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XVI.—Contributions to the Ichthyology of Australia

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XVI.—*Contributions to the Ichthyology of Australia.* By JOHN RICHARDSON, M.D., F.R.S., &c., Inspector of Hospitals, Haslar.

[Continued from p. 31.]

CENTROPRISTES SCORPENOIDES (Cuv. & Val.), Scorpenoid Centropristes.

Scorpène de Waigiu, Quoy & Gaimard, Zool. Voy. de Frey., pl. 58. f. 1.
Centropristes scorpenoides, Cuv. & Val. Hist. des Poiss. iii. p. 48.
 No. 31. Mr. Gilbert's collection.

IN characterizing the *Plectropomes*, Cuvier observes that they differ from the *Serrani* in the teeth of the angle and under limb of the preoperculum being directed forwards, and that he has separated them merely to facilitate their nomenclature. Had the *Centropristes* been equally numerous, this species might have been detached by the same character as the *Plectropomes*, for its preoperculum is spurred beneath still more strongly and acutely*. But though the *Centropristes* do not form a copious group, neither do they, as enumerated in the 'Histoire des Poissons,' constitute a very natural one. The illustrious authors of that work have pointed out the resemblance of the *C. truttaceus* to a *Cæcio*, and indicated it as the probable type of a distinct genus, and its allied species *C. georgianus* has actually been made the type of the genus *Arripis*† by Mr. Jenyns. Abstracting these and the Japanese *C. hirundinaceus*, which has also a peculiar aspect, the remaining *Centropristes* described in the 'Histoire des Poissons' are all American.

The species at present under consideration is named by the natives at Port Essington 'Seebererdidwee,' and is abundant in all the shallow parts of the harbour. It has a strong resemblance to a *Scorpena* in the character of its scales, in general form, in possessing a nasal cirrus, in the structure of the anal spines, and in the small number of rays in that fin. These peculiarities no doubt determined Messrs. Quoy and Gaimard to place it in the genus *Scorpena*. The teeth of the typical *Serrani* being long and slender, particularly posteriorly and towards the mesial line, as well as curved backwards, and having moreover a few stronger ones intermixed, are especially adapted for preventing the escape of the animals on which these fishes feed. But the numerous spe-

* The appellation of *Centrogenys*, which is nearly synonymous with that of *Plectropoma*, would have been appropriate had it been advisable to give a subgeneric name to this curious fish. A specimen having the vomer and palate bones cut away might be taken for a *Centropomus*.

† Zoology of the Voy. of the Beagle.

cies which enter into the genus show various gradations* in the strength of their cardiform dentition; and the teeth in some being finely villiform, with small and scarcely projecting canines, are in fact less efficient organs of retention than the teeth of *Centropristes nigricans*, which are stated by Cuvier to be all 'en fort velours.' The *Centropristes scorpenoides*, on the other hand, has very short, densely crowded teeth, with the dental surfaces curved and fitting into each other, and evidently adapted for rubbing down or bruising soft substances rather than for retaining a living prey. This species also differs from the other *Centropristes*, and approaches the *Serrani* in the snout and suborbital being scaly. The unusual strength and length of the second anal spine, being proportionally greater than even in the *Holocentri*, is a peculiar character. Mr. Gilbert has brought home three specimens in spirits, together with several dried skins, all retaining the configurations of the dark colour strongly defined, particularly on the spines and fins. One of the dried skins has been presented by Mr. Gould to the Muséum d'Histoire Naturelle at Paris. The description of Quoy and Gaimard's specimen, contained in the 'Histoire des Poissons,' agrees exactly with the examples from Port Essington, except in the statement of the suborbital not being scaly and the operculum having only one acute point; but the figure in the zoological volume of Freycinet's voyage is characteristic enough to show that there can be no mistake as to species. The markings are not however so boldly defined in that figure as they still appear on Mr. Gilbert's specimens.

Form.—Snout gibbous, the cranium being arched between the orbits both longitudinally and transversely. The head is concave behind the orbit† and rises again to the beginning of the dorsal fin, from whence to the end of the fin the profile of the back is moderately and regularly arched: the curve of the belly is flatter.

The length of the trunk of the tail is equal to its own height, or to about one-third of the height of the body, which at the insertion of the ventrals, where it is greatest, is exactly equal to the length of the head, measured to the tip of the gill-cover; the total length of the fish exceeds thrice the length of the head by half the length of the caudal fin. The greatest thickness is just above the pectorals, and is equal to half the height; the body thins off more rapidly towards the back, which is rather acute, than towards the belly, which is flattish and has some breadth before the ventrals. Towards the

* The genus *Prionodes* of Mr. Jenyns exhibits a peculiar modification of the teeth of this tribe, the species on which it is founded being in fact a *Serranus* with toothless vomer and palate bones.

† This peculiarity is owing to the soft parts, and not to the form of the skull, which is convex.

tail the fish becomes gradually much compressed, the thickness of the trunk of the tail not exceeding one-third of its height.

The *head* is rather thick and convex above. The distance between the eyes is equal to the vertical diameter of the orbit, and the snout is very short. The moderately large eye is placed high up, occasioning apparently the arching of the frontal bone: it is half a diameter from the edge of the snout, a diameter and a half from the under surface of the head, and two and a half from the tip of the gill-flap. The nostrils are situated on the verge of the orbit, above its upper anterior angle, the two orifices being contiguous, and the foremost one emitting a cirrus which is two lines high. The mouth opens forwards and is of moderate extent, the jaws not separating beyond an angle of 60° . The under jaw is equal in length to the upper one, but as it ascends when the mouth is closed, it appears slightly longer when depressed. The lips are thin. The intermaxillaries are moderately protractile, and, owing to the shortness of the snout, their pedicles, which are of the same length with the oral limbs of the bone, slide over the anterior third of the orbit. The maxillary is wide at its lower end and evenly truncated, and its upper end is only very partially covered by the edge of the preorbital. The lips, jaws, isthmus, and branchial membrane are the only parts of the head that are not scaly; the snout, top of the head, suborbitals, cheeks, and whole opercular pieces being densely covered to their extreme edges with scales. The preorbital is narrow, and curves away to a thin slip as it passes under the anterior third of the orbit; it is scaly, though the scales, being imbedded in integument full of small pores, are not easily seen unless in the dried specimen. The rest of the suborbital chain is restricted to a smooth mucous canal or fold which divides the orbit from the densely scaly cheek. Neither the margin of the orbit nor the preorbital show any acute points, though the anterior edge of the latter is slightly uneven. There are many minute pores with branching mucous tubes on the lower jaw not disposed in any regular order.

The upper limb of the preoperculum inclines slightly forwards as it ascends, and is finely and very acutely serrated; the teeth are divergent on the rounded angle and a little stouter; and the under edge of the bone, which is slightly arched, is occupied by three strong conical and very acute spines which point forwards. The foremost of the three is the largest, being twice as long as the posterior one, which is less than the middle one. These spines lie beneath the scaly edge of the bone, and are not readily seen in the recent fish. The whole edge of the preoperculum is free to a considerable extent, and can be raised from the gill-cover. The gill-flap is triangular, its under edge sloping much upwards to the not very acute scaly tip, which is situated high above the pectoral fin and nearer to the lateral line. There is no membranous margin to the flap, and the scales conceal the unions of the opercular pieces. The under edges of the interoperculum and suboperculum are quite entire. A flat acute spine is situated on the operculum, about its own length from the tip of the gill-flap and immediately behind it. The point of a

second spine is just perceptible higher up, near the superior angle of the gill-opening: this point is conspicuous enough in the skeleton, the bone being cut away in a semicircular arc between it and the principal point. There is no peculiarity in the scales which conceal the supra-scapular and humeral bones.

The *teeth*, which are, singly, but just visible to the naked eye, are disposed in villiform bands, very densely crowded; and by the aid of a microscope are seen to be very short and obtuse, a few scattered ones near the symphysis being more so than the rest. The dental surface on the intermaxillary is concave and inclines much inwards, receiving that of the lower jaw, which is convex. On both jaws it tapers as it recedes from the mesial line. The chevron of the vomer, resembling an inverted Δ , is armed, together with the edge of the palate bones, with very minute villiform teeth.

RAYS:—B.7—7; D.12|12; A.3½; C.12¾; V.1½; P.13; 1st specim.

7—7; 13|9; 3½; 12¾; 1½; 13; 2nd —

7—7; 13|10; 3½; 12¾; 1½; 14; 3rd —

7—7; 13|9; 3½; 12¾; 1½; 13; 4th —

7—7; 13|11; 3½; 13; 1½; 13; C. & V.

The narrow branchiostegous membrane is supported by seven cylindrical rays, the two lower ones being short, very slender, and easily overlooked. The gill-opening is wide. The dorsal varies in different individuals more than is common among the acanthopterygian fishes in the number of its soft rays, viz. from nine to twelve, the last one being in each case deeply divided. One specimen also has a spine fewer than the rest. The fin commences a little behind the edge of the preoperculum; the spinous portion is arched and occupies twice the space of the soft rays, which rise above the posterior spines, and are like them oblique. The anterior spines are the strongest; the first is half the height of the second, and when the fin is fully extended inclines forwards; the third is the tallest, but is very little higher than the second and third; the membrane is more deeply notched between the first three spines than in the succeeding part of the fin; the remaining spines decrease very gradually in succession, the thirteenth being a little taller than the first, and about one half the height of the soft part of the fin, which has a rounded outline. All the spines after the second one are slightly curved. There are no scales on the fin before the third spine, but more posteriorly a little triangular fillet of scales inclines against the fore side of each spine, the fillets increasing successively in size, and the base of the soft fin is densely scaly.

The anal commences far behind the anus and nearly opposite to the middle of the soft dorsal. The first spine is short, tapering and acute, and convex before and behind, whereby it is prevented from reclining against the second spine, which is very long, strong, slightly curved and compressed in an opposite direction, having its anterior and posterior edges acute. The membrane slopes off from it to the point of the third spine, which is one-fourth part shorter, producing an acute notch in the fore part of the fin. The third

spine is however as tall as the highest dorsal spine, and it is flattened or grooved behind for the reception of the first soft ray, which is closely applied to it and overtops it, but does not equal the second spine. The other rays are successively shorter, and the fin terminates sooner than the dorsal, leaving consequently more space between it and the caudal. It contains five articulated rays, the last one deeply divided, and its base is scaly like the dorsal. The caudal terminates evenly with rounded corners, and contains twelve or thirteen forked or branching rays, with three visible, incumbent, simple but jointed ones above and below. The pectoral is rounded and is attached low down, the lower rays partly overlapping the ventrals. All its rays are twice or thrice divided at the tips, but the branches remain in contact without spreading through the membrane that connects one ray to another. The ventrals are attached near each other, entirely on the ventral aspect of the fish, and open horizontally. The spine is one-third shorter than the soft rays.

Scales.—The scales, *in situ*, have a striking resemblance to those of *Scorpana porcus*. They are individually truncated at the base, with parallel rectangular sides and an elliptical exterior edge, which is finely ciliated by slender rigid teeth and narrowly bordered by a shagreened surface. From five to nine furrows originate in a point close to this border and run in a fan-like manner to the basal edge, but do not occasion crenatures thereon. The scales on the head are about one-third smaller than those on the body, and appear to be rougher. They are smallest on the bases of the fins, the snout, and tip of the gill-cover; the cheek ones nearly equal those on the operculum in size. They do not extend far on the pectorals and caudal, and there are none on the ventrals. The lateral line is less curved than the back, and opposite to the posterior third of the soft dorsal, it takes a straight direction through the tail to the membrane between the two middle caudal rays, proceeding as far on the fin as the scales do. The scales composing it are smaller than the adjoining ones, and of a different shape, being wider at the base than at the exterior edge, which is rough and ciliated like the rest: each has a simple tube on its exposed disc. There are forty-two or forty-three scales on the lateral line.

Colours.—The patterns of colour appear to be equally well preserved in the dried skin and in the specimens kept in spirits, the ground-tint being however much lighter in the latter. It is honey-yellow approaching to wood-brown, and the dark parts are deep umber or liver-brown. The dark tint prevails on the top of the head, mottles the cheek, and forms four round blotches along the summit of the back, partly encroaching on the dorsal fin. There is an equal number of spots on the lateral line not so well defined, and some shadings on the sides, particularly at the base of the anal. The lips, lower jaw, margin of the eyeball, and soft dorsal, exhibit the dark colour in form of small rectangular spots; the spinous dorsal shows it in round spots, which form three rows and occupy more space than the ground-colour. The posterior surface of the pectoral is regu-

larly barred by three dark bands alternating with as many pale ones; on the anterior surface there are some spots, and the dark bars shine partly through. The fore part of the anal is also barred, the bars being most clearly seen on the spines; the hind part of the fin is tessellated by the rectangular spots. This tessellated pattern is still more perfectly exhibited on the caudal, the dark and light colours being nearly equal over the whole fin. The ventrals are marked much like the anal. The edges of the scales are mostly lighter, which renders the dark spots less intense on the scaly parts than on the jaws, spines, and fins. The nasal cirrhous is banded by the two colours. The eye is gold-yellow in the dried specimen.

Osteology.—The cranium is convex and smooth over the posterior angle of the orbit, but there is a very small mesial ridge on the occiput between the superior ends of the supra-scapulars. Between the orbits there is a smooth mesial furrow, and the anterior frontals are hollow. The infra-orbitals are narrow, presenting a chain of cells communicating with each other. There is no process extending across the cheek to the angle of the preoperculum as in the *Scorpenæ*. The preoperculum has been described already. The bony operculum ends in two flat acute points, with an even semicircular curve between them. It is the inferior third point, usually present in the *Serrani*, which is wanting in this species. The edges of the interoperculum and suboperculum are perfectly smooth. The supra-scapular presents a series of cells like the suborbitals, and the uneven or crenated edge of a small process shows itself exteriorly at the upper angle of the gill-opening. There are, as in the *Serrani*, twenty-four vertebræ, but I can reckon only nine of them as abdominal, instead of ten; for the tenth has a forked inferior spinous process, which receives the point of the large interspinous bone of the anal, but carries no ribs. There are only nine pairs of ribs, but two or three of the posterior ones are forked. The first spine of the dorsal is articulated to the first interspinous bone; in *Centropristes nigricans* there are three interspinous bones before the first dorsal spine. The small lateral process of the last caudal vertebra which exists in *Serranus rasor* and others of that genus is absent in this *Centropristes*. The three anal spines are attached to a very strong interspinous bone; the middle spine occupying most of the articulation, the first and third spines moving partly on its base. The other anal interspinous bones are much more slender and short.

DIMENSIONS.		Inches. lines.	
Length from intermaxillary symphysis to end of caudal	5	3	
..... base of ditto	4	3	
..... tip of gill-flap	1	7	
..... beginning of dorsal...	0	11	
..... centre of eye	0	6	
Diameter of orbit.....	0	5½	
Length of pectoral	1	2	
..... ventral	1	0	
..... dorsal	3	2	
..... ditto, spinous part	2	1	
..... ditto, articulated part.....	1	1	

DIMENSIONS.		inches.	lines.
Length of anal		0	9
caudal		1	0
Height of nasal cirrus		0	1½
third dorsal spine		0	9
thirteenth ditto		0	5½
soft dorsal		0	7½
second anal spine		1	2
soft anal rays		1	0
Height of body at pectorals		1	6
Thickness of ditto		0	8

THERAPON SERVUS (Cuv.), Jarbua Therapon.

Holocentrus servus, Bl. 238. *Grammistes servus*, Bl. Schn. p. 185.

Sciæna jarbua, Shaw, Gen. Zool. iv. p. 541.

No. 2. Mr. Gilbert's list of Port Essington fish.

Mr. Gilbert states that "this fish inhabits the shallow parts of Port Essington. The specimen was taken from a *fresh-water* swamp near the settlement," and measures $6\frac{3}{4}$ inches in length, caudal included. The lateral line is continuous, being arched until it arrives opposite to the eighth ray of the soft dorsal or sixth articulated one of the anal, whence it runs a straight course to the caudal, and passes a short way between the bases of the middle rays.

THERAPON THERAPS (Cuv. & Val.), The Slave-Therapon.

Therapon theraps, Cuv. & Val. iii. p. 131. pl. 53.

No. 15. Mr. Gilbert's collection of Port Essington fish.

At-a-goorn, Aborigines of Port Essington.

The authors of the 'Histoire des Poissons' remark that this species has a very close resemblance to the Jarbua Therapon (number 2. of Mr. Gilbert's list), and indeed at first sight our specimen, which measures nearly eleven inches in length from snout to tip of caudal, might be easily set down as merely an older individual of the preceding species. Mr. Gilbert however informs us that its habits are somewhat different, for though abundant in the harbour it keeps in the deep water, while the Jarbua seeks the shallows. An attentive comparison of Mr. Gilbert's specimens of the two species, numbers 2. and 15, elicits the following differences.

The scales of *servus* are proportionally smaller, and have a neater and more compact appearance, arising from their being more strongly ciliated, and thereby better defined. The head has rather less vertical height, and the eye, which is smaller, approaches nearer to the profile. The suborbital is ciliated with acute teeth, and the small scales, which closely and entirely cover the cheek, abut against a smooth elevated ridge that separates the cheek from the scaleless limb of the preoperculum. In *theraps* the surface of the suborbital is more decidedly furrowed, but its margin is merely crenated, not acutely toothed; the interoperculum has a perfectly smooth edge,

instead of showing two or three minute teeth posteriorly. The eye is larger, and further removed from the profile, the skull being more arched above as well as more convex transversely. The radiations and ridges of the frontal bone are more pronounced in *theraps*, but present the same patterns as in *servus*. Both species have scaly opercula and subopercula, and there are still some scales remaining anteriorly on the interopercula of both specimens. Cuvier's figure represents the interoperculum of *theraps* as entirely scaly, and also a few crenatures on the edge of the suboperculum, which are not visible in Mr. Gilbert's specimen. Our examples of both species possess the first very small dorsal spine, which Cuvier notes as being occasionally absent in *servus*, and as wanting in *theraps*. In both the fifth spine is the tallest, the fourth and sixth being but little shorter. The second anal spine is the stoutest in *servus*, the third in *theraps*, as mentioned in the 'Histoire des Poissons.' Both have the large black mark between the fourth and seventh dorsal spines, a smaller one on the ninth and the membrane behind it, and three on the edge of the soft dorsal. The three black bands on each side of the body exist in both exactly as described by Cuvier; but our example of *theraps* wants the black mark on the lower tip of the caudal, and has a spot above, between the black tip and first bar, which does not exist in the figure given in the 'Histoire des Poissons.' There is a striking difference in the lateral line of the Port Essington *theraps*, which is perhaps merely an individual variety proceeding from an injury, viz. an interruption beneath the third and sixth soft dorsal rays; it commences anew, and is continued to the caudal at the breadth of two scales lower down, the ends of the two parts passing each other at the interruption by the breadth of four scales. As the specimen consists of only one side of the fish, we cannot speak more confidently of the nature of this interruption of the lateral line,—the scales are of the usual size and appearance around the place.

The most striking distinction of the two species appears to be in the number of the outer conical teeth. These are small, blunt, and distant in *servus*, amounting only to about four on each side of each jaw, while in *theraps* they are at least double that number, are almost contiguous, and more acute, and they decrease in succession as they recede from the symphysis. In *servus* their blunt tips only are visible.

Mr. Gray informs me that the *Pterapon trivittatus* of Hardwicke's 'Indian Zoology' is the *Therapon theraps*.

THERAPON RUBRICATUS (Nob.), Tile-red Therapon.

No. 36. Lieut. Emery's drawings.

Lieutenant Emery has a drawing of a fish taken on the north-west coast of Australia, which is sufficiently characteristic to enable us to place it without hesitation in the genus *Therapon*, but abundantly distinct from any species described in the 'Histoire des Poissons.' The large opercular spine and the serratures of the ascending limb of the preoperculum are distinctly shown, but there are no teeth indicated on the

lower edge of that bone, nor on any other of the opercular pieces, the suborbitals or humerus. This has probably arisen partly from the drawing having been made while the fish was just taken from the sea, and consequently when the soft parts concealed the bones of the head more perfectly, and partly perhaps from the bones above mentioned being less strongly armed than in others of the genus. No radiations of the frontal bone are indicated, nor are there any teeth shown in the jaws.

The head is proportionally smaller than in *servus* or *theraps*, its profile is arched above, but the nape rises more suddenly in a slightly concave line to the commencement of the dorsal; the line of the back is nearly straight to the beginning of the soft dorsal, whence it descends and curves gently into the trunk of the tail, whose upper profile is on a line with the top of the head. The body is higher than in the preceding species, its height under the spinous dorsal being exactly equal to one-third of the whole length, measured to the end of the central caudal rays. The height of the tail is less than one-third of that of the body. The ventrals are larger than in *servus* or *theraps*. The fourth dorsal spine is the tallest; and the third anal spine is represented as considerably longer than the second one. The membrane is not so much curtailed at the eleventh spine as in *theraps*. B. 6; D. 12|10; A. 3|9; V. 1|5, &c.

The markings on the fins are dark reddish brown. One spot includes the tips of the fourth, sixth and seventh dorsal spines; there is a small one on the tip of the tenth spine, a still smaller one on the eleventh; a fourth extends from the tip of the twelfth spine to that of the second soft ray, a fifth reaches from the tip of the fourth soft ray to that of the sixth, and there is a sixth spot on the posterior angle of the soft dorsal. A paler spot covers the hinder half of the anal. The ground-colour of the caudal is imperial purple, and it is crossed by three broad bands of dark liver-brown, the upper and lower tips of the fin being also marked with the same. The back and sides are deep tile-red, which graduates into carmine on the head, the belly being whitish with a yellow tinge. The longitudinal bands are narrow, and have a honey-yellow colour. One commences just before the dorsal spines, and terminates at the middle of the soft fin, as in *servus*; another runs from the nape to the end of the soft dorsal, whence it is continued along the trunk of the tail to the upper base of the caudal. A third runs from the gill-opening, at the opercular spine, to the middle caudal bar, which has more than twice its breadth. There is a fourth very pale, and not complete stripe, at the junction of the red sides with the pale under surface, on a level with the lower third of the pectoral. The length of the individual, which the drawing represents, is noted by Lieutenant Emery as having been six inches.

SILLAGO BURRUS (Nob.), Crimson-backed Sillago.

No. 37. Lieut Emery's drawings.

The drawing was made from an individual $8\frac{1}{2}$ inches long, which was taken on the north-west coast. The species evi-

dently differs from all that are described in the 'Histoire des Poissons,' but the figure expresses the generic form so exactly, that I have no hesitation as to the genus, though no scales are depicted on the side of the head, nor a spinous point indicated on the operculum. It is banded on the sides like *Sillago maculata* of MM. Quoy and Gaimard, which inhabits Port Jackson, but it wants the silvery lateral stripe, shows spots on the dorsals, and has a higher and more elliptical body than that species.

The profile is a lengthened ellipse, or, taking in the trunk of the tail, is fusiform; its greatest height, lying about midway between the ventrals and anal, is somewhat less than a fifth of the total length, caudal included. The outline descends in a flat regular curve from the first dorsal to the end of the snout, which is rendered obtuse only by the thickness of the moderately swelling lips. The mouth, situated at the apex of the subconical head, is on a low level, the under surface of the head being flattish. The curve of the belly is not quite so prominent as that of the back. The length of the under limb of the preoperculum, and its breadth downwards, characteristics of the genus, are well expressed in the figure. There are, however, no scales shown on the cheeks or opercular pieces, nor any spine on the gill-flap. The length of the head is equal to one-third of that of the fish, caudal excluded. The eye is situated near the profile, and rather nearer to the end of the snout than to the gill-opening. Its diameter is equal to one-seventh of the length of the head. The nostrils are situated high up, very near each other, and somewhat further from the end of the snout than from the orbit.

The commencement of the first dorsal, the acute tip of the gill-flap, the pectorals and the ventrals, are in the same vertical line. It is probable that a short incumbent ray at the beginning of the dorsal has been overlooked. In the drawing the first ray is the tallest, the others decrease gradually to the tenth, which has only one-fifth of the height of the first. The shape of the fin is triangular, its membrane terminating exactly at the base of the second dorsal: its height is equal to two-thirds of the height of the part of the body directly beneath it. The second dorsal lowers very gradually as it runs backwards, the last ray being only one-third shorter than the first, which is the tallest, and is as high as the seventh spine of the first dorsal: its outline is even. The anal is opposite to the second dorsal; it is a little lower, but corresponds with it in form, except that it has a short spine at its commencement. The caudal is slightly lunate on the margin. The pectoral measures one-sixth of the length of the fish, and terminates in an acute upper point. The ventral is also acute, but wants the filiform tip which exists in some *Sillagos*.

RAYS:—D. 10(11?)—20; A. 1|21; P. 1|5, &c.

The lateral line is less curved than the back, and is traced a little above the middle height anteriorly, but runs through the middle of

the tail; it is marked by two (or more?) divergent tubes on each scale.

Colour.—The head is yellowish brown, changing on the lower half of the cheek and gill-cover to a flesh-tint. The back down to the lateral line, is crimson, the parts beneath primrose-yellow. Between the nape and caudal fin eleven, irregular, interrupted bars of yellowish brown descend obliquely forwards from the back; those which proceed from the base of the second dorsal pass the lateral line a little way; the anterior and posterior ones are shorter. The caudal is very pale ochre-yellow, without spots. The other fins are colourless, and seemingly transparent; they are also without spots, except the dorsals, which are marked by oblique rows of round brown spots, each spot being nearly as wide as the space between the rays. There are two rows on the first dorsal and five on the second, but these are not complete; for as the lower anterior row terminates, from its obliquity, at the fifth ray, another row commences on the edge of the fin, and the same thing takes place when the second row terminates at the thirteenth ray, so that there are only three rows in any one part of the fin. There is a blue patch on the scaly base of the pectoral.

PERCIS EMERYANA (*Nob.*), Emery's Percis.

No. 22. Lieut. Emery's drawings.

The drawing was made from a fish procured at Depuch island; it measured seven inches.

In form this Percis resembles *cylindrica*, but it is still more lengthened. Its height being one-seventh of the total length, caudal included, remains nearly the same from the occiput to the posterior third of the dorsal, when it begins to taper gradually into the trunk of the tail. The head is depressed before the eye, but it is altogether shorter, and the snout more obtuse than that of *cylindrica*. The teeth are strongly marked on the jaws. In the radiating semicircular form of the spinous dorsal, as well as in the notched caudal, this fish resembles a *Trachinus*. The spinous dorsal has five rays, and the third and fourth being the longest, its outline is much arched: its membrane ends exactly at the base of the first soft ray. The articulated part of the fin and the anal are of equal height throughout, and rather exceed half the height of the body. The posterior corner of the anal is slightly rounded. The caudal is notched to a third of its length, and its lobes are acute. The pectoral is truncated, the spinous dorsal commences immediately over its base, and the elliptical ventrals are affixed a little more anteriorly. The anus is under the fourth jointed ray of the dorsal, and the anal begins a ray further back.

RAYS:—D. 5|21; A. 16; V. 5 (the spine not being expressed).

Colour.—In the markings of the body this species comes near *semifasciata*, but it differs widely from it in the form of the head, body, and spinous dorsal, as well as in the number of rays of the soft dorsal. The general tint of the back and upper half of the sides

is tile-red. Little specks of a deeper tint of the same colour border each scale, and these specks are at intervals crowded so as to produce five vertical bands under the soft dorsal, narrower than the intervening spaces. There is another less distinct band on the nape, and a seventh on the base of the caudal. None of the bands go beyond the general line of the red. The lower half of the side is pale primrose-yellow, which fades to white on the belly. The head, which is represented as scaly on its whole upper surface as well as on the cheeks and gill-covers, is coloured like the body, except that white replaces the yellow of the lower parts. Three azure-blue streaks cross the front between the eyes, one on the upper part of the cheek follows the curve of the orbit, two run from the eye to the upper lip, and two connected like a bent bow and its string, cross the occiput. The spinous dorsal is entirely black, the soft one pale bluish lilac; and behind each ray there are two round white spots, one above the other, and two blackish brown dots higher up, making four rows in all. The anal is also lilac, but with a tinge of crimson; and it is marked by a series of sixteen crimson streaks running obliquely forwards across the rays. The caudal is red like the back, with a yellow upper and under border, and four waving transverse lines on its distal half. The pectorals are unspotted red, and the ventrals greenish.

[To be continued.]

XVII.—On *Mucor* observed by Col. Montagu growing in the Air-cells of a Bird. From WM. YARRELL, Esq., F.L.S.

To the Editors of the *Annals of Natural History*.

GENTLEMEN,

IN addition to the instances quoted in the eighth volume of the 'Annals,' page 229, of the growth of cryptogamous plants in the bronchial tubes of a Flamingo, and on the internal surface of the air-cells of an Eider-duck, allow me to refer you to another example mentioned by Col. Montagu in the 'Supplement to his Ornithological Dictionary,' published in 1813, under the article 'Scaup Duck.' The paragraphs are as follows:—

"The cause of death (in this female) appeared to be in the lungs, and in the membrane that separates them from the other viscera; this last was much thickened, and all the cavity within was covered with *mucor* or blue mould."

"It is a most curious circumstance to find this vegetable production growing within a living animal, and shows that where air is pervious, mould will be found to obtain, if it meets with sufficient moisture, and a place congenial to vegetation. Now the fact is, that the part on which this vegetable was growing was decayed, and had no longer in itself a living