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NEW SPECIES OF PHILIPPINE FISHES.

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The present paper is based on the study of about ten thousand specimens of fishes collected in the Philippine Islands by the author and his native assistants, C. Canonizado and Datto Alli, during 1907 and 1908. The collections were made in almost all the important islands of the Archipelago. All of the specimens were taken to Stanford University and compared with the material in the collection of that institution which included a number of types. All types mentioned in this paper are in the ichthyological collection, Bureau of Science, Manila, P. I.

I take this opportunity to thank President David Starr Jordan for valuable suggestions in regard to the work.

Family MURÆNIDÆ. The Morays.

Gymnothorax indong¹ Seale, sp. nov. [Indong-indong.]

² Head 3.50 in body to anal pore; tail is longer than the body by a distance equal to about two-thirds of head; eye 2 in snout; snout 5 in head; interorbital space equal to eye. Mouth large, the jaws not closing completely, mandible 1.70 in head; gape 2. Teeth strong and saber-like,

¹ Indong is a Moro name for Morays.

² All comparative measurements in this paper are taken in the length from tip of snout to end of last caudal vertebra, and the head is measured to posterior edge of hard operculum and excluding the membraneous opercular flap. Scale count is to end of caudal vertebra, the vertical series being counted at origin of anal, unless otherwise stated.

in a single series in each jaw. Three large median canines anteriorly, no teeth on shafts of vomer except a few small ones at its extreme posterior end. Posterior nostrils consisting of a large round pore situated just above the anterior half of iris, anterior nostrils consisting of two tubes at extremity of snout, their length about two-thirds of eye. Between the nostrils, the skin on sides of snout has a loose fold capable of dilatation. Dorsal fin is low, beginning slightly anterior to gill opening, which is of moderate size, being about equal to eye. Origin of anal fin at anal pore, fins are low, the dorsal the highest, its longest rays being almost equal to snout. The fins are continuous around caudal.

Color in life, brown with irregular-shaped black blotches, which assume the form of irregular, broken vertical bands slightly less than interspaces. Head has a distinct elongate white mark between eye and gape of mouth, this white stripe penetrates the lower portion of a large blackish blotch bordering the posterior portion of eye; another short white stripe from anterior border of eye to middle of maxillary. A black blotch in angle of jaws which is bordered anteriorly by an elongate white stripe on the mandible. A dusky area crossing near the posterior portion of lower jaws, this area with a white median line. Throat crossed with narrow white lines, pores of jaws white, the fins are barred with black.

Color in alcohol similar but slightly faded.

Type is No. 4445, a specimen from Zamboanga, Mindanao, P. I., 16 June, 1908. Length, 385 millimeters.

***Gymnothorax samalensis* Seale, sp. nov.**

Head 3.80 in body; body is shorter than tail by a distance equal to under jaw; gape of mouth 2.70 in head; snout 6.75 in head; eye 1.25 in snout; interorbital space, measured to include soft portion, is equal to eye; posterior nostrils round, pore-like; openings of nostril just above eye; anterior nostrils consisting of two rather long tubes at end of snout, their length about two-thirds of eye. Teeth of upper jaw in a single series except in front where there are several enlarged canines, four enlarged depressible ones in the median line; vomerine series single, about 10 in number, short and rounded. Teeth on lower jaw in a single series except in front, where there are about five or six enlarged depressible canines on each side. Origin of dorsal, a distance equal to length of snout in front of gill openings. Origin of anal directly back of anal pore, the fins of moderate length.

Color in alcohol brownish with indistinct darker cross-bands, more numerous and distinct on posterior of tail, almost obliterated anteriorly; belly and throat yellowish. A distinct white blotch on lower jaw just in front of angle. A white spot on upper jaw below eye and another halfway between eye and tip of snout; these form rings around the mucous pores. Three similar white spots on lower jaw. Top of head and snout

brown, the color fusing gradually with the yellowish of the under jaw and throat.

Type is No. 3781 from Samal Island, Gulf of Davao, Mindanao, P. I., 1 May, 1908. Length, 220 millimeters.

Family OPHICHTHYIDÆ.

Jenkinsella oliveri Seale, sp. nov.

Head 5.10 in body; body 1.80 in tail; gape 1.75 in head; snout 5.75 in head; eye 1.75 in snout; interorbital space about equal to eye; upper jaw projecting beyond lower by a distance equal to eye; upper lip well fringed; mouth large; mandible 2.50 in head. Teeth in lower jaw in two rows, short sharp teeth, no canines. Teeth of upper jaw in two rows on sides, the inner row being larger and depressible; vomerine teeth in two series, uniting posteriorly into one; a patch of 8 or 10 sharp teeth at tip of upper jaw; no canines; posterior nostrils with an inflated membranous opening more or less fringed. Their location midway between eye and anterior nostril; the anterior nostril is tube-shaped, near end of snout, length about two-thirds length of eye. Several distinct pores on head, one just above and in front of eye, another on middle posterior portion of interorbital space. Origin of dorsal fin about the length of pectorals in front of the gill openings and extending to tip of caudal, its longest rays slightly more than half depth of body, pectorals 3.30 in head. Origin of anal directly behind anal pore, it extends to tip of caudal, no caudal fin.

Color, light yellowish brown above, yellow below median line, belly whitish, sides finely punctulate with minute black specks, throat white, top of head brown, these two colors uniting in a sharp line on the middle of side of head, extending from angle of fins to gill openings; tip of snout and anterior portion of dorsal darker.

Type is No. 4299 from Zamboanga, Mindanao, P. I., 2 June, 1908: Length, 360 millimeters.

Moringua cagayana Seale, sp. nov.

Head 8.75 in body to anal opening, the caudal being just one-third of total length from tip of snout to tip of caudal; angle of mouth 4.50 in head; snout 8; eye 2.25 in snout; interorbital 1.10 in snout; pectorals equal to distance from tip of snout to posterior of eye. Origin of dorsal fin posterior to vent by a distance equal to the length from tip of snout to tip of pectorals, its origin being over the anterior third of anal, the fin is then high and distinct for about this same distance when it becomes atrophied, reappearing again near tip of tail to form part of the paddle-shaped end of caudal. The anal fin is similar to dorsal but its origin is nearer the anal pore. Both the anal and dorsal widen at the end of tail and unite with caudal forming a wide paddle or fin-like end to the

fish, the caudal is lunate, its length equal to upper jaw. A single row of rather short strong canine teeth in each jaw and irregular double row of the same kind down shaft of the vomer. Posterior nostril consisting of a large round open pore with a membrane on its anterior margin. Anterior nostril consisting of a small round pore with a membranous cover formed something like lips to the small central opening, each nostril on a line in front of eye. Buccal cavity large and baggy.

Color yellow brown, the posterior of tail and the head brown, a black line along the entire dorsal surface, angle of jaws white, fins brown except pectorals which are yellowish.

Type is No. 1621 caught in the sea near Cagayan, Mindanao, 13 September, 1907.

Probably the form most nearly related to this species is *M. bicolor*.

Family CYPRINIDÆ. The Minnows.

Barbus ivis Seale, sp. nov. Plate I. [Ivis.]

Head without opercular flap 3.75; depth 2.55; dorsal 10; anal II, 6 (not counting branch on last ray) scales 4-23-3, the lateral line curves down to a little below median line of sides, then up again to middle of caudal peduncle; eye 4.70 in head; snout 3.50; interorbital space 2.35; maxillary 3.10 in head, its end under anterior margin of eye. Two maxillary barbules on each side, the lower one the longest, its tip reaching to angle of preopercle; mandible 2.55; pectorals 1.15; ventrals 1.45.

Body is oblong compressed, the upper outline between the spinous dorsal and head is distinctly gibbous; the lower outline from anal to tip of snout is a low even curve, the profile of head from nape to tip of snout is practically straight. The greatest depth of the body is at origin of ventrals. Length of caudal peduncle 1.50 in head, its least depth 1.75; its median width 6.50. The upper portion of head is somewhat rounded, the interorbital space is very slightly convex. Snout is rounded at tip, its median width is slightly greater than its length; anterior nostril with a funnel-like membrane. Greatest depth of head 1.35 in its length, the greatest width 1.55. Eyes small, less than snout. Mouth small, the upper lip closing over the lower. No teeth except pharyngeals, which are 5-3-2, larger ones slightly hooked with a small shoulder. Gill openings restricted, ending on a line with angle of preopercle.

Gill rakers rather short, shaped something like the pharyngeal teeth with the points exaggerated, 7 on lower limb, the longest 3 in pupil.

Body entirely covered with large smooth scales which have five or six striate lines in the centers. Dorsal and anal with high scaly sheaths, base of caudal scaled, ventrals with a long axillary scale, pectorals without axillary scale. Head entirely naked.

Origin of spinous dorsal midway between end of last caudal vertebra and nostril, the third ray of which is large and modified, the longest being 1.14 in head, its hard portion is distinctly serrated except on its lower third; posterior ray 1.50 in modified ray; base of anal 1.55 in head. Origin of anal is slightly nearer origin of ventrals than to end of caudal vertebra; its longest ray 1.55 in head, its base 2.75, its last ray 3; ventral fins are midway between anal and origin of pectorals, their tip not reaching to anal pore; pectorals low on body. Caudal deeply emarginate, its length a fifth greater than head.

Color in life is grayish above, the margins of the scales darker, shaded with greenish, yellowish on sides, shading into pinkish below. From 3 to 5 black spots along the median area of sides, all specimens have at least an indication of a dusky stripe connecting these spots, some show the stripe very distinctly; a slight dusky blotch just below origin of dorsal, none at origin of anal. The head has some bronzy markings on opercles and in front of eye. Dorsal grayish with dusky tip, caudal pinkish with dusky tip, the lower lobe bright red, anal and ventrals bright red with slightly dusky tips. Pectorals bright red.

Color in alcohol is similar except the dark markings show more distinctly. The lower half of fish is yellowish white, the fins are yellowish, dorsal, caudal, and anal with dusky tips.

Ninety specimens from a small stream near the town of Balabac, Balabac Island. Type is No. 5233, Balabac Island, P. I., taken by the author 11 August, 1908. Length, 130 millimeters.

Family BELONIDÆ. The Gars.

Oxyporhamphus brevis Seale, sp. nov. Plate II. (Bamban).

Head 4.40; depth 8.50; dorsal 15; anal 15; scales are very deciduous, about 50 from axil of pectoral to end of caudal vertebra; eye 3.75 in head; snout 3.20, the width of the free triangular portion of upper jaw considerably greater than its length; maxillary equal to eye; mandible 1.75 in head, the beak on under jaw scarcely developed, its length beyond the end of upper jaw equal to pupil of eye; interorbital space equal to eye; pectorals 1.75 in head; ventrals 2.45.

Body elongate, compressed, length of caudal peduncle 3 in head, its least depth 1.50 in its length, its width 3.

Upper profile of head and snout a low even curve; interorbital space like nuchal region very slightly convex, a wide distinct ridge down the middle of interorbital space; greatest width of head 2.50 in its length, its greatest depth 2.10. The most characteristic thing about the head is the extremely short beak of under jaw which while it varies slightly, in most specimens and in type is nearly equal to width of pupil of eye or 2.50 in snout. Eyes of moderate size, impinging slightly on upper profile; mouth large, teeth in villiform bands in jaws, none on vomer,

palatine, or tongue. Gill openings carried forward to below anterior margin of eye. Gill rakers short, wide at base, sharp, pointed, and denticulate on their inner surface, about 20 on lower limb, the longest less than pupil.

Entire body covered with large, smooth, thin deciduous scales; head naked; vertical fins scaled. Origin of dorsal is just one-third distance between end of caudal vertebra and lower axil of pectorals, its longest ray 1.90 in head. Origin of anal is under third ray of dorsal, its longest ray 3.50 in head. Origin of anal is slightly nearer the origin of ventrals than to end of last caudal vertebra. Origin of the ventrals is midway between end of last caudal vertebra and angle of preopercle. Caudal forked, upper lobe scarcely equal to head, lower lobe considerably longer.

Color in life greenish above, silvery and white below, a distinct silvery band on side, bordered above by a narrow greenish band, fins white, the dorsal, anal, and caudal distinctly tipped with jet black.

Color in alcohol dull yellowish, green above, margins of scales darker. Sides with silvery bands which have a bluish green upper margin, yellowish white below. Cheeks silvery; tip of under jaw, snout and top of head more or less dusky; eyes golden, with dusky blotch above; dorsal, caudal, and anal yellowish, broadly tipped with jet black; pectorals and ventrals yellowish, a black spot on upper base and axil of pectorals.

Fourteen specimens, type is No. 5301 from Paawacan, Palawan Island, P. I., 14 August, 1908. Length, 145 millimeters.

Family ATHERINIDÆ. Silversides.

Atherina regina Seale, sp. nov. Plate III, fig. 1. (Gunoc.)

Head 3.50; depth 4.95; dorsal VI-I, 10; anal I, 10; scales 36, counting from the enlarged scale directly above axil of pectoral, 7 in vertical series; eye 2.25 in head; snout 4; interorbital space 2.75, being less than eye; maxillary 2.50; mandible 2; pectoral 1.25; ventrals 1.60; depth of caudal peduncle 3.45.

Body elongate, moderately compressed, greatest depth at origin of ventral fins. Caudal peduncle compressed, its least depth equal to twice its length.

Head heavy and rather blunt, its greatest width equal to its greatest depth, the lower portion of head strongly compressed. Interorbital space is slightly concave, caused by the prominence of the superocular ridges, these bones form distinct ridges on upper lateral part of snout. Top of snout flat except the small hump anteriorly caused by the processes of the maxillary, the anterior margin of the snout is an even concave curve, with a point on each side of processes; width of snout considerably greater than its length. Eye large; mouth large, oblique, the lower jaw slightly protruding. Maxillary narrow, ending on a line with the front margin of iris. Mandible ending under anterior third of pupil.

Preorbital with two or more distinct pores. Teeth in villiform bands in jaws, a small patch of villiform teeth on vomer, back of tongue, and pterygoids; the type specimen has the vomer broken but the two cotypes show teeth on the vomer; no teeth on palatine. Gill openings wide. Gill rakers long and slender, twenty-five or more on lower arch. Pseudo-branchia large.

Scales large and smooth, their margins rounded and scarcely broken, the scaling not extending on the head except on the occiput, no scales on the fins except on base of caudal, but there is a distinct sheath of scales for the soft dorsal and anal. Top and sides of head well furnished with pores. A very large one just above opercles. There are sixteen scales in front of dorsal fin, ten scales between the origin of the two dorsals, and six scales along the base of the soft dorsal.

The origin of the spinous dorsal is midway between end of caudal vertebra and the anterior margin of eye, its longest spine is equal to orbit, the spines are slender and pungent. Soft dorsal on a line with origin of anal, and much nearer tip of ventrals, or to spinous dorsal, than to caudal; the second ray is longest being 1.85 in head; anal rays similar to soft dorsal, the longest being 2 in head. Origin of ventrals midway between end of maxillary and origin of anal. The anal pore is located between the posterior third of the ventral fins. Caudal rather large and deeply emarginate, the lower lobe being at least 1.40 in head. Pectorals are above the median line of body.

Color in alcohol is straw-yellow all the scales on upper half of body more or less punctulate with fine black or bluish dots. These black dots very thick on the middle of the three rows of scales on the back forming a median dark line on its either side. A distinct silvery band occupies the entire median row of scales on the side, the upper margin of this band is of a dull lead color, a double row of small black dots separating the two colors; there is an additional row of very minute black dots on the row of scales below the silvery stripe. The lower third of body is unmarked. Snout and rim of lower jaw washed with dusky, a distinct dusky spot at upper anterior margin of opercle directly behind eye, a dusky spot at upper axil of pectorals and a dusky bar across its inner base; a dusky area just over and impinging on eye. Dorsal, anal, and ventral fins uniform yellowish white. Pectoral with a distinct dusky blotch occupying an area slightly greater than eye at the beginning of the posterior third of fin; the tip of pectorals and the basal third of most of the rays white. Caudal slightly washed with dusky, two more or less distinct dusky blotches on its base.

The type is No. 2082, in the collection of the section of fisheries, Bureau of Science, Manila. It was secured by the writer at Culion Island, P. I., 7 October, 1907. Length of type, 80 millimeters. Two additional specimens No. 2083 were secured the following day at the neighboring island of Busuanga.

This species is related to *A. pinguis* Lacépède, which is no doubt the *A. lacunosa* Forster from which it differs in the fewer scales, location of fins, size of eye and absence of teeth on the palatines.

It somewhat resembles *A. morrisi* Jordan & Starks but their fish has 14 anal rays and scales 45 and the origin of the anal is in advance of the soft dorsal.

A. tsuruga Jordan & Snyder is a long panetela-shaped fish whose chief resemblance to the present species consists in its dusky spot on the pectorals; in other respects it is quite different. *A. lacunosa* Bleeker has no black spot on pectorals. *A. insila* Jordan & Seale has a large number of scales and is a quite differently shaped fish. I have compared this type with all of the above species now in the Stanford University museum and find it quite distinct.

Atherina balabacensis Seale, sp. nov. Plate III, fig. 2. (Gunoc.)

Head 3.75; depth 4.10; dorsal VI-I, 10; anal I, 12; scales 36; six in vertical series; eye 2.10 in head; snout 5; interorbital space 2.50, being less than eye; maxillary 2.50; mandible 2; pectorals 1.10; ventrals 1.80; depth of caudal peduncle 3.

Body elongate, moderately compressed, rather heavy and deep, its greatest depth at origin of spinous dorsal; the back is slightly but evenly curved; caudal peduncle compressed, its least depth 1.50 in its length, measured from end of caudal vertebra to posterior axil of anal.

Head rather heavy and deep, its depth being considerably greater than its greatest width, the lower profile of head is an even rounded curve while the upper profile from the occiput is almost straight. The lower jaw is the longest, forming the anterior point of head. The interorbital space is almost flat and has three short low ridges. Width of snout equal to its depth at its median point. Top of snout flat except for the small hump caused by the processes of the maxillary. Mouth large, oblique, the lower jaw protruding. Maxillary narrow, ending on a line with anterior margin of orbit. Mandible ending under the anterior margin of pupil. Preorbital with about four large pores or mucous cavities which give this bone a sculptured appearance. Villiform teeth in jaws, vomer, pterygoids, and back of tongue; no teeth on palatine. Gill openings large and carried forward to below anterior margin of iris. Gill rakers long, slender, and numerous. Pseudobranchia large, longer than the longest gill filaments. Isthmus long and narrow, a distinct groove on its lower surface.

Scales large and smooth, their margins not rough nor denticulate. Head without scales, fins unscaled, but with a scaly sheath to the soft dorsal and anal. Head is well furnished with numerous pores and canals. Fifteen scales in front of dorsal fin; nine scales between the margin of the two dorsals, and six scales along the base of the soft dorsal.

The origin of the spinous dorsal is midway between end of caudal

vertebra and the posterior margin of pupil, its longest spine is equal to orbit, the spines are slender and pungent. Origin of soft dorsal on a line with the origin of the fourth ray of anal, and much nearer spinous dorsal and tip of ventrals than to base of caudal, the second ray is longest being 1.80 in head. Anal similar to soft dorsal, its longest ray 1.50 in head. Origin of ventrals midway between origin of anal and a line with anterior margin of pupil. Anal pore between and at beginning of posterior half of ventrals. Caudal deeply emarginate, its lower lobe at least 1.20 in head. Pectorals are above the median line of body.

Color in alcohol straw-yellow, a slight greenish wash above. The scales above lateral line with fine dark punctulations. A dusky line along the middle of back from head to caudal, some darker shadings at the origin of the two dorsal fins, a dusky line from origin of anal fin to caudal. A bright silvery stripe occupies the middle third of the median line of scales, a narrow lead-colored margin along the upper margin of this silvery stripe, the row of scales below this silvery stripe has a row of very small black dots along its middle, there is also an indistinct incomplete row of dots on the next row of scales below. Base of pectorals with a dusky band and dusky spot in axil. A dusky blotch on upper part of eye. Lower jaw, top of head, and snout, shaded with dusky. No dusky spot on pectoral rays. Fins all grayish white, the caudal with a slight dusky wash, but without dusky spots at base.

The type is No. 4983 from Balabac Island, P. I. Taken by the writer 1 August, 1908, near the mouth of a small stream. Length of type, 10 millimeters. Eight cotypes were secured from the same locality, Nos. 4983, 5308 and 5229. Additional specimens of this species were secured from the following places: 1241 Samar Island, 1295 Cebu, Cebu Island, 1370 Siquijor Island, 1447, 1457, 1495, 1658 and 1659 Cagayan, Mindanao Island, 1981 and 5475 Puerto Princesa, Palawan Island, 2079 Culion Island, 4866 Samal Island, Mindanao. Thirty-two specimens in all including types.

This species but slightly resembles *A. forskalii* (Rupp.) being a deeper, heavier fish with a caudal peduncle not nearly so deep and has fewer scales and anal rays. Evermann and Seale³ refer specimens from Bacon and Bulan to *A. forskalii* which probably belong to this species. This species somewhat resembles *A. duodecimalis* Bleek., but the shape and color markings are different, the rows of black dots on the sides being always present in our specimens. This species somewhat resembles *A. lineata* Gunther but the latter species has teeth on the palatines, a smaller eye, and different location of fins. *A. lineata* also has the pectoral slightly washed with dusky over its entire surface and the rows of dots are larger and more distinct.

³ Bull. Bur. Fish. (1906).

Family MUGILIDÆ. The Mulletts.

Mugil joloensis Seale, sp. nov. Plate IV.* (Banak.)

Head 4.30; depth 3.60; dorsal IV, I, 7; anal I, 9; scales 33, 10 in vertical series; eye 3.30 in head; snout 4.10; interorbital space 1.95; maxillary exposed at tip; mandible 2.75; pectorals equal to head; ventrals 1.30; least depth of caudal peduncle 2.

Body moderately elongate, compressed, the greatest depth being in middle of body, the depth of the caudal peduncle is scarcely less than its length (measured to axil of dorsal). The profile from origin of spinous dorsal to snout is almost a straight line.

Interorbital space is moderately convex. Top of snout almost flat. Greatest width of head 1.45 in its depth. Depth of head at middle of eye 1.75 in length. Snout short and blunt. The preorbital has a very deep notch, its depth being greater than width of pupil. The upper lip is very thick, with a fold, and fringed with a row of papillæ, an additional row of papillæ on the lip just above the fold, an additional fringed fold at each corner of the mouth; under lip with moderately broad membrane. The nostrils are situated directly above the posterior margin of preorbital notch. Teeth on tongue, vomer, and palatine, none in jaws. Eye with but the slightest indication of adipose eyelid, which is present as a narrow rim to orbit. Snout is much broader than long, it is fully tipped by the broad maxillary. There are four soft differentiated areas between the scales on preopercle. Gill openings large being carried forward to under pupil. Gill rakers numerous slender, longest about equal to pupil. Pseudobranchia present.

Body and head covered with large smooth scales which are slightly ctenoid at margin. A single small ridge in center of each scale. About nineteen scales in front of dorsal fin; soft dorsal and anal scaled. Pectorals without axillary scale. An axillary scale at ventrals. Eleven rows of scales between the origin of the dorsals.

The spinous dorsal is midway between end of caudal vertebra and middle of pupil, the longest spine 1.70 in head. Origin of soft dorsal midway between end of last caudal vertebra and origin of first dorsal being over the middle of anal, its longest ray equal to longest anal ray, 1.50 in head. Origin of anal is slightly nearer end of caudal vertebra than to origin of ventrals. The ventrals are midway between anal and anterior margin of orbit. The upper portion of pectoral base is on a line with upper margin of eye. Caudal fin is rather deeply emarginate its length greater than head.

Color in alcohol silvery with wash of yellowish, grayish above. Upper third of pectorals washed with dusky; soft dorsal, anterior rays of anal, and tip of caudal also slightly washed with dusky. No stripes on body,

* In our figure the spinous dorsal and the ventrals are drawn too far forward.

except those caused by the small ridge along center of scales. A distinct black dot at axil of pectorals.

Type is No. 2379. Secured by the writer at Jolo, Jolo Island, P. I., February, 1908. Length, 125 millimeters.

This species is related to *M. labiosus* C. & V., but *M. labiosus* has "upper lip without fringe." Our species has fewer scales, and the upper third of dorsals dusky, our species has teeth on vomer and palatine.

Mugil banksi Seale, sp. nov. Plate V. (Banak.)

Head 4.50; depth 3.50; dorsal IV, 9; anal III, 9; scales 37, 10 in vertical series; eye 3.10 in head, the exposed portion 4; snout 5; interorbital space 2; maxillary is entirely hidden; mandible 9 in head; preorbital with shallow notch, its end but slightly denticulate, its width at end 1.30 in pupil; pectorals equal to head; ventrals 1.30.

Body moderately elongate and compressed, the upper and lower outlines being about evenly curved to the short blunt snout. Tip of head formed by the deep upper lip. Caudal peduncle is thick and strong, its depth 1.25 in its length measured to vertical dorsal axil.

The head from the blunt snout is rounded conical; interorbital space convex. Eye is large with the adipose lid developed as a narrow fringe to orbit and not covering more than a third of the iris before and behind. Greatest width of head 1.45 in its length being almost equal to its greatest depth, width of snout is equal to twice its length and is much more than its depth. An elongate shallow depression on upper sides of snout containing the two nostrils, the posterior one much the larger. Upper lip thick, with two distinct rows of papillæ, these becoming united into little folds near the corners of the mouth. Lower lip thin, without papillæ. No teeth in jaws or mouth. Gill openings extend forward to below posterior margin of pupil. Gill rakers are short slender and numerous. The two margins of the subopercles fitting closely below, the space between them being confined to a short narrow line anteriorly. The mandibles cover the entire chin.

Head and body including soft fins scaled. The scales of body large, smooth, thin, margined with a thin soft membrane. A short narrow groove in the center of each scale, about 20 scales in front of dorsal fin and 13 series between the origins of the two dorsals. A distinct axillary scale at pectoral and ventral. Anal with scaly sheath. Five soft differentiated areas on the margin of the preopercle between the marginal scales.

Origin of spinous dorsal midway between tip of snout and end of last caudal vertebra, length of first spine 1.50 in head; origin of soft dorsal very little nearer origin of spinous dorsal than to end of caudal vertebra, being on a line with the third anal ray, its longest ray 1.30 in head. Origin of anal slightly nearer end of caudal vertebra than to axil of ventrals. The longest ray equal to longest ray of soft dorsal, base of

fin 1.70 in head. Origin of ventrals midway between origin of anal and notch of preorbital, caudal deeply emarginate, its length considerably greater than head.

Color in life silvery with a grayish wash above. The head with bronzy reflections. A distinct black spot at upper axil of pectorals and a rather broad and distinct white bar across the base of the fin below the dark spot. A white margin to anal pore. Fins whitish, soft dorsal and caudal slightly washed with dusky on posterior third.

Color in alcohol similar to above, but the groove on middle of scale showing more distinctly above and giving the appearance of narrow stripes on center of rows of scales.

Type is No. 1412. Secured at Siquijor Island, P. I., 7 September, 1908. Length, 190 millimeters.

This species is related to *M. longimanus* but is distinguished by the fringed lip, 9 anal rays, and smaller adipose eyelid, markings, and position of fins.

Named for C. S. Banks, entomologist Biological Laboratory, Bureau of Science, Manila.

Family SPHYRÆNIDÆ. The Barracudas.

Sphyræna aureoflammea Seale, sp. nov. (Babayo.)

Head 3.10; depth 6.35; dorsal V, 10; anal 11; scales 7-83-9 (counting to end of caudal vertebra); eye 5 in head (measured to tip of upper jaw); snout 2.25; interorbital space 1.75 in eye; maxillary 2.75 in head; mandible 1.75; ventrals 3.10; pectorals 2.75.

Body elongate, cylindrical, the upper and lower outline about evenly curved, length of caudal peduncle 1.50 in head, its least depth 3 in its length.

The head is elongate, conical, its greatest depth 2.75 in its length, greatest width 3. Upper profile of head is almost straight; the interorbital space is flat, with 4 distinct ridges. The opercle ends in a single obtuse flat point. The lower angle of preopercle extends back as a large membraneous flap. The eyes are of moderate size. Snout is conical, its median width being somewhat greater than its median depth. Preorbital with a distinct oblique ridge in front of the eye. Maxillary falls short of the eye by a distance equal to pupil, the maxillary ends in a small but distinct spine. The lower jaw considerably the longer. Teeth of upper jaw consist of a single row of small teeth on sides of palatines with three enlarged canines a short distance from tip of jaw, and two enlarged canines on each side at tip of jaw, the maxillary also has a single row of small teeth. Teeth of lower jaw a single series of rather strong canines. A single large canine at symphysis. No teeth on vomer. Gill openings large, ending on a line with anterior margin of eye. Two gill rakers on lower limb, one being at the angle, these are distinct, sharp, pointed, their length 2 in pupil.

Body entirely covered with large smooth scales, about 23 in front of dorsal, and 31 between the origins of the two dorsals. The fins, except spinous dorsal, are more or less scaled. Head is naked except on nape, cheeks, and opercles; lower limb of preopercle naked, no scales on head in front of anterior margin of pupil.

Origin of spinous dorsal midway between origin of second dorsal and posterior margin of pupil, being above the middle of the ventral rays, the anterior spines longest, being equal to postocular portion of head. Origin of second dorsal considerably nearer the first dorsal than to end of caudal vertebra. Origin of anal is under the second dorsal ray and is slightly nearer end of caudal vertebra than to origin of ventrals. Base of soft dorsal slightly greater than base of anal which is 3.75 in head. The longest dorsal ray and longest anal ray about equal, 3.10 in head. Origins of ventrals midway between middle of maxillary and anal fin. Caudal deeply emarginate, the lobes 2 in head.

Color in life, above lateral line lemon-yellow, a purplish stripe from snout over interorbital space and nuchal region to near base of second dorsal, a short stripe with some yellow edgings in front of eye. A brown stripe from origin of lateral line to middle of base of caudal, another line from posterior margin of eye over base of pectorals to caudal, the area between these two lines rather a bright blue, ventral surface a pale blue. Some greenish scales with yellow margins on nuchal region, lips brown, soft dorsal with slight wash of brown, caudal yellowish brown, anal with a slight trace of pink, other fins white.

Color in alcohol dull brownish above, silvery below; two brown lines on sides; top of head and snout darker; soft dorsal and caudal grayish, pectoral more or less grayish at axil.

Five specimens. Type is No. 4138, from Zamboanga, Mindanao, 22 May, 1908. Length, 280 millimeters.

Family SYNGNATHIDÆ.

Trachyrhamphus caba ⁵ Seale, sp. nov.

Head 4 in body (measured from tip of snout to anal opening); greatest depth equal to postocular portion of head; dorsal 22, its base occupying 4 rings which are swollen, thus the base of the fin is considerably elevated above the level of the dorsal surface; body with 18 rings, tail with 33 rings. The dorsal is located on two of the tail rings and two of the body rings; anal 4; snout equal to distance from pupil of eye to posterior margin of opercle; eye 4 in head; interorbital equal to eye; pectorals 1.75 in snout; caudal 1.50 in snout, its tip rounded; length of body and head equal to 21 rings of caudal; lateral line passes to lower caudal edge which is strongly scalloped; nuchal region has a decided crest; snout strongly depressed, being in line with lower margin of body,

⁵ *Caba* is the native name for this fish.

the forehead has an abrupt curve, formed by the pronounced ocular ridges; interorbital space deeply concave; opercles with numerous fin-shaped striæ, which radiate from a single larger longitudinal ridge; ten distinct ridges in the interorbital space which unite and form one on the snout, this ridge has a few small spines; the orbital ridge is also spinate; rings of body and tail without spines; length of dorsal rays less than width of opercle.

Color brown, the three anterior caudal rings lighter, the ventral surface of body rings and opercles brown, with the yellow cross lines on their under surface, these cross lines not extending on body rings; snout brown above and white below. A brown ring near the tip, fins grayish without markings.

Type is No. 2324 from Balayan Bay, Luzon, 20 January, 1908. Length, 140 millimeters.

Family HOLOCENTRIDÆ. The Squirrel Fishes.

Myripristis schultzei Seale, sp. nov. (Baga бага.)

Head 3.10; depth 2.50; dorsal X, I, 15; anal III, 13; scales 28 to end of vertebra, 10 in vertical series; eye large, 2 in head; snout 7.50; interorbital space 3.30; maxillary 1.80, its posterior tip ending on a line with posterior margin of pupil, width of distal end 2 in eye; mandible 1.60 in head; pectorals 1.25; ventrals 1.45.

Body oblong, compressed, greatest width at origin of dorsal. Upper and lower outlines of body about equal. Length of caudal peduncle 2.50 in head, its depth 3.10. Depth of head about equal to its length, its greatest width 1.50 in its length; interorbital space flat with 4 longitudinal ridges. The anterior outline of head is bent rather abruptly down in front of eyes making a short blunt snout, the length of which is 2 in its width. The groove to receive the maxillary process ends on a line with anterior of eye. Preorbital is narrow and denticulate, its greatest width 3 in interorbital space; opercular bones are denticulate, the opercle has a single flat spine on its posterior margin, maxillary with small teeth on its lower posterior border. Mouth large, oblique, lower jaw slightly the longest. Four distinct pores on tip of lower jaw; bands of villiform teeth in jaws, vomer, palatin, and on hyoid portion of tongue. A few large exterior teeth on the outside of each jaw, more abundant and larger on lower jaw. Gill openings very large being carried forward to below anterior margin of pupil. Gill rakers rather long, about 30 on lower arch, the longest 2 in eye. Pseudobranchia present.

Scales are large and toothed; body fully scaled; head naked except about 3 rows of scales on cheeks; ventral with distinct axillary scale.

Origin of dorsal fin midway between tip of snout and third anal ray. Fourth spine the longest, 1.85 in head. Anal and soft dorsal similar,

the anal rays are slightly the longest, being 1.30 in head. Third dorsal spine is slightly the longest being 2.30 in head, both the soft dorsal and anal are sharp pointed.

Origin of ventrals midway between anal and anterior margin of eye, caudal forked, 1.10 in head.

Color in life pinkish, washed with violet above, the margins of scales on sides with brighter red, tip of lower jaw and snout red. Margin of spinous dorsal deep red, the body of fin pale red, anterior of soft dorsal and anal broadly margined with deep red. Tip of caudal deep red shading into lighter red at base. No opercular blotch, some deeper red on base of pectorals, inner axil of pectorals deep black.

Color in alcohol yellowish white with some bronzy reflections, darker above; fins uniform yellowish white; no opercular blotch; inner axil of pectorals deep black.

Type is No. 3899 taken at Samal Island, Gulf of Davao, P. I., 4 May, 1908. Length, 160 millimeters.

This species is related to *M. violescens*.

Family CARANGIDÆ. The Pampanos.

Caranx auriga Seale, sp. nov. Plate VI. (Talakitok.)

Head 3.30 in length; depth 2.75; dorsal VII, I, 17; anal II, I 16; 35 armed scutes constituting the straight portion of the lateral line, about 70 scales in curved portion of line, curved portion 1.35 in straight, greatest depth of curve 4.25 in head, the line becomes straight under the third dorsal ray; eye 3.50, the adipose eyelid covering the posterior third of eye and a narrow margin anteriorly; snout 4.20; interorbital space equal to eye; maxillary 2 in head, its end under posterior margin of iris; width of its distal end 1.50 in eye; ventral 2.10 in head; least depth of caudal peduncle 2.40 in eye, its width scarcely less than eye.

Body oblong, moderately compressed, the depth at the origin of spinous dorsal and at soft dorsal equal; the lower outline from the origin of anal rays to mandible is a straight line, the mandibles being placed at a very low angle. The upper outline from origin of soft dorsal to tip of snout is curved, the snout being at an angle much greater than 75° . The length of caudal peduncle (measured from upper origin of caudal rays to axil of dorsal) is but little more than its width, its depth is 2 in its length. Upper profile of head strongly rounded, a distinct ridge from occiput to nostrils, the snout is placed at a steep angle. Width of preorbital 1.60 in eye; greatest width of head 1.85 in its length; eye of moderate size, the adipose lid covering the posterior portion up to pupil, a very narrow anterior adipose lid. Lower jaw is slightly projecting, each jaw has rather wide membraneous lips; maxillary with strong supplemental bone. Each jaw with moderately strong curved canines, the upper jaw with an inner row of villiform teeth. Villiform teeth on vomer,

palatines, and tongue. Gill opening wide, being carried forward to a line with the anterior margin of eye; gill rakers rather strong and saber-like, 14 on lower limb, the longest about 1.50 in eye. Pseudobranchia present.

Scales small, rather smooth, breast fully scaled, head naked except on cheeks and nape. The scutes are graduated in size from middle of caudal peduncle, their greatest depth being slightly less than pupil, their size at beginning of straight portion of lateral line very minute.

Origin of spinous dorsal slightly posterior to axil of pectoral, the spines weak, the second spine the longest being 2.40 in head, the last dorsal spine is free. The soft dorsal and anal are quite similar the rays being of about equal length, the longest being 2 in head, base of anal slightly less than base of soft dorsal, the origin of the anal rays being under the fifth dorsal ray; the last anal ray is slightly prolonged. Anal spines are under origin of soft dorsal; ventrals are about midway between tip of snout and origin of anal rays; their tip reaching to anal pore. Pectorals long and falcate, their tip reaching to fifth anal ray. Caudal strongly forked, two narrow ridges on its base, one on each side of the scutes, length of fin slightly less than head.

Color in life silvery with bronze wash and golden reflections, soft dorsal, anal and caudal yellow, a rather large, not very dark and somewhat diffused opercular spot at origin of lateral line, a black spot on inner axil of pectoral not showing on outer surface.

Color in alcohol similar to above but dull silvery on upper half, yellowish white below. Head with bronze reflections, fins yellowish white, without dark markings except a slight trace of brownish on tip of spinous dorsal and on tip of upper half of caudal.

Type is No. 30. Secured at Manila, P. I., 21 May, 1907. Length, 230 millimeters.

Caranx butuanensis Seale, sp. nov. Plate VII.

Head 3.75; depth 2.50; dorsal VIII, I, 21; anal II, I, 17; scales small; 43 scutes in straight portion of lateral line, and about 70 scales in curved portion, the curved portion contained 1.50 in straight, the greatest depth of the curve about equal to eye. The lateral line becomes straight under the sixth dorsal ray; eye 3 in head; snout 4; interorbital space 3 in head; maxillary 2.1, ending slightly posterior to pupil, width of its distal end 1.50 in eye; mandible 1.85 in head; pectorals 3.30 in body; ventrals 1.85 in head; least depth of caudal peduncle 2 in eye. Body oblong compressed, its greatest depth at origin of soft dorsal, the lower outline from origin of anal rays to tip of lower jaw is a low even curve. The upper outline from origin of soft dorsal to tip of snout is an irregular curve being deeply concave at the occiput, causing the head to be of considerable less depth than in most species of the genus. Length of the caudal peduncle is about a fourth greater than its width. Upper profile of head with a ridge from origin of dorsal to nostril. The snout

is at an angle of a little more than 45° . Greatest depth of head slightly less than its length, its width 2 in length. Mouth is of moderate size, the lower jaw slightly the longest, distinct membranous lips on each jaw, a large supplemental bone on maxillary. Width of preorbital about 2 in eye. Teeth of lower jaw small, in two or more rows, with some large canines anteriorly. Teeth of lower jaw consisting of a single row of rather small canines, teeth on vomer, palatines, and tongue. Gill openings large, being carried forward to below anterior margin of eye. Gill rakers saber-like, 16 on lower limb, the longest about 1.50 in eye. Pseudo-branchia present.

Scales are small, smooth, and fully cover the body, including breast. Head is naked except on cheeks and occiput. The scutes are graduated from the caudal peduncle, the deepest being 1.75 in eye, those at the beginning of straight portion of lateral line minute.

Origin of spinous dorsal slightly posterior to axil of pectoral, the third spine longest, 2.45 in head; the last dorsal spine free. Soft dorsal and anal similar, their longest rays being about equal, 1.85 in head, the last ray of each fin slightly prolonged.

Base of soft dorsal slightly the longest, the origin of anal being under the sixth dorsal ray. Anal spines are below origin of soft dorsal. Origin of ventrals midway between tip of snout and origin of first anal ray. Pectorals falcate, their tip scarcely reaching to anal rays. Caudal forked with the two ridges on base almost obsolete, length of fin slightly less than head.

Color in life silvery below, with about 7 wide dusky bands over the back and down on sides, these bands of much greater width than the interspaces, bands of equal width. Fins yellowish white, except spinous dorsal which has a slight wash of grayish. A dusky opercular spot.

Color in alcohol silvery with slight bronzy reflections, 7 dusky bands on back, the first being on nuchal region and the last on caudal peduncle. A dusky opercular spot. Top of head with some grayish, fins yellowish white except spinous dorsal, which has a slight wash of gray, there is also a very slight trace of grayish on tip of soft dorsal. Inner axil of pectorals dusky, no dusky on their base. Iris golden with dusky blotch on upper margin.

Type is No. 1896, taken at Butuan Bay, Mindanao Island, P. I., 25 September, 1907. Length, 120 millimeters.

Family APOGONICHTHYIDÆ.

Amia magnifica Seale, sp. nov. (Daugat.)

Head 2.75; depth 3; dorsal VI, I, 8; anal II, 7; scales 24, lateral line complete; 7 scales in vertical series; eye 2.75 in head; snout 3.50; interorbital 1.50 in eye; preopercle distinctly denticulate; bands of villiform teeth in jaws, vomer, and palatines.

Body oblong, compressed, the greatest depth at origin of dorsal; caudal peduncle rather long and slender, its depth 2.50 in head, its length 1.45. Upper outline of body more strongly curved than lower. Head pointed, mouth large, lower jaw projecting; eye large, interorbital space slightly convex with two ridges, which unite into one midway between eyes. Tip of maxillary extends to a line with pupil, its distal margin concave, its length 2.10 in head.

Gill openings large, extending forward to below pupil. Gill rakers rather slender not very pointed, about 19 on lower limb.

Body covered with large smooth scales, cheeks and opercles scaled.

Origin of dorsal midway between middle of caudal peduncle and tip of snout, its second spine the longest, 1.80 in head, last dorsal spine almost as long as first ray, the longest ray 2.70 in head; caudal slightly lunate. Origin of ventrals midway between base of caudal and pupil, its second spine about two-thirds length of rays, its longest ray 1.75. Origin of ventrals midway between anal and a line with nostril, their tip reaching almost to anal, their length 1.50 in head. Pectorals 1.75 in head.

Color in life. A bright cardinal red with five silvery longitudinal lines, the middle one being composed of round silvery spots. These lines are arranged as follows: the first is from tip of snout through upper part of eye back to below anterior third of dorsal where it unites with the second line, the portion of this line on the snout is orange, the remainder is silvery; the second line is from posterior of eye to caudal, the portion on the opercle is margined above and below with dusky; the third line is from the lower posterior portion of eye to caudal, this line on the opercle is also margined with dusky, and posterior to opercle it is composed of round silvery dots; the fourth line is from maxillary below eye to lower margin of opercle, this line is margined with dusky; the fourth line extends from the lower posterior portion of opercle to the caudal; the fifth line is below this and forms the general white coloring of the belly, to anal fin. The fins are all uniformly red. Top of head with orange stripe from interorbital space along base of dorsals; chin orange, tip of jaws brownish.

Color in spirits. The bright cardinal fades into dull brownish, the silver becomes pale yellow, the orange fades into dull yellow, the opercles show a beautiful, opalescent bluish reflection, the black on tip of jaw and a black line on snout fade into white; the dusky margins to the stripes on head show more distinctly, the lines on interorbital being bluish white ending on nuchal region. A slight black area on middle of caudal base, fins yellowish white.

Numerous specimens. Type is No. 5192, from Balabac Island, 10 August, 1908. Length, 40 millimeters.

Amia cardinalis Seale, sp. nov.

Head 3; depth 2.75; dorsal VI, 1, 9; anal II, 8; scales 24, the lateral line complete, $7\frac{1}{2}$ scales in vertical series; eye 2.75 in head; snout 4; interorbital 1.50 in eye; maxillary 2 in head, its distal end on a line with posterior margin of iris; mandible 1.55; posterior margin of preopercle strongly denticulate.

Teeth in villiform bands in jaws, vomer and palatines.

Body oblong, compressed, the greatest depth at origin of dorsal, caudal peduncle rather long and thin, its depth equal to orbit, its length 1.20 in head. Upper outline of body more strongly curved than lower. Head rather bluntly pointed, mouth large, cheeks and opercles each with two rows of scales, opercle with a sharp flat spine. Gill openings wide, being carried forward to a line with the pupil. Gill rakers short and sharp pointed, about 13 on lower limb. Body fully covered with large smooth scales which have very finely toothed borders, head without scales except on cheeks and opercles.

Origin of dorsal fin is midway between tip of snout and middle of caudal peduncle, its second spine is the longest and strongest, its length 1.50 in head. The last dorsal spine scarcely more than half the length of the first ray which is 1.75 in head. Caudal slightly bilobed, 1.25 in head; origin of anal midway between end of last caudal vertebra and distal end of maxillary, its longest spine about equal to orbit, its longest ray 1.75 in head. Origin of ventrals midway between anal and a line with middle of pupil, their length 1.50 in head; pectorals 1.40 in head.

Color in life uniform bright cardinal, without stripes or bands; a slight tint of yellow on side of belly, and a brownish blotch on opercles just posterior to eye, fins all uniform red.

Color in alcohol uniform yellowish white, some dusky marks at base of dorsals. A slight opalescent tint on opercle. A brown spot on nuchal region, fins uniform yellowish white.

Type is No. 5463 from Puerto Princesa, Palawan Island, P. I., 21 August, 1908. Length, 40 millimeters.

This species seems to differ in several respect from *A. erythermus* to which it is most nearly related.

Family SERRANIDÆ.

Epinephelus albimuculatus Seale, sp. nov. Plate VIII. (Lapo lapo.)

Head 2.65 (measured from tip of jaw to tip of opercular flap); depth 3.35; dorsal XI, 16; anal III, 8; scales about 120 in lateral series, 50 in vertical series, about 50 pores in lateral line; eye 5.80 in head; snout 4.45; interorbital 7.10; maxillary 2.14, extending posterior to eye; mandible 1.80.

Body oblong, compressed, rather slender and elongate for this genus,

the upper outline considerably more curved than lower. Least depth of caudal peduncle 3.30 in head, caudal truncate.

Anterior profile from origin of dorsal to tip of snout has a gradual even curve. Lower jaw rather strongly projecting. Mouth large. Each lip with a fold. Upper jaw without teeth directly in center of jaw, but with a patch of small sharp teeth on each side of symphysis. A single, small projecting canine on each side; extending back on the jaws from each anterior patch are several rows of villiform teeth with an outer row of enlarged canines. Under jaw with bands of cardiform teeth anteriorly with a projecting canine on each side (broken in type) the side of lower jaw with two rows of enlarged teeth, the anterior row of larger depressible teeth. Bands of villiform teeth on vomer and palatine. Tongue spatulate, without teeth; preopercle rounded and finely toothed, a slight notch near its angle below which the teeth are slightly enlarged. Soft portion of opercle ending in a single sharp point, the hard portion of opercle with three spines the middle one being much the largest in fact the only conspicuous one, the upper one being obtuse and hidden, and the lower one very small, the middle spine is the most posterior and its tip is nearer tip of lower than to upper spine. Gill openings large, being carried forward to below anterior portion of eye. Gill rakers large and strong, 16 on lower limb, the longest equal to two-thirds diameter of eye. Scales are minute and ctenoid; body, head, and fins, except jaws and posterior portion of maxillary, finely scaled; the scales on under surface and on nuchal region smallest.

Origin of dorsal midway between tip of snout and third ray of dorsal, the third to fourth spine longest, 2.40 in head, the first spine 1.90 in second, the longest ray 2.75. Origin of anal slightly nearer to last caudal vertebra than to angle of preopercle, its third spine the longest, 3.75 in head, its longest ray 2.10 in head. Ventrals 2 in head, their origin midway between anal and a vertical line with posterior nostril. Pectorals 1.75 in head.

Color in life brownish with tint of green, about 30 rather large scattered round yellow spots on head, fins slightly darker, otherwise color uniform.

Color in alcohol. Uniform brown with scattered round whitish spots on head, about 30 on each side and 4 or 5 showing indistinctly on shoulders, above lateral line, fins dark brown, uniform, the pectorals a shade less dusky.

Type is No. 1908 from Butuan Bay, Mindanao, P. I., 26 September, 1908. Length, 280 millimeters.

This species is related to *E. coromandelicus* Day but differs in several respects, being more elongate and having a longer maxillary, a slightly different arrangement of opercular spines, and a different color pattern.

Family HÆMULIDÆ.

Plectorhynchus doanei Seale, sp. nov.

Head 3; depth 2.40; dorsal XI, 20; anal III, 8; scales about 75; 64 pores in lateral line; about 30 scales in vertical series; eye 3; snout 3; interorbital space 4; maxillary 3.75, scarcely reaching to anterior margin of eye; mandible 2.75.

Body is oblong, compressed, the upper outline with much stronger curve than lower, the greatest depth is at origin of ventrals. Depth of caudal peduncle 2.75 in head, its length 1.80.

The anterior profile from origin of dorsal to end of snout is a strong curve, the snout however is almost straight and at an angle of more than 45° . Mouth small, lips thick, with fold. Teeth of upper jaw mostly anterior in several rows, small, sharp pointed. Teeth of lower jaw similar, except that those on sides of jaws are in single series. No teeth on vomer or palatine. Posterior margin of preopercle rather strongly denticulate. A rather deep notch on posterior margin of opercle. Gill openings wide, being carried forward to below anterior margin of eye. Gill rakers short, fine, almost hair-like, 26 on lower limb. Pseudobranchia present. Entire body and head, including also bases of all the soft fins covered with fine ctenoid scales. Origin of dorsal midway between tip of snout and base of sixth dorsal ray. The third or fourth spine longest, 1.75 in head, the eighth, ninth and tenth spines are shorter than the first spine, being less than length of snout. Longest dorsal ray 1.35 in head. Origin of anal midway between end of last caudal vertebra and the middle of base of pectorals, its base 2.50 in head, its second spine is much the longest and strongest, its length 1.75 in head, the longest ray 1.40 in head. Caudal forked, 1.1 in head, its lobes rounded; ventrals nearer to angle of mouth than to anal, their length 1.10 in head; pectorals equal to head.

Color in life orange red with about 7 large white areas margined with black, the anterior one occupies the snout, the second the nuchal region, extending down to opercles on each side but not to base of dorsal, the third occupies a region from origin of gill openings to, and including base of ventrals and obliquely up to eye, there is a square red band in the middle of this area across the thorax. There is a dark ocular band about width of eye down from eye around base of lower jaw, the fourth white area is a round spot back of, and above, base of pectorals, the fifth is below seventh to ninth dorsal spines and includes these spines, the sixth just above and includes the origin of anal, the seventh is an oblique white ring occupying the outer two-thirds of caudal peduncle. The posterior two-thirds of caudal is white with an oblong dusky patch on each lobe, the sixth and seventh white areas have an indistinct round dusky spot in the center. The soft dorsal is dusky with margins of

rays white and a white spot near middle of fin. Anal is dusky at base, broadly margined with white, with some dusky blotches at tip. Ventrals black, with a white spot on anterior ray. Pectorals black with white tips.

Color in alcohol similar to above, except that the orange fades into a light brown, the black margins to the white areas remain very distinct.

Type is No. 4760 from Sitanki Island, Jolo Archipelago, 15 July, 1908; length, 40 millimeters; also a specimen No. 1695 from Cagayan, Mindanao.

Family THERAPONIDÆ. The Grunts.

Dentex filiformis Seale, sp. nov. Plate IX.

Head 3.75; depth 4.15; dorsal X, 9; anal III, 7; scales 3-47-16; eye 3 in head; snout 3.10; interorbital space equal to eye; maxillary 3; mandible 2.35; pectorals 1.25 in head; ventrals 1.30; depth of caudal peduncle 3.

Body moderately elongate, oblong, compressed, of about equal depth at origin of pectorals and at anal pore; least depth of caudal peduncle 3 in head.

Head somewhat conical, the profile from nape to snout evenly curved, the interorbital space is moderately convex. Greatest width of head 1.85 in its length. Snout rounded, its width at anterior nostril equal to its length; jaws equal, the upper moderately protractile, each jaw with a rather wide fold or lip. Maxillary fully hidden except at its tip, premaxillary scarcely reaching to eye, preorbital notched at angle of jaw, its width at this point equal to pupil, no spine on its posterior margin. Lower jaw with two distinct pores on each side, mouth wide, slightly oblique. Curved canines in each jaw, with patches of inner villiform teeth anteriorly, the fourth anterior canine of upper jaw largest. No teeth on vomer, palatine, or tongue. Preopercle fully serrated, opercle with a single rather distinct spine; five rows of large scales on cheeks. Head, except snout, preorbital, and under jaw, fully scaled. Gill opening wide, being carried forward to a line with middle of eye. Gill rakers consisting of short, thick asperites, about 4 on lower limb. Pseudobranchia present. Eyes quite large.

Scales small and ctenoid, the rows running horizontally on upper third of fish and obliquely below, body fully scaled; five distinct rows of scales on cheeks with the addition of a few scattered scales at margin of orbit.

Dorsal fin continuous, the spines weak, the fourth and fifth spines the longest, 2.50 in head, the longest ray 1.95 in head, the fin is provided with a distinct groove into which it fits, its origin is directly above the axil of pectoral. Origin of anal on a line with base of second dorsal ray and is midway between end of caudal vertebra and origin of ventrals, the anal spines are graduated, the third being 3.75 in head, longest ray 2.75, base of fin 1.90 in head. Origin of ventrals slightly nearer tip of

snout than origin of anal, its length 1.30 in head. Pectorals 1.30 in head, caudal forked with the outer rays of upper lobe filiform, its length 2.35 of body, the lower lobe 1.30 in head.

Color in alcohol yellowish, a wide brown band slightly less than width of eye, occupies the middle of sides from eye to caudal. A yellowish area above this band, the entire upper portion brown, a round dusky dot at posterior end of lateral line, snout dark brown. There is a slight indication of an additional but very indistinct dusky band on upper sides of belly fading out posteriorly. Fins all uniform, yellowish white without markings.

Type is No. 1755 from Surigao, Mindanao, P. I. taken 17 September, 1907. Length, 130 millimeters.

Family LUTIANIDÆ. The Snappers.

Lutianus orientalis Seale, sp. nov. (Mayamaya.)

Head 2.75; depth 2.80; dorsal X, 14; anal III, 8; scales 8-51-14; eye 3.75; snout 3.10; interorbital 5.25; maxillary 2.30, ending under anterior third of pupil; mandible 1.75 ending on a line with posterior margin of pupil; pectorals 1.30; ventrals 1.55.

Body oblong, compressed, the greatest depth at origin of spinous dorsal. The upper outline from axil of dorsal to eye is an even curve; outline of head at eyes slightly concave. The lower profile from anal to chin is almost straight, the lower jaw being at a low angle. The length of the caudal peduncle is 1.80 in head, its greatest depth 1.25 in its length. Interorbital space slightly convex, a median ridge along its center; snout conical; width of preorbital but slightly greater than pupil. Jaws equal. Teeth consisting of villiform bands with outer row of curved canines, and a very long and strong anterior canine on each side of upper jaw. Teeth on vomer and palatine, none on tongue. A very shallow preopercular notch, no opercular knob, opercle ending in a flat spine. Gill openings wide, ending under anterior margin of eye. Gill rakers of moderate length, sharp-pointed, ten on lower limb, the longest about equal to pupil. Pseudobranchia present. Body fully scaled, cheeks, nape and opercles scaled, soft dorsal, caudal, anal and pectoral scaled at base.

Origin of dorsal above axil of pectoral, the fourth spine the longest, 2.50 in length; longest dorsal ray 2.30 in head; second anal spine slightly the longest, 2.75 in head; longest anal ray 2.10 in head. Origin of anal under second dorsal ray; origin of ventrals, midway between tip of snout and fourth anal ray, their spine only about half length of rays. Pectorals not reaching to anal. Ventrals extend to anal pore. Caudal scarcely emarginate, its length 1.35 in head.

Color in life yellow, darker above, four wide black longitudinal stripes of almost the width of pupil at their median point, the first from snout

through interorbital space to posterior base of spinous dorsal. Second from posterior margin of eye to base of soft dorsal. Third from tip of snout through eye to upper base of caudal, a large black ovate spot in this line and extending above it, below the anterior portion of soft dorsal. Fourth from suborbital to lower base of caudal through the upper axil of pectoral, there is a slight dusky wash on tips of spinous dorsal and caudal, otherwise fins yellowish white.

Color in alcohol similar to above except the lines on top of head do not show, and the general color is dull yellowish white, brownish above with the black lines and black blotch showing very distinctly.

Four specimens; type is No. 2201 from Limbones Cove, Island of Luzon, P. I. Length, 95 millimeters, 14 January, 1908. The three additional specimens are from Balabac Island, P. I.

This fish was called *L. russeli* by Jordan & Seale and *L. quinque-lineatus* by Jordan & Richardson. Day gives it as the young of *L. chrysotania*, but we have specimens of *chrysotania* and there is no doubt of it being a different fish. I have examined specimens of the two former species in the Stanford University Collection and find it can not be classed with either.

Family SPARIDÆ. The Porgies.

Lethrinus cutambi° Seale sp. nov. Plate X. (Cutambak.)

Head 3; depth, 2.75; dorsal X, 9; anal III, 8; scales 6-45-13; eye 4; snout 2, width of maxillary at symphysis almost equal to pupil; its length 2.75 in head; mandible 2.45; width of preorbital 2.95; pectorals 1.20; ventrals 1.50; interorbital space 1.10 in eye.

Body oblong compressed, the greatest depth being at origin of ventrals. The upper outline of body from occiput to axil of dorsal is an even curve, the forehead in front of eye is slightly convex while the snout is decidedly concave, the lower outline of body much less curved than upper; the lower jaw being very slightly oblique. The length of the caudal peduncle is 2 in head, its median width is 3.50 in its length, while its depth is 1.50 in its length.

Greatest depth of head slightly less than its length, its greatest width 2.20 in its length; interorbital space convex. Snout is elongate, its median width being about 2 in its length, nostrils some distance apart, the anterior one with membranous flap. Mouth large, the lips with thick membranous folds. The upper jaw strongly protractile. Teeth of upper jaw consisting of a single row of about six conical molars without cusps on each side, with small conical canine-like teeth anteriorly and with four enlarged outer canines in front. Lower jaw with about eight conical molars without cusps, and small canines, anteriorly, two enlarged outer canines on each side in front. No teeth on vomer,

° From the native name of this fish.

palatine or tongue. The jaws are equal, the maxillary ends on a line with anterior nostril, its end is fully hidden by preorbital. The mandible ends on a line with posterior nostril. Gill openings are of moderate size being carried forward to a line with middle of eye. Gill rakers are thick and short 5 on lower limb, the longest about one-fourth of pupil. Pseudobranchia present.

Body fully covered with rather large smooth scales which are very slightly denticulate on margins. Fins are unscaled, except pectorals which are slightly scaled at base. Head is naked except on opercles, with a small patch of scales behind and posterior to the eye, another small patch posterior to, and slightly above eye.

Origin of dorsal is one spine anterior to a line with axil of pectorals; fourth dorsal spine the longest, 3 in head, the spines received into a sheath, longest dorsal ray 2.50 in head.

The second anal spine is strongest, the third is the longest being 3.10 in head, longest anal ray 2.75, origin of anal is on a line with the second dorsal ray. Origin of ventrals midway between tip of snout and fifth anal ray. Tip of ventrals reaching to anal pore. Pectorals extend to a line with origin of anal. Caudal deeply emarginate, its length 1.25 in head, its shortest ray 2.10 in head.

Color in life rather a dark greenish with 7 or 8 irregular darker vertical bars over back and down on sides. Vertical fins marked with bars of dark green.

Color in alcohol yellowish, with slight shades of greenish, about 8 irregular darker greenish bars extending over back and down on sides to ventral surface, these bars much less than the interspaces, the bands are more or less broken at the lateral line but are continuous below it, there is on the second of these bands above middle of pectorals and below the lateral line an intensified dusky area or blotch, scarcely distinct from coloring of bands. Head is brownish with tint of green, there is a darker band easily overlooked, from lower half of eye down to posterior end of mandible; posterior margin of opercle darker. A darker green line at base of pectorals. A mottling of darker green on the membrane at base of each dorsal spine, each ray of soft dorsal and anal is crossed by one or two darker green blotches. Caudal has three or four darker green vertical bars. Ventrals are crossed by three bars of darker green, pectorals white.

Type is No. 4678, taken at Sitanki Island, Jolo Archipelago, P. I., 11 July, 1908. Length, 210 millimeters. Cotype No. 4680.

Lethrinus atkinsoni Seale, sp. nov. Plate XI. (Cutambak.)

Head 2.90; depth 2.50; dorsal X, 9; anal III, 8; scales 5-48-13; eye 3; snout 2; interorbital space 1.45 in eye (bony part only measured); maxillary 2.50 in head; mandible 2.10; pectorals equal to head; ventrals 1.45.

Body is oblong, compressed, rather deep, greatest depth at origin of ventrals. The upper outline is an even curve to the anterior margin of eye, it is slightly more convex from this point, the practically straight snout extends down to the protractile upper lip, at an angle slightly greater than 45° . Lower outline from anal to tip of snout forming a low even curve, the lower jaw being but slightly oblique. The depth of caudal peduncle is 1.50 in its length, its median width is 3 in its length, while its length is 2 in head. Greatest depth of head equals its length, its greatest width 2 in length; interorbital space slightly convex. Outline of snout almost straight, excluding the protractile upper jaw; width of upper lip at symphysis 2.50 in pupil; maxillary ends slightly posterior to anterior nostril; the mandible ends on a line with anterior margin of eye. Eye is large, 1.50 in snout. Preorbital 2.50 in head, jaws equal. Teeth of upper jaw consisting on each side of three large molars, two of which have cusps, five conical teeth, and two large curved anterior canines, also a patch of minute teeth in anterior of jaw, behind the canines. Lower jaw on each side with four large molars, three of which are bicuspid, five conical teeth, two canines, and a patch of minute teeth just inside the curved anterior canines. No teeth on vomer or palatines, opercle ends in a flat spine and has a rather broad yellow membranous margin.

Gill openings end on a line with middle of eye, the gill rakers are short, thick and blunt, four on lower limb, the longest less than one-fourth of pupil. Pseudobranchia present.

Body entirely covered with large smooth scales which are slightly denticulate on margins; head naked except on opercles and a small patch of scales behind and above eye. The spinous dorsal when collapsed is fully hidden in scaly sheath. Fins not scaled except base of pectorals and caudal. Origin of dorsal is directly above axil of pectoral, its fourth to fifth spines are longest, 2.75 in head. Longest dorsal ray 2.25 in head. Origin of anal is over second dorsal ray, its third spine is the longest, 3.25 in head, the second spine is strongest. Longest anal ray 2.75 in head. Origin of ventrals midway between tip of snout and posterior axil of anal. Tips of ventrals reach to anal pore. Tips of pectorals extend to base of anal. Caudals deeply emarginate, its longest lobe 1.20 in head, its shortest ray 2.30.

Color in life yellow, with slight wash of grayish, fins immaculate, except ventrals which have dusky tips and caudal which is washed with yellow.

Color in alcohol whitish, slightly grayish drab above; the middle of each row of scales darker, making 4 or 5 narrow longitudinal lines above the lateral line, these rows follow the curvature of the back. A large rather indistinct oblong dusky blotch between the pectoral and lateral line, base and upper axil of pectoral grayish. The fins are white,

unmarked except the upper surface of the first ray of pectorals which is gray, and the ventrals, which have some dusky on their posterior third.

Type is No. 5080 taken at Balabac Island, P. I., 6 August, 1908. Length, 220 millimeters.

Family POMACENTRIDÆ. The Damsel-fishes.

Pomacentrus tropicus Seale, sp. nov. Plate XII, fig. 1. (Danigsahasa.)

Head 3; depth 1.95; dorsal XIII, 14; anal II, 14; scales 24, eighteen pores in lateral line, 12 in vertical series; eye 3 in head; snout 3.75; interorbital space 2.75; maxillary 3.50; mandible 3.10; pectorals equal to head posterior to nostril; ventrals slightly longer than pectorals; depth of caudal peduncle 2.10.

Body oblong, compressed, its greatest depth at origin of ventrals, this depth being considerably greater than at origin of anal. Depth of caudal peduncle greater than its length.

Anterior profile from origin of dorsal to tip of snout, is strongly rounded with a very slight constriction on nuchal region. Lower profile not quite so strongly rounded as upper, jaws when closed are equal. Interorbital space evenly convex. Greatest width of head 1.50 in its greatest depth. Snout rounded, its median width being a third less than its depth, its width considerable greater than its length, numerous small pores on top of snout and on orbital ring. Preopercle strongly denticulate, narrow but becoming abruptly wide under anterior margin of orbit, this wide portion ending posteriorly below in one or more strong spines, its anterior margin with a shallow notch; width of preorbital, at angle of mouth, 2 in eye, width below middle of eye, 1.50 in pupil. Maxillary scarcely extending to the anterior margin of orbit; mandible ending under anterior margin of orbit. Teeth in a single row in jaws. They are rather strong and incisor-like, 18 on each side of upper jaw; no teeth on vomer or palatine. Gill openings wide, carried forward to below anterior margin of eye. Gill rakers moderately strong, toothed on their inner side, about 12 on lower limb.

Body and head scaled, no scales on orbital ring. All fins except ventrals more or less scaled; strong scaly sheaths at base of dorsal and anal. The scales are smooth with finely ctenoid margins, those on median portion of sides largest. Three rows of scales on opercle with a few additional small scales on lower margin. Eight scales between dorsal and head, about 14 series on top of head.

Origin of dorsal fin midway between tip of snout and base of twelfth dorsal spine, the median spines of the fin are longest, the first spine is 1.25 in eye, the eighth is 2 in head, the thirteenth is 2.10 in head. The soft dorsal is pointed, its longest ray 1.50 in head. Anal similar to soft dorsal, the second spine is 2 in head, the longest ray equal to length of head posterior of the nostril. Origin of first anal spine is under the

origin of the ninth spine of dorsal, origin of anal is much nearer origin of ventrals than to base of caudal, in fact, the distance between origin of ventrals and anal is considerably less than base of anal. Origin of ventral is midway between anal pore and a vertical line with posterior margin of iris, the ventral rays are more or less prolonged and filamentous, reaching to the origin of anal. Origin of pectorals is slightly anterior to origin of ventrals. Caudal rather long and sharp-pointed, scarcely emarginate, the upper lobe the longer, being longer than head.

Color in alcohol similar to life color, except less bright being orange yellow with a slight brownish wash on top of head, fading on shoulders into the yellow body color. A blue line below eye on preopercle, some blue spots on opercle, a blue line on side of snout, a blue line from each side of belly out onto the anal fin where it forms a submarginal blue band, the tips of the anterior anal rays being black, a narrow black tip to spinous dorsal, otherwise fins all bright yellow. A black dot at origin of lateral line, another in upper axil of pectoral fin, lips dusky.

Type is No. 4737 from Sitanki Island, Jolo Archipelago. Taken by C. Canonizado and the writer 15 July, 1908. Length, 750 millimeters. Five cotypes No. 4736 were taken at the same time and place.

This species is related to *Pomacentrus popei* Evermann and Seale but the coloring is different and the relative location of the anal and ventral fins is quite different. It is also related to *P. moluccensis* Bleeker, but has larger scales and a sharp-pointed caudal, with the additional differences in color markings.

Pomacentrus elongatus Seale, sp. nov. Plate XII, fig. 2.

Head 3.50; depth 2.15; dorsal XIII, 14; anal II, 15; scales 28, 18 pores in lateral line, 14 scales in vertical series; eye 3.10 in head; snout 3.40; interorbital space 3; maxillary 3.40; mandible 3; pectoral equal to head; ventrals longer than head; depth of caudal peduncle 2.

Body oblong, compressed, rather elongate for this family. Greatest depth in middle of body. Depth of caudal peduncle a fourth greater than its length.

Anterior profile from dorsal fin to snout evenly curved and about equal to curve of thorax and chin. Interorbital space convex. Snout rounded, its median width being slightly less than its length. Orbital ring strongly toothed, unscaled, very narrow below pupil, becoming wider under anterior of eye, its width at angle of mouth 2 in eye. A rather strong spine at posterior margin of this wide portion. Preopercle denticulate. Mouth small. Maxillary ending under anterior margin of orbit. Mandible ending under anterior margin of pupil. Teeth in two series the second being smaller and less securely fixed and alternating with those of the anterior series. Gill openings large, being carried forward to below anterior margin of orbit. Gill rakers slender, about 14 on lower limb.

Scales covering entire body and head, except orbital ring and chin.

Four rows of scales on preopercle, the lower row consisting of three or four small scales. All fins, except ventrals, more or less scaled, dorsal and anal with high scaly sheath.

Origin of dorsal midway between tip of snout and base of 11th dorsal spine, the spines increasing in length posteriorly, anterior spine equal to orbit, posterior spine 1.35 in head. Soft dorsal, caudal, and anal sharp pointed, the caudal scarcely emarginate, the upper lobe the longest. Second anal spine 1.55 in head. Longest rays of anal equal to rays of soft dorsal, 1.10 in head. Origin of anal is on a line with base of 13th dorsal spine, and is but slightly nearer origin of ventrals than to end of caudal vertebra. Origin of ventrals midway between anal and angle of jaw.

Color in life brown, becoming lighter on caudal peduncle, some blue lines on cheeks and top of head.

Color in alcohol is a reddish brown, shading into yellow on caudal peduncle, the caudal yellow, with a very slight wash of dusky. Distinct blue lines of less width than pupil uniting on top of snout extend back to about origin of lateral line at top of eye. Another from anterior of eye to middle of maxillary. A few blue dots on cheeks. A black dot at origin of lateral line. Inner axil of pectorals whitish, giving a more or less distinct white dot in upper axil of fin, pectorals grayish, ventrals black, other fins similar to color of body except the yellow caudal.

Type is No. 2214, collected by the writer and C. Canonizado at Limbones Cove at the entrance to Manila Bay, Luzon, P. I., 14 January, 1908. Length, 765 millimeters. Two cotypes were taken at same time and place, Nos. 2212 and 2213.

This species is *P. trilineatus* of Bleeker, Atlas, fig. 3, which we believe to be distinct from the original *P. trilineatus* Ehrenberg.

***Pomacentrus suluensis* Seale, sp. nov.**

Head 3; depth 2.10; dorsal XIII, 13; anal II, 14; scales 25, nineteen pores in lateral line, 12 scales in vertical series; eye 3 in head; snout 3.55; interorbital space 3.20; maxillary 3; mandible 2; pectorals 1.10 in head; ventrals about equal to head; depth of caudal peduncle 1.75 in head.

Body is oblong, compressed, the greatest depth being in the middle of body; upper and lower anterior profiles from base of dorsal and base of ventrals to snout are equal low curves, making the head rather sharp pointed. Depth of caudal peduncle slightly greater than its length. The top of head is almost a straight line from dorsal to snout, the curve being very low. Interorbital space slightly convex, median width of snout slightly greater than its length; two low ridges on upper side of snout; preopercle denticulate. Orbital ring entirely smooth and unscaled, its width at angle of mouth about equal to pupil; suborbital very narrow, less than one-half of pupil. Maxillary scarcely extends to anterior margin

of eye; mandible ending under anterior margin of eye, the lower jaw slightly the longest. Teeth rather strong, in two series, the second alternating with those of first series.

Gill openings wide, carried forward to below anterior margin of orbit, gill rakers sharp-pointed, rather long, about 18 on lower limb.

Body entirely covered with ctenoid scales. All the fins except ventrals more or less scaled. Large scaly sheaths at dorsal and anal, three rows of scales on preopercle.

Origin of dorsal fin midway between tip of snout and base of last dorsal spine, the median dorsal spines are longest, being 2 in head. Longest dorsal ray about equal to longest anal ray, being 1.50 in head; dorsal, anal, and caudal sharp-pointed, caudal scarcely emarginate. Origin of anal under base of eleventh dorsal spine, being nearer origin of ventrals than to base of caudal. Origin of ventrals midway between anal and a vertical line with anterior margin of pupil. Caudal equal to length of head.

Color in life yellowish white, with two reddish brown vertical areas, one occupying the entire head, its posterior border from origin of dorsal to origin of ventrals, the second is from sixth dorsal spine to base of sixth soft dorsal ray down on sides to anterior half of anal fin. A large black yellow-edged ocellus on the last four spines, remainder of soft dorsal and caudal are yellowish white, the anal is bright yellow, some purplish on its anterior part. Ventrals white with some purplish anteriorly; no spot in axil of pectoral or at origin of lateral line.

Color in alcohol similar to above, but the purplish on anal more distinct, forming a dusky anterior border to fin.

Type is No. 4689. Secured by the writer and C. Canonizado at the Island of Sitanki, Jolo Archipelago, 12 July, 1908. Length 355 millimeters.

This species is related to *P. notaphthalmus* Bleeker but differs considerably in the color markings and in having preorbital strongly serrated, the anal fin sharp-pointed and the black spot above operculum absent.

Abudefduf coracinus Seale, sp. nov. Plate XIII.

Head 3.60; depth 2; dorsal XIII, 14; anal II, 13; scales 27; 18 pores in lateral line which ends under middle of soft dorsal, 14 scales in vertical series; eye 3.50; snout 3.10; interorbital space 2.50; maxillary 3.25; mandible 3; pectorals 1.10; ventrals longer than head, 3.15 in length, caudal peduncle 1.60 in head.

Body is oblong compressed, its depth is about the same at origin of ventrals as at origin of anal, depth of caudal peduncle is slightly greater than its length.

Head is evenly rounded. The jaws when closed are equal. The greatest width of head is 1.75 in its greatest depth, the profile both from

the origin of dorsal to snout and from origin of ventrals to snout is a low even curve. The interorbital space is slightly and evenly convex. The snout is rounded, its depth at nostril being greater than its width. Preorbital is rather wide and unscaled, the anterior margin not notched, its width at angle of jaw 1.50 in orbit, its width below middle of eye very little less than its angle. Maxillary ending on a line midway between posterior nostril and anterior margin of eye. The end of mandible not reaching to orbit. Teeth in a single series in jaws, rather strong, fixed, almost conical, and with a slight curve, 20 on each side of lower jaw. No teeth on vomer or palatine. Gill openings large, ending on a line slightly anterior to orbit. Gill rakers slender and pointed, the longest about equal to pupil, 14 on lower limb.

Scales covering entire body and head except the orbital ring, maxillary, and mandibles; the scales are large smooth with their margins finely ctenoid. Fins scaled, except the ventrals; a high scaly sheath to dorsals and anal. A large axillary scale at ventrals; scales largest on the median anterior part of body; small scales at base of fins and thorax. Six scales between origin of dorsal and head and about 13 series on top of head. Two rows of large scales on the preopercle with two or three small scales on its lower margin.

Origin of dorsal fin about the width of eye posterior to pectoral axil, the first spine being midway between tip of snout and origin of twelfth dorsal spine, the spines gradually increase in length posteriorly, the first spine being 1.30 in eye while the last 2 in head (measured to base of scaly sheath). Soft dorsal rounded, its longest ray 1.25 in head. The anal is similar in shape to soft dorsal, its second spine is 2 in head, the longest ray is about equal to longest ray of soft dorsal; origin of second anal spine on a line with base of 13th dorsal spine, being midway between end of caudal vertebra and origin of ventrals, the first anal spine is quite a little in advance of the second. Origin of ventrals midway between first anal spine and tip of snout; ventrals are slightly filamentous at tip but do not quite reach to anal pore. Pectorals are rounded, the width of their base being 2.50 in their length. Caudal rounded, scarcely emarginate, the upper lobe the longer, being about equal to length of head.

Color in life uniform dark brown or blackish.

Color in alcohol olivaceous black, fins black, opercular flap black. A black dot at axil of pectorals. No ocelli anywhere.

Type is No. 4908. A specimen 123 millimeters in length taken by the writer and C. Canonizado at Sitanki Island, Jolo Archipelago, 18 July, 1908.

This species very closely resembles *A. mqlas* but is easily distinguished by the naked orbital ring

Family LABRIDÆ.

Halichoeres iris Seale, sp. nov.

Head 3.10 (measured to end of opercular flap); depth 3; dorsal IX, 13; anal II, 11; scales 26; $13\frac{1}{2}$ in vertical series; eye 4.50 in head; snout 2.75; interorbital 4.10; maxillary 4.50; mandible 3.

Body oblong, compressed, the upper and lower outlines evenly curved to the rather pointed head and snout. Depth of caudal peduncle 2.1 in head, its length 3 in head. Mouth rather small, the jaws equal, the upper jaw protractile, upper lip with wide fold, lower lip with fold less developed. Teeth in a single series in each jaw, the anterior ones consisting of enlarged projecting canines; they graduate in size posteriorly. No canines at angle of jaws. No teeth on vomer or palatines. Gill openings extend forward to line with angle of preopercle. Gill rakers small, fine-pointed, about 13 on lower limb.

Body covered with large smooth scales, which are much smaller on thorax. Head entirely naked, fins unscaled, except a row at base of dorsal and anal, and basal half of caudal. Lateral line continuous.

The dorsal spines are short and pungent, the origin of the fin is midway between tip of snout and base of sixth dorsal ray, the longest spine about 4.25 in head, the longest ray 3. Caudal is slightly lunate, its length 1.35 in head. Origin of anal midway between the end of last caudal vertebra and the posterior margin of hard opercle, being on a line with the base of third dorsal ray, its base is 1.20 in head, its second spine is longest, 3.25 in head, its longest ray 2.50. Origin of ventrals slightly nearer angle of mouth than to anal, the length 2.10 in head. Pectorals 1.30 in head, ending on a line with ninth scale of lateral line.

Color in life. The general color is greenish above and bluish below; there are seven purplish bands over back which extend obliquely back and down to about the median line of sides, the anterior band is from nuchal region to axil of pectoral, the second from origin of dorsal, third from posterior portion of spinous dorsal, fourth from anterior portion of soft dorsal, fifth from middle of soft dorsal, sixth from posterior portion of soft dorsal and the seventh over the middle of caudal peduncle; these bands are almost as wide as the interspaces. The top of head and nuchal region are purple, there are three wide rosy bands tinted with purplish on sides of head, one from posterior of eye to posterior margin of opercle near base of pectoral, one from lower portion of orbit to lower posterior margin of opercles, one from lower anterior margin of orbit to behind angle of mouth; these bars are of slightly greater width than pupil, the coloring of cheeks between these bars is yellowish, with portions shading into orange and greenish, the lower jaw and throat blue, base of pectorals purplish, the base of rays yellow. Spinous dorsal purplish with deep green on base, the purplish coloring extending back as a

graduating line through the lower half of soft dorsal, general color of soft dorsal, pale yellowish, caudal yellowish with tint of green, the upper and lower rays green with the second ray a heavy brownish red. Anal pale yellowish, ventrals pinkish, pectorals washed with yellowish at base and slightly dusky at tip.

Color in alcohol similar to above, except the bluish below fades into whitish, the deep green on dorsal and between the purple bars fades and becomes dull bluish, the stripes on head brown-purplish, the anal shows a dusky blotch on middle of anterior rays.

Type is No. 4582 from Sitanki Island, Jolo Archipelago, P. I., 2 July, 1908. Length, 112 millimeters.

Choerops palawanensis Seale, sp. nov.

Head 3; depth 2.80; dorsal XIV, 7; anal III, 10; scales 28; 11 scales in vertical series; eye 6; snout 2.35; interorbital 5.50; cheeks with about 6 rows of imbricate scales.

Body oblong, compressed, the upper outline more rounded than lower. Depth of caudal peduncle 2.35 in head.

Upper profile of head a strong even curve back to origin of dorsal. Interorbital space convex. Greatest depth of head 1.14 in its length; mouth rather large, the upper jaw protractile. Lips thick, with fold, four strong projecting canines in the front of each jaw, a canine at angle of upper jaw. Posterior margin of preopercle is finely denticulate. Lower limb of preopercle naked. Gill openings moderate, ending on a line slightly posterior to eye. Gill rakers thick, sharp-pointed, short, about 8 on lower limb.

The scales are large and smooth, fully covering head and body except top of head, snout, limb of preopercle, and chin. Tubules of lateral line strongly branched.

Origin of dorsal midway between tip of snout and base of 12th dorsal spine, the longest spine 3.50 in head, its posterior rays the longest, 2.50 in head. Base of anal 1.15 in head, its posterior ray 2.20, origin of anal is midway between last caudal vertebra and angle of preopercle. Origin of ventrals midway between anal and angle of mouth, the anterior rays elongate, reaching to base of anal. Pectorals 1.25, ending on a line with 12th scale of lateral line. Caudal slightly lunate, 1.15 in head.

Color in life. General color brownish above, whitish below, margins of the scales drab. An oblong bright yellow patch on sides under posterior third of spinous dorsal, a row of about five black spots along the median line, sides of head greenish with tint of yellow, the color below this is blue, a red line back from angle of mouth marks the meeting of these two colors, four greenish lines on sides of snout from eye to mouth, about 6 oblique yellow lines on opercle, three red lines on lower jaw, two rows of dusky dots near base of dorsal fin. Dorsal blue with about 4 irregular rows of red dots tending to form broken vertical lines on

soft dorsal. Margin of spinous dorsal blue. Anal similar to dorsal in color except that the round red spots tend to form two or three longitudinal lines on distal portion of fin. Caudal yellowish green with alternating blue and red dots on sides. Ventrals blue, the webs yellow. Pectorals yellow, blue at base with a ring of red.

Color in alcohol dull light brown with tint of green, the golden blotch and the black dots on sides show distinctly. Markings of dorsal scarcely showing; markings of anal more distinct, the dots being yellow, caudal almost uniform greenish with the slightest trace of markings.

Type is No. 5501, from Puerto Princesa, Palawan Island, P. I., 22 August, 1907. Length, 235 millimeters.

Family SCARICHTHYIDÆ.

Callyodon rostratus Seale, sp. nov. (Ogos.)

Head 2.75, measured from tip of opercular flap to tip of upper teeth; depth 3; dorsal IX, 10; anal III, 9; scales 23; $8\frac{1}{2}$ scales in vertical series; eye 7 in head; snout 2.20; interorbital 3.15, two rows of scales on cheeks, the lower limb of preopercle being entirely naked; only the slightest indication of canine teeth at angle of upper jaw, none on lower; teeth green, the margins crenulate; lips narrow, not covering half of either jaw.

Body oblong compressed, the upper and lower outlines equal, the snout is heavy and deep, the teeth large and exposed, giving a blunt appearance to the head. Depth of caudal peduncle 2.50 in head.

Depth of head 1.40 in its length, the upper and lower outlines with very low angle. Interorbital space convex. Gill openings are carried forward to below eye. Gill rakers numerous, minute and hair-like. Scales large and smooth, $3\frac{1}{2}$ in front of dorsal. Origin of dorsal midway between tip of teeth and second dorsal ray, its longest spine 3 in head, the last ray 3.25. Caudal slightly rounded in middle, the lower ray slightly produced. Base of anal 1.70 in head, its origin being midway between last caudal vertebra and axil of pectoral, its longest ray 3. Origin of ventrals slightly nearer to angle of jaws than to anal, their length 2.10 in head. Pectorals 1.50 in head.

Color in life deep blue-green, more decidedly bluish on belly, which shows three or four longitudinal stripes of darker blue. A yellowish area encircles and occupies the entire caudal peduncle. Cheeks washed with reddish, two darker lines extend back from eye. A red line around lips, a second red line across base of lower jaw. Dorsal red with a green line through center and a deep blue margin. Caudal deep blue, with some of the webs washed with red. Base of anal red, the distal two-thirds blue. Pectorals green, the first ray blue. Teeth green.

Color in alcohol yellowish shaded with dull brownish. A yellow area occupies caudal peduncle, two wide dusky stripes from posterior part of eye, snout greenish. Cheeks and opercles yellowish except the upper portion of opercle which is crossed by the dusky bar. An indistinct line

from below angle of jaws around lower lip, dorsal grayish with yellowish margin and clouded with dusky in center. Caudal yellowish with some lighter markings on webs. Anal whitish at base, the distal two-thirds yellowish. Ventrals yellowish, pectorals yellowish, teeth green.

Type No. 2928 from Zamboanga, Mindanao, P. I., 10 April, 1908. Length, 215 millimeters.

Callyodon hadji ⁷ Seale, sp. nov.

Head 3; depth 2.45; dorsal IX, 9; anal III, 9; scales 24 to end of caudal vertebra, $8\frac{1}{2}$ scales in vertical series; eye 5.75 in head; snout 2.60; interorbital space about equal to snout; scales on cheeks in three rows, the lower row covering the limb of preopercle; lips rather wide covering about two-thirds of jaws; each jaw with a strong canine near angle; teeth rosy; pectorals 1.30 in head; ventrals 1.75.

Body oblong, compressed, the upper and lower outlines about evenly curved, the head moderately pointed; least depth of caudal peduncle 2.1 in head, being about equal to its length.

Greatest depth of head about equal to its length. Interorbital space convex. Snout not particularly blunt. Lips thin, without folds. Gill openings of moderate size, ending anteriorly on a line with posterior margin of eye. Gill rakers very minute, short, hair-like, at least 22 on lower limb. Pseudobranchia large.

Scales large and smooth. Body and head fully scaled except snout and chin. Six scales in front of dorsal. Origin of dorsal is midway between tip of snout and base of second dorsal ray, its longest spine 2.75 in head, its longest ray 2.75 in head. Base of anal 1.20 in head, its origin midway between end of caudal vertebra and angle of preopercle, its longest ray about 3 in head, origin of ventrals midway between anal and angle of jaws, the fin not reaching to anal pore. Origin of pectorals below origin of dorsal, its tip on a line with ninth scale of lateral line. Caudal slightly lunate, its longest rays equal to pectoral, the mid rays 1.50 in head.

Color in life is chiefly pinkish and bluish green. The throat, thorax, belly and sides below the median line being a bright pink; each scale on entire side in front of caudal peduncle is margined with pink, upper part of sides and back green, upper half of head reddish brown, caudal peduncle blue-green, upper lip bright green with a blue-green line around its base, this line is bordered by pink above and extends to below and slightly posterior to eye. Three short blue-green lines radiate from eye, two backward and one forward. An irregular-shaped bright green area extends from angle of mouth to below eye and down almost to chin. Under lip pink crossed by two deep blue lines, one near margin the other near base of lip. About 8 deep blue spots or dashes on each side of throat. A row of deeper green spots along base of dorsal fin. Dorsal

⁷ Hadji=Moro pilgrim or chief.

fin salmon-red with a broad blue-green border. A row of green spots along middle of red portion. Caudal fin pea-green with deep blue upper and lower margin. Anal fin deep red with outer half blue. Pectorals deep blue with 4th to 5th rays bright pink. Ventrals pinkish and yellow with anterior ray blue-green.

Color in spirits uniform dull grayish, whitish on belly, the bright greenish irregular area back of angle of mouth shows distinctly. All markings of the fins dull but show the general arrangement described above, the pectorals are greenish with a darker stripe on second to fourth rays.

Type is No. 5367 from Puerto Princesa, Palawan, 19 August, 1909. Length, 225 millimeters, and cotype 5494 from same locality.

Callyodon albipunctatus Seale, sp. nov.

Head 2.75; depth 3; dorsal IX, 10; anal III, 9; scales 23, $8\frac{1}{2}$ in vertical series; eye 5.25; snout 2.50; interorbital 3.25; two rows of scales on cheeks; lower limb of preopercle entirely naked; lips narrow, the teeth being more than half exposed; teeth pinkish.

Body oblong compressed, under normal conditions the upper and lower outlines are evenly curved; the snout, however, is very deep, giving a blunt appearance to head. Depth of caudal peduncle 2.75 in head. Greatest depth of head 1.35 in its length. Mouth rather large. Teeth prominent, no canines. Gill openings carried forward to a line with posterior third of eye. Gill rakers numerous, minute and hair-like. Pseudobranchia large.

Scales large and smooth, four in front of dorsal. Body and head fully scaled except on interorbital space and snout, preopercular limb and chin.

Origin of dorsal midway between tip of teeth and second dorsal ray, the longest spine 3.10 in head, the longest ray 3.10. Origin of anal midway between axil of pectoral and last caudal vertebra, its base 1.75 in head, its longest ray 3.10. Origin of ventrals midway between angle of jaw and anal, their length 2.10 in head. Pectorals 1.50, caudal truncate.

Color in life. General color of lower parts pinkish, the scales on upper portion of body with greenish bases and margins. About ten distinct round white spots on sides usually in pairs at regular intervals, belly with slight wash of purplish. Dorsal fin uniform pink. Caudal uniform pink. Anal bluish at base, fading to pink distally. Pectorals and ventrals uniform pink, iris golden, snout and chin uniform pink, cheeks with a slight tint of bluish. A wide yellow area surrounding caudal peduncle.

Color in alcohol grayish, base of scales darker, belly purplish, gape and chin and area at base of caudal yellowish. Twelve to fourteen round white spots on posterior half of body, fins uniform grayish green.

Type is No. 4876 from Sitanki Island, Jolo Archipelago, P. I., 18, July, 1908. Length, 170 millimeters.

Callyodon ogos Seale, sp. nov.

Head 3.20; depth 2.70; dorsal IX, 10; anal III, 9; scales 22, 8½ in vertical series; eye 5.50 in head; snout 2.85; interorbital 3.15; two rows of scales on cheeks; the lower limb of preopercle naked; lips wide; a canine tooth at angle of each jaw.

Body oblong compressed, the upper and lower outlines evenly curved; head rather more pointed than is usual in this genus. Depth of caudal peduncle somewhat greater than its length, being 2 in head.

Greatest depth of head 1.14 in its length. Interorbital space convex. The lips are wide, the upper almost wholly covering the teeth, the lower covering more than two-thirds of lower teeth. The teeth in life were rosy. The canine teeth of the lower jaw are largest, those of the upper jaw being rather blunt. Gill rakers fine almost hair-like, short, about 26 on lower limb. Gill openings of moderate width, ending on a line with posterior margin of eye. Pseudobranchia large.

Scales are large and smooth, body and head are fully scaled except interorbital space, snout, lower limb of preopercle and chin, which are naked. Lips thin, without folds.

Origin of dorsal midway between tip of snout and base of first dorsal ray, longest spine 2.25 in head, about equal to longest ray. Base of anal 1.20 in head, the origin of the fin is considerably nearer the end of caudal vertebra than to angle of preopercle, its posterior ray 2.50 in head. Origin of ventrals considerably posterior to origin of pectorals, being midway between anal and angle of mouth, their length 1.50 in head. Pectorals 1.25 in head, their tip on a line with 8th scale of lateral line. Caudal is slightly lunate.

Color in life chiefly blue-green; however, there is a large area occupying the upper and median portion of the sides which is reddish yellow, the margins of the scales in this area are green. The upper anterior portion of back is deep green, the lower portion of sides, belly, and caudal peduncle is deep blue-green. About twelve short red lines radiate from eye. A large wedge-shaped deep green area with red margins extends from posterior margin of eye to posterior margin of opercles, ending just in front of axil of pectorals. Snout deep green. A red line from eye to angle of jaws. Lower lip rosy with blue margin and crossed by blue line at base. Two short longitudinal blue lines on sides of throat, base of pectorals rosy with a deep green line across base of rays. Dorsal rosy at base and broadly margined with deep blue, the median portion of the fin between these colors being bright red above and deep green below, the green color fading out and changing into a bright yellow on posterior portion of soft dorsal. Caudal with upper and lower rays bright blue, the second and third upper and lower rays bright pink, the remainder of fin rather dark blue. Anal blue-green, the margin and base darker blue, the median portion with tint of pinkish, showing some darker greenish blotches between the rays. Ventrals with rays deep blue-

green except second rays which are bright pink. Pectorals uniform red, a green line across base.

Color in alcohol. The above striking colors almost entirely disappear and the fish becomes a dull yellowish brown, the fins show very indistinctly the markings described above, the blue of the margins fading into a yellowish white; the deep green wedge-shaped area between eye and axil of pectorals becomes a yellowish area of no distinct shape, while the lines which radiate from eye almost entirely disappear. The pectoral becomes yellowish white with a dusky dot on its upper axil.

Type is No. 5414 from Puerto Princesa, Palawan Island, 20 August, 1908. Length, 225 millimeters, and cotype No. 5411 from the same locality.

Family PSEUDOCROMIDÆ.

Pseudochromis aurea Seale, sp. nov.

Head 3.40; depth 3; dorsal III, 26; anal III, 14; scales 41, vertical series 14; eye 4; snout 3.75; interorbital 5; maxillary 2.50, its distal end on a line with pupil; mandible 1.90.

Body oblong, compressed, the upper anterior outline from origin of dorsal to tip of snout is a low even curve, the lower outline comparatively straight. Depth of caudal peduncle 1.85 in head, its length one-half its depth. Mouth of moderate size, the lower jaw projecting. Teeth in front of jaws in several series with about 4 large curved canines, teeth on sides of jaws in single series, teeth on vomer and palatines. Cheeks with 4 rows of scales, opercle with a single flat obtuse spine and covered with large scales. Gill openings carried forward slightly past angle of preopercle. Gill rakers rather flat and wide, about 13 on lower limb. Three membranous points to lower limb of preopercle. Pseudobranchia present.

Entire body covered with fine smooth scales which have a finely denticulate border.

Origin of dorsal midway between tip of snout and base of 11th ray of soft dorsal, the spines rather weak, the longest 3 in head, the longest ray 1.30 in head; caudal rounded, its length equal to head. Origin of anal about midway between end of caudal vertebra and posterior margin of opercles, the length of its base equal to head, its third spine the longest, 2.30 in head, its longest ray 1.50 in head. Origin of ventrals but slightly nearer anal than to tip of snout, the rays elongate reaching to base of anal. Pectorals 1.14 in head.

Color in life bright orange, most of the scales below the lateral line, except on thorax, have a bright blue dot. Two blue lines cross the eye-ball but do not extend out of orbit, head uniform yellow orange, very slightly dark above, fins all uniform orange without markings.

Color in alcohol uniform yellow, most of scales showing indication of a dot on each scale, blue lateral line except on thorax and head; fins yellow, some indistinct indications of dots on anal.

Type is No. 4899 from Sitanki Island, Jolo Archipelago, P. I., 18 July, 1908. Length, 90 millimeters. Numerous cotypes.

Pseudochromis rex Seale, sp. nov.

Head 3.50; depth 2.90; dorsal III, 25; anal III, 14; pores in lateral line 44, 16 scales in vertical series; eye 4.50 in head; snout 3.20; interorbital 4.20; maxillary 2.50, its distal end under anterior margin of eye; mandible 1.90; width of preorbital 1.75 in orbit.

Body oblong, compressed. Upper anterior profile from origin of dorsal to tip of snout, a moderate and even curve. Depth of caudal peduncle 1.55 in head, its length about one-half its depth. Mouth of moderate size. Lower jaw slightly projecting. Teeth in anterior of jaws in several rows with several large curved canines, those in side of jaws in single row, conical, sharp-pointed. Teeth on vomer and palatines. Cheeks with five rows of scales. Preorbital with two or three membranous points; opercles with a single flat spine. Gill openings rather narrow, scarcely extending forward to angle of preopercle. Gill rakers short and thick, with asperites on inner surface, 12 on lower limb. Pseudobranchia present. Entire body and head, except snout and chin, covered with fine smooth scales; scales on opercles largest; fins, except caudal, unscaled. Origin of dorsal midway between tip of snout and 10th ray of soft dorsal, the dorsal spines very thick and stiff, the third the longest, equal to length of snout, the first dorsal ray considerably longer, 1.75 in head. Base of anal almost equal to length of head, its origin midway between end of caudal vertebra and posterior margin of opercle, its longest ray 2 in head. Ventrals 1.40 in head, their spine 2, their origin is midway between anal and gape of mouth. Pectorals 1.20 in head. Caudal rounded in young, but with upper and lower rays slightly produced in old specimens, length of caudal 1.12 in head.

Color in life. Upper anterior portion of head and body dark bluish with a jet black line equal to width of pupil from tip of snout through eye to below the anterior third of soft dorsal, some dusky dots below the posterior half of this line, general color of body yellow, belly and chin pale blue, dorsal dusky on base with bluish wash, the outer two-thirds of fin yellowish white posteriorly, caudal and anal uniform yellow, ventrals bluish white, pectorals yellowish.

Color in alcohol. Upper anterior portion of body and head brownish with some fine black specks. A black line from snout through eye, extending back and becoming more diffused, fading out under posterior third of soft dorsal. Other portions of body yellowish white without markings, dorsal dusky at base, lighter on its distal half, other fins uniform yellowish white.

Numerous specimens. Type is No. 4631 from Sitanki Island, Jolo Archipelago, P. I., 4 July, 1908. Length, 120 millimeters.

Labracinus flavipinnis Seale, sp. nov.

Head 3.50; depth 3.75; dorsal II, 20; anal III, 10; scales 36, lateral line interrupted; vertical series $10\frac{1}{2}$; eye 3.10; snout 4.75; interorbital equal to snout; maxillary 3.75, its distal end under anterior margin of pupil.

Upper and lower outlines of body evenly and equally curved, depth of caudal peduncle 1.75 in head, its length 2 in head. Head moderately pointed. The lower jaw slightly longer. Mouth oblique, small. Teeth of upper jaw fine, in several bands, with about 6 enlarged anterior canines. Teeth of lower jaw in a single series on sides with two enlarged canines and bands of small teeth in front. Teeth on vomer and palatine. Scales on cheeks in three rows; opercular and preopercular margins entire. Gill openings wide, being carried forward to a line with posterior margin of orbit. Gill rakers thin, sharp-pointed, short, about 12 on lower limb.

Body and head, except snout and chin, covered with rather small smooth scales, caudal scaled for half its length, other fins unscaled, about ten rows of scales in front of dorsal. The two dorsal spines short, the second being about half length of first ray, the longest ray about 2.10 in head. The caudal is rounded, 1.30 in head. Origin of anal midway between end of last caudal vertebra and a line with middle of opercle, its rays about 2 in head. Origin of ventrals slightly in front of origin of pectorals, being considerably nearer the tip of snout than to anal, its length 1.14 in head. Pectorals 1.25.

Color in life yellowish brown, darkest anteriorly, the posterior half of body with some small vertical blue marks. Top of snout, interorbital space and nuchal region back along base of spinous dorsal black. Lower half of spinous dorsal jet black, the upper half orange, a narrow yellow line between the colors. Caudal yellow, a jet black line extends from along top of caudal peduncle into the fin where it forms a submarginal wedge-shaped band; anal and ventrals pink; pectorals yellowish brown.

Color in alcohol similar to above but less bright, the bluish markings obsolete.

Type is No. 4410 from Zamboanga, Mindanao, P. I., 11 June, 1908. Length, 46 millimeters.

Family OSPHROMENIDÆ.

Osphromenus insulatus Seale, sp. nov.

Head 3.18; depth 2.75; dorsal VII, 8; anal XI, 32; scales about 45 in lateral series, from 20 to 34 pores in lateral line which is very irregular, in the type specimen the line is broken on one side and jumps 4 scales, in some cotypes the line is broken in two or three places and jumps several scales, in the type the lateral line has a distinct arch anteriorly as in the carangoids, becoming more or less straight about the middle

of fish; ventrals 5, the first ray filiform, extending to caudal, the other rays very small, almost atrophied. Maxillary short, slightly less than diameter of eye; interorbital space 2.50 in head.

Body oblong, compressed, the head is pointed, the profile from nuchal region to tip of snout is very slightly concave. Depth of caudal peduncle 2.35 in head.

The interorbital space is slightly convex, the mouth is small and directed upward, the lower jaw strongly projecting; width of preorbital is two-thirds of eye, it has a strong notch which receives the tip of the maxillary, lower margins of preorbital provided with about 8 distinct teeth. Jaws with bands of small sharp teeth including several enlarged canines, the latter being curved and more or less projecting; no teeth on vomer or palatine. The posterior margin of preopercle is entire, but its lower limb is margined by a row of long sharp teeth. Opercle without spine, ending in a sharp membranous flap. Three rows of scales on opercles and four on cheeks. Gill openings united on isthmus. Gill rakers numerous, short, flat, sharp-pointed.

Entire body including head covered with fine ctenoid scales, scales largest on opercles, soft dorsal with large scales on base, caudal and anal scaled, throat scaled.

Origin of dorsal is midway between pupil and end of last vertebra, the spines graduate in size, the last one the longest, about 2.1, the rays in male specimens elongate, greater than length of head, caudal slightly inclined to be bilobed, its length slightly greater than head. Spinous anal fitting into a scaly sheath, origin of its first spine midway between tip of upper jaw and ninth anal ray, the spinous portion contained about twice in soft posterior portion, the longest spine about 3 in head, the longest ray 1.35. Origin of ventrals in advance of pectorals, their anterior ray reaching to, or almost to, base of caudal. Pectorals about equal to length of head.

Color in life brown with some irregular blackish marks on shoulders, some yellowish on opercles and on thorax, some vivid pink at base of anal, extending almost length of base. Dorsal, yellowish brown in females, brown in males, the rays marked with yellowish dark-ringed spots. Caudal brown with numerous yellowish spots, anal brown with some yellowish spots, pectorals brown, ventrals yellowish, a distinct black spot at base of caudal, another on middle of side.

Color in alcohol similar to above but yellow much faded, and the pink at base of anal disappears.

Type is No. 4951 from lake on Cagayan-Sulu Island, Sulu Sea. Length, 73 millimeters. Numerous cotypes.

It is rather interesting to find this form in a crater lake on this volcanic island, isolated as it is in the Sulu Sea.

Family GOBIIDÆ.

Genus **BIAT** Seale, new genus.*

This genus is related to *Oxyurichthys* Bleeker but differs in being without nuchal crest or tentacle and in having the upper teeth in two or more series. From *Gobionellus* Girard it differs in having the teeth firm instead of movable. From *Gobiichthys* Klunzanger it differs in having no tentacle over eye and in other respects. It is characterized by the smooth head, without scales, tentacles, or crest, the extremely elongate fully united ventrals, the fine ctenoid scales which are larger posteriorly and the many rayed (16-17) dorsal and anal.

Type is *Biat luzonica* Seale, No. 2040 in collection of Bureau of Science, Manila, from east coast of Luzon Island. Length, 190 millimeters.

Biat luzonica Seale, sp. nov.

Head 4.10; depth 5.10; dorsal VI, 16; anal 17, scales about 110 in a median line; about 25 in lateral series; head entirely naked; eye 4.75 in head; snout 4; eyes close together, the interorbital space less than width of pupil; maxillary 2.45 in head; mandible 2.10.

Body elongate, cylindrical, its greatest width 1.50 in its depth. Depth of caudal peduncle 2.30. Head rather blunt, the anterior profile of head from eye to tip of snout has an angle of about 45 degrees. The mouth is slightly oblique, the lower jaw a little the longer. Gill openings rather wide, being carried forward to a line with angle of preopercle. Gill rakers short and blunt, 10 on lower limb. Margins of opercle and preopercle smooth. The teeth of each jaw are in several series with the addition of an irregular row of short curved canines, the anterior ones being enlarged. Tongue is rounded and adnate to floor of mouth for its entire length. No teeth on vomer or palatine. No barbules or tentacles. Lips with fold of skin, no lines of cirri, or prominent mucous pores, except one with a bifurcated opening on back part of interorbital space.

The entire body is covered with fine ctenoid scales which become larger posteriorly. About 25 series of scales in front of dorsal which, however, do not encroach upon the head.

Spinous dorsal of 6 thin flexible spines which tend to become filamentous, the longest about 1.50 in head, the origin of spinous dorsal is midway between tip of snout and base of third soft ray. Longest ray of soft dorsal 1.45 in head. Origin of anal midway between end of caudal vertebra and angle of preopercle, its base 3.10 in length of fish without caudal, its longest ray 1.50 in head. Caudal lanceolate in shape, its length almost a fourth greater than head. Origin of ventrals midway between anal and angle of mouth, the fin united its entire length, and with a deep membranous cup which has a smooth margin, the fin very

* Biat=Philippine name for goby.

long extending to base of anal, its length greater than head being almost equal to caudal. Pectorals 1.14 in head, their bases rather thick but not nearly so strongly developed as in *Periophthalmus*.

Color in alcohol (the specimen was not seen by us in a fresh state) yellowish brown with six wide dark bluish bars over back and sides, the first occupying anterior part of head including the snout and eyes. Second on nuchal region down to opercles. Third from median portion of spinous dorsal. Fourth from anterior third of soft dorsal. Fifth from posterior part of soft dorsal. Sixth on base of caudal fin. These bands are but little narrower than the interspaces and the margins are not sharply defined although the bands themselves are quite distinct. A few small yellowish spots probably red or blue in life on upper portion of head behind eye. Spinous dorsal grayish with dusky center, soft dorsal dull yellowish as is also the caudal. Anal yellowish, darker at tip with two or three narrow submarginal lines. Ventrals dark gray. Pectorals yellowish.

Type is No. 2040, from the east coast of Luzon, P. I., June, 1907. Secured by Mr. W. D. Carpenter. Length, 190 millimeters.

MACGREGORELLA,⁹ new genus.

This genus is characterized by the presence of numerous striking ridges and pockets of membrane with fringed margins on various portions of the head. The head otherwise entirely naked. No scales in front of dorsal. No pectoral filaments, no barbules, although the folds of membranes from a side view give the appearance of barbules in the figure. Body finely scaled, teeth in bands in each jaw, no large canines, tongue rounded, free at tip. Soft dorsal and anal of 9 to 12 rays. The rays or spines not elongate. Type of genus is *Macgregorella moroana* Seale from Jolo, No. 3575 in fish collection of Bureau of Science.

Macgregorella moroana. Seale, sp. nov.

Head 3.60; depth 5.50; dorsal VI, 11; anal 9; scales about 46, 16 in vertical series; eye 5 in head; snout 3; interorbital, a mere ridge about equal to pupil; maxillary 3.20, its tip not reaching to margin of eye; mandible 2.50; head and nuchal region without scales. The head is curiously marked by numerous membranes with fringed margins, the three large vertical ones on the cheeks being somewhat pocket-like. There are about twelve of these membranous cross-ridges between the tip and the angle of the preopercle, with two wide longitudinal membranes on the median line of lower jaw, preorbital and snout each with two or more membranous ridges, longitudinal as well as vertical membranous ridges on cheeks. Lips with folds, mouth small, bands of small teeth in each jaw, the outer series in upper jaw slightly enlarged, no decidedly

⁹ Named for Richard Crittenden McGregor in recognition of his noteworthy work in Philippine zoölogy.

enlarged canines; the orbital ridges are not prominently developed nor roughened. No filiform rays to pectorals, no barbules. Gill openings confined to sides. The origin of dorsal is midway between tip of snout and seventh dorsal ray, none of the spines elongate, the longest about 1.50 in head, longest dorsal ray 1.40 in head. Caudal acuminate, about one-third longer than head, longest anal ray 1.30 in head, pectorals almost equal to length of head.

Color in life yellowish white, marbled and mottled with brown and grayish. Three irregular-shaped oblique dusky bands backward and downward, one from spinous dorsal, two from soft dorsal; some dusky stripes on sides of head, one from snout to eye, another from eye to upper margin of opercle, another from posterior margin of eye obliquely backward, two others on lower sides of cheeks. Dorsal yellowish with dusky blotch in lower central portion and some other slight shadings of dusky scattered over the fin. Soft dorsal with about three oblique dusky bars, the middle one most distinct, posterior tip of fin dusky. Caudal yellowish gray with three dark bands triangular in shape, the angle pointing backward. Anal yellow with three dusky oblique bars, posterior tip of fin dusky. Ventrals pinkish with slight blotches of dusky. Pectorals yellowish, a dusky irregular bar running out on upper half of fin.

Color in alcohol. Similar to above but with the brown markings showing more distinctly, there being a dusky bar on sides of belly and another at origin of anal. A brown bar across nuchal region, a distinct brown bar obliquely downward and backward from eye, another in front of eye, and three on lower part of cheeks, fins colored as in life.

Type is No. 3575 from Jolo, Jolo Island, P. I. Length, 54 millimeters.

***Rhinogobius perpusillus* Seale, sp. nov.**

Head 3.85; depth 4; dorsal VI, 14; anal 14; scales 56, about 20 in vertical series; eye 3.85; snout 4; interorbital about equal to snout; maxillary 2.75 in head, its tip under anterior margin of pupil; mandible 2.30. Head naked except about 3 rows of scales on upper third of opercle, nuchal region finely scaled. No filamentous pectoral rays.

Body somewhat oblong and compressed, the upper and lower outlines about equally curved, the depth of caudal peduncle 2 in head. The head is rather bluntly pointed, the median width of snout being about equal to its median depth. The mouth is oblique, the lower jaw slightly longer. The tongue is rounded and adnate to floor of mouth. Teeth in upper jaw in two rows those of the outer row enlarged, curved, those of lower jaw in two rows rather large, curved, the outer ones projecting; an enlarged, recurved canine on side of jaw, no teeth on vomer or palatine. Gill openings small, restricted to sides. Body and nuchal region covered with fine scales which are slightly roughened at their margins. Origin of dorsal is midway between tip of snout and base of fourth dorsal ray, its spines not elongate, the longest 2 in head, longest dorsal ray 1.50.

Origin of anal about midway between base of anal rays and angle of preopercle, its rays not elongate. Origin of ventrals much nearer tip of snout than to anal, being directly below the origin of pectorals, their length 1.20. Pectorals about equal to head, caudal slightly rounded, about equal to length of head.

Color in life a distinct whitish with a slight wash of yellow, with 3 very dark brown stripes on each side, the first from between interorbitals to and along base of dorsals, the second from tip of snout to caudal, running along the top of caudal peduncle; the third a wide heavy band from around lower lip across cheek and upper base of pectoral to middle of caudal where it ends in a black spot on the middle of caudal base, on the rays; lower half of body uniform whitish unmarked, dorsal whitish crossed by a dark band on upper third, soft dorsal grayish, darker on posterior half and with dark bar near top of fin. Caudal yellowish with dark brown line extending out on upper and lower margins. Anal yellowish at base, becoming dark on outer half; ventrals yellowish with slight grayish shading. Pectorals yellow.

Color in alcohol is similar to above but is less bright. In two specimens Nos. 1276 and 5106 the side bands are almost obliterated or small, except the wide heavy band from lower jaw, and the black spot on caudal, these specimens also show very indistinct indications of about 5 grayish cross-bands over back, they may be a distinct form.

Type is No. 4022 from Zamboanga, Mindanao. Length, 45 millimeters.

***Rhinogobius carpenteri* Seale, sp. nov.**

Head 3; depth 6; dorsal VI, 9; anal 9; scales about 38, $8\frac{1}{2}$ in vertical series, a few scales directly in front of dorsal, otherwise the entire nuchal region and head naked; eye 5; snout 2.80; interorbital about equal to pupil; maxillary 2.55; mandible 2.10.

The upper and lower outlines are but little curved; the head is bluntly pointed, the depth of caudal peduncle is about 3, its length 1.50 in head, greatest width is at head which is 1.50 in its length, its depth being 2.25. Jaws even, mouth small, tongue almost square at tip. Jaws with several rows of teeth, the outer of which are sharply curved, canine-like. No teeth on vomer or palatines, cheeks fat. Gill openings restricted to sides. Gill rakers short, flat, about 7 on lower limb.

Origin of dorsal posterior to ventral, its longest spine 1.85 in head, the longest dorsal ray 2 in head. Origin of anal nearer to base of caudal than to origin of ventrals, being under the base of fourth dorsal ray, the longest ray 2.50 in head. Ventrals very short and disk-like, length 1.75 in head, their origin much nearer tip of snout than to anal. Caudal rounded, its length 1.30 in head. Pectorals 1.30 in head.

Body covered with small smooth scales with very fine ctenoid edges, no scales on nuchal region or head.

Color in life dull yellow-brown, uniform whitish on under jaw, eyes

blue, fins grayish, 2 anterior spines silvery white, rays of anal silvery white, caudal washed with dusky at tip.

Color in alcohol similar but less bright. Numerous specimens. Type is No. 914.

All specimens and type from the Trinidad River, Baguio; elevation, 1,500 meters; Luzon, P. I.

Pleurogobius boulengeri Seale, sp. nov.

Head 3; depth 3.75; dorsal VI, 12; anal 10; scales about 30, 9 in vertical series; eye 3 in head; snout 4.50; interorbital a mere ridge, being less than pupil; maxillary about equal to eye, ending on a line with margin of eye; mandible 1.85 in head; head naked except a few scales on upper edge of opercle and on nuchal region.

Upper outline of body more curved than lower, the greatest depth at origin of dorsal, the greatest width being at opercles where it is 1.35 in head. Head rather blunt, the lower jaw projecting, the mouth being somewhat oblique. Depth of caudal peduncle 2.50 in head.

Head without barbules or cross-lines of cirri on cheeks, median portion of snout, however, somewhat roughened by two prominent lines of mucous pores. Mouth rather large, tongue free, sub-truncate at tip. Teeth in several rows in each jaw, the outer row enlarged, curved, canine-like, but without prominent recurved canine on sides of lower jaw. Gill openings restricted to sides.

Body fully covered with fine smooth scales which cover nuchal region and extend slightly on upper margin of opercles, otherwise head entirely naked.

Origin of dorsal midway between tip of snout and base of fifth dorsal ray, the spines fine, not elongate, their longest 2.25 in head. Longest soft dorsal ray 1.75 in head; caudal rounded 1.25 in head. Origin of anal is midway between end of caudal vertebra and the angle of the preopercle, its longest ray 1.85 in head; origin of ventrals nearer tip of snout than to anal pore, their length 1.10 in head. Pectorals scarcely equal to head.

Color dark brown banded by 12 narrow white, dark-margined vertical bands which completely encircle the body and are of much less width than the interspaces, four of these bands are on the head, the first over the snout just in front of eyes and down to angle of mouth, the second from outer part of nuchal region down through eyes, the third and fourth from nuchal region down sides of head, the fifth from origin of dorsal over base of pectorals, the remainder at regular intervals on body, there being one around the middle of caudal peduncle and another at base of caudal; these last two indistinct. Vertical fins uniform dark grayish, pectorals and ventrals yellowish white.

Type is No. 5505 from Puerto Princesa, Palawan Island, P. I. Length, 35 millimeters.

Named for Doctor Boulenger of the British Museum whose work on Palawan fishes I have found of great assistance.

Gnatholepis davaoensis Seale, sp. nov.

Head 3.75; depth 4.20; dorsal VI, 12; anal 11; scales about 26, in lateral series; cheek and opercle scaled; eye 3.75 in head; snout 3.75; interorbital a mere ridge; maxillary 2.85, ending on a line with anterior margin of eye; mandible 2.

Upper and lower outlines of body about evenly and equally curved, depth of caudal peduncle 2 in head, its length 1.25 in head. Head rather bluntly rounded, the mouth oblique, jaws equal, tongue strongly bilobed, teeth in upper jaw in several series, the outer one being enlarged curved canines. Teeth of lower jaw in two series, the outer one of curved projecting canines, a large recurved canine on each side. No barbules, margin of preopercle entire. No filamentous pectoral rays. No mucous cirri.

The body and head, except snout and chin, are fully scaled, the scales being large, thin and smooth, three rows on cheeks.

Origin of spinous dorsal, midway between tip of snout and base of fifth dorsal ray, the longest spine 1.30 in head, about equal to longest ray. Caudal rounded, a fourth longer than head. Origin of anal is midway between end of caudal vertebra and angle of mouth, being on a line with the second dorsal ray, its longest ray equal to head. Ventrals very long, equal to caudal, their tips reaching to anal, their origin much nearer tip of snout than to anal, being directly below the base of the pectoral. Pectorals equal to head.

Color dull yellowish gray with 6 dusky blotches along sides, three or four distinct black dots at base of caudal, a black band from eye to middle of throat, some scattered black specks over body and indistinct indication of some dusky bars over back. Spinous dorsal grayish with several scattered dusky spots and ten black dots on lower part of fin. Soft dorsal grayish, anterior rays with slight indications of darker cross bars. Caudal grayish with numerous indistinct brownish dots and several larger distinct black spots on lower half of fin. Anal is most peculiarly colored with round black and white spots alternating as on a checker board. Ventral grayish with a black margin, pectorals grayish.

Type is No. 3858 from Samal Island, Gulf of Davao, Mindanao, P. I. Length, 45 millimeters.

This may be identical with the fish called *G. deltoides* by Jordan and Seale in *Fishes of Samoa*, but their specimens differ decidedly from the type of *G. deltoides* in lacking the characteristic markings which were present in all our 18 specimens from Guam, and in our Philippine specimens also, which are, however, different from the Guam form, therefore we deem it best to give this present species a new name, and it is probable that the Samoan specimens, also represent a new species.

Vaimosa microstomia Seale, sp. nov.

Head 3.80; depth 3.50; dorsal VI, 8; anal 8; scales 27, 8 in vertical series; eye 3.75; snout 5.25; interorbital about one-half diameter of eye; maxillary 2.75 in head, its tip under anterior margin of eye; no filaments on pectorals, nuchal region and opercles fully scaled, cheeks otherwise naked, the cheeks proper being crossed by 2 short lines of mucous pores. No elongate rays or spines.

Upper and lower outlines of body about equally curved, snout is bluntly rounded, heavy, overhanging the mouth; upper jaw slightly projecting. Depth of caudal peduncle 1.50 in head, its length about equal to head. Mouth small. Tongue truncate. Teeth in minute bands in each jaw, no enlarged canines. No teeth on vomer or palatine. No barbules. Gill openings restricted to sides.

Body covered with firm smooth scales which have a slightly roughened margin. Origin of dorsal fin midway between tip of snout and last dorsal ray, the longest dorsal spine about 1.50 in head, there are seven scales in front of dorsal, there are seven rows of scales between origin of spinous dorsal and origin of soft dorsal, longest dorsal ray 1.50 in head. Caudal rounded and considerably longer than head. Origin of anal midway between end of caudal vertebra and the angle of preopercle, its longest ray 1.50 in head, ventrals much nearer tip of snout than to anal, their length equal to head. Pectorals equal to head.

Color yellowish, specked and blotched with brown, some larger dusky blotches along median line, under surface white, about seven indistinct dusky bars over back. A dusky line from eye obliquely downward and backward to in front of preopercular angle. Opercles with a large dusky blotch, spinous dorsal with a large black blotch on its posterior portion, soft dorsal crossed by about six rows of small brown dots. Caudal with eight vertical brown lines. Anal yellowish with an indistinct dusky submarginal area. Ventrals and pectorals yellowish.

This species is especially characterized by the large rounded overhanging snout, the small mouth, and the small spinous dorsal.

Type is No. 827. Length, 45 millimeters. From Malabon, Luzon Island, July, 1909.

Family CALLIONYMIDÆ.

Callionymus inversicoloratus Seale, sp. nov.

Head 3.65 (measured from pore to tip of snout) depth 5.75; width at base of pectorals 4.50; dorsal IV, 8; anal 7; no scales; lateral line distinct running along dorsal surface to slightly above the center of caudal; snout 2.30; interorbital space scarcely equal to pupil; maxillary about equal to orbit; mandible equal to snout; eye 2.40; preopercular spine short and strong with three branches of almost equal size, one directed backward, one directed outward and forward, one directed inward and upward.

This species has the characteristic shape of the callionymids, the depth of the caudal peduncle is less than eye, the snout is depressed and pointed, the interorbital space a mere ridge, not concave. The preorbital bones especially prominent. The mouth is large, the upper jaw rather heavy. Bands of small sharp teeth in jaws, none on vomer or palatine. Nuchal region with four bony asperities one in middle and back of interorbital space, one on each side of nuchal region and a small one in a median line behind these two. Gill openings confined to a pore on distal surface. Origin of dorsal midway between tip of snout and base of sixth dorsal ray, the spines not elongate, the longest 1.75 in head, the membranous portion somewhat quadrangular, longest dorsal ray 1.14 in head, the anterior and the posterior rays being longer than the others. Anal rounded, its length 2 in body. Origin of anal midway between tip of snout and base of caudal rays, its posterior ray the longest, being about equal to head, the first ray is directly on a line with second ray of soft dorsal, ventrals in front of pectorals, without free rays, their length greater than head. Pectorals scarcely equal to head.

The peculiar thing about this species is that the color pattern is inverted from the usual order; the back being uniformly grayish without markings while the entire ventral surface below the median line of sides is beautifully variegated and covered with brown spots with white ray-like markings, these white markings uniting into more or less distinct network, top of head plain gray, sides of head with blue lines and dots with some brownish blotches, a black spot at base of opercular spine and with a narrow dusky line extending from this spot to angle of jaws. Dorsal fins plain grayish, caudal white with three rows of vertical black dots and with the two lower rays dusky. Anal white at base, dusky on its outer half, some narrow blackish marks on center. Ventrals grayish with some dusky and some bluish specks. Pectorals whitish with several rows of smaller inconspicuous brown dots, about three brown spots on base of fin.

Type is No. 3748, from Samal Island, Gulf of Davao, Mindanao, P. I. Length, 60 millimeters. Ten cotypes.

Calliurichthys neptunia Seale, sp. nov.

Head 4.75 (measured from tip of snout to pore of gill openings); depth 11.75; dorsal IV, 9; anal 8; no scales; lateral line distinct and on the dorsal surface, extending out on caudal posteriorly; eye 3 in head; snout 2.30; interorbital less than pupil; a strong straight spine at angle of opercle, six short teeth on its anterior surface and a short spine directed forward at its base, caudal extremely elongate, about one and a half times longer than body without caudal; maxillary 2.75 ending on a line with anterior orbital ridge; mandible 2.55 in head.

Body rather flat, depressed and triangular shaped anteriorly in its lateral outline, cylindrical posteriorly; snout depressed. Interorbital

space a mere ridge. Depth of caudal peduncle 4 in head. Snout flat, its median depth about one-half its width. Jaws equal, the upper jaw protractile. Bands of short sharp teeth on each jaw, those in anterior of lower jaw largest, projecting, brush-like. Preopercle armed with spine described above, opercle unarmed. Gill opening confined to a small pore on dorsal surface just exterior to origin of lateral line. A roughened plate with ten tubercles on top of head posterior to eyes. Outline of spinous dorsal almost square, the 1st to 3rd rays elongate filiform, longer than the webbed portion, the longest dorsal ray is almost 2 in length of fish without caudal, the origin of spinous dorsal is midway between tip of snout and 3rd dorsal ray. Posterior ray of soft dorsal the longest 1.1 in head. Caudal lanceolate and elongate, the two median rays extremely filiform. Origin of anal slightly nearer tip of under jaw than to base of caudal, its anterior ray being on a line with second ray of dorsal, its longest ray equal to head. Ventrals jugular, their base connected by membrane with base of pectorals, their longest ray 3.50 in body without caudal. Pectorals about equal to head.

Color in alcohol brownish above with numerous black specks and line-like blotches, mingled posteriorly with small bluish white markings, uniform yellowish white below the middle of side, belly bluish white. A dark brown mark extending the length of throat becoming cross-shaped on the thorax. Branchiostegal membranes with numerous fine white longitudinal wave-like lines. A dusky bar vertically downward from eyes. Spinous dorsal dusky, somewhat lighter on its upper and lower borders. Soft dorsal white with numerous fine black broken lines and dots. Anal white at base, outer half black, bordered by a fine white line. Caudal with alternating white and black areas or bars. Ventrals grayish mottled with fine dots and lines. Pectorals with fine brownish specks, outer third of lower rays white.

Type is No. 2317 from Balayan Bay, Luzon, P. I., 20 January, 1908. Length, 190 millimeters, and cotype from same locality, length, 160 millimeters.

This species is quite different from *C. longicaudalis* with which I have compared it.

***Synchiropus zamboangana* Seale, sp. nov.**

Head 3.70; depth 5.20; dorsal IV, 8; anal 7; body and head without scales, a single well-developed lateral line; eye 4 in head; snout 3; inter-orbital about equal to pupil; maxillary slightly less than eye, its tip scarcely reaching a line with eye; mandible 2.75 in head; preopercle with a single strong spine directed backward with two small spines on its interior side and two slightly larger spines directed forward on its outer side, the tip of the large spine ends in a line with the gill openings. Villiform teeth in jaws, none on vomer or palatine.

Body cylindrical, snout depressed and pointed, width of head almost a third greater than its depth; depth of caudal peduncle equal to snout.

A roughened asperite on nuchal region behind each eye, the space between these smooth, slightly concave. Interorbital space strongly concave, profile of snout concave, anterior ocular ridge especially prominent. Gill openings confined to a small pore on dorsal surface.

Origin of dorsal is midway between tip of snout and base of second dorsal ray, the anterior spine prolonged, the first 2.14 in length of fish without caudal, the remaining spines are graduate, the last being 2 in head, the origin of the soft dorsal is the width of the eye posterior to last dorsal spine, its longest ray equal to head and longer than its posterior ray. Caudal rounded, its length a third greater than head. Origin of anal midway between base of caudal and angle of ventrals, being below the third dorsal ray, its posterior ray is the longest 1.30 in head, differing in this respect from the shape of the soft dorsal, ventrals are in front of pectorals, a single detached anterior ray which is slightly less than length of head, length of ventrals 2.25 in fish without caudal; pectorals scarcely equal to head.

Color in life brown, marbled and mottled with drab and pale blue. Spinous dorsal brown on lower half, black on upper half, six large yellow spots in the membrane, four between the second and third spines, two between third and fourth spines. Soft dorsal mottled with yellow and brown, its distal third black. Caudal yellow, broadly margined with brown, a submarginal row of brown spots and two additional rows of brown spots on 4 upper rays near base and middle of fins respectively. Anal yellowish at base, dusky on outer two-thirds, about three longitudinal rows of bright blue dots extending the length of fin. Pectorals yellowish brown, with darker markings, ventrals yellowish brown, darker on outer third, the lower ray with about four brown bands and tipped with yellow.

Color in alcohol similar to above except that about five darker cross-bands show on the back, and the sides have whitish rings and ocelli; belly white; the spinous dorsal seems to have 3 or 4 dusky cross-bars and a dusky spot between the two last spines. The pectorals have about 5 cross-rows of dots, the lower rays uniform yellow, the ventrals are brownish except at base which has four pale brown bars extending into fin. Top of eyes dusky, some dusky markings on cheeks.

Type is No. 4456 from Zamboanga, Mindanao, P. I., 16 June, 1908. Length, 73 millimeters. Cotype No. 3070.

ILLUSTRATIONS.

PLATE I. *Barbus ivis* Seale, sp. nov.

II. *Oxyporhamphus brevis* Seale, sp. nov.

III. Fig. 1. *Atherina regina* Seale, sp. nov. Fig. 2. *Atherina balabacensis* Seale, sp. nov.

IV. *Mugil joloensis* Seale, sp. nov.

V. *Mugil banksi* Seale, sp. nov.

VI. *Caranx auriga* Seale, sp. nov.

VII. *Caranx butuanensis* Seale, sp. nov.

VIII. *Epinephelus albimaculatus*, Seale, sp. nov.

IX. *Dentex filiformis* Seale, sp. nov.

X. *Lethrinus cutambi* Seale, sp. nov.

XI. *Lethrinus atkinsoni* Seale, sp. nov.

XII. Fig. 1. *Pomacentrus tropicus* Seale, sp. nov. Fig. 2. *Pomacentrus elongatus* Seale, sp. nov.

XIII. *Abudefduf coracinus* Seale, sp. nov.



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