vided with the external transparent membranes or eyelids, with vertical oval aperture, so frequently met with in many of the pelagic surface or medium-depth fishes.

Colour: The top of the head and back brownish-purple; cheeks, sides, and part of the belly silvery, with golden reflections; the lower part of the belly pure white. The exterior surface of the pectorals when closed are covered with a silvery integument almost up to its tip, this being caused by the external portions of the rays being so covered; when spread the intervening membrane is very dark-brown. The whole of the interior surface of the pectorals is uniformly a very dark brown, almost black. Ventral fins uniform dark-brown, almost black. Dorsal and anal fins immaculate. Upper and lower limbs of caudal brown, central portion immaculate.

The pectoral fins of *speculiger* have "an oblique white band across its lower half" and "a broad whitish edge," whilst its "ventrals are white, the middle rays greyish."

	In.
Total length (snout to "root of tail" end of body, along median line thereof at caudal)	7·7
Length of head	1·4
Greatest depth of body	1·15
Greatest diameter of eye	0·55
Greatest height of dorsal	0·7
Greatest height of anal	0·65
Length of dorsal	1·22
Length of anal	1·15
Greatest length of pectorals	5·7
Greatest length of ventrals	2·55
Distance from anterior margin of orbit to tip of snout (end of chin)	0·275
Length of lower limb of caudal	2·2
Length of upper limb of caudal	1·6

Art. X.—*Notes on Parore (the Mangrove Fish).*

By F. E. Clarke.

[*Read before the Wellington Philosophical Society, 14th March, 1899.*]

Plate VII.

On Wednesday, the 9th August, 1896, there was brought to me by Mr. Busche, one of the fishermen then carrying on his calling at Moturoa, a fish which he did not know. This, on first seeing, I apprehended was one of those referred to by

Sir J. Hector (Trans. N.Z. Inst., vol. vii., p. 245) as the "parore." Subsequent examination disclosed that it was a *Girella*, not *simplex*, on account of its different scale enumeration, specially marked colouration, proportions, and its teeth being all tricuspid. I then made my coloured drawing, and prepared a very full description, as, though in some particulars it resembled *simplex*, in others it does *tricuspidata*, and in colouration *Tephrœops zebra*—which, according to Günther's Catalogue, is known from a drawing only, and is attributed to King George's Sound (West Australia).

I was much pleased, on visiting the waters of the far north of this Island lately, to find that my specimen was the parore, a fish excessively plentiful on the water-covered mangrove-flats and generally about the harbours, it being a great nuisance to the mullet-fishermen on account of its unwittingly occupying net-space which they consider should properly belong to the more valuable fish they seek to capture, and, moreover, being a very painful fish to handle in taking out of the mesh, as it has stout and sharp dorsal spines which it knows how to use. As I also found out, they occasionally play on the surface, when in a shoal, somewhat after a method also followed by the kanae, and therefore in the early morning, or just at dusk, deceive the netter, who encloses his fish under the impression that he has successfully surrounded kanae, instead of their (so-called) "lovely sweet-briars" (a nickname given them, I apprehend, from an equal or greater facility for affording their victims acquaintance with their prickles).

As the tide rises over the mangrove-flats you may see these fish feeding in hundreds at times, frequently in such shallow water that when scraping the confervoid or diatomaceous growths from the bottom or from the tougher weeds, small mangrove-shoots, &c., which are covered with the same, and feeding head downwards, the tails of dozens will simultaneously appear out of the water with a very comical effect. They take the tips of the stronger seaweeds, small kelps, &c., into their mouths, and then, backing, strip the vegetable, &c., growths therefrom. This they do both off the more exposed shores as well as over the mangrove-flats, &c. I never could get them to take a bait, as might be expected from their feeding habits; nor did I ever hear of them being taken on a line, though I have taken, and seen taken, in Sydney Harbour the so-called "black-perch" (*Girellæ simplex* and *tricuspidata*), but the mussel bait used had always to be "masked" with a piece of fine seaweed or *Zostera*. The peculiar "stripping" feeding habit they have, as described, is also common to the kanae (*Mugil perusii*, &c.) frequenting the same waters. I have known of as many as fifty dozen of

the parore captured in one haul of the long mullet-net, but the fishermen, generally without exception, throw them back into the water as soon as taken out of the net. It is a fish of very great vitality, living for some considerable time out of the water. Its flesh, though not rich, is very fair food.

Fam. SPARIDÆ.

Group CANTHARINA.

Genus GIRELLA.

Girella multilineata, sp. nov.

D., 15 + 1 simple + 11 branched (last ray double); P., 1 short spine + 1 simple + 11 branched + 3 feeble simple rays; V., 1 + 5; A., 3 spinous + 1 simple + 11 branched (last double); C., 16; B.R., 6, the first very short and feeble.

Head is to body and tail (total length) as 5 is to 22; head is to body (to base of caudal) a trifle more than as 1 is to 4.

Depth is to total length as $5\frac{1}{2}$ is to $17\frac{1}{3}$; depth is to body to base of caudal as 1 is to 3.

Scales: L.T. ($\frac{12}{20}$ to where they become buried in the epidermis when the lower part of belly is approached), $\frac{12}{25}$ dorsal-fin base to median line of ventral surface. L.L., 53. Small scales on extreme upper angle of operculum. None on sub-, pre-, or inter-opercula. A patch of small scales behind the eyes, and from thence extending down on to the lower part of cheeks. Nose, top of head, round top of eyes in front, and under eyes scaleless and soft-skinned.

Nostrils double, small, anterior, circular, with low surrounding skinny wall, slightly higher in posterior part. Posterior nostril oval, a little larger, no appendage. A low scaly sheath follows foot of posterior portion of spinal part of dorsal, and runs also partly along foot of branched portion. Branched rays of dorsal and anal comparatively slender.

The scales on the belly, from throat to anal orifice, are subcutaneous. Scales moderate in size on sides; small on back and belly. They are very tightly affixed, and scale-pockets nearly cover them, making scale-markings but indistinct when fish is first out of the water. They are of slight though tough texture and finely ctenoid. The scaling continues well on to base of caudal fin and membrane thereof, also on to base of anal.

Caudal fin is broad and large, slightly falcate at tips. Second and third spines of anal fin very strong, first much slighter. Dorsal spines stout and strong. Pectorals small, narrow, and rather slight, with slender rays; the three lowest

are simple, but short and very feeble. Ventral fin strong. Upper axillæ of pectorals provided with small, short, flat appendage.

Double row of broad, imbricate, tricuspid teeth along the edges of the upper and lower mandibles, behind which is a "trenched" toothless groove or space, and then the jaws are armed with short, small, flattened teeth in broad band, with points in three very fine cusps but little developed. The anterior edges of palatines, though not armed with distinct teeth, are developed into a certain amount of prominence and density, giving the approximation of a toothed edge. No canines, no teeth on vomer. Tongue very short, broad, and soft, and palatal curtain very pronounced.

Diameter of eye is contained nearly six times in length of head, also two and a half times in distance from posterior margin of preoperculum to extreme angle of gill-cover. The horizontal limb of preoperculum nearly same length as vertical, and they form almost a rectangle. Sub- and inter-opercula narrow. Projections of the principal frontal bones over the eyes are well padded with flesh, which; with a prominence of the bones below the eyes, causes a groove or depression running from the eye towards and under the nostrils. The cheeks and opercula are flattened.

The ninth and fifteenth rays of the spinous portion of dorsal are the highest, and length of either is contained exactly five times in the length of base of dorsal, or twice in basal length of anal. The rays gradually increase to this ninth ray, then decrease to the twelfth, then again increase to the last spine, which equals length of ninth. The first three rays of soft part of dorsal equal the length of the ninth or fifteenth rays of spinous. Extreme height of anal fin is much greater than dorsal, and slightly exceeds distance from posterior margin of orbit to extreme angle of gill-opening, or equals vertical depth of body under end of dorsal.

The height of pectorals is contained exactly three times in length of base of dorsal. The distance from snout to orbit is twice the diameter of eye (not orbit). The average breadth of larger scales is about one and three-quarter times the diameter of orbit. Top of head rounded between eyes and over nose. Distance between orbits about two and a quarter times diameter of orbit. Distance from anterior margin of orbit to tip of snout is a little more than one and three-quarter times the diameter of orbit. Distance from orbit to angle of jaws slightly exceeds one and a quarter times the diameter of orbit. Distance from upper angle of preoperculum to orbit equals diameter of orbit; from lower angle equals two diameters. Diameter of orbit contained three and one-fifth times in distance from anterior edge of orbit to extreme free angle

of gill-opening. Distance between eyes twice and a half in length of head. Diameter of orbit six times in length of head.

The jaws are feeble, mouth being capable of very little protrusion, dorsal terminates the longitudinal diameter of pupil of eye posterior to the vertical from termination of anal fin. Vertical of origin of anal a trifle in advance of the last spinous ray of dorsal. Ventrals commence in vertical with fourth spinous ray of dorsal.

The whole body is plump and robust, though the sides towards the tail-end are somewhat flattened, and the fish is a very full-blooded one.

Gill-rakers very fine and numerous. Gill-arches 4, with three long openings between first, second, and third, the opening behind the fourth being short, equalling in length diameter of orbit only.

The tricuspid teeth in the two rows in front of jaws are not recuperated from the row behind the groove. When destroyed they are renovated by new ones, which grow up from their bases again. The profile length of upper mandible about equals diameter of orbit.

The stomach is large and siphon-shaped; pyloric appendages very numerous, but none bi- or tri-fid. Peritoneum and lining of throat and mouth of a dense-black colour. Stomach filled with chewed remains of *Zostera* or some similar soft weed, and the intestines full of same digested. It may be remarked that the stomach and bowels of these fish are always excessively gorged with food and food remnants.

Colour: Cheeks and nose golden-green, also tail at base of caudal fin. Top of head and back olive-brown; sides greyish silvery, with pinkish reflections. Throat and belly white. Dorsal fin transparent brown, mottled on rays with darker, in extension of side-bars. Tail brown, tipped with darker, with rosy reflections. Pectorals transparent light-brown. Ventrals brownish, shading to white at axillæ. Anal clear brown, mottled and tipped with darker. Eye, dark golden-brown iris; pupil black, surrounded with golden margin. Lips light pinkish-brown. Eleven narrow rich dark-brown bars descend from the back, the series always commencing from beginning of dorsal and extending in a partially diagonal direction down back and sides; the tenth bar ends near termination of dorsal; the eleventh a proportionate distance from last bar in rear of dorsal. They are not quite symmetrically defined on each side of the body, as they originate from the alternate ray of dorsal from that which is the point of origination on the reverse side. The width covered by each bar roughly approximates to the vertical exposed breadth of a scale.

	In.
Total length (inclusive of caudal)	19·2
Length to base of caudal	13·3
Greatest depth	5·1
Length of head	3·85
Greatest diameter of orbit	0·7
Greatest diameter of eye	0·65
Direct length base of dorsal fin	8·2
Direct length base of anal fin	3·3
Extreme height of pectoral	2·6
Extreme height of ventral	2·45
Heights of ninth and fifteenth dorsal spines	1·6
Greatest expanded width of caudal	6·4
Width narrowest part of body near tail	2·0

ART. XI.—*Formaline in Museology.*

By Dr. G. THILENIUS, Lecturer on Anatomy to the University of Strasburg.

Communicated by Sir J. Hector.

[*Read before the Wellington Philosophical Society, 20th September, 1898.*]

THE liquid called "formaline," or "formol," represents a 40-per-cent. solution of formaldehyde in distilled water, and is likely to replace spirits of wine in many cases, and to improve the conditions and general aspect of preserved specimens. On its introduction into museology formaline was used indiscriminately, and in the same way as spirits, the result, of course, being, to a certain extent, the discrediting of the liquid. By degrees the limits of its use, the proper concentration, and its drawbacks have been observed, and in the following lines I give a short notice of my six years' experience.

VERTEBRATES.

Mammals, birds, and reptiles ought to be preserved in spirits in the usual way. Formaline does not penetrate the skin sufficiently, and, even after opening the abdomen, it is not possible to get a satisfactory result. Especially if the specimen is intended for anatomical dissection formaline must be avoided, because it entirely prevents the maceration of the skeleton. The only exception to this rule is that of a rare small mammal or bird, which, being badly shot, or spoiled, has to be preserved, skinning not being possible. In this case, after opening the abdomen and removing the intestines—except ovaries and testicles—a ball of cotton soaked in con-