AN AMAZONIAN HETERONEMERTINE

by **Eveline du Bois-Reymond Marcus** (*)

(With 3 plates)

In the rich collection of worms gathered by Dr. Harald Sioli-Belém (Pará) in the years 1940-41 and 1945-46 I found 4 specimens of a Nemertine from the river Tapajoz, near Santarém, in 28 m. depth. Although the state of preservation was not quite satisfactory for a histological study, and the available bibliography is not complete, the general anatomy of the worms could be recognized sufficiently for classification. The animals proved to represent a new heteronemertean genus that I call *Siolineus,* combining my acknowledgment to the collector and its position in the system of the Class Nemertini that is discussed after the description.

Siolineus turbidus, new genus, new species (Fig. 1-11) (**)

External characters: The biggest worm (Fig. 1) measures 8 mm. in length and 1,8 mm. in breadth; the smallest (Fig. 2) is 3,7 mm. long, of which 0,8 mm. belong to the everted proboscis, that is curled up and not stretched to its full length. Two specimens had thrown off their proboscis.

The colour of the preserved animals is ivory white, without eye-spots. The anterior third of the biggest worm, the cephalic region, is circular in cross-section, then the body widens and flattens suddenly and is slightly carinate ventrally towards the hind end. There is no caudal appendage.

The head slits (c) begin immediately on the tip of the head, they are 0,4-0,5 mm. long and give the worms an aspect like *Diphyllobothrium.* Sections show the cerebral pores that give rise to the cerebral canals lying in the posterior end of the slits (Fig. 11).

The proboscis pore (op) is nearly terminal. The mouth (m) is a longitudinal slit behind the posterior ends of the head slits. Lateral and frontal sense-organs are wanting. The excretory system was not seen.

The rhynchocoelom extends almost to the hind end of the body (Fig. 2). In the head region it is widened and contains the loops of the

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(**) The specific name was chosen according to Kipling's story "The Beginning of the Armadilloes", where Hedgehog and Tortoise "lived on the banks of the turbid Amazon".

introverted proboscis. On the level of the first intestinal diverticles it narrows and here the retractor of the proboscis originates in the dorsal wall.

Body-wall and integumentary muscles: The epidermis (Fig. 10) has preserved its cilia in many parts. The epithelium is so flat that the classical term "Fadenzellen" (Bürger 1895, p. 188; and others) is quite improper. The cells are widened externally, where the ciliar roots form a stripy layer. Between their slender bases occur the flask shaped gland cells (gs) containing each a brilliant acidophil drop of secretion. In the present material these drops are often expelled and stick to the cilia. The basement membrane of the epidermis is thin.

The cutis is obscured by a thick layer of longitudinal muscle fibres (cm) immediately underneath the epidermis, that are separated into bundles by the connective tissue. Circular muscle fibres do not occur. For the most part the basophilous composed cutis glands (g) did not stain. The few tinged ones lie between the cutis muscles and the external longitudinal muscle layer (l). The circular muscle layer (a) beneath the longitudinal stratum begins behind the brain. It is very strong in the posterior part of the head and thinner behind. The lateral nerve cords (k) and a nerve-plexus (n) run between the outer longitudinal and the circular muscle layer. The latter is followed by the inner longitudinal stratum (li). Diagonal muscles are not developed. The intestinal diverticula are accompanied by isolated dorso-ventral muscles. In the spaces between the rhynchocoelom and the intestine the parenchyma consists of vesicular cells.

The tubes of the cephalic gland (gb) lie embedded in the muscular tissue of the tip of the head. Their cytosomes reach the brain, but do not surpass it. They stain blue. Their openings are probably scattered on the tip, they were not seen.

The muscles of the head that Friedrich (1936, p. 46) considers as important are disposed in the following manner: In the tip of the head there are only diffuse longitudinal fibres, of which a layer investing the dorsal wall is a little more distinct. From ca. 0,1 mm. behind the tip backwards the blood lacuna of the rhynchodaeum is outside its longitudinal muscle layer surrounded by tangential fibres in all directions (Fig. 4, 5, q). These may be regarded as modified circular muscles, as their whole course lies in one transverse plane.

Transverse fibres begin beneath the ventral commissure of the brain, but are interrupted again farther backwards. Beyond the cerebral pores (Fig. 6) the circular muscle layer (a) appears on the dorsal side, inserts itself between the cerebral organs and the lateral nerve cords and forms a horizontal muscle layer above the mouth. Posteriorly this layer gives off part of its fibres to accompany the ventral body-wall; then it disappears between rhynchocoelom and oesophagus and forms only the circular layer of the body-wall.

From the beginning of the circular layer the longitudinal fibres are well stratified. The constriction of the worm on the limit between head and trunk is due to a thickening and contraction of the circular layer, that diminishes again in the region of the intestinal diverticula.

As the circular muscles of the prae-cerebral region are considered as a secondary acquisition of the Nemertines, our worm is primitive in this respect; it has hardly any.

Digestive canal: The mouth forms a contracted slit of 0,17 mm. length, as it is typical for the broad species of *Lineus* (Bürger 1895, p. 192). It lies immediately behind the brain. Many basophilous glands (mg) open into its lips. The oesophagus (o) is richly folded and its epithelium is in very different secretory phases in the two series of sections. The big worm has a bit of food in the oesophagus, and a great number of basophil glands with their plentiful stored and partly already excreted secretion impaste the ciliated and rather flat epithelium. Many of these glands lie in the parenchyma beneath the oesophageal epithelium. In the second worm that seems to be preserved jejune, the cells are clearly ciliated and stain with eosine; no glands are visible. The oesophagus has splanchnic longitudinal muscle fibres, but no circular ones.

From one cell to the next the aspect of the intestinal epithelium changes at the limit to the stomach, that has high columnar cells mixed with unicellular glands. The granular acidophil secretion of the latter looks like that of the "claviform gland cells of Minot" (Böhmig 1929, p. 64). The wall of the stomach is less folded than that of the oesophagus. Backwards the number of glands decreases gradually and the cells between them are filled with granular inclusions of food particles. Behind the constriction at the limit between head and trunk the intestine forms deep lateral diverticula (Fig. 2, 7), in which the intra-cellular granules are bigger than in the main tube. Circular muscle fibres around the intestine do not occur, but the dorso-ventral muscles between the pouches appear like such.

In the posterior end of the body the intestinal epithelium flattens and the diverticula diminish, so that the intestine forms a kind of rectal ampulla containing rests of food, empty diatoms and other. The anus lies sub-terminally.

Contrary to the statement of Punnett (1901, p. 9-10) for *Lineus* the whole length of the alimentary canal of one of the present worms contains setal bundles of Oligochaetes. These allow classification of the food, *Aulodrilus cernosvitovi* du Bois-Reymond Marcus (1947, p. 14), specimens of which were gathered in the same sample of Dr. Sioli's collection.

Proboscis: The opening of the rhynchodaeum (op) lies at the tip of the head, in the first section of a transversal (0,01 mm.) series a little below the centre (Fig. 3). In the beginning the rhynchodaeum is so thin that it is not recognizable in the sections. Then it increases in diameter and is on the dorsal and lateral surface surrounded by a blood lacuna (b). Farther back the lacuna is interrupted dorsally but continues paired on the sides (Fig. 4,5). The rhynchodaeal epithelium grows higher and is ciliated. It has sub-epithelial longitudinal muscle fibres that are more numerous backward and are disposed in four bundles (Fig. 4). Also the blood lacunae have sub-epithelial muscle fibres. Immediately in front of the brain the lumen of the rhynchodaeum is closed by a septum (sr) of a few circular muscles that form a dorsal crossing of fibres and many radial fibres running to the dorsal body-wall.

The proboscis originates at this septum (Fig. 11) with a fine muscular tube of longitudinal fibres and a flat epithelium on both inner and outer side. The proboscis lies in the rhynchocoelom or proboscis sheath composed of epithelium, longitudinal and circular muscle layers. On the level of the cerebral organs the rhynchocoelom is fixed to the dorsal body-wall by a number of radial fibres, the so-called fixator muscle (Fig. 6, f). As the blood lacunae bend to the ventral side, their muscle fibres continue on the proboscis sheath, while some of the circular fibres of the rhynchocoelom join the horizontal layer above the mouth. The dorsal blood-vessel (v) runs in the rhynchocoelom (t) for a short extent. Behind the mouth the lumen of the proboscis sheath widens laterally, and the circular muscle layer thickens. In this widening that lies over the stomach the retracted proboscis is curled up. At the limit of the trunk the proboscis is attached to the dorsal wall of its sheath by the retractor (Fig. 2, r), and the rhynchocoelom continues backwards with a small lumen and thin muscle layers till nearly to the end of the body.

The proboscis (Fig. 8) has a diameter of 0,14-0,17 mm. It has only two muscular layers, the circular one (a) lies beneath the proboscis epithelium (pe), the longitudinal one (l) beneath the rhynchoelomic epithelium (re). Some of the circular fibres crossing one another are diverted from their original stratum, pierce the longitudinal layer and reach the rhynchocoelomic epithelium (me). They form the so-called muscle crosses, of which two may occur on opposite sides of the transverse section of the proboscis, one of them is less apparent than the other, much less than in *Lineus gesserensis* (*ruber*) (Punnett 1901, t. 2 f. 6, mcr.). The rhynchocoelomic epithelium of the proboscis is quite flat in the introverted condition, while the proboscis epithelium is high and has narrow columnar cells and a few unicellular acido-and basophil glands. No rhabdites or nematocysts are present. In the everted proboscis the outer epithelium (proboscis epithelium) is stretched and forms a thin layer with projecting glands, while the rhynchocoelomic epithelium is compressed and high.

Two flat proboscidial nerves (n) lie between the circular muscles and the proboscis epithelium on both sides of the muscle cross.

In the specimen that was preserved with an everted proboscis, one sees that the latter is not everted to its full length: on the hind end the retractor is visible outside the proboscis pore. The retractor does not reach to the tip of the proboscis, but a considerable part of the latter has a double wall, the outer everted and the inner introverted. The scarcity of my material does not permit an exact analysis of the different regions of the proboscis. The outer end near the root has a very flat proboscidial epithelium and longitudinal muscle fibres only, the inner end has a very thin muscle layer that continues into the retractor.

The blood-vascular system consists of the two lateral (vl) and the dorsal vessel (v). The cephalic loop of the vessels is enlarged to form two lacunae (b) that surround the rhynchodaeum and unite dorsally in the tip of the head. On the level of the ventral brain commissure also the lateral vessels form a ventral commissure. From this the dorsal vessel originates, that enters the proboscis sheath for a short distance and leaves it soon to the ventral side, running backwards between the rhynchocoelom and the intestine. The lateral vessels unite a second time in the buccal commissure, whence two small buccal vessels turn to the mouth. They are so inconspicuous that they cannot be followed. In their further course the lateral vessels pass through the cerebral organs (Fig. 6) and run backwards inside the circular muscle layer, slightly dorsal to the lateral nerve cords, that are outside the latter. The oesophagus is ventrally involved by a network of lacunae.

The wall of the rhynchodaeal lacunae (Fig. 4, 5) is covered by a continuous coat of longitudinal muscle fibres that is part of the cephalic musculature (Bürger 1907, p. 258). The same holds true for the tangential fibres that are circular muscles inflected in all directions (q).

The dorsal vessel has an own thick circular layer, while the lateral vessels are feebly provided with muscles.

Nervous system: This corresponds to what Bürger (1895, p. 199) has indicated as typical for Lineids. The two halves of the brain (Fig. 11) are united by a fine (0,01 mm.) dorsal (u) and a thick ventral (0,05 mm.) commissure (h), that lies a little behind the former. The halves are separated by the narrow rhynchocoelom (t). The fibrous core of the dorsal ganglion consists of three separate parts, a small one near the commissure (z), a big one (x) that follows ventrally and is coalesced with the ventral ganglion (j) and a short caudal one (y) that diverges dorsolaterally from the principal direction of the ganglion.

The cerebral organ (Fig. 9, 11) is contiguous with the spherical median part that receives a thick bundle of nerves from the sensory cells of the cerebral canal (cc).

The fibrous core of the ventral ganglion is nearly compact (Fig. 6, j). From the ventral commissure it continues into two thicker strains with anterior projections that turn backwards and, behind the cerebral pores, outwards to form the lateral nerve cords (k).

The thick coat of ganglion cells (gc) corresponds to the description given by Bürger (1895, p. 201; Punnett 1901, p. 16). Neurochord cells do not occur, neither in the brain nor in the lateral nerve cords. Accessory commissures in the brain are wanting.

The lateral nerve cords have one fibrous core each (Fig. 7). They are connected by the anal commissure. The two nerves in the proboscis were already mentioned. I did not succeed to find the median dorsal nerve that is said to be always present (Friedrich 1936, p. 9). In its stead a dorso-lateral plexus (n) is developed between the median dorsal line outside the circular muscle layer.

Of sensory organs only the cerebral organs are visible. Eyes, the frontal organ and lateral sense organs are wanting.

The cephalic slits (c) form the beginning of the cerebral organs. They start on the tip of the head beside the proboscis pore and extend horizontally backwards (for 0,4-0,5 mm.). They are rather shallow (Fig. 3-5) and have a ciliated epithelium with depressed nuclei that is flatter (0,012 mm.) than the surrounding epidermis (0,025 mm.). Neither innervation nor blood vessels could be observed. The cerebral organs suit to the description of Dewoletzky related by Bürger (1895, p. 406-412). The histological details described by Bürger surpass by far the recognizable structures of the present worms. I give a combined figure of the whole organ (Fig. 9).

Gonads: In the biggest specimen ovaries are developed (Fig. 7, w). They lie in the region of the intestine in the parenchyma between the diverticula and consist of isolated ovocytes of different sizes. None of them is full-grown, and no ducts are present.

Synopsis of the fresh-water Nemertini

The taxonomic terminology of the present review is that of Gerarda Stiasny-Wijnhoff (1912; 1913, p. 312-317; 1923, p. 627-630). The diagnoses of the principal systematic categories and their synonymy can be found in the quoted papers. This system is followed by most of the contemporary authors. It distinguishes two sub-classes, Anopla and Enopla M. Schultze (1853, p. 183) with two orders each. The anoplan orders are the Palaeonemertini Hubrecht 1879 and the Heteronemertini Bürger 1895, those of the Enopla the Hoplonemertini Hubrecht 1879 and the Bdellonemertini Coe 1905 (older name: Bdellomorpha Verrill 1893).

The oldest known limnic species are *Prostoma clepsinoides* Dugès (1828, p. 140 t. 4 f. 1, t. 5 f. 25) and *P. lumbricoideum* Dugès (1830, p. 74 t. 2 f. 2). *Prostoma* is to-day considered as an almost cosmopolitan genus of fresh-water species (Stiasny-Wijnhoff 1937; 1938). It belongs to the Hoplonemertini Monostilifera.

A long while ago Leidy (1850, p. 125) discovered a species of *Prostoma* that he called *Emea rubra* in the United States of North America. Recently species of *Prostoma* have also been found in Mexico (Rioja 1941), Venezuela (Cordero 1941), the brazilian States of São Paulo and Paraná (Marcus 1942; 1943), Uruguay and Argentine (Cordero 1943). Specimens of *Prostoma* are also represented in Dr. Sioli's amazonian collection (river Tapajoz, at Fordlandia); the species was not yet determined. *Prostoma* is closely related to the marine and likewise vastly distributed genus *Tetrastemma* Ehrbg.

Of the one bdellonemertean genus, *Malacobdella* Blainv., one species, the south-chilean *M. aurita* Blanchard (1847, p. 143) is limnic. It was found in rivers in the region of Concepcion, where it lives in the lung-cavity of a Pulmonate snail.

Nemertes polyhopla Schmarda (1859, p. 44-45 t. 11 f. 100) from the lake of Nicaragua cannot be identified, before new material is available. Bürger (1895, p. 28) considered the species as a Hoplonemertine, evidently because it has many eyes and swims lively. On the other hand the diagnosis indicates deep cephalic slits that are also emphasized in Schmarda's Text-Book (1871, p. 271). These slits would clearly point to a Heteronemertine, and probably for this reason Stiasny-Wijnhoff (1938, p. 227) refers to Schmarda's worm as a Heteronemertine. The nematocysts of the proboscis of *Nemertes polyhopla* favour the same opinion, although these details cannot be completely inferred from the original description. Numerous eyes arranged in groups are not known in free-swimming Heteronemertines (*Cerebratulus*) and therefore *N. polyhopla,* as Bürger said, continues enigmatic.

The first certain limnic Heteronemertine is *Planolineus exsul* Beauchamp (1928) found in ponds of the Botanical Garden in Buitenzorg. Although the city lies only 250 m. above sea-level and the river Liwoeng establishes a hydrographical communication with the bay of Batavia, the species represents a morphologically isolated type. The absence of cephalic slits and, after Beauchamp (l. c., p. 66), the cerebral organs coalesced with the brain (see below in the discussion of the systematic position of *Siolineus*) are baseodiscid features, the sequence of the muscle layers and the muscle cross in the proboscis as well as the short cephalic glands (f. 1 of *Planolineus* on p. 63) are lineid. It is true that the Anopla of the Siboga-Expedition are not yet published, so that possible related litoral forms from the Java Sea are still unknown.

In the Great Lake (Tonlé or Tale Sap) of Cambodia a Hoplonemertine, *Otonemertes denisi* Dawydoff (1937), occurs that evidentily belongs to the monostiliferous family Ototyphlonemertidae. *Otonemertes* differs from *Ototyphlonemertes* by the occurrence of eyes, but for the rest the fresh-water form is known insufficiently, as no sections are described or drawn. It seems rather strange that the short retractor of the proboscis, an organ of no taxonomic interest, is mentioned in the diagnosis. Perhaps it was confused with the proboscis sheath (rhynchocoelom) that is rather short also in *Ototyphlonemertes.* As species of this marine genus occur in the Black Sea and in tide pools (Coe 1940, p. 289), a certain euryhalinity may be inferred. Moreover the outlet of the Great Lake becomes recurrent in summer and autumn, and waters from the flooded Me-kong penetrate into the lake. The delta of the Me-kong is much exposed to the tides; tide rises two meters in all kills and channels, and 300 km. from the coast, at Pnom-penh, still about 50 cm. Neither the hydrography of the region nor the morphology of *Otonemertes* justify Dawydoff's supposition that the genus developed in the Great Lake while a bay of the sea was isolated from the Gulf of Siam by the sediments of the Mekong and transformed to the great central plain of Cambodia. On the contrary, *Otonemertes* may be a young marine immigrant.

Insufficiently known Hoplonemertines from the brackish lake Paleostom at Poti (Black Sea) in Georgia (Russia) and the lake Baikal are mentioned in the litterature about fresh-water Nemertines (Montgomery 1895, p. 89; Jacobs 1935, p. 128; Stiasny-Wijnhoff 1938, p. 227).

Systematic position of Siolineus

The mouth behind the brain, the proboscis without stylet, the lateral nerve cords situated in the body-wall and the absence of a ventral intestinal caecum caracterize *Siolineus* as an anoplan Nemertine. The musculature of the body-wall in three main layers, an outer longitudinal, a middle circular, and an inner longitudinal one, the median dorsal vessel, and the lateral nerves between the outer longitudinal and the circular muscular strata define the position of the genus among the Heteronemertini.

The families of this Order are separated in different ways by the various authors. Bürger (1907, p. 442) and Friedrich (1936, p. 46) distinguish the two families Baseodiscidae and Lineidae, but the two authors do not include the same genera in their families. Böhmig (1929, p. 104) re-established a third family, the Valenciniidae or Joubiniidae, emended by Bergendal (1902, p. 93). Three important characters of this family are the considerable distance between the tip of the head and the orifice of the rhynchodaeum, the absence of cephalic slits, and the wanting of muscle crosses in the wall of the proboscis. According to these characters it is obvious that *Siolineus* cannot be classified among the Valenciniidae.

Bürger (1907, p. 442) distinguishes his two families principally by the muscle layers of the proboscis, an outer circular and an inner longitudinal one in the Baseodiscidae; an outer longitudinal, a middle circular and an inner longitudinal one that may be absent in the Lineidae. Bürger called the layers "outer" and "inner" corresponding to their position in the introverted proboscis. Böhmig (1929, p. 21) combined the figure of the proboscis at rest (f. 24) with a denomination of the outer and inner layer referring to the everted proboscis. *Siolineus* has a longitudinal stratum adjacent to the rhynchocoelomic epithelium and a circular one at the proboscidean epithelium (terminology after Punnett 1901, p. 6), or in Bürger's terms: an outer (when the proboscis is at rest) longitudinal layer and an inner circular one, as occurs in the Lineidae. This type is the rule also in the Palaeonemertini and therefore Wijnhoff (1914, p. 279) called it the palaeotype. As Friedrich (l. c.) systematizes the heteronemertean families principally after the cephalic slits, without regard to the proboscidean musculature, *Paralineus* is classified among the Baseodiscidae, although it has the same muscle coat (Schütz 1912, p. 128) as *Siolineus.*

Friedrich united all genera without head slits in the Baseodiscidae, and also Bürger did not include Heteronemertini with cephalic slits in this family, although he put some without slits in the Lineidae. *Siolineus* has slits (Fig. 1-5) and must consequently be classified among the Lineidae.

Muscle crosses in the proboscis are present in Bürger's Lineidae and absent in his Baseodiscidae. The sequence of the proboscidean muscle layers and the occurrence of crosses are considered as so important characters by Bürger, that he classifies some genera without head slits among the Lineidae. Friedrich prefers to emphasize the slits and therefore we meet his *Heterolineus* without cross among the Lineidae and one genus, *Zygeupolia,* with crosses among his Baseodiscidae. If he had not overlooked *Planolineus,* it certainly would have been mentioned as the second baseodiscid genus with a muscle cross in Friedrich's system. The occurrence of muscle crosses in *Siolineus* (Fig. 8) indicates its place among the Lineidae.

The last disjunctive character introduced by Friedrich for the two families, the separation of the cerebral organs from the brain (Baseodiscidae) and their coalescence with it (Lineidae), was not used in Bürger's diagnoses. As I do not dispose of Friedrich's extensive publition (Archiv für Naturgeschichte, Neue Folge, vol. 4, 1935), I do not quite understand the meaning of these characters. Already in Bürger's first monograph (1895) a clear separation is shown only in *Valencinia*; in *Eupolia* (*Baseodiscus*) the cerebral organs are much more united with the dorsal ganglia. The text in Bürger's later monograph (1907, p. 445) is univocal with regard to *Baseodiscus:* the cerebral organs lie on the posterior rounding of the dorsal ganglia and are so intimately coalesced with them that they form a united mass with the brain. It seems to me quite right that Böhmig (1929, p. 104) wrote: Valenciniidae, cerebral organs separated from the brain; Baseodiscidae, cerebral organs closely coalesced with the brain. As Friedrich unites these two families, his indication cannot be understood without his probably more detailed paper. The cerebral organs of *Siolineus* are swellings of the dorsal ganglia (Fig. 9, 11) to which they are intimately united (Bürger 1895, p. 202 t. 20 f. 5, t. 21 f. 4, t. 22 f. 2: *Lineus, Cerebratulus, Micrura*). This "centralized" lineid type is also shown in the excellent drawings of Berta Scharrer (1941, f. 1, 2).

In Bürger's Baseodiscidae the nerves of the proboscis are situated between the glandular (proboscis) epithelium and the longitudinal muscles. In the Lineidae they lie between the circular muscles and the longitudinal layer adjoining the proboscidean epithelium. If this longitudinal stratum is absent, they lie between the circular muscles and the proboscis epithelium. This is the case in *Siolineus* (Fig. 8), and the genus corresponds also in this character to the Lineidae.

The cephalic gland of the Baseodiscidae (Bürger) is richly developed and its tubes reach backwards to the region of the anterior intestine. In the Lineidae this gland is composed of only thin tubes that do not extend beyond the brain. It is obvious that the cephalic gland of *Siolineus* (Fig. 11) belongs to the lineid type.

The family Lineidae is divided into two sub-families, according to the occurrence and absence of a caudal appendage (Bürger) and after the development of two or three muscle layers in the proboscis (Friedrich). We can apply the one as well as the other character and come to the same result: *Siolineus* belongs to the Lineinae (Amicrurinae). If we consider cephalic slits and muscle crosses as important characters of the Lineinae, only *Euborlasia* and *Lineus* have to be compared with *Siolineus.* The two older genera have a thick layer of connective tissue in the cutis, two distinct muscle crosses in the proboscis, a short rhynchocoelom and shallow intestinal diverticula. Resuming I give the following diagnosis of the genus:

Siolineus, gen. nov.

Heteronemertini with cylindrical head region separated from the flattened trunk. No caudal appendage. Body-wall with a sub-epithelial layer of longitudinal muscles in the cutis. Cephalic slits long; cerebral organs united with the dorsal ganglia. Orifice of the rhynchodaeum nearly terminal. Prae-cerebral circular muscles almost absent; cephalic gland not extended beyond the brain. Proboscidial muscular coat two-layered: circular fibres underlying the proboscis epithelium, longitudinal ones adjacent to the rhynchocoelomic epithelium. Two muscle crosses, one of which much more developed than the other. Rhynchocoelom nearly as long as the body. Intestinal diverticula deep.

Type of the genus: *Siolineus turbidus,* sp. n., 4 specimens from the river Tapajoz (afluent of the Amazon) near Santarém, 28 m. depth.

Three series of sections, two transversal and one horizontal and one total mount in the Department of Zoology of the Faculty of Philosophy, Sciences and Letters of the University of São Paulo, Brazil. P. O. B. 105-B.

As the Heteronemertini are well represented in the tropical seas (Böhmig 1929, p. 96), it is not surprising that the two or three known findings of fresh-water Heteronemertini, Java, Amazon, and lake Nicaragua, lie in the tropics. The nemertean fauna of the atlantic coast of northern South-America is not known, so that *Siolineus* cannot be compared with eventually related marine forms.

Resumo

Dr. Harald Sioli-Belém (Pará) colecionou 4 espécimes de um Nemertino, no rio Tapajoz, perto de Santarém, a 28 m. de profundidade. Trata-se de um Heteronemertino, chamado *Siolineus turbidus,* gen. nov., spec. nov., da família Lineidae, sub-família Lineinae. Distingue-se dos gêneros mais próximos, *Euborlasia* e *Lineus,* pela substituição, na cutis, da grossa camada de tecido conjuntivo por músculos sub-epiteliais, longitudinais, pelo desenvolvimento desigual dos dois cruzamentos das fibras musculares anelares da tromba, pelo rincoceloma comprido e pelos divertículos intestinais profundos.

Diagnose do gênero: Região cefálica cilíndrica, separada do tronco achatado; sem apêndice caudal. Parede do corpo com uma camada sub-epitelial de músculos longitudinais, na cutis. Fendas cefálicas compridas; órgãos cerebrais unidos aos gânglios dorsais. Orifício do rincodéo aproximadamente terminal. Musculatura anelar pré-cerebral quasi ausente. Glândula cefálica fracamente desenvolvida, não estendida além do cérebro, para trás. Músculos da tromba em duas camadas, a anelar aposta ao epitélio da tromba; a longitudinal, ao do rincoceloma. Um dos cruzamentos das fibras anelares da musculatura da tromba muito mais fraco que o outro. Rincoceloma quasi tão comprido quão o corpo. Divertículos intestinais profundos.

Sendo os Heteronemertinos bem representados nos mares quentes, não é estranho que os três achados de Heteronemertinos límnicos se tenham realizado nos trópicos. São êstes, além do atual, Java (*Planolineus exsul* Beauchamp) e o lago de Nicarágua (*Nemertes polyhopla* Schmarda, provavelmente um Heteronemertino). Outros Nemertinos da água doce são *Malacobdella aurita* Blanchard (Bdellonemertini) do Chile e os Hoplonemertini Monostilifera dos gêneros *Prostoma* Dugès (quasi cosmopolita) e *Otonemertes* Dawydoff (Cambodja).

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PLATE I

Siolineus turbidus, g. n., sp. n.

Fig. 1 — Ventral view of the biggest worm in alcohol.

Fig. 2 — Specimen with everted proboscis in balsam.

Fig. 3-5 — Transverse sections (0,01 mm.) of the specimen figured in Fig. 1.

Fig. 3 — Second section from the tip of the head.

Fig. 4 — Section through the hind part of the rhynchodaeum.

Fig. 5 — Section through the septum from which the proboscis originates.

LIST OF ABREVIATIONS IN PLATES I-III

a, annular (circular) muscle layer.
ag, anterior gland of cerebral organ.
b, blood lacuna.
c, cephalic slit.
cc, cerebral canal.
cm, cutis muscles.
cp, cerebral pore.
d, rhynchodaeum.
e, epidermic epithelium.
f, fixator of the rhynchocoelom.
fo, food particles.
g, cutis glands.
gb, cephalic gland.
gc, ganglion cells.
gs, skin glands.
h, ventral cerebral commissure.
i, intestine.
j, ventral ganglion.
k, lateral nerve cord.
l, longitulinal muscles.
li, inner longitudinal muscle layer of body-wall.
m, mouth.
mc, muscle cross.
mg, mouth gland.
mn, buccal nerve.
n, nerve plexus.
o, oesophagus.
op, proboscis pore.
p, proboscis.
pe, proboscis epithelium.
q, prae-cerebral tangential muscles.
r, retractor of the proboscis.
re, rhynchocoelom epithelium.
s, posterior glandular area of the cerebral organ.
sr, septum of the rhynchocoelom.
t, rhynchocoelom.
u, dorsal cerebral commissure.
v, dorsal vessel.
vl, lateral vessel.
w, ovocytes.
x, middle part of dorsal ganglion.
y, caudal part of dorsal ganglion.
z, upper part of dorsal ganglion.

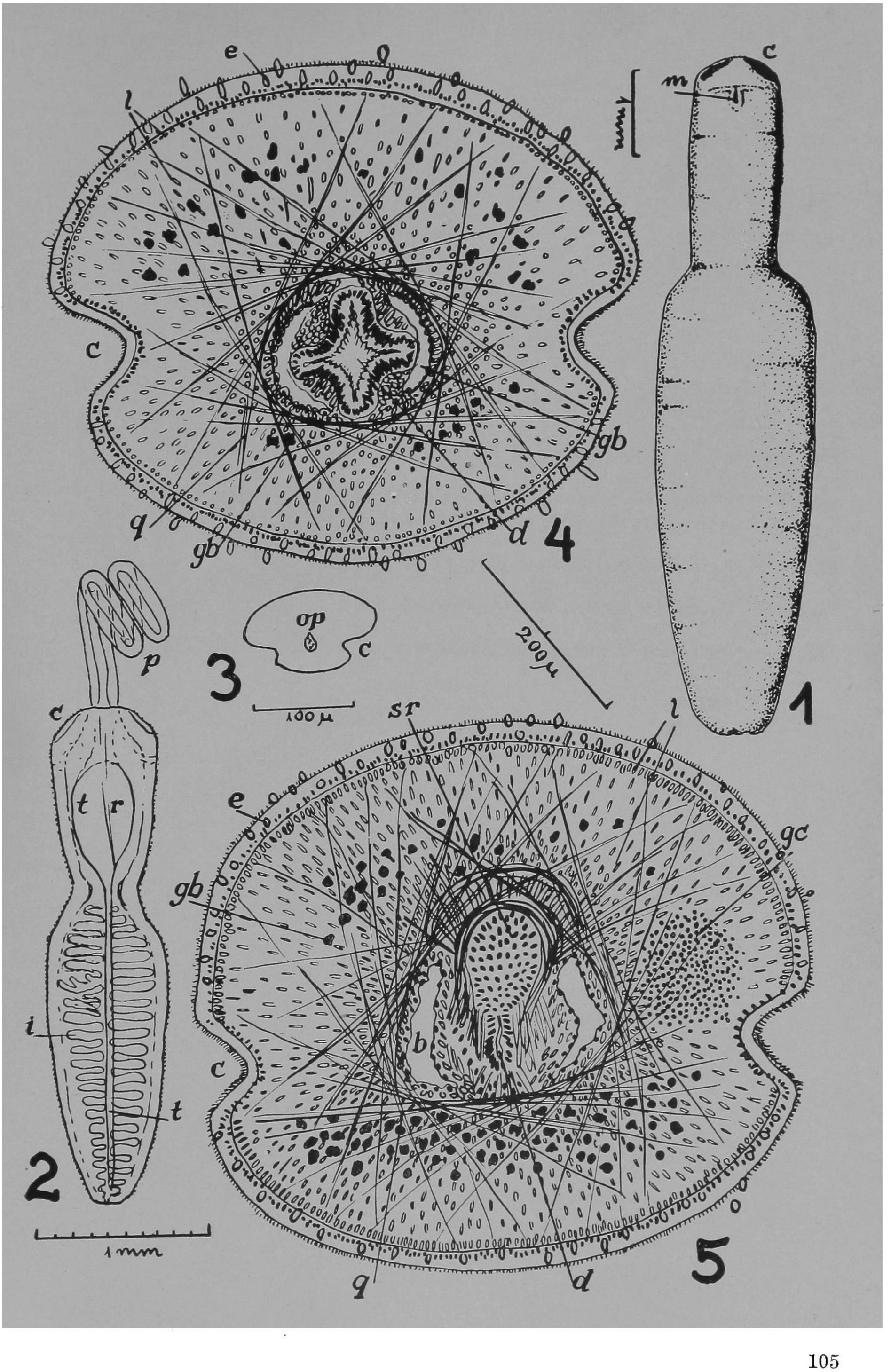
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PLATE II

Siolineus turbidus, g. n., sp. n.

Fig. 6-7 — Transverse sections of the specimen figured in Fig. 1.

Fig. 6 — Sections of the level of the brain; the left half on the level of the cerebral pore (cp), the right half on the level of the mouth (m).

Fig. 7 — Section of the anterior part of the trunk.

Fig. 8 — Transverse section of the proboscis.

Fig. 9 — Combined scheme of horizontal sections of the cerebral organ.

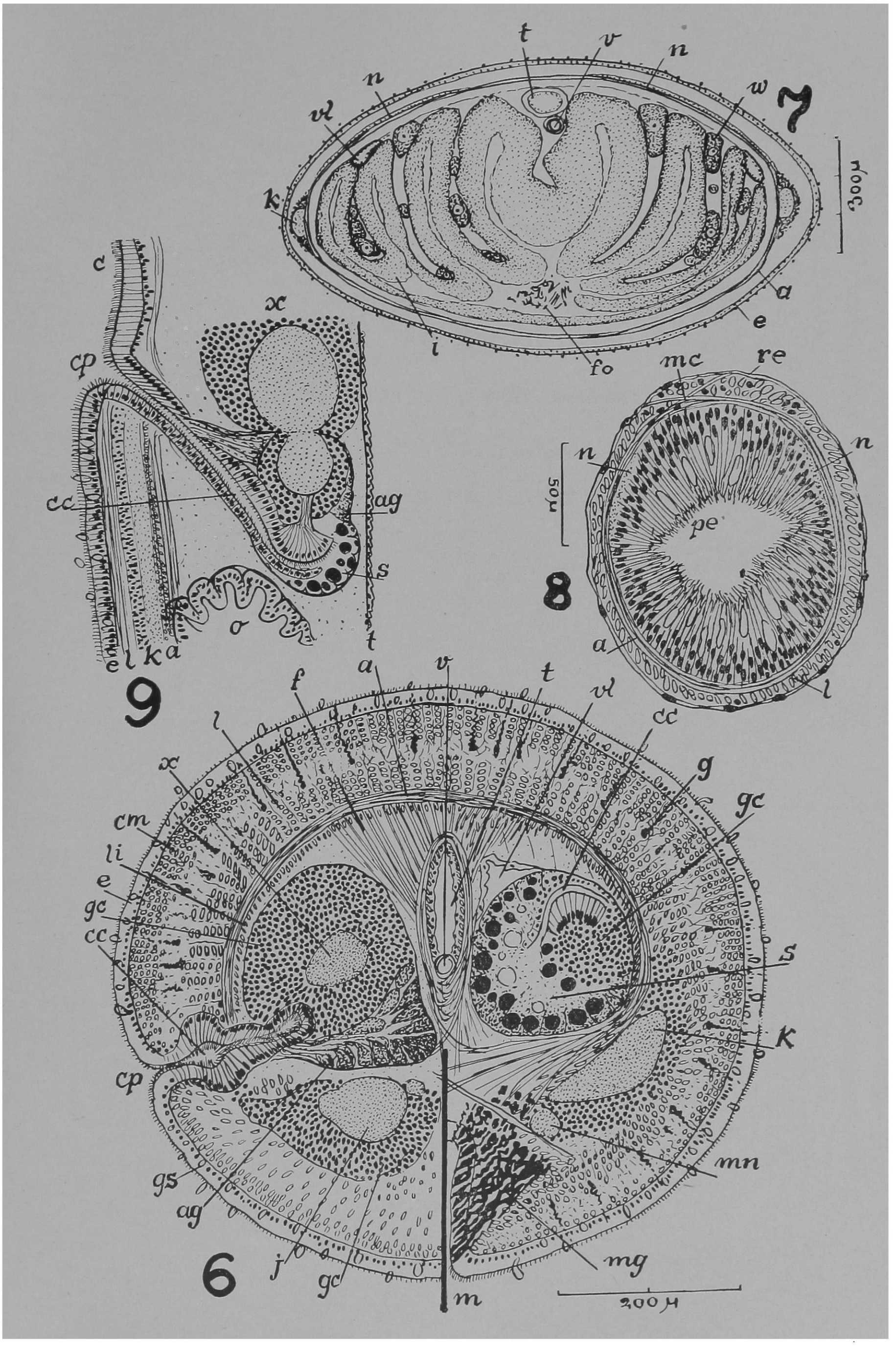
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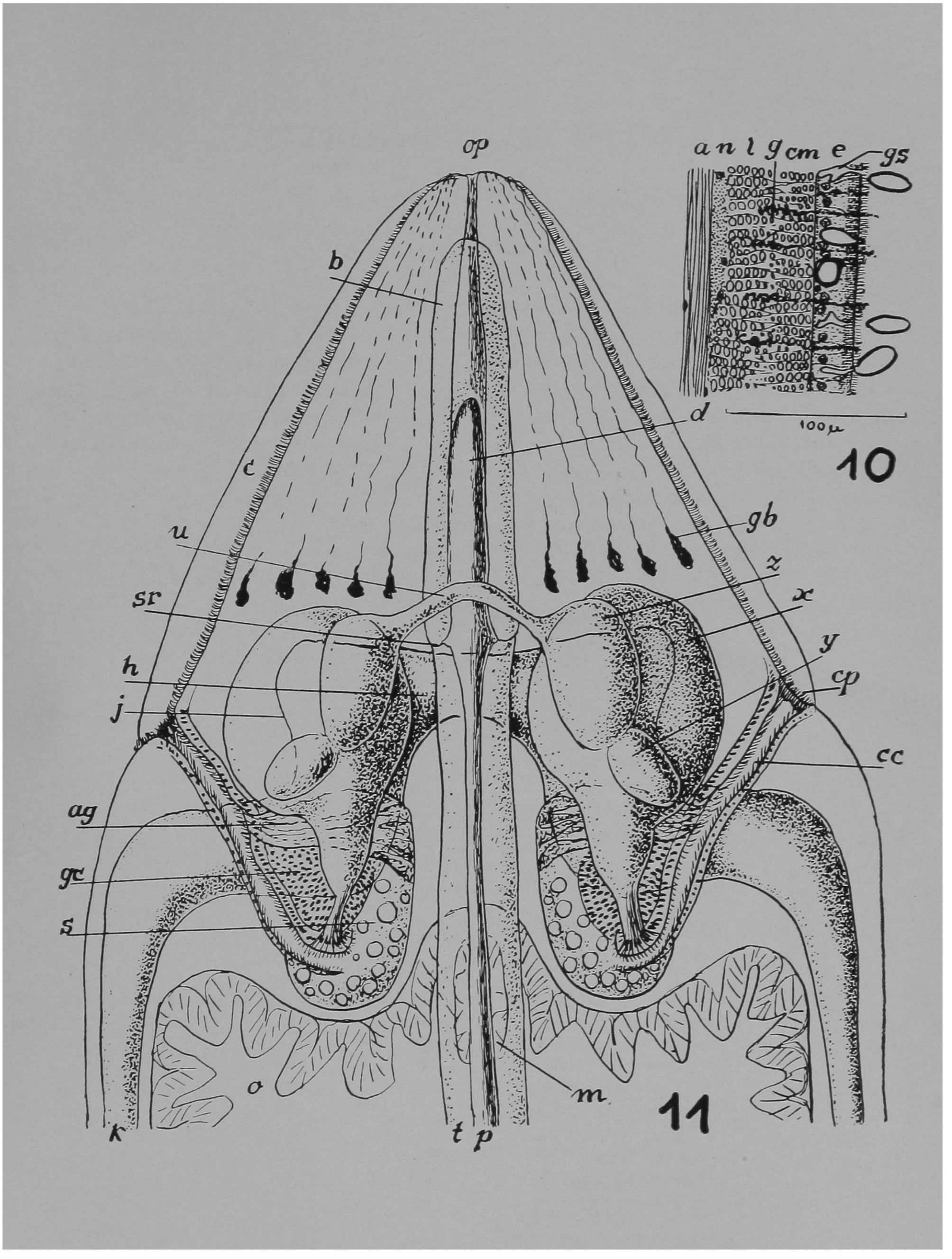
PLATE III

Siolineus turbidus, g. n., sp. n.

Fig. 10 — Body-wall in transverse section.

Fig. 11 — Organisation of the anterior part of the head in dorsal view.



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