





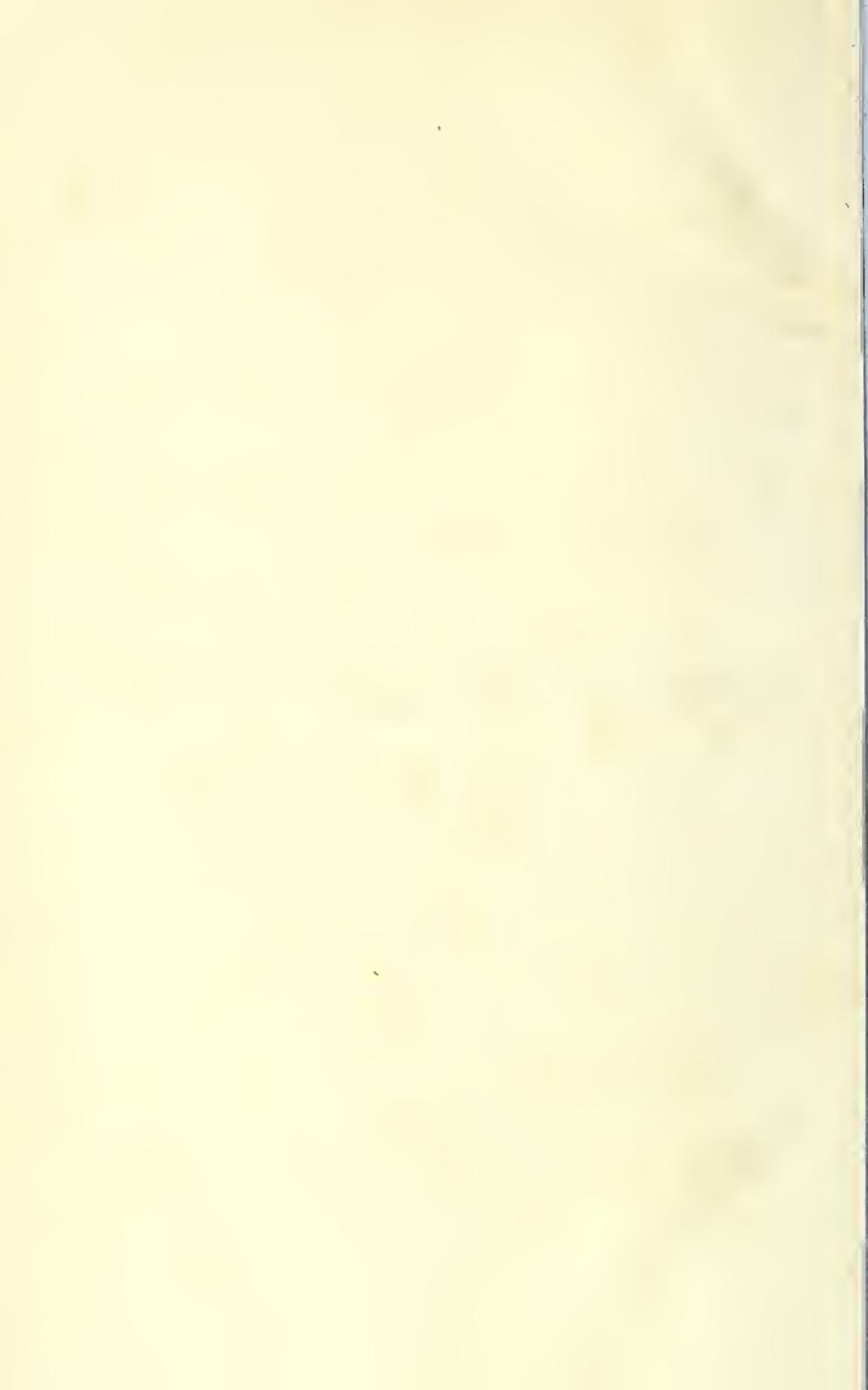




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A
M A N U A L
OF
BRITISH
VERTEBRATE ANIMALS.



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CLASS III. REPTILIA.

ORDER I. TESTUDINATA.

Body enclosed in a double shield; the head, neck, limbs, and tail, alone free; the upper shield formed by the union of the ribs and dorsal vertebræ, the lower one by the pieces of the sternum: jaws horny, without teeth: four feet.

I. CHELONIADÆ.—*Feet, especially the anterior pair, elongated; compressed, fin-shaped.*

1. SPHARGIS.—Shell covered with a continuous coriaceous skin: claws obsolete.

2. CHELONIA.—Shell covered with horny plates: feet with claws.

ORDER II. SAURIA.

Skin covered with scales: body and tail elongated: jaws furnished with teeth: generally four feet.

I. LACERTIDÆ.—*Tongue slender, extensile, bifid: all the feet with five toes; these last*

separate, unequal, armed with claws: scales disposed, under the belly and round the tail, in transverse parallel bands.

3. LACERTA.—Palate armed with two rows of teeth: upper part of the head protected by large squamous plates, terminating posteriorly in a line with the orifices of the ears: a collar on the under side of the neck formed by a transverse row of flat broad scales, separated from those of the breast by a space covered with small granulated scales*: scales on the abdomen much broader than those on the back, and not keeled: one row of femoral pores on each thigh. •

ORDER III. OPHIDIA.

Skin covered with scales: body cylindrical, very much elongated: jaws furnished with teeth: no feet.

I. ANGUIDÆ.—*A third eyelid: body entirely covered with imbricated scales: jaws not dilat-able: rudimentary scapular and clavicular bones beneath the skin.*

4. ANGUIS.—No appearance of extremities visible externally: tympanum concealed beneath the skin: maxillary teeth compressed and hooked; no teeth on the palate.

* This last character, though applicable to the few species met with in this country, must be received with some limitation in the case of two or three others found on the Continent, in which the collar, though still free at the sides, is interrupted in the middle.

II. SERPENTIDÆ.—*No third eyelid: abdomen covered with broad transverse plates: jaws dilatable: no vestiges of bones of the sternum and shoulder.*

5. NATRIX.—Subcaudal plates arranged in pairs: four nearly equal rows of imperforate teeth above, and two below: no poison-fangs.

6. VIPERA.—Subcaudal plates arranged in pairs: maxillaries armed with poison-fangs, but without ordinary teeth.

ORDER I. TESTUDINATA.

GEN. 1. SPHARGIS, *Merr.*

1. *S. coriacea*, Gray. (*Coriaceous Turtle*.) — Shell oval, pointed behind, with three longitudinal ridges.

S. coriacea, Gray, *Syn. Rept.* part i. p. 51. *Testudo coriacea*, *Linn. Syst. Nat.* tom. i. p. 350. *Turt. Brit. Faun.* p. 78. *Coriudo coriacea*, *Flem. Brit. An.* p. 149. *Turtle*, *Borl. Nat. Hist. of Cornw.* p. 285. pl. 27. f. 4. *Coriaceous Tortoise*, *Penn. Brit. Zool.* vol. III. p. 7. pl. 1. *Coriaceous Turtle*, *Shaw, Gen. Zool.* vol. III. part i. p. 77. pl. 21.

DIMENS. Said to attain the length of eight feet.

This species, which is a native of the Mediterranean, has been occasionally taken in our seas. Borlase mentions two which were caught in the mackerel-nets off the coast of Cornwall, in July 1756. The largest measured six feet nine inches from the tip of the nose to the end of the shell, and was adjudged to weigh eight hundred pounds. Pennant speaks of a third individual, of equal weight with that just alluded to, which was taken on the coast of Dorsetshire. *Obs.* The anterior extremities in this species are said to be proportionably longer in the young animal than in the adult.

GEN. 2. CHELONIA, *Brongn.*

2. *C. imbricata*, Gray. (*Imbricated Turtle*.) — Shell elliptic, carinated, with the plates of the disk imbricated.

C. imbricata, Gray, *Syn. Rept.* part i. p. 52. *Testudo imbricata*, *Linn. Syst. Nat.* tom. i. p. 350. *Turt. Brit. Faun.* p. 78. *Chelona imbricata*, *Flem. Brit. An.* p. 149. *Imbricated Turtle*, *Shaw, Gen. Zool.* vol. III. part i. p. 89. pl. 26.

DIMENS. General length, from the tip of the bill to the end of the shell, about three feet: has been known to measure five feet. SHAW.

DESCRIPT. Body roundish-ovate, slightly heart-shaped, slightly carinated down the back: head small, prominent; with the upper mandible curved over the lower: two claws on each foot: plates of the disk imbricated, thirteen in number, rather square, semi-transparent, variegated; of the circumference twenty-five, pointed and incumbent on each other in a serrated manner: tail a mere notch. TURT.

A native of the American seas: has occurred, however, in a few instances, as a straggler, on the British coasts. The first individual (according to Dr. Fleming) is recorded by Sibbald, as having appeared in Orkney. Dr. Fleming himself states that he has "credible testimony of its having been taken at Papa Stour, one of the West Zetland Islands." Dr. Turton has also mentioned one which was taken in the Severn in the Spring of 1774. This last was placed in a fish pond, where it lived till the Winter.

ORDER II. SAURIA.

GEN. 3. LACERTA, *Cuv.*

3. *L. Stirpium*, Daud. (*Sand Lizard*.)—Occipital plate rudimentary; frontal large, nearly as broad behind as before: temples covered with small plates: abdominal lamellæ in six longitudinal rows: fore feet with the third toe longest: femoral pores from twelve to fifteen.

Lézard des Souches, *Edwards in Ann. des Sci. Nat.* (1829) tom. xvi. p. 65. *Dugès, Id.* p. 377.

DIMENS. The following are those of an English specimen. Entire length seven inches: length of the head (measured above to the posterior margin of the occipital plate) nine lines, (underneath from the extremity of the lower jaw to the posterior margin of the collar) one inch and half a line; of the body (from the collar to the anus) two inches one line; of the tail three inches ten lines; of the hind leg one inch three lines and a half; of the fore leg ten lines and a half. These measurements are, however, probably often exceeded.

DESCRIPT. (*Form.*) Larger than the common species; the body and limbs thicker and stronger in proportion to the entire length. Occipital plate rudimentary, very much smaller than the parietal plates; frontal large, and nearly as broad at its posterior, as at its anterior margin; space between the eye and the meatus auditorius covered with small plates of various sizes: collar composed of eleven lamellæ; the margin irregularly toothed or notched: pectoral triangle well-defined: abdominal lamellæ in six longitudinal rows; the two middle rows much narrower than the adjoining ones, with the lamellæ of a parabolic form: ante-anal lamella single*, large, somewhat pentagonal: dorsal scales small, of an irregular form, approaching to square or hexagonal, with a distinct longitudinal keel directed somewhat obliquely; those on the sides of the body

* In one specimen it was observed to be double, but this is probably accidental.

larger, with the keel obsolete: caudal scales oblong, but becoming longer and narrower as they approach the tip of the tail, each terminating below in an obtuse point, and furnished with a longitudinal keel, which also becomes more strongly marked towards the extremity: tail itself moderately stout at its origin, but gradually tapering to a fine sharp point; with fifty-three (Dugès says from fifty to eighty) whorls of the scales last described: fore legs not reaching beyond the eyes, when placed against the sides of the head; strong, with the third toe a little longer than the fourth; all the claws strong and sharp, and more developed than those on the hind feet: hind feet reaching to the carpus of the fore: thighs very much compressed; the number of femoral pores varying (according to Dugès) from twelve to fifteen,—in this specimen, on the right thigh thirteen, on the left fifteen. (*Colours.*) Said to be very variable. In my specimen, the upper parts dark green, thickly spotted with black; a broad interrupted fascia of dark greenish brown down the middle, containing interrupted lines of yellow spots: under parts light bluish green, with small black spots much less numerous than above.

Of this species I have seen but two indigenous specimens, which were obtained by W. Yarrell, Esq. from the neighbourhood of Poole in Dorsetshire. For one of these I am indebted to the kindness of that gentleman. It is common in France, and will probably be met with in other parts of our own country, as soon as our native Reptiles shall have received more attention from naturalists. It is very distinct from the *L. agilis*, though at first sight, and without close examination, it might pass for a large variety of that species. With its habits I am unacquainted. *Obs.* The *L. arenicola* of Daudin is a variety of this species.

- (1.) *L. viridis*, Daud. Hist. Nat. des Rept. tom. III. pl. 34. *Lacertus viridis*, Ray, Syn. Quad. p. 264. *Lézard piqueté*, Edwards in Ann. des Sci. Nat. (1829) tom. XVI. p. 64. *Lézard vert*, Dugès, Id. p. 373.

Larger, with the tail much longer in proportion to the body, than the *L. Stirlingii*. Occipital plate small, and triangular; interparietal lozenge-shaped; frontal very large, quite as broad at its posterior as at its anterior margin: collar consisting of eight lamellæ; the alternate ones smaller, and of a triangular form: abdominal lamellæ in six rows, the two middle ones much narrower than the others: tail with upwards of a hundred whorls of scales: toes long and slender; the third and fourth on the fore feet of equal length: femoral pores from fifteen to eighteen. *Colour* generally a brilliant green variegated with black specks on the back, flanks, and limbs: abdominal lamellæ plain yellowish green. Attains a length of eighteen inches.

This species, which is well known on the Continent and in the Island of Guernsey, is said by Ray to be found in Ireland, but its existence in this last country does not appear to have been confirmed by any subsequent observer. It is also doubtful whether it be indigenous in any part of England, though possibly the "beautiful green *Lacerti*" observed by Mr. White "on the sunny sand-banks near Farnham, in Surrey,"* may have belonged to this species.

4. *L. agilis*, Berkenh. (*Common Lizard.*)—Occipital plate rudimentary; frontal large, as broad behind as

* *Nat. Hist. of Selborne*: seventeenth letter to Mr. Pennant.

before: temples covered with small plates: abdominal lamellæ in six rows: fore feet with the fourth toe longest: femoral pores from nine to eleven.

L. agilis, *Berkeh. Syn.* vol. I. p. 56. *Sheppard in Linn. Trans.* vol. VII. p. 49. *Turt. Brit. Faun.* p. 79. *Flem. Brit. An.* p. 150. Scaly Lizard, *Penn. Brit. Zool.* vol. III. p. 21. pl. 2. no. 7.

DIMENS. Entire length from six inches to six inches nine lines. Relative proportions very variable.

DESCRIPT. (*Form.*) In every respect smaller, and more slender, than the *L. Stirpium*: snout rather sharper: head more depressed, with the superciliary plates raised above the level of the crown: occipital plate very small; frontal large, as broad at its posterior as at its anterior margin: temples covered with small plates, more numerous than in *L. Stirpium*: collar composed of nine nearly equal lamellæ, with the posterior margin entire: pectoral triangle ill-defined, the lamellæ crowded together in an irregular manner: abdominal lamellæ in six longitudinal rows; the two middle rows a little narrower than the adjoining ones, with the lamellæ in these rows approaching to square or rectangular: dorsal scales rather narrower than in the *L. Stirpium*; not carinated, or with the keel very obsolete: caudal scales similar, but the keel of these also less strongly marked: the terminal point of each scale is likewise more obtuse, causing the whorls to appear less crenated: feet much slenderer than in the above species; the fore feet with the fourth toe a little longer than the third; claws small, and not more developed before than behind: thighs scarcely compressed; the number of femoral pores tolerably constant, generally nine, sometimes ten, rarely eleven. The following are *sexual distinctions*. In the *male*, the tail and legs are longer in proportion to the body; the former is nearly (in some specimens quite) two-thirds of the entire length; the hind leg, applied to the side of the abdomen, reaches to, or passes beyond, the carpus of the fore foot: the ante-anal lamella is shorter and broader, or more transverse: the under side of the base of the tail is flattened, with a slight longitudinal depression in the middle just behind the vent; during the season of sexual excitement the base of the tail is much dilated at the sides, appearing swollen. In the *female*, the abdomen is longer, and the tail shorter, the latter being often not more than half the entire length: the hind leg barely reaches to the tips of the claws of the fore foot: the ante-anal lamella is longer in proportion to its breadth, and of a more decided hexagonal or pentagonal form: the base of the tail is rounded, and convex underneath, and never dilated at the sides*. (*Colours.*) Extremely variable. Upper parts generally cinereous brown, more or less dark, often tinged with bluish green; a dark list down the middle of the back, with parallel fasciæ at the sides; these last broader than the former, commencing behind the eyes, and sometimes extending to near the extremity of the tail: between the mesial list and lateral fasciæ, are one or more rows of black spots, and sometimes the same number of yellow ones; under surface of the body and base of the tail, and sides of the abdomen, in the *male*, bright orange, more or less spotted with black; in the *female*, generally pale yellowish green without spots. *Obs.* In some individuals, the whole of the upper parts are plain cinereous brown, without any markings whatever.

* Some of the above distinctions were first pointed out by Mr. Gray in a communication made to the Zoological Society, in May 1832. (See *Proceed. of Zool. Soc.* 1832. p. 112.) I have myself since examined a large number of individuals, and confirmed the accuracy of them.

An extremely abundant species in all parts of the country, frequenting heaths, moors, woods, sand-banks, &c. Is fond of basking in the sunshine, and in warm weather is extremely active. Forms a retreat under ground, in which it resides wholly during Winter. Is first seen in March, or early in April. Feeds principally on insects. Is ovoviviparous; the young broods appearing in June or July. Tail extremely brittle, but, when broken, gradually reproduced. The renewed part, however, according to Dugès, never acquires vertebræ.

(2.) *L. odura*, Sheppard in Linn. Trans. vol. VII. p. 50.

This supposed species is principally characterized by the circumstance of the "tail bulging out a little below the base, which gives it the appearance of having been cut off and set on again." I am indebted to Mr. Gray for a suggestion, which he has since published in the *Proceedings of the Zoological Society*, (1834. p. 101.) that it is nothing more than the male of the common species in summer, when under the full influence of sexual excitement. I think this extremely probable.

(3.) *L. anguiformis*, Sheppard in Linn. Trans. vol. VII. p. 51.

"Head very light brown above, with four dark spots; yellowish white beneath: back with a black line along the middle, reaching from the head to about half an inch beyond the hind legs; on each side of this a broader one of dark brown (these beyond the black line unite, and reach to the end of the tail); next to these succeeds a fine yellow stripe that extends to the end of the tail; then a black one, which reaches no further than the middle line, and afterwards a dark brown stripe mixed with a few yellow spots extending to the end of the tail: a little above the hind legs, in some specimens, is a slight division of the scales, forming a transverse line: belly yellowish white, with a few black spots: tail, under part dirty white, spotted with black as far as within an inch of the end; the remainder marked lengthways with long bars of black: legs dark brown spotted with black. Length seven inches and upwards." SHEPP.

Another species instituted by Mr. Sheppard, but too imperfectly characterized to rank as certainly distinct from those already described. Mr. Sheppard states that he once saw a specimen above a foot long, a length to which, I believe, the common *L. agilis* never attains. Unfortunately, however, this gentleman has in his description almost entirely confined himself to noticing the colours, than which, in these Reptiles, nothing can be more variable*.

Obs. Before concluding this account of our British *Lacertæ*, it may be stated that several other allied species, formerly confounded under the general name of *L. agilis*, are known on the Continent, some of which may possibly occur in this country, although hitherto overlooked by naturalists. Pennant speaks of a Lizard, "which was killed near Worcester, in the parish of Swinford, Worcestershire, in 1741, which was two feet six inches long, and four inches in girth†." He adds, that "another was killed at Penbury, in the same county." It is very possible that these may have been the *L. ocellata* of Daudin, which is found in the South of Europe, and which, according to Dugès, sometimes exceeds two

* Mr. Sheppard thinks that this species may be the *Lacerta anguiformis* of Ray. It is clear, however, that Ray, in his enumeration of the British species of "Eft or Swift," as he terms them, has only copied from Merrett, (*Pinar*, p. 169.) who, I suspect, by the *Lacertus terrestris anguiformis in Ericetis*, meant nothing more than our Common Lizard, which he calls *anguiformis*, in order to distinguish it from the *scale-less* Efts, belonging to the modern genus *Triton*, between which and the true *Lacerta*, the writers of that day did not sufficiently discriminate. Merrett's other species, viz. 1. *Terrestris vulg. ventre nigro-maculato*, 2. *Parvus terrestris fuscus oppido rarus*, 3. *Aqual. fuscus*, and 4. *Aqual. niger*, are probably all referable to one or other of our two well-known British species of *Triton*, being called *terrestres* or *aqualitæ*, according as they may happen to have been found on land or in water.

† No further light is thrown upon this species, in the *Illustrations of the Natural History of Worcestershire*, lately published by Dr. Hastings, who simply alludes to the circumstance, as mentioned by Pennant.

feet in length. In the event of their occurring to any future observer, it may be useful to mention that the *L. ocellata*, independently of its great size, may be easily distinguished by the circumstance of its having the occipital plate very much developed, and at least quite as large as either the frontal or parietal plates*: it also possesses eight or ten longitudinal rows of abdominal lamellæ.

Another species, which may be briefly alluded to, is the *L. muralis* of Latreille, very common on the Continent, and apparently closely resembling our own *L. agilis*, from which, however, it would seem to differ in having the temples covered with very small granulated scales, resembling those of the back, in the middle of which is *one* circular plate†: the number of femoral pores is also much greater, varying from eighteen to twenty-five. It may be stated, that Mr. Gray is of opinion that this species is identical with the *Common Lizard* of this country. Judging, however, from the descriptions of French authors, I cannot but consider this as at present doubtful‡.

ORDER III. OPHIDIA.

GEN. 4. ANGUIS, *Cuv.*

5. *A. fragilis*, Linn. (*Blind-Worm.*)

A. fragilis, Linn. *Syst. Nat.* tom. 1. p. 392. *Turt. Brit. Faun.* p. 81. *Flem. Brit. An.* p. 155. *Cuv. Reg. An.* tom. 11. p. 70. *Cæcilia*, Ray, *Syn. Quad.* p. 289. *Blind-Worm*, Penn. *Brit. Zool.* vol. 111. p. 36. pl. 4. no. 15. *Common Slow-Worm*, Shaw, *Gen. Zool.* vol. III. p. 579.

DIMENS. Length from ten to twelve inches; rarely more.

DESCRIPT. (Form.) Head small; body larger (more bulky in the *female* than in the *male*), cylindrical, and of nearly equal thickness throughout; tail long, equalling half the entire length, sometimes more, blunt at the extremity: eyes small: gape extending a little beyond the eyes: teeth small, slightly hooked, with the points directed backwards: tongue broad; the tip deeply notched: upper part of the head covered

* See a representation of the plates of the head in this species, as well as in *L. Stirpium* and *L. viridis*, in the *Ann. des Sci. Nat.* tom. xvi. pl. 5. f. 1, 3, & 4.

† This plate Edwards calls *disque masséterin*. See *Ann. des Sci. Nat.* tom. xvi. pl. 7. f. 3., where is a representation of the side of the head in this species.

‡ For a more detailed account of the above species, as well as of some others found on the Continent, which may possibly occur in England, I refer the reader to two valuable memoirs, already alluded to, one by Milne Edwards the other by Dugès, in the 16th volume of the *Annales des Sciences Naturelles*. In the same memoirs will be found an explanation of the nomenclature employed in designating the different external parts of these animals, more particularly of the plates on the upper part of the head, which furnish important characters for distinguishing some nearly allied species.

I would also recommend to our own naturalists, in drawing up descriptions of these Reptiles in future, to pay more attention to *form*, as opposed to *colour*. This last can scarcely ever be depended upon. It not only varies to a very great extent in the same species, but in the same individual, according to age, season, and the period of time which may have elapsed since the last moult of the cuticle. Edwards has observed that in general the spots are more regular and better defined in *young*, than in *adult* specimens.

with squamous plates; frontal large; parietal and interparietal plates moderately developed, the latter of a triangular form, with the apex directed backwards: sides of the head, throat, and all the upper as well as under surface of the body and tail, covered with small imbricated scales of a rounded form and not keeled; those on the sides set obliquely with respect to the axis of the body. (*Colours.*) Glistening brownish gray above, inclining to reddish on the sides; bluish black beneath: along the back several parallel rows of small dark spots: sometimes all the upper surface light yellowish brown without spots; the sides only marked with a dusky fascia, commencing behind the eyes, and reaching to the extremity of the tail. *Obs.* The markings are most distinct in young specimens.

Common in most parts of the country. Frequents woods and gardens. Feeds on worms and insects. Is ovoviviparous. Motion slow.

- (4) *A. Eryx*, Linn. Syst. Nat. tom. i. p. 392. *Aberdeen Snake*, Penn. Brit. Zool. vol. iii. p. 35.

"Length fifteen inches: tongue broad and forked: nostrils small, round, and placed near the tip of the nose: eyes lodged in oblong fissures above the angle of the mouth: belly of a bluish lead-colour, marked with small white spots irregularly disposed: the rest of the body grayish brown, with three longitudinal dusky lines, one extending from the head along the back to the point of the tail; the others broader, and extending the whole length of the sides: no *scuta*; but entirely covered with small scales; largest on the upper part of the head." PENN.

The above is a description of a Snake, communicated to Linnæus and Pennant by the late Dr. David Skene, and said to inhabit Aberdeenshire. It is probably nothing more than a variety of the common *A. fragilis*.

GEN. 5. NATRIX, *Flem.*

6. *N. torquata*, Ray. (*Ringed Snake*.)—Dorsal scales carinated: a lunulate yellow spot on each side of the nape, with a black one behind.

- N. torquata*, Ray, *Syn. Quad.* p. 334. *Flem. Brit. An.* p. 156. Coluber *Natrix*, Linn. Syst. Nat. tom. i. p. 380. *Turt. Brit. Faun.* p. 81. Ringed Snake, Penn. Brit. Zool. vol. iii. p. 33. pl. 4. no. 13. Shaw, *Gen. Zool.* vol. iii. p. 446. Couleuvre à collier, *Cuv. Reg. An.* tom. ii. p. 83.

DIMENS. Length from three to four feet; sometimes more. *Obs.* The female is always much larger than the male.

DESCRIPT. (Form.) Head depressed, and broader than the neck; body slender, elongated, thickest in the middle, gradually tapering posteriorly; tail about one-fifth of the entire length, rather sharp-pointed at the extremity: gape the length of the head, arched, ascending upwards behind: teeth very small, serrated, arranged in two rows on each side of the jaws: upper part of the head protected by large squamous plates; the frontal and fronto-parietal plates of considerable size; seven plates on each side of the upper jaw: dorsal scales imbricated, oval, with an elevated keel down the middle; becoming broader and larger at the sides, with the keel obsolete: plates of the belly broad, transverse, oblong, in number about one hundred and seventy; subcaudal plates arranged in pairs, from sixty to sixty-five on each side. (*Colours.*) Upper parts cine-

reous brown, tinged with green: at the back of the head a double lunulate spot, of a bright yellow colour, behind which is a double one of black, larger and more triangular: two rows of small black spots disposed longitudinally down the middle of the back, besides which are some larger ones on the sides, uniting to form short transverse undulating bars: throat, and beneath the neck, yellowish white; abdomen, and under surface of the tail, dusky blue, mottled in some places with yellowish white; edges of the abdomen with a series of yellowish white spots.

A common species; met with in woods and hedges, as well as in marshes. Is particularly abundant in the fens of Cambridgeshire, where it sometimes attains a large size. Often takes to the water, especially when alarmed; and swims easily: will occasionally remain at the bottom for a considerable time. Feeds on frogs, mice, insects, &c. Is oviparous. Eggs from sixteen to twenty in number, often deposited on dunghills, or under hedges. Hibernates during Winter: reappears in March, or early in April. When irritated, voids a fœtid substance.

- (5.) *N. Dumfriensis*, Flem. Brit. An. p. 156. *Coluber Dumfriensis*, Sow. Brit. Misc. p. 5. pl. 3. Loud. Mag. of Nat. Hist. vol. 11. p. 458. (Copied.)

An obscure species, of which little is known. Said to be particularly characterized by having "the scales of the back extremely simple, not carinated; plates on the belly one hundred and sixty-two: scales under the tail about eighty. Of a pale brown colour, with pairs of reddish brown stripes from side to side, over the back, somewhat zigzag; with intervening spots on the sides." Sow. Only one specimen known, which was discovered by T. W. Simmons, near Dumfries. According to Sowerby's figure, which is said to be of the natural size, its length does not exceed three or four inches. Probably an immature variety of the common species.

GEN. 6. VIPERA, Daud.

7. *V. communis*, Leach. (*Common Viper*.)—Three plates on the upper part of the head, larger than the surrounding scales; dorsal scales carinated: a series of confluent rhomboidal black spots down the back.

- V. communis*, Leach, Zool. Misc. vol. 11. p. 7. Flem. Brit. An. p. 156. *Vipera*, Ray, Syn. Quad. p. 285. *Coluber Berus*, Turt. Brit. Faun. p. 80. *Viper*, Penn. Brit. Zool. vol. 11. p. 26. pl. 4. no. 12. *Common Viper*, Shaw, Gen. Zool. vol. 11. p. 365. pl. 101.

DIMENS. Length from one and a half to two feet; rarely more.

DESCRIPT. (*Fora.*) Shorter, and, in proportion to its length, thicker, than the *Natrix torquata*. Head depressed, widening behind the eyes; neck somewhat contracted; gape as long as the head, slightly ascending posteriorly; jaws very dilatable; two rows of fine teeth on the palatines, but none on the maxillaries, besides the poison-fangs: body gradually increasing in thickness to about the middle of the entire length, from that point scarcely diminishing to the vent, beyond which it tapers quite suddenly: tail very short, not one-ninth of the entire length, terminating in a sharp point: upper part of the head covered with small squamous plates, different from the imbricated scales of the back; of these plates three are larger than the rest, one situate in the middle between the eyes, the two others immediately behind the first: dorsal scales imbricated

cated, oval approaching triangular, carinated; increasing in size towards the sides of the body, where the longitudinal keel becomes lost: beneath the lower jaw some imbricated scales without a keel: plates of the belly transverse, oblong, about one hundred and forty-three in number; sub-caudal plates about thirty-three on each side. (*Colours.*) Extremely variable: ground of the back and upper parts, in some, dirty yellow; in others olive, or pale cinereous brown: space between the eyes, and an oval patch on each side of the occiput, black or dark brown; a zigzag dorsal fascia of the same colour commencing at the nape and reaching to the extremity of the tail (in some the fascia assumes rather the appearance of a longitudinal row of confluent diamond-shaped spots); also a row of small triangular black spots along each side parallel to the dorsal fascia: belly, and beneath the tail, steel-blue, stained in some places with yellowish; sometimes almost wholly black. *Obs.* The markings above vary much in intensity of colouring, but always preserve, those on the head especially, nearly the same form. The following are some of the principal varieties noticed by authors.

Var. β. Red Viper. *Rackett in Linn. Trans.* vol. XII. p. 349. *Strickland in Loud. Mag. of Nat. Hist.* vol. VI. p. 399. *Gray in Proceed. of Zool. Soc.* (1834) p. 101. *Coluber Chersea, Linn. Syst. Nat.* tom. I. p. 377. *Petite Vipère, Cuv. Reg. An.* tom. II. p. 92. "Of a bright ferruginous red, with zigzag markings down the back, resembling in form those of the *Common Viper*; but instead of being black or dark brown, they are of a deep mahogany colour: also a series of irregular spots of the same colour along each side: the zigzag line terminates at the back of the head in a heart-shaped spot, placed between two converging dark-coloured bands, which meet on the top of the head, and again diverge towards the eyes: belly ferruginous, like the back. Head much broader and shorter than in the *Common Viper*." STRICKL.

Var. γ. Blue-bellied Viper. (*Coluber cæruleus,*) *Shepp. in Linn. Trans.* vol. VII. p. 56.

Var. δ. Black Viper. *Leach, Zool. Misc.* vol. III. pl. 124. *Coluber Prester, Linn. Syst. Nat.* tom. I. p. 377. Wholly black, or very dark brown; the markings hardly distinguishable.

Common in many parts of the kingdom, frequenting thickets, old chalk-pits, and other waste places, more especially where the soil is dry. Said to be most abundant in the Western Islands. In Cambridgeshire very rare. Feeds on mice, frogs, and insects. Brings forth its young alive.

Var. β. was first obtained by the Rev. T. Rackett from Cranborne Chase, in Dorsetshire. It has been since met with in Suffolk, Worcestershire, Somersetshire, and Berkshire. By some it is considered as a distinct species; I have, however, no hesitation myself in regarding it as a mere variety of the common kind. The fact of its being always found of a small size is probably due to the circumstance of the colours changing in advanced life.

Var. γ. was described by Mr Sheppard, who considered it as another distinct species. He does not state whence his specimen was obtained.

Var. δ. has been found in Suffolk, and a few other parts of England, but is very rare.

Obs. The *Coluber Berus* of Linnæus is thought by Cuvier to be the same as his *Vipère Commune*, a species perfectly distinct from the *Common Viper* of England*.

* *Obs.* According to Mr. Lyell, (*Prim. of Geol.* vol. II. p. 103.) none of the above three species of *Ophidian Reptiles* have been observed hitherto in Ireland. According, however, to another author, (*Edinb. New Phil. Journ.* vol. XVIII. p. 373.) Snakes have been lately imported into that country, and, "are at present (1835) multiplying rapidly within a few miles of the tomb of St. Patrick."

CLASS IV. AMPHIBIA.

ORDER I. CADUCIBRANCHIA.

Gills deciduous.

I. RANIDÆ.—*No tail in the adult state: fore feet with four toes; hind feet with five, or with the rudiment of a sixth.*

1. RANA.—Skin smooth: hind feet very long, adapted for leaping; more or less palmated: upper jaw with a row of small fine teeth; also a transverse interrupted row on the middle of the palate.

2. BUFO.—Body swollen: skin warty; a porous protuberance behind the ears: hind feet of moderate length: jaws without teeth.

II. SALAMANDRIDÆ.—*Body elongated; tail always present: fore feet with four toes; hind feet with five.*

3. TRITON.—Tail compressed: jaws furnished with numerous small teeth; two longitudinal rows of similar teeth on the palate.

ORDER I. CADUCIBRANCHIA.

GEN. I. RANA, *Laurent.*

1. *R. temporaria*, Linn. (*Common Frog*).—Reddish or yellowish brown, spotted with black; an elongated black patch behind the eyes.

R. temporaria, *Linn. Syst. Nat.* tom. i. p. 357. *Turt. Brit. Faun.* p. 80. *Flem. Brit. An.* p. 158. *R. aquatica*, *Ray, Syn. Quad.* p. 247. *R. fusca*, *Ræss. Ran.* tabb. 1-3. *Common Frog*, *Penn. Brit. Zool.* vol. iii. p. 9. *Shaw, Gen. Zool.* vol. iii. p. 97. pl. 29. *Id. Nat. Misc.* vol. xx. pl. 864. (Variety.) *Grenouille rousse*, *Cuv. Reg. An.* tom. ii. p. 105.

DIMENS. (*Average.*) Length (from the end of the snout to the anus) two inches seven lines; hind leg (from its union with the body to the extremity of the longest toe) four inches; fore leg (measured in the same way) one inch five lines and a half. *Obs.* Often attains a larger size.

DESCRIPT. (*Form.*) Body slender, compared with that of the *Toad*: head approaching triangular, the snout a little pointed: gape wide, extending to a vertical line from the posterior part of the orbit: teeth minute, forming a single row in the upper jaw; none in the lower; also an interrupted row across the front of the palate: tongue soft, fleshy, spatula-shaped, emarginated at the tip, folded back upon itself when not in use: eyes somewhat elevated above the forehead: back generally flat; sometimes a little gibbous behind: fore feet moderate, with four divided toes; third toe longest; second shortest; first and fourth nearly equal: hind feet more than half as long again as the body; the thighs strong and muscular; toes on these feet palmated, five in number, with scarcely the rudiment of a sixth; fourth toe considerably longer than any of the others; third and fifth equal: skin naked, everywhere smooth, excepting between the thighs, where it is a little rugose. (*Colours.*) Variable: above brown, yellowish brown, or reddish brown, more or less spotted with black; the spots forming transverse fasciæ on the legs: beneath whitish, or yellowish white; generally plain, but sometimes spotted like the back. The most constant mark is an elongated patch of brown or brownish black behind the eyes, on each side of the occiput: there is also generally more or less indication of a whitish line running longitudinally down each side of the back, and enclosing a space paler than the adjoining regions.

Common and generally distributed in England and Scotland: said, however, to have been unknown in Ireland previously to 1696, in which

year the species was introduced, for the first time, into that country*. Frequents the water during its *larva* state; afterwards, only resorts to it occasionally, or for the purpose of spawning. *Ova* deposited in clusters, in ditches and shallow ponds, about the middle of March: young, or *Tadpoles*, hatched a month or five weeks afterwards, according to the season: by the eighteenth of June, these are nearly full-sized, and begin to acquire their fore feet: towards the end of that month or the beginning of the next (varying in different years), the young frogs come on land, but the tail is still preserved for a short time afterwards. During the breeding season, the thumb of the *male* is much swollen. Food, principally insects.

- (1.) *R. esculenta*, Linn. Syst. Nat. tom. i. p. 357. Turt. Brit. Faun. p. 80. Flem. Brit. An. p. 159. *R. viridis*, Ræs. Ran. tabb. 13, 14. *Edible Frog*, Penn. Brit. Zool. vol. III. p. 13. *Green Frog*, Shaw, Gen. Zool. vol. III. p. 103. pl. 31. Id. Nat. Misc. vol. XX. pl. 871.

Larger than the common species. Colour olive-green, spotted with black: three longitudinal streaks of yellow down the back: belly yellowish.

This species, which is common in France and in other parts of the Continent, has been included in the British Fauna upon rather doubtful authority. In the late Mr. Don's account of the plants and animals found in Forfarshire, it is asserted (p. 37.) that a few are occasionally to be met with about the lakes in that district, although rather rare. More recently, Dr. Stark is said† to have found it in the neighbourhood of Edinburgh. I cannot but think, however, that, in both these instances, some other species, possibly a new one, has been mistaken for it, since it seems hardly probable that an animal so common in the South of Europe, should be found in Scotland, and not in any part of England. Although represented as indigenous by all our British authors, none, with the exception of those above mentioned, have assigned any locality for it. It is much to be desired that Dr. Stark would investigate the subject more thoroughly, and compare the specimens, which he finds in his neighbourhood‡, with the true *R. esculenta* of the Continent.

GEN. 2. BUFO, *Laurent.*

2. *B. vulgaris*, Flem. (*Common Toad.*) — Lurid brownish gray, with reddish brown tubercles: body large and swollen.

- B. vulgaris*, *Flem. Brit. An.* p. 159. *B. terrestris*, *Ræs. Ran.* tab. 20. *Rana Bufo*, *Linn. Syst. Nat.* tom. i. p. 354. *Turt. Brit. Faun.* p. 80. *Bufo*, *Ray, Syn. Quad.* p. 252. *Toad*, *Penn. Brit. Zool.* vol. III. p. 14. *Common Toad*, *Shaw, Gen. Zool.* vol. III. p. 138. pl. 40. *Crapaud commun*, *Cuv. Reg. An.* tom. II. p. 109.

DIMENS. Length three inches three lines; hind leg three inches six lines; fore leg two inches.

DESCRIPT. (*Form.*) Body broad, thick, and very much swollen: head large, with the crown much flattened, the snout obtuse and rounded: gape extremely wide: no teeth either in the jaws or on the palate:

* See *Edinb. New Phil. Journ.* vol. XVIII. p. 372.

† *Proceed. of Zool. Soc.* (1833) p. 88.

‡ That they are not simple varieties of the *R. temporaria*, is probable from the circumstance of Dr. Stark's having observed osteological differences between them and the species just alluded to. But I think it remains to be shewn that they are really the *R. esculenta*.

tongue with the apex entire: eyes moderately projecting; above each a slight protuberance studded with pores; a larger protuberance of the same kind on each side of the head behind the ears, with pores more numerous and secreting a fœtid humour: fore feet with four divided toes; third toe longest; first and second equal, both a little shorter than the fourth: hind legs moderate, scarcely longer than the body; the toes on these feet semi-palmated, five in number with the rudiment of a sixth; fourth toe much the longest; third a little longer than the fifth: skin every-where covered with warts and pimples of various sizes; largest on the back, but most crowded beneath. (*Colours.*) Upper parts of a lurid brownish gray, sometimes inclining to olive, at other times to black; the colour of the tubercles rufous brown: beneath yellowish white; either plain, or irregularly spotted with black.

Common in most parts of Great Britain: rare, however, in Ireland, if not an introduced species in that country. Frequents the shady parts of woods and gardens, cellars, and other damp places. Always a few days later in spawning than the Frog; the difference, in some seasons, amounting to more than a fortnight. *Ova* deposited in long necklace-like chains. Feeds on worms and insects, but is capable of remaining a long time without nourishment. Said to be very long-lived. *Obs.* The *Great Frog* of Pennant* is evidently nothing more than a large variety of this species†.

3. *B. Calamita*, Laurent. (*Natter-Jack*.)—Olivaceous, or yellowish brown; a bright yellow line down the middle of the back: eyes very much elevated.

Rana Bufo, β , *Gmel. Linn.* tom. i. part iii. p. 1047. *R. Rubetra*, *Turt. Brit. An.* p. 80. *Bufo Rubeta*, *Flem. Brit. An.* p. 159. *B. terrest. fœtidus*, *Ræs. Ran.* tab. 24. f. 1. *Natter-Jack*, *Penn. Brit. Zool.* vol. III. p. 19. *Jenyns in Camb. Phil. Trans.* vol. III. p. 373. *Mephitic Toad*, *Shaw, Gen. Zool.* vol. III. p. 149. pl. 43. *Id. Nat. Misc.* vol. XXIII. pl. 999.

DIMENS. Length two inches seven lines and a half; hind leg two inches; fore leg one inch three lines.

DESCRIPT. (*Form.*) General appearance similar to that of the last species; but the eyes more projecting, with the eye-lids very much elevated above the crown: porous protuberance behind the ears not so large: toes on the fore feet more nearly equal; the third, notwithstanding, a little longer than the others; first and second not shorter than the fourth: hind legs not so long as the body; the toes on these feet much less palmated than in the *B. vulgaris*; the sixth toe scarcely at all developed: skin similarly covered with warts and pimples. (*Colours.*) Above, yellowish brown, or olivaceous, eluded here and there with darker shades; a line of bright yellow along the middle of the back; warts and pimples, especially the porous protuberance behind the eyes, reddish: beneath, whitish, often spotted with black: legs marked with transverse black bands.

First observed near Revesby Abbey in Lincolnshire, by the late Sir J. Banks. Has been since met with in plenty on many of the heaths about London, as well as on Gamlingay Heath in Cambridge-

* *Brit. Zool.* vol. III. p. 20.

† See, on this subject, *Leach's Zoological Miscellany*, vol. III. p. 9. pl. 125.

shire, and in two or three localities in Norfolk. Appears to affect dry sandy districts. Of much more active habits than the Common Toad, its pace being a kind of shuffling run: never leaps. Spawns later in the season.

Obs. Before concluding this family, it may be just stated, that amongst the British species, Merrett has enumerated the *Tree Frog*, (*Ranunculus viridis*, *Pinax Rer. Nat. Brit.* p. 169.) This, however, is so obviously a mistake, that there is no occasion to dwell longer on the circumstance.

GEN. 3. TRITON, *Laurent.*

4. *T. palustris*, Flem. (*Warty Eft.*)—Body rough; with scattered pores; a distinct lateral line of pores: dorsal and caudal crests (in the *male*) separate; the former deeply serrated.

T. palustris, *Flem. Brit. An.* p. 157. *Lacerta palustris*, *Linn. Syst. Nat.* tom. 1. p. 370. *Shepp. in Linn. Trans.* vol. vii. p. 52. *Turt. Brit. Faun.* p. 79. *Salamandra aquatica*, *Ray, Syn. Quad.* p. 273. *S. cristata*, *Latr. Hist. Nat. des Sal. de France*, pp. 29, & 43. pl. 3. f. 3. A. *Warty Lizard*, *Penn. Brit. Zool.* vol. iii. p. 23. pl. 3. *Warted Newt*, *Shaw, Nat. Misc.* vol. viii. pl. 279. *Great Water-Newt*, *Id. Gen. Zool.* vol. iii. p. 296. pl. 82. *Salamandre crêtée*, *Cuv. Reg. An.* tom. ii. p. 116.

DIMENS. Entire length from five to six inches, rarely more.

DESCRIPT. (*Form.*) Head depressed: snout obtuse and rounded: gape extending a little beyond the eyes: teeth minute, sharp, slightly hooked, forming a single row in each jaw, and two parallel rows on the palate: a collar beneath the neck formed by a loose fold of the skin: fore feet extending a little beyond the snout; each with four flattened toes; third toe longest; second a little longer than the fourth; this last a little longer than the first: hind feet, placed against the sides of the abdomen, reaching to the carpus of the fore; with five toes, more developed than those in front; third and fourth toes equal, and longest; second longer than the fifth; first shortest: tail about two-fifths of the entire length: very much compressed, with its upper and under edges sharply keeled; of a lanceolate form, gradually tapering to an obtuse point: skin warty, uniformly covered with scattered pores; parotids porous; also a row of distinct pores on each side of the body, forming a line between the fore and hind legs. *Obs.* In the *male* the abdomen is rather shorter, compared with the entire length, than in the *female*; the hind feet are somewhat larger and stronger; the back, *during the spring*, is ornamented with an elevated membranous crest, commencing between the eyes, and running longitudinally down the mesial line to near the tail; this last is also furnished with a similar but separate membrane along its upper and under ridges, causing it to appear at the base as broad as the body; both membranes, but the dorsal more especially, are deeply jagged, and serrated. In the *female*, there is only a slight dorsal ridge occupying the place of the membrane in the other sex. (*Colours.*) Upper parts blackish brown, with round spots of a somewhat darker tint: breast and abdomen bright orange, or orange-yellow, with

conspicuous round black spots, sometimes confluent, and forming interrupted transverse fasciæ: sides dotted with white: frequently a silvery white band along the sides of the tail: membranes dusky, tinged with violet.

Not uncommon in ditches, ponds, and other stagnant waters, during the spring months. Late in Summer, is sometimes met with on land, in damp shady situations: this, however, is probably in consequence of the drying up of the waters in its accustomed haunts. *Ova* deposited on aquatic plants.

5. *T. punctatus*, Bonap. (*Common Eft.*) — Body smooth, without pores; lateral line of pores indistinct; top of the head with two porous bands: dorsal and caudal crests united, and uniformly crenate.

T. punctatus, Bonap. *Faun. Ital.* fasc. i. tab. 4. f. 4. *T. aquaticus*, *Flem. Brit. An.* p. 158. *Lacerta aquatica*, *Linn. Syst. Nat.* tom. 1. p. 370? *L. maculata*, *Shepp. in Linn. Trans.* vol. viii. p. 53. *Turt. Brit. Faun.* p. 79. *Salamandra punctata*, *Latr. Hist. Nat. des Sal. de France*, pp. 31, & 53. pl. 6. f. 6. A. (Male.) B. (Female.) Smaller or Common Water-Newt, *Shaw, Nat. Misc.* vol. xi. pl. 412. *Id. Gen. Zool.* vol. iii. p. 298. pl. 83. *Salamandre ponctuée*, *Cuv. Reg. An.* tom. ii. p. 116.

DIMENS. Entire length from three and a half to four inches.

DESCRIPT. (*Form.*) Always much smaller than the last species, from which it may be further distinguished by its smooth soft skin: tail terminating in rather a sharper point than in the *T. palustris*: fore feet, relatively, a little longer; but the disposition of the toes on both fore and hind feet similar: very little trace of a collar beneath the throat: two rows of pores on the top of the head, but none on the body; occasionally a few distant pores between the legs forming an indistinct lateral line. In the *male*, the dorsal crest commences at the occiput, and is more elevated than in the *L. palustris*; it also forms one continuous membrane with the crest of the tail; its margin, instead of being serrated, is regularly crenate, or festooned, throughout its whole length: *during the season of love*, the hind toes of this sex are also broadly fringed with dilated membranes. (*Colours.*) Above light brownish gray, inclining to olivaceous; beneath yellowish, passing into bright orange *in the spring*: every-where marked with round black spots of unequal sizes: on the head the spots unite to form longitudinal streaks; there is generally also a yellowish white fascia commencing beneath the eyes, and terminating a little beyond them. *Obs.* The *female* is much less spotted than the *male*; the spots are also smaller: sometimes, in this sex, the under parts are quite plain.

Equally common with the last species, and found in similar situations.

Obs. The above species is subject to considerable variation. It is also often found on land, a circumstance which tends in some measure to alter its characters. In such specimens, the skin loses its softness; becoming at the same time opaque, and somewhat corrugated: the membranes of the back and tail entirely disappear, causing this last to appear narrower, and thicker in proportion to its depth: the toes, from being flattened, become rounded: the colours also are every-where more obscure. In this state it is the *Lacerta vulgaris* of Sheppard and Turton (and pro-

bably of Linnæus also), the *Triton vulgaris* of Fleming, the *Brown Lizard* of Pennant, and the *Common Newt* of Shaw. By these authors, the variety in question is considered as a distinct species, an opinion to which I was formerly myself inclined. I am, however, now perfectly satisfied, from the examination of a large number of specimens, that it is identical with the aquatic kind, and that all its peculiarities may be traced to the change of circumstances under which it is placed. Sheppard lays great stress upon the fact of its being observed "of all sizes, from one to four inches in length, but never in any other than a perfect state;" and he considers this "a sufficient proof that, like the rest of the *land* lizards, it undergoes no change." The same circumstance is noticed by Shaw, who regards it as an argument in favour of its being viviparous. I suspect, however, that the period of time during which this species remains in the larva state, although perhaps constant in ordinary cases, is subject to much variation; and that if any thing occur to oblige the young to exchange their native element for another before they would naturally attain their perfect form, the gills are cast prematurely, to enable the animal to accommodate itself to its new circumstances. The fact of such small specimens, as Sheppard has noticed, being found on land is indisputable, but I think I have generally observed some traces of there having *been* gills at no very long period before. I may just add, that Sheppard appears to have confounded, as Pennant had done before him, the *males* of these reptiles, when possessing the dorsal and caudal fins, with the *larvæ*.

6. *T. vittatus*, Gray. (*Striped Eft.*)—Body smooth, without pores; lateral line of pores distinct; top of the head with two porous bands: dorsal and caudal crests irregularly and deeply notched.

T. vittatus, Gray's *Ms.*

DIMENS. Entire length four inches six lines.

DESCRIPT. Skin smooth: top of the head and parotids with scattered pores: a series of distant pores on the lower part of the sides between the fore and hind legs. *Male in summer* with a high, deeply notched, dorsal crest, commencing in front of the eyes, and with a deep notch over the vent; continued into a low entire crest extending the whole length of the tail. *Colour* white (yellow? when alive), with unequal black spots; tail black; belly, under sides of the legs and tail, and a broad streak along each side of the body and tail, white.

Var. β. Throat white, with a few spots; upper part of the tail pale, black-spotted: dorsal crest very low; caudal crest distinct.

Var. γ. Above black, beneath white; throat black-spotted: dorsal crest none.

A new species, discovered in ponds near London, by J. E. Gray, Esq. to whom I am indebted for the above description. It differs remarkably from both the preceding species in the form of the dorsal crest, and in the disposition of the colours. From the *T. palustris*, it may be further distinguished by its smooth skin.

CLASS V. PISCES.

(I. OSSEI.)

Skeleton bony; the osseous matter disposed in fibres: sutures of the cranium distinct: maxillary and intermaxillary bones, always one, and generally both, present.

§ 1. PECTINIBRANCHII. — *Branchiæ in continuous pectinated ridges; furnished with an opercle and branchiostegous membrane: jaws complete, and free.*

ORDER I. ACANTHOPTERYGII.

The first portion of the dorsal fin, or the entire first dorsal when two are present, with simple spinous rays: also the anal and ventrals with one or more of the anterior rays generally spinous.

I. PERCIDÆ. — *Scales generally rough, with ciliated margins: margin of the opercle or pre-opercle, sometimes both, denticulated, or armed with spines: both jaws, as well as the vomer, and almost always the palatine bones also, armed with teeth.*

1. PERCA.—Body oblong, somewhat compressed: ventrals beneath the pectorals: branchiostegous membrane with seven rays: preopercle with the basal and posterior margins denticulated: jaws, vomer, and palatines, all armed with small teeth: scales rough; not easily detached.

- (1. PERCA.) Two dorsals: opercle with the upper half covered with scales, terminating behind in a flattened point: infra-orbitals slightly denticulated: tongue smooth.
- (2. LABRAX.) Two dorsals: opercle entirely covered with scales, terminating behind in two spines: infra-orbitals not denticulated: tongue rough with minute teeth.
- (3. SERRANUS.) A single dorsal: cheeks and opercle covered with scales; the latter terminating behind in one or more flattened points: jaws with some elongated sharp teeth among the smaller ones.
- (4. ACERINA.) A single dorsal: head without scales, pitted with indentations: opercle terminating behind in a single spine: teeth uniform.

2. TRACHINUS.—Head compressed; body elongated: ventrals before the pectorals: two dorsals; the first short; the second, as well as the anal, long: branchiostegous membrane with six rays: opercle with one strong spine directed backwards: two small spines in front of the eye: both jaws, as well as the vomer and palatines, armed with minute teeth.

(1.) SPHYRÆNA.—Body elongated: two dorsals remote from each other: head oblong: lower jaw pointed, longer than the upper, with some of the teeth larger than the others: branchiostegous membrane with seven rays: no denticulations on the preopercle, or spines on the opercle.

3. MULLUS.—Body oblong, thick: ventrals a little behind the pectorals: two dorsals widely separated: branchiostegous membrane with four rays: no denticulations on the preopercle, or spines on the opercle: teeth in the lower jaw and on the palatines only: chin with two long barbules: scales large, deciduous*.

* *Obs.* The characters of this and the last genus depart rather from those of the rest of the *Percidæ*. With respect to the *Mulletts*, Cuvier observes that they might almost be considered as a distinct family.

II. LORICATI.—*Infra-orbitals extending more or less over the cheeks, articulating behind with the preopercle: head mailed, or otherwise armed.*

4. TRIGLA.—Head mailed; in the form of a parallelo-piped: opercle, and bones of the shoulder, armed with spines: body scaly: two dorsals: three detached rays beneath the pectorals: branchiostegous membrane with seven rays: fine velvet-like teeth* in both jaws and on the front of the vomer.

5. COTTUS.—Head broad, depressed; more or less armed with spines: body naked, without scales: two dorsals, distinct, or very slightly connected: lower rays of the pectorals simple: branchiostegous membrane with six rays: teeth in both jaws, and also on the front of the vomer; none on the palatines: ventrals small.

6. ASPIDOPHORUS.—Head broad, depressed; armed with spines and tubercles: body attenuated behind, mailed with angular plates: two dorsals, nearly contiguous: branchiostegous membrane with six rays; furnished, as well as the chin, with small thread-like filaments: teeth in both jaws; none on the vomer or palatines: ventrals small †.

7. SCORPÆNA.—Head compressed, armed more or less with spines and tubercles: body oblong, scaly: a single dorsal: lower rays of the pectorals simple: branchiostegous membrane with seven rays: velvet-like teeth in both jaws, and on the palatines.

(1. SEBASTES.) Head scaly; spines on the preopercle and opercle; no tubercles.

8. GASTEROSTEUS.—Head without spines or tubercles: body generally more or less protected by

* The terms employed to designate the different forms of teeth in fishes have been, in most instances, adopted from Cuvier. See *Hist. Nat. des Poiss.* tom. i. p. 362. See also Yarrell's *British Fishes*, vol. i. p. 99.

† Since the publication of my Catalogue, I have inclined to the opinion that this group should rank higher than as a mere subdivision of the genus *Cottus*.

shield-like plates: several free spines instead of a first dorsal: ventrals reduced nearly to a single spine: branchiostegous membrane with three rays: teeth in both jaws; none on the vomer or palatines.

- (1. GASTEROSTEUS.) Bones of the pelvis united, forming a triangular plate on the abdomen: ventrals with only one soft ray.
- (2. SPINACHIA.) Bones of the pelvis separate: ventrals with two soft rays: lateral line armed with large carinated scales.

III. SCIÆNIDÆ.—*Preopercle denticulated; opercle with spines: mouth but little protractile: no teeth on the vomer or palatines: bones of the face and cranium often cavernous, causing the snout to appear more or less protuberant.*

9. SCIÆNA.—Head protuberant, covered entirely, as well as the body, with scales: two dorsals; the second much longer than the first: anal short: preopercle, except in advanced age, denticulated; opercle terminating behind in two flat spines: branchiostegous membrane with seven rays.

- (1. SCIÆNA.) A row of strong pointed teeth in each jaw, accompanied, in the upper, by smaller ones behind: anal with only one small spine: no cirrus on the chin.
- (UMBRINA.) A broad band of fine small teeth in each jaw without an anterior row of stronger ones: anal with two spines, the second strong: a barbule beneath the symphysis of the lower jaw.

IV. SPARIDÆ.—*No denticulations on the preopercle, or spines on the opercle: palate without teeth: mouth not protractile: body oval, covered with large scales; no scales on the vertical fins.*

10. SPARUS.—Sides of the jaws furnished with rounded molars forming a pavement: cheeks scaly: a single dorsal: branchiostegous membrane with five or six rays.

- (1. CHRYSOPHRYS.) From four to six conical incisors in each jaw; molars large, in three or more rows.
- (2. PAGRUS.) Conical incisors in front, with card-like teeth behind; molars of moderate size, in only two rows.
- (3. PAGELLUS.) All the anterior teeth fine and card-like: molars small, in two or more rows.

11. DENTEX.—All the teeth conical, and forming but a single row; some of the anterior ones longer than the others, and hooked: cheeks scaly: a single dorsal: branchiostegous membrane with six rays.

12. CANTHARUS.—All the teeth card-like, and crowded together; the anterior row larger, and more hooked, than the others: cheeks scaly: branchiostegous membrane with six rays.

V. SQUAMIPINNATI.—*Body compressed; scaly: dorsal and anal fins, or at least their soft portions, closely covered with scales.*

13. BRAMA.—Both jaws, as well as the palatine bones, with card-like teeth: dorsal and anal fins long: the spinous rays few in number: branchiostegous membrane with seven rays.

VI. SCOMBRIDÆ.—*Opercular pieces without denticulations: scales very small: body smooth: vertical fins not scaly.*

14. SCOMBER.—Lateral line unarmed: two dorsals; the first continuous; posterior rays of the second, as well as the corresponding rays of the anal, separated into spurious finlets: body fusiform: branchiostegous membrane with seven rays.

- (1. SCOMBER.) First dorsal separated from the second by a wide space: scales small, and every-where uniform: sides of the tail with two small cutaneous ridges.
- (2. THYNNUS.) First dorsal reaching nearly to the second: some large scales surrounding the thorax, forming a corselet: sides of the tail with a cartilaginous keel between two small cutaneous ridges.

15. XIPHIAS.—Lateral line unarmed: a single dorsal, continuous: body elongated; the snout produced into a sword-like process: jaws without teeth: sides of the tail with a strong projecting keel: ventrals wanting.

16. CENTRONOTUS.—Lateral line unarmed: spines of the first dorsal free, and not connected by a membrane: ventrals always present.

(1. NAUCRATES.) Body fusiform: sides of the tail keeled: two free spines before the anal.

(LICHLA.) Body compressed: sides of the tail not keeled: two free spines before the anal: before the spines on the back, a reclined spine directed forwards.

17. CARANX.—Lateral line armed with large, imbricated, spinous plates: two distinct dorsals; before the first a sharp reclined spine directed forwards: some free spines before the anal; sometimes connected, forming a small fin: body fusiform.

18. ZEUS.—One dorsal; the spinous and soft portions separated by a deep notch: body oval, compressed: mouth very protractile: teeth small, few in number: ventrals thoracic.

(1. ZEUS.) Dorsal spines accompanied by filamentous prolongations of the membrane: a series of forked spines along the base of the dorsal and anal.

(2. CAPROS.) No spines at the base of the dorsal and anal fins: body covered with rough scales.

19. LAMPRIS.—Dorsal entire, very much elevated anteriorly: anal also elevated, with one small spine in front of the base: body oval, compressed: no teeth: ventrals, and lobes of the caudal, very much elongated; the former abdominal, with ten rays: sides of the tail keeled.

20. CORYPHÆNA.—Body compressed, elongated: upper part of the head presenting a sharp edge: one dorsal running the whole length of the back; all the

rays nearly equally flexible, but the anterior ones not articulated: branchiostegous membrane with seven rays.

(1. *CENTROLOPHUS*.) Head oblong: palate destitute of teeth: a space without rays between the occiput and commencement of the dorsal.

VII. *TÆNIOIDEI*.—*Body very much elongated, as well as compressed: scales small.*

* *Snout elongated: gape wide: teeth strong, sharp, and cutting: lower jaw projecting.*

21. *LEPIDOPUS*.—Ventrals reduced to two small scales: dorsal extending throughout the whole length: anal narrow: caudal well formed: branchiostegous membrane with eight rays.

22. *TRICHIURUS*.—Ventrals and caudal wanting: tail produced into a long, slender, compressed filament: anal represented by a series of small, almost invisible, spines: branchiostegous membrane with seven rays.

** *Mouth small, very protractile: teeth small.*

23. *GYMNETRUS*.—Anal entirely wanting: dorsal long; the anterior rays prolonged: ventrals very long (but easily broken): caudal of few rays, attached vertically to the extremity of the tail, which terminates in a small hook or claw: branchiostegous membrane with six rays.

*** *Snout very short; gape oblique: teeth well developed.*

24. *CEPOLA*.—Dorsal and anal long, both reaching to the base of the caudal: ventrals moderately developed: branchiostegous membrane with six rays.

VIII. *MUGILIDÆ*.—*Body oval, approaching to cylindric; covered with large scales: snout very short: mouth transverse, angular when*

closed, the lower jaw with an eminence in the middle fitting into a corresponding hollow in the upper: teeth extremely minute: two dorsals widely separated: ventrals a little behind the pectorals: branchiostegous membrane with six rays.

25. MUGIL.

26. ATHERINA*. — Body elongated: mouth very protractile: teeth minute: two dorsals widely separate: ventrals behind the pectorals: branchiostegous membrane with six rays: a broad silver band along each side.

IX. GOBIADÆ. — *Body elongated: one or two dorsals: the spinous rays always slender and flexible.*

27. BLENNIUS.—Ventrals before the pectorals, very much reduced: body elongated, compressed, smooth, covered with small scales: gill-opening large; the membrane continued across the breast: a single dorsal, composed almost entirely of simple flexible rays.

- (1. BLENNIUS.) Teeth long, even, close-set, forming a single row; the last in the series sometimes longer than the others, and curved: ventrals of two or three rays.
- (2. GUNNELLUS.) Teeth short, in more than one row: ventrals extremely small, reduced nearly to a single ray: dorsal extending the whole length; all the rays simple, and without articulations.

28. ZOARCES†.—Ventrals before the pectorals, small, with three rays: body elongated, covered with a mucous

* Cuvier places this genus between the *Mugilidæ* and the *Gobiadæ*, observing that it will not exactly associate with either.

† This genus has been probably misplaced by authors. It seems (as Nilsson observes) to shew more affinity to the *Malacopterygian* Fishes, especially to some of the *Gadidæ*. It is a curious circumstance that the *Zoarces viviparus* and the *Lota vulgaris* should have obtained the same English name (that of *Eel-Pout*;) in some parts of the country.

secretion : branchiostegous membrane with six rays ; not continued across the breast : teeth conical, in one row at the sides of the jaws, in many in front : fins invested with a thick skin ; the dorsal, anal, and caudal, united ; all the rays of the dorsal soft and articulated.

29. ANARRHICHAS.—Ventrals wanting : body elongated, smooth : one dorsal, composed entirely of simple rays, not connected with the caudal : branchiostegous membrane with six rays : palatines, vomer, and mandibles, armed with large osseous tubercles ; the anterior teeth long, and conical.

30. GOBIUS.—Ventrals thoracic ; more or less united at the edges, forming a funnel-shaped cavity : body elongated, scaly : head moderate : gill-opening small ; branchiostegous membrane with five rays : two distinct dorsals ; the first with the spines extremely flexible.

31. CALLIONYMUS.—Ventrals jugular, widely separate, broader than the pectorals : body naked : head broad and depressed : gill-opening reduced to a small hole on each side of the nape : preopercle terminating behind in several small spines : two dorsals.

X. LOPHIADÆ.—*Bones of the carpus elongated, forming a kind of arm supporting the pectorals : skeleton semicartilaginous.*

32. LOPHIUS.—Ventrals before the pectorals : opercle and branchiostegous rays enveloped in the skin ; the branchiostegous membrane forming a large purse-like cavity in the axilla : two distinct dorsals ; in front of which are some free rays, produced into long slender filaments : skin naked : head broad and depressed ; extremely large with respect to the rest of the body.

XI. LABRIDÆ.—*Body oblong, scaly : only one dorsal ; the spines invested with membranous*

shreds, extending beyond their tips, and giving them a bifid appearance: lips fleshy: pharyngeans three in number; two above and one below; all armed with strong teeth.

33. LABRUS.—Lips double: branchiostegous membrane with from four to six rays: maxillary teeth conical; the anterior ones longest: pharyngeans cylindrical, blunt, forming a pavement.

- (1. LABRUS.) Preopercle with the margin entire: cheeks and opercle scaly: first dorsal spines not elongated.
(*LACHNOLAIMUS*.) First dorsal spines produced into long flexible threads.
- (2. JULIS.) First dorsal spines elongated: head entirely smooth, and without scales.
- (3. CRENILABRUS.) Preopercle with the margin denticulated: cheeks and opercle scaly.

XII. CENTRISCIDÆ.—*Mouth at the extremity of a long tube, formed by a prolongation of the rostral and opercular bones.*

34. CENTRISCUS.—Body oblong-oval, compressed at the sides, carinated beneath: mouth extremely small, cleft obliquely: branchiostegous membrane with two or three slender rays: two dorsals; the anterior one placed very backward, with the first spine much longer and stouter than the others: ventrals small, behind the pectorals.

ORDER II. MALACOPTERYGII.

All the fin-rays, with the exception sometimes of the first in the dorsal and the first in the pectorals, soft and cartilaginous; these rays of an articulated structure, and generally more or less branched at their extremities.

(I. ABDOMINALES.)

Ventrals suspended from the abdomen, and situate far behind the pectorals.

I. CYPRINIDÆ.—*Mouth small: jaws weak, generally without teeth, formed by the intermaxillaries: pharyngeans with strong teeth: body scaly: no adipose fin.*

35. CYPRINUS.—Jaws without teeth: lips simple, with or without barbules: branchiostegous membrane with three flat rays: one dorsal: scales generally large.

(*1. CYPRINUS.) Dorsal long; the second ray, as well as that in the anal, a serrated spine.

(2. BARBUS.) Dorsal and anal short; the former with the second or third ray strongly spinous: upper jaw with four barbules; two at the angles, and two at the extremity of the mouth.

(3. GOBIO.) Dorsal and anal short; without spines: upper jaw with two barbules.

(4. TINCA.) Dorsal and anal short; without spines: scales small, and slimy: two very short barbules.

(5. ABRAMIS.) Neither spines nor barbules: dorsal short, placed behind the ventrals: anal long.

(6. LEUCISCUS.) Dorsal and anal short; without spines: mouth without barbules.

36. COBITIS.—Jaws without teeth: lips fleshy, fitted to act as suckers, furnished with barbules: body elongated: scales small, and slimy: branchiostegous membrane with three rays: one dorsal: ventrals very much behind.

II. ESOCIDÆ.—*Mouth with strong teeth: upper jaw formed by the intermaxillary, or if not entirely, the maxillary without teeth and concealed in the substance of the lips: no adipose fin.*

37. ESOX.—Snout broad, oblong, rounded, depressed; intermaxillaries forming two-thirds of the upper jaw; teeth

in both jaws, as well as on the vomer, palatines, tongue, pharyngeans, and branchial arches: one dorsal; the anal opposite.

38. **BELONE.**—Snout attenuated, greatly prolonged: intermaxillaries forming the entire margin of the upper jaw: both jaws with small teeth; none on the vomer, palatines, or tongue: body elongated: a row of carinated scales along each side of the abdomen.

(1. **BELONE.**) Dorsal and anal entire.

(2. **SCOMBERESOX.**) Last rays of the dorsal and anal detached, forming spurious finlets.

39. **EXOCÆTUS.**—Head depressed, scaly: intermaxillaries without pedicles, and forming the entire margin of the upper jaw: both jaws with small teeth: branchiostegous membrane with ten rays: a row of carinated scales forming a projecting line along the bottom of each flank: pectorals extremely large, almost as long as the body.

SILURIDÆ.—No true scales: skin naked, or covered with osseous plates: adipose fin often present: upper jaw formed by the intermaxillaries: first ray of the dorsal and pectoral fins generally a strong articulated spine.

(2.) **SILURUS.**—Skin naked, covered with a mucous secretion: head depressed: mouth terminal: with several fleshy barbules: card-like teeth in both jaws, as well as on the vomer: dorsal small, without any sensible spine: anal very long.

III. **SALMONIDÆ.**—*Body scaly: two dorsals; the first with all the rays soft; second small, and adipose.*

40. **SALMO.**—The greater part of the upper jaw formed by the maxillaries: one row of sharp teeth on the maxillaries, intermaxillaries, palatines, and mandibulars;

two rows on the vomer, tongue, and pharyngeans: ventrals opposite the middle of the first dorsal; the adipose fin opposite the anal: branchiostegous membrane with more than eight rays.

41. OSMERUS.—Two rows of teeth on each palatine, the vomer with only a few teeth in front: ventrals opposite the anterior margin of the first dorsal: branchiostegous membrane with only eight rays: scales minute.

42. THYMALLUS.—Gape small: jaws, tongue, palatines, and front of the vomer, with very fine velvet-like teeth: branchiostegous membrane with ten rays: first dorsal long and high: scales large.

43. COREGONUS.—Mouth as in the last genus, but the teeth still smaller, sometimes entirely wanting: dorsal not so long as it is high in front: scales very large.

(3.) SCOPELUS.—Gape and gill-openings large: both jaws with very small teeth; the margin of the upper formed entirely by the intermaxillaries: tongue and palate smooth: branchiostegous membrane with nine or ten rays: first dorsal answering to the space between the ventrals and the anal; second very small, with vestiges of rays.

IV. CLUPEIDÆ.—*No adipose fin: upper jaw formed in the middle by the intermaxillaries, which are without pedicles; at the sides by the maxillaries: body scaly.*

44. CLUPEA.—Intermaxillaries short, and narrow; sides of the jaw formed by the maxillaries in three pieces, and alone protractile: mouth with few teeth, sometimes with none: abdomen compressed, the scales on the margin forming a serrated ridge: gill-opening very large; branchiostegous membrane with from six to eight rays.

(1. CLUPEA.) Maxillaries arched in front: gape moderate; upper lip entire.

(2. ALOSA.) Upper jaw notched in the middle.

45. ENGRAULIS.—Snout projecting, and sharp-pointed; intermaxillaries placed beneath, and very small;

maxillaries straight and long: gape extending to behind the eyes: both jaws furnished with teeth: gill-opening extremely large; the membrane with twelve or more rays: abdomen generally smooth.

(4.) *LEPISOSTEUS*.—Snout prolonged, formed by the union of the intermaxillaries, maxillaries, palatines, vomer and ethmoid: lower jaw equalling it: both jaws armed with sharp teeth: branchiostegous membrane with three rays: body covered with hard osseous scales: dorsal and anal opposite, placed very far back.

(II. SUBBRACHIALES.)

Ventrals immediately beneath the pectorals, the pelvis being attached to the bones of the shoulder.

V. *GADIDÆ**.—*Ventrals jugular, pointed: body covered with soft scales: all the fins soft: jaws, and front of the vomer, armed with several rows of sharp card or rasp-like teeth: gill-opening large with seven rays.*

46. *GADUS*.—Body oval, moderately elongated: head compressed: three dorsals: two anals: one barbule at the extremity of the lower jaw: ventrals with six rays.

47. *MERLANGUS*.—Body elongated: three dorsals: two anals: no barbule on the chin: ventrals with six rays.

48. *MERLUCCIUS*.—Body elongated: head compressed: two dorsals; the first small: one anal: chin without barbules.

49. *LOTA*.—Body slender, elongated, compressed behind: two dorsals; the first short; the second dorsal, as

* I have followed Cuvier in the arrangement of the genera belonging to this family. It may be questioned, however, whether those which he has adopted are all of them groups of equal value, and whether some might not with more propriety be lowered to a subordinate rank. Without an extensive acquaintance with foreign species, it would be presumptuous to decide this point.

well as the anal, long: chin with one or more barbules: ventrals with six or seven rays.

50. MOTELLA.—Body elongated, compressed behind: first dorsal but little elevated, and scarcely perceptible; the rays detached and hair-like, all, except the first, very minute: second dorsal, and also the anal, long: ventrals with six or seven rays.

51. BROSMUS.—Body elongated, compressed behind: only one long dorsal extending nearly to the caudal: anal long: chin with a single barbule: ventrals thick and fleshy, consisting of five rays.

52. PHYCIS.—Ventrals consisting of only a single ray; often forked: head large: body elongated: chin with one barbule: two dorsals; the second, as well as the anal, long.

53. RANICEPS.—Head depressed and very broad: body very much compressed behind: two dorsals; the first very small, scarcely perceptible; the second, as well as the anal, long: ventrals with the two first rays elongated.

VI. PLEURONECTIDÆ.—*Body deep, very much compressed; with both the eyes on the same side of the head: sides of the mouth, and generally the pectorals, unequal: dorsal and anal extending the whole length of the back and abdomen respectively: ventrals appearing like a continuation of the anal: branchiostegous membrane with six rays.*

54. PLATESSA.—A single row of obtuse cutting teeth in each jaw; and generally a pavement of teeth on the pharyngeans: dorsal commencing in a line with the upper eye, and leaving, as well as the anal, a space between it and the caudal: form rhomboidal: eyes on the right side.

55. HIPPOGLOSSUS.—Jaws and pharyngeans armed with strong sharp teeth: dorsal commencing in a line with the upper eye, and terminating before the caudal: form oblong: eyes sometimes on the right, sometimes on the left side.

56. PLEURONECTES.—Jaws and pharyngeans with fine card-like teeth: dorsal commencing immediately above the upper lip, and reaching, as well as the anal, to very near the caudal: form rhomboidal: eyes generally on the left side.

57. SOLEA.—Mouth irregular, and as it were twisted on the side opposed to the eyes, and furnished on that side only with fine velvet-like teeth, the upper side being without teeth: form oblong-oval: snout rounded, advancing beyond the mouth: dorsal commencing at the mouth, and reaching, as well as the anal, quite to the caudal.

(1. SOLEA.) Pectorals of moderate size, and not very unequal.

(2. MONOCHIRUS.) Pectoral on the side of the eyes extremely small; that on the side opposite rudimentary, or altogether wanting.

VII. DISCOBOLI.—*Ventrals united, forming a concave disk beneath the body: skin without scales.*

58. LEPADOGASTER. — Pectorals large, descending to the inferior surface of the body, then doubling forwards upon themselves, and finally uniting under the throat by a transverse membrane: a second, circular, concave disk behind the disk formed by the united ventrals: head broad and depressed; snout projecting: gill-opening small; branchiostegous membrane with four or five rays: one dorsal.

59. CYCLOPTERUS.—Pectorals large, uniting under the throat, and enclosing the disk of the ventrals: no second

disk: mouth broad; both jaws, as well as the pharyngeans, armed with small pointed teeth: gill-opening closed at bottom; branchiostegous membrane with six rays.

- (1. CYCLOPTERUS.) A first dorsal more or less obvious, with simple rays; a second, with branched rays, opposite the anal: body thick.
- (2. LIPARIS.) Only one, moderately long, dorsal: anal long: body smooth: elongated, compressed behind.

VIII. ECHENEIDIDÆ.—*An oval flattened disk on the upper part of the head, composed of several transverse cartilaginous plates directed obliquely backwards, and toothed on their posterior margin: body elongated, covered with small scales.*

60. ECHENEIS.

(III. A P O D E S.)

Ventrals wanting.

IX. ANGUILLIDÆ.—*Body very much elongated: skin thick and soft; the scales deeply imbedded, and scarcely apparent.*

61. ANGUILLA.—Gills opening by a small aperture on each side beneath the pectoral: dorsal and anal fins prolonged round the end of the tail, forming by their union a pointed caudal.

- (1. ANGUILLA.) Dorsal commencing considerably behind the pectorals: upper jaw shorter than the lower.
- (2. CONGER.) Dorsal commencing a little behind, sometimes immediately above, the pectorals: upper jaw longest.

(5.) OPHISURUS.—Gills opening by a small aperture beneath the pectorals: dorsal and anal not reaching to the end of the tail, which terminates in a point, and is itself without a fin.

62. MURÆNA. — Gills opening by a small aperture on each side: pectorals wanting: dorsal and anal uniting at the tail; low, sometimes scarcely distinguishable.

63. LEPTOCEPHALUS. — Gill-opening small, before the pectoral: body very much compressed, ribband-shaped: head extremely small; snout short: pectorals scarcely perceptible: dorsal and anal obsolete, uniting at the extremity of the tail.

64. OPHIDIUM. — Gills opening by a moderately large aperture; furnished with a distinct opercle and branchiostegous membrane: body very much compressed: dorsal and anal uniting to form a pointed caudal; the dorsal rays articulated, but not branched.

65. AMMODYTES. — Gill-opening very large; all the pieces of the opercle considerably developed: snout sharp; upper jaw capable of great extension, but when at rest shorter than the lower: dorsal and anal separated from the caudal by a small space; the dorsal furnished with simple articulated rays: caudal forked.

§ II. LOPHOBRANCHII. — *Branchiæ in small round tufts disposed in pairs along the branchial arches; opercle large, confined on all sides by a membrane, with only a small hole for the external aperture; branchiostegous rays rudimentary: jaws complete, and free.*

ORDER III. OSTEODERMI.

Body mailed with transverse angular plates: snout very much produced, formed by a prolongation of

the bones of the head and gill-covers: generally one dorsal, with simple slender rays: the other fins often wanting.

66. SYNGNATHUS.—Snout prolonged into a tube; mouth placed at the extremity, and cleft nearly vertically: body very much elongated, slender, and of nearly equal thickness throughout: gill-opening towards the nape: ventrals always wanting.

67. HIPPOCAMPUS.—Snout tubular; the mouth placed at the extremity: trunk of the body laterally compressed, and more elevated than the tail: the joints of the squamous plates raised in ridges; the projecting angles spinous: ventrals, and also caudal, always wanting.

§ III. PLECTOGNATHI. — *Jaws incomplete; maxillary firmly attached to the side of the intermaxillary, which alone forms the jaw; palatine arch united to the cranium by suture, and immoveable; branchiæ with the pectinations continuous; opercle and rays concealed beneath the skin; external aperture a simple cleft.*

ORDER IV. GYMNODONTES.

No true teeth; but the jaws covered with a lamellated substance resembling ivory, either entire, or divided in the middle by a suture: opercle small; branchiostegous rays five on each side; both deeply concealed.

68. TETRODON. — Jaws divided in the middle, so as to present the appearance of four teeth, two above and two below: skin rough, with small slightly projecting spines: body capable of inflation.

69. ORTHAGORISCUS. — Jaws undivided: body very much compressed, short, truncated behind; rough, but without spines; not capable of inflation: dorsal and anal fins high and pointed, uniting with the caudal.

ORDER V. SCLERODERMI.

Snout very much produced, of a conical or pyramidal form; mouth small, with distinct teeth in each jaw: skin generally scabrous, or clothed with large scales.

70. BALISTES. — Eight teeth, forming a single row, in each jaw: body compressed; covered with large, hard, rhomboidal scales, not overlapping one another: first dorsal with three spines: the first much the largest, the third very small, and remote from the others: extremity of the pelvis projecting; armed with prickles.

(II. CARTILAGINEI.)

Skeleton cartilaginous: bones soft, and destitute of fibres: sutures of the cranium indistinct: maxillary and intermaxillary bones either wanting or rudimentary; the palatines, or vomer alone, supplying their place.

ORDER VI. ELEUTHEROPOMI.

Branchiæ pectinated, free, with one large external aperture; furnished with an opercle, but without rays in the membrane: upper jaw formed by the palatine bone firmly united to the maxillary: intermaxillary rudimentary.

71. ACIPENSER.—Body elongated; mailed, as well as the head, with osseous tubercles arranged in longitudinal rows: snout conical: mouth placed beneath, very protractile, small, without teeth: nostrils and eyes lateral: four pendent barbules on the under surface of the snout.

ORDER VII. ACANTHORRHINI.

Branchiæ pectinated; adhering by a large portion of their external margin; opening outwards by a single aperture, communicating with five others at the bottom of the general cavity: opercle rudimentary: the vomer alone present to represent the upper jaw.

72. CHIMÆRA.—Body elongated: snout conic, marked with lines of pores: jaws armed with hard plates instead of teeth; four above and two below: between the eyes a fleshy process, bent forwards, and terminating in a cluster of small spines: first dorsal armed with a strong spine; placed above the pectorals: second dorsal commencing immediately behind the first, and reaching to the end of the tail, which terminates in a long filament.

ORDER VIII. PLAGIOSTOMI.

Branchiæ pectinated, fixed, opening outwards by several distinct apertures: no opercle: jaws represented by the palatine and postmandibular bones, which alone are armed with teeth: pectorals and ventrals always present; the latter (in the *male*) furnished on their internal margin with long appendages.

73. SQUALUS.—Body elongated: tail thick and muscular: pectorals of moderate size: branchial openings at the sides of the neck: snout more or less produced; with the mouth and nostrils beneath: eyes lateral.

* *Snout short and obtuse: nostrils near the mouth, with a groove-like prolongation conducting to the edge of the lips; more or less closed by two membranous flaps: caudal truncated at the extremity, not forked.*

(1. SCYLLIUM.) Teeth sharp and pointed, with small denticulations on each side: temporal orifices, as well as an anal fin, always present: dorsals very much behind, the first never in advance of the ventrals: branchial openings partly above the pectorals.

** *Snout produced: nostrils not prolonged in a groove, nor furnished with valves: caudal with a lobe beneath, causing it to appear forked.*

(2. CARCHARIAS.) Snout depressed; the nostrils beneath the middle: teeth cutting, pointed, and generally denticulated at the sides: first dorsal far in advance of the ventrals; second nearly opposite to the anal, which is always present: no temporal orifices: the last of the branchial openings above the pectorals.

(3. LAMNA.) Snout pyramidal; the nostrils beneath the base: teeth sharp and pointed, denticulated at the sides: first dorsal considerably before the ventrals: anal present: no temporal orifices: the branchial openings all before the pectorals.

(4. GALEUS.) Snout depressed; the nostrils beneath the middle: teeth sharp and pointed, with a few denticulations on the outer side only: temporal orifices, as well as an anal fin, present: the last branchial opening above the pectoral.

(5. MUSTELUS.) Snout depressed; the nostrils beneath the middle: teeth small and obtuse, forming a closely-compacted pavement in each jaw: temporal orifices, and anal, both present.

- (6. SELACHE.) Teeth small, conical, not denticulated at the sides: temporal orifices, and anal, both present: branchial openings all before the pectorals: large, nearly surrounding the neck.
- (7. SPINAX.) Snout depressed: teeth small, cutting, in several rows: temporal orifices present: anal wanting: branchial openings all before the pectorals: a sharp strong spine in front of each of the dorsals.
- (8. SCYMNUS.) Teeth in two or more rows; in the upper jaw lanceolate, with the cutting edges rough; in the lower jaw pyramidal, compressed, with the cutting edges crenated: temporal orifices present: anal wanting: no spines before the dorsal fins.

74. ZYGÆNA.—Head flattened horizontally, truncated in front, with the sides very much produced, appearing hammer-shaped; eyes placed at the extremities of the lateral prolongations; the nostrils at their anterior margin; mouth beneath: pectorals moderate: branchial openings at the sides of the neck.

75. SQUATINA.—Body broad, flattened horizontally: pectorals large, extending forwards, but separated from the neck by a cleft, in which are the branchial openings: head round; mouth at the extremity of the snout; eyes above: temporal orifices present: no anal: both dorsals further back than the ventrals.

(6.) PRISTIS.—Body elongated, flattened anteriorly; with the branchial openings placed beneath: snout prolonged into a depressed sword-shaped beak, armed on each side with strong sharp spines resembling teeth: mouth beneath: temporal orifices present: no anal fin.

76. RAI A.—Body very much flattened, resembling a disk: pectorals extremely large, uniting with the snout, or with each other, anteriorly; extending backwards to near the base of the ventrals: mouth, nostrils, and branchial openings, beneath; eyes, and temporal orifices, above: dorsals almost always upon the tail.

- (1. TORPEDO.) Tail short, and moderately thick: the disk of the body nearly circular; the part between the pectorals and the head and the branchiæ furnished with an electrical apparatus: teeth small and sharp.
- (2. RAI A.) Tail slender; furnished above, towards its extremity, with two small dorsals, and sometimes the vestige of a caudal: disk rhomboidal: teeth slender, close-set, arranged in a quincuncial order.

- (3. *TRYGON*.) Tail slender; armed with a sharp serrated spine, but without fins: head enveloped in the pectorals, which meet at an obtuse angle: teeth slender, set in a quincuncial order.
- (*MYLIOBATIS*.) Tail long, and extremely slender; armed with one or more serrated spines, and also furnished, near its base, with a small dorsal: head projecting from between the pectorals, which last are much broader transversely than in the preceding sub-genera: jaws with broad flat teeth forming a pavement.
- (4. *CEPHALOPTERA*.) Tail long, and extremely slender; armed with a spine, and also furnished at its base with a small dorsal: head truncated in front, placed between two horn-like prolongations of the pectorals, which are broad as in the last sub-genus: teeth small, and very slender, finely denticulated.

ORDER IX. CYCLOSTOMI.

Branchiæ purse-shaped, fixed, opening outwards by several apertures: jaws represented by an immoveable cartilaginous ring, formed by the union of the palatine and mandibular bones: no pectorals or ventrals: body elongated: the skeleton very imperfectly developed.

77. *PETROMYZON*.—Seven branchial openings on each side: maxillary ring armed with strong teeth; inside of the mouth furnished with tooth-like tubercles: lip circular: tongue with two longitudinal rows of small teeth.

78. *AMMOCÆTES*.—Branchial openings seven in number: lip semicircular, and covering only the upper part of the mouth: no teeth; but the opening of the mouth furnished with a row of small branched cirri.

79. *MYXINE*.—Branchial openings two in number, placed beneath: maxillary ring entirely membranaceous, with a single tooth above: tongue with strong teeth arranged in two longitudinal rows on each side: mouth circular, surrounded by eight barbules; a spiracle above, communicating with the interior.

(I. OSSEI.)

ORDER I. ACANTHOPTERYGII.

GEN. 1. PERCA, Linn.

(1. PERCA, Cuv.)

1. *P. fluviatilis*, Linn. (*Common Perch*.) — Back dusky green; sides with five transverse dusky bands.

P. fluviatilis, Linn. *Syst. Nat.* tom. i. p. 481. Bloch, *Ichth.* pl. 52. Don. *Brit. Fish.* vol. iii. pl. 52. Flem. *Brit. An.* p. 213. Perch, Will. *Hist. Pisc.* p. 291. tab. S. 13. f. 1. Penn. *Brit. Zool.* vol. iii. p. 254. pl. 48. no. 124. *Id.* (Edit. 1812.) vol. iii. p. 345. pl. 59. Bowd. *Brit. fr. wat. Fish.* Draw. 5. Yarr. *Brit. Fish.* vol. i. p. 1. Perche commune, Cuv. et Val. *Poiss.* tom. ii. p. 14. Cuv. *Reg. An.* tom. ii. p. 132.

LENGTH. From twelve to sixteen inches.

DESCRIPT. (*Form.*) Body compressed; back much arched, highest over the ventrals, the depth at that part equalling nearly one-third of the length, caudal fin excluded; greatest thickness half the depth: head about one-fourth of the entire length, including caudal: nape depressed, the back rising rather suddenly behind; profile gently falling from the forehead towards the end of the snout: jaws nearly equal; teeth in both jaws, as well as on the vomer, palatines, pharyngeans, and branchial arches: head and cheeks for the most part smooth, the latter covered with small scales: preopercle rectangular; the margin finely serrated: opercle triangular, terminating behind in a sharp point; the subopercle reaching beyond it: gill-opening large: lateral line nearly parallel with the line of the back, its course at about one-fourth of the depth*: first dorsal fin commencing in a line with the terminating point of the opercle: the fourth and fifth rays longest; those on each side gradually decreasing; the last, or last two, in the fin small and inconspicuous; height of the longest rays nearly equalling half the depth of the body: second

* The course of the lateral line is said to be at half, one-third, one-fourth, &c. of the depth, when the distance from the line of the back to the lateral line equals half, one-third, one-fourth, &c. of the depth of the body.

dorsal close behind the first, only a small space intervening; first ray spinous, not half the length of the second; third and fourth longest; the succeeding ones slightly decreasing; all the soft rays, except the first, branched: anal commencing rather more backward than the second dorsal, and not extending so far towards the caudal; two first rays strongly spinous, much shorter than the others, which are all branched and articulated: caudal forked: pectorals about two-thirds of the length of the head: the middle rays longest, those on each side decreasing: the first two and last three simple, the others branched: ventrals placed a little behind the pectorals, equal to them in length; the first ray strongly spinous, shorter than the others, which are all soft and much branched: number of rays in the respective fins,

D. 14 or 15—1/13; A. 2/3; C. 17, and some short ones; P. 14; V. 1/5*:

vent in a line with the commencement of the second dorsal. Number of vertebræ forty-two. (*Colours.*) Back and sides dusky green, with from five to seven dark transverse bands; abdomen white, tinged with red: ventrals bright scarlet; anal and caudal fins somewhat paler; dorsals and pectorals dusky, tinged with red; often a conspicuous black spot on the webs connecting the four last spines in the first dorsal.

Common in lakes, rivers, and streams. Found, according to Cuvier, throughout all the temperate parts of Europe, and a great part of Asia. Often, but not always, gregarious. Feeds on worms, insects, small crustacea, and the fry of other fish. Seldom attains a greater weight than four pounds, but has been known to weigh as many as nine. Spawns in April or May. A monstrous variety, with the back hunched, and the lower part of the back-bone next the tail much distorted, is mentioned by Pennant as found in a lake in Merionethshire.

(2. LABRAX, *Cuv.*)

2. *P. Labrax*, Linn. (*Common Basse.*)

P. Labrax, *Linn. Syst. Nat.* tom. i. p. 482. *Don. Brit. Fish.* vol. ii. pl. 43. *Flem. Brit. An.* p. 213. *Sciæna Labrax*, *Bloch, Ichth.* pl. 301. *Labrax Lupus*, *Cuv. et Val. Poiss.* tom. ii. p. 41. pl. 11. *Cuv. Reg. An.* tom. ii. p. 133. *Basse*, *Will. Hist. Pisc.* p. 271. tab. R. 1. *Penn. Brit. Zool.* vol. iii. p. 257. pl. 49. *Id.* (Edit. 1812.) vol. iii. p. 348. pl. 60. *Yarr. Brit. Fish.* vol. i. p. 6.

LENGTH. From one to two feet.

DESCRIPT. (*Form.*) Resembling the *Perch*, but more elongated; the back not so high: greatest depth a little behind the ventrals, equalling one-fourth of the length, caudal excluded: line of the back somewhat concave beneath the first dorsal, and convex beneath the second: head nearly one-fourth of the entire length, including caudal: lower jaw longest; strong card-like teeth on the intermaxillary, vomer, and palatines; on the sides, and towards the root, of the tongue, teeth like velvet: head smooth; cheeks covered with small scales: preopercle large: the serratures on the ascending margin more developed than in the *Perch*; the basal margin with three strong spines: opercle triangular, the posterior angle armed with two strong flattened spines: lateral line curved, descending a little from the upper angle of the opercle to

* I have adopted throughout the same kind of formula, by which to express the number of fin-rays, as that employed by MM. Cuvier and Valenciennes.

beneath about the middle of the first dorsal, then passing off straight to the caudal: first dorsal commencing a little behind the ventrals; the fourth and fifth rays equal and longest, those on each side gradually decreasing: second dorsal immediately after the first; first ray spinous, not half the length of the succeeding ones; third longest; the others gradually decreasing: space between the second dorsal and the base of the caudal equal to that occupied by the former fin: anal similar to the second dorsal, but placed a little more backward, with the three first rays spinous, gradually increasing in length: caudal a little forked: pectorals somewhat less than half the length of the head, covered at their base with small scales; the first ray simple, and shorter than the others: ventrals a little behind the pectorals, equal to them in length; the first ray spinous: number of rays in the respective fins,

D. 9—1/12; A. 3/11; C. 17; P. 17; V. 1/5.

Number of vertebræ twenty-six. (*Colours.*) Back and sides dusky gray, with a paler spot in the middle of each scale; lower portion of the sides, and abdomen, white, slightly silvery; cheeks and gill-covers with a faint yellowish tinge; posterior portion of the opercle almost black, forming a dark patch on that part: dorsal and caudal fins deep lead-gray; anal the same, tipped with whitish; pectorals pale gray; ventrals nearly white.

Met with occasionally on different parts of the coast, particularly southward, and likewise in the estuaries of rivers, but seldom in any great plenty. Common in the Mediterranean, where it attains a much larger size than in the British seas. Said to be very voracious. *Obs.* Pennant states that in the young of this species the space above the side-line is marked with small black spots: the same remark is made by Cuvier and others; but certainly in the larger number of British specimens there is no indication of these spots whatever.

(3. SERRANUS, *Cuv.*)

3. *P. Cabrilla*, Linn. (*Smooth Serranus.*) — Jaws without scales: cheeks and gill-covers marked with three or four oblique bands; sides with a few longitudinal bands.

P. Cabrilla, Linn. *Syst. Nat.* tom. i. p. 488. *P. Channus*, Couch in *Loud. Mag. of Nat. Hist.* vol. v. p. 19. fig. 6. *Serranus Cabrilla*, *Cuv. et Val. Poiss.* tom. ii. p. 166. pl. 29. *Smooth Serranus*, *Yarr. Brit. Fish.* vol. i. p. 9. *Smooth Perch*, Couch, *l. c.* *Serran commun*, *Cuv. Reg. An.* tom. ii. p. 139.

LENGTH. About ten inches. COUCH.

DESCRIPT. (*Form.*) "Under jaw longest: teeth in both and in the palate, numerous, irregular, sharp, incurved: tongue small, loose: eyes large, near the top of the head: first plate of the gill-covers serrate; the second with two (in the *female* one) obscure spines, scarcely to be distinguished, except in form, from the scales with which the gill-covers and body are thickly and firmly covered, and which are also ciliated: seven rays in the gill-membrane, curved; the superior broad: body compressed, deep: dorsal fin commencing opposite the ventrals: pectorals pointed: caudal slightly curved: number of fin-rays,

D. 10/14; A. 2/7; C. 17; P. 15; V. 6:

lateral line nearer the back." COUCH. According to Cuvier and Valenciennes, this species is distinguished from the *Serranus Scriba*, Cuv. (a closely allied one found in the Mediterranean) by its shorter snout and rather more convex forehead*; larger eye; and rather less rounded preopercle, with the denticulations towards the angle a little stronger: the lower jaw has the under surface of its branches chagrined and vermiculated by little marks in the skin. (*Colours.*) "Colour of the back brown, having, in some specimens, distinct bars running round to the belly: sides yellow, reddish, or saffron-coloured, more faint below: two irregular parallel whitish lines pass along the side from head to tail; a third, more imperfect, on the belly: gill-plates with several faintish blue stripes, running obliquely downward: fins striped longitudinally with red and yellow; pectorals wholly yellow." COUCH.

An abundant species in the Mediterranean. In the British seas it has hitherto been observed only by Mr. Couch, who represents it as common on the coast of Cornwall, "keeping in the neighbourhood of rocks, not far from land."

4. *P. Gigas*, Gmel. (*Dusky Serranus.*)—Lower jaw covered with very small scales.

P. Gigas, Gmel. *Linn.* tom. i. part iii. p. 1315. *P. robusta*, Couch in *Loud. Mag. of Nat. Hist.* vol. v. p. 21. fig. 7. *Serranus Gigas*, Cuv. et Val. *Poiss.* tom. ii. p. 201. pl. 33. *Dusky Serranus*, Yarr. *Brit. Fish.* vol. i. p. 15. *Dusky Perch*, Couch, *l. c.* *Merou brun*, Cuv. *Reg. An.* tom. ii. p. 140.

LENGTH. Three feet. COUCH.

DESCRIPT. (*Form.*) "Depth, exclusive of the fins (in a specimen measuring three feet in length), seven inches: body thick and solid: under jaw longest: both jaws, as well as the palate, with numerous slender incurved teeth: in front of the under one a bed of them: lips like those of the *Cod-Fish*: two large open nasal orifices, and a large hole under the projection of the nasal bone: first plate of the gill-covers serrate, the second with a broad flat spine projecting through the skin, and pointing backward; the fleshy covering of the gill-cover elongated posteriorly; seven rays in the gill-membrane: body and head covered with large scales: lateral line gently curved: dorsal fin single, long, expanding towards its termination, with eleven spinous rays, the first short, and seventeen soft rays, the last two from one origin: pectorals round, with nineteen rays: ventrals fastened down by a membrane through part of their course, with six rays: vent an inch and a half from the origin of the anal fin, which last has two spinous and nine soft rays, the last two from one origin: caudal roundish, with sixteen rays." COUCH. According to Cuvier and Valenciennes, the number of fin-rays stands thus:

D. 11/15 or 16; A. 3/3; C. 15; P. 17; V. 1/5.

(*Colours.*) "Back reddish brown, lighter on the belly: two slightly marked lines on the gill-covers running obliquely downward, one on each plate." COUCH.

* Or rather that part of the face between the forehead and the nostrils termed by the French *chanfrein*, for which we have no adequate term in the English language.

A single individual of this species, which is found in the Mediterranean, has been obtained by Mr. Couch from the coast of Cornwall. Cuvier states that nothing is known of its habits, excepting that at Nice it approaches the shores in the months of May and April. Usual weight from ten to twenty pounds.

- (1.) *Serranus Couchii*, Yarr. Brit. Fish. vol. 1. p. 12. *Stone-Basse*, Couch in Linn. Trans. vol. XIV. p. 81.

This fish, which has been observed by Mr. Couch on the Cornish coast, accompanying floating timber covered with barnacles, remains yet to be identified with certainty. It was considered by that gentleman, in his paper in the *Linnean Transactions*, as the *Pagrus totus argenteus* of Sloane*, a species, however, to which it evidently bears no affinity. Mr. Yarrell, who has received an original drawing of the fish from Mr. Couch, regards it as a new species of *Serranus*, and accordingly names it after its first discoverer. No description of it has been yet published.

(4. ACERINA, Cuv.)

5. *P. Cernua*, Linn. (*Common Ruffe*.) — Back and sides olivaceous, spotted with dusky brown.

- P. Cernua*, Linn. *Syst. Nat.* tom. 1. p. 487. Bloch, *Ichth.* pl. 5. f. 2. Don. *Brit. Fish.* vol. 11. pl. 39. *Cernua fluviatilis*, Flem. *Brit. An.* p. 212. *Acerina vulgaris*, Cuv. et Val. *Poiss.* tom. 111. p. 4. pl. 41. Cuv. *Reg. An.* tom. 11. p. 144. Ruffe, *Will. Hist. Pisc.* p. 334. tab. X. 14. f. 2. Penn. *Brit. Zool.* vol. 111. p. 259. *Id.* (Edit. 1812.) vol. 111. p. 350. Bowd. *Brit. fr. wat. Fish.* Draw. 10. Yarr. *Brit. Fish.* vol. 1. p. 18.

LENGTH. From six to eight inches.

DESCRIPT. (*Form.*) Not so high in the back as the *Perch*, and less compressed in proportion; head broader, thicker, and more obtuse about the snout: greatest depth at the commencement of the dorsal fin, equaling one-fourth of the entire length, including caudal; thickness two-thirds of the depth: eyes very large and brilliant; their diameter one-fourth of the length of the head: mouth rather small; upper jaw a little the longest; both jaws, as well as the vomer, armed with fine teeth like velvet; pharyngeans card-like: head without scales; the snout, cheeks, and jaws, pitted with numerous excavations: preopercle with the ascending and basal margins strongly spined; posterior angle of the opercle terminating in a small spine: gill-opening very large: lateral line nearly parallel with the back; its course at rather less than one-third of the depth: dorsal commencing in a line with the posterior angle of the opercle; first ray very short; the succeeding ones gradually lengthening to the fourth and fifth, which are longest, then decreasing to the fourteenth, or last of the spinous rays; soft portion of the fin rather more than half the length of the spinous; middle rays longest, the last ray double: anal commencing a little nearer the caudal than the soft dorsal, and not extending quite so far; first two rays strongly spinous and slightly curved: finless portion of the tail about equal in length to the caudal; this last deeply forked: pectorals in a line with the commencement of the dorsal, and two-thirds the length of the head; all the rays soft, and, except the first and last, branched; middle rays longest: vent-

* *Nat. Hist. of Jam.* vol. 11. tab. 253. f. 1.

rals about equal to the pectorals, placed immediately beneath them; the first ray spinous, rather more than half as long as the third, which is longest; all the soft rays much branched: number of rays,

D. 14/12; A. 2/5; C. 17; P. 14; V. 1/5.

Number of vertebræ thirty-seven. (*Colours.*) Back and upper half of the sides pale brown, inclining to olivaceous; lower portion of the sides with a slight lustre of golden yellow: belly silvery: cheeks, opercle, and breast, of a pearly hue, with a play of iridescent colours varying according to the light: head, back, and a portion of the sides, sprinkled with brownish spots: dorsal, caudal, and pectorals, yellowish gray, speckled with brown; ventrals and anal pale yellowish white, without spots: irides with the upper portion dusky, the lower half inclining to golden yellow.

Not uncommon in rivers and clear streams. Said to have been first observed by Dr. Caius in the river Yare near Norwich. Habits somewhat resembling those of the Perch. Seldom exceeds a weight of three ounces. Spawns in March and April. Is sometimes called a *Pope*.

GEN. 2. TRACHINUS, *Linn.*

6. *T. Draco*, *Linn.* (*Great Weever.*)—Entire length six times the depth of the body: second dorsal with about thirty rays: lower jaw ascending.

T. Draco, *Linn. Syst. Nat.* tom. i. p. 435. *Cuv. et Val. Poiss.* tom. iii. p. 178. *Cuv. Reg. An.* tom. ii. p. 152. *T. major*, *Don. Brit. Fish.* vol. v. pl. 107. *Flem. Brit. An.* p. 214. *Weever, Will. Hist. Pisc.* p. 288. tab. S. 10. f. 1. *Great Weever, Penn. Brit. Zool.* vol. iii. p. 171. pl. 29. *Id.* (Edit. 1812.) vol. iii. p. 229. pl. 33. *Yarr. Brit. Fish.* vol. i. p. 20.

LENGTH. From twelve to fifteen inches.

DESCRIPT. (*Form.*) Elongated; head and sides much compressed; entire length more than six times the depth of the body, and more than four times the length of the head; greatest thickness half the depth: head and back nearly in a continuous straight line; the profile slightly falling from the forehead; abdomen scarcely more convex than the back: lower jaw longer than the upper, and sloping upwards to meet it; both armed, as well as the vomer, palatines, pterygoidians, and pharyngeans, with fine sharp velvet-like teeth; arch-bones of the gills with a number of serrated tooth-like processes: before and rather above each eye are two short strong spines; there is also a strong sharp spine on the upper part of the opercle, but not projecting beyond the edge of the membrane: supra-scapulars represented by a large denticulated scale: lateral line straight; its course at rather less than one-fourth of the depth: scales small, disposed in oblique transverse rows: first dorsal very short, commencing immediately above the denticulated scale: spines stiff and very sharp; the third longest; those on each side gradually decreasing; the last very small and partly concealed: second dorsal immediately after the first, almost continuous with it, and extending nearly to the caudal: anal thick and fleshy, rather longer than the second dorsal, the ends of the rays reaching beyond the webs, and somewhat hooked: caudal scarcely notched: pectorals two-thirds of the length of the head; the third and six following rays branched, the others simple; ninth ray longest: ventrals before the pectorals, and scarcely more than half their

length; first ray short and spinous: the rest articulated, with the last three branched; fourth ray in the fin longest: number of rays,

D. 6—31; A. 1—31; C. 13; P. 16; V. 1/5.

Number of vertebræ forty. (*Colours.*) Back and upper portion of the sides reddish brown, with interrupted lines of black and yellow, running parallel with the oblique rows of scales: lower part of the sides, and abdomen, white, with interrupted yellow lines: first dorsal with the web deep black; second dorsal and caudal pale, more or less spotted with brown.

Met with occasionally at Weymouth, Hastings, Scarborough, and other parts of the coast. Is much apprehended by fishermen on account of its spines, which are sharp, and capable of inflicting a severe wound: they are usually considered as venomous, but, in the opinion of Cuvier, there is no real secretion of any poisonous fluid. Feeds on small fish, crustacea, and marine insects. Spawns in June.

7. *T. Vipera*, Cuv. (*Little Weever.*)—Entire length four times the depth of the body: second dorsal with twenty-four rays: lower jaw nearly vertical.

T. Vipera, Cuv. et Val. Poiss. tom. III. p. 189. Cuv. Reg. An. tom. II. p. 152. *T. Draco*, Bloch, Ichth. pl. 61. Don. Brit. Fish. vol. I. pl. 23. Flem. Brit. An. p. 213. Common Weever, Penn. Brit. Zool. vol. III. p. 169. pl. 28. no. 71. Id. (Edit. 1812.) vol. III. p. 226. pl. 32. Lesser Weever, Yarr. Brit. Fish. vol. I. p. 25.

LENGTH. Five or six inches; rarely more.

DESCRIPT. (*Form.*) Much resembling the *T. Draco*, but deeper in proportion to its length, owing to the greater convexity of the abdomen: profile not falling, but in the same horizontal line with the back; lower jaw more nearly vertical; when the mouth is opened wide, the upper jaw becomes exactly vertical, and the lower forms with it a right angle: sides very much compressed: greatest depth beneath the first dorsal, equalling one-fourth of the length, caudal excluded: thickness half the depth: teeth (in the lower jaw especially) very sharp, and somewhat longer in proportion than in the last species: the toothed scale, formed by the supra-scapular and part of the omoplat, of a different form, rounded, bilobed, and more deeply denticulated: lateral line commencing at the above scale, and running nearly straight throughout its course: the oblique transverse lines on the sides, formed by the scales, much less strongly marked: first dorsal more distinctly separated from the second; the fifth and sixth spines (the last especially) very small and inconspicuous: pectorals pointed, about equal in length to the depth of the body: caudal rounded: number of fin rays,

D. 6—23 or 24; A. 25; C. 13; P. 14; V. 1/5.

(*Colours.*) Back reddish gray; sides and abdomen much paler than in the last species, approaching to silvery white, with faint indications of transverse yellow lines: the web connecting the four first spines of the first dorsal deep black: a black spot at the extremity of the caudal fin.

Rather more common than the last species, and met with on various parts of the British coast. Said to conceal itself in the loose soil at the

bottom of the water, with only its head exposed. It is probably the small species alluded to by Willughby*, under the name of *Otterpike*.

GEN. (1.) *SPHYRÆNA*, Schn.

- (2.) *S. vulgaris*, Cuv. et Val. Poiss. tom. iii. p. 242. *S. Spet*, Lacép. Hist. Nat. des Poiss. tom. v. p. 326. *Esox Sphyræna*, Linn. Syst. Nat. tom. i. p. 515. Bloch, Ichth. pl. 389. *Sea-Pike*, Couch in Linn. Trans. vol. xiv. p. 84.

A very doubtful native. Inserted by Mr. Couch in his list of Cornish Fishes, accompanied by a remark that he had been informed that a fish, which he could refer to no other species but this, had been taken some time since near Falmouth. He had never, however, himself met with a specimen. Inhabits the Mediterranean.

GEN. 3. *MULLUS*, Linn.

8. *M. Surmuletus*, Linn. (*Striped Surmullet*.)—Red; sides with longitudinal yellow lines: profile descending obliquely from the forehead.

M. Surmuletus, Linn. Syst. Nat. tom. i. p. 496. Bloch, Ichth. pl. 57. Don. Brit. Fish. vol. i. pl. 12. Flem. Brit. An. p. 216. Surmullet, Will. Hist. Pisc. p. 285. tab. S. 7. f. 1. Striped Surmullet, Penn. Brit. Zool. vol. iii. p. 274. pl. 53. *Id.* (Edit. 1812.) vol. iii. p. 368. pl. 64. Striped Red Mullet, Yarr. Brit. Fish. vol. i. p. 27. Surmulet, Cuv. et Val. Poiss. tom. iii. p. 319. Cuv. Reg. An. tom. ii. p. 157.

LENGTH. From twelve to fifteen inches.

DESCRIPT. (*Form.*) Thick and blunt-headed, the profile falling abruptly from the forehead: greatest depth contained four times and a half in the entire length; thickness rather more than half the depth: head a little less than one-fourth of the whole length: eyes large; mouth small; jaws equal; the lower one only with fine teeth like velvet; teeth in the middle of the palate forming a pavement: chin with two barbules two-thirds of the length of the head: scales large, particularly those on the head and gill-covers, easily falling: first dorsal commencing at a little less than one-third of the entire length from the end of the snout; its length half the depth of the body; its height somewhat exceeding its length; first three rays nearly equal, the others gradually decreasing: space between the two dorsals equalling the length of the first: height of the second rather less than that of the first; its length somewhat greater; first ray shorter than the second and third, which are equal and longest; the succeeding ones gradually decreasing; all the rays branched: caudal deeply forked: anal similar to the second dorsal, commencing a little more backward, but ending in the same vertical line; all the rays except the first branched: finless portion of the tail not quite one-fourth of the whole length, caudal excluded: pectorals not quite so long as the head, narrow, and somewhat pointed; the first two rays simple, the others branched: fourth ray longest: ventrals exactly beneath them, and nearly of the same length; first ray spinous; second and third longest; all the soft rays branched: number of rays altogether,

D. 7—8 or 9; A. 3; C. 15, and some short ones; P. 17; V. 1/6.

* Hist. Pisc. p. 289.

Number of vertebræ twenty-four. (*Colours.*) General colour of the back and sides vermilion-red, with three longitudinal lines of golden yellow: throat, breast, belly, and beneath the tail, white, tinged with rose-colour: fins pale red, inclining in some places to yellow. When the scales are rubbed off, the skin appears crimson.

Met with principally on the southern coast. Mr. Couch states that it "is a migratory fish, and usually reaches the Cornish shores about Midsummer. Its common habit is to keep close to the ground, but the migration is performed near the surface." Has no air-bladder. Food, according to Bloch, crustacea, small fish, and shelled mollusca. Spawns in Spring.

9. *M. barbatus*, Linn. (*Red Surmullet.*)—Plain red; the sides without any longitudinal yellow lines: profile nearly vertical.

M. barbatus, Linn. *Syst. Nat.* tom. 1. p. 495. Bloch, *Ichth.* pl. 348. f. 2. Mullus, *Will. Hist. Pisc.* p. 285. tab. S. 7. f. 2. Red Surmullet, *Penn. Brit. Zool.* vol. 111. p. 271. *Id.* (Edit. 1812.) vol. 111. p. 365. Plain Red Mullet, *Yarr. Brit. Fish.* vol. 1. p. 32. Vrai Rouget, ou Rouget-Barbet, *Cuv. et Val. Poiss.* tom. 111. p. 325. pl. 70.

LENGTH. Rarely exceeds six inches.

DESCRIPT. (*Form.*) Readily distinguished from the last species by the form of the head, the fall of the profile approaching more nearly to vertical: the pores of the infra-orbitals are also larger and more numerous; the scales narrower, with fewer indentations on their basal margin, and with the striæ more strongly marked. In other respects the two species are similar. (*Colours.*) Of a deeper red, and of a more uniform colour than the *M. Surmuletus*, without any longitudinal yellow lines*: beneath the body silvery: fins yellow. Cuv.

This species, which resides principally in the Mediterranean, appears to be extremely rare in the British seas. Pennant mentions having heard of its being taken on the coast of Scotland. More recently two specimens have been obtained by Mr. Couch on the coast of Cornwall. There is no other recorded instance in which it has been noticed. Habits said to resemble those of the *M. Surmuletus*.

GEN. 4. TRIGLA, Cuv.

* *Body marked with fine transverse thread-like ridges.*

10. *T. Pini*, Bl. (*Pine-leaved Gurnard.*)—Transverse lines not reaching below the middle of the sides: lateral line smooth: profile oblique.

* According to Mr. Couch, there is *one* yellow line, a little below the lateral line.

T. Pini, *Bloch, Ichth.* pl. 355. T. lineata, *Mont. in Wern. Mem.* vol. II. p. 460. *Flem. Brit. An.* p. 215. Pine-leaved Gurnard, *Shaw, Nat. Misc.* vol. XXII. pl. 954. Red Gurnard, *Yarr. Brit. Fish.* vol. I. p. 34. Grondin rouge, ou Rouget commun, *Cuv. et Val. Poiss.* tom. IV. p. 20. *Cuv. Reg. An.* tom. II. p. 159.

LENGTH. From twelve to sixteen inches.

DESCRIPT. (*Form.*) Head large; body tapering from the nape to the base of the caudal: greatest depth contained six times and a half in the entire length; length of the head contained four times; thickness three-fourths of the depth: profile falling obliquely, and making with the cranium an angle of one hundred and thirty to one hundred and forty degrees; the descending line slightly concave: sides of the head flat and nearly vertical; space between the eyes contracted and concave: cheeks and upper part of the head rough with granulations disposed in lines radiating from different centres: extremity of the snout slightly emarginated, with three or four blunt denticulations on each side: above the anterior angle of the eye two or three short spines: supra-scapulars ending in a sharp point, of a semi-elliptic form, with the inner margin denticulated: opercle with two short spines, not extending beyond the membrane; the upper one directed obliquely upwards, the lower one backwards: clavicle likewise terminating in a short, but sharp, point: lateral line straight, slender, bifurcating at the caudal extremity, and almost perfectly smooth, as is the rest of the body, with the exception of the dorsal ridges, which are deeply and strongly serrated: upper part of the sides marked with a number of transverse parallel lines, intersecting the lateral line nearly at right angles, and reaching as far below as above it: both dorsals placed in a groove; the first commencing above the supra-scapulars, of a triangular form, with the first ray serrated; second ray longer and stouter than the others, equalling the depth of the body at this point: second dorsal a very little behind the first, scarcely more than half as high, but twice as long: anal answering to the second dorsal, but commencing a little further backward: caudal slightly forked: pectorals equalling one-fourth of the whole length, reaching a little beyond the vent; first seven rays branched, gradually decreasing; the rest simple: ventrals somewhat shorter than the pectorals; the spinous ray half as long as the soft ones, which are all branched:

B. 7; D. 9—18; A. 17; C. 11, and some short ones; P. 11, & 3 free; V. 1/5.

Number of vertebræ thirty-six or thirty-seven. (*Colours.*) The whole body, fins included, rose-red; the under parts somewhat paler: occasionally the red is more or less clouded with brown and cinereous.

Very abundant on the southern and western coasts, and generally known by the name of the *Red Gurnard*. Is considered by many authors as the *T. Cuculus* of Linnæus, but since the characters in the *Systema Naturæ* apply equally well to two species, this must remain doubtful. Feeds principally on crustaceous animals. Spawns in May or June.

11. *T. lineata*, Gmel. (*Streaked Gurnard*.)—Transverse lines encircling the whole body: lateral line sharply serrated: profile nearly vertical.

T. lineata, Gmel. *Linn.* tom. I. pt. 3. p. 1345. *Bloch, Ichth.* pl. 354. *Don. Brit. Fish.* vol. I. pl. 4. *T. Adriatica*, *Flem. Brit. An.* p. 215. *Mullus imberbis*, *Will. Hist. Pisc.* p. 278. tab. S. I. f. 1. *Cuculus*

lineatus, *Ray, Syn. Pisc.* p. 165. Streaked Gurnard, *Penn. Brit. Zool.* vol. iii. p. 231. pl. 57. *Id.* (Edit. 1812.) vol. iii. p. 377. pl. 66. *Yarr. Brit. Fish.* vol. i. p. 46. Rouget Camard, *Cuv. et Val. Poiss.* tom. iv. p. 25. *Cuv. Reg. An.* tom. ii. p. 159.

LENGTH. One foot.

DESCRIPT. (*Form.*) Thicker anteriorly than the last species; the body tapering behind more suddenly: head shorter: profile falling more abruptly; the descending line inclining to convex: cheeks higher in proportion: snout less emarginated; the denticulations at the sides very indistinct: opercle broader, the terminating spine shorter and blunter: clavicular spine not quite so sharp: first dorsal with the second ray shorter; the first more strongly serrated; all the spinous rays weaker: pectorals longer: lateral line and dorsal ridges sharply serrated: rest of the body roughish, marked with elevated transverse lines, which, after crossing the lateral line, pass onwards to the abdomen, where they ramify, thus nearly encircling the whole body; these lines correspond in number with the scales on the lateral line, amounting to about sixty-eight: number of fin-rays,

D. 10—16; A. 16; C. 11 or 13; P. 10, and 3; V. 1/5.

Number of vertebræ thirty-three. (*Colours.*) Dusky green, mottled with purple, and sprinkled with red and gamboge-yellow spots; lower portion of the sides silvery white, eluded with flesh-red: pectorals blue on their under surface, but red at the base; their upper surface yellowish green, spotted with red: free rays yellowish green tipped with red: ventrals white: dorsal, anal, and caudal fins, red; the rays of the anal tipped with white. *Obs.* Young fish are much less variegated, and generally want the yellow spots.

A rare species; first observed on the Cornish coast by Mr. Jago, and communicated by him to Petiver. Is occasionally met with at Weymouth, Hastings, and as far north as the coast of Scotland. At Hastings it is called the *French Gurnard*. The colours are very variable, but the transverse lines encircling the whole body will always serve to identify the species.

** *Body without transverse lines.*

12. *T. Hirundo*, Bl. (*Sapphirine Gurnard*.)—Lateral line smooth: pectorals very large, reaching beyond the ventrals: spine on the opercle scarcely projecting beyond the membrane.

T. Hirundo, *Bloch, Ichth.* pl. 60. *Don. Brit. Fish.* vol. i. pl. 1. *T. lævis*, *Mont. in Wern. Mem.* vol. ii. p. 455. *Flem. Brit. An.* p. 214. *Tub-Fish, Will. Hist. Pisc.* p. 250. tab. P. 4. *Sapphirine Gurnard, Penn. Brit. Zool.* vol. iii. p. 280. pl. 56. *Id.* (Edit. 1812.) vol. iii. p. 376. pl. 68. *Yarr. Brit. Fish.* vol. i. p. 41. *Le Perlon, Cuv. et Val. Poiss.* tom. iv. p. 29. *Cuv. Reg. An.* tom. ii. p. 159.

LENGTH. From eighteen to twenty-five inches.

DESCRIPT. (*Form.*) Somewhat resembling the *T. Pini* in its general proportions, but thicker in the body, and broader across the head and snout: inclination of the profile the same: eyes much smaller; the space between them broader and not so much hollowed out: cheeks smoother:

snout more emarginated, with three or four rather blunt denticulations on each side: gape more capacious: supra-scapulars triangular, the terminating spine rather more pointed: the opercular and clavicular spines preserve the same proportions, the former scarcely projecting beyond the membrane: lateral line straight, slender, and almost perfectly smooth, like the rest of the body with the exception of the dorsal ridges, which are strongly serrated: spines in the first dorsal not so strong as in the *T. Pini*; the first with very obsolete denticulations; the second scarcely longer than the adjoining ones, and equalling not above two-thirds of the depth of the body: pectorals contained three times and a half in the whole length: number of fin rays,

D. 9—16; A. 16; C. 11 or 13; P. 10, and 3; V. 1/5:

scales very small, oval, smooth, entire; those on the lateral line scarcely projecting beyond the others. Number of vertebræ thirty-three or thirty-four. (*Colours.*) General colour of the head and body brownish red, here and there faintly tinged with yellowish green: pectorals bluish green on their inner surface, edged and spotted with bright blue; on their outer surface brownish red with the rays whitish: first dorsal reddish; second, as well as the anal and ventrals, nearly white.

Common on the southern and western coasts, attaining a larger size than any other British species, the *T. Lyra* excepted. Is sometimes called a *Tub-Fish*. According to Mr. Couch, "sheds its spawn about Christmas." *Obs.* Linnæus and Pennant have erroneously attributed to this species a rough lateral line, a circumstance which appears to have misled Montagu, when he established a second under the name of *T. lævis*. All the individuals which have fallen under my notice have had this part perfectly smooth, neither does Cuvier seem at all aware of there being any allied species in which it is otherwise.

13. *T. Lyra*, Linn. (*Piper*).—Lateral line smooth: pectorals large, reaching beyond the ventrals: humeral and opercular spines extremely long: snout divided into two dentated processes.

T. Lyra, Linn. *Syst. Nat.* tom. i. p. 496. Bloch, *Ichth.* pl. 350. Don. *Brit. Fish.* vol. v. pl. 118. *Flem. Brit. An.* p. 215. Piper, *Will. Hist. Pisc.* p. 282. tab. S. 1. f. 4. *Penn. Brit. Zool.* vol. III. p. 279. pl. 55. *Id.* (Edit. 1812.) vol. III. p. 374. pl. 67. *Yarr. Brit. Fish.* vol. 1. p. 44. La Lyre, *Cuv. et Val. Poiss.* tom. IV. p. 40. *Cuv. Reg. An.* tom. II. p. 159.

LENGTH. From twenty to twenty-eight inches.

DESCRIPTION. (*Form.*) Readily distinguished from all the other British species by the length of the opercular and humeral spines. Head very large: depth at the nape a little less than one-fifth of the whole length: length of the head one-fourth: snout deeply emarginated; the lateral lobes much more produced than in any other species; the margin of each lobe divided into twelve or fifteen teeth, the middle ones long and pointed: the whole head finely granulated: only one, rather strong, spine at the anterior angle of the orbit: the spine on the supra-scapular, and the large one on the opercle, longer and sharper than in any other species; the humeral spine still more developed; the humeral bone, when measured to the end of the spine, equalling more than half the length of the head: first dorsal with the rays very sharp, a little bent, and smooth; the first and second only with their anterior edges obsoletely denticu-

lated: second and third rays equal; fourth scarcely shorter: pectorals very large, equalling nearly one-third of the entire length, extending considerably beyond the ventrals:

D. 9—16; A. 16; C. 11, and some short ones; P. 14, and 3; V. 1/5:

dorsal ridges more strongly serrated than in the other species: lateral line smooth. Number of vertebræ thirty-three. (*Colours.*) "The general colour pale flesh-colour, rosy or darker on the back, and the belly white; fins bluish at the base, and tinged with reddish towards the extremities: irides fine golden yellow." Don.

Far from common; the name of *Piper* being often applied to the last species, which is of much more frequent occurrence in the London market. Frequents the western coasts at all seasons of the year, according to information communicated to Pennant. Is also occasionally taken at Weymouth. Attains a weight of nearly seven pounds. Feeds on crustacea. This and some other species have the power of uttering a low grumbling sound when taken out of the water. The English name of *Piper* is derived from this circumstance.

14. *T. Gurnardus*, Linn. (*Gray Gurnard.*)—Lateral line sharply serrated: pectorals of equal length with the ventrals: humeral and opercular spines long: first three rays of the first dorsal granulated.

T. Gurnardus, Linn. *Syst. Nat.* tom. i. p. 497. Bloch, *Ichth.* pl. 58. Don. *Brit. Fish.* vol. ii. pl. 30. Flem. *Brit. An.* p. 215. Gray Gurnard, Will. *Hist. Pisc.* p. 279. tab. S. 2. f. 1. Penn. *Brit. Zool.* vol. iii. p. 276. pl. 54. *Id.* (Edit. 1812.) vol. iii. p. 371. pl. 65. *Farr. Brit. Fish.* vol. i. p. 48. Le Grondin gris, *Cuv. et Val. Poiss.* tom. iv. p. 45. *Cuv. Reg. An.* tom. ii. p. 160.

LENGTH. From fifteen to twenty inches; rarely two feet.

DESCRIPT. (*Form.*) Body more elongated, the snout longer, and the profile less inclined than in most of the other species: depth at the pectorals less than one-sixth of the whole length: length of the head one-fourth: cranium very slightly hollowed out between the eyes: descending line of the profile nearly straight: emargination of the snout moderate; each lobe with three or four well-marked denticulations: the whole of the head, as well as the shoulders, granulated: two sharp spines at the anterior angle of the orbit: supra-scapular and its terminating spine much as in the *T. Hirundo*: humeral and opercular spines strongly developed, much more so than in any of the foregoing species, excepting the *T. Lyra*; the latter projecting four or five lines beyond the membrane: spines of the first dorsal very strong, especially the first three, which are rough with granulations; the second longest, a little exceeding the depth of the body beneath: pectorals and ventrals of equal length, both falling short of the vent by two or three lines:

D. 8—29; A. 19; C. 11, besides short ones; P. 10, and 3; V. 1/5:

lateral line broad, and sharply serrated: the scales larger than those on the rest of the body: scales on the dorsal ridges with little projecting crests, which are crenated and rough with minute granulations, but not spinous. Number of vertebræ thirty-eight. (*Colours.*) Above gray, clouded with brown, and more or less spotted with black and yellowish white: beneath silvery: lateral line forming a longitudinal whitish band: sometimes the whole body red, or inclining to that colour.

One of the most common species on the British coasts. Pennant states that it sometimes attains the length of two feet and a half; it is however usually found much less. Said to keep near the bottom, preying on shells and crustacea. According to Bloch, spawns in May and June.

15. *T. Cuculus*, Bl. (*Red Gurnard*.) — Constantly red, with a black spot on the first dorsal: this last with the first three rays smooth, without granulations.

T. Cuculus, Bloch, *Ichth.* pl. 59. *Mont. in Wern. Mem.* vol. II. p. 457. *Flem. Brit. An.* p. 215. *T. Blochii*, *Yarr. Brit. Fish.* vol. I. p. 50. *Red Gurnard*, *Penn. Brit. Zool.* vol. III. p. 278. pl. 57. *Id.* (Edit. 1812.) vol. III. p. 373. pl. 66. *Le Grondin Rouge*, *Cuv. et Val. Poiss.* tom. IV. p. 48. *Cuv. Reg. An.* tom. II. p. 160.

LENGTH. From nine to twelve inches.

DESCRIPT. Distinguished from the last species, which it closely resembles in all its other characters, by the first three spines in the dorsal fin not being granulated, but simply with a few denticulations on the anterior edges of the first two: the crests likewise of the scales on the dorsal ridges are not crenated as in the *Grey Gurnard*, but entire, each terminating in a little point. *Colour* constantly red, with a conspicuous black spot on the upper part of the first dorsal, extending from the second to the fifth spine. From the *T. Pini*, it is easily distinguished, by the serratures of the lateral line, and the absence of the transverse striæ.

D. 8—19; A. 18; C. 11, besides short ones; P. 11, and 3; V. 1/5.

Number of vertebræ thirty-seven.

Never attains the size of the *T. Gurnardus*, and is not so abundant. The above description is from specimens taken at Weymouth. It is doubtful whether the *Cuculus* of Willughby* be this species or the *T. Pini*.

GEN. 5. COTTUS, Linn.

16. *C. Gobio*, Linn. (*Bull-head*.) — Head nearly smooth: preopercle armed with a single spine.

C. Gobio, Linn. *Syst. Nat.* tom. I. p. 452. Bloch, *Ichth.* pl. 39. f. 2. *Don. Brit. Fish.* vol. IV. pl. 80. *Flem. Brit. An.* p. 216. *Bull-head*, or *Miller's Thumb*, *Will. Hist. Pisc.* p. 137. tab. H. 3. f. 3. *River Bull-head*, *Penn. Brit. Zool.* vol. III. p. 216. pl. 39. *Id.* (Edit. 1812.) vol. III. p. 291. pl. 43. *Bowd. Brit. fr. wat. Fish.* Draw. 24. *Yarr. Brit. Fish.* vol. I. p. 56. *Le Chabot de rivière*, *Cuv. et Val. Poiss.* tom. IV. p. 106. *Cuv. Reg. An.* tom. II. p. 162.

LENGTH. From three to four, rarely five, inches.

DESCRIPT. (*Form.*) Head very large, occupying one-third of the whole length; as broad as long; somewhat depressed above, rounded in front: body gradually tapering from behind the nape: greatest depth beneath the first dorsal, equalling one-fifth of the entire length: gape very wide; jaws equal; both armed, as well as the fore part of the vomer, with fine teeth like velvet: eyes small, placed on the upper part of the head, a little inclined; somewhat nearer together in the *male* than in the *female*: head smooth, without spines, covered, as well as the whole body,

* *Hist. Pisc.* p. 261. §. 7.

with a soft naked skin: preopercle only, with a single curved spine at its posterior angle, the point turning upwards; opercle terminating behind in a flat blunt point: lateral line nearly straight, its course at one-third of the depth; formed by a row of small lozenge-shaped elevations of the skin, from thirty to thirty-five in number: first dorsal commencing a little behind the base of the pectorals; all the rays somewhat soft and flexible, but not articulated: second dorsal twice as high, and nearly three times as long, as the first; the membrane continuous from one to the other; most of the rays simple, but all flexible and articulated: anal commencing a little more backward than the second dorsal, and not extending so far towards the caudal: this last rounded: pectorals broad and rounded, equalling one-fourth of the entire length; most of the rays simple, but all articulated: ventrals immediately under them, the first or spinous ray enveloped in a membrane, which causes it to appear longer and thicker than it really is:

D. 6—16; A. 13; C. 11, and some short ones; P. 14; V. 1/3.

Number of vertebræ thirty-two. (*Colours.*) Brownish gray, occasionally marbled with yellow and dusky spots; belly silvery white: fins barred and varied with brown.

Common in fresh waters, especially clear streams which have a gravelly bottom. Lurks under stones, and swims with great rapidity. Swells out its head when in danger by raising the gill-covers, thus causing the former to appear broader than it is. Food, principally aquatic insects. Spawns in March and April, according to Bloch and some other authors; but, according to Cuvier, during the months of May, June, and July. Has no air-bladder.

17. *C. Scorpius*, Bl. (*Sea-Scorpion, or Father-lasher.*)
—Two erect spines before the eyes: preopercle with three spines; the first barely one-fifth the length of the head.

C. Scorpius, Bloch, *Ichth.* pl. 40. *Don. Brit. Fish.* vol. II. pl. 35.
Flem. Brit. An. p. 216. *Sea-Scorpion*, *Yarr. Brit. Fish.* vol. I.
p. 60. *Le Chaboisseau de mer commun*, *Cuv. et Val. Poiss.*
tom. IV. p. 117.

LENGTH. Rarely exceeds eight or nine inches.

DESCRIPTION. (*Form.*) Head less depressed than in the last species; its breadth not much more than half its length: eyes larger in proportion, situate a little nearer the nose than the nape; the space between them concave, and not equal to their diameter: mouth large; jaws equal: in front of the space between the eyes, two small, but sharp, erect spines: at the posterior part of the upper margin of the orbit a small tubercle, more or less pointed, whence proceeds a slightly elevated crest on each side of the occiput towards the nape, terminating there in another tubercle; the space included between these ridges is of an oblong form approaching to square: preopercle terminating behind in a strong sharp spine directed backwards and a little upwards, its length barely one-fifth that of the head; beneath it one smaller; and at the anterior extremity of the lower margin a third still smaller, directed downwards and somewhat forwards: opercle likewise ending in a sharp spine: subopercle with two small spines, one directed backwards and the other downwards: scapulars and clavicles also each with a single spine directed backwards: first dorsal commencing nearly in a line with the base of the pectorals: second immediately behind it: somewhat longer as well as higher: this

last with all the rays simple, but flexible and articulated: anal a little more backward than the second dorsal, and generally terminating nearer the caudal: pectorals very broad, rounded at the extremity; rays simple; seventh and eighth longest: ventrals narrow; the spinous ray and first soft one so intimately united as to appear but one:

D. 9 or 10—14 or 15; A. 11; C. 12, and some short; P. 17; V. 1/3.

Number of vertebræ thirty-four or thirty-five. (*Colours.*) Reddish gray, marbled and spotted with dusky and brown: belly whitish: fins pale, with spots and specks of brown forming irregular transverse bars.

Apparently not so abundant on the British coasts as the next species, with which it was for a long time confounded. Inhabits rocky shores, and is of solitary habits. Swells out its head when attacked, endeavouring to wound with the spine on the preopercle. Is very voracious, and feeds on crustacea. Colours variable. According to Bloch, spawns in December and January.

18. *C. Bubalis*, Euph. (*Four-spined Father-lasher.*)
—Two erect spines before the eyes: preopercle with four spines; the first one-third the length of the head.

C. Bubalis, *Cuv. et Val. Poiss.* tom. IV. p. 120. pl. 78. *Cuv. Reg. An.* tom. II. p. 163. *Yarr. in Zool. Journ.* vol. IV. p. 470. *Father-lasher*, *Will. Hist. Pisc.* p. 138. tab. H. 4. f. 3. *Penn. Brit. Zool.* vol. III. p. 218. *Id.* (Edit. 1812.) vol. III. p. 294. *Yarr. Brit. Fish.* vol. I. p. 63.

LENGTH. From seven to nine inches.

DESCRIPT. (*Form.*) Very similar to the last species, but differs in the following points. The head is rougher; the space between the eyes narrower, and more concave: the occipital ridges are closer together, more prominent, and very finely denticulated; behind, they terminate each in a sharp, strong, and well-defined point; the space included between the ridges is twice as long as it is broad: the great spine on the preopercle is nearly one-third the length of the head; beneath it are three, instead of only two, smaller ones: spine on the opercle, as well as the tubercles which form the lateral line, rough and granulated, in some cases finely denticulated: second dorsal with only eleven or twelve, very rarely thirteen rays: anal with only nine; terminating before the second dorsal, instead of after it, as in the last species.

D. 8—11 to 13; A. 9; C. 10; P. 16; V. 1/3.

(*Colours.*) Similar to those of the *C. Scorpio*, but the belly, lower part of the sides, and membranes of the anal and pectoral fins, with a bright red tinge, rarely observed in the other species.

First distinguished as British by Mr. Yarrell. Common on many parts of the coast, and having the same habits as those of the last species. Is evidently the one described by Willughby as well as Pennant, though the figure of this last author on the whole more resembles the *C. Scorpio*. Food, crustacea and the fry of other fish. Spawns in January.

19. *C. quadricornis*, Linn. (*Four-horned Father-lasher.*)
—Four tubercles on the occiput: preopercle with three spines.

C. quadricornis, *Linn. Syst. Nat.* tom. I. p. 451. *Bloch, Ichth.* pl. 108. *Cuv. et Val. Poiss.* tom. IV. p. 123. *Cuv. Reg. An.* tom. II. p. 163. *Four-horned Cottus*, *Yarr. Brit. Fish.* vol. I. p. 68.

LENGTH. From ten to twelve inches.

DESCRIPT. (*Form.*) Distinguished principally by four large, rough, osseous tubercles, which take the place of the four occipital spines in the *C. Scorpius*: head broader than in this last species; cranium broader than long, and without the lateral ridges: first infraorbital much more pitted, or hollowed out; on the second, often a small spine: preopercle with three strong spines; the uppermost longer than the others, and bending a little outwards: spine on the opercle, as well as that on the supra-scapular, likewise a little curved; this last large: scales on the lateral line, large, osseous, rectangular, with two concave impressions, one above the other: above the lateral line a row of osseous tubercles, round, a little raised in the middle, and finely granulated in streaks; a few others scattered beneath: in most other respects the two species are similar:

D. 7—14; A. 15; C. 11; P. 17; V. 1/3. Cuv.

Individuals of this species, recently observed in the London market amongst Sprats from the mouth of the Thames, are now in the British Museum. Has not hitherto occurred in any other instance in our seas. Common in the Baltic, and said generally to keep near the mouths of rivers where the salt and fresh waters mix. Habits resembling those of the *C. Scorpius*.

GEN. 6. ASPIDOPHORUS, *Lacép.*

20. *A. cataphractus*, Nob. (*Pogge.*)—Dorsals contiguous: upper jaw longest: chin and branchiostegous membrane furnished with numerous thread-like filaments.

A. armatus, *Lacép. Hist. Nat. des Poiss.* tom. III. p. 222. *A. Europæus*, *Cuv. et Val. Poiss.* tom. IV. p. 147. *Cottus cataphractus*, *Lim. Syst. Nat.* tom. I. p. 451. *Bloch, Ichth.* pl. 39. f. 1. *Don. Brit. Fish.* vol. I. pl. 16. *Cataphractus Schoneveldii*, *Flem. Brit. Au.* p. 216. *Pogge, Will. Hist. Pisc.* p. 211. tab. N. 6. f. 2, & 3. *Armed Bull-head*, *Penn. Brit. Zool.* vol. III. p. 217. pl. 39. *Id.* (Edit. 1812.) vol. III. p. 293. pl. 43. *Yarr. Brit. Fish.* vol. I. p. 70.

LENGTH. From four to six inches.

DESCRIPT. (*Form.*) Distinguished from the *Cotti* by the osseous plates on the body, which form longitudinal sharp angular ridges, and render it somewhat octagonal: head broad, and much depressed: body tapering behind: depth at the nape about one-seventh the entire length: breadth across the head one-fourth: space between the eyes concave: snout slightly recurved, and armed at its extremity with four small acute spines directed upwards: upper jaw projecting over the lower: both jaws with fine sharp velvet-like teeth: pharyngeans the same: tongue and palate smooth: infra-orbitals with three blunt tubercles on their lower margin; beyond them a sharp spine directed backwards: preopercle with a similar but larger spine; opercle small and unarmed: branchiostegous membrane, as well as the chin, furnished with numerous small fleshy filaments in the form of threads: body only octagonal from the vent to the termination of the second dorsal and anal; at that point the two uppermost carinæ, and the two lowermost, unite respectively to form one; and beyond, the body is hexagonal: the lateral line is first parallel to the upper series, then takes a bend opposite to the vent where the second series commences, and passing between this and the third, proceeds straight to the caudal: four uppermost carinæ rough and sharp: the four lower ones almost

smooth: first dorsal rounded: the rays flexible but not articulated: second immediately behind it; all the rays simple: anal answering exactly to the second dorsal: finless portion of the tail one-third of the entire length: caudal rounded: pectorals also rounded, about the length of the head; all the rays simple: ventrals immediately under them, narrow and pointed, the spinous ray closely attached to the first articulated one:

D. 5—6; A. 7; C. 11; P. 16; V. 1/2.

(Colours.) Brown above; beneath white: more or less marked with dusky spots.

Common on many parts of the coast, concealing itself in the sand, or amongst stones. Feeds on small crustacea and marine insects. Spawns, according to Bloch, in May.

GEN. 7. SCORPÆNA, Linn.

(1. SEBASTES, Cuv.)

21. *S. Norvegica*, Cuv. (*Northern Sebastes*.)—Dorsal fin with fifteen spinous and fifteen soft rays; the longest of the spinous rays scarcely more than one-fifth the depth of the body.

Sebastes Norvegicus, Cuv. et Val. Poiss. tom. iv. p. 240. pl. 87.

Cuv. Reg. An. tom. ii. p. 166. Serranus Norvegicus, Flem. Brit.

An. p. 212. Sea-Perch, Penn. Brit. Zool. vol. iii. p. 258. pl. 48.

Id. (Edit. 1812.) vol. iii. p. 349. pl. 59. Bergylt, & Norway Had-

dock, Yarr. Brit. Fish. vol. i. p. 73.

LENGTH. Two feet and upwards. CUV.

DESCRIPT. (*Form.*) Resembles the *Perch*: body oblong, a little compressed; dorsal and ventral lines slightly convex: mouth oblique; lower jaw longest: depth at the pectorals contained not quite three times and a half in the length: thickness not half the depth: snout a little convex: space between the eyes flat: infra-orbitals somewhat pitted, but not armed: one small spine on the edge of the orbit in front; behind it, on the cranium, three others also small: on each side of the occiput a slightly elevated crest, terminating likewise in a small spine: scapular and supra-scapular each with a single spine: two on the opercle: preopercle rounded, with five sharp, but rather short, spines; subopercle and interopercle each also with one small spine at the point where they meet: fine velvet-like teeth in both jaws, as well as on the vomer and palatines: dorsal commencing above the supra-scapular: spinous portion equalling nearly one-third of the whole length; rays strong but short; soft portion only half the length of the spinous, but twice as high: anal commencing in a line with the soft portion of the dorsal; first three rays spinous, the first only half the length of the two others; soft rays branched, twice as long as the spinous ones: caudal nearly even: pectorals equalling one-fifth of the whole length, rounded, as broad as long; the first ten rays branched, the rest simple: ventrals a little behind the pectorals, and not quite so long:

D. 15/15; A. 3/8; C. 14; P. 19; V. 1/5:

scales covering the whole head and body; a few small ones on the soft portions of the dorsal and anal fins, as well as on the caudal: lateral line parallel to the back; its course at one-fourth of the depth. Number of vertebræ thirty-one. CUV.

This species, the *Perca marina* of Linnæus, frequents high latitudes, and is little known as a native of our own seas, excepting along the northern coasts of the Island. Has been met with on the coasts of Aberdeenshire and Berwickshire: also in Zetland by Dr. Fleming. Food, according to Cuvier, crustacea and small fish. *Obs.* It is very doubtful whether the *Sea-Perch* of Willughby* be referable to this species.

GEN. 8. GASTEROSTEUS, Linn.

(1. GASTEROSTEUS, Cuv.)

* *Sides more or less protected by transverse scaly plates.*

22. *G. aculeatus*, Linn. (*Three-spined Stickleback*.)
—Three dorsal spines.

G. aculeatus, Linn. *Syst. Nat.* tom. 1. p. 489. Bloch, *Ichth.* pl. 53. f. 3. Don. *Brit. Fish.* vol. 1. pl. 11. Flem. *Brit. An.* p. 219. *G. trachurus*, leirus, & semiarmatus, Cuv. et Val. *Poiss.* tom. iv. p. 352. pl. 98, & p. 361. *G. trachurus*, & *gymnurus*, Cuv. *Reg. An.* tom. 11. p. 170. *Stickleback*, Will. *Hist. Pisc.* p. 341. tab. X. 14. f. 1. Bowd. *Brit. fr. wat. Fish.* Draw. 20. *Three-spined Stickleback*, Penn. *Brit. Zool.* vol. 111. p. 261. pl. 50. no. 129. *Id.* (Edit. 1812.) vol. 111. p. 353. pl. 61.

LENGTH. From two to two and a half, rarely three inches.

DESCRIPT. (*Form.*) Oval; rather elongated; sides compressed; tail slender: dorsal and ventral lines equally convex: greatest depth about the middle, rather more than one-fifth of the entire length; head one-fourth; thickness a little more than half the depth: eyes large: cranium more or less striated, the striæ formed of minute granulations: mouth protractile: when closed, the lower jaw advancing a little beyond the upper: both jaws with fine small teeth, but none on the tongue, vomer, or palatines: opercle large and triangular, the posterior margin rounded: no true scales, but the sides protected by a series of oblong osseous plates, varying in number, disposed in transverse bands; a similar plate, ascending from the base of the ventrals, reposes on the third and fourth of the above series; there is also another placed longitudinally on each side of the breast, and a large triangular one on the belly, having its base in a line with the ventrals, and its apex directed towards the vent; all these scaly plates more or less granulated in lines: instead of a first dorsal three free strong spines, a little distant from each other, more or less serrated at their edges, varying in length, but the second always longest; first spine above the first or second of the lateral scaly plates; second above the fourth; the third, which is much smaller than the other two, in a line with the apex of the triangular plate on the belly: soft dorsal commencing immediately behind this last spine; all the rays, except the first, branched: anal about half the length of the soft dorsal, with one short, curved, free spine immediately before the first ray: caudal rounded: ventrals consisting of one strong serrated spine, united by a delicate membrane to one slender soft ray scarcely one-third of its own length:

D. 3—10 to 13; A. 1/3 to 10; C. 12; P. 10; V. 1/1:

sides of the tail sometimes furnished with a horizontal expansion of the skin forming a keel. Number of vertebrae thirty-three. (*Colours.*)

Back and sides olivaceous, sometimes passing into yellowish brown or dusky blue: throat and breast, in some individuals, bright fiery red: belly and flanks silvery, with a pearly lustre.

Var. a. *G. trachurus*, *Cuv.* *Yarr. in Mag. of Nat. Hist.* vol. III. p. 522. fig. 127. *a.* Rough-tailed Stickleback, *Yarr. Brit. Fish.* vol. I. p. 76. The scaly plates extending the whole length of the sides; in number about thirty.

Var. β. *G. semiarmatus*, *Cuv.* *Yarr. in Mag. of Nat. Hist.* vol. III. p. 522. fig. 127. *b.* Half-armed Stickleback, *Yarr. Brit. Fish.* vol. I. p. 80. Lateral plates extending to a vertical line joining the vent and commencement of the soft dorsal; in number from twelve to fifteen.

Var. γ. *G. leiurus*, *Cuv.* *Yarr. in Mag. of Nat. Hist.* vol. III. p. 522. fig. 127. *c.* Smooth-tailed Stickleback, *Yarr. Brit. Fish.* vol. I. p. 81. Lateral plates from four to six; extending only as far as the pectoral fins, when these last are laid back.

Var. δ. *G. brachycentrus*, *Cuv.?* Short-spined Stickleback, *Yarr. Brit. Fish.* vol. I. p. 82. Lateral plates not extending beyond the pectorals: dorsal and ventral spines very short.

Common throughout the country in rivers and streams, as well as in stagnant waters. Is also found occasionally in the sea. Of active and lively habits. Is very voracious, and preys on worms and aquatic insects. Spawns, according to Bloch, in April and June; according to Cuvier, in July and August.

Obs. The above species is subject to great variation, not only in the number of the lateral plates, but in several other less obvious respects. The former may occasionally be found of every intermediate number between that which characterizes the *G. leiurus*, *Cuv.* and that which appears in the *G. trachurus* of the same author. This number, moreover, is sometimes found constant in specimens which differ remarkably in other respects; at other times, varying, when all other characters remain the same. From these circumstances combined, I feel satisfied that the above are mere varieties, notwithstanding the high authorities on which they stand recorded as distinct species. Perhaps it may be useful to state the result of a close comparison of a large number of individuals with each other from different localities.

(1.) *Specimens from the Thames, procured by W. Yarrell, Esq.* These agreed in having the eyes very large; the space between rugose, with granulations disposed in lines; the teeth rather prominent; the osseous disk between the opercle and pectoral large; the lateral plates varying in number, but well-defined and very regularly disposed; the ventral plate narrow, more than twice as long as broad at the base; the dorsal and ventral spines long, the latter equalling two-thirds of the depth of the body, nearly straight, and often with serrated edges; sides of the tail generally, but not always, carinated.

(2.) *Specimens from Wilbraham in Cambridgeshire.* Depth greater in proportion to the length than in no. 1; eyes much smaller; the rugose lines between as before; teeth similar; osseous disk behind the opercle much smaller; lateral plates few in number but well-defined; ventral plate very large, its breadth at the base contained only once and a half in its length; spines, the ventral especially, nearly as long as in the above, equally serrated, but not so straight, being slightly curved from their base; sides of the tail perfectly smooth.

(3.) *Specimens from the pond in the Botanic Garden, Cambridge.* Eyes intermediate in size between those of nos. 1 & 2, but varying slightly in different individuals; rugose lines on the vertex generally indistinct, sometimes wholly wanting with the exception of two, one

above each eye, which are always present; teeth varying a little, but generally smaller than in either of the above; osseous plate behind the opercle generally larger than in the last, but seldom so large as in the Thames specimens; lateral plates varying in number, sometimes extending the whole length of the sides, but generally few, and irregularly disposed; ventral plate about twice as long as broad at the base; spines varying a little, but always much shorter (the dorsal especially) than in no. 1; ventrals equalling half the depth; sides of the tail, except in one or two instances, not earinated.

(4.) *Specimens from the North of Ireland, procured by W. Thompson, Esq.* Of very large size, measuring full three inches. Eyes large, but less than in the Thames specimens; the space between smooth, with the exception of two deeply impressed lines, one above each eye; teeth moderate; osseous disk between the opercle and pectoral rather large; lateral plates five in number, and regularly disposed; ventral plate twice as long as broad at the base, its apex very obtuse; dorsal and ventral spines strong, but much shorter in proportion than in any of the former specimens, a little curved, their margins finely serrated; sides of the tail smooth, without any trace of a keel.

From the above details it will be seen how each character varies in its turn, and at the same time how little connection there is between the variation of one part and that of the others*.

23. *G. spinulosus*, Yarr. and Jen. (*Four-spined Stickleback*.)—Four dorsal spines.

Four-spined Stickleback, *Edinb. New Phil. Journ.* Apr. 1831. p. 386.
Yarr. Brit. Fish. vol. 1. p. 83.

LENGTH. One inch and a quarter.

DESCRIPT. Differs in no essential particulars from the last species, excepting in being smaller, and having an additional dorsal spine, situate half-way between the second and third of the ordinary ones; this spine is very small, and even shorter than that which precedes the soft fin: in my specimen, there are only two lateral plates, and these not very well developed; they occupy that portion of the side which lies beneath the first and second spines: the ascending plate from the base of the ventrals is longer and narrower than in young specimens of the *G. aculeatus* of the same size: none of the spines are serrated, and the sides of the tail shew no appearance of a keel:

D. 4—11; A. 1/10; C. 12; P. 10; V. 1/1.

Discovered in some plenty near Edinburgh, by Dr. James Stark (to whom I am indebted for a specimen), in September 1830. Possibly a mere variety of the last species, which is said to have been numerous in the same pond. In the number of the spines, it resembles the *G. tetra-canthus* of Cuvier; but this last is represented as having the spines shorter than in the common species, and the ventral plate broader.

** *Sides naked.*

24. *G. Pungitius*, Linn. (*Ten-spined Stickleback*.)—Dorsal spines nine or ten.

* It is more than probable that some of the other foreign *Gasterostei* described by Cuvier are mere varieties of this species. They hardly differ more from those described above than these last do from each other.

G. Pungitius, *Linn. Syst. Nat.* tom. i. p. 491. *Bloch, Ichth.* pl. 53. f. 4. *Don. Brit. Fish.* vol. II. pl. 32. *Flem. Brit. An.* p. 219. Lesser Stickleback, *Will. Hist. Pisc.* p. 342. Ten-spined Stickleback, *Penn. Brit. Zool.* vol. III. p. 262. pl. 50. no. 130. *Id.* (Edit. 1812.) vol. III. p. 355. pl. 61. *Yarr. Brit. Fish.* vol. I. p. 85. L'Épinochette, *Cuv. et Val. Poiss.* tom. IV. p. 370. *Cuv. Reg. An.* tom. II. p. 170.

LENGTH. Rarely exceeding two inches.

DESCRIPT. (*Form.*) Rather more elongated than the *G. aculeatus*; the depth not so great: differs essentially from that species in wanting the lateral scaly plates, although it possesses the triangular one on the belly, and the ascending branch from the base of the ventral spines: dorsal spines generally nine, but sometimes ten in number, much shorter than in the *G. aculeatus*, all equal, placed at equal distances from each other, erect but somewhat inclining alternately to the right and to the left, without denticulations at the edges, each furnished with a small membrane at the base: ventral spines barely so long as the ventral plate, likewise without serratures: ventral plate somewhat narrower and more pointed than in the *G. aculeatus*: sides of the tail keeled; each keel being furnished with several slender scales, which themselves appear keeled under the microscope:

D. 9 or 10—10 or 9; A. 1/9; C. 12; P. 10; V. 1/1.

(*Colours.*) Back and portion of the sides yellowish green, marked occasionally with transverse dusky bands; abdomen silvery; the whole more or less dotted with black specks: fins pale. A *variety* sometimes occurs of a uniform dark bluish black, pervading the whole body above and below.

Var. β. *G. lævis*, *Cuv. Reg. An.* vol. II. p. 170. Sides of the tail smooth.

Equally abundant with the *G. aculeatus*, and as generally distributed. Like that species, is occasionally found in salt water. Habits similar. *Obs.* The *G. lævis* of Cuvier differs in no respect excepting in wanting the carinated scales at the sides of the tail, and is evidently a mere variety.

(2. SPINACHIA, *Flem.*)

25. *G. Spinachia*, Linn. (*Fifteen-spined Stickleback.*)

G. Spinachia, *Linn. Syst. Nat.* tom. i. p. 492. *Bloch, Ichth.* pl. 53. f. 1. *Don. Brit. Fish.* vol. II. pl. 45. *Spinachia vulgaris*, *Flem. Brit. An.* p. 219. *Aculeatus marinus*, *Will. Hist. Pisc.* p. 340. tab. X. 13. f. 2. Fifteen-spined Stickleback, *Penn. Brit. Zool.* vol. III. p. 263. pl. 50. no. 131. *Id.* (Edit. 1812.) vol. III. p. 356. pl. 61. *Yarr. Brit. Fish.* vol. I. p. 87. Le Gastré, *Cuv. et Val. Poiss.* tom. IV. p. 373. *Cuv. Reg. An.* tom. II. p. 170.

LENGTH. From five to six inches.

DESCRIPT. (*Form.*) Very much elongated; the entire length ten times the depth and the breadth: lateral line marked throughout its course by a series of carinated scales, which form ridges, and render the posterior half of the body quadrangular; before the vent it is pentagonal: head one-fourth of the whole length; snout very much produced; mouth rather small; lower jaw longest: vertex flat, with a sulcus between the eyes: dorsal spines commencing immediately above the pectorals, fifteen

in number, of equal length, the last excepted, which is longer and more hooked than the others; space occupied by these spines equalling nearly one-fourth of the whole length: soft fin immediately behind the last spine, of a triangular form; its greatest height equalling the depth of the body; all the rays branched: anal exactly answering to it in form, situation, and number of rays; before the first ray a short hooked spine: portion of the tail beyond these fins very much depressed, sharp at the sides, and equalling one-third of the whole length: caudal square at the end; all the rays branched: pectorals rounded, one-ninth of the entire length; the rays simple: ventral spines short and slightly curved, each accompanied by two small soft rays:

D. 15—6 or 7; A. 1/6; C. 12; P. 11; V. 1/2:

about forty-two scales in the lateral line, all sharply keeled and slightly granulated; those on the sides of the tail forming the sharpest edge: rest of the skin smooth. Number of vertebrae forty-one. (*Colours.*) Greenish brown; silvery beneath: dorsal and anal fins, each with a round black spot.

Found only in the sea, never ascending rivers. Not uncommon on some parts of the coast. Feeds on worms and small crustacea, as well as on the eggs and fry of other fish. Spawns in Spring. Is stated by Cuvier to be the only known species belonging to this sub-genus.

GEN. 9. SCIÆNA, Cuv.

(1. SCIÆNA, Cuv.)

26. *S. Aquila*, Cuv. (*Maigre*.)

S. Aquila, Cuv. et Val. Poiss. tom. v. p. 21. pl. 100. Neill in Edinb. New Phil. Journ. Apr. 1826. p. 135. Flem. Brit. An. p. 213. *S. Umbra*, Cuv. Reg. An. tom. 11. p. 172. The Maigre, Yarr. Brit. Fish. vol. 1. p. 90.

LENGTH. From three to five, sometimes six feet.

DESCRIPT. (*Form.*) General appearance resembling that of the Basse (*Perca Labrax*): head one-fourth of the entire length; greatest depth rather more than one-fifth: profile descending obliquely, inclining to convex at the nape, concave at the forehead: snout blunt and slightly protuberant: each jaw with a row of sharp, somewhat hooked teeth, separate from each other, with several smaller ones amongst them in the lower, behind them in the upper jaw: none on the tongue, vomer, or palatines: preopercle with the posterior margin denticulated when young, but not afterwards: opercle terminating in two flat, but rather sharp points, with an emargination between: first dorsal with the third spine longest, equalling half the depth of the body: second dorsal more than twice the length of the first, immediately behind it, the membrane of the latter continuous with that of the former: pectorals and ventrals nearly one-sixth of the entire length: anal very small in proportion to the second dorsal, with only one slender spinous ray almost concealed in the edge of the fin, and eight soft ones: caudal with seventeen branched rays: number of rays altogether,

D. 9—1/27 or 23; A. 1/3; C. 17; P. 16; V. 1/5:

lateral line nearly parallel to the back: the whole head and body covered with scales; those on the back and sides large, deeply imbricated, and

set obliquely to the axis of the body. Number of vertebræ twenty-four. (*Colours.*) Of a uniform silvery gray, inclining to brownish on the back, and to white on the belly: first dorsal, pectorals, and ventrals, red; the other fins reddish brown. Cuv.

Common in the Mediterranean, where it attains a large size. Has not occurred in the British seas in more than four or five instances. One specimen recorded by Mr. Neill as having occurred off the Shetland coasts in November 1819. A second taken in the seine, at Start Bay, on the south coast of Devon, in August 1825*. A third, taken on the coast of Northumberland, is in the possession of Mr. J. Hancock of Newcastle. A fourth is mentioned by Mr. Yarrell as having occurred on the Kentish coast in November 1834. Said to swim in shoals, and when taken, to make a low grumbling noise like the Gurnards. Air-bladder, according to Cuvier, very large, extending the whole length of the abdomen, and remarkable for its branched lateral appendages. *Obs.* This species has been much misunderstood, and confounded with others by many authors, especially by Willughby, Artedi, and Linnæus, whose descriptions in consequence are rendered of no value. It is the only European species belonging to this sub-genus.

(*UMBRINA*, Cuv.)

- (3.) *S. cirrhosa*, Linn. Syst. Nat. tom. i. p. 481. Bloch, Ichth. pl. 300. *Umbrina vulgaris*, Cuv. et Val. Poiss. tom. v. p. 127. Bearded *Umbrina*, Yarr. Brit. Fish. vol. i. p. 95.

According to an extract from the Minute-Book of the Linnæan Society, (*Linn. Trans.* vol. xvi. p. 751.) dated Nov. 20, 1827, a specimen of this fish, weighing one hundred weight, has been taken in the river Exe. As, however, there has been much confusion with respect to the species of this family, it is possible that this British individual may not have been different from the *Sciæna Aquila* described above. According to Cuvier, the *Umbrina* is never found so large as this last species, though it often exceeds two feet in length. It is common on the coasts of France, Spain, and Italy, and is easily distinguished by a short barbule attached to the symphysis of the lower jaw.

GEN. 10. SPARUS, Cuv.

(1. *CHRYSOPHRYS*, Cuv.)

27. *S. Aurata*, Linn. (*Gilt-head*).—Molars in four or five rows above, and three below: a golden spot on the preopercle, and a dark one on the opercle.

S. Aurata, Bloch, Ichth. pl. 266. *Flem. Brit. An.* p. 211. *Chrysophrys Aurata*, Cuv. et Val. Poiss. tom. vi. p. 62. pl. 145. *Cuv. Reg. An.* tom. ii. p. 182. *Gilt-head*, Will. *Hist. Pisc.* p. 307. tab. V. 5. *Yarr. Brit. Fish.* vol. i. p. 97. *Lunulated Gilt-head*, Penn. *Brit. Zool.* vol. iii. p. 240. but not pl. 42. *Id.* (Edit. 1812.) vol. iii. p. 327. but not pl. 46.

* *Proceedings of Comm. of Zool. Soc.* 1831. p. 112.

LENGTH. Fifteen inches.

DESCRIPT. (*Form.*) Body oval, larger before than behind: depth nearly one-third of the entire length; thickness two-fifths of the depth: snout obtuse: eyes moderate, situate on the upper part of the cheek, at the distance of twice the length of their diameter from the end of the snout: opercle narrow, almost three times as high as broad; the scales which cover it larger than those on the preopercle: lower jaw a little the shortest; in each jaw six strong, hooked, conical, rather blunt, incisors; tubercular teeth in five rows above, in three below; the anterior ones small and rounded; at the back of the mouth, always one, often two, oval ones larger than the others, their longest diameter measuring sometimes four lines: (in *young* individuals the teeth are smaller and in only four rows:) lateral line nearly straight; its course a little above one-third of the depth: number of scales in a longitudinal line nearly eighty, in the depth about twenty-four: dorsal commencing at a distance from the end of the snout equalling nearly one-third of the whole length; spinous, higher than the soft, portion: anal in a line with the third soft ray of the dorsal, and not extending beyond that fin; its spinous rays shorter than those of the dorsal; second stoutest: caudal moderately forked: pectorals long, reaching beyond the vent, equalling nearly one-fourth of the whole length; their point of attachment a little before the dorsal: ventrals rather behind the pectorals, moderately broad:

B. 6; D. 11/13; A. 3/11; C. 17; P. 16; V. 1/5.

Number of vertebræ twenty-four. (*Colours.*) Back silvery gray; belly like polished silver; sides with from eighteen to twenty longitudinal golden bands; on the forehead, between the eyes, a crescent-shaped band of golden yellow; a large spot on the shoulder; opercle also dusky or violet. Cuv.

This species must be considered as very rare in the British seas, if it have really any claim at all to a place in the Fauna. The descriptions of Pennant and Fleming apply with tolerable correctness, but the *Gilt-head* of Donovan and other English authors is only the *Pagellus centrodonatus* of Cuvier hereafter described. Found in the Mediterranean along with another nearly allied species, and said, by Cuvier, to feed on the eonchiferous mollusca.

(2. PAGRUS, Cuv.)

28. *S. Pagrus*, Linn. (*Braize, or Becker.*)—Silvery, tinged with red: no golden crescent between the eyes; no black spot on the shoulder.

Pagrus vulgaris, Cuv. et Val. Poiss. tom. vi. p. 104. pl. 148. Le Pagre de la Méditerranée, Cuv. Reg. An. tom. ii. p. 182. Becker, Couch in Linn. Trans. vol. xiv. p. 79. Braize, or Becker, Yarr. Brit. Fish. vol. i. p. 102.

LENGTH?

DESCRIPT. (*Form.*) Snout obtuse, like that of the *S. Aurata*, but the nape less elevated, and the body more elongated than in that species: head one-fourth of the entire length; depth a little more: eyes large and round: opercle more than twice as high as broad: four strong pointed teeth at the extremity of each jaw, with a group of small card-like teeth behind them; beyond these a row of five teeth obtusely conical, and four or five round ones; within, and parallel to this

series, another row of five or six teeth all round: pharyngeans strong and card-like: lateral line more strongly marked than in the *Gilt-head*: scales on the upper part of the head and on the gill-covers smaller; those on the body larger in proportion: number in a longitudinal line nearly sixty; in the depth twenty: dorsal when laid back almost entirely concealed in a deep groove; the spinous rays compressed, and somewhat flexible: the longest not one-third the depth of the body: anal answering to the soft portion of the dorsal: the three spinous rays sensibly stronger than those of that fin; along its base a slight scaly projection partly concealing it: pectorals pointed, contained three times and a half in the entire length, and reaching when laid back to the third spinous ray in the anal fin: ventrals only half the length of the pectorals; the spinous ray one-sixth shorter than the first soft one:

B. 6; D. 12/10; A. 3/8; C. 17; P. 15; V. 1/5.

Number of vertebræ twenty-four. (*Colours.*) Silvery, tinged with red: no semilunar mark between the eyes, as in the last species, and no dark patch on the shoulder, as in the *S. centrodonatus*. Cuv.

So much confusion and misunderstanding prevails with respect to the species of this family, that it is not easy to attach to each correctly its proper synonyms. The present one appears to be the *Becker* of Mr. Couch, which is stated by that gentleman to approach the Cornish coasts during the Summer and Autumn. There is very little respecting it, at least on which any dependence can be placed, in other British writers. The *Pagrus vulgaris* of Fleming (the *Red Gilt-head* of Pennant) is probably only the *Pagellus centrodonatus* of Cuvier and of this work. According to Cuvier, the present species is found in the Mediterranean, along with two others belonging to the same sub-genus.

(3. PAGELLUS, Cuv.)

29. *S. Erythrinus*, Linn. (*Spanish Sea Bream.*)—
Rose-colour, with silvery reflections: a golden crescent between the eyes, but no lateral spot.

S. Erythrinus, Bloch, *Ichth.* pl. 274. *Shaw, Nat. Misc.* vol. xx. pl. 834. *Pagellus Erythrinus*, Cuv. et Val. *Poiss.* tom. vi. p. 126. pl. 150. *Erythrinus Rondeletii*, Will. *Hist. Pisc.* p. 311. tab. V. 6. *Le Pagel commun*, Cuv. *Reg. An.* tom. ii. p. 183. *Spanish Bream*, Couch in *Loud. Mag. of Nat. Hist.* vol. v. p. 17. *Yarr. Brit. Fish.* vol. i. p. 104.

LENGTH?

DESCRIPT. (*Form.*) Body oval, elongated, moderately compressed, a little contracted towards the tail: depth to the right of the pectorals one-third of the length: nape elevated; profile descending in a straight line, a little obliquely, towards the snout: eyes large and round, placed half-way between the end of the snout and the shoulder: infra-orbitals large: preopercle also large, covering nearly the whole cheek; the ascending margin rectilinear and nearly vertical: mouth scarcely protractile: lower jaw a little the longest: both jaws with fine card-like teeth at their extremities, the outer row rather the strongest; nine or ten on each side; molars behind small, in two or more rows, more numerous in the *adult* than in the *young*: pharyngeans strong and hooked: lateral line strongly marked; its course straight to the end of the dorsal, then turning in and terminating at the caudal, passing a little above the middle of the tail:

number of scales in a longitudinal line nearly sixty; in the depth twenty-one: dorsal with the fourth spinous ray longest, equalling nearly one-third of the depth beneath; the succeeding ones gradually decreasing; soft rays a little longer than the last of the spinous: anal answering to the soft portion of the dorsal; the spinous rays stronger than those in that fin: caudal deeply forked; the two lobes equal, covered for half their length with small scales: pectorals narrow, contained three times and a half in the length of the body: ventrals triangular, rather large, a little behind the pectorals:

D. 12/10; A. 3/3; C. 17; P. 15; V. 1/5.

Number of vertebrae twenty-four. (*Colours.*) Fine carmine-red, passing into rose-red on the sides; belly with silvery reflections: fins rose-red; the anal and ventrals palest. *Cuv.*

Observed by Mr. Couch in two or three instances off the coast of Cornwall, and said to be known to the fishermen there by the name of *Spanish Bream*. Not mentioned by any other writer on British Zoology; though, according to Mr. Yarrell, it appears to have been met with at Teignmouth by the late Mr. Walcott. Common in the Mediterranean. Stated by Cuvier to keep in small shoals, and to feed on fish and conchiferous mollusca. Is always smaller than the next species.

30. *S. centrodontus*, Laroche. (*Common Sea Bream.*)

—Flesh-red, with golden-yellow reflections: a crescent-shaped mark above the eyes; a large black spot on the shoulder.

S. centrodontus, *Laroche, Ann. du Mus.* tom. XIII. p. 345. pl. 23. f. 11. *S. Pagrus*, *Bloch, Ichth.* pl. 267. *S. Aurata*, *Don, Brit. Fish.* vol. IV. pl. 89. *Pagellus centrodontus*, *Cuv. et Val. Poiss.* tom. VI. p. 133. *Pagrus vulgaris*, *Flem. Brit. An.* p. 211. *Sea Bream*, *Will. Hist. Pisc.* p. 312. tab. V. 1. f. 5. *Yarr. Brit. Fish.* vol. I. p. 107. *Red Gilt-head*, *Penn. Brit. Zool.* vol. III. p. 242. *Lunulated Gilt-head*, *Id.* pl. 42. no. 112. *Le Rousseau, Cuv. Reg. An.* tom. II. p. 183.

LENGTH. From fifteen to twenty inches, or more.

DESCRIPT. (*Form.*) Distinguished from the last species by its larger size, more obtuse snout, larger eye, and finer as well as more numerous teeth: body a little thicker, and more regularly oval: head rather more than one-fourth of the entire length; profile descending obliquely from the forehead, and still more rapidly from the nostrils to the lips, giving the snout a remarkably blunt and convex appearance: diameter of the eye one-third the length of the head; the distance between the eyes equal to this diameter: jaws nearly equal: anterior teeth finer than in the *S. Erythrinus*; molars smaller in proportion, disposed in three or more rows above, and in two or three below: pharyngean tubercles larger: infra-orbitals and preopercle very narrow from the great size of the eyes: lateral line strongly marked; its course parallel to the curvature of the back at one-fourth of the depth: number of scales in a longitudinal line nearly eighty; in the depth more than twenty: dorsal rising from a shallow groove, and commencing just above the insertion of the pectorals; its length half the entire length; fourth, fifth, and sixth spinous rays longest, equalling nearly one-third of the depth; soft portion of the fin half the length of the spinous, the rays much of a

height, being a little longer than the last of the spinous: anal answering to this soft portion: caudal moderately forked; lobes equal; the base of the fin scaly: pectorals long and pointed, about the length of the head: ventrals immediately under them; the spinous ray strong, and shorter than the others:

B. 6; D. 12 or 13/13 or 12; A. 3/12; C. 17; P. 16 or 17; V. 1/5.

Number of vertebræ twenty-three. (*Colours.*) Flesh-colour, with a bright golden-yellow lustre; the red tint most conspicuous from the ridge of the back to the lateral line; belly very pale reddish yellow: fins flesh-red: the ventrals palest: upper part of the head deep purplish flesh-red, with a faint golden lunulated mark above the eyes: infra-orbitals, upper and lateral portions of the snout, preopercle, and margin of the opercle, bright silvery: at the commencement of the lateral line, above the pectorals, a black patch.

Common on many parts of the southern and western coasts: off Hastings and Weymouth in great abundance. Small specimens taken at the former place in the month of September, of the length of eight inches, were observed to be without the black spot on the shoulder, which is said not to be acquired till during the second year. This species is probably the *Bream* of Mr. Couch.* Its habits are similar to those of the last.

GEN. 11. DENTEX, *Cuv.*

31. *D. vulgaris*, *Cuv.* (*Toothed Gilt-head.*)—Silvery; back tinged with sky-blue: dorsal bluish yellow; pectorals and caudal reddish.

D. vulgaris, *Cuv. et Val. Poiss.* tom. vi. p. 163. pl. 153. *Flem. Brit. An.* p. 212. *Sparus Dentex*, *Bloch, Ichth.* pl. 268. *Don. Brit. Fish.* vol. iv. pl. 73. *Dentex*, *Will. Hist. Pisc.* p. 312. tab. V. 3. *Toothed Gilt-head*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. p. 331. but not pl. 54. *Four-toothed Sparus*, *Farr. Brit. Fish.* vol. i. p. 111. *Le Denté vulgaire*, *Cuv. Reg. An.* tom. ii. p. 184.

LENGTH. From two to three feet.

DESCRIPT. (*Form.*) Body oval, elongated; dorsal line more convex than the ventral: depth contained three times and three-quarters in the length; thickness twice and a half in the depth: head large; its length equalling the depth of the body: profile from the forehead convex; the snout, however, somewhat pointed: eyes moderate, high on the cheeks, nearly at equal distances from the end of the snout and the point of the opercle: infra-orbitals very large, occupying nearly half the cheeks; preopercle occupying nearly the other half, pitted in front, and covered with small smooth scales: scales on the opercle and subopercle rather larger than those on the preopercle: jaws but little protractile; in each four strong hooked canine teeth, behind which are others much smaller, like velvet; beyond, on the edges of the jaws, a row of strong large teeth, which are short and straight: palate and tongue smooth: lateral line parallel to the curve of the back: its course at one-fourth of the depth: about fifty scales in a longitudinal line, and twenty-four in the depth: length of the dorsal rather more than one-third that of the body; spinous rays moderate: vent nearly in the middle: anal short, com-

* *Linn. Trans.* vol. xiv. p. 79.

mencing a little behind it; first spinous ray in this fin shorter than the second; second shorter than the third; this last equal to the soft rays: caudal forked; upper lobe a little the longest: pectorals long and narrow: ventrals triangular, placed a little behind them:

B. 6; D. 11/11; A. 3/7; C. 17; P. 14; V. 1/5.

Number of vertebræ twenty-four. Cuv.

An individual of this species, taken off the coast of Hastings in Sussex, was obtained by Donovan in the Billingsgate market, April 9, 1805. There is no other recorded instance of its having occurred in the British seas. Not uncommon in the Mediterranean, where it attains a weight of twenty pounds and upwards.

GEN. 12. CANTHARUS, Cuv.

32. *C. griseus*, Cuv. (*Black Sea Bream*.) — Silvery gray, with bluish reflections; on each flank twenty-four dark longitudinal lines.

C. griseus, Cuv. et Val. Poiss. tom. vi. p. 249. *Sparus lineatus*, Mont. in Wern. Mem. vol. ii. p. 451. pl. 23. *Pagrus lineatus*, Flem. Brit. An. p. 211. *Black Bream*, Yarr. Brit. Fish. vol. i. p. 114.

LENGTH. Fifteen to eighteen, rarely twenty, inches.

DESCRIPT. (*Form.*) Deeper in proportion to its length than the *Sparus centrodontus*; the back more arched; the dorsal line falling more abruptly: length of the head, and depth at the nape, equal, each contained about four times and a half in the total length: jaws equal: teeth card-like, somewhat crowded in front, in several rows, the outer row longest; no molars, but on each side of the jaws above and below, one single row of small card-like teeth: eyes moderate, their diameter contained four times and a half in the length of the head; the space between them a little convex: infraorbital broad, and deeply notched on that part of the margin which answers to the extremity of the maxillary: scales on the checks in six rows: lateral line broad and strongly marked; its course parallel to the curvature of the back at one-third of the depth: dorsal commencing in a line with the pectorals; the spinous portion of the fin twice the length of the soft; fourth ray longest, exactly equalling the depth to the lateral line; succeeding rays nearly of the same length: caudal much forked; the upper lobe a little the longest: anal commencing nearly in a line with the soft portion of the dorsal, and terminating at the same distance from the caudal; spinous rays stronger than those of the dorsal, shorter than the soft ones; these last branched, the last two springing from one root: pectorals reaching to the vent, one-fourth of the whole length, narrow and pointed; fifth ray longest: ventrals a little behind the pectorals; in the axilla of each a long narrow pointed scale, and on the belly between the two, another similar but broader scale, of a triangular form, not present in the *Sparus centrodontus*:

B. 5; D. 12/11; A. 3/11; C. 17; P. 16; V. 1/5.

Number of vertebræ twenty-two. (*Colours.*) Lead-gray, with a very faint tinge of golden yellow; becoming paler on the belly: sides marked with twenty-four or twenty-five longitudinal lines, darker than the ground colour, but narrower and less conspicuous than the lateral line,

which last assumes the appearance of a broad brown band: fins dark gray: a faint golden lunulated mark with blue reflections on each side of the nape continuous with the gill-opening: beneath this line, immediately above the eyes, an irregular spot, presenting the same colours: no lateral dark spot.

First noticed by Montagu, who states that "it is by no means an uncommon fish on the south coast of Devon." Is also found occasionally off Hastings, but is not distinguished by the fishermen from the *Sparus centrodonatus*, which is taken there in much greater plenty. According to Cuvier, there are two or three other allied species met with in the Mediterranean, which may not improbably also occur at times in the British seas. Food, according to that same author, at least in part, vegetable substances.

- (4.) *Old Wife*, (*Sparus Vetula*,) Couch in Linn. Trans. vol. xiv. p. 79. Loud. Mag. of Nat. Hist. vol. v. p. 743.

As considerable doubt attaches to this species, I have thought it proper to place it at the end of the present family, to which it certainly belongs. The following is Mr. Couch's description. "Body deep, compressed, and bearing a considerable resemblance to the *S. Pagrus* (of Couch): lips fleshy; jaws furnished with a pavement of teeth, those in front the longest; gill-membrane with five rays; gill-covers and body covered with large scales; ten first rays of the dorsal fin spinous; the anal also has four spinous rays, after which it becomes more expanded; tail concave. This fish has a membranous septum across the palate, as in the Wrasse genus. When in high season, the colour behind the head is a fine green, towards the tail reddish orange; the belly has a lighter tinge of the same colour. When out of season, the whole is a dusky lead colour. Weight about three pounds." I should have had no hesitation in referring this fish to the species last described, with which Mr. Couch himself has since associated it, had it not been said to possess "a pavement of teeth." This character, which is common to nearly all the other British *Sparidae*, is inapplicable to the *Canthari*, in which there are no rounded molars whatever. I am more inclined to think from such a circumstance, that it will prove to be a species of the sub-genus *Sargus*, Cuv.

GEN. 13. BRAMA, Schn.

33. *B. Raii*, Cuv. (*Ray's Sea Bream*.)

B. Raii, Cuv. et Val. Poiss. tom. vii. p. 210. pl. 190. *Sparus Raii*, Bloch, Ichth. pl. 273. Don. Brit. Fish. vol. ii. pl. 37. *S. niger*, Turt. Brit. Faun. p. 98. *Brama marina* caudâ forcipatâ, Ray, Syn. Pisc. p. 115. Will. Hist. Pisc. App. p. 17. tab. V. 12. *B. marina*, Flem. Brit. An. p. 210. La Castagnole, Cuv. Reg. An. tom. ii. p. 194. Toothed Gilt-head, Penn. Brit. Zool. vol. iii. p. 243. pl. 43. Mont. in Linn. Trans. vol. vii. p. 292. *Ray's Bream*, Yarr. Brit. Fish. vol. i. p. 117.

LENGTH. From twenty-six to thirty inches. Cuv.

DESCRIPT. (*Form.*) Body deep, compressed, elongated posteriorly: snout rounded, very obtuse, the profile falling rapidly from the forehead: mouth oblique, approaching to vertical when the jaws are closed: upper jaw with an outer row of sharp slender teeth, and a narrow band of smaller ones behind; in the lower jaw two rows of similar teeth, with smaller ones between; those in the inner row curving inwards and

stronger than the others; more particularly two or four in front of the lower jaw so much produced as to appear like true canines: palatines also with card-like teeth, but none on the vomer or tongue: eyes very large: cheeks and gill-covers scaly: lateral line indistinct; its course parallel to the back at one-fourth of the depth: dorsal commencing above the insertion of the pectorals; its length nearly half the entire length; three spinous rays gradually increasing; second and third soft rays longest, equalling nearly one-third of the depth; fourth to the ninth gradually decreasing; rest of the fin even, its height at this part only one-third that of the anterior portion: anal resembling the dorsal in form; commencing a little behind it, but terminating in the same vertical line: caudal crescent-shaped; the lobes long and pointed, equal: pectorals one-fourth of the whole length, pointed; sixth and seventh rays longest: ventrals very small, only one-quarter the length of the pectorals, placed immediately beneath them; at the base of their external margin a large triangular scaly plate; beneath, on the inner margin, another smaller one:

D. 3/33; A. 2/23; C. 26; P. 19; V. 1/6:

all the vertical fins with nearly their whole surface covered with small scales. (*Colours.*) Dull silvery, towards the back tinged with brown: vertical fins brownish ground, with silvery scales: pectorals and ventrals yellowish.

First described by Ray from a specimen found on the sands at low water near the mouth of the Tees, Sept. 18, 1681. Since then several other individuals have occurred at different times on various parts of the British coast. Common in the Mediterranean. Weight from ten to twelve pounds. According to Cuvier, spawns in Summer, and during that season is much tormented by intestinal worms. The only European species belonging to this genus. *Obs.* Cuvier is of opinion that the *Chaetodon* mentioned by Mr. Couch as taken at Looe in Cornwall, Aug. 1821*, was only an individual of this species.

GEN. 14. SCOMBER, *Cuv.*

(1. SCOMBER, *Cuv.*)

34. *S. Scomber*, Linn. (*Common Mackarel.*) — First dorsal with twelve rays: lower part of the sides and abdomen plain silvery.

S. Scomber, Linn. *Syst. Nat.* tom. i. p. 492. *Bloch, Ichth.* pl. 54. *Don, Brit. Fish.* vol. v. pl. 120. *S. vulgaris*, *Flem. Brit. An.* p. 217. *Mackrell, Will. Hist. Pisc.* p. 181. tab. M. 3. *Common Mackrell, Penn. Brit. Zool.* vol. III. p. 264. pl. 51. *Mackerel, Yarr. Brit. Fish.* vol. i. p. 121. *Le Maquereau commun, Cuv. et Val. Poiss.* tom. VIII. p. 5.

LENGTH. From sixteen to eighteen inches.

DESCRIPT. (*Form.*) Body compressed, fusiform, tapering to a point before the caudal fin: depth behind the ventrals one-sixth of the length, caudal excluded; thickness half the depth: head a compressed cone, one-fourth of the whole length, measured to the commencement of the

* Linn. *Trans.* vol. XIV. p. 73.

caudal fork: profile slightly convex: jaws about equal: teeth small but numerous, in a single row on the edge of each jaw, as well as on the palatines; longer and more slender teeth on the pharyngeans: diameter of the eye one-fifth the length of the head: interopercle and subopercle much developed: first dorsal commencing at one-third of the whole length from the end of the snout: of a triangular form; rising from a deep groove, in which it is entirely concealed when laid back; second ray longest, equalling two-thirds of the depth beneath; last ray extremely short: space between the dorsals one-sixth of the whole length: second only half as high as the first; its length twice its height; first ray spinous; the next two articulated but simple; the rest articulated and branched: between it and the caudal five spurious finlets: each consisting of one branched ray; the last double: anal similar to the second dorsal, and followed by the same number of spurious finlets; before its base, immediately behind the vent, a small free spine: caudal forked nearly to the extremity of the tail itself; the central rays only one-fourth the length of the lateral ones: pectorals small, not half the length of the head; third ray longest; all except the first two branched: ventrals a little behind them, and somewhat shorter, triangular; first ray spinous but slender; the rest soft and branched:

B. 7; D. 11 or 12—1/11, and V false; A. 1—1/11, and V false; C. 17;
P. 18 or 19; V. 1/5:

two cutaneous ridges on each side of the tail, forming a double keel. Number of vertebræ thirty-one. (*Colours.*) Back, and sides above the lateral line, rich green varied with blue, with dark transverse bands; belly and lower part of the sides silvery white: dorsal, caudal, and pectoral fins, dusky; ventrals and anal reddish.

Gregarious: approaches the shore in large shoals to spawn early in the Spring, and retires at the end of the Summer to deep water. Weight about two pounds; but, according to Pennant, has been known in one instance to exceed five. Has no swimming bladder.

35. *S. maculatus*, Couch. (*Spanish Mackarel.*)—

First dorsal with seven rays: sides and belly thickly covered with small dusky spots.

S. maculatus, Couch in Loud. Mag. of Nat. Hist. vol. v. p. 22. f. 8.
Le Maquereau Colias, Cuv. et Val. Poiss. tom. VIII. p. 29. pl. 209.?
Spanish Mackarel, Couch, l. c. Yarr. Brit. Fish. vol. i. p. 131.

DESCRIPT. "Figure round and plump, six inches and a half in compass near the pectoral fins (in a specimen fourteen inches and a half in length), the thickness of its figure being carried far towards the tail: mouth large; jaws of equal length; teeth small; tongue moveable and pointed: head large and long: eye large, one inch and one-eighth from the snout, and itself six eighths of an inch wide; from the snout to the pectoral three inches and a half: rays of the gill-membrane six, concealed: lateral line at first slightly descending, then straight: scales on the superior plate of the gill-covers as well as on the body: first dorsal in a chink, with seven rays, the first shorter, second and third of equal lengths: spurious fins six above and below, the anterior not high: tail divided, and at its origin doubly carinated: vent prominent. *Colour* dark blue on the back, striped like the *Mackarel*, but more obscurely and with fewer stripes; a row of large dark spots from the pectoral fin to the tail; sides and belly thickly covered with smaller dusky spots: tail, gill-

covers, and sides, and behind the eye, bright yellow. From the *Mackarel*, which it resembles, this fish differs in the markings of the head, longer snout, larger eye and gape, longer head, and in having scales on the anterior gill-covers: the body is not nearly so much attenuated posteriorly; the ventral fins are sharp and slender, those of the *Mackarel* wider and more blunt: in the former, the pectorals lie close to the body; in the latter, they stand off; in the latter, also, is a large angular plate, the point directed backward, close above the pectoral fins, which does not exist in the Spanish Mackarel." COUCH.

The above species will probably prove to be the *S. Colias* of Cuvier and Valenciennes, which is found in the Mediterranean, and is remarkably distinguished from the *S. Scomber* by having a swimming bladder. For the present, however, I have thought it proper to retain the name given to it by Mr. Couch, and to annex his description. This gentleman observes that it is scarce, but that some are taken every year off the coast of Cornwall. It attains the weight of four or five pounds, but is in no estimation as food. It is called by the fishermen *Spanish Mackarel*.

(5.) *S. Colias*, Turt. Brit. Faun. p. 100. sp. 76.

Under this name Turton speaks of a species which is "found frequently in the Weirs about Swansea, and which very much resembles the *Common Mackarel*, except in size, which seldom exceeds six or seven inches in length. Its colours are much richer, and it does not appear to come in shoals." Whether this be any thing more than the young state of one of the foregoing species can only be determined by a closer examination of its characters.

(2. THYNNUS, Cuv.)

36. *S. Thynnus*, Linn. (*Common Tunny*.)—Nine spurious finlets above and below: pectorals falcate; contained five times and a half in the entire length.

S. Thynnus, Linn. *Syst. Nat.* tom. 1. p. 493. *Bloch, Ichth.* pl. 55. *Don. Brit. Fish.* vol. 1. pl. 5. *Flem. Brit. An.* p. 218. *Thynnus vulgaris*, Cuv. et Val. *Poiss.* tom. viii. p. 42. pl. 210. *Tunny-Fish*, Will. *Hist. Pisc.* p. 176. tab. M. 1. f. 3. *Tunny*, Penn. *Brit. Zool.* vol. iii. p. 266. pl. 52. *Yarr. Brit. Fish.* vol. 1. p. 134. *Le Thon commun*, Cuv. *Reg. An.* tom. ii. p. 197.

LENGTH. From three to seven feet; sometimes more.

DESCRIPT. (*Form.*) General form resembling that of the *Mackarel*, but thicker in proportion to its length, and shorter in the snout: head a little less than one-fourth of the entire length; profile slightly convex; lower jaw a little longer than the upper; each with a single row of small sharp teeth, slightly curving inwards and backwards; about forty on each side above and below; a few fine teeth like velvet also on the palatines and fore part of the vomer: diameter of the eye one-seventh the length of the head: cheeks covered with long narrow pointed scales, which cause them to appear wrinkled: gill-covers, as well as all the rest of the head, naked: lateral line irregularly and slightly flexuous, marked throughout its length by large scales similar to those which form the corselet: pectorals sickle-shaped, contained five times and a half in the whole length: ventrals scarcely more than half as long: first dorsal commencing nearly in a line with the base of the pectorals, rising from a groove, and extending nearly to the second; first spine longest; the others decreasing rapidly to the sixth, afterwards more slowly: second

dorsal with one small concealed spine; the soft rays which follow elevated anteriorly and pointed; those behind rapidly decreasing: anal similar to the second dorsal, and nearly opposite to it, with two spines concealed in its anterior margin: nine or ten spurious finlets above, and nine below: caudal crescent-shaped:

B. 7; D. 14—1/13, and IX; A. 2/12, and VIII; C. 19, and 16 or 17; P. 31; V. 1/5:

sides of the tail keeled. Number of vertebræ thirty-nine. (*Colours*.) Upper part of the body bluish black; corselet inclining to whitish: sides of the head whitish: belly grayish, with silvery whitish spots: first dorsal, pectorals, and ventrals, dusky; caudal somewhat paler; second dorsal and anal inclining to flesh-colour, with silvery reflections; spurious finlets sulphur-yellow, edged with black. *Cuv.*

According to Pennant, "not uncommon in the Lochs on the western coast of Scotland; where they come in pursuit of Herrings." Rare southwards. Donovan mentions three which were captured near the mouth of the Thames in the Summer of 1801, and brought to Billingsgate market. Very abundant in the Mediterranean. Usually swim in large shoals. Feed on other fish. Weight of one examined by Pennant, measuring seven feet ten inches in length, four hundred and sixty pounds.

37. *S. Pelamys*, Linn. (*Bonito*.)—Eight spurious finlets above, seven below: sides of the abdomen with four longitudinal dusky bands.

S. Pelamys, *Linn. Syst. Nat.* tom. i. p. 492. *Thynnus Pelamys*, *Cuv. et Val. Hist. Nat. des Poiss.* tom. viii. p. 82. pl. 214. *Bonito*, *Yarr. Brit. Fish.* vol. i. p. 140. *Bonite des Tropiques*, ou *Thon à ventre rayé*, *Cuv. Reg. An.* tom. ii. p. 198.

LENGTH. Rarely exceeds thirty inches. *YARR.*

DESCRIPT. "Girth close behind the pectoral fins (in a specimen twenty-nine inches long) twenty inches; head conical, ending in a point at the nose; under jaw projecting; teeth few and small; tongue flat and thin; nostrils obscure, not in a depression; from the nose to the eye two inches and a half; gill-covers of two plates: body round to the vent, from thence tapering to the tail; near the tail depressed; lateral line at first descending and waved, becoming straight opposite the anal fin, from thence ascending and terminating in an elevated ridge, with another above and below the lateral line near the tail: eye elevated, round; iris silvery: from the nose to the pectoral fin eight inches and three-fourths, the fin pointed, four inches long, received into a depression: first dorsal fin seven inches long, four inches high, lodged in a groove; the first two rays stout, the others low: the body is most solid opposite the second dorsal, which fin and the anal are falcate: tail divided and slender: ventral fins in a depression. *Colour* a fine steel blue, darker on the back; sides dusky, whitish below: behind the pectoral fins is a bright triangular section of the surface, from which begin four dark lines, that extend along each side of the belly to the tail. Scales few, like the *Mackarel*." *COUCH*, as quoted by *YARR.* Number of fin-rays, according to *Cuvier*,

D. 15—1/12, and VIII; A. 2/12, and VII; C. 35; P. 27; V. 1/5.

Specimens of this fish, which is the *Bonito* of the Tropics so well known to navigators, are stated by Mr. Couch to have occurred occasionally

on the Cornish coast. According to Stewart*, it has been also taken, though rarely, in the Frith of Forth; and, according to Dr. Scouler†, in the Frith of Clyde. In the two last instances, however, it is doubtful whether the present species be intended, or the *Pelamys Sarda* of Cuvier‡, to which also the name of *Bonito* has been applied. This last is found principally in the Mediterranean, and is characterized by a variable number of *obliquely transverse* bands extending from the top of the back to a little below the lateral line. The species here described inhabits the Ocean, and is particularly distinguished by four *longitudinal* bands on each side of the abdomen: the teeth are also much weaker than in the *Pelamys Sarda*.

GEN. 15. XIPHIAS, Linn.

38. X. *Gladius*, Linn. (*Common Sword-Fish*.)

X. *Gladius*, Linn. *Syst. Nat.* tom. i. p. 432. Bloch, *Ichth.* pl. 76. *Flem. Brit. An.* p. 220. Cuv. *Reg. An.* tom. II. p. 201. Cuv. et Val. *Poiss.* tom. VIII. p. 187. pls. 225, & 226. X. Rondeletii, Leach in *Wern. Mem.* vol. II. p. 58. pl. 2. f. 1. Leach, *Zool. Misc.* vol. I. p. 62. pl. 27. Sword-Fish, *Will. Hist. Pisc.* p. 161. tab. I. 27. f. 2. Penn. *Brit. Zool.* vol. III. p. 160. pl. 26. *Id.* (Edit. 1812.) vol. III. p. 216. pl. 30. Knox in *Edinb. Journ. of Nat. and Geog. Sci.* vol. II. p. 427. Yarr. *Brit. Fish.* vol. I. p. 143.

LENGTH. From ten to fifteen feet; sometimes more.

DESCRIPT. (*Form.*) Body elongated, nearly round posteriorly, a little compressed in front: depth increasing with the age from one-tenth to one-sixth of the entire length, reckoning this last from the end of the sword to the extremity of the lobes of the tail: sword three-tenths: upper part of the cranium flat or slightly convex; profile falling gently; sides of the head vertical: eye round; its diameter nearly two-thirds of the breadth of the cranium above it: sword terminating in a sharp point; the edges cutting, and finely denticulated: lower jaw likewise pointed, extending to where the upper surface of the sword becomes horizontal: no teeth in either of the jaws: pharyngeans only with fine teeth like shorn velvet: no true tongue: gill-opening large; the branchiostegous membrane with seven rays: pectorals inserted very low down, sickle-shaped, one-seventh of the entire length, this last being reckoned as before: ventrals none: dorsal commencing above the gill-opening, and extending in *young* subjects to within a short distance of the caudal; its anterior portion very much elevated and pointed; rays rapidly decreasing from the fifth to the eleventh, continuing low beyond that point to the thirty-ninth or fortieth; last three or four again elevated: all the intermediate or low portion of the fin extremely delicate, and with the rays more slender than those at the two extremities; in *adult* individuals often found very much torn, or even entirely destroyed, causing the two elevated ends which are left to appear like two distinct fins: anal somewhat similar in shape to the dorsal, but much shorter, only commencing in a line with its last third portion: caudal crescent-shaped:

B. 7; D. 3/40; A. 2/15; C. 17; P. 16:

* *Elem. of Nat. Hist.* vol. I. p. 363.

† *Loudon's Mag. of Nat. Hist.* vol. VI. p. 529.

‡ *Cuv. et Val. Hist. Nat. des Poiss.* tom. VIII. p. 108. pl. 217.

the whole head and body covered with a somewhat rough skin, the roughness arising from very minute scales; opercle smooth: lateral line scarcely visible: on each side of the tail a projecting horizontal keel. Number of vertebræ twenty-five. (*Colours.*) All the under parts fine silvery white: upper parts tinged with dusky blue. *Young individuals from twelve to eighteen inches in length*, have the whole body covered with little tubercles, disposed in longitudinal rows: these disappear first on the back, and afterwards on the belly: they are no longer visible in individuals of three feet. CUV.

Occasionally taken in the British seas, off various parts of the coast. Common in the Mediterranean, where it is much sought after as an article of food. Attacks other fish, on which it is said to prey; but, according to Bloch, feeds also on vegetable substances. The stomach of one examined by Fleming contained the remains of the *Loligo sagittata*. But little is known on the subject of its reproduction. When the intermediate part of the dorsal fin is worn away, it becomes the *X. Rondeletii* of Leach.

GEN. 16. CENTRONOTUS, Lacép.

(I. NAUCRATES, Cuv.)

39. *C. Ductor*, Nob. (*Common Pilot-Fish.*)

Naucrates Ductor, Cuv. et Val. Poiss. tom. VIII. p. 229. pl. 232.

Gasterosteus Ductor, Linn. Syst. Nat. tom. I. p. 489. Scomber

Ductor, Bloch, Ichth. pl. 338. *Pilot-Fish*, Will. Hist. Pisc. App. tab. 8. f. 2. *Yarr. Brit. Fish.* vol. I. p. 149.

LENGTH. One foot.

DESCRIPT. (*Form.*) General contour a little like that of the *Mackarel*: depth one-fifth of the whole length: length of the head contained in this last four times and a half: profile slightly convex; snout transversely obtuse; lower jaw projecting a little beyond the upper: each jaw with a narrow band of teeth like shorn velvet; the same on the palatines, vomer, and middle of the tongue: diameter of the eye one-fifth the length of the head: opercular pieces much as in the *Mackarel*: pectorals attached a little below the middle; oval, contained seven times and a half in the whole length: ventrals very close together, a little behind the insertion of the pectorals, of about the same length: first dorsal represented by three, rarely four, very small free spines, commencing nearly in a line with the extremity of the pectorals: second dorsal commencing about the middle of the body; anterior rays longest, equalling a little more than one third of the depth: anal of a similar form to this last fin, and commencing beneath the middle of its length; before it two small free spines, the first hardly perceptible: caudal forked to the middle; the lobes rather broad, and moderately pointed:

B. 7; D. 3 or 4—1/26 to 28; A. 2/16 or 17; C. 17, and 8; P. 18; V. 1/5:

cheeks, upper part of the opercle, and the whole body, excepting a triangle above the base of the pectoral, covered with small oval scales; forehead, snout, jaws, and greater portion of the opercular pieces, without scales: lateral line curved, marked by a narrow series of very small elevations: sides of the tail with a projecting horizontal keel. Number of vertebræ twenty-six. (*Colours.*) Silvery bluish gray; deeper on the back, paler on the belly: sides with five broad transverse bands of deep violet. CUV.

Mr. Couch states* that "two of this species a few years since accompanied a ship from the Mediterranean into Falmouth, and were taken in a net." It has been observed in the British seas, under similar circumstances, in a few other instances. Is well known for its habit of following vessels to a considerable distance, in order to get what falls from them.

(*LICHIA*, Cuv. ?)

- (6.) *Albacore*, Couch in Linn. Trans. vol. XIV. p. 82. *Lichia glaucus*, Cuv. et Val. Poiss. tom. VIII. p. 263. pl. 234.?

Mr. Couch states that he believes the *Albacore* to be not uncommon in the Summer off Cornwall, though keeping at a distance from the shore, and but rarely taken. This name, however, having, like that of *Bonito*, been applied to more than one species, it does not appear with certainty to which he alludes. If he refer to the *Scomber glaucus* of Linnæus, this last is synonymous with the *Lichia glaucus* of Cuvier and Valenciennes. I have accordingly annexed a corresponding reference to their work for a description and figure.

GEN. 17. CARANX, Cuv.

40. *C. Trachurus*, Lacép. (*Scad.*)

- C. Trachurus*, Cuv. et Val. Poiss. tom. IX. p. 9. pl. 246. *Scomber Trachurus*, Bloch, *Ichth.* pl. 56. *Don. Brit. Fish.* vol. I. pl. 3. *Trachurus vulgaris*, Flem. *Brit. An.* p. 218. *Scad*, Will. *Hist. Pisc.* p. 290. tab. S. 22. *Penn. Brit. Zool.* vol. III. p. 269. pl. 51. *Scad*, or *Horse-Mackerel*, Yarr. *Brit. Fish.* vol. I. p. 154.

LENGTH. From twelve to sixteen inches.

DESCRIPT. (*Form.*) General form resembling that of the *Mackerel*: tail slender; head a little pointed, rather less than one-fourth of the entire length: greatest depth a little more than one-fifth; thickness half the depth: lower jaw projecting beyond the upper, inclining upwards at an angle of forty-five degrees: in each jaw one very narrow row of extremely minute teeth, more sensible to the touch than to the eye; the same on the vomer and palatines: eyes large, above the middle of the cheek: cranium, cheeks, and all the body, covered with small scales; snout, jaws, and opercular pieces, without scales, the upper half of the opercle excepted: lateral line parallel to the back, at one-fourth of the depth, till opposite the commencement of the second dorsal; then bending obliquely downwards and backwards; when in a line with the ninth ray of that fin, passing off straight to the caudal at half the depth; protected throughout its course by a series of large scaly laminae, seventy-two in number, three or four times as high as broad, closely compacted; the last forty of these laminae with keels terminating backwards in sharp points, the keels more elevated and the points sharper as they get nearer the caudal: first dorsal commencing at about one-third of the length, triangular, its length and height about equal; third and fourth rays longest; before it a small, but sharp, horizontal spine, with the point directed forwards: second dorsal immediately behind the first; three times its length; its height at first nearly the same, but afterwards falling, and remaining low throughout the rest of its length: behind the vent, two stout, sharp spines, united at their base by a short membrane; then the true anal, exactly similar to the second dorsal excepting in being shorter, and com-

* Linn. Trans. vol. XIV. p. 82.

mencing nearer the caudal; its point of termination in the same vertical line: both dorsal and anal arising from deep grooves in the back and abdomen respectively: pectorals falcate, very much pointed, of the length of the head: ventrals a little behind them, scarcely more than half as long: caudal deeply forked:

B. 7; D. 8—1/30; A. 2—1/25; C. 17, and 10; P. 21; V. 1/5.

(Colours.) Lead-gray, variegated with blue and green; beneath silvery; a black spot on the upper part of the opercle; irides golden.

Common throughout the Summer, according to Mr. Couch, off the coast of Cornwall. Occurs also at Hastings, and off other parts of the English, as well as Scotch, coast. Preys on other fish. *Obs.* Cuvier and Valenciennes describe this fish as varying greatly in the number of scaly laminae on the lateral line, as well as in the degree of curvature of this last, and seem to think that possibly two or more species may have been hitherto confounded. For this reason I have been the more particular in the above description, which is taken from specimens obtained at Hastings, Sept. 1833.

GEN. 18. ZEUS, Linn.

(1. ZEUS, Cuv.)

41. *Z. Faber*, Linn. (*Dory*.)

Z. Faber, *Linn. Syst. Nat.* tom. i. p. 454. *Bloch, Ichth.* pl. 41. *Don. Brit. Fish.* vol. i. pl. 8. *Flem. Brit. An.* p. 218. *Doree, Will. Hist. Pisc.* p. 294. tab. S. 16. *Penn. Brit. Zool.* vol. III. p. 221. pl. 41. *Dory* or *Doree, Yarr. Brit. Fish.* vol. i. p. 162. *Le Dorée, Cuv. Reg. An.* tom. II. p. 211.

LENGTH. From twelve to eighteen inches.

DESCRIPT. (*Form.*) Oval, very much compressed; tail suddenly contracting immediately before the caudal: greatest depth half the entire length; thickness four times and a half in the depth: head very large, but greatly compressed, one-third of the entire length: profile falling regularly from the nape in nearly a straight line, and making a right angle with the lower jaw, when the mouth is closed: this last very protractile; gape large; upper lip reflexed: lower jaw a little longer than the upper, bifurcated behind, and terminating in two small sharp spines: both jaws with fine velvet-like teeth: eyes large, very high on the cheeks: opercle small, triangular, without spines: clavicular bone behind the opercle terminating in a sharp spine: two spines behind the eye directed backwards, and one on each side of the occiput: a row of spines on each side of the base of the dorsal and anal fins, at first simple, afterwards forked; between the ventrals and anal, a double row of large strongly serrated scales, the serratures directed backwards; pectoral ridge before the ventrals with three rows of the same serratures: scales on the cheeks and body, small, deeply impressed: lateral line continually descending from the supra-scapulars for two-thirds of its course, then suddenly passing off straight to the caudal: dorsal commencing in a line with the posterior angle of the opercle; the spinous and soft portions divided by a deep notch; third spine longest, equalling half the depth; all except the last attended by filamentous prolongations of the membrane nearly as long as themselves*; soft portion only half as high as the spinous; all the rays

* Judging from the descriptions of other authors, it would appear that these filaments vary very much in length, and that they are sometimes found twice or thrice the length of the spines themselves.

simple: anal with the first four rays strongly spinous: the soft portion separate as in the dorsal, and answering to the same part in that fin: caudal oblong, even at the end: pectorals small, rather less than one-third the length of the head, of an oblong rounded form, the middle rays a little the longest; all simple: ventrals a little before the pectorals, more than twice their length; first ray strongly spinous; third and fourth longest; all the soft rays except the last branched:

B. 6; D. 10/24; A. 4/23; C. 12, and 2 short; P. 13; V. 1/7.

(*Colours.*) Yellowish, varied with olive and lead-gray; in the middle of each side an oval black spot: the whole tinged with a golden lustre.

Not uncommon on some parts of the southern and western coasts. Occasionally attains a considerable size. Pennant speaks of one which weighed twelve pounds. According to Bloch, is very voracious, and keeps near the shore in order to prey on the fish which come there to spawn.

(2. CAPROS, *Lactp.*)

42. *Z. Aper*, Gmel. (*Boar-Fish.*)

Z. Aper, Gmel. *Linn.* tom. i. part iii. p. 1225. *Capros Aper*, *Lactp. Hist. Nat. des Poiss.* tom. iv. p. 591. *Riss. Hist. Nat. de l'Eur. Mër.* tom. iii. p. 380. *Cuv. Reg. An.* tom. ii. p. 211. *Proceed. of Comm. of Zool. Soc.* 1833. p. 114. *Aper Rondeletii*, *Will. Hist. Pisc.* p. 296. tab. I. 4. f. 4. *Boar-Fish*, *Yarr. Brit. Fish.* vol. i. p. 169.

LENGTH. The British specimens have not exceeded seven inches.

DESCRIPT. (*Form.*) "Body a shorter oval than that of the *Dory*: mouth protruding: a band of minute teeth considerably within each jaw: eye very large, placed at the distance of its own diameter from the end of the nose when the mouth is shut: nostrils large, just anterior to the edge of the orbit: origin of the first dorsal, pectoral, and ventral, fins, nearly in the same plane: the base of the first dorsal about as long as its third spine, which is the longest: the base of the second dorsal equal to that of the first, the rays very slender and flexible, the membrane only extending up one-third of the length of the rays: pectoral fin as long as the third ray of the first dorsal, slender and delicate in structure: ventral with one strong spine, the other rays flexible and branched, the membrane not extending the whole length of the rays: anal with all the characters observable in the second dorsal, and ending at the same distance from the tail: the caudal rays slender, and twice as long as the fleshy portion of the tail: number of fin-rays,

D. 9/24; A. 3/24; C. 12; P. 14; V. 1/5.

No lateral line observable: body quite smooth when the finger is passed from before backwards, but rough to the touch in the contrary direction, from numerous small scales which are minutely ciliated." (*Colours.*) "Upper part of the back and sides pale earmine, still lighter below, and passing to silvery white on the belly: body divided by seven transverse orange-coloured bands reaching three-fourths of the distance from the back downwards: irides orange; the pupil bluish black: all the fin-rays the same colour as the back; the membranes much lighter." YARR. *Obs.* In one of the British specimens there were no transverse bands.

This species, which is a native of the Mediterranean, has twice occurred in the British seas. The first individual is recorded by Dr. Henry Boase

as having been taken in Mount's Bay, in October 1825. The second is said to have been obtained in Bridgewater fish-market, on the 18th of April 1833. Dr. Boase's specimen is described in the "Proceedings of the Zoological Society," *l. c.* Of its habits little appears to be known, excepting that (according to Risso) it spawns in April.

GEN. 19. LAMPRIIS, *Retz.*

43. *L. Luna*, Risso. (*Opah*, or *King-Fish*.)

L. Luna, *Riss. Hist. Nat. de l'Eur. Mérid.* tom. III. p. 341. *Flem. Brit. An.* p. 219. *Zeus Luna*, *Gmel. Linn.* tom. I. part III. p. 1225. *Don. Brit. Fish.* vol. V. pl. 97. *Z. imperialis*, *Shaw, Nat. Misc.* vol. IV. pl. 140. *Chrysotosa Luna*, *Lacép. Hist. Nat. des Poiss.* tom. IV. p. 587. pl. IX. f. 3. *Lampris guttatus*, *Cuv. Reg. An.* tom. II. p. 211. *Opah*, *Penn. Brit. Zool.* vol. III. p. 223. pl. 42. *Id.* (Edit. 1812.) vol. III. p. 299. pl. 46. *Sow. Brit. Misc.* pl. 22. *Opah*, or *King-Fish*, *Yarr. Brit. Fish.* vol. I. p. 173.

LENGTH. From three to four feet and a half.

DESCRIPT. (*Form.*) Body oval, compressed, greatly diminishing at the tail, which is almost cylindrical: greatest depth (in a specimen three feet six inches long) nearly two feet: thickness not above six inches: mouth small: jaws without teeth: tongue thick, set with reflected prickles: eyes remarkably large: pectorals broad, about eight inches long: dorsal commencing a little behind their insertion, and extending nearly to the caudal; elevated anteriorly to the height of seven inches, but sloping away very suddenly, then continuing low till just at its termination, where it again becomes slightly elevated: ventrals very strong, placed near the middle of the body: anal narrow, running from the vent to the tail: caudal forked, expanding twelve inches. PENN.

D. 54; A. 26; C. 30; P. 23; V. 10:

skin smooth: scales scarcely perceptible: lateral line irregular, and somewhat curved at its commencement. DON. (*Colours.*) Back deep blue, inclining to regal purple, below which the purple is glossed in various directions of light with a reddish and golden hue, blending into green upon the sides, and the green fading to yellow as it approaches the silvery white of the abdomen: the whole body covered with numerous large distinct oval silvery spots: all the fins fine scarlet. DON.

Rare; but has been taken in the British seas in several instances; in some cases been found stranded on the coast after storms. Most of the individuals have occurred off Scotland and the Orkney Islands, but one or two on the western coast of England. Has been known to attain the weight of one hundred and forty pounds. Donovan, who has figured a specimen taken in the Frith of Forth, describes the pectoral fins as much longer than usually represented by British writers: he states that when placed erect, they reach even above the back. This species is not noticed either by Willughby or Ray.

GEN. 20. CORYPHÆNA, Linn.

(I. CENTROLOPHUS, Lacép.)

44. *C. Morio*, Cuv. (*Black-Fish*.)

Centrolophus Morio, *Cuv. et Val. Poiss.* tom. ix. p. 254. *C. niger*, *Lacép. Hist. Nat. des Poiss.* tom. iv. pp. 441, & 442. pl. 10. f. 2. *Perca nigra*, *Gmel. Linn.* tom. i. part iii. p. 1321. *Black-Fish*, *Borl. Nat. Hist. of Cornw.* p. 271. pl. 26. f. 8. *Yarr. Brit. Fish.* vol. i. p. 158. *Black Ruffe*, *Penn. Brit. Zool.* vol. iii. p. 260. *Black Perch*, *Id.* (Edit. 1812.) vol. iii. p. 351.

DESCRIPT. "Smooth, with very small thin scales; fifteen inches long, three-quarters of an inch (three or four inches?) broad besides the fin; head and nose like a *Peal* or *Trout*; little mouth; very small teeth; a full and bright eye: only one fin on the back, beginning from the nose four inches and three-quarters, near six inches long; a forked tail; a large double nostril." BORL.

"Fifteen inches long: (a second specimen measured two feet eight inches in length, and weighed nearly fourteen pounds:) blunt and rounded over the snout, flattened on the crown; mouth small; tongue rather large; teeth in the jaws fine; nostrils double, that nearest the eye large and open; eye prominent and bright; five gill-rays; though soft, the membrane of the preopercle had a free edge, somewhat incised: body compressed, about three inches deep; a thin elevated ridge, which makes it appear deeper on the back, on which the dorsal fin is seated: this fin begins at four and a half inches from the snout, and reaches to the distance of twelve inches from it; the rays fleshy at the base, many of them obsolete; vent six and a half inches from the lower jaw; pectoral fins pointed; ventral fins bound down by a membrane; tail forked: lateral line somewhat crooked at its commencement: body covered with minute scales, which when dry appear curiously striated. *Colour* of the whole black, the fins intensely so, very little lighter on the belly; somewhat bronzed at the origin of the lateral line. While employed in drawing a figure, the side on which it lay changed to a fine blue." COUCH, as quoted by YARR.

We have as yet but an imperfect knowledge of this species, which was originally described by Borlase from the papers of Mr. Jago, who obtained two specimens at Looe, May 26, 1721. Cuvier seems to entertain no doubt of Jago's fish being the same as the *Centrolophus niger* of Lacépède, which last he thinks may prove to be the adult state of his *C. Pompilus*, the *Pompilus* of Rondeletius. This idea receives confirmation from a statement of Mr. Couch, who has lately rediscovered this species in the Cornish seas, and, apparently without knowledge of Cuvier's work, gives it as his opinion that it is the *Pompilus* of Gesner and Ray*. For the present, however, Cuvier considers these two species as distinct, and if he be right in so doing, it is just possible that they may both occur in our seas, and that Jago may have seen one, and Mr. Couch the other. For this reason I have annexed the descriptions given by both these authors. Mr. Couch's specimens were obtained in 1830 and 1831. His notice of them, in the work just referred to, is accompanied by a remark, that there is "an error in Borlase's original description, of three-fourths of an inch, instead of three or four inches," and that this "has chiefly led to the continued mistake respect-

* *Lond. Mag. of Nat. Hist.* vol. v. p. 315.

ing this fish." Some further particulars respecting this species, from Mr. Couch, will be found in Yarrell's "British Fishes," l. c., to which the reader is referred.

GEN. 21. LEPIDOPUS, *Gouan.*

45. *L. argyreus*, Cuv. (*Scale-foot, or Scabbard-Fish.*)

L. argyreus, *Cuv. Reg. An.* tom. ii. p. 217. *Cuv. et Val. Poiss.* tom. viii. p. 163. pl. 223. *L. Lusitanicus*, *Leach, Zool. Misc.* vol. ii. p. 7. pl. 62. *L. tetradens*, *Flem. Brit. An.* p. 205. *Vandellius Lusitanicus*, *Shaw, Gen. Zool.* vol. iv. p. 199. *Zipotheca tetradens*, *Mont. in Wern. Mem.* vol. i. p. 82. pls. 2, & 3. *Id.* vol. ii. p. 432. *Scabbard-Fish*, *Penn. Brit. Zool.* (Ed. 1812.) vol. iii. p. 210. *Yarr. Brit. Fish.* vol. i. p. 176.

LENGTH. From four to six feet.

DESCRIPT. (*Form.*) Ensiform, much compressed, and equally carinated above and below, except the head, which is flat on the top: depth at the gills (in a specimen five feet six inches long) four inches and a half, continuing nearly the same to the vent, from thence decreasing, at first gradually, but afterwards more suddenly; portion of the tail beyond the termination of the anal nearly round: head porrected, conic; lower jaw longest by half an inch, terminating in a callous fleshy projection: in each jaw an irregular row of extremely sharp-pointed teeth, standing very conspicuous, even when the jaws are elosed; those below, about twenty on each side; above, not quite so numerous, but in this jaw four large teeth in front, not found in the other; two fore-teeth approximating; and two larger canine, rather crooked and compressed, with a slight process or barb on the inside near the point: tongue smooth: a row of minute teeth on each palatine: eyes very large, lateral, independent, not covered with the common skin: pectorals five inches long; the lower rays twice the length of the upper ones: instead of ventrals, two oblong silvery scales, half an inch in length, partly detached from the body, and connected at the base; their situation considerably behind the pectorals: vent in the middle: anal commencing at about one-sixth of the entire length from the posterior extremity, and running nearly to the caudal: dorsal commencing at the nape and extending uninterruptedly till opposite the termination of the anal: caudal forked:

D. 105; A. 17; P. 12.

Lateral line slightly elevated: skin quite smooth, destitute of scales. (*Colour.*) Like burnished silver, with a bluish tint: MONT.

First described as British by Montagu, from a specimen taken in Salcomb Harbour on the coast of South Devon, June 4th, 1808. Said to have been swimming with great velocity, with its head above water. According to Fleming, a second individual, only ten inches in length, occurred on the Devon coast in February 1810. Mr. Yarrell mentions two others which were also obtained from the southern shores of England. *Obs.* Cuvier, in his description of this species, observes that the number of large hooked teeth in the upper jaw ought to be six, but that two or three are generally found broken. He also speaks of a triangular moveable scale a little behind the vent, not noticed by Montagu; and states further, that in his specimens, the anal rays amounted to twenty five, but

that some of the anterior ones are so small and slender as easily to be overlooked. Number of vertebræ given as one hundred and eleven. Cuvier would seem to be of an opinion, that there is no other well ascertained species belonging to this genus.

GEN. 22. TRICHIURUS, *Linn.*

46. *T. Lepturus*, *Linn.*? (*Hair-Tail.*)

T. Lepturus, *Hoy in Linn. Trans.* vol. xi. p. 210. *Flem. Brit. An.* p. 204. *Bloch, Ichth.* pl. 158.? *Cuv. Reg. An.* tom. ii. p. 218.? *Cuv. et Val. Poiss.* tom. viii. p. 173.? *Silvery Hair-Tail*, *Yarr. Brit. Fish.* vol. i. p. 182.

LENGTH. Twelve feet and upwards. *Hoy*.

DESCRIPT. "Length, from the gills to the extremity of the tail, twelve feet nine inches: breadth, eleven inches and a quarter, nearly equal for the first six feet in length from the gills, diminishing gradually from thence to the tail, which ended in a blunt point: greatest thickness two inches and a half: distance from the gills to the anus forty-six inches: dorsal fin extending from the head to the tail: no ventrals or anal; but the thin edge of the belly closely mucicated with small hard points, scarcely visible through the skin, but plainly felt. Both sides of the fish white, with four longitudinal bars of a darker colour; the one immediately below the dorsal fin about two inches broad; each of the other three about three-fourths of an inch. Side-line straight along the middle." *Hoy*.

The above fish, originally described by Mr. Hoy, *l.c.*, was found on the beach of the Moray-Frith, near the fishing village of Port Gordon in Scotland, November 12, 1812. Its head had been broken off, and was quite gone, and a small bit of the gills only remained about the upper part of the throat. A fish, supposed to be of a similar kind, had been cast upon the same shore two years previously, and Mr. Hoy commences his account with a description of this last individual. From the great difference, however, which appears in their relative proportions, as stated by this gentleman, I am inclined to Dr. Fleming's opinion, that the individual last alluded to was a distinct species, if not belonging to a different genus. There can be no doubt that the one described above was a true *Trichiurus*, and probably the *T. Lepturus* of Linnæus and other authors; but as the description is rather imperfect, and the species of this genus ill determined, it is impossible to speak with certainty on this last point. It is worth noting, however, that neither Cuvier nor Bloch describe this species as exceeding three feet. The *T. Lepturus* is found in the Atlantic Ocean, and, like the *Lepidopus argyreus*, appears to have a wide geographical range. It is erroneously said by Bloch to inhabit fresh waters.

GEN. 23. GYMNETRUS, *Bl.*

47. *G. arcticus*, *Cuv.* (*Deal-Fish.*)

Gymnogaster arcticus, *Cuv. Reg. An.* (1st Ed.) tom. ii. p. 246. *Deal-Fish of Orkney*, *Flem. in Mag. of Nat. Hist.* vol. iv. p. 215. *with fig.* *Vaagmaer*, or *Deal-Fish*, *Yarr. Brit. Fish.* vol. i. p. 191.

LENGTH. From four to six feet.

DESCRIPT. "Body excessively compressed, particularly towards the back, where it does not exceed a table-knife in thickness: breadth (in a specimen three feet long) nearly five inches, tapering to the tail: colour silvery, with minute scales; the dorsal fin of an orange-colour, occupying the whole ridge from the head to the tail, with the rays of unequal sizes: caudal fin forked, the rays of each fork about four inches long: pectorals very minute: no ventral or anal fins whatever: vent immediately under the pectoral fins, and close to the gill-openings: head about four inches and a half long, compressed like the body, with a groove in the top: gill-lids formed of transparent porous plates: eyes one inch and a quarter in diameter: both jaws armed with small teeth: lateral line rough; and, towards the tail, armed with minute spines pointing forwards, and these are the only spines on the body." (*Another specimen.*) "Length four feet and a half: breadth eight inches: thickness one inch, thin at the edges, viz. back and belly: length of the head five inches, terminating gradually in a short snout: tail consisting of eight or nine fin-bones or rays, the third ray seven inches long, the rest four inches: dorsal fin reaching from the neck to the tail, rays four inches long: on each side of the fish, from head to tail, a row of prickles pointing forward, distance between each half an inch: under edge fortified by a thick ridge of blunt prickles: pectorals one inch long, lying upwards: skin rough, without scales (?): colour a leaden or silvery lustre; dorsal fin and tail blood-colour: the skin or covering of the head like that of a herring: several small teeth: gills red, consisting of four layers." FLEM. *l. c.*

The above descriptions were communicated to Dr. Fleming by Dr. Alexander Duguid of Kirkwall, Orkney, in April and October 1829. They relate to a species of fish, which it would seem is not unfrequently cast on the shores of the Island of Sanday during bad weather, and which is called there the *Deal-Fish*. Dr. Fleming considers it as identical with the *Vaagmaer* of Olafsen, the *Gymnogaster arcticus* of Brunnich, and of Cuvier's first edition of the "Regne Animal," though afterwards referred by this last author to the genus *Gymnetrus*, Bl.*, under the belief that the ventrals, usually considered as wanting in the *Vaagmaer*, were only accidentally lost in the specimens hitherto observed†. The *Vaagmaer* is found off Iceland. Nothing is known of it as a British species beyond what Dr. Fleming has recorded in the work above referred to.

- (7.) *G. Hawkenii*, Bloch, Ichth. pl. 423. *Blochian Gymnetrus*, Shaw, Gen. Zool. vol. iv. p. 197. pl. 29. *Ceii Comin*, Couch in Linn. Trans. vol. xiv. p. 77. *Hawken's Gymnetrus*, Yarr. Brit. Fish. vol. i. p. 188.

A doubtful native. Said to have been 'drawn on shore in a net at Newlin in Cornwall, in Feb. 1791. The extremity of the tail was wanting; the length of what remained was eight feet and a half, the depth ten inches and a half, thickness two inches and three quarters; weight forty pounds.'" Couch. The species itself is an obscure one, and not well ascertained. Bloch and Shaw have both figured the caudal fin from imagination, that part having been deficient in the specimens hitherto obtained.

* *Reg. An.* 2nd Edit. tom. 11. p. 219.

† This opinion, that the *Vaagmaer* possesses ventrals, when not mutilated by accident, has been confirmed by Professor Reinhardt, who has recently published a notice respecting a nearly perfect specimen of this fish, which had been cast ashore during the foregoing year, on the coast of Skagen. See *L'Institut*, 1834, p. 158.

GEN. 24. CEPOLA, *Linn.*48. *C. rubescens*, *Linn.* (*Red Band-Fish.*)

C. rubescens, *Mont. in Linn. Trans.* vol. vii. p. 291. pl. 17. *Don. Brit. Fish.* vol. v. pl. 105. *Flem. Brit. An.* p. 204. *Cuv. Reg. An.* tom. ii. p. 221. *C. Tænia*, *Bloch, Ichth.* pl. 170. ? *Serpens rubescens*, *Will. Hist. Pisc.* p. 118. c. 13. *Red Band-Fish*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. p. 285. *Yarr. Brit. Fish.* vol. 1. p. 195. *Red Snake-Fish*, *Couch in Linn. Trans.* vol. xiv. p. 76.

LENGTH. From ten to fifteen inches.

DESCRIPT. (*Form.*) Long, slender, smooth, sub-pellucid, somewhat compressed, tapering gradually from the head to the tail: depth behind the head (in a specimen ten inches long) rather more than three-quarters of an inch; breadth half an inch: head not larger than the body, sloping from the eye to the end of the upper jaw: under jaw longest, sloping upwards: mouth large: both jaws with one row of distant, subulate, curved teeth at their very edge, the front ones projecting forwards: eyes large, placed high on the cheeks: pectorals small, rounded: ventrals small, oval; the first ray short and spinous, with a filament adjoining longer than the other rays, and detached from them; close together, and rather before than immediately under the pectorals: dorsal commencing just behind the head, immediately above the gill-opening, and continuing uninterruptedly to unite with the caudal: anal commencing just behind the vent, which is scarcely an inch from the ventral fins, and like the dorsal, continuing the whole length to unite with the caudal: this last lanceolate, the middle ray being much the longest, and gradually shortening on each side, till the distinction is lost in the dorsal and anal fins:

B. 4; D. 70; A. 61; C. 12; P. 16; V. 1/5:

lateral line a little curved near the head, but afterwards running quite straight to the tail: skin smooth, but when examined by a lens appearing finely punctured. (*Colours.*) Pale carmine, darkest above and towards the tail; gill-covers, and undulated transverse lines along the sides, silvery: fins of the same colour as the body, except the ventrals, which are nearly white. *Mont.*

First noticed as a British species by Montagu, who obtained two specimens from Salcomb Bay, on the south coast of Devonshire. Several others have since occurred off Cornwall, where it is represented by Mr. Couch as being not very uncommon. In the Mediterranean it is well known.

GEN. 25. MUGIL, *Linn.*

49. *M. Capito*, *Cuv.* (*Gray Mullet.*) — Maxillary visible when the mouth is closed: orifices of the nostril near together: the skin at the margin of the orbit not advancing upon the eye: scale above the pectoral short and obtuse.

M. Capito, *Cuv. Reg. An.* tom. II. p. 232. M. Cephalus, *Don. Brit. Fish.* vol. I. pl. 15. *Flem. Brit. An.* p. 217. Mullet, *Will. Hist. Pisc.* p. 274. tab. R. 3.? *Penn. Brit. Zool.* vol. III. p. 329. pl. 66. Gray Mullet, *Yarr. Brit. Fish.* vol. I. p. 200.

LENGTH. From fifteen to twenty inches.

DESCRIPT. (*Form.*) Back but little elevated: ventral line more convex than the dorsal: greatest depth beneath the first dorsal, about one-fourth of the whole length, excluding caudal: greatest thickness nearly two-thirds of the depth: head broad and depressed: snout short, transversely blunt and rounded, but vertically sharp: mouth very protractile, transverse, angular; teeth, in the jaws scarcely perceptible, on the tongue, vomer, and palatines, more developed: maxillary visible when the mouth is closed, and not retiring beneath the infra-orbital: upper lip rather thick and fleshy, margined with a number of close-set minute pectinations: eyes rather high up; the skin at the anterior and posterior margins of the orbit not advancing over any portion of the iride: nostrils double on each side; the two orifices placed near together, the anterior one round, the posterior one oblong: head smooth; all the upper part covered with large polygonal scales: scales on the body large, but smaller than the above, deciduous: first dorsal commencing about the middle: its height twice its length; spines strong: the first two equal and longest: second dorsal considerably behind the first; its height and length the same as in that fin; all the rays except the first branched: caudal forked: anal rather in advance of the second dorsal, somewhat longer than that fin, but of the same height: pectorals about three-fourths of the length of the head; second, third, and fourth rays longest; all the rays except the first branched: ventrals a little behind the pectorals, close together, somewhat shorter; first ray strongly spinous; second soft ray longest:

B. 6; D. 4—9; A. 3/9; C. 14, and some short; P. 17; V. 1/5.

(*Colours.*) Back dusky blue: sides and belly silvery; the former marked with several parallel longitudinal dark lines.

Several species of this genus are noticed by Cuvier in his "Regne Animal", confounded by previous authors under the general name of *M. Cephalus*. That which occurs most abundantly in our own seas, appears to be his *M. Capito*, to which species he himself refers the *Mullet* of Willughby and Pennant*. This is not uncommon on many parts of the coast, and is often found in estuaries. Spawns, according to Mr. Couch, about Midsummer.

50. *M. Chelo*, Cuv. (*Thick-lipped Gray Mullet.*)—Lips very large and fleshy, the margins ciliated; teeth penetrating into their substance like so many hairs: maxillary curved, showing itself behind the commissure. Cuv.

M. Chelo, *Cuv. Reg. An.* tom. II. p. 232. Thick-lipped Gray Mullet, *Yarr. Brit. Fish.* vol. I. p. 207.

LENGTH. Ten inches. COUCH. Probably attains a larger size.

DESCRIPT. (*Form.*) "Head wide, depressed: eyes (in a specimen ten inches long) one inch apart, and three-eighths of an inch from the angle

* Dr. Hancock appears to have been the first of our own naturalists to remark that the *Gray Mullet* of the British coasts was not the true *Mugil Cephalus*. He named it *M. Britannicus*. See *Lond. Quart. Journ. of Sci.* 1830. p. 129, &c.

of the mouth, not connected with any membrane: nostrils close together, and while the fish is alive, moveable on each contraction of the mouth: a prominent superior maxillary bone, minutely notched at its lower or posterior edge: upper lip protuberant and fleshy, with a thin margin minutely notched or ciliated; the lip appears behind as projecting under the maxillary: earina of the under jaw prominent and square; edge of the lower lip fine and simple: body solid, round over the back: pectoral fins high on the side, pointed, rounded below, the first rays short: the first dorsal fin five inches and three-eighths from the snout, the origin of the first three rays approximate, the first ray the longest: the first two rays of the anal fin short: tail broad, concave: scales large." (*Colours.*) "Head and back greenish; all besides silvery, with six or seven parallel lines along the sides of the same colour as the back." COUCH, as quoted by YARR.

This species would seem, from Mr. Couch's MSS. communicated to Mr. Yarrell, to be not uncommon on the coast of Cornwall. Said to be "gregarious, frequenting harbours and the mouths of rivers in the winter months in large numbers." It does not appear, hitherto, to have been observed by any other of our own naturalists.

51. *M. curtus*, Yarr. (*Short Gray Mullet.*)

M. curtus, Yarr. *Brit. Fish.* vol. i. p. 210.

DESCRIPT. "Length of the head compared with that of the body and tail as one to three, the proportion in the *Common Gray Mullet* being as one to four: the body deeper in proportion than in *M. Capito*, being equal to the length of the head: head wider, the form of it more triangular, and also more pointed anteriorly: eye larger in proportion: fin-rays longer, particularly those of the tail: the ventral fins placed nearer the pectorals; also a difference in the number of some of the fin-rays:

D. 4—1/3; A. 3/3; C. 14; P. 11; V. 1/5.

The *colours* of the two species are nearly alike; and in other respects, except those named, they do not differ materially." YARR.

A new species described by Mr. Yarrell, of which only one specimen has hitherto been obtained. This, which is probably quite young, measuring but little more than two inches in length, was taken, in company with the fry of the *Common Gray Mullet*, between Brownsey Island and South Haven, at the mouth of Poole Harbour.

(8.) *M. Cephalus*, Cuv. Reg. An. tom. ii. p. 231.

Whether the true *M. Cephalus* of Cuvier be found in the British seas, must be left doubtful, until naturalists shall have more closely examined and compared our native species. It may, perhaps, assist in determining this point, just to point out its distinguishing characters. These consist (according to Cuvier) in the eyes being partly covered by a fatty membrane adhering to the anterior and posterior margins of the orbit; in the maxillary being entirely concealed beneath the infra-orbital, when the mouth is closed; and in the base of the pectoral fin being surmounted by a long carinated scale*; the orifices of the nostril are also separate from each other, and the teeth are tolerably well developed.

* See a representation of this scale in the vignette at the foot of page 201 of Yarrell's *British Fishes*.

GEN. 26. ATHERINA, *Linn.*

52. *A. Presbyter*, Cuv. (*Atherine*).—Anal with fifteen soft rays : fifty-one vertebræ.

A. Presbyter, Cuv. *Reg. An.* tom. 11. p. 235. *A. Hepsetus*, Don. *Brit. Fish.* vol. 1v. pl. 87. *Flem. Brit. An.* p. 217. *Atherine*, Penn. *Brit. Zool.* vol. 111. p. 328. pl. 65. *Id.* (Edit. 1812.) vol. 111. p. 434. pl. 76. *Atherine*, or *Sand-Smelt*, Yarr. *Brit. Fish.* vol. 1. p. 214.

LENGTH. From four to six inches.

DESCRIPT. (*Form.*) Elongated; head and back in nearly the same horizontal line: abdomen rather more convex: greatest depth one-sixth of the entire length; thickness two-thirds of the depth: snout short; lower jaw projecting beyond the upper, and ascending to meet it at an angle of forty-five degrees with the axis of the body: mouth very protractile; both jaws, as well as the vomer and base of the tongue, with very fine velvet-like teeth; pharyngeans rather stronger: eyes large; their diameter contained two and a half times in the length of the head; distance from them to the end of the snout equalling scarcely more than half their diameter; space between, and upper part of the snout, with several longitudinal ridges and corresponding depressions: first dorsal commencing a little before the middle; its length rather less than its height: spines weak and slender; second and third longest: second dorsal remote, longer and more elevated than the first; first ray spinous; the rest soft; second longest: anal answering to second dorsal, but somewhat longer than that fin, commencing a little in advance of it: caudal deeply forked: pectorals a little shorter than the head: ventrals shorter than the pectorals, and about in a line with the tips of those fins when laid back:

B. 6; D. 7 to 9—1/12; A. 1/15; C. 17; P. 15; V. 1/5:

vent a little behind the middle. Number of vertebræ fifty-one. (*Colours.*) A longitudinal silver band on each side, running straight from behind the eye to the commencement of the caudal, bounded above by a narrow dusky or purplish line; breadth of the band about one-sixth of the depth: back, and portion of the sides above the band, pellucid grayish white, freckled with black; along the dorsal ridge an interrupted yellowish line: belly, and portion of the sides beneath the band, pellucid white, without spots: above the snout, and between the eyes, yellowish, spotted with black: fins pellucid, with minute black specks: irides silvery white.

According to Cuvier, the present genus, like the last, embraces several species hitherto confounded by naturalists. Our British specimens, at least those found on the southern coast, whence the individuals were obtained which furnished the above description, appear to belong to his *A. Presbyter*. Not uncommon at East Bourne and Brighton, where they are termed *Sand-Smelts*. Taken in most abundance during the spring months. Spawn in May and June. According to Pennant and Donovan, they are also found at Southampton and on the coast of Devonshire. *Obs.* The *Atherine* of Bloch (pl. 393. f. 3.) is probably distinct from our British species.

GEN. 27. BLENNIUS, *Linn.*(1. BLENNIUS, *Cuv.*)* *Head with two or more tentaculiform appendages.*

53. *B. ocellaris*, Bl. (*Ocellated Blenny*).—Head with two principal appendages: dorsal bilobated; the anterior lobe much elevated, marked with an ocellated spot.

B. ocellaris, *Bloch, Ichth.* pl. 167. f. 1. *Mont. in Wern. Mem.* vol. II. p. 443. pl. 22. f. 2. *Flem. Brit. An.* p. 206. *Butterfly-Fish, Will. Hist. Pisc.* p. 131. tab. H. 3. f. 2. *Ocellated Blenny, or Butterfly-Fish, Yarr. Brit. Fish.* vol. I. p. 223. *Le Blennie papillon, Cuv. Reg. An.* tom. II. p. 237.

LENGTH. From four to six inches.

DESCRIPT. (*Form.*) Sides much compressed: greatest depth contained three times and a half in the whole length, caudal excluded: thickness rather more than half the depth: head rounded anteriorly, very obtuse; snout short; profile nearly vertical: jaws equal: teeth numerous, closely compacted, the last in the series on each side above and below hooked, and longer than the others: eyes large, high on the cheeks; the space between narrow and concave: above each eye a narrow tentaculiform appendage, slightly branched on its posterior margin, equalling in length one-third that of the head; considerably behind the eyes, on each side of the occiput, a minute membranaceous flap: lateral line proceeding from the upper angle of the opercle at one-fourth of the depth, but bending suddenly down about the middle of the body, where it alters its course to half the depth: dorsal commencing at the occiput, and extending very nearly to the caudal, with which, however, it is not continuous, as in the next species; the first eleven rays soft, but not articulated; first much longer than any of the others, and more than equalling the whole depth of the body; the succeeding ones gradually decreasing to the eleventh, which is the shortest in the whole fin; beyond the eleventh the rays again lengthen, the twelfth being twice the length of the preceding one; all the rays in this portion of the fin articulated, but not branched: anal commencing under the twelfth ray of the dorsal, and answering to the posterior lobe of that fin; the two fins terminating exactly in the same line: caudal rounded; rays branched; the two outermost above and below excepted: pectorals the length of the head, slightly pointed; all the rays simple: ventrals one-fourth shorter than the pectorals, narrow and pointed, of three simple rays, the middle one longer than the other two:

D. 11/15; A. 17; C. 11, and 2 short; P. 12; V. 3.

(*Colours.*) "Pale rufous brown, mixed with bluish gray, and slightly tinged with green in some parts; the sides of the head, throat, and branchiostegons rays, spotted with rufous brown: the dorsal fin also a little spotted and barred with olive-brown and white; between the sixth and eighth rays, a roundish purple-black spot, sometimes surrounded with white." MONT.

First noticed as a British species by Montagu, who obtained three specimens from an oyster-bed at Torcross, on the south coast of Devon, in 1814. A fourth, likewise British, from which the above description was taken, is in the collection of Mr. Yarrell. This last occurred among the rocks of the Island of Portland. In one of Montagu's examples the

ocellated spot was so ill-defined, that he was led to suspect it may sometimes be altogether wanting. He observed that those in which the ocellated spot was most perfect, had the first dorsal ray very long. Not an uncommon species in the Mediterranean.

54. *B. Gattorugine*, Mont. (*Gattoruginous Blenny*.)

—Head with two appendages: dorsal nearly even throughout, continuous with the caudal.

B. Gattorugine, Mont. in *Wern. Mem.* vol. II. p. 447. *Flem. Brit. An.* p. 206. *Gattorugine*, *Will. Hist. Pisc.* p. 132. c. xx. tab. H. 2. f. 2. *Penn. Brit. Zool.* vol. III. p. 207. pl. 35. no. 91. *Gattoruginous Blenny*, *Yarr. Brit. Fish.* vol. I. p. 226.

LENGTH. From five to seven inches, sometimes more.

DESCRIPT. (*Form.*) Snout not so obtuse as in the last species, the profile falling more gradually: teeth even throughout, the last in the series not longer than the others: eyes very high on the cheeks, rising above the level of the crown; the intervening space longitudinally impressed with a deep sulcus, conducting to another placed transversely immediately behind the eyes; beyond this is a slight gibbosity in front of the dorsal fin: over each eye a broad compressed tentaculiform appendage, much palmated on both its margins, in length more than one-third that of the head: lateral line as in the *B. ocellaris*: dorsal extending the whole length of the body, and uniting with the base of the caudal; nearly even throughout, having only a slight indentation about the middle; posteriorly somewhat rounded; the first thirteen rays soft but not articulated, the first and thirteenth being the shortest; fourteenth one-third longer than the preceding; this and all the succeeding ones articulated*, but simple: anal commencing under the thirteenth ray of the dorsal, not extending quite so far as that fin, and leaving a small space between it and the caudal: this last as in the *B. ocellaris*: pectorals equalling the head in length; all the rays simple; the two middle ones longer than the others: ventrals of only two simple articulated rays, without even the rudiment of a third; the inner ray longer and stouter than the outer one:

D. 13/20; A. 23; C. 11, and two short; P. 14; V. 2.

(*Colours.*) "Plain rufous brown, without any markings, paler on the belly, as far as the vent: throat and fins orange-red, except the base of the dorsal and pectorals: irides, and cirrhi over the eyes, orange." MONT.

The species of this genus, especially the British ones, have hitherto been but ill-determined. There is reason to believe that two or more have been confounded under the name of *B. Gattorugine*. The above description, from a specimen taken at Weymouth, appears to agree with the *Gattorugine* of Willughby and Pennant, which is probably quite distinct from the species described by Linnæus under that name†. It also accords with the *B. Gattorugine* of Montagu, and of Fleming, who copies from him, but not with that of Donovan, as hereafter shown. Apparently not very common, at least on all parts of the coast. Pennant's specimen was taken on the coast of Anglesea: Montagu's in a crab-pot on the south coast of Devon. Others have since occurred in Cornwall to Mr. Couch. Mr. Yarrell has also specimens from Poole Harbour, and from other localities on the south coast.

* The articulations are not easily seen, except the membrane investing the rays be dissected off, and the fin viewed against a strong light.

† On this point, see *Bull. des Sci. Nat.* 1823. tom. xv. no. 120.

- (9.) *B. Gattorugine*, Don. Brit. Fish. vol. iv. pl. 86. *B. Gattorugine*, Linn. Syst. Nat. tom. i. p. 442.? Bloch, Ichth. pl. 167. f. 2.? Turt. Brit. Faun. p. 92.

"The anterior half of the lateral line double; its lower limb extending in a straight direction from the gills to the tail; midway between this and the back is an arched lateral line originating at the hind part of the head, and curving down to the former, with which it is united a little behind the tip of the pectoral fin: D. 32; P. 13; V. 2, of nearly equal length, with a very small lateral appendage: A. 20; C. 12: the rays of the tail branched: all the rest simple or undivided." Don.

The double lateral line, the small lateral appendage to the ventrals forming a kind of third ray, and the four palmated membranes on the head, clearly characterize this as a distinct species from either of the two last, supposing Donovan's figure and description to be correct. The four appendages on the head associate it with the *B. Gatt.* of Linnaeus and Bloch. The double lateral line is probably an error. Bloch and Turton describe the lateral line as straight. In the *B. Gattorugine* of this work it is curved. Donovan does not state whence his specimen was obtained.

55. *B. palmicornis*, Cuv. (*Crested Blenny*).—Head with four appendages: dorsal even throughout, continuous with the caudal: ventrals very small.

- B. palmicornis*, Cuv. Reg. An. tom. ii. p. 237. *B. Galerita*, Flem. Brit. An. p. 207. *B. Pennantii*, Jen. Cat. of Brit. Vert. An. 24. sp. 54. *Crested Blenny*, Penn. Brit. Zool. vol. iii. pl. 35. no. 90. but not p. 206. Yarr. Brit. Fish. vol. i. p. 233.

LENGTH. Four or five inches.

DESCRIPT. (*Form.*) Much more elongated than either of the preceding species: depth, which is tolerably uniform throughout, equalling not more than one-seventh of the entire length: body considerably compressed: snout short and obtuse; the profile descending in a curve: "outline of the mouth, when viewed from above, forming a semicircle; viewed laterally, the angle of the mouth is depressed," the lower jaw ascending to meet the upper: gape rather wide; "lips capable of extensive motion:" teeth small and short; rather irregularly disposed, and not all exactly of the same length: eyes high on the cheeks, but not elevated above the crown: the intervening space flat, ornamented with four fimbriated tentaculiform appendages; the first pair of appendages are placed, one at the anterior margin of each eye, and are connected at the base by a low transverse membrane or fold of the skin; the second pair, which are twice the length of the first, and rather more fimbriated, are placed further back near the posterior margins of the eyes: "nape of the neck, and for some distance towards the commencement of the dorsal fin, the skin is smooth, with the exception of various small papillæ:" orbits surrounded by a circle of large, open, conspicuous pores: a row of similar pores at the upper part of the opercle, falling in with the commencement of the lateral line: dorsal commencing in a line with the upper angle of the opercle, and extending quite to the caudal, with which it is continuous; its height, which is uniform throughout, equalling rather more than half the depth of the body; the first ray a little shorter than the second; all the rays simple, and apparently all spinous or inarticulated, their extreme tips projecting beyond the connecting membrane; the first three, however, accompanied by short filamentous prolongations of the membrane, which extend further than themselves: anal commencing in a line with the fourteenth ray of the dorsal, and extending, like that fin,

quite to the caudal; the first ray only half the length of the second; the second a little shorter than the third; this last and the rest nearly equal, and of about the same length as the dorsal fin-rays, the ends, however, projecting further, the connecting membrane not being so deep: caudal rounded, with the principal rays branched: pectorals a little shorter than the head, also rounded: ventrals very small, consisting of only three rays, the longest being scarcely more than one-third the length of the head: number of fin-rays;

D. 51; A. 37; C. 14, and some short ones; P. 14; V. 3.

(Colours.) "General colour of the body and fins pale brown, mottled on the sides with darker brown: the head, the anterior part of the body, the ventral and pectoral fins, being darker than the other parts." YARR.

Of this species, I have only seen the specimen, taken at Berwick-upon-Tweed, which has been already described by Mr. Yarrell, and which was kindly lent me for examination. To that gentleman we are indebted for having cleared up some part of its history. It is probably the same as the *B. Galerita* of Dr. Fleming, which was found by him in Loch Broom. It is also clearly identical with Pennant's *figure* of the *Crested Blenny*, but the *description* of that species, in the "British Zoology," is in part borrowed from Willughby, and belongs to the *Alauda cristata* of that author, which last I am inclined to think is synonymous with the next species.

** *Head with one principal, transverse, crest-like, appendage.*

56. *B. Galerita*, Mont. (*Montagu's Blenny*.)

B. Galerita, Mont. in *Wern. Mem.* vol. i. p. 98. pl. 5. f. 2. *Alauda cristata* sive *Galerita*, Will. *Hist. Pisc.* p. 134. *B. Montagu*, *Flem. Brit. An.* p. 206. Diminutive Blenny, *Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 277. *Montagu's Blenny*, *Yarr. Brit. Fish.* vol. I. p. 219.

LENGTH. From one and a half to two and a half inches. MONT.

DESCRIPT. "Body rather more slender than the *Smooth Blenny*: head much sloped; eyes high up, approximating, gilded; the upper lip furnished with a bony plate that projects at the angles of the mouth into a thin lamina that turns downwards, the ends of which are orange-coloured: on the top of the head, between the eyes, a transverse, fleshy, fimbriated membrane; the *fimbriæ* of a purplish brown colour, tipped with white: nostrils furnished with a minute bifid appendage: behind the crest several minute, erect, filiform *appendiculæ*, between that and the dorsal fin, placed longitudinally: lateral line considerably curved near the head: pectorals large and ovate, of twelve rays, reaching as far as the vent: ventrals, two unconnected rays: dorsal extending from the head to the tail, of thirty rays, and appearing like two distinct fins, by reason of the slope to the thirteenth ray, which is not above half the length of the anterior ones, and the sudden elongation of the fourteenth ray; this fin is very broad, and in one specimen there was an ovate black spot between the first and second ray, and another obscure one between the next rays, but this is not a constant character: anal fin equally broad, and extending from the vent to the tail, consisting of eighteen rays usually margined with black, and tipped with white: caudal slightly rounded, composed of fourteen rays.

D. 30; A. 18; C. 14; P. 12; V. 2.

The colour above generally olive-green spotted with pale blue shaded to white; the belly white, and the pectoral fins spotted with orange." MONT.

Montagu observes that this species is occasionally taken, with the *B. Gattorugine* and *B. Pholis*, among the rocks on the south coast of Devon, in the pools left by the receding tide. Several specimens seem to have been noticed by him. It has also occurred to Mr. Couch in Cornwall; but none of our other naturalists appear to have met with it. I see no reason for supposing it distinct from the *Alauda cristata* of Willughby, the *Galerita* of Rondeletius, although not the same as the *B. Galerita* of Linnæus, who (as Mr. Yarrell has pointed out) has confounded this species with that which has been since termed by Cuvier *B. palmicornis*. Should the contrary hereafter appear, it will then be proper to exchange the name of *Galerita* for that of *Montagui*, first adopted by Fleming.

*** *Head without appendages.*

57. *B. Pholis*, Linn. (*Smooth Blenny, or Shan.*)—
Dorsal notched in the middle; not continuous with the caudal.

B. Pholis, Linn. *Syst. Nat.* tom. i. p. 443. Bloch, *Ichth.* pl. 71. f. 2. Don. *Brit. Fish.* vol. iv. pl. 79. *Alauda non cristata*, Will. *Hist. Pisc.* p. 133. e. xxi. tab. H. 6. f. 2. *Pholis lævis*, Flem. *Brit. An.* p. 207. *Smooth Blenny*, Penn. *Brit. Zool.* vol. iii. p. 208. pl. 36. *Id.* (Edit. 1812.) vol. iii. p. 280. pl. 40. *Shanny*, or *Smooth Shan*, Yarr. *Brit. Fish.* vol. i. p. 230. *Baveuse commune*, Cuv. *Reg. An.* tom. ii. p. 238.

LENGTH. From four to five inches.

DESCRIPT. (*Form.*) Thicker anteriorly than the *B. Gattorugine*; the head less compressed; the body not quite so deep: depth contained a little more than four times in the whole length, caudal excluded: thickness two-thirds of the depth: snout short and obtuse; profile almost vertical: teeth crowded, with one or two longer than the others, and hooked, at the end of each series above and below: eyes smaller, and not so high on the cheeks as in *B. Gattorugine*; the space between wider, with only a very slight longitudinal depression: no appendages on the head of any kind, or transverse sulcus on the nape, which last part is rather convex: lateral line similar, taking a sweep over the pectorals: dorsal commencing at a greater distance from the end of the snout by one-fourth, and terminating a little before it reaches the caudal: first ray a little shorter than the second; fifth, sixth, and seventh, slightly the longest, equalling not quite half the depth; eighth and following ones decreasing to the twelfth, which is the shortest in the whole fin, and only half the length of the thirteenth, or first of the articulated rays; rest of the fin nearly even: anal answering to the posterior portion of the dorsal, but terminating a little sooner, leaving a larger space between it and the caudal: pectorals rather more rounded than in the *B. Gattorugine*, the middle rays being not so much elongated: ventrals rather shorter, of only two rays, the inner one longest:

B. 6; D. 12/19; A. 20; C. 11, and 4 short; P. 13; V. 2.

(*Colours.*) Marbled and variegated with dusky and olive-brown, occasionally more or less spotted with white: rays of the anal always tipped with this last colour.

The most common species in the genus. Found on many parts of the coast, lurking beneath stones and sea-weed near low-water mark. Is tenacious of life, and will live for some time out of the water. Said to feed on small crustacea and marine worms. Spawns in Summer.

(2. GUNNELLUS, *Flem.*)

58. *B. Gunnellus*, Linn. (*Spotted Gunnel*.)—A row of dark ocellated spots along the base of the dorsal fin.

B. Gunnellus, *Linn. Syst. Nat.* tom. i. p. 443. *Bloch, Ichth.* pl. 71. f. 1. *Don. Brit. Fish.* vol. ii. pl. 27. *Gunnellus Cornubiensium*, *Will. Hist. Pisc.* p. 115. c. ix. tab. G. 8. f. 3. *G. vulgaris, Flem. Brit. An.* p. 207. *Spotted Blenny, Penn. Brit. Zool.* vol. iii. p. 210. pl. 35. *Id.* (Edit. 1812.) vol. iii. p. 282. pl. 39. *Spotted Gunnel, or Butter-Fish, Yarr. Brit. Fish.* vol. i. p. 239.

LENGTH. From six to eight, rarely ten, inches.

DESCRIPT. (*Form.*) Body elongated, and very much compressed throughout: greatest depth rather exceeding one-eighth of the entire length: thickness half the depth: head and back in one horizontal line; the former small, not more than one-ninth of the whole length, excluding caudal: snout more pointed than in the true Blennies; mouth small; lower jaw sloping considerably upwards; teeth minute: eyes placed rather high; the space between forming an elevated ridge: nape, behind the eyes, a little depressed: dorsal fin commencing a little behind the nape, at a distance from the end of the snout equalling one-eighth of the entire length, and extending quite to the caudal, with which it is continuous; all the rays simple and inarticulated, flexible, of the same height throughout, equalling scarcely more than one-sixth of the depth, projecting a little beyond the connecting membrane: anal commencing at about the middle of the whole length, likewise continuous with the caudal; the first two rays spinous; the rest articulated and branched: caudal rounded, with fifteen branched rays, and six simple ones shorter than the others, four above and two below: pectorals short, scarcely more than half the depth, rounded; all the rays articulated, and, except the first and last, branched: ventrals extremely small, scarcely one-third the length of the pectorals, reduced to a single spine united to one small soft ray of about its own length:

D. 77; A. 2/40; C. 15, and 6; P. 12; V. 1/1:

vent exactly in the middle. (*Colours.*) Deep olive, with a row of dark ocellated spots, varying in number, but generally from ten to twelve, along the line of the back, extending partly on to the dorsal fin: belly whitish: pectorals yellow.

Variety. Purple Blenny, *Low, Faun. Orc.* p. 203. "Reddish purple; fins lightest. Likewise wants the spots on the back; instead of eleven, has only a single one, and that placed near the beginning of the back fin." *Low.*

Not uncommon; particularly off the coasts of Cornwall and Anglesea. Habits similar to those of the last species.

GEN. 28. ZOARCES, *Cuv.*59. *Z. viviparus*, *Cuv.* (*Viviparous Blenny.*)

Z. viviparus, *Cuv. Reg. An.* tom. ii. p. 240. *Blennius viviparus*, *Linn. Syst. Nat.* tom. i. p. 443. *Bloch, Ichth.* pl. 72. *Don. Brit. Fish.* vol. ii. pl. 34. *Mustela vivipara*, *Will. Hist. Pisc.* p. 122. tab. H. 3. f. 5. *Gunnellus viviparus*, *Flem. Brit. An.* p. 207. *Viviparous Blenny*, *Penn. Brit. Zool.* vol. iii. p. 211. pl. 37. *Id.* (Ed. 1812.) vol. iii. p. 283. pl. 41. *Yarr. Brit. Fish.* vol. i. p. 243.

LENGTH. From ten to twelve, rarely fifteen, inches.

DESCRIPT. (*Form.*) Slender, elongated: body sub-cylindric anteriorly, compressed and tapering behind: skin smooth and naked: head small, equalling about one-sixth of the entire length: snout blunt; upper jaw thick, projecting a little beyond the lower: teeth conical, sharp, very minute: lateral line indistinct; its course straight, at half the depth of the body: dorsal commencing at the nape and extending the whole length, nearly even till just before its union with the caudal, where it becomes suddenly depressed and appears notched; all the rays soft and articulated, but simple: anal commencing a little before the middle, even throughout, also uniting with the caudal: this last rounded: pectorals large and rounded: ventrals jugular, very small and narrow, of three rays:

B. 6; D., A. and C., about 150; P. 18; V. 3.

(*Colours.*) Back and sides yellowish brown, stained and spotted with dusky: a series of dark spots more or less well-defined along the dorsal fin: under parts, and anal, yellowish.

Found on many parts of the coast both in England and Scotland. Stated by Pennant to be common in the mouth of the river Esk at Whitby, Yorkshire. Keeps at the bottom, lurking beneath stones. Feeds on small crabs. Is ovoviviparous. The young, according to Bloch, from two to three hundred in number, are excluded in the month of June.

GEN. 29. ANARRHICHAS, *Linn.*60. *A. Lupus*, *Linn.* (*Wolf-Fish.*)

A. Lupus, *Linn. Syst. Nat.* tom. i. p. 430. *Bloch, Ichth.* pl. 74. *Don. Brit. Fish.* vol. i. pl. 24. *Flem. Brit. An.* p. 208. *Wolf-Fish*, *Will. Hist. Pisc.* p. 130. c. xviii. tab. H. 3. f. 1. *Ravenous Wolf-Fish*, *Penn. Brit. Zool.* vol. iii. p. 151. pl. 24. *Id.* (Edit. 1812.) vol. iii. p. 201. pl. 27. *Wolf-Fish*, *Yarr. Brit. Fish.* vol. i. p. 247.

LENGTH. From four to six feet; sometimes more.

DESCRIPT. (*Form.*) "Head a little flattened on the top: nose blunt; nostrils very small; eyes small, and placed near the end of the nose: fore-teeth strong, conical, diverging a little from each other, standing far out of the jaws; commonly six above, and the same below, though sometimes only five in each jaw; these are supported within side by a row of lesser teeth, which makes the number in the upper jaw seventeen or eighteen, in the lower eleven or twelve: grinding teeth of the under jaw higher on the outer than the inner edges, which inclines their surfaces inward; they join to the canine teeth in that jaw, but in the upper are separate from them: in the centre are two rows of flat strong teeth, fixed on an

oblong basis upon the bones of the palate and nose: body long, a little compressed: skin smooth and slippery: pectorals consisting of eighteen rays: dorsal extending from the hind part of the head almost to the tail; the rays in the fresh fish not visible: anal extending as far as the dorsal: caudal rounded, of thirteen rays. (*Colours.*) Sides, back, and fins, of a livid lead-colour; the first two marked downwards with irregular obscure dusky lines: these in different fish have different appearances. *Young* of a greenish cast." PENN.

A powerful and ferocious species, most abundant in the northern parts of the globe, where it is said to attain to a larger size than in the British seas. Not unfrequently met with off the coasts of Scotland and Yorkshire. Feeds on shell-fish and crustacea, which it readily crushes by means of its strong molars. According to Pennant, is full of roe in February, March, and April, and spawns in May and June.

GEN. 30. GOBIUS, Linn.

61. *G. niger*, Linn. (*Black Goby*.)—Dorsals contiguous: lower jaw a very little the longest: distance between the eyes not equal to their diameter.

G. niger, Linn. *Syst. Nat.* tom. 1. p. 449. Sea-Gudgeon, *Will. Hist. Pisc.* p. 206. tab. N. 12. f. 1. Black Goby, *Penn. Brit. Zool.* vol. iii. p. 213. pl. 38. *Yarr. Brit. Fish.* vol. 1. p. 251. Le Boulereau noir, *Cuv. Reg. An.* tom. ii. p. 243.

LENGTH. From four to five, rarely six, inches.

DESCRIPT. (*Form.*) Elongated, the anterior extremity depressed, the posterior compressed and tapering: depth one-sixth of the entire length; thickness more than three-fourths of the depth: line of the back nearly straight; abdominal line bellying a little behind the ventral fins: head rather large, as broad as the body, somewhat more than one-fourth of the whole length: snout blunt and rounded: gape wide; lower jaw a very little the longest: fine card-like teeth, in several rows, the inner rows much smaller than the outer: eyes large, placed on the upper part of the head, approximating; the distance between barely three-fourths of their diameter: gill-opening much contracted: head naked; marked on the cheeks and before the eyes with several dotted lines, consisting of very minute papillæ: from the occiput to the first dorsal a shallow groove: body covered with large scales of a semicircular form, the free edges of which are finely ciliated: lateral line straight along the middle, rather indistinct: first dorsal commencing at one-third of the whole length, excluding caudal; spines very slender and flexible, a little unequal in height; fourth longest, equalling three-fourths of the depth; from the last ray the membrane passing on, falls gradually till it terminates at the base of the first ray in the second dorsal: this last with fourteen rays, nearly of equal height, the middle ones somewhat exceeding the others, equalling the longest of the spinous rays; all articulated, and, except the first, branched: anal answering to second dorsal, but commencing a little nearer the tail, and not extending quite so far; rays similar: caudal rounded; rays branched: pectorals the length of the head, of an oval-oblong form, with the middle rays longest; all the rays branched: ventrals forming by their union a funnel-shaped cavity; rays very unequal; the central ones, which are longest, somewhat shorter than the pectorals:

B. 5; D. 6—14; A. 12; C. 13, and some short; P. 19; V. 10, when united:

vent exactly in the middle; immediately behind it a little conical papilla. (*Colours.*) Deep olive-brown, variegated with dusky spots and streaks: dorsals dusky brown, variegated with whitish.

Found on many parts of the coast, but not in any abundance. Sometimes called *Rock-Fish*, from the power which they are said to possess of affixing themselves to the rocks by means of their united ventrals, though, according to Fleming, these fins are not capable of acting as a sucker. It is probable that under the name of *Gobius niger* several species have been confounded. That figured by Bloch is evidently distinct from our British one, differing from it in having sixteen rays in the second dorsal, and the jaws of equal length. The *G. niger* of Donovan and Fleming refers to the next species.

62. *G. bipunctatus*, Yarr. (*Two-spotted Goby.*) — Dorsals nearly contiguous: lower jaw considerably the longest: distance between the eyes more than equal to their diameter.

G. bipunctatus, Yarr. *Brit. Fish.* vol. 1. p. 255. *G. niger*, Don. *Brit. Fish.* vol. v. pl. 104. *Flem. Brit. An.* p. 206.

LENGTH. From two to four inches.

DESCRIPT. (*Form.*) General form resembling that of the last species, but rather more elongated in proportion to the depth: eyes further asunder, and placed more laterally; the distance between them rather more than equal to their diameter: head moderately depressed: lower jaw considerably more projecting: dorsals not approximating quite so nearly; the first with a ray more; the second with three (in Donovan's two) less; posterior rays of this last rather the longest. In other respects the forms of the two species are similar.

D. 7—11; A. 11; C. 12, and 2 short; P. 18; V. 12.

(*Colours.*) Testaceous, or yellowish white, all the scales on the back and upper part of the sides edged with brown; towards the top of the back this last colour prevails almost entirely: on the lateral line, beneath the commencement of the first dorsal, a conspicuous black spot; a similar one on each side of the base of the caudal fin: fins grayish white, with obsolete dusky bars.

Perhaps more common than the last species, with which it has, until lately, been confounded. The above description is taken from a specimen in the collection of Mr. Yarrell. Donovan's was from the coast of Devonshire.

63. *G. minutus*, Pall. (*Spotted Goby.*) — Dorsals remote; the second with the fourth and succeeding rays gradually decreasing: eyes closely approximating.

G. minutus, Gmel. *Linn.* tom. 1. part iii. p. 1199. Don. *Brit. Fish.* vol. 11. pl. 38. *Flem. Brit. An.* p. 206. Spotted Goby, Penn. *Brit. Zool.* vol. 111. p. 215. pl. 37. Yarr. *Brit. Fish.* vol. 1. p. 258. Le Boulereau blanc, *Cuv. Reg. An.* tom. 11. p. 243.

LENGTH. From two to three inches.

DESCRIPT. (*Form.*) More elongated and tapering than the *G. niger*, and not so much compressed: greatest depth, in the region of the pec-

torals, contained six times and a half in the entire length: thickness the same as the depth: head depressed: snout short; lower jaw projecting beyond the upper: eyes full and prominent, closely approximating on the upper part of the head, the space between reduced to a shallow groove, less than one-fourth of their diameter: opercle large, of an irregular square form, with the lower angle rounded off; the ascending margin nearly vertical; reaching nearly to the base of the rays of the pectorals: scales small: first dorsal with the first four rays nearly equal: fifth and sixth decreasing; all inclining backwards: space between the dorsals equalling half the depth of the body: second dorsal with the first ray a little shorter than the second; second, third, and fourth, equal and longest; the succeeding rays gradually decreasing to the last, which is scarcely more than half the length of the third and fourth: anal answering to the second dorsal, commencing and terminating nearly in the same line; the rays, however, with the exception of the first, which is much shorter than the others, more nearly of a height: caudal nearly even.

B. 5; D. 6—11; A. 12; C. 13, and 2 short; P. 20; V. 12.

(Colours.) Yellowish white, and somewhat pellucid; the back and sides obscurely spotted and mottled with ferruginous; three or four of these spots, larger than the others, are placed at intervals on the lateral line; that which is most distinct being just at the base of the caudal: rays of the caudal and dorsal fins spotted with the same colour, giving the appearance of transverse bars when the fins are close: anal and ventrals plain: opercle with silvery reflections.

Common on many parts of the coast where it is sandy, and often taken in the shrimp-nets. Is probably, however, frequently confounded with the next species. Pennant considers it as the *Aphua Cobites* of Willughby, but as this last is represented as having seventeen rays in the second dorsal, this opinion is probably incorrect.

64. *G. gracilis*, Jenyns. (*Slender Goby*.) — Dorsals remote; the second with the posterior rays longest: eyes closely approximating.

G. gracilis, Jen. *Cat. of Brit. Vert. An.* 25. sp. 63. *Slender Goby*, *Yarr. Brit. Fish.* vol. 1. p. 260.

LENGTH. Three inches two lines.

DESCRIPT. (*Form.*) Closely resembling the last species, but more elongated and slender throughout: greatest depth barely one-seventh of the whole length: snout rather longer: opercle approaching more to triangular, the lower angle being more cut away, and the ascending margin more oblique; a larger space between it and the pectorals: the two dorsals further asunder: rays of the second dorsal longer; these rays also gradually *increasing* in length, instead of *decreasing*, the posterior ones being the longest in the fin, and rather more than equalling the whole depth: rays of the anal in like manner longer than in the *G. minutus*:

D. 6—12; A. 12; C. 13, and 2 short; P. 21; V. 12:

in all other respects similar. (*Colours.*) Also resembling those of the last, with the exception of the anal and ventral fins, which are dusky, approaching to black in some places, instead of plain white, as in the *G. minutus*.

Apparently a new species; though probably of not less frequent occurrence than the last, with which it may be easily confounded. My specimens were obtained from Colchester, and were supposed to have been taken somewhere off the Essex coast.

GEN. 31. CALLIONYMUS, *Linn.*

65. *C. Lyra*, *Linn.* (*Gemmeous Dragonet*).—Distance from the end of the snout to the posterior margin of the orbit, and thence to the first dorsal fin-ray, equal: first ray of the first dorsal greatly prolonged.

C. Lyra, *Linn. Syst. Nat.* tom. i. p. 433. *Bloch, Ichth.* pl. 161. *Don. Brit. Fish.* vol. i. pl. 9. *Flem. Brit. An.* p. 208. *Dracunculus*, *Will. Hist. Pisc.* p. 136. tab. H. 6. f. 3. *Gemmeous Dragonet*, *Penn. Brit. Zool.* vol. iii. p. 164. pl. 27. *Id.* (Edit. 1812.) vol. iii. p. 221. pl. 31. *Yarr. Brit. Fish.* vol. i. p. 261. *Le Savary ou Doucet, Cuv. Reg. An.* tom. ii. p. 247.

LENGTH. From nine to twelve inches.

DESCRIPT. (*Form.*) Head depressed, oblong-triangular, broader than the body, equalling one-fourth of the entire length: body elongated, gradually tapering from the nape to the caudal: eyes approximating, directed upwards, removed twice their diameter from the end of the snout; the distance from the end of the snout to the posterior margin of the orbit equalling the distance from this last point to the first dorsal fin-ray: gape wide: intermaxillary very protractile: upper jaw longest: both jaws with velvet-like teeth; none on the vomer or palatines: preopercle prolonged backwards, and terminating in three short but strong spines, the two innermost of which are directed upwards: opercle concealed beneath the investing skin, which is carried all round and nearly closes the branchial aperture, leaving only a small round hole on each side of the nape for the egress of the water: lateral line at first slightly descending, but afterwards straight: skin smooth and naked: first dorsal commencing at a little less than one-third of the whole length, caudal excluded; first ray prolonged into a slender filament, varying in length, but often reaching, when laid back, to the base of the caudal; the three succeeding rays much shorter, and rapidly decreasing, the last scarcely equalling the depth of the body; membrane of the fin extending beyond the last ray, and terminating at the base of the first ray in the second dorsal: this last fin three times as long as the first; all the rays articulated but simple; of moderate and nearly equal height, the last two only being a little the longest: both dorsals rise from a shallow groove which is continued on to the caudal: this last rounded; the uppermost ray and the two lowermost simple, the rest branched: anal similar to the second dorsal, but placed rather more backward, and with the rays not quite so long: pectorals somewhat pointed; the middle rays longest; all, except the first, branched: ventrals jugular, very far asunder, broader than the pectorals, to which they are partly united at the base by a membrane; first ray short and spinous; articulated rays very much branched:

D. 4—10; A. 9; C. 10, and 2 short; P. 20; V. 1/5:

vent rather before the middle; furnished with a conical papilla as in the last genus. (*Colours.*) "Predominant colour a fine pellucid brown, with

marks and spots of pale blue, white, yellow, and black, disposed with peculiar elegance, especially about the head and dorsal fin: ventrals dark purple, finely contrasting with the pellucidity and whiteness of the pectorals: throat black." DON.

Found on many parts of the coast, but seldom in any plenty. Pennant states that it is not unfrequent off Scarborough, where it is taken by the hook in thirty or forty fathoms water. *Obs.* Both Willughby and Bloch represent this species with all the rays of the first dorsal nearly equally elongated. In our British specimens it is only the first ray which is so extraordinarily developed. This circumstance seems to suggest the possibility of their species being different from ours.

66. *C. Dracunculus*, Linn. (*Sordid Dragonet*.) — Distance from the end of the snout to the posterior margin of the orbit only half that from the eye to the first dorsal fin-ray: first ray of the first dorsal moderate.

C. Dracunculus, *Linn. Syst. Nat.* tom. i. p. 434. *Bloch, Ichth.* pl. 162. f. 2. *Don. Brit. Fish.* vol. iv. pl. 84. *Turt. Brit. Faun.* p. 89. *Sordid Dragonet*, *Penn. Brit. Zool.* vol. iii. p. 167. pl. 28. *Id.* (Edit. 1812.) vol. iii. p. 224. pl. 32. *Yarr. Brit. Fish.* vol. i. p. 266.

LENGTH. From six to eight and a half inches; rarely more.

DESCRIPT. (*Form.*) Differs from the *C. Lyra*, which it closely resembles, in the following particulars: head shorter, and more decidedly triangular: eyes removed from the end of the snout by a space equalling not more than once their diameter; the distance from the end of the snout to the posterior margin of the orbit equalling only half the distance from this last point to the first dorsal fin-ray: gape much smaller: lateral line not so strongly marked: first dorsal with the first ray only one-third longer than the second, not prolonged into an extended filament. Number of fin-rays,

D. 4—10; A. 10; C. 10, and a short one; P. 21; V. 1/5.

(*Colours.*) Back and sides reddish brown, sometimes cinereous brown, mottled with darker spots: lower portion of the sides with a faint gloss of metallic gold: beneath white, with the posterior half pellucid: irides pale gold.

Considered by Neill* and Fleming† as only the female of the last species. This seems, however, hardly probable, from its being of much more frequent occurrence than the *C. Lyra*, invariably smaller, and with the colours very different. Common on most parts of the coast, and, when small, often taken in the shrimp-nets. Is sometimes called a *Fox*.

GEN. 32. LOPHIUS, Linn.

67. *L. piscatorius*, Linn. (*Common Angler*.)

L. piscatorius, *Linn. Syst. Nat.* tom. i. p. 402. *Bloch, Ichth.* pl. 87. *Turt. Brit. Faun.* p. 115. *Don. Brit. Fish.* vol. v. pl. 101. *Flem. Brit. An.* p. 214. *Shaw, Nat. Misc.* vol. xi. pl. 422. *Rana piscatrix*, *Will. Hist. Pisc.* p. 85. tab. E. 1. *Common Angler*, *Penn.*

* *Hern. Mem.* vol. i. p. 529.

† *Brit. An.* p. 208.

Brit. Zool. vol. iii. p. 120. pl. 18. *Id.* (Edit. 1812.) vol. iii. p. 159. pl. 21. *Fishing-Frog*, *Yarr. Brit. Fish.* vol. i. p. 269. *La Baudroye* commune. *Cuv. Reg. An.* tom. ii. p. 251.

LENGTH. From three to five feet.

DESCRIPT. (*Form.*) Head enormously large, occupying more than one-third of the entire length, broad and very much depressed: body tapering suddenly from behind the pectorals: snout obtuse and rounded; gape excessively wide; lower jaw considerably the longest, fringed along its edge with numerous short filaments: teeth conical, of various lengths and sizes, numerous and very sharp; two closely approximating rows in the lower jaw; the same above, but more widely separated; palatines, pharyngeans, and middle of the tongue, likewise bristling with teeth: eyes moderate, placed towards the upper part of the head, equally distant from the end of the snout and from each other: orbits above the eyes armed with a number of tooth-like processes, which forming two rows extend backwards to meet on the nape, but do not project through the skin: also two erect spines on each side of the end of the snout: gill-opening in the form of a wide, loose, purse-like cavity immediately beneath the pectorals; opercle small, not appearing externally: skin every-where soft and naked: above the nose, in front of the eyes, two long erect filamentous processes, one before the other, nearly half the length of the head; further down the mesial line, and about as far behind the eyes as the above are before them, another single filament about one-fourth shorter; after the same interval again two others about half the length of the first ones, and a third very short one: these three are sometimes connected at the base by a low membrane, forming a first dorsal: second dorsal commencing after a similar interval taken the third time, of a somewhat semicircular form, its length twice its height and half the length of the head; membrane enveloping the rays thick and fleshy, extending beyond the fin nearly to the caudal; this last even: pectorals in a line with the first of the three posterior dorsal filaments, of an oblong form, the rays of equal length, appearing truncated; their length one-third that of the head: anal similar to the second dorsal, but placed a little nearer the caudal: ventrals a little before the pectorals: the distance between them equalling their own length:

B. 6; D. 2—1—3—11; A. 9 or 10; C. 7 or 8; P. 24 to 26; V. 5.

(*Colours.*) All the upper parts brown, inclining to dusky: beneath white.

Taken occasionally on most parts of the coast. Keeps wholly at the bottom, and is very destructive to other fish. Has no swimming-bladder. *Obs.* Cuvier speaks of another species belonging to this genus, which may possibly also occur in the British seas. It is principally characterized by having the second dorsal less elevated, and only twenty-five vertebrae, the present species having thirty.

(10.) *L. Cornubicus*, Shaw, *Gen. Zool.* vol. v. p. 381. *Fishing-Frog of Mount's Bay*, *Borl. Cornw.* p. 266. pl. 27. f. 6. *Long Angler*, *Penn. Brit. Zool.* vol. iii. p. 123.

In the opinion of Cuvier this supposed species is only an altered individual of the common one*. "Found on the shore of Mount's Bay, Aug. 9, 1757." *BORL.*

* The same may probably be said of the *Rana Piscatrix*, figured in Leigh's "Natural History of Lancashire," &c. (p. 186. pl. 6. f. 5.)

GEN. 33. LABRUS, *Linn.*(1. LABRUS, *Cuv.*)* *Dorsal with twenty or twenty-one spinous rays.*

68. *L. maculatus*, Bloch. (*Ballan Wrasse*).—Ascending margin of the preopercle oblique: soft portion of the dorsal more than twice the height of the spinous: dorsal and anal terminating nearly in the same line.

L. maculatus, Bloch, *Ichth.* pl. 294. *L. Tinca*, Shaw, *Nat. Misc.* vol. xi. pl. 426. *Id. Gen. Zool.* vol. iv. p. 499. pl. 72. *Don. Brit. Fish.* vol. iv. pl. 83. *L. Balanus*, *Flem. Brit. An.* p. 209. *Ballan Wrasse*, *Penn. Brit. Zool.* vol. iii. p. 246. pl. 44. *Id.* (Edit. 1812.) vol. iii. p. 334. pl. 55. *Yarr. Brit. Fish.* vol. i. p. 275. *La Vieille tachetée*, *Cuv. Reg. An.* tom. 11. p. 255.

LENGTH. From twelve to eighteen inches.

DESCRIPT. (*Form.*) Oblong-oval, narrowing at the tail beyond the termination of the dorsal and anal fins: body thick and bulky: depth one-fourth of the entire length: back not much elevated; dorsal line nearly straight from the commencement of the dorsal fin backwards, but in advance of that point falling gradually to the snout; no depression at the nape: head one-fourth of the whole length, caudal excluded: snout short and conical: mouth very protractile; lips double, the anterior pair thick and fleshy, and partially reflexed, shewing the teeth: jaws equal: teeth rather small, conical, the anterior ones longest, amounting to about eighteen in each jaw: distance from the eye to the end of the snout equalling twice the diameter of the eye; space between the eyes convex, without any depression or sulcus, equalling two diameters and a half: preopercle with the ascending margin inclined, this last forming with the basal margin an obtuse angle: lateral line bending a little downwards beneath the termination of the dorsal fin; its previous course nearly straight at one-third of the depth: dorsal commencing at a distance from the end of the snout equalling one-fourth of the entire length; space occupied by the fin nearly equalling half the entire length; spinous portion three-fourths of the whole, the height of this part one-fourth of the depth of the body; soft portion more than twice the height of the spinous: anal commencing in a line with the soft portion of the dorsal, and terminating also nearly in the same line with that fin; first three rays spinous, stronger than the dorsal spines, shorter than the soft rays which follow: caudal slightly rounded; its base scaly, beyond which are rows of scales between the rays for one-fourth of their length: pectorals rounded, two-thirds the length of the head: ventrals a little shorter: all the fins very stout; the membranes enveloping the rays thick and fleshy:

D. 20/11; A. 3/9; C. 13; P. 15; V. 1/5.

(*Colours.*) Back and sides bluish green, becoming paler on the belly; all the scales margined with orange-red: head and cheeks bluish green, reticulated with orange-red lines; lips flesh-colour; irides bluish green: all the fins greenish blue, with a few scattered red spots; the dorsal with spots along the base only: the blue on the caudal passing into dusky at the tip.

Not an uncommon species in the British seas. Pennant and Donovan obtained their specimens from Scarborough; where, according to the former author, "they appear during Summer in great shoals off Filey-Bridge; the largest weighing about five pounds." Donovan states that he has also received it from Cornwall; from the Skerry Islands, north of Anglesea, and from Scotland. Mr. Yarrell mentions various parts of the Irish coast, the eastern coast of England, and the shores of Dorsetshire and Devonshire, as other localities for this species. The description given above is that of a specimen in the collection of the Zoological Society, from the London market. Frequents rocky ground, and feeds principally on crustacea. Spawns, according to Mr. Couch, in April. *Obs.* The colours in this, and in all the other species of this family, are liable to much variation.

69. *L. lineatus*, Don. (*Streaked Wrasse.*)

L. lineatus, Don. *Brit. Fish.* vol. iv. pl. 74. *Turt. Brit. Faun.* p. 99. *Flem. Brit. An.* p. 209. *L. Psittacus*, *Riss. Hist. Nat. de l'Eur. Mèrid.* tom. iii. p. 304.? Green-streaked Wrasse, *Yarr. Brit. Fish.* vol. i. p. 279.

LENGTH. Seven inches. DON.

DESCRIPT. Body green, with numerous longitudinal yellowish lines: fins greenish. Number of fin-rays,

D. 20/10; A. 33; C. 15; P. 14; V. 8. DON.

Obtained by Donovan from the coast of Cornwall, where it is said to be provincially known by the name of *Green-Fish*. According to Mr. Yarrell, it appears also to have been met with on the Devonshire coast by Montagu. It is probably the *L. Psittacus* of Risso*, but Donovan's description is too imperfect to speak with certainty on this point.

70. *L. pusillus*, Jenyns. (*Corkling.*) — Ascending margin of the preopercle very oblique; a few obsolete denticulations about the lower angle: soft portion of the dorsal a little higher than the spinous: dorsal extending a little beyond the anal.

L. pusillus, *Jen. Cat. of Brit. Vert. An.* 25. sp. 69.

LENGTH. Four inches.

DESCRIPT. (*Form.*) Distinguished by its small size. Back but little elevated, sloping very gradually towards the snout; ventral line more convex than the dorsal: sides compressed: depth contained about three times and three-quarters in the entire length; thickness half the depth, or barely so much: head one-fourth of the entire length: snout rather sharp; jaws equal: teeth of moderate size, conical, regular, about sixteen or eighteen in each jaw: eyes rather high in the cheeks, situate halfway between the upper angle of the preopercle and the margin of the first upper lip; the space between about equal to their diameter, marked with a depression; a row of elevated pores above each orbit: preopercle with the ascending margin very oblique; the basal angle,

* By an error, the *L. Psittacus* was inserted in my Catalogue as British, independently of Donovan's species.

which falls a little anterior to a vertical line from the posterior part of the orbit, very obtuse, and remarkably characterized by a few minute denticulations, which further on become obsolete, and in some specimens are scarcely anywhere obvious: lateral line a little below one-fourth of the depth; nearly straight till opposite the end of the dorsal, then bending rather suddenly downwards, and again passing off straight to the caudal: number of scales in the lateral line about forty-five: dorsal commencing at one-third of the length, excluding caudal; spinous portion nearly three-fourths of the whole fin, the spines very slightly increasing in length from the first to the last, which last is not quite one-third of the depth of the body; soft portion a little higher than the spinous, of a somewhat rounded form, the middle rays equalling nearly half the depth: anal commencing a little anterior to the soft portion of the dorsal, and terminating a little before it; the first three rays spinous, the third being the longest, but the second the stoutest spine; soft rays resembling those of the dorsal: caudal nearly even, with rows of scales between the rays for nearly half their length: pectorals rounded, about two-thirds the length of the head, immediately beneath the commencement of the dorsal; all the rays soft and articulated, and, except the first, branched: ventrals a little shorter; the first ray spinous, shorter than the second and third, which are longest; all the soft rays branched; the last ray united to the abdomen by a membrane for half its length:

B. 5; D. 20/10 or 11; A. 3/9; C. 13; P. 14; V. 1/5.

(Colours of specimens in spirits.) Yellowish brown, with irregular transverse fuscous bands: dorsal irregularly spotted with fuscous; anal light brown; the other fins pale.

This species, which is the smallest in the genus, is possibly the *Turdus minor* or *Corkling* of Mr. Jago*. It is apparently quite distinct from any of those described by other authors. Though belonging to the present section, which it is convenient to retain, it would seem to form the transition to the *Crenilabri*, to which its near affinity is indicated by the rudimentary denticulations on the margin of the preopercle. The only specimens I have seen, amounting to four or five, were obtained at Weymouth by Professor Henslow, and are now in the Museum of the Cambridge Philosophical Society. One of these is very minute, and quite young, but the two largest, measuring four inches, have all the appearance of being full-grown fish.

- (11.) *Comber*, Penn. Brit. Zool. vol. III. p. 252. pl. 47. Id. (Edit. 1812.) vol. III. p. 342. pl. 58. *Comber Wrasse*, Yarr. Brit. Fish. vol. I. p. 289. *Labrus Comber*, Gmel. Linn. tom. I. part III. p. 1297. Turt. Brit. Faun. p. 99. Flem. Brit. An. p. 209.

An obscure and doubtful species. Pennant's fish, which was obtained from Cornwall, is thus characterized. "Of a slender form: dorsal fin with twenty spinous, and eleven soft, rays: pectoral with fourteen: ventral with five: anal with three spinous and seven soft: tail round. Colour of the back, fins, and tail, red: belly yellow: beneath the lateral line ran parallel a smooth even stripe from gills to tail, of a silvery colour."

Mr. Couch is recorded to have met with a single individual of this species several years since, but his account of it, as given in the "British Fishes" of Mr. Yarrell, is scarcely more explicit. He observes that "compared with the *Common Wrasse*, the *Comber* is smaller, more slender, and has its jaws more elongated: the two upper front teeth are very long: a white line passes along the side from head to tail, unconnected with the lateral line: it has distinct blunt teeth in the jaws and palate: the ventral fins are somewhat shorter than in others of the genus."

* Ray, *Syn. Pisc.* p. 165.

It may be observed that Pennant supposed his fish to be the *Comber* of Mr. Jago*. This, however, must be considered very doubtful, Ray mentioning nothing respecting Jago's fish, except that it was small, scaly, and of a red colour. Cuvier† regarded it as a red variety of the *L. maculatus*, with a series of white spots along the flank.

** *Dorsal with from sixteen to eighteen spinous rays : form elongated.*

71. *L. variegatus*, Gmel. (*Striped Wrasse*.)—Ascending margin of the preopercle nearly vertical: dorsal extending a little beyond the anal; the soft portion scarcely higher than the spinous: branchiostegous membrane with five rays.

L. variegatus, Gmel. *Linn.* tom. 1. part iii. p. 1294. *Don. Brit. Fish.* vol. 1. pl. 21. *Turt. Brit. Faun.* p. 99. *Turdus perbellus pictus*, *Will. Hist. Pisc.* p. 322. tab. X. 3. *Sparus formosus*, *Shaw, Nat. Misc.* vol. 1. pl. 31. *Striped Wrasse*, *Penn. Brit. Zool.* vol. 111. p. 240. pl. 45. *Id.* (Edit. 1812.) vol. 111. p. 337. pl. 57. *Blue-striped Wrasse*, *Yarr. Brit. Fish.* vol. 1. p. 281. *La Vieille rayée*, *Cuv. Reg. An.* tom. 11. p. 255.

LENGTH. From twelve to fourteen inches.

DESCRIPT. (*Form.*) More elongated than any of the former species: back not much elevated: greatest depth contained four times and one-third in the entire length: thickness rather less than half the depth: dorsal line continuous with the profile; no depression at the nape: head more than one-fourth of the whole length: teeth numerous, conical, sharp, the anterior ones longest, slightly curved; about twenty in the upper, and thirty-five in the lower jaw; a few smaller ones behind: distance from the eye to the end of the snout equalling twice and a half the diameter of the eye; distance between the eyes equalling two diameters; the intervening space very slightly concave: no elevated pores above the orbits: ascending margin of the preopercle nearly vertical, forming with the basal margin a slightly obtuse angle, which angle falls behind the eye and not immediately under it, as in the next species: lateral line high, its course at rather below one-fifth of the depth, bending downwards opposite the termination of the dorsal, but much more gradually than in the species of the first section: number of scales in the lateral line forty-six: dorsal commencing in a line with the pectorals and posterior angle of the opercle: the soft portion scarcely higher than the spinous: anal commencing in a line with the soft portion of the dorsal, but terminating a little before that fin: caudal nearly even, with rows of scales between the rays extending for half their length: pectorals not half the length of the head: ventrals equal to them:

B. 5; D. 17/12 or 13; A. 3/11; C. 13; P. 15; V. 1/5.

(*Colours.*) Back and sides for two-thirds of their depth olivaceous brown, with spots and interrupted longitudinal lines of bluish gray; remainder of the sides orange: head and cheeks like the back; lower jaw, and all beneath the head, bluish gray: dorsal orange, with a large oblong space

* *Ray, Syn. Pisc.* p. 163. fig. 5.

† *Reg. An.* tom. 11. p. 255. note (2).

of bluish gray on its anterior half, occupying three-fourths of the height of the fin; on the posterior half, three round spots of the same colour: anal and ventrals orange-yellow, edged with bluish gray: caudal variegated with the same colours.

Not a very common species. Pennant and Donovan obtained specimens from the coast of Anglesea off the Skerry Islands. According to Mr. Thompson of Belfast, it is occasionally met with on the coast of Ireland. The individual described above is one of two, in the collection of Mr. Yarrell, from the London market. The colours are very variable, and at certain periods of the year extremely beautiful.

72. *L. Vetula*, Bloch? (*Sea-Wife*).—Ascending margin of the preopercle oblique, forming with the basal an obtuse angle: dorsal nearly of equal height throughout: branchiostegous membrane with four rays.

L. Vetula, Bloch, *Ichth.* pl. 293.? *Sea-Wife*, *Yarr. Brit. Fish.* vol. 1. p. 284.

LENGTH. Thirteen inches.

DESCRIPT. (*Form.*) Very similar to the last species, but rather more bulky in proportion to its length: depth about the same: thickness somewhat greater: teeth smaller, and more numerous, especially in the upper jaw: ascending margin of the preopercle more oblique, forming a more obtuse angle with the basal margin; this angle more immediately under the eye, a vertical from it forming a tangent to the posterior part of the orbit; (a line similarly drawn in *L. variegatus* is nearly coincident with the ascending margin, and falls behind the eye at a distance equaling the diameter of the eye:) branchiostegous membrane with only four rays*: lateral line rather lower, its course at one-fourth of the depth: scales somewhat larger: dorsal similar, nearly of equal height throughout: anal with the rays of the terminating fourth portion rather longer than the others; (in *L. var.* the rays are equal throughout:) caudal, pectorals, and ventrals, similar:

D. 16/13; A. 3/11; C. 13; P. 14; V. 1/5.

(*Colours of a specimen in spirits.*) Back and sides for three-fourths of their depth dark brown without spots; lower portion of the sides and belly pale orange-yellow: anterior half of the dorsal with a large oblong space at the base of dusky blue; remainder of the fin pale, with a row of dark spots, one at the base of nearly every ray: anal and ventrals orange-yellow, edged with dusky blue: caudal pale, with some of the exterior rays tipped with the same colour.

The individual described above, the only one which I have seen of this species, is in the collection of the Zoological Society. It was procured in the London market. It so nearly resembles the *L. variegatus*, that had I not seen the two together and compared them closely, I should have hesitated about admitting them as distinct. I do not feel certain that it is the *L. Vetula* of Bloch, but it approaches more nearly to that species than any other described one with which I am acquainted.

* The *Labrus Vetula* of Bloch is represented by that author as having six branchiostegous rays.

73. *L. trimaculatus*, Gmel. (*Trimaculated Wrasse*).—Ascending margin of the preopercle oblique: dorsal with the posterior rays a little the longest: body red; with three dark spots on each side, two at the base of the dorsal fin, and one between the dorsal and the caudal.

L. trimaculatus, Gmel. *Linn.* tom. i. part iii. p. 1294. *Shaw, Nat. Misc.* vol. XIX. pl. 786. *Don. Brit. Fish.* vol. III. pl. 49. *Turt. Brit. Faun.* p. 99. *L. carneus*, Bloch. *Ichth.* pl. 289. *Trimaculated Wrasse*, Penn. *Brit. Zool.* vol. III. p. 248. pl. 46. *Id.* (Edit. 1812.) vol. III. p. 336. pl. 56. *Red Wrasse*, Yarr. *Brit. Fish.* vol. I. p. 286. *La Vieille couleur de chair*, *Cuv. Reg. An.* tom. II. p. 256.

LENGTH. From eight to twelve inches.

DESCRIPT. (*Form.*) Oblong, elongated, and rather slender; the back and profile nearly in a straight line: snout longer and more produced than in either of the two last species: greatest depth contained about four times and a half in the entire length: teeth numerous, conical, the anterior ones longest: ascending margin of the preopercle oblique, forming with the basal a much more obtuse angle than in the *L. variegatus*: course of the lateral line rather above one-fourth of the depth: dorsal and anal much as in *L. variegatus*; the former with the posterior rays a little the longest: anal terminating a little before the dorsal: caudal even, or very slightly rounded, with rows of scales between the rays:

D. 18/13; A. 3/11; C. 13; P. 15; V. 1/5.

(*Colours.*) "Pervading colour a fine orange, varying to red upon the back, and becoming paler and whiter towards the belly: dorsal and tail a rich orange; the former strongly marked with dark purplish black, and prettily edged with blue; the rest of the fins of a paler hue: the three dark spots at the posterior extremity of the back of a rich blackish purple; contiguous to these are four other spots of a delicate rose-colour; two disposed in the space between the three dark ones, and the third and fourth placed one at each extremity of the outermost ones, so as to form together a series of seven spots, alternately of a pale rose-colour and a very deep purple." DON.

Apparently a rare species in the British seas. Pennant's specimen was taken on the coast of Anglesea; Donovan's on the south coast of Devonshire near Exmouth. It has also occurred in Cornwall, and in the Frith of Forth. *Obs.* Fleming has erroneously considered this species and the Striped Wrasse as mere varieties of the *L. maculatus*.

(12.) *L. bimaculatus*, Linn. *Syst. Nat.* tom. I. p. 477. *Bimaculated Wrasse*, Penn. *Brit. Zool.* vol. III. p. 247. *Id.* (Edit. 1812.) vol. III. p. 335.

This must be considered a very doubtful species, especially as British. Pennant does not appear to have seen it himself, but to have inserted it simply on the authority of Brunnich, who is said to have observed it at Penzance. No one has met with it since.

(13.) *Cook* (i. c. *Coquus*) *Cornubiensium*, Ray, *Syn. Pisc.* p. 163. f. 4. *Penn. Brit. Zool.* vol. III. p. 253. *Id.* (Edit. 1812.) vol. III. p. 340. *Lab. Coquus*, *Turt. Brit. Faun.* p. 99. *Flem. Brit. An.* p. 209.

Ray's description of this species, which is one of those discovered by Mr. Jago on the coast of Cornwall, is so short and imperfect as hardly to

admit of its being identified with certainty. It is, however, in all probability the same as the *L. variegatus* already described. To the same species may be referred the *Cuckow-Fish* described by the editor of the last edition of the "British Zoology" (vol. III. p. 341.) Mr. Couch speaks of the *Cook** as a species with which he is familiar, but he has not added any description of the fish to which he alludes.

(*LACHNOLAIMUS*, Cuv. ?)

- (14.) *L. Suillus*, Linn. Syst. Nat. tom. I. p. 476. *Lachnolaimus suillus*, Cuv. Reg. An. tom. II. p. 257. note (1)? *Hog Wrasse*, Couch in Loud. Mag. of Nat. Hist. vol. V. p. 19.

Inserted by Mr. Couch in his "Fishes of Cornwall" on the authority of Osbeck, who mentions † "Rock-Fish (*Labrus Suillus*, Linn.)" amongst other species of fish which were brought on board his vessel by the people of the Scilly Islands. This bare statement, unaccompanied by any description of the fish alluded to, seems hardly sufficient ground for admitting the present species into the British Fauna.

(2. *JULIS*, Cuv.)

74. *L. Julis*, Linn. (*Rainbow Wrasse*.)—"Above fuscous and green; beneath white, with a fulvous dentated stripe on each side: two fore-teeth longest." DON.

L. Julis, Linn. Syst. Nat. tom. I. p. 476. Bloch, *Ichth.* pl. 287. f. 1. ? Don. *Brit. Fish.* vol. IV. pl. 96. *Turt. Brit. Faun.* p. 99. *Julis*, Will. *Hist. Pisc.* p. 324. pl. X. 4. f. 1. ? *Julis vulgaris*, *Flem. Brit. An.* p. 210. La Girelle, *Cuv. Reg. An.* tom. II. p. 257. *Rainbow Wrasse*, *Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 343. *Yarr. Brit. Fish.* vol. I. p. 291.

LENGTH. Rather exceeding seven inches. DON.

DESCRIPT. "Of a slender, or elongated form, and remarkable for the elegant distribution of its colours, which are changeable in various directions of light: a broad dentated stripe, extending along each side, from the head nearly to the tail, of a silvery and fulvous colour:

D. 9/13; A. 2/13; C. 13; P. 12; V. 1/5." DON.

Received by Donovan from the coast of Cornwall, in the year 1802. The only recorded instance in which it has hitherto occurred in the British seas. Inhabits the Mediterranean along with two other closely allied species.

(3. *CRENILABRUS*, Cuv.)

75. *L. Tinca*, Linn. (*Ancient Wrasse*.)—Dorsal line falling gradually to the snout: depth very nearly one-third of the length: denticulations of the preopercle moderate.

L. Tinca, Linn. Syst. Nat. tom. I. p. 477. *Turt. Brit. Faun.* p. 98. *Crenilabrus Tinca*, *Flem. Brit. An.* p. 208. *Turdus vulgatissimus*, Will. *Hist. Pisc.* p. 319. Ray, *Syn. Pisc.* p. 136. *Ancient Wrasse*, *Penn. Brit. Zool.* vol. III. p. 244. pl. 47. *Id.* (Edit. 1812.) vol. III. p. 332. pl. 58. *Gilt-Head*, *Yarr. Brit. Fish.* vol. I. p. 293.

* Linn. Trans. vol. XIV. p. 80.

† Voyage to China, vol. II. p. 122.

LENGTH. From eight to ten inches.

DESCRIPT. (*Form.*) General form resembling that of the species in the first section of the first sub-genus: greatest depth contained a very little more than three times in the entire length: thickness twice and a half in the depth: dorsal line falling very regularly, continuous with the profile; no depression at the nape: head contained three times and a half in the whole length: jaws equal; teeth prominent, of moderate size, the middle anterior ones longest, about thirteen above and fifteen below, with a secondary but imperfect row of smaller ones behind in the upper jaw: eyes moderate, rather high up; their distance from the end of the snout equalling twice their diameter; the space between them a little concave, equal to the same: ascending margin of the preopercle sharply denticulated, but the denticulations not so much developed as in the next species; nearly vertical, and making a right angle with the basal margin: opercle large; the margin entire, rounded below, emarginated above: lateral line following the curvature of the back at one-fourth of the depth, bending suddenly downwards opposite the termination of the dorsal fin: scales very large; number in the lateral line thirty-six: dorsal commencing in a line with the pectorals, and posterior angle of the opercle; soft portion rounded, higher than the spinous: anal commencing a little anterior to the soft portion of the dorsal, but terminating in a line with that fin: caudal rounded, scaly at the base, but with no rows of scales between the rays: pectorals and ventrals much as in the other species of this genus:

B. 5; D. 16/9; A. 3/10; C. 13, and 2 short; P. 14; V. 1/5.

(*Colours.*) Back, and upper part of the sides above the lateral line, marked with alternate longitudinal lines of dull red and dusky blue; sides beneath the lateral line bluish green, spotted with dull red; abdomen the same, but paler: upper part of the head deep brownish red, with undulating lines of bright azure-blue; cheeks and gill-covers bluish green with longitudinal lines of red; throat and beneath the pectorals paler, lined with red: irides bluish green, with an inner circle of red: dorsal, caudal, anal and ventral fins, bluish green, spotted and lined with red: pectorals pale without spots.

Found on many parts of the coast, and perhaps the most common of all the British species belonging to this family. Chiefly frequents deep water where the bottom is rocky, and is often taken in the prawn-pots. Feeds principally on crustacea. Spawns in April. It is the *Common Wrasse* of Couch*, and the *Old Wife* of some English authors. Pennant calls it *Ancient Wrasse*, but it must not be confounded with the *Ancient Wrasse* of Donovan, which is clearly the *L. maculatus* of this work.

76. *L. Cornubicus*, Gmel. (*Goldsinny*).—Depth considerably less than one-third of the length: denticulations of the preopercle very much developed: a conspicuous black spot on each side of the tail.

L. Cornubicus, Gmel. *Linn.* tom. i. part iii. p. 1297. *Don. Brit. Fish.* vol. iii. pl. 72. *Turt. Brit. Faun.* p. 99. *Goldsinny, Ray, Syn. Pisc.* p. 163. fig. 3. *Penn. Brit. Zool.* vol. iii. p. 251. pl. 47.

* *Linn. Trans.* vol. xiv. p. 80.

Id. (Edit. 1812) vol. III. p. 339. pl. 58. Corkwing, *Couch in Loud. Mag. of Nat. Hist.* vol. v. p. 17. f. 4. Goldfinny, *Yarr. Brit. Fish.* vol. I. p. 296.

LENGTH. From four to four inches and a half.

DESCRIPT. (*Form.*) Very similar to the last species, but much smaller, and slightly more elongated: depth contained nearly three times and a half in the entire length: thickness twice and a half in the depth: head one-fourth of the whole length: jaws and teeth similar, but the latter not so numerous in the upper jaw, only eight or ten, with no secondary row behind; those below in about the same number: denticulations of the preopercle longer and more conspicuous: all the other characters, including lateral line, form and relative position of the fins, number of fin-rays, &c. exactly the same in the two species.

B. 5; D. 16/9; A. 3/10; C. 13, and 2 short; P. 14; V. 1/5.

(*Colours.*) Somewhat similar to those of the last species, but in general much paler: a conspicuous dusky spot on each side of the tail, near the commencement of the caudal, and immediately below the lateral line: dorsal fin variegated with fuscous bands.

First observed by Mr. Jago on the coast of Cornwall, and communicated by him to Ray. Obtained since from the same locality by Donovan and Mr. Couch. Has been also found in Devonshire by Montagu. The specimens which furnished the above description were procured at Weymouth. *Obs.* This species is erroneously considered by Fleming as a mere variety of the last.

77. *L. gibbus*, Gmel. (*Gibbous Wrasse.*)—Depth considerably more than one-third of the length; dorsal line falling suddenly to the snout.

L. gibbus, *Gmel. Linn. tom. I. part III. p. 1295. Turt. Brit. Faun.* p. 98. *Crenilabrus gibbus*, *Flem. Brit. An.* p. 209. *Gibbous Wrasse*, *Penn. Brit. Zool.* vol. III. p. 250. pl. 46. *Id.* (Edit. 1812.) vol. III. p. 338. pl. 56. *Yarr. Brit. Fish.* vol. I. p. 298.

LENGTH. Eight inches. PENN.

DESCRIPT. (*Form.*) "Very deep and elevated, the back vastly arched, and very sharp or ridged: greatest depth three-eighths of the length: from the beginning of the head to the nose a steep declivity: teeth like those of the others: eyes of a middling size: the nearest cover of the gills finely serrated:

D. 16/9; A. 3/11; P. 13; V. 1/5:

caudal large, rounded at the end; the rays branched; the ends of the rays extending beyond the webs: lateral line incurvated towards the tail: gill-covers and body covered with large scales. (*Colours.*) Gill-covers most elegantly spotted, and striped with blue and orange, and the sides spotted in the same manner; but nearest the back the orange disposed in stripes: dorsal and anal sea-green, spotted with black; ventrals and tail a fine pea-green; pectorals yellow, marked at their base with transverse stripes of red." PENN.

This species appears to be known only from the description of Pennant, who obtained a specimen taken off Anglesea. Its great depth

clearly distinguishes it from the *L. Cornubicus*, of which Mr. Couch seems inclined to think it a mere variety*.

78. *L. luscus*, Linn. ? (*Scale-rayed Wrasse*).—Very much elongated: between the rays of the dorsal, anal, and caudal fins, processes of imbricated scales.

L. luscus, Couch in Loud. *Mag. of Nat. Hist.* vol. v. p. 18, & p. 742. fig. 121. Scale-rayed Wrasse, Yarr. *Brit. Fish.* vol. i. p. 300.

DESCRIPT. "Length twenty-two inches; greatest depth, exclusive of the fins, two inches and a quarter: body plump and rounded: head elongated; lips membranous; teeth numerous, in several rows, those in front larger and more prominent, rather incurved: eyes moderately large: anterior gill-plate serrate; six gill-rays: body and gill-covers with large scales: lateral line nearer the back, descending with a sweep opposite the termination of the dorsal fin, thence backward straight: dorsal with twenty-one firm, and eight soft, rays: the fin connected with the latter expanded, reaching to the base of the tail: pectorals round, with fourteen rays: ventrals with six rays, the outermost simple, stout, firm, tipped; between these fins a large scale: anal with six firm, and eight soft, rays, the latter a soft portion expanded: caudal round, with fifteen rays: between each ray of the dorsal, anal, and caudal fins, a process formed of firm elongated imbricated scales.

D. 21/8; A. 6/8; C. 15; P. 14; V. 1/5.

Colour a uniform light brown, lighter on the belly; upper eye-lid black; at the edge of the base of the caudal fin a dark brown spot: pectorals yellow; all the other fins bordered with yellow." Couch.

A single individual of this species is recorded by Mr. Couch to have been taken off Cornwall, in February 1830, at the conclusion of a very cold season. It appears to be particularly characterized by having rows of scales between the rays of the dorsal and anal fins, as well as the caudal; this last fin exhibiting the above character in many other species of the present family. Its identity, however, with the *L. Luscus* of Linnæus appears very questionable. Cuvier thinks† that the Linnæan *L. Luscus* is only a variety of *L. Turdus* of Gmelin.

GEN. 34. CENTRISCUS, Linn.

79. *C. Scolopax*, Linn. (*Trumpet-Fish*.)

C. Scolopax, Linn. *Syst. Nat.* tom. i. p. 415. *Bloch, Ichth.* pl. 123. f. 1. *Don, Brit. Fish.* vol. III. pl. 63. *Turt. Brit. Faun.* p. 117. *Shaw, Nat. Misc.* vol. XIV. pl. 584. *Flem. Brit. An.* p. 220. *Cuv. Reg. An.* tom. II. p. 263. *Trumpet-Fish, Will. Hist. Pisc.* p. 160. c. xi. tab. I. 25. f. 2. *Couch in Linn. Trans.* vol. XIV. p. 89. *Yarr. Brit. Fish.* vol. I. p. 302. *Snipe-nosed Trumpet-Fish, Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 190.

* *Mag. of Nat. Hist.* vol. v. p. 18.

† *Reg. An.* tom. II. p. 256. note (2).

LENGTH. From four to five inches.

DESCRIPT. (*Form.*) "Body oval, compressed: snout elongated, the jaw-bones forming a tube extending an inch and a half before the eyes; mouth placed at the extremity, small, without teeth: eyes large: back elevated, forming a slight ridge, and ending in a short spine just in advance of the long and strong denticulated spine of the first dorsal fin: scales on the body hard, rough, minutely ciliated at the free edge, the surface granulated: first dorsal with but three spinous rays (generally said to be four); the first three times as long as, and also much stronger than, the others, pointed, moveable, and toothed like a saw on the under part, constituting a formidable weapon of defence; the other spines short, but their points projecting beyond the membrane by which they are united: the rays of the second dorsal soft: anal elongated; the rays short: pectorals small: ventrals also small, with a depression behind in which they can be lodged.

D. 4—12; A. 18; C. 16; P. 17; V. 4.

(*Colours.*) Back red, the sides rather lighter; sides of the head and belly silvery, tinged with gold-colour: irides silvery, streaked with red; pupils black: all the fins grayish white." -YARR.

An individual of this species is recorded to have been thrown on shore at Menabilly near Fowey, Cornwall, early in the year 1804*. Donovan appears to have been acquainted with one or two other instances in which it had occurred on the western coasts of England. Common in the Mediterranean.

ORDER II. MALACOPTERYGII.

(I. ABDOMINALES.)

GEN. 35. CYPRINUS, *Linn.*

(* 1. CYPRINUS, *Cuv.*)

* *With barbules.*

* 80. *C. Carpio*, *Linn.* (*Common Carp.*)—Mouth with two barbules on each side: caudal forked.

C. Carpio, *Linn. Syst. Nat.* tom. i. p. 525. *Blach, Ichth.* pl. 16. *Turt. Brit. Faun.* p. 107. *Don. Brit. Fish.* vol. v. pl. 110. *Flem. Brit. An.* p. 185. *Carp, Will. Hist. Pisc.* p. 245. tab. Q. 1. f. 2. *Penn. Brit. Zool.* vol. III. p. 353. pl. 70. *Id.* (Edit. 1812.) vol. III. p. 467. pl. 81. *Bowd. Brit. fr. wat. Fish. Draw.* no. 2. *Yarr. Brit. Fish.* vol. i. p. 305. *La Carpe vulgaire, Cuv. Reg. An.* tom. II. p. 271.

* *Linn. Trans.* vol. VIII. p. 358.

LENGTH. From one to one and a half, or even two, feet.

DESCRIPT. (*Form.*) Oval; body thick anteriorly; back moderately elevated; dorsal line more convex than the ventral, falling with the profile in one continuous curve, without any depression at the nape: greatest depth beneath the commencement of the dorsal fin, measuring rather more than one-third of the entire length: greatest thickness in the region of the gills, equalling half the depth: head large: jaws equal; lips thick, furnished with two barbules at the corners of the mouth, and two shorter ones above nearer the nose: mouth small: no teeth in the jaws; pharyngeans with flat teeth striated on the crown: eyes small, and rather high on the cheeks: opercle marked with radiating striæ: lateral line nearly straight; its course a very little below the middle: scales large; number, in the lateral line, thirty-eight; in the depth twelve, six and a half being above, and five and a half below, the lateral line*: dorsal commencing in a line with the end of the pectorals, and occupying a space equal to nearly one-third of the entire length; first two rays bony, and partaking of the nature of spines; the first not half the length of the second; this last very strong and serrated posteriorly; third (or first of the soft rays) longest, equalling rather more than one-third of the depth; succeeding ones gradually decreasing to the seventh or eighth, beyond which they remain even to the end; all the soft rays branched; the last two from one root†: anal short, opposite the last quarter of the dorsal, and terminating in a line with that fin; first two rays bony; the second strongly serrated; third ray longest, nearly equalling the third in the dorsal; fourth and succeeding ones decreasing; all the soft rays branched; the last two from one root: caudal forked for half its length; all the principal rays except the outer ones branched: pectorals attached low down, in a line with the posterior margin of the opercle; their length about three-fourths that of the head: all the rays soft, and, except the first, branched: ventrals similar to the pectorals but rather shorter, situate in a line with the first three soft rays of the dorsal:

B. 3; D. 2/22; A. 2/6; C. 19, and some short; P. 17; V. 9.

(*Colours.*) General colour olive-brown, tinged with gold; darkest on the head; belly yellowish white: fins, dorsal and caudal, dusky; ventrals and anal tinged with red.

Originally from the middle of Europe. Said to have been introduced into England about the year 1514, but was certainly known before that time. Common in lakes and ponds, as well as in some rivers. Attains to the weight of nearly twenty pounds, but arrives at a still larger size on some parts of the Continent. Spawns in May and June, and is very prolific. Food, insects, worms, and aquatic plants.

** *Without barbules.*

* 81. *C. Gibelio*, Gmel. (*Gibel.*)—Depth one-third of the entire length: lateral line bending slightly downwards: caudal crescent-shaped.

C. Gibelio, Gmel. *Linn.* tom. i. part iii. p. 1417. *Bloch, Ichth.* pl. 12. *Flem. Brit. An.* p. 185. *Carassius*, *Will. Hist. Pisc.* p. 249. *Crucian*,

* The number of scales in the lateral line, and the number of rows of scales in the depth, are characters of some importance in distinguishing the different species of *Cyprinidae*. They are here adopted from Jurine, and I shall state, nearly in the words of that author, the exact method in which they are computed. In estimating the number of scales in the lateral line, the reckoning is confined to those scales which are marked with the tube-like projection, the small irregular scales at the insertion of the caudal being neglected. The number of rows in the depth is taken at the deepest part of the body, or in a line from the first rays of the dorsal fin to the base of the ventral. Such a line, however, being interrupted near the middle by the lateral line, it is divided into two parts, the dorsal portion containing the number of scales *above* the lateral line, the ventral portion the number *below* it. Moreover, one of the scales themselves being always divided by the lateral line, and this line serving as the boundary of the two portions, it follows that half a scale is given each way to be added to the number of entire scales that appear in these portions respectively. It may be further stated that the curved tile-like scale, which appears on the ridge of the back in most of the fish belonging to this family, being common to both sides, is not taken into the account; neither are the small incomplete irregular scales which may be often observed at the base of the rays of the dorsal fin. In like manner, the numerous small scales which appear at the bottom of the abdomen, and which could not be counted with precision, are omitted; the reckoning at this point commencing with the first entire scale above the long scale which is placed at the base of the ventral fin. See Jurine's memoir on the Fish of the Lake of Geneva, contained in the *Mém. de la Soc. de Phys. et d'Hist. Nat. de Genève*, tom. III. part i. pp. 143, 144.

† In all the *Cyprinidae*, the last two rays in the dorsal and anal fins will be found to spring from one root. In computing the fin-ray formula they may be reckoned either as one or two. I have considered them as two.

Penn. Brit. Zool. vol. III. p. 364. pl. 72. no. 171. *Bowd. Brit. fr. wat. Fish.* Draw. no. 23. *Yarr. Brit. Fish.* vol. I. p. 311. *Gibele, Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 480. pl. 83. *La Gibèle, Cuv. Reg. An.* tom. II. p. 271.

LENGTH. From ten to twelve inches, or more.

DESCRIPT. (*Form.*) Back moderately elevated, the dorsal line more convex than the ventral: greatest depth one-third of the entire length: head about one-fifth: profile falling very regularly, and forming one continuous curve with the line of the back: snout short, and rather obtuse; jaws nearly equal, the lower one a little the longest when the mouth is open; gape rather small: eyes small: opercle marked with radiating striæ: lateral line descending in a gentle curve a little below the middle: scales large; number in the lateral line thirty-four; in the depth twelve, six and a half above, and five and a half below, the lateral line: dorsal much as in the last species; the first two rays bony; the first very short; the second strong and serrated, but the serratures very fine compared with those of the same ray in the *Carp*: anal short, also with the first two rays bony; the first extremely short; this fin terminating a little beyond the termination of the dorsal: caudal forked; the depth of the fork about one-third of its length: pectorals and ventrals much as in the *Carp*; the latter nearly in a line with the second bony ray of the dorsal.

D. 2/18; A. 2/7; C. 19, and some short; P. 14; V. 9.

Number of vertebræ (according to Mr. Yarrell) thirty. (*Colours.*) Back, and sides above the lateral line, olive-brown; lower part of the sides yellow, becoming paler on the belly; the whole tinged with a bright golden lustre: irides golden: cheeks and gill-covers bright golden yellow: dorsal fin olivaceous; caudal the same, tinged with orange-yellow; anal, pectorals, and ventrals, bright orange-red.

Supposed to be a naturalized species in this country, but not exactly known when it was introduced. Found in some of the ponds about London, as well as in other parts of England. Usual weight about half a pound: has been known, however, to weigh upwards of two pounds. Said to spawn in April or May. Food, aquatic plants and worms. Is very tenacious of life.

(15.) *C. Carassius*, Linn. *Syst. Nat.* tom. I. p. 526. *Bloch, Ichth.* pl. 11. *Turt. Brit. Faun.* p. 108. *Le Carreau ou Carrassin*, *Cuv. Reg. An.* tom. II. p. 271.

Mr. Yarrell has reason to believe that he has more than once received this species from the Thames. Its claims, however, to a place in the British Fauna are not fully established. By Turton, it was probably confounded with the *C. Gibelio*, from which it may be distinguished by the greater depth of the body, straight lateral line, and nearly even caudal. It has also more rays in the dorsal and anal fins.

* 82. *C. auratus*, Linn. (*Golden Carp*.)—Caudal deeply forked; sometimes three or four lobed.

C. auratus, Linn. *Syst. Nat.* tom. I. p. 527. *Bloch, Ichth.* pls. 93, & 94. *Turt. Brit. Faun.* p. 108. *Flem. Brit. An.* p. 185. *Gold-Fish, Penn. Brit. Zool.* vol. III. p. 374. *Id.* (Edit. 1812.) vol. III. p. 490. *Gold Carp, Yarr. Brit. Fish.* vol. I. p. 315. *La Dorade de la Chine, Cuv. Reg. An.* tom. II. p. 272.

LENGTH. Seldom exceeds eight or ten inches.

DESCRIPT. (*Form.*) General form resembling that of the *Carp*: head short; jaws equal; eyes large; nostrils tubular, placed near the eyes: body covered with large scales: lateral line straight, near the back: fins extremely variable in form and size, as well as in the number of the rays: dorsal often very small; sometimes entirely wanting, or represented by a simple elevation on the ridge of the back: anal often double: caudal large, sometimes enormously developed; deeply forked, or divided into three or more lobes. (*Colours.*) Black during the first year; afterwards mottled with silver; this last colour continually spreading till it occupies

the entire fish: after a few years the red tint is assumed, which becomes more brilliant with age: sometimes red from birth, or before acquiring the silvery hue: fins scarlet: irides golden.

A native of China. According to Pennant, first introduced into England about the year 1691, but not generally known till 1728. Is now completely naturalized, and breeds freely in ponds in many parts of the country. Spawns in May.

(2. BARBUS, *Cuv.*)

83. *C. Barbus*, Linn. (*Barbel.*)

C. Barbus, *Linn. Syst. Nat.* tom. i. p. 525. *Bloch, Ichth.* pl. 18. *Don. Brit. Fish.* vol. ii. pl. 29. *Turt. Brit. Faun.* p. 107. *Barbus vulgaris*, *Flem. Brit. An.* p. 185. *Barbel, Will. Hist. Pisc.* p. 259. tab. Q. 2. f. 1. *Penn. Brit. Zool.* vol. iii. p. 357. pl. 71. *Id.* (Edit. 1812.) vol. iii. p. 472. pl. 82. *Bowd. Brit. fr. wat. Fish. Draw.* no. 9. *Yarr. Brit. Fish.* vol. i. p. 321. *Barbeau commun, Cuv. Reg. An.* tom. ii. p. 272.

LENGTH. From two to three feet.

DESCRIPT. (*Form.*) Rather elongated; the back but little elevated; dorsal line continuous with the profile, and falling in one gradual slope to quite the end of the snout: greatest depth beneath the commencement of the dorsal, equalling between one-fifth and one-sixth of the entire length: head one-fifth of the same; of a somewhat oblong form: snout rather pointed, and advancing considerably beyond the lower jaw: upper lip fleshy, furnished with four barbules; two at the corners of the mouth, and two shorter ones in front of the nose: eyes small; nostrils placed near them: lateral line nearly straight; its course along the middle: head smooth; scales on the body rather small, firmly attached to the skin, finely striated, with their free edges slightly scolloped: dorsal short, commencing at about the middle point between the end of the snout and the base of the caudal; first ray very short, second half the length of the third; this last strong and bony, with sharp serratures at the edges; succeeding rays all soft and branched, and gradually decreasing to the last, which is only half the length of the third: anal also short, commencing in a line with the tip of the dorsal when laid back; third ray longest; all the rays soft, and, except the first two, branched: caudal forked for more than half its length: pectorals shorter than the head: ventrals attached beneath the middle of the dorsal, a little shorter than the pectorals; in the axilla of each a long narrow pointed scale:

B. 3; D. 3/9; A. 8; C. 20; P. 16; V. 9.

(*Colours.*) Back and sides olivaceous brown, with more or less of a golden-yellow lustre; belly white: irides golden-yellow: dorsal brown, tinged with red; anal and ventrals reddish yellow; caudal deep purplish red; pectorals pale brown.

Common in rapid streams and rivers, especially those with a hard gravelly bottom. Lives in society. Conceals itself during the day in hollows and amongst large stones: roves about at night in quest of food. At the approach of Winter retires down the river to deep water. Food aquatic mollusca, worms, and small fish. Spawns in May and June; but, according to Bloch, is not capable of breeding till towards the fourth or fifth year. Grows quickly, and attains a large size: has been known to weigh as much as eighteen pounds.

(3. GOBIO, Cuv.)

84. *C. Gobio*, Linn. (*Gudgeon*.)

C. Gobio, *Linn. Syst. Nat.* tom. i. p. 526. *Bloch, Ichth.* pl. 8. f. 2. *Don. Brit. Fish.* vol. iii. pl. 71. *Turt. Brit. Faun.* p. 107. *Gobio fluviatilis*, *Flem. Brit. An.* p. 186. *Gudgeon*, *Will. Hist. Pisc.* p. 264. tab. Q. 8. f. 4. *Penn. Brit. Zool.* vol. iii. p. 361. *Id.* (Edit. 1812.) vol. iii. p. 476. *Bowd. Brit. fr. wat. Fish.* Draw. no. 15. *Yarr. Brit. Fish.* vol. i. p. 325.

LENGTH. From six to eight inches.

DESCRIPT. (*Form.*) Of an elongated form, resembling that of the *Barbel*: greatest depth beneath the commencement of the dorsal, equaling one-fifth of the entire length; thickness half the depth: head large, approaching to conical, a little depressed, with a transverse groove across the nose, beyond which, at the extremity of the snout, is a small elevation; its length about equal to the depth of the body: mouth wide: upper jaw very protractile, projecting beyond the lower when the mouth is closed, and furnished with a short barbule at each angle: nostrils a little in advance of the eyes: these last moderately large: head smooth and naked: scales on the body large, thin, firmly attached to the cuticle, semicircular, the free portion radiated, and crenated at the margin: lateral line at first very slightly descending, but afterwards straight, along the middle of the side: number of scales in the lateral line forty; in the depth nine; five and a half above, and three and a half below, the lateral line: dorsal commencing exactly in the middle of the whole length, caudal excluded; its length half, and its greatest height three-fourths, of the depth of the body; first and second rays simple, the others branched; second and third longest: anal similar to the dorsal, but smaller; commencing nearly in a line with the extremity of that fin when laid back: caudal forked for about half its length: pectorals about three-fourths the length of the head; second and third rays longest; all the rays except the first branched: ventrals in a line with the third dorsal ray, a little shorter than the pectorals, but of a similar form; rays similar: vent about midway between the ventrals and the anal:

B. 3; D. 10; A. 9; C. 19, and some short ones; P. 16; V. 8.

(*Colours.*) Back, and upper part of the sides, olivaceous brown, spotted with black; gill-covers greenish white; lower part of the sides silvery; belly white: dorsal and caudal spotted; the other fins plain.

Common in rivers and gentle streams, preferring those with a sandy or gravelly bottom. Frequents shallows during the warm months, but retires to deep water at the approach of Winter. Generally keep in shoals. Pennant mentions one taken near Uxbridge which weighed half a pound: usually much smaller. Food, worms, mollusca, and aquatic plants. Spawns in April or May.

(4. TINCA, Cuv.)

85. *C. Tinca*, Linn. (*Tench*.)

C. Tinca, *Linn. Syst. Nat.* tom. i. p. 526. *Bloch, Ichth.* pl. 14. *Turt. Brit. Faun.* p. 108. *Don. Brit. Fish.* vol. v. pl. 113. *Tinca vulgaris*, *Flem. Brit. An.* p. 186. *Tench*, *Will. Hist. Pisc.* p. 251. c. vi. tab. Q. 5. f. 1. *Penn. Brit. Zool.* vol. iii. p. 359. *Id.* (Edit.

1812.) vol. III. p. 474. *Bowd. Brit. fr. wat. Fish.* Draw. no. 13. *Yarr. Brit. Fish.* vol. I. p. 328. *Tanche vulgaire, Cuv. Reg. An.* tom. II. p. 273.

LENGTH. From twelve to eighteen inches; sometimes more.

DESCRIPT. (*Form.*) Thick and bulky in proportion to its length: back moderately elevated: dorsal line continuous with the profile, falling in one regular curve to the end of the snout: greatest depth a little before the dorsal, contained about three times and a half in the entire length: thickness exceeding half the depth: head about one-fourth of the whole length, excluding caudal: snout rather broad and rounded when viewed from above: eyes small and somewhat sunk in the head, directed downwards: jaws equal: a minute barbule at each corner of the mouth: lateral line descending in a gentle curve from the upper part of the opercle to the middle of the body, then passing off straight to the base of the caudal: scales very small, invested with a slimy mucus: dorsal commencing a little beyond the middle; its greatest height rather more than half the depth of the body; its length a little less than its height; first ray scarcely more than half the length of the second; this last and the next three nearly equal; the succeeding ones slightly decreasing; all except the first two branched: anal similar to the dorsal, but smaller; commencing beyond the termination of that fin: caudal broad, rather thick and fleshy, the end nearly even: pectorals large and rounded, about two-thirds the length of the head; the fifth, sixth, and seventh rays longest: ventrals exactly half-way between the pectorals and the anal; in shape and length similar to the former:

B. 3; D. 11; A. 10; C. 19, &c.; P. 18; V. 10.

(*Colours.*) Head, back, and sides, deep olive-green, tinged with golden-yellow; abdomen sordid yellow: irides orange-red: all the fins deep purplish brown, inclining to dusky.

Inhabits lakes, ponds, and other still waters. Keeps near the bottom, and remains in a tranquil state buried in the mud during the winter months. Usually from four to six pounds in weight, but has been known to exceed eleven. Spawns in June. Very tenacious of life.

(5. ABRAMIS, *Cuv.*)

36. *C. Brama*, Linn. (*Yellow Bream.*)—Depth one-third of the whole length: number of scales in the lateral line fifty-seven: anal with twenty-eight or twenty-nine rays.

C. Brama, *Linn. Syst. Nat.* tom. I. p. 531. *Bloch, Ichth.* pl. 13. *Don. Brit. Fish.* vol. IV. pl. 93. *Turt. Brit. Faun.* p. 108. *Abramis Brama*, *Flem. Brit. An.* p. 187. *Bream, Will. Hist. Pisc.* p. 248. tab. Q. 10. f. 4. *Penn. Brit. Zool.* vol. III. p. 362. pl. 70. no. 169. *Id.* (Edit. 1812.) vol. III. p. 478. pl. 81. *Bowd. Brit. fr. wat. Fish.* Draw. no. 18. *Yarr. Brit. Fish.* vol. I. p. 335. *Brème commune, Cuv. Reg. An.* tom. II. p. 274.

LENGTH. From one to two feet, or upwards.

DESCRIPT. (*Form.*) Body very deep in proportion to its length; the depth increasing suddenly at the shoulder; greatest above the ventrals, where it equals one-third of the entire length: sides much compressed; the greatest thickness contained three times and one-third in the depth: back sharp: dorsal line forming a salient angle at the commencement

of the dorsal fin, thence falling very obliquely to the nape, from which point the profile falls less obliquely, causing a depression at the nape: ventral line less convex than the dorsal: head small, about one-fifth of the entire length: mouth remarkably small in proportion: jaws nearly equal: distance from the eye to the end of the snout rather greater than the diameter of the eye; distance between the eyes nearly equal to twice their diameter: scales smaller than in the next species, of a broad oblong form, the basal portion with the margin somewhat sinuous, without radii, the free portion with ten or twelve diverging radii: lateral line sloping downwards from the upper part of the opercle, and curved throughout; midway, its course is at two-thirds of the entire depth: number of scales in the lateral line about fifty-seven; in the depth eighteen, twelve and a half being above, and five and a half below, the lateral line: the whole of the dorsal behind the middle, as well as behind the ventrals; first ray only half the length of the second; both these simple; the rest branched; last two from one root: anal twice the length of the dorsal; first ray very small and easily overlooked; second half the length of the third; third and fourth longest; the succeeding ones decreasing to the twelfth, beyond which they remain even: caudal crescent-shaped; the lower lobe longer than the upper: pectorals reaching to the ventrals: these last extending to the vent:

B. 3; D. 12 or 13; A. 23 or 29; C. 19, &c.; P. 17; V. 9.

(Colours.) Back dusky, passing into bluish green; sides yellowish white, with a slight golden lustre; belly almost plain white: irides yellowish white: all the fins dusky, the pectorals alone faintly tinged with red.

Found in large lakes and slow rivers; generally in shoals. Keeps near the bottom. Food, worms and aquatic vegetables. Attains to a large size: weight sometimes exceeding twelve pounds. Spawns in May.

87. *C. Blicca*, Bl. ? (*White Bream*.)—Depth three times and a half in the entire length: number of scales in the lateral line not exceeding fifty-one: anal with from twenty-two to twenty-four rays.

C. Blicca, *Bloch, Ichth.* pl. 10. ? *C. latus*, *Gmel. Linn.* tom. i. part iii. p. 1438. ? *Jen. Cat. of Brit. Vert. An.* 26. sp. 86. *La Bordelière, Cuv. Reg. An.* tom. 11. p. 274. ? *White Bream*, or *Bream-Flat*, *Yarr. Brit. Fish.* vol. i. p. 340.

LENGTH. Rarely exceeding ten or twelve inches.

DESCRIPT. (*Form.*) Not so deep as the last species; the back much less elevated: depth, at the commencement of the dorsal, contained three times and a half in the entire length: greatest thickness very little more than three times in the depth: dorsal line falling less obliquely, and continued in one regular slope to the end of the snout, without any depression at the nape: eyes relatively larger; the distance from them to the end of the snout not nearly equal to their diameter; the distance between them not equal to one and a half times their diameter: scales larger; the number in the lateral line about fifty or fifty-one, scarcely exceeding this last number: number in the depth fifteen; nine and a half being above, and five and a half below, the lateral line: anal shorter, with five or six fewer rays; dorsal and pectorals also with one or two rays less in number: in all other respects similar to the last.

D. 10 or 11; A. 22 to 24; C. 19, &c.; P. 15; V. 9.

(Colours.) Back dusky, tinged with bluish green; sides of a silvery bluish white, with scarcely any of the golden yellow lustre observable in the last species: irides silvery: all the fins dusky, but sometimes very pale; pectorals and ventrals occasionally tinged with reddish.

This species, very distinct from the last, though closely resembling it, agrees in all respects with the *C. Blicca* of Bloch, excepting that I never saw the pectorals and ventrals of so deep a red as represented by that author. It is without doubt the same as the *White Bream* alluded to by Sheppard in the *Linnean Transactions**. It is of very common occurrence in the Cam, and is found in some parts of that river in which the *C. Brama* is not met with. It is known to the fishermen about Ely by the name of *Bream Flat*. It never attains to the size of the last species, rarely exceeding a pound in weight.

(6. LEUCISCUS, Klein.)

* *Dorsal immediately above the ventrals.*

88. *C. Rutilus*, Linn. (*Roach*.)—Body deep: jaws equal: dorsal with twelve rays: irides, and all the fins, red.

C. Rutilus, Linn. *Syst. Nat.* tom. i. p. 529. Bloch, *Ichth.* pl. 2. Don. *Brit. Fish.* vol. III. pl. 67. Turt. *Brit. Faun.* p. 108. Leuciscus *Rutilus*, Flem. *Brit. An.* p. 188. Roach, Will. *Hist. Pisc.* p. 262. tab. Q. 10. f. 5. Penn. *Brit. Zool.* vol. 111. p. 365. *Id.* (Edit. 1812.) vol. III. p. 482. Bowd. *Brit. fr. wat. Fish.* Draw. no. 3. Yarr. *Brit. Fish.* vol. i. p. 348. La Rosse, *Cuv. Reg. An.* tom. II. p. 275.

LENGTH. From twelve to fifteen inches.

DESCRIPT. (*Form.*) Oval; the back much elevated, and sharply ridged: greatest depth at the commencement of the dorsal fin, about one-third of the length, excluding caudal: greatest thickness not twice and a half in the depth: dorsal line very convex, falling gradually to the nape, whence the profile falls less obliquely and in nearly a straight line, causing a slight depression at the part just mentioned: head contained about four times and three-quarters in the whole length, caudal excluded: mouth small: jaws equal: eyes moderate; the distance between equal to twice and a half their diameter: lateral line commencing at the upper part of the opercle, and taking a descending course below the middle, but not quite so low as two-thirds of the depth: head and gill-covers smooth and naked: scales on the body broad, marked with numerous very fine circular concentric striæ, and with a few deeper and more distinct lines radiating anteriorly and posteriorly; number in the lateral line forty-three; above it seven and a half; beneath three and a half: dorsal commencing a very little behind the middle point between the end of the snout and the base of the caudal; its greatest height equalling half the depth; its length nearly the same; first ray only one-third the length of the second, which is longest; third and succeeding rays gradually decreasing; all except the first two branched; the last two from one root: anal commencing a little beyond the termination of the dorsal; of a similar form; second ray longest; all the rays except the first branched; last two from one root: caudal deeply forked: pectorals rather more than three-fourths of the length of the head; first ray

* Vol. XIV. p. 587.

longest; all the rays except the first branched: ventrals in a line with the commencement of the dorsal, about equal to the pectorals, rounded; first ray simple; the others branched; in their axilla a triangular pointed scale:

B. 3; D. 12; A. 13; C. 19, and 4 or 6 short ones; P. 16; V. 9.

(*Colours.*) Upper part of the head and back dusky green, with blue reflections; sides and belly silvery: cheeks and gill-covers silvery white: dorsal and caudal dusky, tinged with red; anal, pectorals, and ventrals, bright red: irides reddish yellow.

Common in lakes and still deep rivers throughout the country. Keeps in large shoals. Usual weight from a pound to a pound and a half: sometimes, however, exceeding two, or even three, pounds. Spawns in May or June, at which season the scales are rough to the touch: is very prolific. Food, worms and aquatic vegetables.

89. *C. Dobula*, Linn. (*Dobule*.)—Elongated: head broad; snout blunt and rounded: upper jaw longest: anal, pectorals, and ventrals, red.

C. Dobula, Linn. *Syst. Nat.* tom. 1. p. 528. *Bloch, Ichth.* pl. 5. *Yarrell in Linn. Trans.* vol. xvii. p. 9. Le Meunier, *Cuv. Reg. An.* tom. 11. p. 275. *Dobule Roach, Yarr. Brit. Fish.* vol. 1. p. 346.

LENGTH. That of the specimen described below was six inches and a half: gets to a larger size.

DESCRIPT. (*Form.*) "Body slender in proportion to its length: the head, compared with the length of the head and body alone, without the caudal rays, as two to nine: depth of the body equal to the length of the head: diameter of the eye compared with the length of the head as two to seven: nose rather rounded: upper jaw longest: the ascending line of the nape and back more convex than any other portion of the dorsal or abdominal line: the first ray of the dorsal fin arising half-way between the anterior edge of the orbit of the eye, and the edge of the fleshy portion of the tail; the first ray half as long as the second, which is the longest, and is as long again as the last ray of this fin, the length of the last ray being equal to the length of the base of the fin: the pectoral fin rather long and narrow: ventrals arising just in advance of the line of the origin of the first ray of the dorsal fin; the distance from the origin of the ventrals to the origin of the anal fin, and from the origin of the last ray of the anal fin to the end of the fleshy portion of the tail, equal; the first ray of the anal fin nearly as long again as the last: tail considerably forked, the external rays being as long again as those in the centre: scales of the body moderate in size, fifty forming the lateral line, with an oblique row of seven scales above it under the dorsal fin, and four below it; the lateral line itself concave to the dorsal line throughout its whole length.

D. 9; A. 10; C. 19; P. 16; V. 9.

(*Colours.*) Top of the head, nape, and back, dusky blue, becoming brighter on the sides, and passing into silvery white on the belly: dorsal and caudal fins dusky brown; pectoral, ventral, and anal fins, pale orange-red: irides orange: cheeks and opercle silvery white." YARR.

A single individual of this species was obtained by Mr. Yarrell in August 1831, whilst fishing in the Thames below Woolwich. No other

has hitherto occurred in this country. According to Bloch, it prefers clear rivers and large lakes, in which it deposits its spawn in the months of March and April. Food, worms and aquatic mollusca. In general appearance it somewhat resembles the last species, but is much less deep for its length, and darker in colour. Said rarely to exceed half a pound in weight.

90. *C. Leuciscus*, Linn. (*Dace*).—Elongated; depth rather more than one-fifth of the length: upper jaw longest: dorsal with ten rays: anal, pectorals, and ventrals, pale: irides yellowish.

C. Leuciscus, Linn. *Syst. Nat.* tom. 1. p. 528. Bloch, *Ichth.* pl. 97. Don. *Brit. Fish.* vol. iv. pl. 77. Turt. *Brit. Faun.* p. 109. *Leuciscus vulgaris*, Flem. *Brit. An.* p. 187. Dace, Will. *Hist. Pisc.* p. 260. tab. Q. 10. f. 3. Penn. *Brit. Zool.* vol. iii. p. 366. *Id.* (Edit. 1812.) vol. iii. p. 483. Bowd. *Brit. fr. wat. Fish.* Draw. no. 11. Yarr. *Brit. Fish.* vol. 1. p. 353. La Vandoise, *Cuv. Reg. An.* tom. ii. p. 275.

LENGTH. From eight to ten inches; sometimes more.

DESCRIPT. (*Form.*) More elongated than the *Roach*; the back but slightly elevated: greatest depth one-fourth of the entire length, excluding caudal; thickness half the depth: dorsal line continuous with the profile, and deviating but little from a straight line: head small; one-fifth of the entire length, measured quite to the extremity of the longest caudal rays: snout rather acute, viewed laterally, but somewhat rounded when viewed from above; upper jaw projecting beyond the lower: eyes moderate; distant from the end of the snout a little more than the length of their diameter; the distance from one to the other scarcely more than one diameter and a half: lateral line slightly descending; its course, beneath the commencement of the dorsal, at just two-thirds of the depth: scales smaller than in the *Roach*, with the radiating striæ posteriorly finer and more numerous; number in the lateral line fifty-one; above it eight and a half; beneath four and a half: dorsal commencing a little behind the middle point between the extremity of the snout and the base of the caudal; second ray longest, equalling rather more than two-thirds of the depth: anal similar to the dorsal, commencing in a line with the tip of that fin when folded back: caudal deeply forked: pectorals and ventrals as in the *Roach*, the latter a very little in advance of the first ray of the dorsal:

D. 10; A. 11; C. 19, &c.; P. 16; V. 9.

(*Colours.*) Upper part of the head and back dusky, with a bluish cast; this last tint terminating at about one-third of the depth by a tolerably well-defined line: sides beneath, and belly, silvery: dorsal and caudal fins dusky; pectorals, ventrals, and anal, very pale red: irides yellowish.

Common in deep rivers and other clear waters, but not so plentiful as the *Roach*. Is gregarious. According to Bloch, spawns in June, but according to other authors in February and March. Is very prolific, and multiplies fast. Seldom attains to the weight of a pound, though Pennant mentions one which weighed a pound and a half. Is sometimes called a *Dare*.

91. *C. Lancastriensis*, Shaw. (*Graining*).—Elongated; depth one-fifth of the length: back and upper part of the sides pale drab: fins yellowish white.

C. Lancastriensis, Shaw, *Gen. Zool.* vol. v. p. 234. *Leuciscus Lancastriensis*, Yarr. in *Linn. Trans.* vol. xvii. p. 7. pl. 2. f. 1. *Graining*, Penn. *Brit. Zool.* vol. 111. p. 367. *Id.* (Edit. 1812.) vol. III. p. 484. *Yarr. Brit. Fish.* vol. I. p. 355.

LENGTH. From seven to nine inches.

DESCRIPT. (*Form.*) "Length of the head, compared with the whole length of the head, body, and tail, as one to six: depth of the body, compared with the whole length, as one to five: nose more rounded than in the *Dace*; the upper line of the head straighter: eye rather larger: the inferior edge of the preopercle less angular: the dorsal line less convex: dorsal fin commencing exactly half-way between the point of the nose and the end of the fleshy portion of the tail; the first ray short; the second longest: pectorals longer in proportion than in the *Dace*: ventrals placed, on a vertical line, but little in advance of the first ray of the dorsal fin: anal commencing, on a vertical line, under the termination of the dorsal fin-rays when that fin is depressed; the first ray short; the second longest; the last double: the fleshy portion of the tail long and slender; the caudal rays also long and deeply forked: all the fins a little longer than those of the *Dace*: scales of a moderate size, rather larger than those of the *Dace*, the diameter across the line of the tube greater, and the radiating lines less numerous; the number in the series forming the lateral line forty-eight; those in an oblique line up to the base of the dorsal fin eight, and downwards to the origin of the ventral fins four: lateral line descending from the upper edge of the opercle by a gentle curve to the middle of the body, and thence to the centre of the tail in a straight line: number of fin-rays,

D. 9; A. 11; C. 19; P. 17; V. 10.

(*Colours.*) Top of the head, back, and upper part of the sides, of a pale drab-colour, tinged with bluish red, separated from the lighter coloured inferior parts by a well-defined boundary line: irides yellowish white: cheeks and gill-covers shining silvery white, tinged with yellow: all the fins pale yellowish white." YARR.

Originally observed by Pennant in the Mersey near Warrington. Mr. Yarrell has since obtained it from the same locality, and pointed out its claims to rank as a distinct species. According to this last gentleman, it is met with in considerable abundance in several streams connected with the above river; but is not known to exist in ponds. In its habits and food it is said to resemble the Trout. Weight not commonly exceeding half a pound.

** *Dorsal above the space intervening between the ventrals and anal.*

92. *C. Cephalus*, Linn. (*Chub*).—Elongated: body thick; snout broad and rounded; upper jaw longest: dorsal and anal with ten rays: pectorals, ventrals, and anal, pale red.

C. Cephalus, *Linn. Syst. Nat.* tom. i. p. 527. *C. Jeses*, *Don. Brit. Fish.* vol. v. pl. 115. *Leuciscus Cephalus*, *Flem. Brit. An.* p. 187. *Chub* or *Chevin*, *Will. Hist. Pisc.* p. 255. tab. Q. 4. f. 2. *Chub*, *Penn. Brit. Zool.* vol. iii. p. 368. pl. 73. *Id.* (Edit. 1812.) vol. iii. p. 485. pl. 84. *Bowd. Brit. fr. wat. Fish.* Draw. no. 6. *Yarr. Brit. Fish.* vol. i. p. 358.

LENGTH. From sixteen to eighteen inches.

DESCRIPT. (*Form.*) Oblong-oval, elongated, and subcylindrical: greatest depth contained four times and a half in the entire length; thickness two-thirds of the depth: dorsal line continuous with the profile and nearly straight; ventral rather more convex: head one-fifth of the entire length: snout broad and rounded: gape large; upper jaw projecting beyond the lower: eyes rather small; the space between them flat, equalling three times their diameter: nostrils large: lateral line descending, following the curve of the ventral line at about two-thirds of the depth: scales large; the free portion finely striated across, with six or eight diverging radii from the centre; the basal with finer and more numerous diverging radii, the margin lobed; number in the lateral line forty-five; above it seven and a half; beneath three and a half: dorsal commencing about the middle of the back; second ray longest, equalling two-thirds of the depth: anal similar to the dorsal, commencing in a line with the tip of that fin when folded down: caudal forked for nearly half its length: pectorals and ventrals much as in the *Roach*; the latter a very little in advance of the first ray of the dorsal, and having a narrow elongated pointed scale in their axilla:

B. 3; D. 10; A. 10; C. 19, &c.; P. 19; V. 9.

(*Colours.*) Back dusky green; the sides and belly silvery: lateral scales with the free portion dotted with black: cheeks and gill-covers with gold reflections: irides pale yellow, almost white: dorsal and caudal fins dusky; pectorals pale; anal and ventrals tinged with red, with the exception of two or three of the last rays.

Found principally in rivers. Lurks in holes and near the roots of trees. Food, insects, worms, and the young of other fish. Spawns in April and May. Attains to a weight of four or five pounds, sometimes more. *Obs.* The *C. Jeses* of Linnæus and Bloch, and which this last author supposes to be the *Chub* of Pennant, is evidently distinct from this species, and has not hitherto been identified as a native of Britain.

93. *C. Erythrophthalmus*, *Linn. (Rudd, or Red-Eye.)*
—Body deep: lower jaw longest: anal with fourteen rays: sides and abdomen gilded; caudal, ventrals, and anal, bright vermilion.

C. Erythrophthalmus, *Linn. Syst. Nat.* tom. i. p. 530. *Bloch, Ichth.* pl. 1. *Don. Brit. Fish.* vol. ii. pl. 40. *Turt. Brit. Faun.* p. 108. *Leuciscus Erythroph.* *Flem. Brit. An.* p. 188. *Rudd* or *Finscale*, *Will. Hist. Pisc.* p. 252. tab. Q. 3. f. 1. *Rud, Penn. Brit. Zool.* vol. iii. p. 363. pl. 72. *Id.* (Edit. 1812.) vol. iii. p. 479. pl. 83. *Bowd. Brit. fr. wat. Fish.* Draw. no. 21. *Red-Eye*, *Yarr. Brit. Fish.* vol. i. p. 361. *Le Rotengle*, *Cuv. Reg. An.* tom. ii. p. 276.

LENGTH. From twelve to fourteen inches.

DESCRIPT. (*Form.*) General appearance resembling that of the *Roach*, but the body deeper and thicker; the back more arched, and forming a slightly salient angle at the commencement of the dorsal fin; ventral line very convex anteriorly, but behind, along the base of the anal, nearly straight; tail suddenly contracting before the caudal: head small: snout short; lower jaw projecting beyond the upper: lateral line bending downwards; its course, beneath the commencement of the dorsal, at about two-thirds of the depth: scales large; number in the lateral line forty-one; above it seven and a half; beneath three and a half: dorsal fin entirely behind the middle, as well as the ventrals; first ray only half the length of the second; all the rays except the first two branched: anal commencing a little beyond the termination of the dorsal: caudal deeply forked: pectorals about the length of the head: ventrals a little shorter, situate exactly half-way between the pectorals and the vent:

D. 11; A. 14; C. 19, &c.; P. 14; V. 9.

(*Colours.*) Back olivaceous; sides and belly golden-orange, the metallic lustre very brilliant in the living fish, but fading soon after death: irides orange: dorsal and pectorals dusky, tinged with red; ventrals, anal, and caudal, bright vermilion, the two former pale at the base.

Found in rivers and other deep waters, not uncommonly. Recorded by Willughby as inhabiting the lakes of Yorkshire and Lincolnshire, and the river Cherwell in Oxfordshire. Is also met with in the Thames, Stour, and Cam; very abundantly in some parts of the river last mentioned, where it is called a *Shallow*. Feeds on worms, mollusca, and vegetable substances. Spawns in April or May. Weight from one to one and a half, rarely two pounds.

94. *C. cæruleus*, Nob. (*Azurine*).—Depth moderate: lower jaw longest: anal with fourteen rays: sides and abdomen silvery; all the fins plain white.

Leuciscus cæruleus, Yarr. in *Linn. Trans.* vol. xvii. p. 8. pl. 2. f. 2. *Azurine*, *Id. Brit. Fish.* vol. i. p. 365.

DESCRIPT. (*Form.*) General form resembling that of the last species: greatest depth rather more than one-fourth of the entire length; head one-fifth; thickness not half the depth: back arched; the dorsal line descending in one regular curve to the end of the snout, without any depression at the nape; ventral line much less convex: snout blunt; mouth small; lower jaw a little the longest: eyes rather large: nostrils midway between them and the upper lip: opercle marked with radiating lines: lateral line descending; its lowest point at rather more than two-thirds of the depth: scales large, oval, marked anteriorly and posteriorly with a variable number of radiating striæ; number in the lateral line about forty-one; above it seven and a half; beneath three and a half: dorsal entirely behind the middle, commencing half-way between the posterior edge of the orbit of the eye and the base of the caudal fin; its form and rays as in the last species: anal commencing nearly in a line with the last ray of the dorsal; first ray extremely short and easily overlooked; second half the length of the third; third and fourth equal and longest; all except the first three branched: caudal forked for half its length: pectorals and ventrals as in the *Red-Eye*, the latter

altogether in advance of the dorsal, which last is directly over the intervening space between them and the anal :

D. 12; A. 14; C. 20; P. 16; V. 9.

(*Colours.*) Upper part of the head, back, and sides, slate-blue, passing into silvery white beneath, and both shining with metallic lustre: irides white, tinged with pale straw-yellow: all the fins plain white; the dorsal and caudal inclining to dusky.

A new species described by Mr. Yarrell from specimens received along with the Graining from Knowsley in Lancashire. Not much at present known of its habits. Said to be hardy, tenacious of life, and to spawn in May. Weight of the largest individual hitherto obtained about a pound.

95. *C. Alburnus*, Linn. (*Bleak.*)—Elongated: lower jaw longest, ascending: anal with about nineteen rays: bright silvery; fins pellucid white.

C. Alburnus, Linn. *Syst. Nat.* tom. i. p. 531. *Bloch, Ichth.* pl. 8. f. 4. *Don, Brit. Fish.* vol. i. pl. 18. *Turt. Brit. Faun.* p. 109. *Leuciscus Alburnus*, *Flem. Brit. An.* p. 188. *Bleak, Will. Hist. Pisc.* p. 263. tab. Q. 10. f. 7. *Penn. Brit. Zool.* vol. III. p. 370. pl. 73. *Id.* (Edit. 1812.) vol. III. p. 487. pl. 84. *Bowd. Brit. fr. wat. Fish. Draw.* no. 4. *Yarr. Brit. Fish.* vol. i. p. 368. *L'Ablette, Cuv. Reg. An.* tom. II. p. 276.

LENGTH. From six to seven, rarely eight, inches.

DESCRIPT. (*Form.*) General form resembling that of the *Dace*, but more elongated: greatest depth exactly one-fifth of the entire length; greatest thickness about half the depth: ventral line more convex than the dorsal, rising rather abruptly posteriorly along the base of the anal fin: head contained five times and a half in the entire length: forehead flat: eyes large; their diameter very nearly one-third the length of the head: snout short; lower jaw projecting, ascending to meet the upper: lateral line descending in a sweep from the upper angle of the opercle till it reaches the middle of its course, thence passing off nearly straight to the caudal; above the ventrals its course is at just two-thirds of the depth: scales of moderate size, thin, finely striated, easily detached; number in the lateral line about forty-eight; above it seven and a half; beneath three and a half: dorsal entirely behind the middle; its greatest height about two-thirds of the depth; its length scarcely more than half its height; first ray only half the length of the second; second and third rays longest; the succeeding ones decreasing; the first two simple, the rest branched: anal commencing in a line with, or rather in advance of, the last ray of the dorsal; longer than in any of the preceding species of this sub-genus, and occupying half the space between the vent and the origin of the caudal fin; the first two rays very short; third and fourth longest, about equalling the longest rays in the dorsal; the first three simple, the others branched: caudal forked for half its length; the lower lobe of the fin a very little longer than the upper: pectorals shorter than the head, not reaching to the ventrals when laid back: ventrals shorter than the pectorals, considerably before the dorsal, and not reaching to the vent.

D. 10 or 11; A. 19 to 21; C. 19, &c.; P. 16; V. 9.

(Colours.) Back olivaceous green; sides and belly bright silvery; the two colours separated by a well-defined line: cheeks and gill-covers silvery white: all the fins pale; the anal and ventrals nearly pure white: irides pale yellow.

Common in rivers, swimming in large shoals near the surface. Spawns in May and June. Food, principally insects.

96. *C. Phoxinus*, Linn. (*Minnow*.) — Body slender, rounded: jaws equal: scales very minute: anal with ten or eleven rays: fins pale.

C. Phoxinus, Linn. *Syst. Nat.* tom. i. p. 528. Bloch, *Ichth.* pl. 8. f. 5. Don. *Brit. Fish.* vol. III. pl. 60. Turt. *Brit. Faun.* p. 109. Leuciscus *Phoxinus*, *Flem. Brit. An.* p. 188. Pink or Minim, *Will. Hist. Pisc.* p. 268. tab. Q. 8. f. 7. Minnow, *Penn. Brit. Zool.* vol. III. p. 373. *Id.* (Edit. 1812.) vol. III. p. 489. Bowd. *Brit. fr. wat. Fish.* Draw. no. 8. Yarr. *Brit. Fish.* vol. 1. p. 372. Le Véron, *Cuv. Reg. An.* tom. II. p. 276.

LENGTH. From three to four inches.

DESCRIPT. (*Form.*) Body elongated and rounded, tapering posteriorly: dorsal line but slightly curved; ventral more convex: greatest depth a little before the ventrals, equalling about one-fifth of the entire length: head rather less than one-fifth: thickness exceeding half the depth: snout short; jaws equal: eyes small: nostrils wide, approximating: lateral line very slightly descending; its course a little below the middle: scales very minute: dorsal entirely behind the middle, as well as the ventrals; first ray half the length of the second; second and third longest; the first two and the last in the fin simple; the rest branched: anal commencing in a vertical line with the last ray of the dorsal; first ray very short and easily overlooked; second not half the length of the third; third and fourth longest; the first three and the last ray of all simple; the others branched: caudal forked for nearly half its length: pectorals about three-fourths the length of the head: ventrals a little shorter:

D. 10; A. 10 or 11; C. 19, &c.; P. 16; V. 8.

(Colours.) Back, and upper half of the sides, deep olive-brown, sometimes spotted with black; lateral line often of a golden hue; lower portion of the sides and belly yellowish white, but (in the *males*?) during the spawning season of a rich crimson: dorsal and caudal fins pale brown; generally a large dusky spot at the base of the caudal; anal, pectorals, and ventrals, lighter.

Common in rivers, more especially those with a gravelly bottom. Keeps in shoals. Spawns the end of May, or beginning of June, at which season the head is covered with small tubercles. Food, worms, insects, and aquatic plants.

(16.) *C. Idus*, Linn. *Syst. Nat.* tom. i. p. 529. Bloch, *Ichth.* pl. 36. *The Ide*, Yarr. *Brit. Fish.* vol. i. p. 344.

Said to have been found by the late Dr. Walker in the mouth of the Nith*. Its claims, however, to a place in the British Fauna do not appear to have been confirmed by any subsequent observer.

* *Stew. El. of Nat. Hist.* vol. i. p. 332.

- (17.) *C. Orfus*, Linn. Syst. Nat. tom. 1. p. 530. Bloch, Ichth. pl. 96.

This species having been confounded by Willughby and Ray with the Rud, (*C. Erythrophthalmus*), Linnæus was led, apparently on their authority, to consider it as inhabiting the English rivers. This error has been reproduced in the "British Animals," (p. 186), of Dr. Fleming, who attaches the name of *Barbus Orfus* to the Rud or Finscale of Willughby, a species undoubtedly the same as the Red-Eye of Donovan. It is almost certain that the true *C. Orfus*, which is a native of Germany, has no claim whatever to a place in the British Fauna.

GEN. 36. COBITIS, Linn.

97. *C. barbatula*, Linn. (*Bearded Loach*.)—Body rounded anteriorly, compressed behind: sides of the head unarmed.

- C. barbatula*, Linn. Syst. Nat. tom. 1. p. 499. Bloch, Ichth. pl. 31. f. 3. Don. Brit. Fish. vol. 1. pl. 22. Turt. Brit. Faun. p. 103. Flem. Brit. An. p. 189. Loche, Will. Hist. Pisc. p. 265. tab. Q. 8. f. 1. Penn. Brit. Zool. vol. III. p. 282. pl. 58. Id. (Edit. 1812.) vol. III. p. 379. pl. 69. Bowd. Brit. fr. wat. Fish. Draw. no. 12. Yarr. Brit. Fish. vol. 1. p. 376. La Loche franche, Cuv. Reg. An. tom. II. p. 278.

LENGTH. From four to four and a half, rarely five, inches.

DESCRIPT. (*Form.*) Elongated; subcylindric anteriorly, compressed towards the tail: greatest depth one-seventh of the entire length; thickness, in the region of the pectorals, about two-thirds of the depth: head small, a little depressed, the profile gently sloping: snout blunt; upper jaw projecting over the lower; mouth small, placed beneath, furnished with six short barbules, two at the corners, and four in front of the upper lip; those at the corners longest, equalling rather more than one-third the length of the head: eyes small; the intervening space flat: body covered with very small scales, and invested with a mucous secretion: lateral line straight: dorsal commencing midway between the end of the snout and base of the caudal; its height nearly equalling the depth of the body; first ray very short and easily overlooked; second not half the length of the third; fourth and fifth longest; the first three simple; the rest branched: anal commencing beyond the tip of the dorsal when laid back, somewhat smaller than that fin, but in other respects similar; first ray very small; fourth and fifth longest: caudal slightly rounded: pectorals attached low down, about the length of the head, rounded; second and third rays longest, and, as well as the fourth, much stouter than the others: ventrals in a line with the commencement of the dorsal, somewhat shorter than the pectorals; third ray longest:

B. 3; D. 10; A. 9; C. 17; P. 12; V. 8:

vent in a line with the tip of the dorsal when laid back. (*Colours.*) Back and sides yellowish brown, mottled and spotted with dusky; abdomen and lateral line whitish: dorsal, caudal, and pectoral fins, spotted; anal and ventrals nearly plain.

Not uncommon in rivers and streams with a gravelly bottom. Feeds on aquatic insects. Spawns in March and April.

98. *C. Tænia*, Linn. (*Groundling*).—Body much compressed throughout: beneath each eye a forked spine.

C. Tænia, Linn. *Syst. Nat.* tom. i. p. 499. Bloch, *Ichth.* pl. 31. f. 2. Berken. *Syn.* vol. i. p. 79. Turt. *Brit. Faun.* p. 103. *Flem. Brit. An.* p. 189. *C. barbatula aculeata*, Will. *Hist. Pisc.* p. 265. tab. Q. 8. f. 3. Spinous Loche, Penn. *Brit. Zool.* (Edit. 1812.) vol. III. p. 381. Spined Loche, Yarr. *Brit. Fish.* vol. I. p. 381. La Loche de rivière, Cuv. *Reg. An.* tom. II. p. 278.

LENGTH. From three to four inches.

DESCRIPT. (*Form.*) Much more compressed than the last species, especially about the head, which is also smaller: thickness of the body only half the depth: profile more convex, the snout appearing somewhat truncated: barbules shorter and less conspicuous: eyes smaller, placed very high on the cheeks; the intervening space contracted into a narrow elevated ridge: beneath each eye, but a little in advance, a sharp moveable forked spine directed backwards: dorsal and anal fins similar, and similarly situated, but the former with a ray more: pectorals relatively shorter and less developed, not equal to the length of the head; the second, third, and fourth rays not stouter than the others: ventrals likewise smaller:

D. 11; A. 9; C. 15; P. 8; V. 7.

(*Colours.*) Yellowish, tinged with orange; the back and upper half of the sides spotted and mottled with brown; more particularly a longitudinal series of large round spots on the lateral line, a second on the dorsal ridge, and a third intermediate between these two; those on the lower part of the back, between the dorsal and caudal fins, sometimes assume the appearance of short transverse bars: dorsal and caudal spotted; the other fins plain.

Much less frequent than the last species. Found in the Trent in Nottinghamshire, and, according to Turton, in the clear streams of Wiltshire. I have also met with it in some plenty in the Cam, as well as in fish-ponds at Ely. Keeps near the bottom, and appears to reside more in the mud than the *C. barbatula*. Spawns, according to Bloch, in April and May. Is very tenacious of life.

GEN. 37. ESOX, Cuv.

99. *E. Lucius*, Linn. (*Pike*.)

E. Lucius, Linn. *Syst. Nat.* tom. i. p. 516. Bloch, *Ichth.* pl. 32. *Don. Brit. Fish.* vol. v. pl. 109. Turt. *Brit. Faun.* p. 105. *Flem. Brit. An.* p. 184. Cuv. *Reg. An.* tom. II. p. 282. Pike, Will. *Hist. Pisc.* p. 236. tab. P. 5. f. 2. Penn. *Brit. Zool.* vol. III. p. 320. pl. 63. *Id.* (Edit. 1812.) vol. III. p. 424. pl. 74. Bowd. *Brit. fr. wat. Fish.* Draw. no. 17. Yarr. *Brit. Fish.* vol. I. p. 383.

LENGTH. From two to three feet; sometimes more.

DESCRIPT. (*Form.*) Oblong, rather elongated, suddenly narrowing behind the dorsal and anal fins; sides compressed: depth nearly uniform throughout, about one-sixth of the entire length: head large, rather more than one-fourth: cranium flat, a little concave between the eyes;

snout broad and depressed, rounded at the extremity; lower jaw projecting beyond the upper: intermaxillaries, vomer, palatines, tongue, pharyngeans, and branchial arches, armed with sharp card-like teeth of unequal lengths; also a series of long sharp teeth on the sides of the lower jaw: eyes moderate, situate half-way between the end of the snout and posterior edge of the opercle: nostrils a little in advance: above and below each orbit, beneath the lower jaw on each side, and along the margin of the preopercle, a row of pores: gill-opening very large: cheeks and upper part of the opercle covered with small scales; scales on the body moderate, oblong-oval, with the basal margin three-lobed: lateral line at first slightly descending, but afterwards straight: dorsal placed very far back, commencing at about two-thirds of the entire length; first six rays simple, gradually increasing in length, the first being very short; seventh longest; this and all the succeeding ones branched: anal similar to the dorsal, and answering to it: caudal forked: pectorals attached low down, not half the length of the head, rounded; fourth ray longest: ventrals equal to the pectorals, placed at about the middle of the entire length; third ray longest:

B. 14 or 15*; D. 21; A. 18 or 19; C. 19, &c.; P. 15; V. 11.

(Colours.) Head, back, and sides, bright olive-green spotted with yellow, or, when out of season, greenish gray with pale spots; more or less of a metallic gloss; belly white: fins dusky, spotted and variegated with red.

Probably indigenous, though usually supposed to have been introduced into England during the reign of Henry VIII. Found in rivers, lakes, and most stagnant waters. Very voracious, preying on other fish, including its own species, as well as water-rats and young water-fowl. Is very long-lived. Grows rapidly, and occasionally attains a weight of thirty, forty, or even sixty pounds. Spawns in March and April.

GEN. 38. BELONE, *Nob.*

(1. BELONE, *Cuv.*)

100. *B. vulgaris*, *Flem.* (*Common Gar-Fish.*)

B. vulgaris, *Flem. Brit. An.* p. 184. *Esox Belone*, *Linn. Syst. Nat.* tom. i. p. 517. *Bloch, Ichth.* pl. 33. *Don. Brit. Fish.* vol. III. pl. 64. *Turt. Brit. Faun.* p. 105. Horn-Fish or Gar-Fish, *Will. Hist. Pisc.* p. 231. tab. P. 2. f. 4. Gar-Pike, *Penn. Brit. Zool.* vol. III. p. 324. pl. 63. *Id.* (Edit. 1812.) vol. III. p. 429. pl. 74. Gar-Fish, *Yarr. Brit. Fish.* vol. I. p. 391.

LENGTH. From eighteen inches to two feet; rarely more.

DESCRIPT. (*Form.*) Subcylindrical, slender, and very much elongated: depth nearly uniform till past the commencement of the dorsal and anal fins, contained seventeen times and a half in the entire length: thickness rather more than two-thirds of the depth: abdomen flat, bounded on each side by a longitudinal series of large scales, forming a sort of lateral keel which runs the whole length of the body: head, snout included, contained a little more than three times and a half in the entire length; cranium flat and horizontal; cheeks vertical; snout produced into a long, slender, sharp-pointed beak; the lower jaw considerably the longest: both jaws armed at their edges with a single row of

* One individual was found to have fourteen on one side and fifteen on the other.

fine sharp card-like teeth; none on any other part of the mouth: eyes large, placed high, a little behind the corners of the mouth: nostrils wide, immediately in advance of them: lateral line nearly straight, not very distinct: head and opercle without scales; those on the body, with the exception of the longitudinal row on each side of the abdomen, thinly scattered and not very conspicuous: dorsal very far behind, commencing at three-fourths of the entire length; first ray only half the length of the second, which is longest; third and three following ones decreasing; beyond the sixth, the rays remain low and nearly even to the termination of the fin; all except the first branched: anal similar to the dorsal, and answering to it: caudal forked: pectorals small, in length scarcely exceeding the depth of the body, attached about half-way down, a little behind the gill-opening; second ray longest: ventrals still smaller; their point of attachment exactly half-way between the posterior part of the opercle and the end of the fleshy portion of the tail:

D. 18; A. 21; C. 19, &c.; P. 13; V. 7.

(Colours.) Head, back, and upper part of the sides, fine rich bluish green: gill-covers, and all below the lateral line of the body, bright silvery.

Common on many parts of the coast, appearing in shoals about April, and remaining till late in Autumn. At the approach of Winter, retires to deep water. From its usually preceding the Mackerel, is sometimes called the *Mackerel-Guide*. Said to deposit its spawn close to the shore, among rocks and sea-weed. The bones are well known for acquiring a green colour when boiled.

(18.) *Little Gar (Esox Brasiliensis)*, Couch in Linn. Trans. vol. XIV. p. 85.

A doubtful species, taken by Mr. Couch "in the harbour at Polperro, in July 1818, as it was swimming with agility near the surface of the water. About an inch in length: head somewhat flattened at the top; the upper jaw short and pointed; the inferior much protruded, being at least as long as from the extremity of the upper jaw to the back part of the gill-covers: the mouth opened obliquely downwards; but that part of the under jaw which protruded beyond the extremity of the upper, passed straight forward in a right line with the top of the head: body compressed, lengthened, and resembling that of the Gar-Pike (*E. Belone*): one dorsal and one anal placed far behind, and opposite to each other: tail straight. Colour of the back bluish green, with a few spots; the belly silvery." Couch.

Mr. Couch conceived that this species might be the *Esox Brasiliensis* of Linnaeus. It seems, however, more likely to have been the young of some species of *Hemiramphus*, Cuv.

(2. SCOMBERESOX, Lac.)

101. *B. Saurus*, Nob. (*Saury*, or *Skipper*.)

Esox Saurus, Rackett in Linn. Trans. vol. VII. p. 60. tab. 5. *Turt. Brit. Faun.* p. 105. *Neill in Wern. Mem.* vol. I. p. 541. *Don. Brit. Fish.* vol. V. pl. 116. *Lacertus* vel *Saurus*, *Will. Hist. Pisc.* p. 232. *Scomberesox Saurus*, *Flem. Brit. An.* p. 184. *Skipper (Cornubiensium)*, *Ray, Syn. Pisc.* p. 165. *Saury*, *Penn. Brit. Zool.* vol. III. p. 325. pl. 64. *Id.* (Edit. 1812.) vol. III. p. 424. pl. 75. *Saury Pike*, *Yarr. Brit. Fish.* vol. I. p. 394.

LENGTH. From fifteen to eighteen inches. NEILL.

DESCRIPT. (*Form.*) "Body long and slender, agreeing precisely with that of the common *Gar-Fish*: snout subulate, fine, toothless, and slightly

curving upwards: jaws of unequal length, the lower longest, and bending upwards at the tip: body smooth; the scales with which it is covered being thin and glabrous: the lower part of the body from the gills to the tail marked with a longitudinal carina or keel, which terminates at the latter part in a somewhat protuberant manner: all the fins small: the dorsal placed far down the back, and containing eleven rays: between this and the tail five distinct pinnules or spurious fins: pectorals somewhat falcated, containing eleven rays: ventrals with six rays: anal opposite to the dorsal, of eleven rays: between this and the tail seven distinct pinnules: caudal of twenty-two rays.

D. 11, and V false; A. 11, and VII false; C. 22; P. 11; V. 6.

(Colours.) Back of a most lovely azure blue, changing to green, and glossed with purple and yellow; the lower parts silvery." DON.

Rare on the southern coast, but, according to Mr. Neill, not uncommon in the North of Scotland, entering the Frith of Forth almost every Autumn in considerable shoals. Mr. Rackett's specimen was taken near the Isle of Portland in Dorsetshire. This species derives its English name of *Skipper* from its habit of leaping out of the water, and passing over a considerable space (Mr. Couch says thirty or forty feet) before returning to that element. It is not noticed either by Linnæus, Gmelin, or Bloch.

GEN. 39. EXOCÆTUS, Linn.

102. *E. volitans*, Linn.? (*Flying-Fish*.) — Ventrals small, placed before the middle.

E. volitans, *Linn. Syst. Nat.* tom. I. p. 520. *Don. Brit. Fish.* vol. II. pl. 31. *Turt. Brit. Faun.* p. 106. *E. evolans*, *Bloch, Ichth.* pl. 398. *Winged Flying-Fish*, *Penn. Brit. Zool.* vol. III. p. 333. pl. 67. *Id.* (Edit. 1812.) vol. III. p. 441. pl. 78. *Flying-Fish*, *Yarr. Brit. Fish.* vol. I. p. 398.

According to Pennant, a fish of this genus was caught in June 1765, at a small distance below Caermarthen, in the river Towy. A second individual is said to have occurred in July 1823, in the Bristol channel, ten miles from Bridgewater*. Others are recorded to have been seen off Portland Island, in August 1825, by a vessel going down channel†. Although referred, by Pennant, in the first instance, to the *E. volitans* of Linnæus, in none of these cases does the species appear to have been determined with certainty. Pennant seems to suppose his to be the one so common in the Mediterranean: but, according to Cuvier, this last is the *E. exilens* of Bloch‡, which is distinguished from the *E. volitans* by its much longer ventrals, placed beyond the middle of the body. For this reason I have not annexed any detailed description.

* *Ann. of Phil.* vol. XXII. p. 152.

† *Lond. Quart. Journ. of Sci.* vol. XX. p. 412.

‡ *Ichth.* pl. 397.

(2.) *SILURUS*, Arted.

- (19.) *S. Glanis*, Linn. Syst. Nat. tom. i. p. 501. Bloch, Ichth. pl. 34. Cuv. Reg. An. tom. ii. p. 291. *Sly Silurus*, Yarr. Brit. Fish. vol. i. p. 403.

This species, or at least a fish bearing the same name, is included by Sibbald in his list of Scottish fishes*, but it is not said on what authority. Possibly some other species (perhaps the *Burbot*) may be intended. At any rate it is not likely that it should exist in that country at the present day, as from its great size, it would in that case hardly have been for so long a time overlooked by our naturalists. It is the largest fresh-water fish found in Europe, attaining the weight of from one to two hundred pounds and upwards. It is met with in the rivers of Germany, Hungary, and other parts of the Continent.

GEN. 40. SALMO, Cuv.

103. *S. Salar*, Linn. (*Common Salmon*.)—Posterior margin of the gill-cover forming a semicircle: vomerine teeth confined to the anterior extremity: caudal forked: ventrals dusky on their inner surface.

- S. Salar*, Linn. Syst. Nat. tom. i. p. 509. Bloch, Ichth. pls. 20, & 98. Turf. Brit. Faun. p. 103. Flem. Brit. An. p. 179. Jard. in Edinb. New Phil. Journ. vol. xviii. p. 46. Salmo, Will. Hist. Pisc. p. 189. tab. N. 2. f. 1. Salmon, Penn. Brit. Zool. vol. iii. p. 284. pl. 58. no. 143. Id. (Edit. 1812.) vol. iii. p. 382. pl. 69. Le Saumon, Cuv. Reg. An. tom. ii. p. 302.

LENGTH. From two to three feet, sometimes three feet and a half.

DESCRIPT. (*Form*.) Oval; moderately elongated; with the head and back in nearly the same line: greatest depth a little before the dorsal, contained about five times and a half in the entire length, increasing, however, with age: thickness half the depth: head small, about one-sixth of the entire length: snout rather sharp: jaws, in *young fish*, nearly equal; but in *old males*, the lower one longest, and curving upwards in a hook: a row of sharp teeth along both sides of each jaw, as well as on the palatines; but those on the vomer confined to its anterior extremity, and in some specimens rather obsolete; two rows of teeth on the tongue: eyes directly above the posterior extremity of the maxillary, and nearer the end of the snout than the furthest point of the gill-cover by one-third: gill-cover with the posterior margin more curved than in the next species, and forming a semicircle; opercle oblong, the basal margin slightly ascending posteriorly; subopercle about one-third the size of the opercle; a line drawn from the extremity of the upper jaw to the furthest point of the gill-cover passes through the eyes: lateral line perfectly straight, dividing the body into two nearly equal parts: scales small: dorsal occupying a middle position between the end of the snout and the end of the fleshy part of the tail; rather longer than high, its greatest elevation not equalling half the depth of the body; first ray very short: fourth longest; first two rays simple, the rest branched; last two from one root: adipose small; much nearer the caudal than the anal:

* Scot. Illust. part ii. vol. II. p. 25.

anal similar to the dorsal, more in advance than the adipose, terminating in a line with this last fin; third ray longest; first two simple; the rest branched; the last two from one root: tail, between the adipose and the caudal fin, more slender than in the next species; the end of the fleshy portion cut square, appearing truncated: caudal very much forked when young, gradually becoming less so as age advances, but never (except perhaps in *very old* fish) quite even; pectorals more than half the length of the head; their inferior margin rather concave; second and third rays longest; ventrals beneath the middle of the dorsal; rather shorter than the pectorals; the axillary scale half their own length: number of rays,

B. 12; D. 14; A. 12; C. 19, and some short ones; P. 15; V. 9.

Number of vertebræ sixty. (*Colours.*) Bluish gray or lead-colour; abdomen silvery; here and there, principally above the lateral line, a few dusky spots: dorsal, caudal, and pectorals, dark gray; ventrals deeply stained, especially on their inner surface, with the same colour; anal less so, nearly white. *In the fry, till about five or six inches long*, the sides shew more or less indication of dark transverse bands. *The adult male, during and after the spawning season*, acquires a reddish tinge.

Found both in the sea and in rivers. Principal fisheries carried on in Scotland, the North of England, and Ireland, where the species is very abundant. Begins to ascend rivers in April; at the approach of Autumn, pushes up towards their sources in order to spawn, springing up cataracts, and surmounting any other obstacles which oppose its progress. Spawning season principally from October to February, but varying much in different rivers. Male and female pair for the occasion, and excavate a furrow in the gravelly or sandy beds of shallows, in which the spawn and milt are deposited simultaneously. After spawning, both sexes return to the sea in a very reduced state; the males going down sooner than the females: at this season, the former are called *Kippers*, the latter *Kelts*. Young fry, termed *Smolts* or *Sanlets*, appear about March, and keep going down to sea from the end of that month to the middle of May: after remaining in the sea some weeks, they return to the rivers, having attained to the weight of from a pound and a half to four or five pounds: fish of the former weight, and up to two pounds, termed *Peal*; of the latter weight *Grilse*, which last name they retain till they have spawned once, when they are called *Salmon*. From the time of their first return to the rivers, they increase rapidly in size. Greatest weight which the species attains to forty or fifty pounds, sometimes more: Pennant mentions one which weighed seventy-four pounds. Food at sea, according to Fleming, principally the Sand-eel. *Obs.* According to M. Agassiz*, the *S. hamatus* of Cuvier is only an old fish of this species: the *S. Gødenii* of Bloch (*Ichth.* pl. 102.†) the young.

104. *S. Eriox*, Linn. (*Bull Trout, or Grey*).—Posterior margin of the gill-cover very little curved: vomerine teeth confined to the anterior extremity: caudal even: back and sides spotted with purplish gray; ventrals plain white.

S. Eriox, Linn. *Syst. Nat.* tom. 1. p. 509. *Turt. Brit. Faun.* p. 103. *Flem. Brit. An.* p. 180. *S. Cambricus*, Don. *Brit. Fish.*

* *Edinb. New Phil. Journ.* vol. xvii. p. 365.

† Mr. Yarrell thinks that the fish figured by Bloch on his 102nd plate is only *S. Fario*.

vol. IV. pl. 91. The Grey, *Will. Hist. Pisc.* p. 193. *Penn. Brit. Zool.* vol. III. p. 295. *Id.* (Edit. 1812.) vol. III. p. 394.? Sea Trout, *Penn. Brit. Zool.* vol. III. p. 296. *Id.* (Edit. 1812.) vol. III. p. 397.

LENGTH. Two feet eight inches.

DESCRIPT. (*Form.*) Closely resembling the *Salmon*, but of a more clumsy make: head and nape somewhat thicker: curvature of the posterior margin of the gill-cover much less considerable; margin of the preopercle more sinuous; subopercle larger with respect to the opercle, the basal margins of both nearly parallel to the axis of the body; a line drawn from the extremity of the upper jaw to the furthest point of the gill-cover passes beneath the eyes: vomer with only two or three teeth at its anterior extremity: tail, beyond the adipose, more bulky and muscular than in the *Salmon*: caudal even; in *old fish* rather convex: the other fins similar: number of fin rays,

D. 12 to 14; A. 11; C. 19, &c.; P. 14; V. 10.

Number of vertebræ fifty-nine. The *female* is characterized by having shorter jaws than the *male*, with the teeth less developed. (*Colours.*) For the most part similar to those of the *Salmon*, but the back and sides, above the lateral line, more spotted; the spots being most abundant in the *female*. In the spawning season, the *male* acquires a red tinge: the *female* remains gray.

Migratory like the *Salmon*. A common species in the Tweed, where the young are called *Whittlings*. Found also in the rivers of Wales, Dorsetshire, and Cornwall. Apparently the same as the *Seven* of Donovan, (*S. Cambricus*), said by that author to be found in such great plenty on the coasts of Glamorganshire and Caermarthenshire; this last (which, according to Donovan, rarely exceeds twelve or fifteen inches in length, and from one to two pounds in weight) only a younger fish. It is also probable that the *S. Hucho* of Fleming, and other British authors, is not distinct from the present species. Flesh inferior to that of the *Salmon*; cutting yellow.

105. *S. Trutta*, Linn. (*Sea Trout*.) — Gill-cover slightly produced behind; the margin rounded: vomerine teeth extending the whole way: caudal forked: back and sides with X-shaped dusky spots: ventrals plain white.

S. Trutta, Linn. *Syst. Nat.* tom. I. p. 509. *Bloch, Ichth.* pl. 21. *Turt. Brit. Faun.* p. 103. *Flem. Brit. An.* p. 180. *Jard. in Edinb. New Phil. Journ.* vol. XVIII. p. 49. *Trutta lacustris*, *Will. Hist. Pisc.* p. 198. tab. N. 1. fig. 5. *Truite saumonée*, *Cuv. Reg. An.* tom. II. p. 304.

LENGTH. From one to two feet, or rather more.

DESCRIPT. (*Form.*) Not so slender as a *Salmon* of the same size: jaws nearly equal: teeth rather larger; those on the vomer extending all along the ridge of the palate, and forming by pressure a groove in the tongue between the two rows of lingual teeth: eyes rather nearer the extremity of the snout: gill-cover more produced behind than in either of the preceding species, the margin more curved; basal margins of the opercle and subopercle sloping obliquely upwards to form a considerable angle with the axis of the body: position of the fins much as in the *Salmon*; but the adipose rather larger; the caudal, with the outer rays

shorter, and not so much forked; in *very old fish* nearly even: the fleshy portion of the tail rounded at its extremity: pectorals with their inferior margin straight: number of fin-rays,

D. 13; A. 11; C. 19, &c.; P. 14; V. 10.

Number of vertebræ fifty-eight. (*Colours.*) Darker in the body, and lighter in the fins, than the *Salmon*: back and sides, above the lateral line, more thickly spotted; the spots assuming the form of the letter X; those above sometimes surrounded by a pale circle; gill-covers and cheeks spotted, as well as the dorsal and adipose fins: ventrals always plain white.

A common species, inhabiting the sea and rivers. Enters these last about the end of May or beginning of June. Is the *Salmon-Trout* of the London markets. Flesh red, and highly esteemed. Food, according to Sir W. Jardine, principally the *Talitrus Locusta*, or common Sandhopper. *Obs.* According to Agassiz, the *S. Lemanus* of Cuvier is the same as the present species. The *Sea-Trout* of Pennant appears to be identical with the species last described, which is called by the above name in some rivers.

- (20.) *S. albus*, Flem. Brit. An. p. 180. Jard. in Edinb. New Phil. Journ. vol. xviii. p. 50. *White*, Penn. Brit. Zool. vol. iii. p. 302. Id. (Edit. 1812.) vol. iii. p. 396. *Herling*, Jard. in Proceed. of Berwicksh. Nat. Club, p. 50.

This is held to be a distinct species by Sir W. Jardine, and some other of our naturalists. I must confess, however, that I have been unable to discern any appreciable difference between it and the last, of which, in the opinion of Mr. Yarrell and myself, it is only the young of the first year. Found in the Solway, the Tweed, the Esk, and a few other rivers in the North. Is sometimes called a *Whiting* or *Phinoc*. Pennant says it never exceeds a foot in length. According to Sir W. Jardine, the fish in the Solway average from a pound to a pound and a half in weight, very seldom reaching two pounds. It is added by this last gentleman, that "one of the most marked appearances of this fish, is the great proportional breadth of the back, and the peculiar grayish green colour of the upper parts."

106. *S. Fario*, Linn. (*Common Trout.*)— Gill-cover produced behind into a rounded angle: vomerine teeth extending the whole way: maxillaries reaching to a vertical line from the posterior part of the orbit: caudal slightly forked: back and sides with numerous red spots.

- S. Fario*, Linn. Syst. Nat. tom. i. p. 509. *Bloch*, Ichth. pls. 22, & 23. *Turt. Brit. Faun.* p. 103. *Don*, Brit. Fish. vol. iv. pl. 85. *Flem. Brit. An.* p. 181. *Jard. in Edinb. New Phil. Journ.* vol. xviii. p. 51. *Trutta fluviatilis*, *Will. Hist. Pisc.* p. 199. *Trout*, Penn. Brit. Zool. vol. iii. p. 297. pl. 59. no. 146. *River Trout*, Id. (Edit. 1812.) vol. iii. p. 399. pl. 70. *Bowd. Brit. fr. wat. Fish.* Draw. no. 14. *Truite commune*, *Cuv. Reg. An.* tom. ii. p. 304.

LENGTH. From one to two feet; sometimes more.

DESCRIPT. (*Form.*) General proportions resembling those of the *S. Trutta*: differs from that species in the form of the gill-cover, which is much more produced behind, forming at its distal extremity a rounded angle; basal margins of the opercle and subopercle rising more obliquely:

snout short; but the jaws, which are nearly equal, becoming more lengthened in the spawning season: maxillary reaching to a vertical line forming a tangent to the posterior part of the orbit, by which character it is distinguished from the *S. Salmulus*: teeth on the whole length of the vomer: dorsal and adipose fins placed as in the *Salmon*; the former with the first three rays, the first especially, very small and inconspicuous, but gradually increasing in length; sixth and seventh longest; first four simple, the rest branched: anal entirely in advance of a vertical line from the adipose: caudal not so much forked as in the *S. Trutta*, or so square as in *S. Eriox*: number of fin-rays,

D. 14; A. 11; C. 19, &c.; P. 13; V. 9.

(*Colours.*) Back dusky: sides and belly, the former more especially, yellow, tinged with gold, and also with green: a row of red spots along the lateral line: dorsal fin, and above the lateral line, spotted with dusky. In *young fish*, more or less indication of transverse dusky bands on the sides.

Var. β. Gillaroo Trout, *Sow. Brit. Misc.* pl. 61.

A common species in lakes and rivers, attaining in some localities to a large size. Has been known to weigh from sixteen to twenty pounds, though usually much smaller. In many places seldom exceeds a pound or a pound and a half. Spawns in September and October; ascending to the sources of rivers for this purpose. Is very voracious. Feeds on worms, small fish, and insects, especially *Ephemera* and *Phryganea*. The variety, called the *Gillaroo Trout*, is distinguished by its strong muscular stomach, resembling the gizzard of birds, resulting from feeding principally on shells. It is found in some of the lakes in Ireland.

Obs. The above species exhibits very great variation in colours*, and in some measure in form also, according to the locality in which it is found. Possibly two or more species may have been hitherto confounded, but in the present state of the science it is almost impossible to decide this point. Sir W. Jardine, who has paid great attention to the whole family, and from whom we may expect much light upon the subject, has particularized some remarkable varieties found in Sutherlandshire, in the "Edinburgh New Philosophical Journal," l. c., to which I refer the reader. According to Agassiz, the *S. punctatus* of Cuvier, the *S. marmoratus* of the same author, and the *S. alpinus* of Bloch, all belong to this species.

107. *S. ferox*, Jard. and Selb. (*Great Lake Trout.*)

Great Lake Trout (*S. ferox*), *Jard. in Encycl. Brit.* (7th Edit.)
Art. Angling, p. 142. *Id. in Edinb. New Phil. Journ.* vol. xviii.
p. 55.

DESCRIPT. (*Form.*) "Principally distinguished by its large size, square tail in all its stages of growth, the form of the gill-covers and teeth, the relative position of the fins, the form of the scales, particularly those composing the lateral line, and in the generally delicate skin which is spread over the outside of the body being extremely strong and tough, and from under which the perfectly transparent scales can be

* Sir H. Davy was of opinion, that when Trout feed much on hard substances, such as Larvæ and their cases, and the ova of other fish, they have more red spots, and redder fins: and that when they feed most on small fish, as minnows, and on flies, they have more tendency to become spotted with small black spots, and are generally more silvery. See *Salmonia*, (2nd Edit.) p. 41.

extracted. The fins may be stated nearly thus, though a greater variation may occur;

D. 13 to 15; A. 12; P. 14; V. 11; gill-covers, 12:

the greatest variation occurs in the dorsal fin." JARD. (*Colours*.) "Deep purplish brown on the upper parts, changing into reddish gray, and thence into fine orange-yellow, on the breast and belly: the whole body, when the fish is newly caught, appearing as if glazed over with a thin tint of rich lake-colour, which fades rapidly away as the fish dies: gill-covers marked with large dark spots: the whole body covered with markings of different sizes, and varying in amount in different individuals; the markings, in some, few, scattered, and of a large size; in others, thickly set, and of smaller dimensions: each spot surrounded by a paler ring, which sometimes assumes a reddish hue: the spots more distant from each other as they descend beneath the lateral line: lower parts of the fish spotless." JARD.

A new species first identified as distinct from the Common Trout by Sir W. Jardine and Mr. Selby. The former of these gentlemen states that it is generally distributed in all the larger and deeper lochs of Scotland, but that it seldom ascends or descends the rivers running into or out of them, and never migrates to the sea. Very voracious, feeding nearly entirely upon small fish. Average weight from ten to twenty pounds: has been known, however, to reach twenty-eight pounds. Spawns in Autumn. *Obs.* It is probably the same as the *S. lacustris* of Berkenhout*, though (in the opinion of M. Agassiz) not of continental authors.

103. *S. Salmulus*, Turt. (*Samlet*.)—Vomerine teeth extending the whole way: maxillaries reaching to beneath the centre of the orbit: caudal forked for half its length: sides marked with long, narrow, transverse, bluish bands.

S. Salmulus, Turt. *Brit. Faun.* p. 104. *Jard. in Edinb. New Phil. Journ.* vol. XVIII. p. 56. *Salmulus*, Will. *Hist. Pisc.* p. 192. tab. N. 2. fig. 2. *Ray, Syn. Pisc.* p. 63. *Samlet* and Parr, *Penn. Brit. Zool.* vol. III. p. 303. pl. 59. no. 148. & pl. 66. no. 78. *Id.* (Edit. 1812.) vol. III. p. 404. pls. 70, & 77.

LENGTH. From six to eight inches.

DESCRIPT. (*Form.*) Closely resembling the *young Trout*, but differing in the following particulars. Body somewhat deeper in proportion to its length: snout blunter: teeth weaker and less developed; those on the tongue not very conspicuous: maxillary shorter, not reaching beyond a vertical line from the centre of the orbit; also broader at its posterior extremity: gill-cover not so much produced into an angle, the hinder margin being more regularly rounded, as in the *Salmon*: "scales, taken from the lateral line below the dorsal fin, altogether larger, the length greater by nearly one-third, the furrowing more delicate, and the form of the canal not so apparent or so strongly marked towards the basal end of the scale †:" caudal more deeply forked, the fork extending about half its length: pectorals larger. (*Colours.*) "The row of blue marks on the sides, which are also found in the *young Trout*, and in the *young*

* *Syn.* vol. I. p. 79.

† This character, which I have not had an opportunity of verifying myself, is taken from Sir W. Jardine.

of several of the *Salmonidæ*, in this species are narrower and more lengthened. The general spotting seldom extends below the lateral line, and two dark spots on the gill-cover are a very constant mark." JARD. According to Pennant, "the adipose fin is never tipped with red; nor is the edge of the anal white."

This fish, which is common in many of the rivers of Wales and Scotland, as well as in some of those in England, has been regarded by different observers as the young, either of the Salmon, the Sea Trout, or the common Trout. It is, however, now pretty well ascertained to be a distinct species, always remaining of a small size. Is called in some places a *Parr*, in others a *Skirling* or *Brandling*. Said, by Sir W. Jardine, "to frequent the clearest streams, delighting in the shallower fords or heads having a fine gravelly bottom, and hanging there in shoals, in constant activity, apparently day and night." According to Dr. Heysham*, the adult fish go down to the sea after spawning, which takes place, as in the other migratory species of this genus, in the depth of Winter.

109. *S. Umbla*, Linn. (*Charr*).—Vomerine teeth confined to the anterior extremity: dorsal midway between the end of the snout and the base of the caudal: anal commencing beyond the tip of the reclined dorsal: axillary scale nearly half the length of the ventrals.

S. Umbla, Linn. *Syst. Nat.* tom. i. p. 511. *Bloch, Ichth.* pl. 101. *S. alpinus*, Don. *Brit. Fish.* vol. iii. pl. 61. *Turt. Brit. Faun.* p. 104. *Flem. Brit. An.* p. 180. *Charr*, Penn. *Brit. Zool.* vol. iii. p. 305. pl. 60. *Id.* (Edit. 1812.) vol. iii. p. 407. pl. 71.

LENGTH. From twelve to fourteen inches.

DESCRIPT. (*Form.*) Elongated; the line of the back nearly straight; profile sloping gently downwards from the nape: greatest depth about one-fifth of the entire length: head contained five times and a half in the same: snout short and somewhat obtuse: jaws nearly equal, except in the spawning season, when the lower one becomes longest: teeth small and sharp; those on the vomer confined to the anterior extremity: eyes moderate; their diameter rather less than one-fourth the length of the head; the distance between them equalling twice their diameter: gill-cover produced behind into a rounded lobe; the basal margin sloping very obliquely upwards: lateral line arising at the upper angle of the opercle, at first slightly descending, but afterwards nearly straight, its course being a little above the middle: scales small: dorsal a little before the middle of the entire length; the distance from the first ray to the end of the snout, when measured behind, not reaching beyond the base of the caudal; of a somewhat triangular form, the posterior rays being not more than half the length of the anterior ones; fifth ray longest, equalling a little more than half the depth of the body: adipose so placed, that two-thirds of the distance between the dorsal and caudal lie before it, one-third behind it: anal commencing considerably beyond a vertical line from the tip of the reclined dorsal: pectorals just three-fourths the length of the head: ventrals beneath the middle of the dorsal; in their axillæ a long narrow pointed scale, nearly half their own length:

B. 10 or 11; D. 14; A. 13; C. 19, and some short ones; P. 11; V. 9.

* *Catalogue of the Animals of Cumberland*, p. 31.

(Colours.) Back, and upper part of the sides, bluish gray, tinged with olivaceous; flanks and belly flesh-colour: above the lateral line spotted with white; beneath the same, spots more obscure: dorsal, anal, and caudal, dusky, the latter darkest; pectorals and ventrals dark red. *In the spawning season*, the flanks and abdomen are bright crimson-red; the whole of the sides, above and below the lateral line, spotted with deeper red; the anal, pectorals, and ventrals, are also deep red, the first rays of the anal and ventrals excepted, which are bluish white.

Found in the lakes of Cumberland and Westmoreland, especially in Winander Mere, in the latter county; also in Crummoek and Coniston Waters in Lancashire, and, according to Sir W. Jardine, in many of the northern lochs of Scotland. Frequents clear and deep waters, keeping near the bottom. Feeds on insects. Varies much in its colours at different seasons, a circumstance which has obtained for it several different names. In its ordinary state, it is the *Case Charr* of Pennant and other authors: when exhibiting the bright crimson belly which it assumes before spawning, it is called *Red Charr*: when out of season, the spawn having been shed, it is distinguished by the name of *Gilt Charr*. *Obs.* According to Agassiz, the *S. Umbla*, the *S. Salvelinus*, the *S. alpinus*, and the *S. Salmarinus*, of Linnæus, are all referable to this species in its different states.

110. *S. Salvelinus*, Don. (*Torgoch*.)—Vomerine teeth confined to the anterior extremity: dorsal exactly in the middle of the entire length: anal commencing in a line with the tip of the reclined dorsal: axillary scale not one-third the length of the ventrals.

S. Salvelinus, Don. *Brit. Fish.* vol. v. pl. 112.

LENGTH. Six inches.

DESCRIPT. (*Form.*) Differs from the last species as follows: not so much elongated in proportion to its depth: head larger; contained not more than four times and a half in the entire length: teeth, those on the tongue especially, stronger and more developed: eyes larger; their diameter rather more than one-fourth the length of the head; the distance between them not equalling above one diameter and a half: posterior lobe of the opercle not so much produced: all the fins relatively larger: dorsal exactly in the middle of the entire length; the distance in front, when measured behind the fin, reaching to the end of the caudal; fifth and sixth rays longest, equalling at least three-fourths of the depth of the body: posterior portion of the fin very little less elevated than the anterior: adipose nearer the middle point between the dorsal and the caudal: anal commencing exactly in a line with the tip of the reclined dorsal: pectorals longer: scale in the axillæ of the ventrals much shorter, not one-third the length of the fin:

B. 9; D. 14 or 15; A. 13; C. 19, &c.; P. 13; V. 8.

(Colours.) Probably as variable as in the last species. The following were those of the specimens examined: head, back, and upper part of the sides, dark olivaceous-green; lower part of the sides yellowish, passing into bright orange-red on the abdomen: above the lateral line spotted with yellowish white; yellow of the sides, beneath the lateral line, spotted with red: dorsal, caudal, and pectorals, dark olivaceous; first and last

rays of the pectorals, and the whole of the anal and ventrals, bright red.

Whether this species be found on the Continent, or be the same as any of those described by foreign authors, it is not easy to determine, owing to the great confusion which prevails in this genus. I have, however, little hesitation in considering it as the *S. Salvelinus* of Donovan, though not of Turton and Fleming, who appear to have confounded it with the *Red Charr* of Pennant, which is only a variety of the last species. The same may be said of Willughby, who has comprised them both under the title of *Umbla minor*, Gesn.* That it is distinct from the *S. Umbla* of this work (the *S. alpinus* of most English authors) no one, I conceive, can doubt, who has had an opportunity of comparing the two. My examination was made from specimens in the possession of Mr. Yarrell, who obtained them from Corsygiddel Lake near Barmouth. According to Donovan, it is found in the Waters of Llyn Quellyn, one of the alpine lakes on the west side of Snowdon: he adds, that formerly it was also met with in the Llanberris Lake, on the opposite side of the mountain, but that of late years it has disappeared in the locality last mentioned. The species appears to be confined to Wales, in which country it is said to be called *Torgoch*, a Welch term signifying *Red-belly*.

GEN. 41. OSMERUS, *Art.*

111. *O. Eperlanus*, Flem. (*Smelt*.)

O. Eperlanus, *Flem. Brit. An.* p. 181. *Eperlanus*, *Will. Hist. Pisc.* p. 202. tab. N. 6. f. 4. *Salmo Eperlanus*, *Linn. Syst. Nat.* tom. 1. p. 511. *Bloch, Ichth.* pl. 28. figs. 1, 2. *Don. Brit. Fish.* vol. 11. pl. 48. *Turt. Brit. Faun.* p. 104. *Smelt, Penn. Brit. Zool.* vol. III. p. 313. pl. 61. no. 151. *Id.* (Ed. 1812.) vol. III. p. 416. pl. 72.

LENGTH. From eight to ten, rarely twelve, inches. Pennant mentions one which measured thirteen inches.

DESCRIPT. (*Form.*) Elongated: the back straight, and in the same line with the profile: greatest depth one-seventh of the entire length: thickness rather more than half the depth: head small, one fifth of the entire length, somewhat conical: lower jaw longest, curving upwards when the mouth is closed: gape wide, extending to beneath the eyes: maxillary teeth sharp, but very fine; those in the lower jaw curved, and much longer; two rows of teeth on each palatine; also some very strong long curved teeth on the tongue and front of the vomer: eyes large: gill-cover produced posteriorly into an obtuse lobe: lateral line at first slightly descending, but afterwards straight: scales small, deciduous: dorsal commencing exactly half-way between the extremity of the upper jaw and the end of the fleshy part of the tail; its height nearly twice its length, and about equal to, or rather less than, the depth of the body: third ray longest; first two rays simple, the others branched: the last two from one root: adipose small, a little nearer the caudal than the dorsal: anal commencing a little beyond the tip of the reclined dorsal, much longer than that fin, and extending beyond a vertical line from the adipose; first ray very short: fourth longest; first three simple, the rest branched: the last two from one root: caudal deeply forked: pectorals

* *Hist. Pisc.* p. 196.

attached low down, and just below the produced lobe of the gill-cover: ventrals beneath the commencement of the dorsal: number of fin-rays,

D. 11; A. 17; C. 19; P. 11; V. 8.

(Colours.) Back whitish, tinged with green; upper part of the sides varied with blue; lower part of the sides, and belly, bright silvery: irides silvery; pupil black: fins pale.

A common species on the British coasts, ascending rivers in December, January, and February, for the purpose of spawning, which takes place in March and April. Food, according to Bloch, worms, and small shells. Varies greatly in size; a circumstance which has induced the author just mentioned to form two species of it. Derives its English name of *Smelt* from a peculiar scent which it emits, and which has been compared by some to cucumbers, by others to violets. Is sometimes called a *Sparling**.

GEN. 42. THYMALLUS, *Cuv.*

112. *T. vulgaris*; Nilss. (*Grayling*.)

T. vulgaris, Nilss. *Prod. Ichth. Scand.* p. 13. *Thymallus*, Will. *Hist. Pisc.* p. 187. tab. N. 8. *Salmo Thymallus*, Linn. *Syst. Nat.* tom. I. p. 512. *Bloch, Ichth.* pl. 24. *Don. Brit. Fish.* vol. IV. pl. 88. *Turt. Brit. Faun.* p. 104. *Coregonus Thymallus*, *Flem. Brit. An.* p. 181. *Grayling*, *Penn. Brit. Zool.* vol. III. p. 311. pl. 61. no. 150. *Id.* (Edit. 1812.) vol. III. p. 414. pl. 72. *Ombre commune*, *Cuv. Reg. An.* tom. II. p. 306.

LENGTH. From ten to fifteen, rarely eighteen, inches.

DESCRIPT. (*Form.*) Back slightly elevated at the commencement of the dorsal fin, from which point it falls gradually to the snout: greatest depth one-fifth of the entire length; thickness not quite half the depth: head contained five times and a half in the entire length: snout rather short; obtuse, and rounded: gape small: upper jaw a little the longest: maxillary, and all the other teeth, small and fine: lateral line at first slightly descending, afterwards straight: scales large, disposed in longitudinal rows; seven and a half above the lateral line, the same number below it: dorsal commencing at one-third, and occupying about one-fourth, of the entire length; being twice as long as high; its greatest elevation three-fourths of the depth of the body; anterior rays gradually increasing from the first, which is very short, to the eighth and ninth, which are longest; tenth and succeeding rays slightly decreasing; first eight simple, the rest branched: adipose situate at nearly two-thirds of the distance from the dorsal to the base of the caudal: anal commencing a little beyond the tip of the reclined dorsal; shaped like that fin, but much smaller; first five rays simple, the rest branched: caudal deeply forked: pectorals three-fourths the length of the head: ventrals about the same; attached beneath the middle of the dorsal; with a long narrow scale in their axillæ:

B. 10; D. 22; A. 15, the last double; C. 19, and some short ones; P. 15; V. 11. (Colours.) Upper part of the head dusky; back and sides silvery gray, marked with longitudinal dusky streaks: dorsal spotted; the spots arranged in longitudinal lines: other fins plain.

* I may state in this place that the *Mallotus villosus*, or *Capelin*, was inserted by error in my Catalogue as a doubtful inhabitant of the British seas. There is no recorded authority for such insertion.

An inhabitant of streams and rivers, in which it remains stationary all the year, though asserted by Donovan to be migratory*. Partial to clear and rapid waters. Found in Derbyshire, in some of the rivers in the North, and in a few other parts, of England. Food, insects, testaceous mollusca, small fish, &c. Spawns in April and May. Has been known to attain the weight of five pounds†, but is usually found much smaller.

GEN. 43. COREGONUS, *Cuv.*

113. *C. Lavaretus*, Flem.? (*Gwiniad.*)—Jaws equal; snout scarcely advancing beyond them.

C. Lavaretus, *Flem. Brit. An.* p. 182.? *Nilss. Prod. Ichth. Scand.* p. 15.? *Salmo Wartmanni*, *Bloch, Ichth.* pl. 105.? *Gwiniad, Will. Hist. Pisc.* p. 183. *Penn. Brit. Zool.* vol. iii. p. 316. pl. 62. *Id.* (Ed. 1812.) vol. iii. p. 419. pl. 73. *Le Lavaret, Cuv. Reg. An.* tom. ii. p. 307.?

LENGTH. From ten to twelve inches.

DESCRIPT. (*Form.*) Extremely similar in form to the *Common Herring*. Back slightly arched: greatest depth about one-fifth of the entire length: head triangular, also about one-fifth: snout moderate, scarcely advancing beyond the jaws; these last equal, and without teeth; a few very fine velvet-like teeth on the tongue: eyes round, and large; their diameter contained three times and a half in the length of the head; the distance between them about equal to their diameter: gill-opening very large: opercle of a somewhat triangular form, the basal margin ascending very obliquely; subopercle approaching to oblong, rounded beneath: lateral line straight, dividing the sides into two nearly equal parts: scales large; of an oval or roundish form, marked with close concentric circles, but without radiating lines: dorsal occupying about the middle of the entire length; the distance from the end of the snout to the first ray, when measured behind the fin, reaching a little beyond the end of the fleshy part of the tail; anterior part of the fin elevated, the fourth ray, which is longest, equalling three-fourths of the depth of the body; fifth and succeeding rays rather rapidly decreasing; length of the fin about two-thirds of its greatest height; first three rays simple, the rest branched: space between the dorsal and adipose three times that between this last and the caudal: anal commencing considerably beyond the tip of the reclined dorsal, terminating in a line with the adipose; similar to the dorsal in form, but longer and less elevated: caudal deeply forked: pectorals inserted low down, a little shorter than the head: ventrals attached beneath the middle of the dorsal; axillary scale nearly one-third their own length:

B. 10; D. 13; A. 16; C. 19, and some short ones; P. 17; V. 11.

(*Colours.*) "Head dusky; pupil deep blue; gill-covers silvery, powdered with black; back, as far as the lateral line, glossed with deep blue and purple, but towards the line assuming a silvery cast, tinged with gold, beneath which those colours entirely prevail: lateral line marked by a series of distinct dusky spots: ventrals, in some, of a fine sky-blue, in others, as if powdered with blue specks; the ends of the other lower fins tinged with the same colour." PENN.

* According to Sir H. Davy, "the Grayling will not bear even a brackish water, without dying." *Salmonia*, (2d Edit.) p. 207.

† Daniel's *Rural Sports*, vol. ii. p. 290.

This species is found in Bala Lake, Merionethshire, as well as in the North of England and Scotland. I do not feel certain that it is identical with the *C. Lavaretus* of continental authors (synonymous with the *Salmo Wartmanni* of Bloch), there being several other allied species, the characters of which have not as yet been determined with precision. The above description is from specimens in the collection of W. Yarrell, Esq. By Turton and some other English authors, it appears to have been confounded with the *Salmo Lavaretus* of Bloch (*S. Oxyrhynchus*, Linn.), a very distinct species, in which the snout is furnished with a soft conical projection at its extremity extending beyond the jaws, and which is not, that I am aware, a native of this country. According to Pennant, the Gwiniad is a gregarious fish, and spawns in December.

114. *C. Pollan*, Thomps. (*Pollan*.)

C. Pollan, Thomps. in *Proceed. of Zool. Soc.* June 9, 1835.

LENGTH. From ten to twelve inches. THOMPS.

DESCRIPT. (*Form.*) "Differs from the *Gwiniad* in the snout not being produced; in the scales of the lateral line: in having fewer rays in the anal fin, and in its position being rather more distant from the tail; in the dorsal, anal, and caudal fins, being of less dimensions; and in the third ray of the pectoral fin being longest; (the first being of the greatest length in the *Gwiniad*.) Relative length of the head to that of the body as one to about three and a half: depth of the body equal to the length of the head: jaws equal; both occasionally furnished with a few delicate teeth: the tongue with many teeth: lateral line sloping downwards for a short way from the opercle, and thence passing straight to the tail: nine rows of scales from the dorsal fin to the lateral line, and the same number thence to the ventral fin: the row of scales on the back and that of the lateral line not reckoned: the third ray of the pectoral fin longest:

B. 9; D. 14; A. 13; C. 19; P. 16; V. 12.

Number of vertebræ fifty-nine. (*Colours.*) Colour to the lateral line dark blue; thence to the belly silvery: dorsal, anal, and caudal fins, towards the extremity tinged with black; pectoral and ventral fins of crystalline transparency, excepting at their extremities, which are faintly dotted with black: irides silvery: pupil black." THOMPS.

The above description is that of a species of *Coregonus*, lately brought under the notice of the Zoological Society by Mr. W. Thompson of Belfast, who considers it distinct from those hitherto published by authors. It is found in Lough Neagh in Ireland, in which district it is said to be known by the name of *Pollan*. Not having given it myself a close examination, I forbear offering any opinion about it. Judging, however, from the description, it certainly appears different from the last species, with which it was probably confounded by Fleming, who gives Lough Neagh as a locality for the *C. Lavaretus*.

115. *C. Marænula*, Jard. (*Vendace*.) — Lower jaw longest, obliquely ascending.

C. Marænula, Jard. in *Edinb. Journ. of Nat. and Geog. Sci.* vol. III. p. 4. pl. 1. *Salmo Marænula*, Bloch, *Ichth.* pl. 28. f. 3. ? *Gmel. Linn.* tom. I. part iii. p. 1381. ? *S. albula*, Stew. *El. of Nat. Hist.* vol. I. p. 373. *La Vemme*, *Cuv. Reg. An.* tom. II. p. 307. ?

LENGTH. From four to ten inches. JARD.

DESCRIP. (*Form.*) Differs essentially from the *C. Lavaretus* in having the lower jaw longest, and ascending at an angle of forty-five degrees to meet the upper, which receives it as in a groove: general outline similar: greatest depth exactly one-fourth of the entire length, caudal excluded: head small; "the crown heart-shaped, and so transparent that the form of the skull and brain may be seen through the integuments*:" maxillaries and lower jaw without teeth: tongue, which is small and triangular, and placed far back, rough to the touch, with a few, almost invisible, velvet-like teeth: eyes large and brilliant; their diameter contained three times and a half in the length of the head; the intervening space scarcely equal to their diameter: gill-opening very large: lateral line straight: "scales of considerable size, oval, and nearly smooth on the outer surface:" dorsal commencing at the middle of the entire length; very much elevated and pointed anteriorly, its greatest height being nearly twice its length; first ray very short; fourth longest; fifth and succeeding rays rapidly decreasing; the last not half the length of the fourth; first three simple, the rest branched: space between the dorsal and adipose more than double that between the adipose and caudal: anal commencing a little beyond the tip of the reclined dorsal, and terminating in a line with the adipose: first ray very minute; fourth and fifth longest; first four simple, the rest branched: caudal very much forked: pectorals attached low down: ventrals opposed to the anterior half of the dorsal; the axillary scale scarcely more than one-fourth of their length:

B. 9; D. 12; A. 14; C. 19, &c.; P. 15; V. 11.

"Number of vertebræ fifty to fifty-two." (*Colours.*) "Upper parts of a delicate greenish brown, shading gradually into a clear silver lustre: irides and cheeks silvery: dorsal fin greenish brown; the lower fins all bluish white." JARD.

First distinguished as a British species by Sir W. Jardine. By previous authors in this country it appears to have been confounded with the *C. Lavaretus*. The only locality known for it "is the lochs in the neighbourhood of Lochmaben, in Dumfries-shire;" into which (according to tradition) it was introduced by Mary Queen of Scots. "General habits resembling those of the Gwiniad. Swims in large shoals, retiring to the depths of the lakes in warm and clear weather. Spawns about the commencement of November."

(3.) SCOPELUS, Cuv.

- (21.) *S. Humboldti*, Cuv. Reg. An. tom. ii. p. 315. *S. borealis*, Nilss. Prod. Ichth. Scand. p. 20. *Sheppy Argentine*, Penn. Brit. Zool. vol. iii. p. 327. pl. 65. no. 156. Id. (Edit. 1812.) vol. iii. p. 432. pl. 76.

Cuvier considers the *Sheppy Argentine* of Pennant, an obscure species of which little is known, to be the same as the *Serpes Humboldti* of Risso, this last being the type of his genus *Scopelus*. The following is Pennant's description of his fish, which he obtained from the sea near Downing, in 1769. "Length two inches and one-fourth. Eyes large; irides silvery: lower jaw sloped much: teeth small: body compressed, and of an equal depth almost to the anal fin: tail forked. Back of a dusky green: the sides and covers of the gills as if plated with silver. Lateral line in the middle and quite straight. On each side of the belly a row of circular punctures: above them another, ceasing near the vent."

Whether the *Argentine* of Low† be the same as Pennant's fish, can scarcely, from his imperfect description, be determined.

* Sir W. Jardine.

† *Faun. Orcad.* p. 225.

GEN. 44. CLUPEA, Linn.

(1. CLUPEA, Linn.)

116. *C. Harengus*, Linn. (*Common Herring*).— Minute teeth in both jaws: infra-orbitals and gill-covers veined: subopercle rounded at bottom: dorsal behind the centre of gravity: ventrals beneath the middle of the dorsal.

C. Harengus, Linn. *Syst. Nat.* tom. 1. p. 522. *Bloch, Ichth.* pl. 29. f. 1. *Turt. Brit. Faun.* p. 106. *Flem. Brit. An.* p. 182. *Harengus*, *Will. Hist. Pisc.* p. 219. tab. P. 1. f. 2. *British Herring*, *Penn. Brit. Zool.* vol. 111. p. 335. pl. 68. no. 160. *Common Herring*, *Id.* (Edit. 1812.) vol. 111. p. 444. pl. 79. *Hareng commun*, *Cuv. Reg. An.* tom. 11. p. 317.

LENGTH. Ten to twelve inches; sometimes more.

DESCRIPT. (*Form.*) Oval; rather elongated: dorsal and ventral lines equally convex: greatest depth one-fifth of the entire length, excluding caudal: thickness half the depth: sides compressed: belly sharply carinated, but without any sensible serratures: head triangular, very much compressed; one-fifth of the entire length, this last being measured to the base of the caudal fork: lower jaw longer than the upper, with a few minute teeth confined to its extremity; upper jaw with the lower half of the maxillaries finely serrated: a few minute teeth on the tongue, as well as on the vomer: eyes large; their diameter contained about four times and a half in the length of the head: infra-orbitals, preopercle, and upper part of the opercle, marked with fine vein-like striæ: subopercle rounded beneath: gill-opening extremely large: lateral line not very distinct; its course nearly straight, and rather above the middle: scales large, very deciduous: dorsal fin behind the centre of gravity, commencing exactly half-way between the end of the snout and base of the caudal rays; rays rapidly increasing from the first, which is very short, to the fifth, which is longest; then gradually decreasing; the first four simple, the succeeding ones branched: anal commencing beyond the tip of the dorsal, this last being laid back; of about the same length as that fin, but not so high; fourth and some of the succeeding rays longest: caudal deeply forked: pectorals rather narrow, more than half the length of the head: ventrals attached beneath the middle of the dorsal, a vertical line from the first dorsal ray falling considerably in advance of them:

B. 8; D. 19; A. 17; C. 19, and 5 or 6 short ones; P. 17; V. 9.

Number of vertebræ fifty-six. (*Colours.*) Back and upper portion of the sides deep sky-blue, tinged with sea-green: belly and flanks bright silvery: irides, cheeks, and gill-covers, tinged with gold.

A common and well-known species visiting our coasts in large shoals towards the end of Summer. Deposits its roe in October and November, after which it retires again into deep water. Food, according to Pennant, small crustacea; sometimes the fry of its own species.

117. *C. Leachii*, Yarr. (*Leach's Herring*.)

C. Leachii, Yarr. in *Proceed. of Zool. Soc.* (1831.) p. 34. *Id. in Zool. Journ.* vol. v. p. 278. pl. 12.

DESCRIPT. "Much deeper in proportion than the *Common Herring*, an adult fish eight inches long, being one inch and seven-eighths deep, while a *Common Herring* of the same depth measures ten inches and a half in length: dorsal and abdominal lines much more convex; the latter keeled, but without serration: under jaw with three or four prominent teeth placed just within the angle formed by the symphysis; the upper maxillæ with their edges slightly crenated: eye large: scales smaller than in the other species: no distinct lateral line. Back and sides deep blue, with green reflections, passing into silvery white beneath. Dorsal fin behind the centre of gravity; but not so far behind it as in the *Common Herring*: number of fin-rays,

D. 18; A. 16; C. 20; P. 17; V. 9.

Number of vertebræ fifty-four." YARR.

A new species, obtained by Mr. Yarrell in 1831, from fishermen engaged in taking Sprats at the mouths of the Thames and Medway. Found heavy with roe on the 31st of January: probably does not spawn till the middle of February. Flesh said to be much milder than that of the *Common Herring*.

Obs. From the statements made by Mr. Yarrell in the "Zoological Journal*", it seems probable that there may be yet another species of *Herring*, larger than either of those described above, occasionally met with in the British seas. Pennant also speaks of one, seen by Mr. Travis, which measured twenty-one inches and a half in length.

118. *C. Sprattus*, Bloch. (*Sprat.*)—Teeth in the lower jaw obsolete: infra-orbitals and gill-covers not veined: dorsal further back than in the *Herring*; the ventrals beneath its anterior margin: keel of the abdomen serrated: anal with eighteen rays.

C. Sprattus, Bloch, *Ichth.* pl. 29. f. 2. *Turt. Brit. Faun.* p. 107. *Sprattus*, Will. *Hist. Pisc.* p. 221. *Sprat*, Penn. *Brit. Zool.* vol. III. p. 346. *Id.* (Edit. 1812.) vol. III. p. 457. Melet, *Esprot ou Harenguet*, *Cuv. Reg. An.* tom. II. p. 318.

LENGTH. Five inches.

DESCRIPT. Proportions nearly the same as those of the *adult Herring*, but the depth (equalling one-fifth of the entire length, caudal included) considerably greater than in a *young Herring* of the same length: keel of the abdomen more sharply serrated than in that species: teeth in the lower jaw more obsolete, scarcely sensible to the touch: subopercle of nearly the same form; but the veins on the infra-orbitals and preopercle not so distinct: scales larger: dorsal placed a little further back, commencing at the middle point between the end of the snout and the base of the caudal fork: ventrals, in consequence, *relatively* more forward, being slightly in advance of a vertical line from the first dorsal ray: number of fin-rays,

D. 17; A. 18; C. 19, &c.; P. 16; V. 7.

Number of vertebræ forty-eight.

* Vol. v. pp. 279, and 332.

This species has by many authors been confounded with the young of the Herring. Pennant was the first to point out its true distinguishing characters. It is very abundant in the Thames during the Winter, entering the river (according to Pennant) in the beginning of November, and leaving it in March. It is also found on other parts of the coast, but not every-where in plenty. Mr. Couch states*, that he never saw above one specimen of the true Sprat in Cornwall; though the Cornish fishermen apply this name to the young of both the Herring and the Pilchard.

119. *C. alba*, Yarr. (*White-Bait*.)—Minute teeth in both jaws: dorsal further back than in the *Herring*: ventrals beneath the middle of the dorsal: keel of the abdomen serrated: anal with sixteen rays.

C. alba, Yarr. in *Zool. Journ.* vol. iv. pp. 137, and 465. pl. 5. f. 2.
C. latulus, Cuv. *Reg. An.* tom. ii. p. 318. *White-Bait*, Penn.
Brit. Zool. vol. iii. p. 371. pl. 69. no. 176. *Id.* (Edit. 1812.)
 vol. iii. p. 465. pl. 80.

LENGTH. Three to four inches, rarely four inches nine lines.

DESCRIPT. Body more compressed than in the *Herring*, the thickness being less than half the depth: abdominal serratures much sharper than in either the *Herring* or *Sprat*, but not so sharp as in the *Shad*, in which last species they are also of a different form: head one-fourth of the entire length: lower jaw longest: teeth very minute; those in the lower jaw confined to the extremity; upper jaw with the lower half of the maxillaries finely serrated: eyes large; their diameter nearly one-third the length of the head: lateral line distinctly marked, and straight: dorsal a very little further back than in the *Herring* †; ventrals immediately beneath it: number of fin-rays,

D. 19; A. 16; C. 19, &c.; P. 16; V. 9.

Number of vertebræ fifty-six.

Supposed formerly to have been the young of the *Shad* ‡, but clearly proved by Mr. Yarrell to be a distinct species. Found only in the Thames, which river it ascends in April, sometimes as early as the end of March. Abundant throughout the Summer about Greenwich and Blackwall, but never found higher up the river than the locality last mentioned. Supposed to deposit its spawn during Winter. Swims near the surface. Food minute shrimps.

120. *C. Pilchardus*, Bloch. (*Pilchard*.)—Teeth obsolete: infra-orbitals and opercular pieces strongly veined: subopercle square at bottom: dorsal exactly in the centre of gravity: ventrals beneath the posterior half of the dorsal.

* Loudon's *Mag. of Nat. Hist.* vol. v. p. 315.

† Cuvier says *plus avancee*, but I have not found it so in our English specimens, at least in those which I have examined.

‡ The *White-Bait* represented in Donovan's *British Fishes* (vol. v. pl. 98.) are really young *Shads*, and not the above species.

C. Pilchardus, *Bloch, Ichth.* pl. 406. *Don. Brit. Fish.* vol. III. pl. 69. *Turt. Brit. Faun.* p. 106. *Flem. Brit. An.* p. 183. Harengus minor, sive Pilchardus, *Will. Hist. Pisc.* p. 223. tab. P. 1. f. 1. Pilchard, *Penn. Brit. Zool.* vol. III. p. 343. pl. 68. no. 161. *Id.* (Edit. 1812.) vol. III. p. 453. Le Pilchard, ou le Célan, *Cuv. Reg. An.* tom. II. p. 319.

LENGTH. Nine to eleven, rarely twelve, inches.

DESCRIPT. General form resembling that of the *Herring*: the body, however, somewhat thicker and rounder; the depth greater, the dorsal line being more curved: belly not so sharp as in that species, although the abdominal serratures, more especially those in front of the ventrals, are rather more produced: head shorter: lower jaw not so long with respect to the upper: scarcely any perceptible teeth; the maxillaries simply with a few very fine denticulations quite at their lower extremity: diameter of the eye about one-fourth the length of the head: subopercle cut square at bottom, and forming with the preopercle an oblong (not a semicircle as in the *Herring*); both opercle and preopercle, but the last especially, with strongly-marked radiating striæ: scales larger than in the *Herring*: dorsal more forward, and placed exactly in the centre of gravity; the distance from the end of the snout to the first ray, equalling the distance from the last ray to the base of the caudal: caudal deeply forked: pectorals two-thirds the length of the head, attached low down, beneath the subopercle: ventrals rather behind a vertical line from the middle of the dorsal:

B. 6; D. 18; A. 18; C. 19, &c.; P. 16; V. 8.

Principally taken off the coast of Cornwall, where they appear in large shoals towards the end of Summer. The fishery for them commences (according to Mr. Couch) towards the end of July, and terminates about the time of the autumnal equinox. Food undetermined, but thought by Mr. Couch to be the seeds of *fuci*.

(2. ALOSA, *Cuv.*)

121. C. *Finta*, *Cuv.* (*Shad.*)—Distinct teeth in both jaws: a row of dusky spots along each side of the body.

C. *Finta*, *Cuv. Reg. An.* tom. II. p. 320. C. *Alosa*, *Bloch, Ichth.* pl. 30. f. 1. *Don. Brit. Fish.* vol. III. pl. 57. *Turt. Brit. Faun.* p. 106. *Flem. Brit. An.* p. 183. ? *Shad*, *Will. Hist. Pisc.* p. 227. tab. P. 3. f. 1. *Penn. Brit. Zool.* vol. III. p. 348. pl. 69. no. 164. *Id.* (Edit. 1812.) vol. III. p. 460. pl. 80. *Yarr. in Zool. Journ.* vol. IV. pp. 137, and 465. pl. 5. f. 1. (Young.) *Thames Shad*, *Bowd. Brit. fr. wat. Fish.* Draw. no. 19.

LENGTH. From ten to sixteen inches; occasionally rather more.

DESCRIPT. (*Form.*) Much larger in all its dimensions than either the *Herring* or the *Pilchard*: body thicker; also somewhat deeper in proportion to its length: ventral line more convex than the dorsal: abdomen sharply carinated: the serratures much sharper and stronger than in any of the true *Clupeæ*, most developed between the ventrals and the anal: head somewhat triangular; measuring rather more than one-fifth of the entire length: snout short; under jaw relatively longer than in the *Pilchard*, but not so long as in the *Herring*: intermaxillary deeply notched: maxillaries sharply serrated with fine teeth along their whole margin; lower jaw likewise with three or four teeth, much stronger than

the others, on each side near the extremity: tongue smooth, of a triangular form, free, and terminating in a blunt point: eyes placed high on the cheeks; much smaller than in the *Pilchard*, their diameter being scarcely more than one-fifth the length of the head; the distance from them to the edge of the maxillary just equal to their diameter: subopercle as in the *Herring*, but rounded off at bottom more obliquely; preopercle more resembling that of the *Pilchard*, and marked with radiating striæ as in that species, though not quite so distinctly: lateral line scarcely perceptible: scales of moderate size: dorsal placed further back than in the *Pilchard*, but more advanced than in the *Herring*, the distance from the snout to its commencement, when brought behind the fin, reaching to nearly one-third of the caudal; fifth ray longest; the preceding ones gradually increasing from the first, which is very short; first three simple, the rest branched; the last two from one root: anal longer than in the *Pilchard*, and not approaching quite so near the caudal; the intervening space one-seventh of the entire length of the body, caudal excluded: caudal deeply forked: pectorals more than half the length of the head: ventrals beneath the middle of the dorsal.

B. 8; D. 20; A. 21; C. 19, &c.; P. 15; V. 9.

Number of vertebræ fifty-five. (*Colours.*) Back, and upper part of the sides, dusky blue: lower part of the sides, and belly, silvery white, or yellowish, glossed with golden hues: a row of dusky spots, generally five or six in number, but varying in different individuals, along each flank. *Obs.* The *young* of this species are distinguished from *White-Bait* by their greater depth in proportion to their length, smaller eye, bifid snout, the presence of teeth along the *whole* margin of the maxillary, more forward dorsal fin, much sharper, as well as differently formed, abdominal serratures, and by the row of spots on the sides, the first of which, immediately behind the opercle, is never wanting.

A migratory species, entering rivers in May for the purpose of spawning, and returning to the sea about the end of July. Very abundant in the Thames and Severn. In the former river is found as high up as Putney and Hammersmith, where the *White-Bait* is unknown. Feeds, according to Bloch, on worms, insects, and small fish. Spawns about the first week in July. Flesh coarse and insipid. In the Severn is called a *Twaite*, the name of *Shad* being reserved for the next species.

122. *C. Alosa*, Cuv. (*Allis.*)—Jaws without distinct teeth: a single black spot behind the gills.

C. Alosa, Cuv. *Reg. An.* tom. ii. p. 319. *Shad*, Bowd. *Brit. fr. wat. Fish.* Draw. no. 27.

LENGTH. From two to three, sometimes four, feet.

DESCRIPT. (*Form.*) Depth greater than in the last species, equalling rather more than one-fourth of the entire length: maxillaries rough at the edges, but without any distinct teeth: anal a little longer: in all other respects nearly similar: number of fin-rays,

D. 19; A. 26; C. 19, &c.; P. 15; V. 9.

(*Colours.*) Resembling those of the *C. Finta*, but with rarely more than a single dusky spot behind the gills, which is always present.

This species abounds in the Severn, and is also occasionally, though rarely, taken in the Thames, in which last river it is called *Allis*. It

is more esteemed for the table than the *C. Finta*: it also attains to a larger size, weighing from four to five, sometimes even as much as eight, pounds. *Obs.* Either this or the last species is the *Chad* of Jesse*.

GEN. 45. ENGRAULIS, *Cuv.*

123. *E. Encrasicolus*, *Flem.* (*Anchovy*.)

E. Encrasicolus, *Flem. Brit. An.* p. 183. Clupea *Encrasicolus*, *Linn. Syst. Nat.* tom. i. p. 523. *Bloch, Ichth.* pl. 30. f. 2. *Don. Brit. Fish.* vol. III. pl. 50. *Turt. Brit. Faun.* p. 107. *Encrasicolus*, *Will. Hist. Pisc.* p. 225. tab. P. 2. f. 2. *Anchovy*, *Penn. Brit. Zool.* vol. III. p. 347. pl. 67. *Id.* (Edit. 1812.) vol. III. p. 441. pl. 78. *L'Anchois vulgaire*, *Cuv. Reg. An.* tom. II. p. 322.

LENGTH. Six inches and a half. PENN.

DESCRIPT. (*Form.*) Body slender, but thicker in proportion than the *Herring*: eyes large: under jaw much shorter than the upper: teeth small; a row in each jaw, and another on the middle of the tongue: the tongue doubly ciliated on both sides: dorsal consisting of twelve rays, transparent, and placed nearer the nose than the tail: scales large and deciduous: edge of the belly smooth: tail forked. (*Colours.*) Back green, and semipellucid: sides and belly silvery, and opaque: irides white, with a cast of yellow. PENN. According to Donovan, the number of the fin-rays is as follows:

D. 15; A. 14; C. 24; P. 15; V. 7.

Apparently a rare species in the British seas. First obtained by Ray from the estuary of the Dee. Pennant mentions a few which were taken near his house at Downing, in Flintshire, in 1769. Donovan procured a specimen from the coast of Hampshire. More recently single individuals have occurred on the coasts of Norfolk and Durham. Common in the Mediterranean, where there is also (according to Cuvier) a second and smaller species, distinguished by the profile being less convex. Both this last and the British one belong to that section of the genus, in which the belly is smooth without a sharp edge, and the dorsal opposite the ventrals.

(4.) *LEPISOSTEUS*, *Lacép.*

(22.) *L. Gavalis*, *Lacép. Hist. Nat. des Poiss.* tom. v. p. 333. *Esox osseus*, *Linn. Syst. Nat.* tom. i. p. 516. *Bloch, Ichth.* pl. 390. *Berkenh. Syn.* vol. i. p. 81. *Don. Brit. Fish.* vol. v. pl. 100.

Berkenhout was the first to include this species in the British Fauna. He gives us to understand that it had occurred on the Sussex coast. The only other author who has mentioned any locality for it is Stewart, who states † that it has been taken in the Frith of Forth. It is probable, however, that in both these instances there is some error, as the species is a native of America, where it is said to inhabit lakes and large rivers.

* *Gleanings in Nat. Hist.* Second Series, p. 129.

† *Elements of Nat. Hist.* vol. i. p. 374.

(II. SUBBRACHIALES.)

GEN. 46. GADUS, *Linn.*

124. *G. Morrhua*, *Linn.* (*Common Cod.*)—Back and sides spotted with yellow and brown; lateral line white: jaws nearly equal.

G. Morrhua, *Linn. Syst. Nat.* tom. 1. p. 436. *Bloch, Ichth.* pl. 64. *Tart. Brit. Faun.* p. 89. *Don. Brit. Fish.* vol. v. pl. 106. *Asellus major vulgaris*, *Will. Hist. Pisc.* p. 165. tab. L. m. 1. n. 1. f. 4. *Morhuia vulgaris*, *Flem. Brit. An.* p. 191. *Common Cod-Fish*, *Penn. Brit. Zool.* vol. 111. p. 172. *Id.* (Edit. 1812.) vol. 111. p. 231. *La Morue*, *Cuv. Reg. An.* tom. 11. p. 331.

LENGTH. Two to four feet. Has been known (according to Pennant) to reach five feet eight inches.

DESCRIPT. (*Form.*) Oval; elongated; thickest behind the pectorals; somewhat tapering posteriorly: greatest depth about one-fifth of the entire length: dorsal line nearly straight beyond the commencement of the first fin, in front of which it slopes gently downwards to the snout; ventral line more bellying: head large; rather more than one-fourth of the entire length: snout rounded: jaws nearly equal; but sometimes the upper a little the longest: both jaws, as well as the fore part of the vomer, armed with small, sharp, card-like teeth in several rows, of unequal lengths: beneath the symphysis of the lower jaw a single barbule about one inch and a half in length: eyes moderate: head smooth and naked: body covered with small soft scales: a longitudinal groove on the nape extending from behind the eyes to the commencement of the first dorsal: lateral line arising from the upper part of the opercle, curving gently downwards till beneath the twelfth ray of the second dorsal, then passing off straight to the caudal; beneath the first dorsal, its course is about one-fifth of the depth: three dorsals: the first commencing at nearly one-third of the length; of a somewhat triangular form: its length rather greater than its height, which last equals about one-third of the depth of the body; first ray only half the length of the second; third, fourth, and fifth, rays longest; succeeding ones gradually diminishing; the last ray very small: second dorsal almost immediately behind the first, of the same height, but its length half as much again; third, fourth, and fifth, rays longest: third dorsal resembling the first, but rather longer; fourth, fifth, and sixth, rays longest; the first ray very short: two anals; the first nearly corresponding to the second dorsal, beginning a little backward, but terminating in the same line; first ray very small, and easily overlooked; seventh and eighth longest: second anal answering exactly to the third dorsal: caudal nearly even at the extremity; the rays proceeding principally from the sides of the tail, which is prolonged into the middle of the fin: pectorals rounded, rather less than half the length of the head; fifth ray longest; all the rays, except the first two, branched: ventrals a little shorter than the pectorals, placed before them, narrow, and pointed: third ray longest: number of fin-rays,

D. 12—20—19; A. 19—17; C. 34, and several short ones; P. 19; V. 6.

(Colours.) Back, head, and upper half of the sides, cinereous brown, obscurely spotted with yellow; lower half of the sides, and abdomen, white: lateral line forming a narrow white band, very conspicuous on the dusky ground: fins dusky; ventrals pale, approaching to white.

A common species on most parts of the coast, but said to increase in numbers towards the North. According to Dr. Fleming, the most extensive fisheries in our seas are off the Western Isles and the coast of Zetland. Spawns in the early part of the Spring. Food, worms, crustacea, shell-fish, &c. Has been known to attain the weight of seventy-eight pounds.

- (23.) *G. Callarias*, Linn. Syst. Nat. tom. i. p. 436. Bloch, Ichth. pl. 63. Berkeih. Syn. vol. i. p. 67. Turt. Brit. Faun. p. 89. Nilss. Prod. Ichth. Scand. p. 40. *Asellus varius vel striatus*, Will. Hist. Pisc. p. 172. tab. L. m. i. n. 1. f. 1. *Variable Cod-Fish*, Penn. Brit. Zool. (Ed. 1812.) vol. III. p. 239. *Le Dorsch*, Cuv. Reg. An. tom. II. p. 332.

This species, which is common in the Northern seas, especially in the Baltic, has been included in the British Fauna by Berkenhout, Turton, and the Editor of the last edition of Pennant's Zoology; its claims to insertion, however, must be considered as rather doubtful. It is probable that by some observers it has been confounded with a variety of the last species, in which the upper jaw projects a little beyond the lower, though never so much as in the *G. Callarias*, in which this character forms a striking feature. According to Cuvier, the true *G. Callarias* is usually of much smaller size than the *G. Morrhu*. Nilsson states its length to be from one to two feet. The same observer has annexed a distinguishing character between the two species, which it may be well to repeat here for the guidance of our own naturalists, in the event of the *G. Callarias* being really an inhabitant of the British seas. He remarks, that in the *G. Morrhu*, the length of the lower jaw equals half that of the head, also equals the distance from the snout to the posterior margin of the orbit: in the *G. Callarias*, it is shorter than half the length of the head, and equals the distance from the snout to the middle of the eye. The colours of this last species, upon which some authors appear to have relied, are said to be extremely variable.

The *G. Callarias* has been sometimes distinguished by the English name of *Dorse*. Its flesh (according to Cuvier) is reckoned superior to that of the Common Cod.

125. *G. Æglefinus*, Linn. (*Haddock*.)—Lateral line, and a large spot behind the pectorals, black: upper jaw longest.

- G. Æglefinus*, Linn. Syst. Nat. tom. i. p. 435. Bloch, Ichth. pl. 62. Don. Brit. Fish. vol. III. pl. 59. Turt. Brit. Faun. p. 89. Onos, Will. Hist. Pisc. p. 170. tab. L. m. i. n. 2. *Morhu* Æglefinus, Flem. Brit. An. p. 191. *Haddock*, Penn. Brit. Zool. vol. III. p. 179. *Id.* (Edit. 1812.) vol. III. p. 241. *L'Ægrefin*, Cuv. Reg. An. tom. II. p. 331.

LENGTH. From eighteen inches to two feet; rarely more.

DESCRIPT. (*Form.*) Rather more elongated, in proportion to its depth, than the *Common Cod*: barbule on the chin shorter: nape with an elevated ridge instead of a groove: upper jaw considerably the longest: lateral line hardly so much curved: first dorsal more decidedly triangular; the second and third rays longest, and more elevated above the others: third dorsal of the same length as the first, but not so

high, the rays being more nearly equal: first and second anals answering to the second and third dorsals respectively: insertion of the pectorals in a line with the first ray of the first dorsal: ventrals narrow and pointed; the second ray longest: caudal forked: number of fin-rays,

D. 16—21—19; A. 24—20; C. about 40, besides short ones; P. 21; V. 6:

scales small; firmly attached to the skin: vent in a line with the commencement of the second dorsal. (*Colours.*) Dusky brown: belly, and lower part of the sides, silvery: lateral line black: a large black spot on each side of the body, behind the pectorals and beneath the first dorsal.

An abundant species on all parts of the coast, particularly during Winter. Migrates northwards in Spring. Keeps in large shoals. Spawns in February.

(24.) *G. punctatus*, Turt. Brit. Faun. p. 90. *Morhua punctatus*, Flem. Brit. An. p. 192.

"Body eighteen inches long, slightly arched on the back, a little prominent on the belly, covered above with numerous gold-yellow roundish spots, beneath with dusky specks which are stellate under a glass: head large, gradually sloping: teeth small, in several rows in the upper jaw, in the lower a single row: nostrils double: iris reddish, pupil black: chin with a single beard: nape with a deep longitudinal groove: lateral line nearer the back, curved as far as the middle of the second dorsal fin, growing broader and whiter towards the end: upper fins and tail brown, with obscure yellowish spots, and darker towards the ends; lower ones tinged with green: vent near the middle of the body: scales small; under a glass minutely speckled with brown: gill-covers of two pieces: lower jaw with five obscure punctures on each side:

D. 14—20—18; A. 19—16; P. 13; V. 6,

the first ray shorter than the second, and divided a little way down; C. 36, even at the extremity." TURT.

This supposed species, which I am not acquainted with, is stated by Dr. Turton as being frequently taken in the Weirs at Swansea. No other author appears to have noticed it. I would venture to suggest that it is only a variety of the *G. Morrhuæ*.

126. *G. luscus*, Linn. (*Bib*, or *Pout*.)—Depth one-fourth of the length: first, anal commencing nearly in a line with the first dorsal.

G. luscus & *barbatus*, Linn. *Syst. Nat.* tom. i. p. 437. Turt. *Brit. Faun.* p. 90. *G. barbatus*, Bloch, *Ichth.* pl. 166. *G. luscus*, Don. *Brit. Fish.* vol. i. pl. 19.? *Morhua lusca* & *barbata*, Flem. *Brit. An.* p. 191. *Bib* and *Blinds* (*Cornubiensibus*), Asellus *luscus*, Will. *Hist. Pisc.* p. 169. *Asellus mollis latus*, *Id.* *App.* p. 22. tab. L. m. 1. n. 4. *Pout* & *Bib*, Penn. *Brit. Zool.* vol. iii. pp. 183, & 184. pl. 30. no. 76. *Id.* (Edit. 1812.) vol. iii. pp. 246, & 247. pl. 34.

LENGTH. From ten to twelve inches, seldom more.

DESCRIPT. (*Form.*) Remarkable for the great depth of the body, equalling, at least, one-fourth of the entire length: sides compressed: back slightly arched, and somewhat carinated; nape in particular offering a sharp ridge, which commences in a line with the eyes, and extends nearly to the dorsal: head about one-fourth of the entire length, ex-

cluding caudal: snout obtuse and rounded: upper jaw a little the longest: a single row of sharp moderately long teeth in the lower jaw; the same in the upper with a band of smaller teeth behind: barbule at the chin about one-fourth the length of the head: eyes large; their diameter one-third the length of the head; invested with a loose membranous skin capable of inflation; the distance between the eyes less than their diameter: scales not particularly large: lateral line curved, the flexure taking place beneath the commencement of the second dorsal; anterior to which its course is at rather more than one-fourth of the depth: beneath the lower jaw, on each side, a row of seven or eight open pores: fins thick, fleshy at the base, invested with a loose skin: first dorsal commencing at about one-third of the entire length, excluding caudal; second and third rays longest; fourth and succeeding ones gradually decreasing; the last very short; greatest height of this fin about two-thirds the depth of the body: second dorsal commencing at a very short interval after the first; more than twice its length; third ray longest: third dorsal closely following the second; in length, a little exceeding the first; third and fourth rays longest: first anal commencing in a line with the second ray of the first dorsal, and terminating in a line with the last ray of the second dorsal; the rays gradually increasing to the eleventh, which is longest, the first being very short: second anal immediately following the first; answering to the third dorsal; fourth ray longest: caudal nearly even: pectorals about three-fourths the length of the head; third and fourth rays longest: ventrals long and narrow; the first two rays very much produced beyond the others, terminating in slender filaments; the second, which is the longer, rather more than equalling the length of the pectorals: number of fin-rays,

D. 12—23—19; A. 35—21; C. 31, and some short ones; P. 18; V. 6:

vent directly beneath the commencement of the first dorsal. (*Colours.*) Whitish, inclining to dusky olivaceous on the back; sides tinged with yellow: fins dusky, becoming paler at the base; a dusky spot at the root of the pectorals.

Common all along the southern coast, where it is taken in considerable quantities for the table. Found also in other places. It is the *Whiting Pout* of the London market. *Obs.* I have ventured to bring together (as Bloch has already done before me) the *G. luscus* and *G. barbatus* of authors, under a strong belief that they form but one species*. Should

* This opinion has not been adopted hastily. I have in vain sought for any author who has described both the supposed species from his own observation, and after a due comparison of their respective characters. The error of considering them as distinct appears to have originated with Ray, the Editor of Willughby's Ichthyology. It would seem that Willughby was the first to describe a fish (called in Cornwall *Bib* or *Blinds*) under the name of *Asellus luscus*, a species evidently the same as the *Pout* of the Southern coast, to which Willughby's description, as far as it goes, applies exactly. After that the body of his work was printed, Ray, his Editor, appears to have received from Martin Lister, along with other novelties, a short account of the *Whiting Pout* of the London market, to which he gave a separate place in the Appendix, never suspecting that it might be the same as what had been already described by Willughby under the name of *Bib*. Hence the two nominal species, which were afterwards perpetuated by Ray in his "Synopsis Piscium;" and either to that work or Willughby's, the descriptions of all succeeding authors, so far as regards one of the species, when they have noticed both, may ultimately be traced. This is the case with Artedi, in the instance of the *G. luscus*. He simply refers to Ray and Willughby, annexing a short character, apparently taken from the description by the author last mentioned. This character is repeated by Linnæus in his "Systema Naturæ," accompanied by a reference to Artedi. Pennant's account of the two species is partly copied, and partly original: his description of the *Pout* is perhaps his own; but that of the *Bib* is in a great measure taken from Willughby, and although he has made one or two additional remarks, as well as annexed a figure, I question whether these were derived from any fish specifically distinct from his *Whiting Pout*. Gmelin, who, with respect to the *G. luscus*, only compiles from Willughby and Pennant, appears to have suspected that the two fish were not really different. Berkenhout states nothing beyond what is mentioned either by Willughby, Pennant, or Gmelin. Turton's descriptions of the two species are evidently compiled from Pennant and Gmelin, excepting as regards the number of fin-rays in the *G. luscus*, in which there is manifestly some error. Lastly,

I be wrong in holding this opinion, the minute description which I have given above of the *Pout*, as it occurs at Hastings, where my specimens were obtained, will not be without its use in enabling future observers to point out more precisely than has been hitherto done, the essential differences between it and the true *G. luscus*.

(25.) *Lord-Fish*.

Mr. Yarrell possesses the drawing of a fish (itself, unfortunately, not preserved) which was brought to him some years since, under the above name, by the Thames fishermen, and which was said to have been taken at the mouth of that river. In general form, it approaches the *G. luscus*, but it differs remarkably from that species, in having the first anal much shorter, and more rounded, commencing at a further distance from the head, and leaving a considerable space between itself and the second anal; the vent also, which in *G. luscus* is in a line with the commencement of the first dorsal, is here in a line with the commencement of the second dorsal, or hardly so far advanced, being nearer the tail than the head. The number of fin-rays is as follows:

D. 14—19—18; A. 17—11; C. 24; P. 14; V. 6.

It is impossible to do more than thus briefly indicate the existence of a fish, which, if not a case of accidental deformity*, may hereafter turn out to be an undescribed species.

127. *G. minutus*, Linn. (*Poor*).—Depth one-fifth of the length: first dorsal entirely before the first anal.

G. minutus, Linn. *Syst. Nat.* tom. i. p. 438. Bloch, *Ichth.* pl. 67. f. 1. *Turt. Brit. Faun.* p. 90. Asellus mollis minor, Will. *Hist. Pisc.* p. 171. tab. L. m. 1. n. 1. f. 2. Morhua minuta, Flem. *Brit. An.* p. 191. Poor or Power, Jago in *Ray's Syn. Pisc.* p. 163. fig. 6. Penn. *Brit. Zool.* vol. iii. p. 185. pl. 30. no. 77. *Id.* (Edit. 1812.) vol. iii. p. 249. pl. 34.

LENGTH. From six to eight inches.

DESCRIPT. The smallest species in the genus, but more elongated in proportion than the *G. luscus*: greatest depth one-fifth of the entire length: head contained nearly five times in the same: lateral line nearly straight: a row of very distinct open pores, six or seven in number, commencing near the corner of the mouth, on each side of the head, and extending along the preopercle: distance from the end of the snout to the commencement of the first dorsal considerably less than one-third of the entire length: vent in a line with the tenth ray of the fin just mentioned: first dorsal entirely before the first anal, this last commencing nearly in the same line as that in which the former terminates: number of fin-rays,

D. 13—24—20; A. 23—24; P. 13; V. 6.

In all other respects, the *form* of this species is similar to that of the *G. luscus*. The *colour*, according to Pennant, is light brown on the back, and dirty white on the belly.

Dr. Fleming compiles from Willughby and Pennant. I would beg to ask, after this statement, what is the value of our authority for considering these species as distinct? In further confirmation of their identity, I may add that Mr. Yarrell has received from Mr. Couch, of Cornwall, a drawing of the fish which is called *Bib* on that coast, and that it proves in every respect to be the same as the *Whiting Pout* of the London market.

* This has been suggested by Mr. Yarrell, who hints that it may possibly be only a monstrous variety of the *G. Morhua*, and that the name of *Lord-Fish*, given it by the fishermen, may be due to this circumstance.

First noticed as a British species by Jago, who obtained it on the Cornish coast, where it has been since observed by Mr. Couch. The specimen described above was caught at Weymouth, and measured eight inches in length, considerably exceeding the size usually assigned by authors to this species. Said to be very abundant in the Mediterranean, and to go in large shoals. According to Willughby and Bloch, it is peculiarly characterized internally by the *peritonæum* being black.

GEN. 47. MERLANGUS, *Cuv.*

128. *M. vulgaris*, Flem. (*Whiting*.) — Upper jaw longest: lateral line nearly straight.

M. vulgaris, *Flem. Brit. An.* p. 195. *Gadus Merlangus*, *Linn. Syst. Nat.* tom. i. p. 438. *Bloch, Ichth.* pl. 65. *Turt. Brit. Faun.* p. 91. *Don. Brit. Fish.* vol. ii. pl. 36. *Asellus mollis major seu albus*, *Will. Hist. Pisc.* p. 170. tab. L. m. 1. n. 5. *Whiting*, *Penn. Brit. Zool.* vol. iii. p. 190. *Id.* (Edit. 1812.) vol. iii. p. 255. *Merlan commun*, *Cuv. Reg. An.* tom. ii. p. 332.

LENGTH. From twelve to sixteen, rarely twenty, inches.

DESCRIPT. (*Form.*) More slender and elongated than the *Common Cod*: greatest depth one-sixth of the entire length: head about one-fourth: snout a little pointed: upper jaw very sensibly the longest: teeth above in several rows; the outer row longer than the others, and appearing beyond those in the lower jaw, when the mouth is closed; these last forming but a single row: eyes round, large: their diameter about one-fifth the length of the head: no longitudinal groove on the nape: lateral line nearly straight, showing only a slight flexure beneath the commencement of the second dorsal: scales small: first dorsal commencing at about one-third of the entire length; of a triangular form, its length and greatest elevation about the same, equalling two-thirds of the depth of the body; third, fourth, and fifth, rays longest: second dorsal commencing after a very short interval, much longer than the first, but in other respects similar: third dorsal resembling the second, and commencing after about the same interval: fourth and fifth rays longest: vent in a line with the fourth ray of the first dorsal: first anal commencing immediately behind it, and terminating a little beyond a vertical line from the end of the second dorsal: first seven rays gradually increasing in length from the first, which is extremely short; eighth and some of the succeeding rays longest, and nearly even; last five or six gradually decreasing: second anal answering to the third dorsal: caudal nearly even: pectorals a little in advance of the first dorsal; rather more than half the length of the head; third and fourth rays longest: ventrals narrow and tapering, rather shorter than the pectorals; second ray much longer than the others: number of fin-rays,

D. 15—19—20; A. 32—21; C. 31, and some short ones; P. 19; V. 6.

(*Colours.*) Back, and upper part of the sides, pale brown, or reddish gray, generally without spots: belly silvery: lateral line whitish: a dusky spot at the roots of the pectoral fins.

A common species, taken in large quantities for the table during the spring and summer months. Said to keep in large shoals at the distance of two or three miles from the shore.

129. *M. Pollachius*, Flem. (*Pollack*).— Lower jaw considerably the longest: lateral line curved, and dark coloured: caudal slightly forked.

M. Pollachius, *Flem. Brit. An.* p. 195. *Gadus Pollachius*, *Linn. Syst. Nat.* tom. i. p. 439. *Bloch, Ichth.* pl. 68. *Don. Brit. Fish.* vol. i. pl. 7. *Turt. Brit. Faun.* p. 91. Asellus Huitingo-Pollachius, *Will. Hist. Pisc.* p. 167. *Pollack, Penn. Brit. Zool.* vol. III. p. 188. *Id.* (Edit. 1812.) vol. III. p. 254. Lieu, ou Merlan jaune, *Cuv. Reg. An.* tom. II. p. 333.

LENGTH. From two feet to two feet nine inches.

DESCRIPT. (*Form.*) Not so much elongated as the *Whiting*: depth greater, equalling (beneath the first dorsal) one-fourth of the whole length, excluding caudal: ventral line more convex than the dorsal: head long, contained three times and a half in the entire length: snout a little depressed: lower jaw considerably the longest: teeth smaller and finer than those of the *Whiting*: lateral line with a strongly marked flexure beneath the termination of the first dorsal; its course, before the bend, running at one-fourth of the depth, after it, at nearly one-half: first dorsal resembling that of the *Whiting*: second twice the length of the first: third rather more than half the length of the second: vent in a line with the third ray of the first dorsal: anals much as in the *Whiting*: caudal slightly forked: length of the pectorals about half that of the head: ventrals much smaller than in the *Whiting*; only one-third the length of the pectorals; second ray longest: number of fin-rays,

D. 14—21—19; A. 28—21; C. 31, and several short ones; P. 19; V. 6.

(*Colours.*) Upper part of the head, back, and a portion of the sides, grayish or dusky brown, sometimes inclining to green; the rest of the sides, and lower part of the body, whitish; these two colours separated by a well-defined line, coinciding with the lateral line along the first half of its course, but leaving it at the flexure: lips and fins dusky, with a tinge of dull red.

Not uncommon off Weymouth and Scarborough, and other rocky parts of the British coast. The specimen described above was caught at Hastings, and measured thirty-three inches in length, being above the usual size of this species. Is sometimes called a *Whiting Pollack*.

130. *M. Carbonarius*, Flem. (*Coal-Fish*).— Lower jaw longest: lateral line straight, and white: caudal deeply forked.

M. Carbonarius, *Flem. Brit. An.* p. 195. *Gadus Carbonarius*, *Linn. Syst. Nat.* tom. i. p. 438. *Bloch, Ichth.* pl. 66. *Don. Brit. Fish.* vol. i. pl. 13. *Turt. Brit. Faun.* p. 91. Asellus niger, *Will. Hist. Pisc.* p. 168. tab. L. m. 1. n. 3. *Coal-Fish, Penn. Brit. Zool.* vol. III. p. 186. pl. 31. no. 78. *Id.* (Edit. 1812.) vol. III. p. 250. pl. 35. Merlan noir, *Cuv. Reg. An.* tom. II. p. 332.

LENGTH. Two to three feet.

DESCRIPT. (*Form.*) Resembling the last species, but more elongated; greatest depth about one-fifth of the entire length: head a little shorter: profile rather more convex: lower jaw not projecting so far beyond the

upper: lateral line perfectly straight throughout its whole course: dorsal and anal fins much as in the *Pollack*: ventrals rather longer than in that species: caudal more deeply forked: number of fin-rays,

D. 14—19—22; A. 26—24; C. 31, &c.; P. 21; V. 6.

(*Colours.*) Head, back, upper part of the sides, and dorsal fins, brown, dusky, or deep black; varying in different specimens: lateral line, belly, ventral and anal fins, whitish. According to Pennant, the dark colour of the back and sides deepens with age.

Equally common with the last species, but taken in most abundance on the northern coasts of the Island. Said by Pennant to swarm about the Orkneys, where the young are much used by the poor as an article of food. Is called in Cornwall a *Rauning Pollack*.

131. *M. virens*, Flem. (*Green Cod*).—"Jaws equal: lateral line straight."

M. virens, *Flem. Brit. An.* p. 195. *Gadus virens*, *Linn. Syst. Nat.* tom. i. p. 438. *Neill in Wern. Mem.* vol. i. p. 532. *Green Cod*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. p. 253.

LENGTH. Less than a foot. FLEM.

DESCRIPT. "Smooth; dusky green on the back, silvery in every other part: jaws of equal length; side-line straight; tail forked." PENN. According to Fleming, the number of fin-rays is,

D. 15—24—19; A. 27—22; P. 22; V. 6.

This species, which I have not seen, is said by Mr. Neill to resemble the young Coal-Fish. Pennant first included it in the British Fauna, on the authority of Sir John Cullum. Dr. Fleming states, that it is frequently taken in the Frith of Forth, during Summer.

GEN. 48. MERLUCCIUS, *Cuv.*

132. *M. vulgaris*, Flem. (*Common Hake*).—"Whitish, grayish on the back: lower jaw longest."

M. vulgaris, *Flem. Brit. An.* p. 195. *Gadus Merluccius*, *Linn. Syst. Nat.* tom. i. p. 439. *Bloch, Ichth.* pl. 164. *Don. Brit. Fish.* vol. ii. pl. 28. *Turt. Brit. Faun.* p. 91. *Asellus primus*, *Will. Hist. Pisc.* p. 174. tab. L. m. 2. n. 1. *Hake*, *Penn. Brit. Zool.* vol. iii. p. 191. *Id.* (Edit. 1812.) vol. iii. p. 257. *Merlus ordinaire*, *Cuv. Reg. An.* tom. ii. p. 333.

LENGTH. From eighteen inches to nearly three feet. PENN.

DESCRIPT. Of a slender elongated form: head large, broad, and flat-tish: mouth very wide: lower jaw longest: teeth very long and sharp, particularly those of the lower jaw: near the eyes four small perforations: lateral line straight, nearer the back, beginning with several small tubercles near the head: vent nearer the head: first dorsal small, and pointed: the second reaching from the base of the first almost to the tail; the last rays highest: pectorals and ventrals pointed: caudal nearly even: number of fin-rays,

D. 9—38 to 40; A. 36 to 39; C. 18; P. 12 to 15; V. 7 or 8. PENN. & TURT.

Said to be found in vast abundance on many of our coasts, particularly those of Ireland. Rare, according to Fleming, in Scotland. A coarse fish, and seldom admitted to table.

GEN. 49. LOTA, *Cuv.*

133. *L. Molva*, Nob. (*Ling.*)—Above gray, inclining to olive; beneath silvery: upper jaw longest.

Gadus Molva, *Linn. Syst. Nat.* tom. i. p. 439. *Bloch, Ichth.* pl. 69. *Turt. Brit. Faun.* p. 91. *Don. Brit. Fish.* vol. v. pl. 102. *Asellus longus*, *Will. Hist. Pisc.* p. 175. tab. L. m. 2. n. 2. *Molva vulgaris*, *Flem. Brit. An.* p. 192. *Ling, Penn. Brit. Zool.* vol. iii. p. 197. *Id.* (Edit. 1812.) vol. iii. p. 262. *Lingue, Cuv. Reg. An.* tom. ii. p. 333.

LENGTH. (*Average.*) From three to four feet. Pennant mentions having heard of one which reached seven feet.

DESCRIPT. (*Form.*) Body slender, more elongated than that of the *Hake*, roundish; head flat; gape large; lower jaw shorter than the upper, with a single barbule at its extremity; teeth in the upper jaw small, and very numerous; those in the lower longer and larger, forming but a single row; lateral line straight; scales small, firmly adhering to the skin: two dorsals; of equal height: first short, commencing near the head, not pointed as in the *Hake*, but with most of the rays even: second long, immediately behind the first, reaching nearly to the caudal; the posterior portion the most elevated: vent in a line with the eighth or ninth ray of the second dorsal: anal immediately behind it, long, resembling the second dorsal, and terminating in the same line with that fin posteriorly: caudal rounded at the extremity: number of fin-rays,

D. 15—65; A. 67; C. 40; P. 15; V. 6*.

(*Colours.*) Back and sides gray, inclining to olive; sometimes cinereous, without the olivaceous tinge; belly silvery; ventrals white; dorsal and anal edged with white; caudal marked near the end with a transverse black bar, the extreme tip white.

Not an uncommon species on many parts of the coast. Said by Pennant to abound about the Scilly Isles, on the coasts of Scarborough, and those of Scotland and Ireland. Approaches the land in January and February, according to Mr. Couch, in order to deposit its spawn. Very prolific. Feeds on other fish.

134. *L. vulgaris*, Nob. (*Burbot.*) — Yellowish or olivaceous brown, with darker blotches: jaws equal.

Gadus Lota, *Linn. Syst. Nat.* tom. i. p. 440. *Bloch, Ichth.* pl. 70. *Turt. Brit. Faun.* p. 91. *Don. Brit. Fish.* vol. iv. pl. 92. *Mustela fluviatilis*, *Will. Hist. Pisc.* p. 125. tab. H. 3. f. 4. *Molva Lota*, *Flem. Brit. An.* p. 192. *Burbot, Penn. Brit. Zool.* vol. iii. p. 199. *Id.* (Edit. 1812.) vol. iii. p. 265. *Barbolt, Bowd. Brit. fr. wat. Fish.* Draw. no. 30. *Lotte commune, Cuv. Reg. An.* tom. ii. p. 334.

LENGTH. From one to two feet; sometimes more.

DESCRIPT. (*Form.*) Body elongated, thick and roundish anteriorly, but much compressed behind: dorsal line nearly straight, but the ventral

* The above fin-ray formula is from Turton.

rather convex: greatest depth between one-fifth and one-sixth of the entire length: head broad and depressed: snout short and rounded: jaws equal; each with a band of rasp-like teeth: beneath the chin a single barbule, not one-third the length of the head: gape large: eyes round, moderate: gill-opening large; the membrane uniting with that on the opposite side under the throat: head naked: scales on the body minute, deeply imbedded, and invested with a slimy mucus: lateral line straight, not very distinct: dorsals of equal height; the first short, and slightly rounded, commencing at one-third of the entire length; the second long, closely following the first, and carried on quite to the caudal, to the base of which it is united; height of the second dorsal uniform throughout, only the first and last rays shorter than the others: vent a little before the middle of the entire length, excluding caudal; anal immediately behind it, carried on likewise very nearly to the caudal, but not extending quite so far as the second dorsal: caudal rounded: pectorals rounded, shorter than the head: ventrals of about the same length, narrow and pointed; the second ray much longer than the others: number of fin-rays,

D. 13—71; A. 68; C. 48, including short ones; P. 20; V. 7.

(Colours.) Yellowish brown, blotched and stained with dark olivaceous brown; sometimes of a uniform dark olivaceous brown: head approaching to dusky: belly yellowish white.

The only species of this family inhabiting fresh water. Not uncommon in Cambridgeshire, where it is called an *Eel-Pout*. Found also (according to Pennant) in the Trent, in the river Witham, and in the great East Fen in Lincolnshire; but not generally distributed over the country. Frequents lakes and rivers. In England, seldom attains a greater weight than three pounds, but on the Continent is said sometimes to reach ten or twelve. Spawns (according to Bloch) in the months of December and January. Feeds on other fish, worms, and aquatic insects. Very tenacious of life: will live a long time out of water. Flesh excellent eating.

GEN. 50. MOTELLA, Cuv.

135. *M. tricirrata*, Nilss. (*Three-bearded Rock-Ling*.)

—Reddish yellow, spotted with black: two barbules on the snout; and one at the symphysis of the lower jaw.

M. tricirrata, Nilss. *Prod. Ichth. Scand.* p. 48. *Gadus tricirratus*, Bloch, *Ichth.* pl. 165. *Don. Brit. Fish.* vol. 1. pl. 2. *Turt. Brit. Faun.* p. 92. *Flem. Brit. An.* p. 193. *Rock-Ling*, Jago in *Ray's Syn. Pisc.* p. 164. fig. 9. *Three-bearded Cod*, Penn. *Brit. Zool.* vol. III. p. 201. pl. 33. no. 87. *Id.* (Edit. 1812.) vol. III. p. 267. pl. 36. *Mustèle commun*, Cuv. *Reg. An.* tom. II. p. 334.

LENGTH. (*Average*.) From twelve to fifteen inches. According to Pennant, sometimes reaches nineteen inches.

DESCRIPT. (*Form*.) Body elongated; approaching cylindric anteriorly, compressed behind: depth tolerably uniform throughout, equaling, behind the pectorals, one-seventh of the entire length: thickness, at the same part, more than three-fourths of the depth: head depressed;

rather more than one-fifth of the entire length: snout short, broad, and rounded: gape wide: upper jaw a little the longest: a broad band of velvet-like teeth in each jaw, with a single row of longer conical ones *behind* them in the lower, *before* them in the upper: sharp card-like teeth on the front of the vomer: two barbules on the upper part of the snout, in advance of the nostrils; a third at the symphysis of the lower jaw; these three barbules of equal length, each measuring one-fourth that of the head: gill-opening large; the membranes uniting under the throat as in the *Burbot*: scales very small; the skin every-where soft, and covered with a mucosity: lateral line bending downwards beneath the commencement of the second dorsal, and gradually altering its course from one-fifth to one-half the depth: first dorsal commencing in a line with the gill-opening, situate in a deep groove, about half the length of the head; all the rays detached, fine and hair-like, scarcely showing themselves above the groove, numerous; the first ray stouter and longer than the others: second or true dorsal immediately behind the first; long, running nearly to, but not connected with, the caudal; its height, except just at its commencement, uniform, being rather more than one-third the depth of the body: vent exactly in the middle of the entire length, caudal excluded; anal immediately behind it, resembling the second dorsal, and terminating in the same line with that fin: caudal, and also the pectorals, rounded: ventrals narrow; the first two rays longer than the others, with the intervening membrane deeply divided: number of fin-rays,

2nd D. 56; A. 48; C. 24, and some short ones; P. 19; V. 7.

(*Colours.*) "Head and body reddish yellow, marked above the lateral line with large black spots: dorsal fin and caudal darker; anal of a brighter red, but all spotted." PENN.

Frequents rocky shores, but is far more rare in the British seas than the next species. The specimen which furnished the above description, was taken at Weymouth. Is sometimes called the *Whistle-Fish*.

136. *M. Mustela*, Nilss. (*Five-bearded Rock-Ling*.)
—Olive-brown: four barbules on the snout; and one at the symphysis of the lower jaw.

M. Mustela, Nilss. *Prod. Ichth. Scand.* p. 49. *Gadus Mustela*, Linn. *Syst. Nat.* tom. 1. p. 440. *Don. Brit. Fish.* vol. 1. pl. 14. *Turt. Brit. Faun.* p. 92. *Flem. Brit. An.* p. 193. *Five-bearded Cod*, Penn. *Brit. Zool.* vol. III. p. 202. pl. 33. no. 88. *Id.* (Edit. 1812.) vol. III. p. 268. pl. 36.

LENGTH. About the same as that of the last species.

DESCRIPT. (*Form.*) Differs from the last species, which it closely resembles, in having two additional barbules, rather shorter than the other ones, at the extremity of the upper lip: head shorter: upper jaw more projecting: teeth not quite so strongly developed; eyes smaller: all the fins similar, but the first ray of the first dorsal much longer and stouter with relation to the other rays in that fin: number of fin-rays,

2nd D. 51; A. 43; C. 24, &c.; P. 16; V. 7;

the dorsal and anal always containing fewer than in the *M. tricirratu*s, by about five rays. (*Colours.*) Back and sides deep olive-brown, some-

times inclining to green; generally without spots: belly whitish, tinged with silvery.

Much more abundant than the *M. tricirrata*, and met with on most parts of the British coast. By Willughby, the two species were considered simply as varieties of one, which he describes under the general name of *Mustela vulgaris**. Some modern authors, amongst whom may be reckoned Mr. Couch †, are inclined to the same opinion.

137. *M. glauca*, Nob. (*Mackerel Midge*.) — “Back bluish green; all besides silvery: five barbules.”

Midge (Ciliata glauca), *Couch in Loud. Mag. of Nat. Hist.* vol. v. p. 15. fig. 2. and p. 741.

LENGTH. One inch three lines. COUCH.

DESCRIPT. “Body moderately elongated, the proportions much resembling those of the *Whiting*: head obtuse: upper jaw longest, having four barbs, the under jaw one; teeth in both jaws: gill-membrane with seven rays: eyes large and bright: pectoral and ventral fins rather large for the size of the fish: a ciliated membrane placed in a cink behind the head: the dorsal and anal fins reaching almost to the tail, which last is large and straight: scales deciduous. Colour of the back bluish green: belly and fins silvery.” COUCH.

This fish, which has been noticed only by Mr. Couch, will probably prove eventually to be the fry of some other species. This gentleman states that it is found in multitudes on the Cornish coast, swimming near the surface; and that it is migratory, making its first appearance about the middle of May. When Winter approaches, they disappear; he is disposed, however, to think that they do not go to a great distance.

(26.) *Gadus argenteolus*, Mont. in Wern. Mem. vol. II. p. 449. *Flem. Brit. An.* p. 193.

“Head obtuse: cirri three; two before the nostrils, and one on the chin: upper jaw longest: eyes lateral; irides silvery: all the fins of a pale colour, and the whole fish of a silvery resplendence, except the back, which is blue, changeable to dark green: pectorals rounded, with sixteen or eighteen rays: ventrals with six or seven, the middle ray considerably the longest, and placed much before the pectorals: first dorsal commencing above the gills; the rays very minute and obscure, the first excepted, which is much the longest, but more than thirty have been counted: second dorsal commencing close to the other, in a line with the end of the pectorals, and terminating close to the caudal; the rays innumerable: anal beginning immediately behind the vent, and terminating even with the dorsal: caudal nearly even at the end. Length about two inches.” MONT.

This fish is supposed by Montagu to constitute a new species. He mentions having noticed many of them thrown upon the shore in the South of Devonshire, in the Summer of 1808, and adds, that he had taken two or three since. The fishermen, he observes, called it *White-Bait*. It has, however, so much the character of the fry of some larger species, that it cannot be viewed without doubt. Had it not been said to possess but three cirri, I should have thought it the same as Mr. Couch's *Mackerel Midge*. Montagu appears to be quite certain that it is not the young of the *Motella tricirrata*.

* *Hist. Pisc.* p. 121.

† See *Linn. Trans.* vol. XIV. p. 73.

GEN. 51. BROSMUS, *Flem.*138. *B. vulgaris*, *Flem.* (*Torsk.*)

B. vulgaris, *Flem. Brit. An.* p. 194. *Gadus Brosme*, *Gmel. Linn.* tom. i. part iii. p. 1175. *Don. Brit. Fish.* vol. iii. pl. 70. *Turt. Brit. Faun.* p. 92. *Nilss. Prod. Ichth. Scand.* p. 47. *Torsk, Penn. Brit. Zool.* vol. iii. p. 203. pl. 34. *Id.* (Edit. 1812.) vol. iii. p. 269. pl. 37. *Low, Faun. Orc.* p. 200.

LENGTH. From eighteen inches to two feet; rarely three feet. NILSS. Largest specimen observed by Low, three feet and a half.

DESCRIPT. (*Form.*) Greatest depth (in a specimen twenty inches and a half in length) four inches and a half: head small: upper jaw a little the longest: both jaws with numerous small teeth: on the chin a small single beard: belly, from the throat, growing suddenly very prominent, continuing so to the vent, where it grows smaller to the tail; body, beyond the vent, pretty much compressed: from the head to the dorsal fin a broad furrow: lateral line scarcely discernible, but running nearer the back than the belly, till about the middle of the fish, where it bends a little downward, and then runs straight to the tail: dorsal running the whole length of the back, within about an inch of the tail: anal beginning at the vent, and ending at the tail, but not joined with it: the rays of the dorsal and anal fins numerous, but from their softness, and from the thickness of the skin, not easily counted with exactness: caudal rounded: pectorals broad, and rounded: ventrals small, thick, fleshy, ending in four points, or cirri. Low. The following is the number of rays in the several fins, according to Donovan:

D. 49; A. 37; C. 35; P. 21; V. 5.

(*Colours.*) "Head dusky; back and sides yellow, the yellow becoming lighter by degrees, and losing itself in the white of the belly: edges of the dorsal, anal, and caudal fins white; the other parts dusky: pectorals brown." Low.

A native of the northern seas. Represented by Low as being extremely common on the coast of Shetland, where it forms a considerable article of commerce. According to Pennant, it has not been discovered lower than the Orkneys. Is sometimes called a *Tusk*.

GEN. 52. PHYCIS, *Arted.*

139. *P. furcatus*, *Flem.* (*Common Fork-Beard.*)—First dorsal more elevated than the second; the first ray very much elongated: ventrals twice as long as the head. Cuv.

P. furcatus, *Flem. Brit. An.* p. 193. *P. blennoides*, *Nilss. Prod. Ichth. Scand.* p. 49. *Asellus Callarias*, *Will. Hist. Pisc.* p. 205. *Ray, Syn. Pisc.* p. 75. *Barbus major*, *Jago in Ray's Syn. Pisc.* p. 163. fig. 7. *Blennius Phycis*, *Turt. Brit. Faun.* p. 93. *Forked Hake*, *Penn. Brit. Zool.* vol. iii. p. 193. pl. 31. no. 82. *Id.* (Edit. 1812.) vol. iii. p. 259. pl. 35. *Greater forked Beard*, *Couch in Linn. Trans.* vol. xiv. p. 75. *Merlus barbu*, *Cuv. Reg. An.* tom. ii. p. 335.

LENGTH. Eleven inches and a half. PENN. Eighteen inches and a half. BORLASE.

DESCRIPT. Greatest depth (in a specimen eleven inches and a half long) three inches: head sloping down to the nose as in the rest of the *Gadidae*: mouth large: besides the teeth in the jaws, a triangular congeries of small teeth in the roof of the mouth: at the end of the lower jaw a small beard: first dorsal triangular; the first ray* extending far beyond the rest, and very slender: second dorsal commencing just behind the first, and extending almost to the tail: ventrals three inches long; consisting of only two rays, joined at the bottom, and separated or bifurcated towards the end: vent in the middle of the body: anal extending from thence† just to the tail: lateral line incurvated: tail rounded. Colour cinereous brown. PENN. Number of fin-rays,

D. 10—62; A. 56; P. 12. FLEM.

First obtained by Mr. Jago from the coast of Cornwall, where it has been since observed by Mr. Couch. According to this last gentleman, it keeps in deep water, and is not common: is called by the Cornish fishermen a *Hake's Dame*. Pennant's specimen was taken on the shores of Flintshire. It has also occurred near St. Andrew's in Scotland‡. *Obs.* The specific character of this fish given above from Cuvier, is requisite in order to distinguish it from a nearly allied species found in the Mediterranean, (*P. Mediterraneus*, Laroche,) in which the first dorsal is round, and not elevated above the second, and the ventrals nearly of the same length with the head. According to Cuvier, it is this last species, which is the *Blennius Phycis* of Linnæus, and not the one described and figured by Pennant, as supposed by many of our English authors.

GEN. 53. RANICEPS, Cuv.

140. R. trifurcatus, Flem. (*Tadpole-Fish*.)

R. trifurcatus, *Flem. Brit. An.* p. 194. *Blennius trifurcatus*, *Turt. Brit. Faun.* p. 93. Trifurcated Hake, *Penn. Brit. Zool.* vol. III. p. 196. pl. 32. Trifurcated Tadpole-Fish, *Id.* (Edit. 1812.) vol. III. p. 272. pl. 38.

LENGTH. From eight to twelve inches. DAVIES.

DESCRIPT. (*Form.*) Head depressed and very broad: eyes large: mouth very wide, with irregular rows of incurvated teeth; in the roof of the mouth likewise a congeries of teeth: no tongue, a broad abrupt rudiment only supplying the defect: body compressed, but remarkably so as it approaches the tail: above the pectoral fins, on each side, a row of tubercles, nine or ten in number, from the last of which commences the lateral line, which descends in a curved direction at the middle, and from thence continues straight to the tail: first dorsal placed in a furrow, rudimentary, consisting of three slender feeble rays easily overlooked: second dorsal reaching almost to the tail, with sixty-two rays: anal corresponding, with fifty-nine: caudal rounded, with thirty-six: pectorals also rounded, with twenty-three: ventrals with six rays, the last three of which are very slender and short, and the whole connected by a very delicate membrane.

D. 3—62; A. 59; C. 36; P. 23; V. 6.

* According to Nilsson, it is the *third* ray which is so much elongated beyond the others.

† According to Mr. Couch, "a few spines are placed before the anal fin."

‡ *Wern. Mem.* vol. VI. p. 569.

(*Colour.*) Deep brown, the folding of the lips excepted, which are snow-white: irides yellowish. DAVIES.

Pennant's description of this species was taken from a specimen sent him from Beaumaris by Mr. Hugh Davies, which gentleman has given some additional particulars respecting it in the last edition of the "British Zoology." Within these last three or four years, it has been obtained from Berwick Bay by Dr. Johnston*, a circumstance conclusive as to the existence of the species†, though it is still but little known to many of our naturalists.

(27.) *R. Jago*, Flem. Brit. An. p. 194. *Barbus minor*, (*The Lesser Forked-Beard*), Jago in Ray's Syn. Pisc. p. 164. fig. 8. Couch in Linn. Trans. vol. XIV. p. 75. *Lest Hake*, Penn. Brit. Zool. vol. III. p. 195. Id. (Edit. 1812.) vol. III. p. 261.

There is great reason for believing that this supposed species, obtained by Mr. Jago from the coast of Cornwall, where it has been since found by Mr. Couch, is identical with the *R. trifurcatus* last described. Jago says but little of his fish by which it can be recognized. He has, however, annexed a figure, which, allowing for the rude style in which drawings were executed in those days, might easily be intended for the species just mentioned. The following is Mr. Couch's description of his own specimen. "Length ten inches: head wide and flat: eyes forward and prominent: under jaw shortest: teeth in the jaws and palate, sharp and incurved, and some in the throat: a small barb at the under jaw: body compressed, smooth: first dorsal fin triangular and extremely small; second dorsal fin and the anal fin long, ending in a point: tail round: ventral fins with several rays, of which the two outermost are much elongated, the longest measuring two inches: the fins all covered with the common skin: a furrow passing above the eyes to the back. Stomach firm, with longitudinal folds: no appendix to the intestines: air-bladder large, and of unusual form. In the intestines were the remains of an *Echinus*."

GEN. 54. PLATESSA, *Cuv.*

141. *P. vulgaris*, Flem. (*Common Plaice*.)—Rhomboidal: a row of osseous tubercles on the eye-side of the head: lateral line curved above the pectoral: body smooth: teeth blunt, contiguous.

P. vulgaris, *Flem. Brit. An.* p. 198. *Pleuronectes Platessa*, *Linn. Syst. Nat.* tom. I. p. 456. *Bloch, Ichth.* pl. 42. *Don. Brit. Fish.* vol. I. pl. 6. *Turt. Brit. Faun.* p. 96. *Passer Bellonii*, *Will. Hist. Pisc.* p. 96. tab. F. 3. *Plaice*, *Penn. Brit. Zool.* vol. III. p. 228. *Id.* (Edit. 1812.) vol. III. p. 304. *Plie franche*, ou *Carrelet*, *Cuv. Reg. An.* tom. II. p. 338.

LENGTH. From twelve to eighteen inches.

DESCRIPTION. (*Form.*) Subrhomboidal; the tail very much contracted before the caudal: greatest breadth just half the length, fins excluded:

* *Proceed. of Berwicksh. Nat. Club.* p. 7.

† Donovan has asserted in the Preface to his "British Fishes," that the *Trifurcated Hake* of Pennant is not in being, and that the description in the *British Zoology* was taken from a damaged skin of the *Forked Hake*. This opinion appears to have been adopted by Dr. Leach. See *Wern. Mem.* vol. II. p. 59.

head a little less than one-fourth of the entire length: dorsal curve not carried on continuously to the mouth, but very much depressed behind the eyes: snout a little sharp; mouth small, ascending; the lower jaw longest: teeth small, closely set, cutting, even, and rather obtuse: eyes on the right side; full and prominent; both equally advanced towards the end of the snout; the intervening space narrow, with an osseous ridge in the middle, which, behind the eyes, becomes interrupted, giving rise to a flexuous row of tubercles five or six in number: lateral line commencing at the upper part of the opercle where the tubercles terminate, slightly arched above the pectoral, but afterwards continued straight along the middle of the body: both sides of the body smooth: scales minute, and deeply impressed in the cuticle, causing the skin, except on the lateral line, to appear pitted: dorsal commencing behind the eye, and extending the whole length of the back, leaving, however, a small space between it and the caudal; greatest elevation about the middle, equalling rather more than one-fourth of the breadth of the body; all the rays simple, and projecting a little beyond the webs: pectorals immediately behind the posterior angle of the opercle, rounded, small; that on the right side of the body not half the length of the head; fifth and sixth rays longest; the first two and the last simple, the rest branched; pectoral on the left side a little shorter and smaller than the other: anal commencing a little beyond a vertical line from the pectorals, similar to the dorsal, and terminating in the same line with that fin; before it a short stiff spine directed forwards: caudal oblong, even or slightly rounded at the extremity; its length equalling nearly half the breadth of the body; the three outermost rays above and below simple, the rest branched: ventrals a little shorter than the pectorals, and rather in advance of those fins; third and fourth rays longest; all the rays simple:

B. 6; D. 72; A. 53; C. 20; P. 11; V. 6.

(Colours.) Upper part of the body and fins olivaceous brown, marked with large bright orange spots; also, occasionally, a few oblong dusky blotches, or stains of a darker brown than the ground colour: beneath white.

Very abundant on most parts of the British coast. The largest said to be found off Rye, on the coast of Sussex. According to Pennant, has been known to weigh fifteen pounds. Feeds on small fish and testaceous mollusca. Spawns in February and March. *Obs.* Cuvier notices a second species of Plaice* (*Platessa lata*, Cuv.), which is sometimes taken, though rarely, upon the French coast, closely resembling the common sort, and possessing the same row of tubercles on the head, but differing in the greater breadth of its body, which is not contained more than once and a half in the entire length. Possibly this species may occur in our own seas; though I am not aware that it has ever been observed hitherto.

142. *P. Flesus*, Flem. (*Flounder*).—Rhomboidal: a row of tubercular asperities along the base of the dorsal and anal fins; lateral line slightly curved, and rough with denticulated scales; rest of the body smooth: teeth blunt.

P. Flesus, *Flem. Brit. An.* p. 198. *Pleuronectes Flesus*, *Linn. Syst. Nat.* tom. I. p. 457. *Bloch, Ichth.* pl. 44. *Don. Brit. Fish.* vol. iv. pl. 94. *Turt. Brit. Faun.* p. 96. *Passer fluviatilis*, *Will. Hist.*

* *Reg. An.* tom. II. p. 339.

Pisc. p. 98. tab. F. 5. Flounder, *Penn. Brit. Zool.* vol. III. p. 229.
Id. (Edit. 1812.) vol. III. p. 307. *Bowd. Brit. fr. wat. Fish. Draw.*
 no. 25. Flet ou Picaud, *Cuv. Reg. An.* tom. II. p. 339.

LENGTH. Twelve inches and upwards.

DESCRIPT. (*Form.*) Resembling the *Plaice*, but rather more elongated; greatest breadth contained more than twice in the length, fins excluded; body, in the adult fish, thicker. Dorsal and ventral lines equally curved; profile depressed above the eyes: snout rather sharp; mouth small; lower jaw longest, ascending obliquely at an angle of forty-five degrees: teeth small and cutting, the summits obtuse: eyes large, approximating, nearly equally in advance, the lower one a little the most so: immediately behind the eyes, an elevated ridge of minute tubercular asperities passing off to the upper part of the opercle, there to unite with the lateral line, which last takes a slight bend over the pectoral before passing off straight to the extremity of the caudal: greater part of the head rough from the scales being denticulated; region of the lateral line also rough from a band of similar scales extending along its whole length immediately above and below it; there is also a row of tuberculated asperities along the basal margins of the dorsal and anal fins: rest of the body smooth; the scales small, and very adherent: dorsal commencing above the eye, and extending nearly the whole length of the back, as in the *Plaice*; greatest elevation a little behind the middle, equalling one-third of the depth of the body: anal as in the *Plaice*; immediately before it a strong sharp spine directed forwards: caudal oblong, slightly rounded at the extremity: pectoral on the right side rather more than half the length of the head; that on the left smaller: ventrals much smaller than the pectorals: number of fin-rays,

D. 61; A. 43; C. 18; P. 10; V. 6.

(*Colours.*) Extremely variable: upper surface generally olivaceous brown, more or less deep; sometimes entirely dusky; occasionally flesh-coloured or yellowish, or with brown spots upon a ground of one of these colours; or with one-half of the body deep brown, the rest pale; more rarely entirely flesh-colour, with scattered spots of a deep rose-red: under side of the body generally whitish, but sometimes nearly as dark as above.

Var. β. *Pleuronectes Passer*, *Bloch, Ichth.* pl. 50. Eyes and lateral line on the left side.

Equally common with the last species, and often found in rivers. Very abundant in the Thames, where they are taken in considerable quantities during the spring months. Such generally held in more estimation for the table than those met with in the sea. Has been known to weigh (according to Pennant) six pounds. Spawns in April and May. *Obs.* The sinistral variety is not very uncommon. The *Pleuronectes roseus* of Shaw*, and the *Platessa carnaria* of Brown†, are mere varieties of this species, distinguished by a peculiarity of colouring; the former being of a uniform delicate rose-colour; the latter flesh-red, with irregular, deep, rose-coloured, distant spots.

143. *P. Limanda*, *Flem. (Dab.)*—Subrhomboidal: lateral line strongly curved above the pectoral: body rough throughout; the scales with ciliated margins: teeth sharp, a little distant from each other.

* *Nat. Misc.* vol. VII. pl. 236.

† *Edinb. Journ. of Nat. and Geog. Sci.* vol. II. p. 99. pl. 2.

P. Limanda, *Flem. Brit. An.* p. 198. *Pleuronectes Limanda*, *Linn. Syst. Nat.* tom. i., p. 457. *Bloch, Ichth.* pl. 46. *Don. Brit. Fish.* vol. II. pl. 44. *Turt. Brit. Faun.* p. 96. *Passer asper sive squamosus*, *Will. Hist. Pisc.* p. 97. tab. F. 4. *Dab, Penn. Brit. Zool.* vol. III. p. 230. *Id.* (Edit. 1812.) vol. III. p. 308. *Limande*, *Cuv. Reg. An.* tom. II. p. 339.

LENGTH. From six to nine, rarely twelve, inches.

DESCRIPT. (*Form.*) General form similar to that of the *Flounder*: greatest breadth contained about twice and a half in the length, including caudal: head contained five times in the same: dorsal line nearly continuous with the profile, suffering very little depression above the eyes: teeth small; sharper and narrower than in either of the foregoing species, and not set quite so closely together: eyes large, but rather less prominent than in the *Ploice*; both equally advanced towards the mouth; between them a slightly projecting ridge, passing backwards in an ascending direction, but not accompanied by any osseous tubercles: lateral line at first strongly curved, but after passing the pectoral, straight to the end of its course: both sides of the body rough, but the upper one much the most so; the scales having their free edges ciliated: dorsal, anal, and caudal fins as in the *Ploice*: before the anal, a small, sharp, reclined spine, directed forwards: pectorals more than half the length of the head; first ray only half the length of the second; third longest; the first two and the last simple; the others branched: ventrals small, nearly in a line with the pectorals: number of fin-rays,

D. 72; A. 57; C. 18; P. 10; V. 6.

(*Colours.*) Upper side of a uniform pale brown; sometimes clouded with shades of a darker tint, or with a few ill-defined spots: beneath white.

Rather less abundant than either of the foregoing species, and never attaining to so great a size. Found, nevertheless, on most parts of the British coast. Feeds on marine worms and small crustacea. Spawns in May and June.

144. *P. microcephala*, *Flem. (Lemon Dab.)*—Oblong-oval: lateral line slightly curved above the pectoral: body smooth: head and mouth very small: jaws equal: teeth obtuse.

P. microcephala, *Flem. Brit. An.* p. 198. *Pleuronectes microcephalus*, *Don. Brit. Fish.* vol. II. pl. 42. *Turt. Brit. Faun.* p. 96. *P. lævis*, *Id. l.c.* *P. microstomus*, *Nilss. Prod. Ichth. Scand.* p. 53. ? *Rhombus lævis Cornubiensis maculis nigris*, (A Kitt,) *Jago in Ray's Syn. Pisc.* p. 162. fig. 1. *Smear-Dab*, *Penn. Brit. Zool.* vol. III. p. 230. but not pl. 41. no. 106. *Id.* (Edit. 1812.) vol. III. p. 309. pl. 47. New species of Sole, *Edinb. New Phil. Journ.* no. 37. July, 1835. p. 209.

LENGTH. From twelve to eighteen inches.

DESCRIPT. (*Form.*) Oblong-oval; more elongated than any of the preceding species: greatest breadth, dorsal and anal fins excluded, contained twice and three-quarters in the entire length: head very small, not more than one-seventh of the entire length: dorsal curve continuous with the profile, falling regularly to the extremity of the snout: mouth extremely small; lips a little projecting: jaws equal: teeth cutting, set closely

together, their summits nearly even, and rather obtuse: eyes moderately large, approximating, situate close behind the mouth, and both equally advanced towards it; between them an osseous ridge, which, however, is not produced behind as in the last species: lateral line commencing higher up than the gill-opening, curved above the pectoral, but afterwards straight; the degree of curvature less than in the *Dab*, but greater than in the *Plaice*: both sides of the body smooth: scales small, their free edges scarcely ciliated: dorsal commencing above the eyes, and extending the whole length of the back, and very nearly to the caudal; greatest elevation one-fourth of the breadth of the body: anal commencing in a line with the pectorals, and answering to the dorsal; the spine before it scarcely perceptible: caudal much as in the *Plaice*: the two pectorals of equal size, and more than half the length of the head: ventrals very small, a little in advance of the pectorals, and about three-quarters of their length; second ray longest: number of fin-rays,

D. 92; A. 69; C. 19; P. 9; V. 5.

(Colours.) Above light brown, sometimes mottled with yellow and dusky: beneath white. Pennant says, "belly white, marked with five large dusky spots;" but, according to the editor of the last edition of the "British Zoology," this spotting is not a constant character.

Met with occasionally on the southern and western coasts, but much less plentiful than any of the preceding species. The specimen from which the above description was taken, was obtained at Hastings. Said to be frequent on the coast of Cornwall. According to Hanmer*, it is known at Bath by the name of the *Lemon Sole*; at Plymouth, by that of the *Merry Sole*; at Looe, by that of the *Kitt*; and at Penzance, by that of the *Queen*, or *Queen-Fish*. Obs. This species is probably the *Pleuronectes microstomus* of Faber and Nilsson, but this last author has noticed another, the *P. Cynoglossus* of Linnæus, which also approaches very nearly to it. Possibly both these species may occur in our own seas. Donovan appears to have considered it as the *Vraie Limandelle* of Duhamel, but, according to Cuvier, this last is synonymous with the *Platessa Pola* next described. I may add that I can see no difference between the present species and the supposed *New Species of Sole* lately characterized by Mr. Parnell†, of which I have seen a specimen in the possession of Mr. Yarrell.

145. *P. Pola*, Cuv. (*Pole*).—Oblong-oval: lower eye more advanced than the upper one: lateral line straight throughout its course: body everywhere smooth: lower jaw longest: teeth cutting.

P. Pola, Cuv. *Reg. An.* tom. 11. p. 339. New species of *Platessa*, *Edinb. New Phil. Journ.* no. 37. July, 1835. p. 210.

LENGTH. Seventeen to nineteen inches.

DESCRIPT. (*Form.*) Oblong-oval, approaching the form of the *Sole*: greatest breadth, dorsal and anal fins excluded, rather exceeding one-third of the entire length; body narrowing both ways from that point, but more towards the tail than the head: length of the head half the

* See Hanmer's observations on the genus *Pleuronectes*, in the Appendix (No. 5.) to the third volume of the last edition of Pennant's "British Zoology."

† *Edinb. New Phil. Journ.* l. c.

breadth of the body: mouth very small; lower jaw longest; commissure of the lips, when the mouth is closed, nearly vertical: teeth cutting, set closely together, with even summits, extending the whole length of the jaws: eyes on the right side, large, placed obliquely, the lower one being more advanced than the upper, close together, with an osseous ridge between; diameter of the orbit equalling one-third the length of the head: lateral line almost perfectly straight throughout its whole course, but not exactly parallel to the axis of the body, inclining slightly upwards anteriorly; half-way, its course is found to be a very little above the mesial line: skin smooth above and below: scales large: dorsal fin commencing above the eye, at a distance from the end of the snout equalling nearly half the length of the head; rays short at first, but doubling their length beyond the line of the pectorals; from that point nearly even throughout; greatest elevation of the fin contained five times and a half in the breadth of the body: anal commencing just opposite the point at which the dorsal rays begin to lengthen, answering to that fin, and terminating in the same line, a little before the caudal: caudal rounded at the extremity; its length equalling half the breadth of the body: pectorals attached just behind the posterior angle of the opercle, their length about half that of the head: ventrals immediately beneath them, of the same length.

D. 109; A. 93*; C. 19; P. 12; V. 6.

(Colour of a specimen in spirits.) Yellowish brown.

The above description of this species, which is a recently acquired addition to the British Fauna, was taken from a specimen in the Museum of the Zoological Society, procured in the London market, in May, 1833. Mr. Yarrell has another from the Frith of Forth, sent him by Mr. R. H. Parnell, by whom it appears to have been considered as an undescribed species†. This last gentleman states that it is known to the fishermen in that neighbourhood under the appellation of *Craig Pluke*. I have ventured to suggest the English name of *Pole*, as being in unison with the Latin name which it has received from Cuvier.

146. *P. Limandoides*, Nob. (*Sandnecker*.)—Oblong-oval: both eyes equally advanced towards the mouth: lateral line straight: body rough; the scales with ciliated margins: teeth conical, and sharp-pointed.

Pleuronectes Limandoides, Bloch, *Ichth.* pl. 186. *Gmel. Linn.* tom. i. part iii. p. 1232. *Nilss. Prod. Ichth. Scand.* p. 57. *P. limandanus*, *Edinb. New Phil. Journ.* no. 37. July, 1835. p. 210.

LENGTH. From ten to twelve inches.

DESCRIPT. (*Form.*) Oblong-oval; the body more elongated than in the last species: greatest breadth, dorsal and anal fins excluded, about one-third of the entire length; head rather more than half the breadth: mouth considerably larger than in the *P. Pola*; lower jaw longest, ascending obliquely to meet the upper; teeth conical, sharp-pointed, a little distant from each other: eyes on the right side, and both equally advanced towards the mouth; between them an osseous ridge, produced behind, and falling in with the commencement of the lateral line; diameter of the orbit one-fourth the length of the head: lateral line straight throughout its course:

* The numbers of rays in the dorsal and anal fins are taken from Mr. Parnell.

† See *Edinb. New Phil. Journ.* l. c.

scales large, with their free edges ciliated, communicating a marked roughness to both sides of the body: dorsal commencing above the upper eye, and extending nearly to the caudal; highest part of the fin a little beyond the middle: caudal rounded: anal and other fins, much as in the *P. Pola*: number of fin-rays,

D. 32; A. 64; C. 18; P. 10; V. 6.

(*Colour.*) Of a uniform pale brown, or yellowish brown, above; white beneath.

This species, which, like the last, has been only recently added to our Fauna, has been obtained from Berwick Bay by Dr. Johnston, and from the Frith of Forth by Mr. Parnell. In the last-mentioned locality, particularly on the Fifeshire coast, it is represented as not very uncommon, and as known to most of the fishermen by the name of *Sandnecker*, or *Long Fluke*. It appears to be a northern species, inhabiting, according to Bloch, sandy bottoms, and preying upon young crabs and small lobsters. Flesh stated by the same author to be white, and of good eating. *Obs.* In its general form this species resembles the *Holibut*, with which, perhaps, it ought properly to be associated.

GEN. 55. HIPPOGLOSSUS, *Cuv.*

147. *H. vulgaris*, *Flem.* (*Holibut.*) — Eyes on the right side: lateral line arched above the pectorals: body oblong; smooth.

H. vulgaris, *Flem. Brit. An.* p. 199. *Pleuronectes Hippoglossus*, *Linn. Syst. Nat.* tom. i. p. 456. *Bloch, Ichth.* pl. 47. *Don. Brit. Fish.* vol. iv. pl. 75. *Turt. Brit. Faun.* p. 95. *Nilss. Prod. Ichth. Scand.* p. 57. *Hippoglossus*, *Will. Hist. Pisc.* p. 99. tab. F. 6. *Holibut*, *Penn. Brit. Zool.* vol. iii. p. 226. *Id.* (Edit. 1812.) vol. iii. p. 302. *Le grand Flétan ou Helbut*, *Cuv. Reg. An.* tom. ii. p. 340.

LENGTH. From three to six feet, and upwards.

DESCRIPT.* (*Form.*) Body oblong; of a more elongated form than in the last sub-genus, tapering much towards the tail: greatest breadth, dorsal and anal fins excluded, rather more than one-third of the entire length: head small, a little more than one-sixth of the same: mouth large; both jaws armed with several long, sharp, curved, distant, teeth: eyes large, approximating, situate on the right, very rarely on the left, side of the head: gill-cover of three pieces; the gill-opening large, with the membrane exposed: lateral line arched above the pectoral, but afterwards running straight to the caudal fin: body smooth: both sides covered with small, soft, oblong, scales, strongly adhering, and invested with a slimy mucus: dorsal commencing above the eyes, and reaching very nearly to the caudal: vent further removed from the head, than in the other species belonging to this family: before the anal a long spine: pectorals oblong: caudal crescent-shaped:

B. 7; D. 107; A. 32; C. 16; P. 15; V. 7.

(*Colours.*) "Dusky brown, most commonly inclining to a liver-colour, and free from spots; the tint variable, and said to be blackest, or more dusky, in fish of poor condition: lower surface uniformly white." *DON.*

* Not having any original description of this species, the above has been compiled from Bloch, Gmclin, Donovan, and Nilsson. The fin-ray formula is from Bloch.

Not uncommon on some parts of the coast, and occasionally exposed for sale in the London markets. Attains to a very large size. One taken off the Isle of Man in April 1828, is said to have measured seven feet and a half in length, and to have weighed three hundred and twenty pounds*. Said to be very voracious, preying upon other fish, and on crustacea. Spawns, according to Bloch, in the Spring. Flesh poor, and not much esteemed. In the northern parts of Britain, is called a *Turbot*.

GEN. 56. PLEURONECTES, *Flem.*

148. *P. maximus*, Linn. (*Turbot*.)—Body rhomboidal, and nearly as broad as long: the eye-side beset with small, subacute, osseous, tubercles.

P. maximus, Linn. *Syst. Nat.* tom. i. p. 459. Bloch, *Ichth.* pl. 49. Don. *Brit. Fish.* vol. ii. pl. 46. *Flem. Brit. An.* p. 196. *P. tuberculatus*, *Turt. Brit. Faun.* p. 97. *Rhombus maximus asper non squamosus*, Will. *Hist. Pisc.* p. 94. tab. F. 2. *Turbot*, Penn. *Brit. Zool.* vol. iii. p. 233. *Id.* (Edit. 1812.) vol. iii. p. 315. pl. 49. Le *Turbot*, *Cuv. Reg. An.* tom. ii. p. 341.

LENGTH. From eighteen inches to two feet; sometimes more.

DESCRIPT. (*Form.*) Body rhomboidal, approaching to round: greatest breadth, dorsal and anal fins included, almost equalling the entire length without the caudal: head broad: dorsal curve carried on continuously to the mouth, without any depression before or behind the eyes; forming with the ventral curve, at the extremity of the snout, a right angle: lower jaw longest, ascending obliquely to meet the upper: both jaws armed with small card-like teeth: eyes on the left side of the head; both equally advanced towards the mouth; a little remote from each other, the intervening space nearly flat: basal and ascending margins of the preopercle meeting at a right angle; gill-opening large: lateral line commencing behind the orbit of the upper eye, forming a considerable arch above the pectoral, but afterwards straight, dividing the body into two equal parts: both sides of the body smooth, but studded with small, subacute, osseous, tubercles; the tubercles on the upper or eye-side larger and more numerous than those on the lower: scales small: dorsal commencing in front of the eye, immediately above the upper jaw, and extending very nearly to the caudal; greatest elevation of the fin about the middle, attained gradually: anal commencing nearly in a line with the posterior lobe of the opercle, and answering to the dorsal: ventrals appearing like a continuation of the anal; a small space intervening, in which the vent is situate: caudal rounded: number of fin-rays,

D. 67; A. 45; C. 17; P. 12; V. 6.

(*Colours.*) Upper side yellowish brown, mottled and spotted with darker brown: under side white.

Found on many parts of the British coast, in some places, in considerable abundance. Attains to a larger size than any other species in this family, the *Holibut* excepted. Weight from fifteen to twenty pounds, sometimes as much as thirty, or even more. Flesh firm, and highly esteemed for the table. Food, according to Bloch, insects and worms.

* Loudon's *Mag. of Nat. Hist.* vol. i. p. 84.

149. *P. Rhombus*, Linn. (*Brill.*) — Body broadly oval; smooth, without tubercles: first rays of the dorsal half free, and branched at their extremities.

P. Rhombus, *Linn. Syst. Nat.* tom. i. p. 458. *Bloch, Ichth.* pl. 43. *Don. Brit. Fish.* vol. iv. pl. 95. *Sow. Brit. Misc.* pl. 50. *Turt. Brit. Faun.* p. 97. *Flem. Brit. An.* p. 196. *Rhombus non aculeatus squamosus*, *Will. Hist. Pisc.* p. 95. tab. F. 1. *Pearl, Penn. Brit. Zool.* vol. III. p. 238. *Id.* (Edit. 1812.) vol. III. p. 321. pl. 50. *La Barbue, Cuv. Reg. An.* tom. II. p. 341.

LENGTH. From twelve to eighteen inches; sometimes more.

DESCRIPT. (*Form.*) Very similar to the *Turbot*, but of a more oval form: breadth not so great, contained about once and a half in the entire length: upper surface perfectly smooth, without any osseous tubercles: lateral line arched above the pectorals, but the curvature not so great as in that species: the first four or five rays of the dorsal fin half free, and divided at their extremities: in most other respects the two species are similar:

D. 71; A. 57; C. 16; P. 12; V. 6.*

(*Colours.*) Rather darker than the *Turbot*: upper surface deep brown, with numerous dusky and white spots; sometimes intermixed with yellowish: beneath white: fins spotted.

Met with in the same localities as the last species, and more abundantly. Does not attain to so great a size. Flesh less esteemed. Is sometimes called a *Pearl*.

150. *P. punctatus*, Bloch. (*Bloch's Top-Knot.*) — Roundish oval: both sides of the body rough; the edges of the scales denticulated: the first ray of the dorsal fin elongated: ventrals and anal separate.

P. punctatus, *Bloch, Ichth.* pl. 189. *Flem. in Wern. Mem.* vol. II. p. 241. *Id. Phil. Zool.* pl. III. f. 2. *Id. Brit. An.* p. 197.

LENGTH. Five inches and a half.

DESCRIPT. (*Form.*) Roundish oval, the dorsal and ventral lines equally convex: greatest breadth, fins excluded, just half the length: head a little less than one-third of the same: profile notched immediately before the eyes: mouth of moderate size, very protractile; jaws nearly equal; the lower one a very little the longest, and ascending obliquely at an angle of rather more than forty-five degrees: teeth so fine as to be scarcely visible: eyes large, remarkably full and prominent, their diameter about one-fourth the length of the head; placed on the left side; approximating; the lower one rather more advanced than the upper; between them a projecting ridge: basal and posterior margins of the preopercle meeting at a very obtuse angle, the former rising obliquely to meet the latter: lateral line commencing at the upper part of the opercle, at first very much arched, but afterwards straight: both sides of the body, but more especially the upper, extremely rough; scales minute; those on the upper side having their free margins set with from four to six longish denticles; those beneath having the

* The above fin-ray formula is from Bloch.

denticles finer and more numerous: dorsal commencing immediately in advance of the upper eye, and extending very nearly to the caudal, at the same time passing underneath the tail, where the rays become very delicate; greatest elevation of the fin near its retral extremity; first ray very much produced, nearly three times the length of those which follow; most of the rays divided at their tips; some of the last in the fin branched from the bottom: anal commencing in a line with the posterior angle of the preopercle, answering to the dorsal, and terminating in the same manner beneath the tail; greatest elevation corresponding: caudal oblong, the extremity rounded: pectorals inserted behind the posterior lobe of the opercle, a little below the middle; the first ray very short; the next three or four longest; the succeeding ones nearly as long; pectoral on the eye-side rather larger than that on the side opposite: ventrals immediately before the anal, and appearing like a continuation of that fin, but not connected with it, as in the next species; vent situate between the two last pairs of rays: the rays of all the fins covered with rough scales nearly to their tips:

D. 37; A. 68; C. 16; P. (Left) 12, (Right) 11; V. 6.

(Colours.) Above brown, or reddish brown, mottled and spotted with black; a large round spot, more conspicuous than the others, in the middle of the side towards the posterior part of the body; fins spotted: beneath, plain white.

This species, which I believe to be the same as the *P. punctatus* of Bloch, was confounded by that author with the *P. Megastoma*. More recently, it has been confounded by several naturalists, including Cuvier, Nilsson, Hanmer, and Fleming, with that next described. The elongated first dorsal ray, and the ventrals, disjoined from the anal, will, however, always serve to distinguish it. It is evidently to the present species that Fleming's fish, procured in Zetland, belongs. The only other British specimen I know of, is in the Museum of the Cambridge Philosophical Society. This last, from which the above description was taken, was obtained by Professor Henslow at Weymouth. The Top-Knot of Hanmer belongs to the next species.

151. *P. hirtus*, Mull. (*Muller's Top-Knot*.)—Roundish oval: eye-side of the body rough; the edges of the scales denticulated: jaws equal: the first dorsal ray not longer than the succeeding ones: ventrals and anal united.

P. hirtus, *Mull. Zool. Dan.* vol. III. p. 36. pl. 103. Smear-Dab, *Penn. Brit. Zool.* vol. III. pl. 41. no. 106. (*No description annexed.*) Top-Knot, *Hanmer in Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 322. pl. 51. Whiff, *Couch in Linn. Trans.* vol. XI.V. p. 78.

LENGTH. Seven inches nine lines.

DESCRIPT. (*Form.*) In general appearance very similar to the last species, but differing in the following particulars: profile without the notch before the commencement of the dorsal fin: mouth rather smaller, and more oblique; when closed, the maxillaries assuming nearly a vertical position: jaws more nearly equal: eyes not so prominent, nor so close together; the lower one rather more in advance with respect to the upper, a tangent to the posterior part of the orbit of the former

nearly bisecting the latter into two equal parts: the space between more flattened, or with very little of a projecting ridge: basal and posterior margins of the preopercle meeting at a less angle, the former being more nearly parallel to the axis of the body: upper side of the body less rough; the lower one perfectly smooth: scales on the upper side smaller, with more numerous and shorter denticles; the two middle denticles, however, longer than the others; the scales on the lower side without any denticles: dorsal fin almost in close contact with the mouth; the first ray not longer than the succeeding ones: ventrals united, at their posterior margins, to the anal, from which, at first sight, they are scarcely to be distinguished; the vent placed between them: fleshy portion of the tail not so long, or not so much projecting from the oval of the body; the dorsal and anal fins approaching one another more closely on its under surface:

D. 96; A. 73; C. 16; P. 12; V. 6.

(Colours.) For the most part similar to those of the *P. punctatus*: the dark spots and markings are however better defined; more particularly a black, slightly angulated, band, passing across the head through the eyes, and a large spot beyond the extremity of the pectoral, upon the lateral line.

Muller is the only author, so far as I am aware, who has distinguished this from the last species. It appears to have been more often met with in our seas than the *P. punctatus*. Pennant has evidently figured it under the name of *Smear-Dab*, though the corresponding description belongs to the *Platessa microcephala* of this work. A better representation of it is given in the last edition of the "British Zoology," from a specimen obtained by Mr. Hammer from the coast near Plymouth. More recently it has been noticed on the Cornish coast by Mr. Couch, and on the coast of Berwickshire by Dr. Johnston. It has also occurred near the mouth of the Medway. Mr. Couch observes that it keeps in rocky ground, and rarely, if ever, takes a bait.

152. *P. Megastoma*, Don. (*Whiff*.) — Body oblong; the eye-side rough, with the scales finely ciliated: gape large; lower jaw longest: first rays in the dorsal fin free, but simple.

P. Megastoma, Don. *Brit. Fish.* vol. III. pl. 51. *Turt. Brit. Faun.* p. 97. *Flem. Brit. An.* p. 196. *P. Cardina*, *Cuv. Reg. An.* tom. II. p. 341. *Passer Cornubiensis asper*, magno oris hiatu, (*A Whiff*), *Jago in Ray's Syn. Pisc.* p. 163. fig. 2. *Whiff*, *Penn. Brit. Zool.* vol. III. p. 238. *Id.* (Edit. 1812.) vol. III. p. 324. pl. 52. *Carter*, or *Lantern-fish*, *Couch in Linn. Trans.* vol. XIV. p. 78.

LENGTH. From twelve to eighteen inches.

DESCRIPT. (*Form.*) Body oblong, the tail suddenly contracting before the caudal; thin, and rather pellucid: greatest breadth, dorsal and anal fins excluded, not quite one-third of the entire length: head large, nearly one-fourth of the same: dorsal curve falling regularly to the end of the snout; the profile slightly concave before the eyes: gape extremely large; lower jaw longest, ascending obliquely, furnished with a blunt tubercle beneath the symphysis: both jaws with very fine velvet-like teeth: eyes very large; their diameter at least one-fourth the length of the head; placed on the left side; approximating; the lower one most

in advance; between them an osseous ridge, passing upwards behind to unite with the lateral line: gill-opening large; opercle small, of a triangular form; subopercle and interopercle much developed: lateral line very much arched above the pectoral, afterwards straight, and carried on to quite the end of the caudal: scales large; those on the eye-side of the body with their free edges finely ciliated, communicating a roughness to the touch; those on the opposite side smooth, with their margins entire; scales on the lateral line with a slightly elevated oblong tubercle: dorsal commencing about half-way between the extremity of the snout and the upper eye, and carried on very nearly to the caudal; greatest elevation of the fin a little beyond the middle, where it equals one-third of the depth of the body; most of the rays simple, some of the longest only divided at their tips; the first four or five nearly free, the connecting membrane being very low: anal commencing in a line with the posterior lobe of the opercle, and answering to the dorsal; before it a blunt point: caudal oblong, rounded at the extremity, its length rather more than half the depth of the body; all the principal rays, except the two outermost, branched: pectorals inserted a little below the middle of the depth, and in a line with the commencement of the anal; very unequal; that on the eye-side rather more than half the length of the head; the opposite one more than one-third shorter; first ray very short; third and fourth rays longest: ventrals entirely in advance of the pectorals, and appearing like a portion of the anal, only double, from which they are separated by the vent:

B. 7; D. 85; A. 71; C. 15, and 4 short; P. (Left) 12, (Right) 10; V. 6.

(Colours.) Upper side light reddish brown, here and there mottled and spotted with dusky and darker brown: under side white.

First observed by Mr. Jago on the coast of Cornwall, where it has been since represented, by Mr. Hanmer and Mr. Couch, as very common. Occasionally met with on other parts of the southern, as well as on the western, coast. The specimen from which the above description was taken occurred at Hastings. In Cornwall called a *Lantern-Fish*.

153. *P. Arnoglossus*, Schn. (*Scald-Fish*.) — Body oblong-oval: scales large, deciduous, finely ciliated: jaws equal: lower eye most in advance: before the anal a strong sharp spine.

P. Arnoglossus, *Flem. Brit. An.* p. 197. *Bonap. Faun. Ital.* Fasc. iv. *Arnoglossus*, vel *Solea levis*, *Will. Hist. Pisc.* p. 102. tab. F. 8. f. 7.? *Smooth Sole*, *Penn. Brit. Zool.* vol. III. p. 232. *Scald-Fish*, *Id.* (Edit. 1812.) vol. III. p. 325. pl. 53.

LENGTH. Five to six inches.

DESCRIPT. (*Form.*) Oblong-oval; the body narrowing behind more gradually than in the last species, and not so suddenly contracted before the caudal; thin and somewhat pellucid: greatest breadth, dorsal and anal fins excluded, one-third of the entire length: head one-fourth of the same, excluding caudal: profile slightly emarginated before the eyes: gape moderate; jaws nearly equal; lower one obliquely ascending: both with fine velvet-like teeth: eyes placed as in the *Whiff*, but not so large in proportion: lateral line arched above the pectoral, afterwards straight: scales large, thin, very deciduous; their free edges finely ciliated, and emarginated; those on the lateral line with an oblong tubercle as in the

Whiff, but not so much elevated: dorsal and anal as in that species; before the anal a strong, sharp, triangular, spine or lamina, directed downwards and backwards: caudal rounded: pectorals unequal; that on the upper side about three-fourths the length of the head: ventrals consisting of a double row of rays; that on the upper side more advanced than the other: the rays of all the fins slender and bristly; the connecting membranes very delicate, and easily broken:

D. 85; A. 66; C. 17; P. 10; V. 6.

(*Colour.*) "Upper side pale brown, or dirty white." HANMER.

Apparently not common in the British seas. Hitherto noticed only by Mr. Hanmer, who states that it occurs at Plymouth, though very rarely. The Museum of the Cambridge Philosophical Society possesses specimens from Weymouth, where it is called *Megrin**. The name of *Scald-Fish* has arisen from the peculiarly smooth naked appearance of the sides, when divested of the scales, which adhere so slightly as to yield to the slightest friction. Inhabits the Mediterranean, along with one or two other closely allied species.

(28.) *P. Cyclops*, Don. Brit. Fish. vol. iv. pl. 90. *Platessa Cyclops*, Flem. Brit. An. p. 199.

Eyes on the left side: left eye subvertical, and visible on both sides. Body very broad, smooth; marked with dusky spots, surrounded by a whitish ring: head elongated: lateral line much curved above the pectoral fin: scales inconspicuous: dorsal commencing behind the eye: middle rays of both dorsal and anal longest: caudal rounded:

D. 66; A. 52; C. 16; P. 11; V. 7.

Length, one inch and three-eighths. Don.

An obscure and doubtful species. Sent to Donovan by Captain Merri-
rick, of Aberfraw, in Anglesea, North Wales, who obtained it on that coast. Probably the fry of some other species. The backward commencement of the dorsal fin associates it with the last genus; but the sinistral position of the eyes with this.

GEN. 57. SOLEA, Cur.

(1. SOLEA, Cur.)

154. *S. vulgaris*, Flem. (*Common Sole.*)—Greatest breadth not half the length: upper side of the body dark brown; the pectoral tipped with black.

S. vulgaris, *Flem. Brit. An.* p. 197. *Pleuronectes Solea*, *Linn. Syst. Nat.* tom. 1. p. 457. *Bloch, Ichth.* pl. 45. *Don. Brit. Fish.* vol. iii. pl. 62. *Turt. Brit. Faun.* p. 96. *Buglossus*, seu *Solea*, *Will. Hist. Pisc.* p. 100. tab. F. 7. *Sole*, *Penn. Brit. Zool.* vol. iii. p. 231. *Id.* (Edit. 1812.) p. 311.

LENGTH. From twelve to eighteen inches; sometimes two feet, or more.

DESCRIPT. (*Form.*) Oblong-oval; very much rounded anteriorly; body narrowing behind: dorsal line carried on in one continuous curve to the

* According to Mr. Hanmer, the name of *Megrin* is sometimes given to the last species. Several other instances might be pointed out, in which the same English name is applied, on different parts of the coast, to two or more totally distinct species.

mouth; greatest breadth, dorsal and anal fins excluded, rather more than one-third of the entire length: length of the head just half the breadth of the body: snout obtuse and rounded, projecting beyond the mouth; this last appearing distorted on the side opposed to the eyes, and furnished on that side only with fine velvet-like teeth; upper jaw the longest: eyes small; distant from each other about twice their diameter: the lower one immediately above the corner of the mouth, the upper one further advanced towards the end of the snout; the space between them flat: nostrils tubular, placed a little above the lip, one on the upper and the other on the under side of the head: side of the head opposed to the eyes bearded with numerous white fleshy cirri: lateral line arising above the upper eye, and, after making a great curve, descending to the upper part of the opercle; thence running straight to the caudal along the middle of the side: scales small, of an oblong form: their free edges ciliated, the denticles about ten in number: dorsal commencing a little above the mouth, and extending along the whole ridge of the back quite to the caudal; its greatest elevation less than one-seventh of the breadth of the body; all the rays simple, of a compressed conical form, and scaly for the greater part of their length: pectorals one-third the length of the head, both of equal size, placed just behind the upper part of the gill-opening; narrow and rounded, with the middle rays longest; first and last rays simple, the others branched: anal commencing a little in advance of the insertion of the pectorals; answering to the dorsal: caudal oblong, slightly rounded at the extremity: ventrals very small, about two-thirds the length of the pectorals; situate just in advance of the anal; third ray longest:

B. 6; D. 84; A. 67; C. 18; P. 8; V. 5.

“Number of vertebræ forty-seven*.” (*Colours.*) All the upper side of the body dark brown, the scales edged with a deeper tint, causing a reticulated appearance; the pectoral on that side tipped with black: under side of the body white: irides golden yellow.

Common on all parts of the coast, particularly in the West and South of England, where it attains a large size. Weight, according to Pennant, sometimes so much as six or seven pounds; usually, however, very much less. Keeps almost entirely at the bottom, and feeds on the eggs and fry of other fish.

155. *S. Pegusa*, Yarr. (*Lemon Sole.*) — Greatest breadth, dorsal and anal fins included, half the length: upper side of the body light orange-brown, freckled with dark brown spots; pectoral tipped with black.

S. Pegusa, Yarr. in *Zool. Journ.* vol. iv. p. 467. pl. 16.

LENGTH. Eight to ten and a half inches.

DESCRIPT. (*Form.*) Wider in proportion to its whole length than the *Common Sole*, and also somewhat thicker: greatest breadth (in a specimen eight inches long), not including the dorsal and anal fins, three inches, including both fins, four inches: head obtuse, shorter and wider: mouth arched: opercle formed externally of a single piece, circular in shape, and less deep: under surface of the head almost smooth, without any of the papillary eminences so remarkable in the *Common Sole*; the nostril on that side pierced in a prominent tubular projection, wanting in

* Yarrell. (*Zool. Journ.* vol. iv. p. 468.)

the other species: scales differing both in character and general arrangement; the appearance of them more strongly marked upon the under than upon the upper surface: lateral line straight, but not very strongly marked: tail narrower than in the *Common Sole*, though composed of the same number of rays:

D. 31; A. 69; C. 17; P. 8; V. 5.

Number of vertebræ forty-three. (*Colours.*) Upper surface a mixture of orange and light brown, freckled over with small circular spots of very dark brown, presenting a mottled appearance; tip of the pectoral black: under surface white. YARR.

First obtained by Mr. Yarrell at Brighton, where it is said to be "occasionally taken with the *Common Sole* by trawling over a clear bottom of soft sand, about sixteen miles from the shore." Is known there by the name of *Lemon Sole*. Has since been met with, in a few instances, in the London market. *Obs.* This species is not the *Pleuronectes Pegusa* of Risso, as was at first supposed by Mr. Yarrell. It appears to be undescribed by any of the continental authors.

(2. MONOCHIRUS, *Cuv.*)

156. *S. Lingula*, Nob. (*Red-backed Sole*.)—Eye-side of the body light reddish brown; dorsal, anal, and caudal fins with dusky spots.

Pleuronectes Lingula, *Hanmer in Penn. Brit. Zool.* (Edit. 1812.) vol. 111. p. 313. pl. 48. *P. variegatus*, *Don. Brit. Fish.* vol. v. pl. 117. *Solea variegata*, *Flem. Brit. An.* p. 197. *S. Mangilii*, *Bonap. Faun. Ital.* Fasc. v. *Solea parva*, sive *Lingula*, *Rondel. Pisc.* p. 324. *Will. Hist. Pisc.* p. 102. tab. F. 8. fig. 1.

LENGTH. From six to nine inches.

DESCRIPT. (*Form.*) Very much resembling the *Common Sole*, but remarkably distinguished by the small size of the pectorals, that on the eye-side being less than one-eighth the length of the head, that on the side opposite scarcely perceptible: body rather thicker in proportion than in that species; the breadth hardly so great, equalling just one-third of the entire length, excluding caudal: eyes rather nearer together; the upper one a little in advance: scales of a different form; oblong, but always contracted about the middle; their free edges set with more numerous denticles, varying from eighteen to twenty-one in number: dorsal and anal fins with fewer rays, and not approaching quite so near the caudal:

B. 6; D. 77; A. 62; C. 19; P. (Right) 4; V. 5.

In other respects the two species are similar. (*Colours.*) "Upper side a very light brown, tinged with red; the scales shewing a pattern, something like that of the *Common Sole*, though in proportion coarser; the dorsal, anal, and caudal fins, marked with brown or blackish spots, extending some lines to the body of the fish." HANMER.

A local species obtained by Mr. Hanmer from the coast near Plymouth, where it is said to be common in the Spring. It is probably the same as the *Pleuronectes variegatus* of Donovan, which was procured by that naturalist in Billingsgate market, and which is said to have been since found at Rothsay, in Scotland*. The specimen from which the above

* Loudon's *Mag. of Nat. Hist.* vol. vi. p. 530.

description was taken, was caught at Weymouth, and is now in the Museum of the Cambridge Philosophical Society. It appears to differ from Mr. Hanmer's fish in its colours, but as these were not observed in the recent state, and may possibly have been altered by the preserving liquor, I have suppressed any notice of them, and substituted a part of Mr. Hanmer's description. It also differs in the larger number of dorsal fin-rays, which amount, in Mr. Hanmer's fish, to about sixty-eight. Further observation is necessary in order to decide whether, in this instance, I have confounded two nearly allied species.

GEN. 58. LEPADOGASTER, *Gouan.*

157. *L. Cornubiensis*, Flem. (*Cornish Sucker.*)—
A double cirrus in front of each eye: dorsal and anal fins connected by a membrane with the caudal.

L. Cornubiensis, *Flem. Brit. An.* p. 189. *Cyclopterus Cornubicus*, *Shaw, Gen. Zool.* vol. v. p. 397. *C. ocellatus*, *Don. Brit. Fish.* vol. iv. pl. 76. *Turt. Brit. Faun.* p. 116. *Small Suck-Fish, Borl. Cornw.* p. 269. pl. 25. f. 28, & 29. *Jura Sucker, Penn. Brit. Zool.* vol. III. p. 137. pl. 22. no. 59. *Id.* (Edit. 1812.) vol. III. p. 181. pl. 25. *Couch in Linn. Trans.* vol. XIV. p. 87.

LENGTH. Four inches.

DESCRIPT. (*Form.*) Head and anterior part of the body broad and depressed: towards the caudal compressed and tapering: snout very much produced, spatula-shaped, narrower and more flattened than the head; gape wide; jaws nearly equal, the lower one a little the shortest; both furnished with minute sharp teeth; lips a little reflected: length of the head rather more than one-third of the entire length: eyes lateral; the space between them equalling about twice their diameter; immediately in advance of the anterior angle of each a membranous cirrus with a second minute filament branching out from its base; behind the cirrus a small fleshy tubercle: gill-opening small: skin smooth and naked: pectorals large, placed immediately behind the gill-opening, and extending downwards to the lower surface of the body, where the rays become suddenly stronger, and the membrane, doubling forwards, passes on to unite with that of the opposite fin under the throat; the membranes of the pectorals thus united enclose a disk, and form an hemispherical cavity; behind this cavity is a second, larger, circular, concave disk, formed by the united ventrals: dorsal commencing beyond the middle of the entire length, and reaching very nearly to the caudal, with which its membrane is connected: anal shorter, commencing further back, united in like manner to the caudal: rays of both fins articulated but simple: caudal rounded: number of fin-rays,

D. 19; A. 11; C. 14; P. 18, and 4 stouter ones.

(*Colours.*) Dusky, or purplish brown, (according to Mr. Couch, sometimes crimson,) with minute inconspicuous spots; flesh-coloured beneath: on the nape, behind the eyes, two ocellated spots; "each consisting of a large obovate spot of deep purple, enclosed within a broad pale brownish

ring, and embellished in the centre with a brilliant blue dot, or pupil* : " dorsal, anal, and caudal fins, bright purplish red.

First observed by Borlase on the coast of Cornwall, where it has been since noticed by Mr. Couch. Found by Pennant in the Sound of Jura; by Montagu†, in some plenty, at Milton, on the coast of Devonshire, adhering to the rocks at low water. *Obs.* All our English authors represent this species as having only eleven rays in the dorsal fin; and this is made by Fleming a ground of distinction between it and the *L. Gouani* of Risso, which is said to have a larger number. In the only two British specimens, however, which I have had an opportunity of examining, they amounted to no less than nineteen. Possibly we may have two species in our seas, which have been hitherto confounded‡. I may add, that in the above specimens, although there were two filaments before each eye, the second was extremely minute compared with the first, and much smaller than represented and described by Donovan.

158. *L. bimaculatus*, Flem. (*Bimaculated Sucker*.)
—No cirri before the eyes: dorsal and anal fins short; not connected with the caudal: behind the pectoral, on each side, a purple spot.

L. bimaculatus, *Flem. Brit. An.* p. 190. *Cyclopterus bimaculatus*, *Turt. Linn.* vol. i. p. 907. *Don. Brit. Fish.* vol. iv. pl. 78. *Turt. Brit. Faun.* p. 115. *Bimaculated Sucker*, *Penn. Brit. Zool.* vol. iii. App. p. 397. pl. 22. *Id.* (Edit. 1812.) vol. iii. p. 181. pl. 25. *Mont. in Linn. Trans.* vol. vii. p. 293.

LENGTH. An inch and a half; rarely more.

DESCRIPT. (*Form.*) General form resembling that of the last species, but the head and anterior part of the body more depressed: snout conical, with the sides not so much hollowed out: jaws equal; teeth more developed, those in the lower jaw sharp and curved: eyes further asunder, and placed more laterally; no cirri in front of them: pectorals, and the two disks which form the organs of adhesion, similar: dorsal short, and placed far behind: anal answering to it: both fins terminating at a small distance from the caudal, with which they are not in any way connected: caudal narrow, the end nearly even:

D. 6; A. 6; C. 12; P. about 20, and 4.

(*Colours.*) Back and sides pink or rose-colour, with spots and interrupted fasciæ of white: behind the pectoral fin, on each side, a purple spot, surrounded by a ring of white: irides pink, surrounded by a dark purplish ring: fins variegated with pink and white: under surface of the body whitish. According to Montagu§, "the fry are of a green colour, minutely speckled with blue, and without the smallest trace of the pectoral spots."

First obtained at Weymouth by the late Dowager Dutchess of Portland. Has been since taken at the same place by Professor Henslow. Not very uncommon, according to Montagu, at Torcross in Devonshire, adhering to stones and old shells; procured by deep dredging. By the same means

* Donovan.

† *Linn. Trans.* vol. vii. p. 294.

‡ Several others, allied to our British one, are noticed by Risso.

§ *Wern. Mem.* vol. i. p. 92.

Mr. W. Thompson has procured several specimens in Belfast Bay. Has also occurred on the coasts of Kent and Cornwall. Apparently unknown except in the British seas.

GEN. 59. CYCLOPTERUS, *Linn.*

(1. CYCLOPTERUS, *Cuv.*)

159. *C. Lumpus*, *Linn.* (*Common Lump-Fish.*)—
Three longitudinal rows of osseous tubercles on each side: a tuberculated ridge on the back, representing a first dorsal fin.

C. Lumpus, *Linn. Syst. Nat.* tom. i. p. 414. *Bloch, Ichth.* pl. 90. *Don. Brit. Fish.* vol. i. pl. 10. *Turt. Brit. Faun.* p. 115. *Flem. Brit. An.* p. 190. *Lumpus* Anglorum, *Will. Hist. Pisc.* p. 208. tab. N. 11. *Lump-Sucker*, *Penn. Brit. Zool.* vol. iii. p. 133. pl. 21. no. 57. *Id.* (Edit. 1812.) vol. iii. p. 176. pl. 24. *Le Lump*, *Cuv. Reg. An.* tom. ii. p. 346.

LENGTH. From eighteen inches to two feet.

DESCRIPT. (*Form.*) Body deep, and at the same time remarkably thick and fleshy: back sharp and elevated, with a salient ridge of osseous tubercles, occupying the place of, and representing, a first dorsal fin; the tubercles ten in number, of a somewhat conical form, striated, and sharp-pointed: three longitudinal rows of similar tubercles on each side of the body; the first commencing a little above the eye, and extending nearly to the caudal; the second commencing behind the gills, and reaching to the same distance; the third, a short row of five tubercles, placed at the side of the abdomen, and terminating near the commencement of the anal fin: there are also two very short rows of tubercles, placed one on each side of the space intervening between the dorsal ridge and the dorsal fin: belly, included between the two rows of abdominal tubercles, flat: head short; forehead broad, rising very obliquely: mouth wide; lips thick and fleshy; jaws furnished with numerous small sharp teeth, besides which are some small rough tubercles on the pharyngean bones, and near the root of the tongue: nostrils single, tubular, about half-way between the mouth and the eyes: skin without scales, but every-where rough with small sharp points: second or true dorsal placed far behind; its length a little exceeding its height; extending to near the caudal, but leaving a small intervening space: anal answering to the dorsal: ventrals united, forming together a circular disk, with a funnel-shaped cavity in the middle: pectorals very large, passing downwards and forwards beneath the throat, and surrounding the disk of the ventrals:

B. 6; D. 11; A. 10; C. 12; P. 21.

(*Colours.*) Back and sides dusky olive, here and there tinged with reddish; belly crimson: caudal and anal fins purplish red, spotted with dusky: pectorals bright orange.

Var. β. *C. pavoninus*, *Shaw, Nat. Misc.* vol. ix. pl. 310. "Back of a fine azure, deepening towards the ridge: the sides tinged with crimson: mouth, sides of the head, and all the under parts to the tail, of a delicate sea-green, with a silvery tinge on the cheeks, the pectoral fins, and the part of the body next the tail: irides likewise silvery; pupil black: fins and tail terminating in a fine pale yellow." *DAVIES.*

Not an uncommon species on many parts of the British coast, but taken in most abundance northwards. Spawns, according to *Bloch*, in March.

Power of adhesion, by means of the ventral disk, very great. *Var.* β was taken near Bangor in Caernarvonshire, in 1797, and sent to Shaw by Mr. Hugh Davies of that place. It measured only six inches in length. *Obs.* The *Lumpus gibbosus* of Willughby* (*Cyclopt. pyramidatus*, Shaw †), characterized by a pyramidal hump on the back, and said to be found in the Scotch seas, owes its origin, in the opinion of Cuvier, to a badly-stuffed specimen of the present species.

(2. LIPARIS, *Arted.*)

160. *C. Liparis*, Linn. (*Common Sea-Snail.*)—Dorsal and anal fins united to the caudal.

C. Liparis, Linn. *Syst. Nat.* tom. 1. p. 414. Bloch, *Ichth.* pl. 123. f. 3. Don. *Brit. Fish.* vol. 11. pl. 47. *Turt. Brit. Faun.* p. 115. *Liparis nostras*, Will. *Hist. Pisc. App.* p. 17. tab. H. 6. fig. 1. *Liparis vulgaris*, Flem. *Brit. An.* p. 190. Unctuous Sucker, Penn. *Brit. Zool.* vol. 11. p. 135. pl. 21. no. 58. *Id.* (Edit. 1812.) vol. 11. p. 179. pl. 24.

LENGTH. From three to five inches.

DESCRIPT. (*Form.*) Body elongated, thick and rounded anteriorly, but much compressed behind: belly very protuberant: head large, broad, a little depressed in front, and somewhat inflated about the gills; its length contained about four times and a half in the entire length: snout blunt and rounded: mouth moderately large; upper lip with two short cirri: in each jaw a band of rasp-like teeth: tongue thick and fleshy: eyes small, and rather high on the cheeks: nostrils double: gill-opening very small; the opercle produced behind into a cartilaginous spine: head and body every-where covered with a smooth, soft, naked, unctuous, semi-transparent, skin: dorsal fin commencing a little behind the nape, and extending to the base of the caudal, with which it is just united; rays slender and simple, the anterior ones rather shorter than those which follow, but on the whole the rays nearly of a length: anal commencing at about half the length of the body, and also uniting to the caudal, but at a point beyond that at which the dorsal terminates: caudal slightly rounded: pectorals large, extending downwards and forwards to unite under the throat; two or three rays, just at the turn of the fin beneath the body, very much elongated, and considerably produced beyond those on each side of them: ventral disk concave, and nearly circular; placed on the throat, and partly encircled by the pectorals; the circumference set with twelve or thirteen flattened tubercles, the central portion impressed with four or five curved lines branching out on each side of a longitudinal diameter:

D. 36; A. 26; C. 12; P. 32 $\frac{1}{2}$.

(*Colours.*) "Pale brown, sometimes finely streaked with darker brown." PENN. In a *variety*, met with by Donovan, "the head and body were strongly marked with longitudinal streaks and waves of white, edged with blue, and disposed on a ground of testaceous or rather chestnut-colour." It is observed by this last author, that this species "differs very considerably in colour at different seasons of the year, as well as in its various stages of growth: small specimens have occurred in which the sides and belly were white; in some pale yellow, and in others rosy: the sides of the head usually partaking of the same tints as those of the body."

* *Hist. Pisc.* p. 209. tab. N. 10. fig. 2.

† *Gen. Zool.* vol. v. part ii. p. 390. pl. 167.

‡ The above fin-ray formula is from Donovan.

Common on many parts of the coast, and generally found near the mouths of rivers. When taken out of the water, said rapidly to dissolve and melt away. Food, according to Bloch, aquatic insects, young shells, and small fish. Spawns early in the year: found by Pennant heavy with roe in January. Arrives at a much larger size in the northern seas than in our own.

161. *C. Montagui*, Don. (*Montagu's Sea-Snail*).—Dorsal and anal fins unconnected with the caudal: upper lip marked with several indentations.

C. Montagui, Don. *Brit. Fish.* vol. iii. pl. 68. (Young.) *Mont. in Wern. Mem.* vol. i. p. 91. pl. 5. f. 1. *C. Montacuti*, *Turt. Brit. Faun.* p. 115. *Liparis Montagui*, *Flem. Brit. An.* p. 190. *Montagu's Sucker*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. p. 183.

LENGTH. From two to three inches.

DESCRIPT. (*Form.*) General form similar to that of the *C. Liparis*: body very much rounded as far as the vent, beyond which it becomes suddenly compressed: head more depressed than in that species, and much inflated at the gills: snout, jaws, and teeth, similar: eyes small, placed high: front of the head, above the upper lip, scalloped with about six indentations: rest of the head, and body, very smooth: dorsal fin commencing a little behind the nape, and extending to the base of the caudal, with which, however, it is not in any way connected; rays at first very short and inconspicuous, but gradually increasing in length to just before the caudal, where the fin is broadest, and presents a rounded appearance: anal similar, and likewise separate from the caudal: pectorals and ventral disk much as in the *C. Liparis*: vent about half-way between the posterior margin of the disk and the commencement of the anal fin:

D. about 26; A. about 24; C. 12; P. about 29*.

(*Colours.*) "Purplish brown in appearance to the naked eye; but by the assistance of a lens, the ground-colour is dull orange, covered with minute confluent spots of the former: the under parts are paler, and about the throat and sucker white: irides golden; pupil dark blue." MONT.

Discovered by Montagu, at Milton, on the south coast of Devon, where a few specimens were obtained at extraordinary low tides, among the rocks. Has been since found on the coast of Ireland by Mr. W. Thompson of Belfast: also on the coast of Berwickshire by Dr. Johnston. Apparently a rarer species than the foregoing.

GEN. 60. ECHENEIS, Linn.

162. *E. Remora*, Linn. (*Common Remora*).—Shield on the head with about eighteen transverse bars: caudal crescent-shaped.

E. Remora, *Linn. Syst. Nat.* tom. i. p. 446. *Bloch, Ichth.* pl. 172. *Turt. Brit. Faun.* p. 94. *Cuv. Reg. An.* tom. ii. p. 347. *Remora*, *Will. Hist. Pisc.* p. 119. App. tab. 9. f. 2. *Mediterranean Remora*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. App. p. 524.

* The above fin-ray formula is from Montagu.

LENGTH. From twelve to eighteen inches. BLOCH.

DESCRIPT. (*Form.**) Body moderately elongated; covered with small scales: head perfectly flat above; the shield consisting of from seventeen to nineteen transverse elevated bars divided into two series; the margin of the shield cartilaginous: eyes lateral: mouth wide and rounded: lower jaw advancing beyond the upper; furnished, as well as the intermaxillaries, with small card-like teeth: a very regular row of small teeth, resembling *cilia*, along the edge of the maxillaries, which form the outer margin of the upper jaw: the anterior margin of the vomer furnished with a band of card-like teeth, and its whole surface, as well as that of the tongue, rough: four orifices near the upper lip; the anterior pair cylindrical, the posterior oval: gill-opening very large: lateral line, which is scarcely visible, taking a curve towards the end of the pectoral fin: dorsal single, commencing a little beyond the middle of the length: anal opposite: vent nearer the caudal than the head: caudal crescent-shaped: all the fin-rays soft, much branched, and invested with a thick membrane.

B. 9†; D. 21; C. 20; P. 22; V. 4.

(*Colour.*) "Dusky brown." TURT.

This species, which is well known for its power of adhering, by means of the shield on the head, to other fish, and to the bottoms of vessels, is found in the Mediterranean, as well as in various parts of the ocean. In a single instance it has occurred in the British seas, Dr. Turton having taken a specimen at Swansea, from the back of a Cod-Fish, in the summer of 1806.

(III. A P O D E S.)

GEN. 61. ANGUILLA, Cuv.

(1. ANGUILLA, Cuv.)

163. *A. acutirostris*, Yarr. (*Sharp-nosed Eel.*)—Snout sharp, compressed at the sides; gape extending to beneath the middle of the eye: about one-third of the entire length before the dorsal, and between one-eighth and one-ninth before the pectorals.

A. acutirostris, Yarr. in *Proceed. of Zool. Soc.* 1831. p. 133. *Riss. Hist. Nat. de l'Eur. Mérid.* tom. III. p. 198. ? *A. vulgaris*, Turt. *Brit. Faun.* p. 87. *Flem. Brit. An.* p. 199. *Muraena Anguilla*, Bloch, *Ichth.* pl. 73. *Common Eel*, Penn. *Brit. Zool.*

* Compiled from Cuvier and Bloch.

† The above formula is from Bloch: according to Cuvier, there are but eight rays in the branchiostegous membrane.

vol. III. p. 142. *Id.* (Edit. 1812.) vol. III. p. 191. *Bowd. Brit. fr. wat. Fish.* Draw. no. 7. Sharp-headed Eel, *Yarr. in Zool. Journ.* vol. 4. p. 469. *L'Anguille long-bec, Cuv. Reg. An.* tem. II. p. 349.

LENGTH. Usual length from two to three, sometimes four, feet: has been known to attain to six feet three inches.

DESCRIPT. (*Form.*) Very much elongated; body thick, approaching to cylindrical; the depth and thickness nearly uniform for three-fourths of the entire length; the last quarter compressed and slightly tapering: depth, taken at the commencement of the dorsal fin, equalling about one-sixteenth of the entire length: head, measured from the end of the snout to the branchial orifice, contained nearly eight times and three-quarters in the same; convex, and slightly elevated, at the nape, from which point the profile slopes forward, becoming much depressed above the eyes: snout sharp and attenuated, compared with that of the two next species; the sides rather compressed: jaws gradually narrowing towards their extremities, which are slightly rounded; the lower one a little the longest; both furnished with a broad band of velvet-like teeth, the band above dilating on to the fore part of the vomer: gape small: the commissure of the lips not extending to a vertical line drawn as a tangent to the posterior part of the orbit: eyes small: the distance from them to the end of the snout not equalling twice their diameter; the space between them rather less than the above distance: nostrils double; the anterior orifice tubular, situate on the edge of the upper lip, the posterior one a simple pore immediately in advance of the eye: a row of pores above the upper lip on each side, and another forming the commencement of the lateral line; which last arises a little above the pectorals, and passes off straight to the extremity of the tail: gill-opening reduced to a small round aperture, immediately before, and a little below, the pectoral fin: scales very minute, scarcely visible, deeply imbedded in a thick, soft, slimy skin: dorsal commencing at about (sometimes a little before) one-third of the entire length: low, preserving throughout the same elevation, which equals scarcely more than one-fourth of the depth: vent before the middle of the entire length by a space equalling the depth of the body: anal commencing immediately behind it, similar to the dorsal: both dorsal and anal are carried quite to the extremity of the tail, forming by their union a pointed caudal: pectorals small and rounded, not half the length of the head; the distance from the line of their insertion to the end of the snout contained eight times and a half in the entire length, and about twice and three-quarters in the portion anterior to the commencement of the dorsal fin: ventrals wanting. Number of vertebræ one hundred and thirteen*. (*Colours.*) Upper part of the head, back, and a large portion of the sides, dark olivaceous green, tinged with brown; lower part of the sides paler: throat, belly, and a portion of the anal fin, yellowish white.

Common in rivers, lakes, and other fresh-waters, throughout the country. Attains to a larger size than either of the two following species, with which it was formerly confounded. Two taken some years since in a fen-dyke near Wisbeach, in Cambridgeshire, weighed together fifty pounds; the heaviest twenty-eight, the other twenty-two pounds. Usually, however, much smaller. Generally considered as viviparous, but, from the observations of Mr. Yarrell, it is probable that this is not the case†. In the Autumn, migrates down the rivers, in order, it is said, to pass the

* The number of vertebræ rests on the authority of Mr. Yarrell.

† See on this subject *Proceed. of Zool. Soc.* 1831. p. 133; also *Jesse's Glean. in Nat. Hist.* (Second Series), p. 57, &c.

Winter in the brackish water, and to deposit its spawn; the young fry migrating up the river in the Spring. Many, however, certainly remain in ponds all the year, and breed there. Roves about, and feeds, principally in the night. Said to quit its native element occasionally, and to cross meadows, in search of other waters, as well as for the purpose of feeding on worms and snails*. Very tenacious of life. *Obs.* This species varies a good deal in colour, according to the nature of the water in which it is found. Those in which the belly is of a clear white are called sometimes *Silver Eels*.

164. *A. latirostris*, Yarr. (*Broad-nosed Eel*).—Snout broad and rounded; gape extending to a vertical line from the posterior part of the orbit: more than one-third of the entire length before the dorsal, and about one-seventh before the pectorals.

A. latirostris, Yarr. in *Proceed. of Zool. Soc.* 1831. p. 133. *Riss. Hist. Nat. de l'Eur. Mérid.* tom. 111. p. 199.? Blunt-headed Eel, Yarr. in *Zool. Journ.* vol. iv. p. 469. Glut Eel, *Bowd. Brit. fr. wat. Fish.* Draw. no. 22. L'Anguille pimperneaux, *Cuv. Reg. An.* tom. 11. p. 349.

LENGTH. From one to two, perhaps sometimes three, feet.

DESCRIPT. (*Form.*) Body much larger and thicker anteriorly than in the last species, but more compressed behind; thickness not uniform beyond the commencement of the dorsal, from which point the compression of the sides rapidly increases: depth greatest at the nape: head large, appearing, when viewed from above, broader than the body: snout blunt and rounded, flattened before the eyes: jaws broad; the lower one wider and longer than the upper: gape large; the commissure reaching to, or almost beyond, a tangent to the posterior part of the orbit: lips thick and fleshy at the sides of the mouth, and partially reflexed: eyes larger than in the *A. acutirostris*; the distance from them to the end of the snout equals at least twice their diameter; the distance between them rather less: dorsal commencing at a point beyond one-third of the entire length: both that and the anal thicker in substance and more elevated than the same fins in the *A. acutirostris*, their height equalling nearly half the depth: vent before the middle by a space equalling about three-fourths of the depth: tail broader, and more rounded at its extremity: pectorals somewhat larger, and placed, as well as the branchial orifices, further behind; the distance from the line of their insertion to the end of the snout is contained not more than seven times in the entire length, and not so much as twice and a half in the portion anterior to the commencement of the dorsal fin. Number of vertebræ one hundred and fifteen†. (*Colours.*) Back and sides of a darker colour than in the *A. acutirostris*, and having more of a bluish than a greenish tinge; the lateral line, however, forms a pale green stripe down each side: underneath, including a portion of the anal, white, without any yellow tinge. The colours, however, are variable, as in the last species.

This species, which is probably the *Grig*‡ or *Glut Eel* of Pennant, is nearly as common as the last. It has not been known, however, to exceed

* See an instance mentioned by Dr. Hastings in his *Nat. Hist. of Worcestersh.* p. 134.

† The number of vertebræ rests on the authority of Mr. Yarrell.

‡ I am informed by Mr. Yarrell, that the term *Grig* is applied in many places generally to all small-sized Eels. Too much reliance, therefore, must not be placed upon the mere name.

a weight of five pounds. Independently of the above external differences, Mr. Yarrell has observed others "in the size and character of the bones of the head and *vertebræ*; those of the present species being nearly as large again as the same parts of the *A. acutirostris* in examples of the same length*."

165. *A. mediorostris*, Yarr. (*Snig Eel*).—Snout rather long, and moderately broad; gape extending not quite to a vertical line from the posterior part of the orbit: rather less than one-third of the entire length before the dorsal, and between one-seventh and one-eighth before the pectorals.

A. mediorostris, *Yarrell's Mss.* *Snig Eel*, *Yarr. in Jesse's Glean. of Nat. Hist.* (2nd Series) pp. 75, & 76.

LENGTH. The length of my specimen is nineteen inches.

DESCRIPT. (*Form.*†) More slender and elongated in proportion to the depth and thickness than either of the preceding species: depth at the commencement of the dorsal fin not exceeding one-nineteenth of the entire length: nape but little elevated, and nearly in the same horizontal line with the profile: snout and jaws somewhat resembling those of the *A. acutirostris*, but longer and broader than in that species, though not so broad as in the *A. latirostris*: both jaws rounded at their extremities; the lower one longest: teeth longer and more developed than in the *A. acutirostris*: gape more capacious, owing to the greater length of the jaws; commissure nearly, but not quite, extending to a tangent to the posterior part of the orbit: the distance from the eye to the end of the snout equalling full twice the diameter of the former: dorsal commencing rather before one-third of the entire length: its height about one-third of the depth of the body: vent nearer the middle than in either of the two former species: caudal moderately pointed at its extremity: pectorals small; the distance from the line of their insertion to the end of the snout contained seven times and a half in the entire length. (*Colours.*) Upper parts dark greenish brown, passing by a lighter olive-green to yellowish white below.

This species was first distinguished by Mr. Yarrell, who received it from the river Avon in Hampshire. Said to be known there by the name of *Snig*. Does not attain to a large size, seldom exceeding half a pound in weight. Said to differ from the other eels in its habit of roving and feeding during the day. Presents also some osteological peculiarities, "the first five cervical *vertebræ* being smooth and round, and entirely destitute of superior or lateral spinous processes, both of which are possessed by the two other species‡."

(29.) *Grig Eel*, Bowd. *Brit. fr. wat. Fish. Draw.* no. 28. *L'Anguille Plat-Bec*, Cuv. *Reg. An.* tom. II. p. 349.

Being unacquainted with this species, I am unable to point out its distinguishing characters. According to Mrs. Bowdich, it is the smallest of

* *Proceed. of Zool. Soc.* 1831. p. 133.

† The above description having been drawn up with reference to a single specimen, the only one I have had an opportunity of examining, possibly some of the characters may not be found constant in all cases.

‡ *Yarr. l.c.*

the Eel tribe, and is caught plentifully in the Thames, but more especially in Berkshire and Oxfordshire. She thinks that Pennant has confounded it with the *Glut Eel*. Mr. Yarrell informs me, he considers it as distinct from the last species.

(2. CONGER, *Cuv.*)

166. *A. Conger*, Shaw. (*Conger Eel*.)—Dorsal and anal fins margined with black: lateral line spotted with white.

A. Conger, *Shaw, Gen. Zool.* vol. iv. part i. p. 20. pl. 1. *Turt. Brit. Faun.* p. 87. *Flem. Brit. An.* p. 200. *Muraena Conger*, *Linn. Syst. Nat.* tom. i. p. 426. *Bloch, Ichth.* pl. 155. *Don. Brit. Fish.* vol. v. pl. 119. *Conger*, *Will. Hist. Pisc.* p. 111. tab. G. 6. *Penn. Brit. Zool.* vol. 111. p. 147. *Id.* (Edit. 1812.) vol. III. p. 196. *Yarr. in Proceed. of Zool. Soc.* (1831.) p. 158.

LENGTH. From five to six feet: said to reach occasionally as much as ten feet, or upwards.

DESCRIPT. (*Form.*) General form resembling that of the *Common Eel*: body thick, and nearly cylindrical anteriorly, compressed and tapering behind: head larger than in that species, being a little less than one-seventh of the entire length: crown flat; snout a little depressed, narrowing towards the extremity, and rather pointed: upper jaw a little the longest: both jaws with a band of sharpish card-like teeth, "forming three rows, of which those in the middle line are much the largest; numerous smaller teeth, more uniform in size, occupy the line of the vomer, but do not extend far backwards:"* lips fleshy: gape wide; not extending quite so far as a tangent to the posterior part of the orbit: eyes much larger than in the *Common Eel*: nostrils double; the first orifice placed a little before the eye; the second, which is tubular, at the extremity of the snout: a row of mucous pores along the upper lip; several pores also between the corner of the gape and the gill-opening: dorsal commencing a little behind the pectorals, or at about one-fifth of the entire length: vent (in a specimen measuring thirty-one inches and a half in length) about three inches before the middle: anal commencing immediately behind the vent, and extending quite to the extremity of the tail, where it unites with the dorsal (prolonged in a similar manner) to form a pointed caudal:

"B. 10; D. A. & C. 306; P. 19"†.

(*Colours.*) Of a uniform pale brownish gray above, passing into a dirty white beneath: dorsal and anal fins whitish, margined with deep bluish black: lateral line spotted with white.

A common inhabitant of the British seas, and found on most parts of the coast in considerable abundance. Attains to a very large size: has been known to weigh upwards of one hundred pounds. Frequents rocky ground. Is very voracious, preying on other fish and on crustacea.

(30.) *A. Myrus*, Shaw, *Gen. Zool.* vol. iv. part i. p. 24. *Turt. Brit. Faun.* p. 87. *Flem. Brit. An.* p. 200. *Muraena Myrus*, *Linn. Syst. Nat.* tom. i. p. 426. *Berkeuh. Syn.* vol. i. p. 64. *Le Myre*, *Cuv. Reg. An.* tom. II. p. 350.

* Yarrell.

† Bloch.

This species, which is found in the Mediterranean, has been included in the British Fauna by Berkenhout and Turton, but it is not said on what authority. It is distinguished from the last by its smaller size, and by some spots on the snout, a transverse band on the occiput, and two rows of dots on the nape, of a whitish colour*.

(5.) *OPHISURUS*, Lacép.

- (31.) *O. Ophis*, Lacép. Hist. Nat. des Poiss. tom. II. p. 196. Flem. Brit. An. p. 200. *Muræna Ophis*, Linn. Syst. Nat. tom. I. p. 425. Bloch, Ichth. pl. 154. Berkenh. Syn. vol. I. p. 64. *Ophis maculata*, Turt. Brit. Faun. p. 87.

Like the last, a very doubtful native. Given as British by Berkenhout, but without any remarks. Of a whitish or silvery colour, with several longitudinal rows of dark oval spots. Length from three to four feet. Inhabits the European seas.

- (32.) *O. Serpens*, Lacép. Hist. Nat. des Poiss. tom. II. p. 198. *Muræna Serpens*, Linn. Syst. Nat. tom. I. p. 425. *Serpens marinus*, Merr. Pinax, p. 185. Sibb. Scot. Illust. part II. tom. II. p. 23.

Whether this, or the last, be the species alluded to by Merrett and Sibbald under the name of *Serpens marinus*, is very doubtful. Neither is it known on what authority either of these naturalists has inserted it in the British Fauna. The *O. Serpens* of Lacépède is distinguished from the *O. Ophis*, by its being without spots. It also grows to a larger size, attaining the length of five or six feet. A native of the Mediterranean.

GEN. 62. *MURÆNA*, Thunb.

167. *M. Helena*, Linn. (*Common Muræna*.)—Olivaceous brown, marbled with yellow.

M. Helena, Linn. Syst. Nat. tom. I. p. 425. Bloch, Ichth. pl. 153. *Muræna*, Will. Hist. Pisc. p. 103. tab. G. 1. Roman *Muræna*, Shaw, Gen. Zool. vol. IV. part I. p. 26. pl. 2. *Murène commune*, Cuv. Reg. An. tom. II. p. 252.

LENGTH. Three feet and upwards. CUV.

DESCRIPT. (*Form.*) Body, in *old* fish, compressed at the sides, in *young*, round: head small: mouth large: jaws armed with sharp pointed teeth, a little distant from each other: palate also armed with teeth: two tubular orifices near the eyes, and two at the extremity of the snout: gill-opening large: dorsal, anal, and caudal, united; forming together a low fleshy fin, invested by the common skin, commencing on the back at a pretty considerable distance from the head, passing round the tail, and terminating underneath the body at the vent: no pectorals or ventrals. BLOCH. (*Colours.*) "Of a dusky greenish brown, pretty thickly variegated on all parts with dull yellow subangular marks or patches, disposed in a somewhat different manner in different individuals, and generally scattered over with smaller specklings of brown: the whole forming a kind of obscurely reticular pattern." SHAW.

An individual of this species, measuring four feet four inches in length, was caught by a fisherman at Polperro, in Cornwall, in October 1834†. I am not aware that it had been ever taken previously in our

* Cuvier, *l. c.*

† This circumstance was communicated by Mr. Couch to Mr. Yarrell, to which latter gentleman I am indebted for the knowledge of it.

seas*. Common in the Mediterranean, and well known as the *Muraena* of the Romans. Said to live with equal facility in fresh and salt water, though principally found at sea. Is very voracious.

GEN. 63. LEPTOCEPHALUS, Gronov.

168. *L. Morrisii*, Gmel. (*Anglesea Morris*.)

L. Morrisii, Gmel. *Linn.* tom. i. part iii. p. 1150. *Turt. Brit. Favn.* p. 88. *Mont. in Wern. Mem.* vol. ii. p. 436. pl. 22. f. 1. *Leach, Zool. Misc.* vol. iii. p. 10. pl. 126. *Flem. Brit. An.* p. 200. *Cuv. Reg. An.* tom. ii. p. 358. *Deere in Loud. Mag. of Nat. Hist.* vol. vi. pp. 530, & 531. *Ophidium pellucidum*, *Couch in Loud. Mag.* vol. v. pp. 313, & 742. *Anglesea Morris, Penn. Brit. Zool.* vol. iii. p. 158. pl. 25. no. 67. *Id.* (Edit. 1812.) vol. iii. p. 212. pl. 28.

LENGTH. From five inches to six inches and a quarter.

DESCRIPTION. (*Form.*) Body ribbon-shaped, extremely thin and compressed, semipellucid: greatest depth, which is tolerably uniform throughout, diminishing only near the head and tail, one-twelfth of the entire length: thickness (according to Montagu) not exceeding the sixteenth part of an inch: head small; the profile sloping a little downwards from the line of the back, which is nearly straight: snout short: jaws nearly equal: teeth (according to Montagu) numerous, and all inclining forwards: eyes large: gill-opening, a small transverse aperture before the pectorals: lateral line straight, and nearly in the middle: sides of the body marked with a double series of oblique lines which meet in the lateral line at an acute angle; these lines are parallel to each other in the same series, and the angles formed by their union with those of the other series are directed forwards: dorsal commencing a little beyond one-third of the entire length, low and rather obscure, the rays extremely delicate, and not easily counted: vent about the middle†: anal commencing immediately behind it; in form, similar to the dorsal: both dorsal and anal are carried on to the extremity of the tail, where they unite to form a caudal: pectorals extremely small, scarcely a line in length, but sufficiently obvious, if carefully sought for: ventrals wanting. (*Colours.*) Pale colourless white, with a row of minute black dots along the margins of the back and abdomen: a few similar dots, arranged in a longitudinal series, down the mesial line of each side.

First discovered, in the sea near Holyhead, by the late Mr. William Morris, who communicated it to Pennant. Has been since met with in several instances in our seas. Four specimens taken near Beaumaris, by the Rev. Hugh Davies; one by Mr. Lewis Morris, at Penrhyn Dyfi; two by Mr. Anstice in the river Pervet, near Bridgewater; one by Mr. Deere, at Slapton, near Dartmouth; and four by Mr. Couch, on the coast of Cornwall. Mr. Thompson has also recently recorded the occurrence, at different times, of six specimens on the coast of Ireland. The pectorals are so small, as to have been thought wanting by Pennant, a circum-

* A species of *Muraena*, three feet in length, is figured in Nash's "Collections for the History of Worcestershire" (vol. i. p. lxxxvi.), along with some other fish from the Severn, but nothing positive is stated respecting its capture, or the circumstances which have led to its being introduced into that work. It appears not very dissimilar to the *M. Helena* described above.

† So it appeared to be in the specimen examined by me. Montagu says, "situated a trifle nearer the head than the tail."

stance which has led to some little confusion amongst naturalists, in their attempts to identify his fish. There can be little doubt, however, that in all the above instances, the same species has been observed. At the same time it may be added, that several others have been detected in warmer latitudes, though I am not aware that their essential and distinguishing characters have been hitherto established.

GEN. 64. OPHIDIUM, *Linn.*

- (33.) *O. barbatum*, *Linn. Syst. Nat. tom. i. p. 431.* Bloch, *Ichth. pl. 159. f. 1.* Berkenh. *Syn. vol. i. p. 66.* Turt. *Brit. Faun. p. 88.* *Donzelle commune*, *Cuv. Reg. An. tom. ii. p. 359.*

Two pair of small barbules attached to the extremity of the hyoid bone, the anterior pair shorter than the other. Flesh-colour; the dorsal and anal fins edged with black. Length from eight to ten inches*. *Cuv.*

Introduced into the British Fauna by Berkenhout, but without the mention of any authority for its insertion. Must, in consequence, be considered as a very doubtful native. Found in the Mediterranean, along with another closely allied species.

169. *O. imberbe*, *Mont. (Beardless Ophidium.)*— Lower jaw without barbules.

- O. imberbe*, *Mont. in Wern. Mem. vol. i. p. 95. pl. 4. f. 2.* *Flem. Brit. An. p. 201.* Beardless *Ophidium*, *Penn. Brit. Zool. vol. III. App. p. 398. and vol. IV. pl. 93.?* *Id. (Edit. 1812.) vol. III. p. 208. pl. 29.*

LENGTH. About three inches. *MONT.*

DESCRIPT. (*Form.*) Body ensiform, considerably compressed towards the tail, and in shape not unlike *Cepola rubescens*: depth about one-twelfth of the entire length: head very obtuse, rounded in front: mouth, when closed, inclining obliquely upwards: lips marginated: eyes large, placed forward, and lateral: gill-membranes inflated beneath: lateral line nearly in the middle, arising at the angle of the gill-cover, but rather obscure: vent nearly in the middle: pectorals rounded: dorsal commencing immediately above the base of the pectoral, at first not so broad, and usually not so erect, as the other part: anal commencing at the vent, and, together with the dorsal, uniting with the caudal fin, which is cuneiform, but obtusely pointed:

D. about 77; A. 44; C. 18 or 20; P. 11.

(*Colours.*) Purplish brown, disposed in minute speckles; along the base of the anal fin about ten small bluish white spots, regularly placed, but scarcely discernible without a lens, and possibly peculiar to young specimens: all the fins of the same colour as the body, except the pectoral and caudal; the first of which is pale, the last yellowish: irides dark, with a circle of silver round the pupil. *MONT.*

The above fish was obtained on the south coast of Devon by Montagu, who considered it as the *Ophidium imberbe* of Linnæus. Cuvier, however, appears to have entertained some doubts as to its identity with that species†. Whether it be the same as the *Beardless Ophidium* of Pennant, which was sent to that naturalist from Weymouth by the late

* Cuvier says "eight or ten inches at the most," but Bloch, "from twelve to fourteen inches."

† See *Reg. An. tom. ii. p. 359. note (2).*

Dowager Dutchess of Portland, and which also was referred to the Linnæan species, is likewise uncertain; Pennant having published no description of his fish, and his figure being very unlike that given by Montagu. Montagu's specimen was taken among rocks at low water.

GEN. 65. AMMODYTES, *Linn.*

170. *A. Tobianus*, Bloch. (*Wide-mouthed Launce.*)
— Gape large; maxillaries long; the pedicels of the intermaxillaries very short: dorsal commencing in a line with the extremities of the pectorals.

A. Tobianus, Bloch, *Ichth.* pl. 75. f. 2. *Turt. Brit. Faun.* p. 87. *Cuv. Reg. An.* tom. II. p. 360. *A. lanceolatus*, Lesauv. in *Bull. des Sci. Nat.* (1825) tom. IV. p. 262. *A. Anglorum verus*, Jago in *Ray's Syn. Pisc.* p. 165. pl. 2. f. 12. Sand Launce, *Penn. Brit. Zool.* vol. III. p. 156. but not pl. 25. no. 66. *Id.* (Edit. 1812.) vol. III. p. 206. but not pl. 28.

LENGTH. From ten to fifteen inches and a half.

DESCRIPT. (*Form.*) Slender, and very much elongated: body square, but with the angles somewhat rounded, approaching cylindrical, and of nearly equal thickness throughout: greatest depth contained about sixteen times in the entire length: head an elongated cone, forming one-fifth of the same: lower jaw projecting far beyond the upper, and terminating in a point; the upper one slightly rounded at its extremity: scarcely any perceptible teeth, excepting two long sharp teeth on the front of the vomer directed downwards: gape very wide on account of the great length of the maxillaries; intermaxillaries (compared with those of the next species) with the pedicels very short: when the mouth is fully opened, the upper jaw turns up at its extremity, and the maxillaries become vertical, drawing after them the sides of the lower jaw, which, ascending from behind, become vertical also, and parallel to the former: gill-opening very large: pieces of the opercle all considerably developed, but especially the subopercle, which is produced beyond the true opercle in the form of a projecting lobe, having its descending margin sinuated, and its surface elegantly marked with several diverging striæ; true opercle forming an equilateral triangle: head naked; body covered with minute scales: lateral line arising on each side of the nape, and running parallel with the dorsal fin a very little below it; marked by a series of oblong slightly elevated tubercles: along the middle of each side a second impressed line formed by the division of the muscles: dorsal commencing at about, or a little beyond, one-fourth of the entire length, exactly in a line with the extremities of the pectorals, and terminating a little before the caudal; height tolerably uniform throughout, equalling not quite half the depth of the body; rays very slender; all simple, but articulated: vent some little way beyond the middle of the entire length; anal commencing immediately behind it, similar to the dorsal, and terminating in the same line with that fin: caudal forked for nearly half its length; the rays much branched, with the exception of the outermost above and below: pectorals inserted just below the produced lobe of the subopercle, and equalling one-third the entire length of the head; fourth and fifth rays longest; the middle ones branched; two or three of the lateral ones above and below simple.

B. 7; D. 58; A. 31; C. 15, and a few short ones; P. 15.

(Colours.) Back, and upper part of the sides, brown, a little varied with blue and green: one or two dusky lines running parallel with the dorsal fin: lower part of the sides, and belly, silvery.

Not so common on the British coast as the next, with which it was confounded previously to *M. Lesauvage*, who first pointed out (l. c.) the distinguishing characters of the two species. Generally keeps near the shore, burying itself in the sand, at the ebb of the tide, to the depth of one or two feet. Food, marine worms, and, according to Bloch, the young of its own species. Is much used as a bait for other fish. Said to spawn in May.

171. *A. Lancea*, Cuv. (*Small-mouthed Launce*).—Gape not so large; maxillaries short; the pedicels of the intermaxillaries very long: dorsal commencing before the extremities of the pectorals.

A. Lancea, Cuv. *Reg. An.* tom. ii. p. 360. *A. Tobianus*, Don. *Brit. Fish.* vol. ii. pl. 33. *Swains. Zool. Illust.* vol. i. pl. 63. upper fig. *Lesauv. in Bull. des Sci. Nat.* (1825.) tom. iv. p. 262. *Flem. Brit. An.* p. 201. *Ammodytes*, *Will. Hist. Pisc.* p. 113. *Launce*, *Penn. Brit. Zool.* vol. iii. pl. 25. no. 66. but not p. 156. *Sand-Launce*, *Id.* (Edit. 1812.) vol. iii. pl. 28. but not p. 206.

LENGTH. From five to eight inches; rarely more.

DESCRIPT. (*Form.*) Much thicker in proportion than the *A. Tobianus*; in a fish measuring one-fourth less in length, the depth and thickness remain the same as in that species: head a perfect cone, contained five times and a half in the entire length: lower jaw not produced so far beyond the upper, and less pointed: the two teeth on the vomer much less developed: gape smaller, the maxillaries being much shorter; the pedicels of the intermaxillaries, on the contrary, are considerably longer, very much increasing the protractility of the upper jaw, which, when the mouth is opened, instead of turning back as in the last species, protrudes itself forwards and downwards, the maxillaries never becoming vertical: the pieces of the opercle not so much developed, nor produced so far backwards, but preserving the same form: dorsal commencing a little nearer the head, in a line with the commencement of the last quarter of the pectorals: both dorsal and anal contain fewer rays: pectorals exactly half the length of the head: in other respects the forms of the two species are similar.

D. 53 or 54; A. 23; C. 15, &c.; P. 13.

(Colours.) Similar to those of the *A. Tobianus*, only paler.

Common on all our sandy shores, in which it may be found buried at the ebb of the tide. Habits resembling those of the last species. *Obs.* Willughby has erroneously figured this species (tab. G. 8. f. 1.) with two dorsal fins: his description, however, is correct.

ORDER III. OSTEODERMI.

GEN. 66. SYNGNATHUS, *Cuv.*

* *Anal, caudal, and pectoral fins, all present.*

172. *S. Acus*, Linn. (*Great Pipe-Fish*).—Body heptangular anteriorly: crown with an elevated longitudinal ridge; profile descending in a sinuous curve: snout much narrower, vertically, than the head.

S. Acus, Linn. *Syst. Nat.* tom. i. p. 416. Bloch, *Ichth.* pl. 91. f. 2. *Turt. Brit. Faun.* p. 116. *Flem. Brit. An.* p. 175. *Pipe-Fish*, Penn. *Brit. Zool.* vol. 111. pl. 23. no. 60. lower fig. but not p. 138. *Shorter Pipe-Fish*, *Id.* (Edit. 1812.) vol. 111. pl. 26. no. 60. lower fig. *Low, Faun. Orc.* p. 181.

LENGTH. From twelve to sixteen inches: according to Bloch, from two to three feet.

DESCRIPT. (*Form.*) Very much elongated, slender, tapering behind: greatest depth and thickness about equal; each contained thirty-seven times in the entire length: body, from the head to the vent, heptangular; thence to the termination of the dorsal fin, hexangular; thence to the caudal, quadrangular: the heptangular portion presents two longitudinal ridges on each side, one on each side of the middle of the back, and one down the middle of the belly; this last terminates at the vent; the dorsal ridges terminate at the end of the dorsal fin, and the upper pair of lateral ridges rise to take their place; beyond the vent, the under surface of the tail is very flat, with the margins rather dilated, and, in the *male*, contains a long purse-like cavity, for the reception of the *ova*, opening by a longitudinal slit: body protected by transverse, striated, shields or plates, sixty-three in number; nineteen occupying that portion of the trunk between the gills and the vent, forty-four the remainder of the length: head compressed, contained (snout included) about seven times and a half in the entire length: occiput rising into a longitudinal elevated ridge, continued over the crown; the profile falling thence in a sinuous curve to the base of the snout: eyes large, protected above by a sharp osseous ridge; the intervening space concave; in front of each a sharp spinous process: snout elongated, nearly twice the length of the rest of the head, compressed, much narrower than the head in a vertical direction; mouth very small, situate quite at the extremity; lower jaw longest, ascending: no teeth: opercle large, marked with diverging striæ, closed on all sides by a continuous membrane, the gill-opening being reduced to a small hole on each side of the nape: dorsal so placed as to terminate exactly at the middle point of the entire length; length of the fin about equal to that of the head; its height equalling

the depth of the body, and nearly uniform throughout, the anterior rays being slightly shorter than the succeeding ones; all the rays simple: vent in a line with the seventh dorsal ray; anal immediately behind it, very small and inconspicuous, consisting of only three short simple rays: caudal moderate, rounded; the rays simple and articulated: pectorals a little behind the gills, not very large, of a rounded form; all the rays simple.

D. 42; A. 3; C. 10; P. 12.

(*Colours.*) Pale yellowish brown, with transverse bands of darker brown: belly whitish.

Not uncommon on many parts of the coast, frequenting chiefly the shallower places. I am not aware, however, that in the British seas it ever attains to the length which Bloch assigns to it. This and several other species in the present genus are remarkable for the *males* carrying the ova, until hatched, and even the young themselves for a short time after they have been hatched, in a peculiar longitudinal pouch beneath the tail, into which the former are received, at the time of their exclusion by the *female**. The present species breeds in Summer, and at a very early age, sometimes when not exceeding four inches in length. *Obs.* This and the next were considered by Pennant as mere varieties of one species, to which he applied the name of *Shorter Pipe-Fish*. The same opinion appears to have been entertained by Montagu†.

173. *S. Typhle*, Linn. (*Lesser Pipe-Fish*.) — Body hexangular anteriorly: crown flat; profile nearly in the same line: snout almost as broad, vertically, as the head.

S. Typhle, Linn. *Syst. Nat.* tom. i. p. 416. *Bloch, Ichth.* pl. 91. f. 1. ? *Don, Brit. Fish.* vol. III. pl. 56. *Turt. Brit. Faun.* p. 116. *Flem. Brit. An.* p. 175. *Acus Aristotelis, Will. Hist. Pisc.* p. 158. tab. I. 25. f. 1. *Pipe-Fish, Penn. Brit. Zool.* vol. III. pl. 23. no. 60. upper fig. but not p. 138. *Shorter Pipe-Fish, Id.* (Ed. 1812.) vol. III. pl. 26. no. 60. upper fig.

LENGTH. One foot: rarely more.

DESCRIPT. (*Form.*) Thicker in proportion to its length than the last species; the ventral carina not so prominent, causing the anterior part of the body to appear more hexangular than heptangular: number of transverse shields between the gills and the vent the same, but from the vent to the caudal only thirty-six or thirty-seven: head larger: the crown nearly flat, without any elevated ridge; the profile passing off almost in a straight line to the mouth, with very little sinuosity: snout every-way larger; longer, and, measured vertically, nearly as broad as the head; very much compressed: spinous process before the eyes smoother, and less projecting: head, including the snout, rather more than one-sixth of the entire length: opercle much larger: dorsal placed further back, being exactly in the middle of the entire length: anal very minute: caudal and pectorals similar.

D. 39; A. 3; C. 10; P. 15.

(*Colours.*) "Varying from greenish olive, to olivaceous yellow, and brown, variegated sometimes with dark or bluish lines." DON.

* See on this subject *Proc. of Zool. Soc.* (1834.) p. 118.

† *Wern. Mem.* vol. 1. p. 86.

Found in the same situations as the last species, and equally, if not more, common. *Obs.* I feel some hesitation in considering the *S. Typhle* of Bloch to be the same as that of English authors. His figure, as Donovan has observed, resembles more nearly the *S. Acus* in a young state.

- (34.) *S. pelagicus*, Don. Brit. Fish. vol. iii. pl. 58. Turt. Brit. Faun. p. 117. Flem. Brit. An. p. 176.

I very much doubt whether this supposed species be any thing more than the young of *S. Acus*. During a stay at East Bourne, in Sept. 1833, I obtained three specimens, taken in the shrimp-nets at that place, which appeared exactly to coincide with Donovan's figure, but which, I am tolerably satisfied, are only what I have stated above. Two of these were *females*, and possessed an extremely minute anal fin; but the third, which was a *male*, exhibited no vestige of it whatever, even when examined carefully with a lens. In this last individual, though measuring only three inches and a half in length, the caudal pouch was full of newly-hatched young. What the *S. pelagicus* of Linnæus may be, I do not pretend to say.

** *Anal and pectoral fins wanting; caudal obsolete.*

174. *S. æquoreus*, Linn. (*Æquoreal Pipe-Fish*).— Body octangular anteriorly: snout short; much narrower, vertically, than the head: dorsal and vent nearly in the middle of the entire length.

S. æquoreus, Linn. *Syst. Nat.* tom. i. p. 417. *Mont. in Wern. Mem.* vol. i. p. 85. pl. 4. f. 1. *Flem. Brit. An.* p. 176. *Acus nostras caudâ serpentinâ*, *Sibb. Scot. Illust.* part ii. tom. ii. p. 24. tab. 19. *Æquoreal Pipe-Fish*, *Penn. Brit. Zool.* (Edit. 1812.) vol. iii. p. 188.

LENGTH. From twenty to twenty-four inches.

DESCRIPT. (*Form.*) Readily distinguished from both the foregoing species by the want of the pectoral and anal fins. Form slender, and very much elongated: body compressed, with an acute dorsal and abdominal ridge; also with three slight ridges on each side; hence the trunk from the gills to the vent is octangular; the tail is obsoletely quadrangular, becoming almost round towards the tip, which is extremely tapering: transverse shields or plates, between the gills and the vent, twenty-eight in number; from the vent to the extremity of the tail, sixty or more (Montagu says about sixty-six), but, from the extreme minuteness of the last few, not admitting of being counted with exactness: head not more than one-twelfth of the entire length; without any elevated ridge on the occiput: snout narrower than the head, similar in shape to that of *S. Acus*, but much shorter in relation to the entire length of the fish: dorsal occupying nearly a middle position in the entire length; the distance from the last ray to the end of the tail at the same time a little exceeding that from the end of the snout to the commencement of the fin: vent a very little before the middle, being nearly in a vertical line with the commencement of the last quarter of the dorsal fin: tail compressed at the extremity, showing a very small rudimentary caudal fin; the rays however so obsolete, and so much enveloped in the common skin, as to be scarcely distinguishable.

D. about 40; A. 0; C. 0?; P. 0.

(Colours.) "Yellowish, with transverse pale lines, with dark margins, one in each joint, and another down the middle of each plate, giving it the appearance of possessing double the number of joints it really has: these markings, however, cease just beyond the vent." MONT.

This species, which had been previously observed by Sibbald in the Frith of Forth, was obtained by Montagu at Salcomb, in 1807. A second specimen, he mentions, was afterwards picked up on the same coast. That from which the above description was taken was procured in Berwick Bay by Dr. Johnston: it is now in the collection of W. Yarrell, Esq.

175. *S. Ophidion*, Bloch. (*Snake Pipe-Fish*.)—Body round, very obsoletely octangular anteriorly: snout short; much narrower, vertically, than the head: dorsal and vent considerably before the middle of the entire length.

S. Ophidion, Bloch, *Ichth.* pl. 91. f. 3. *Gmel. Linn.* tom. i. part iii. p. 1456. ? *S. anguineus*, *Jen. Cat. of Brit. Vert. An.* 30. sp. 176. *Snake Pipe-Fish*, *Shaw, Gen. Zool.* vol. v. part ii. p. 453. pl. 179. (Copied from Bloch.) *Longer Pipe-Fish*, *Low, Faun. Orc.* p. 179.

LENGTH. From twelve to fourteen inches. According to Bloch, from one to two feet.

DESCRIPT. (*Form.*) Very similar to the last species, but more slender and tapering in proportion to its length: anterior part of the body scarcely thicker than a goose-quill, presenting the same angles as the *S. æquoreus*, but with these angles so ill-defined and obsolete, as to appear on the whole nearly round: beyond the vent the body is obsoletely quadrangular, becoming quite round near the extremity of the tail, the tip of which is compressed into a very minute rudimentary caudal fin: transverse shields on the trunk not separated by any well-marked lines, so as scarcely to admit of being counted: head one-twelfth of the entire length, similar, as is also the snout, to that of the *S. æquoreus*: dorsal much forwarder than in that species, entirely before the middle; the distance from the last ray to the end of the tail more than half as long again as that from the end of the snout to the commencement of the fin: vent considerably before the middle of the entire length, but in relation to the dorsal situate as in the *S. æquoreus*, three-fourths of that fin lying in advance of it: rays of the caudal too minute and obsolete to be distinguished.

D. 33; A. 0; C. 0?; P. 0.

(*Colour of a specimen in spirits.*) Of a uniform yellowish brown, paler beneath: no indication of the transverse bands which appear in the last species.

This species, which has evidently been confounded with the next by many authors*, I have, since the publication of my Catalogue, ascertained to be the true *S. Ophidion* of Bloch, and probably of Gmelin, but whether of Linnæus also is doubtful, as his very concise description applies nearly equally well to both. It is closely allied to the *S. æquoreus*, from which it scarcely differs, excepting in its slenderer and rounder form, and much forwarder position of the dorsal and vent. It is indeed with this last species, that it has probably been confounded by Low, under

* Montagu was the first to point out the great discrepancies which appear in the different figures and descriptions given by different authors of *S. Ophidion*, and it is entirely owing to his observations on this subject, that I was led to detect the existence of another species. See *Wern. Mem.* vol. i. p. 89.

the name of *Longer Pipe-Fish*, part of whose description, borrowed from Sibbald and Pennant, does not belong to it: the proportions, however, which Low assigns to his own specimens, convince me that this is the species which had occurred to himself, and, according to his own account, in great plenty. The only specimens which I have seen, amounting, however, to several, are in the collection of W. Yarrell, Esq. I am ignorant as to the locality whence they were obtained.

- (35.) *Longer Pipe-Fish*, Penn. Brit. Zool. vol. III. p. 138. pl. 23. no. 61. Id. (Edit. 1812.) vol. III. p. 184. pl. 26. no. 61. *Syngnathus barbarus*, Turt. Brit. Faun. p. 117. Flem. Brit. An. p. 176.

I consider this as a very doubtful species. The figure, in which there is neither anal nor pectoral fins, approaches so closely the *S. aequoreus*, that I feel confident it was taken either from that species, or the *S. Ophidion* last described. In the description, however, mention is made both of anal and pectorals, but of no caudal, a combination of characters which is not only at variance with every British species I am acquainted with, but which will not accord with any of those given by Linnaeus, (not even with the *S. barbarus*, in which, according to that author, there is no anal,) and which, moreover, will not fall under any of the sections into which Cuvier has divided the genus. There is strong ground for believing that, by some unaccountable accident, Pennant has mixed up under one name the descriptions of two totally distinct species.

*** *Anal, pectoral, and caudal fins, all wanting.*

176. *S. lumbriciformis*, Nob. (*Worm Pipe-Fish*.)—
Body round, slightly compressed anteriorly: snout very short; of nearly equal breadth with the head: dorsal and vent at about the middle of the entire length.

S. Ophidion, *Flem. Brit. An.* p. 176. *Aeus lumbriciformis*, *Will. Hist. Pisc.* p. 160. *Little Pipe-Fish*, *Penn. Brit. Zool.* vol. III. p. 141. pl. 33. no. 62. *Id.* (Edit. 1812.) vol. III. p. 187. no. 62.

LENGTH. From six to nine inches.

DESCRIPT. (*Form.*) Extremely slender; the trunk or anterior half slightly compressed, but without angles; the tail round, and tapering to a very fine point, without even the rudiment of a caudal fin: transverse shields smooth, and of a membranous nature, somewhat resembling the segments of the common earth-worm; between the gills and the vent twenty-eight; thence to the end of the tail upwards of sixty, perhaps near seventy, but towards the tip so minute as scarcely to admit of being counted with exactness: head small, scarcely one-seventeenth of the entire length; crown flat, without any elevated ridge; snout very short, blunt at the tip, compressed, with a sharp keel above and below; its breadth, vertically, not much less than that of the head: dorsal at about the middle of the entire length, but rather more of the fin behind than before it, the distance from the end of the snout to the first ray being a little greater than that from the last ray to the extremity of the tail: vent also almost exactly in the middle, if any thing a little behind it; with respect to the dorsal, it is forwarder than in the two last species, only one-third of that fin lying in advance of it.

D. 39; A. 0; C. 0; P. 0.

(Colour.) Of a uniform olive, sometimes yellowish, brown; in my specimen, a longitudinal dark fascia extends from behind the gill-cover over the first six segments of the trunk.

As this species would seem not to be the *S. Ophidion* of continental authors, I have restored to it the name originally given it by Willughby, in consideration of its worm-like appearance. I believe it is not uncommon on many parts of the coast, and is said to be called in Cornwall a *Sea-Adder*. The *ova* are not carried by the male in a caudal pouch, but "in hemispheric depressions on the external surface of the abdomen, anterior to the vent." *Obs.* The *S. Ophidion* of Berkenhout and Turton may be intended either for this species or the last.

GEN. 67. HIPPOCAMPUS, Cuv.

177. *H. brevirostris*, Cuv. ? (*Sea-Horse*.) — Snout short.

H. brevirostris, Cuv. *Reg. An.* tom. II. p. 363. *H. Rondeletii*, *Will. Hist. Pisc.* tab. I. 25. fig. 3.

Pennant states his having been informed that the *Syngnathus Hippocampus* of Linnæus had been found on the southern shores of this kingdom*. More recently, Messrs. C. and J. Paget have recorded † that it is occasionally met with at Yarmouth. As, however, several species have been confounded by authors under the above name, and the British one has not hitherto been correctly ascertained, it is impossible to annex any description. At the same time there is ground for believing that it will prove to be the *Hippocampus brevirostris* of Cuvier.

ORDER IV. GYMNODONTES.

GEN. 68. TETRODON, Linn.

178. *T. stellatus*, Don. (*Stellated Globe-Fish*.) — Above blue; beneath silvery; abdomen spinous; each spine arising from a stellated root, of four rays. DON.

T. stellatus, *Don. Brit. Fish.* vol. III. pl. 66. *Turt. Brit. Faun.* p. 116. *Flem. Brit. An.* p. 174. *Globe Diodon*, *Penn. Brit. Zool.* vol. III. p. 132. pl. 20. *Globe Tetrodon*, *Id.* (Edit. 1812.) vol. III. p. 174. pl. 23.

* *Brit. Zool.* vol. III. p. 141.

† *Nat. Hist. of Yarm.* p. 18.

DIMENS. Entire length one foot seven inches; length of the belly, when distended, one foot; the whole circumference in that situation two feet six inches. **PENN.**

DESCRIPT. (*Form.*) Body usually oblong, but when alarmed the fish has the power of inflating the belly to a globular shape of great size: the whole surface of the abdomen, down to the vent, armed with small sharp spines, each arising from a distinct stellated root of four processes: mouth small: back from head to tail almost straight, or at least very slightly elevated: dorsal placed low on the back; anal opposite: caudal almost even, divided by an angular projection in the middle: pectorals present; ventrals wanting.

D. 11; A. 10; C. 6; P. 14.

(*Colours.*) Back of a rich deep blue: belly and sides silvery white; the spines of a rich carmine-colour: tail and fins brown: irides white, tinged with red. **PENN.** and **DON.**

An individual of this species is recorded by Pennant as having been taken at Penzance in Cornwall. A second specimen, also captured on the Cornish coast, is figured by Donovan. Bloch appears to have considered Pennant's fish as his *T. lagocephalus**, but by Donovan it was thought, and apparently with some reason, to be distinct. This and all the other species in this genus have the power of inflating the abdomen to a large size, at the same time that they erect the spines with which it is armed, by which means they defend themselves against the attacks of their enemies.

GEN. 69. ORTHAGORISCUS, *Schn.*

179. *O. Mola*, *Schneid.* (*Short Sun-Fish.*) — Depth about two-thirds of the length: skin rough.

O. Mola, *Flem. Brit. An.* p. 175. *Mola Salviani*, *Will. Hist. Pisc.* p. 151. tab. I. 26. *Tetrodon Mola*, *Linn. Syst. Nat.* tom. i. p. 412. *Don. Brit. Fish.* vol. ii. pl. 25. *Diodon Mola*, *Bloch, Ichth.* pl. 128. *Cephalus brevis*, *Shaw, Gen. Zool.* vol. v. part ii. p. 437. pl. 175. *Turt. Brit. Faun.* p. 116. *Sun-Fish*, *Borl. Cornw.* p. 267. pl. 26. f. 6. *Short Diodon*, *Penn. Brit. Zool.* vol. iii. p. 131. pl. 19. *Short Tetrodon*, *Id.* (Edit. 1812.) vol. iii. p. 172. pl. 22.

LENGTH. From three to four feet.

DESCRIPT. (*Form.*) Oblong, approaching orbicular, truncated behind: sides very much compressed; the dorsal and ventral lines presenting a sharp edge: depth behind the pectorals about two-thirds of the entire length; thickness rather more than one-third of the depth: head not distinguishable from the trunk; mouth small; jaws exposed; the lamellated substance undivided: eyes moderate, about equidistant from the corner of the mouth and the branchial aperture, which last is of an oval form, and situate immediately before the pectoral fin: skin destitute of scales, but every-where very rough with minute granulations: no lateral line: dorsal placed at the further extremity of the body, short but very much elevated, its height equalling two-thirds or more of the depth of the body, terminating upwards in a point; rays very much branched: anal opposite and exactly similar to the dorsal: caudal with the posterior

* *Ichth.* pl. 140.

margin slightly rounded, very short, but its depth (or breadth, measured vertically) nearly equalling that of the body, extending from the dorsal to the anal, with both of which fins it is connected: pectorals small, rounded, attached horizontally: ventrals wanting.

D. 17; A. 16; C. 14; P. 13*.

(Colours.) Back dusky gray; belly and sides silvery.

Rare in the British seas, but has been captured, in different instances, upon various parts of the coast. Attains to an enormous size; sometimes weighing as much as four hundred or five hundred pounds. Generally distributed over the European seas. According to Bloch, occasionally reposes on one side, in which situation, when surprised, it is easily taken. Flesh bad, but yielding a great deal of oil.

180. *O. oblongus*, Schneid. (*Oblong Sun-Fish*.)—
Length more than twice the depth of the body: skin smooth.

O. truncatus, *Flem. Brit. An.* p. 175. *Jen. Cat. of Brit. Vert. An.* 31. sp. 181. *Tetrodon truncatus*, *Gmel. Linn.* tom. i. part iii. p. 1448. *Don. Brit. Fish.* vol. II. pl. 41. *Cephalus oblongus*, *Shaw, Gen. Zool.* vol. v. part ii. p. 439. pl. 176. *Turt. Brit. Faun.* p. 116. Sun-Fish from Mount's Bay, *Borl. Cornw.* p. 268. pl. 26. f. 7. Oblong Diodon, *Penn. Brit. Zool.* vol. III. p. 129. pl. 19. Oblong Tetrodon, *Id.* (Edit. 1812.) vol. III. p. 170. pl. 22.

DESCRIPT. (*Form.*) Represented by authors as closely resembling the last species, excepting in its more oblong and elongated shape, the entire length being more than twice (according to Turton, nearly three times) the depth of the body: skin smooth: branchial aperture lunulate. The number of fin-rays, according to Donovan, stands thus:

D. 12; A. 15; C. 17; P. 14.

(Colours.) "Back dusky, with some variegations; abdomen silvery; between the eyes and the pectoral fins a few dusky streaks pointing downwards." SHAW.

Apparently more rare in the British seas than the last species. First noticed by Borlase, who has figured a specimen from Mount's Bay in Cornwall. The same author speaks of another taken at Plymouth in 1734, which weighed five hundred pounds. Since then other individuals have occasionally been met with. In the stomach of one, obtained by Donovan from the Bristol Channel, there were found fragments of testaceous and crustaceous animals. *Obs.* Both this and the *O. Mola* have a bright glistening appearance when taken fresh out of the water, to which circumstance is to be attributed their English name of *Sun-Fish*. At night they are said to be phosphorescent.

* The above fin-ray formula is from Bloch.

ORDER V. SCLERODERMI.

GEN. 70. BALISTES, Cuv.

181. *B. Capriscus*, Gmel. (*Mediterranean File-Fish*.)

B. Capriscus, Gmel. *Linn.* tom. i. part iii. p. 1471. *Cuv. Reg. An.* tom. ii. p. 372. *Capriseus Rondeletii*, *Will. Hist. Pisc.* p. 152. tab. I. 19. *Le Baliste Caprisque*, *Lacép. Hist. Nat. des Poiss.* tom. i. p. 372. *Mediterranean File-Fish*, *Shaw, Gen. Zool.* vol. v. part ii. p. 411. pl. 168*.

LENGTH. From one to two feet. SHAW.

DESCRIPT. (*Form.*) Head very much compressed: mouth small: each jaw armed with eight large, broad, strong teeth, forming a continuous series: eyes round, placed high: first dorsal nearly in the middle of the back, consisting of three strong spines connected by a membrane, the first three times as large as either of the other two; when at rest, concealed in an osseous furrow on the ridge of the back; these spines are so articulated as only to admit of being elevated or depressed all together: second dorsal long, reaching nearly to the caudal: anterior portion of the abdomen armed with a sharp strong recurved bone, the extremity of which projects out of the skin in a backward direction; between this and the vent are several other much smaller, but moderately strong, serrated spines: anal similar to the dorsal, commencing behind the vent: tail becoming suddenly narrow, and terminating in a broad fin: pectorals small and round: ventrals wanting. WILL. (*Colours.*) "General colour violaceous gray, sometimes variegated both on the body and fins with blue or red spots: irides yellow; pupils blue." SHAW.

A single individual of this species, which is a native of the Mediterranean, as well as of the American seas, is recorded by Mr. Children to have been captured on the Sussex coast in August, 1827*. Not previously known as a British fish. Most of the species belonging to this genus inhabit the Tropics.

* See his *Address to the Zoological Club of the Linnean Society*. p. 6.

(II. CARTILAGINEI.)

ORDER VI. ELEUTHEROPOMI.

GEN. 71. ACIPENSER, *Linn.*

182. A. *Sturio*, *Linn.* (*Common Sturgeon*).—Osseous tubercles in five longitudinal rows; strong and spinous.

A. *Sturio*, *Linn. Syst. Nat.* tom. i. p. 403. *Bloch, Ichth.* pl. 88. *Turt. Brit. Faun.* p. 114. *Don. Brit. Fish.* vol. III. pl. 65. *Flem. Brit. An.* p. 173. *Sturio, Will. Hist. Pisc.* p. 239. tab. P. 7. fig. 3. *Sturgeon, Penn. Brit. Zool.* vol. III. p. 124. pl. 19. no. 53. *Common Sturgeon, Id. (Edit. 1812.)* vol. III. p. 164. pl. 22. *L'Esturgeon ordinaire, Cuv. Reg. An.* tom. II. p. 379.

LENGTH. From six to eight feet, sometimes more.

DESCRIP. (*Form.*) Body elongated; somewhat pentagonal; with five longitudinal rows of osseous tubercles, one on the back, two at the sides, and two at the edges of the abdomen; tubercles marked with radiating striæ, broad at the base, terminating above in a sharp strong spine directed backwards; those on the back more developed than the others: the whole skin rough with minute points and tubercles independently of the above larger ones: abdomen flat: head long, covered above with lozeng-shaped plates; a longitudinal sulcus on the forehead: snout depressed, somewhat conical, rather slender and sharp-pointed; mouth placed beneath, cylindrical, small, without teeth, bordered by a protractile cartilage instead of lips: four pendent barbules on the under surface of the snout, nearer its extremity than the mouth: eyes small: nostrils near the eyes, double; the anterior orifice round, the posterior one elongated: gill-opening large; the gill-cover marked with numerous striæ, radiating in all directions: a single dorsal, of a somewhat triangular form, small, placed very far back near the tail: anal also small, and nearly opposite: caudal forked; the upper lobe long and pointed, produced very much beyond the lower: pectorals oval: vent beneath the commencement of the dorsal; the ventral fins a little in advance of it.

D. 35; A. 23; C. 125; P. 28; V. 24*.

(*Colours.*) Upper parts gray, variegated with dusky, sometimes inclining to olivaceous; the central part of the tubercles white: beneath silvery white.

A migratory species, residing in the sea during the winter months, but entering rivers at the approach of Spring to spawn. Very abundant in many parts of the Continent, but seldom in any plenty in this country. Attains to the weight of from one hundred to three hundred pounds.

* The above fin-ray formula is from Donovan.

Pennant mentions one, taken in the Esk, which weighed four hundred and sixty pounds. Arrives at a still larger size abroad, according to Bloch and other authors. Feeds principally upon the smaller fish. Flesh much esteemed. The well known article of food termed *Caviar* is prepared from the roe.

ORDER VII. ACANTHORRHINI.

GEN. 72. CHIMÆRA, Linn.

183. *C. monstrosa*, Linn. (*Sea-Monster*.)

C. monstrosa, Linn. *Syst. Nat.* tom. 1. p. 401. Bloch, *Ichth.* pl. 124. *Turt. Brit. Faun.* p. 114. Don. *Brit. Fish.* vol. v. pl. 111. *Flem. Brit. An.* p. 172. Galeus Acanthias Clusii, *Will. Hist. Pisc.* p. 57. tab. B. 9. f. 6. Northern Chimæra, *Penn. Brit. Zool.* (Edit. 1812.) vol. III. p. 159*. La Chimère arctique, *Cuv. Reg. An.* tom. II. p. 382.

LENGTH. From two to three feet. CUV.

DESCRIPT. (*Form.*) "Body compressed: head blunt; the snout sub-ascending, blunt: a narrow crenulated grinder on each side in the lower jaw, and a broad tubercular one corresponding above: nostrils immediately above the upper lip, contiguous, each with a cartilaginous complicated valve: branchial openings in front of the pectorals: eyes large, lateral: lateral line connected with numerous waved anastomosing grooves on the cheeks and face: on the crown, in front of the eyes, a thin osseous plate, bent forwards, with a spinous disk at the extremity on the lower side: the first dorsal fin above the pectorals, narrow, with a strong spine along the anteal edge: second dorsal arising immediately behind the first, narrow, and continued to the caudal, where it terminates suddenly: pectorals large, subtriangular: ventrals rounded; in front of each a broad recurved osseous plate, with recurved spines on the ventral edge: claspers pedunculated, divided into three linear segments, the anteal one simple, the retral ones having the opposite edges covered with numerous small reflected spines: a small anal fin opposite the extremity of the second dorsal: caudal fin above and below, broadest near the origin, gradually decreasing to a linear produced thread." FLEM. (*Colours.*) "The whole body dark brown above, varied with yellowish brown and silvery; the lower parts of a bright silver colour: eyes green, with silvery irides, and very brilliant, or shining with phosphoric splendour." DON.

Found principally in the northern seas of Europe, and but rarely met with in those of Great Britain. The above description was taken by Dr. Fleming from a specimen captured in the Zetland seas, where it is said to be known by the name of *Rabbit-Fish*. Food, according to Bloch, medusæ and crabs.

ORDER VIII. PLAGIOSTOMI.

GEN. 73. SQUALUS, *Linn.*(1. SCYLLIUM, *Cuv.*)

184. *S. Canicula*, *Linn.* (*Spotted Dog-Fish.*)—Spots small and numerous: ventrals cut obliquely at their posterior margin: valves of the nostrils united, partly covering the mouth.

S. Canicula, *Linn. Syst. Nat.* tom. i. p. 399. *S. Catulus*, *Bloch, Ichth.* pl. 114. *Don. Brit. Fish.* vol. iii. pl. 55. *Blainv. Faun. Franç.* p. 69. pl. 17. f. 1. *Scyllium Catulus*, *Flem. Brit. An.* p. 165. (Male.) *S. stellare*, *Id.* (Fem.) *S. Canicula*, *Bon. Faun. Ital. Fasc. vii.* *Catulus major vulgaris*, *Will. Hist. Pisc.* p. 62. tab. B. 4. f. 1. *Catulus minor*, *Id.* p. 64. ? Lesser Spotted Dog-Fish, (Male), and Spotted Dog-Fish, (Fem.) *Penn. Brit. Zool.* vol. iii. pp. 115, and 113. pl. 15. Lesser Spotted Shark, (Male,) and Spotted Shark, (Fem.) *Id.* (Ed. 1812.) vol. iii. pp. 150, and 143. pl. 19. *La grande Roussette*, *Cuv. Reg. An.* tom. ii. p. 386.

LENGTH. From two to three feet; sometimes three feet and a half, or even more.

DESCRIPT. (*Form.*) Body elongated, tapering from behind the pectorals, where the thickness is greatest: head blunt, depressed: snout short and rounded: nostrils on the under surface of the snout, near the mouth, large, prolonged in a channel to the margin of the lips, and almost entirely closed by a fleshy valve or lobe of the skin; each valve unites with its fellow on the opposite side, the two together forming a large flap, emarginated in front, which extends over the upper lip and entirely conceals it: mouth beneath, behind the nostrils, of a semicircular form: both jaws with several rows of small, but sharp, teeth, inclining backwards; each tooth furnished with a long point in the middle, and smaller denticulations at the sides: eyes large, oblong-oval, at equal distances from each other and the end of the snout; behind each a small temporal orifice, or spiracle, communicating with the mouth: branchial openings at the sides of the neck, five in number, parallel to, and equally distant from, each other, arranged in a longitudinal series, the first as far behind the eyes, as these last are distant from the end of the snout, the last immediately above the pectoral fin; first four openings nearly of equal size, the fifth smaller: skin somewhat glistening, very rough when the hand is passed from tail to head, but only slightly so in the opposite direction, the roughness proceeding from very minute denticulated scales: no distinct lateral line: two dorsals; both placed very much behind: the first commencing about the middle of the entire length, of a trapezoidal form, cut square behind, its greatest height about equal to the depth of the body, the space which it occupies about two-thirds of the same:

second dorsal rather before the middle point between the first dorsal and the end of the caudal, shaped like the first, but rather smaller: anal answering to the space between the two dorsals, commencing a little beyond the termination of the first, and terminating nearly in a line with the commencement of the second; somewhat triangular, with the posterior portion produced backwards in the form of a lanceolate process: tail very long, equalling a little more than half the entire length; terminating in a caudal fin; upper lobe of the caudal commencing a little beyond the termination of the second dorsal, low at first, but gradually widening towards its extremity, which is truncated; lower lobe a little distant from the upper, and of a triangular form: pectorals large, of about the length of the head, broadest at their posterior margin, which is cut square: ventrals a little in advance of the first dorsal, attached horizontally, much smaller than the pectorals, obliquely truncated behind, their posterior margins meeting at an acute angle; together they form a kind of lozenge, in the middle of which is the vent. The *male* is characterized by having the ventrals larger than in the other sex, and united throughout their length by an intermediate membrane; they are also furnished on their inner margins with fusiform appendages, not extending beyond the fin in young subjects, but lengthening in adults: in the *female*, the ventrals have the last third portions of their inner margins separate. (*Colours.*) Back, upper portion of the head, and the whole of the sides, reddish gray, or dirty flesh-red, with very numerous small dark brown spots; the spots on the posterior portion of the body more scattered: fins coloured like the back, but the spots larger and less numerous; anal almost without spots: under portion of the head and body whitish, free from spots. *Obs.* The spots are generally less numerous, and rather larger, in the *female* than in the *male*.

A common species on all parts of the coast. Does not attain to any great size. Very voracious, preying on almost any animal substance. Oviparous: produces, according to Pennant, about nineteen young at a time. Very tenacious of life. *Obs.* I have ventured to bring together the *Spotted Dog-Fish* and the *Lesser Spotted Dog-Fish* of Pennant, under a strong suspicion that they are simply the two sexes of the present species. The female has probably been confounded by some authors with the following.

185. *S. stellaris*, Linn. (*Rock Dog-Fish.*) — Spots large and scattered: ventrals cut square at their posterior margin: valves of the nostrils separate, not reaching to the mouth.

S. stellaris, Linn. *Syst. Nat.* tom. i. p. 399. *Blainv. Faun. Franc.* p. 71. pl. 17. f. 2. *Scyllium stellare*, Bon. *Faun. Ital.* Fasc. vii. *Catulus maximus*, Will. *Hist. Pisc.* p. 63.? *Spotted Dog-Fish*, Var. *Penn. Brit. Zool.* vol. iii. p. 114. *Id.* (Edit. 1812.) vol. iii. p. 150. *Rock Shark*, Shaw, *Gen. Zool.* vol. v. part ii. p. 336. *La petite Roussette ou Rochier*, Cuv. *Reg. An.* tom. ii. p. 386.

LENGTH. From two to three feet. According to Blainville, it attains to a larger size than the last species.

DESCRIPT. (*Form.*) Closely resembling the *S. Camicula*, but differing essentially in the structure of the lobes of the nostrils, and in the form of the ventrals: the former are not united as in that species, and of a smaller size, leaving the whole of the mouth and the upper lip visible: the vent-

rals, instead of being cut obliquely, are cut nearly square, their posterior margins meeting at a very obtuse angle; they are united or separate, according to the sex, in a similar manner: the snout is rather more elongated; and, according to some authors, the tail rather shorter, giving the dorsal a more backward position, but this last character I have not noticed myself. (*Colours.*) Upper parts brownish gray, with very little of the red tinge observable in the last species: back, flanks, and tail, sparingly marked with large brown spots of a deep brown or black colour: under parts whitish.

Whether this species be common on our coasts or not, I am ignorant. In many instances it appears to have been confounded with the last. The only specimens I have seen were obtained at Weymouth. According to Blainville, resides amongst rocks. Skin very rough, and said to be of more value in the arts than that of the *S. Canicula*. In some of its characters it appears to resemble the *Catulus maximus* of Willughby, to which I have annexed a reference above.

(36.) *Scyllium melanostomum*, Bon. Faun. Ital. Fasc. viii. *Squalus melastomus*, Blainv. Faun. Franç. p. 75.

A drawing of a third British species of this sub-genus, supposed to be the *S. melanostomum* of the Prince of Musignano, has been recently forwarded to Mr. Yarrell by Mr. Couch of Cornwall. It was taken upon that coast. Not possessing any description of it, and not being able to speak with certainty as to its identity with the above species, I have confined myself to giving this notice of its existence in the British seas. The following are the characters given to the *S. melanostomum* in the "Fauna Italica."—" *Sc. rufocinereus; maculis magnis obscurioribus oblongis; pinnis ventralibus obliquè truncatis; ore intus nigro-cæruleo.*"

(2. CARCHARIAS, Cuv.)

186. *S. Carcharias*, Linn. (*White Shark*.)—Teeth triangular, the sides straight and denticulated; those in the lower jaw narrower than those above.

S. Carcharias, Linn. *Syst. Nat.* tom. i. p. 400. *Turt. Brit. Faun.* p. 113. *Blainv. Faun. Franç.* p. 89. *Canis Carcharias*, Will. *Hist. Pisc.* p. 47.? *Carcharias vulgaris*, *Flem. Brit. An.* p. 167. *White Shark*, *Penn. Brit. Zool.* vol. iii. p. 106. *Id.* (Edit. 1812.) vol. iii. p. 139. *Low, Faun. Orc.* p. 174. *Le Requin*, *Cuv. Reg. An.* tom. ii. p. 387.

LENGTH. Twenty-five feet. CUV.

DESCRIPT. (*Form.*) "Body very much elongated: skin very hard and granulated: the first dorsal placed before the middle of the back, elevated, rounded above; the second small, nearly in the middle of the tail: anal nearly opposite to this last: head flattened; snout rounded, pierced with a large number of pores: tail moderate, terminating in a falciform caudal of two lobes, the upper lobe double the lower one: mouth very large, semicircular, entirely beneath: vent nearly in the middle: form of the nostrils unknown: eyes lateral, small, round: jaws large, bent: teeth in five or six rows in both jaws, above and below; of a triangular form, compressed, finely denticulated at the edges, which are perfectly straight; the lower ones a little narrower than the upper ones: no temporal orifices: branchial openings five in number, but their form and proportion unknown: pectorals very large, in the form of an

isosceles triangle, extending beyond the base of the first dorsal: ventrals small, a little nearer the second dorsal than the first. (*Colours.*) Cinereous brown above, whitish beneath, with two rows of black dots on the sides." BLAINV.

This species appears to be very rare in the British seas; nor am I aware of any description of a native specimen on record. Grew has incidentally thrown out a remark* that it is sometimes found upon the Cornish coast. Low states, that according to information given to him, it is met with in the neighbourhood of the Orkneys. None of our other English authors, that I am aware, have specified any localities in which it has occurred. The description given above is taken from the *Faune Française*. It may be of use in enabling future observers to identify this species: it must be remembered, however, that two or more appear to have been confounded under the name of *Carcharias*; and possibly it may not belong to the one which has been met with in the British seas. According to Cuvier, the *S. Carcharias* of Bloch† is very distinct. The present species is widely distributed, and attains to a very large size. It is very voracious, and much dreaded by navigators.

187. *S. Vulpes*, Gmel. (*Sea-Fox*, or *Thresher*).—Teeth triangular, pointed; the edges not denticulated: caudal with the upper lobe nearly as long as the body.

S. Vulpes, Gmel. *Linn. tom. 1. part iii. p. 1496. Turt. Brit. Foun. p. 112. Blainv. Faun. Franc. p. 94. pl. 14. f. 1. Vulpes marina, Will. Hist. Pisc. p. 54. tab. B. 6. f. 2. Carcharias Vulpes, Flem. Brit. An. p. 167. Long-tailed Shark, Penn. Brit. Zool. vol. iii. p. 110. pl. 14. Id. (Edit. 1812.) vol. iii. p. 145. pl. 17. La Faux, ou Renard, Cuv. Reg. An. tom. ii. p. 388.*

LENGTH. Thirteen feet; the tail alone measuring more than six. PENN.

DESCRIPT. (*Form.*) "Body fusiform, appearing very much elongated in consequence of the relatively great size of the tail: skin very finely and equally shagreened above and below: first dorsal moderately large, triangular, elevated, adhering by almost the whole length of its base, in the middle of the back: the second exceedingly small, triangular, inclined, terminating behind in a very sharp point, and falling in a vertical line with the base of the anal, which is similar to itself: head small, rounded: snout short, conical: tail exceedingly long, in consequence of the great development of the caudal fin, which is in the form of a long sithe; upper lobe enveloping the extremity of the vertebral column, and separated by a notch from the lower lobe, which is moderately broad at its origin: mouth moderate, of a horse-shoe form, entirely beneath: vent at nearly the anterior third of the entire length: nostrils beneath, at the posterior third of the length of the snout, transversely oval: eyes lateral, large, occupying three-fifths of the length of the upper jaw: teeth similar in both jaws, triangular, very sharp, not denticulated, broad at the base, without any accessory points or tubercles: no temporal orifices: branchial openings nearly equal, entirely lateral, the last two somewhat smaller, nearer together, and reaching beyond the anterior margin of the pectoral fin: pectorals narrow, very much elongated, triangular; the adhering side much smaller, and attached for nearly its whole length: ventrals small, triangular, horizontal, adhering by two-thirds of their inner edge,

* *Rarities of Gresham College. p. 90.*

† *Ichth. pl. 119.*

the remaining portion free. (*Colours.*) Bluish gray above, white beneath; the pectoral fins attached to the white portion." BLAINV.

Met with occasionally on the British coast, but not very plentiful. Derives its English name of *Thresher* from its supposed habit of attacking and striking the Grampus with its long fox-like tail*.

188. *S. glaucus*, Linn. (*Blue Shark*.)—Teeth in the upper jaw triangular, and curved; in the lower jaw longer, and more straight; all denticulated: body slender, slate-blue above.

S. glaucus, Linn. *Syst. Nat.* tom. i. p. 401. *Watson in Phil. Trans.* (1778.) vol. LXVIII. p. 789. pl. 12. *Bloch, Ichth.* pl. 86. *S. cæruleus*, *Blainv. Faun. Franc.* p. 90. *Galeus glaucus*, *Will. Hist. Pisc.* p. 49. *Carcharias glaucus*, *Flem. Brit. An.* p. 167. *Blue Shark*, *Penn. Brit. Zool.* vol. III. p. 109. *Id.* (Edit. 1812.) vol. III. p. 143. *Le Bleu, Cuv. Reg. An.* tom. II. p. 388.

LENGTH. Six or seven feet. PENN. (Edit. 1812.)

DESCRIPT. (*Form.*) Elongated: the skin less rough than in the others of this genus: snout long, sharp, depressed, not pellucid at the extremity, punctured above and below with numerous pores: (mouth large, widely cleft; teeth numerous, in four or five rows; the upper ones broadest, curving a little backwards, and denticulated at the edges; the lower ones narrower, straight, in the form of a scalene triangle, and finely denticulated:) nostrils long, transverse, (equally distant from the edge of the jaw, and the extremity of the snout:) eyes elliptic, but the irides exactly circular, the pupils lenticular and transverse; (commisure of the lips extending far beyond them:) no temporal orifices: five branchial openings, (moderate, elevated, lateral; the first three largest and furthest asunder; the last two, especially the fifth, smaller, and closer together:) two dorsals; the first at about the middle of the length, excluding caudal: (triangular, of moderate size, the base longer than the two other sides:) second dorsal not far from the setting on of the caudal, (much smaller, equally triangular, and much more inclined:) anal answering to this last fin: tail (scarcely equalling half the body,) with a triangular excavation at the upper part of the base of the caudal fin; this last with two lobes, the upper extending very far beyond the lower, and terminating in an acute angle: vent at the distance of more than one-third of the length from the setting on of the caudal: pectorals large, (falciform,) very long, terminating in an acute angle: ventrals small, (cut square behind.) (*Colours.*) Back of a fine, moderately deep, blue: belly silvery. WILL. and BLAINV.

Said to be not uncommon on some parts of the coast, particularly that of Cornwall during the pilchard season. The specimen described by Dr. Watson in the "Philosophical Transactions" was taken on the coast of Devonshire. It is possible, however, that in the case of this species, as in that of the *S. Carcharias*, two or more have been confounded under one name. The above description is from Willughby, and is that of a specimen observed by him at Penzance. It appears to be the same as the *S. cæruleus* of Blainville, from whom I have borrowed some additional characters†. The *S. glaucus* of this last author is a closely allied species, in which the teeth are not denticulated at the sides.

* *Borl. Cornw.* p. 265.

† The parts borrowed from Blainville are included in parenthesis.

(3. LAMNA, Cuv.)

189. *S. Cornubicus*, Gmel. (*Porbeagle Shark*.)

S. Cornubicus, Gmel. *Linn.* tom. 1. part iii. p. 1497. *Turt. Brit. Faun.* p. 113. *Don. Brit. Fish.* vol. v. pl. 108. *Neill in Wern. Mem.* vol. i. p. 549. *Blainv. Faun. Franç.* p. 96. pl. 14. f. 2.? *S. Selanonus*, *Leach in Wern. Mem.* vol. ii. p. 64. pl. 2. f. 2.? *Lamna Cornubica*, *Flem. Brit. An.* p. 168. *Porbeagle*, *Borl. Cornw.* p. 265. pl. 26. f. 4. *Penn. Brit. Zool.* vol. iii. p. 117. *Id.* (Edit. 1812.) vol. iii. p. 152. *Goodenough in Linn. Trans.* vol. iii. p. 80. pl. 15. *Le Squalé Nez*, *Cuv. Reg. An.* tom. ii. p. 389.?

LENGTH. Said to attain the length of from five to nine feet.

DESCRIP. (*Form.*) Girth (in the thickest part of a specimen three feet nine inches in length) two feet one inch: body very thick and deep, but extremely slender and flattened just at the setting on of the tail; the sides near that part distended and sloping, thinning off to a sharp angle or elevated line: snout very long, slender towards the extremity, sharp-pointed, and punctured beneath: nostrils near the mouth, at about one-fourth of the distance between it and the end of the snout; of a lunar form, the extremities pointing backwards: mouth semicircular: teeth very sharp, smooth, two-edged, with a little acute process at the base on either side; (the process in some concealed within the gums;) arranged (according to Goodenough) in the upper jaw, in two rows, except in the front, where the two middle ones stand single; in the under jaw, in two rows also, except in the front, where the two middle teeth have a triple row; the inner row bent inwards, the others all turned outwards; (according to Pennant) in three rows in the upper jaw; the same on the sides of the lower, but only two rows in the front of the latter: eyes about four inches* from the extremity of the snout, and upon an exact level with the surface of the body: branchial openings five in number, placed in a regular series; the apertures perpendicular, and about three inches long: skin, when stroked backwards, a little roughish, with an obsolete line of minute tubercles running from the head down the sides, and at length ending in the thick elevated ridge, which takes place at the depression of the body near the tail: first dorsal placed nearly in the middle, erect, its height not quite equal to its length: second dorsal pretty near the tail, much smaller: anal nearly opposite to this last, of the same length and size: above and below the tail, near the base of the caudal, a semicircular or lunar impression, the points directed backwards: caudal of a lunar form, vertical, the upper lobe nearly one-third longer (Pennant says, a little longer†) than the lower: pectorals immediately behind the branchial openings, and equalling rather more than one-sixth of the entire length; of a semilunar form behind: ventrals small, also of a semilunar form behind. GOODEN. and PENN. (*Colours.*) "Colour of the whole upper part, the sides, fins, and tail, dusky, tinged obscurely with green and blue; beneath, from the tip of the nose, and also part of the sides, entirely white." PENN.

This species was first noticed by Jago, from whose drawing of it Borlase's figure was engraved. Since his time many other individuals have occurred on different parts of the coast. Dr. Goodenough's specimen was obtained at Hastings; Pennant's at Brighton. Mr. Neill states that it is occasionally met with in the Frith of Forth: Mr. Couch remarks that

* This is with reference to Dr. Goodenough's specimen: as, however, there was only an inch difference in length between his and Pennant's, this difference would not much affect the relative proportions.

† According to Cuvier and Blainville, the lobes are nearly equal.

on the coast of Cornwall it is not uncommon. It appears to be the same as the *S. Selanonus* of Leach. Is ovoviviparous. Hunts its prey (according to Mr. Couch) in companies, from which circumstance it has received its common name. *Obs.* Authors do not agree in all the characters which they assign to this species, but it is probable that some of these, especially the number of rows of teeth, may vary with age.

190. *S. Monensis*, Shaw. (*Beaumaris Shark*.)

S. Monensis, *Shaw, Gen. Zool.* vol. v. part ii. p. 350. *S. Cornubicus*, β , *Gmel. Linn.* tom. i. part iii. p. 1497. *Turt. Brit. Faun.* p. 113. *Beaumaris Shark*, *Penn. Brit. Zool.* vol. iii. p. 118. pl. 17. *Id.* (Edit. 1812.) vol. iii. p. 154. pl. 20. *Le Beaumaris*, *Cuv. Reg. An.* tom. ii. p. 389. note (2).

LENGTH. Seven to nine and a half feet. DAV.

DESCRPT. (*Form.*) "Snout and body of a cylindrical form: greatest circumference (in a specimen seven feet long) four feet eight inches: nose blunt: nostrils small: mouth armed with three rows of slender teeth, flattened on each side, very sharp, and furnished at the base with two sharp processes; the teeth are fixed to the jaws by certain muscles, and are liable to be raised or depressed at pleasure: first dorsal two feet eight inches distant from the snout, of a triangular form: second dorsal very small, and placed near the tail: pectorals strong and large: ventrals and anal small: the space between the second dorsal and the tail much depressed, the sides forming an acute angle: above and below a transverse fossule or dent: tail crescent-shaped, but the horns of unequal lengths; the upper, one foot ten inches; the lower, one foot one inch: skin comparatively smooth, being far less rough than that of the lesser species of this genus. (*Colour.*) The whole fish lead-colour." DAV.

No one appears to have met with this species excepting Mr. Davies, who communicated to Pennant, by whom it was first published, a drawing and description of one taken near Beaumaris. In the last edition of the "British Zoology," there are some further particulars by Mr. Davies, including an account of a second individual stranded near Bangor Ferry, on the Anglesea side of the Menai, in June 1811. This last differed from the former specimen in having the nose smaller (though itself a larger fish), and more abruptly tapering. It was a female, and contained in its belly four young ones, each about twenty-eight or thirty inches long. *Obs.* By Gmelin and Turton, this species is made a variety of the last, from which it scarcely seems to differ, excepting in its blunt snout. Donovan and Fleming regard them as the same fish. Further observation alone can determine whether either of these opinions is correct.

(4. GALEUS, Cuv.)

191. *S. Galeus*, Linn. (*Common Tope*.)

S. Galeus, *Linn. Syst. Nat.* tom. i. p. 399. *Bloch, Ichth.* pl. 118. *Turt. Brit. Faun.* p. 112. *Blainv. Faun. Franç.* p. 85. *Canis Galeus*, *Will. Hist. Pisc.* p. 51. tab. B. 6. f. 1. *Galeus vulgaris*, *Flem. Brit. An.* p. 165. *Tope*, *Penn. Brit. Zool.* vol. iii. p. 111. *Id.* (Edit. 1812.) vol. iii. p. 146. but not pl. 18. *Le Milandre*, *Cuv. Reg. An.* tom. ii. p. 389.

LENGTH. From three to five feet.

DESCRPT. (*Form.*) Body fusiform, elongated: head moderately large, depressed, behind the eyes broad, but narrowing anteriorly; snout pro-

duced, of a somewhat triangular form, very much flattened, and in front of the nostrils somewhat pellucid: nostrils beneath, nearly midway between the mouth and the extremity of the snout, partly covered by a small membranous flap: mouth wide: jaws moderately bent: teeth small, sharp-pointed, of a triangular form, with some smaller denticulations on the outer edge only; in several rows, and nearly similar above and below: eyes about half-way between the end of the snout and the first branchial opening; behind each a small temporal orifice: branchial openings five in number, rather small, near together; the first four of nearly equal size; the fifth smaller, and placed immediately above the base of the pectoral: skin moderately rough from tail to head, but smooth in the opposite direction: two dorsals: the first not very large, commencing at exactly one-third of the entire length; its height and length about equal; of a triangular form, but with a projecting point at its posterior extremity directed towards the tail: second dorsal just half-way between the first and the extremity of the tail; of a similar form, but smaller: anal present, resembling the second dorsal; nearly opposite to that fin, but placed a little backward: caudal with a large projecting lobe on its lower margin; the upper lobe terminal, and obliquely truncated at its extremity: pectorals moderate, approaching triangular, the distance from their insertion to the end of the snout considerably more than equal to their length: ventrals exactly in the middle of the entire length, and answering to the middle of the space between the two dorsals; only half the size of the pectorals, and obliquely truncated at their extremities. (Colours.) Of a uniform deep slate-gray above; yellowish white beneath.

Common in the Mediterranean, but apparently of not very frequent occurrence in the British seas. Willughby speaks of its being met with on the Cornish coast, where it has been since observed by Mr. Couch. Pennant's specimen was taken on the coast of Flintshire, and weighed twenty-seven pounds, its length being five feet. Dr. Johnston has procured it on the coast of Berwickshire*. The individual described above was obtained, with others, at Weymouth, by Professor Henslow. According to Bloch, it sometimes attains to the weight of one hundred pounds. It is stated by this same author, that it usually lives in society, and in deep water.

(5. MUSTELUS, Cuv.)

192. *S. Mustelus*, Linn. (*Smooth Hound*.)

S. Mustelus, Linn. *Syst. Nat.* tom. 1. p. 400. *Turt. Brit. Faun.* p. 112. *Blainv. Faun. Franç.* p. 81. pl. 20. f. 1. *Mustelus lævis*, Will. *Hist. Pisc.* p. 60. tab. B. 5. f. 2. *Flem. Brit. An.* p. 166. *Galeus Mustelus*, Leach in *Wern. Mem.* vol. 11. p. 63. pl. 2. f. 3. *Smooth Hound*, Penn. *Brit. Zool.* vol. 111. p. 116. pl. 16. *Smooth Shark*, Id. (Edit. 1812.) vol. 111. p. 151. *Tope Shark*, Id. pl. 18. *L'Emissole commune*, Cuv. *Reg. An.* tom. 11. p. 390. note (1).

LENGTH. From three to four feet; sometimes more.

DESCRIPT. (*Form.*) General form very similar to that of the *S. Galeus*; the snout, however, not quite so much produced: nostrils midway between the mouth and the end of the snout, partly covered by a small cutaneous membrane: teeth small and numerous, obtuse, forming a closely compacted pavement, disposed in a quincuncial order: eyes large, oval: behind each a temporal orifice of moderate size:

* *Proceed. of Berwicksh. Nat. Club.* p. 7.

branchial openings large, set nearer together as they are more behind: the middle three larger than the others; the last smallest, and placed above the base of the pectoral: skin less rough, when rubbed from tail to head, than in the *S. Galeus*; in the opposite direction perfectly smooth: all the fins in shape and situation exactly the same as in that species; only the second dorsal relatively somewhat larger, while the projecting lobe on the lower portion of the caudal is smaller. (*Colours.*) Upper parts of a uniform pearl-gray; paler, or almost white, beneath.

Tolerably common on most parts of the coast. According to Mr. Couch, "keeps near the bottom, and feeds chiefly on crustaceous animals, which its blunt teeth are well calculated to crush."

- (37.) *S. Hinnulus*, Blainv. Faun. Franç. p. 83. pl. 20. f. 2. *Mustelus stellatus*, Riss. Hist. Nat. de l'Eur. Mérid. tom. iii. p. 126. *L'Emissole tachetée de blanc, ou Lentillat*, Cuv. Reg. An. tom. ii. p. 390. note (1).

Length three feet. *Form* almost the same as that of the last species; only the lateral line more distinctly marked. *Colour* brownish ash, with a row of small whitish spots from the eye towards the first of the branchial openings; lateral line indistinctly spotted with white; also a moderate number of small scattered white spots between the lateral line and the dorsal ridge.

The above notes, made at Weymouth in Aug. 1832, relate to a species of shark, not unfrequently captured on that coast, which appears to be identical with the *S. Hinnulus* of Blainville. I have since seen a drawing of a similar fish in the possession of Mr. Yarrell, to whom it was sent by Mr. Couch of Cornwall. Not being aware at the time of the existence of a second species of *Mustelus*, and having had no opportunity of comparing a recent specimen with Blainville's description, I restrict myself to this notice of the circumstance, without positively asserting the *S. Hinnulus* to be British. It is, however, a great question, whether this last be any thing more than a variety of the *S. Mustelus*. As such it is considered by the Prince of Musignano in his *Fauna Italica*.

(G. SELACHE, Cuv.)

193. *S. maximus*, Linn. ? (*Basking Shark*.)

S. maximus, Linn. *Syst. Nat.* tom. i. p. 400. ? *Home in Phil. Trans.* (1809.) p. 206. pl. 6. f. 1. *Flem. Brit. An.* p. 164. *Basking Shark*, *Penn. Brit. Zool.* vol. iii. p. 101. pl. 13. *Id.* (Edit. 1812.) vol. iii. p. 134. pl. 16. *Low, Faun. Orc.* p. 171.

LENGTH. Thirty feet and upwards.

DESCRIPT. (*Form.*) Form rather slender: snout short, blunt, and pierced full of small holes: mouth large: teeth small and numerous: (according to Low, in five or six rows;) those before much bent, those more remote in the jaws conic and sharp-pointed: eyes small: branchial apertures five in number, large, reaching from the neck to the throat: first dorsal very large, not directly in the middle, but rather nearer the head: the second small, situate near the tail: pectorals (in a specimen twenty-three feet long) nearly four feet: ventrals smaller, placed just beneath the hind fin of the back: a small anal: tail very large; (according to Pennant,) the upper lobe remarkably longer than the lower; (according to Low,) the lobes equal in length, only the upper one somewhat broader and blunter than the lower: skin rough, like shagreen, but less so on the belly than the back. PENN. and Low. The following characters are added from Sir E. Home. "Nostrils opening on the edge

of the upper lip: eyes very small; the pupils perfectly round: half-way between the eye and the gills, on each side, the orifice of a canal, leading into the mouth: pectorals situate a little behind the posterior gills: dorsal situate nearly opposite to the middle space between the pectoral and anal (ventral?) fins: posterior dorsal small, and situate half-way between the anal (ventral?) fins, and the setting on of the tail: the two anal (ventral?) fins attached on their upper edge for about half their extent each to the lower side of a long projecting body peculiar to the *male*: all the fins have a thick round edge anteriorly, and become gradually thinner towards the posterior part, which is partially serrated: a deep sulcus at the setting on of the tail, and, on each side of the fish, a scabrous ridge extending from this sulcus as far forwards as the posterior dorsal fin." (*Colours*.) "Upper part of the body deep lead-colour: belly white." PENN.

A large species of Shark, referred by authors to the *Squalus maximus* of Linnæus, has been repeatedly noticed in the British seas. Pennant observes that such a fish has been long known to the inhabitants of the South and West of Ireland and Scotland, and those of Caernarvonshire and Anglesea; that they are seen in the Welsh seas in most summers, sometimes in vast shoals; that they also appear in the Frith of Clyde, and among the Hebrides, in the month of June, in small droves, but oftener in pairs. Mr. Neill states* that they are common in the Scottish seas, occasionally, though seldom, entering the Frith of Forth. Low speaks of their being also common in the Orkneys. Dr. Shaw notices one which was taken at Abbotsbury in Dorsetshire †. Sir E. Home has described another captured at Hastings. Mr. Couch mentions another taken on the coast of Cornwall ‡. Whether, however, in these and other instances the same species has been observed, from the want of more accurate descriptions, it is impossible to determine. Blainville is of opinion that no less than four distinct species have been confounded by naturalists under the name of *Squalus maximus* §. Cuvier, on the other hand, thinks that the differences observable in the figures and descriptions which authors have given of this fish, may have arisen from incorrect observation, and from the difficulty which attends a close examination of such large animals ||. These points can only be cleared up by further investigation into the real characters of such individuals as

* *Wern. Mem.* vol. i. p. 550.

† *Gen. Zool.* vol. v. part ii. p. 330.

‡ *Linn. Trans.* vol. xiv. p. 91.

§ See two memoirs on this subject, one contained in the *Journal de Physique* for Sept. 1810, (vol. LXXI. p. 248); the other in the *Annales du Muséum* for 1811, (vol. XVII. p. 88.). In the first of these, Blainville has briefly characterized what he considers as three species, under the following names: (1.) *Squalus Grimmerianus*; distinguished principally by the want (?) of temporal orifices, and the presence of an anal fin: this, which is intended for the original fish observed by Gunner, (with reference to which Linnæus established his species,) he regards the same as Pennant's, supposing this last to have been without temporal orifices, on which point Pennant is silent. (2.) *S. peregrinus*; in which there are neither temporal orifices nor anal: the type of this species is in the Museum at Paris. (3.) *S. Homianus*; distinguished by the presence of temporal orifices, and the absence of an anal: this species is founded upon the specimen described by Sir E. Home, and named after him. In his second memoir, Blainville has given a most elaborate description of both the external and internal characters of a large shark brought to Paris in 1810, which he regards as a fourth species, characterized by the presence of both temporal orifices and anal, the former, however, being extremely small. With this last he associates the "Basking Shark, *male*," figured by Shaw in his "General Zoology," (vol. v. part ii. pl. 149.), the drawing of which was probably taken from the specimen mentioned by that author as having been captured on the coast of Dorsetshire, but to which no description is annexed.

It is much to be desired that any of our own naturalists who may have an opportunity of observing any individuals of the species usually termed *Basking Shark*, would take as accurate and detailed a description as possible of the several parts, and compare it afterwards with that given by Blainville in the second of the above memoirs, which should serve as a standard of comparison in all future cases. It is particularly important that they note the presence or absence of temporal orifices and an anal fin, which are so small (compared with the entire bulk of the animal) as to be easily overlooked. They should also attend to the form of the teeth, the nature of the skin, and the size, as well as form and position, of the branchial openings.

|| See *Reg. An.* tom. 11. p. 391. note (1).

may be hereafter met with. The Basking Shark of Pennant is represented as a tame and inoffensive species, deriving its English name from its habit of "lying as if to sun itself on the surface of the water." Its food is supposed to consist entirely of marine plants, no remains of fish having ever been discovered in the stomach. Pennant thinks that it is migratory.

(7. SPINAX, *Cuv.*)194. *S. Acanthias*, Linn. (*Picked Dog-Fish.*)

S. Acanthias, *Linn. Syst. Nat.* tom. i. p. 397. *Bloch, Ichth.* pl. 85. *Don. Brit. Fish.* vol. iv. pl. 82. *Turt. Brit. Faun.* p. 114. *Blainv. Faun. Franc.* p. 57. *Cuv. Reg. An.* tom. ii. p. 392. *Galeus Acanthias sive Spinax, Will. Hist. Pisc.* p. 56. tab. B. 5. f. 1. *Spinax Acanthias, Flem. Brit. An.* p. 166. *Picked Dog-Fish, Penn. Brit. Zool.* vol. iii. p. 100. *Picked Shark, Id.* (Edit. 1812.) vol. iii. p. 133.

LENGTH. From three to three and a half, sometimes four, feet.

DESCRIPT. (*Form.*) General form much resembling that of the *S. Mustelus*: body moderately elongated: head depressed; snout long, conical, obtuse at the extremity: nostrils beneath, more remote from the mouth than in the *S. Mustelus*, partly covered by a minute eutaneous flap: jaws bent: teeth in two rows, small, sharp, the edges cutting and not denticulated, bending from the middle each way towards the corners of the mouth, the points short and inclining backwards: eyes large, oblong: temporal orifices large, round, placed higher than in the *S. Mustelus*: branchial openings five in number, small, a little decreasing in size from the first to the last; placed in a line with the base of the pectorals, the last opening being immediately in advance of those fins: skin very rough when rubbed from tail to head, but nearly smooth in the opposite direction: lateral line tolerably well-defined, straight: two dorsals; in form and situation much as in the *S. Mustelus*, but before each a sharp strong spine; the spine of the second stronger and longer than that of the first: caudal unequally forked, the upper lobe projecting far beyond the lower: no anal: pectorals broad, triangular, cut square behind, reaching when laid back to a vertical line from the spine of the first dorsal: ventrals a little behind the middle of the entire length, much smaller than the pectorals, obliquely truncated. (*Colours.*) Of a uniform reddish gray, or grayish brown above; whitish beneath. The *young*, according to Bloch and Cuvier, are spotted with white.

A common species on all parts of the British coast. Is very voracious, preying on other fish. Oviviparous.

(38.) *S. Spinax*, Linn. *Syst. Nat.* tom. i. p. 398. *Stew. El. of Nat. Hist.* vol. i. p. 319. *Blainv. Faun. Franc.* p. 60. *Nilss. Prod. Ichth. Scand.* p. 118. *Acanthias Spinax*, *Riss. Hist. Nat. de l'Eur. Mérid.* tom. iii. p. 132.

This species is marked as British by Stewart, in both Editions of his "Elements of Natural History," but on what authority he does not mention. It is not noticed, that I am aware, by any other of our English authors. Said to be distinguished from the last, which it closely resembles, principally by the abdomen being nearly black, and the nostrils at the extremity of the snout. According to Nilsson, it is the smallest species in the genus, not exceeding a length of sixteen inches. It is found in the Northern seas, as well as in the Mediterranean.

(8. SCYMNUS, *Cuv.*)195. *S. borealis*, Scoresb. (*Greenland Shark.*)

S. borealis, Scoresb. *Arct. Reg.* vol. i. p. 538. and vol. ii. pl. 15. f. 3, & 4. *S. Norvegianus*, Blainv. *Faun. Franc.* p. 61. *S. glacialis*, Nilss. *Prod. Ichth. Scand.* p. 116. *Scymnus borealis*, Flem. *Brit. An.* p. 166.

LENGTH. From twelve to fourteen feet, sometimes more. SCORESB.

DESCRIPT. "Circumference (in a specimen fourteen feet long) about eight feet. Colour gray: eye blue; pupil emerald-green. Mouth wide. Teeth in the upper jaw, broad at the base, suddenly becoming narrow and lanecolate with the cutting edges rough; in the lower jaw pyramidal, compressed, the cutting edges erenulated, a little convex on the fore-edge, and subangularly concave on the hind-edge. Tongue broad and short. First dorsal fin larger than the second; more advanced than the ventrals: pectorals large: ventrals elongated; the two sides nearly parallel." FLEM. According to Blainville, the general form of the body is exactly similar to that of the *S. Acanthias*, differing principally in the want of spines before the dorsal fins, and in the peculiar character of the teeth, which are arranged in two rows in the lower jaw, and in three in the upper.

This species, which is the *S. Carcharias* of Gunner and Fabricius, and perhaps of Bloch, is a native of the Northern seas. Dr. Fleming, however, mentions two instances in which it has occurred in those of our own Islands. One of the specimens was caught in the Pentland Frith in 1803: the other was found dead at Burra Firth, Unst, in July 1824. Said to be very voracious. Food, according to Scoresby, dead whales, as well as small fishes and crabs. Nilsson states that it resides principally in the deepest parts of the sea, rarely coming to the surface.

Obs. It is uncertain to which of the foregoing sub-genera the following two doubtful species belong.

(39.) *S. Selamoneus*, Flem. *Brit. An.* p. 168.

An obscure species, found (according to Fleming) by the late Dr. Walker, in Lochfyne, in Argyleshire, where it is said to appear during the herring season. The following description is quoted by Dr. Fleming, from the original Mss. of that naturalist.

"*Caput*, maxilla subæqualis, superiore prominente, rostrata. Maxilla superior crassissima, apice truncata marginata, angulo superiori obtuso suberecto. Maxilla inferior angusta. Dentes numerosi, acuti. Oculi super cantham oris positi sunt. *Corpus*, octo-pedale, oblongum, tertiolum, cute aspera. Spiracula quinque, antico breviora, erecta, lineari-lunata: margine postico curvato. Tria spiracula postica super pinnam pectoralem positi sunt, duo altera ante pinnam pectoralem versus oculum. *Pinnæ*: dorsum suberectum, muticum, bipinne. Pinna dorsalis antica erecta, subpedalis, circa medium corporis. Pinna dorsalis postica, multo minor, medium inter pinnam anticam et caudam occupat. Pinnæ pectorales pedem longitudine superant, et ante pinnam anticam dorsalem positæ sunt. Pinnæ ventrales spatium ante pinnam dorsalem posticam occupant. *Cauda*, perpendicularis, furcata, segmentis subæqualibus subacutis; superiori longiori. Sore prolato, maxillis subæqualibus; superiore truncata emarginata."

From the circumstance of Dr. Walker's taking no notice either of the anal fin or temporal orifices, Dr. Fleming infers the absence of both. He thinks that in consequence this species may claim to rank as a new genus, occupying a place between *Carcharias* and *Lamna*.

(40.) *Rashleigh Shark*, Couch in Linn. Trans. vol. XIV. p. 91.

"Twenty-nine feet four inches long; twenty-four feet round; the fork of the tail seven feet; weight four tons. Eye in front, under a snout that projects and is turned upward; mouth two feet and a half wide. Head deep: the first dorsal fin much elevated." Couch.

The above notes relate to a species of Shark, a drawing and memorandum of which are said to be in the possession of W. Rashleigh, Esq. of Menabilly. Mr. Couch observes that it seems to resemble the *Basking Shark*, but differs from it in the form of the head and situation of the eye.

GEN. 74. ZYGÆNA, Cuv.

196. *Z. Malleus*, Val.? (*Hammer-head*.)

Z. Malleus, Valenciennes in *Mém. du Mus.* (1822.) tom. IX. p. 223. pl. 11. f. 1.? *Cuv. Reg. An.* tom. II. p. 393. *Squalus Zygæna*, Linn. *Syst. Nat.* tom. I. p. 399.

A fish of this genus is recorded by Messrs. C. and J. Paget* as having occurred at Yarmouth, October 1829. The head is said to be preserved in the Norwich Museum. As, however, the species have been much confounded, and the exact one in this instance does not appear to have been determined, it is impossible to annex any description. The *Squalus Zygæna* of Linnæus is the *Z. Malleus* of M. Valenciennes, who has published detailed descriptions of four species of this genus, accompanied in each case by a representation of the head, which appears to offer the best characteristic marks for distinguishing them. In the *Z. Malleus*, which is the most common species, the head is in the form of a very long rectangle; the anterior margin straight, and deeply notched near the external angle; the nostrils immediately beneath the notch. The *Squalus Zygæna* of Bloch is a distinct species, in which the nostrils are removed much further from the eyes. M. Valenciennes' memoir, which is referred to above, should be consulted by those who may have an opportunity of seeing any other British specimen of this genus.

GEN. 75. SQUATINA, Dumér.

197. *S. Angelus*, Cuv. (*Angel-Fish*.)

S. Angelus, *Cuv. Reg. An.* tom. II. p. 394. *Blainv. Faun. Franc.* p. 53. *S. vulgaris*, *Flem. Brit. An.* p. 169. *Squatina*, *Will. Hist. Pisc.* p. 79. tab. D. 3. *Squalus Squatina*, Linn. *Syst. Nat.* tom. I. p. 398. *Bloch, Ichth.* pl. 116. *Don. Brit. Fish.* vol. I. pl. 17. *Turt. Brit. Faun.* p. 114. *Shaw, Nat. Misc.* vol. XXI. pl. 906. *Angel-Fish*, *Penn. Brit. Zool.* vol. III. p. 98. pl. 12*. *Angel Shark*, *Id.* (Edit. 1812.) vol. III. p. 130. pl. 15.

LENGTH. From five to seven, sometimes eight, feet.

DESCRIPT. (*Form.*) Broad and depressed anteriorly, elongated and tapering behind: upper part of the body convex: lower part flat: greatest breadth in the region of the pectorals, equalling, those fins being excluded, not quite one-fourth of the entire length; being included, more than half of the same: head nearly round, broader than the body, from which it is separated by a deepish notch on each side: mouth large, terminal, transverse: jaws but little bent, and nearly of equal length:

* *Nat. Hist. of Yarm.* p. 17.

teeth numerous, in five rows above and below, broad at the base, each terminating upwards in a sharp slender point: nostrils almost at the margin of the upper lip, covered by a membrane terminating in two filaments; between the nostrils the snout is slightly notched: eyes on the upper part of the head, very small, not half the size of the large temporal orifices, which last are of a lunulate form, the horns of the crescent being directed backwards: branchial openings rather small, situate on each side of the neck, between the head and the trunk: skin very rough, covered with numerous small prickly tubercles; some larger tubercles of a similar nature above the eyes, and along the mesial line of the back: two dorsals, placed very much behind on the upper part of the tail; both small, and nearly of the same size: caudal large, obliquely bifurcated, the upper lobe being a little the longest: no anal: pectorals very large, attached horizontally, broadest at their posterior margin, projecting forwards on each side of the neck in the form of an acute shoulder: ventrals of a somewhat similar form, but smaller. *Obs.* Cuvier and Fleming describe this species as having the pectorals armed with short curved spines near their margins. In the few specimens which I have examined they were not present. Probably, as in the family of the *Rays*, they are merely a sexual character. (*Colours.*) Upper parts more or less deep gray: lower parts dirty white.

A common and very voracious species, preying upon other fish. Keeps near the bottom. Attains to a large size. Pennant mentions having seen them of near an hundred weight. According to Bloch, produces in the Spring and Autumn from seven to eight young. On some parts of the coast is called a *Monk-Fish*; on others, a *Kingstone*.

(41.) *Lewis*, Couch in Linn. Trans. vol. xiv. p. 90.

Under the above name, Mr. Couch notices a fish, which he states is not unfrequently taken with a line on the coast of Cornwall, and which bears some resemblance to the *Squatina Angelus*, but which he seems disposed to consider as a distinct species. The following is his description:

"Somewhat smaller than the *Monk*. Head large, flat, the jaws of equal length, forming a wide mouth; the upper jaw falls in somewhat at the middle, so that at this part the lower jaw seems a little the longest; both are armed with several rows of sharp teeth; the tongue is small. The head is joined to the body by something which resembles a neck; the body is flat so far back as the ventral fins, beyond these it is round: the pectoral and ventral fins are very large; the former are flat, and both have near their extremities a number of spines. The two dorsal fins are placed far behind: the lobes of the tail are equal and lunated. There are five spiracula: the eyes are very small, and the nictitating membrane, which is of the colour of the common skin, contracts over the eye, leaving a linear pupil. The body is slightly rough, of a sandy brown colour: the under parts white. It is about five feet long, and keeps near the bottom."

Judging from the above description, I must confess I hardly see in what respects it differs from the last species.

(6.) *PRISTIS*, Lath.

(42.) *P. antiquorum*, Lath. in Linn. Trans. vol. ii. p. 277. pl. 26. f. 1. (Rostrum.) Cuv. Reg. An. tom. ii. p. 395. *Squalus Pristis*, Linn. Syst. Nat. tom. i. p. 401. *Pristibatis antiquorum*, Blainv. Faun. Franc. p. 50.

According to the late Dr. Walker*, this species has been found sometimes in Loch Long. It does not appear, however, to have been noticed

* On the authority of Dr. Fleming. See *Brit. An.* p. 164.

in our seas by any other naturalist. It is distinguished from some other allied species by the rostral spines not exceeding in number from eighteen to twenty-four on each side. It is found in various parts of the Ocean, as well as in the Mediterranean. Attains to the length of from twelve to fifteen feet.

GEN. 76. RAIA, Linn.

(1. TORPEDO, Dumér.)

198. R. *Torpedo*, Linn. (*Electric Ray*.)

R. *Torpedo*, Linn. *Syst. Nat.* tom. I. p. 395. Bloch, *Ichth.* pl. 122. ?
Don. *Brit. Fish.* vol. III. pl. 53. *Turt. Brit. Faun.* p. 110.
Blainv. Faun. Franç. p. 44. *Torpedo vulgaris*, Flem. *Brit. An.*
p. 169. *Torpedo*, Walsh in *Phil. Trans.* (1774.) p. 464. *Electric Ray*, Penn. *Brit. Zool.* vol. III. p. 89. pl. 10. *Id.* (Edit. 1812.)
vol. III. p. 118. pl. 12.

LENGTH. From two to four feet.

DESCRIPT. (*Form.*) "Head and body indistinct, and nearly round: greatest breadth two-thirds of the entire length: thickness, in the middle, about one-sixth of the breadth, attenuating to extreme thinness on the edges: mouth small; teeth minute, spicular: eyes small, placed near each other: behind each a round spiracle, with six small cutaneous rags on their inner circumference: branchial openings five in number: skin every-where smooth: two dorsal fins on the trunk of the tail: tail one-third of the entire length, pretty thick and round; the caudal fin broad and abrupt: ventrals below the body, forming on each side a quarter of a circle. (*Colours.*) Cinereous brown above; white beneath." PENN.

First ascertained to be a native of the British seas by Mr. J. Walsh, who obtained specimens from Torbay. According to Pennant, it is not unfrequently taken on that coast; has been also caught off Pembroke, and sometimes near Waterford in Ireland. Donovan mentions the coast of Cornwall; where it has been since noticed by Mr. Couch, though, according to this last gentleman, it is extremely rare. I may add that it occurs also occasionally off Weymouth, where it is called the *Numb-Fish*. It must be stated, however, that, in the opinion of Risso and Cuvier, several species have been confounded under the name of *Raia Torpedo*, and the exact one met with in our seas, or whether more than one has occurred, are points not hitherto ascertained*. Fleming thinks that the

* It may assist future observers in determining the British species, to state the leading characters of four established by Risso in his "Histoire Naturelle de l'Europe Méridionale."

(1.) *Torpedo Narke*, Riss. tom. III. p. 142. *T. Corpore supra rubro luteo, maculis quinque ocellatis, in pentagoni figura dispositis.*

La Torpille à taches œillées, Cuv. *Reg. An.* tom. II. p. 397. *Blainv. Faun. Franç.* pl. 10. f. 2.

(2.) *T. unimaculata*, Riss. tom. III. p. 143. pl. 4. f. 8. *T. Corpore fulvo, albido punctulato; ocello unico, oblongo, in medio dorso; cauda elongata, gracili.*

La Torpille à une tache, *Blainv. Faun. Franç.* pl. 10. f. 1.

Risso states that in this species the spiracles are large, and without the tooth-like processes: the electrical apparatus scarcely visible, and giving but very slight shocks.

British species belongs to the *Torpedo marmorata* of Risso. According to Blainville, who regards Risso's species as mere varieties, the *T. Galvani* of that author is the one most commonly met with on the shores of the Mediterranean. This fish, at least the British species, attains to a large size: according to Pennant, it has been known to weigh above eighty pounds. The exact use of the electrical apparatus is not well ascertained. It is generally supposed to serve as a means of defence, or to assist the fish in securing its prey, which is said to consist of other fish. Mr. Couch imagines that it is connected with the functions of digestion*.

(2. RAIA, Cuv.)

* *Snout sharp; more or less elongated.*

199. R. *Batis*, Linn. (*Skate*.)—Snout sharp, conic, the lateral margins not parallel: skin granulated above: one or three rows of spines on the tail; the points of the lateral rows, when present, directed forwards: colour beneath gray, with black specks.

R. *Batis*, Linn. *Syst. Nat.* tom. i. p. 395. Bloch, *Ichth.* pl. 79. *Turt. Brit. Faun.* p. 110. *Flem. Brit. An.* p. 171. *Blainv. Faun. Franç.* p. 13.? R. *lævis undulata*, seu *cinerea*, Will. *Hist. Pisc.* p. 69. tab. C. 5. Ray, *Syn. Pisc.* p. 25. Skate, *Penn. Brit. Zool.* vol. III. p. 82. pl. 9. *Id.* (Edit. 1812.) vol. III. p. 111, and Sharp-nosed Ray, pl. 11. La Raie blanche ou cendrée, Cuv. *Reg. An.* tom. II. p. 398.

LENGTH. From two to four feet; sometimes more.

DESCRIPT. (*Form.*) Form rhomboidal; the transverse diameter greater by one-third than the length, this last being measured from the extremity of the snout to the vent: body thin, in proportion to its bulk: snout considerably elongated, sharp, conical, the lateral margins never becoming parallel, but approaching gradually to form an acute angle: teeth numerous, in several rows, rather closely compacted, oval and broad at the base, each terminating above in a sharp conical point, hooked, the hooks inclining backwards, and most developed in the inner rows, and on the central teeth in those rows: nostrils in a line with the angles of the mouth, with which they are connected by means of a prolonged channel, and placed at less than one-third of the distance from the mouth to the margin of the pectorals: eyes of moderate size: spiracles large: skin finely granulated above, communicating a slight roughness to the touch;

(3.) *T. marmorata*, Riss. tom. III. p. 143. pl. 4. f. 9. *T. Corpore earneo, maculis fuscis, fasciisque sinuosis, marmorato; cauda erassa, summitate rotundata.*

La Torpille marbrée, *Blainv. Faun. Franç.* pl. 9.

Spiracles surrounded by seven tooth-like processes: branchial openings crescent-shaped: electrical apparatus very distinct.

(4.) *T. Galvani*, Riss. tom. III. p. 144. *T. Corpore fulvo, immaculato, nigro-marginato.*

La Torpille Galvanienne, Cuv. *Reg. An.* tom. II. p. 397.

Differs from the three preceding species in its much larger dimensions, and in the upper part of the body being constantly of a uniform red colour, without any spots or markings whatever.

* See *Linn. Trans.* vol. XIV. pp. 89, 90.

under surface mostly smooth, but a little rough in places, more especially beneath the snout: a row of strong spines along the mesial line of the tail, with the points directed backwards; a lateral row on each side of the same, with the points standing out or directed forwards; sometimes the lateral rows are wanting, or simply indicated (especially in *young* specimens) by small osseous tubercles: generally no spines above or behind the eyes, or on any part of the back: tail as long as the body, depressed, not very stout; furnished with two moderately-sized finlets near the extremity, a little remote from each other; scarcely the rudiment of a caudal: pectorals broad, rounded at their lateral extremities, the anterior margins nearly straight, the posterior rather convex: ventrals moderate, divided into two lobes; the upper lobe polliciform; the appendages (of the *male*) very small in young specimens, and not extending so low as the ventrals themselves, but in the adults much longer and more developed. *Obs.* The *Males* in this, and in all the other species of this family, besides possessing the ventral appendages, are characterized by several parallel rows of sharp hooked spines on the anterior lobe, and at the angle, of each of the pectorals. These spines are always very much reclined, and partly concealed, with the points directed inwards. They are quite independent of the other, generally larger and more erect, spines, which are more or less characteristic of the particular species. The number of rows, and the number in each row, depend upon age, being greatest in the oldest individuals: sometimes, in *very young males*, these sexual spines (as they may be termed) hardly show themselves at all. It may be added that the teeth also often differ in the two sexes; the *males* generally having them sharper and more pointed than the other sex; in the *young*, however, they are sometimes similar in both sexes. (*Colours.*) Upper surface of a uniform dusky brown, tinged with cinereous: under surface dusky gray, sometimes grayish white, studded with black specks, having a white centre, most abundant beneath the snout. The colours of both sides become paler with age.

Not uncommon on many parts of the coast, though less plentiful than some other species. Attains to a very large size, weighing sometimes nearly two hundred pounds. According to Pennant, the ova, or *purses*, are cast by the females from May to September. The young are sometimes called *Moids*. *Obs.* By some authors the skin of this species is represented as smooth; and it is not quite certain whether two have not been in some instances confounded under the name of *R. Batis*.

200. *R. Oxyrhynchus*, Linn.? (*Sharp-nosed Ray*).—Snout sharp, slender, and very much elongated, the lateral margins parallel near the tip: skin smooth: one or three rows of spines on the tail: colour beneath plain white, without spots.

R. Oxyrhynchus, *Mont. in Wern. Mem.* vol. II. p. 423. *Sharp-nosed Ray*, *Penn. Brit. Zool.* vol. III. p. 83. *Id.* (Edit. 1812.) vol. III. p. 113. but not pl. 11.

LENGTH. Six feet and upwards.

DESCRIPT. (*Form.*) Differs from the last species, which it very much resembles, in having the snout more slender, the margins, in a moderately sized fish, running nearly parallel to each other for three or four inches at the extremity: teeth longer, and not so closely compacted: skin perfectly smooth: three rows of spines on the tail, when arrived at

maturity. (*Colours.*) Upper parts of a plain brown colour, without spots or lines: under parts white, also without spots. MONT.

This species, which I have not seen, is represented by authors as not very uncommon in the British seas. Like the last it attains to a great size. One obtained by Pennant in the Menai measured nearly seven feet in length, and five feet two inches in breadth. Montagu states that specimens have been taken of which the computed weight was above five hundred pounds. As, however, in the case of *R. Butis*, the name of *Oxyrhinchus* has been applied at different times to two or more perfectly distinct species, and it is impossible to state whether we have not in our seas more than one to which that name has been given. For this reason I have not annexed any references except to Pennant and Montagu, whose descriptions alone (of all our English authors) appear original, and can with any certainty be referred to the same species. Whether the present one be synonymous with the *Oxyrhinchus* of Willughby*, I consider very doubtful. The *R. Oxyrhinchus* of Bloch †, as well as that of Blainville ‡, appear quite distinct.

201. *R. marginata*, Lacép. (*Bordered Ray*).—Snout sharp, slender, moderately elongated, the lateral margins nearly parallel at the tip: skin smooth: three rows of spines on the tail: colour beneath white, with a broad dusky border.

R. marginata, Lacép. *Hist. Nat. des Poiss.* tom. v. p. 663. pl. 20. f. 2. *Blainv. Faun. Franç.* p. 19. pl. 3. f. 2. *Flem. Brit. An.* p. 172.

DISENS. The following are those of an English specimen. Total length fifteen inches six lines: length of the head (measured from the end of the snout to the spiracles behind the eyes) three inches six lines; of the tail (from the vent to its extremity) seven inches nine lines: greatest breadth (across the pectorals) eleven inches three lines. *Obs.* The total length of Blainville's specimen was two feet.

DESCRIPT. (*Form.*) Rhomboidal; the transverse diameter rather more than one-third greater than the length from the end of the snout to the vent: snout elongated, projecting considerably from between the pectorals, terminating in a sharp point, with the lateral margins nearly parallel for the last quarter of their length: mouth moderately wide; jaws transverse; teeth numerous, closely set, in several rows, roundish, or somewhat quadrilateral, at the base, each terminating in a sharp point: nostrils in a line with the corners of the mouth, and rather more than half-way between them and the upper margins of the pectorals; a channel from the nostrils to the mouth, covered by a membranous flap: eyes and spiracles both large: skin perfectly smooth above; also beneath, excepting along the anterior margins of the pectorals and the surface of the snout, which are set with very minute spines and denticles: one large sharp spine above each eye, inclining backwards, and another smaller one behind each eye: no spines on any part of the back, but three rows on the tail, one occupying the middle ridge, the two others the sides; the spines on these rows strong and sharp, and mostly inclining backwards: tail scarcely longer than the body, depressed, rather

* *Hist. Pisc.* p. 71. tab. C. 4.

† *Ichth.* pl. 80.

‡ *Faun. Franç.* p. 18. pl. 3. f. 1.

stout, with two moderately-sized finlets, of equal size and form, nearly contiguous; scarcely the rudiment of a caudal: pectorals broad, with the anterior margin hollowed out, and not prolonged beyond the basal half of the snout: ventrals moderate, deeply notched or bilobated. (*Colours.*) General colour of the upper parts reddish brown, somewhat paler on the pectorals, with a faint indication of round whitish spots: beneath white, with a broad border all round, especially beneath the angles of the pectorals, of dark reddish brown, approaching to dusky: tail entirely black.

First described by Lacépède from specimens sent him by M. Noel from Dieppe, Liverpool and Brighton. The individual described above was obtained at Weymouth by Professor Henslow, and is now in the Museum of the Cambridge Philosophical Society. In the same collection is a young one, extracted from the purse, which is very large, compared with those of other species. Blainville states that he has seen several from the Channel, the Ocean, and the Mediterranean. He thinks that it never attains to a very large size.

202. *R. chagrinea*, Mont. (*Shagreen Ray*).—Snout long and sharp: skin rough above: only two principal rows of spines on the tail, the ridge being without spines: colour beneath white.

R. chagrinea, Mont. in *Wern. Mem.* vol. II. p. 420. pl. 21. *R. aspera* nostras, *Will. Hist. Pisc.* p. 78. *R. aspera*, *Flem. Brit. An.* p. 172. *Blainv. Faun. Franç.* p. 22.? *Shagreen Ray*, *Penn. Brit. Zool.* vol. III. p. 87. *Id.* (Edit. 1812.) vol. III. p. 117.

DIMENS. The following were those of Montagu's specimen. Entire length three feet; length of the tail seventeen inches: breadth twenty-four inches. According to Pennant, it attains to the size of the Skate.

DESCRIPT. (*Form.*) Form narrower than that of the common kinds: greatest breadth two-thirds of the entire length: snout long and sharp, much resembling that of the *R. Oxyrhynchus*: teeth slender and very sharp: the whole upper surface rough, covered closely with minute shagreen-like tubercles, resembling the skin of the *Dog-Fish*; under surface smooth, except the head, breast and tail: nine or ten spines above the eye, but in the middle of the brow a vacancy; on the snout several tubercular spines, but scarcely definable, in two rows: behind the head, seven or eight spines on the dorsal ridge, extending so far back as to be in a line with the branchiæ: two rows of strong spines on the tail, one on each side of the ridge, projecting outwards, the points much hooked backwards, and extremely sharp; some smaller spines on each side of the tail, intermixed with innumerable little spicula. In Montagu's specimen, which was a *male*, there were the usual four series of hooked spines, very sharp-pointed, each series consisting of two rows: the ventral appendages were nearly half as long as the tail. (*Colours.*) Upper surface of a uniform cinereous brown; in one instance, with a few black spots: under surface white. PENN and MONT.

This species, which appears very distinct and well characterized, I have not seen. Judging from the descriptions given of it by Pennant and Montagu, I am inclined to consider it the same as the *R. aspera* of Willughby, who expressly mentions the double row of spines on the tail. It is also the *R. aspera* of Fleming, and perhaps of Blainville, but it would be hazardous to annex any other synonyms. Pennant met with

it at Scarborough, where, he observes, it is called the *French Ray*. He says that it is fond of *Launces*, or Sand-eels, which it takes greedily as a bait. Montagu speaks of having seen several of both sexes on the coast of Devon, but none larger than that which he has described. He adds that it is known to some of the west country fishermen by the name of *Dun-Cow*.

** *Snout short, and rather obtuse.*

203. *R. maculata*, Mont. (*Spotted Ray*).—Teeth, in the *adult*, sharp-pointed: skin smooth: generally three rows of spines on the tail, the middle row continued along the back: colour above brown, with distinct roundish dusky spots.

R. maculata, *Mont. in Wern. Mem.* vol. II. p. 426. *R. Rubus*, *Don. Brit. Fish.* vol. I. pl. 20. Fuller Ray, *Penn. Brit. Zool.* vol. III. p. 86. (Synonyms excluded.) *Id.* (Edit. 1812.) vol. III. p. 116. (Syn. excl.)

LENGTH. From two to three feet.

DESCRIPT. (*Form.*) Rhomboidal; the transverse diameter more than one-third greater than the length from the end of the snout to the vent: snout short and obtuse, projecting very little beyond the pectorals, the anterior margins of which meet in front at more than a right angle: jaws transverse, moderate: teeth small, numerous, very closely compacted; in several longitudinal, somewhat oblique, rows; roundish at the base, each terminating above in a minute fine sharp point, the points inclining inwards, and much more developed on the inner than on the outer rows, on which last they are sometimes entirely wanting; in *young* fish all the teeth are obtuse, the points not shewing themselves till afterwards: nostrils much nearer to the mouth than to the anterior angles of the pectorals: eyes moderate: spiracles large: skin perfectly smooth above and below, excepting along the anterior margins of the pectorals and the upper ridge of the snout, which are rough with very minute spines: two strong spines at the corners of each eye; an interrupted series of spines down the line of the back, with one isolated spine on each side of the series, about mid-way between the eyes and the posterior margin of the pectorals; the dorsal series of spines is continued down the middle of the tail, at the sides of which are more or less indication of two lateral rows; sometimes, in small specimens, these last are wholly wanting; all the above spines incline a little backwards: tail about the length of the body, rather stout, depressed, with two moderate finlets, of similar size and form, nearly but not quite contiguous; merely the rudiment of a caudal: pectorals broad, the lateral angles rather obtuse, the posterior margin rounded, the anterior margin straight or nearly so: ventrals moderate. The *male*, in addition to the spines mentioned above, has the usual series of curved spines on the pectorals, which, however, do not shew themselves till a certain age. (*Colours.*) Upper parts brown, sometimes reddish brown, distinctly marked all over with roundish dusky spots: under parts plain white. A *variety* is not uncommon, in which the usual spots are nearly obsolete, but there is more or less trace of one ocellated spot in the middle of each pectoral: Montagu has noticed two kinds of this last variety; one, with a large

dark spot surrounded with a white circle; the other with a black spot within a white circle, the whole surrounded by five equidistant dark spots. *Another variety* is in the Museum of the Cambridge Philosophical Society, in which the upper parts are pale orange-yellow, with light rufous brown spots.

This species, although very common and well characterized, has been so misunderstood and confused with others, that it is extremely difficult to attach to it its proper synonyms. For this reason I have adopted the name given it by Montagu, who was the first in this country to point out its true distinguishing characters. It is undoubtedly the *R. Rubus* of Donovan, and most probably the *Fuller Ray* of Pennant, who describing from an adult male, appears to have considered the sexual spines as characteristic of the species. It is impossible to identify it with certainty in the works of Turton and Fleming*, both of whom appear to have mixed up the description of this with that of other species. It is known on some parts of the coast by the name of *Hommelín*, on others by that of *Sand-Ray*.

204. *R. microcellata*, Mont. (*Small-eyed Ray*).—
Teeth obtusely cuneiform: skin rough with minute spines: one row of small hooked spines on the tail, continued along the dorsal ridge to the head: eyes remarkably small.

R. microcellata, Mont. in *Wern. Mem.* vol. II. p. 430. *Flem. Brit. An.* p. 171.

DIMENS. Total length twenty inches: length of the tail nine inches: breadth fourteen inches. MONT.

DESCRIPT. (*Form.*) Resembling in shape the *R. maculata*, but rather more obtuse in front, and particularly distinguished by the comparative smallness of the eyes†: teeth obtusely cuneiform, with a broad edge, that feels rough to the finger as it is withdrawn from the mouth; in one jaw fifty-three, in the other fifty-six, longitudinal rows, closely connected: skin on the upper side rough with minute spines; the under side smooth: in one specimen there was observed a single large spine, with a broad base, before one of the eyes; (possibly in older fish that part may be more spinous;) above the eyes, the spinulæ were rather larger than those which cover the whole upper surface: one row of small hooked spines on the tail, continued along the dorsal ridge to the head. (*Colours.*) Upper parts plain brown, with the exception of a few scattered pale spots and lines on the margins of the wings: under parts white. MONT.

This species appears to have been observed hitherto only by Montagu, who obtained two females, the largest not exceeding the dimensions above given. He states that it appears to be confounded with the *R. chagrinea*, both being indiscriminately called *Dun-Cow* by the fishermen in the West of England. Whether it be the same as any of those described by continental authors is uncertain.

* The *R. Fullonica* of Turton is partly applicable to the above species and partly to the *R. chagrinea* last described. The *R. Rubus* of the same author may be the same as the *R. maculata* of Montagu, but the description is not quite correct, nor sufficiently precise to enable one to speak with certainty on this point. The *R. Rubus* of Fleming agrees with the *R. maculata* in some of its characters, but not in others.

† Montagu says, "The eyes of the specimen described did not exceed half an inch in diameter from the opposite angles of the eye-lids; whereas the *R. maculata*, and most others of similar size, have eyes nearly double that diameter."

205. *R. clavata*, Linn. (*Thorn-Back*).—Teeth sharp in the *male*?, blunt in the *female*: skin rough; studded with large osseous tubercles terminating in strong spines; one, three, or five, rows of such tubercles on the tail.

R. clavata, Linn. *Syst. Nat.* tom. i. p. 397. *R. Rubus*, Bloch, *Ichth.* pl. 84. (Male.) *R. clavata*, *Id.* pl. 83. (Female.) *R. clavata*, Don. *Brit. Fish.* vol. ii. pl. 26. *Turt. Brit. Faun.* p. 111. *Mont. in Wern. Mem.* vol. ii. p. 416. *Flem. Brit. An.* p. 170. *Blainv. Faun. Franç.* p. 33. *Thorn-Back, Penn. Brit. Zool.* vol. iii. p. 93. pls. 11, and 12. *Id.* (Edit. 1812.) vol. iii. p. 122. pls. 13, and 14. La Raie bouclée, *Cuv. Reg. An.* tom. ii. p. 398.

LENGTH. From two to three feet; sometimes more.

DESCRIPT. (*Form.*) General form resembling that of the *R. maculata*: snout short, and rather obtuse: mouth wide, transverse: teeth larger than in the above species, and not so closely compacted; set in oblique rows; each with a broad round head, terminating, in the *male*?, in a strong curved point; in the *female*, all blunt, with scarcely any trace of a point or cutting edge: nostrils, eyes, and spiracles, much as in the *R. maculata*: body rather thick, convex above; the whole of the upper surface extremely rough with minute hooked spines and asperities, besides which are a greater or less number of large osseous tubercles, each terminating upwards in a strong hooked spine, or tooth-like process, very sharp at the extremity; these spinous tubercles, which are of an oval form, and very broad at the base, are scattered about in rather an irregular manner, and very variable in number; almost always one or two above the eyes, and a row down the middle of the back, continued along the ridge of the tail; also one or two on each side of the dorsal series about the middle; sometimes three complete rows on the back, and three or five on the tail; occasionally, especially in large fish, the under surface of the body is studded with tubercles as well as the upper; more rarely the tubercles are almost wanting altogether: tail a little longer than the body, depressed, rather stout, and very rough with minute asperities independently of the spinous tubercles; two finlets near its extremity, much as in *R. maculata*, besides the rudiment of a caudal: pectorals and ventrals the same as in that species. (*Colours.*) Variable: generally bluish gray above, tinged with reddish brown; the whole sparingly sprinkled with large, but ill-defined, whitish spots: beneath white. A *variety* sometimes occurs, shewing more or less appearance of an ocellated spot on the middle of each pectoral.

Common as this species is on all parts of the coast, its true characters, at least those which distinguish the sexes, are involved in a little obscurity. Montagu was led to regard the *R. Rubus* of authors, in which the teeth are sharp, as the male of *R. clavata*, in which they are blunt, from the circumstance of his not being able to discover a female of the former, nor a male of the latter, species. As far as my own observation goes, which, however, has been but limited, it confirms Montagu's opinion. I have never seen a *male Thorn-Back* with *blunt* teeth, but I have seen, in the collection of Mr. Yarrell, two fish perfectly similar in every respect, excepting that in one, a *male* with long ventral appendages, the teeth were sharp, in the other, a *female*, the teeth were blunt. These I was led to regard as the sexes of the common *Thorn-Back*. Yet both Risso and Blainville speak of the sexes of the *R. clavata*, without any allusion to the teeth being otherwise than blunt, in the *male*, as well

as in the *female*. Moreover, they both give the *R. Rubus* as a distinct species. Further observation is necessary in order to clear up this difficulty. According to Pennant, the Thorn-Back preys on all sorts of flat fish, as well as on Herrings and Sand-eels, of which it is said to be particularly fond; also on crabs. Produces its young in July and August, which, until a certain age, are called, in common with the young of the *R. Batis*, by the name of *Moids*. It is taken in large quantities for the table.

206. *R. radiata*, Don. (*Starry Ray*).—Teeth sharp in both sexes: skin smooth; but thickly studded with strong conical spines, intermixed with more numerous smaller ones, radiating at the base; one or three rows on the tail.

R. radiata, Don. *Brit. Fish.* vol. v. pl. 114. *Flem. Brit. An.* p. 170.

DIMENS. The following were those of the specimen described below. Entire length eighteen inches nine lines: length of the head (measured from the end of the snout to the spiracles) three inches two lines; of the tail (measured from the vent) nine inches three lines: breadth, across the pectorals, thirteen inches three lines.

DESCRIPT. (*Form.*) General form similar to that of the last species: snout short and obtuse, projecting very little beyond the pectorals: teeth much larger than in the *R. maculata*, not so closely compacted, and terminating above in a sharper and longer point; from those of the *R. clavata*, they differ in being rather smaller at the base, more widely separate, and strongly pointed in *both* sexes: ground of the back smooth, but thickly studded with strong sharp hooked spines, arising from a conical furrowed base, intermixed with smaller ones, which spread out at bottom in a radiating or stellate manner; of the larger spines a row occupies the mesial ridge of the tail, and is continued along the back to behind the eyes; there are also two on each side of the centre of the back, one before the eyes, and two at the posterior angles of the same; the smaller radiating spines form a parallel and more numerous series on each side of the central row of larger ones, commencing at the middle of the back, and extending nearly to the extremity of the tail; (in Donovan's specimen these lateral rows appear to have been wanting;) they are also irregularly but thickly scattered over the wings of the pectorals, becoming smaller and more numerous towards the margins: the other characters resemble those of the last species. (*Colours.*) Upper surface brown, with a slight reddish tinge; beneath, white.

Since publishing my Catalogue of British *Vertebrata*, I have seen a pair of this species, male and female, in the collection of Mr. Yarrell, who received them from the Frith of Forth. The same gentleman possesses a third specimen sent him by Dr. Johnston of Berwick. I am inclined, now, to regard it as a well-marked species, quite distinct from any of the foregoing ones, but perhaps not specifically different from the *R. Rubus* of Blainville*, of which it is considered as a variety by that author. Both sexes are equally thorny on their upper surface, the under surface being, in both, smooth. The male specimen above alluded to had the ventral appendages half the length of the tail. Donovan's example of this species was caught on the north coast of Britain.

* *Faun. Franç.* p. 21.

- (43.) *R. Miraletus*, Don. Brit. Fish. vol. v. pl. 103. Turt. Brit. Faun. p. 111. *R. oculata*, Flem. Brit. An. p. 172.

This is probably nothing more than the ocellated variety of the *R. maculata* already alluded to. As such it was regarded by Montagu*. Blainville, however, makes it the same as his *R. Speculum*†. Procured by Donovan in the London market, and supposed to have come from the coast of Sussex.

- (44.) *Rough Ray*, Penn. Brit. Zool. vol. III. p. 85. Id. (Edit. 1812.) vol. III. p. 115.

"Length from the nose to the tip of the tail two feet nine inches: the tail almost of the same length with the body. Nose very short: before each eye a large hooked spine, and behind each another, beset with lesser. Upper part of the body of a cinereous brown colour, mixed with white, and spotted with black; and entirely covered with small spines. On the tail three rows of great spines; all the rest of the tail irregularly beset with lesser. The fins, and under side of the body, equally rough with the upper. Teeth flat and rhomboidal." PENN.

This species was taken by Pennant in Loch Broom, in the shire of Ross. It is doubtful whether it be distinct from all those already described. Blainville appears to consider it as his *R. Rubus*, but the "flat rhomboidal teeth" seem rather at variance with the characters which he ascribes to those of that species.

- (45.) *R. Cuvieri*, Lacép. Hist. Nat. des Poiss. tom. I. p. 141. pl. 7. f. 1. Neill in Wern. Mem. vol. I. p. 554. Flem. Brit. An. p. 172. *Cuvier Ray*, Penn. Brit. Zool. (Edit. 1812.) vol. III. p. 124.

This supposed species, which was first noticed by Lacépède, was obtained by Mr. Neill, in a single instance, on the Scottish coast in 1808. Its distinguishing character consists in the first dorsal fin being on the middle of the back. Cuvier‡, however, regards it as nothing more than an accidental variety, or rather monstrosity, observed by him in more than one species. Blainville§ speaks with confidence as to Lacépède's fish being nothing more than a variety of the *R. clavata*. As tending to confirm this opinion, it is worth noticing that Mr. Neill's specimen is said to have been obtained from among a large cargo of *Thorn-Backs*.

(3. TRYGON, *Adans.*)

207. *R. Pastinaca*, Linn. (*Sting-Ray*.) — Back smooth.

R. Pastinaca, Linn. Syst. Nat. tom. I. p. 396. Bloch, Ichth. pl. 82. Don. Brit. Fish. vol. v. pl. 99. Turt. Brit. Faun. p. 112. Blainv. Faun. Franç. p. 35. pl. 6. *Pastinaca marina*, Will. Hist. Pisc. p. 67. tab. C. 3. Trygon *Pastinaca*, Flem. Brit. An. p. 170. *Sting-Ray*, Penn. Brit. Zool. vol. III. p. 95. Id. (Edit. 1812.) vol. III. p. 125. Pasténague commune, Cuv. Reg. An. tom. II. p. 399.

LENGTH. From two to three feet; rarely more.

DESCRIPT. (*Form.*) Disk of the body more approaching to orbicular than in the last sub-genus; very thick and convex in the middle, but growing thin towards the edges: the transverse diameter scarcely more than one-fourth greater than the length measured from the end of the snout to the vent: snout sharp, but very short, scarcely projecting beyond

* Wern. Mem. vol. II. p. 429.

‡ Reg. An. tom. II. p. 399.

† Faun. Franç. p. 29. pl. 4. f. 1.

§ Faun. Franç. p. 35.

the pectorals, the anterior margins of which meet at an obtuse angle: mouth small; teeth small, arranged in oblique rows, appearing granulated on the surface: eyes moderate: skin entirely smooth above and below, "excepting a few small tubercles along the mesial line of the back and tail, as well as on the upper and posterior part of the pectoral fins*:" tail varying in length, less than, equal to, or very much exceeding, half the entire length; slender, tapering at the extremity to a fine point, without any trace of fins, but armed, at about the first third of its length, with a very strong, sharp, serrated spine, the serratures directed backwards: pectorals large, rounded posteriorly and at the lateral angles: ventrals small, entire. *Obs.* Occasionally the tail is found armed with two spines, owing, it is said, to the circumstance of the spine being annually renewed, and the new one sometimes appearing before the old one drops off. (*Colours.*) "Upper part of the body dirty yellow, the middle of an obscure blue; lower part white; the tail and spine dusky."

PENN. According to Donovan, small specimens are more or less spotted.

Met with principally on the southern coasts, and rather less frequently than some of the other species. It occurs at Weymouth, as well as on the coast of Cornwall. The spine is capable of inflicting a severe wound, but is not poisonous. Flesh said to be rank and disagreeable. The liver is large, and yields a great deal of oil.

(*MYLIOBATIS*, Dumér.)

- (46.) *Whip Ray*, Penn. Brit. Zool. vol. III. p. 88. Id. (Edit. 1812.) vol. III. p. 128. *R. Aquila*, Linn. Syst. Nat. tom. I. p. 396.? Blainv. Faun. Franc. p. 38. pl. 7.? *L'Aigle de Mer*, Cuv. Reg. An. tom. II. p. 401.?

Pennant states that in 1769, Mr. Travis, of Scarborough, had brought to him by a fisherman of that town the tail of a Ray (the body having been flung away) which was above three feet long, extremely slender and taper, and destitute of a fin at the end. It is conjectured by the Editor of the last edition of the "British Zoology," that this fish must have been the *R. Aquila* of Linnaeus, a species which is found in the Mediterranean, and which attains to a large size. It is, however, equally probable that it may have belonged to the next sub-genus. The *R. Aquila* cannot, therefore, be considered otherwise than as a doubtful native.

(4. CEPHALOPTERA, Dumér.)

208. *R. Giorna*, Lacép.? (*Giorna Ray*).—"Body smooth: the margins of the fins straight; horns of one colour: spine very long, situate at the base of the tail." RISS.

Cephaloptera *Giorna*, *Riss. Hist. Nat. de l'Eur. Mérid.* tom. III. p. 163. pl. 5. Cephaloptera, *Thompson in Proceed. of Zool. Soc.* June 9, 1835.

A fish of this sub-genus is stated by Mr. Thompson, in a recent communication to the Zoological Society, to have been taken about five years ago on the southern coast of Ireland, and thence sent to the Royal Society of Dublin, in the Museum of which public body it is at present

* Blainville.

preserved. In breadth it is about forty-five inches. The specimen being imperfect, and the characters of some of the species ill-defined, Mr. Thompson hesitates applying to it a specific name. He states, however, that it somewhat resembles the *C. Giorna* figured by Risso. I have accordingly annexed a reference to that author.

ORDER IX. CYCLOSTOMI.

GEN. 77. PETROMYZON, *Linn.*

209. *P. marinus*, *Linn.* (*Sea Lamprey*.) — Greenish or yellowish brown, marbled with dusky: dorsals separate; the posterior one rounded, just reaching to the caudal.

P. marinus, *Linn. Syst. Nat.* tom. i. p. 394. *Bloch, Ichth.* pl. 77. *Don. Brit. Fish.* vol. iv. pl. 81. *Turt. Brit. Faun.* p. 109. *Flem. Brit. An.* p. 163. *Blainv. Faun. Franç.* p. 5. pl. 1. f. 1, & 2. *Lampetra Rondeletii, Will. Hist. Pisc.* p. 105. tab. G. 2. f. 2. *Sea Lamprey, Penn. Brit. Zool.* vol. iii. p. 76. pl. 8. no. 27. *Id.* (Edit. 1812.) vol. iii. p. 102. pl. 10. *Bowd. Brit. fr. wat. Fish.* Draw. no. 26. *La Grande Lamproye, Cuv. Reg. An.* tom. ii. p. 404.

LENGTH. From two to two and a half feet; sometimes more.

DESCRIPT. (*Form.*) Anguilliform: body thick and cylindric anteriorly, compressed and somewhat tapering beyond the commencement of the dorsal fin: head indistinct, obtuse and obliquely truncated in front, rather depressed above the eyes: mouth very large, circular, bordered by a fleshy lip, studded on the inside with corneous conical tooth-like papillæ disposed in concentric rows, and gradually increasing in size as they advance inwards; beyond these one large tooth below, in the middle, with six or eight points, the extreme points being the most developed; answering to it above a similar tooth, also in the middle, but with only two points; tongue with two pairs of crenated teeth: eyes large, lateral, a little in advance of the first branchial opening: a single nostril on the top of the head, in the middle, a little in advance of the eyes, moderately large: line of the branchial apertures a little below the level of the eyes, and rather inclining downwards posteriorly: skin every-where smooth and naked: two distinct dorsals: the first commencing beyond the middle of the entire length, short and low, of a somewhat semicircular form: second commencing a little behind the first, more elevated, and attaining its greatest height rather suddenly, afterwards sloping gradually off, and finally terminating immediately before the caudal: vent very much be-

hind, beneath the anterior portion of the second dorsal, and at nearly, but not quite, three-fourths of the entire length: caudal rounded at the extremity, giving a truncated appearance to the tail, the fleshy portion of which, however, is pointed; underneath, the caudal is continued for a little way towards the vent, sinking gradually into a low ridge representing the anal. (*Colours.*) Above, greenish or yellowish brown, marbled with dark brown and dusky: beneath, white, tinged with reddish.

A migratory species, entering rivers from the sea early in the Spring to spawn, and returning after the expiration of a few months. Common in many parts of Great Britain, but said to be more abundant in the Severn than in most other rivers. Attains to the weight of between four and five pounds. Has the power of adhering very firmly to stones with its circular mouth, by means of suction. Flesh much esteemed. *Obs.* It was formerly supposed that in this and the next species the two sexes were united in the same individual; this has, however, been since proved to be erroneous*.

210. *P. fluviatilis*, Linn. (*River Lamprey.*)—Dusky blue above, silvery beneath: dorsals widely separate; the posterior one angular, uniting with the caudal.

P. fluviatilis, Linn. *Syst. Nat.* tom. 1. p. 394. Bloch, *Ichth.* pl. 78. f. 1. Don. *Brit. Fish.* vol. III. pl. 54. Turt. *Brit. Faun.* p. 110. *Flem. Brit. An.* p. 163. *Blainv. Faun. Franç.* p. 6. pl. 2. f. 1. *Lampetræ* medium genus, *Will. Hist. Pisc.* p. 106. tab. G. 3. f. 2. Lesser Lamprey, *Penn. Brit. Zool.* vol. III. p. 79. pl. 8. no. 28. *Id.* (Edit. 1812.) vol. III. p. 106. pl. 10. Bowd. *Brit. fr. wat. Fish.* Draw. no. 16. *Lamproye de rivière*, *Cuv. Reg. An.* tom. II. p. 404.

LENGTH. From twelve to fifteen inches.

DESCRIPT. (*Form.*) General form resembling that of the *P. marinus*, but more elongated in proportion: anterior half of the body thick and semicylindric; posterior portion much compressed: mouth similar; teeth less numerous; one large tooth above, in the middle, with two remote points; opposed to it below, a larger one, forming the arc of a circle, with seven or eight points, and having a crenated appearance; a few other smaller teeth at the corners of the mouth: eyes large: nostril single, in the middle of the upper part of the head, a little in advance of the eyes: line of the branchial apertures commencing nearly on a level with the eyes, but inclining a little downwards posteriorly: skin every-where smooth: a considerable space between the two dorsals: the first commencing at about, or a very little beyond, the middle of the entire length, low, and nearly of equal height throughout: the second commencing beyond two-thirds of the entire length, low at first, but elevated about the middle into a sharp projecting angle, then again sloping off to meet the caudal with which it unites: vent at exactly three-fourths of the entire length: anal narrow, extending to, and also uniting with, the caudal. (*Colours.*) Dusky blue above; silvery white beneath: fins whitish. Said, however, by Donovan, to be very variable.

Common in many of our rivers, especially in the Thames, about Mortlake, where large quantities are said to be caught annually, and sold

* See Mr. Yarrell's observations on this subject in the "Proceedings of the Zoological Society," 1831. p. 133. See also some remarks by an anonymous author in Loudon's "Magazine of Natural History," vol. III. p. 478.

to the Dutch to be used as bait in the Cod-fisheries. Food, according to Bloch, insects, worms, small fish, and the flesh of dead fish. Spawns towards the end of April or beginning of May. Sometimes called a *Lampern*.

211. *P. Planeri*, Cuv. (*Planer's Lamprey*.)—Dusky blue above, silvery beneath: dorsals contiguous.

P. Planeri, Cuv. *Reg. An.* tom. 11. p. 404. Nilss. *Prod. Ichth. Scand.* p. 122. *Lampetra parva et fluviatilis*, Will. *Hist. Pisc.* p. 104. tab. G. 2. f. 1.?

LENGTH. From eight to ten inches.

DESCRIPT. Differs from the *P. fluviatilis*, principally in having the two dorsals contiguous, or with only a very small space between: the first commences at about, or a little before, the middle of the entire length; the second at exactly two-thirds of the same: the vent is, relatively, a little further from the extremity of the tail; the body is also somewhat thicker in proportion to its length. In all other respects, including colours, armature of the mouth, &c., the two species are identical.

This species is evidently the *P. Planeri* of Cuvier and Nilsson, but not of Bloch and Blainville. That of Bloch, Cuvier thinks is only the young of *P. fluviatilis*. It is probably also the species described by Willughby under the name of *Lampetra parva*, in which he expressly speaks of the two dorsals being contiguous. Willughby, however, erroneously considered it as the *Pride* of Plot, a circumstance which has led to some little confusion in the works of later authors with respect to the synonyms of this last fish. Whether the *P. Planeri* be common in this country I am not aware. My specimens were given to me by Mr. Yarrell, who obtained them from a brook in Surrey. The same gentleman has since received it from the Tweed.

(47.) *P. Juræ*, Mac Cull. West. Isl. vol. 11. pp. 186, 187. pl. 29. f. 1.

Under the above name, Dr. Mac Culloch has described a species of *Petromyzon*, which he considers distinct from those hitherto noticed by naturalists. He observes that "in size it approaches to the *P. fluviatilis*, which it also resembles in the proportion and disposition of the fins; but that it differs materially in the absence of the *annuli*, in the greater number of the teeth, and in the number and forms of the bony bodies which surround the opening of the throat." This fish was found adhering to the back of a gray gurnard on the Eastern shore of Jura: the specimen was not preserved. Dr. Fleming does not seem to allow that it is specifically different from the *P. fluviatilis**, an opinion in which I feel inclined to join.

GEN. 78. AMMOCETES, *Dumér.*

212. *A. branchialis*, Flem. (*Pride*.)

A. branchialis, Flem. *Brit. An.* p. 164. *Blainv. Faun. Franç.* p. 3. pl. 2. f. 3, & 4. *Petromyzon branchialis*, Linn. *Syst. Nat.* tom. 1. p. 394. Bloch, *Ichth.* pl. 78. f. 2. *Turt. Brit. Faun.* p. 110. *P. cæcus*, Couch in Loud. *Mag. of Nat. Hist.* vol. v.

* *Brit. An.* p. 164.

p. 23. fig. 10. *Lampetra cæca*, Will. *Hist. Pisc.* p. 107. tab. G. 3.
 f. 1. Ray, *Syn. Pisc.* p. 36. Pride, *Plot, Oxfordsh.* p. 187.
 pl. 10. *Penn. Brit. Zool.* vol. III. p. 80. pl. 8. no. 29. *Id.* (Edit.
 1812.) vol. III. p. 107. pl. 10. Bowd. *Brit. fr. wat. Fish. Draw.*
 no. 32. Lamprillon, *Cuv. Reg. An.* tom. II. p. 406.

LENGTH. From six to eight inches.

DESCRIPT. (*Form.*) Body more slender than in the last genus, vermiform, scarcely larger than a goose-quill, marked with numerous transverse lines, subcylindric anteriorly, somewhat compressed and tapering beyond the vent: jaws and lips soft and membranaceous; the upper lip semicircular, fleshy, prominent: inside of the mouth papillose, with a lingual and palatine plate somewhat harder than the other portions, but no true teeth: eyes obscure: a single nostril on the upper part of the head: branchial orifices seven in number, situate in a kind of lateral groove; the body at this part somewhat dilated: skin naked, and covered with an abundant mucosity: two dorsals; the first small and low; the second closely following, longer, and rather more elevated anteriorly, but sloping off to a narrow edge before uniting to the caudal: fleshy portion of the tail sharp at the extremity, but the fin rounded: vent rather anterior to the commencement of the last quarter of the entire length; anal commencing a little beyond it, uniting with the caudal. *Obs.* Two distinct forms of this fish are not unfrequent: in one, the eyes are larger, the mouth smaller, the snout more elongated, and the orifice on the crown further removed from the extremity: in the other, the eyes are smaller and very obsolete, the mouth larger, and the snout shorter: whether these are merely sexes, or two different species, is not certain. (*Colours.*) "Bluish or reddish gray above, whitish beneath; fins of the same colour and almost transparent*." The following are those which Mr. Couch assigns to his *Petromyzon cæcus*: "Colour dusky yellow, dark on the back, light below; fins light."

Said to be frequent in the rivers near Oxford, particularly the Isis, where it was first observed by Plot. Found also in other parts of England, as well as in Ireland. Buries itself in the soft mud. Has not the power of adhering by the mouth, like the Lamprey; although the lips, according to Mr. Couch, are capable of extensive and complicated motions. Spawns at the end of April or the beginning of May. Probably the *Stone Grig* of Merrett†.

GEN. 79. MYXINE, Linn.

213. *M. glutinosa*, Linn. (*Glutinous Hag.*)

M. glutinosa, Linn. *Syst. Nat.* tom. I. p. 1080. *Flem. Brit. An.*
 p. 164. Nilss. *Prod. Ichth. Scand.* p. 123. Gastrobranchus
 cæcus, Bloch, *Ichth.* pl. 413. Shaw, *Nat. Misc.* vol. X. pl. 362.
Turt. Brit. Faun. p. 110. *Myxine cæca*, Blainv. *Faun. Franç.*
 p. 2. Glutinous Hag, *Penn. Brit. Zool.* vol. IV. p. 39. pl. 20.
 f. 15. *Id.* (Edit. 1812.) vol. III. p. 109. Le Gastrobranche, *Cuv.*
Reg. An. tom. II. p. 406.

LENGTH. From ten to fifteen inches.

DESCRIPT. (*Form.*) Body elongated, vermiform, thick and cylindric anteriorly, compressed and slightly tapering behind: head scarcely distinguishable, obliquely truncated in front: mouth large, circular,

* Blainville.

† Pinax, p. 188.

obliquely terminal, surrounded by eight barbules; in the middle of the upper margin a single nostril or spiracle of a roundish form; a pair of barbules are placed on each side of the spiracle; the remaining pairs at the sides of the mouth: maxillary ring soft and membranaceous, with a single curved tooth on the upper part; two rows of strong pectinated teeth on each side of the tongue: eyes wanting: branchiæ opening externally by two small apertures, placed beneath, near the mesial line, at a little beyond one-fourth of the entire length: a row of pores along each side of the abdomen: skin naked, invested with an abundant mucosity: a low and rather obscure fin commences beyond the middle of the length, turns round the tail, and is continued along the under surface of the body as far as the vent: this last placed at a great distance from the head, scarcely one-twelfth of the entire length intervening between it and the posterior extremity. (*Colours.*) "Blue above; whitish beneath." BLAINV.

This species was placed by Linnæus in his class *Vermes*. Its affinity, however, to the other Cyclostomous Fishes is obvious. Inhabits the northern seas, but is met with on some parts of the English and Scottish coasts. Said by Pennant to be often taken at Scarborough, where it is in the habit of "entering the mouths of other fish when on the hooks attached to the lines which remain a tide under water, and totally devouring the whole except the skin and bones." The fishermen there call it the *Hag*. According to Dr. Johnston, it occurs on the coast of Berwickshire*.

* *Proceed. of Berwicksh. Nat. Club.* p. 7.

A P P E N D I X.

SINCE this Work went to press, I have been made acquainted with two recent additions to the British Fauna, too late for inserting them in their proper places. One of these belongs to the Class MAMMALIA, the other to the Class AVES.

GEN. LUTRA. Page 13.

9*. *L. Roensis*, Ogilby. (*Irish Otter*.)

L. Roensis, *Ogilby in Proceed. of Zool. Soc.* (1834.) p. 111.

By the above name, Mr. Ogilby has designated, provisionally, a species of Otter found in Ireland, chiefly along the coast of the county of Antrim, which he is disposed to regard as distinct from the *Common Otter* (*L. vulgaris*) of England. The difference is said to consist in the intensity of its colouring, which approaches nearly to black both on the upper and under surface; in the less extent of the pale colour beneath the throat; in the relative size of the ears, and in the proportions of other parts. Mr. Ogilby adds that it is further distinguished by the peculiarity of its habitation and manners. "It is, in fact, to a considerable extent a marine animal*, living in hollows and caverns formed by the scattered masses of the basaltic columns on the coast of Antrim, and constantly betaking itself to the sea when alarmed or hunted. It feeds chiefly on the Salmon." No detailed description of it has been yet published.

* Possibly this species may be the *Sea Otter*, which, according to Pennant, was noticed by Sir Robert Sibbald. See *Brit. Zool.* vol. 1. p. 95.

GEN. NOCTUA. Page 93.

(SURNIA. p. 93.)

26*. *N. funerea*, Nob. (*Canada Owl*).—Upper parts spotted with brown and white; beneath white, with transverse brown bars: quills spotted with white; tail marked with distant, transverse, narrow, white bars.

Strix funerea, *Lath. Ind. Orn.* vol. 1. p. 62. *Temm. Man. d'Orn.* tom. 1. p. 86. *Faun. Bor. Amer.* part ii. p. 92. Little Hawk Owl, *Edw. Nat. Hist.* pl. 62. Hawk Owl, *Lath. Syn.* vol. 1. p. 143.

DIMENS. Entire length fourteen inches two or three lines: length of the tail six inches six lines. TEMM.

DESCRIPT. Forehead dotted with white and brown; a black band arises behind the eyes, surrounds the orifice of the ears, and terminates on the sides of the neck: upper parts marked with brown and white spots of various forms; edge of the wing with similar white spots upon a brown ground: throat whitish; the rest of the under parts white, with transverse streaks of cinereous brown: a large spot of dusky brown at the insertion of the wings: tail-feathers cinereous brown, with distant zigzag streaks forming narrow transverse bands: bill yellow, varied with black spots according to age: irides pale yellow: feet feathered to the claws. The *female* differs only in being somewhat larger, and in having the colours less pure. TEMM.

An individual of this species, which inhabits the Arctic Regions, is recorded by Mr. Thompson, in a recent communication to the Zoological Society*, to have been taken on board a collier, a few miles off the coast of Cornwall, in March, 1830, being at the time in so exhausted a state as to allow itself to be captured by the hand. According to Temminck, the species appears occasionally as a bird of passage in Germany, and more rarely in France, but never in the southern provinces. Said to feed principally on mice and insects. Builds in trees, and lays two white eggs.

* *Procecd. of Zool. Soc.* June 9, 1835.

ALPHABETICAL LATIN INDEX.

THE names of the Genera are printed in LARGE CAPITALS: those of the Sub-genera in SMALL CAPITALS: those of the Species in Roman Characters: the Synonyms, as well as the names of a few Species incidentally mentioned, and those of the principal Varieties, in *Italics*.

The first of the two numbers attached to the names of the Genera and Sub-genera, refers to the page containing the generic and sub-generic characters.

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