

OCCASIONAL PAPERS

BERNICE P. BISHOP MUSEUM OF
POLYNESIAN ETHNOLOGY AND
NATURAL HISTORY

VOLUME X

HONOLULU, HAWAII
PUBLISHED BY THE MUSEUM
1932-1935

NEW NEMERTEANS FROM HAWAII

By W. R. COE

OSBORN ZOOLOGICAL LABORATORY, YALE UNIVERSITY

In contrast with the continental coasts and islands of more northerly latitudes, the shores and off-shore waters of the tropical and subtropical coasts bordering the Pacific Ocean have but a sparse representation of nemerteans. Only three species, of which two belong to the genus *Baseodiscus* and one (as yet undescribed) to *Drepanophorus*, have been previously recorded from Hawaii.¹ All of these were taken by the dredge in the vicinity of the islands.

Collections from the intertidal zone along the shores and reefs have been made by Dr. H. C. Edmondson during the past few years. These contain, in addition to the two species of *Baseodiscus* (*Tacniosa*) reported from the off-shore waters, one hitherto undescribed species of the same genus and one new species of *Lineus*. Both of these show a number of morphological peculiarities which seem to be of sufficient zoological interest to warrant their publication at this time.

The genus *Baseodiscus* Diesing includes the most numerous and widely distributed species of all the nemerteans inhabiting the tropical and subtropical seas. They are found around the entire circumference of the earth. Only a few of the described species of the genus extend north or south along the continental shores beyond 40 degrees latitude. Species of the genera *Lineus* and *Drepanophorus*, on the contrary, are found in all latitudes.

Baseodiscus edmondsoni, new species (fig. 1).

External Features

Body slender, rounded anteriorly; upwards of 100-500 mm in length but seldom more than 1-3.5 mm in diameter.

Head variable in shape according to state of contraction: pointed or rounded; truncate when the tip is fully withdrawn in the spasmodic contraction which occurs during preservation; more or less completely demarcated from body by transverse folds and the pair of oblique cephalic grooves.

Ocelli small, numerous, situated in an elongated group on each side of head, bending toward median line posteriorly; each group containing upwards of 15 ocelli posterior to the transverse pigment band on head and 20 or more on antero-lateral margin.

¹Coe, W. R., Nemerteans of the Hawaiian islands collected by the steamer "Albatross" in 1902: U. S. Fish. Com., Bull., 1903, pp. 975-986, 1906.

Mouth varies from a circular pore to an elongated slit, according to state of contraction.

Color. Ventral and lateral surfaces of body and anterior margin of head pale yellowish or flesh-color; dorsal surface in anterior half of body marked by a broad median stripe of deep reddish brown, with more or less distinctly alternating bands of darker and lighter shades. Near posterior end of foregut region the dorsal pigment stripe becomes broken into a series of narrow transverse bands joined together in the median line by a slender continuation of the longitudinal band. The pigment stripe broadens in the head region and terminates abruptly anteriorly. A single transverse band of the same brown color lies on the dorsal surface of the head above the brain; this is separated from the main dorsal stripe by a broad band of white. In some specimens the median stripe is narrower, with 20-30 narrow transverse bands of much deeper color extending laterally on each side, while in others it is of more uniform width.

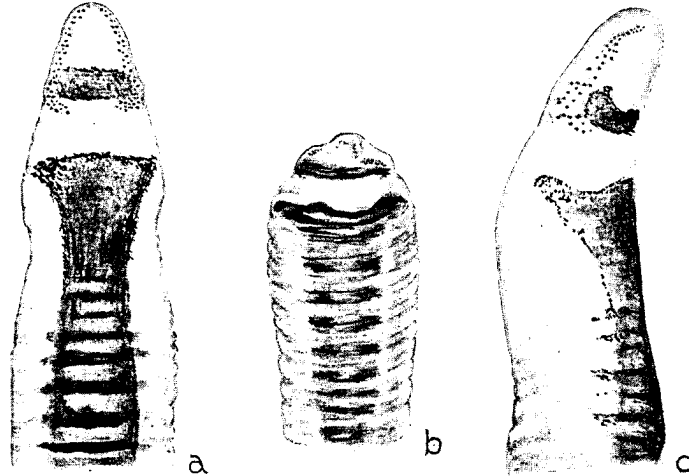


FIGURE 1.—*Baseodiscus edmondsoni*, new species: a, dorsal view of anterior end of body, showing positions of ocelli and extent of pigment band and stripe; b, same for strongly contracted specimen; c, lateral surface of anterior end of body in fully extended condition.

Internal Anatomy

Specimens studied after clearing in oil and later after being cut into serial sections show the following peculiarities of internal anatomy:

Body walls. Epidermis with usual arrangement of ciliated, glandular, and sensory cells. Basement membrane thick, with cup-shaped elevations and ridges for securing attachment of epidermis. Epidermal musculature of thin outer circular and inner longitudinal layers. Cutis unusually thick; outer portion with closely packed glands arranged in clusters; with common duct from each cluster to surface of epidermis; inner portion of cutis consists of dense connective tissue with fibrous branches extending externally to give support to the cutis glands and internally to hold in place the bundles of the outer longitudinal musculature. The connective layer is less than half as thick as the glandular layer.

Cephalic glands very extensive; principal opening terminal, above rhyncho-deal opening; continuous with intermuscular glands in anterior portion of foregut region. In ventral half of body in the foregut region the intermuscular glands become so closely placed as to separate the outer longitudinal muscular layer into outer and inner portions. Some of these glands extend entirely through this musculature and rest upon the outer surface of the nerve-plexus layer.

Dorso-ventral muscles well developed in posterior half of body, particularly near posterior extremity, as thin bands of muscles which lie close against anterior and posterior borders of intestinal diverticula. The two members of each pair of bands on each side of the body become separated as the gonads increase in size and evidently serve not only in flattening the body in the midgut region but may also aid in the discharge of the mature gametes.

Proboscis sheath and proboscis. The proboscis is small and short, being attached to the dorsal wall of the sheath near the anterior end of midgut region. The longitudinal muscle fibers of the retractor interlace with the longitudinal fibers of the sheath. The proboscis sheath is less than one third the length of the body, ending blindly in the connective tissues above the anterior portion of the midgut. In its posterior third it is held in place by branches of the dorso-ventral musculature.

Blood-vascular system. The usual cephalic lacunae unite to form a pair of large lateral lacunae posterior to the brain and these branch into a complex network of lacunae in the mouth region. These lacunae surround the foregut on all sides except in the dorsal area which is occupied by the proboscis sheath. At the posterior end of the foregut region the lacunae unite again into the pair of lateral vessels which continue to the posterior end of the body. The dorsal vessel leaves the proboscis sheath in the mouth region and joins the lateral vessels at the posterior end of the body.

Nephridia. The excretory system extends nearly the entire length of the foregut region. The terminal organs project freely into the lumens of the blood lacunae beneath and beside the foregut to form conspicuous nephridial glands, which in many places occupy fully half the diameter of the blood spaces. The efferent ducts are numerous, some of them leading to the dorsolateral surfaces of the body, while others open directly into the foregut as in *B. cingulatus* and a few other species of the genus.

Nervous system. The cerebral ganglia are unusually massive as compared with the size of the body; the dorsal nerve is also relatively large and the nerve-plexus, which extends around the entire circumference of the body between circular and outer longitudinal muscular layers, is much thicker than in most species of the genus.

Sense organs. The cerebral sense organs are voluminous, with relatively large canals leading to the ventrolateral surfaces of the head. The ocelli are highly differentiated, each having a pigment cup beneath a well-demarcated lens. The optic nerves are correspondingly large and conspicuous. Organs of similar structure but without pigment cups are also present; these are considered imperfectly developed ocelli. The spindle-shaped sensory cells of the epidermis are also highly differentiated, especially on the head, where the epidermis reaches an unusual thickness.

Parasites. Both specimens sectioned contained slender nematode-like parasites in cysts in the connective tissue between lateral nerve cord and epithelium of the midgut, as well as many elongated gregarines in the intestinal lumen.

Known only from the Hawaiian islands, where specimens were obtained by C. H. Edmondson at Wake Island and at Kaaawa and Kahala, Oahu, and by A. E. Verrill at Lihue, Kauai.

Baseodiscus univittatus (fig. 2).

Taeniosoma univittatum Coe: U. S. Fish Com., Bull., 1903, p. 978, 1906.

Individuals of this species are easily distinguished by the single stripe of dark reddish-brown pigment which extends the entire length of the dorsal surface. Elsewhere the body is creamy white or flesh-colored. The species differs from most others of the genus in the inconspicuousness or absence of ocelli. In only one specimen could a few minute and irregular pigment spots be detected.

The species resembles *B. unistriatus* (= *Eupolia unistriata* Isler) from the Indian Ocean in having a single dorsal stripe, but differs in several morphological peculiarities.

The body is slender in life, with a length of upward of 100 mm and a diameter of 1.5-2 mm. Strongly contracted specimens measure 20-30 mm in length and 2-3 mm in diameter.

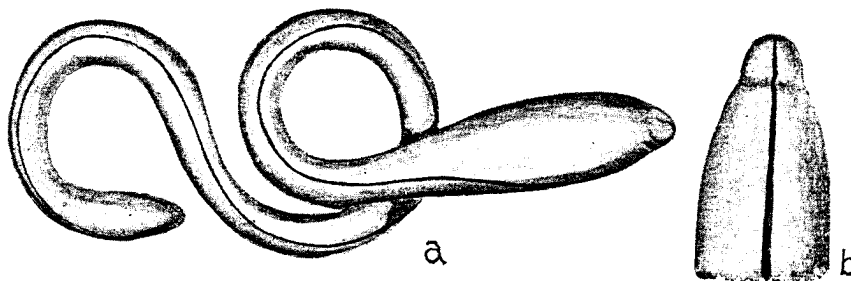


FIGURE 2.—*Baseodiscus univittatus* (Coe): a, body of cotype of variety with narrow dorsal stripe, strongly contracted; b, dorsal view of anterior end of body.

Specimens collected by C. H. Edmondson on the reefs of Oahu, one from Kaaawa and one from Waikiki.

Previously reported by Coe from depths of 250 to 260 meters off the southern coast of Molokai and from about the same depth north of Maui.

Baseodiscus cingulatus (fig. 3).

Taeniosoma cingulatum Coe: U. S. Fish. Comm., Bull., 1903, p. 981, 1906.

This species is easily distinguished by the numerous narrow rings of dark reddish-brown pigment which contrast sharply with the pale yellowish or flesh-colored tone of the rest of the body. Large individuals often have more than a

hundred of these rings situated at irregular intervals throughout the length of the body. Frequently the rings are even narrower on the ventral than on the dorsal surface and in some individuals many of them are incomplete on the ventral surface. Between the more sharply demarcated rings may be others which are so faintly pigmented as to be scarcely discernible.

Individuals of this species grow to a relatively large size, sometimes exceeding a meter in length, but the body is comparatively slender except when strongly contracted. One of the specimens measured 475 mm in length after preservation, with a diameter of about 4 mm in the anterior part of the body, but was scarcely more than 1 mm wide toward the posterior end.

On each lateral margin of the head are 35 to 50 ocelli; these are difficult to distinguish when the head is strongly contracted.

The nephridial system differs from that found in most nemerteans in having some of the efferent ducts leading to the lumen of the foregut, whereas others open on the dorso-lateral surfaces of the body as is more characteristic for members of this genus.

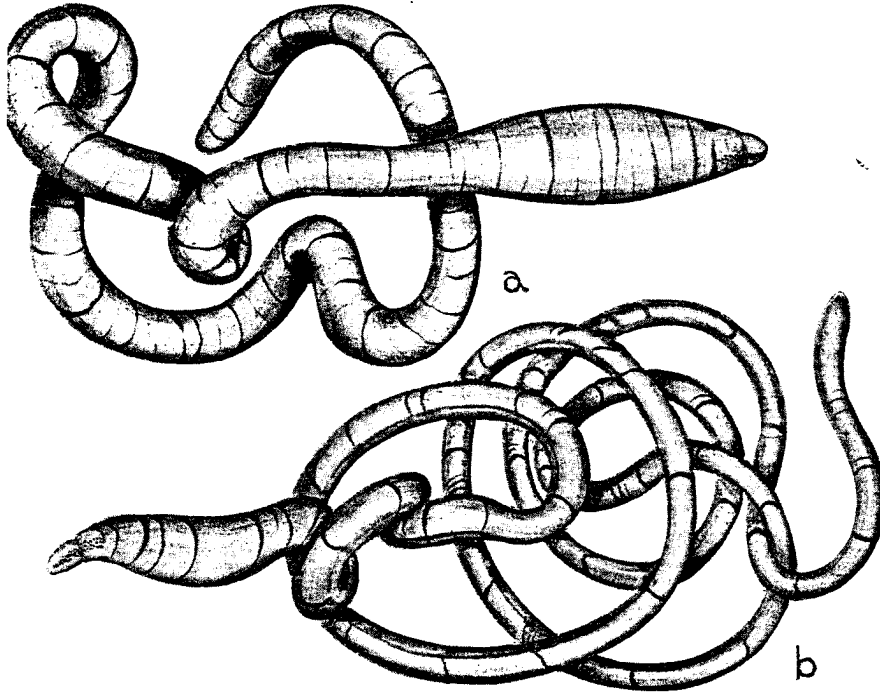


FIGURE 3.—*Baseodiscus cingulatus* (Coe): *a*, variety with irregular and incomplete transverse pigmented rings, body rather strongly contracted; *b*, variety with regular, sharply demarcated rings of pigment.

Previously dredged from depths of 40 to 80 meters in the channel between Maui and Lanai. In the collections sent by C. H. Edmond-

son are specimens from Kahala, Malaekahana, and Kaaawa, Oahu, and from Necker Island.

***Lineus albifrons*, new species (fig. 4).**

A single specimen of an apparently new species with characteristic color pattern was found in the collection sent by C. H. Edmondson. Although the precise hue of the deeply pigmented anterior end of the body can not be stated, the white or colorless anterior tip will presumably make the worms easily recognizable in life.

Body slender, rounded anteriorly, somewhat flattened in posterior half of body; single known specimen 14 mm long and 1.5 mm in diameter after preservation.

Color of preserved specimen indicates a deeply pigmented anterior third of body, sharply demarcated anteriorly by a colorless area at the extreme anterior end. Posteriorly the amount of pigment decreases gradually, giving the midgut region a much paler coloration. Pattern similar but paler on ventral surface.

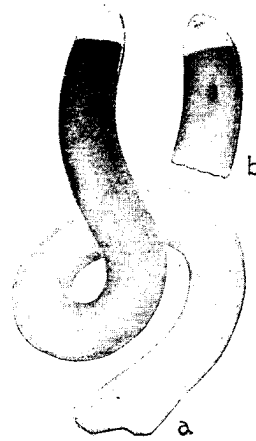


FIGURE 4.—*Lineus albifrons*, new species: dorsal and ventral aspects of anterior end of body, showing extent of terminal unpigmented area.

Cephalic grooves of moderate length, but not deep; rhynchodeal opening subterminal; mouth situated immediately behind posterior ends of cephalic grooves.

Ocelli inconspicuous or wanting.

Proboscis sheath extends through fully half the length of the body. Proboscis large; musculature composed of three layers anteriorly, in addition to a thin external layer of circular or oblique fibers. In the posterior half of the proboscis the inner longitudinal musculature gradually disappears; muscular crosses are found not only between the two circular musculatures but also between the two layers of longitudinal fibers.

Body walls, cephalic glands, and frontal sense organs as in related species. Cutis thin, the glandular layer limited to outer portion of outer longitudinal

musculature; pigment granules scattered in outer portion. Dorso-ventral muscles well developed posteriorly.

Brain and cerebral sense organs large; cephalic, buccal, and proboscicial nerves conspicuous.

Cephalic blood lacunae lead to communicating lacunae surrounding foregut, with larger lateral vessels beside proboscis sheath. Dorsal vessel remains in rhynchocoel through most of foregut region.

Nephridia limited to middle of foregut region; embedded in dorso-lateral walls of lateral blood lacunae and projecting freely into the blood spaces. A single pair of large efferent ducts leads to dorso-lateral surfaces of body near posterior ends of the pair of nephridial glands.

Known from only a single specimen collected at Kahala, Oahu.

The color pattern of individuals of this new species, with deeply pigmented anterior third of body and sharply demarcated colorless tip, is evidently similar to that of *Cerebratulus albifrons* Coe, which is found along the Pacific coast of North America from Alaska to southern California. The resemblance is superficial, however, for the generic distinctions are obvious.

Drepanophorus species.

At least one species of *Drepanophorus* is present in the off-shore waters of Hawaii. It has not yet been identified.

Tetrastemma species.

A species of the genus *Tetrastemma* collected by A. E. Verrill on the reef at Lihue, Kauai, is not available for study. The body in life is uniformly flesh-colored and without distinctive markings.