THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY.
SUPPLEMENT TO VOL. XI. JULY 1843.

LXIII.—*Contributions to the Ichthyology of Australia.* By John Richardson, M.D., F.R.S., &c., Inspector of Hospitals, Haslar.

[Concluded from p. 428.]

Leuciscus (Ptycholepis) salmoneus.

Mugil salmoneus, J. R. Forster, MS. iv. 14. apud Schneid. G. Forster, No. 237.

Mugil lavaretoides, Solander, Pisc. Austr. p. 15. ?

No. 29. Mr. Gilbert's list.

This fish is stated to be in general an inhabitant of deep water, and rarely seen within the harbour of Port Essington, though the natives occasionally spear it close in shore. Mr. Gilbert's specimen was obtained at Point Smith. The existence of this fish in the collection is important, as it serves to rectify a mistake in the 'Règne Animal,' ii. p. 324, respecting a species discovered at the island of Tanna by the Forsters. Cuvier's expression is, "L'Elops de la mer des Indes est l'*Argentina machnata* de Forskål, et le *Mugil salmoneus* de Forster, Bl. Schn. 121, quoiqu'il ne lui donne que quatre rayons branchiaux, je m'en suis assuré par sa figure. C'est aussi le *jinagow*, Russell, 179, &c." Forster's figure measures a foot and a half, within an inch of the length of our specimen, which it exactly represents, with the single exception of the caudal fin being a trifle smaller. The four gill-rays are correctly drawn, and show that the fish cannot be ranked in the Clupeoid family; and in fact neither the figure nor the specimen has, even excluding the great dissimilarity of the number of the gill-rays, more than a distant resemblance to the *Elops jinagow* of Russell.

The following brief notice of a New Zealand fish occurs in the 'Pisces Australiæ':—"*Mugil lavaretoides*. Piscis dorso e cæruleo-virescens (uti in Harengo), inferne argenteus. In occipite supra et paulo pone oculos area magna ex argenteo sordide virescens, quasi subpellucida. Iris ex argenteo-flava; pupilla parva nigra. Pinnæ ex albido-cinerascentes. Habitat Tolaga." (p. 15.) Though there is nothing in this extract to point out the genus of the fish it alludes to, yet, as both the specific appellation of *lavaretoides* and the tints

of colour spoken of agree well with the Port Essington fish, it is possible enough that Solander may have had before him an example of the same or of a nearly allied species. He may have given an equal latitude to the generic term *Mugil*, as the Forsters afterwards did, and indeed as is done vulgarly by the English residents on the Indian coasts, who apply the term 'mullet' to several *Leucisci* as well as to the true *Mugiles*. M. Valenciennes says, "Il y a dans les manuscrits de ce même naturaliste (Solander), un *Mugil lavaretoides* qu'il est difficile de caractériser par le peu de mots qu'il en dit; mais nous avons cependant quelques raisons de soupçonner que c'est de l'Elops dont il s'agit ici." (C. & V. xi. p. 118.) Mr. J. McClelland, who has contributed so largely to our knowledge of the Indian *Cyprinidæ*, writes, "Nor is anything whatever known, as far as I am aware, of the existence of Cyprins in New Holland, or any of the Polynesian islands." (Annals of Nat. History for Nov. 1841, p. 198.) And after carefully examining the South-Sea drawings of Parkinson and George Forster, and all the collections of New Zealand, Australian, and Polynesian fish that have come in my way, the *Leuciscus salmoneus* is the only Cyprinoid that I have found among them*.

Two of Russell's *Cyprini*, the *tooleloo* (No. 208) and the *palah-bontah* (No. 207), agree with *L. salmoneus* in possessing four gill-rays, as well as in a portion or the whole of the scales being closely furrowed, producing numerous narrow delicate ridges which terminate on the free edge of the scale in acute projecting points or teeth. For these, as a subgenus or minor division of *Leuciscus*, I propose the designation *Ptycholepis*. In the *palah-bontah* the scales above the lateral line only are striated; the *tooleloo* agrees with *salmoneus* in the striated structure being common to all the scales of the body. Both of Russell's species receive the name of "mullet" from the English residents on the Coromandel coast, the *palah-bontah* being distinguished as the "milk mullet," and the *tooleloo*, which is caught in the river at Madepollam only when the freshes come down and never in the sea, as the "mountain mullet."

In shape and general aspect this fish strongly resembles a *Coregonus*. The head is small and forms only a fifth part of the total length, excluding the lobes of the caudal. The profile is a narrow ellipse, the back and belly being bounded by equal curves, which rise regularly from the mouth to midway between the gill-openings and ventrals, where the body is highest. The posterior curves are flatter and one-third longer, and the body tapers gradually to the base of the caudal, where the height is only one-third of that before the ventrals.

The head is covered with a smooth nacry skin which is continued

* Mr. McClelland, in pointing out the analogical relations which exist between the Rasorial birds and the *Cyprinidæ*, says, that "while there is no instance of Rasorial birds possessed of aquatic habits, so no species of *Cyprinidæ* is known to belong to the sea; in India they are exclusively confined to fresh water, mostly keeping beyond the influence of the tides." The *Ptycholepis salmoneus* is an exception.

evenly over the cheeks and gill-covers, so that the opercular bones can scarcely be distinguished from each other even in the dried specimen. The under border alone of the preoperculum is marked out by a slight fold of the skin, and the membrane, which is stretched from the fore-part of the interoperculum to the under lip, is not attached to the integument which covers the limb of the hyoid bone over which it passes, a kind of pocket opening downwards being thus formed. The posterior part of the interoperculum and rest of the opercular pieces form one continuous surface with the gill-membranes. The top of the head is flattish, and narrows gradually from the nape to the snout. In the dried fish the flat space is bounded laterally by a slightly elevated line which extends from the nostrils to the nape. The upper edge of the orbit is prominent and rounded, and a scarcely raised line is continued from it to the upper angle of the gill-cover. The eye is large, and is only half the length of the orbit from the orifice of the mouth, but twice as far from the gill-opening. The mouth is small, but the true shape of its orifice cannot be ascertained from the specimen, the under lip having been injured. The maxillary widens gradually towards its lower end, which is rounded away: it forms half the upper lip, which is arched, and is received a short way under the bulging edge of the preorbitar. The upper lip has no soft parts beyond the thin integument covering the bone. There are no vestiges whatever of teeth either on the jaws or roof of the mouth. A mucous canal with short branchlets traverses the surface of the preorbitar, and closely skirts the orbit beneath and behind. The gill-rays are strap-shaped, very thin and flat.

There are no scales on any part of the head. The scales of the body are of moderate size, there being eighty-five rows and some small ones between the gill-opening and caudal fin, on which the scales terminate by an obtusely oval outline, and cover the central rays more than half-way. The lateral line, with the exception of a short inclination at its commencement, keeps a perfectly straight course a little above mid-height from the gill-opening to the end of the scales. The texture of the scales is thin and their form suborbicular. The basal half is divided by a notch into two rounded lobes, and shows no other impressions than the very fine concentric lines of structure. The uncovered portion is marked by about twenty-six slightly divergent furrows, producing an equal number of rounded ridges which terminate on the edge in acute points.

Rays:—B. 4; D. 15; A. 11; C. 19$\frac{2}{3}$; P. 17; V. 11.

The pectoral is small and situated low down; it is composed of seventeen rays and a short incumbent one, and there is a long pointed scale beneath it. The acute point of the fin reaches nearly half-way from the gill-opening to the ventrals. The dorsal fin commences exactly midway between the mouth and base of the central caudal rays: its margin is lunate with acute points, and the anterior point is thrice as high as the posterior one. The first three rays are simple without visible joints, short and closely incumbent; the rest are

more or less divided at their tips. The fourth and fifth are the tallest, and form the anterior tip of the fin. The bases of the rays are covered by a scaly fillet, which runs to a point posteriorly and rises a little from the back. The ventrals stand opposite to the middle of the dorsal, or midway between the mouth and tips of the central caudal rays. There are eleven rays, the outer one being strong, flat and bony, but divided at the tip, the others becoming gradually smaller as they are more and more interior. There is a long acute scale above the fin, and a scaly plate between the fins. The anal is small, with a wide notch in its edge, and is composed of eleven rays, including three short, graduated, incumbent ones. A scaly fillet rising obliquely from the base of the anterior rays nearly covers the posterior half of the fin. The caudal fin is very deeply forked, its acute and widely separated lobes being five times the length of the central rays. The divergence of the points exceeds the height of the body, and nearly equals the distance between the tips of the dorsal and ventrals; it consists of nineteen rays, with nine shorter, graduated, incumbent ones above and eight below. The exterior simple ray which reaches to the point of the lobe above and below is broad and bony, and is crossed at regular distances by oblique lines, which are nearly obsolete on the bases of the more interior branched rays, and are less conspicuous on the exterior short incumbent ones.

There are no distinct traces of colour remaining, except some dark shades along the back. The sides and belly have a bright silvery lustre, and the sides of the head a somewhat golden hue.

Dimensions.	inches.	lines.
Length from intermaxillary to tip of upper lobe of caudal	19	0
——— tips of central rays	15	1
——— base of ditto	14	6
——— beginning of anal	11	6
——— ventrals	8	0
——— dorsal	7	5
——— pectorals	3	5
——— tip of gill-cover	3	3
Length of orbit	0	11
Distance between angle of orbit and orifice of mouth	0	7
Height of body	4	0
——— dorsal fin	2	7
Length of ditto	2	2
——— pectoral rays	2	2
——— ventral rays	1	8
——— anal fin	1	5
Depth of ditto	0	9½
Length of caudal lobes	5	6
Divergence of points of ditto	5	6
Depth of caudal fork	3	6

Obs. This subgenus and many of the other species described in this paper have already been named by me in a Report on the Ichthyology of New Zealand, read at the Meeting of the British Association in June 1842, and in the Appendix to Dr. Dieffenbach's account of New Zealand.

MEGALOPS SETIPINNIS, Forster's Megalops.

Clupea setipinna, Forster, fig. 242. Banks. Biblioth. (A reference to *Clupea cyprinoides*, Brouss., is added to the fig. by Dryander.)

No. 3. Mr. Gilbert's list.

Mr. Gilbert informs us that this fish is named the "freshwater herring" by the settlers at Port Essington, and "*orroree*" by the natives. It inhabits all the freshwater streams, swamps and lakes of Cobourg Peninsula, and may be taken readily with a hook and line. In the latter end of the dry season, when the waters have become shallow, it is caught in great numbers in clap-nets by the Aborigines; and when the swamps have altogether dried up, this fish is found living in the mud at the depth of several feet, where it remains until the ponds fill again; then it reappears in multitudes and of full size, although the mud may be covered merely by a few inches of water. It is an indifferent acquisition to the table, being not only full of bones like the English herring, but soft as if putrid, however early it may be cooked after it is caught.

The Banksian library contains a pencil sketch made by Forster of a fish taken by him in a freshwater pond on the island of Tanna in August 1774, which is a tolerable representation of the form of our fish*. Broussonnet confounds Forster's fish with Bloch's *Clupea cyprinoides*, a native of the Caribbean Sea, noticing however the difference of the fin-rays in Forster's and Bloch's specimens. He mentions the habit the fish has of burying itself in the mud. The Atlantic and the Pacific species are again confounded in Schneider's posthumous edition of Bloch under the name of *Clupea thrissoides* (p. 424), and in quoting the numbers of the rays from Broussonnet, Forster's name is transposed and placed against the rays of Bloch's species. The *Megalope filamenteux* (Lacep. v. pl. 13. f. 3, Russell, 203), which is stated in the 'Règne Animal' to have sixteen rays in the dorsal, has a smaller eye with a larger space between it and the edge of the intermaxillaries, and also larger fins, especially pectorals, than *setipinnis*. Although the term *setipinnis* refers more to a generic character than to a specific distinction, I do not think myself authorized to change it.

The profile of Mr. Gilbert's specimen is a pretty regular and elegant ellipse, whose vertical diameter at the ventrals is equal to one-fourth of the axis from the snout to the extremity of the central caudal rays. The caudal is deeply forked. The length of the *head*, measured to the extreme edge of the gill-cover, is exactly equal to

* The size of the eye and shortness of the snout correspond with Mr. Gilbert's specimen, but the dorsal is placed too far forward, probably from inadvertence.

the vertical axis of the body. The belly is rounded, and not serrated like *Chatoëssus*. The *under jaw* exceeds the snout in length, so that the mouth opens obliquely upwards when the jaw is moderately depressed. The maxillary bone is large and strong, and consists of three pieces; a long and slightly arched one, which carries the teeth on its anterior edge, and receives the two shorter pieces into its posterior arc, so that the form of the whole bone is a long oval, whose tip reaches backwards beyond the middle of the eye. The intermaxillaries, maxillaries, and lower jaw are armed on their thin edges only with very narrow bands of minute teeth, which have more resemblance to the asperities of a fine file than to the pile of shorn velvet. The whole surface of the palate-bone is rough, and when examined with a lens appears like shagreen, or as if densely powdered with very fine sand.

The eye is large, and is situated the breadth of itself from the scales on the nape, and half that distance from the end of the snout, and a diameter and a half from the extreme edge of the gill-cover. It just touches the profile of the forehead, but is nearly its own height above the inferior outline of the head. The crest of the preoperculum is defined in the dried specimen by an arc of irregular pits, from whence fine furrows radiate over the broad and delicately thin limb of the bone. Similar streaks are visible on the suborbitars, and are connected with a chain of pores which surround the orbit.

The *scales* are large, there being only forty in a longitudinal row, exclusive of one or two small ones on the base of the caudal, and there are nine in a vertical row between the dorsal and ventrals. The *lateral line* runs straight along the middle of the side, and each of its scales, which are of the same size with the rest, is marked by six or seven slightly undulating and mostly forked furrows, which radiate from an irregular eminence at the back of the uncovered surface. The area of the scales resembles frosted silver with a thin, narrow margin imitating the polished metal, and yielding silvery, greenish and purplish reflexions. The top of the head and summit of the back retain a dark olive tint, which gradually fades away above the lateral line. The belly appears to have been white. The head is nacry with metallic lustre, and yields golden reflexions. The vertical fins are dark gray, thickly powdered with minute dark dots, as was the case with Forster's fish. The colours are described from the specimen after being washed and while still wet.

Rays:—1st spec.	B. 21;	D. 19;	A. 25;	V. 10;	P. 15;	C. $20\frac{4}{4}$.
2nd do.	22;	18;	25;	10;	15;	$20\frac{4}{4}$.
Forster's spec.	22;	17;	25;	10;	15;	$20\frac{5}{5}$ (Brous.)

The first specimen is the left side of a fish, and the second one the right. A difference of one ray in the branchiostegous membrane of the right and left sides of the same individual is common among the *Salmonidæ*, and it is very probable that Forster did not reckon the two very short incumbent rays at the beginning of the dorsal which I have included in my enumeration.

The dorsal, standing directly over the ventrals, commences exactly

midway between the tip of the snout and base of the anal; its first four rays are graduated and closely incumbent on the base of the fifth, without intervening membrane. The fifth is nearly as long as the sixth and seventh, the more posterior ones again decrease in length till the sixteenth, but the seventeenth and eighteenth are a little longer, and the nineteenth is prolonged and tapers to a point, which, when turned back, falls but little short of the base of the caudal. It is about one-fourth longer than the sixth ray, is broader than the rest, and is grooved behind so as to show very clearly its binate structure: it has a short anterior branch, which is not longer than the preceding ray. The anal is placed much further back than the dorsal and has more rays, but is otherwise very similarly constructed. Its last ray resembles the last one of the dorsal in form, being forked, with the posterior portion wider, grooved and tapering, but not much prolonged beyond the preceding rays. There is a small fold of the skin above the upper ray of the ventral, producing an acute ridge about half as long as the fin. No such ridge can be perceived at the pectoral.

Dimensions.	inches.	lines.
Length from snout to tip of caudal	9	2
——————— base of caudal	7	2
——————— anus	5	0
——————— beginning of dorsal or ventrals	3	7¼
——————— edge of gill-cover	1	9
——————— nape	1	6
Diameter of eye	0	6½
Length of dorsal	1	0
Height of its sixth ray	1	5
——————— last ray	2	2
Length of anal	1	3
Height of its fifth and sixth rays	1	3
——————— last ray	0	6
Length of caudal lobes	2	2
——————— caudal central rays	0	6
——————— pectorals	1	5
——————— ventrals	1	1

Rhombus lentiginosus (*Nob.*).

Rh. lentiginosus; cum pinnis verticalibus ellipticus; pinna caudæ rhomboidali, pinnis ventralibus invicem et a pinna anali discretis; oculis approximatis sinistris; squamis apice ciliatis, singulis macula lunata verticali notatis; linea laterali super pinnam pectoralem curvata, dein recta.

Rad.—Br. 7; D. 73; A. 59; C. 15½; P. 1|11; V. 6.

No. 35. Mr. Gilbert's list.

This fish, which as far as I can ascertain is hitherto undescribed, inhabits all parts of the harbour of Port Essington, and the whole coast of Cobourg Peninsula. The Aborigines name it "wooneerung."

Its profile, excluding the vertical fins and extremely short trunk of

the tail, is an ellipse, whose axis is twice the length of its vertical diameter. The ellipse is not however quite regular, being more taper in its posterior half. This is compensated by the greater, though graduated length of the dorsal and anal rays bordering that part of the fish, so that instead of the rhomboidal outline usual in the genus, these fins produce an ellipse more regular than that of the body, and having a vertical diameter equal to the entire length from the end of the snout to the tip of the rhomboidal caudal.

The tolerably large orifice of the mouth is in the anterior apex of the ellipse, and runs backwards and downwards with a moderate curve: when it is shut, the oblique end of the lower jaw projects a little beyond the intermaxillaries. The whole edge of the lower jaw and the upper jaw near the symphysis are armed by short awl-shaped teeth set rather remotely in a single row. On the lateral parts of the upper jaw the teeth are minute, short and crowded, but also in a single row. The roof of the mouth is toothless. The perfectly smooth chevron of the vomer projects considerably, while the articular heads of the maxillaries are but just visible within the mouth.

On the lower dilated and truncated end of the left maxillary there is a small cluster of scales. The right maxillary is scaleless. Each limb of the lower jaw is traversed by two furrows divided from each other by an acute ridge, and the uppermost furrow on the coloured side is lined by a row of small ciliated scales, which do not exist on the other side.

The head is flattened on the pale side, and the nostrils of that side are much nearer the dorsal or mesial line than the left ones are. The eyes are on the left side close to each other, and not much out of the same vertical line, the upper one being but a very little posterior to the under one. The orbits are bordered posteriorly at a little distance by a line of slightly raised tubes with porous mouths, the line belonging to the under eye being a semicircular one, while the upper one encloses an acutely triangular area whose apex terminates in a slight but evident ridge, which runs to the occiput and is covered with scales like the adjoining parts. The disc of the lower limb of the preoperculum is roughened by irregular tubular elevations, covered with epidermis and a very few interspersed scales; the upper limb is smooth, the rest of the opercular pieces and the whole cheek is densely scaly. The interoperculum has an oval form, and is longer and wider than the suboperculum. The edges of all the pieces of the gill-cover are smooth. A flexible cartilaginous tip extends from the suboperculum under the operculum to the membranous edge of the gill-cover, as is usual in most acanthopterygian genera.

Rays:—Br. 7; D. 73; A. 59; P. 1|11; C. $15\frac{2}{2}$; V. 6—6.

The (left) pectoral is obliquely rounded; its second articulated ray is the longest, and but just exceeds the first and third; the under ones are regularly graduated to the lowest, which is half the length of the uppermost ones. There is a short, slender spine incumbent on the base of the upper ray. The membrane is very delicate and perfectly scaleless. The dorsal commences over the posterior nasal orifices, and the membranous edge of its first ray turns towards the

right side, and originates at the margin of the nostril. The rays between the thirty-fifth and fifty-fifth are equal to each other and longer than the rest, which shorten very gradually each way; the first being about half the length of these, and the last only about one-third of their length. The tips of ten or twelve of the most anterior rays are more tapering and their membrane more notched. A single row of scales reclines against the fore-side of each ray, on both sides of the fin. The anal* is formed like the dorsal. The trunk of the tail, included between the caudal and these fins, is very short, and consists of little more than the swelling base of the caudal. The ventrals are not connected with the anal, and are not even in the same plane with it, but are attached one on each side of the edge of the belly. The outline of the fin is rounded; all its rays are jointed, its outer one is bound down nearly to its tip; the membrane is scaleless and is notched between the rays. The caudal is rhomboidal, its central ray is the longest, and all its rays are scaly.

The scales of the head and body are of moderate size. A longitudinal line between the gill-cover and caudal contains seventy, and a vertical line at the broadest part of the fish forty-four. Each scale is bordered on its exterior tip by a small elliptical disc, which appears under the microscope to be thickly tiled with subulate teeth, the exterior ones being the largest and forming a rough fringe; next the rough disc there is a semilunate spot, which in the dried specimen contrasts strongly with the shining greenish epidermis of the rest of the exposed disc, and was most probably more gaily coloured in the recent fish. The concealed basal half of the scale shows many of the usual fan-like furrows with corresponding shallow crenatures on the margin. The lateral line is boldly curved over the pectoral fin, and perfectly straight from thence to the tip of the caudal. A curved line of similar construction proceeds from the posterior end of the cranial ridge upwards to the base of the tenth dorsal ray. All the colourless side of the specimen, posterior to the jaws, has been removed in the preparation of it.

Dimensions.	inches.	lines.
Length from tip of upper jaw to extremity of caudal	9	5
——————————— base of ditto	7	10
——————————— anus	2	0
——————————— pectoral	2	1½
——————————— ventral	1	7
——————————— anterior angle of lower eye	0	5½
——————————— upper eye	0	6
Length from tip of pectorals	1	5
——————— ventrals	0	6
——————— caudal	2	8
——————— highest dorsal or anal rays	0	10
Vertical diameter of body	3	6
Diameter of eye	0	3

* This fin has been injured in Mr. Gilbert's specimen while the fish was alive, four or five of the middle rays having been destroyed, though the membrane remains.

ECHENEIS NAUCRATES (*Linn. Auct.*), Ship-master Echeneis.

No. 7. Mr. Gilbert's list.

This species is named "munnèmullergo" by the natives of Port Essington, who take it occasionally in the harbour. Schneider's account of the fish is in many respects erroneous, the caudal fin being stated to be rounded instead of lunate on the margin, and the numbers of the rays, probably from typographical error, are wrongly noted. The Port Essington specimen agrees in every respect with one from the West Indies, preserved in the Haslar Museum. The rays are as follows:—

Br. 9—9; discal plates (1st dors.?) 24; D. 37; A. 37; C. $16\frac{5}{5}$; P. 21; V. 7.

Artedi and Cuvier mention twenty-two as the usual number of discal plates.

LXIV.—*On some new Genera of the Class* Myriapoda.

By G. NEWPORT, Esq.*

THE family *Geophilidæ* of Leach, composed of those little, gliding, wormlike Myriapodes so abundant in our gardens, and yet so imperfectly known to the scientific naturalist, includes at least two distinct genera, one of which only has hitherto been characterised. Dr. Leach himself, to whom we are indebted for the foundation of nearly all the scientific knowledge we possess of these animals, appears to have regarded one of the five native species with which he was acquainted as distinct from the others, and placed it accordingly in a division of his genus *Geophilus*, founding his divisions on the comparative length of the joints of the antennæ. These divisions, with the same distinguishing characters, have been retained by M. Gervais, who in 1837 published a monograph on the whole class, and added a third section to the genus *Geophilus*, composed of two species, one of which, *Geophilus ferrugineus*, had been described by Koch; and the other, *Geophilus maxillaris*, was then first described by M. Gervais as a new species. It is this division, added by M. Gervais, the *Geophili maxillares*, which I now propose to establish as a separate genus, under the name of *Mecistocephalus*, the characters of which, derived from the peculiarly elongated form of the head, are as distinctly marked as in any genus of this order.

In a collection of *Myriapoda*, from the magnificent cabinet of the Rev. F. W. Hope, which that gentleman many months ago, in the most handsome manner, placed entirely at my control for the purpose of describing, I discovered a third species, brought to this country by the late Rev. Lansdowne Guilding, from the island of St. Vincent, which I immediately recognized as a new genus; and on examining the unarranged specimens of *Myriapoda* in the collections of the British Museum, which the head of the zoological depart-

* From the Proceedings of the Zoological Society for Dec. 13, 1842.