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The Caecilians of Ecuador

Edward H. Taylor and James A. Peters

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Edward H. Taylor* and James A. Peters**

ABSTRACT

This paper deals with a study of a caecilian collection made in Ecuador largely by the junior author and for the most part not available to the senior author in the preparation of his 1968 monograph on the caecilians.

INTRODUCTION

The junior author spent considerable time in Ecuador collecting in various parts of the country and in studying the collections that have been largely acquired by the United States National Museum. The senior author visited some weeks in the country, all of which time was spent in the field. Both were surprised at the large number of species of caecilians that are to be found there and doubt that so large a number occur in any other area of equal size. We believe that the high continental divide is responsible for dividing the species largely into two groups, one occurring in the Pacific and western Caribbean drainage, the other largely if not entirely in the Atlantic and the eastern Caribbean drainage.

It is true that certain species have been reported in both areas; some of these are in obvious error. Of course it is entirely probable that certain ones do occur in both areas.

The senior author believes that the Linnaean name *Caecilia tentaculata* was originally applied to a now unidentifiable species (the type now lost). The matter is being investigated.

The following museum abbreviations are used:

BMNH: British Museum of Natural History, London.

EPN: Escuela Politechnica Nacional Ecuador, Quito.

JAP: James A. Peters, Private Collection, Washington, D.C.

KUMNH: Kansas University Museum of Natural History, Lawrence, Kansas.

USNM: United States National Museum, Washington, D.C.

SPECIES ACCOUNTS

Family **Ichthyophiidae**

Of the two South American genera, *Rhinatrema* and *Epicrionops,* recognized in the family Ichthyophiidae, only the latter is known to occur in Ecuador. One of the most striking characters separating these genera is that *Rhinatrema* has a transverse anal vent, *Epicrionops* a longitudinal vent. There is also a striking difference in the character of the caudal appendage of the two forms.

Epicrionops appears to be distributed from Perú north and east as far as eastern Venezuela, while *Rhinatrema* is known only from the type-locality in Cayenne. Three forms of *Epicrionops* are recognized in Ecuador. These are *E. bicolor, E. marmoratus,* and *E. petersi petersi.*

Epicrionops bicolor Boulenger

Epicrionops bicolor Boulenger, Ann. Mag. Nat. Hist., ser. 5, vol. 11, 1883, pp. 202-203 (type-locality, "Intac, 3900 ft. elevation in western Ecuador").

The type was collected in Ecuador. Presumably the species is confined to the Pacific drainage area. The type is redescribed by Taylor (1968).

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The junior author and Robert Copping collected a specimen of this genus, JAP 4092, on May 9, 1959, on the cacao farm of Colonel Dyott, at kilometer 121 from Quito, six kilometers east of Santo Domingo de los Colorados, Pichincha Province, Ecuador, at an altitude of about 675 meters. The specimen was found in a thoroughly rotted, termite riddled log lying partly in a small stream in a brush-choked ravine. The area is one of fairly heavy rain forest. The light areas of this individual were bright yellow; the dark areas were coffee brown. Unfortunately, the specimen cannot currently be located, but a series of color photographs of it is available.

The species to which it probably belongs is *E. bicolor,* since there seems to be no sign of the marbling characteristic of *E. marmoratus.* We hesitate to assign it to *bicolor,* however, since the specimen is not available, and the locality from whence it comes is almost the same as that for all known specimens of *marmoratus.*

Epicrionops marmoratus Taylor

Epicrionops marmoratus Taylor, The Caecilians of the World, 1968, pp. 205-209, figs. 98-101 (type-locality, Santo Domingo de los Colorados, Pichincha Province, Ecuador).

The holotype and two paratypes are known. According to the notes of the junior author, made while he was a Fulbright Professor in residence in Quito, Ecuador, the specimen EPN 3986 was collected on the road to Mindo, Pichincha Province, a locality somewhat more precise than that available to the senior author at the time of publication of his monograph. Mindo is on the western Andean slopes at about 1400 meters, while the type-locality lies below it at about 670 meters.

Epicrionops petersi petersi Taylor

Epicrionops petersi petersi Taylor, The Caecilians of the World, 1968, pp. 224-230, figs. 112-116 (type-locality, Agua Rica between Limón and Gualaceo, 6200 ft. [1908 m]).

This species and *Caecilia orientalis* were found together, living under precisely the same environmental conditions. Most of the specimens in the type series were taken under a thick layer of mold, roots and dirt covering huge fallen trees. The logs had been in place for a considerable length of time, and were heavily overgrown by vines and roots that were in turn covered by humus, detritus, and dirt, all forming a layer about four to six inches thick. The area in which the logs were found was swampy, with the entire layer across the log very wet. The caecilians live in the detritus layer between it and the surface of the log. The technique used for collecting the animals was to chop through the layer at two points about three feet apart. Then a horizontal cut was made in the layer low on one side, and the entire layer then rolled across the log like a carpet. The caecilians were exposed on the log surface as the layer rolled away from them, and were easily picked up. On several occasions there were three or four individuals on a single log. *C. orientalis* was found more frequently than *E. p. petersi.*

This species is uniform brownish in life.

Epicrionops sp.

A larval specimen, JAP 6690, measuring 107 mm in total length, is from Morena-Santiago Province.

The tail length is 7.2 mm, the body width 7 mm, the head width 3.2 mm. A gill slit is present, relatively large, with a small diagonal flap preceding, and one following, the diagonal opening. Preceding the slit are small gill filaments not yet absorbed. There is a lateral stripe, 1.8 to 2.1 mm wide, reaching from vent to head, continued along the upper jaw to below the eye, where it widens. We do not discern a tentacular opening and presume that the tentacle has not yet perforated the surface.

This specimen was caught by Peter

Spoecker. It was found under a rock in an extremely moist area within a clearing for a "tambo" (inn) called Mirador, on the mule trail between Sevilla de Oro and Méndez. The altitude is approximately 1980 m, on the eastern slopes of the Andes. The general area is quite heavily forested, although the slopes are precipitous, and the only cleared areas are found in the immediate vicinity of tambos, so it seems likely that this is a forest species.

When first caught, the specimen was uniform dark brown. When it was killed for preservation, however, the distinct light yellow area appeared dorsolaterally.

Since we lack a number of adult characters and since we are unable to count accurately the annular folds, we hesitate to place a name on the form. The coloration and markings, however, suggest that it may be either *Epicrionops subcaudalis* or, not impossibly, *E. laticaudalis,* and would thus represent a fourth species of the genus for Ecuador.

Family **Typhlonectidae**

Of the four genera recognized in this family (*Typhlonectes, Chthonerpeton, Nectocaecilia,* and *Potamotyphlus*), only *Potamotyphlus* is certainly known from Ecuador.

Potamotyphlus kaupii (Berthold)

Caecilia kaupii Berthold, Nachr. Gesel. Göttingen, 1859, p. 181 (type-locality, Angostura [= Ciudad Bolívar], Venezuela).

Potamotyphlus kaupii Taylor, The Caecilians of the World, 1968, pp. 257-263, figs. 130, 131.

One specimen, USNM 811 from "Pucayacú entre Montalvo et Sarayacú Río Bobonaza, Pastaza Province, Ecuador," is the only record of the species in Ecuadorian waters known to us.

The following characters are evident: Length about 442 mm; body width about 10.4 mm; body (compressed) height, 17.2 mm; head width, 8.2 mm. There are 93 primaries and no secondaries. The teeth are premaxillary-maxillary, 24-1-24; prevomeropalatine, 19-1-20; dentary, 24-24; splenial, 5-4+. The terminal fin reaches a height of 3 mm. The terminal 10 mm of the animal is unsegmented. The general color of the specimen is brownish, distinctly lighter on sides and venter; the edges of the folds are bordered by black lines.

The development of the enlarged clasping organ in the tail of the male, the character of body segmentation, and the reduced head size of this species seem to warrant its recognition in the genus *Potamotyphlus* Taylor.

The black lines bordering the well-defined folds, and the diminutive head of this aquatic species will likewise identify the female, although lacking the large clasping organ.

Family **Caeciliidae**

This family is represented in Ecuador by four genera: *Siphonops, Microcaecilia, Oscaecilia,* and *Caecilia.* The last genus, the largest in numbers of species in South America, has representatives of three of the largest species of the order. There are approximately a dozen species known in Ecuador.

One of us (Taylor, 1968) has recently proposed separating the family Caeciliidae into two subfamilies, the *Caeciliinae,* composed of the large-toothed *Caecilia* and *Oscaecilia,* and the remainder of the genera in the subfamily Dermophiinae.

Siphonops annulatus (Mikan)

Caecilia annulata Mikan, Delectus florae et faunae Brasiliensis . . . Vidabonae, 1820, folio, pl. II (type-locality, Sebastianopolis, Brasil).

Siphonops annulatus Wagler, Isis von Oken, Band 21, Heft 7, 1828, p. 742, pl. 10, figs. 1-2, Taylor, The Caecilians of the World, 1968, pp. 555-560, figs. 301, 301a, 302.

This species, the most widely distributed form of the order known in South America, is confined to areas draining into

the Atlantic or Caribbean. It is not known in the Transandean regions draining into the Pacific. The ability of the species better to withstand desiccation seemingly is responsible for this distribution since it is reputedly found, at least occasionally, in relatively dry situations; also it would appear to utilize a somewhat greater variety of food which also might be a factor.

The variation in statistical data and color in the widespread populations is relatively small.

Our specimen, USNM 160367, from the mouth of the Río Copataza, Napo Province, Ecuador, shows the following characteristics: length 329 mm; body width, about 24.5 mm; width in length, approximately 13 times; primary folds, 92, complete save for the terminal folds which are incomplete above; premaxillary-maxillary teeth, 14-1-14; prevomeropalatine, 14-1-14; dentary, 12-12; no splenial teeth. No scales present.

The uniform basal coloration of gray to ultramarine with white bands bordering the folds make this one of the most conspicuous and easily identified species.

Microcaecilia albiceps (Boulenger)

Dermophis albiceps Boulenger, Catalogue of the Batrachia Gradientia *s.* Caudata and Batrachia Apoda in the collection of the British Museum, 2nd ed., 1882, p. 98, pl. 8, fig. 1, 1a (type-locality, "Ecuador").

Microcaecilia albiceps Taylor, The Caecilians of the World, 1968, pp. 533-538, figs. 290, 291.

The close similarity between the type and specimens from the eastern slope of the Ecuadorian Andes suggests that the type originated in that area also.

While this is a common species, none has been found on the western, Pacific drainage of the country.

Oscaecilia bassleri (Dunn)

Caecilia bassleri Dunn, Bull. Mus. Comp. Zool. Harvard College, vol. 91, 1942, pp. 518-519 (type-locality, Río Pastaza, Ecuador).

Oscaecilia bassleri Taylor, The Caecilians of the World, 1968, pp. 600-605, figs. 327-330.

This species, originally described in the genus *Caecilia,* has been placed in the genus *Oscaecilia* Taylor since the type-specimen differs from the other Ecuadorian species of the genus *Caecilia* in having a solid skull with the eye pushed close to the brain and covered with bone.

Three specimens of this species are present in our material from Ecuador. These are USNM 160368 from Río Conambo, Pastaza; USNM 160369, headwaters of Río Bobonaza, Pastaza; and JAP 7803, Río Arajuno, Napo.

The species is known from numerous other localities.

Oscaecilia equatorialis Taylor

Oscaecilia equatorialis Taylor, Univ. Kansas Sci. Bull., vol. 50, no. 5, 1973, pp. 221-224, figs. 34-36 (type-locality, Dyott Farm, Km 121 from Quito, 6 km east Santo Domingo de los Colorados, Pichincha Province, Ecuador).

The eye is covered with bone but is visible through the bone when the skin above it is lifted. The tentacular aperture is on the underside of the snout, almost directly below the nostril but much closer to the nostril than to the eye; secondary folds are present and scales occur in at least the last third of the body. Splenial teeth are present.

The following data were taken from the type, USNM 166421: Total length, 432 mm; width of body, 5 mm; width in length, approximately 86 times; width of head, 5.8 mm; eye to tentacle, 2.5 mm; tentacle to nostril, 1.0 mm. The first collar is relatively narrow without an obvious transverse groove; the second is wider than the first, without a transverse dorsal groove. Primaries, 180, complete on posterior part of body; secondaries, 10; two prominent narial plugs within the border of the anterior part of tongue, behind which the tongue shows rather short longitudinal striations; choanae of mod-

erate size, the diameter of one in the distance between choanae, 1.0 time. The nostril is dorsal, well visible from directly above head. The snout projects 1.5 mm. The formula for the dentition is: Premaxillary-maxillary, 9-1-10; prevomeropalatine, 8-1-9; dentary, 8-8; splenial, 3-3.

Color: Head yellowish olive above and below in distinct contrast to the grayish slate color of the body, with some brownish olive color on sides of neck and throat; vent and entire ventral face of terminus whitish.

The specimen is a female, but probably not full grown. Anal glands are not present. The head has been nearly severed.

This is the first report of a form of *Oscaecilia* to occur on the western slope of the Ecuadorian Andes.

Caecilia pachynema Günther

Caecilia pachynema Günther, Proc. Zool. Soc. London, 1859, pp. 417-418 (type-locality, "Western Ecuador," elevation 6200 ft.). Taylor, The Caecilians of the World, 1968, pp. 425,431, figs. 225-230.

This species would seem to be confined to western Andean areas (Pacific and Caribbean drainage) despite the fact that it has also been reported in the Amazonian drainage (Villavicencio, Colombia, and Normandia, Zunia, Río Upano, Ecuador). Dunn (1942) reported some specimens from "Perú" and certain ones lacking specific locality data. Parker (1934) reported specimens from Zamora, also on the eastern face of the Andes.

Taylor (1968) regarded the specimen from Normandia as representing a different species, *C. crassisquama,* and he referred the two Peruvian specimens to *C. attenuata.* Seemingly certain other specimens referred to this species by Dr. Dunn (1942) are open to question.

The type of *Caecilia pachynema* described by Günther gives the following data: folds on body, 168; ratio of body length to greatest diameter, 92:1. He states that the folds do not reach entirely around the body and that the body is covered all over with rudimentary scales which have more the appearance of minute granulations. The folds on the posterior portion of the body are not deeper than the others, nor do they contain any scales, as in *C. gracilis.* The upper and lower jaws are armed with five hooklike teeth directed backwards on each side, and the palate has three similar teeth on each side. I cannot find any prominences on the tongue or distinguish the eyes. The color is blackish-ash; there is a whitish blotch between every pair of folds.

Günther's description must be interpreted with care. The so-called rudimentary scales are in reality only the glands in the skin; some of the terminal folds of the body may have scales; and the given number of teeth does not take into account the group-loss of alternate teeth in the anterior part of the premaxillary-maxillary series and in the dentary and prevomerine series. At a certain time in the cycle the alternate teeth may be in place and functioning before the formerly functioning teeth are lost. There are two nearly terminal narial plugs present on the tongue. While the tentacular aperture is not mentioned, it is invariably present below the nostril on the underside of the snout in adults.

USNM 160363 is from Pucará, Imbabura Province, Ecuador, 5 km north of Apuel. The total length is 433 mm; body width, about 8.8 mm; width in length, about 49 times; eye to tentacle, 3.4 mm; tentacle to nostril, 1.2 mm; tongue with narial plugs; primary folds, 161, mostly incomplete; secondary folds, 0; premaxillary-maxillary teeth, 9-1-9; prevomeropalatine, 8-1-9; dentary, 9-9; splenial, 2-2; eye in a socket. This specimen differs somewhat from the type in that the median ventral dark stripe is incomplete so that the lateral cream or yellow spots may reach onto the venter in places.

We strongly suspect that the species is confined to the Pacific drainage.

Caecilia abitaguae Dunn

Caecilia abitaguae Dunn, Bull. Mus. Comp. Zool. Harvard College, vol. 91, 1942, pp. 508-509 (type-locality, Abitagua, Pastaza Province, Ecuador, 1100 m elevation).

This species for a considerable time has been known from only the type and two topotypic paratypes. It is a very large species, reaching a known length of 1200 mm and a diameter of about 22 mm. Taylor (1968) has recently reported two more specimens that differ from the type. One of these is from near the type-locality but it lacks traces of secondary folds. The second specimen was taken on the Cordillera del Condor at an elevation of 1280 m, Morena-Santiago, Ecuador. This is also a large specimen, 990 mm in length.

Caecilia bokermanni Taylor

Caecilia bokermanni Taylor, The Caecilians of the World, 1968, pp. 359-363, figs. 188-190 (type-locality, Chicherota, Río Bobonaza, Napo Pastaza Province, Ecuador).

In this type-description the type is stated to be No. 234 which presumably was a field number. When entered into the EHT-HMS Collection the number given was 4581, and figures 189 and 190 are so numbered. Both figures are of the same specimen.

A second specimen, EHT-HMS 10906, acquired from Ecuador is apparently a topotype.

The following characters obtain (the italicized data are from the type; measurements in mm): Length, 325, *527;* body width, 4.8, *10.2;* body height, 6.3, *?;* primary folds, 190, *192;* secondaries, 16, *15;* premaxillary-maxillary teeth, 6-1-7, *10-10;* prevomeropalatine teeth, 8-1-8, *8-1-8;* dentary teeth, 8-8, *10-10;* splenial teeth, 2-2, *2-2;* width in length, 67.5 times, *51.5* times.

Caecilia orientalis Taylor

(Fig. 1)

Caecilia orientalis Taylor, The Caecilians of the World, 1968, pp. 417-425, figs. 220, 224, 224a (type-locality, La Bonita, Napo Province, Ecuador, elevation 1935 m).

As stated in the type-description of this species, the material obtained by the junior author in Ecuador represents two populations that seem to differ chiefly in the presence of a few incomplete rows of scales posteriorly. In one lot, obtained for the most part near the headwater of Río Aguarico at La Bonita, Napo Province, 1935 m elevation and La Alegría, Río Chingsac, most of the specimens have a few scales in the terminal folds. No trace of scales is to be discovered in the second lot from Baeza and Borja in the upper drainage of the Río Napo in the province of Napo. The first lot, however, has certain specimens also lacking these scales. USNM 160350 varies from the norm of coloration in having light areas on the sides, almost contiguous so that there is an indefinite light stripe, vaguely broken at the folds since the grooves marking the primaries are slightly darker than the stripe that extends from the lower jaw to near the terminus of the body. USNM 159792 has the ventrolateral regions distinctly lighter than the dorsum, each fold having somewhat irregular dim spots reaching from midway on the sides to the venter and separated from each other by a darker slate-gray line.

The habitat for this species is the same as that for *Epicrionops petersi petersi* (*q.v.*). *Caecilia orientalis* is considerably more common than *E. p. petersi,* however, and was collected in several additional places. We took them under rocks in the yards of houses, and under smaller logs in very wet pasture land. In the latter case, the animals seemed to prefer the wettest logs and were often in the mud under the logs. They burrowed into a log

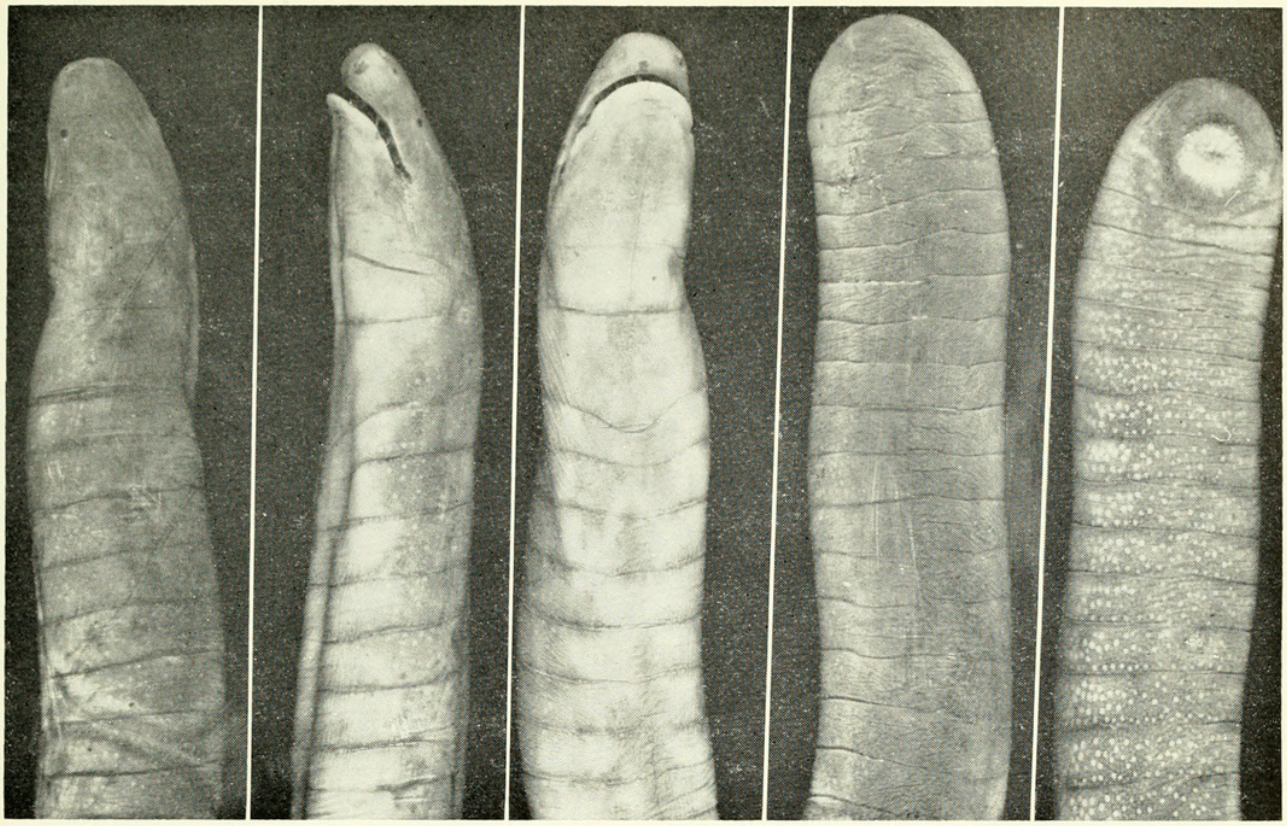

FIG. 1. *Caecilia orientalis* Taylor. Paratype. JAP 4553. La Alegría, Río Chingoac, "elevation 6248 ft." Dorsal, lateral and ventral views of head and neck region; dorsal and ventral views of terminal region.

only when it was very rotten, pulpy, and extremely wet.

The animal is a solid blue color in life.

The electrocardiogram of this species was described in some detail by Peters and Mullen (1966) under the name *Caecilia guentheri* (W. Peters).

Caecilia crassisquama Taylor

Caecilia crassisquama Taylor, The Caecilians of the World, 1968, pp. 369-370, fig. 193 (type-locality, Normandía, Zuñia, Río Upano, Ecuador, 1400-1800 m elevation; eastern slope of the Andes, Amazonian drainage).

This large species lacks traces of secondaries, but has bony, inflexible scales in the posterior folds. Practically all folds are incomplete above and below. A lateral yellowish stripe is present. It is known only from the type-locality.

Caecilia disossea Taylor

Caecilia bassleri Dunn (*part.*), Bull. Mus. Comp. Zool. Harvard College, vol. 91, 1942, pp. 518-519 (excluding specimens with eye sockets).

Caecilia disossea Taylor, The Caecilians of the World, 1968, pp. 374-378, figs. 196, 197 (type-locality, mouth of the Río Santiago, Perú) (a paratype of *Caecilia bassleri*).

Two specimens were collected from the eastern Ecuadorian slopes; one, USNM 160364, from Río Pucunó, Napo Province; one, USNM 160366 ♂, from Cabeceras del Río Napo, Napo Province, Ecuador.

Caecilia dunni Hershkovitz

Caecilia dunni Hershkovitz, Occ. Papers Mus. Zool. U. Michigan, No. 370, 1938, p. 2, fig. 1 (type-locality, near Tena, Napo Province, Ecuador, 1700 ft. elevation). Dunn, Bull. Mus. Comp. Zool. Harvard College, vol. 91, no. 6, 1942, p. 500. Taylor, The Caecilians of the World, 1968, pp. 378-381.

Dunn recorded a second Ecuadorian specimen, BMNH 98.3.1, Cachabe, N.W. Ecuador, that was reputed to have only 38 secondaries. Neither of us has examined this specimen.

Caecilia nigricans Boulenger

Caecilia nigricans Boulenger, Ann. Mag. Nat. Hist.,

ser. 7, vol. 9, 1902, p. 51 (type-locality, Río Lita, 3000 ft. elevation, northwest Ecuador [Pacific drainage]).

This very large species ranges along the Pacific Andean slope and coast of northern Ecuador and Colombia; in the cuenca of the Río Atrato; and extends into eastern Darień, Panamá. Presumably it is confined to these Pacific and Caribbean drainage areas.

One specimen, JAP 8257, collected about 10 km north of Mindo on the road to Puerto Quito, Ecuador, has the following characters: Length, approximately 800 mm; body width, 24 mm tapering to 19 mm near terminus; width in length, about 33 times; primary folds, 133; secondary folds, 16. Scale rows, 1 in each fold, irregular posteriorly; scales begin about 40th fold; subdermal scales present; eye in socket.

The head has been injured and the dentition of the upper jaw is not known. The dentary teeth are 11-(11) with numbers 1, 3, and 5 functioning, indicating group loss and replacement of the teeth. The splenials are 3-2.

The larger scales posteriorly are leathery and reach a diameter a little above 3 mm. Occasional scales may be folded or krinkled.

This individual was found dead on the road at about 2:30 p.m. on a dark day during a drizzling rain. The road was under construction at the time, through an area of forest at about 1500 m altitude, and there was a considerable amount of debris and trash scattered about on both sides of the road. The forest in the area was newly cleared.

The specimen was uniform dark brown when picked up.

Caecilia albiventris Daudin

(Fig. 2)

Caecilia albiventris Daudin, Histoire Naturelle Generalle et Particulere des Reptiles, vol. 7, 1802, pp. 423-426, pl. 92, fig. 1 (type-locality, "Surinam").

Until recently this form has been placed as a synonym of what is now regarded as *Caecilia tentaculata* Linnaeus. Taylor (1972), however, has recently resurrected *albiventris* and figures are given. It is a wide-spread species, occurring from Dutch Guiana to Ecuador.

We figure a specimen, USNM 111968, from Santa Cecilia, Napo Province, 340 m elevation.

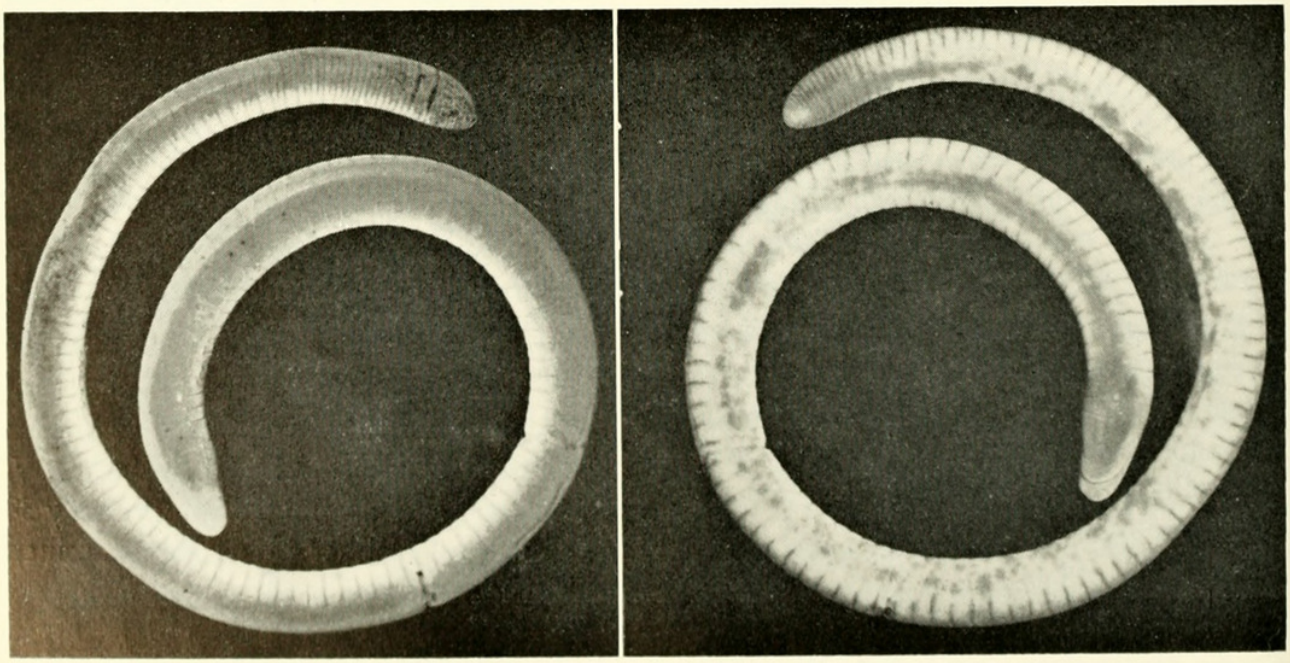

FIG. 2. *Caecilia albiventris* Daudin. USNM 111968. Santa Cecilia, Napo, Ecuador, elev. 340 m. Dorsal (left) and ventral (right) views.

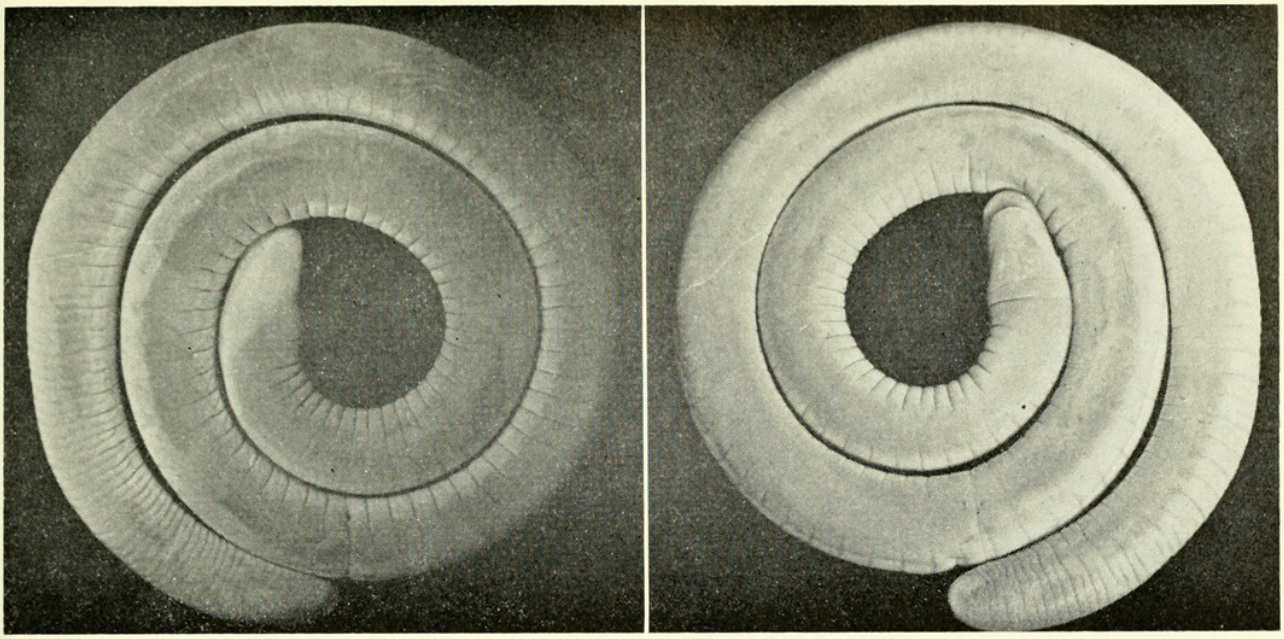

FIG. 3. *Caecilia tentaculata* Linnaeus. JAP 2066. Two km E Vera Cruz, Pastaza, Ecuador, "3300 ft. elev." Dorsal (left) and ventral (right) views. The photo at right is much lighter than the actual light slate color of the ventral surface.

Caecilia tentaculata Linnaeus

(Fig. 3)

Caecilia tentaculata Linnaeus (*part.*), Systema Naturae, ed. 10, 1758, p. 229 (type-locality, "America" [Surinam]). Taylor, The Caecilians of the World, 1968, pp. 442-448, figs. 236-238.

This species seemingly has a wide range. It has been reported throughout northern South America (Surinam, Venezuela, Colombia, Ecuador and perhaps Perú). *C. albiventris* Daudin has long been placed in the synonymy of this species. The type of Daudin's species had a length of "1 pied, 8 pouc, 5 lign" (approximately 498 mm). The type catalogue of the Paris Museum (Guibé, Catalogue des types d'amphibiens du Muséum National d'Histoire Naturelle, without date) records No. 840 as the type of *Caecilia albiventris* Daudin. This specimen measures 620 mm, a difference of approximately 120 mm. This fact throws some doubt on this specimen as the type of *albiventris* Daudin.

Our two specimens (USNM 160370, Upper Río Bobonaza, Pastaza Province, and JAP 2066, 2 km east of Vera Cruz, Pastaza Province, 1006 m) provide the following data (nos. 2066 and 160370, respectively): Length, approximately 1025, 510 mm; body width, 32, 17 mm; width in length, 32, 28 times; primary folds, 124, 123; secondary folds, 62, 57; scales begin about 30th, 34th fold; scale rows complete or partial, 1, 1; subdermal scales, none found in either; eye visible in socket in both; teeth: premaxillary-maxillary, 11-1-11, 12-1-12; prevomeropalatine, 11-1-11, 10-1-10; dentary, 10-11, 13-13; splenial, 3-3, 2-(?).

JAP 2066 was found lying beside a trail made of small logs laid crosswise, often with standing water between the logs, and had obviously just been hit with a machete a few moments before. Since the time of collection was shortly before noon, the animal had been out and crawling on the surface during the day. The area is one of heavy tropical rain forest.

The animal was fairly uniform light blue when found.

Caecilia sp.

A male specimen, JAP 1931, Pichincha Province, is left unidentified. This pre-

sents the following data: Total length, 633 mm; width of body (average), 11 mm; greatest width of head, 8 mm; eye to tentacle, 3.7 mm; tentacle to nostril, 1.2 mm; first collar with a dorsal and ventral transverse groove; second collar with a dorsal transverse groove, fused ventrally with the first primary.

Primary folds, 158, all folds seemingly complete; 5 or 6 short irregular secondary folds, none complete. Scales in posterior part; never more than one row of scales in a fold; eye in a socket, not visible externally. The tentacle below and slightly behind nostril. The palate and jaws are badly damaged; the teeth, however, can be counted as follows: premaxillary-maxillary, 10-1-11; prevomeropalatine, 10-1-11; dentary, 10-10; splenial, 3-3.

This individual was picked up in a roadside ditch in the town of Chiriboga, at 1863 meters elevation. It had been killed prior to collection, probably on the road, and had deteriorated slightly when found. The general area is one of forest and cleared forest, with parts still fairly heavily wooded. The entire area was very wet rather constantly during the rainy season.

Caecilia attenuata Taylor

Caecilia attenuata Taylor, The Caecilians of the World, 1968, pp. 358-359 (type-locality, Perú).

A recent specimen of this species is KUMNH 143556, collected by Bruce McBride 10.4 km N of Santa Rosa, Napo, Ecuador and reported by Taylor (1973).

Caecilia sp.

Two specimens from Girón, Azuay Province, at 2110 meters elevation on the Pacific slope of Ecuador offer difficulties in finding the proper species with which to associate them. They have a large number of primary folds (above 200), and lack secondaries, but have scales present in the two or three terminal centimeters of the body. There is a series of yellowish spots on the sides—a pair on each fold. The tentacle is below the nostril and the eyes are in sockets.

It is possible that they are related to *C. attenuata,* a Peruvian form from unknown specific locality (*vide supra*). They agree in having a faint line of lateral spots, the grooves between them darker. The general brownish color of the body of *attenuata* may be due to preservation; the primary folds are 186-192 (as compared to our specimens with 211-215). *C. attenuata* has no scales, while scales are present in our specimens. The width in length of *attenuata* is 62-66 times, in our specimens, 86-90 times.

Compared with *pachynema,* a species known to occur on the western slope, there is a difference of more than 50 primary folds; occasionally a few secondaries are present in *pachynema* in which case a few scales may be present also.

Data from these specimens, JAP 3531 and 3532, respectively, follow (measurements in mm): Total length, 644, 495; width of head, 7.5, 7.1; width of body, 7.5, 5.5; width in length, 86, 90 times; preanal width, 6, 4.3; eye to tentacle, 3.2, 3; tentacle to nostril, 1.2, 1; first and second collars each with a dorsal transverse groove; primary folds, 211, 215; secondaries, 0, 0.

The eyes of both are in sockets but are not visible externally, except for a slightly lighter area above them.

The dentition is premaxillary-maxillary series, 9-1-8, 9-1-8; prevomeropalatine, 10-1-10, 10-1-10; dentary, 9-1-9, 11-10; splenial, 2-2, 3-2. Scales are present in at least the last two centimeters of the body preceding the vent. The unsegmented terminal "shield" is relatively elongate.

These two specimens were found together under a single rock in soft muck, in a cleared, comparatively level area of spring seepage. The whole area was very wet and spongy, and there were several

small standing pools of water. The surrounding region was dry, with the vegetation consisting of scattered trees, low shrubs, agave fences and occasional cacti.

In life, these animals are almost totally jet black. A small region of the belly is purplish-white. In preservation they are now dark slate-gray dorsally with a lighter spot low on the sides. There is a grayish ventral stripe; laterally the folds are edged in slate-gray.

Caecilia subterminalis Taylor

Caecilia subterminalis Taylor, The Caecilians of the World, 1968, pp. 437-442, figs. 232-235 (type-locality, "Ecuador").

This specimen was obtained by exchange with Prof. Orcés of the Escuela Politechnica Nacional, Quito, Ecuador. It is clearly marked by a continuous lateral cream stripe the length of the body.

Caecilia tenuissima Taylor

(Fig. 4)

Caecilia tenuissima Taylor, Univ. Kansas Sci. Bull., vol. 50, no. 5, 1973, pp. 219-221, figs. 32, 33 (type-locality, Guayaquil, Ecuador).

Only the type, USNM 12353, is known.

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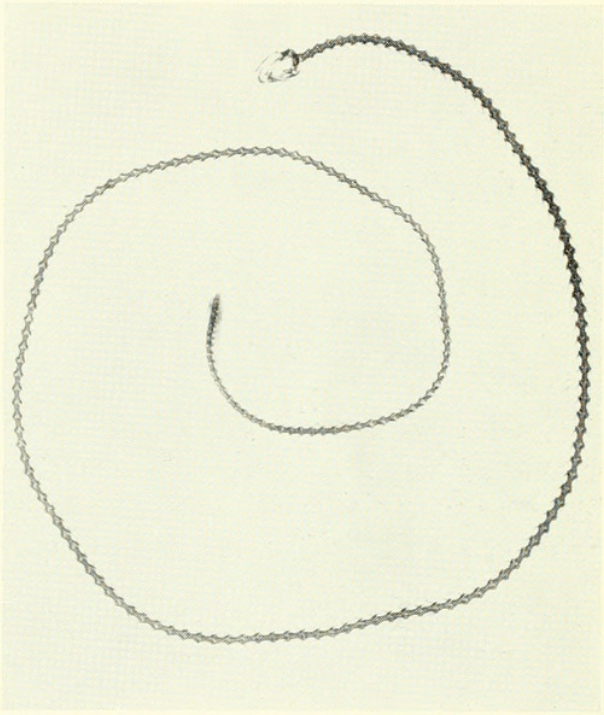

FIG. 4. *Caecilia tenuissima* Taylor. X-ray of type, USNM 12353. 186 folds; 191 vertebrae.