

DESCRIPTION OF DEEP-SEA FISHES FROM THE COAST OF HAWAII, KILLED BY A LAVA FLOW FROM MAUNA LOA.

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In November, 1919, I received from a former student, Mr. Carl Schurz Carlsmith, a resident of Hilo, Hawaii, a small collection of fishes killed on the southwest of the island of Hawaii by a lava flow from an eruption of Mauna Loa.

The circumstances under which these were taken are related by Mr. Carlsmith as follows:

At the end of September, 1919, a lava flow started in the district of Kau on the island of Hawaii, and flowed to the sea through the land of Alika, which name was given to the flow to distinguish it from others. The lava was of a very fluid variety, and upon reaching the sea it built a tunnel for itself upon the floor of the ocean. The offshore water at this point is very deep, and within a hundred feet or more of the shore reaches a depth of at least 200 fathoms. On visiting the place in a native canoe on the night of October 1, I found that the subterranean tunnel was bursting at various points with heavy detonations and sending up thick clouds of steam. These clouds of steam were noticed by me as far as 2 miles from the point where the flow entered the ocean. A large number of fish, eels, and other sea life were killed by the heat and explosions, and many curious forms were found floating on the water. Some few days later, probably October 6, Tom Reinhardt, a boatman, was on his way from the flow to Hilo, and at a point, estimated by him to be 3 or 4 miles offshore, saw the water in ebullition and found a large number of boiled fish. He is a Part-Hawaiian and has spent his life on the water close to the shore. None of these fish were known to him and the specimens which are submitted herewith were taken by him floating on the top of the water and brought to the native fish inspector of Hilo. The latter did not recognize any of the forms, and I was requested to find anything definite referring to the names, habitat, and other points of interest.

The specimens were all sun-dried when received by me, but their characters are easily made out. They are of special interest as representing an offshore fauna, beyond the reach of nets, but protected from the dredge by the extreme roughness of the lava-strewn seabottom. Seven species, five of them representing each a genus new to science, are included in the collection, these having escaped the shore explorations of Jordan and Evermann in 1901, and the deep-sea work of the Bureau of Fisheries steamer *Albatross*, directed by Charles H. Gilbert in 1902.

The types of the new species are presented to the United States National Museum. A partial series is in the Bernice Pauahi Bishop Museum of Honolulu, the gift of Mr. Reinhardt.

Family MURAENESOCIDAE.

RHECHIAS, new genus.

This genus *Rhechias* seems to agree in nearly all respects with *Neoconger* Girard, differing, however, in the hook-like armature of the side of the upper jaw.

(ῥηχός, thorn.)

Type of the genus.—*Rhechias armiger*, new species.

RHECHIAS ARMIGER, new species.

Type.—Cat. No. 84097, U.S.N.M., about $5\frac{1}{2}$ inches long, much shriveled, depth about two-fifths length of head. Head pointed, as

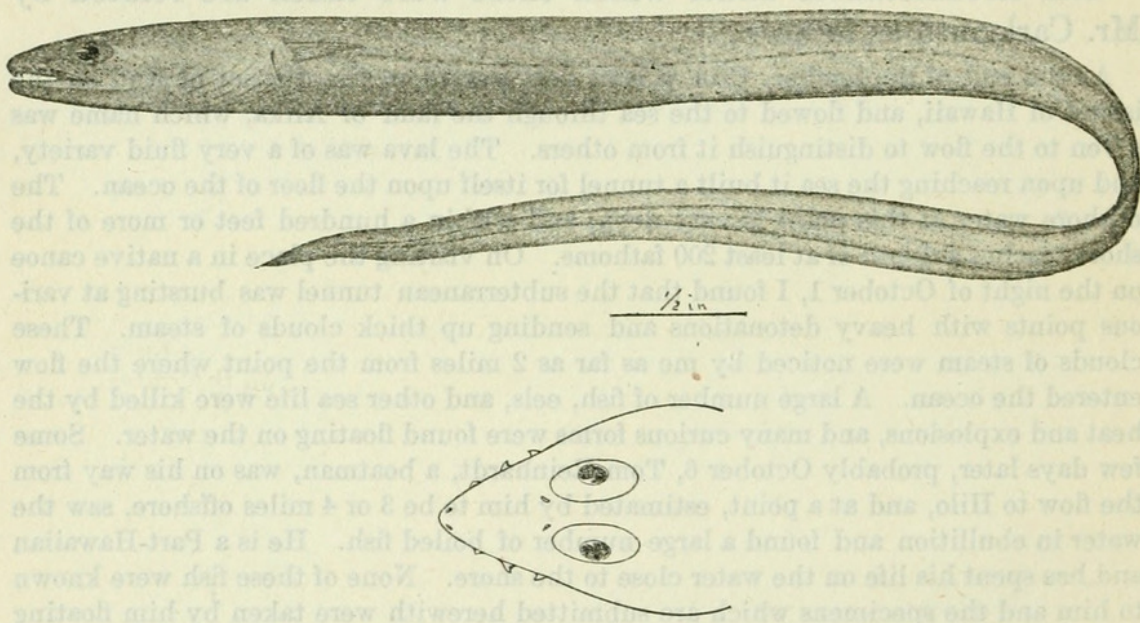


FIG. 1.—RHECHIAS ARMIGER, NEW SPECIES.

broad as deep, triangular as seen from above. Body slender, not much compressed, tapering to a very long and slender tail, which is considerably longer than rest of body. Eye moderate, near middle of cranium, about half snout, and $6\frac{1}{2}$ in head, from tip of snout to gill opening; gill opening lateral, vertical, its depth more than half eye; interorbital space very narrow. Preorbital on each side with three sharp stiff, hooked spines like bramble thorns, the first two turned backward, the last forward; tongue not free; lower jaw a shade shorter than upper, each with a narrow band of sharp, close-set, irregular teeth, relatively large and larger in front, where in the upper jaw they form a patch of small canines: a row of minute teeth on the palatines.

Posterior nostril an oblique slit just before eye; anterior nostril a round pore without barbel at tip of snout. Branchiostegals, 9; pec-

torals narrow, pointed, about as long as from tip of snout to front of pupil. Dorsal fin very low, beginning well beyond tip of pectoral, and in front of vent, as a mere fold of skin, growing higher on the tail, where for a distance the height is almost equal to length of eye; anal quite similar; tail ending in a filamentous point. Color dusky, dotted with black, especially along the lateral line; the pectorals pale, the dorsal and anal slightly darker along the edge.

Family MYCTOPHIDAE.

NYCTIMASTER, new genus.

Closely allied to *Lampanyctus* Bonaparte, having the same general form, subacute snout, and elongate pectorals, but differing in not having the scales of the lateral line enlarged. *Lampanyctus crocodilus* (Risso), the type of the genus, has these scales much larger than the others, being deeper than long. *Nannabrachium* Günther

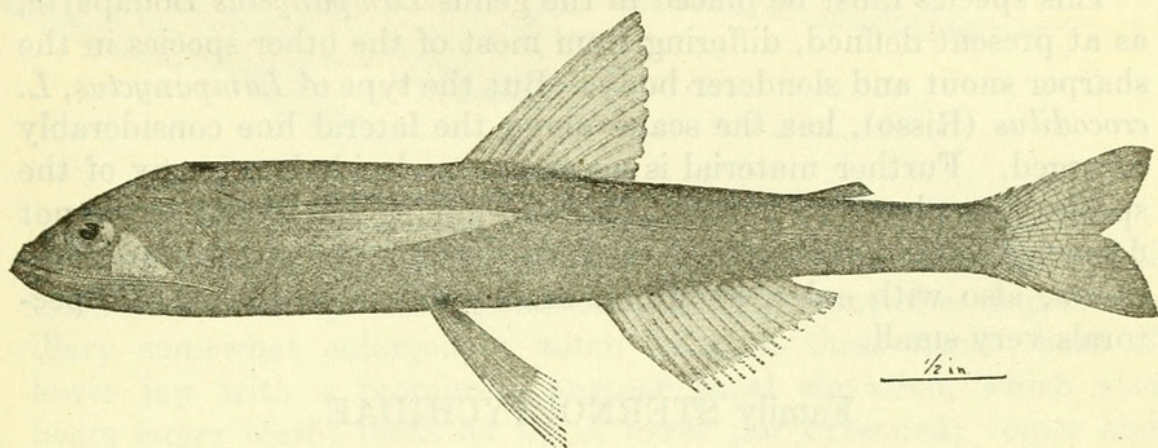


FIG. 2.—NYCTIMASTER REINHARDTI, NEW SPECIES.

agrees with *Lampanyctus* in this regard, but has the pectoral fins very short.

Most of the species thus far referred to *Lampanyctus* belong apparently to *Nyctimaster*.

(νύξ, night; μαστήρ, searcher.)

Type of the genus.—*Lampanyctus jordani* Gilbert, from northern Japan.

NYCTIMASTER REINHARDTI, new species.

Three examples badly shriveled, each about 4 inches long. The type is Cat. No. 84095, U.S.N.M. Head about $3\frac{1}{2}$ in length; depth $1\frac{2}{3}$ in head; dorsal rays about 12, anal about 16; scales 4–38–6. Body subterete, rather elongate, little compressed; head rather pointed, the mouth very large, the long premaxillary $1\frac{1}{3}$ in head, reaching far beyond eye, the posterior border of eye in front of its middle; eye rather large, about as long as snout, about 5 in head. Lower jaw slightly the longer; jaws nearly straight; the upper with a slight sigmoid curve, but with no distinct angle anteriorly. Premaxillary

very narrow, reaching angle of preopercle; each jaw with a band of small, sharp, even teeth; two patches of similar teeth on vomer; palate with two broad bands of similar teeth, the outer much the broader; no canines. Preorbital very narrow; opercle very oblique; cheeks longer than deep; opercle rather short, oblique; scales large, smooth, caducous, lateral line well developed; its scales not enlarged; some photophores on its course and on belly, but these are mostly destroyed, hence not shown in the drawing. A moderate photophore in front of eye and a large triangular luminous patch just below and behind eye. Pectoral placed rather high, narrow, long, as long as head, the lower rays short. Ventrals nearly reaching front of anal, more than half head. Dorsal inserted in front of middle of body, just behind ventrals, the first rays high, two-thirds head, adipose fin small (shriveled); anal similar to dorsal, but lower, inserted under its last rays. Caudal broken, apparently lunate. Color uniform jet black, the fins whitish, especially the pectoral.

This species must be placed in the genus *Lampanyctus* Bonaparte, as at present defined, differing from most of the other species in the sharper snout and slenderer body. But the type of *Lampanyctus*, *L. crocodilus* (Risso), has the scales along the lateral line considerably enlarged. Further material is necessary to decide how many of the species now placed in *Lampanyctus* and having the lateral scales not deepened should be assigned to *Nyctimaster*. The genus *Nannobrachium*, also with enlarged lateral scales, differs in having the pectorals very small.

Family STERNOPTYCHIDAE.

POLYIPNUS NUTTINGI Gilbert.

A very small example, $1\frac{1}{4}$ inches long. Black area along the back continuous to base of caudal and not extending down behind the scapular region. Scales mostly lost. Spine at front of dorsal relatively high, the anterior spine much lower. This specimen diverges somewhat from the account given by Gilbert, being very young and badly shriveled. The species is, however, probably the same.

Family SERRANIDAE.

RHYACANTHIAS, new genus.

Subfamily *Anthiinae*, allied to *Leptanthias* Tañaka, from Japan. Body much elongated; caudal lobes extremely attenuate in the adult; lateral line not angulated; head closely scaled; vertical fins scaleless; teeth small, no true canines, the base of the lower jaw with an elevated angular lobe with stronger teeth; dorsal and anal rays rather few. (D. IX, 7; A. III, 7.)

Type of the genus.—*Rhyacanthias carlsmithi*, new species.

RHYACANTHIAS CARLSMITHI, new species.

Type.—Cat. No. 84099, U.S.N.M., 7 inches long, besides the caudal fin, which is $1\frac{1}{2}$ inches. Head, $3\frac{3}{4}$ in length to base of caudal; depth, $3\frac{3}{4}$; dorsal rays, IX.7; anal, III.7; pectoral, 15; scales, 5–53–13.

Body compressed, lanceolate, little elevated. Head moderate, the occipital region little elevated. Interorbital space broad, with two low ridges. Eye very large, $3\frac{1}{4}$ in head, the snout three-fifth its length; mouth moderate, the broad maxillary reaching middle of eye, $2\frac{1}{3}$ in head, its tip four times width of the very narrow pre-orbital lower jaw, slightly projecting, with an emarginate, toothed symphyseal knob.

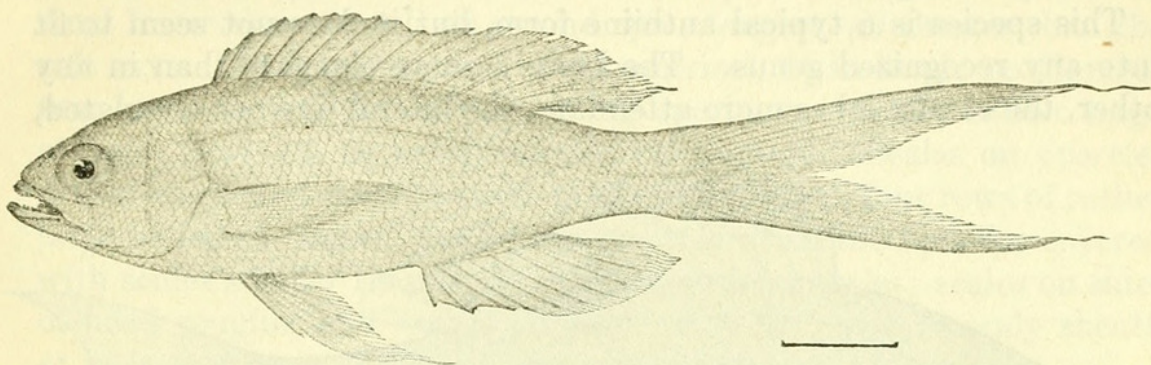


FIG. 3.—RHYACANTHIAS CARLSMITHI, NEW SPECIES.

Teeth small, even, no true canines, but those on the symphyseal knob and a corresponding patch on a knob in front of each premaxillary somewhat enlarged; a notch between these knobs; base of lower jaw with a prominent angular basal elevation, which also bears larger teeth; teeth on tip of lower jaw extended; vomer and palatines with narrow bands of small teeth, a small patch on tongue and apparently (not certainly) on pterygoids also. Propercle with a right angle, somewhat produced, the vertical and horizontal limbs entire, or nearly so. Cheek region quadrate. Interopercle prominent. Opercle moderate, with two small flat spines, besides a soft point. Gill rakers rather slender and numerous.

Head everywhere closely beset with moderate, ciliated scales, these covering forehead, preorbital, suborbital, maxillary, mandible, preopercle, including both limbs, cheeks, opercle, and interopercle. Scales on mandible smaller and smoother. Scales of body rather small, ciliated, the soft dorsal and anal nearly naked, scaled only along a basal sheath. Lateral line running high, descending in a broad, even curve under soft dorsal, not at all angulated; tubes simple, covering most of the length of each scale; caudal and pectorals with small scales basally. Dorsal and anal (dried down and not easily studied, the soft rays not certainly counted) dorsal spines slender, the third not elevated, about half head; last ray pointed, a little elevated, about three-fourths head; base of soft dorsal about

as long as that of spinous. Anal spines strong, graduated, the third longest, 3 in head; last soft ray $1\frac{1}{2}$ in head; caudal very deeply forked, slightly scaly at base, its lobes subequal, attenuate, more than twice length of head, one of its upper rays ending in a very long and slender thread, the other rays with short filaments. Filament of lower lobe shorter than upper; pectoral narrow, unsymmetrical, pointed, the rays all branched, the upper rays filamentous, a little longer than head; ventrals close together, just behind pectorals, reaching past vent, the tip slightly filamentous, as long as head.

Color uniform whitish when received, probably rosy silvery in life, with no markings or shades anywhere.

This species is a typical anthiine form, but it does not seem to fit into any recognized genus. The body is more elongate than in any other, the caudal lobes more attenuate, the lateral line not angulated,

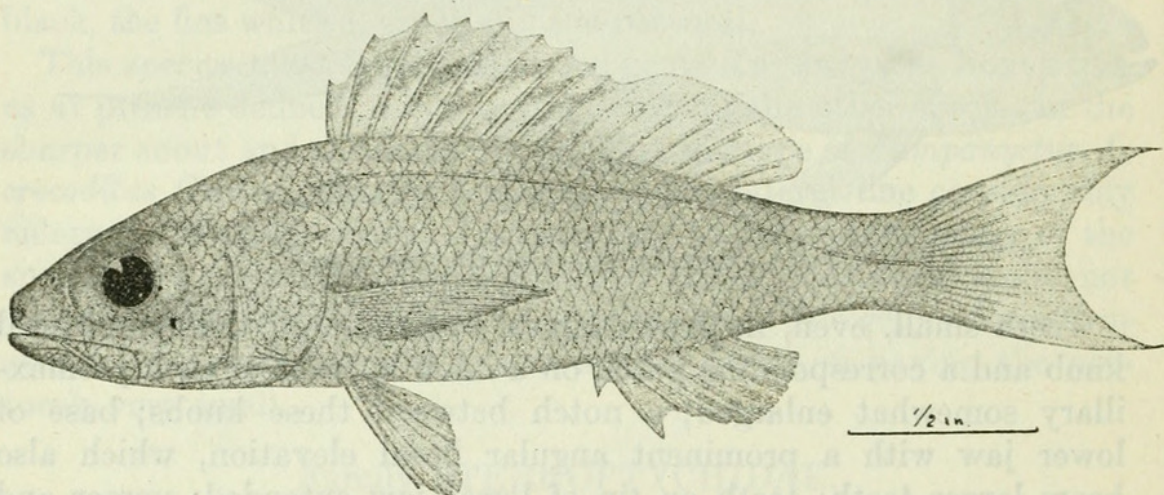


FIG. 4.—*RHYACANTHIAS CARLSMITHI* (YOUNG).

and the head closely scaled, while the vertical fins are naked. The absence of true canines and the presence of a strong toothed angle at the base of the mandible will serve to characterize the new genus *Rhyacanthias* (ῥυαζ, volcano) as also the very small number of soft rays in the dorsal, much fewer than those of the nearest ally, the Japanese genus *Leptanthias* Tanaka.

RHYACANTHIAS, species.

Another specimen of the same genus, I suppose to be the young of this species, although at first I took it to be distinct. Its length (Cat. No. 24101, U.S.N.M.) is $3\frac{3}{8}$ inches.

Head, $2\frac{3}{4}$ in length; depth, $3\frac{1}{2}$. Body elongate, the back moderately elevated, the anterior profile even; head moderate, snout short, rather abruptly truncate, about half the large eye, which is 3 in head. Mouth moderate, the jaws equal, the upper $2\frac{1}{2}$ in head, maxillary extending to below middle of eye; teeth small, unequal, some of them on front and on base of jaw somewhat enlarged, a moderate elevated

angle at base of lower jaw, with slightly larger teeth; tip of lower jaw with small exerted teeth, fitting into a notch in the upper. Preorbital very narrow; cheeks rather longer than deep, preopercle with two limbs, the anterior entire, the posterior rather finely and sharply serrate, with a slender sharp spine at the angle in one example, broken in the others and probably lost with age; replaced in the largest example by rather stronger serrations; lower limb of preopercle with a few small sharp forward directed serrations. Opercle with two sharp spines. Dorsal fin rather high, slightly notched, its rays apparently IX, 7 to 9, the soft part very short, anal rays III, 7. None of the dorsal spines elevated, the third longest, $2\frac{1}{4}$ in head, rather higher than the soft rays. Caudal broken in all specimens, evidently forked. Anal lower than dorsal, its second spine longest, all shorter than the soft rays. Pectoral narrow, unsymmetrical, $1\frac{1}{2}$ in head; no filamentous rays on any fin in this young specimen. Scales rather large ctenoid, 3-47-10, as nearly as can be counted. Scales on opercles rather larger and more ctenoid, in about five rows, four rows of rather large scales on cheeks; both jaws, snout, and all the opercles covered with scales smaller than those on cheeks and opercles; scales on sides of head rougher and rather larger than in the type; a scaly sheath at base of dorsal; the fin otherwise scaleless.

Lateral line complete, concurrent with the back, nowhere angulated, its pores covering most of the scale.

Color plain, probably red in life. Spinous dorsal with six oblique black cross shades, running upward and backward, three dusky shades downward and backward on soft dorsal, the edge black, other fins pale. Scales on back with some black dots; scales on opercle dusky at base.

There are also three other examples, $2\frac{1}{2}$ to 4 inches in length, which I refer to the same species, though not without some doubt. They are more slender, and the back is quite dark in color, made so by a multitude of dark punctulations; the upper fins and caudal also dusky, scales on opercle with a dusky area at base. Teeth very small, but unequal, certainly none of them canine-like, although the lower jaw is angulated at base. Though these three look unlike the other young example, and unlike the type, it is probable that all belong to *Rhyacanthias carlsmithi*.

Family GRAMMICOLEPIDAE.

VESPOSUS, new genus.

Closely allied to *Grammicolepis* Poey, with the same peculiar type of scales, but distinguished by the well-developed ventral fins and by the much stronger armed bucklers along bases of dorsal and anal fins.

Type of the genus.—*Vesposus egregius*, new species.

VESPOSUS EGREGIUS, new species.

Type.—(Cat. No. 84098 U.S.N.M.); length, $13\frac{1}{2}$ inches; head, $3\frac{3}{4}$ in length; depth, $1\frac{9}{10}$; dorsal rays, X-I-34; anal, III-38; ventral, I, 6; pectoral, 15; caudal, 15; scales, about 118; dorsal scutes, 38; anal scutes, 36.

Body broad, ovate or pear-shaped in outline, strongly compressed, its thickness less than one-tenth its length. Head rather small, a little longer than deep, the anterior profile even, nearly straight to the elevated nape, which forms an even curve with the back, followed by a very weak even curve to base of caudal peduncle. Anal

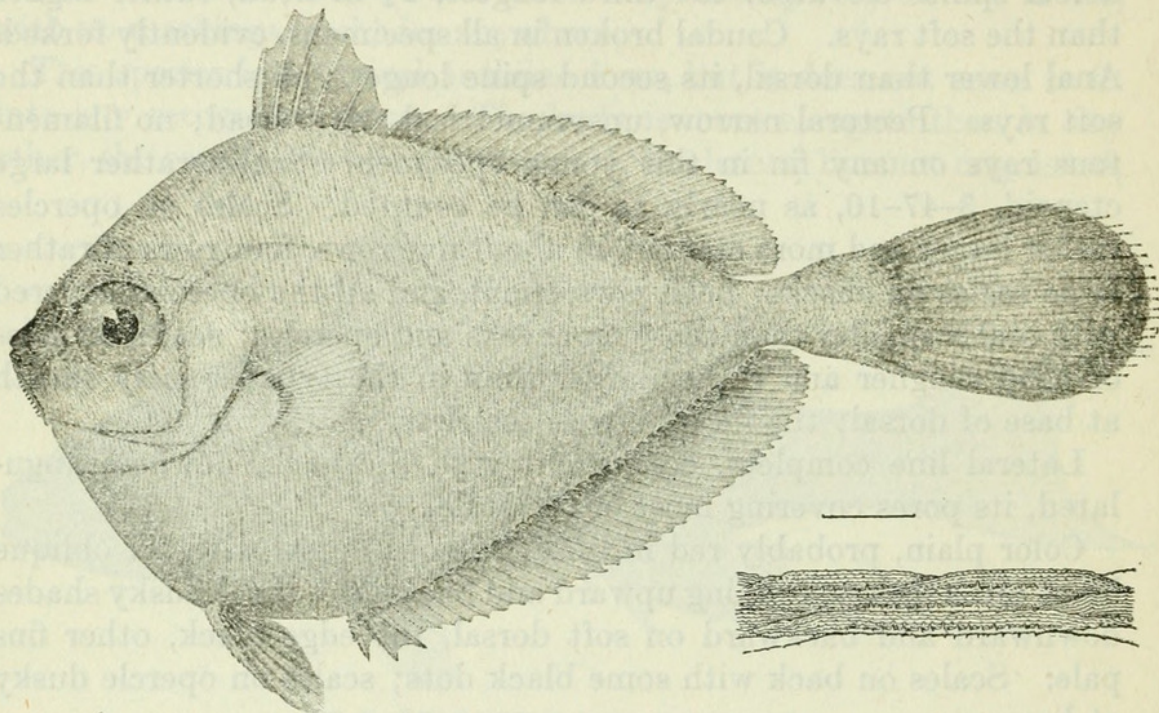


FIG. 5.—VESPOSUS EGREGIUS, NEW SPECIES.

beginning behind middle of spinous dorsal and ending just behind it; base of anal nearly straight, ascending obliquely.

Eye very large, $2\frac{2}{3}$ in head, longer than the short blunt snout; top of head very short, the groove for the protractile premaxillary lying between very rough, rugose supraocular bones; preorbital very short, broad, rugose, with rough radiating ridges; maxillary slipping under it; length of upper jaw about 6 in head; mouth very small, very oblique, the jaws equal, the mandible not quite reaching front of eye, 3 in head, its angles very rough with small serrations, as are all prominent bones about head. Preopercle with two ridges, both finely and evenly serrate, the anterior ridge roughest, the teeth coarser below; posterior limb vertical, the anterior horizontal, the two forming a rounded angle; region of cheeks rectangular, nearly twice as long as deep. Opercle rather short, with-

out spine. Teeth very small, even, apparently in a narrow band (characters of teeth, gill rakers, and branchiostegals, not to be ascertained without dissection). Gill membranes free from the isthmus, but broadly united across it, and covered with small rough scales.

Scales of body unique, each developed as a long thin vertical strip, of the color and texture of the material of a wasps' nest; the edges parallel, each scale many times as deep as long; with three or four parallel vertical ridges roughened with small prickles, and each with a vertical series of larger prickles turned backward, along its base, apparently not on the scale itself, but on the basal skin. Similar scales on cheeks, opercles, and gill membranes; scales on caudal peduncle gradually assuming by degrees a normal form, small, rounded, and rough at base, the edges entire. A very narrow lateral line curved upward on anterior half of body, straight and nearly horizontal behind; fins scaleless, mandible scaly; snout, nostrils, and upper jaw with some naked skin. A row of stout, hooked, immovable thorn-like spines along base of dorsal and anal, these subequal in size. Dorsal fin with the spines rather low and weak, the second a little elevated, about as long as eye (broken in the type); soft rays low slowly rising posteriorly where the longest is about $2\frac{1}{2}$ in head. Anal with three stiff curved spines, the first two serrated, the second nearly 4 in head. Soft anal longer than soft dorsal, separated from the spinous part by a short notch (whether actually connected or not can not be now determined), the last rays about equal to the last of dorsal. Rays of pectoral dorsal and anal not branched.

Caudal peduncle rather slender, compressed, longer than deep, its length two-thirds that of head, its least depth about one-third; broadened at base of caudal fin, which is narrow, rounded, its middle rays longest, a shade longer than head; pectoral short, rounded, $2\frac{1}{3}$ in head; ventrals inserted just before them; longer than pectoral $1\frac{2}{3}$ in head: ventral spine and outer rays of caudal strongly serrate, as is the first spine of the dorsal and the first two of the anal.

Shoulder girdle slender, apparently normal, so far as can be ascertained without dissection.

Color uniform slaty gray, the tip of caudal and edges of vertical fins blackish.

The type is in fair condition except for having been dried in the sun.

This extraordinary fish is plainly allied to the *Zeidae*, although very properly placed in a different family, *Grammicolepidae*. The only other species of this family known, *Grammicolepis brachiusculus*

Poey, is known from a single specimen obtained from deep water off Habana. In the new genus, *Vesposus*, the form of the body and fins is essentially the same, as is also the aquamation. The genus is apparently distinguished by the strong, hooked spines along the bases of dorsal and anal, and by the much larger ventral fins. Other apparent points of difference seem to be of specific value only. The name, *vesposus*, waspy, alludes to the dry scales, suggesting the material of a wasp's nest.

Family CHAETODONTIDAE.

LOA, new genus.

Allied to *Chaetodon* Linnaeus, but with the anterior dorsal spines thickened at base, the third and fourth greatly elevated and all higher and stronger than in *Chaetodon*.

Type of the genus.—*Loa excelsa*, new species.

LOA EXCELSA Jordan, new species.

Type.—Cat. No. 84094, U.S.N.M., 2 inches in length; head, $2\frac{1}{2}$ in body; depth, $1\frac{1}{6}$; dorsal rays, XI, 23; anal III, 18; scales, 12–50–15.

Form and appearance of a *Chaetodon*, the body greatly compressed and elevated, snout short, sharply exerted, the profile behind nearly straight to front of dorsal, the cranium above eye slightly convex. Eye as long as snout, $3\frac{1}{2}$ in head; mouth very small, with slender teeth; bones of head entire; preorbital moderate, entire, sheathing the maxillary; bones of head generally all covered with small scales; lateral line strongly arched, ceasing at root of caudal peduncle. Dorsal spines very strong, unequal; the third longest and strongest, one-third longer than head; the second and third thickened at base, longer than third, $1\frac{1}{2}$ in head. Soft rays of dorsal and anal high, but not produced, the first of dorsal slightly longer than last spine; the posterior outline of both fins almost vertical, the last rays rapidly shortened; soft dorsal and anal closely scaled at base, the margin naked; some scales on bases of dorsal spines, especially the last five, caudal very short, rounded, $1\frac{1}{2}$ in head. Pectorals long, nearly as long as head, reaching sixth soft ray of anal; ventrals large as long as head, inserted just before pectorals.

Color gray, perhaps yellow in life; with broad dark black-edged cross bands, snout dusky, paler behind in front of eye; a broad black band dark-edged from front of dorsal across eye to suborbital region, next a pale area, broadened below, having the form of an inverted V, from second dorsal spine to ventral spine, then a broad dusky bar, covering space from third to seventh dorsal spine, this bordered before and behind by a narrow sharp black streak; a clear white or yellow band as wide as eye from last dorsal spines to anal spines; a dark streak behind this, then a broad dusky space covering most

of soft dorsal and anal; a narrow black streak again behind this; then a narrow white band bounded again by a black streak extending on dorsal and anal, the tips of the rays broadly white; a white bar, then a dark one across base of caudal, which is otherwise dusky. Middle of soft dorsal above with a jet-black ocellus larger than eye,

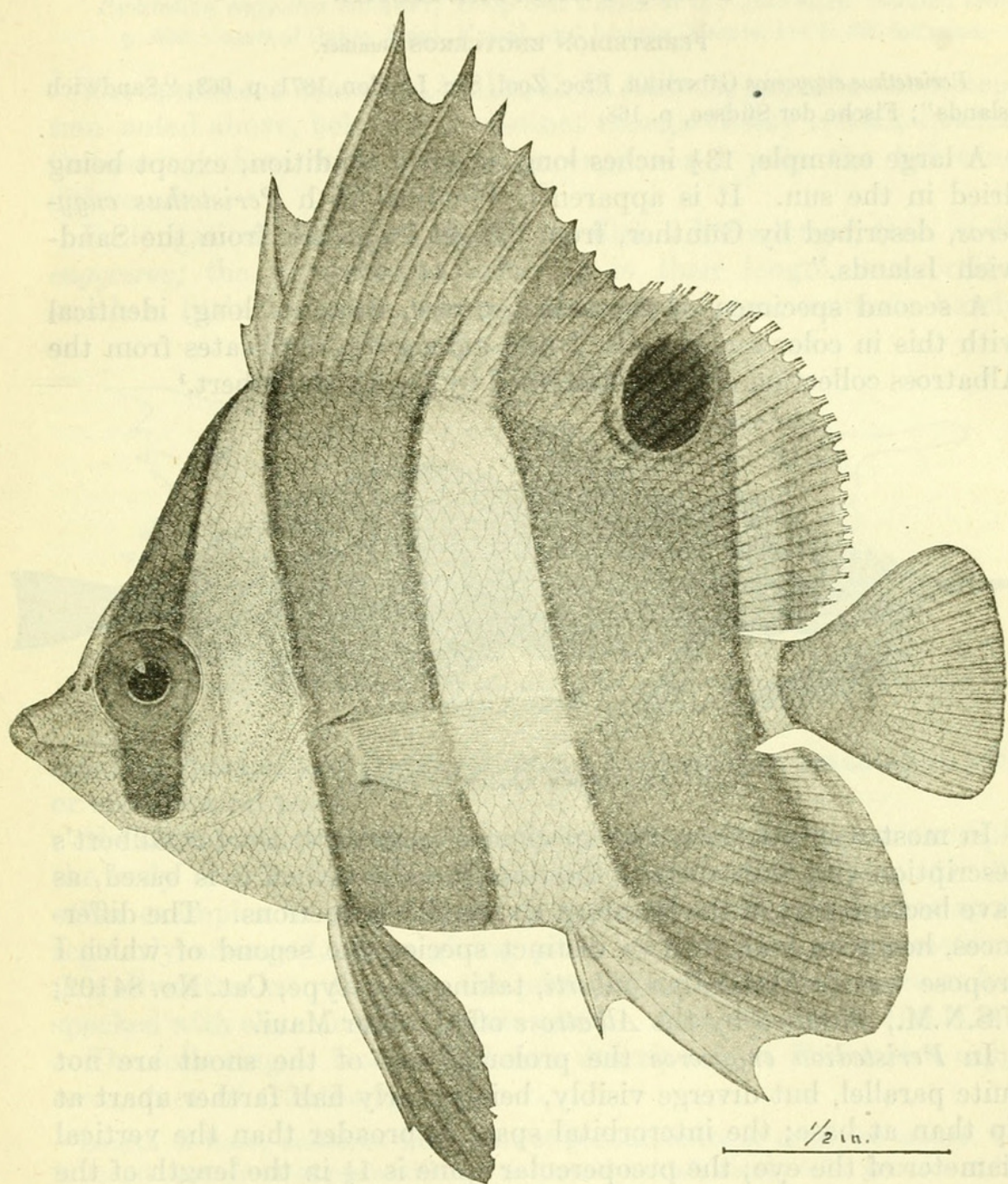


FIG. 6.—*LOA EXCELSA*, NEW SPECIES.

ringed with white; pectorals pale, dusky at base; ventral black, with the soft rays all black; the spine white; markings of body extended more or less on the fins.

In general coloration and more or less in form this elegant fish resembles a common butterfly-fish or Kihikihi of Hawaii, *Chaetodon lunula*. The ocellus on the fin may disappear with age. From this

as from all other species of *Chaetodon* the present species differs generically in the extraordinary development of the spinous dorsal, which characterizes the genus *Loa*, named for the great volcano, the eruption of which brought this strange fish to light.

Family PERISTEDIIDAE.

PERISTEDION ENGYCEROS Gunther.

Peristethus engyceros GÜNTHER, Proc. Zool. Soc. London, 1871, p. 663; "Sandwich Islands"; Fische der Südsee, p. 168.

A large example, 13½ inches long, in good condition, except being dried in the sun. It is apparently identical with *Peristethus engyceros*, described by Günther, from "dried fragments from the Sandwich Islands."

A second specimen of the same species, 6 inches long, identical with this in color and details, I find among the duplicates from the Albatross collection of 1902, described by Dr. C. H. Gilbert.¹

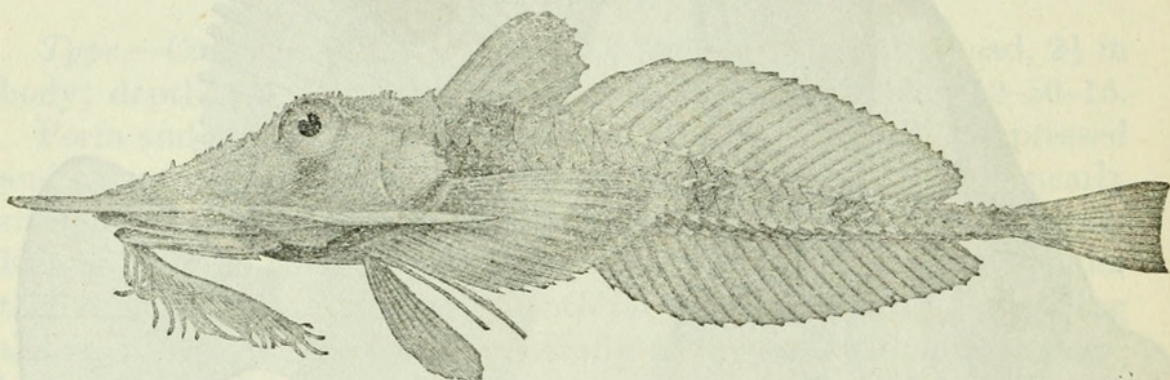


FIG. 7.—PERISTEDION ENGYCEROS GÜNTHER.

In most respects these two specimens agree with Doctor Gilbert's description and with such of the duplicates on which it is based, as have become part of the Stanford University collections. The differences, however, indicate two distinct species, the second of which I propose to call *Peristedion gilberti*, taking as a type, Cat. No. 84102, U.S.N.M., obtained by the *Albatross* off Oahu or Maui.

In *Peristedion engyceros* the prolongations of the snout are not quite parallel, but diverge visibly, being nearly half farther apart at tip than at base; the interorbital space is broader than the vertical diameter of the eye; the preopercular spine is 1½ in the length of the prolonged spines: The dorsal rays are VII-22: anal, 22: pectoral, 13+2, reaching to the seventh lateral scute, 1½ in head with the spines. Ventrals nearly reaching front of anal; pectoral considerably beyond.

Body with four broad blackish cross bars, one under spinous dorsal; two under soft dorsal and one near base of caudal, the first broadest;

¹ Deep Sea Fishes of the Hawaiian Islands, 1905, p. 639.

no spots or reticulations; a dark area below eye; both dorsals narrowly but sharply edged with black; caudal blackish at base and tip; pectoral black with a narrow white edge, the middle paler, lower parts pale.

PERISTEDION GILBERTI, new species.

Peristedion engyceros GILBERT, Deep Sea Fishes of the Hawaiian Islands, 1905, p. 639, Coasts of Oahu, Maui, Kauai, and Laysan Islands, 178 to 305 fathoms.

The specimens examined by Dr. C. H. Gilbert, with the one exception noted above, belong to a distinct though closely related species. Comparing these with *Peristedion engyceros* I note the following differences:

Prolongations on snout, rigidly parallel, a little longer than in *P. engyceros*; the preopercular spine $1\frac{2}{3}$ in their length; interorbital width a little less than vertical diameter of eye; ventrals barely

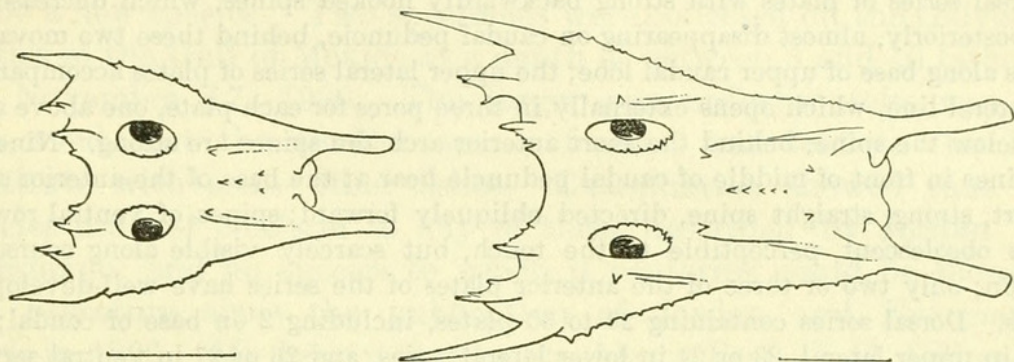


FIG. 8.—PROLONGATION ON SNOUT OF (a) *PERISTEDION ENGYCEROS* GÜNTHER CONTRASTED WITH THAT OF (b) *P. GILBERTI*, NEW SPECIES.

reaching front of anal; pectorals also a little shorter, reaching to fifth or sixth lateral plate.

No dark bars anywhere on body or fins. In the largest example the body and fins are all pale, alike, no doubt pink in life. All the other examples have the upper parts marked with small olive spots regularly arranged, these giving place on the head to symmetrical fine olive streaks. In some, the pectoral and caudal are more or less specked with olive, in others quite plain. (Cat. No. 84102, U.S.N.M.)

The following is Doctor Gilbert's description of *Peristedion engyceros*, (not of Günther):

Length of head, measured from front of premaxillaries to opercular margin, 2.5 in length from front of premaxillaries to base of caudal; depth, 5.75; greatest width of head, 3.65. D. vii, 20 (rarely 21); A. 20; P. 14×2.

The species differs strikingly from *P. hians* in the shape of the rostral processes, which are very slender, parallel, of nearly equal width throughout; the distance between them equals their length and is about half length of snout without them; width of the snout opposite anterior nostril equal to its length; interorbital space deeply concave, with a median groove, which widens posteriorly; a small postocular spine, a much stronger spine at end of occipital ridges, and small spines at end of paroccipital opercular crests; upper orbital rim spinulose along its entire length; in the young are usually two preorbital spines which disappear in adults; behind

snout the lateral margins of head are expanded to form a thin knife edge, which leads to the long preopercular spine, the anterior limit of the expanded edge marked by a projecting spine, to the base of which runs a vertical ridge from front of eye and an oblique ridge from middle of lower orbital margin; all the plates of the head minutely prickly; on median portion of snout six or eight stronger hooked spines, distributed on the rostral ridges; interorbital width 0.65 diameter of eye, which is contained 4.4 times in head; premaxillaries protruding beyond mandible for a distance equal to 0.2 length of head; length of maxillary contained 2.3 times in head and equal to the greatest external width at angles of mouth; the large barbel, when laid back, extending to base of ventral fins; along its anterior margin it bears a series of smaller barbels, mostly arranged in pairs, seven barbels, similar to these smaller ones, occurring on each side of symphysis, on lower lip and adjacent portions of mandible; the most posterior of these, on the mandible, is always paired; mouth toothless; gill rakers 5×16 or 17, the terminal ones represented by papillae, spinous dorsal joined to soft dorsal at extreme base; pectorals long, reaching fifteenth plate along lateral line, length of upper ray equaling distance from tip of snout to front of pupil; upper free ray contained 2.25 times in head.

Dorsal series of plates with strong backwardly hooked spines, which decrease in size posteriorly, almost disappearing on caudal peduncle, behind these two movable spines along base of upper caudal lobe; the upper lateral series of plates accompanies the lateral line, which opens externally in three pores for each plate, one above and two below the spine; behind the short anterior arch the spines are strong. Nine to 12 spines in front of middle of caudal peduncle bear at the base of the anterior side a short, strong, straight spine, directed obliquely forward; spines of ventral row of plates obsolescent, perceptible to the touch, but scarcely visible along course of anal fin; only two or three of the anterior plates of the series have well-developed spines. Dorsal series containing 29 to 30 plates, including 2 on base of caudal; 34 or 35 in upper lateral, 23 or 24 in lower lateral series, and 26 or 27 in ventral series, including 2 on base of caudal.

A specimen in life was pink, with a yellowish tinge, the tips of rostral processes, the fins and long barbels deeper pink or almost scarlet, the tips of fins and ends of barbels white; breast and belly white; upper parts of head and body marked with fine olive dots and lines, those on head arranged regularly and symmetrically; some specimens appear nearly or wholly plain, without spots and lines, pectorals whitish, streaked or spotted with olive, anal marked with three indistinct narrow yellowish vertical bars; other fins unmarked.



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