in the conformation of the jaws, which are both of equal length, but in the form of its teeth, which are all very minute: the tail is not so extremely slender and sharp as in the former, and the colour of the whole animal is pale brown, variegated with spots of a deeper cast. It is a native of the Indian seas, and is said to possess a degree of electrical power.



Hill sculp.

COMMON WOLF-FISH

1803 July 1. London Publish'd by G. Kearsley Fleet Street.

ANARHICHAS. WOLF-FISH.

Generic Character.

Caput obtusiusculum.	*Head* rather obtuse.
Dentes primores supra infraque conici, divergentes, sex pluresve.	*Fore-Teeth* both above and below conical, divergent, strong, six or more in number.
Molares inferiores palatique rotundati.	*Grinders* in the lower jaw and palate rounded.
Membr: branchiostega radiis sex.	*Gill-Membrane* six-rayed.
Corpus teretiusculum. Pinna caudæ distincta.	*Body* roundish. Tail-fin distinct.

COMMON WOLF-FISH.

Anarhichas Lupus. *A. lividus, fasciis transversis fuscis.*
Livid Wolf-Fish, with transverse brown bands.
Anarhichas *Lupus. Lin. Syst. Nat. p.* 430.
Anarhichas dentibus osseis. *Bloch.* 3. *p.* 18. *t.* 74.
Ravenous Wolf-fish. *Penn. Brit. Zool.* 3. *p.* 157. *pl.* 24.

I KNOW not that any thing material can be added to the descriptions of this fish by Mr. Pennant and Dr. Bloch. The former, in his British Zoology, informs us that it is confined to the northern regions of the globe, being met with in the seas of Green-

land, those of Iceland and Norway, and in some parts of the British coasts. It is a most fierce and ravenous fish, and when taken fastens on any thing within its reach: the fishermen, dreading its bite, endeavour, as soon as possible, to beat out its fore-teeth, and then kill it by striking it on the head: Schonfelde relates that its bite is so hard that it will seize on an anchor and leave the marks of its teeth behind; and we are informed by Steller that one which he saw taken on the coast of Kamtskatka seized with great violence a cutlass with which it was attempted to be killed, and broke it in pieces as if it had been made of glass. It feeds almost entirely on crustaceous animals and shell-fish, viz. crabs, lobsters, prawns, muscles, scallops, large whelks, &c. &c. these it grinds to pieces with its teeth, and swallows with the shells. It grows to a large size, being occasionally found on the British coasts of the length of four feet, but on the more northern coasts of Europe has been seen of the length of seven* feet: the head is a little flattened on the top; the nose blunt, the nostrils very small; the eyes small and placed near the end of the nose: the irides are pale yellow: the teeth are very remarkable, and finely adapted to its way of life: the fore-teeth are strong, conical, diverging a little from each other, and stand far out of the jaws: they are commonly six above, and as many below, though sometimes there are only five in each jaw: these teeth are supported withinside by a row of smaller

* According to Dr. Gmelin it has been found of the length of fifteen feet.

teeth, making the number in the upper jaw seventeen or eighteen, and in the lower eleven or twelve: the sides of the under jaw are convex inwards, which greatly adds to their strength, and at the same time allows room for the large muscles with which the head of this fish is furnished: the molares or grinders of the under jaw are higher on the outer than on the inner edges, which inclines their surfaces inwards: they join the canine teeth in that jaw, but in the upper are separate from them: in the centre are two rows of strong flat teeth, fixed on an oblong basis, upon the bones of the palate and nose: these and the grinding teeth are often found fossil, and in that state have been called *Bufonites* or *Toad-Stones*: they were formerly much esteemed for imaginary virtues, and were set in gold and worn as rings: the two bones that form the under jaw are united before by a loose cartilage, which mechanism admitting a motion from side to side, most evidently contributes to the design of the whole; viz. a facility of breaking, grinding, and comminuting its testaceous and crustaceous food: at the entrance of the gullet, above and below, are two echinated bones; these are very small, being the less necessary, as the food is in a great measure comminuted in the mouth by the aid of the grinders: the body is long, and a little compressed sideways: the skin smooth and slippery: the colour is an obscure livid brown, with several deeper transverse bands, which in some individuals are narrower and more irregular than in others: the pectoral fins are moderately large, rounded, and placed very near

the head: the dorsal fin commences almost immediately behind the head, and is continued as far as the tail, which is small and rounded: the vent-fin commences at a little more than half the distance of the whole animal from the head, and is continued, like the dorsal, as far as the tail.

Dr. Bloch observes that the skin of this animal is in reality beset with small scales, though the fish is by the generality of ichthyologists described as scaleless; an error arising from their small size, and their deep situation on the skin: they are thin, and placed at some distance from each other: the body is also marked by a lateral line, though described by Mr. Pennant as destitute of that part. Of three specimens of this fish examined by Dr. Bloch, one had six rows of grinders in the upper jaw, and as many in the lower; another had six rows above, and four below; while a third had five above and three below.

Notwithstanding the ferocity of this fish, which is as dreadful to the small inhabitants of the water as the wolf is to those on land, it is said to be sometimes attacked and destroyed by an enemy of far inferior size and strength; viz. the Lump-Fish (Cyclopterus Lumpus), which fastens itself on its neck, and adheres immoveably; tormenting it in such a manner as to cause its death.

The Wolf-Fish commonly frequents the deep parts of the sea, and in spring-time approaches the coasts in order to deposit its spawn among the marine plants, &c. the ova are about the size of peas; and the young, according to Mr. Pennant,

are of a greenish cast, like that of the sea-wrack, among which they reside for some time after their birth.

The Wolf-Fish is taken both in nets and by the line, but much more rarely by the latter method, as it does not easily take the bait. Though the flesh is tolerable, yet from the forbidding appearance of the animal, it is rarely eaten in Europe, except by the fishermen: the Greenlanders however eat it, both fresh and dried, and make convenient satchels of the skin, in which they keep their utensils of various kinds.

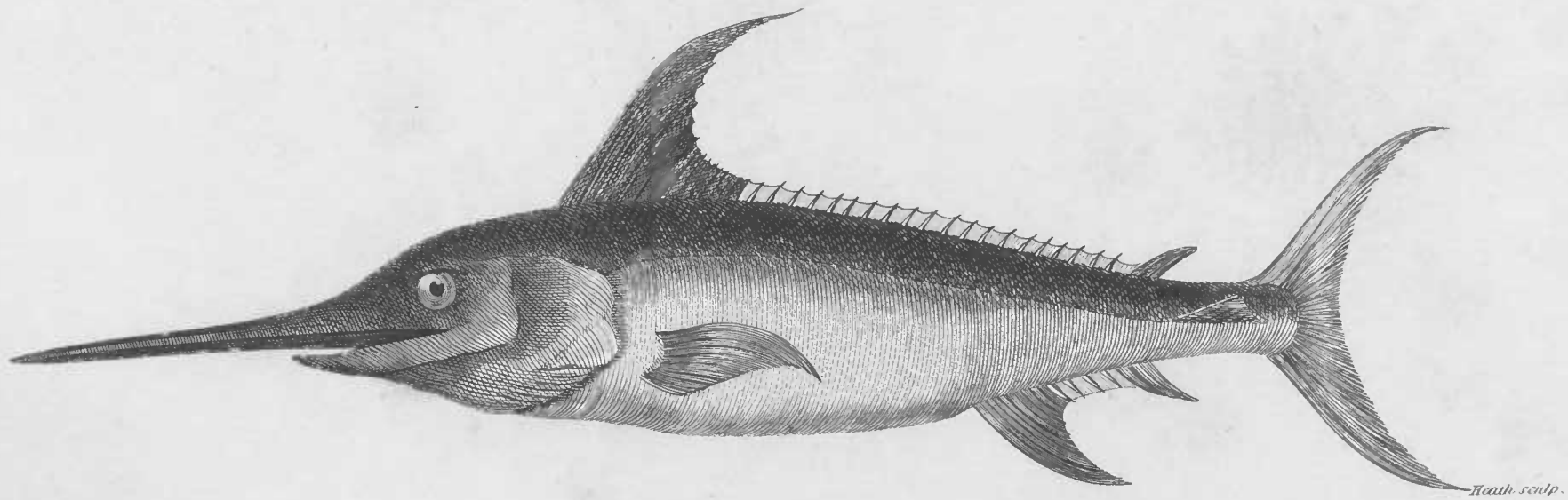
The *Anarhichas strigosus*, mentioned in Dr. Gmelin's edition of the Systema Naturæ, seems to be nothing more than a variety in which the dusky bands of the body are narrower and somewhat less regular than usual, as in the specimen engraved in the British Zoology.

PANTHER WOLF-FISH.

Anarhichas Pantherinus. *A. flavus fusco maculatus.*
Yellow Wolf-Fish, spotted with brown.
Anarhichas pantherinus. *A. maculis per totum corpus rotundis fuscis. Lin. Syst. Nat. Gmel. p.* 1144. *Act. Petrop.* 1781. *p.* 271. *t.* 6.

In its general appearance this is much allied to the preceding species, but differs greatly in colour, being of a deep yellow or fulvous, variegated on all parts with pretty numerous, round, deep brown or blackish spots of different sizes, the largest of

which are those on the back, upper part of the sides, and dorsal fin: the whole skin is of the same mucous or slippery nature as in the common Wolf-Fish, and is every where covered with small points or specks in place of scales: the head is roundish; the lips doubled; the eyes rather large, and the general disposition of the teeth the same as in the preceding: the length of such specimens of this fish as have hitherto been observed is about three feet or rather more: in other particulars it agrees with the common species. Native of the Northern seas.



Heath sculp.

COMMON SWORD-FISH.

1803 July 1. London Publish'd by G. Kearsley Fleet Street.

XIPHIAS. SWORDFISH.

Generic Character.

Caput maxilla superiore terminatum rostro ensiformi.	*Head* with the upper jaw terminating in a sword-shaped snout.
Os edentulum.	*Mouth* without teeth.
Membr. branch. radiis octo.	*Gill-Membrane* eight-rayed.
Corpus teretiusculum, alepidotum.	*Body* roundish, without scales.

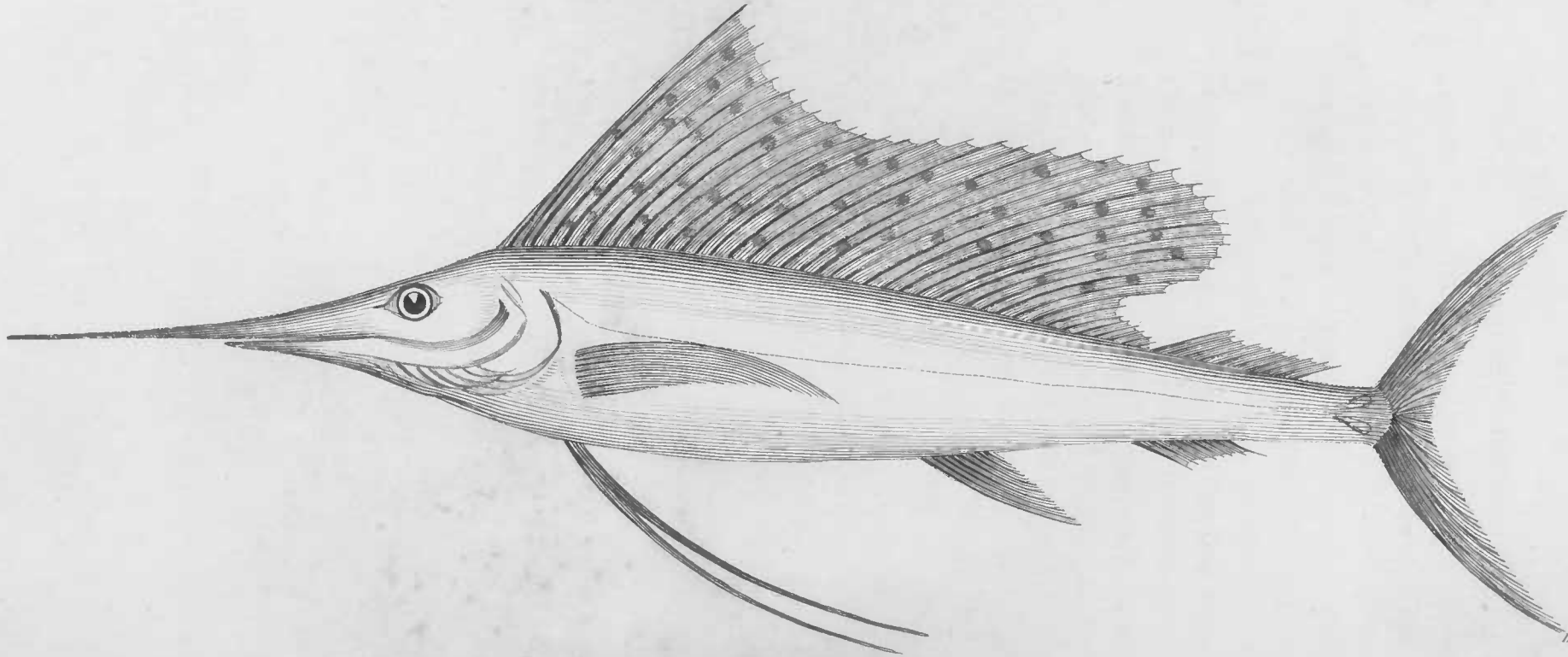
COMMON SWORDFISH.

Xiphias Gladius. *X. pinna dorsali postice attenuata.*
Swordfish with the dorsal fin attenuated at the hind part.
Xiphias Gladius. *Lin. Syst. Nat. p.* 432.
Xiphias. *Gesner. Will. Jonst. &c.*
Gladius. *Aldrov. l.* 3. *c.* 21. *p.* 332.
Sicilian Sword-Fish. *Penn. Brit. Zool.* 4. *p.* 141. *pl.* 26.

THE Swordfish, which is a native of the Mediterranean, and is mostly found in the Sicilian sea, grows to a very large size, sometimes measuring twenty feet in length, and is of an active and predacious disposition, feeding on the smaller kind of fishes, which it kills by piercing with its sword-shaped snout. The body is long, round, and gradually tapers towards the tail: the head flattish, the mouth wide, both jaws ending in a point, but the upper stretched to a great distance beyond the

lower: this part, which is commonly called the sword, is flattish above and beneath, and sharp on the sides: it is of a bony substance, covered by a strong skin or epidermis: down the middle of the upper part runs an impressed line or furrow, and three similar ones on the lower surface: the tongue is free or unconnected with the palate, and is of a strong texture, and in the throat are certain rough bones: the nostrils are double, and seated near the eyes, which are moderately large, and protuberant: the body is covered by a thin skin, having a thick fatty membrane lying beneath: the lateral line is placed near the back, and is formed of a series of longish black specks: the dorsal fin is very high at its commencement, and sinking suddenly, becomes very shallow, and is continued to within a small distance from the tail, terminating in an elevated process: the vent-fin is placed nearly opposite this part beneath, and is moderately small, and much wider at each extremity than at its middle: the pectoral fins are rather small, and of a lanceolate shape: the tail is large and crescent-shaped, and on each side the body, immediately before the tail, is a strong finny prominence or appendage. The general colour of the Swordfish is brown, accompanied by a deep steel-blue cast on the head and upper parts, and silvery white on the sides and abdomen.

Mr. Pennant observes that the ancient method of taking the Swordfish, particularly described by Strabo, agrees exactly with that practised by the moderns at the present day. A man ascends one



Heath sculp.

BROAD-FINNED SWORD-FISH

1803 July 1 London Published by G. Kearsley Fleet Street.

of the cliffs that overhang the sea, and as soon as he spies the fish gives notice, either by his voice or by signs, of the course it takes. Another person, stationed in a boat, climbs up the mast, and, on seeing the fish, directs the rowers to it. As soon as he thinks they are got within reach, he descends, and taking a spear in his hand, strikes it into the fish, which, after wearying itself with its agitations, is seized and drawn into the boat. It is much esteemed by the Sicilians, who cut it in pieces and salt it: this process was anciently performed particularly at the town of *Thurii* in the bay of *Tarentum*, and hence the fish was called *Tomus Thurianus**

The Swordfish is occasionally found not only in the Mediterranean but in the Northern seas, and sometimes in the Pacific: it is probable however that it has been often confounded with a different species more common in that ocean.

BROAD-FINNED SWORDFISH.

Xiphias Platypterus. *X. pinna dorsali latissima, appendicibus pectoralibus acuminatis longissimis.*
Swordfish with extremely broad back-fin, and very long sharp-pointed thoracic appendages. *Nat. Miscell. vol. 3. pl. 88.*
Guebucu. *Marcgr. Bras. l. 4. c. 15. p. 71.*
Scomber Gladius. *S. rostro ensiformi. Bloch. 10 p. 69. t. 345.*

In the appearance of the long and sharp-pointed process of the upper jaw this species is very nearly

* *Plin. l. 32. c. 11.*

allied to the common Swordfish, but differs in other striking particulars. It is found of the length of twenty feet, and even sometimes much longer. It was first described by Marcgrave in his Natural History of Brasil, who has illustrated his description by a figure, which though not possessing any degree of elegance, is yet sufficient to ascertain the animal. The general colour of this fish is a silvery blueish white, except on the back, head, tail, and fins, which in the living animal are of a deep-blue, fading into brown in the dried specimens, one of which is preserved in the British Museum, to which collection it was presented by Sir Joseph Banks, Bart. President of the Royal Society. Some years ago a letter was sent to the President from the captain of an East-Indiaman, accompanied by an account of an astonishing instance of the powerful strength which this fish occasionally exerts; the bottom of the ship having being pierced through by a fish of this species in such a manner that the sword or snout was completely imbedded or driven through almost to its base; the animal having been killed by the violence of the effort. A most singularly fortunate circumstance for the preservation of the vessel, which, had the fish been enabled to have withdrawn its snout, must inevitably have foundered in consequence of the leak. The wood, together with the sword imbedded in it, is now in the British Museum.

This fish is found not only in the Brasilian and East-Indian seas, but also in the Northern ocean. It is said to be a great enemy to whales, with

which it is reported to have frequent combats. It is remarkable that Pliny mentions the circumstance of the Swordfish being able to transfix vessels; which has generally been regarded as one of those exaggerations so frequent in the works of the ancient naturalists: but since the present fish is well known to possess this power, (several other equally well attested accounts having been received within these few years), it is surely no improbable supposition that Pliny, though not conscious of the difference, in reality spoke of this very species, which at that time was doubtless confounded with the common Swordfish.

In the arrangement of this animal I have ventured to differ from Dr. Bloch, who, notwithstanding its general appearance, its sword-shaped snout, and other particulars in which it evidently proclaims itself a genuine Xiphias, has placed it among the *Thoracic Fishes* as a species of the genus *Scomber*, considering the long processes beneath the breast as a kind of pectoral fins. Dr. Bloch seems also to have considered the finny processes above and below the tail, together with the prominences on each side that part, as sufficient to justify his classification of the animal. It may be added that Piso, in his description of this fish, compares its viscera to those of the Tunny.

Dr. Bloch informs us that when this species does not exceed the length of about four feet, it is considered as an eatable fish, but is too coarse when it exceeds that length.

SHORT-SNOUTED SWORDFISH.

Xiphias Makaira. *X. nigricans, rostro mediocri, cauda utrinque tuberculis duobus osseis.*
Blackish Swordfish, with snout of middling length, and two bony tubercles on each side the tail.
Le Makaira noiratre. *Cepede pisc. 4. p. 689. pl. 13. f. 3.*

This species, which has but lately been discovered, is described by Cepede under the title of *Makaira*. Its general appearance resembles that of the common Swordfish: it seems also to equal that species in size; the principal difference consisting in the much shorter and thicker appearance of the sword-like process of the upper jaw in proportion to the rest of the animal: the lower jaw is about half the length of the upper, and the mouth is destitute of teeth: the eyes are large and round: the gill-covers rounded behind, and composed each of two pieces: the pectoral fins are very narrow and about the same length with the upper jaw: the first dorsal fin is large, and gradually sinks as it passes down the back: it is capable of being so far depressed or lowered at the pleasure of the animal, as to rise but little above the outline of the back: beyond this, at a small distance from the tail, is a second fin, of nearly similar shape, but of much inferior size, and the vent-fin, which is placed opposite to this, is but little larger: the tail is large and crescent-shaped, and is marked by numerous black spots, and on each side the tail are two oblong

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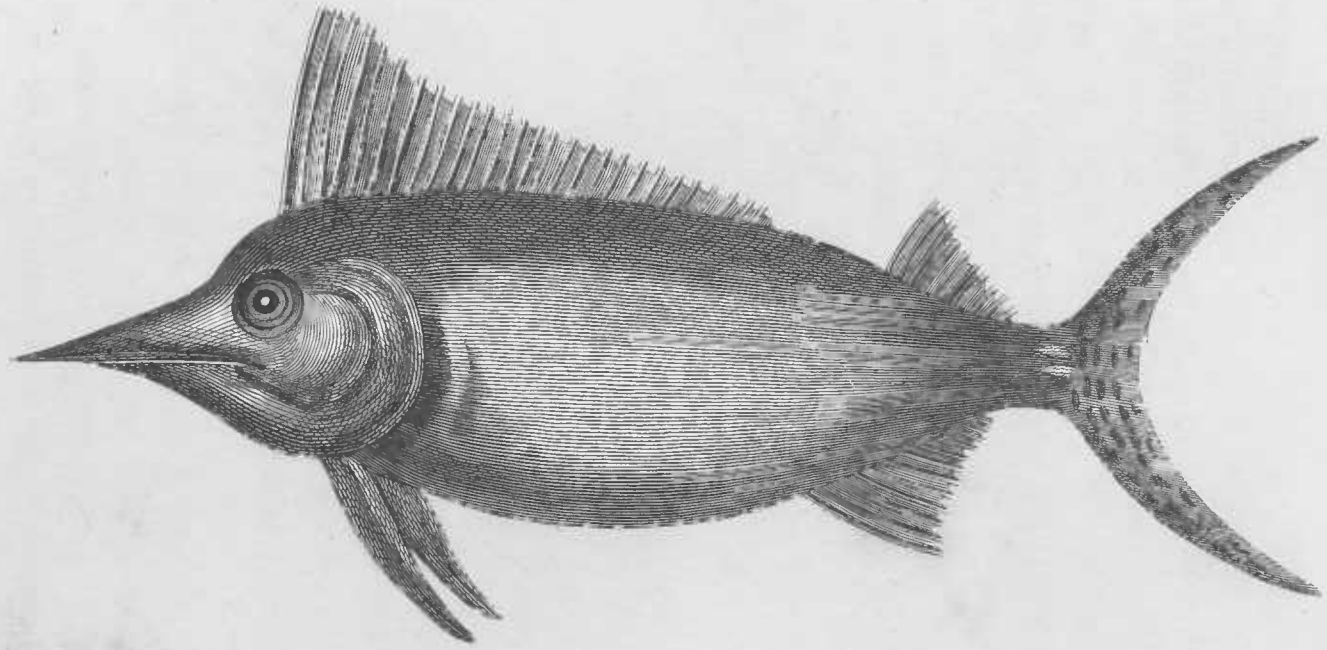

Heath sculp.

SHORT-SNOUTED SWORD-FISH

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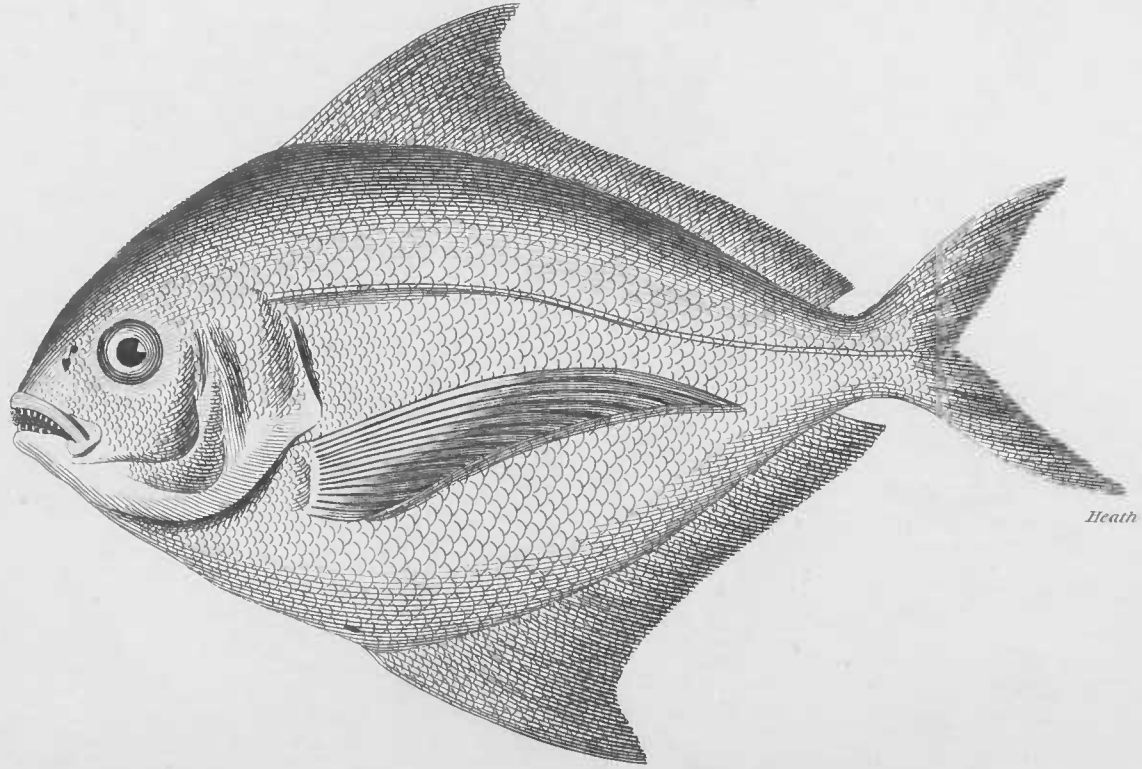
sharpish prominences or bony tubercles. This fish was cast on the isle of Rhe, near Rochelle in France. Its length was 330 French centimetres, and its weight 365 kilogrammes: its colour was blackish: it was eaten by many of the inhabitants of Rochelle, and was found to be tolerable food, though somewhat dry: the flesh was white: on inspecting the mouth it was observed that the palate was extremely rough.

It is probable, as the Count de Cepede observes, that this species has hitherto been confounded with the common Swordfish, and that it is an inhabitant of the same seas.

ROUND-SNOUTED SWORDFISH.

Described by Cepede from the sword or snout, preserved, with the fore-part of the head, in the Paris Museum. It differs from the snout of the common Swordfish in being convex above, instead of flattish, as in that species, and in having the sides perfectly rounded or incapable of cutting: it is also nearly cylindric in its shape, whereas that of the common Swordfish is much depressed: it has three longitudinal furrows above, and one beneath: (the Count de Cepede however seems mistaken in supposing that there are no furrows on that of the common Swordfish, though they are differently placed from those of the present): the skin with

which it is covered is of a very rough or shagreen-like surface; the tubercles being much larger than on the common species, and on the under surface or mouth, they are prolonged into a kind of small, curved teeth, lying in a reversed direction.



Heath sculp.

STRIPED STROMAT

1803. July 1 London Published by G. Kearsley Fleet Street

STROMATEUS. STROMAT.

Generic Character.

Caput compressum.	*Head* compressed.
Dentes in maxillis, palato.	*Teeth* both in jaws and palate.
Corpus rhombeo-ovatum, compressum, lubricum.	*Body* rhombic-ovate, compressed, lubricous.

STRIPED STROMAT.

Stromateus Fiatola. *S. Argenteo-cœrulescens, fasciis undulatis transversis.*
Blueish-silvery Stromat, with transverse undulated bands.
Stromateus Fiatola. *S. subfasciatus. Lin. Syst. Nat. p.* 432.
Fiatola Romæ dicta. *Gesn. Jonst. Will. &c.*

THIS species, though a native of the Mediterranean, seems to be somewhat less distinctly known than the rest of the genus. It is described by Belon, Aldrovandus, Willughby, and others, as of a broad and flat form, but thin, the body being much compressed laterally: its colour on the upper parts is blue, of the sides and abdomen silvery; the whole body being marked transversly by numerous undulated or rather zigzag lines of a yellowish or golden cast, and the lips edged with red: on each side the body are two lateral lines, one of which, viz. that nearest the back, is curved; the other

nearly strait: the mouth is small, the tongue large and smooth; in both jaws is a row of minute teeth, and in the palate are two rough bones; the eyes are small, placed near the mouth, and have silvery irides: the skin is covered with very minute scales: the pectoral fins are rather small, with very numerous rays: the dorsal fin commences at about a third part of the length of the whole animal from the head, and is continued almost to the beginning of the tail: it is of a thickish nature, being covered by the common skin: the tail is considerably forked: the vent-fin resembles the dorsal, but commences at a greater distance from the head. This fish is said to be not uncommon in some parts of the Mediterranean, and is known to the modern Romans by the name of *Fiatola*.

PARU STROMAT.

Stromateus Paru. *S. dorso aureo, abdomine argenteo. Lin. Syst. Nat. Gmel. p.* 1148.
Stromat with gold-coloured back and silvery abdomen.
Stromateus striis carens. *Bloch. 5. p. 63. t.* 160.

This, which is a native of the South-American seas, is of a bright gold-colour on the upper parts, which gradually sinks into bright silver on the lower: the whole body is covered with small, tender scales, which are easily detached from the skin: the fins themselves are also scaly: the head is of moderate size, and brownish in front; the jaws of equal length, and armed with numerous sharp-

pointed teeth: the tongue large and smooth: in the throat are certain rough bones, serving to retain the prey: between the eyes and mouth are two foramina: the gill-covers consist each of a single piece: the lateral line, which is nearer the back than the abdomen, is rather broad, and is curved in the direction of the back. This species is said to be much esteemed as a food. Its general size is that of a turbot.

ASH-COLOURED STROMAT.

Stromateus Cinereus. *S. cinereus, cauda furcata, lobo inferiore longiore.*

Ash-coloured Stromat with forked tail, the lower lobe longer than the upper.

Stromateus cinereus. *S. parte inferiore pinnæ caudæ longiore. Bloch.* 12. *p.* 81. *t.* 420.

THE body of this species is of a somewhat more rhomboid form than that of the preceding, and the fins are somewhat more extended or pointed: the tail is more deeply forked, and the lower lobe considerably exceeds the upper in length: the colour of the whole animal is cinereous, with a cast of yellow on the sides of the head and the base of the fins and tail: the pectoral fins are tinged with red. It is a native of the Indian seas, and grows to about the length of a foot or more, and about the thickness of two inches: it is considered as ex-

cellent for the table, those which are largest being generally preferred: the bones are said to be of a soft or nearly cartilaginous nature, and the ribs but few in number: the residents in India use this fish both in its fresh and salted state, prepared in various ways: the native name is *Pampel.*

SILVER STROMAT.

Stromateus Argenteus. *S. argenteus caudæ lobis æqualibus.*
Silvery Stromat, with the lobes of the tail equal.
Stromateus argenteus. *S. partibus utrisque pinnæ caudæ æqualibus. Bloch.* 12. *p.* 83. *t.* 421.

Of the same general form with the preceding, but with rather shorter fins and tail, the lobes of the latter being both of equal length: the mouth is situated considerably beneath the muzzle, which is thick and round, the colour of the whole animal is bright silver, with a blueish or dusky tinge on the back and fins: the scales are small, thin, and easily deciduous. It is a native of the same seas with the preceding, and is in equal estimation as an article of food.

BLACK STROMAT.

Stromateus Niger. *S. totus nigricans.*
Stromat entirely of a blackish colour.
Stromateus niger maxillis æqualibus. *Bloch.* 12. *p.* 85. *t.* 422.

GREATLY allied to the former in shape, but the mouth is placed in the usual manner, the upper part of the muzzle not rising above it, as in that species: the colour of the whole animal is blackish, with a silvery cast about the breast and sides of the head: the scales are small, and the lateral line, as in others of the genus, is curved in the direction of the back. Native of the Indian seas: not much esteemed as an article of food, on account of a popular prejudice entertained against it from its colour, as well as from its feeding on onisci, which are occasionally found in its mouth.

It may be observed that there is a considerable degree of general resemblance between the habit of the genus Stromateus and that of Chætodon; but as the Stromats are destitute of ventral fins, they cannot be placed in the same artificial order, and must rank among the Apodes. The same is the case with some other genera, which are naturally allied to fishes placed in very different orders. This forms the greatest objection to the Linnæan arrangement of Fishes: it would however be difficult to prove that a more natural distribution would lead to a readier investigation of the animals.

STERNOPTYX. STERNOPTYX.

Generic Character.

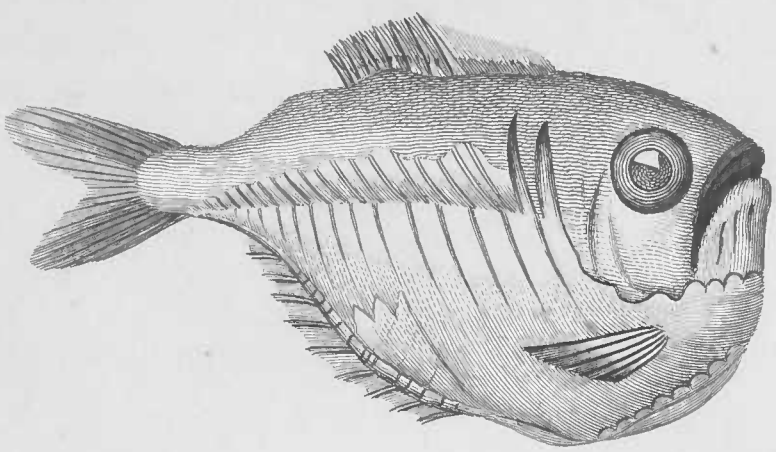
Caput obtusum.
Os simum.
Dentes minutissimi.
Membrana branch. nulla.
Corpus compressum, alepidotum; *sterno* carinato bifariam plicato; *abdomine* pellucido.

Head obtuse.
Mouth abrupt.
Teeth very minute.
Gill-membrane none.
Body compressed, without visible scales; *breast* carinate, folded both ways; *abdomen* pellucid.

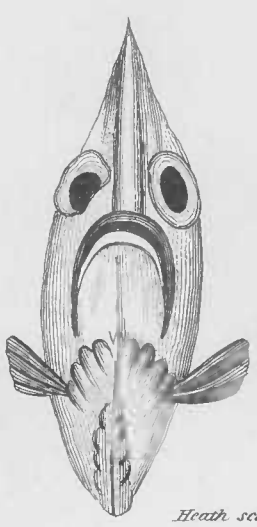
TRANSPARENT STERNOPTYX.

Sternoptyx Diaphana. *S. argentea, sterno carinato, abdomine pellucido.*
Silvery Sternoptyx, with carinated breast, and pellucid abdomen.
Sternoptyx diaphana. *Lin. Syst. Nat. Gmel. p.* 1150. *Hern. Naturf.* 16. *p.* 8. *t.* 1. *f.* 1. 2.

THE small fish from which this genus is instituted is a native of the American seas, and is described as of the general length of two or three inches; the shape broad, and pretty much compressed; the back rising into a sharp edge, and the abdomen terminating in a carina: the eyes are large; the mouth rather wide, and suddenly descending, so as to appear abrupt when viewed in front: the breast



TRANSPARENT STERNOPTYX.



Heath sculp.

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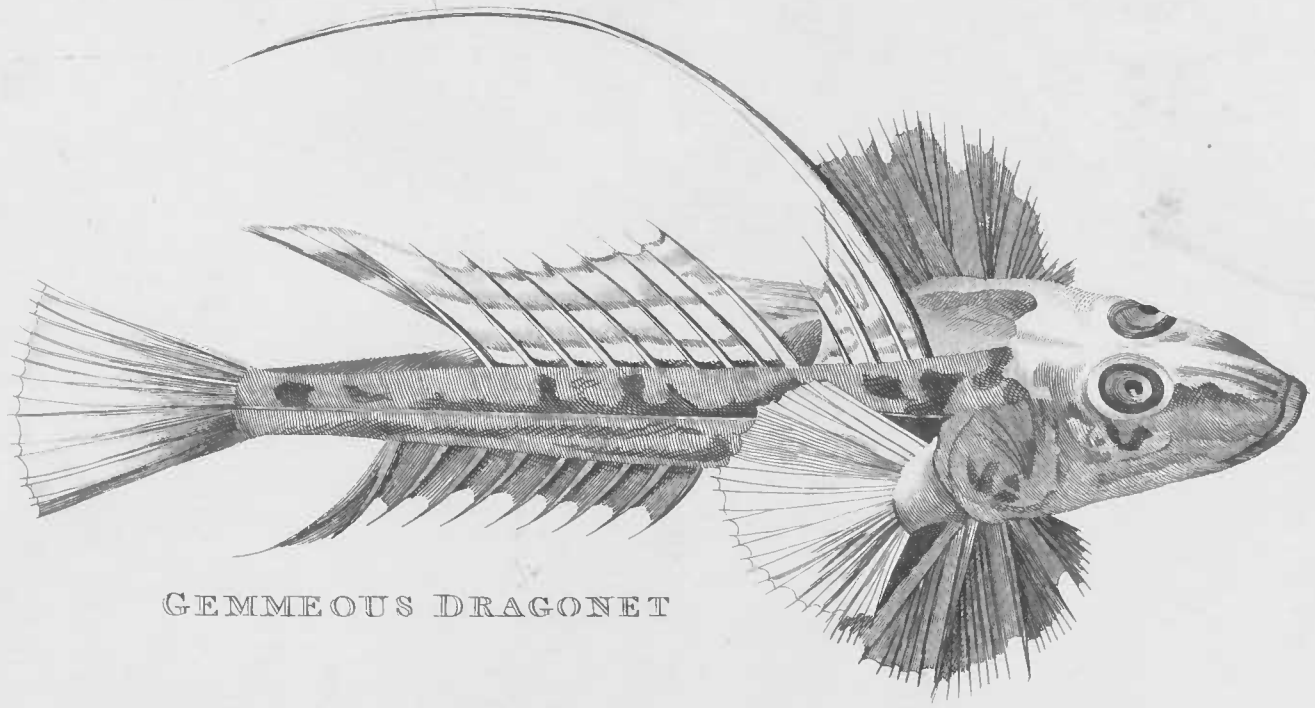
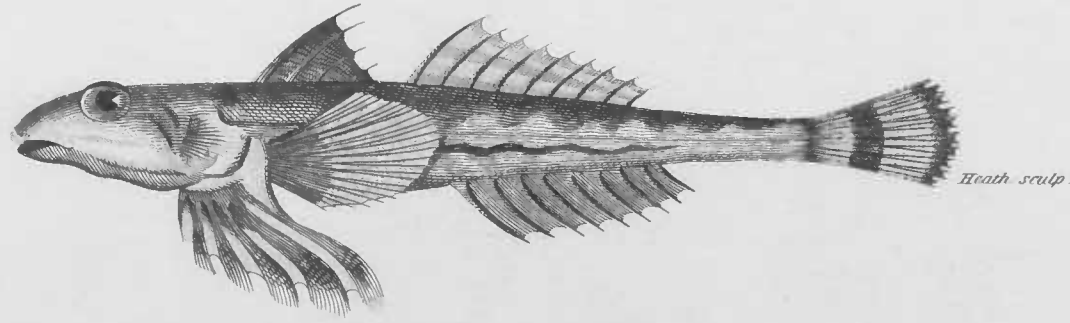
is disposed into a kind of folds on each side, so as to form a pellucid ridge; the pectoral fins are small: the dorsal short, and furnished with an extremely thick and strong ray at its origin: the anal fin is shallow, with distant rays, and extends a considerable way from the vent towards the tail, which is slightly forked. The general colour of this fish is a bright silver; the back inclining to olive, and the fins and tail dull yellow. The particulars of its shape are best exemplified by the annexed figure.



GEMMEOUS DRAGONET



Heath sculp.

SORDID DRAGONET

1803 July 1 London Publisht by G.Kearsley Fleet Street

FISHES.

ORDER

JUGULARES.

CALLIONYMUS. DRAGONET.

Generic Character.

Oculi verticales, approximati.
Opercula clausa, apertura branchiali utrinque in nucha.
Membr. branch. radiis sex.
Corpus nudum: Pinnæ ventrales remotissimæ.

Eyes vertical, approximated.
Gill-covers shut, with a small aperture on each side the neck.
Gill-Membrane six-rayed.
Body naked, ventral fins very remote.

GEMMEOUS DRAGONET.

Callionymus Lyra. *C. radio primo pinnæ dorsalis prioris longitudine corporis.*
Dragonet with the first ray of the first dorsal fin as long as the body.

Callionymus Lyra. *C. dorsalis prioris radiis longitudine corporis. Lin. Syst. Nat. p.* 433.
Dracunculus. *Gesner.* Cottus. *Aldrov. Jonst. Will. Artedi.*
Gemmeous Dragonet. *Penn. Brit. Zool.* 3. *p.* 145. *pl.* 27.

THIS beautiful fish has obtained its specific title from the peculiar form of its first dorsal fin, the shape of which bears a fancied resemblance to that of an ancient lyre or harp. It is a native of the Mediterranean and Northern seas, and measures, when full grown, about a foot in length. The head is large and of a somewhat depressed form: the mouth wide, and the teeth small and numerous: the eyes are placed near each other on the upper part of the head: the gill-covers are joined to the skin of the body, in such a manner as to leave only two small openings on the top of the neck: the body is of a taper form, smooth, and destitute of visible scales: the pectoral and ventral fins are large, rounded, and of a peculiarly thin and delicate structure: the first dorsal fin is of a triangular outline, the first ray extending far beyond the rest, which are very few in number, rarely exceeding four or five. Like most other fishes the Dragonet varies slightly in colour in different individuals and at different seasons of the year; but when in full perfection, generally corresponds with the description given by Mr. Pennant in the British Zoology, viz. "the pupils of the eyes rich sapphirine blue; the irides fine fiery carbuncle: the pectoral fins light brown: the side-line strait: the colours of the fish yellow, blue, and white, making a beautiful appear-

ance when fresh taken: the blue is of an inexpressible splendor; the richest cærulean, glowing with a gemmeous brilliancy: the throat black." In the Philosophical Transactions, vol. 24, this fish is described by Dr. Tyson under the name of Yellow Gurnard: Dr. Tyson seems to have ranked it among the Gurnards from its general habit, as well as from the sharp processes of the gill-covers, each of which, at its end, is armed with a triple spine. Linnæus once considered it as a species of Trachinus or Weever, and Gronovius referred it to the genus Uranoscopus.

SORDID DRAGONET.

Callionymus Dracunculus. *C. pinnæ dorsalis prioris radiis corpore brevioribus. Lin. Syst. Nat. Gmel. p.* 1152.

Dragonet with the rays of the first dorsal fin shorter than the body.

Dracunculus. *Will. ichth. p.* 136.

Callionymus radiis 4 in pinna dorsali brevibus. *Bloch.* 5. *t.* 162.

Sordid Dragonet. *Penn. Brit. Zool.* 3. *p.* 147. *pl.* 28.

This species seems so nearly allied to the preceding, that it may perhaps be doubted whether it may not be in reality the same animal in a less advanced state. It is thus described by Mr. Pennant. "Length six inches and a half: head compressed; forehead sloping down to the nose, being not so level as that of the preceding: eyes large

and almost contiguous: mouth small; teeth very minute: over the gills a strong, trifurcated, broad spine: the first dorsal fin had four rays; the first setaceous, extending a little higher than the others; the last very short: the two first rays and webs yellow, the others black: the second had ten soft rays, their ends extending beyond the webs, which were pellucid: the pectoral fins consisted of twenty rays, and were ferruginous, spotted with a deeper cast of the same: the ventral fins consisted of five broad and much-branched rays, like those of the first species: the anal fin was white, and had ten rays: the tail had ten rays: in both species they are bifurcated at their ends, and the ray next the anal fin is in both very short. In colour this species is far inferior to the former, being of a dirty yellow, mixed with white and dusky spots: the belly is entirely white." This fish, like the preceding, is a native of the Mediterranean and Northern seas: both are numbered among edible fishes, and are supposed to live principally on worms and sea-insects.

INDIAN DRAGONET.

Callionymus Indicus. *C. capite lævi longitudinaliter rugoso, operculis latere aperiendis. Lin. Syst. Nat. p.* 434.

Dragonet with smooth head longitudinally wrinkled, and gill-covers opening at the sides.

This species is a native of the Asiatic seas, and is described by Linnæus as having the head de-

pressed, and wrinkled in a longitudinal direction; the mouth rough; the tongue obtuse and emarginated, and the lower jaw rather longer than the upper: the branchial apertures large and lateral: the fore part of the gill-covers furnished with a double spine, and the hind part with a single one: the body much depressed, and of a livid colour: the vent situated in the middle of the abdomen; the first ray of the first dorsal fin very short and remote from the rest: the ventral fins very remote from each other. Linnæus adds that it is a kind of intermediate species, between the Callionymi, the Trachini, and the Uranoscopi.

BAIKAL DRAGONET.

Callionymus Baikalensis. *C. pinnis ventralibus nullis, dorsali prima minima, secundæ radiis cirrhiferis. Lin. Syst. Nat. Gmel. p.* 1153. *Pall. it.* 3. *p.* 707.

Dragonet without ventral fins, the first dorsal fin very small, and the second furnished with cirrhiferous rays.

This species is described by Dr. Pallas, and is an inhabitant of the deepest parts of the Lake Baikal, from whence it occasionally wanders during the summer months to the shores, appearing in considerable numbers: the head is large, somewhat quadrangular at the base and flat at the top, with two tubercles on each side: the eyes are large and black: the snout broad and depressed, and the

mouth very wide: the mandibles thick at the edges, the lower projecting beyond the upper: both are internally beset with small curved hooks or teeth, but the lower is smooth at the tip and subacute: the gill-membrane is lax and furnished with very remote cartilaginous rays: the pectoral fins are lax and very long, equaling half the length of the body, and have very slender stiff rays: the rays of the second dorsal fin are also slender, and fifteen of them are stiff: the tail is bilobate and stronger than the fins: the lateral line is nearer the back than the abdomen: the length of this species is about a span: it is of a soft oily nature, and of a slender and somewhat compressed shape, gradually tapering from head to tail.

OCELLATED DRAGONET.

Callionymus Ocellatus. *C. pinnæ dorsalis prioris membrana fasciolis fuscis et ocellis quatuor fuscis picta. Lin. Syst. Nat. Gmel. p.* 1154. *Pall. spic. Zool.* 8. *p.* 25. *t.* 4. *f.* 13.

Dragonet with the membrane of the first dorsal fin marked with dusky streaks and four dusky ocellate spots.

A SMALL species, not exceeding the size of the little finger: native of the Indian seas: colour above a variegation of ash and brown, the ash-coloured parts being marked by white specks: beneath white: head smaller and sharper than in

others of the genus; flattish on the top; with the snout obtuse: eyes small and lateral: mouth small, with tumid, fleshy lips, the upper one doubled: gill-covers sharp, armed by a simple spine, and punctated on their membrane: first dorsal fin, in the male, minute, entirely black, with setaceous, flexile rays: in the female broad, the connecting membrane being marked on its lower part by dusky bars included by a white line edged with black; and on its upper part by eye-shaped spots black in the middle, surrounded by a white circle edged with black: the second dorsal fin is more shallow, and of a dusky colour, marked with white parallel lines: pectoral fins hyaline, spotted with white at their base; their rays twice barred with brown; the two middle rays being longer than the rest: ventral fins large, laciniate, black, with a white border, and very thick rays which are very much branched: vent fin serrated, black, with white base; the two first rays setaceous, the rest bifid: vent situated a little before the middle of the abdomen, and behind it, in the female, is a small conical peduncle recumbent in a fossule: lateral line strait: tail rounded: spotted with white at the base; the rays barred or interrupted with brown.

ARROW-HEADED DRAGONET.

Callionymus Sagitta. *C. capite triangulari, membrana branchiostega triradiata, pinnarum dorsi radiis æqualibus. Lin. Syst. Nat. Gmel. p.* 1155. *Pall. spic. zool.* 8. *p.* 29. *t.* 4. *f.* 4. 5.
Dragonet with triangular head, three-rayed gill-membrane, and the rays of the dorsal fins equal.

NATIVE of the Indian seas: found about Amboina, &c. Length about three inches: of a slender shape, obscurely quadrangular, and of a brownish colour variegated with grey; beneath of a greyish white: head large and broad, much depressed, with a sharpish snout, at the tip of which is the mouth, which is small, with thin lips, the superior of which is doubled: mandibles rough: tongue very short, and flat: eyes small and approximated; iris silvery: gill-covers soft, with the hinder lamina large and extended as far as the pectoral fins, the first lamina terminated by a long, subulate spine, serrated within with small teeth in a backward direction: first dorsal fin small, and marked at the hind part by a black band: second dorsal fin and pectoral ones hyaline, variegated with brown and white: ventral fins laciniate, spotted with brown, and furnished with very numerous rays: vent fin low, with the last ray branched: vent situated before the middle of the body: lateral line strait, obscure towards the head: tail rounded at the end, and spotted above with brown.

JAPANESE DRAGONET.

Callionymus Japonicus. *C. pinna dorsali priore ocello nigro picta, radio primo in pilos semipollicares terminato. Lin. Syst. Nat. Gmel. p.* 1155. *Houttuyn act. Harl.* 20. *p.* 313.

Dragonet with the first dorsal fin marked by a black ocellate spot, the first ray terminating in two hairs.

NATIVE of the Japanese sea: head depressed: eyes large, approximate: first dorsal fin with black rays: second dorsal fin whitish: pectoral fins rounded: ventral fins very large: tail four inches long, forked, with unequal rays; length of the fish about nine inches and a half: body variegated, smooth, and roundish.

URANOSCOPUS. STAR-GAZER.

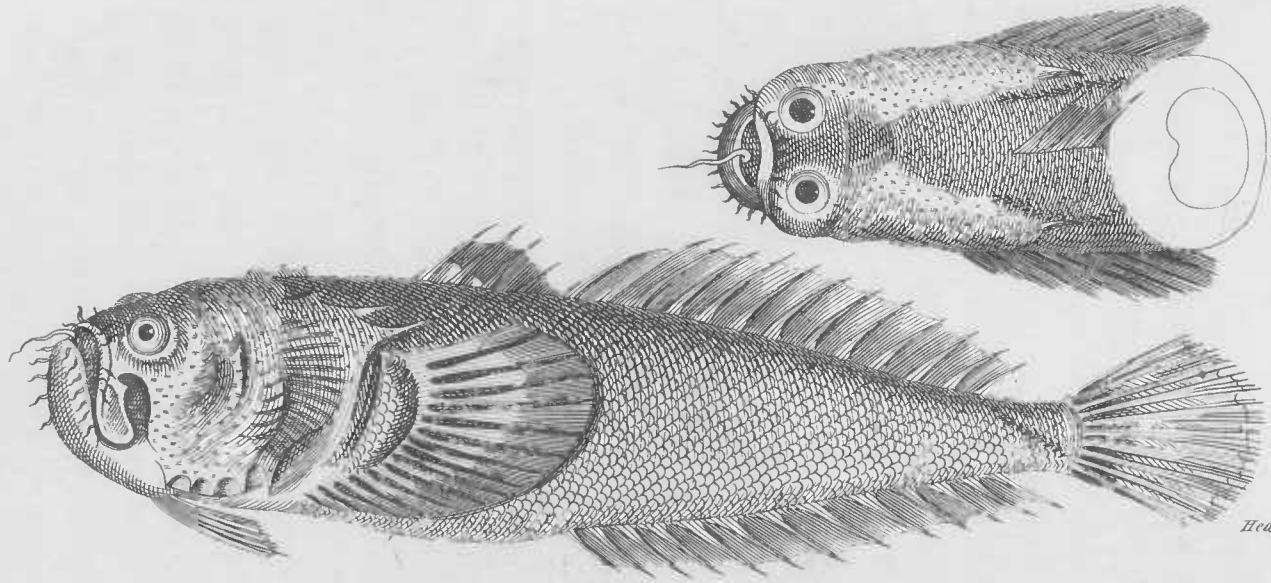
Generic Character.

Caput depressum, scabrum, majus.	*Head* large, depressed, rough.
Os cirrho interno.	*Mouth* furnished with an internal cirrus.
Opercula membranaceo-ciliata.	*Gill-covers* edged by a ciliated border.
Membr. branch. radiis quinque.	*Gill-membrane* five-rayed.

BEARDED STAR-GAZER.

Uranoscopus Scaber. *U. labiis cirrhosis, dorso lævi.*
Star-Gazer with bearded lips and smooth back.
Uranoscopus scaber. *Lin. Syst. Nat. p.* 434.
Uranoscopus. *Capite scabro. Bloch. 5. p. 75. pl.* 163.
Uranoscopus. *Gesn. Aldr. Will. &c.*

THE head of this fish is large, squarish, and covered by a strong bony case, roughened by an infinite number of small warts or protuberances: each side of this case is terminated above by two spines, the hindermost of which is the strongest and covered by a skin: the under part has five spines, smaller than those above: the mouth, which



Heath sculp.

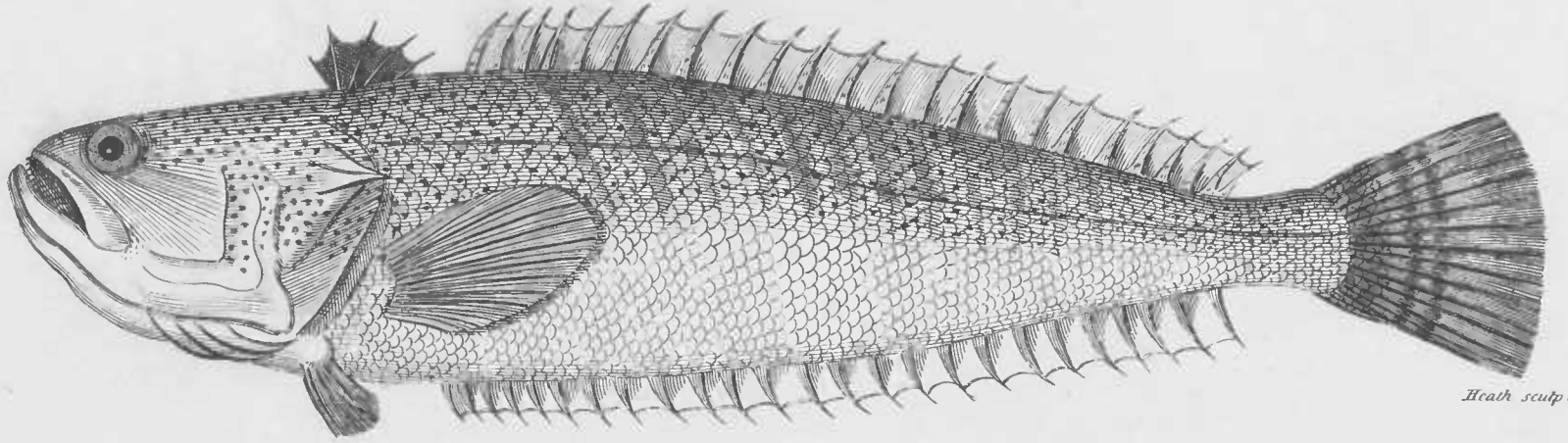
BEARDED STAR-GAZER

1803 July 1. London. Publish'd by G. Kearsley Fleet Street.

is wide, opens in an almost vertical direction: the tongue is thick, short, and roughened with numerous small teeth: near the interior tip of the lower jaw is a membranaceous process which terminates in a long cirrus or beard extending to some distance beyond the lips, which are themselves edged with smaller ones: the eyes are situated very near each other on the top of the head: the body is of a somewhat squarish form as far as the vent, and from thence becomes cylindric: it is covered with small scales, and marked near the back by a lateral line composed of small pores or points bending from the neck to the pectoral fins on each side, and from thence in a strait line to the tail: on the back are two fins, of which the first is much shorter than the latter and furnished with stronger spines: the pectoral fins are large, with soft rays: the ventral fins are small; the tail of moderate size and rounded at the end. The colour of the body is brown, with a whitish or silvery cast towards the abdomen; the head, pectoral fins, and tail having a strong ferruginous cast, and the first dorsal fin being marked towards its hind part by a large black spot.

The Star-gazer is an inhabitant of the Mediterranean and Northern seas, chiefly frequenting the shallow parts near the shores, where it lies concealed in the mud, with the tip of the head alone exposed: in this situation it waves the beards of the lips, and particularly the long cirrus of the mouth, in various directions, thus alluring the smaller fishes and marine insects which happen to be swimming near, and which mistaking these organs for worms

are instantly seized by their concealed enemy. The usual length of this fish is about twelve inches. It is in no esteem as an article of food, being generally considered as coarse and of an ill flavour: the gall was anciently considered as of peculiar efficacy in external disorders of the eyes.



Heath sculp.

DRAGON-WEAVER

1803 July 1. London Published by G. Kearsley Fleet Street.

TRACHINUS. WEEVER.

Generic Character.

Caput minus læve, compressum.	*Head* slightly roughened, compressed.
Membr. branch. radiis sex, operculorum lamina serrata.	*Gill-membrane* six-rayed. *Gill-covers* serrated on the edge.
Corpus compressum. Anus prope pectus.	*Body* compressed. Vent situated near the breast.

DRAGON WEEVER.

Trachinus Draco. *T. subargenteus, striis subobliquis transversis flavescentibus, pinna dorsali priore quinque-radiata nigra.*
Subargenteous Weever, with suboblique, transverse, yellowish streaks; the first dorsal fin black and five-rayed.
Trachinus Draco. *Lin. Syst. Nat. p.* 435.
Draco marinus. *Belon. Gesn. Aldr. &c.*
Weever. *Willughb. Pennant, &c.*

THIS fish is of a lengthened shape, much compressed on the sides, and covered with small and easily deciduous scales: the mouth is wide, and opens vertically, like that of the Star-gazer: both jaws are armed with sharp teeth: the tongue is strait, smooth, and pointed: the eyes are seated on the

upper part of the head, pretty near each other: the gill-covers are armed at their tips with a strong spine: the first dorsal fin is small, and furnished with five strong spines: the second fin is continued almost to the tail; the vent fin is of similar extent, and the tail is rather large, and even at the end: the pectoral fins are of moderate size, and the ventral very small: the general colour of the Weever is silvery, with a yellowish, or dusky cast on the upper parts, while the sides are commonly varied by numerous obliquely transverse streaks of a similar colour: the scales are small and rounded: the first dorsal fin is of a deep black. The usual length of the fish is about ten or twelve inches.

This fish, like the Star-gāzer, is an inhabitant of the Mediterranean and Northern seas, commonly frequenting the coasts, and frequently imbedding itself in the sand; in which situation, if accidentally trodden on, it strikes backwards with great violence, and endeavours to wound the aggressor with the spines of its first dorsal fin. So troublesome are the consequences arising from the punctures inflicted by this part, that a law is said to exist in France obliging the fishermen to cut it away before the fish is exposed for sale. The usual symptoms attending the wound are, violent heat, pain, and inflammation; and it not unfrequently happens that when the hand is thus wounded, a sudden redness extends throughout the whole length of the arm, as far as the shoulder. The usual remedy among the English fishermen is, according to Mr. Pennant, sea-sand, well rubbed on the part: an

application which one might at first suppose would rather aggravate than alleviate the complaint. Many other popular remedies are used in different countries. Notwithstanding the suspicious aspect of the above-mentioned black fin, it does not seem to have any thing in its conformation which can justify the idea of any poisonous fluid conveyed from it into the wound; the spines when microscopically examined shewing no appearance of a tubular structure.

The Weever is considered as an excellent article of food, and is much esteemed in Holland, France, &c. It feeds principally on marine insects, worms, and small fishes: it is tenacious of life, and can exist many hours out of water: the skin is remarkably tough, and the animal may be excoriated with almost the some facility as an eel.

It is maintained by some ichthyologists, that there are in reality two kinds of this fish; viz. the greater and smaller Weever; but the difference, if any, seems to consist merely in size and a slight variation of colour: thus Willoughby mentions his having seen a specimen at Rome which, exclusive of its size, differed from the common kind in being marked along the sides with large black spots instead of the usual oblique yellow streaks: the same variety seems also to be figured in the work of Salvian. Mr. Pennant likewise describes and figures the Great Weever in the British Zoology, but makes no mention of the spots observed by Willoughby.

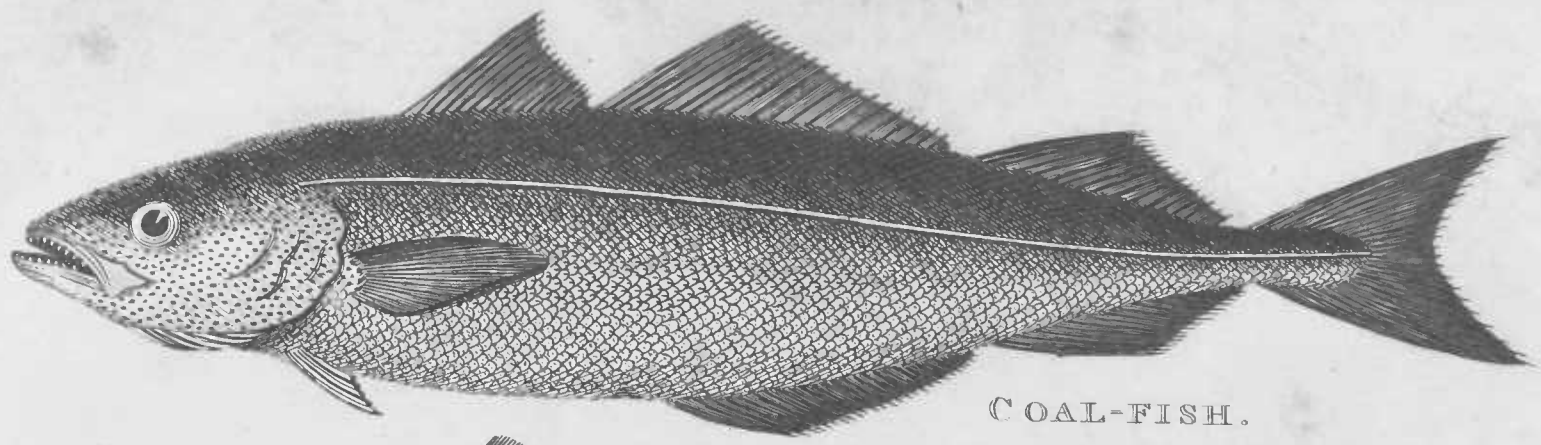
It may be added that the Weever was by Artedi

considered as not generically distinct from the Uranoscopus. Its English name *Weever* seems, as Mr. Pennant observes, to be a corruption from the French title *la Vive.*

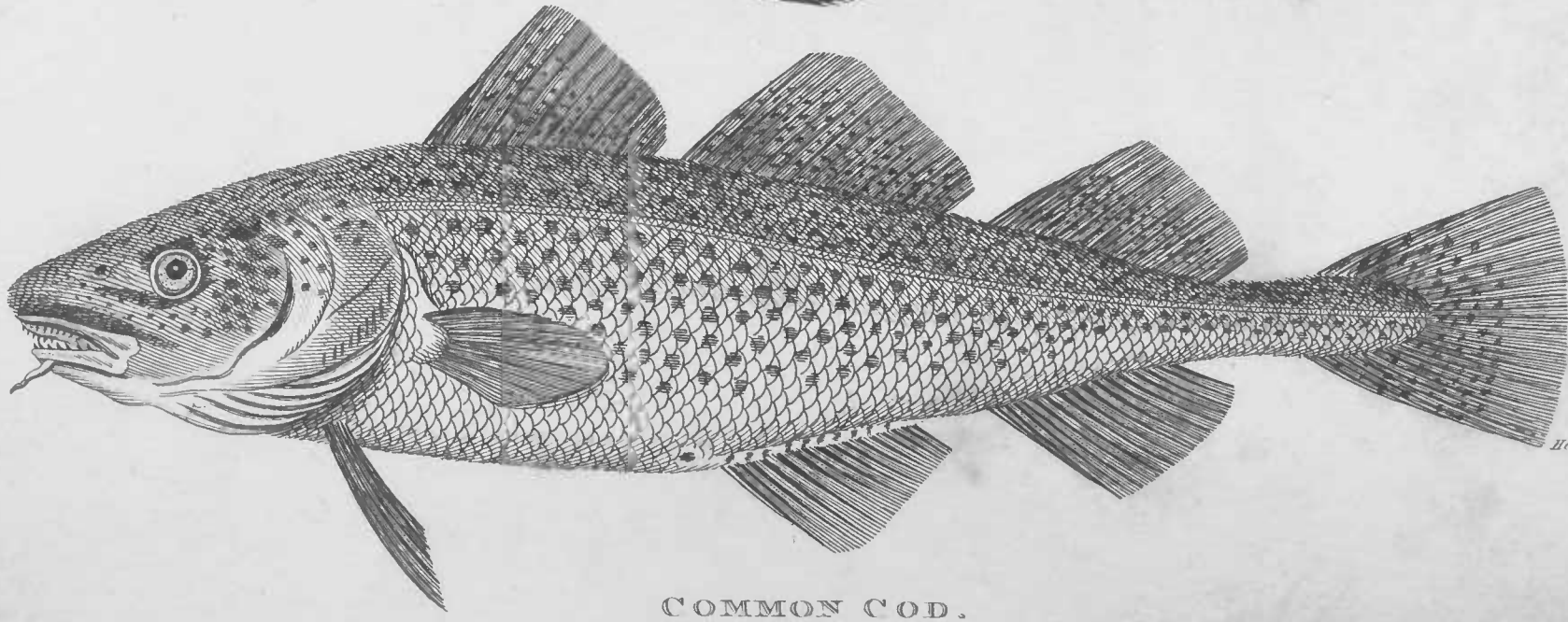
OSBECKIAN WEEVER.

Trachinus Osbeckii. *T. albus, nigro maculatus, maxillis æqualibus.*
White Weever, spotted with black, with both jaws of equal length.
La Trachine Osbeck. *Cepede pisc.* 1. *p.* 364.

NATIVE of the Atlantic seas, and found about the Isle of Ascension, &c. Colour white, spotted with black: both jaws of equal length, and furnished with several rows of long and pointed teeth, three of which, both above and below, are larger than the rest: some sharp teeth are also situated in the throat: each gill-cover is terminated by two spines of unequal length: tail even. Described by Osbeck in his voyage to China.



COAL-FISH.



Heath sculp.

COMMON COD.

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GADUS. COD.

Generic Character.

Caput læve.	*Head* smooth.
Membr. branch. radiis septem teretibus.	*Gill-membrane* seven-rayed.
Corpus oblongum, squamis deciduis.	*Body* oblong, covered with deciduous scales.
Pinnæ omnes cute communi vestitæ.	*Fins* all covered by the common skin.
Dorsales anique plures, radiis muticis.	*Dorsal and anal* generally more than one; the rays unarmed.
Pectorales in acumen attenuatæ.	*Ventral fins* slender, ending in a point.

COMMON COD.

Gadus Morhua. *G. cinereus subflavo maculatus, squamis majoribus, cauda subæquali, radio primo anali spinoso.*
Ash-coloured Cod, with yellowish spots, largish scales, and first ray of the vent fin spiny.
Gadus Morhua. *G. tripterygius cirratus, cauda subæquali; radio primo anali spinoso. Lin. Syst. Nat. p.* 436.
Morhua. *Belon. Gesn. Aldr. &c.*
Common Cod-Fish. *Penn. Brit. Zool.* 3. *p.* 152.

THIS highly important and prolific species, which furnishes employment for so many thousands,

and forms so considerable a part of the subsistence of mankind, is an inhabitant of the Northern seas, where it resides in immense shoals, performing various migrations at stated seasons, and visiting in succession the different coasts of Europe and America. Its history is so well detailed by Mr. Pennant, that little can be added to what that author has collected in his British and Arctic Zoology.

" The general rendezvous of the Cod-fish," says Mr. Pennant, " is on the banks of Newfoundland, and the other sand-banks that lie off the coasts of Cape Breton, Nova Scotia, and New England. They prefer those situations on account of the quantity of worms produced in those sandy bottoms, which tempt them to resort there for food; but another cause of this particular attachment to those spots is their vicinity to the polar seas, where they return to spawn: there they deposit their roe in full security, but want of food forces them, as soon as the first more Southern seas are open, to repair thither for subsistence. Few are taken north of Iceland, but on the south and west coasts they abound: they are again found to swarm on the coasts of Norway, in the Baltic, off Orkney and the Western Isles; after which their numbers decrease, in proportion as they advance towards the south, when they seem quite to cease before they reach the mouth of the Straits of Gibraltar."

Before the discovery of Newfoundland, the greater fisheries of Cod were on the seas of Iceland and our own Western Isles, which were the grand resort

of the ships of all the commercial nations, but it seems that the greatest plenty was met with near Iceland.

Newfoundland, a name in the infancy of discovery common to all North America, was discovered in the year 1496, by the celebrated Venetians Sebastian Cabot and his three sons; who, at their own charges, under a grant of Henry the seventh, giving them possession, as vassals of his, of all lands they might discover, coasted from lat. 67. 30, to the Capes of Florida.

The isle of Newfoundland is of a triangular form, and lies between lat. 46. 40, and 51. 30: visited occasionally, but not inhabited, by savages from the continent. The boasted mine of this island, viz. its sand-bank, is represented as a vast submarine mountain, of above 500 miles long, and near 300 broad, and seamen know when they approach it by the great swell of the sea, and the thick mists that impend over it. The water on the bank is from twenty-two to fifty fathoms; on the outside from sixty to eighty; and on the smaller banks much the same: the increase of shipping that resort to these fertile banks is now unspeakable: our own country still enjoys the greatest share, and ought to be esteemed one of our chiefest treasures, bringing wealth to individuals, and strength to the state. All this immense fishery is carried on by the hook and line only: the principal baits are herring, the small fish called a capelin, the shell-fish called clams, and pieces of sea-fowl; and with these are caught fish sufficient to find employ

for fifteen thousand British seamen, and to afford subsistence to a much more numerous body of people at home, who are engaged in the various manufactures which so vast a fishery demands. The fish, when taken, are properly cleaned, salted, and dried, and in this state sent into various parts of the European continent.

The Cod grows to a very large size. Mr. Pennant commemorates a specimen taken on the British coasts which weighed seventy-eight pounds, and measured five feet eight inches in length, and five feet in girth round the shoulders; but the general size, at least in the British seas, is far less, and the weight from about fourteen to forty pounds; and such as are of middling size are most esteemed for the table.

The Cod is of a moderately long shape, with the abdomen very thick and prominent: the head is of moderate size, and the eyes large: the jaws of equal length, the lower one bearded at the tip by a single cirrus: in the jaws and palate are numerous sharp teeth: the dorsal and anal fins are rather large, the pectoral rather small: the ventral small and slender: the tail of moderate size, and even at the end, the first ray on each side being short, strong, and bony. The usual colour of this fish is cinereous on the back and sides, and commonly spotted with dull yellow: the belly white or silvery; but the colours occasionally vary very considerably, and instances are often seen in which a yellow, orange, or even red tint prevails on the upper parts of the body, while the spots are lighter or deeper accord-

ing to the different seasons in which the fish is taken: the lateral line, which is one of the principal distinctive marks of the species, is broad and whitish, and the scales are somewhat larger than in others of the genus.

The food of the Cod is either small fish, worms, testaceous or crustaceous animals, such as crabs, large whelks, &c. its digestion is so powerful as to dissolve the greatest part of the shells it swallows: it is very voracious, catching at any small body it perceives moved by the water, even stones and pebbles, which are often found in the stomach. The fishermen are well acquainted with the use of the air bladder or *sound* of this fish, and dexterously perforate the living fish with a needle, in order to let out the air contained in that part; for without this operation the fish could not be kept under water in the well-boats, and brought fresh to market. The sounds when salted, are reckoned a delicacy, and are often brought in this state from Newfoundland. A species of Isinglass is also prepared from this part of the fish by the natives of Iceland.

HADDOCK.

Gadus Æglefinus. *G. albicans, cauda biloba, maxilla superiore longiore, macula nigra pone pinnas pectorales.*
Whitish Gadus, with bilobate tail, upper jaw longer than the lower, and a black spot beyond the pectoral fins.
Gadus Æglefinus. *Lin. Syst. Nat. p.* 435.
Gadus Æglefinus. *G. cirro unico, linea laterali nigra. Bloch. pl.* 62.
Hadock. *Willughb. Pennant, &c.*

The Haddock is distinguished from the rest of this genus by having a forked tail, and the lower jaw longer than the upper: the colour of the body is silvery or white, with a dusky cast on the back: the lateral line is black, and on each side, at some distance beyond the head, and above the pectoral fins, is a moderately large, squarish black spot: the tip of the lower jaw is furnished with a cirrus: the eyes are large; the scales small, round, and pretty closely attached to the skin.

This species is a native of the Northern seas, where, like the cod, it assembles in prodigious shoals, visiting particular coasts at stated seasons: the shoals are sometimes near six miles in length, and more than a mile in breadth. "The grand shoal of Haddocks," says Mr. Pennant, "comes periodically on the Yorkshire coasts. It is remarkable that they appeared in 1766 on the 10th of December, and exactly on the same day in 1767. These shoals extended from the shore near three miles in breadth, and in length from Flamborough Head to Tinmouth Castle, and perhaps much

farther northwards. An idea may be given of their numbers by the following fact: three fishermen within the distance of a mile from Scarborough harbour frequently loaded their *coble* or boat with them twice a day, taking each time about a ton of fish: when they put down their lines beyond the distance of three miles from the shore they caught nothing but dog-fish, which shews how exactly these fish keep their limits. The best were sold from eight-pence to a shilling per score, and the poor had the smaller sort at a penny, and sometimes a half-penny per score." The Haddock is taken in vast quantities about Heiligiland, and is from thence sent to Hamburgh. In stormy weather this fish is said to imbed itself in the ooze at the bottom of the sea, none being taken in such weather; and those which are taken afterwards are observed to be covered with mud on their backs.

The Haddock is, in general, of moderate size, measuring about eighteen inches or two feet in length: those which are most esteemed for the table weighing from two to four pounds; but it sometimes arrives at the length of three feet, and the weight of fourteen pounds. Its food consists of small fishes, worms, and sea-insects. It spawns in the month of February.

DORSE.

Gadus Callarias. *G. cinereus subtus albus, capite corporeque fusco-maculatis, cauda integra, maxilla superiore longiore.*
Cinereous Gadus, white beneath, with head and body spotted with brown, even tail, and upper jaw longest.
Gaudus Callarias. *Lin. Syst. Nat. p.* 436.
Gadus linea laterali lata ænea maculataque. *Bloch. pl.* 63.
The Dorse.

This is a somewhat smaller species than the Haddock, those which are usually taken rarely exceeding the weight of two pounds.

The head is smaller than that of the Haddock, and is marked by several spots, which in the summer are generally brown, and in the winter black: the general colour of the fish is cinereous above, and white beneath, several brown spots being scattered over the body, which, in the young fish, are often of an orange-colour: the scales are small, thin, and soft: the upper jaw is longer than the lower, and is furnished with more rows of teeth: at the tip of the lower jaw is a cirrus or beard.

The Dorse is a native of the Northern seas, as well as of the Mediterranean and the Baltic. It is taken both by the line and the net, and is highly esteemed as an article of food. It lives, like most others of this genus, on the smaller fishes, and sea-insects. Instances are adduced by authors in which this fish, like the Haddock, has been found greatly to exceed the usual size, and to weigh seven, eight, ten, or even fourteen pounds. It spawns in the month of February.

WHITING-POUT.

Gadus Barbatus. *G. albus, dorso pinnisque subfuscis, maxilla inferiore punctis utrinque septem.*
White Gadus, with brownish back and fins, and seven punctures on each side the lower jaw.
Gadus barbatus. *Lin. Syst. Nat. p.* 437.
Gadus corpore lato. *Bloch. pl.* 166.
Whiting-Pout. *Penn. Brit. Zool.* 3. *p.* 161.

This species, according to Mr. Pennant, never grows to a large size, rarely exceeding a foot in length, and is distinguished from all others by its great depth; one of the size above mentioned being near four inches deep in the broadest part: the back is very much arched, and carinated: the scales larger than those of the Cod-fish: the mouth small, and the head short: on each side the lower jaw are seven or eight punctures: the first dorsal fin is triangular, and terminates in a long fibre: the colour of the fins and tail is dusky or blackish, and at the bottom of the pectoral fins is a black spot: the body is white, but more obscure on the back than the belly, and tinged with yellow: the lateral line is white, broad, and crooked. This fish is in high estimation as a food, and is found in the Mediterranean and Northern seas.

BIB.

Gadus Luscus. *G. albidus, lateribus subflavis, dorso olivacco, radio pinnarum ventralium primo setaceo, cauda nigro marginata.*
Whitish Gadus with yellowish sides, olivaceous back, first ray of the ventral fins setaceous, and tail bordered with black.
Gadus luscus. *G. radio pinnarum ventralium primo setacco. Lin. Syst. Nat. Gmel. p.* 1163. *Mus. Ad. Frid.* 2. *p.* 60.
The Bib. *Penn. Brit. Zool.* 3. *p.* 162.

Length a foot: greatest depth three inches and a half: body deep; sides compressed; scales large and easily deciduous: eyes covered with a loose membrane, so as to be blown up like a bladder at the pleasure of the animal: mouth small, and beneath the chin a beard of about an inch in length: colour of the back light olive; the sides finely tinged with gold; the belly white; the anal fins dusky, edged with white; the tail with black. Native of the European seas, and much esteemed as a food.

POOR.

Gadus Minutus. *G. argenteus, dorso subfusco, maxilla superiore longiore, ano in medio corporis.*
Silvery Gadus, with brownish back, upper jaw longest, and vent in the middle of the body.
Gadus minutus. *G. abdomine intus nigro. Bloch. pl. 67. f. 1. Capelan.*
The Poor. *Penn. Brit. Zool. 3. p. 163.*

This is a small species, seldom exceeding six or seven inches in length, and of a more slender form than any of the preceding kinds. It is of a silvery colour, brownish on the back, and marked with dusky specks on the sides: the scales are very small and thin: the head is of a somewhat sharpened form, with the upper mandible longer than the lower, and furnished with several rows of small and sharp teeth: beneath the tip of the lower is a cirrus: the lateral line is strait, and the vent is situated at the middle of the body: it is remarkable of this spccies that the abdomen is perfectly black within, being lined with a peritonæum of that colour. The Poor is found in the Baltic and the Mediterranean, as well as in some parts of the Northern seas. Its appearance in the Mediterranean is considered by the fishermen as the precursor of the Cod, the Dorse, and the Haddock, of which it is supposed to indicate very plentiful shoals. It is reckoned a wholesome food, and is taken both by the line and net. It is supposed to feed chiefly on worms and sea-insects, and deposits its

spawn among the stones and sea-plants towards the borders of the shore.

BLENNOID GADUS.

Gadus Blenoides. *G. argenteus, dorso subcinereo, pinnis ventralibus didactylis.*

Silvery Gadus, with greyish back, and didactyle ventral fins.

Gadus blennoides. *G. pinnis ventralibus didactylis. Pall. spic. zool.* 8. *p.* 47. *Lin. Syst. Nat. Gmel. p.* 1165.

Described by Dr. Pallas. Habit of a Whiting: length about a span: body plump, soft, convex, compressed, silvery white, with subcinereous back, and covered with very small scales: head thick, conic, obtuse; lips fleshy, doubled: teeth minute, unequal, in the upper jaw extremely minute, hardly more than six, at some distance from each other, being distinctly visible: tongue sharp and fleshy: palate longitudinally striated: eyes large; irides silvery: lateral line arched on the fore-part: fins yellowish white, with very slender rays: dorsal and anal fins reclined; the first dorsal narrow, triangular; the second narrower; the third a little broader and shorter: pectoral fins subfalcated, very thin; first ray of the ventral ones very long, thickish, and bifid: tail forked, with rounded ends. Native of the Mediterranean.

SAIDA.

Gadus Saida. *G. cærulescens, dorso fusco, abdomine albido, pinnarum ventralium radio secundo in setam longam terminato.*
Blueish Gadus, with brown back, white abdomen, and the second ray of the ventral fins terminating in a long bristle.
Gadus Saida. *Lepechin. nov. Comm. Petrop.* 18. *p.* 512. *Lin. Syst. Nat. Gmel. p.* 1166.

Described by Lepechin. Native of the white sea: length about eight inches: colour blueish, with dusky back, and white abdomen; head compressed on the fore-part, but more round behind, and marked on the top with a black spot: mandibles furnished with sharp, curved, setaceous teeth which are barbed backwards: upper jaw rather obtuse; lower longer and sharper: palate armed with a double row of teeth, and on each side the entrance into the throat is a rough or denticulated bone: eyes large, with whitish pupil and blueish iris: gill-covers silvery, speckled with black, and composed of three laminæ, of which the lowest is lunated, the next elliptic, and the third triangular and bicuspidate: back convex, slightly furrowed on the fore-part, and marked by a few confluent blackish specks: lateral line strait, nearest the back: dorsal fins triangular, brown, with whitish rays: anal oblong-triangular, with the fore-part of the base dusky-blue: ventral whitish at the base: tail forked. This species is edible, but of a dry or juiceless nature.

With three dorsal fins, as in the preceding kinds, but with beardless mouth.

WHITING.

Gadus Merlangus. *G. argenteus, supra subfuscus, maxilla superiore longiore.*
Silvery Gadus, brownish on the upper parts, with the upper jaw longer than the lower.
Gadus Merlangus. *G. tripterygius imberbis albus, maxilla superiore longiore. Lin. Syst. Nat. p.* 438.
The Whiting. *Penn. Brit. Zool.* 3. *Bloch. pl.* 65.

The Whiting is, according to Mr. Pennant, the most delicate as well as the most wholesome of the genus, but does not grow to a large size, the usual length being about ten or twelve inches, and the largest scarce exceeding that of twenty. It is a fish of an elegant make: the body is rather long, and covered with small, round silvery scales: the head and back are of a pale brown, and the sides slightly streaked with yellow: the head is of a pointed form, with the upper jaw longer than the lower, and furnished with several rows of teeth, of which those in front are longest; the lower jaw has only a single row: on each side the palate is a triangular, and in the throat two rough bones above, and two smooth ones beneath: on each side the lower jaw are nine or ten impressed points: the vent is nearer the head than the tail: the lateral line is strait, and at the beginning of the pectoral fins on each side is a black spot. This fish is an inhabitant of the Baltic, and

the Northern seas, and is found in some parts of the Mediterranean. Vast shoals appear in the British seas during the spring; keeping at the distance of about half a mile to that of three from the shore: they are caught in vast numbers by the line, and afford excellent diversion: their food consists of small fishes, sea-insects and worms: they are said to be particularly fond of sprats and young herrings, with which the fishermen generally bait for them, and in defect of these with pieces of fresh herring, one being sufficient, when cut, for twenty baits. According to Dr. Bloch the chief time of the Whiting fishery in France is in the months of January and February, though in England and Holland it is practised at a much later period. The Whiting spawns in December and January.

COAL-FISH.

Gadus Carbonarius. *G. nigricans, subtus subargenteus, maxilla inferiore longiore, linea laterali recta alba.*

Blackish Gadus, subargenteous beneath, with the lower jaw longer than the upper, and strait, white lateral line.

Gadus Carbonarius. *G. tripterygius imberbis, maxilla inferiore longiore, linea laterali recta. Lin. Syst. Nat. p.* 438. *Bloch. pl.* 66.

Coal-Fish. *Penn. Brit. Zool.* 3.

The Coal-Fish, when full grown, is, in general, readily distinguished from its congeners by its very dark or black colour, though in this respect it some-

times varies: it is of a moderately long and elegant shape, with a small head, sharpened snout, and lower jaw exceeding the upper in length: when full grown the head, dorsal fins, tail, and upper parts of the body are of a dusky black, which gradually softens into a silvery tinge as it approaches the abdomen: the lateral line is strait and white: the mouth is rather small, and black on the inside, though the tongue is of a bright silver-colour: the body is covered with small, thin scales, and the jugular and pectoral fins are generally of a pale colour: the tail is pretty large and forked.

The Coal-fish is an inhabitant of the Baltic, the Northern, and Mediterranean seas: it is common on most of our rocky and deep coasts, but particularly on those of Scotland and the Orkneys, where, according to Mr. Pennant, it swarms, and where the young or fry forms a great part of the support of the poor. In July, according to the same author, the young begin to appear in vast shoals on the coast of Yorkshire, and are at that time about an inch and half long: in August they are from three to five inches in length, and are taken in great numbers with the angling rod, and are then esteemed a very delicate fish, but when about a year old are so coarse that few people will eat them: at this period they are above fifteen inches in length, and begin to blacken on the gills and back; the blackness increasing with their age: the fry of the Coal-fish is known by different names in different places: at Scarborough the young are called *Parrs*, and when a year old, *Billets:* at that place such swarms have

occasionally appeared that for some weeks together it was impossible to dip a pail into the sea without taking several.

The varieties as to colour which this fish sometimes exhibits are different shades of brown rather than black; but in all the lateral line is invariably white, which therefore forms a good specific mark. Though the Coal-fish, in general, in its full grown state is but little esteemed as a food, yet it is frequently salted and dried for sale, in the manner of the Cod and others of this genus.

POLLACK.

Gadus Pollachius. *G. subargenteus, dorso pinnisque fuscis, maxilla inferiore longiore, linea laterali curva nigra.*

Subargenteous Gadus, with dusky back and fins, lower jaw longer than upper, and curved, black lateral line.

Gadus Pollachius. *G. maxilla inferiore longiore, linea laterali curva. Lin. Syst. Nat. Gmel. p.* 1169. *Bloch. pl.* 68.

Pollack. *Penn. Brit. Zool.* 3.

" This species (says Mr. Pennant) is common on many of our rocky coasts: during the summer they are seen in great shoals, frolicking on the surface of the water, and flinging themselves into a thousand forms: they are at this time so wanton as to bite at any thing that appears on the top of the waves, and are often taken with a goose's feather fixed to a hook: they are a very strong fish, being observed to keep their station at the feet of the

rocks in the most turbulent and rapid sea: they are a good eating fish: they do not grow to a very large size; at least the biggest we have seen did not exceed six or seven pounds; but we have heard of some that were taken in the sea near Scarborough, which they frequent during the winter, that weighed near twenty-eight pounds: they are there called *Leets*. The under jaw is longer than the upper: the head, and body rises pretty high, as far as the first dorsal fin: the side-line is incurvated, rising toward the middle of the back, and then sinking and running strait to the tail: it is broad and of a brown colour: the first dorsal fin has eleven rays, the middle nineteen, and the last sixteen: the tail is a little forked: the colour of the back is dusky, of some inclining to green: the sides beneath the lateral line marked with lines of yellow: the belly white."

Dr. Bloch observes that the scales of the Pollack are small, thin, oblong, and bordered with yellow: according to that author it is found in the Baltic and the Northern sea: it feeds chiefly on small fish, and especially on launces, which are generally found in its stomach.

GREEN GADUS.

Gadus Virens. *G. albus, dorso virescente, cauda bifurca.*
White Gadus, with greenish back, and forked tail.
Gadus virens. *Gadus dorso virescente, cauda bifurca. Lin. Syst. Nat. Gmel. p.* 1166. *Faun. Suec.* 309.

THIS species is said to bear a very near general resemblance to the Pollack, but to differ in being of a greenish or olive-colour on the upper parts, and to have the lateral line perfectly strait, instead of curved as in that fish: the jaws are also equal, and the tail distinctly forked; whereas in the Pollack the lower jaw is longer than the upper, and the tail but very slightly inclining to a forked appearance. Notwithstanding these differences it is held in doubt by some authors whether the present fish be really a distinct species from the preceding. It is said to be found plentifully in the Northern seas.

With two dorsal fins.

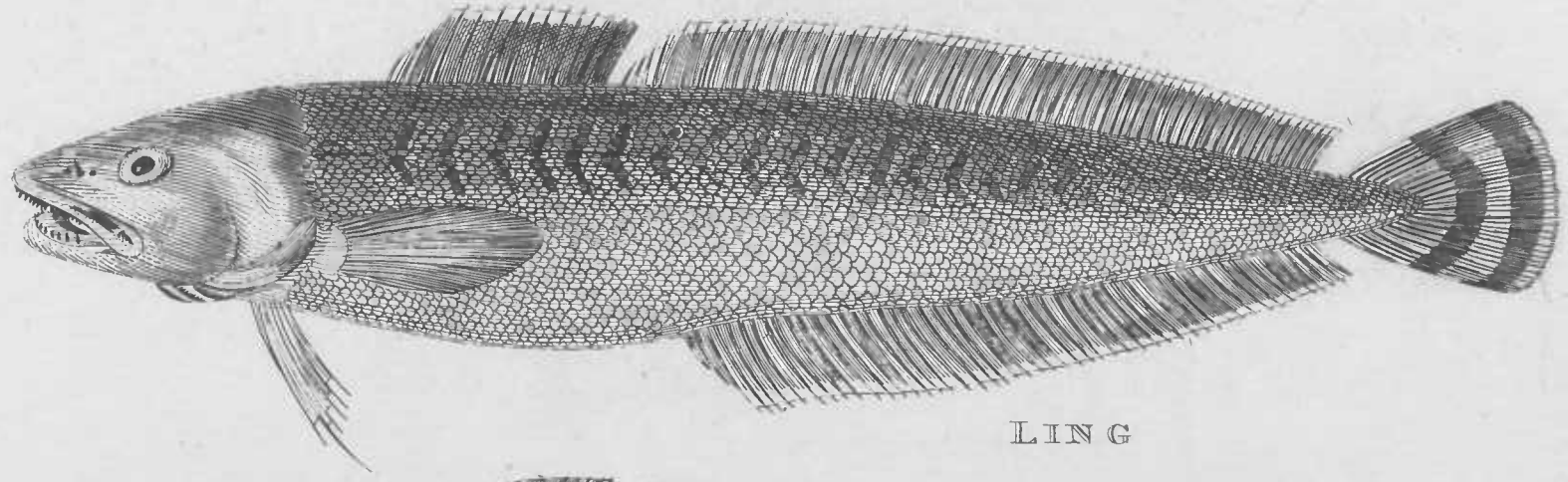
HAKE.

Gadus Merluccius. *G. albidus, dorso subcinereo, maxilla inferiore longiore.*
Whitish Gadus, with subcinereous back, and lower jaw longer than the upper.
Gadus Merluccius. *G. dipterygius imberbis, maxilla inferiore longiore. Lin. Syst. Nat. p.* 439. *Bloch. t.* 154.
Hake. *Penn. Brit. Zool.* 3.

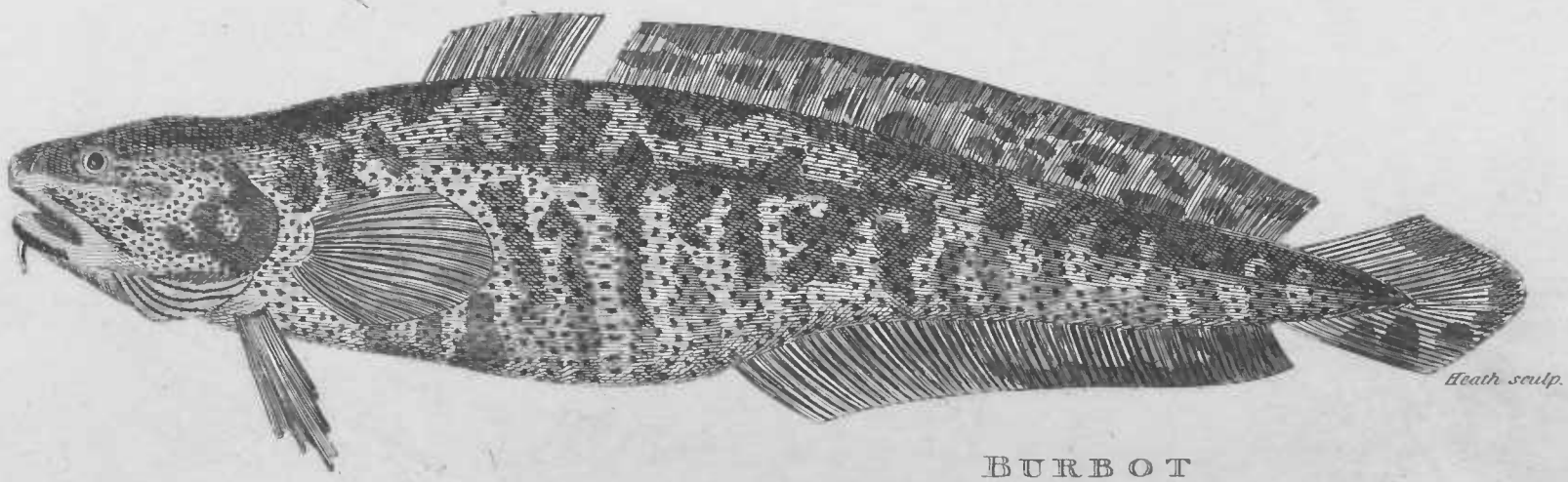
THE Hake is a species of a considerably lengthened form: the head is rather large, broad and flat

at the top, but compressed on the sides; the opening of the mouth wide, and the jaws armed with two rows of long, sharp-pointed, curved teeth, intermixed alternately with smaller ones: the palate is also furnished with a row of teeth on each side: the lower jaw is longer than the upper, and at a small distance from the eyes are situated four small foramina: the body is covered with small scales, and is of a pale ash-colour on the back, and whitish on the sides and abdomen: the first dorsal fin is small, consisting only of about nine rays, but the second, which commences almost immediately from the former, is continued almost to the tail: the anal fin corresponds with this beneath: the pectoral and ventral fins are of moderate size, and of a sharpened shape, and the tail is nearly even at the end: the lateral line commences by several small warts beyond the head, and is continued in a strait direction to the tail: the usual length of the Hake is from one to two feet, but it is sometimes found of the length of three feet.

This fish is an inhabitant of the Mediterranean and Northern seas, in both of which its fishery is very considerable: it is salted and dried in the manner of Cod, Haddock, &c. but is not considered as a delicate fish either in its fresh or salted state, and is rarely admitted to the tables of the rich and luxurious: it forms however a very useful article of food for the lower orders in many parts both of our own and other countries. It is found in vast abundance on many of our coasts, as well as those of Ireland. We are informed by Mr. Pennant



LING



Heath sculp.

BURBOT

1803. July 1. London Publishid by G. Kearsley, Fleet Street.

that there was formerly a vast stationary fishery of the Hake on the *Nymph Bank* off the coast of *Waterford*, immense quantities appearing there twice a year; the first shoal coming in June, during the Mackrel season, and the other in September, at the beginning of the Herring season; probably in pursuit of those fish: it was no unusual thing for six men with hooks and lines to take a thousand Hake in one night, besides a considerable quantity of other fish.

At present, as we are informed by Dr. Bloch, one of the greatest Hake-fisheries is carried on about the coasts of Britany, both by the hook and net. It is carried on chiefly by night, in boats properly manned for the purpose: the principal baits for such as are taken by the line are launces, sardines, and other small fishes.

LING.

Gadus Molva. *G. cinereus, subtus albus, maxilla superiore longiore, cauda fascia fusca.*

Cinereous Gadus, white beneath, with the upper jaw longer than the lower, and tail crossed by a dusky bar.

Gadus Molva. *G. dipterygius cirratus, maxilla superiore longiore. Lin. Syst. Nat. p.* 439. *Bloch. t.* 69.

Ling. *Penn. Brit. Zool.* 3.

THE Ling (says Mr. Pennant) takes its name from its length, being corrupted from the word long: the body is very slender; the head flat; the

upper jaw longer than the lower, and furnished with very numerous, small teeth, those in the lower jaw being few, slender, and sharp: on the chin is a small beard: the first dorsal fin is small, placed near the head, and consists of fifteen rays: the second is very long, reaching almost to the tail, and consists of sixty-five rays; the anal is placed in a corresponding direction beneath, and consists of sixty-two rays: the pectoral fins have fifteen radiated rays, and the ventral six: the tail is rounded at the end. The usual size of the Ling is from three to four feet, but it is said to have been sometimes seen of the length of seven feet: in colour it varies, being sometimes of an olive hue on the sides and back, and sometimes cinereous: the abdomen is white, as are also the ventral fins, and the dorsal and anal are edged with white: the tail is marked near the end with a transverse black bar, and tipped with white.

The Ling is an inhabitant of the Northern seas, and forms in many places a considerable article of commerce. It chiefly frequents the depths of the sea, living on small fishes, shrimps, &c. It spawns in June, depositing its eggs among the fuci on the oozy bottoms. In the Yorkshire seas, according to Mr. Pennant, the Ling is in perfection from the beginning of February to the beginning of May, and some till the end of that month: as long as they continue in season, the liver is very white, and abounds with a fine flavoured oil; but as soon as the fish goes out of season the liver becomes red and affords no more oil: the same circumstance is

observable in several other fish in a certain degree, but not so remarkably as in the Ling*

Vast quantities of this fish are salted for exportation as well as for home consumption. When it is cut or split for curing it must measure twenty-six inches or upwards from the shoulder to the tail; if less than that it is not reckoned a sizeable fish, and consequently not entitled to the bounty on exportation†.

LEVERIAN GADUS.

Gadus Leverianus. *G. subcinereus, maculis ocellatis albidis.*
Subcinereous Gadus, with ocellated whitish spots.

Described from a specimen in the Leverian Museum. Body extremely long in proportion to its depth, and of nearly uniform diameter as far as the second dorsal fin, from which part it gradually lessens towards the tail: head large: mouth wide: lower jaw longer than the upper; both furnished with a row of sharp, subulated, and slightly curved teeth, of which those in the lower jaw are by far the largest and longest: eyes rather large: gill-membrane six or seven-rayed: pectoral fins of moderate size: ventral rather small and narrow: first dorsal fin subtriangular, situated at a considerable distance from the head, and the second at a great distance from the first, being of similar shape, but rather larger: vent-fin small, shallow, squarish, and

* Brit. Zool. † Brit. Zool.

situated immediately beneath the second dorsal: tail of moderate size, and even at the end: skin smooth, without perceptible scales, and every where marked by numerous, small, round, whitish, ocellated spots on a pale brown ground-colour: lateral line not distinctly visible, but rather marked by a continued angular elevation of the skin along the whole length of the body, so as to give the fish a squarish form: length about two feet two inches: depth about two inches and a half. Supposed to be a native of the Southern ocean, being placed in a collection of fishes taken during the last voyage of Captain Cook.

BURBOT.

Gadus Lota. *G. olivaceo-flavescens nigro variegatus, ore cirrato, maxillis æqualibus.*

Yellowish-olive Gadus, variegated with black, with barbed mouth and both jaws equal.

Gadus Lota. *G. dipterygius cirratus, maxillis æqualibus. Lin. Syst. Nat. p.* 440. *Bloch. t.* 70.

Burbot. *Penn. Brit. Zool.* 3.

The Burbot, a fish very highly esteemed for its superior delicacy, is an inhabitant of clear lakes and rivers, and is found in many parts of Europe and Asia. In our own country it occurs chiefly in the lakes of the Northern counties, in some of the fens of Lincolnshire, and the rivers Witham and Trent; but it is said to arrive at its greatest perfection in the Lake of Geneva, where it is found in

great plenty. In its habit or general appearance the Burbot makes an obscure approach to the Muræna, having a remarkably lengthened body of a subcylindric shape: the head is broad and flattened; the eyes small and lateral, with blue pupils and yellow irides: the mouth wide; the jaws armed with several rows of sharp teeth: the lower jaw is furnished with a beard of considerable length, and two small cirri are seated on the top of the nose, at some distance from the eyes: the tongue is broad: the colour of the Burbot, which, like all others, varies as to its particular shades at different seasons and in different individuals, is a dull or brownish yellow, approaching to whiteness on the abdomen, and to olivaceous on the back and fins; while the whole is variegated with numerous and irregularly formed spots and patches of different sizes and of a blackish colour: in some the ground-colour is greenish, and in others rather brown than yellow: the skin is remarkably smooth, and mucous or slippery like that of an eel, and is covered with extremely small scales: the first dorsal fin is small, and situated near the middle of the back; the second commences at a small distance beyond this, and is continued as far as the tail, which is rather short, and of a rounded form: the anal fin is of similar length with the dorsal, and like that is continued as far as the beginning of the tail: the pectoral fins are small and rounded; the ventral narrow and of a sharper form.

The Burbot is considered as a very voracious fish, preying on all the smaller fishes, as well as on frogs,

worms, and aquatic insects: it grows to a considerable size: the largest however of those which are taken in England have been rarely known to exceed the weight of three pounds, but in some parts of Europe they are found of more than double that weight, and of the length of three feet or more. The reputation of this fish as a food has long been established, but its liver is celebrated as an article of peculiar luxury, and we are informed by Aldrovandus that an old German countess carried her epicurism so far as to expend the greatest part of her income in the purchase of this dish. The gall has been famed, like that of the Stargazer, the Barbel, and some other fishes, for its supposed efficacy in external disorders of the eyes.

WEESLE GADUS.

Gadus Mustela. *G. cirris quinque vel tribus, pinna dorsali priore exoleta.*

Gadus with either five or three beards, and the first dorsal fin incomplete.

Gadus Mustela. *G. dipterygius cirratus, cirris quinque, pinna dorsali priore exoleta. Lin. Syst. Nat. p.* 440.

Gadus Mustela. *G. cirris tribus. Bloch. t.* 165.

Mustela vulgaris Rondeletii. *Will. ichth. p.* 121.

Five-Bearded Cod. *Penn. Brit. Zool.* 3. *Three-Bearded Cod. id.* 3.

This species appears to admit of two varieties, the one furnished with four beards on the upper lip and one on the lower; the other with two on the upper and one on the lower. These varieties or, per-

haps, sexual differences, have been considered by some authors as distinct species. Of this opinion is Mr. Pennant, whose description of both is so accurate as to require no additions.

Three-Bearded Cod.

"This species commonly frequents the rocky shores of these islands, and is sometimes taken with a bait. It grows to the length of nineteen inches; the weight two pounds two ounces: the head is large and flat: the eyes not remote from the end of the nose: the body is long, slender, and compressed sideways, especially towards the tail: at the end of the upper jaw are two beards; on the chin one: the teeth are numerous and small, disposed along the jaws in form of a broad plate: in the roof of the mouth is a set of small teeth, disposed in a triangular form: the number of branchiostegous rays is seven: the first dorsal fin is lodged in a deep furrow just beyond the head, and consists of a number of short, unconnected rays: the second rises just behind it, and reaches very near the tail: the pectoral fins are broad and round: the ventral fins small; the second ray the longest: the anal fin reaches almost to the tail: the tail rounded at the end: the scales are very small: the colour of the body and head a reddish yellow, marked above the lateral line with large black spots: the back fin and tail are darker; the vent fin of a brighter red, but all are spotted: the lateral line bends in the middle, then passes strait to the tail."

Five-Bearded Cod.

" Mr. Willughby makes this species with five beards a variety only of the former; but having opportunity of examining several specimens, we must dissent from his opinion, having always observed the number of the beards in the spotted kind not to exceed three, nor the number in the brown kind to be less than five: the first ray of the dorsal fin is very long: there is also some difference in the form as well as colour, this species being rather thicker in proportion than the former.

" Excepting in these particulars, and the number of the beards, there is a general agreement in the parts of both: the beards on the upper jaw are four, viz. two at the very end of the nose, and two a little above them: on the end of the lower jaw is a single one. These fish are of a deep olive brown, their belly whitish. They grow to the same size as the former."

Russian Gadus.

A third variety of the Weesle Gadus, under the above title is described by Mr. Walbaum, and is introduced into the Gmelinian edition of the Systema Naturæ: it differs from the two former in being furnished only with a single beard.

CIMBRIAN GADUS.

Gadus Cimbrius. *G. cirris quatuor, pinna dorsali priore exoleta, radio primo hastato. Lin. Syst. Nat. Gmel. p.* 1174.
Gadus with four beards, first dorsal fin incomplete, with the first ray hastated.

GREATLY allied to the Mustela, but with the first ray of the first dorsal fin larger than the rest, subulate, and divided at the tip in form of the letter T. A single barb both on the upper and lower lip, and two over the nostrils: pectoral fins with sixteen rays; ventral seven; anal forty-two; caudal twenty-five. Native of the Atlantic and Northern seas.

TOAD GADUS.

Gadus Tau. *G. fusco-flavescens, nigro maculatus, labio inferiore cirris cincto, operculis triacanthis, pinna dorsali priore triradiata.*
Yellowish-brown Gadus, spotted with black, with the lower lip fringed with beards, the gill-covers three-spined, and the first dorsal fin three-rayed.
Gadus Tau. *G. dipterygius cirratus, operculis triacanthis, pinna dorsali priore triradiata. Lin. Syst. Nat. p.* 440.
Gadus cirris plurimis. *Bloch. pl.* 67.

THIS fish is so unlike the rest of the Gadi that it might almost be allowed to constitute a distinct genus: it is in fact more allied to the following genus, *Blennius*, under which however it cannot with strict propriety be placed.

The head and fore-parts are extremely broad and depressed, while the remainder of the animal is

compressed, tapering pretty suddenly towards the tail: the eyes are large, with gold-coloured irides, and are situated towards the upper part of the head: on each side the eyes is a series of small warts: the mouth is wide; the upper jaw furnished with several rows of sharp teeth; the lower with only two rows: the upper lip projects somewhat beyond the lower, which is fringed with a semicircle of short cirrhi or beards: the pectoral and ventral fins are of a sharpened form, and the first ray of the latter is very strong, and of a considerable length: the rays of the first dorsal fin, which is very small, are spiny; those of the second dorsal, as well as of the anal and caudal, are soft, and project somewhat beyond the edge of the membrane: the tail is rounded. The colour of this fish is yellowish brown, paler beneath, and the whole body as well as the fins variegated with pretty numerous and somewhat irregular blackish spots: the tail marked by two or three transverse bars, and between the eyes is commonly observed a transverse yellow bar or band. Native of the American and Indian seas. Grows to the length of about a foot, but is generally found of smaller size. It is supposed to be of a predacious nature, but its particular history seems to be not very distinctly known. The Count de Cepede places this fish, together with the *Gadus blennoides* of Linnæus, in a distinct genus, to which he gives the title of *Batrachoides.*

With one dorsal fin.

MEDITERRANEAN GADUS.

Gadus Mediterraneus. *G. maxilla superiore cirris duobus, inferiore unico. Lin. Syst. Nat. Gmel. p.* 1175.
Gadus with two cirri on the upper lip and one on the lower.

This also is very nearly allied to the Gadus Mustela, insomuch that it may be doubted whether it be really a distinct species, though furnished with only the second or long dorsal fin: mouth with two beards on the upper, and one on the lower lip. Native of the Mediterranean.

According to Cepede this species has but two rays in the ventral fins, for which reason he considers it as a *Blennius*.

TORSK.

Gadus Brosme. *G. ore cirroso cauda ovata.*
Gadus with the lower lip bearded, and ovate tail.
Brosme. *Ström. sondm.* 1. *p.* 272. *t.* 1. *f.* 19. *Pontopp. norw.* 2. *p.* 178.

This species is well described in the last edition of the British Zoology under the title of the Torsk. It is an inhabitant of the Northern seas, and is not observed lower than the Orkney islands, and even there is rather a scarce fish. The length of the specimen communicated to Mr. Pennant was twenty inches, and the greatest depth four and a half: the

head small; the upper jaw a little longer than the lower, and both jaws furnished with a multitude of small teeth: on the chin was a small, single beard: from the head to the dorsal fin was a deep furrow: the dorsal fin began within six inches from the tip of the nose, and extended almost to the tail: the pectoral fins were small and rounded: the ventral short, thick, and fleshy; ending in four cirrhi: the belly, from the throat, grew very prominent: the anal fin was long, and reached almost close to the tail, which was small and circular: the number of rays could not be counted with accuracy by reason of the softness and the thickness of the skin: the side-line was scarcely discernible: colour of the head dusky; of the back and sides yellow; of the belly white: the edges of the dorsal, anal, and caudal fins were white; the other parts dusky.

In the seas about Shetland this fish is said to swarm; and forms, both barrelled and dried, a considerable article of commerce.

In the Gmelinian edition of the Systema Naturæ this species is described (from Müller) as having an ovate acute tail, but the descriptions and figures of other authors uniformly represent that part as of a rounded shape.

BLENNIUS. BLENNY

Generic Character.

Caput declive.	*Head* sloping.
Corpus elongatum, subcompressum, lubricum.	*Body* lengthened, subcompressed, lubricous.
Memb. branch. radiis sex.	*Gill-membrane* six-rayed.
Pinnæ ventrales di, tri, s. tetradactylæ, muticæ.	*Ventral fins* two, three, or four-rayed, unarmed.

With appendiculated head.

CRESTED BLENNY.

Blennius Galerita. *B. fusco-flavescens nigro-punctatus, crista capitis transversa cutacea.*

Yellowish-brown Blenny, with black specks, and a transverse skinny crest on the head.

Blennius Galerita. *B. crista capitis transversa cutanea. Lin. Syst. Nat. p.* 441. *Adonis. Bell. aquat. p.* 219.

Crested Blenny. *Penn. Brit. Zool.* 3. *pl.* 96.

GENERAL length about four or five inches: body long, compressed, smooth and slippery: colour yellowish brown, freckled with darker coloured specks: belly of a paler cast: head furnished on the middle with a transverse finny appendage, which may be

either raised or depressed at pleasure; and between the eyes is a small triangular prominence, pointing backward, and red about the edges: ventral fins very small, short, and didactyle: dorsal shallow, running from the hind part of the head to the tail, which is of a round shape: vent placed at some distance beyond the pectoral fins: anal fin reaching from the vent to the tail. Native of the European seas, and found about the rocky coasts of Great Britain.

PUNARU.

Blennius Cristatus. *B. crista longitudinali setacea inter oculos. Lin. Syst. Nat. p.* 441. *Ray pisc. p.* 73. *Punaru.*
Blenny with longitudinal setaceous crest between the eyes.

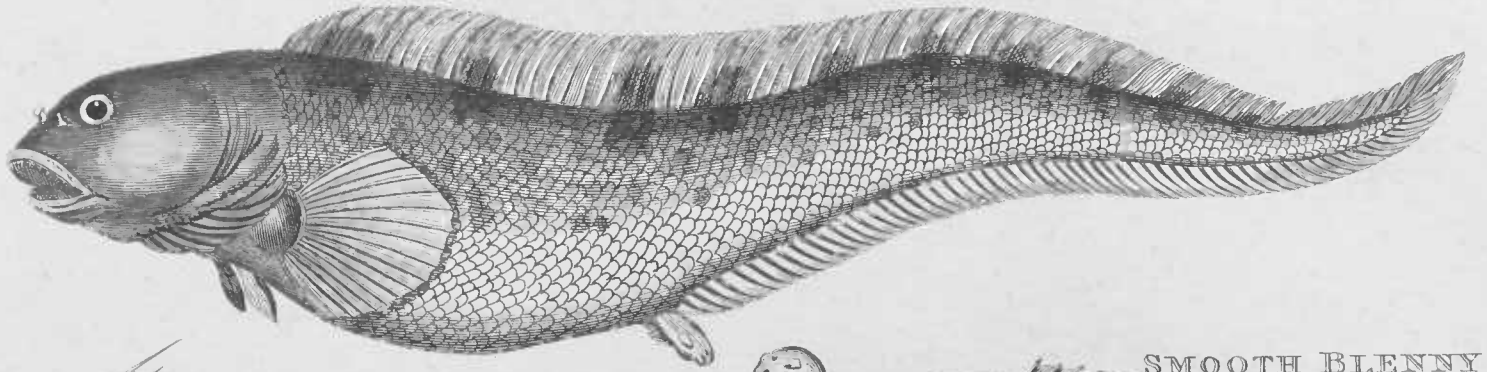
Length about four inches: head thickish; eyes gold-coloured, situated towards the top of the head: over the eyes two short, red filaments: ventral fins three-rayed. Native of the Indian seas.

HORNED BLENNY.

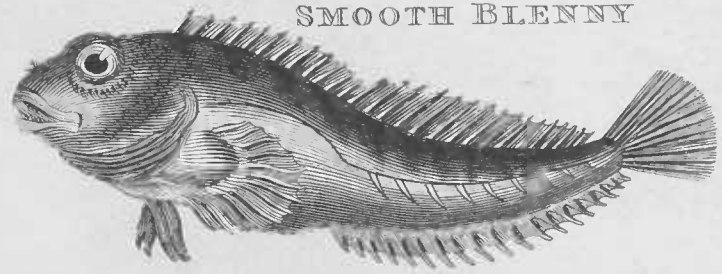
Blennius Cornutus. *B. radio simplici supra oculos, pinna dorsali solitaria. Lin. Syst. Nat. p.* 441. *Mus. Ad. Frid.* 2. *p.* 61.
Blenny with simple ray between the eyes, and single dorsal fin.

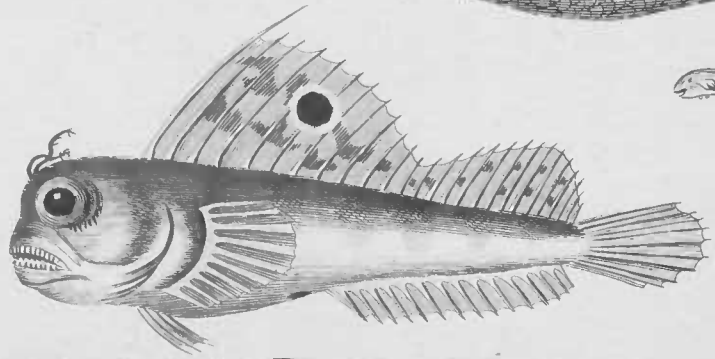
This, according to Linnæus, its first describer, is a small species, with a long, thin, and simple process over each eye: on the head are a great many very small or scarcely visible scattered tuber-

VIVIPAROUS BLENNY

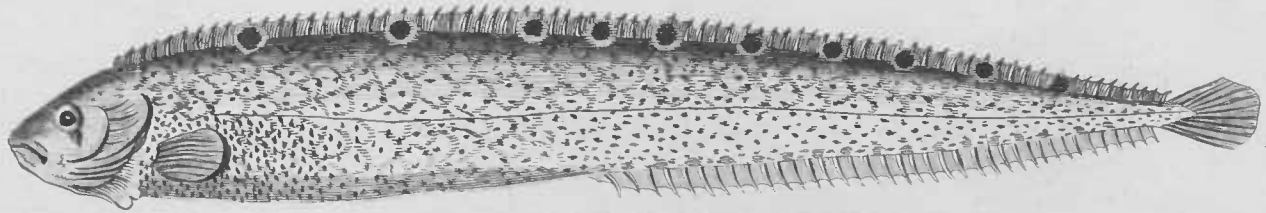


SMOOTH BLENNY





OCELLATED BLENNY



Hill sculp.

GUNNEL BLENNY

1803. July 1. London. Publisht by G. Kearsley, Fleet Street.

cles or points: on each side the lower jaw is a tooth longer than the rest: the skin is mucous, and freckled all over with small reddish specks.

OCELLATED BLENNY.

Blennius Ocellaris. *B. cæruleo-virescens, fusco subfasciatus, pinna dorsali lata, macula ocellari nigra.*

Blueish-green Blenny, subfasciated with brown, with broad dorsal fin marked by a black ocellated spot.

Blennius ocellaris. *B. radio simplici supra oculos, pinna dorsali anteriore ocello ornata. Lin. Syst. Nat. p.* 441.

Butterfly Fish. *Will. p.* 131. *pl. H.* 3. *f.* 2. *Bloch. pl.* 167. *f.* 1.

This species is an inhabitant of the Mediterranean sea, and is usually seen of the length of about six or eight inches: it is numbered among edible fishes, though not much esteemed: it is of a thickish form in front, the body gradually declining towards the tail: the head is large, and slopes suddenly downwards: the mouth is wide, and furnished with sharp and close-set teeth: the body is without visible scales, and is generally of a greenish cast, much deeper on the back, and marked by a few large, distant, transverse clouds or bands of a dusky hue: on the head, between the eyes, are placed two long processes or filaments, slightly subdivided at their extremities: the back fin, which is very wide on its fore-part, is of a pale blueish tinge, clouded with dusky variegations, and is marked in the middle by a large black, or deep blue spot, surrounded by a whitish border. This fish is described

by Linnæus and some others * as having two dorsal fins; but Artedi and Bloch consider it as having in reality only one, the sinking in of the middle part, being in some specimens much deeper than in others, seems to be the cause of this difference of opinion.

FASCIATED BLENNY.

Blennius Fasciatus. *B. fusco-flavescens, fasciis transversis fuscis, cirris duobus simplicibus inter oculos.*

Yellowish brown Blenny, with transverse brown bands, and two simple cirri between the eyes.

Blennius fasciatus. *B. pinnulis simplicibus duabus inter oculos, pinna ani radiis novendecim. Bloch. pl.* 162. *f.* 1.

This fish, says Dr. Bloch, is distinguished from the rest by its simple filaments, by a pair of tufts situated between the eyes, and by having nineteen rays in the anal fin: the head is small and sloping: the body broad in front, and taper behind: the lateral line, which runs pretty near the back, is strait: the belly is thick; the vent placed nearer the head than the tail: the body covered with a viscid mucus: the rays of the tail subdivided, those of the other fins simple. Dr. Bloch makes no mention of the colour of this species, but his figure represents it of a pale yellowish brown, fasciated both across the body and dorsal fin with dusky bands. Its length is about six inches. Native of the Indian seas.

* Cepede describes two dorsal fins, but observes that they are sometimes so closely placed as to appear but one.

SALIENT BLENNY.

Blennius Saliens. *B. fuscus, nigro striatus, cirro simplici inter oculos, pinnis pectoralibus maximis.*

Brown Blenny streaked with black, with a simple cirrus on the head, and extremely large pectoral fins.

Le Blennie Sauteur. *Cepede* 2. *p.* 479.

This small species was observed by Commerson about the coasts of some of the Southern islands, and particularly those of New Britain, in the month of July 1768. It seems to be of a gregarious nature, and is seen swimming by hundreds, and as it were flying over the surface of the water, occasionally springing up and down with great rapidity among the rocks: it seems naturally formed for the celerity of its movements; the pectoral fins being very large in proportion to the body: they are nearly of a circular form when expanded, and when contracted reach almost as far as the vent on each side. This approach in point of form to the genera of *Pegasus*, *Trigla*, *Scorpœna*, *Exocoetus*, and others possessed of the power of temporary flight, seems, as Cepede observes, naturally to indicate a similar property. The body is of a very lengthened form, and greatly compressed on the sides: the upper jaw longer than the lower, so that the mouth seems to be placed underneath: the eyes are seated near the top of the head, and are large and round, with gold-coloured irides; and on the occiput rises a cartilaginous longitudinal process, of a simple cylindric form, of about four

millimetres in length: the colour of the body is brown, streaked with black, and the skin is extremely mucous or slippery. When dead, the colour frequently changes to a pale blue: there is no particular appearance of a lateral line, except what results from the longitudinal trace between the dorsal and lateral muscles.

The Count de Cepede farther informs us that the above species, in the manuscripts of Commerson, its first describer, is considered as a distinct genus, under the name of *Alticus*, and called Alticus saltatorius, but that it is a genuine species of Blenny. The gill-membrane has at least five rays: the dorsal fin has thirty-five articulated rays; the pectoral fins thirteen; the ventral two filiform rays; the anal twenty-six, and the tail, which is of a lanceolate shape, ten rays.

GATTORUGINE.

Blennius Gattorugine. *B. albidus fusco transversim undulatus, pinnulis superciliorum nuchæque palmatis.*

Whitish Blenny, with transverse brown undulations, and palmated cirri over the eyes and the nape.

Blennius Gattorugine. *B. pinnulis superciliorum nuchæque palmatis. Lin. Syst. Nat. p.* 441.

Gattorugine. *Will. p.* 132. *Penn. Brit. Zool. pl.* 96. *Bloch. pl.* 167.

The Gattorugine is a Mediterranean species, usually growing to the length of eight or ten inches. It is of a moderately lengthened and com-

pressed form, and of a whitish or pale ash-colour, variegated, particularly on the upper parts and dorsal fin, by several transverse undulations or streaks of a darker tinge: these colours are observed to vary; the streaks and spots being sometimes olive-coloured with pale blue edges; but what particularly distinguishes the fish from its congeners, is a double pair of ramified tentacula or lengthened processes on the head; the first pair being situated immediately over the eyes, and the latter pair over the back of the head: the mouth is wide, and the teeth very slender and sharp: the dorsal fin runs, as in most others of this genus, nearly along the whole length of the back; and the anal is continued from the vent to the tail. The Gattorugine is considered as an eatable fish, and feeds in the same manner as most others of the genus.

SUPERCILIOUS BLENNY.

Blennius Superciliosus. *B. flavescens, rubro maculatus, cirris superciliorum palmatis.*

Yellowish Blenny spotted with red, with palmated superciliary cirri.

Blennius superciliosus. *B. pinnulis superciliorum palmatis, linea laterali curva. Lin. Syst. Nat. p.* 441. *Bloch. pl.* 168.

This species is of a moderately long and thick form: the head is small; the eyes rather large, with silvery irides, and immediately over each eye

is situated a small palmated crest or appendage, divided into three segments: the lips are large; the mouth rather wide, and the upper jaw furnished with several rows of teeth: the body is covered with very small scales, and is of a yellow or gilded tinge, paler beneath, and marked, as well as the fins, by pretty numerous, and somewhat irregular spots of dusky red: the dorsal fin commences at the back part of the head, and is continued almost to the tail, but not far from its commencement suddenly sinks, so as almost to give the appearance of a smaller anterior dorsal fin, separate from the longer one: the pectoral fins are of moderate size; the ventral ones didactyle, and rather long: the vent is situated in the middle of the abdomen, from which part the anal fin commences, and reaches as far as the tail. This species is viviparous. It is a native of the Indian seas, and grows to the length of about twelve inches.

TENTACULATED BLENNY.

Blennius Tentacularis. *B. exalbidus, fuſco maculatus, radio supra oculos simplici, pinna dorsali antice unioculata.*

Whitish Blenny, spotted with brown, with a simple cirrus over the eyes, and a large ocellated spot on the back fin.

Blennius tentacularis. *B. radio supra oculos simplici, pinna dorsali integra antice unioculata. Lin. Syst. Nat. Gmel. p.* 1179. *Brunn. pisc. massil. No.* 36.

This small species is greatly allied to the horned Blenny before described, but is scarcely more than two inches and a half long. Cepede seems inclined to consider it as a variety of the horned Blenny caused by a difference of climate; this being a Mediterranean and the other an Indian fish. It is of an elongated form, and of a whitish colour, variegated with dusky clouds and specks; and marked on the back fin by a large ocellated spot: above each eye is a simple tentacular process, and the head is marked beneath by three or four transverse white bars: the irides are silvery, with red specks: the dorsal and anal fins are variegated with dusky spots and streaks.

SIMOUS BLENNY.

Blennius Simus. *B. cirro supra oculos minimo, pinna dorsali posterius caudali annexa, linea laterali curva. Lin. Syst. Nat. Gmel. p.* 1179. *Sujet. Act. Petrop.* 1779. *p.* 198. *t.* 6. *f.* 2. 4.

Blenny with very small cirrus over the eyes, dorsal fin united behind to the caudal fin, and crooked lateral line.

Length about three inches and a half: body smooth and very thin: mouth placed beneath: jaws arched: lips membranaceous, very thin, and serrate: teeth small, crouded, equal, in a single row: eyes very large, approximate, and prominent: gill-covers small, flexible, pellucid, and consisting of two pieces: vent in the middle of the body: at the origin of the dorsal fin is a fatty tubercle: tail rounded, with four or five small spurious fins placed near it.

HAKE BLENNY.

Blennius Phycis. *B. fusco-cinereus, naribus subcristatis, cirro labii inferioris, dorso bipinni.*

Cinereous brown Blenny, with subcristated nostrils, a beard at the lower lip, and two dorsal fins.

Blennius Phycis. *B. naribus subcristatis, cirro labii inferioris, dorso bipenni. Lin. Syst. Nat. p.* 441.

Forked Hake. *Penn. Brit. Zool.* 3. *p.* 170.

The present species is ranked by Mr. Pennant among the Gadi, but the ventral fins, being fur-

nished with only two rays, seem to justify its being rather considered as a Blenny than a Gadus. It has however a general resemblance to that genus, being of a similar shape, and having a beard beneath the lower lip: it is a native of the European seas, and is so well described by Mr. Pennant in the British Zoology that nothing need be added to the account there detailed.

"The length of one that was taken on the Flintshire shores was eleven inches and a half; its greatest depth three inches; but, according to Dr. Borlace *, some grow to be above eighteen inches long. The head sloped down to the nose in the same easy manner with others of this genus (Gadus): the mouth large: besides the teeth in the jaws, was a triangular congeries of small teeth in the roof of the mouth. At the end of the lower jaw was a small beard: the first dorsal fin was triangular; the first ray extended far beyond the rest, and was very slender: the second fin began just behind the first, and extended almost to the tail: the ventral fins were three inches long, and consisted only of two rays, joined at the bottom, and separated or bifurcated towards the end: the vent was in the middle of the body; the anal fin extended from thence just to the tail: the lateral line was incurvated: the tail rounded. The colour was a cinereous brown."

* Nat. Hist. Cornw. p. 268.

VAR. ?

THIS is introduced by Ray, in his *Synopsis Piscium*, on the authority of Mr. Jago, a judicious ichthyologist of that age, under the title of *Barbus minor Cornubiensis cirris bifurcis*, or the *Lesser Forked-Beard*. Mr. Pennant having never seen the fish, places it next to the preceding, under the name of *Least Hake*. It is said not to exceed five inches in length: the first dorsal fin (according to the figure in Ray's Synopsis) is shorter than that of the preceding fish: the second resembles that of the other kind: the ventral fins are bifurcated: it has a small beard, and a rounded tail, but the head is shorter and more steep: the colour black, the skin smooth, and the appearance disagreeable.

With plain or inappendiculated head.

TRIFURCATED BLENNY.

Blennius Trifurcatus. *B. fuscus, labiis albis, pinnis ventralibus triradiatis solutis.*

Brown Blenny, with white lips, and three-rayed open ventral fins.

Trifurcated Hake. *Penn. Brit. Zool.* 3. *p.* 172. *pl.* 32.

FIRST described by Mr. Hugh Davies of Beaumaris in Wales, who communicated it to Mr.

Pennant. Habit resembling that of the *Gadus Tau*, the head being depressed and very broad; the eyes large; the irides yellowish; the mouth very wide, with irregular rows of incurvated teeth: in the roof of the mouth a semilunar congeries of teeth: no tongue; beneath the lower lips a small beard: body compressed from the setting on of the pectoral fins, but remarkably so as it approaches the tail, growing very slender near that part: on the beginning of the back a furrow containing the rudiment of a first dorsal fin: the second dorsal fin reaches almost to the tail, and the anal fin corresponds: above the pectoral fins on each side, is a row of tubercles, nine or ten in number, from the last of which commences the lateral line, which at its middle descends in a curved direction, and from thence continues strait to the tail: the ventral fins were very slender, and deeply trifurcated: the pectoral ones rounded and of moderate size: the length of the specimen described was twelve inches; the colour a deep brown, except the foldings of the lips, which were snow-white, giving a singular appearance to the animal. This species is evidently allied to the *Gadus Tau*, and was first discovered by Mr. Davies near Beaumaris.

PUNCTULATED BLENNY.

Blennius Punctulatus. *B. albidus squamosus, punctis irregularibus fuscis, pinnis ventralibus elongatis.*

Whitish scaly Blenny, with irregular brown points, and elongated ventral fins.

Le Blennie pointillé. *Cepede 2. p. 506. pl. 12. f. 3.*

The head of this species is large, and scattered over with numerous impressed specks, which extend as far as the gill-covers: the opening of the mouth is narrow, the lips thick, and the teeth sharp and close-set: the eyes very large: the body covered with very visible scales, and marked by several small, irregular clouds and spots on a paler ground: the pectoral fins very large, and ovate: the ventral composed each of two soft rays, almost as long as the pectoral fins: the dorsal commences at the back of the head, and extends as far as the tail: its rays are tipped with small filaments, more especially the eight last, of which six are rather longer and two shorter than the rest: the vent fin is distinct from the tail, which is of a rounded shape. Size, according to Cepede's figure, about five inches. Described from a specimen in the Paris Museum.

SMOOTH BLENNY.

Blennius Pholis. *B. olivaceus, subnigro alboque nebulosus, lined laterali curva, subbifida.*

Olivaceous Blenny, with blackish and whitish clouds, and curved sub-bifid lateral line.

Blennius Pholis. *B. capite lævi, linea laterali curva subbifida. Lin. Syst. Nat. p.* 443.

Smooth Blenny. *Penn. Brit. Zool.* 3. *pl.* 36. *Bloch. pl.* 71. *f.* 2.

This species, which appears to have been known to Aristotle, is an inhabitant of the Northern and Mediterranean seas, where it commonly frequents the borders of the coasts, lying among the stones, sea-weeds, &c. and occasionally enters the mouths of rivers. It grows to the length of seven or eight inches, but is usually found much smaller: it is a fish of a strong and vigorous nature, biting fiercely when first taken, though incapable of piercing the skin on account of the smallness of its teeth: it is so tenacious of life that, according to Mr. Ray, it may be kept for the space of four and twenty hours out of water. By the help of its ventral fins it is observed to creep with ease up the sides of stones, &c. It feeds on smaller fishes and their spawn, as well as on shell-fish, sea insects, &c. It is caught both by the line and net, but being a coarse fish, is very little esteemed as a food, and is rather used for the purpose of a bait for other fish. In colour it is subject to vary, but is usually of a deep olive-brown, marbled with blackish clouds: sometimes it is nearly black, and

sometimes is marked along the sides by several small whitish specks: the head is large, sloping suddenly to the mouth: the teeth slender, very sharp, and close-set: the irides red: the pectoral fins broad and rounded, consisting of about thirteen rays: the ventral small, consisting of only two thick rays separated at the ends: the dorsal fin reaches from the hind part of the head almost to the tail: the vent is placed about the middle of the abdomen, and the anal fin reaches from thence nearly to the tail, which is rounded at the end.

BOSCIAN BLENNY.

Blennius Boscianus. *B. olivaceus, albido fuscoque nebulosus, ano in medio corporis.*

Olivaceous Blenny with brown and whitish clouds, and vent in the middle of the body.

Le Blennie Bosquien. *Cepede 2. p. 493. pl. 13. f. 1.*

NATIVE of the American seas, and very common in the bay of Charles-Town. It is extremely nearly allied to the Blennius Pholis, and like that species bites hard when taken: length about three inches and a half: colour olive, with whitish clouds or variegations, and obscure brown streaks: head inclining to a sub-triangular form: front whitish and flattish: eyes small: irides yellow: each jaw armed with very numerous, small, crooked teeth: body mucous, compressed, without apparent scales: fins spotted with brown: pectoral fins of moderate

size, and rounded: ventral small, and didactyle: the first eleven rays of the dorsal fin shorter and softer than the rest: the rays of the anal fin bent backwards at their tips: both anal and dorsal fins join the tail, which is of a rounded shape. This species was discovered by Mr. Bosc, by whom it was communicated to the Count de Cepede.

GUNNEL BLENNY.

Blennius Gunellus. *B. fusco-flavescens, fusco-punctatus, pinna dorsali ocellis circiter decem nigris.*

Yellowish-brown Blenny, with deeper specks, and about ten ocellated black spots in the dorsal fin.

Blennius Gunnellus. *B. pinna dorsali ocellis decem nigris. Lin. Syst. Nat. p.* 443.

Butter-Fish. *Will. p.* 115. Spotted Blenny. *Penn. Brit. Zool.* 3. *pl.* 96. *Bloch, pl.* 71. *f.* 1.

This species is an inhabitant of the Baltic, Mediterranean, and Northern seas, and grows to the length of about nine or ten inches: the body is of a long and very compressed form; the head small; the lower jaw longer than the upper, and both furnished with a row of small teeth: but what principally distinguishes this fish is a row of moderately distant, round, black spots, with paler circles, disposed throughout the whole length of the dorsal fin, which is shallow, and reaches from the top of the head to the tail: the pectoral fins are very small and rounded, and the ventral most extremely small, each consisting of only two short thick rays: the

vent is situated in the middle of the abdomen, and the vent fin, which is shallow, is continued from thence to the tail; being marked in its progress by several small dusky spots near its base: the tail is small and of a rounded shape: the colour of the body is yellow-brown, clouded and freckled with deeper specks: the skin is extremely slippery, and the rays of the back fin are strong and pungent. This fish inhabits similar situations with the B. Pholis; is of similar manners, and like that species is used by the fishermen as a bait. It is however eaten by the Greenlanders, who often dry it for that purpose. It is said to swim with considerable rapidity. Dr. Bloch observes that the specific character given by Linnæus cannot be admitted as sufficiently exact, since the number of spots on the back fin is not constantly ten, but varies from nine to twelve.

VIVIPAROUS BLENNY.

Blennius Viviparus. *B. olivaceus subtus albidus, supra fusco subfasciatus, naribus tubulosis.*

Olivaceous Blenny, whitish beneath, subfasciated above with brown, and with tubular nostrils.

Blennius viviparus. *B. ore tentaculis duobus. Lin. Syst. Nat. p.* 443.

Viviparous Blenny. *Penn. Brit. Zool.* 3. *pl.* 37.

Mustela vivipara. *Will. p.* 122. *Bloch. pl.* 72.

This species is considerably larger than either the *Pholis* or *Gunnellus*, being sometimes found of the length of twelve inches. It is of a moderately

slender form, with a smooth, slippery skin, covered by small scales, and is of a yellowish olive-colour, paler beneath, and marked on the upper parts by several moderately large dusky spots, which are peculiarly conspicuous along the base of the dorsal fin, forming a kind of bars on that part and over the back: the dorsal, caudal, and anal fins in this species are united, while the ventral fins are very small and short, each consisting of two thick, rounded rays: the pectoral fins are rounded, and of moderate size: the head is small, the lips thick, and the nostrils prominent and tubular: the rays of all the fins are soft.

This fish, like the *B. superciliosus*, is distinguished by a particularity which takes place in but very few fishes, except those of the cartilaginous tribe; being viviparous, the ova hatching internally, and the young acquiring their perfect form before the time of their birth. Not less than two, or even three hundred of these have been sometimes observed in a single fish. One might be apt to imagine that so great a number of young, confined in so small a space, might injure each other by the briskness of their motions; but this is prevented by the curious disposition of fibres and cellules among which they are distributed, as well as by the peculiar fluid with which they are surrounded. When the fish is thus advanced in its pregnancy, it is scarcely possible to touch the abdomen without causing the immediate exclusion of some of the young, which are immediately capable of swimming with great vivacity: their relative size may

be judged of by an inspection of the annexed plate.

The Viviparous Blenny is a littoral fish, and is found about the coasts of the Mediterranean, the Baltic, and the Northern seas, and sometimes enters the mouths of rivers. It seems to vary as to the period of producing its young, which, according to some authors, takes place in the winter, or in the very early part of spring, and according to others in the summer season.

Like others of its genus it feeds on the smaller fishes, insects, &c. It is taken by the line and net, but is in very small esteem as a food, though perhaps some degree of prejudice may operate in this respect, the bones, like those of the Gar-Fish, acquiring a greenish colour by boiling.

WEESLE BLENNY.

Blennius Mustelarius, *B. pinna dorsali anteriore triradiata. Lin. Syst. Nat. p.* 443.
Blenny with the first dorsal fin three-rayed.

A SMALLISH species, slightly described by Linnæus in the work above referred to, and principally distinguished by having two dorsal fins with only three rays in the first, the other being of considerable extent.

AREOLATED BLENNY

Blennius Lumpenus. *B. corpore teretiusculo flavicante, areolis dorsalibus fuscis. O. Fabr. faun. Groenl. p.* 151. *Lin. Syst. Nat. Gmel. p.* 1183.

Yellowish Blenny with subcylindric body marked on the back by brown patches.

A SMALLISH species, of a palish brown colour, whitish beneath, and yellowish towards the hind part: the head is also yellow and narrower than the body: the back marked with brown patches or spots: native of the Mediterranean, inhabiting deep, sandy shores, and concealing itself among fuci, stones, &c. in the manner of the B. Pholis and some others.

FROG BLENNY.

Blennius Raninus. *B. fuscus, pinnis ventralibus subsexfidis, cirro gulari. Lin. Syst. Nat. p.* 444.

Brown Blenny, with obscurely six-cleft ventral fins, and gular cirrus.

Gadus raninus. *Müll. Zool. Dan. prodr. No. 359.*

NATIVE of the Northern seas, as well as of some of the larger lakes: in habit resembling the *Gadus Tau*, and may be considered as a kind of intermediate species, connecting the genera of Gadus and Blennius. By Cepede it is placed, together with the *Gadus Tau*, in a distinct genus under the name of *Batrachoides*. The head is very much depressed, and broader than the body: the irides

tawny: the mouth turned up, and white within: the jaws are each beset with a double row of sharp teeth: the tongue is obtuse, fleshy, and thick: the fins black, fleshy, and soft: the dorsal and anal equal, and abrupt on the hind part; and the two first rays of the ventral fins terminate in a long bristle. This is not an eatable fish, and it is said that wherever it appears the other fishes retire.

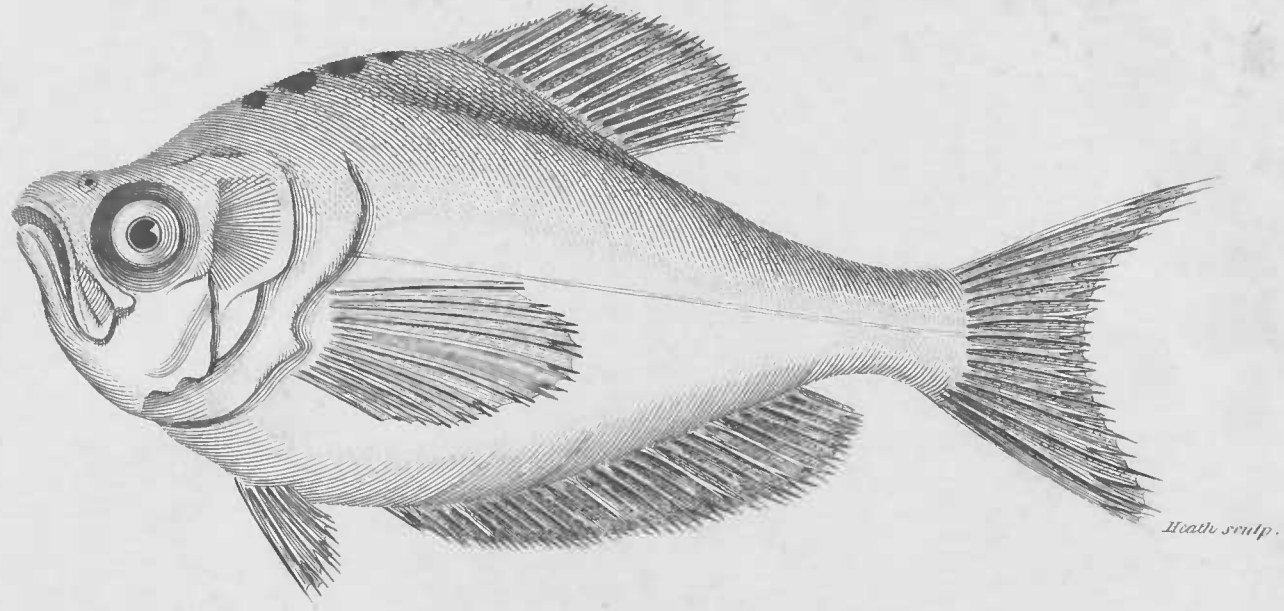
MURÆNOID BLENNY.

Blennius Murænoides. *B. fusco-cinerascens, subtus albidus, pinnis ventralibus uniradiatis spinosis minimis.*

Brownish ash-coloured Blenny, whitish beneath, with very small, single-rayed, spiny ventral fins.

Blennius Murænoides. *B. membrana branchiostega triradiata, pinnis ventralibus uniradiatis spinosis minimis. Lin. Syst. Nat. Gmel. p.* 1184.

Body compressed, sword-shaped, smooth, and without visible scales: length about six inches: colour cinereous brown, the head and belly paler: head marked by minute tubercles: front triangular, rather convex: mouth oblique: jaws equal, with two rows of teeth: lateral line obscure: vent in the middle of the abdomen: dorsal fin prickly: pectoral and caudal oblong: vent fin equal. Native of the northern seas?



INDIAN KURTUS

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KURTUS. KURTUS.

Generic Character.

Corpus latum, utrinque carinatum, dorso elevato.
Membrana branchiostega radiis duobus.

Body broad, carinated both above and below; with greatly elevated back.
Gill-Membrane two-rayed.

INDIAN KURTUS.

Kurtus Indicus. *K. argenteus, dorso aureo.*
Silvery Kurtus, with gold-coloured back.
Kurtus Indicus. *Bloch. pl.* 169.

THE genus Kurtus, instituted by Dr. Bloch, consists at present of a single species only. This is a native of the Indian seas, and is supposed to feed on shell-fish, small cancri, and other sea insects, the remains of which were observed in the stomach of the specimen examined by Dr. Bloch. The length of this fish was about ten inches, including the tail, and its greatest breadth something more than four inches: its shape is deep or broad, the sides being much compressed, and the back rising very high in the middle: the gill-covers consist of a large single membrane on each side: the eyes are large, with silver irides: the mouth is of moderate width, and curves downwards: the teeth are small and numerous, stand-

ing in several rows in each jaw: the nostrils are simple: the rays of the fins are soft, (except the first ray of the dorsal and ventral,) projecting somewhat beyond the membrane of the fin. The colour of the whole body is silvery as if covered with foil, without any appearance of scales: the back is tinged with gold-colour and marked by three or four black spots on its ridge, and the fins have a reddish cast.

END OF PART I.