Description of a New Finless Ophichthid Eel From the Gulf of California

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The specimens described as a new species in this paper were obtained by the writer and his assistants on the 1952 Sefton-Stanford Expedition to the Gulf of California, aboard the research ship *Orca* of the Sefton Foundation, San Diego, California.

The new species apparently lacks all vestiges of fins and would belong to *Sphagebranchus* Bloch. However, the writer follows Myers and Wade (1941, p. 75) in considering *Sphagebranchus* to be a synonym of *Caecula* Vahl, including in the latter genus fishes with "vertical fins absent or feebly developed." He further follows Gosline (1951, pp. 308 and 311) in retaining the completely finless species in the subgenus *Sphagebranchus* within the genus *Caecula.*

Caecula (Sphagebranchus) gymnocelus, new species

Holotype.—S.U. No. 17589, 217.5 mm. in total length, dredged at Station 38-D-2, from a large bay on the east side of Isla Angel de la Guarda, Golfo de California: 29° 21' North Latitude, 113° 19' West Longitude; May 8, 1952. Collectors: D. Cohen, J. Lindbergh, and J. Böhlke; 58–62 fathoms; 10 minute haul; bottom: largely very fine oozy sand, with a small amount of crushed shell material.

Paratype.—S.U. No. 17590, one large gravid female specimen, 240 mm., obtained in the same dredge haul as the holotype.

Description.—In the following description the proportions for the holotype are given first, followed, in parentheses, by those for the paratype. Body very elongate, round in cross-section, with parallel dorsal and ventral body outlines until near the end of the tail where they taper to a sharp point. Body nowhere compressed, even the tail ending in a rounded point. Body scaleless and completely finless. Depth at anus contained 2.9 (2.7) times in length of head, 42.6 (44.4) in total length. Anus placed near end of anterior half of fish, its distance from tip of snout 2.1 (2.1) in total length.

Head very short (proportionately much shorter in the female, or longer in the male), its length 6.9 (7.6) in length of head and trunk combined, 14.7 (16.2) in total length. Dorsal profile of head evenly rounded from occiput to tip of snout. Eyes lateral (not entering the

dorsal profile), small, 12.6 (12.9) in head, embedded, only slightly protruding, readily visible from the exterior, placed closer to angle of jaws than tip of snout, their anterior margins just posterior to a line across the tip of the lower jaw. Snout rather long, rounded dorsally, with a bluntly rounded tip, flattened below, greatly produced beyond lower jaw, its length contained 4.9 (5.0) times in length of head. Interorbital convex, its width 9.9 (10.6) in length of head. A groove above the upper lip and parallel to it, from the posterior nostril backward, nearly to the angle of the jaw. Tubular anterior nostril thick-walled, set in a pit; opening of tube with two opposed papillae on its lateral margins which project into the opening. Distance from mid-point of tip of snout to anterior nostrils 19.7 (14.8) in head. Posterior nostrils small round openings without raised margins, the openings protected by a flap of skin; nostrils placed up from edges of lips, very slightly evident from a side view, and a line drawn between their front margins would fall just behind the tip of the lower jaw. Distance from tip of snout to posterior nostril 5.6 (5.5) in head. Lower jaw short, pointed, its entire border well within outlines of head when viewed from below. Distance from tip of snout to angle of mouth 2.1 (2.6) in length of head, distinctly longer on the holotype. Deep groove present posterior to angle of mouth, giving the appearance of a larger mouth. Midpoint of upper jaw deeply incised, leaving an open triangular area and exposing several teeth between tip of lower jaw and lip of upper jaw when mouth is closed. Teeth slightly depressible, backward; two or three large teeth on each intermaxillary; a single series of about 17 to 24 somewhat smaller, close-set teeth with backwardly directed tips on each maxillary; three or four teeth at anterior end of vomer; a single, close-set row of about 22 teeth on each mandible, similar in size and shape to those on maxillaries. Gular region with strong longitudinal folds; jugostegalia present, although the skin is too thick for them to be readily seen. Gill openings small, low, directed diagonally upward and back from a side view. When viewed from below, the openings are boomerang-shaped; medial ends of openings transverse, posterior ends horizontal, ends approximately equal in length. Straight distance between the two ends of a gill opening contained 7.6 (7.4) times in length of head. Isthmus very narrow, its width 16.4 (19.7) in head.

Lateral line system well developed on both head and body. Lateral line opening to the surface by 130-132 pores projecting from the lower surface of the lateral line canal (this figure includes those of the arch over the branchial region). Supraorbital branch of lateral line system on head opening by a single pore above the eye on the interorbital space, and three pores in a straight line in front of the eye on the snout; the

suborbital canal displays two pores behind the eye, three pores in a line below the eye and behind the posterior nostril, two pores between the nostrils, and a single pore before each anterior nostril; the mandibular branch opens by three pores forming an angle behind the rictus of the mouth, and, continuing forward, bears five pores on the underside of either mandible; the remaining pores are a median pore behind the eyes, a median pore on the occiput, and a supratemporal pore on each side of the head.

Color in alcohol.—Uniform light tan, the dorsal and ventral surfaces lightest. A light and even sprinkling of chromatophores along middle of sides, above and below the lateral line. Branchial region and top of head covered by irregular small dark blotches. Two very characteristic black transverse stripes across lower surface of head and continued less distinctly upward on the sides of the head; the anteriormost stripe is about at the angle of the mouth, the front edge of the posterior stripe approximately as far from the rictus as the latter is from the eye.

Relationships.—The new species is apparently very closely related to *Caecula equatorialis* Myers and Wade (1941, p. 75, pl. 11) from the Galapagos, and may eventually prove to be a northern subspecies of that form. However, the observed differences between the two forms appear sufficient to warrant their recognition as distinct species at the present time. These differences are as follows:

C. equatorialis	*C. gymnocelus*
1. Head 5.8 in length of head and trunk combined.	1. Head 6.9-7.6 in length of head and trunk combined.
2. Eye 16 in head.	2. Eye 12.6-12.9 in head.
3. Interorbital 13.3 in head.	3. Interorbital 9.9-10.6 in head.
4. Snout 4.76 in head.	4. Snout 4.9-5.0 in head.
5. Isthmus 2 times in eye.	5. Isthmus 1.3 in eye.
6. Posterior nostril oval, somewhat elongated (from figure).	6. Posterior nostril round.
7. Transverse portion of gill opening much longer than longitudinal part (from figure).	7. Transverse and longitudinal portions of gill opening approximately equal in length.
8. Four pores in anterior part of mandibular series (from figure).	8. Five pores in anterior part of mandibular series.
9. Suborbital pore just behind posterior nostril close to nostril, its front end and rear end of nostril overlapping (from figure).	9. Suborbital pore just behind posterior nostril behind nostril a distance equal to diameter of nostril.
10. "Body color light cream with no dark markings of any kind. The snout and the anterior part of the head are somewhat lighter in color."	10. Color as in the specific description (with some markings).

From its only congener in the Gulf of California, *Caecula selachops, C. gymnocelus* differs in having a rounded rather than a pointed snout,

anterior nostril closer to tip of lower jaw than to tip of snout rather than the reverse, posterior nostril within rather than outside the lip, and others.

The following are some measurements expressed in percentage of total length or of head length:

	Holotype	Paratype
In percentage of total length:		
Length of head	6.8	6.2
Length of head + trunk	47.1	46.9
In percentage of head length:		
Depth of body at anus	34.5	36.5
Diameter of eye	7.9	7.8
Length of snout	20.3	19.9
Width of interorbital	10.1	9.5
Width of head at occiput	33.8	36.1
Tip of snout to tip of lower jaw	14.9	15.9
Tip of snout to anterior nostril	5.1	6.8
Tip of snout to posterior nostril	17.9	18.2
Tip of snout to angle of mouth	48.3	38.2
Width of gill opening	13.2	13.5
Width of isthmus	6.1	5.1

This species is named gymnocelus from the Greek: gymnus, naked,

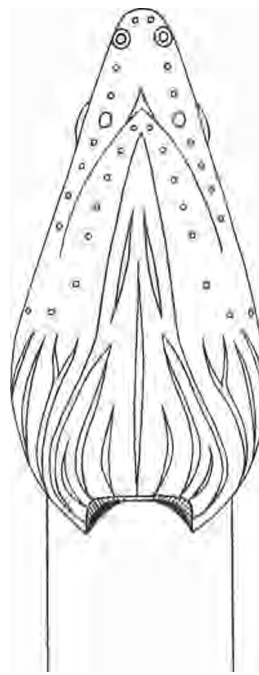

Fig. 1. Lower surface of the head of Caecula (Sphagebranchus) gymnocelus, new species. Holotype; semi-diagrammatic.

and *celum,* the shaft of an arrow—in reference to its shape and lack of fins.

Notes on figure.—First, the writer wishes to thank Dr. John C. Briggs of Stanford University for the semi-diagrammatic drawing that illustrates this paper. The figure is meant to show the relative positions of the pores and nostrils, and should be compared directly with that shown on plate 11 of Myers and Wade's 1941 paper. With this end in view, certain details have been sacrificed, such as: the marginal papillae on the anterior nostrils, the covering of the posterior nostrils, the teeth that are visible just anterior to the tip of the lower jaw, and the sizes of the individual pores (they are shown proportionately somewhat larger than they actually are). The major proportions of the head parts are correct.

Literature Cited

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MYERS, G. S., and C. B. WADE 1941 Four new genera and ten new species of eels from the Pacific Coast of tropical America. Allan Hancock Pacific Expeditions, 9:4:65-111, pls. 7-16.

Some Effects of X-Radiation on Intestinal Phosphatase in the Mouse[1]

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INTRODUCTION

The present extensive use of radioactive materials in industry and the possibility of their future use as sources of energy indicate a need for research on the effects of ionizing radiations on animal tissues. The use of these materials in the field of medicine is also widespread, but the side effects of the treatment and its mechanism of action are not well understood.

In a study of the effects of a type of energy on an organ or tissue it is necessary to observe the pattern of gross, microscopic, and chemical changes in order to determine the nature of the functional change which has been effected. The microscopic observations may be divided into two general groups: (1) Changes which are anatomical and may be observed by the ordinary staining techniques such as hematoxylin and eosin. (2) Changes in the chemical constitution of the cell or tissue with or without a concomitant change in visible structure or relationships. For demonstration of the latter, use has been made of the histo-chemical procedures such as the Gomori methods for alkaline and acid phosphatases. Chemical changes have also been studied in homogenates without regard for the structural entity with which they are associated or in ultracentrifugates of specific cellular parts.

This paper deals with changes which are produced in alkaline phosphatase activity of the intestinal tract by a measured dose of x-rays. The methods of attack on this problem combine the last two general procedures mentioned, microscopic and chemical.

MATERIALS AND METHODS

The experimental animals were male CH_3 mice obtained from Carworth Farms, New City, N. J. All mice were observed for at least ten days prior to use in order to determine their general health. During this period they were maintained at a temperature of 70 degrees Farenheit and given food and water *ad libitum.* The age of the animals at the time of experimentation was 1 to 3 months during which period the phosphatase of the intestine is relatively constant.

The animals were kept in a metal cage without food or water for 1

Transactions of the Kansas Academy of Science Vol. 56, No. 3, 1953.

[1] These studies were aided by funds from the Office of Surgeon General, United States Army, Contract No. W 49-007-MD-466.