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DESCRIPTION OF A NEW SPECIES OF SEA SNAKE FROM THE PHILIPPINE ISLANDS, WITH A NOTE ON THE PALATINE TEETH IN THE PROTEROGLYPHA

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The correctness of the suggestion of the unity of the genera *Hydrophis* and *Disteira* has been most clearly brought out by an examination recently made by Dr. Thompson of the dental characters of nearly every known species of sea snake. In the species referred by authors to *Hydrophis,* as well as in those placed in the genus *Disteira,* the teeth behind the fangs normally are grooved. This grooving varies from deep and wide channels extending the entire length of the tooth and readily visible to the unaided eye, to the merest trace, present only at the base of the tooth and requiring for its demonstration a magnification of sixty diameters. In the widely distributed *D. cyanocincta* and *D. fasciata* one not rarely finds specimens in which the grooving is absent, or present on the

anterior teeth only. It is reasonable to expect that when a considerable series of any of the species is examined a similar variation may be found.

During the course of this examination it has been discovered that the *palatine* teeth of many of the species are grooved. The groove is on the antero-internal and on the internal quadrant of the tooth instead of on the antero-external quadrant, as in the maxillary teeth. This condition was first observed in the type specimen of *Hydrelaps darwiniensis*. An examination of a skull of *Naja melanoleuca* from Gaboon reveals the interesting fact that all the palatine teeth are grooved on their internal quadrants, and all the mandibular teeth are grooved on their antero-external quadrants. The palatine teeth are grooved also in the genera *Pseudelaps, Diamenia, Bungarus, Doliophis,* and *Elaps*. In *Dendraspis* they are solid.

Among a large number of marine snakes collected by Dr. Thompson at Cavite, Manila Bay, in 1906, are nineteen specimens which we are unable to identify with any of the described species of *Hydrophinæ*. This new species of *Disteira* we propose to name for the U. S. S. Cincinnati, to the crew of which the junior author is deeply indebted for much aid in collecting sea-snakes.

Disteira cincinnatii new species

Diagnosis.—This species is closely related to *D. fasciata* Schneider and *D. brookii* Boulenger. From *D. fasciata* it differs in being much stouter; in the narrow portion of the neck being shorter; in the lower average number of gastrosteges[1]; in the arching of the maxilla between the fang and first tooth, and the absence of an acute apex in front of the fangs; and in the less acute posterior angle of the frontal plate. From *D. brookii* it differs in the lower average number of gastrosteges; in the character of the scales on the sides of the body, which are mostly regular hexagons or are a trifle broader than long, where in *D. brookii* the upper and lower angles of the scales are very acute and the laterals are twice the size of the scales on the back. In *D. brookii* the snout is much broader.

Type.—Adult male. California Academy of Sciences, No. 15016. One mile N. E. of Cavite, Manila Bay, Philippine Islands. Dr. J. C. Thompson. December 20, 1906.

[1]Average in twenty specimens of *D. cincinnatii* is 361, while in twenty-six *D. fasciata* it is 417.

Description of the Type.—Head not distinct from neck, convex above; snout tapering and slightly projecting; eye large, its diameter equaling one and a half times its distance from mouth. Neck small, less than one-third greatest depth of body, slender portion short, less than one-fourth total length. Body compressed, width less than one-half depth, greatest depth about three and one-half times that of neck. Tail about one-tenth total length. Rostral nearly as deep as broad, breadth .0024M., depth .0021M.; sutures with first labial converge a trifle above, upper angle a little less than a right angle; facet for nasal .0012M., longer than facet for labial; lower border with convex median protuberance about one millimeter wide, fitting into deep concavity in mental; on each side of this protuberance are little concavities into which fit external superior angles of mental; portion of rostral visible from above about one *mm.* long. Nasal .003M. long, .002M. wide; anterior border formed by facets for rostral and first labial, latter shorter; mutual facet straight, .0023M. long; posterior borders of nasals nearly in straight line, if anything forming an angle with apex posterior; facet for second labial divided into two portions by suture running from anterior external quadrant of nostril outward and slightly forward to middle of second labial; nostril oval, long axis (.0008M.) parallel to suture of nasal and rostral plates; between nostril and prefrontal plate is a dent or suggestion of suture in nasal shield. Prefrontal broadly in contact with its fellow and second labial; length .0015M.; breadth .002M.; mutual suture .0009M.; anterior external angle acute; facet for frontal .0012M., a trifle longer than that for supraocular; facet for preocular .001M. Frontal one and one half times as long as broad, length .003M., breadth .0019M.; .003M. from rostral; supraocular facets .0014M., parallel; parietal facet .0014M.; posterior angle barely acute; anterior angle obtuse. Parietal .003M. long, .0025M. wide; mutual suture .0028M.; anterior angle obtuse; facet for superior postocular .0005M.; facet for anterior temporal .0014M., posterior .0024M.; posterior angle rounded, touching a single scale which lies between the azygos shield and posterior temporal. Preocular one, in contact with second and third labials. Postoculars two (normally one), superior a little larger. Temporals one followed by one; posterior larger, its suture with parietal nearly twice as long as that of anterior. Superior labials six; third and fourth entering eye; first nearly square; second greatly produced upward and backward, touching preocular and prefrontal. Mental .0018M. wide, .0007M. long. Infralabials eight; first in contact with its fellow; fourth very small; fifth largest. Genials in two pairs; subequal; anterior in contact; posterior partially separated by a single scale. Gastrosteges 360; distinct throughout; nearly all with two tubercles; on anterior part of body vary from one and one-fourth times to nearly twice size of scales in adjoining row. Preanals five; outer pair about three times as large as inner. Scales on neck in 28 rows, subimbricate, smooth, longer than broad, with truncate apex; on body, in 44 rows, oblong in a few median dorsal rows, majority on sides as broad as long, some a trifle broader than long; smooth on anterior portion of body, gradually acquiring a single tubercle and changing to hexagonal type posteriorly.

Head black; neck black with light vertical bars or incomplete rings, the first just behind the head; body black marked with lighter rings; tail black with light rings or vertical bars. The light bars or rings are much wider on the sides and below than on the back. The upper portion of each light ring is gray, while the lower half or more is clear yellow. The tubercles of the gastrosteges are black. There are 45 bands on the body and six on the tail.

Total length 752 mm.
Length of tail 77 mm.
Diameter of neck 6 mm.
Diameter of body 20 mm.

Variation.—The following table shows the variation in the more important characters:

Specimen No.	Sex	Length		Diameter		Scale Rows		Gastrosteges	Preanals	Preoculars	Postoculars	Superior Labials	Temporals	Bands	
		Total	Tail	Neck	Body	Neck	Body							Body	Tail
15001.....		474	45	5	15	27	40	333	4	1	1	7	1–1	46	3
15002.....		487	41	6	14	28	42	365	4	1	1	6	1–1	41	1
15003.....	♀♀♂	518	47	6	14	26	39	370	4	1	1	6	1–1	44	4
15004.....		579	45	6	16	29	46	394	4	1	1	6	1–1	49	5
15005.....		587	61	6	15	26	41	345	4	1	1	6–7	1–1	43	4
15006.....	♀	676	69	6	16	24	38	323	4	1	1–2	6	1–1	41	5
15007.....		679	71	6	17	25	38	351	4	1	1	5–6	1–1 / 1–2	47	4
15008.....		701	54	6	23	29	44	371	4	1	1	6	1–1	53	4
15009.....	♀	717	74	6	20	26	42	358	4	1	1	6	1–1	54	5
15010.....	♂	718	80	6	21	27	44	365	4	1	1	6	1–1	46	4
15011.....		721	77	6	18	28	42	356	4	1	1–0	7–8	1–1	47	3
15012.....	♂♀	723	75	6	19	27	44	336	4	1	1	6	1–1	44	3
15013.....		743	59	6	26	28	42	390	4	1	1	6	1–1	49	3
15014.....	♂♀♀♂♀♂	748	67	6	23	28	42	384	4	1	1	6	1–1	46	6
15015.....		752	58	7	24	28	44	379	4	1	1	6	1–1	47	3
15016 Type....	♂	752	77	6	20	28	44	360	5	1	2	6	1–1	45	6
15017.....		771	67	6	21	26	42	380	4	1	1	6–7	1–1	49	6
15018.....		786	77	7	20	28	42	355	5	1	1	7	1–1	42	3
British Museum	♂	651	66			28	41	320	4	1	1–2	7	1–1	50	3
Senckenberg...		340	32			29	44	386							
Average...						27	42	361	4	1	1	6	1–1	45	4

An accurate idea of the difference in the length of the tail between the male and the female is to be seen in the specimens No. 15016 and No. 15015: this is .019M. or exactly 25% longer in the male.

In No. 15002 the right anterior temporal enters the rim of mouth, and the left is fused with the sixth superior labial.

Fresh Coloration.—The following notes on coloration were made from fresh specimens.

No. 15001.—Body rings, above yellowish greenish gray, sides and below ochre yellow; demarcation not distinct, on about the ninth scale row.

No. 15002.—Head and neck shiny jet black, body dull black, tail blacker; on nape two oblong yellow spots; on neck and body forty yellow spots on each side, the majority confluent across back; on tail, one similar mark and a faint yellow spot behind it. The upper third of each spot on body is olive yellow, the lower two-thirds are orange yellow. These spots at widest part on body average one to one and one-half scales narrower than the black body-color between them.

No. 15010.—Head and neck for over 100 mm. shiny jet black; latter with canary-yellow bars, the first represented by two little oblong patches three scales behind the posterior temporals. The black bars on the body average nine scales long on the middorsal line, and four or five on the middle of the sides. The light markings are grayish olive yellow above and orange below; there is an abrupt line of demarcation on about the eleventh to twelfth row of scales. Tail dull black, the yellow clear, no olive above.

No. 15012.—Light markings olive gray above, light yellowish gray on sides, demarcation fairly sharp on about the eleventh row of scales.

Anatomical Notes.—In the maxilla are positions for two fangs, the inner a trifle the more anterior. There usually is one fang firmly cemented into place, and another nearly erect but loose. The fangs are compressed laterally and are about one millimeter long. The space between the base of the outer fang and the center of the base of the first tooth is a little more than the length of the fang. There are five teeth, about two-thirds the length of the fang; the grooving is on the anterior and outer quadrant.

The hemipenis (from specimen No. 15012) is bifurcate; with the organ everted and inflated the distance from an apex to the bottom of the division is .0004M.; sulcus bifurcate for a distance of .0026M. from apex. Apex and portion between rami of sulcus smooth. Papillæ border smooth area for about two indistinct rows. Spines begin about the middle of the

rami of the sulcus and extend to .013M. from apex; they are very uniform in size. There is a basal papilla on the smooth portion of the base of the organ opposite the sulcus; this is .003M. from the spinous area and .0155M. from the apex. This papilla is triangular, about .0012M. long, and its apex points toward the base of the organ and is free for about .0004M. We have found such a basal papilla also in *Lapemis hardwickii, Disteira ornata* and *Disteira cyanocincta.* Its presence in *Disteira stokesii* is indicated in the figure given by Cope. According to Cope's figure it does not exist in *Hydrus platurus* and we have found it wanting in *Laticauda colubrina.*

Habits.—This species is rarely seen in the daytime, and has not been observed floating on the surface during the day, as has been the case with *Disteira cyanocincta.* When it comes to the suface for air it swims directly upward at great speed, with the neck and anterior third of the body straight and the tail and posterior portion of body undulating, the head rises about a centimeter above the surface of the water, and then, instantly, the animal turns and dives vertically down out of sight. At night, in the area illuminated by the gangway lights, they are seen swimming slowly and horizontally at the surface, the neck nearly straight or curving slightly while the posterior third of the snake is in motion. All the specimens were taken with a dip-net from the gangway of the ship after dark. A light was hung over the side near the water, attracting crustacea and fish. There is no reason to believe the serpents were drawn by the light, for they would swim in and out of the illuminated area quite as though it were not there. They are fairly easy to capture and are extremely helpless when out of the water. The only food found in the stomachs of the series of nineteen snakes was four specimens of a small eel belonging in the genus *Muræenichthys.* These eels were submitted to Professor Charles H. Gilbert of Stanford University and pronounced by him to belong to an undescribed species which has since been named *Muræenichthys thompsoni* Jordan and Richardson.[1] The ship was anchored

[1]Dr. Gilbert writes us, "I regret we have no knowledge of its [*Muræenichthys thompsoni*] habits, and can only say that the probabilities are much in favor of its being a bottom form living in moderate depths (within fifty fathoms)."

in about twelve fathoms of water at the time these snakes were collected. Two females collected January 6, 1907, each contained three embryos. The heart of one embryo was found beating fifty-six times per minute, one hour after the death of the mother in alcohol.

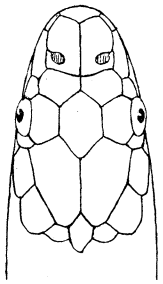
Material.—In addition to the eighteen specimens of this snake in the Academy's collection and the one presented by Dr. Thompson to the British Museum, we know of but one other specimen of *Disteira cincinnatii.* This is No. 9281.1a Senckenberg Museum and is mentioned by Boettger in his catalogue of snakes as *Hydrophis fasciatus* collected by Moellendorff at Manila.

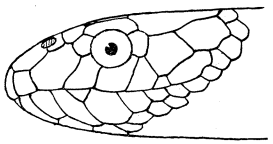
California Academy of Sciences,
December 7, 1908.

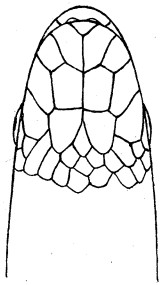
EXPLANATION OF PLATE I

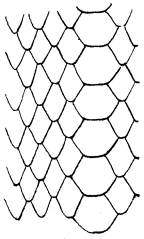
Disteira cincinnatii new species

From the specimen in the British Museum. No. 08-3-19-1. Male.
Enlarged three times.

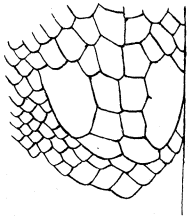




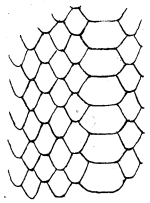




near neck.



anal



near tail.

J. Green
3.6.08.