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The Comparative Anatomy of Caecilian Mandibles and Their Teeth

EDWARD H. TAYLOR

TABLE OF CONTENTS

ABSTRACT	261
INTRODUCTION	261
MATERIALS AND METHODS	262
OBSERVATIONS	262
DESCRIPTIONS	262
LITERATURE CITED	264
FIGURES	266-281

ABSTRACT

The dentary and splenial teeth on the mandibles were counted for 23 species of caecilians in 14 genera and 5 families. The genera *Scolecomorpha*, *Caudacaecilia*, *Dermophis* and *Siphonops* lack splenial teeth. However, lack of splenial teeth is a trait of the species for some caecilians in genera where other species have them and is therefore not a generic nor familial trait. The number of teeth on the mandible and their sizes are potentially useful in taxonomic identification of species.

INTRODUCTION

The teeth of caecilians were discussed at some length in my monograph on caecilians of the world (Taylor, 1968). The figures of the buccal region, drawn by the

Persian artist Mr. Habib Kamrani, that appear in the monograph do not have photographic accuracy, but do present general relationships of the dental series to

buccal anatomy. Additional information on the mandible and mandibular teeth is provided in the present review.

MATERIALS AND METHODS

The number of prepared skeletons in museums is small, but through the kindness of their curators I was permitted to extract the mandible or part thereof from certain specimens. In preparing the specimens, little attention had been given to opening the jaws and as a result many of the teeth are broken and often the bones on which the teeth are present are likewise injured.

The artist who prepared the figures, Mr. William Cutter, mounted the specimens in a stationary pan of water with a background of black velvet cloth. The camera was mounted on a mechanism that permitted it to be moved up and down. Unfortunately, the bones of the lower jaw were not always mounted at exactly the same angle, or the water permitted some movement while focusing, thus sometimes creating illusory differences where none exist. This must be taken into account when comparing the two sides of the jaw.

OBSERVATIONS

The actual number of teeth varies with age, new teeth being added on the distal portion of the bone. Teeth may be shed and replaced (as explained in the monograph, pages 26 and 27) as a "group" phenomenon.

The individual teeth tend to break off near their middle, thus exposing the fact that they are hollow. Near the base of each tooth is an opening that serves as a passageway for nerves and blood vessels. In counting the teeth, one must take into consideration these missing teeth, since in group replacement the full set is restored before the next group loss is begun.

The teeth of the second row in the

lower jaw are designated splenials. These are usually very small and are often overlooked, because they may be partially concealed by the gingivae. They are smaller and almost always fewer than the dentaries. It may be necessary to remove parts of the gingivae on one side to find them. Certain genera may lack all traces of splenials.

Only brief comments in this paper are given on dentition of the various species and all pertain to the particular specimens illustrated. The figures serve to amplify those comments and to illustrate distinguishing characters.

Abbreviations for museums cited are: AMNH, American Museum of Natural History, New York; BMNH, British Museum of Natural History, London, England; EHT-HMS, Edward H. Taylor-Hobart M. Smith Collection, Lawrence, Kansas; DSBM, Division of Systematic Biology, Stanford University Collection (now in California Academy of Sciences, San Francisco); JAP, personal collection of the late James A. Peters; KUMNH, Museum of Natural History, Kansas University, Lawrence, Kansas; MCZ, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; UIM, Museum of Natural History, University of Illinois, Urbana, Illinois; UMMZ, Museum of University of Michigan, Ann Arbor, Michigan; USNM, United States National Museum, Washington, D.C.

DESCRIPTIONS

Family *SCOLECOMORPHIDAE* Taylor
Genus *SCOLECOMORPHUS* Boulenger

Scolecormorphus kirkii kirkii Boulenger (Fig. 1). The dentary teeth are usually 14, but some larger preserved specimens I have seen have as many as 18. The dentary bone is relatively slender, the head and neck being distinctly narrower than the body. No splenial teeth.

The prevomerine and palatine series of teeth in all known members of this family are separated by a diastema, present in no other family.

Family TYPHLONECTIDAE Taylor
Genus TYPHLONECTES Peters

Typhlonectes compressicaudus (Duméril & Bibron) (Fig. 2A). There are 20 teeth indicated, 5 having been lost in a group long before preservation. Three splenial teeth. The dentary teeth are pointed, many broken near their middle, showing the teeth to be hollow. There are small basal openings on the inner side of the teeth, for passage of blood vessels and nerves. The anterior ventral edge of the dentary bone bears a short flange for the splenials.

Typhlonectes natans (Fischer) (Fig. 2B). There are 19 pointed, dentary teeth; posterior ones much smaller than anterior ones. The somewhat-widened, lower edge of the anterior part of the bone bears 6 or 7 very small splenials. The anterior dentary teeth are distinctly larger than in the preceding species.

These two forms and others of the family are aquatic, the young being born in the water, which they do not leave. Their large, baggy gills are absorbed before birth.

Family ICHTHYOPHIIDAE Taylor
Genus ICHTHYOPHIS Fitzinger

Ichthyophis mindanaoensis Taylor (Fig. 3A). Dentary teeth, 22; splenial teeth, 10, the series extending nearly half the length of the dentary bone.

Ichthyophis singaporensis Taylor (Fig. 3B). Dentary teeth, 20; splenial teeth, 10.

Ichthyophis kohtaoensis Taylor (Fig. 3C). Dentary teeth, 20-21; splenials, 17-18. The mandible is more slender than

in the two preceding species and proportionately longer.

In this family, the postanal region has several transverse folds; the caudal terminus is usually pointed.

Genus CAUDACAECILIA Taylor

Caudacaecilia weberi (Taylor). In DSBM 21764 (Fig. 4A), there are 23 dentary teeth, almost equal in size. Splenials are absent. In DSBM 21758 (Fig. 4B), the dentaries are 22, all nearly the same size. No splenials. The tip of tail is bluntly rounded rather than pointed.

Splenials are absent in all members of this genus.

Family CAECILIIDAE Gray
Genus CAECILIA Linnaeus

Caecilia albiventris Daudin (Fig. 5). This species has most often been treated under the name *Caecilia tentaculata*, but that nominal species is in question as a *nomen dubium*, since it is based largely on a picture which cannot be verified with certainty. Dentaries, 12-13; splenials, 3 or 4.

Caecilia degenerata Dunn (Fig. 6). Anterior dentaries are elongate, slender, pointed, the 1st, 3rd, 5th and 7th teeth lost, most probably by group shedding before preservation. Six or 7 posterior teeth relatively very small. Two or 3 splenials present.

Caecilia nigricans Boulenger (Fig. 7). Dentaries are relatively large, the 6 anterior teeth now broken, but elongate and sharply pointed in life. Nine or 10 smaller, posterior teeth. Anteromedian flange of the dentary bears 3 relatively very large splenial teeth.

Caecilia orientalis Taylor (Fig. 8). A badly damaged dentary bone, number of teeth indeterminate. The anterior teeth slender, pointed. Three splenial teeth. The posterior parts of the lower jaws are foreshortened, smaller than usual.

Genus *OSCAECILIA* Taylor

Oscacilia bassleri (Dunn) (Fig. 9). Dentary bone relatively short, with 8 enlarged anterior teeth. The teeth numbered 1, 3, 5 and 6 showing a group loss; 3 much smaller, posterior teeth. Three small splenial teeth. Eye under bone, no eye socket (eye sometimes visible as a black dot through the transparent bone). A very slender species.

Oscacilia ochrocephala (Cope) (Fig. 10). Six enlarged, anterior, dentary teeth and 4 much smaller posterior teeth. Four splenial teeth on the anterior, widened edge of the dentary. Eye under bone; subdermal scales present.

Genus *GYMNOPIS* Peters

Gymnopsis proxima (Cope) (Fig. 11). The dentary teeth are 18-18, the posterior teeth not differing much in size from the anterior. The splenial teeth are 1-1 and a portion of the splenial area is broken from the dentary. Unfortunately, the dentary bones have been mounted at an incorrect angle and the teeth are pointing inwardly.

Gymnopsis multiplicata multiplicata Peters (Fig. 12). Eight or 9 enlarged, anterior, dentary teeth, followed by 10 or 11 somewhat smaller teeth. The splenial flange of the dentary bone bears only a single tooth. Some preserved, young specimens have 12 to 15 teeth.

In this species there is no eye socket and the body folds have 5 rows of scales.

Genus *DERMOPHIS* Peters

Dermophis mexicanus mexicanus (Duméril and Bibron). In UIM 66889 (Fig. 13A), the dentary teeth are 15-15. The bone is broken on the right side of the figure. In MCZ 12121 (Fig. 13B), the dentary teeth are 13. In this genus no splenials are present.

Genus *SCHISTOMETOPUM* Parker

Schistometopum gregorii Boulenger (Fig. 14). Dentaries, 15-14, larger anteriorly, much reduced in size, posteriorly. Two splenials, one large and one very small on each bone.

Genus *SIPHONOPS* Wagler

Siphonops paulensis Boettger (Fig. 15). Dentaries, 15-15, bluntly pointed, diminishing in size posteriorly. No splenials in the genus.

Siphonops annulatus (Mikan). In EHT-HMS 1848 (Fig. 16), 11 or 12 teeth in dentary series, the tips somewhat rounded. In MCZ 19407 (Fig. 17), 14-16 dentaries.

Genus *GEGENEOPHIS* Peters

Gegeneophis ramaswamii Taylor (Fig. 18). Fragment of the dentary bone showing 13 teeth. Three splenials.

Genus *GRANDISONIA* Taylor

Grandisonia alternans (Stejneger) (Fig. 19). Dentary teeth, 20; splenial teeth, 6 or 7.

Genus *HERPELE* Peters

Herpele squalosoma (Stutchbury) (Fig. 20). Dentary teeth, 10-11. However, the number counted in preserved specimens usually varies between 10 and 15. The splenials in the figure are 3-3, although some other preserved specimens have 4 or 5.

Genus *GEOTRYPETES* Peters

Geotrypetes seraphini seraphini (A. Duméril) (Fig. 21). All teeth broken. Of the 9 anterior dentary teeth, 3 lost. The 9 posterior teeth, of nearly equal size, are much smaller than anterior 9. Splenials, 12-12.

LITERATURE CITED

- TAYLOR, EDWARD H. 1968. The caecilians of the world: a taxonomic review. Lawrence, Univ. Kansas Press. i-xiv, 848 pp., 425 figs.

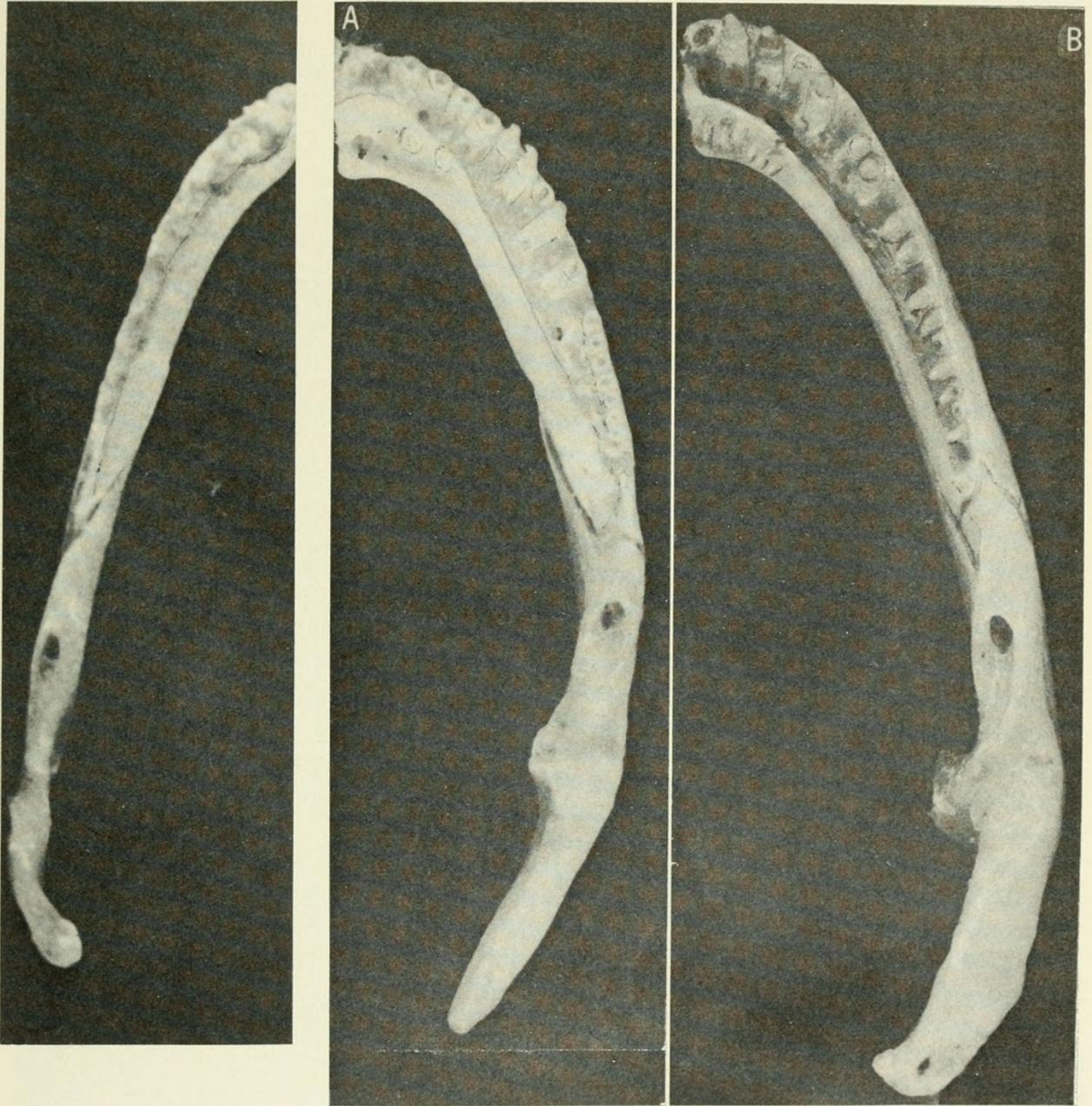


FIG. 1. *Scolecomorphus kirkii kirkii* Boulenger. MCZ 27120, Cholo Mts., Cholo District, Nyassaland.

FIG. 2. A. *Typhlonectes compressicaudus* (Duméril & Bibron). UMMZ 82854, Belém, Brasil. B. *Typhlonectes natans* (Fischer). AMNH 23418, Bogotá, Colombia.

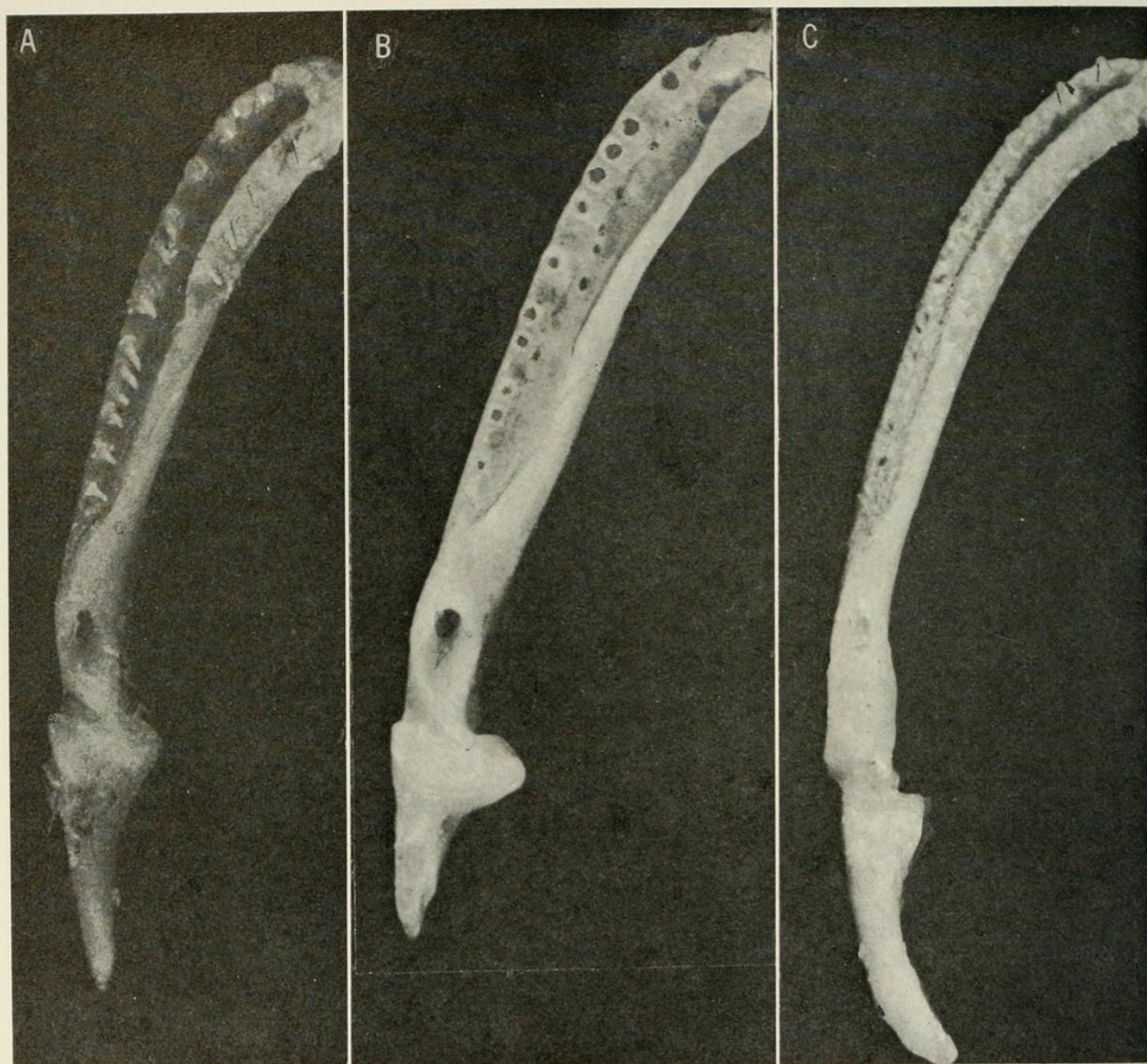


FIG. 3. A. *Ichthyophis mindanaoensis* Taylor. DSBM 20926, Dapitán, Misamis, Mindanao, Philippine Islands.
B. *Ichthyophis singaporensis* Taylor. BMNH RR 1959-1-2-43 (holotype), Singapore Island, Malay Peninsula.
C. *Ichthyophis kohtaoensis* Taylor. EHT-HMS 3935, 10 mi N Chiang Dao, Chiang Mai Province, Thailand.

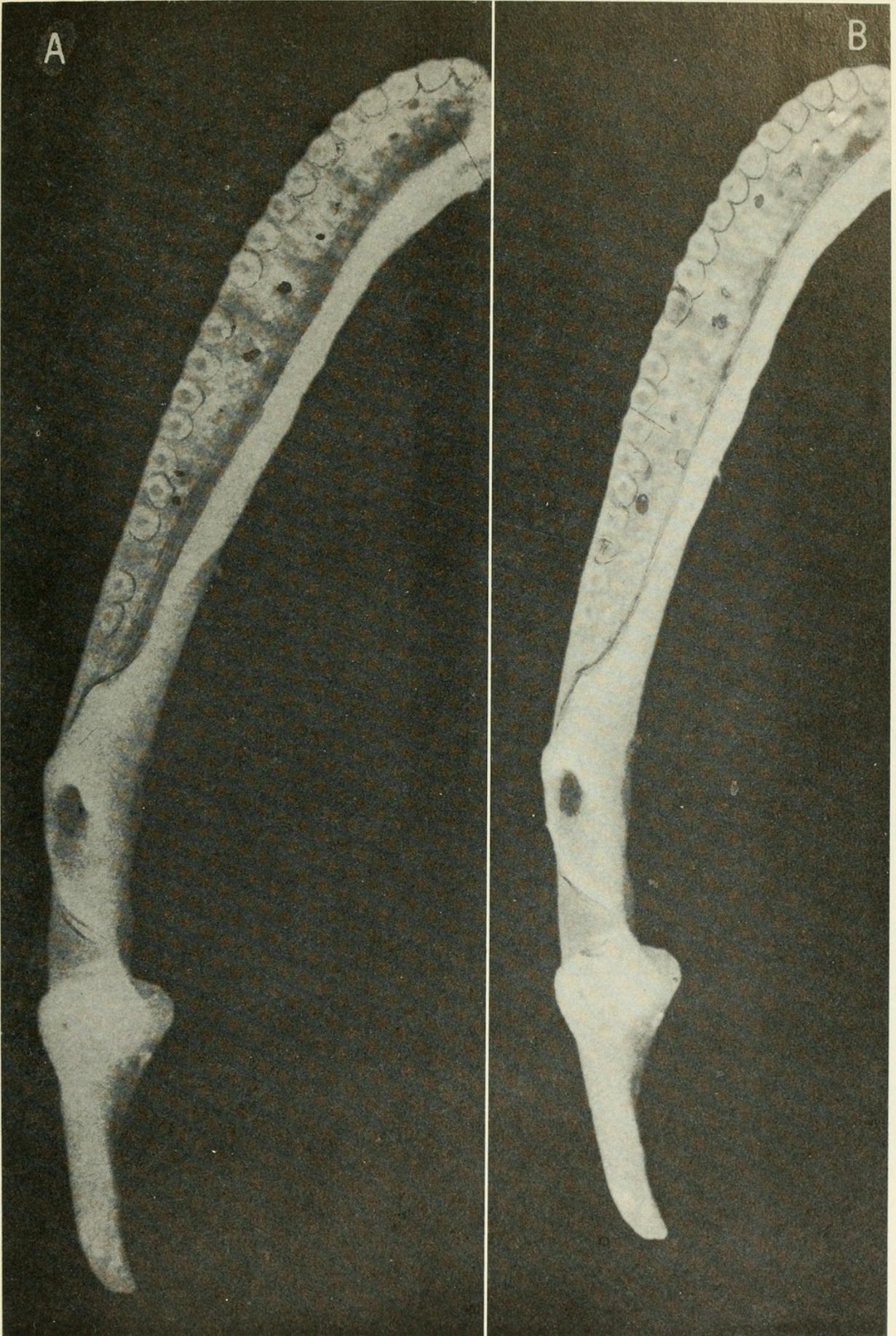


FIG. 4. *Caudacaecilia weberi* (Taylor). A, DSBM 21764 (neotype), Malatgán River, 15 km SW Iwahig, Palawan, Philippine Islands; B, DSBM 21758, near Iwahig, Palawan, Philippine Islands.

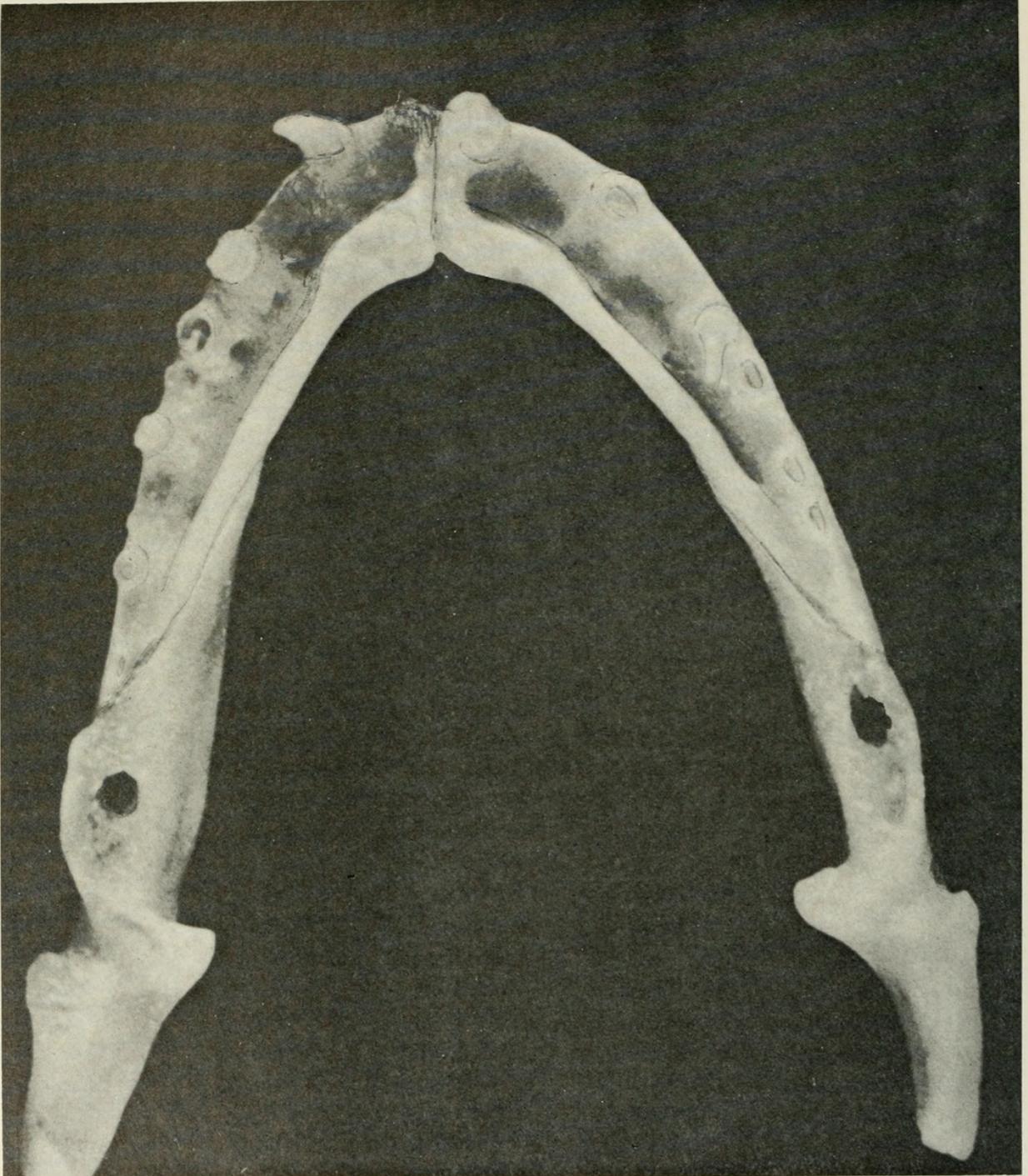


FIG. 5. *Caecilia albiventris* Daudin. AMNH 49960, Río Copataza, Ecuador.

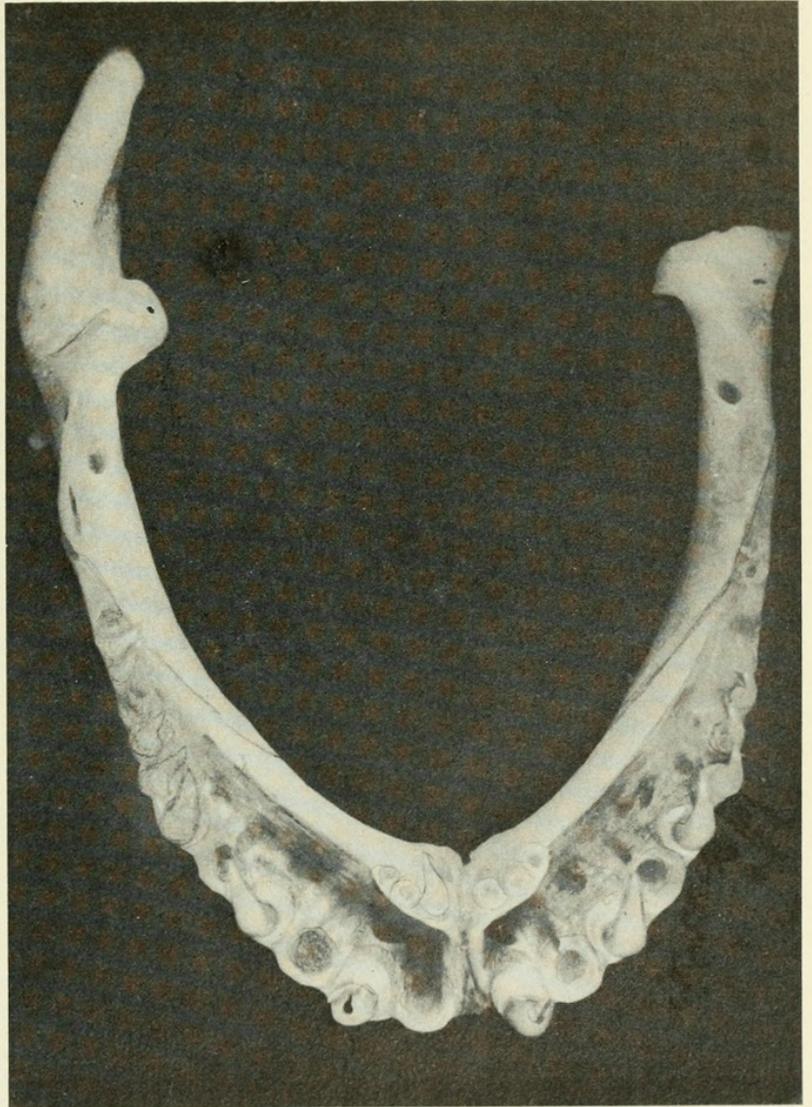
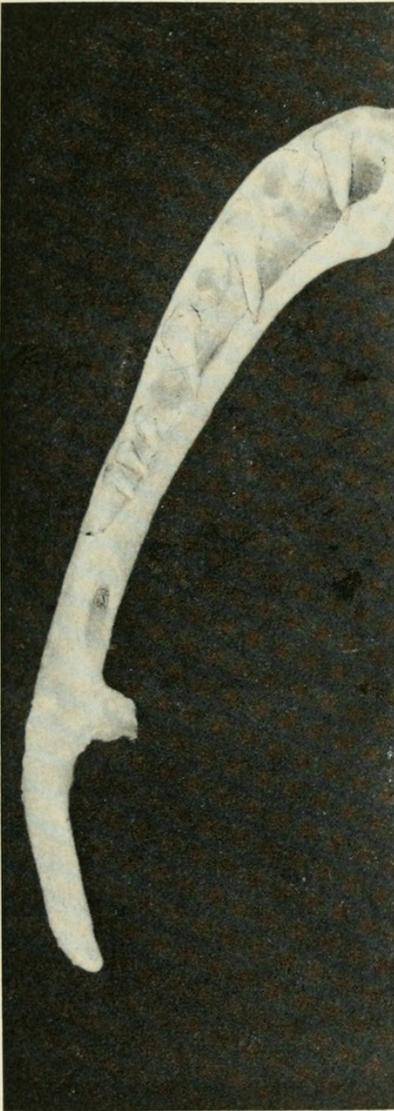


FIG. 6. *Caecilia degenerata* Dunn. AMNH 23354, either Boyaca or Condinamarca, Colombia.

FIG. 7. *Caecilia nigricans* (Boulenger). KUMNH 94377, Cana, Darién, Panamá, 500 m.

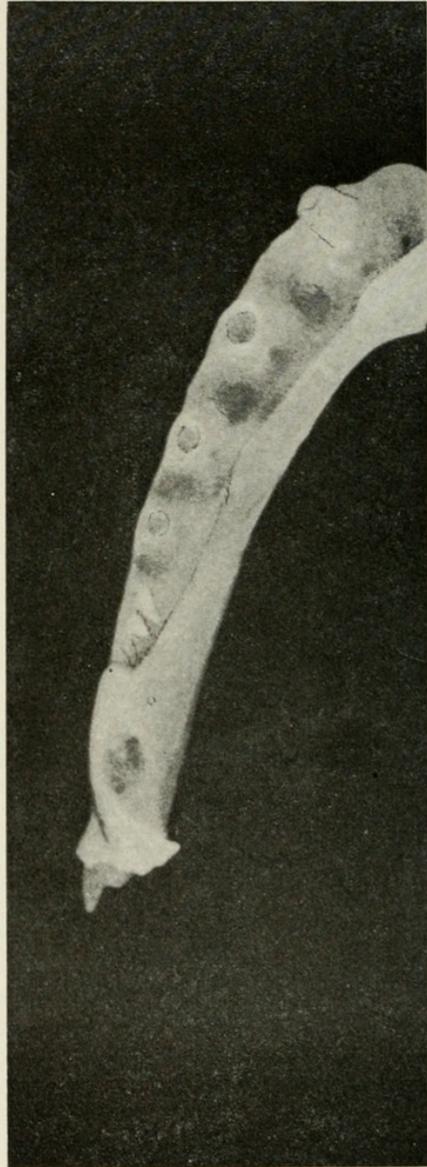
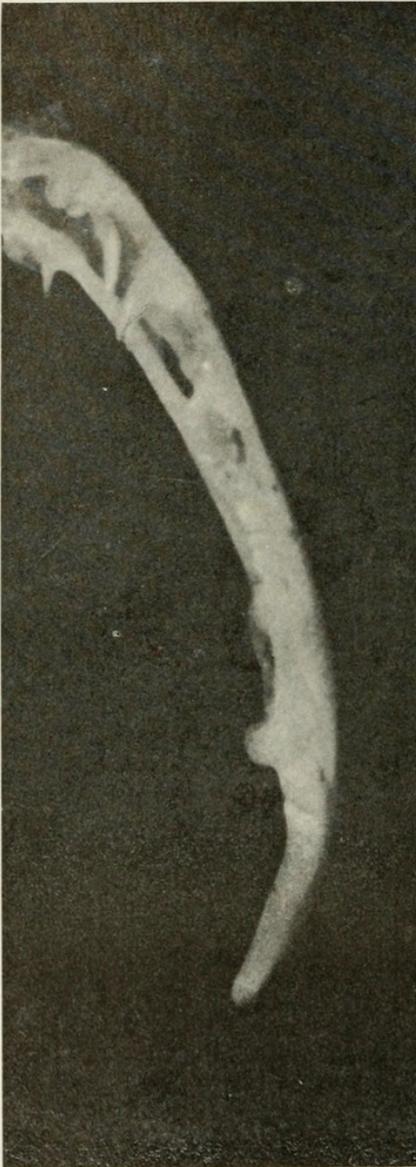


FIG. 8. *Caecilia orientalis* Taylor. JAP 4690, Napo Pastaza, Ecuador.

FIG. 9. *Osaecilia bassleri* (Dunn). EHT-HMS 4675, Ecuador, specific locality uncertain; collected by Orces.

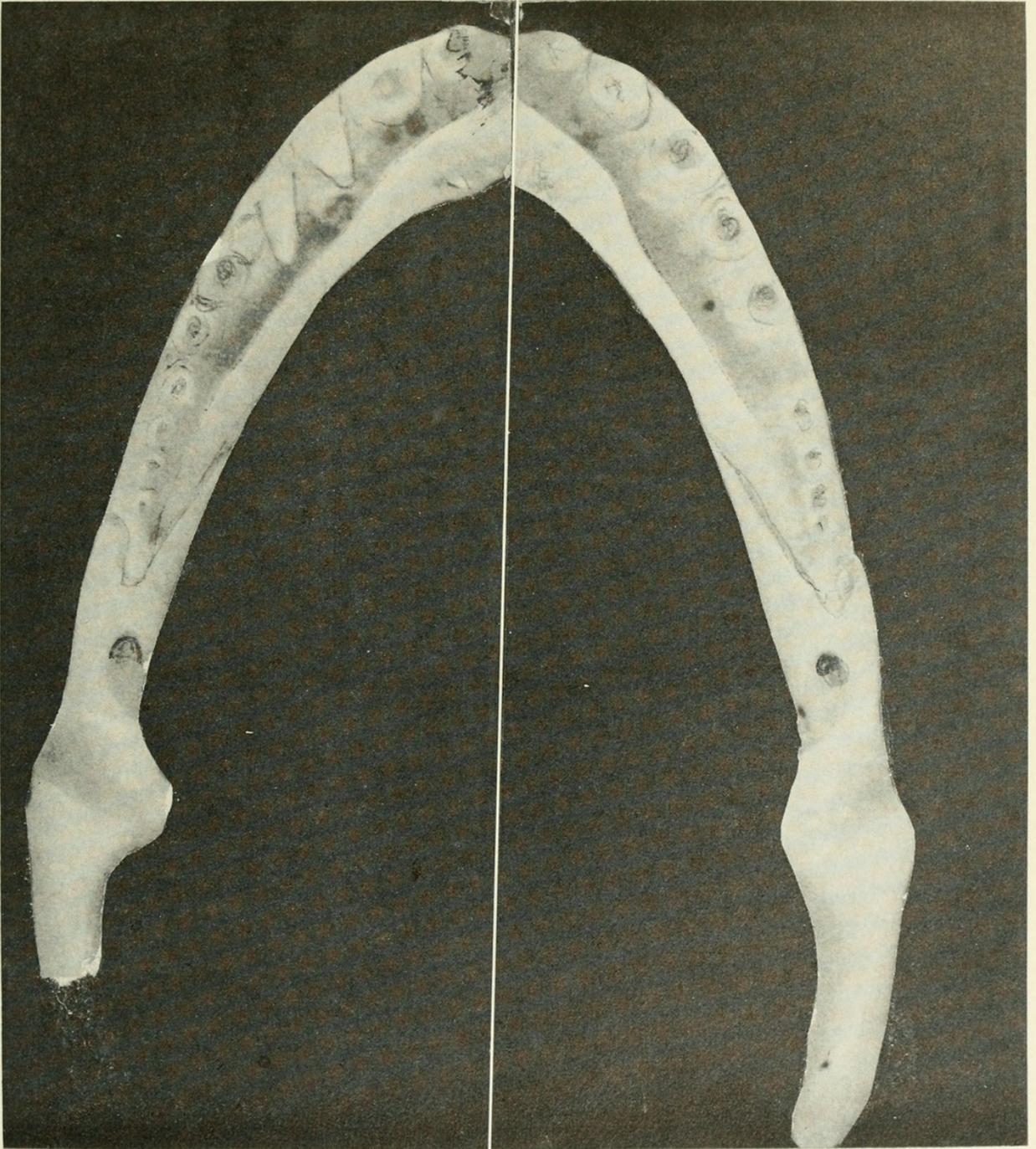


FIG. 10. *Osaecilia ochrocephala* (Cope). EHT-HMS 1736 (41092), Gatún, Panamá Canal Zone.

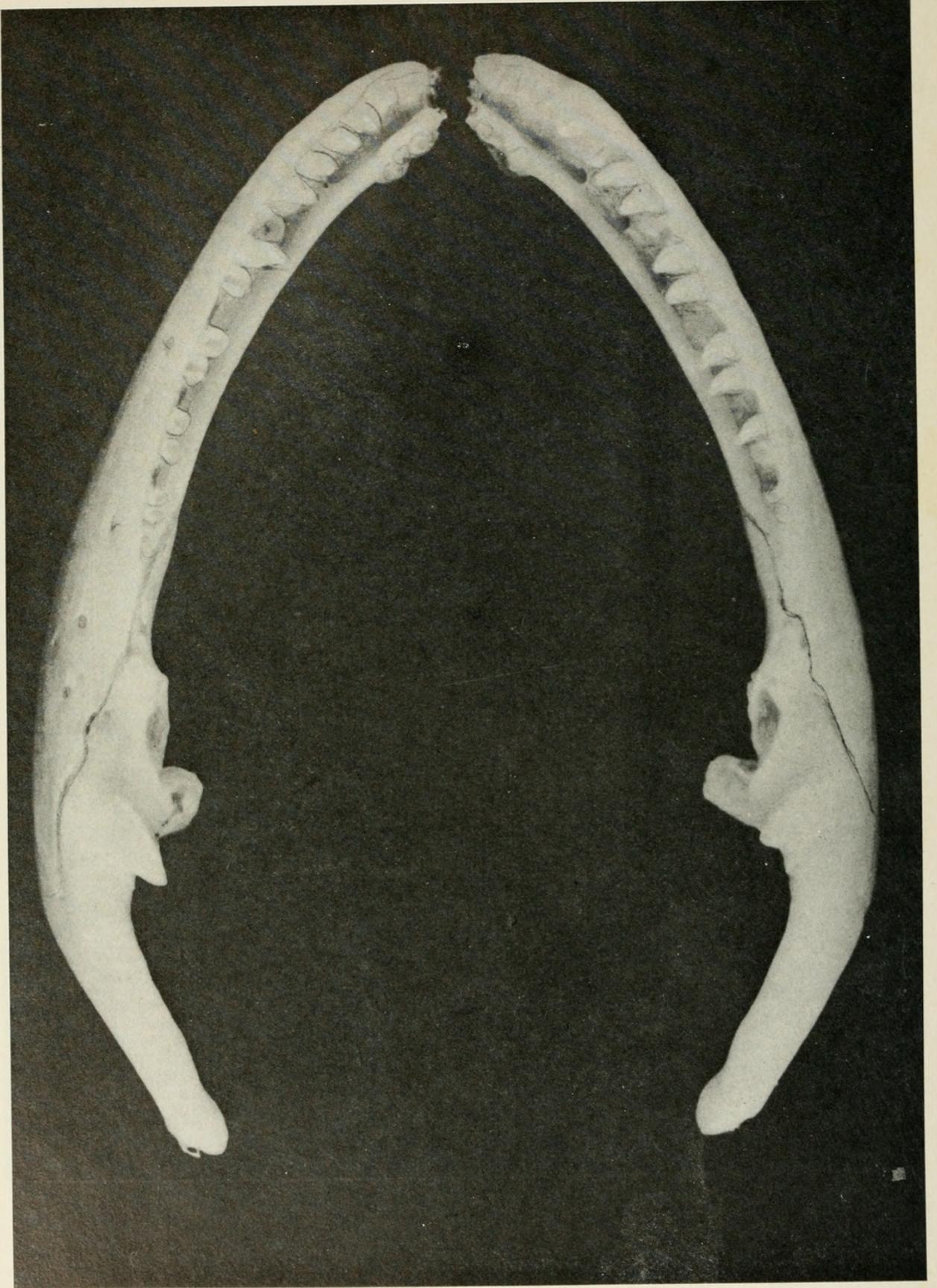


FIG. 11. *Gymnopsis multiplicata proxima* (Cope). EHT-HMS 4712, Rancho Dominica, Turrialba, Limón Province, Costa Rica.

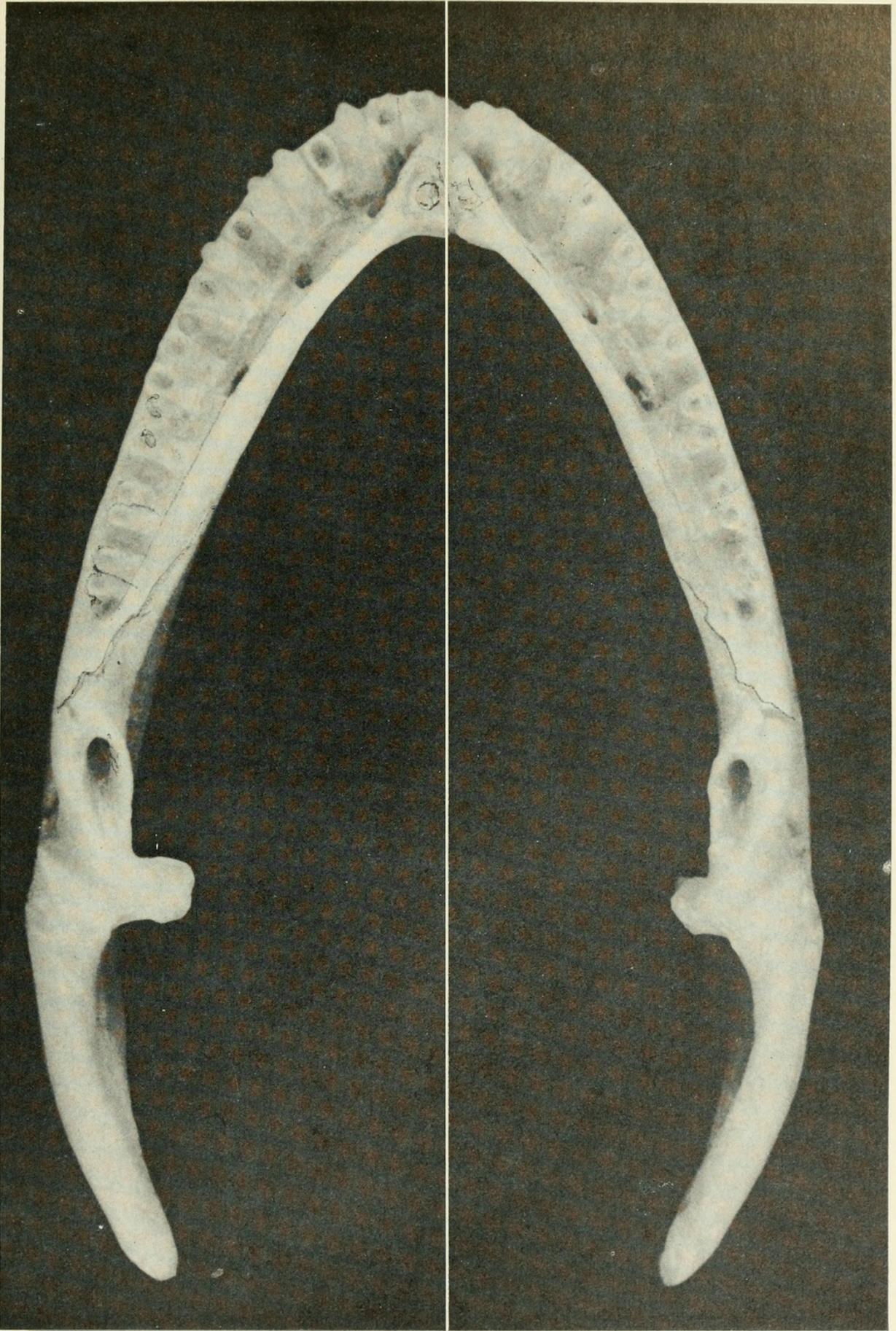


FIG. 12. *Gymnopsis multiplicata multiplicata* Peters. EHT-HMS 4702, San Bosco, Tilarán, Guanacaste Province, Costa Rica.

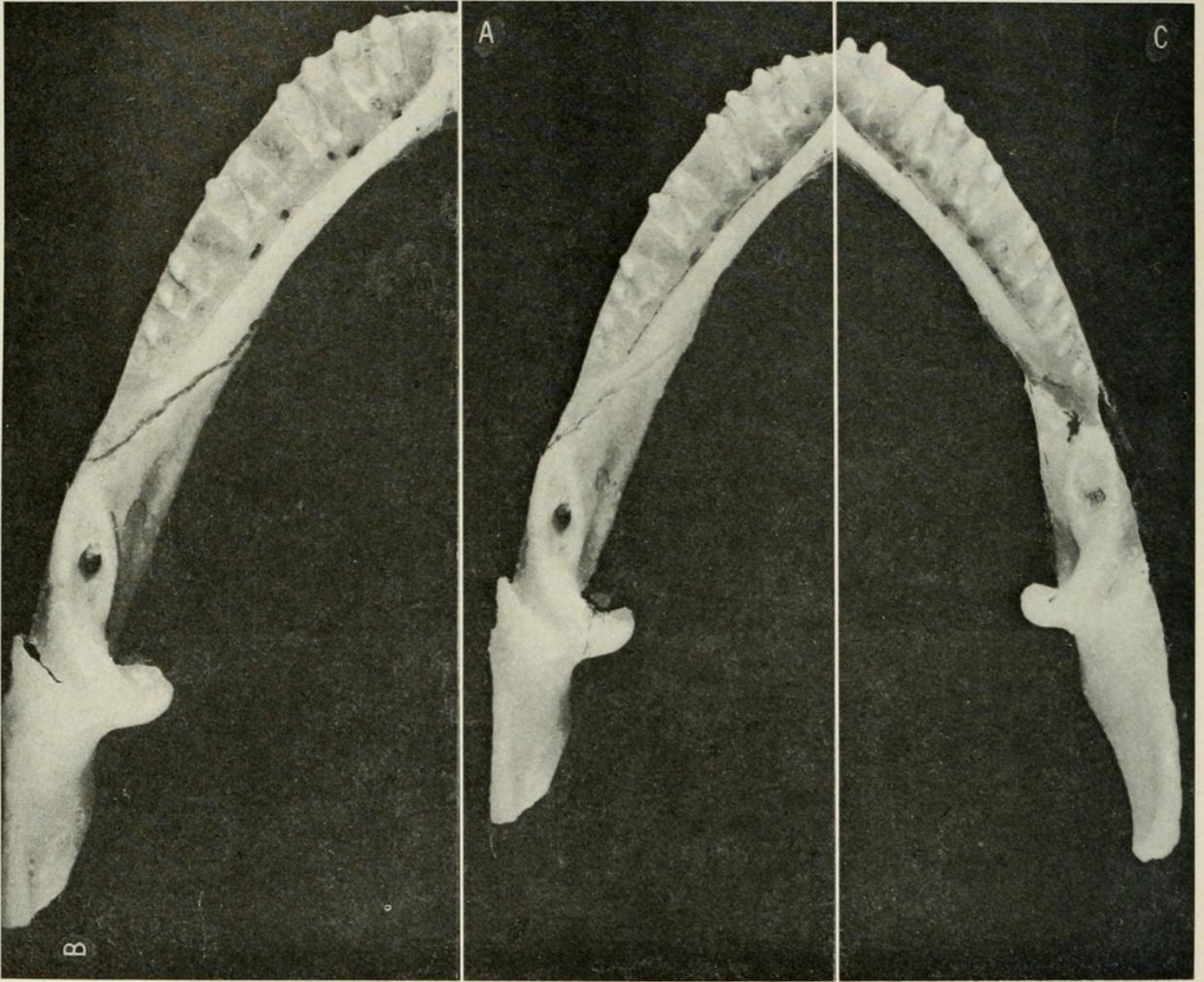


FIG. 13. *Dermophis mexicanus mexicanus* (Duméril & Bibron). A, B, UIM 66889, Finca El Naranjo, Suchitepequez, Guatemala; C, MCZ 12121, Guatemala.

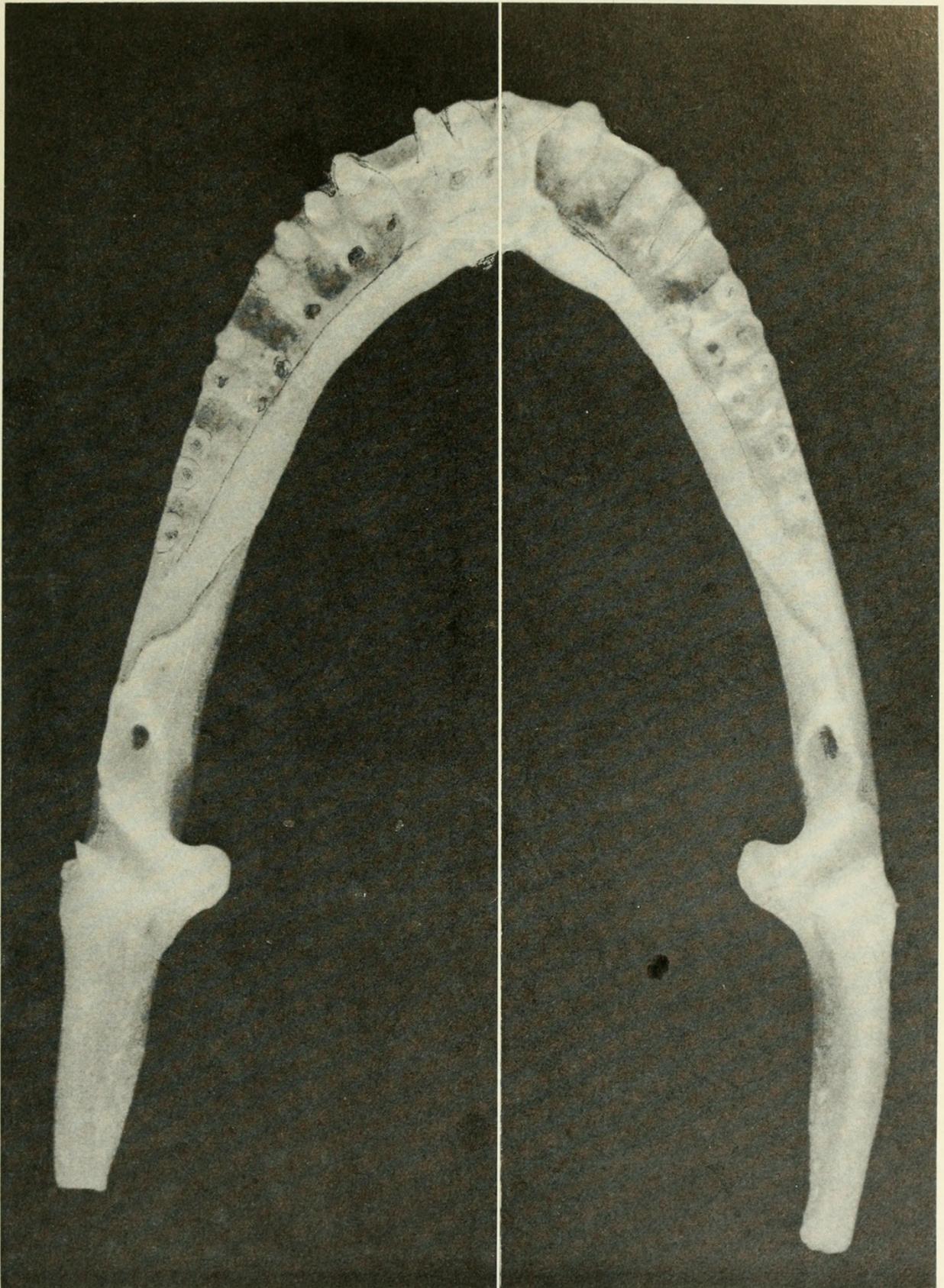


FIG. 14. *Schistometopum gregorii* (Boulenger). MCZ 20117, Lake Peccatoni, Kenya.

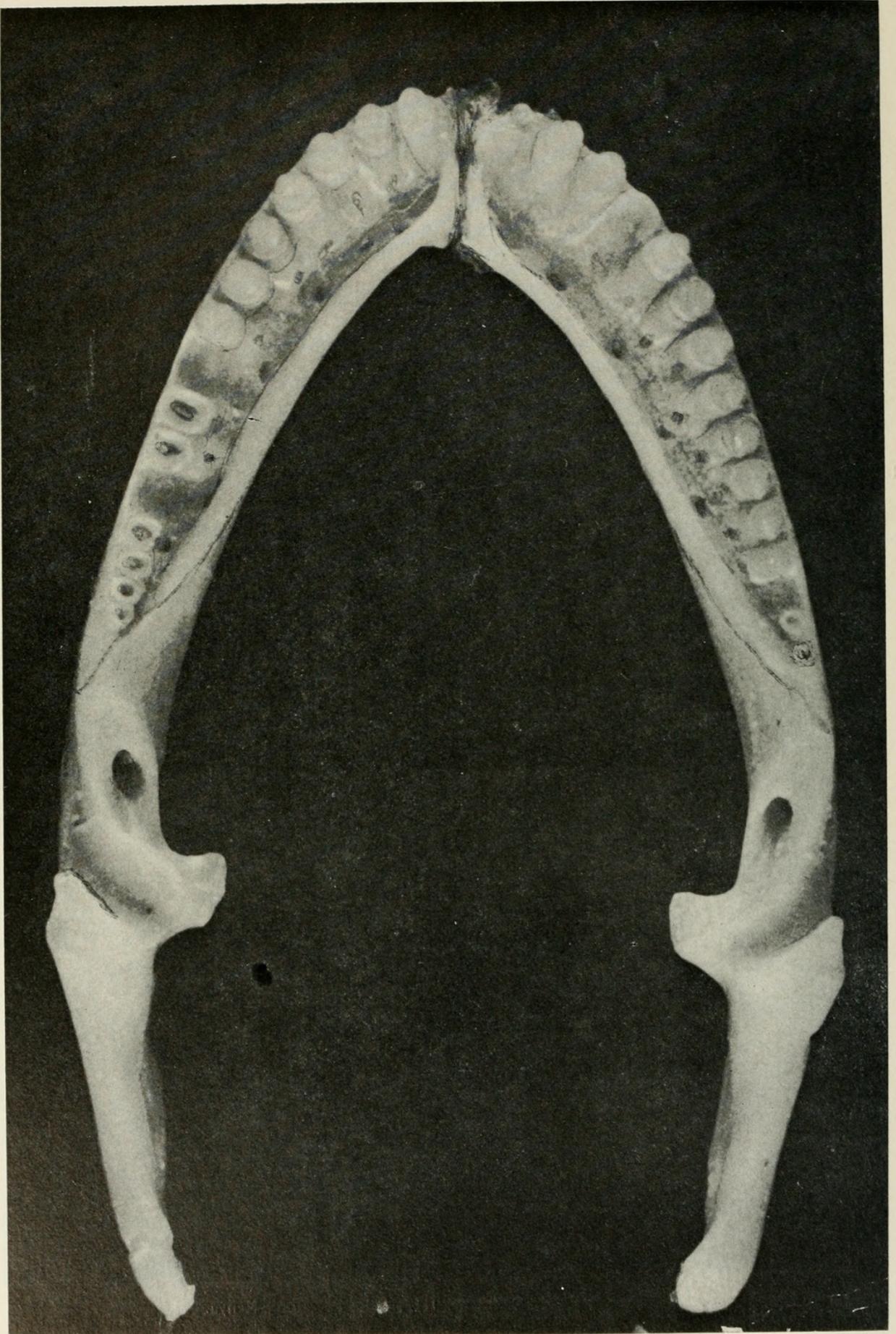


FIG. 15. *Siphonops paulensis* Boettger. EHT-HMS 3235, southern Brasil (no exact locality).

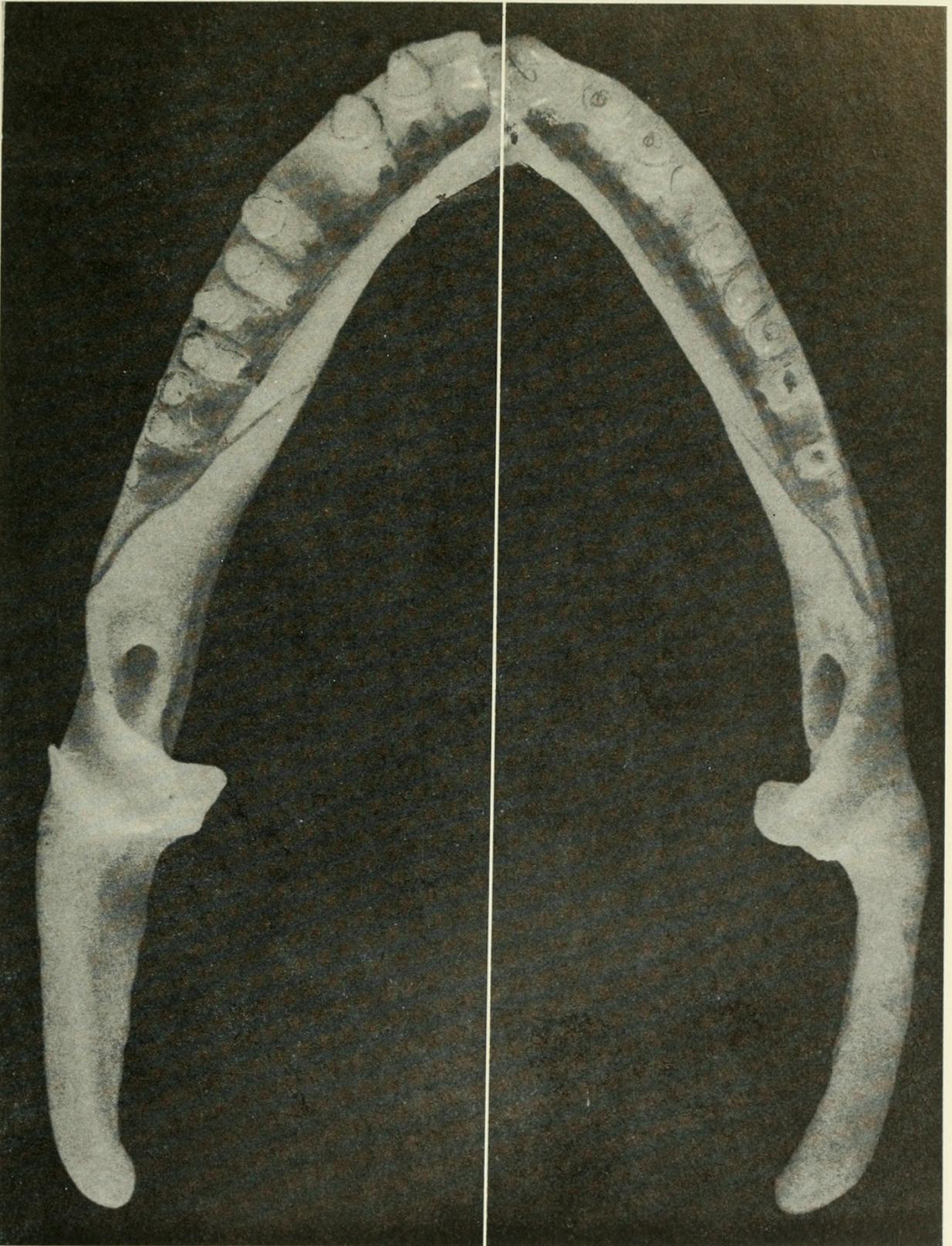


FIG. 16. *Siphonops annulatus* (Mikan). EHT-HMS 1848, Teresopolis, Guanabara, Brasil.

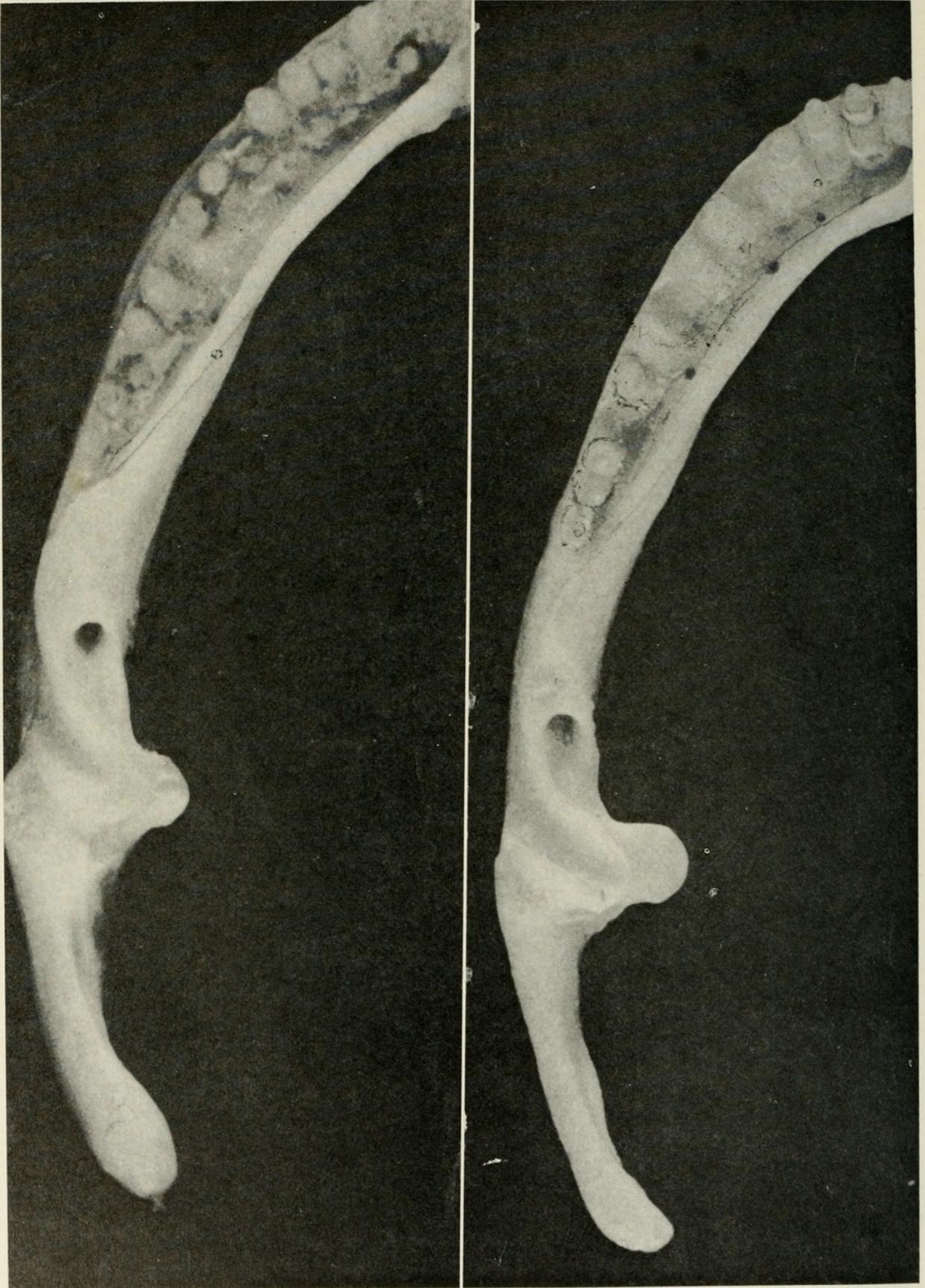


FIG. 17. *Siphonops annulatus* (Mikan). MCZ 19407, Ecuador, Pastaza River, "Canelos to Maranon," Ecuador.

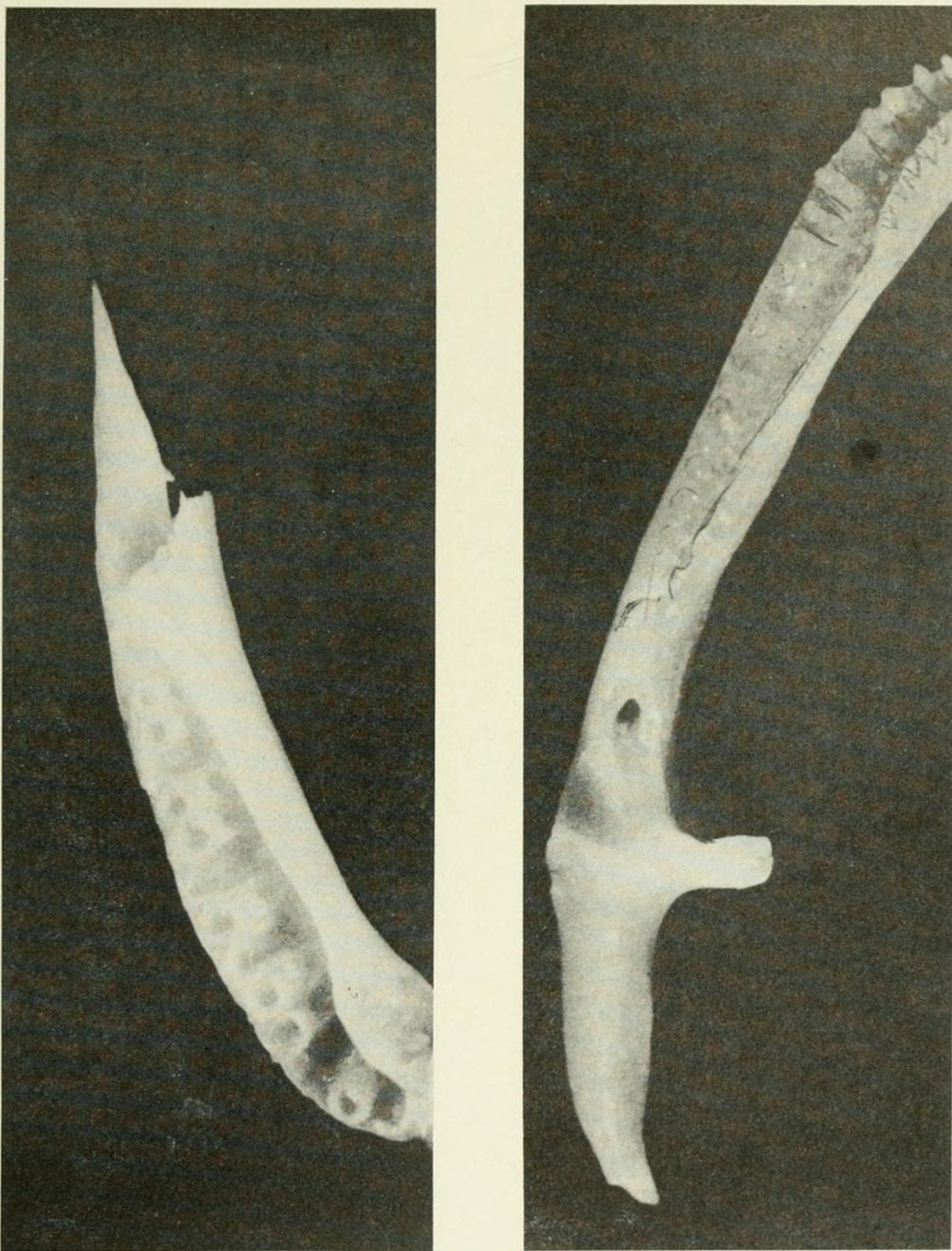


FIG. 18. *Gegeneophis ramaswamii* Taylor. MCZ 29452, Tenmalai Forest, Kerala State, India.

FIG. 19. *Grandisonia alternans* (Stejneger). EHT-HMS 4647 (formerly MCZ 15638), Silhouette Island, Seychelles Islands.

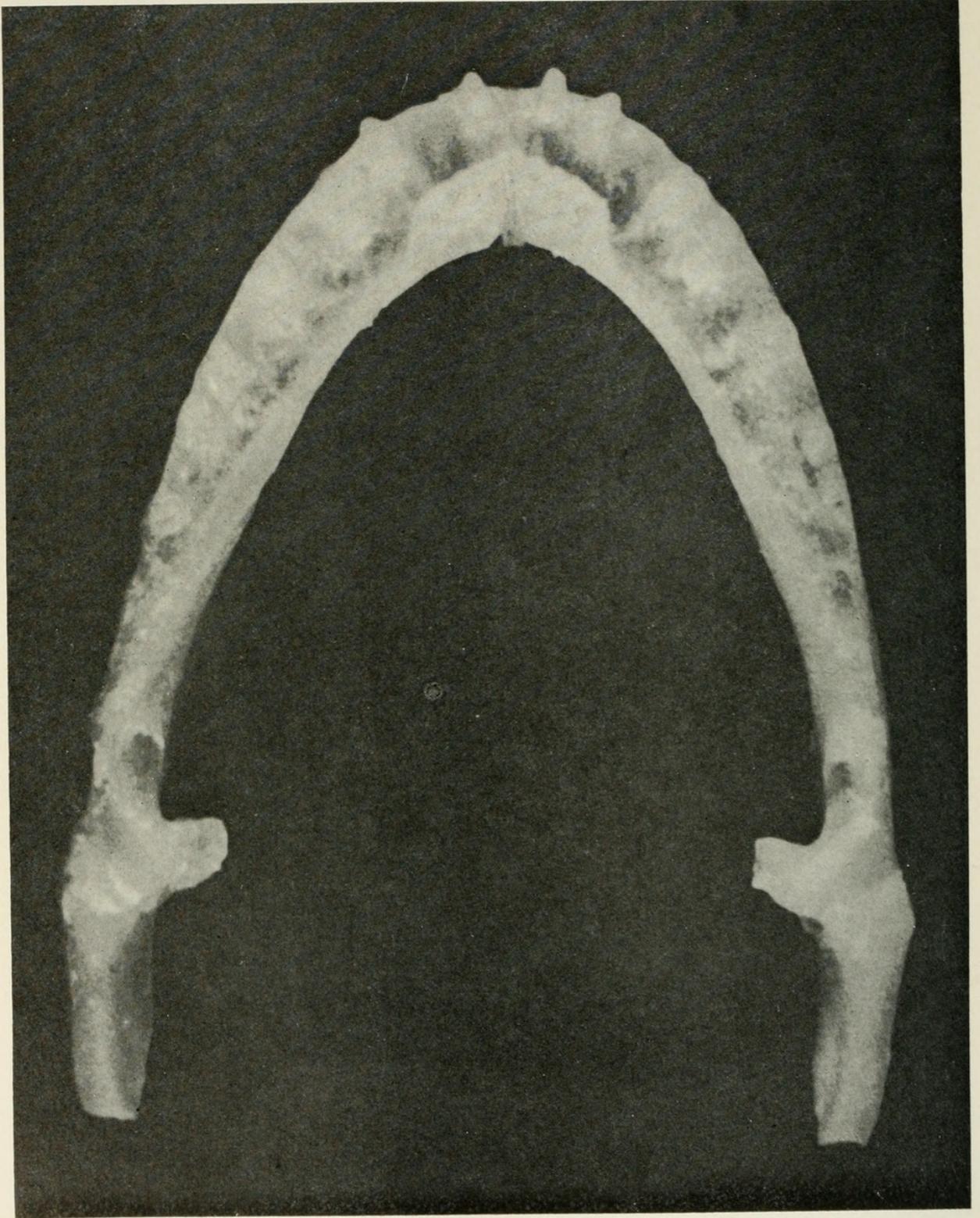


FIG. 20. *Herpele squalostoma* (Stutchbury). MCZ 3412, Metet, Cameroons.

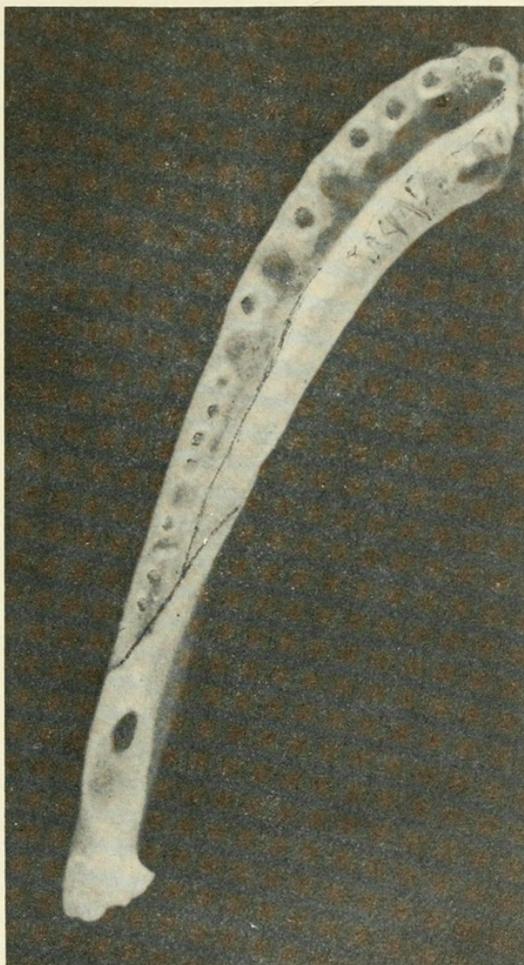


FIG. 21. *Geotrypetes s. seraphini* (A. Duméril). MCZ 3424, Metet, Cameroons.



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