
NEMERTEANS OF THE HAWAIIAN ISLANDS COLLECTED
BY THE STEAMER ALBATROSS IN 1902.

By WESLEY R. COE,

*Assistant Professor of Comparative Anatomy, Sheffield Scientific School,
Yale University.*

NEMERTEANS OF THE HAWAIIAN ISLANDS COLLECTED BY THE STEAMER ALBATROSS IN 1902.

By WESLEY R. COE,
*Assistant Professor of Comparative Anatomy, Sheffield Scientific School,
Yale University.*

Among the collections made by Prof. C. H. Gilbert and party with the U. S. Fish Commission steamer *Albatross* at the Hawaiian Islands in the summer of 1902 are a number of well-preserved specimens of nemerteans. These specimens, however, represent only three species, of which two are believed to have been undescribed hitherto. Microscopic study reveals a number of interesting anatomical peculiarities, which are detailed below. Two of the species belong to the genus *Teniosoma*, which is abundantly represented in nearly all tropical and subtropical regions. The third belongs to the genus *Drepanophorus*, but is unfortunately represented by the proboscis only, so that its specific identity is indeterminable.

All the specimens were obtained by the dredge at depths of from 21 to 282 fathoms.

The fact that so few nemerteans were collected by the *Albatross* party must not be taken as an indication that more extended shore collecting would not yield a much larger number of species. Comparatively few miscellaneous collections of invertebrates contain numerous species of this group, even from localities where such worms are abundant. So far as is known to the writer no nemerteans whatever have previously been recorded from the Hawaiian Islands or from the deep water in their vicinity. On this account the present collection, although very meager, possesses a certain interest. Its principal value, however, is due to the interesting anatomical peculiarities revealed in the new species it contains.

TENIOSOMA Stimpson.

Teniosoma Stimpson, Proc. Ac. Nat. Sci. Phila., 1857, 162.

Polia Delle Chiaje, Mem. sulla storia e notomia degli animali senza vertebre del regno di Napoli, Naples, 1823-28.

Eupolia Hubrecht, Report of Challenger Exped., Zoöl., XIX, 1887.

Eupolia Bürger, Fauna u. Flora von Neapel, Monogr. 22, p. 598, 1895.

Teniosoma Coe, Proc. Washington Ac. Sci., III, 1901, 61.

This genus is widely distributed in tropical and subtropical waters, and its presence at the Hawaiian Islands was to have been expected. As has been stated elsewhere^a, Stimpson's name for it

^aCoe, Proc. Wash. Ac. Sci., III, 1901, 4.

has indisputable priority over the name *Eupolia*, although the latter is still retained by most European writers. The fact that Stimpson in 1857^a, in establishing his new genus *Tæniosoma*, in addition to giving a satisfactory generic diagnosis, specially mentioned *Borlasia quinquelineata* Quoy & Gaimard as a typical species of the genus leaves no valid excuse for ignoring this name and adopting that given by Hubrecht thirty years later. Furthermore, Stimpson in the same paper describes as new species two forms, *T. septemlineatum* and *T. æquale* (= *T. quinquelineatum*) both of which are typical representatives of the genus. Although Stimpson's generic diagnosis is brief it is accurate, and its brevity is justified by the citation of a well-known typical species.

The species belonging to this genus show a remarkable specific variation in the general shape and size of the body. Some are characterized by extremely long, slender, flattened, and much-twisted bodies, while others are short, thick, and cylindrical. In nearly all the species, however, the head in life is rounded in front and is sharply marked off from the parts immediately following by lateral constrictions. Horizontal furrows are wanting, but small, oblique or transverse grooves are usually present on the head. In strong contraction the posterior portion of the head becomes greatly swollen and the snout is withdrawn into it, the anterior end of the body becoming large and abruptly truncated.

Proboscis sheath and proboscis short, seldom reaching more than one-third the length of body. Proboscis opening subterminal, minute. Mouth situated on the ventral surface immediately behind the ganglia.

Muscular layers of body composed of a thick outer longitudinal, a circular, and a less thickened inner longitudinal layer. Outside the muscular layers is a well developed cutis, composed of a thick inner layer of connective tissue, and an outer layer of glandular tissue. External epithelium thin as compared with the other layers of the body, though the basement layer separating it from the cutis is usually well developed. Musculature of proboscis consists of an inner longitudinal and an outer circular muscular layer; consequently muscular crosses are wanting. Cephalic glands enormously developed, stretching backward on all sides beyond the brain, and often reaching some distance into the esophageal region.

Lateral nerves situated immediately outside circular muscular layer. Ocelli usually present in great numbers, though very small. There are three longitudinal blood vessels.

These worms are sluggish in their habits, are unable to swim, and usually show great irregularities in the diameter of the body. They often twist their bodies in sharp coils or in knots, or lie tangled together in lumps. All species are extremely contractile.

Tæniosoma univittatum sp. nov.

(Pl. I, figs. 1-3; text cuts 1, 2.)

This species is represented in the collection by four well-preserved specimens which were dredged from depths between 127 and 178 fathoms.

The specimens bear a close external resemblance to those of a species which Isler,^b in 1900, described from the Indian Ocean (Ceylon) under the name *Eupolia unistriata*. The next year, and evidently written while Isler's paper was in press, Punnett^c gave a description of a very similar species, also collected in the Indian Ocean (Maldive Islands), to which he gave a name identical with that which Isler gave to his species, viz, *Eupolia unistriata*. Isler's specimens were yellowish-white with a narrow longitudinal stripe of olive green, while Punnett's specimens were white with a similar narrow stripe of black. Those described by Isler possessed numerous ocelli; Punnett does not state in his description whether such sense organs were present in his specimens, but he writes me that they are as well developed as in *T. melanogrammum*. The two forms, to which the one specific name was given by both of these investigators, are evidently very closely related, if not identical. Although very similar to them in form and coloration of body, the species herein described, *Tæniosoma univittatum*, differs in the total absence of ocelli and in minor anatomical details.

From *Tæniosoma hemprichi* (Ehrenberg) and *T. mediolineatum* (Bürger), both of which possess a median ventral as well as a median dorsal brown or blackish stripe, the present species differs conspicuously in the possession of a dorsal stripe only.

^aProc. Ac. Nat. Sci. Phila., 1857, 162.

^bZool. Anzeiger, XXIII, 1900, p. 178.

^cGardiner's Fauna and Geography of the Maldive and Laccadive Archipelagoes, Vol. 1, p. 106, pl. IV, fig. 4, 1901.

As in *Teniosoma unistriatum*, the present species is conspicuously marked, having a whitish or very pale-colored body, with a sharply marked dorsal line of reddish brown or black color extending the whole length of the body (pl. 1, figs. 1, 2).

After preservation, the body is of moderate proportions, rounded throughout, largest in esophageal region a short distance behind mouth; head rounded in front, marked off from body by fairly distinct transverse lateral grooves which, when the head is contracted, form an annular constriction immediately in front of mouth; anterior portion of head, or snout, demarcated from the posterior portions. When strongly contracted the head is much swollen and the snout partially withdrawn into the posterior part of it (pl. 1, fig. 2). Mouth and proboscis pore situated as in related species.

Careful examination of the specimens after clearing in cedar oil and in microscopic sections failed to reveal the presence of any ocelli. Their absence is doubtless correlated with the depth at which these worms live. Three other species of the genus, *T. australe*, *T. girardii*, and *T. nipponense*, are described by Hubrecht^a from the Challenger collections as having been dredged from depths of 300 fathoms or more. Whether ocelli are likewise wanting in these species is not mentioned, although nearly all the other known species of the genus possess them. Mr. R. C. Punnett, however, informs me that he has recently collected an eyeless species in Norway.

Size.—Length of each of two specimens which were not strongly contracted, 50 to 60 mm.; width, 1.5 to 2 mm. Two contracted specimens were each 20 to 30 mm. long and 3 mm. in diameter in anterior portion of esophageal region.

Color.—After preservation for a short time, the whole body is creamy white with the exception of a single sharply marked stripe of reddish brown extending in the dorsal median line throughout the whole length of the body. These colors probably represent very closely the natural coloration in life.

In the two specimens which are fairly well extended (pl. 1, fig. 1) the dorsal stripe is a narrow line of less than 0.3 mm. in width, but is sharply marked and conspicuous throughout because of its very dark color. In the two specimens which are strongly contracted (pl. 1, fig. 2) the stripe is about 1 mm. in width anteriorly and 0.5 mm. wide farther back. In the extended specimens the stripe is only one-eighth as wide as the body, while in the contracted specimens it is from one-third to one-fourth the width of the body.

On the dorsal side of the head the stripe becomes narrower (pl. 1, fig. 3) and terminates immediately above the proboscis pore or very near the exact end of the dorsal surface of the snout. It is also narrower in the posterior half of the body, but extends nearly or quite to the posterior extremity.

The stripe remains of a reddish brown color after preservation for a few months in alcohol, but at the end of a year is hardly to be distinguished.

Proboscis well developed for the genus; attached to the tissues of the head immediately anterior to the ventral brain commissure; composed of the usual muscular, nervous, and epithelial layers.

Body walls.—The comparative thickness of the various layers which constitute the body walls is shown in text cuts 1 and 2. Integument rather high; basement layer thin; cutis in esophageal region from two-thirds to three-fourths as thick as integument, its glandular layer being about twice as thick as the underlying connective tissue layer (fig. 1).

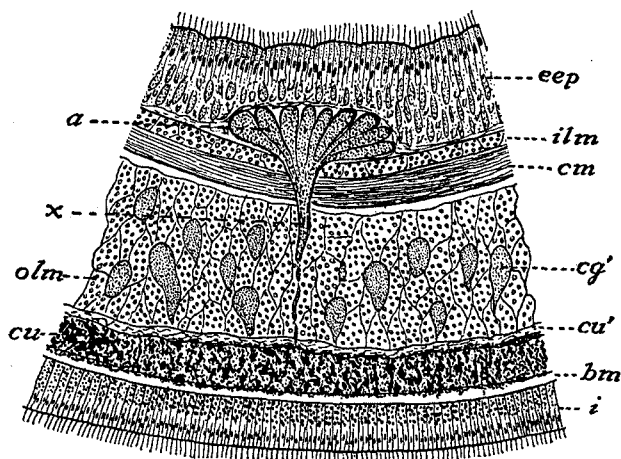


FIG. 1.—*Teniosoma univittatum* sp. nov. Portion of transverse section of body in anterior portion of esophageal region, showing peculiar multicellular gland (*a*) situated internal to the body walls and immediately outside the esophageal epithelium (*eep*); (*x*) Duct of gland; (*ilm*) Internal longitudinal muscles; (*cm*) Circular muscles; (*olm*) Outer longitudinal muscles; (*cu*) Glandular layer of cutis; (*cu'*) Fibrous layer of cutis; (*bm*) Basement layer; (*i*) Integument. $\times 90$.

Cephalic glands enormously developed, occupying the whole thickness of the outer longitudinal muscular layer in the mouth and anterior esophageal regions, and making up fully three-fourths the substance of this layer. A short distance back of the mouth these glands begin to decrease in abundance in the dorsal half of the body, and gradually disappear, except for scattered clusters in the midst of the outer longitudinal muscular layer in the ventral half of the body (fig. 1, *cg'*). They disappear completely at about four-fifths the distance from mouth to anterior end of stomach.

In the single specimen sectioned a very peculiar gland (fig. 1, *a*) is present in the anterior portion of the esophageal region. It is situated in the mid-ventral line of the body, directly beneath the esophageal epithelium, and thus quite internal to the body walls. A large and conspicuous duct (fig. 1, *x*) filled with secretion passes through the body walls to the superficial integument, thus discharging the secretion from the gland on the mid-ventral surface of the body. The gland itself is composed of some 20 or more large clusters of gland cells, each cluster resembling one of the groups of

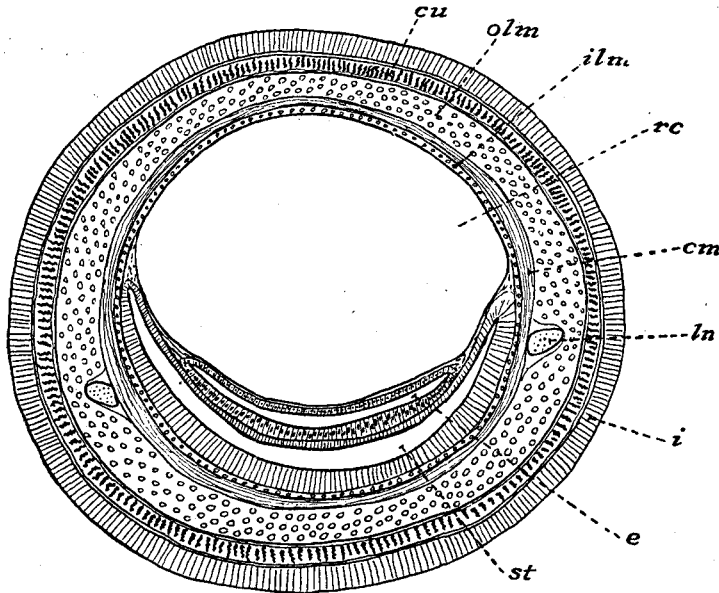


FIG. 2.—*Taxisoma univittatum* sp. nov. Transverse section through posterior end of esophageal region, showing section of esophagus (*e*) immediately anterior to its opening into dorsal wall of stomach, a short blind portion of which (*st*) lies ventral to posterior end of esophagus; (*rc*) rhynchocœl; (*ln*) lateral nerve. Other reference letters as in fig. 1. $\times 30$.

the cephalic glands (fig. 1, *cg'*) which lie in the midst of the outer longitudinal muscular layer in the same region. The duct through which the secretion is discharged is, like the ducts from the cephalic glands, merely temporary, and exists only when filled with secretion.

It is doubtful whether this gland occurs in all individuals of the species. It seems more probable that it is an abnormally developed cluster of cephalic glands which has pierced the underlying circular and inner longitudinal muscular layers, and has come to lie quite internal to the body walls.

Alimentary canal.—Mouth and esophagus as in related species. At about midway between mouth and intestine proper the esophagus opens into the stomach, from which it is sharply demarcated both anatomically and histologically. In the single specimen sectioned the esophagus did not open directly into the anterior end of the stomach, but into the dorsal wall of the latter at some little distance from its anterior end. Thus a blind anterior pouch of the stomach (fig. 2, *st*) lies beneath the posterior end of the esophagus (*e*), and recalls the intestinal cœcum of the Haploneumertea. As commonly occurs in the Heteroneumertea, the esophagus is much flattened dorso-ventrally, and is crescentic in cross section. The epithelium of the ventral wall is several times as thick as that of the dorsal wall (fig. 2). The esophagus is somewhat diminished in size at its posterior end, although its opening into the dorsal wall of the stomach is quite large.

The walls of the stomach are without lobes except near its posterior end, where lateral pouches make their appearance. The most anterior of these pouches are but little developed, but they gradually become deeper at the approach to the intestine proper. The histological structures, too, gradually assume the characteristics peculiar to the intestine, so that there is no sharp line of demarcation between stomach and intestine proper. Similar conditions have been described for a number of Heteronemerteans.

Nephridia.—The nephridial tubules are small and inconspicuous. They are situated, as in most related species, on the lateral borders of the posterior portion of the esophagus and beside the anterior portion of the stomach. There are numerous efferent ducts of minute size which pass immediately dorsal to the lateral nerves and open on the dorso-lateral surface of the body. About 8 efferent ducts could be distinguished on each side, although there may have been more, for their exact number was difficult to determine in the specimen sectioned because some of the ducts were so very inconspicuous as to be hardly distinguished from radial bundles of connective tissue fibers which pass at irregular intervals through the body walls, particularly in the vicinity of the lateral nerves.

Blood vascular system.—This presents few deviations from the arrangement of vessels found in related species. The cephalic lacunæ, however, are smaller than in most other forms of the genus.

Nervous system as in related species. Cerebral sense organs remarkably voluminous, with a large glandular lobe situated ventrally to the main body of each of the sense organs.

Reproductive organs.—Sexual products immature in a specimen collected in April.

Habitat.—Of the four specimens of this species collected by the *Albatross*, two were dredged at station 3855, south coast of Molokai, at a depth of 127 to 130 fathoms. The bottom here was composed of fine brown sand and gravel; bottom temperature, 65.5° F. The other two came from station 4079, north coast of Maui Island; depth, 143 to 178 fathoms; bottom composed of gray sand and foraminifera; bottom temperature, 60.8° F.

The species may therefore be looked upon as inhabiting depths of over 100 fathoms, and this fact will partially account for the absence of eyes.

***Tæniosoma cingulatum* sp. nov.**

(Pl. 1, figs. 4-6; text cuts 3-7.)

Body long and slender, rounded throughout (pl. 1, fig. 4); head rather slender, with a distinct annular groove situated immediately in front of mouth and separating head from succeeding portions of the body; a less distinct groove lies farther forward on the head and marks off the snout from the posterior portion of the head (fig. 3; pl. 1, fig. 6). Esophageal region somewhat wider than intestinal region, into which it passes without external line of demarcation.

Size.—Length of two preserved specimens (pl. 1, figs. 4, 5), 90 and 250 mm.; width, 3 mm. in esophageal region and 2 mm. in more posterior portions of the body. The two specimens were probably of about equal size in life, the great difference in their lengths after preservation being largely or wholly due to the different states of contraction.

Ocelli.—Numerous conspicuous black ocelli of moderate size are situated on each lateral margin of the head (fig. 3). The number of such ocelli is from 35 to 50 on each side in each of the two specimens at hand. They extend in an elongated irregular cluster from near the proboscis pore along the lateral margins of the head backward nearly to the annular constriction separating head from body. About 8 of these ocelli are situated in a single marginal row on the snout itself, the others scattered irregularly on the main portion of the head. All are crescentic or cup shaped, with the concavity directed laterally.

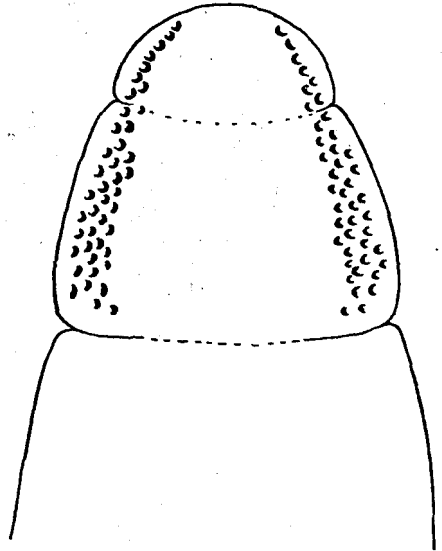


FIG. 3.—*Tæniosoma cingulatum* sp. nov. Outline of anterior portion of body of preserved specimen, showing position and arrangement of ocelli, the transverse groove separating snout from remaining portions of head, and the similar groove separating head from esophageal region. $\times 23$.

When seen in prepared sections the ocelli appear to be highly developed, with well-marked lens and pigment cup. They are situated for the most part in the glandular portion of cutis immediately beneath the basement membrane of the integument, although a few are scattered in the deeper cephalic musculature. They extend posteriorly as far as the brain commissures, both of which occur in a single transverse section.

Color.—Definite color in life unknown, for after short preservation the body loses its general color, although it retains certain definite and characteristic markings. These markings consist of a series of narrow but sharply marked rings situated at fairly regular intervals throughout the whole length of the body (pl. 1, figs. 4, 5). After preservation the general ground-color of the body is very pale or whitish, while the rings are reddish brown and are always conspicuous from above, although they are often wanting on the ventral surface. The most anterior ring or rather transverse marking, is situated on the snout a short distance in front of the transverse groove and is incomplete, appearing on the dorsal surface only, and not extending laterally even as far as the groups of ocelli; the second is situated exactly in the region of the mouth and is interrupted on the ventral surface by the mouth opening;

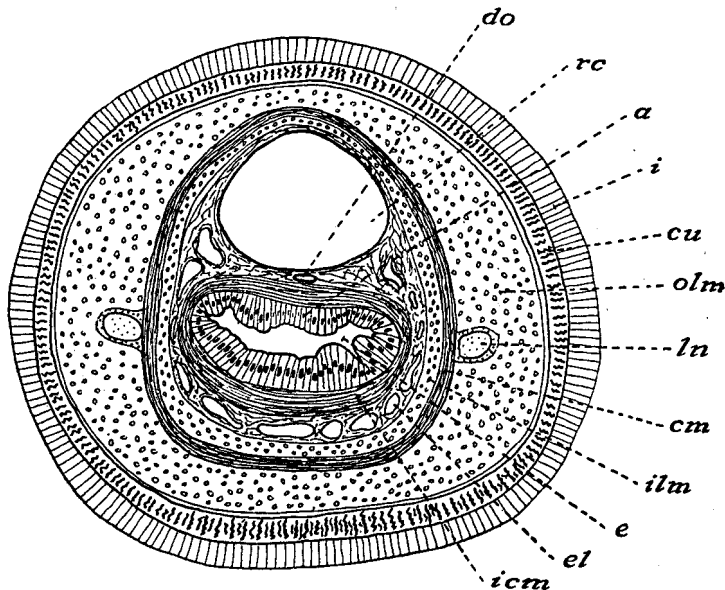


FIG. 4.—*Teniosoma cingulatum* sp. nov. Transverse section of body through posterior end of esophageal region, showing the thick layer of circular muscles (*icm*) forming a sphincter about the posterior end of the esophagus (*e*); (*a*) groove of cells similar to those of stomach; (*do*) dorsal blood vessel; (*rc*) rhynchocœl; (*el*) esophageal blood lacunæ; (*ln*) lateral nerve. Other reference letters as in fig. 1. $\times 30$.

then follow an irregular series of rings, some of which are complete while others are represented merely by transverse markings on the dorsal surface (pl. 1, fig. 5). All the rings are very narrow, but some are much finer than others and are indicated only by a few scattered dots.

In one of the two specimens collected the rings were for the most part complete, but were narrower on the ventral surface than dorsally, while in the other they were represented as transverse markings mainly confined to the dorsal surface. In the former specimen the body was contracted and the rings were separated from each other by considerably less than the body diameter (pl. 1, fig. 5), while in the other specimen, which was preserved in a fully extended state, the rings in the intestinal region were often separated by a space equal to three to five times the diameter of the body (pl. 1, fig. 4).

After having been preserved for a year in alcohol the specimens retain only faint indications of their original markings.

Proboscis.—Proboscis sheath short, extending only to anterior end of the intestinal region; composed of outer circular and inner longitudinal muscles (fig. 6). Proboscis small and weak, attached to tissues of head immediately anterior to brain commissures. Muscular walls of proboscis consisting

of an inner layer of longitudinal fibers and an outer, much thinner layer of circular fibers. Posterior end of proboscis attached to dorsal wall of sheath near its posterior end by strong longitudinal muscles. Fluid of rhynchocœle contains an abundance of large corpuscles, each with a conspicuous nucleus.

Body walls.—The relative thickness of the various layers which constitute the body walls is shown in figs. 4 and 5. Glandular layer of cutis three to four times as thick as the underlying fibrous layer. Outer longitudinal muscular layer massive, far exceeding in thickness the circular and inner longitudinal muscular layers combined (figs. 4, 5).

Cephalic glands.—As in most species of the genus, these glands are very voluminous. They occupy a great portion of the tissues of the head, and extend posteriorly for some distance into the esophageal region, where they are scattered among the bundles of the outer longitudinal muscular layer, as figured for *T. univittatum* (fig. 1).

Alimentary canal.—Mouth and esophagus as in related species. The esophagus opens posteriorly into a long chamber, the stomach, without diverticula, and this in turn passes gradually into the intestine proper.

At its posterior end the esophagus is surrounded by a well-developed layer of circular muscles, forming a strong sphincter (fig. 4, *icm*). These muscles are very limited in extent as a distinct layer, although they can be followed well forward in the esophageal region. Immediately in front of the opening of the esophagus into the intestine (fig. 4) they become fully equal in thickness to the circular muscular layer of the body walls. They are doubtless perfectly homologous with the inner circular muscular layer which surrounds the posterior end of the stomach in *Zygeupolia*, *Micrura*, and other forms, and which is apparently homologous with the inner circular muscular layer of the Paleonemertea.

The histological elements of the esophagus are sharply demarcated from those of the stomach, as in many other forms, and the change from esophagus to stomach is histologically as well as anatomically abrupt. Nevertheless, in one of the specimens sectioned a narrow band of epithelial cells (fig. 4, *a*) characteristic of the stomach extends forward for a short distance along the dorsal wall of the esophagus (*e*).

The transition from stomach to intestine, on the other hand, is so very gradual, both histologically and anatomically, that it is necessary to observe the arrangement of the blood vessels and the muscular layers in order to determine where the stomach region ends and the intestinal region begins.

The intestinal lobes are even less developed than in *T. univittatum*, and consequently the central lumen of the intestine is very large.

Blood vascular system.—Cephalic blood lacunæ as in related species; esophageal lacunæ voluminous, surrounding the lateral and ventral walls of the esophagus as closely placed anastomosing blood spaces of large size (figs. 4, 6, 7, *el*). In the stomach region these lacunæ decrease in number and size and eventually unite into a single pair of vessels, which later join the pair of lateral vessels situated in the

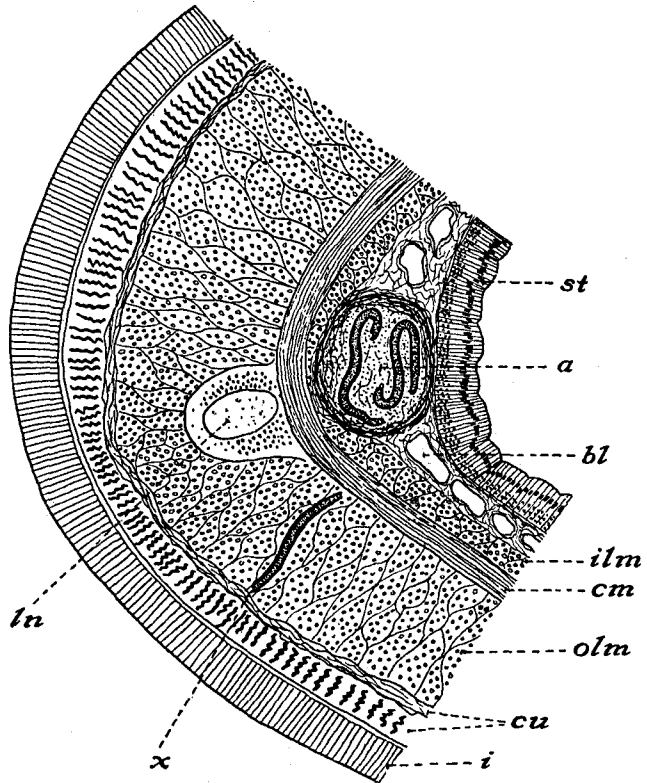


FIG. 5.—*Tæniostoma cingulatum* sp. nov. Portion of transverse section of body through anterior end of stomach region, showing peculiar cyst of fibrous tissue (*a*) containing two parasitic nematodes; a similar parasite (*x*) is shown in the outer longitudinal muscles; (*bl*) blood lacuna; (*ln*) lateral nerve. Other reference letters as in fig. 1. $\times 58$.

angle between stomach and proboscis sheath. In the intestinal region the lateral vessels lie beneath the intestine about halfway between the median line of body and the lateral border of intestine. The dorsal vessel occupies a position within the cavity of the rhynchocoel for only a very short distance immediately behind the brain. In the mouth region it passes through the proboscis sheath and becomes situated immediately ventral to the sheath throughout the length of the latter. At the posterior end of the proboscis sheath, in the anterior portion of the intestinal region, the dorsal vessel continues in the mid-dorsal line above the intestine to the posterior end of the body. Throughout the length of the intestinal region the dorsal vessel has frequent (metameric?) anastomoses with the lateral vessels.

Nephridia.—The nephridial canals are remarkable in that they have numerous efferent ducts which open into the lumen of the esophagus (figs. 6, 7, *nd*), as well as others which open on the external surface of the body. This remarkable condition is known in but one other species of nemertean, which also belongs to the genus *Tæniosoma*. This is *T. melanogrammum* (Punnett), a new name proposed for

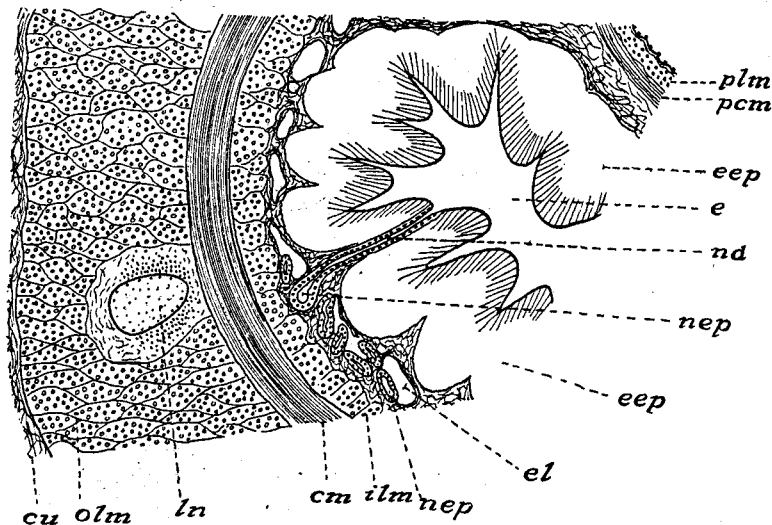


FIG. 6.—*Tæniosoma cingulatum*. Portion of transverse section of body through esophageal region, showing arrangement of blood lacunæ (*el*), nephridial canals (*nep*), and nephridial duct (*nd*) opening through esophageal epithelium (*eep*) into lumen of esophagus (*e*); (*plm* and *pcm*) longitudinal and circular muscles of proboscis sheath; (*ln*) lateral nerve. Other reference letters as in fig. 1. $\times 90$.

T. quinquelineatum (Quoy et Gaimard). In this species Punnett^a has found in each of two specimens sectioned a number of efferent nephridial ducts opening directly through the esophageal epithelium into the lumen of the esophagus, in addition to a somewhat smaller number opening above the lateral nerves to the dorso-lateral surface of the body. The ducts opening externally are interspersed irregularly between those opening into the esophagus. Exactly similar conditions prevail in *T. cingulatum*, as stated above.

The nephridial tubules are profusely branched and rather extensive, being found throughout the posterior three-fifths of the esophageal region. The branches are themselves of rather large size and are situated on the lateral walls of the esophageal blood lacunæ (figs. 6, 7) and in close contact with the epithelial lining of the blood spaces. The efferent ducts which open into the esophagus are conspicuous in many instances and show a distinct, though thin-walled, tube (figs. 6, 7, *nd*) passing directly from one of the larger nephridial canals (*nep*) to the surface of the ciliated epithelium lining the esophagus. The efferent duct itself is lined with flattened cells and often presents a distinct lumen throughout its length, so that there is not the slightest doubt of the communication between the nephridial canals and the lumen of the esophagus.

The esophageal epithelium is thrown up into numerous temporary longitudinal ridges of varying size and thickness. Some of the nephridial ducts open in the grooves between these ridges, as shown in fig. 7, while others open near or at the summit of the ridges (fig. 6). With varying degrees of extension of the walls of the esophagus and the consequent change in the height of the longitudinal ridges must occur great variations in the length of the efferent nephridial ducts.

Both of the two specimens sectioned presented similar conditions, although the number of such efferent ducts is somewhat different in each and on the two sides of the body. The actual number is difficult to determine with certainty, but is apparently between 7 and 20 on each side of the body.

A smaller number of similar ducts open on the dorso-lateral surfaces of the body. These, too, originate directly from the larger nephridial canals, but whether there is actual communication between the canals opening externally and those opening into the esophagus could not be determined. The canals are much twisted and bent upon themselves, as well as being profusely branched, so that numerous sections of the canal occur in each transverse section of the body (figs. 6, 7).

The ducts opening externally are interspersed irregularly between those opening into the esophagus, but the average position of the former is somewhat more anterior than that of the latter. Those opening externally are narrower and somewhat less conspicuous than the others.

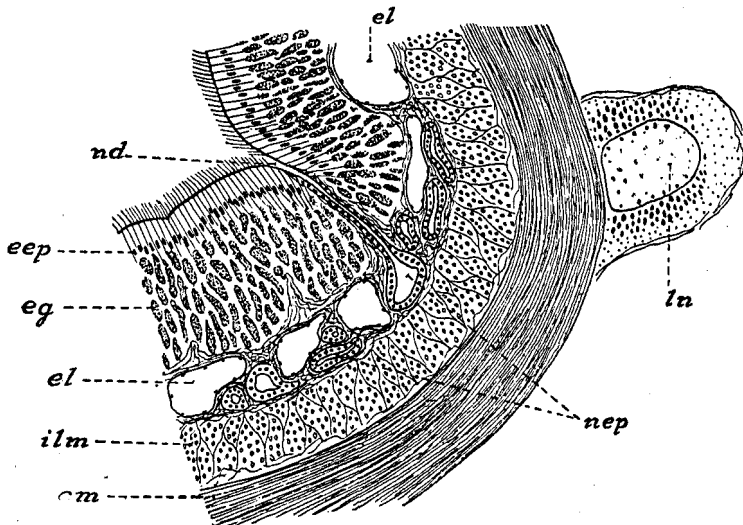


FIG. 7.—*Taniolosoma cingulatum* sp. nov. Portion of transverse section of body through middle of esophageal region, showing efferent nephridial duct (*nd*) opening through esophageal epithelium (*eep*) into lumen of esophagus; (*nep*) nephridial canals, situated beside and external to the esophageal blood lacunae (*el*); (*eg*) esophageal glands; (*ln*) lateral nerve. Other reference letters as in fig. 1. $\times 150$.

Although the two species mentioned above are the only nemerteans in which the nephridia are known to open into the esophagus, yet in one other species of the same genus, *T. indicum* (*Eupolia indica* Punnett^a), fine cords of cells, resembling "delicate ducts compressed to obscure the lumen, pierce the glandular layer of the esophagus and may be traced to the esophageal epithelium," although Punnett suggests that they are not functional. He was, however, unable to find any traces of other efferent ducts leading to the exterior of the body.

Nervous system.—The most remarkable peculiarity of the nervous system is the presence of unusually large and numerous buccal or esophageal nerves. In the mouth region there are 4 to 6 large branches on each side, which together constitute a bulk nearly equal to the core of the lateral nerve in the same region. The buccal nerves are united with each other shortly after their origin from the brain and exhibit similar unions with the lateral nerves in the mouth region.

Reproductive organs.—Sexual products not present in specimens collected in April.

Parasites.—Both the specimens sectioned were infested with parasitic nematode worms which formed large and conspicuous cysts or tumors in the connective tissue between the esophageal epithelium

^aGardner's Fauna and Geography of the Maldive and Laccadive Archipelagoes, vol. 1, part 1, Nemerteans, p. 104. 1901.

and the lateral nerves (fig. 5, *a*). Such cysts commonly exceed the lateral nerve in diameter, and in one specimen were scattered irregularly through the posterior portion of the esophageal region backward into the intestinal region. Not all of the cysts contained the parasites, however, and in some cases the parasitic worms were found imbedded in the body walls, principally in the outer longitudinal muscular layer (fig. 5, *x*). When found in other places than in the cysts referred to the parasites were quite free among the tissues, presenting an appearance as if they had wandered from the cysts toward the exterior of the body. The cysts themselves are composed of an irregular network of fibrous tissue supporting numerous large, oval nuclei. A firmer layer of the same tissue makes up the external wall of the cyst, which is completely filled with tissue except for the space actually occupied by the parasite. Occasionally two or three such parasites were found in a single cyst (fig. 5, *a*). In the second specimen sectioned only a few such cysts were present. The length of the parasitic nematode varies from 0.2 to 0.3 mm.; the width is about 0.017 mm.

Habitat.—Dredged in 21 to 28 fathoms in Auau Channel, between Maui and Lanai islands (station 3874). Bottom composed of sand, pebbles, and shells; temperature 75.3° F. Also dredged in 28 to 43 fathoms near same locality (station 3876). Bottom composed of sand and gravel, with a temperature of 74° F.

The species is therefore known only from the Hawaiian Islands.

Drepanophorus sp.?

The genus *Drepanophorus* is represented in this collection by a single proboscis only, so that the specific identity of the form represented remains unknown. The preserved proboscis measures 33 mm. in length and 4 mm. in diameter. It must therefore have belonged to a worm of fairly large size. The armature was not well preserved. The general features of basis and stylets could be made out, but no details of structure. It is provided with 26 large and conspicuous nerves.

The color of this proboscis is described as uniform rose pink in life, but is colorless after preservation.

Apparently no species of the genus has been heretofore found which had exactly 26 proboscicial nerves, although the widely distributed *D. spectabilis* has 24, and several other forms 30 or more.

This proboscis was collected at station 4117, off the northwest coast of Oahu Island, at a depth of between 253 and 282 fathoms. The bottom at this locality was composed of coral sand and foraminifera, and had a temperature of 45.6° F.

It is unfortunate that the worm itself was not obtained, for it would be extremely interesting to determine whether a representative of a genus in which the ocelli are usually so highly developed would retain them unimpaired at a depth of more than 250 fathoms, where it must live in absolute darkness. It may be noted in this connection that Punnett has recently found a species of *Lineus*^a living in the fjords of Norway at a nearly equal depth which has numerous small ocelli. He looks upon this as a recent immigrant from shallower arctic seas into the deeper waters of the fjords, because most other deep-water nemerteans have been found to be destitute of ocelli.

EXPLANATION OF PLATE.

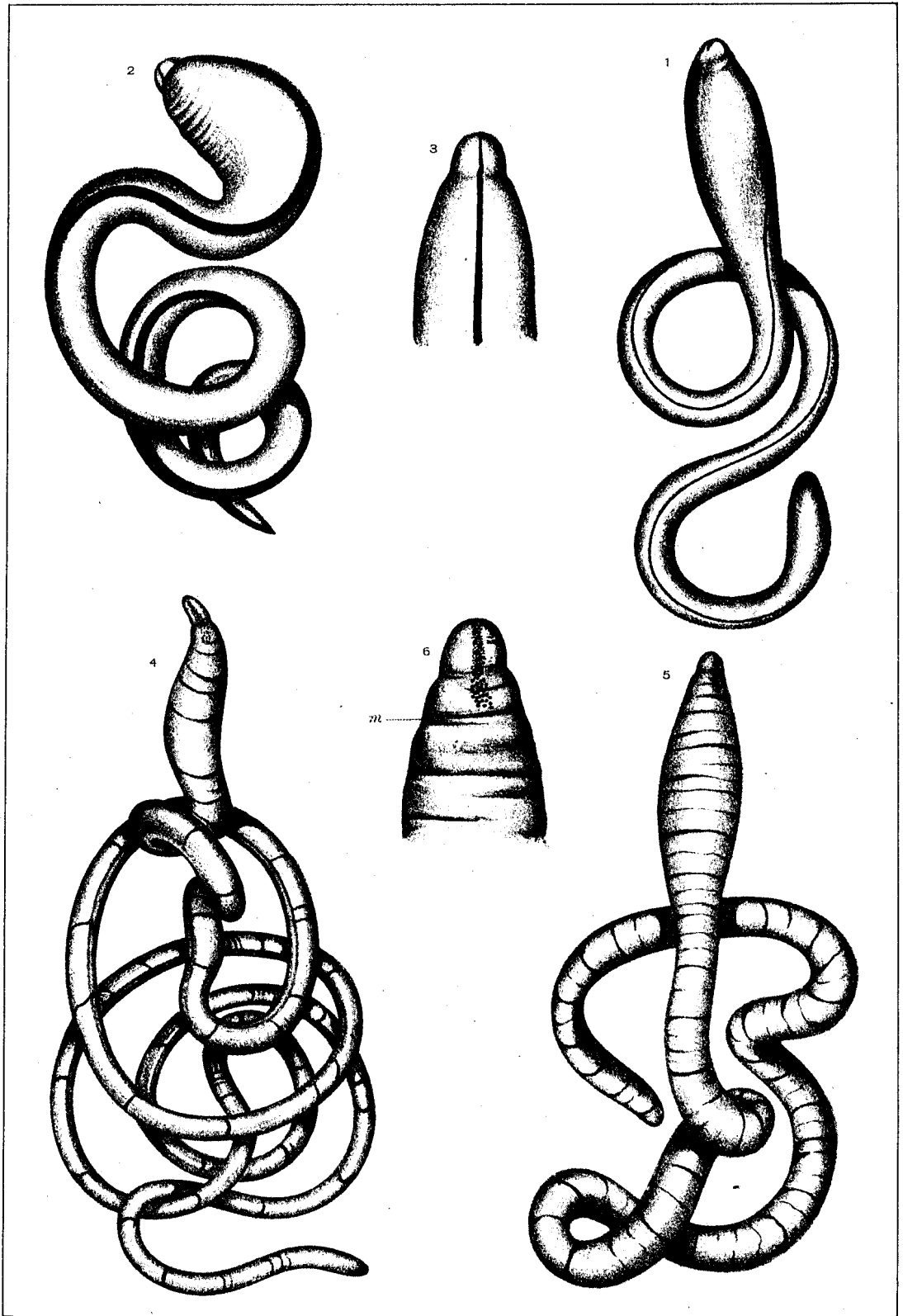
Taniosoma univittatum sp. nov.

- | | |
|--|--|
| <p>Fig. 1. Preserved specimen moderately extended;
× 5.</p> <p>2. Preserved specimen strongly contracted;
× 5.</p> | <p>Fig. 3. Dorsal side of head and anterior portion of body, showing position and anterior extent of dorsal longitudinal marking;
× 8.</p> |
|--|--|

Taniosoma cingulatum sp. nov.

- | | |
|---|--|
| <p>Fig. 4. Specimen preserved in a well-extended condition; head and anterior portion of body seen from lateral surface; × 3.</p> <p>5. Preserved specimen somewhat contracted; position of head as in preceding figure;
× 3.</p> | <p>Fig. 6. Head and anterior portion of body of contracted specimen more highly enlarged; showing numerous ocelli on lateral margin of head; <i>m</i>, mouth; × 6.</p> |
|---|--|

^a *L. cinereus* Punnett, Bergen's Museum Aarbog, 1903, p. 17.



A. HUEN & CO. BALTIMORE.

FIGS. 1-3 TÆNIOSOMA UNIVITTATUM COE, NEW SPECIES.

FIGS. 4-6 TÆNIOSOMA CINGULATUM COE, NEW SPECIES.