

THIRD ADDITION TO A KNOWLEDGE OF THE BATRACHIA AND
REPTILIA OF COSTA RICA.

BY E. D. COPE.

The present paper is a continuation of the subject which has been treated in several contributions, and is preliminary to a second illustrated memoir, which, it is hoped, will present the subject in some completeness. The last "Addition" appeared in the Proceedings of the American Philosophical Society for 1893, p. 333; and the illustrated memoir was published in the Journal of this Academy for 1875.

I am indebted to the Museo Nacional of San José for the opportunity of examining the material here described.

BATRACHIA.

URODELA.

Ædipus robustus sp. nov.

Size large; proportions robust. Twelve costal folds. One phalange of digits free, as in *Æ. morio*, except in the inner (first) digits, which are entirely enclosed. Extended limbs separated by two intercostal spaces. Head flat, wide; muzzle short, its truncation little conspicuous; no canthus rostralis. Width of head entering length to groin five times. Eye small, its fissure equaling one-fourth the width of the head, and less than the interorbital space. Vomerine series straight in the transverse direction; extending beyond the nares externally, and abruptly recurved at the internal extremity toward the parasphenoid patch, which they do not reach. Parasphenoid patch not divided anteriorly. Tail rounded, the extremity moderately compressed. A gular fold.

Color, uniform plumbeous; soles paler.

Dimensions 206 mm.; length of head and body, 98 mm.; to gular fold, 22 mm.; width of head at rictus oris, 16.5 mm.; length of anterior limb, 20 mm.; do. of fore foot, 6.5 mm.; length of posterior limb, 21.5 mm.; do. of hind foot, 6 mm.; width of do. at base of fifth digit, 7 mm.

This is the largest salamander of tropical America, equaling in

length the *Spelerpes bellii* Gray. It resembles in appearance the unicolor form of that species, but differs in its proportions, as well as in the generic character displayed by the feet. The muzzle is longer, and more broadly truncate, and the head is narrower, than in the *S. bellii*. In the latter the eye is larger, equaling the width of the interorbital space plus that of an eyelid, and is little less than half the width of the head posteriorly.

One specimen, No. 226, from the Faldas of the volcano of Irazu, from J. P. Cooper.

SALIENTIA.

Hyla cherrei sp. nov.

Vomerine teeth few, opposite the middle of the very large choanæ, at the apex of a ridge which proceeds from the anterior margin of the latter. Ostia pharyngea round, large, but smaller than choanæ. Tongue longer than wide, but little free, and openly notched posteriorly. Tympanic drum distinct, one-half the area of eye, and equal in vertical diameter. Iris dark. Manus almost without web; pes fully palmate. Thumb not opposed. Heel of extended hind limb reaching end of muzzle. Canthus rostralis straight angular, lores vertical. Width of interorbital space 1.5 times the width of an eyelid. External nostrils terminal, a little nearer the eye than the diameter of the latter. Muzzle not prominent, vertical in profile. Skin smooth above.

Head and body above pigmented probably with yellow, in abrupt contrast to the color of the rest of the integument, from which it is separated from the orbit to the sacrum by a narrow white stripe. Colors otherwise uniform straw-color, the limbs pigmented on the exposed surfaces; the humerus and femur not pigmented.

Length of head and body, 26 mm.; do. of head to canthus oris, 5 mm.; width of head at do., 8 mm.; length of fore limb, 17 mm.; of fore foot, 6 mm.; length of hind limb, 45 mm.; do. of hind foot, 20 mm.; do. of astragalo-calcaneum, 8.5 mm.

No. 253, Alajuela, R. Alfaro.

This small and brightly colored species differs from all others known to me in the combination of characters it presents. The sharp canthus rostralis, anterior vomerine teeth, elongate tongue, large choanæ, and webless fingers, are not found together in any other species. It is dedicated to Mr. Geo. K. Cherrie, of San José,

to whom I am indebted for the opportunity of studying the present collection.

Hylella chrysops sp. nov.

Head short, wide, canthus rostralis wanting. Tongue a little longer than wide, faintly emarginate; ostea pharyngea each a transverse slit. Tympanum not visible. Pupil a dumb-bell shaped horizontal slit in the golden iris. Heel of extended hind limb reaching to end of muzzle. The muzzle is as long as the diameter of the eye, and does not project beyond the lips; nostrils terminal. The fingers are one-third webbed, the thumb free, and at least as long as the short third (second) digit. Hallucal tubercle minute; pallets well developed.

Color above and below yellow; pigment more conspicuous on edges of eyelids. No markings of any kind, except that one specimen is covered above with rather distinct, minute, black specks.

Total length, 22 mm.; length of head to canthus oris, 6 mm.; width at do., 8 mm. Length of anterior limb, 13.5 mm.; do. of anterior foot, 6 mm.; do. of posterior limb, 36 mm.; do. of hind foot, 15 mm.; do. of astragalo-calcaneum, 7 mm.

No. 252, Alajuela, R. Alfaro; 492, San José, P. Biolley.

This small and brilliant species is related distantly to the *H. platycephala* Cope, from the West Coast of Mexico. In that species the canthus rostralis and the tympanum are well marked, and the size is larger.

Lithodytes euryglossus sp. nov.

A large species with small pallets, in which the heel does not reach the end of the muzzle, although it extends to a point anterior to the eye. General appearance that of a *Leptodactylus*. No distinct canthus rostralis; end of muzzle sloping backwards from lip-border. Tympanic disc a vertical oval, of which the long diameter is two-thirds that of the eye. Nostril nearer the end of the muzzle than its distance from the orbit. Tongue wider than long, openly notched posteriorly. Choanæ moderate. Vomerine teeth in two transverse series, on transverse ridges whose anterior borders are in line with the posterior borders of the choanæ, and whose external borders are a little within the internal borders of the choanæ. Ostia pharyngea larger than choanæ. Pallets distinct but small, smallest on the manus. Digits without dermal margins. First and second fingers

equal. Integument everywhere smooth. A discoidal abdominal fold. A fold on the distal half of the external border of the tarsus, extending to a rather prominent præhallucal tubercle.

Color above, brownish lead-color; below whitish. Groin reticulate, and sides punctate with the dorsal on the ventral color. Four brown spots on the upper lip anterior to the line of the tympanum, and a black streak above and behind the tympanum. A blackish cross-band between the posterior parts of the orbits, and some black longitudinal spots on the dorso-lateral region, bounding upwards the paler color of the sides. Limbs with obscure blackish cross-bands. Thighs behind, whitish at base, and obscurely reticulate on the superior and distal portions. Limbs below, and gular region, clouded.

Total length of head and body, 75 mm.; do. of head to line of canthus oris, 19 mm.; width of head at do., 28 mm. Length of anterior limb, 40 mm.; do. of head, 18 mm.; do. of posterior limb, 115 mm.; do. of hind foot, 50 mm.; do. of astragalo-calcaneum, 20 mm.

This is the largest species of *Lithodytes*, but it is less robust than the *L. gulosus* Cope. In general appearance it resembles one of the large species of *Leptodactylus*, but it is a true Hylodine, with T-shaped terminal phalanges. It has some resemblance to *L. melanostictus*, but that species has much longer hind limbs, larger pallets, an oval tongue, etc. A single specimen of the *L. euryglossus* is in the collection, which was taken at San José, by Sen. P. Biolley (No. 448).

Levirana vibicaria gen. et sp. nov.

Char. gen.—Identical with *Ranula*, but without vomerine teeth.

Char. specif.—Form robust, muzzle short, wide; hind limbs rather short, the heel reaching to the front of the eye. Canthus rostralis strongly marked, angulated at the nostril, anterior to which it is deflected to the apex, which does not project beyond the lip-border. Loral region slightly concave; nostril nearly on canthus, .6 the length of the muzzle anterior to the orbit. Tympanic drum sub-round, about .7 the diameter of the eye-slit. Choanæ rather small, about equal to ostia pharyngea. Tongue large obovate, deeply emarginate posteriorly. Digits with slight terminal enlargements; those of the fingers scarcely distinct, those of the toes supported by elongate T-shaped phalanges. Second (first) finger a little shorter

than third (second); inferior tubercles inconspicuous. Toes half-webbed, fourth digit with three, the others with two free phalanges. Sole with one tubercle, the flat oval præhallux. Integument smooth everywhere. A wide glandular body connecting rictus oris and humerus; a glandular thickening extending from orbit to end of urostyle, which is unusually wide between the orbit and the sacrum. No dermal folds.

Color above a dark olivaceous gray; side of head and a stripe from orbit to urostyle, black. Two rows of small black spots on each side of the vertebral column. Superior side of limbs colored like the back. Inferior surfaces of the body yellowish, more distinctly yellow on inferior surfaces of hind limbs. Concealed surface of femur with a reddish tinge, unspotted. Superior face of femur with a black stripe on the distal half. Lips unspotted, with a dark shaded border.

Length of head and body 65 mm.; do. of head to rictus oris 21 mm.; width of head at rictus oris, 25 mm.; length of fore limb, 40 mm.; of hand, 15 mm.; length of hind limb, 101 mm.; of hind foot, 49 mm.; of astragalo-calcaneum, 16 mm.

No. 3912, Rancho Redondo on the divide of the Irazu Range; 3915-6, Isla Nueva near the head of the Rio Sucio, on the Atlantic side; all taken by G. K. Cherrie.

This distinct species is probably an inhabitant of the elevated mountain region, and it has so far escaped the observation of collectors, who have mostly explored lower elevations. It is not nearly related to any species hitherto known.

REPTILIA.

LACERTILIA.

Cnemidophorus amivoides sp. nov.

Eight abdominal rows of subequal plates; a row of plates at the gular fold, which, with a few granules form its border. A group of about 18 enlarged posterior gular scales, which does not have a transverse posterior border separating it from smaller scales. Nostrils in nasal suture. Three supraorbitals, a small plate occupying an angular space between the second and third, at the external edge on both sides. Two interparietals and one parietal, followed by three rows of smaller plates. Five infralabials in the second (large) row. Sixteen femoral pores. Four preanal plates larger than those sur-

rounding them, two of them transverse and posterior, and two longitudinal and anterior. Three rows of brachial plates, the anterior continuous with the posterior of two rows of antebrachials. No postantebrachials. Four rows of plates on inferior side of femur at middle, and two rows on inferior side of tibia.

Color above dark brown, with three narrow yellowish stripes on each side, which proceed respectively from the temple, and from the superior and inferior borders of the tympanum. The inferior stripe is more or less broken into elongate spots. The space between the superior and median stripes is marked by black cross-bars, and a row of black spots extends along the inner side of each of the superior stripes. A light stripe on the posterior face of the femur, which is continued on the tail. Below this stripe on the femur, another less perfect stripe, and above it a longitudinal row of spots. Tibia with small light spots. Upper surface of femur and tibia brown, blackish varied. Inferior surfaces pale greenish-blue; top of head light brown.

Length of head and body, 64 mm.; length to edge of gular fold, 21 mm.; do. to auricular meatus, 15 mm.; width of head at rictus oris, 11 mm. Length of fore limb from axilla, 21 mm.; length of fore foot, 10 mm.; length of hind leg from canthus ani, 45 mm.; do. of hind foot, 24 mm.

This species resembles very much the younger specimens of the *Amiva undulata*, but is a true *Cnemidophorus* with sagittiform tongue. It differs in specific characters from both that species and the *A. quadrilineata*, in the possession of three rows of brachial scuta, instead of one. In coloration it differs from the young striped stages of those species in having three light stripes on each side instead of two. The longitudinal division of the interparietal plate is a marked peculiarity, but may be abnormal. The two plates together, however, are larger in dimensions than a single interparietal. Among *Cnemidophori* it is nearest to the *C. lemniscatus* in appearance, but it differs in almost all points of squamation of the head and throat.

No. 236, La Carpintera; A. Alfaro.

Cnemidophorus alfaronis sp. nov.

Allied to *C. deppei*. Nostril entirely in nasal plate; first loreal bordering first three labials; second loreal higher than long. Supra-orbital plates four on one side, and five on the other, the first quite

small, the third and fourth broader than long. Interparietals and the single parietals, longer than the frontoparietals. Infralabials eight; median gulars enlarged all the way across, graded; scales of mesoptychium large, in two or three rows, no granules on the border. Abdominal plates in eight rows; large brachials in six rows, continuous with brachials; no postantebrachials. Six rows of femorals at middle. Femoral pores nineteen. Preanal plates about a dozen in a triangular patch continuous with the ventrals. Extended hind foot reaches to orbit.

Four white lines on each side, and a vertebral line. Spaces between first and second, and dorsally between fourths of opposite side, greenish-gray; space between second and fourth, black. Head paler; below greenish-white. Posterior limbs with four irregular longitudinal lines; one anterior, two superior, and one posterior.

Total length, 170 mm.; length to vent, 55 mm.; do. to collar, 19 mm.; length of fore limb, 20 mm.; do. of hind limb, 41 mm.; do. of hind foot, 23 mm.

This species resembles in general appearance the *C. deppei deppei*,¹ but the scutellation is materially different. An important character is the presence of four supraorbital plates, from the last of which a fifth may be cut off. The parietals and interparietals are also relatively longer than in that species.

No. 216, San Mateo; found by Sen. Anastasio Alfaro, Director of the Museo Nacional, to whom the species is dedicated.

Celestus cyanochloris sp. nov.

Scales in thirty-three longitudinal series all with about a dozen longitudinal keels, and no prominent median keel, except on the tail, beyond the base. The scales of the tail are roof-shaped, so that the lateral edges run in open furrows, while the middle line is prominent. The striations extend not only to the head, but the parietal and interparietal plates are grooved and ridged. The rostral and symphyseal plates are of equal width. Two postnasals, two prelores and two postlores, one above the other in each pair. A large preocular; two suboculars, the posterior elongate, and four postoculars. Four external, and four internal supraorbitals. Parietals wider than the triangular interparietal, each three times as large

¹ For definition of the subspecies of *C. deppei*, see Transac. Amer. Philos. Soc., 1892, p. 30.

as the well-separated frontoparietals, and bounded by five scales between the frontoparietal and the single transverse postparietal. Frontal twice as wide as long. Eight superior labials to end of long subocular, the second reaching to the middle of the postnasal only. Auricular meatus horizontal, shorter than eye fissure. Extended limbs separated by the length of the anterior foot only.

Color above light golden-green, with several indistinct longitudinal rows of paler spots as large as a scale, mingled with as many brown spots as large as a scale. Sides paler than back. Lower surfaces blue, paler on chin and tail.

Total length (end of tail lost), 151 mm.; do. to vent, 70 mm.; do. to line of axilla, 16 mm.; do. of fore limb, 16.5 mm.; do. of hind limb, 22 mm.; of hind foot, 11 mm.

This species is allied to the *C. steindachnerii* Cope. The latter has seven superior labials instead of eight, of which the second reaches the loreal, as it does not in *C. cyanochloris*; the postnasals are much shorter. The scales of the anterior regions and parietal plates, are smooth, and the color is totally different. The limbs are shorter.

This handsome species, whose coloration is unique in the genus, was found by Sen. Juan Cooper, on the volcano of Irazu, No. 217.

OPHIDIA.

ASINEA.

Trimetopon pliolepis sp. nov.

In the genus *Trimetopon* Cope, I find that the hemipenis has a simple sulcus spermaticus, and that the apex for a space on each side of the sulcus is feebly calyculate. The rest of the surface is occupied by spines which are in longitudinal series, and are largest opposite the sulcus at the lower part of the hemipenis. The genus is then to be regarded as one of the Colubrinæ allied to *Contia*. A single species, the *T. gracile* Gthr., has been described hitherto, which is also from Costa Rica. I only know it from the description and figures of Günther in the Annals and Magazine of Natural History for 1872, p. 16.

Char. specif.—Scales in seventeen rows, like the plates of the head with iridescent refulgence and without fossæ. Rostral plate not visible from above; internasals much wider than long; anterior border of frontal slightly convex forwards. Lateral border of frontal

shorter than the parietal border, which forms less than a right angle with that of the opposite side. Loreal longer than high; oculars 1-1, the anterior well separated from frontal by superciliary. Temporals 1-1; superior labials eight, fourth and fifth entering orbit, all longer than high except the eighth. Inferior labials eight, fifth largest, and in contact with postgenial. Postgenials half as long as pregenials. Total length, 287 mm.; of tail, 76 mm. Gastrosteges, 154; anal 1-1; urosteges 69.

Dark brown above, the scales with a paler, minutely speckled center, except those of the third row. This, together with the more restricted pale centers of the scales of the first and second rows, gives the appearance of a dark lateral band, which tips the gastrosteges. Below uniform yellow. A narrow yellow collar borders, and does not cross the extremities of the parietal plates. Each upper labial with a large yellow spot next the border; that at the top of the sixth and front of the seventh has the effect of a postocular band.

This species differs from the type in the scale formula. In the *T. gracile*, the scales are in fifteen rows; the oculars are 1-2, and there are but seven superior labials. The coloration is more obscure.

No. 451, San José, P. Biolley.

***Drymobius paucicarinatus* sp. nov.**

Scales in seventeen rows, the five median only keeled, and that faintly. Oculars 1-2; preocular not reaching frontal; loreal sub-quadrate, longer than high. Temporals 1-2; four and a half scales bordering each parietal. Superior labials nine, fourth, fifth, and sixth in orbit; eighth and ninth longer than high. Eye large, its diameter equaling length of muzzle from its border to the nostril, and equaling a little over half of the interocular width; equal also length from rostral to frontal plate; equal length of frontal plate, and exceeding a little the length of the common parietal suture. Frontal plate wide in front, contracting rapidly posteriorly, lateral borders very little concave. Ten inferior labials. Postgenials longer than pregenials. The scales are not much narrowed, and those of the sides are rather wide. Total length, 1,230 mm.; tail, 415 mm.; length to canthus oris (axial) 26.5 mm. Gastrosteges 183; anal 1-1; urosteges, 127.

Color above brown, without markings; below yellow; ends and a

narrow transverse line near base of gastrosteges, lead colored. Upper lip, except upper parts of Nos. 2-3-4, 8 and 9, yellow.

No. 116; La Candelaria, Bruno Carranza.

This species is allied to the *D. percarinatus* Cope (Proceeds. Amer. Philos. Soc., 1894, p. 344), but differs in the much smaller number of more feebly keeled scales; in the shorter and wider head, and in the coloration.

Dr. Günther has united under the head of the *Dendrophidium dendrophis* (*Drymobius dendrophis* Schl., Fauna Centrali-Americana, 1894), the species *Drymobius chloroticus* and *Crossanthera melanotropis* Cope. Bocourt has pointed out that the genus *Dendrophidium* differs from *Drymobius* in the entire anal plate and I have not found any variability in this respect in the specimens at my disposal. In the *D. dendrophis* the eye is larger, its long diameter exceeding the width of the superciliary and frontal plates together; while in the species mentioned above, and the *D. percarinatus* and *D. rhombifer* Pet., the diameter of the eye either equals the width of those plates, or, more frequently is considerably less. The *Crossanthera melanotropis* further differs in the short occipital plates, whose middle suture is considerably less than the diameter of the orbit, while it is the same in the *D. dendrophis*.

Leptophis ultramarinus sp. nov.

The relation of this species to those already known may be shown in the following table. I mention here that a study of the species shows that it is impossible to keep apart as a separate genus (*Philothamnus*) the species with smooth scales.

I. Scales all smooth.

Nine superior labials. Scales above blue tipped with golden; scuta and two inferior rows of scales golden with green bases; no stripes,

L. ortonii Cope.

II. Three median rows smooth, two or three on each side keeled.

Eight supralabials; green, with black median lines on two or three dorsal rows of scales; pale oblique cross-lines on the anterior half of the body,

L. sargii Fisch.

III. Five median dorsal rows keeled.

Eight supralabials; above uniform ultramarine blue; below and one and a half rows of scales, with upper lip, silvery,

L. ultramarinus Cope.

IV. Eleven to thirteen rows of scales keeled.

Supralabials eight or nine; silvery with a wide blue dorsal band; sometimes obscure in alcohol; smaller, *L. ahætulla* L.

Supralabials nine; robust; uniform green; smaller, *L. occidentalis* Gthr.

Supralabials nine; green, head plates and scales all black bordered, *L. marginatus* Cope.

Supralabials nine; uniform green, the keels of the scales, except those of the median row, black; size large, *L. præstans* Cope.

The *L. ultramarinus* is further characterized by the large size of its eye, whose diameter equals the length of the muzzle to the rostral plate, exclusive. The preocular reaches the frontal. Temporals 1-2, the anterior in contact with the inferior postocular only. Each parietal is bounded by only three plates, with half of a median plate. Seventh and eighth superior labials longer than deep. Nine inferior labials, in contact with the genials up to the seventh. Postgenials a little longer than pregenials. General form slender, tail long, about one-third the total length, gastrosteges feebly angulated, 168; anal, 1-1; urosteges, 176. Total length, 1050 mm.; tail, 425 mm.

Besides the colors above described there may be added, that the preorbital labials are bordered with blue above, and the last two labials are entirely blue. There are no stripes or lines of any kind.

No. 108, Pazo Azul; J. C. Zeledon.

Pogonaspis ruficeps gen. et sp. nov.

Char. gen.—Posterior maxillary tooth elongate, grooved; other teeth numerous, small, present on the usual bones of the mouth. Pupil round. Cephalic plates normal; two nasals, no loreal. One pair of genials; anal plate and urosteges double. Scales smooth, without apical fossa, extensively imbricate. In the hemipenis the sulcus spermaticus is single, and the apex is calyculate. On the side opposite the sulcus is a wide welt which is bordered by spines, whose bases are connected by transverse flounces. Surface on each side of welt coarsely spinous.

This genus is probably more nearly allied to *Tantilla* than to any other. The head of the only known species is rather more distinct than is usual in that genus. The tail is probably elongate. It differs from *Tantilla* in the large single genial plate.

Char. specif..—Rostral plate rounded obtuse, visible from above; internasals small; prefrontals large, descending laterally and touching second superior labial. Frontal elongate, slightly angulate in front, acute posteriorly; parietals elongate. Nostril in posterior part of prenasal; postnasal elongate, separated from preocular by suture between prefrontal and second labial. Oculars 1-2, preocular well removed from frontal; temporals 1-1, superior labials seven; the first bounds the postnasal below; the second the prefrontal and the preocular; third and fourth enter orbit; fifth and sixth lower than the large seventh. Inferior labials only six; those of the first pair in contact behind the symphyseal; the fourth elongate, terminating opposite the end of the long genial. Gastrosteges, 146; anal, 1-1; urosteges, 20 + (a considerable part of the tail lost). Length to vent, 223 mm.; do. to rictus oris, 9 mm.

Color in alcohol, above light brown, below yellow. Median dorsal row of scales deep brown; a narrow yellow line on the adjacent borders of the third and fourth rows of scales which is bounded above by a single dark brown row, and below by several rows with dark brown centers, growing paler towards the gastrosteges. All the colors are less conspicuous posteriorly. Upper surface of head light reddish-brown, with a pale spot at the extremity of each parietal plate. Upper lip yellow, with a black spot below eye; lower labial plates with brown borders; gular region unspotted.

No. 141, Jimenez; A. Alfaro.

Enulius torquatus Günther. *Leptocalamus torquatus* Günther. Ann. Mag. Nat. Hist., 1872, p. 16.

This specimen gives me the opportunity of examining the hemipenis of this genus. I find that it is undivided, but that the sulcus is bifurcate near the extremity. The surface of the organ is marked with longitudinal laminae only, and these are set with numerous small spines to the apex. The laminae are separated by deep grooves.

As already described by me, there are very few teeth in the mouth. These consist of a few small ones at the posterior part of the maxillary bone, with one or two near the junction of the palatine and pterygoid, and a few on the anterior half of the dentary. The large posterior tooth is incurved and flattened, and has a thin blade with a cutting edge posteriorly. The groove is fine if present. This arrangement reminds of the characters of the genus *Elachistodon*² Reinhdt., of

² American Naturalist, 1893. p. 477.

which the sole species is found in the Paletropical Realm. The few teeth of *Enulius* are, however, better developed than in *Elachistodon*, whose real affinities are as yet uncertain. *Enulius* is probably allied to *Scytale*, since it not only enters the Scytalinæ, as defined in my paper on the characters of the hemipenis, but in the prominent rostral plate it resembles the *S. neovidii* D. & B.



Cope, E. D. 1894. "Third addition to a knowledge of the batrachia and reptilia of Costa Rica." *Proceedings of the Academy of Natural Sciences of Philadelphia* 1894, 194–206.

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