

Polyclad turbellarians recorded from African waters

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CONTENTS

Synopsis	47
Introduction	47
Systematic section	48
Key to suborders of Polycladida	48
Suborder Acotylea	48
Key to acotylean superfamilies	48
Superfamily Stylochoidea: key to families from African waters	48
Family Polyposthiidae	48
Family Discocelididae	49
Family Stylochidae	51
Family Latocestidae	55
Family Cryptocelididae	57
Superfamily Planoceroidea: key to families from African waters	59
Family Leptoplanidae	59
Subfamily Leptoplaninae	59
Subfamily Stylochoplaninae	62
Family Gnesiocerotidae	68
Family Planoceridae	70
Family Callioplanidae	72
Superfamily Cestoplanoidea: key to families from African waters	73
Family Cestoplanidae	73
Family Emprosthopharyngidae	74
Suborder Cotylea	74
Key to cotylean families from African waters	74
Family Boniniidae	74
Family Anonymidae	75
Family Pericelididae	75
Family Opisthogeniidae	75
Family Pseudocerotidae	75
Family Euryleptidae	91
Family Prosthiostomidae	93
Glossary	94
References	95

SYNOPSIS. This work lists species of polyclad turbellarians reported from African waters since 1826. Ninety-seven species have hitherto been recorded, but only 16 of them were noted during the nineteenth century. As the result of the present writer's studies, the number is now increased to 142, which includes 6 new genera and 29 new species. The new material came from South Africa, Inhaca Island and the Comoro Islands in the Mozambique Channel, the Red Sea and the Gulf of Aqaba, Morocco and West Africa. Included in this work are differential keys to families, genera and species, as well as diagnoses of species of the leptoplanid genera *Stylochoplana* and *Notoplana*. The problem of speciation within the genus *Pseudoceros* is discussed.

INTRODUCTION

Polyclad turbellarians occurring along the African coasts have been little explored. Known studies have provided information on specimens from the Red Sea, South Africa and isolated localities on the coasts of Angola, Senegal, Ghana,

Sierra Leone, Mauritania and Morocco. Unfortunately, the descriptions of several species published during the nineteenth century are unrecognizable, in fact, only 6 of the 15 or so species reported are now recognizable with any degree of certainty.

Material available to the writer was obtained from Inhaca I., Mozambique, by Dr Vivien Gabie, formerly of the Witwatersrand University, Johannesburg, from the Comoro

Is in the northern region of the Mozambique Channel by Dr P. Bouchet of the Museum National d'Histoire Naturelle, Paris, from South Africa by Professor John H. Day and students of Cape Town University during ecological surveys along the South African coast, from Morocco by Dr Ghazi Bitar formerly of the Rabat Institute and from collectors who have from time to time sent specimens to the British Museum (Natural History) for identification. Dr Gabie's material also includes a number of water-coloured paintings of living worms and that of Dr Bouchet some colour-transparencies again of living specimens.

It should be mentioned that the Inhaca collection was originally submitted to the late Dr Libbie H. Hyman in 1959 for examination. After recognizing *Stylochoplana inquilina* and *Pseudoceros bedfordi*, Miss Hyman appears to have felt unable, because of ill-health, to continue with her study and returned the collection to Dr Gabie in 1967 with the suggestion that the present writer might be willing to undertake its examination. All specimens have been studied, firstly, as whole mounts cleared in methyl salicylate and, secondly, in some instances, as longitudinal serial sections of the copulatory organs. The specimens, water-coloured paintings and the colour-transparencies have been incorporated into the helminthological collections of the British Museum (Natural History). The registration numbers of type-material are given below.

In view of an entirely new classification of the Polycladida recently proposed by Faubel (1983, 1984) it needs to be mentioned that the classification here used is that erected by Lang (1884) and later modified by Bock (1913), Bresslau (1928-30), Hyman (1951), Marcus and Marcus (1968) and Prudhoe (1985). Faubel's classification is based on the presence or absence of a prostatic vesicle and, when present, its structure and its relationship with the ejaculatory duct. In the present writer's experience, when the male phase of the worm reaches its peak a prostate is invariably present, in one form or other, varying from a muscular vesicle to a mere gathering of prostate gland-cells investing or lining a portion of the ejaculatory duct (*sensu lato*). The male copulatory complex often undergoes much structural change during its development, so that a complex in a young, but not sexually functional, adult may appear different in the fully functional complex.

Unfortunately, Dr Faubel's work contains a number of inaccuracies among his family and generic definitions. He also seems to have been unaware of the existence of the International Code of Zoological Nomenclature, which, if applied, would assign several of his new generic names to synonymy.

Finally, the writer is most grateful to Mr David Cooper of the histology section of the British Museum (Natural History) for preparing excellent serial sections of several worms included in this investigation.

SYSTEMATIC SECTION

Order **POLYCLADIDA** Lang, 1884, emend. Gamble, 1893

Key to suborders of Polycladida recorded from African waters

- 1 Usually with ventral sucker, adhesive pad or depression posterior to female genital pore; tentacles, when present, antero-marginal (except *Opisthogenia*) **COTYLEA**
- 2 Without ventral adhesive structure posterior to female pore; tentacles, when present, nuchal . . . **ACOTYLEA**

Suborder **ACOTYLEA** Lang, 1884

DIAGNOSTIC FEATURES. Forms without adhesive structure posterior to female genital pore (except some species of *Cestoplanea*). Eyes distributed fanwise over cephalic region, or in tentacular and cerebral clusters, sometimes also in marginal or submarginal bands. Pharynx ruffled. Copulatory complexes posterior to pharynx. Male complex tends to be directed anteriorly from male pore. Vagina often forms loop anteriorly to female pore; uterine canals directed anteriorly on leaving vagina.

Key to acotylean superfamilies

- 1 Eyes in marginal zones of body; eyes very rarely absent **Stylochoidea**
- 2 Eyes anteriorly distributed fanwise from cerebral organ only to submarginal zones of body **Cestoplanoidea**
- 3 Eyes only in region of cerebral organ **Planoceroidea**

Superfamily **STYLOCHOIDEA** Poche, 1926, emend. Nicoll, 1936

DIAGNOSTIC FEATURES. With marginal eyes and eyes variably distributed over cephalic region; eyes very occasionally absent.

Key to stylochoid families from African waters

- | | | |
|----|--|------------------------|
| 1 | Male copulatory complex with prostatoids | 2 |
| 1' | Without prostatoids | 3 |
| 2 | Prostatoids opening into male antrum; Lang's vesicle U-shaped | Discocelididae |
| 2' | Prostatoids opening on ventral surface of body; Lang's vesicle sacciform | Polyposthiidae |
| 3 | Prostate interpolated | Cryptocelididae |
| 3' | Prostate independent | 4 |
| 4 | Eyes include tentacular and cerebral clusters | Stylochidae |
| 4' | Eyes spreading fanwise from cerebral organ; no tentacular or cerebral clusters | Latocestidae |

Family **POLYPOSTHIIDAE** Bergendal, 1893, emend. Bock, 1913

DIAGNOSTIC FEATURES. Fleshy, oval forms tapering somewhat anteriorly. Eyes occasionally absent. Mouth central; pharynx in mid-third of body; intestinal branches not anastomosing. Male copulatory complex without seminal vesicle or spermiducal bulbs; vasa deferentia well developed, lateral to uterine canals; many pyriform prostatoids variably distributed. Female genital pore anterior or posterior to male pore. Female copulatory complex simple; Lang's vesicle sacciform.

Key to polyposthiid genera from African waters

- 1 Eyes absent. Ventral epidermal cushion posterior to female pore *Polyphalloplana*
 1' Eyes present. No ventral epidermal pad ... *Cryptocelides*

Genus *CRYPTOCELIDES* Bergendal, 1890

DIAGNOSTIC FEATURES. Numerous eyes along anterior margin of body; isolated frontal eyes; two elongate clusters of cerebral eyes, postero-laterally to which lies a pair of tentacular eye-clusters. Male genital pore posterior to female. No prostate; 2 to 8 unarmed prostatoids in rosette around wide male antrum into which they open; vasa deferentia open into anterior prostatoid. Many smaller prostatoids posterior to male pore and opening independently on ventral surface of body. Vagina thrown into anteriorly-directed loop.

***Cryptocelides loveni* Bergendal, 1890**

LOCALITY. On sand and rock at 40 to 133 metres, off Atlantic coast of Morocco, July, 1924 (de Beauchamp, 1951b).

FURTHER DISTRIBUTION. Scandinavian waters (Bock, 1913), North Sea and possibly southern Australia (Laidlaw, 1904).

DESCRIPTION. Bock, 1913: 100.

Genus *POLYPHALLOPLANA* Bock, in de Beauchamp, 1951

DIAGNOSTIC FEATURES. Without eyes. Male copulatory complex with several unarmed pyriform prostatoids in rounded group, and opening ventrally through an ovoid epidermal pad lying posteriorly to female genital pore; no prostate. Female copulatory complex between pharynx and male complex.

***Polyphalloplana bocki* de Beauchamp, 1951**

LOCALITY. 85 metres, off coast of Morocco.

DESCRIPTION. de Beauchamp, 1951b: 239.

Family DISCOCELIDIDAE Laidlaw, 1903, emend. Poche, 1926

DIAGNOSTIC FEATURES. Oval forms without tentacles. Marginal eyes in band of variable extent; two elongate clusters of cerebral eyes lateral to, or merging with, tentacular eye-clusters. Pharynx in mid-third of body; intestinal branches not anastomosing. Common genital atrium may occur; male copulatory complex immediately posterior to pharynx. Vasa deferentia forming a loop posteriorly to female copulatory complex; seminal vesicle feebly developed or not apparent; prostate, when evident, interpolated; penis-papilla variably developed. Many unarmed prostatoids embedded in very thick musculature investing male antrum, into which they open. Vagina long; Lang's vesicle present; uterine canals anteriorly separated.

Key to discocelidid genera from African waters

- 1 With two external openings to female copulatory complex *Tetratrema*

- 1' With single female opening in genital atrium 2
 2 One seminal canal opening into genital atrium *Discocelis*
 2' Two seminal canals opening into genital atrium *Paradiscocelis*

Genus *DISCOCELIS* Ehrenberg, 1836, *sensu* Lang (1884)

DIAGNOSTIC FEATURES. Marginal eyes in anterior third of body. One or two genital pores. Feebly-developed seminal vesicle; ejaculatory duct passes through thick muscular wall of genital atrium, into which it opens; without prostatic vesicle; numerous prostatoids embedded in thick dorsal wall of atrium. Vagina extends dorso-posteriorly from its aperture; Lang's vesicle horseshoe-shaped.

***Discocelis tigrina* (Blanchard, 1847) Lang, 1884**

Polycelis tigrina Blanchard, 1847

Leptoplana tigrina (Blanchard) Diesing, 1850

Elasmodes tigrinus (Blanchard) Stimpson, 1857

LOCALITY. Port Etienne, Mauritania, 9 Nov., 1935 (Palombi, 1939b). Also recorded from Mediterranean Sea (Lang, 1884).

DESCRIPTION. Lang, 1884: 467.

Genus *PARADISCOCELIS* gen. nov.

DEFINITION. Discocelididae. Body elongate oval. Marginal eyes confined to anterior third of body; additional eyes in two elongate clusters in cerebral region. Male and female ducts open into genital atrium. Male copulatory complex enclosed in a muscular mass; vasa deferentia unite to form a vesicle lined with a glandular epithelium and giving rise to two sperm-canals opening separately into genital atrium. Pair of large fusiform glandular organs lie in anterior wall of muscular mass and a similar pair in posterior wall, with several small prostatoids lying between the two pairs. Vagina directed posteriorly from genital atrium; Lang's vesicle horseshoe-shaped.

TYPE-SPECIES. *Paradiscocelis furcata* sp. nov.

***Paradiscocelis furcata* sp. nov.**

TYPE-LOCALITY. Inhaca Island, Mozambique (among *Favia* weed and on flats opposite Marine Biol. Stat.—V. Gabie leg.). B.M. reg.nos: Holotype 1985.7.3.3; Paratypes 1985.7.3.4–7.

DESCRIPTION (Fig. 1). None of the available specimens is fully mature. Body 16–27 mm in length and up to 7 mm in width. According to a water-coloured painting, the dorsal surface in life is pale brown, with underlying intestinal branches showing as dark brown transverse streaks. Very small eyes arranged in two or three irregular rows along anterior margin of body, gradually diminishing to a single row as they extend posteriorly to about level of cerebral organ or a little beyond. Laterally to the cerebral organ, further eyes lie in two elongate clusters with 75 to 90 eyes in each cluster, in which tentacular eyes are the larger and lie nearer to the dorsal surface of the body, somewhat laterally in posterior half of each cluster. Mouth opens into hind region of pharyngeal

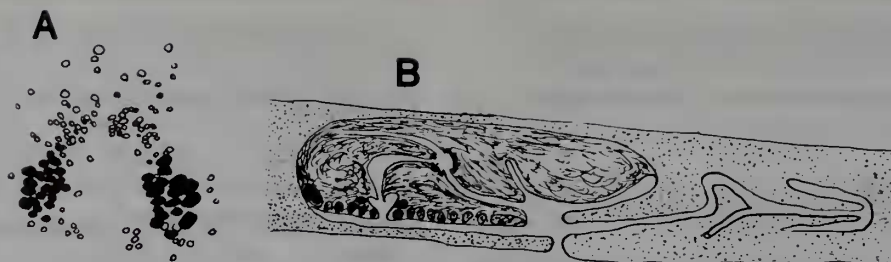


Fig.1 *Paradiscocelis furcata*: A, arrangement of eyes anteriorly; B, sagittal section of copulatory organs.

chamber; pharynx with several pairs of shallow lateral folds lying in mid-third of body.

Common genital pore lies shortly posterior to pharynx and leads into a spacious genital atrium containing openings of male and female ducts. Male complex not yet fully mature, so only a partially-developed structure can be described. The male copulatory complex is invested with a very thick mass of muscle-fibres. An ejaculatory duct appears in the antero-dorsal region of this musculature and is lined with a ciliated epithelium, but it is not possible to determine whether a seminal vesicle will be formed later. In the middle of the muscular mass, the ejaculatory duct widens into a small vesicle lined with glandular cells, suggesting that the vesicle might later function as a prostate. This vesicle gives off two limbs, one directed anteriorly and the other posteriorly. The anterior limb opens into the anterior region of the genital atrium through a wide depression on the ventral surface of the muscular mass, whereas the posterior limb opens through a thick protuberance into the atrium near the genital pore. At each end of the muscular mass lies a pair of relatively large fusiform glandular organs, and between the two pairs a number of pyriform prostatoids lie beneath the surface of the mass and open into the atrium. The latter is wide, but much compressed dorso-ventrally. No penis-papilla has been made out.

From the hind wall of the genital atrium, the vagina extends posteriorly and terminates in a crescentic Lang's vesicle with anteriorly-directed limbs. The vagina has not yet developed a 'shell'-chamber, but about midway along its length, it receives a common uterine canal.

Genus *TETRATREMA* gen.nov.

DEFINITION. Discocelididae, Body elongate oval. Marginal eyes extend posteriorly to various levels, mainly in anterior half of body. Tentacular and cerebral eyes mingle to form two elongate clusters lateral to cerebral organ. Male and female genital pores well separated, additional female pore adjacent and posterior to male pore. Thick muscular dorsal wall of male antrum forms two large symmetrically-disposed bulbs, between which the ejaculatory duct passes to open into the male antrum; many prostatoids lie beneath surface of each bulb. Posterior region of ejaculatory duct is swollen and lined with a glandular epithelium and probably functions as a prostate. Female antrum short, leads into an elongate anterodorsally directed 'shell'-chamber; Lang's vesicle U-shaped.

TYPE-SPECIES. *Tetratrema bifurcatum* sp.nov.

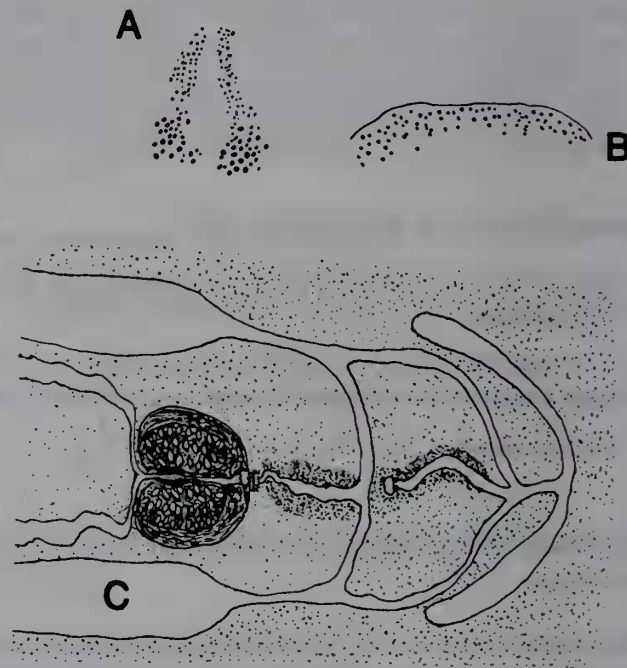


Fig.2 *Tetratrema bifurcatum*: A, tentacular and cerebral eye-clusters; B, anterior marginal eyes; C, ventral view of male and female copulatory complexes.

Tetratrema bifurcatum sp.nov.

TYPE-LOCALITY. Ishmalia, Red Sea (A.El-Ghamery leg.)
B.M.reg.nos: Holotype 1985.6. 11.1; Paratypes 1985.6.11. 2-5.

DESCRIPTION (Fig.2). Of the specimens available, only one appears to be fully developed and measures 22 mm in length and 14 mm in maximum width. The other specimens are smaller and have reached varying degrees of development; the smallest being 15 mm long and 9 mm wide. Dorsal surface of body brownish, darker towards the pharyngeal region, with a reticulum of darker brown, due to ovaries and oviducts lying beneath the body-wall.

Eyes in two elongate clusters alongside the cerebral organ, which lies at about one-sixth of the body-length from the anterior margin. Each cluster contains cerebral and tentacular eyes; latter darker and larger than former and placed in hind region of each cluster. The two clusters may be distinctly separated or anteriorly confluent. Marginal eyes extend posteriorly to different levels according to size of body; in smallest specimen to level with tentacular eyes, in largest to hind level of pharynx. Pharynx with several pairs of lateral folds and about half as long as body. It extends posteriorly from near cerebral organ to immediately anterior to male copulatory complex. Mouth opens into posterior region of

pharyngeal chamber. Intestinal trunk long, extending anteriorly and posteriorly beyond pharynx; it has several pairs of lateral branches.

Testes ventral, ovaries dorsal, to intestinal branches. Vasa deferentia appear to arise laterally to mid-level of pharynx and ventrally to uterine canals. They extend posteriorly to beyond the female copulatory complex, where both limbs turn inwardly to unite in the median line to form a posterior loop. At a level between the pharynx and the male copulatory complex, each vas deferens gives off an inner branch. These branches unite in the median line to form a short ejaculatory duct, the distal region of which is somewhat swollen, lined with a glandular epithelium, and possibly functions as a prostate. Dorsal wall of male antrum strongly muscular and appears as two large symmetrically-arranged bulbs. The ejaculatory duct passes between these bulbs to open into the middle of the male antrum. Beneath the ventral surface of each bulb lie numerous small pyriform prostatoids opening into the male antrum.

There are two female genital pores. The main pore lies at about 1 mm posteriorly to the male. It opens into a short antrum leading to an elongate 'shell'-chamber extending posteriorly for a short distance, then bending antero-dorsally to join the vagina interna lined with a tall glandular epithelium. After receiving the common uterine canal, the vagina interna continues posteriorly to open into the base of a U-shaped Lang's vesicle, limbs of which are anteriorly directed.

This new form also possesses an accessory female copulatory complex opening to the exterior immediately posterior to the male pore. The aperture of the accessory complex leads into a shallow antrum from which a relatively wide convoluted canal runs postero-dorsally. The inner two-thirds of this canal is coated with a thick layer of eosinophilic gland-cells resembling 'shell'-glands. The inner end of the canal bifurcates into two laterally-directed branches, each opening into its nearest uterine canal. This accessory complex is confined to the region between the male and female genital pores. The uterine canals extend anteriorly to the ocular region where they remain separated.

NOTE. Again, here is an instance among discocelidid poly-clads of where a portion of the ejaculatory duct is swollen and lined with gland-cells, suggesting the existence of a prostate, an organ perhaps appearing late in the development of the male complex.

Family *STYLOCHIDAE* Stimpson, 1857

DIAGNOSTIC FEATURES. Fleshy forms of varying shape and size. Nuchal tentacles in varying degrees of development usually present. Marginal eyes small; many eyes spread over cephalic region, disposed in tentacular and cerebral clusters and sometimes in frontal or cerebro-frontal groups. Pharynx more or less in mid-third of body. Male and female genital pores in posterior third of body. Male copulatory complex usually anterior to male pore; seminal vesicle and/or pair of spermiducal bulbs more or less ventral to independent prostate; penis-papilla elongate or bluntly conical. Vagina often forming an anteriorly-directed loop; its end may function as a genito-intestinal canal, a ductus vaginalis, Lang's vesicle, or fuse with uterine canals.

Key to stylochid genera from African waters

- | | | |
|----|--|-----------------------|
| 1 | Uterine canals open into proximal end of vagina | |
| | | <i>Stylochus</i> |
| 1' | Vagina extending posteriorly beyond entrance of uterine canals | 2 |
| 2 | Vagina with ductus vaginalis | <i>Cryptophallus</i> |
| 2' | Vagina terminating in Lang's vesicle | 3 |
| 3 | With spermiducal bulbs | <i>Ancoratheca</i> |
| 3' | Without spermiducal bulbs | 4 |
| 4 | Seminal vesicle ventral to prostate | <i>Leptostylochus</i> |
| 4' | Seminal vesicle dorsal to prostate | <i>Pseudidioplana</i> |

Genus *STYLOCHUS* Ehrenberg, 1836

DIAGNOSTIC FEATURES. Oval or somewhat discoid forms with retractile tentacles. Marginal eyes in band of variable extent; cerebral eyes in a single row or two distinct clusters; tentacular eyes within or below tentacles, frontal eyes often present. Pharynx relatively long, centrally or posteriorly placed. Genital pores approximate, near posterior end of body. Seminal vesicle simple, bipartite or tripartite; prostate large and muscular, lined with tall epithelium thrown into longitudinal, diagonal or radial folds; unarmed penis-papilla stoutly conical, without penis-sheath. Vagina crozier-like or sigmoid in lateral view; 'shell'-chamber with lining often thrown into a spiral fold of four or five turns.

NOTE. In a review of *Stylochus*, du B.-R. Marcus and Marcus (1968) divided the genus into two subgenera: *Stylochus* (*Stylochus*) for species with an entire or undivided seminal vesicle, and *Stylochus* (*Imogine*) for species in which the vesicle and a pair of spermiducal bulbs unite to form a trilobed anchor-shaped structure, regarded as a seminal vesicle. This division of the genus has been generally accepted. As mentioned below, the genus *Distylochus* Faubel, 1983, appears to fall between the subgenera *S.* (*Stylochus*) and *S.* (*Imogine*), thus it is here considered as a subgenus of *Stylochus*.

Key to subgenera of the genus *Stylochus*

- | | | |
|----|--------------------------------------|------------------------|
| 1 | Seminal vesicle simple | (<i>Stylochus</i>) |
| 1' | Seminal vesicle bipartite | (<i>Distylochus</i>) |
| 1' | Seminal vesicle tripartite | (<i>Imogine</i>) |

From available evidence, the structure of the copulatory complexes among species in each subgenus is so uniform that it is rarely possible to separate one species from another on this basis. At present, it seems that the disposition of the cerebral and tentacular eye-clusters, and perhaps the coloration of the tentacles, are means of differentiating species. There seem also to be features in the male complex that require the study of several specimens of a species. Firstly, the size of the seminal vesicle and its comparison with that of the prostate, and the length of the ejaculatory duct in fully mature worms. Secondly, early in its development, the prostate is so packed with a glandular epithelial lining that a lumen is not apparent, but as the organ becomes larger, so a lumen appears and the lining is thrown into folds disposed in a longitudinal, a diagonal or a radial direction. It remains, however, to be seen whether the direction of the folds is constant within a given species. From a comparison of figures of *Stylochus* (*Imogine*) *alexandrinus* given by Steinböck (1937) and by Galleni (1976) it would appear that this is not so.

Because of the uncertainty concerning speciation in the genus *Stylochus*, the following key to species is somewhat artificial, as emphasis has been placed on features which may not be constant among individuals of a species.

Key to species of *Stylochus* (*Stylochus*) from African waters

- | | | | |
|----|---|----------------------|---|
| 1 | Vasa deferentia enter seminal vesicle by a common canal | <i>alexandrinus</i> | |
| 1' | Vasa deferentia open separately into seminal vesicle | | 2 |
| 2 | Ejaculatory duct very short | <i>suesensis</i> | |
| 2' | Ejaculatory duct long | | 3 |
| 3 | Dark ring round base of each tentacle | <i>meixneri</i> | |
| 3' | Tentacles without dark ring | | 4 |
| 4 | Frontal eyes present | <i>sixteni</i> | |
| 4' | Frontal eyes absent | | 5 |
| 5 | Prostate oval; epithelial folds radial | | 6 |
| 5' | Prostate pyriform or conical; epithelial folds directed posteriorly | | 8 |
| 6 | Marginal eyes round body | <i>castaneus</i> | |
| 6' | Marginal eyes only in anterior third of body | | 7 |
| 7 | Dorsal surface of body salmon-coloured | <i>salmoneus</i> | |
| 7' | Dorsal surface of body light grey with reddish spots | <i>djiboutiensis</i> | |
| 8 | Cerebral eyes present | <i>neapolitanus</i> | |
| 8' | Cerebral eyes said to be absent | <i>zanzibaricus</i> | |

Stylochus (*Stylochus*) *suesensis* Ehrenberg, 1831

Planocera suedensis Örsted, 1844

Localities. Red Sea (Ehrenberg, 1831); Suez Canal and Gulf of Suez (Palombi, 1928).

Descriptions: Ehrenberg, 1831:36; Palombi, 1928: 582.

Stylochus (*Stylochus*) *alexandrinus* Steinböck, 1937

LOCALITIES. eastern harbour, Alexandria, Egypt (Steinböck); Tuscany coast of Italy (Galleni, 1976); Ocean, Morocco (G. Bitar leg.).

DESCRIPTIONS. Steinböck, 1937:1; Galleni, 1976:15.

Stylochus (*Stylochus*) *castaneus* Palombi, 1939

Stylochus neapolitanus of Laidlaw, 1906.

LOCALITIES. Cape Verde Is (Laidlaw, 1906); 14°40'N., 16°15'W., near Rufisque, Senegal (Palombi).

DESCRIPTIONS. Laidlaw, 1906:707; Palombi, 1939b:95.

Stylochus (*Stylochus*) *djiboutiensis* Meixner, 1907

LOCALITY. Gulf of Tadjourrah, Djibouti (Meixner).

DESCRIPTION. Meixner, 1907: 419.

Stylochus (*Stylochus*) *meixneri* Böck, 1925

Stylochus reticulatus (Stimpson, 1855) Meixner, 1907

Stylochus cosieriensis Böck, 1925 (= *reticulatus* Meixner of Meyer, 1922)

LOCALITIES. Grand Reef, Musha I., Gulf of Tadjourrah, Djibouti (Meixner); Kossier, Red Sea (Meyer).

DESCRIPTIONS. Meixner, 1907: 435; Meyer, 1922: 145.

NOTE. As *S. meixneri* and *S. cosieriensis* appear to be morphologically identical, and each bears a dark ring round the base of each tentacle, the species are here considered to be synonymous.

Stylochus (*Stylochus*) *neapolitanus* (delle Chiaje, 1841) Lang, 1884

Planaria neapolitana delle Chiaje, 1841

LOCALITIES. Cape Verde Is (Laidlaw, 1906:707).

DESCRIPTIONS. Lang, 1884: 447; Meixner, 1907: 422.

NOTE. Laidlaw (1906) provisionally assigned a specimen from the Cape Verde Is to this species, but Palombi (1939) considered this specimen to belong to *Stylochus castaneus*.

Stylochus (*Stylochus*) *salmoneus* Meixner, 1907

LOCALITY. Penguin Reef, Gulf of Tadjourrah, Djibouti (Meixner).

DESCRIPTION. Meixner, 1907: 420.

Stylochus (*Stylochus*) *sixteni* Marcus, 1947

Stylochus crassus Böck, 1931, nec Verrill, 1892

LOCALITY. Scraped from ship at 30°S., 15°W. It was thought not improbable that the worm became attached to the ship during its stay in the Cape Verde Is (Böck).

DESCRIPTION. Böck, 1931: 263.

Stylochus (*Stylochus*) *zanzibaricus* Laidlaw, 1903

LOCALITIES. Zanzibar (Laidlaw); suspected predator of barnacles in New Zealand (Skerman, 1968).

DESCRIPTIONS. Laidlaw, 1930a: 105; Meixner, 1907: 425.

NOTE. Both Laidlaw and Meixner express doubt as to this species being distinct from *Stylochus* (*S.*) *neapolitanus*. Laidlaw also states that he did not find 'any definite groups of brain-eyes'.

Key to *Stylochus* (*Imogine*) species from African waters

- | | | | |
|----|--|----------------------|---|
| 1 | Seminal vesicle feebly developed; without penis-papilla (?) | <i>minimus</i> | |
| 1' | Seminal vesicle strongly developed; penis-papilla distinct | | 2 |
| 2 | Cerebral eyes almost entirely posterior to level of tentacles | <i>meridianus</i> | |
| 2' | Cerebral eyes equally distant anteriorly and posteriorly to level of tentacles | | 3 |
| 3 | Dorsal surface of body greenish yellow; uterine canals branched | <i>orientalis</i> | |
| 3' | Dorsal surface whitish, speckled with dark brown; uterine canals not branched | <i>mediterraneus</i> | |

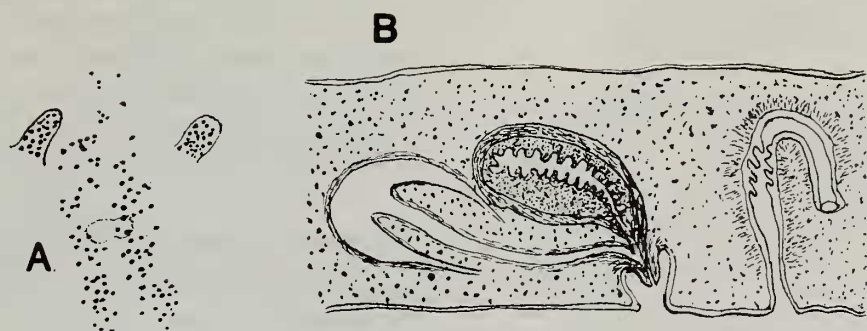


Fig. 3 *Stylochus (Imogine) meridianus*: A, arrangement of tentacular and cerebral eye-clusters; B, sagittal section of copulatory complexes.

Stylochus (Imogine) minimus Palombi, 1940

LOCALITY. Loango, French Equatorial Africa (Congo), June, 1938 (Palombi).

DESCRIPTION. Palombi, 1940: 111 (only specimen available appears to be not fully developed).

Stylochus (Imogine) mediterraneus Galleni, 1976

LOCALITIES. Temara and Ocean, Morocco (G. Bitar *leg.*) Also known from the Tuscan coast of Italy (Galleni).

DESCRIPTION. Galleni, 1976: 15.

Stylochus (Imogine) orientalis Böck, 1913

LOCALITIES. Vicinity of Marine Biol. Stat., Inhaca I., Mozambique (V. Gabie *leg.*) and Eylath, Gulf of Aqaba, Red Sea (H. Steinitz *leg.*). Widely distributed in Indo-West Pacific region, having been recorded from the Gulf of Siam, Formosa Canal and Western Australia (Böck).

DESCRIPTION. Böck, 1913: 128.

Stylochus (Imogine) meridianus sp. nov.

Stylochus sp. Day, Field & Penrith, 1970

LOCALITIES. South Africa. Type-specimen from 12–14 metres, Roman Rock, False Bay, 23.9.1954 (reg.no. 1987.3.31.1); paratypes from Langebaan, Saldanha Bay (reg.no. 1987.3.31.2–8). *False Bay*: among rocks in 14–17 m, S. of Kogel Bay, 19.8.52; on vertical rock in 4–6 m below LWST; intertidal, in sandy mud, Knysna Estuary, 18.7.47. *Saldanha Bay*: intertidal, Lynch Point, 22.9.57; on fine khaki sand in 22 m, 33°02'S., 17°57.4'E., 25.4.62; in mud on *Zostera* bed at Oesterval, Langebaan, 3.5.61; on mud, Langebaan, 28.4.49. *Durban Bay*: scraped from buoy at junction of Maydon and Congella Channels, 24.4.54.

DESCRIPTION. (Fig. 3). Body broadly oval in outline, measuring up to 12 mm in length and 10 mm in width, or more or less discoid 8–10 mm in diameter. Dorsally, the living worm is brownish or brownish with dark speckles, but one specimen had 'abundant dorsal coloration (black)'. 20 to 60 eyes lie within and at the base of each well-developed tentacle; cerebral eyes arranged in two elongate clusters often posteriorly confluent, mainly posterior to level of tentacles; marginal eyes around body, disposed in a band of four or five irregular

rows anteriorly, decreasing to a single, double or triple row along the posterior margin. Cerebral organ distinctly posterior to level of tentacles.

As in most other species of *Stylochus*, the ventral subepidermal musculature is about three times deeper than that of the dorsal, owing to a very thick layer of longitudinal muscles.

Mouth centrally placed; pharynx with about 7 pairs of lateral folds in mid-third of body. In preserved specimens, the male copulatory complex may be well separated from the pharynx. Testes ventral, ovaries dorsal, but in the region of the copulatory organs they tend to mingle with each other.

Trilobed or anchor-shaped seminal vesicle well developed, lying anteriorly to the prostate; median lobe of vesicle is narrowest and soon becomes the ejaculatory duct. Prostate oval, with a thick muscular wall through which pass efferent ducts of extracapsular gland-cells opening into its lumen; its epithelial lining is thrown into several radial folds, leaving a narrow lumen. Penis-papilla broadly conical. The vagina has a crozier-like outline in lateral view, with a short female antrum and a well-developed 'shell'-chamber for much of its length. Part of the lining of the 'shell'-chamber, when fully developed, is thrown into a spiral fold of three or four turns. When the female complex is fully developed, a system of branching uterine canals may be apparent in whole specimens cleared in methyl salicylate and depicted by Böck (1913) in *Stylochus orientalis*. However, before the branching system appears, the usual two canals extend anteriorly where they remain separated.

Genus *STYLOCHUS* Subgenus (*DISTYLOCHUS* Faubel, 1983)

As mentioned above, du Bois-Reymond Marcus and Marcus (1968) divided the genus *Stylochus (sensu lato)* into two subgenera: *S. (Stylochus)* for those species with an undivided seminal vesicle; and *S. (Imogine)* for those species with a muscular trilobed vesicle. This subgeneric division was accepted by Faubel (1983), but for species with a bilobed seminal vesicle constricted into a muscular distal chamber and a non-muscular proximal chamber he erected a new genus *Distylochus*, with *Stylochus pusillus* as its type-species. Since *Distylochus* clearly falls between the two above-mentioned subgenera, the genus is here relegated to subgeneric rank with *Stylochus (Distylochus)* containing *S. (D.) pusillus* Böck, 1913, *S. (D.) martaë* Marcus, 1947, and *S. (D.) isifer* du Bois-Reymond Marcus, 1955.



Fig.4 *Stylochus (Distylochus) martae*, anterior region of body.

***Stylochus (Distylochus) martae* Marcus, 1947**

NOTE (Fig.4). Two specimens available agree very well with the single specimen described by Marcus (1947), except in the number of cerebral eyes which vary from 4 to 9 in each row.

LOCALITY. Kisny dockyard, Freetown, Sierra Leone, July 1976. Also known from Praia da Enseada, Ilha de Sto. Amaro, 15 km southeast of Santos, Brazil.

***Stylochus* (s.l.) sp.innom.**

Stylochus suesensis Ehrenberg of Laidlaw, 1903a

LOCALITY. Ras Oswemba, Zanzibar (Laidlaw, 1903a).

NOTE. Laidlaw's description is inadequate and Palombi (1928) implied that Laidlaw's specimen is not comparable with *Stylochus suesensis* because its marginal eyes are in a continuous series round the body, whereas in Ehrenberg's species they are not. At present it seems reasonable to accept Palombi's opinion as some of his specimens were collected in the Gulf of Suez and Ehrenberg's specimen came from the Red Sea.

***Stylochus* (s.l.) sp.innom.**

Stylochus neapolitanus (Delle Chiaje) Laidlaw, 1906

LOCALITY. on lighters, in crevices of compound ascidians or in empty lamellibranch shells, Cape Verde Is, North Atlantic (Laidlaw, 1906).

NOTE. No details of the copulatory organs were given by Laidlaw, who said 'I have some doubts as to whether this species is really identical with the Mediterranean *S. neapolitanus*.' Palombi (1939b), however, considered Laidlaw's specimens to be *Stylochus castaneus*. There is nevertheless, one feature in the Cape Verde specimens which may distinguish them from both *S. neapolitanus* and *S. castaneus*, namely, the tentacles, which are dark grey in contrast to the colour of the dorsal surface of the body. In *S. neapolitanus* each tentacle is ringed with a band of vermillion, and the tentacles of *S. castaneus* are of a chestnut colour. Therefore, it seems advisable to regard Laidlaw's form as an indeterminate species of *Stylochus*, until more specimens from Cape Verde Is become available for study.

Genus *ANCORATHECA* Prudhoe, 1982

DIAGNOSTIC FEATURES. Body oval. Marginal eyes in band of variable extent; cerebro-frontal eyes widely distributed;

tentacular eyes in two small clusters among c.f. eyes. Pharynx in mid-third of body. Genital pores near posterior end of body. Seminal vesicle trilobed or anchor-shaped; prostate well developed, elongate, with smooth shallow epithelial lining; penis-papilla with stylet in penis-pocket with shallow penis-sheath. Vagina forming a loop, ending in Lang's vesicle which may open on ventral surface of body.

***Ancoratheca pacifica* (Böck, 1923) Prudhoe, 1982**

Neostylochus pacificus Böck, 1923

Neostylochus sp.nov. Day, Field & Penrith, 1970

Localities: Cape Province, South Africa (Saldanha Bay, Port Elizabeth, common in False Bay). Also known from Juan Fernandez Is, off coast of Chile, South America (Böck, 1923)

DESCRIPTION. Böck, 1923:342.

NOTE. (Fig.5). The South African specimens agree very well with Böck's description. The many specimens available are in various stages of development and one noticeable feature is the presence of two groups of tentacular eyes enclosed by numerous cerebro-frontal eyes in mature specimens, and the absence of such eyes in immature worms, as shown in fig. In young specimens, the cerebro-frontal eyes tend to run in streaks, presumably along nerves radiating from the cerebral organ. Usually, the genital pores are placed very close to one another, but in some specimens the tissue around them is so contracted as to form a deep depression on the ventral surface of the body to give the appearance of the male and female ducts opening into an antrum.

Genus *CRYPTOPHALLUS* Böck, 1913

DIAGNOSTIC FEATURES. Broadly-oval fleshy forms with shallow tentacles containing eyes. Marginal eyes extend round body; cerebral eyes in one or two elongate groups merging with frontal eyes. Pharynx long. Genital pores widely separated. Male copulatory complex relatively small; spermiducal bulbs pyriform or elongate; no seminal vesicle; small pyriform prostate disposed vertically to male pore and posteriorly to spermiducal bulbs, epithelial lining shallow and slightly ridged; ejaculatory duct short; conical penis-papilla short, thick, without penis-sheath. Vagina thrown into anteriorly-directed loop; ductus vaginalis opening into female antrum.

***Cryptophallus wahlbergi* Böck, 1913**

Cryptophallus aegyptiacus Melouk, 1940

LOCALITIES. Umtwalumi, Natal, South Africa, 27.12.1938 (Day colln.). Port Natal, Durban, S. Africa (Böck); El Ataka, Gulf of Suez and Ghardaga, Red Sea (Melouk).

DESCRIPTION. Böck, 1913: 120; Melouk, 1940:125.

NOTE. The male complex, as figured by Melouk, appears to be partially everted, thus showing the prostatic duct and the ejaculatory duct to open to the exterior independently of each other. When compared with other species of *Cryptophallus*, there seems to be very little doubt that the condition figured has been brought about by contraction of the body at fixation, and that *C. aegyptiacus* is otherwise comparable with *C. wahlbergi*.



Fig.5 *Ancoratheca pacifica*, anterior region of body: A, mature specimen; B, immature specimen.

Genus *LEPTOSTYLOCHUS* Böck, 1925

DIAGNOSTIC FEATURES. Body oval or elongate. Tentacles weakly developed or apparently absent. Tentacular eyes may merge with cerebral eyes; marginal eyes in anterior half of body. Pharynx in mid-third of body and has several pairs of lateral folds. Genital pores close to each other, situated posteriorly. Spermiducal bulbs present; no seminal vesicle; elongate or pyriform prostate horizontally disposed dorsally to ejaculatory duct; epithelial lining of prostate in radial folds; penis-papilla small, unarmed. Vagina long, thrown into an anteriorly-directed loop; Lang's vesicle bulbous.

Leptostylochus capensis Palombi, 1938

Leptostylochus sp.? Palombi, 1936.

LOCALITIES. Cape Province, South Africa. Still Bay and False Bay (Day colln.); Praekstoel (Palombi, 1936); St. James and Reef Bay, Port Elizabeth (Palombi, 1938); Bat's Cave Rock, East London (Palombi, 1939).

REFERENCES. Palombi, 1938: 334, 1939a: 125.

Genus *PSEUDIDIOPLANA* gen. nov.

DIAGNOSTIC FEATURES. Stylochidae with oval body and conical tentacles containing numerous eyes crowded near apex; several small cerebral eyes scattered between tentacles; marginal eyes in anterior half of body. Pharynx centrally situated. Genital pores close to each other in hind third of body. Thin-walled vasa deferentia open separately into spacious seminal vesicle. Large globular prostate ventral to seminal vesicle and lined with an epithelium thrown into several deep folds mainly diagonally disposed. Ejaculatory duct and prostatic duct at base of unarmed penis-papilla. Lang's vesicle probably horseshoe- or anchor-shaped.

TYPE-SPECIES. *Pseudidioplana palombii* (Faubel, 1983).

Pseudidioplana palombii (Faubel, 1983) nov. comb.

Idioplana australiensis Woodworth of Palombi (1928)

Leptostylochus palombii Faubel, 1983

LOCALITY. Suez (Port Taufig), Egypt (Palombi).

DESCRIPTION. Palombi, 1928: 586.

NOTE. Palombi's specimen appears not to be identical with *Idioplana australiensis* Woodworth, 1898, originally described from the Australian Great Barrier Reef. In fact, as the present writer (1952) points out, it bears a closer morphological resemblance to species of the genus *Idioplanoides* Barbour, 1912, than to those of the genus *Idioplana* Woodworth. Faubel (1983) also considers Palombi's identification to be erroneous and placed *Idioplana australiensis* of Palombi in the genus *Leptostylochus* under a new name *Leptostylochus palombii*. However, Palombi's specimen is certainly not congeneric with the type-species of *Leptostylochus*, *L. elongatus* Böck, 1925, which has a pair of spermiducal bulbs and a prostate lying dorsally to a seminal vesicle, features not found in Palombi's specimen. It is perhaps opportune to mention that according to Faubel's definition of *Idioplana*, the genus possesses a seminal vesicle and an anchor-shaped Lang's vesicle. But Woodworth (1898) indicated that in the type-specimen of *Idioplana australiensis* the male copulatory complex includes a pair of spermiducal bulbs ('vesiculae seminales'), no seminal vesicle, and Lang's vesicle is bulbous, not horseshoe- or anchor-shaped. It would seem that Faubel has based his conception of *Idioplana* on *Idioplanoides insignis* (Laidlaw, 1904) and *Idioplanoides atlantica* (Böck, 1913), but *Idioplanoides* is clearly distinct from *Idioplana*.

Family *LATOCESTIDAE* Laidlaw, 1903

DIAGNOSTIC FEATURES. Elongate to ribbon-like forms without tentacles. Numerous eyes scattered fanwise, often in streaks, over cephalic region of body; marginal eyes usually present. Mouth and ruffled pharynx centrally or posteriorly situated. Genital pores separated, near hind end of pharynx. Male copulatory complex directed more or less anteriorly from male pore. Relatively large prostate independent, usually dorsal to ejaculatory duct and provided with a tall epithelial lining; prostatic duct and ejaculatory duct unite before entering thick, conical, penis-papilla lying in a penis-pocket or shallow male antrum. Vagina narrow, thrown into an anteriorly-directed loop; Lang's vesicle or ductus vaginalis present.

Genus *LATOCESTUS* Plehn, 1896

DIAGNOSTIC FEATURES. Body narrowing towards extremities. Marginal eyes, assumed absent in type-species, *L. atlanticus*, in band of variable extent; further eyes disposed fanwise from posterior to cerebral organ. Pharynx in mid-third of body;



Fig.6 *Latocestus plehni*: A, eyes in anterior region of body; B, reproductive organs and intestinal branches (ventral view).

anterior branch of intestinal trunk long; intestinal branches not anastomosing. Usually with spermiducal bulbs, efferent ducts of which unite to form long ejaculatory duct; prostate pyriform; small unarmed penis-papilla in male antrum. Lang's vesicle bulbous or somewhat U-shaped; uterine canals not anteriorly confluent.

Key to *Latocestus* species from African waters

- | | | | |
|----|---|-------------------|---|
| 1 | Without marginal eyes | <i>atlanticus</i> | |
| 1' | With marginal eyes | | 2 |
| 2 | Lang's vesicle elongate | <i>marginatus</i> | |
| 2' | Lang's vesicle irregularly bulbous or somewhat crescentic | <i>plehni</i> | |

Latocestus atlanticus Plehn, 1896

LOCALITIES. Atlantic Ocean (Cape Verde Is, type-locality) and Rio de Janeiro, Brazil (Plehn).

DESCRIPTION. Plehn, 1896a: 159.

NOTE. Although material from two localities was originally available, Plehn's (1896) description contains no mention of the presence of marginal eyes, and because of this it appears to have been assumed by subsequent writers that *L. atlanticus* is a species without marginal eyes. It should, however, be stressed that marginal eyes in *Latocestus* are sometimes exceedingly small, and were very likely overlooked by Plehn.

Latocestus marginatus Meixner, 1907

LOCALITY. Among *Zoanthus* colonies in Gulf of Tadjourah, Djibouti, 7.2.1904.

DESCRIPTION. Meixner, 1907: 461.

Latocestus plehni Laidlaw, 1906

LOCALITIES. East Beach, Pram Pram, Ghana, 30.1.1949 (B.M.(N.H.) colln.); in deep crevices of nullipore or in shells, Cape Verde Is (Laidlaw); among algae, Malembo, Angola (Palombi).

DESCRIPTION. Laidlaw, 1906: 711; Palombi, 1940: 110.

DESCRIPTIVE NOTE (Fig.6). Laidlaw's account of this species is most inadequate, and Palombi examined only a juvenile specimen. The specimens from Ghana measure up to 30 mm in length and 6 mm in width. In life, they were 'dirty brownish pink', but after preservation in alcohol, they are now light brown tinged with pink. Distribution of eyes in anterior region of body as shown in Fig.6; marginal eyes in band around body. Mouth opens into hind region of pharyngeal chamber. Two narrow thin-walled vasa deferentia, each of which is posteriorly modified into a muscular spermiducal bulb before uniting to form a long ejaculatory duct. Muscular pyriform prostate dorsal to ejaculatory duct and lined with a tall glandular epithelium thrown into thick radial folds. Ejaculatory duct and prostatic duct unite before entering the male antrum through a broad, but shallow, unarmed penis-papilla. Male pore at about 1.5 mm from posterior end of body in largest specimen.

Female aperture at about 0.5 mm posterior to male pore. Vagina externa thrown into a short anteriorly-directed loop before bending posteriorly to receive common uterine canal and continuing as the vagina interna to shortly terminate in U-shaped Lang's vesicle with an irregular posterior outline, as shown in Fig.6. Epithelium of vagina interna or 'stalk' of Lang's vesicle has a number of radial folds to give its lumen a moniliform appearance. Epithelium of 'shell'-chamber thrown into a spiral fold of four or five turns.

Morphologically, the Ghanaian specimens very closely resemble *Latocestus atlanticus*. In fact, were it not for the supposed absence of marginal eyes in Plehn's species, it would be justifiable to accept that *atlanticus* and *plehni* are identical.

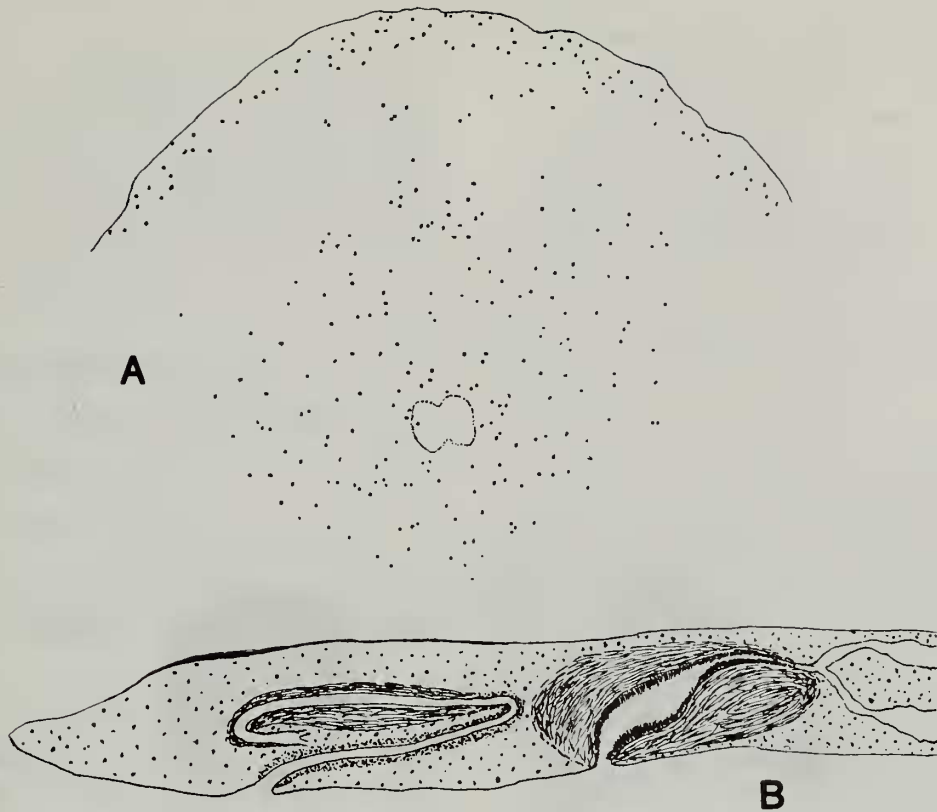


Fig.7 *Cryptocelis capensis*: A, eyes in anterior region of body; B, sagittal section of copulatory organs.

Family **CRYPTOCELIDIDAE** Laidlaw, 1903, emend. Poche, 1926

DIAGNOSTIC FEATURES. Elongate oval or discoid forms. Tentacles indistinct or not apparent. Marginal eyes small; additional eyes distributed fanwise anteriorly or disposed in cerebral tentacular and frontal groups. Mouth in mid-third of body; pharynx ruffled; intestinal trunk relatively short. Genital pores in mid or hind third of body. Male copulatory complex closely posterior to pharynx and anterior to male genital pore; prostate variously developed, interpolated. Vagina short, sometimes with Lang's vesicle.

Key to cryptocelidid genera in African waters

- | | | | | |
|----|----------------------------------|-------|-----------------------|---|
| 1 | Dorsal surface of body papillate | | <i>Ommatoplana</i> | |
| 1' | Dorsal surface smooth | | | 2 |
| 2 | With ductus vaginalis | | <i>Neocryptocelis</i> | |
| 2' | Without ductus vaginalis | | <i>Cryptocelis</i> | |

Genus **CRYPTOCELIS** Lang, 1884

DIAGNOSTIC FEATURES. Oval fleshy forms without tentacles. Marginal eyes in band of variable extent; frontal eyes may be absent; cerebral and frontal eyes may merge into a wide-spread mass; tentacular eyes may be well differentiated, or not readily distinguishable from cerebral eye-clusters. Pharynx in mid-third of body; intestinal branches not anastomosing. Vasa deferentia or spermiducal bulbs open into large prostate divided into a glandular proximal or anterior chamber, epithelial lining of which is thrown into deep radial folds, and a sinuous distal or posterior chamber lined with a smooth or slightly folded epithelium; penis-papilla weakly developed or

not apparent. Vagina simple, directed anteriorly from female pore; without Lang's vesicle; 'shell'-chamber spacious.

Cryptocelis capensis sp.nov.

LOCALITY. Cape Province, South Africa (on sandy bottom in 24 metres, False Bay 34°10'S, 18°27.5'E.) (Day colln.) Holotype B.M. reg.no. 1987.3.11.7; paratypes 1987.3.11.8-9.

DESCRIPTION (Fig.7). Body of holotype is oval, broadly rounded anteriorly and narrowing posteriorly. It measures 17 mm long and 8 mm wide. Marginal eyes extend round body; additional very small eyes lie posteriorly to cerebral organ and spread fanwise anteriorly to sometimes reach marginal eyes. Mouth at about 11 mm from anterior margin of body and opening into third quarter of pharyngeal pocket; pharynx about 9 mm long, centrally placed, with several pairs of lateral folds; intestinal branches not anastomosing.

Male and female genital pores close together in posterior region of body. Testes ventral to intestinal branches, ovaries dorsal. Swollen vasa deferentia extend posteriorly alongside the pharynx and narrowing considerably in their distal regions to unite and form a short ejaculatory duct leading into a very muscular oval mass. At its junction with the muscular mass, the ejaculatory duct is invested with eosinophilic gland-cells. The duct, still invested with gland-cells, passes into the muscular mass for a short distance, widens, and is then lined with an epithelium of large gland-cells bearing long cilia. This epithelium shows signs of perhaps being thrown into folds later in its development. The duct, now the lumen of the muscular structure, continues its course ventrally. The cilia of the duct become longer and appear to be coated with an eosinophilic material to give this region of the male complex the false impression of being lined with slender bristles. On approaching the ventral surface of the body, the lumen

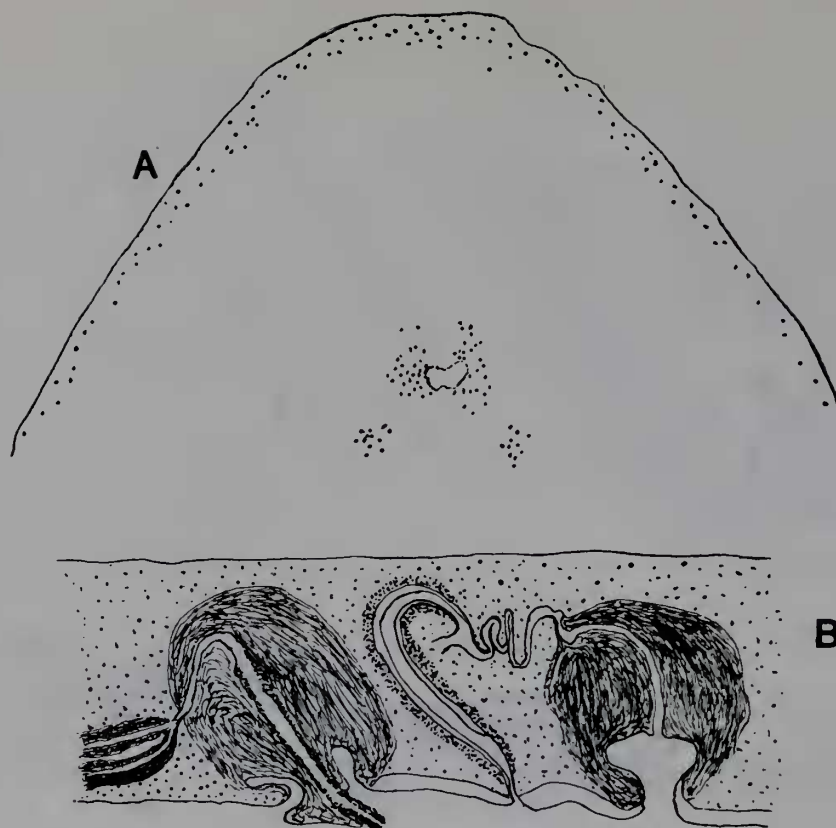


Fig.8 *Neocryptocelis dayi*: A, eyes in anterior region of body; B, sagittal section of copulatory organs.

narrows and opens directly to the exterior. Male antrum absent. The oval muscular mass appears to represent the prostate.

Female antrum narrow and shallow. Vagina thrown into an anteriorly-directed loop, its antero-dorsal portion functioning as a 'shell'-chamber, whereas the posteriorly-directed portion is exceedingly muscular and represents the vagina interna. Uterine canals open directly into the proximal end of the vagina.

NOTE. The fact that the vasa deferentia unite before passing into the male copulatory complex by a common canal agrees with *Cryptocelis alba* Lang and *C. compacta* Lang, but differs from them in the distribution of eyes in the cephalic region.

Genus *NEOCRYPTOCELIS* gen.nov.

DIAGNOSTIC FEATURES. Cryptocelididae. Elongate-oval forms without tentacles. Cerebral and tentacular eyes in separate clusters; marginal eyes confined to anterior region of body. Genital pores separated in hind region of body; elongate spermiducal bulbs open independently into pyriform prostate, the lumen of which is divided into two sections. Vagina thrown into an anteriorly-directed loop, with ductus vaginalis.

TYPE-SPECIES. *Neocryptocelis dayi* sp.nov.

Neocryptocelis dayi sp.nov.

LOCALITY. On fine sand in 22 metres, 33°02'S, 17°57.4'E, Saldanha Bay, South Africa, 25.4.1962. (Day colln.). Holotype B.M. reg.no. 1987.3.11.1.

DESCRIPTION (Fig.8). Elongate-oval body 17 mm long and 6 mm wide, broader anteriorly than posteriorly; without

tentacles. Few very small eyes arranged in paired cerebral and tentacular clusters; marginal eyes in band extending posteriorly to level with tentacular clusters. Pharynx narrow, mainly in posterior half of body and with shallow lateral folds.

Male and female genital pores about 0.5 mm apart in hind region of body. Distal region of each vas deferens is modified as an elongate spermiducal bulb. From each bulb, a narrow duct passes into a pyriform muscular organ and travels dorsally to open into a narrow lumen of the organ. This structure is really a prostate, for its lumen is lined with a low eosinophilic epithelium. In the only specimen available, the distal portion of the prostate is protruded through the male genital pore as a papilla, probably due to contraction of the body at fixation. The epithelial lining of the distal region contains many large gland-cells that stain deeply with haematoxylin. This region, as already mentioned, has everted itself so that its surface appears covered with rings of deeply-stained cells.

Vagina thrown into an anteriorly-directed loop, much of which functions as a 'shell'-chamber. On turning posteriorly, the vagina receives the common uterine duct and continues as a narrow convoluted ductus vaginalis passing through a globular mass of muscles to enter a spacious chamber opening on the ventral surface of the body.

NOTE. The shape of the body, the arrangement of the eyes and the interpolated prostate indicates that the above-described specimen belongs to the family Cryptocelididae and is closely related to the genus *Cryptocelis* Lang. Although its male copulatory complex appears not to be fully developed and is probably somewhat distorted, the structure of the female complex sets it apart from all previously-known cryptocelidids. Therefore, a new genus has been erected for its reception.

Genus *OMMATOPLANA* Laidlaw, 1903

DIAGNOSTIC FEATURES. Fleshy, broadly-oval forms with dorsal tubercles. Marginal eyes in anterior third of body; numerous small eyes scattered in irregular groups over cephalic region. Mouth central. Genital ducts open into atrium near mouth. Seminal vesicle? Prostate assumed to be interpolated, with thick muscular wall and tall epithelial lining containing longitudinal canals. Penis-papilla unarmed, enclosed in penis-pocket. Lang's vesicle present.

Ommatoplana tuberculata Laidlaw, 1903

LOCALITY. Prison Island, Zanzibar, 4.6.1901 (Laidlaw).

DESCRIPTION. Laidlaw, 1903a: 111.

NOTE. Type-specimen probably immature.

Superfamily **PLANOCEROIDEA** Poche, 1926, emend. Nicoll, 1935

DIAGNOSTIC FEATURES. Acotylea without marginal eyes; with paired cerebral and tentacular eye-clusters in four separate clusters or in two elongate clusters lateral to the cerebral organ. Pharynx ruffled.

Key to planoceroid families from African waters

1	Male complex with cirrus	2
1'	Male complex without cirrus	3
2	Prostate independent	<i>Planoceridae</i>
2'	Prostate interpolated	<i>Gnesiocerotidae</i>
3	Prostate independent	<i>Callioplanidae</i>
3'	Prostate interpolated	<i>Leptoplanidae</i>

Family **LEPTOPLANIDAE** Stimpson, 1857

DIAGNOSTIC FEATURES. Body variable in outline, often somewhat cuneate. Mouth central or in hind half of body. Genital pores generally separated posteriorly to pharynx. Male copulatory complex anterior to male pore; often with muscular seminal vesicle; sometimes with spermiducal bulbs. Prostate variably developed, from bulbous muscular organ to portion of the ejaculatory duct lined or invested with eosinophilic gland-cells. Vagina narrow, usually forming anteriorly-directed loop; Lang's vesicle or ductus vaginalis may be present.

Key to leptoplanid subfamilies from African waters

1	Prostate tubular, sometimes indistinct or moderately differentiated from ejaculatory duct	<i>Leptoplaninae</i>
1'	Prostate muscular and vesicular	<i>Stylochoplaninae</i>

Subfamily **LEPTOPLANINAE** Marcus, 1947

DIAGNOSTIC FEATURE. Without vesicular prostate.

Key to leptoplanine genera from African waters

1	Tubular prostate with appendix at its inner end	<i>Leptoplana</i>
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1'	Tubular prostate without appendix	2
2	No seminal vesicle; no Lang's vesicle	<i>Haploplana</i>
2'	With seminal vesicle; Lang's vesicle present	3
3	Paired spermiducal bulbs united with elongate seminal vesicle	<i>Phylloplana</i>
3'	No spermiducal bulbs	4
4	Female antrum with small bursa	<i>Pulchriplana</i>
4'	Female antrum without bursa	<i>Discoplana</i>

Genus *LEPTOPLANA* Ehrenberg, 1831, *sensu* Lang (1884)

DIAGNOSTIC FEATURES. Body oval, often broad anteriorly and narrowing posteriorly; without tentacles. Eyes in paired tentacular and cerebral clusters. Pharynx central. Genital pores separated, between them lies an adhesive depression with muscular margin. Vasa deferentia unite to open into muscular seminal vesicle; prostate tubular, with lateral or ventral diverticulum proximally; unarmed penis-papilla inconspicuous lying in long narrow penis-pocket; male antrum shallow. Thick musculature invests male copulatory organs. Lang's vesicle variably developed; uterine canals anteriorly confluent when fully developed.

Leptoplana hyalina Ehrenberg, 1831

LOCALITY. Tor, Red Sea (Ehrenberg).

NOTE. This species, known only from the Red Sea, is the type-species of the genus *Leptoplana*, but is unrecognizable. Lang (1884), however, considered it to be comparable with *Planaria tremellaris* Müller, 1774, from Norway, and it is on this opinion that *Leptoplana* has been generally accepted as a recognizable genus. Bock (1913) doubts this synonymy, and a close examination of the problem shows that *L. tremellaris* is a North Atlantic form with a southern distribution extending into the Mediterranean Sea. It is not known in the Indian Ocean. Since Lang gave no evidence to support his conclusion, it seems that the synonymy of *Planaria tremellaris* and *Leptoplana hyalina* is exceedingly doubtful. Nevertheless, it seems that usage supports Lang's conception of the genus *Leptoplana* with *tremellaris* as its type-species.

Leptoplana tremellaris (Müller, 1774) Örsted, 1843

LOCALITIES. Port Said, Egypt, 13.12.1924 (Palombi, 1928); several localities on Moroccan coast (G. Bitar *leg.*). Common along European coast from Norway to the Mediterranean.

DESCRIPTION. Bock, 1913:181; Faubel, 1983:84.

Genus *DISCOPLANA* Bock, 1913

DIAGNOSTIC FEATURES. Large oval forms without tentacles. Eyes in separated pairs of cerebral and tentacular clusters. Pharynx centrally situated. Genital pores well separated. Seminal vesicle pyriform or elongate; ejaculatory duct extends from seminal vesicle to penis-papilla without forming distinct prostate, but at height of male phase parts of the male complex are thickly coated with extracapsular eosinophilic gland-cells. Penis-papilla distinct and muscular. Vagina narrow; Lang's vesicle bulbous or crescentic.

NOTE. It seems necessary to re-establish the validity of the genus *Discoplana*, because Hyman (1953) considered it to be a synonym of the genus *Euplana* Girard, 1893. Furthermore, Faubel (1983) also rejected *Discoplana* and distributed its species among two families and three genera, two of which were said to be 'new.' Between them, Bock (1913) and Kato (1935 & 1943) assigned six species to the genus, namely, *gigas* (Schmarda, 1859) (type-species), *pacificola* (Plehn, 1896), *malayana* (Laidlaw, 1903), *concolor* (Meixner, 1907), *take-wakii* Kato, 1935 and *longipenis* Kato, 1943. The type-species is readily distinguished from that of *Euplana*, *E. gracilis* (Girard), by the presence of a distinct penis-papilla and Lang's vesicle, features here regarded as generically important. The dissolution of *Discoplana* by Faubel is untenable because he has named the type-species of that genus as the type-species of a new genus, *Ilyella*, which is therefore invalid and a synonym of *Discoplana*. Of the remaining species of this genus, Faubel erected the genus *Euilyoidea* for *D. take-wakii*, presumably because two small spines are said to lie in the efferent duct of the penis-papilla; *D. longipenis* was transferred by Faubel to the genus *Aprostatum* Bock, 1913, which, according to the re-description of its type-species, *A. stiliferum*, given by Marcus (1954), is most certainly not congeneric with *longipenis*. The remaining species of *Discoplana*, namely, *pacificola*, *concolor* and *malayana*, were placed by Faubel in a new genus, *Euplanoides*, with *pacificola* as its type-species. It seems that he differentiated these from *gigas* because in the latter the epithelium of the male antrum contains eosinophilic gland-cells, presumably of a prostatic nature, whereas such gland-cells have not been described in the other species. Because a prostatic lining to a portion of the ejaculatory duct (*sensu lato*) and extracapsular gland-cells often appear late in the development of the male phase among leptoplanid polyclads that have no vesicular prostate, it would seem that the genus *Euplanoides* might be of doubtful validity.

Key to *Discoplana* species from African waters

- 1 With penis-pocket; Lang's vesicle bulbous *concolor*
 1' Penis-pocket absent; Lang's vesicle U-shaped or crescentic *gigas*

Discoplana concolor (Meixner, 1907) Bock, 1913

Leptoplana concolor Meixner, 1907

Euplana concolor (Meixner) Hyman, 1954b.

LOCALITY. On a madreporic reef, Musha I., Gulf of Tadjourah, Djibouti (Meixner).

DESCRIPTION. Meixner, 1907: 452.

Discoplana gigas (Schmarda, 1859) Stummer-Traunfels, 1933

Leptoplana gigas Schmarda, 1859

Leptoplana subviridis Plehn, 1896a

Leptoplana pardalis Laidlaw, 1902

Discoplana subviridis (Plehn) Bock, 1913

Susakia badiomaculata Kato, 1934

LOCALITY. Under stones, Recif de la Clochette, near Obok, Djibouti (Meixner). Also known from Sri Lanka, Indonesia, Maldives, Indian Ocean and Funafuti I., Pacific Ocean, Somalia, Bonin and Gilbert Is, and Japan.

DESCRIPTIONS. Schmarda, 1859:xii,17; Plehn, 1896a:330; Laidlaw, 1902:278; Meixner, 1907:457; Bock, 1913:220; Stummer-Traunfels, 1933:3492; Kato, 1934:125.

Genus *PHYLLOPLANA* Laidlaw, 1903

Indiplana Stummer-Traunfels, 1933

DIAGNOSTIC FEATURES. Oval forms without tentacles. Eyes in paired cerebral and tentacular groups or in two elongate clusters. Pharynx mainly in anterior half of body; intestinal branches not anastomosing. Separate genital pores in mid-third of body. Elongate spermiducal bulbs fusing with highly muscular portion of ejaculatory duct to form a trilobed or anchor-shaped seminal vesicle. Prostatic glands invest portion of narrow ejaculatory duct to function as a cylindrical prostate. Penis-papilla distinct and may bear stylet. Vagina thrown into an anteriorly-directed loop; Lang's vesicle small.

NOTE. Faubel (1983) maintains *Indiplana* as a valid genus and places it in the family Leptoplanidae because it has the 'male' complex enclosed in massive muscular bulb, whereas he places *Phylloplana* in the family Stylochoplanidae which lacks such a bulb. A careful examination of Stummer-Traunfels' description and figure of *Indiplana oosora* gives no indication of such a bulb enclosing the male complex, although a reticulum of coarse parenchymatous fibres surround the ejaculatory duct and penis-papilla. This difference is here regarded as specific, not generic, and is discussed below.

Phylloplana lactea Laidlaw, 1903

Armatoplana lactea (Laidlaw) Faubel, 1983

LOCALITIES. On sand-flats and among coral fragments at low tide, west coast of Inhaca Island, Mozambique. (V. Gabie leg.) Also East African coast (Laidlaw, 1903).

DESCRIPTION (Fig.9). Six specimens from Mozambique in

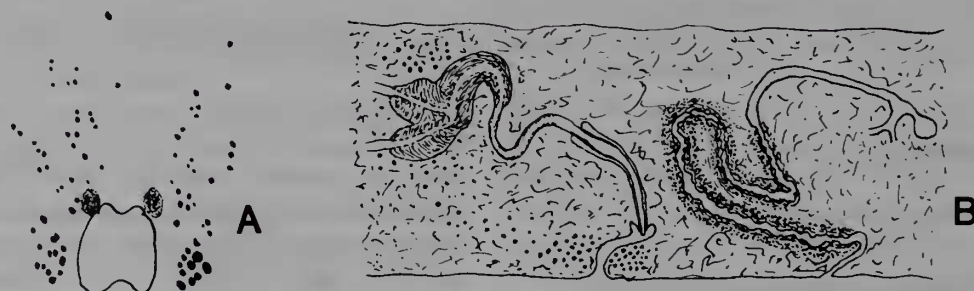


Fig.9 *Phylloplana lactea*: A, cerebral and tentacular eye-clusters; B, sagittal section of copulatory organs.

various stages of development are available for study. They measure 27–30 mm in length and 13–16 mm in maximum width. In life, the whitish body is profusely covered dorsally with small brownish spots forming a reticulate pattern, except along the margins and in the cerebral region. The median area of the mid-third of the body is dark brown, due to the underlying pharynx. On the postero-lateral borders of the cerebral organ lie two clusters of tentacular eyes, each cluster containing 11–18 eyes. Immediately anterior to these are smaller cerebral eyes arranged in two irregular rows, each with 27–34 eyes. Mouth more or less centrally situated; slender pharynx with several pairs of shallow lateral folds; intestinal trunk longer than pharyngeal chamber, bifurcating posteriorly, the two branches passing posteriorly round the copulatory complexes, whereas anteriorly the trunk trifurcates, the median branch passing dorsally to the cerebral organ. Many short lateral intestinal branches not anastomosing, each limb bifurcating near margin of body.

Mature specimens available agree very well with Laidlaw's description, but the male copulatory organs need some re-description. They lie immediately posterior to the pharynx and anterior to the male pore. Each vas deferens is convoluted, swollen and ending in a spermiducal bulb, which unites with the muscular proximal part of the ejaculatory duct to form a trilobed or anchor-shaped seminal vesicle. The central lobe of the vesicle extends antero-dorsally, narrows as it turns ventrally to continue as the ejaculatory duct leading into the base of a penis-papilla. In the present specimens, the penis-papilla is elongate and lies in a long penis-pocket opening into the male antrum through a broad but shallow penis-sheath. The papilla is coated with a cuticle for much of its length and when viewed ventrally very closely resembles the 'penis' depicted by Laidlaw. In not fully-mature specimens, however, there is a long narrow penis-papilla, but it does appear to be coated with a cuticle. No part of the male complex appears to be modified as a muscular or vesicular prostate. On the other hand, from the seminal vesicle much of the ejaculatory duct is lined with eosinophilic gland-cells, as found by Laidlaw. Also in agreement, the distal region of the ejaculatory duct is lined with cilia. Moreover, eosinophilic gland-cells occur in the parenchyma near the ventral wall of the seminal vesicle and are massed around the male antrum. Similar gland-cells occur dorsally to the union of the seminal vesicle and the ejaculatory duct. It seems likely that these gland-cells have a prostatic function, but their efferent ducts have not been made out in the material available. In a specimen with the male copulatory complex not fully developed such extracapsular gland-cells are not apparent and the lining of the ejaculatory duct shows no sign of producing an eosinophilic substance.

The female genital pore lies at about 1 mm posteriorly to the male. It leads into a narrow female antrum of variable length. From the antrum, a long vagina media, functioning as a 'shell'-chamber, is thrown into an anteriorly-directed loop—vagina media—reaching to about level with the male pore, where it turns to run posteriorly to a level dorsal to the female pore, where it opens into a vagina interna. The vagina media or 'shell'-chamber is therefore relatively long and provided with a thick coat of loose muscle-fibres invested with 'shell'-glands. Its lumen is narrow and somewhat corrugated. From the 'shell'-chamber, the vagina interna extends posteriorly for a short distance to receive the common duct of the uterine canals, following which the vagina terminates in a small bulbous Lang's vesicle. Uterine canals extend

anteriorly to near cerebral organ, where they are not confluent.

SYSTEMATIC NOTE. *Phylloplana lactea* has been transferred by Faubel (1983) to a 'new' genus *Armatoplana*, with *Leptoplana panamensis* Plehn, 1896, as its type-species. The latter species is not congeneric with *P. lactea*, for it possesses an elongate muscular prostate and its seminal vesicle is not tripartite. A further species of *Phylloplana*, unnamed by Stummer-Traunfels (1933), but found by him among the original material of *Leptoplana purpurea* Schmarda, 1859, from Jamaica, has been placed by Faubel into a new genus, *Ilyella*, as *I. purpurea* (Stummer-Traunfels, 1933), but it undoubtedly belongs to the genus *Phylloplana*.

After examining the type-specimen of *Polycelis oosora* Schmarda, 1859, from Sri Lanka, Stummer-Traunfels (1933) erected the genus *Indiplana* for its reception, but Prudhoe (1985) gave reasons for regarding this genus as a synonym of *Phylloplana*. Faubel (1983), however, maintained *Indiplana* as a valid genus and placed it in the family Leptoplanidae, presumably because it possesses a 'male copulatory complex enclosed in massive muscular bulb', whereas he placed *Phylloplana* in the family 'Stylochoplanidae' which lack such a muscular bulb. A careful examination of Stummer-Traunfels description and figure of *Indiplana oosora* gives no indication of a 'massive muscular bulb', although he does describe a reticulum of parenchymatous fibres enclosing the male complex and in this respect resembles *Phylloplana tropicalis* (Hyman, 1954).

The main differences between *oosora* and *lactea* are the possession in the former of a reticulum of parenchyme-fibres investing much of the male complex, and a vagina media without a loose coating of muscle-fibres invested with 'shell'-glands. These differences are here regarded as being of specific value only, hence *Indiplana oosora* becomes *Phylloplana oosora* (Stummer-Traunfels, 1933) comb. nov.

Not fully-mature specimens in the present material offer an interesting point of value in the classification of polyclads, inasmuch as the male copulatory organs are initially formed without certain histological elements being apparent. For instance, eosinophilic gland-cells investing or lining the proximal region of the ejaculatory duct in mature specimens may not yet be developed in immature specimens, and the penis-papilla may not yet be covered with cuticle. The absence of these features might lead a student to regard a not fully-mature specimen to be taxonomically distinct from a fully-mature one. It seems, therefore, unwise to differentiate genera solely on the presence or absence of a penis-stylet, or of a supposed lack of certain gland-cells associated with the male reproductive system.

Genus *HAPLOPLANA* Laidlaw, 1903

DIAGNOSTIC FEATURES. Small, oval, rather stout forms without tentacles. Eyes in two elongate clusters alongside cerebral organ. Pharynx in anterior half of body; intestinal branches anastomosing. Genital pores more or less centrally situated. Apparently no seminal vesicle nor prostate present. Vasa deferentia lead into small vesicle (? penis-papilla) lying in small antrum. Vagina short; Lang's vesicle small; uterine canals not confluent anteriorly.

NOTE. Prudhoe (1985) discussed the problems arising from the inadequate description of this genus. Faubel (1983)

placed *Haploplana elioti* in a new genus, *Euplanoida*, but Laidlaw's species appears not to have a seminal vesicle nor a coiled ejaculatory duct, said to be characteristic of *Euplanoida*.

Haploplana elioti Laidlaw, 1903

LOCALITY. British East Africa—probably Zanzibar.

DESCRIPTION. Laidlaw, 1903a: 109.

Genus *PULCHRIPLANA* Palombi, 1938

DIAGNOSTIC FEATURES. Oval forms with tentacles. Eyes at base of each tentacle, between which lie two small groups of cerebral eyes. Pharynx central; intestinal branches not anastomosing. Vasa deferentia arise in posterior region of body and anteriorly to open separately into small muscular seminal vesicle; prostate said not to be developed, but extracapsular eosinophilic gland-cells invest distal region of ejaculatory duct; penis-papilla very small. Female antrum spacious; large thin-walled vesicle opens into hind region of antrum. Vagina narrow, with small bursa between antrum and 'shell'-chamber; Lang's vesicle slender.

Pulchriplana insignis Palombi, 1938

LOCALITY. Reef Bay, Port Elizabeth, South Africa.

DESCRIPTION. Palombi, 1938: 342.

Subfamily *STYLOCHOPLANINAE* Meixner, 1907

DIAGNOSTIC FEATURE. Muscular prostate vesicular

Key to stylochoplanine genera from African waters

- | | | |
|----|---|---|
| 1 | Epithelial lining of prostate with longitudinal tubes or radial folds | 2 |
| 1' | Lining without such tubes or folds | 3 |
| 2 | Epithelial lining of prostate with deep radial folds | |
| | <i>Notoplanella</i> | |
| 2' | Epithelial lining of prostate with longitudinal tubes | |
| | <i>Notoplana</i> | |
| 3 | Copulatory complexes very near hind end of body | |
| | <i>Zygantriplana</i> | |
| 3' | Copulatory complexes well separated from hind end of body | |
| | <i>Stylochoplana</i> | |

Genus *STYLOCHOPLANA* Stimpson, 1857

Notoplanides Palombi, 1928

DIAGNOSTIC FEATURES. Rather translucent forms, usually broadly rounded anteriorly and narrowing posteriorly. Nuchal tentacles may be present. Eyes in paired cerebral and tentacular groups or in two elongate clusters alongside cerebral organ. Seminal vesicle well developed; prostate rounded to elongate, with smooth epithelial lining; ejaculatory duct not projecting into lumen of latter; penis-papilla variably developed and may bear stylet. Vagina simple, with or without Lang's vesicle.

NOTE. Faubel (1983) has presented the genus *Stylochoplana* in a new sense and distributed its 40 or more species among 11 genera, 6 of which are said to be new. This re-organization contains so many doubtful premises that the present writer prefers to retain *Stylochoplana* Stimpson *sensu* Bock (1913) and its accompanying species. It is, however, admitted that *Stylochoplana* in the latter sense contains many species that require serious study of fully-mature specimens and an understanding of the changes that take place in the structure of the copulatory complexes during their development.

Key to *Stylochoplana* species from African waters

- | | | |
|-----|--|-------------------|
| 1 | Penis-papilla with stylet | 2 |
| 1' | Penis-papilla without stylet | 5 |
| 2 | With vagina bulbosa | <i>vesiculata</i> |
| 2' | Without vagina bulbosa | 3 |
| 3 | Two lateral vesicles open into Lang's vesicle | <i>affinis</i> |
| 3' | Without such vesicles | 4 |
| 4 | Genital pores near posterior margin of body | <i>robusta</i> |
| 4' | Genital pores well separated from hind margin of body .. | |
| | <i>tenuis</i> | |
| 5 | Without Lang's vesicle | 6 |
| 5' | With Lang's vesicle | 7 |
| 6 | Dorsal surface with two broad submedian bands of brownish yellow | <i>inquilina</i> |
| 6' | Dorsal surface without such bands | <i>simplex</i> |
| 7 | Thick-walled vagina externa | <i>suesensis</i> |
| 7' | Thin-walled vagina externa | 8 |
| 8 | Cup-shaped depression between genital pores | |
| | <i>genicotylo</i> | |
| 8' | Without such a depression | 9 |
| 9 | Body narrowly elongate | <i>graffii</i> |
| 9' | Body oval or cuneate | 10 |
| 10 | With common genital pore | <i>agilis</i> |
| 10' | Genital pores separated | 11 |
| 11 | Genital pores widely separated | <i>modesta</i> |
| 11' | Genital pores near each other | 12 |
| 12 | Eyes in two elongate clusters | <i>parva</i> |
| 12' | Eyes in four separate clusters | 13 |
| 13 | Lang's vesicle elongate | <i>nadiae</i> |
| 13' | Lang's vesicle crescentic | <i>capensis</i> |

Stylochoplana affinis Palombi, 1940

LOCALITY. In *Teredo* tube among mangroves at Banana, Zaire.

DESCRIPTION. Palombi, 1940: 117.

DIAGNOSTIC FEATURES. Oval body 6 mm long and 3.5 mm wide. Dorsal surface yellowish, tinted with chestnut brown to near margins. No tentacles. Eyes in paired cerebral and tentacular clusters, latter alongside cerebral organ, former immediately anterior to larger tentacular eyes. Genital pores well separated from hind margin of body. Seminal vesicle pyriform, arcuate; relatively large prostate pyriform; penis-papilla very small, with long stylet in penis-pocket; penis-sheath distinct. Pair of rounded vesicles lateral to Lang's vesicle, with which they communicate.

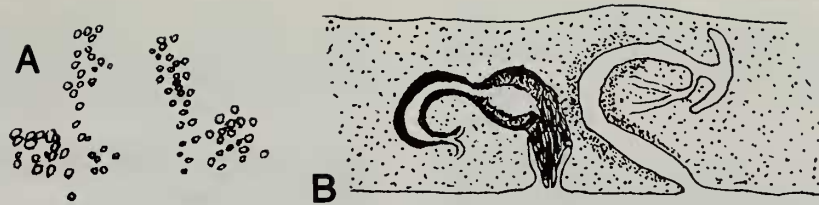


Fig.10 *Stylochplana capensis*: A, cerebral and tentacular eye-clusters; B, sagittal section of copulatory organs.

Stylochplana agilis Lang, 1884

LOCALITIES. Akari, Ocean, Bouznika, Sidi R'bat, Atlantic coast of Morocco (G. Bitar *leg.*) Also known from the English Channel, Portugal and the western Mediterranean.

DESCRIPTIONS. Lang, 1884: 456; Prudhoe, 1982a: 46.

DIAGNOSTIC FEATURES. Cuneate body light brown dorsally with brown, red-brown or brownish black specks, absent in narrow whitish marginal band which sometimes bears violaceous streaks. Nuchal tentacles distinct. Cerebral eyes few, in two clusters lying between two groups of few eyes lying at bases of tentacles. Pharynx central. Common genital pore. Globular seminal vesicle opens directly into well-developed globular prostate; penis-papilla small, unarmed. Lang's vesicle small.

Stylochplana capensis sp. nov.

LOCALITY. Brede River, Cape Province, South Africa (from 'rocks outside estuary mouth proper'), 7.7.1951. B.M.reg.no. 1987.3.11.4.

DESCRIPTION (Fig.10). The only specimen available is oval in outline, 10 mm in length and 4 mm in maximum width, being narrower anteriorly than posteriorly. Without tentacles. Eyes in separate paired cerebral and tentacular clusters. Mouth central; pharynx with seven pairs of shallow lateral folds in mid-third of body.

Genital pores close together. Male copulatory complex closely posterior to pharynx. Vasa deferentia arise laterally to pharynx and extend posteriorly to converge towards median line where they unite and immediately open into ventrally-disposed proximal end of an arcuate seminal vesicle. Through a very short ejaculatory duct, the seminal vesicle opens into a globular prostate, lined with a low epithelium. From the prostate, the ejaculatory duct passes into a thick, conical, unarmed penis-papilla occupying the entire male antrum.

The vagina is thrown into a loop dorsal to the penis-papilla. A shallow female antrum leads into a well-developed 'shell'-chamber which extends to the point in the loop where the vagina turns posteriorly to continue as the vagina interna. Shortly after the union of the 'shell'-chamber and the vagina interna, the latter receives the common uterine duct shortly before opening into a somewhat crescentic Lang's vesicle, with its limbs directed anteriorly and lined with low epithelium. After leaving the common uterine duct the two uterine canals each bifurcate, the inner limbs containing mature ova and extending anteriorly to become confluent in the median line between the eye-clusters and the pharynx, whereas the outer limbs appear empty and extend in the ventral parenchyma, but very soon pass into the dorsal parenchyma to reach the pharynx.

NOTE. The new form may be distinguished from known species of the genus *Stylochplana* by the presence of a



Fig.11 *Stylochplana inquilina*, dorsal surface of body.

somewhat crescentic Lang's vesicle and a bifurcation of each uterine canal—an unusual feature already recorded by Kato (1934) in *Stylochplana pusilla* Bock, 1924, which may be separated from the new form by the presence of nuchal tentacles, a male copulatory complex placed some distance posteriorly to the pharynx, a pyriform prostate and a large bulbous Lang's vesicle.

Stylochplana genicotyla Palombi, 1939

LOCALITY. Baie de Caballo, Rio de Oro (24°13'N, 15°44'W), West Africa, 2.11.1938.

DESCRIPTION. Palombi, 1939b: 101.

Stylochplana graffii (Laidlaw, 1906) Bock, 1913

Leptoplana graffii Laidlaw, 1906

LOCALITY. Among nodules of nullipores dredged in 27 to 55 metres, Cape Verde Is.

DESCRIPTION. Laidlaw, 1906: 708.

DIAGNOSTIC FEATURES. Body pallid, with broad, sandy-coloured longitudinal median band with ramifying branches, elongate and measuring 25 mm long and 3.5 mm wide. Eyes in two tentacular groups lateral to cerebral organ, each group with 4 or 5 large eyes; anteriorly to, but distinctly separated from, each group are 7 or 8 smaller cerebral eyes. Pharynx in anterior half of body. Genital pores separated, anteriorly placed. Seminal vesicle small, opens into prostate without interposition of ejaculatory duct. Prostate relatively large, pyriform and highly muscular and lined with smooth shallow epithelium. Seminal vesicle and prostate bound together by a common musculature. Penis-papilla stout, without stylet. Lang's vesicle large.

***Stylochoplana inquilina* Hyman, 1950**

LOCALITY. Associating with anemone *Calliactis* opposite Sacco coral reef, Inhaca I., Mozambique.

DESCRIPTION. Hyman, 1950: 55.

DIAGNOSTIC FEATURES (Fig. 11). Body lanceolate, up to 25 mm in length and 7 mm in maximum width. Dorsal surface white or pinkish with two broad submedian bands of brownish yellow edged with a narrow band of dark brown, each band tapers towards its extremities. No tentacles. Eyes in paired cerebral and tentacular clusters; former, with about 50 eyes in each cluster, latter with about 40 eyes. Pharynx narrow, extending through third and fourth fifths of body. Genital pores closely separated. Vasa deferentia open separately into antero-ventral region of oval muscular seminal vesicle; short ejaculatory duct unites seminal vesicle with large bulbous prostate. Conical penis-papilla without stylet. Vagina externa large; no Lang's vesicle.

NOTE. No specimen is available for study, but a water-coloured painting (Fig. 11) of it leaves no doubt as to its identity. The Inhaca specimen was originally identified by Miss Hyman. This species was originally reported from Hawaii, where it was found at a depth of about 30 metres inhabiting the umbilicus in the shell of a *Tonna* snail, occupied by a hermit-crab, and to which the anemone *Calliactis armillata* was attached. The colour-pattern of the polyclad harmonized with that of the shell and the anemone.

***Stylochoplana modesta* (Quatrefages 1845) comb. nov.**

Polycelis modesta Quatrefages, 1845

Leptoplana pallida (Quatref.) Laidlaw, 1906

Stylochoplana pallida (Quatref.) Palombi, 1928

LOCALITIES. From encrustations on rocks exposed to surf at Port Sal Rei, Boa Vista, Cape Verde Is (Laidlaw), and immature specimen from Lake Timsah, Suez Canal (Palombi). Originally found in the Bay of Naples.

DESCRIPTIONS. Quatrefages, 1845:133; Lang, 1884:489.

NOTE. It seems that Lang (1884) has confused *Polycelis pallidus* Quatrefages, 1845, and *Polycelis modestus* Quatrefages, 1845, and regarded them as varieties of the same species, *Leptoplana pallida*. It is clear from Quatrefages' figures that the two species are specifically distinct from each other in at least three features. Firstly, in *pallidus* the pharynx lies in the middle region of the body, whereas in *modestus* it lies in the anterior half; secondly, in *pallidus* the vasa deferentia open separately into a bulbous seminal vesicle, which lies well anteriorly to a broadly pyriform prostate, whereas in *modestus* the vasa deferentia unite to enter a fusiform seminal vesicle lying ventrally to a comparatively large pyriform prostate; and thirdly, in *pallidus* the very small penis-papilla bears a long slender stylet, absent in *modestus*. A close comparison of the original descriptions and figures of these two species reveals other differences between them. Again, it seems that Lang's description of *Leptoplana pallida* is based on that of *Polycelis modesta*, so it is reasonable to assume that the records of *pallida* by Laidlaw (1906) and Palombi (1928) are really those of *modestus*. It needs to be noted that Faubel (1983) transferred *Stylochoplana pallida* (Quatrefages) *sensu* Lang (1884), *S. gracilis* (Heath & McGregor) and *S. hancocki* Hyman to the genus *Emprostho-*

pharynx Bock, 1913. In their gross morphology, these species bear scarcely any resemblance to the type-species of *Emprostopharynx*, *E. opisthoporos* Bock, and are here returned to the genus *Stylochoplana*.

***Stylochoplana nadiae* (Melouk, 1941) du B. R. Marcus & Marcus, 1968**

Leptoplana nadiae Melouk, 1941

LOCALITY. Adhering to oral arms of a syphozoan in northern region of Red Sea.

DESCRIPTION. Melouk, 1941: 41.

DIAGNOSTIC FEATURES. Elongate-oval body up to 22 mm long and 7 mm wide. No tentacles. Two tentacular eye-clusters, each with 15–16 large eyes; between these clusters lie two cerebral clusters, each with a few smaller eyes. Mouth more or less centrally placed. Genital pores separated in middle of posterior half of body. Vasa deferentia open together into elongate arcuate seminal vesicle; pyriform prostate of moderate size; penis-papilla large and conical, nearly fills shallow male antrum. Female copulatory complex enclosed in thick musculature; 'shell'-chamber relatively long; Lang's vesicle elongate.

***Stylochoplana parva* Palombi, 1939**

LOCALITY. Cap Blanco, Rio de Oro (24°15'N, 15°44'W), West Africa, 9.11.1935.

DESCRIPTION. Palombi, 1939b: 104.

DIAGNOSTIC FEATURES. Delicate oval body 12 mm long and 6.5 mm wide. Ground-colour yellow, median zone and marginal band of a more distinctive yellow, while the remainder of the dorsal surface is diffused with grey. No tentacles. Eyes in two elongate clusters lateral to cerebral organ; tentacular eyes in posterior region of each cluster. Pharynx mainly anterior to middle of body. Genital pores separated in third fifth of body. Vasa deferentia open together into robust seminal vesicle; prostate elongate, with thick musculature, ventral to seminal vesicle; small unarmed penis-papilla in shallow male antrum. Vagina simple, thrown into an anteriorly-directed loop, terminates in small Lang's vesicle. Two small vesicles attached to vagina at its union with Lang's vesicle.

***Stylochoplana robusta* (Palombi, 1928) du B. R. Marcus & Marcus, 1968**

Notoplana robusta Palombi, 1928

LOCALITY. Kabrit, Suez Canal, 21.10.1924.

DESCRIPTION. Palombi, 1928, 596.

DIAGNOSTIC FEATURES. Oval body fleshy, 3.5–6.5 mm long and 2–4.5 mm wide; dorsal surface chestnut brown. Tentacles absent. 6–8 tentacular eyes on each side of cerebral organ; cerebral eyes smaller, in two elongate clusters mainly anterior to tentacular eyes. Mouth central. Genital pores well separated in hind region of body. Vasa deferentia unite before opening into well-developed globular seminal vesicle; prostate pyriform, posterior to seminal vesicle; small penis-papilla bearing moderately long stylet in penis-pocket. Vagina externa thin walled; Lang's vesicle small.

***Stylochoplana simplex* sp.nov.**

LOCALITIES. Cape Province, South Africa. Among rock in 3–4 metres below LWST., Windmill Beach, False Bay (*Holotype*. B.M.reg.no. 1987.3.17.46); on rocks off Rooi Els in 16–19 metres, False Bay, 29.7.52; on rock in 12–14 metres, Roman Rock, False Bay, 23.9.54; on rock in 4–6 metres below LWST, Oakland Pt., False Bay; intertidal in cochlear zone, Froggy Pond, 28.8.54.

DESCRIPTION (Fig.12). Delicate elongate forms said to be 'white and frilly' when active, measuring up to 9 mm long and 3 mm wide. Eyes disposed in two elongate groups alongside cerebral organ; cerebral eyes anterior to larger tentacular eyes in each cluster. Pharynx has shallow marginal folds in mid-third of body. Genital pores widely separated. Male copulatory complex immediately posterior to pharynx. Vasa deferentia unite to open into proximal end of fusiform seminal vesicle directed antero-dorsally. Ejaculatory duct short, directed posteriorly from seminal vesicle to open into an elongate-oval prostate lined with a shallow epithelium. The prostate opens directly into a relatively large, conical, unarmed penis-papilla lying in a relatively deep male antrum. Vagina narrow and thrown into a long anteriorly-directed loop, but not reaching the male complex. Vagina externa short; 'shell'-chamber long; vagina interna short, into the proximal end of which open the uterine canals. The features of *S. simplex* are the very simple copulatory complexes, the widely-separated genital pores, the elongate prostate and the absence of Lang's vesicle.

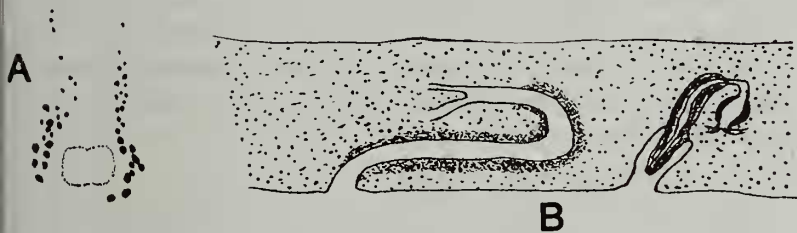


Fig.12 *Stylochoplana simplex*: A, tentacular and cerebral eye-clusters; B, sagittal section of copulatory organs.

***Stylochoplana suesensis* Palombi, 1939**

Stylochoplana angusta Palombi, 1928, *nec* Verrill, 1893

Notoplanides opisthopharynx Palombi, 1928

Stylochoplana opisthopharynx (Palombi) Faubel, 1983

LOCALITIES. Ferry Port, Suez Canal, 28.11.1924; dredged at Toussoum, Suez Canal, 29.11.1924.

DESCRIPTION. Palombi, 1928: 590, 599.

DIAGNOSTIC FEATURES. Delicate body brownish, somewhat darker dorsally; about 8 mm long and up to 3 mm wide. No tentacles. Eyes in two elongate clusters alongside cerebral organ. Pharynx posterior to middle of body. Separated genital pores in posterior region of body. Vasa deferentia may open together into seminal vesicle or by a short duct. Short ejaculatory duct unites seminal vesicle with pyriform prostate. Penis-papilla very small, unarmed. Vagina externa muscular; Lang's vesicle small.

NOTE. Palombi (1928) erected the genus *Notoplanides* with *opisthopharynx* as its type-species. This species was erected on a damaged and badly contracted specimen. The proposed new genus is based on the very close proximity of the genital

pores to the posterior margin of the body. But, as Palombi states, in the single specimen available to him, a portion of the hind region of the body is missing, so that the actual relationship of the genital pores to the posterior margin of the body in a complete specimen is not known.

Palombi also includes in *Notoplanides* an immature leptoplanid partially described by Bock (1923), from Easter Island, because of the posterior position of its pharynx. Palombi did not seem to realize that in young leptoplanids the pharynx tends to assume a posterior position, but with the development of the copulatory organs posteriorly to the pharynx the hind region of the body lengthens and the pharynx thereby moves to a more central position. On the other hand, du Bois-Reymond Marcus and Marcus (1968) have described *Notoplanides alcha* which has both pharynx and copulatory organs in hind third of body-length, but Faubel (1983) has transferred this species to *Stylochoplana* and this move is here accepted, because all gradations in the position of the pharynx between the anterior third and the posterior region of the body are to be found among species of this genus.

***Stylochoplana tenuis* Palombi, 1936**

LOCALITIES. South Africa. Cape Province (sublittoral fringe, Oakland Pt, False Bay, 12–10.54; intertidal cochlear zone, Oakland Pt., 12.10.54.). Natal (from hull of ship permanently moored at Salisbury Island, Durban Bay, 15.1.51; scraped from buoy at junction of Maydon and Congella Channels, Durban Bay, 24.4.52). Also known from Still Bay, Cape Town (Palombi, 1936), and from Shelley Beach, East London (Palombi, 1939).

DESCRIPTION. Palombi, 1936:13, 1939a:126.

DIAGNOSTIC FEATURES (Fig.13). Body rounded anteriorly, narrowing posteriorly, 5–17 mm long and 3–8 mm wide. Dorsal surface brownish or yellow-ochre, weakly tinged with grey, sometimes with a marginal reticulum of greyish. Without tentacles. Eyes in two elongate clusters alongside cerebral organ, larger tentacular eyes in hind region of each cluster. Pharynx more or less central. Genital pores approximate, and well separated from hind margin of body. Vasa deferentia open into proximal end of thick-walled seminal vesicle; latter elongate oval, curves antero-dorsally to open directly into elongate-oval or fusiform prostate with thick walls and lined with a smooth glandular epithelium; prostatic duct tortuous and opening into small penis-papilla coated with a cuticle and lying in a penis-pocket; penis-sheath present. Anteriorly looped thin-walled vagina reaches the male complex. Lang's vesicle bulbous.

NOTE. The terminal portion of the male copulatory complex as described by Palombi does not seem to agree well with his figure of a sagittal view of the complex. The penis-papilla is described as small, conical, without a stylet, but in his figure it appears as a large amorphous mass filling much of the male antrum. The complex is also said to be without a penis-pocket, but in the same figure there is a suggestion that such a pocket does occur.

The present specimens from South Africa agree well with Palombi's species from Still Bay, differing in the presence of a penis-pocket. The penis-papilla is exactly like the short, slender conical structure seemingly lying in a penis-pocket depicted by Palombi, but in the present specimens the papilla is covered with cuticle. It is, therefore, here considered that

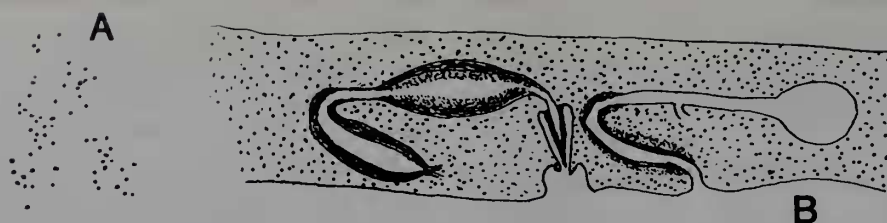


Fig. 13 *Stylochoplana tenuis*: A, tentacular and cerebral eye-clusters; B, sagittal section of copulatory organs.

Stylochoplana tenuis possesses a cuticle-covered penis-papilla lying in a penis-pocket.

Stylochoplana vesiculata Palombi, 1940

LOCALITIES. On reef covered with algae at Cabinda, Angola (Palombi) and among littoral rocks at Mocamedes, Praia das Conchas, Angola, 18.10.1949 (de Beauchamp).

DESCRIPTIONS. Palombi, 1940:113; de Beauchamp, 1951:75.

DIAGNOSTIC FEATURES. Body rounded oval, 10–16 mm in length and 6–8 mm in width. Yellowish dorsally, ash-grey ventrally. Tentacles retractile. Cerebral eyes in two elongate clusters, each with about 50 eyes, dense in each group anteriorly, decreasing in number posteriorly; tentacular eyes in two groups, each with about 40 eyes, laterally to cerebral eyes. Pharynx central. Genital pores separated at about four-fifth level of body length. Muscular seminal vesicle small, opens directly into well-developed pyriform prostate; small penis-papilla with stylet lying in penis-pocket. Vagina externa with thick muscular walls. Lang's vesicle large and pyriform; on side of narrow region of the vesicle there is a vesicular appendage, which suggests that Lang's vesicle might be horseshoe-shaped or crescentic later in its development.

Genus *NOTOPLANA* Laidlaw, 1903

DIAGNOSTIC FEATURES. Body more or less oval, sometimes cuneate. Short contractile tentacles may occur. Eyes in paired cerebral and tentacular clusters, which may be distinctly separated into four groups, or merged into two elongate clusters, the larger eyes in each cluster being tentacular. Pharynx central. Genital pores separated. Seminal vesicle well developed; ejaculatory duct projecting well into lumen of bulbous prostate lined with a tall epithelium containing longitudinal tubes lying parallel to duct; penis-papilla of variable development, sometimes covered with a cuticle or bearing a thin stylet. Vagina thrown into any anteriorly-directed loop; Lang's vesicle may be present.

Key to *Notoplana* species from African waters

- | | | |
|----|---|-------------------|
| 1 | Penis-papilla without stylet or cuticular covering | 2 |
| 1' | Penis-papilla with stylet or tipped with cuticle | 3 |
| 2 | Eyes in two elongate clusters | <i>gardineri</i> |
| 2' | Eyes in four distinctly separated clusters | <i>patellarum</i> |
| 3 | Long penis-stylet in penis-pocket | 4 |
| 3' | Penis-papilla large, tipped with cuticle; no penis-pocket | <i>alcinoi</i> |
| 4 | Sucker between genital pores | <i>cotylifera</i> |
| 4' | No genital sucker | 5 |
| 5 | Lang's vesicle small | <i>vitrea</i> |

- | | | |
|----|---|------------------|
| 5' | Lang's vesicle large and elongate | 6 |
| 6 | Vagina externa thin walled | <i>atlantica</i> |
| 6' | Vagina externa very muscular | <i>atomata</i> |

Notoplana alcinoi (Schmidt, 1861) Bock, 1913

Leptoplana alcinoi Schmidt, 1861

Notoplana igiliensis Galleni, 1974

LOCALITIES. Among nodules of nullipore in 9 to 18 metres. St Vincent Harbour, Cape Verde Is (Laidlaw, 1906); several localities along Moroccan coast (G. Bitar *leg.*) Apparently common in Mediterranean waters from the Iberian Peninsula to the Black Sea.

DIAGNOSTIC FEATURES. Body up to 20 mm in length, dorsal surface with brownish, yellow-brown, dark brown or greyish spots. Tentacles as shallow bosses, not always apparent. Eyes in two elongate groups, smaller cerebral eyes mostly anterior in each group, larger tentacular eyes posterior. Genital pores approximate in hind quarter of body. Seminal vesicle smaller than prostate; deep epithelial lining of prostate with 5–7, usually 6, longitudinal chambers. Large, elongate, conical penis-papilla muscular, tipped with cuticle. Vagina bulbosa developed; Lang's vesicle small.

NOTE. Galleni (1974) recognized the very close resemblance between *alcinoi* and his *igiliensis*, but differentiates the species only on size, on an arbitrary difference in the relative position of the cerebral and tentacular eye-clusters and on the union of the uterine canals anteriorly to the pharynx in *alcinoi* and their separation in *igiliensis*. The first two of these differences have no sound taxonomic value, and the third difference is no doubt due to specimens of *igiliensis* not being fully gravid, because among many leptoplanid genera the anterior confluence of the uterine canals does not appear until full development of the female complex is attained.

Notoplana atlantica Bock, 1913

Leptoplana nationalis Plehn, 1896

LOCALITY. Trawled at 120 metres, 8°S. 14.5°W., near Ascension I., Atlantic Ocean.

DESCRIPTION. Plehn, 1896b:6.

DIAGNOSTIC FEATURES. Delicate whitish worm, 9 mm long. Eyes in two elongate groups with 20–23 eyes in each group; larger tentacular eyes posterior to cerebral eyes in each group. Mouth central. Genital pores approximate, at about junction of middle and hind thirds of body. Vasa deferentia open independently into globular seminal vesicle; large globular prostate dorsal to seminal vesicle. Epithelial lining of prostate contains usual longitudinal chambers. Penis-papilla small, but tipped with a long stylet in a long penis-pocket.

Vagina spacious, thin walled; 'shell'-chamber long and narrow; Lang's vesicle elongate.

***Notoplana atomata* (Müller, 1776) Bock, 1913**

Planaria atomata Müller, 1776

Leptoplana atomata Johnston, 1865

LOCALITY. Port Said, Egypt, 15.12.1924 (Palombi, 1928).

DESCRIPTIONS. Bock, 1913:195; Hyman, 1939b:135.

DIAGNOSTIC FEATURES. Body may be oval or somewhat cuneate, up to 28 mm long and 13 mm wide; dorsal surface white or covered with various shades of brown, spotted with reddish brown or reddish brown with dark spots. No tentacles. Cerebral eyes in two elongate clusters extending anteriorly from cerebral organ; larger tentacular eyes in two clusters lateral to hind end of cerebral clusters. Mouth central. Genital pores separated. Vasa deferentia open separately into an arcuate or bulbous seminal vesicle. Prostate posterior to seminal vesicle, with epithelial lining containing 6 or 7 longitudinal chambers. Penis-papilla small, bearing a long stylet lying in a long penis-pocket. Vagina externa long and strongly muscular; Lang's vesicle elongate.

NOTE. There appears to be some uncertainty as to the accuracy of Palombi's determination of specimens from Port Said as *N. atomata*. This species ranges from Scandinavia to the English Channel and in the boreal regions of the Atlantic and Pacific coasts of North America. Delle Chiaje (1831 and 1841) provisionally identified specimens from Naples and Sicily as *Planaria atomata* Müller, but he expressed some doubt about his identification, as well as the occurrence of this species in the Mediterranean. It is, however, not possible to recognize delle Chiaje's specimens as *N. atomata* from his description. It seems, therefore, that the occurrence of this species at the Mediterranean entrance to the Suez Canal must at present be considered doubtful, especially as Palombi gave no description of his specimens. His specific determination does, however, imply that his specimens possess a long penis-stylet and the close relative of *N. atomata* possessing such a stylet and occurring in the Mediterranean is *Notoplana vitrea* (Lang). Hence, it is possible that Palombi's specimens and those of della Chiaje belong to this species, which, for this reason, is here included as a probable African form.

***Notoplana vitrea* (Lang, 1884) Bock, 1913**

Leptoplana vitrea Lang, 1884

LOCALITY. Mediterranean Sea.

DESCRIPTION. Lang, 1884:493.

DIAGNOSTIC FEATURES. Body delicate, cuneate, up to 40 mm long and 10 mm wide. Eyes in two elongate clusters, numerous cerebral eyes on either side of cerebral organ, larger tentacular eyes a little posterior and lateral to cerebral eyes. Mouth central. Genital pores near each other at about junction of middle and hind third of body and between them the musculature of the body-wall is thickened and the body-surface corrugated. Vasa deferentia open together into muscular arcuate seminal vesicle. Prostate well developed. From prostate, ejaculatory duct runs dorsally to open into small penis-papilla bearing long stylet in long penis-pocket. Distal portion of ejaculatory duct and penis-pocket enclosed

in a thick muscular sheath. Vagina externa with thick muscular wall; Lang's vesicle small.

NOTE. The features distinguishing *N. vitrea* from *N. atomata* are the thickening and corrugation of body-wall between genital pores, the long duct connecting prostate with penis-papilla and the small Lang's vesicle.

***Notoplana cotylifera* Meixner, 1907**

LOCALITIES. Eylath, Gulf of Aqaba (H. Steinitz *leg.*) Also recorded from Gulf of Tadjourah, Djibouti (Meixner, 1907) and in sponge associated with coral at Graa, Red Sea (Prudhoe, 1952). A specimen from Caesarea on Mediterranean coast of Israel has been determined by the writer as *N. cotylifera*.

DESCRIPTION. Meixner, 1907:448.

DIAGNOSTIC FEATURES. Body elongate oval, yellowish green and up to 24 mm long and 10 mm wide. Tentacles may be conical, with eyes at bases. Cerebral eyes in two elongate clusters between tentacles. Mouth in mid-third of body; pharynx short. Genital pores well separated, closely posterior to pharynx. Genital sucker between pores. Vasa deferentia open separately into seminal vesicle with thick musculature and narrow lumen. Prostate posterior to seminal vesicle, its tall epithelial lining containing 7 long tubes. Penis-papilla well developed, lined with a cuticle so that when the papilla is protracted it is covered with a cuticle. Male antrum spacious. Vagina externa short, 'shell'-chamber long; no Lang's vesicle.

NOTE. Meixner (1907) described and figured an anteriorly-directed pocket or a 'Rudiment einer accessorische Blase' in the middle of the vagina externa ('Eiergang'). The present specimens from the Gulf of Aqaba possess an accessory vesicle, but it arises from the anterior wall of the female antrum. Initially, this vesicle is lined with a tall epithelium, but its inner half appears to be merely a cavity in the parenchyme and without a recognizable lining. This cavity opens on the dorsal surface of the body, almost directly above the sucker lying between the genital pores. The dorsal aperture of this cavity is plugged with parenchymatous tissue. In the specimen from Caesarea there likewise appears to be an anteriorly-directed canal connected with the female antrum, but the cavity in the parenchyme is not yet developed, although the parenchyme in this region is exceptionally loose and could readily break down to form an ill-defined cavity.

***Notoplana patellarum* (Stimpson, 1855) Palombi, 1939**

Leptoplana patellarum Stimpson, 1855

Polycelis lyrosora Schmarda, 1859

Polycelis erythrotaenia Schmarda, 1859

Leptoplana patellensis Collingwood, 1876

Notoplana ovalis Bock, 1913

Notoplana erythrotaenia Stummer-Traunfels, 1933

Notocomplana erythrotaenia Faubel, 1983

LOCALITIES. Cape Province, South Africa (Steenberg, 21.2.1939; in 3–8 metres below LWST., Glencairn Rocks, False Bay, 17.2.1953; intertidal, St. James, 1.9.1956; on rocks 'from LWST to 1 ft. higher', Oatland Pt, False Bay, 20.9.1954; low tide level on rock at mouth of Breede River Estuary, 5.7.1951. Usually found on rocks, or living between mantle and foot of *Patella*, particularly *P. oculus*; common along

coast of Cape Province from Table Bay eastwards to East London (Stimpson, 1855:389; Schmarda, 1859:24; Collingwood, 1876:93; Palombi, 1936:18 and 1939a:128). Has also been found in Mauritius, Indian Ocean (Bock, 1913:212).

DESCRIPTIONS. Bock, 1913:212; Palombi, 1939a:128.

DIAGNOSTIC FEATURES. Fleshy broadly-oval body, up to 17 mm long and 10.5 mm wide. Dorsal surface in varying shades of yellow with a wide brown or reddish central band; ventral surface greyish yellow. Tentacles may not be apparent or appear as shallow protuberances or bosses. Eyes in two separate cerebral groups and two tentacular groups. Mouth central; pharynx 4–5 mm long with 5 to 7 pairs of lateral folds. Genital pores in middle of hind third of body. Vasa deferentia unite to open into dorso-ventrally arcuate muscular seminal vesicle. Prostate posterior to seminal vesicle; its epithelium contains 8 longitudinal chambers. Penis-papilla robust, filling male antrum provided with tall glandular epithelial lining. Female antrum short and narrow; 'shell'-chamber long and narrow. Lang's vesicle small.

NOTE. Faubel (1983) erected the genus *Notocomplana* with *Leptoplana humilis* Stimpson, 1857, as its type-species and listed *Notoplana erythrotaenia* Stummer-Traunfels, 1933, = *N. patellarum* among its species. Included in the list are *N. evelinae* (Marcus, 1947), the type-species of the genus *Pucelis* Marcus, 1947, and *N. litoricola* (Heath & McGregor, 1913), the type-species of the genus *Freemania* Hyman, 1953. If the two latter species be accepted as congeners of *N. humilis*, then the name *Notocomplana* has no validity, according to Article 23 of the International Code of Zoological Nomenclature.

Notoplana gardineri (Laidlaw, 1904) Bock, 1913

Leptoplana gardineri Laidlaw, 1904

LOCALITY. Under rock near low-tide mark at Sherm Sheik, Red Sea (Prudhoe, 1952); also record from Sri Lanka (Laidlaw, 1904).

DESCRIPTIONS. Laidlaw, 1904:133; Prudhoe, 1952:176.

DIAGNOSTIC FEATURES. Body oval, yellowish white, somewhat pellucid; 16 mm in length and 7.5–9 mm in maximum width. Without tentacles. Eyes in two elongate clusters, smaller cerebral eyes anterior, larger tentacular eyes posterior. Pharynx central, much folded laterally. 4.5 mm long. Genital pores closely separated. Vasa deferentia unite to open into muscular arcuate seminal vesicle. Prostate elongate, dorsal and posterior to seminal vesicle; its tall glandular lining with 7 longitudinal chambers. From the prostate, the ejaculatory duct passes through a thick muscular sheath to enter a small unarmed penis-papilla lying in shallow male antrum. Female copulatory system has not yet been fully described, but does include a small Lang's vesicle.

Genus *NOTOPLANELLA* Bock, 1913

DIAGNOSTIC FEATURES. Body without tentacles. Eyes in two elongate clusters alongside cerebral organ. Pharynx in mid-third of body. Arcuate seminal vesicle linked with prostate by a short ejaculatory duct. Prostate large, elongate-oval, dorsal to seminal vesicle and lined with a deep epithelium thrown into radial folds; penis-papilla shallow. Vagina weakly developed, without Lang's vesicle.

NOTE. Faubel (1983) has placed *Notoplanella* in the family Cryptocelididae, but it is difficult to understand the reason for this action, except that it may have been induced by the fact that the epithelial lining of the prostate is thrown into radial folds. However, the gross morphology of *Notoplanella* is typically that of the leptoplanids.

Notoplanella inarmata Bock, 1931

LOCALITIES. Cape Province, South Africa (dredged in 19 metres, 34°12.9'S. 18°49.1'E., 16.2.65; Danger Point, 5.7.1939; Saldanha Bay, 27.4.1964; Langebaan, Saldanha Bay, 28.4.1949 and 8.5.1953). Also Simon's Bay, near Cape Town (Bock, 1931:272).

DESCRIPTION. Bock, 1931: 272.

NOTE. The fully mature specimen available to the writer agrees well with Bock's description of *N. inarmata*. There is a considerable thickening of the musculature of the body-wall around the genital pores, especially the female, and might give the female antrum the appearance of being a vagina bulbosa. This feature is little developed in a younger specimen.

Genus *ZYGANTROPLANA* Laidlaw, 1906

DIAGNOSTIC FEATURES. Elongate to elongate-oval forms without tentacles. Eyes in paired cerebral and tentacular groups or in two elongate clusters alongside the cerebral organ. Pharynx mainly posterior to middle of body. Copulatory complexes open into a common atrium or closely associated genital pores adjacent to posterior margin of body. Male and female copulatory complexes directed anteriorly from their respective openings, the male lying ventrally to female. Seminal vesicle moderately developed; prostate lined with smooth shallow epithelium; penis-papilla small. Vagina long, dorsal to male organs and terminating in a large Lang's vesicle. Uterine canals short.

Zygantriplana verrilli Laidlaw, 1906

LOCALITY. Among weeds in St Vincent Harbour, Cape Verde Is (Laidlaw, 1906).

DESCRIPTION. Laidlaw, 1906:709.

Family *GNESIOCEROTIDAE* Marcus & Marcus, 1966, emend. Prudhoe, 1982

DIAGNOSTIC FEATURES. Elongate-oval forms. Eyes in two elongate clusters alongside cerebral organ or in paired cerebral and tentacular clusters. Pharynx in mid-third of body or somewhat anterior, much folded marginally. Genital pores separated. Vasa deferentia may form a pair of spermiducal bulbs before opening into a true seminal vesicle or prostate. Prostate interpolated between sperm ducts or seminal vesicle and an eversible cirrus-sac. Cirrus-sac may contain a long cuticularized papilla or be lined with cuticle thrown into transverse ridges, but more often lined with bristles, spines or hooks; with thick musculature which may also invest the prostate. Vagina simple often with Lang's vesicle.

Key to gnesiocerotid genera from African waters

- 1 Ejaculatory papilla projecting into lumen of prostate 2
 1' Without papilla in prostate *Gnesioceros*
- 2 Pyriform glandular organ in anterior wall of male antrum *Neoplanocera*
 2' Without such an organ 3
- 3 Genital sucker with corrugated surface between genital pores *Echinoplana*
 3' Highly glandular epithelium around genital pores *Gabiella*

Genus *GNESIOCEROS* Diesing, 1861

DIAGNOSTIC FEATURES. Pellucid cuneate forms. Conical tentacles contain eyes; cerebral eyes in two scattered groups lateral to cerebral organ and between tentacles. Intestinal branches not anastomosing. Genital pores separated. Seminal vesicle well developed, opening directly into oval prostate lined with an epithelium thrown into deep radial folds. Conical cirrus lined with several transverse serrated ridges of cuticle. Vagina externa with wide glandulo-muscular fold invested with gland-cells. Lang's vesicle U-shaped or crescentic, limbs directed anteriorly.

***Gnesioceros sargassicola* (Mertens, 1832) *sensu* Graff (1892)**

Planaria sargassicola Mertens, 1832
Stylochus pelagicus Moseley, 1877
Stylochoplana sargassicola Graff, 1892

LOCALITIES. Off West African coast (21°–35°N., 36°–38°W.) (Mertens, 1832); off West African coast (9°21'N., 18°25'W. and 5°48'N., 14°20'W.) (Moseley, 1877); West Africa and Madeira (Graff, 1892); dredged in about 2 metres at Boa Vista, Cape Verde Is (Laidlaw, 1906).

DESCRIPTIONS. Mertens, 1832:13; Moseley, 1877:24; Graff, 1892:207; Hyman, 1939c:11; du B.-R. Marcus & Marcus, 1968:48.

Genus *ECHINOPLANA* Haswell, 1907

DIAGNOSTIC FEATURES. Elongate forms without tentacles. Eyes in two elongate groups alongside cerebral organ. Pharynx mainly in anterior half of body; intestinal branches anastomosing. Genital sucker with corrugated surface between genital pores. Seminal vesicle elongate; prostate muscular and elongate, lined with smooth epithelium and joined with cirrus-sac by a convoluted ejaculatory duct invested with a mass of muscle-fibres. Very muscular cirrus-sac lined with spines. No male antrum. Vagina narrow, anteriorly directed from female pore, invested with 'shell'-glands in its inner and outer regions. Lang's vesicle rudimentary.

***Echinoplana celerrima* Haswell, 1907**

LOCALITIES. Cape Province, South Africa (on vertical rock in 2–4 metres below LWST., Oakland Pt, False Bay, 10.6.1953; from mud under water at Hell's Gate, St Lucia Lakes, Saldanha Bay, 21.7.1949; among *Zostera* at tip of Point I. and from Charter's Creek, St Lucia Lakes, Saldanha Bay

5.7.1948.); Israel (Eylath, Gulf of Aqaba, Red Sea, May 1947, L. Fishelson & Cl. Lewinsohn *leg.*) This species appears to be widely distributed, having hitherto been recorded from southern Australia (Haswell, 1907; Prudhoe, 1982b) and from the Mediterranean Sea (Galleni, 1978).

DESCRIPTIONS. Haswell, 1907:475; Galleni, 1978:139; Prudhoe, 1982b:377.

Genus *GABIELLA* gen.nov.

DEFINITION. Gnesiocerotidae without tentacles. Eyes in two elongate clusters alongside cerebral organ. Pharynx with few lateral folds in mid-third of body. Genital pores separate, in depression lined with well-developed glandular epithelium in ventral wall of body. Seminal vesicle fusiform, ventro-dorsally disposed; ejaculatory duct opens through long papilla projecting into lumen of globular prostate lined with tall epithelium thrown into radial folds. Cirrus-sac lined with spines decreasing in size towards either end of sac. Prostate and cirrus-sac enclosed in weakly-developed musculature. Male antrum absent. Vagina thrown into an anteriorly-directed loop. Lang's vesicle small.

TYPE-SPECIES. *Gabiella in hacensis* gen.nov., sp.nov.

***Gabiella in hacensis* sp.nov.**

LOCALITY. Among *Favia* opposite beacon on western shore, Inhaca I., Mozambique, July 1958 (V. Gabie *leg.*) B.M.reg.no. 1985.7.3.1/2 syntypes.

DESCRIPTION (Fig.14). According to a water-coloured painting of the living worm, the body is light brown, with a darker brown median band. The body measures 9.7 to 12 mm long and a more or less uniform width of about 3 mm. Eyes in two elongate groups, each with 14 to 24 eyes, some of which are larger and more deeply pigmented than the remainder and represent tentacular eyes. Weakly-developed pharynx about 2 mm long.

Male and female genital pores situated at about midway between pharynx and posterior margin of body. Both lie in a depression of the body-wall lined with a wrinkled epithelium containing relatively large gland-cells. Vasa deferentia appear on either side of median line, near hind end of pharynx. They extend posteriorly as swollen convoluted canals to just anterior to the male pore, where they unite in the median line to form a very short common canal opening into the hind end or ventral wall of a seminal vesicle. This vesicle is thin-walled, somewhat fusiform with its long axis disposed dorso-ventrally against the anterior of the prostate. Dorsally a short ejaculatory duct runs posteriorly from the seminal vesicle to open into a ventrally-directed prostate through a long papilla projecting into its lumen. The prostate is oval, provided with a thick muscular wall and lined with a tall epithelium thrown into several deep radial folds. The prostate opens through a short duct into a narrow cirrus-sac lined with many spines of variable size, the larger spines occurring in the middle of the sac and gradually diminishing in size towards the proximal and distal ends of the sac. The latter opens directly to the exterior through the male pore, which lies at about 2.5 mm from the posterior margin of the body. The cirrus-sac and the prostate are enclosed in a feebly-developed muscular sheath. Male antrum not apparent. Vagina externa directed

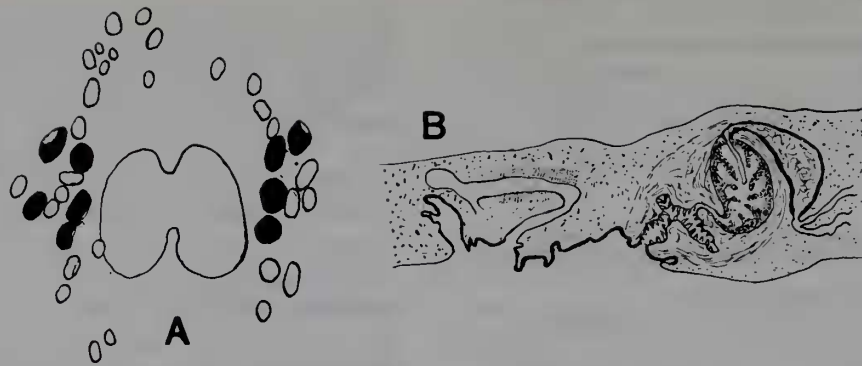


Fig. 14 *Gabiella inhacensis*: A, cerebral and tentacular eye-clusters; B, sagittal section of copulatory organs.

antero-dorsally from female pore to near cirrus-sac, where it turns posteriorly to enter a narrow 'shell'-chamber. Throughout its length this chamber is surrounded by numerous 'shell'-glands. A little beyond the hind end of the 'shell'-chamber, the vagina receives the common duct of the uterine canals and, shortly beyond, the vagina ends in a small rounded Lang's vesicle. Vagina lined with a ciliated epithelium, whereas Lang's vesicle is lined with relatively large vacuolate cells. Uterine canals not anteriorly confluent.

NOTE. The above-described form bears a strong resemblance to *Echinoplana celerrima* Haswell, but differs in possessing a highly glandular epidermis around the genital pores, in the distribution of 'shell'-glands and in the presence of a long ejaculatory papilla projecting into the lumen of the prostate lined with a tall glandular epithelium thrown into deep radial folds. These differences appear to warrant the erection of a new genus here named *Gabiella* in honour of Dr Vivien Gabie, formerly of the Witwatersrand University, who has collected many interesting polyclads from the Mozambique Island of Inhaca.

Genus *NEOPLANOCERA* Yeri & Kaburaki, 1918

Cirroposthia Steinböck, 1937

DIAGNOSTIC FEATURES. Eyes in two elongate clusters. Body without tentacles. Pharynx in mid-third of body. Seminal vesicle elongate, thin-walled; elongate prostate lined with tall smooth epithelium and dorsal to seminal vesicle; cirrus-sac lined with spines or stiff bristles; prostate and cirrus-sac not enclosed in muscular sheath. Independent pyriform glandular organ lies ventrally to cirrus-sac and opens into male antrum. Vagina short and narrow. Lang's vesicle rudimentary or not apparent.

NOTE. Faubel (1983) stated that a 'true prostatic vesicle is lacking' in *Neoplanocera*, but he appears to have overlooked Kato's (1937) redescription of the type-species, *N. elongata*, in which it is shown that the genus possesses a distinct prostate. Moreover, Faubel also includes *Cirroposthia steueri* Steinböck in the genus *Neoplanocera* and in which Steinböck found a genuine interpolated prostate.

Neoplanocera steueri (Steinböck, 1937) Marcus, 1947

Cirroposthia steueri Steinböck, 1937

LOCALITY. Among algae in eastern harbour of Alexandria, Egypt (Steinböck). A specimen from Tel Aviv, Israel, was

included in the collection sent to the writer for identification by Dr H. Steinitz.

NOTE. While the Israeli specimen is rather larger than that described by Steinböck, it otherwise agrees very well with the structure of the copulatory complexes of *N. steueri*.

Family *PLANOCERIDAE* Lang, 1884

DIAGNOSTIC FEATURES. Elongate to discoid forms, often with nuchal tentacles. Eyes in paired tentacular and cerebral clusters, or in two elongate groups at sides of cerebral organ. Pharynx central. Genital pores well separated from posterior margin of body. Male copulatory complex closely posterior to pharynx, anterior to male pore. Seminal vesicle or a pair spermiducal bulbs present. Prostate independent. Eversible cirrus-sac lined with spines. Vagina variably developed, sometimes with a muscular bursa, either as a vaginal bursa or a bursa copulatrix. Lang's vesicle variably developed.

Key to planocerid genera from African waters

- | | | |
|----|---|----------------------|
| 1 | Without nuchal tentacles; eyes in two elongate clusters | <i>Disparoplana</i> |
| 1' | With nuchal tentacles; eyes in separated cerebral and tentacular clusters | 2 |
| 2 | With seminal vesicle; no spermiducal bulbs | 3 |
| 2' | With spermiducal bulbs; no seminal vesicle | <i>Paraplanocera</i> |
| 3 | Eyes at base of tentacles | <i>Planocera</i> |
| 3' | Eyes within and at base of tentacles | <i>Planocerodes</i> |

Genus *PLANOCERA* Blainville, 1828, *sensu* Lang (1884)

DIAGNOSTIC FEATURES. Large discoid or oval forms with slender nuchal tentacles. Eyes at base of tentacles; four ill-defined groups of cerebral eyes between tentacles. Pharynx with 4 to 6 pairs of deep lateral folds; intestinal trunk with 5 to 8 pairs of non-anastomosing lateral branches. Seminal vesicle strongly muscular; prostate bulbous and muscular with deeply folded epithelial lining; cirrus-sac lined with small spines, sometimes with one or more large spines or thorns at opening of sac into male antrum; ejaculatory duct and proximal region of cirrus-sac surrounded by a mass of loose connective tissue enclosed in a thick muscular sheath. Vagina bulbosa present. Lang's vesicle variable; uterine canals anteriorly separated.

Key to *Planocera* species from African waters

- 1 With one or more thorn-like hooks among small spines in cirrus-sac 2
 1' Cirrus-sac lined only with small spines 3
 2 With one thorn-like hook *pellucida*
 2' With three large thorn-like hooks on opening of cirrus-sac *crosslandi*
 2' With several small thorn-like hooks on opening of cirrus-sac *uncinata*
 3 Vasa deferentia open into seminal vesicle by common canal *graffii*
 3' Vasa deferentia open separately into seminal vesicle *gilchristi*

***Planocera crosslandi* Laidlaw, 1903**

LOCALITIES. Dredged in about 20 metres off mainland coast of East Africa (Laidlaw, 1903); associating with corsal, Sherm Sheik, Red Sea (Prudhoe, 1952).

DESCRIPTIONS. Laidlaw, 1903a:100; Prudhoe, 1952:175.

***Planocera gilchristi* Jacobowa, 1906**

LOCALITIES. Cape Province, South Africa (Quolora, 20.5.1939; Danger Point, 5.7.1939; among sand and loose weed in 1.5 to 1.8 metres in channel, Knysna Estuary, 16.7.1947; Great Brak River Estuary, 3.5.1950). Natal (Port Edward, 30.13.1938) (Day colln.). Fairly common, living under stones, but sometimes found creeping on exposed rock in pools, near Marine Laboratory, Cape Town, South Africa (Jacobowa, 1907). Still Bay, Cape Province 4.1.1932 (Palombi, 1936). Shelley and Bat's Cave Rocks, East London, Cape Province, 10–12.7.1937 (Palombi, 1939).

DESCRIPTIONS. Jacobowa, 1908:145; Palombi, 1936:23, 1939a:129.

***Planocera graffii* Lang, 1879**

LOCALITY. Dredged in about 2 metres, Boa Vista, Cape Verde Is (Laidlaw, 1906:706).

DESCRIPTION. Lang, 1884:434.

***Planocera pellucida* (Mertens, 1832) Örsted, 1844**

Planaria pellucida Mertens, 1832

Stylochus pelagicus Moseley, 1877

LOCALITIES. Atlantic Ocean 7°48'N. 23°56'W. (Mertens, 1832); off West African coast, 9°21'N. 18°25'W. and 5°48'N. 14°20'W. (Moseley, 1877); Cape of Good Hope, South Africa, and off north-east coast of Cape Verde Is (Graff, 1892:7.11); off Cape Town and Port Natal, South Africa (Bock, 1913); mid and South Atlantic and Red Sea (Faubel, 1983).

DESCRIPTIONS. Graff, 1892:195; Bock, 1913:240; Moseley, 1877:24; Kato, 1938:231; Faubel, 1983:77.

NOTES. Graff (1892:211) thought that Moseley may have described two species, *Planocera pellucida* and *Gnesioceros sargassicola*, under *Stylochus pelagicus*. The descriptions of this species by Graff (1892), Bock (1913) and Faubel (1983) do not mention the presence of a relatively large hooked

spine at the connection of the cirrus-sac and the male antrum, as found by Kato (1938) and seen by the present writer in a North Sea specimen steeped in methyl salicylate for about 24 hours.

***Planocera uncinata* Palombi, 1939**

LOCALITIES. Cape Province, South Africa: (Home Wood Beach, Port Elizabeth, 10.7.1936; Bat's Cave Rock, East London, 12.7.1937—Palombi, 1939,129); (The Haven, 9.1.1939 and from rocks, 2.4 km from mouth of Buchman's River Estuary, 10.9.1950—Day colln.)

Genus *PLANOCERODES* Palombi, 1936

DIAGNOSTIC FEATURES. Large broadly-oval forms with slender nuchal tentacles. Cerebral eyes in two irregular clusters between tentacular eyes within and at base of each tentacle. Intestinal branches not ramifying. Seminal vesicle small. Prostate large. Ductus communis prolonged into a large conical papilla covered with series of spines and lying in tubular spacious cirrus-sac. Female copulatory complex similar to that in *Planocera*.

NOTE. Palombi (1936) recognized the very close resemblance between *Planocerodes* and *Planocera*, but claimed that the former may be differentiated by the presence of eyes within and at the base of each tentacle and by the presence of a spiny penis-papilla. The difference in the disposition of the tentacular eyes is merely a specific feature, as found in the genus *Paraplanocera*, while the large conical spiny penis-papilla lying in the cirrus-sac of *Planocerodes ceratommata* is similar to the partially protracted inner region of the cirrus-sac sometimes found in *Planocera gilchristi*.

***Planocerodes ceratommata* Palombi, 1936**

LOCALITY. Still Bay, Cape Province, South Africa, 4.1.1932 (Palombi, 1936).

DESCRIPTION. Palombi, 1936:25.

NOTE. Faubel (1983) is probably justified in transferring this species to the genus *Planocera*, but for certainty it requires the careful re-examination and redescription of specimens of *Planocera gilchristi* in various stages of development. A paratype specimen of *P. ceratommata* has been examined by the present writer but it is in very poor condition.

Genus *PARAPLANOCERA* Laidlaw, 1903

DIAGNOSTIC FEATURES. Broadly-oval forms with slender nuchal tentacles. Eyes in paired tentacular and cerebral clusters. Pharynx with 4–7 pairs of deep lateral folds. Two spermiducal bulbs; no seminal vesicle; prostate bulbous, two chambered, with epithelium thrown into deep lateral folds. Cirrus-sac lined with spines. Short ejaculatory duct and much of the cirrus-sac in an intermuscular space filled with connective tissue; thick muscular sheath encloses prostate and cirrus-sac. One pair of glandular pockets open into male antrum. Posteriorly-directed bursa copulatrix well developed. Lang's vesicle large.

Key to *Paraplanocera* species from African waters

- 1 With reddish submarginal band dorsally; spermiducal bulbs open into posterior chamber of prostate *marginata*
 1' Without submarginal band; spermiducal bulbs open into prostatic duct *aurora*

Paraplanocera aurora Laidlaw, 1903

LOCALITY. Coast of Zanzibar (Laidlaw, 1903). Known also from Sri Lanka (Laidlaw, 1904).

DESCRIPTION. Laidlaw, 1903a:102. Prudhoe, 1945:200.

Paraplanocera marginata Meyer, 1922

Paraplanocera rubrifasciata Kato, 1937

LOCALITIES. Red Sea (Meyer, 1922); on sand-flats of Bamburi, near Mombasa, Kenya (Prudhoe, 1945); Tor, Red Sea, 3.1.1957 (H. Steinitz leg.). Known also from Japan and the Persian Gulf.

DESCRIPTIONS. Meyer, 1922:139; Prudhoe, 1945:195.

NOTE. Dr Steinitz found the 'Body yellowish. Margin with a garland-like pattern of violet. Central portion of ventral side white'. The present writer has also seen a specimen from Australia with a white body bearing a narrow submarginal band of black.

Genus *DISPAROPLANA* Laidlaw, 1903

DIAGNOSTIC FEATURES. Body elongate, without tentacles. Eyes in two elongate clusters alongside cerebral organ. Mouth anterior to middle of body. Genital pores adjacent. Seminal vesicle bulbous; prostate not interpolated, opens directly into cirrus-sac alongside opening of ejaculatory duct; cirrus-sac relatively small, lined with spines. Thick musculature envelops prostate and cirrus-sac. Female antrum spacious; 'shell'-chamber short; Lang's vesicle small.

Disparoplana dubia Laidlaw, 1903

LOCALITY. East Africa (Zanzibar) (Laidlaw, 1903).

DESCRIPTION. Laidlaw, 1903a:103.

Family CALLIOPLANIDAE Hyman, 1953

DIAGNOSTIC FEATURES. Discoid or oval forms. Nuchal tentacles well developed, with eyes in lower half of each tentacle; cerebral eyes in two clusters between tentacles. Pharynx in mid-third of body. Genital pores adjacent to one another, well separated from posterior margin of body. Male copulatory complex anterior to its pore; with spermiducal bulbs or seminal vesicle; prostate vesicular, independent, dorsal to ejaculatory duct or seminal vesicle. Vagina long and narrow, thrown into an anteriorly-directed loop.

Key to callioplanid genera from African waters

- 1 Lang's vesicle horseshoe shaped *Callioplana*
 1' Lang's vesicle bulbous *Stylochoposthia*

Genus *CALLIOPLANA* Stimpson, 1857

DIAGNOSTIC FEATURES. Oval forms with prominent tentacles. Intestinal branches occasionally anastomosing. Seminal vesicle small, elongate, thin-walled; prostate small elongate, dorsal to seminal vesicle. Ejaculatory duct and prostatic duct pass through penis-papilla to open into male antrum. No penis-pocket. Vagina long, dorsal to male complex. Lang's vesicle horseshoe-shaped, with anteriorly-directed limbs.

Callioplana marginata Stimpson, 1857

LOCALITY. Inhaca I., Mozambique (on sand-flats in front of Marine Biol.Station (V. Gabie leg.) and under stones at low tide (M. Beverley-Burton leg.)) Known also from Sri Lanka, Japan and Australia.

DESCRIPTIONS. Yeri & Kaburaki, 1918:32; Stummer-Traunfels, 1933:3561; Kato 1944:289.

Genus *STYLOCHOPOSTHIA* Faubel, 1983

Faubel (1983) erected the genus *Stylochoposthia* for *Pseudostylochus bellus* Hyman, 1959, presumably because it possesses a common genital pore and a penial stylet, features not known to occur among other species assigned to the genus *Pseudostylochus*. The new species of *Stylochoposthia*, described below, is also without these two features, but in agreement with *S. bella* it has a very long looped vagina which extends anteriorly well beyond the male copulatory complex not found in *Pseudostylochus*. The new species requires *Stylochoposthia* to be redefined.

DIAGNOSTIC FEATURES. Broadly-oval or discoid forms of firm consistency. Tentacles well developed; ring of eyes at base of each. Cerebral eyes in two loose clusters between tentacles. Pharynx with 5 or 6 pairs of lateral folds. Male copulatory complex elongate, enclosed in thick sheath of connective tissue. Seminal vesicle muscular and fusiform; small prostate lined with tall epithelium thrown into longitudinal folds. Long vagina forming an anteriorly-directed loop dorsally to male complex. Lang's vesicle small and bulbous. Uterine canals not anteriorly confluent.

Stylochoposthia inhacae sp.nov.

LOCALITY. West shore coral reef between village and Marine Biol.Stat., Inhaca I., Mozambique (V. Gabie leg.) B.M.reg. no.1985.7.8.27-30 (syntypes).

DESCRIPTION (Fig.15). Body up to 63 mm in length and 50 mm in maximum width. Dorsal surface of the living worm is yellowish brown speckled with brown, except for a narrow marginal band clear of such markings. In the lateral fields of the dorsal surface, there is an irregular row of bluish areolae larger than the brown speckles. The pharynx and uterine canals appear as red-brown longitudinal bands, and the copulatory complexes as a somewhat trilobed reddish brown mass. Ventrally, the body is also yellowish brown, but with no speckling.

A pair of long reddish brown tentacles is situated at about one-third of the body-length from anterior margin. Arrangement of eyes typical of family Callioplanidae (Fig.15). Mouth in mid-third of body; pharynx with 5 pairs of lateral folds; intestinal branches appear not to anastomose.

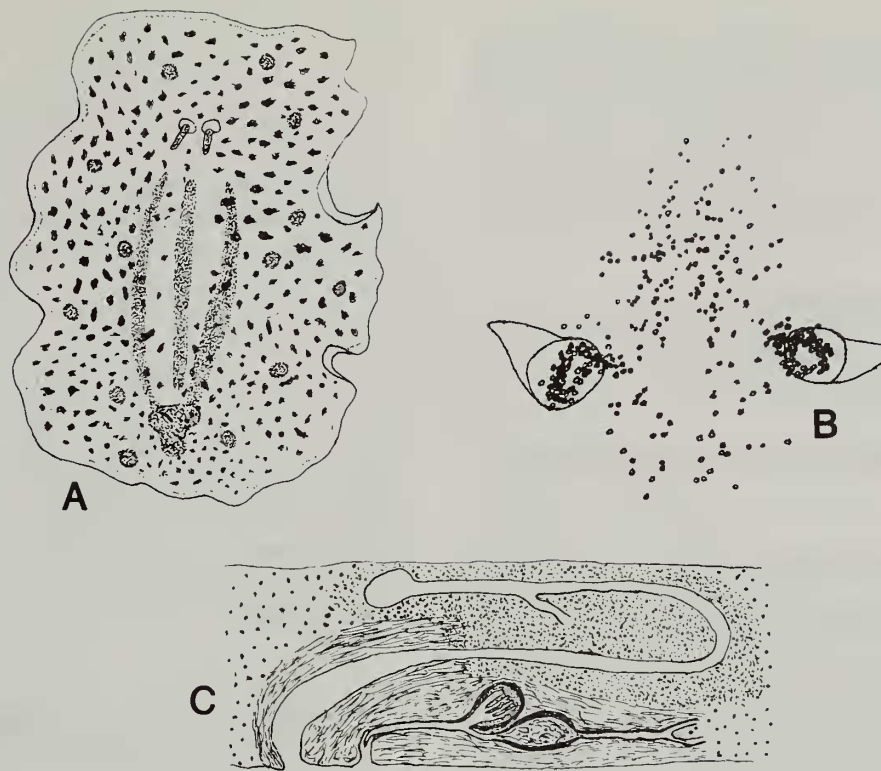


Fig.15 *Stylochoposthia inhacae*: A, dorsal surface of body in life; B, tentacles and eyes; C, sagittal section of copulatory organs.

Male genital pore at about 0.2 mm anteriorly to female, which lies at about 2 mm from posterior margin of body. Male copulatory complex lies anteriorly to its pore. Thin-walled sperm-ducts arise at a level a little posteriorly to that of the genital pores and extend anteriorly to beyond the male complex. At this point they become convoluted, much swollen and turn towards the median line, where they unite to form a narrow duct lying ventrally to the 'shell'-chamber of the female complex. This duct, a vas deferens, is relatively long and runs posteriorly to open into an elongate muscular seminal vesicle. Postero-laterally to the seminal vesicle, lies a small rounded prostate lined with a tall glandular epithelium thrown into four deep longitudinal folds arising from the anterior wall. From the seminal vesicle, an ejaculatory duct runs posteriorly and at a point ventrally and posteriorly to the prostate it receives a short prostatic duct to become a ductus communis. This duct is long and enclosed in a thick sheath of connective tissue and extends posteriorly to a small unarmed penis-papilla lying in the male antrum.

From the female genital pore, the vagina is thrown into a long anteriorly-directed loop reaching in the dorsal parenchyma to a level beyond the male copulatory organs. The vagina externa runs antero-dorsally to above the prostate where it becomes the vagina media. It is enclosed along its length by a thick sheath of connective tissue. The vagina media or 'shell'-chamber is invested with an exceptionally large mass of 'shell'-glands. At its anterior limit, the vagina turns sharply posteriorly near the dorsal wall of the body, soon to receive the common uterine duct and terminate in a very small Lang's vesicle. Uterine canals anteriorly separated.

Superfamily **CESTOPLANOIDEA** Poche, 1926, emend. Prudhoe (1982a)

DIAGNOSTIC FEATURE. Eyes widely distributed over cephalic region of body, except in marginal zone.

Key to cestoplanoid families from African waters

- 1 Pharynx in posterior third of body *Cestoplanidae*
- 1' Pharynx in anterior third of body . . *Emprostopharyngidae*

Family **CESTOPLANIDAE** Lang, 1884

DIAGNOSTIC FEATURES. Elongate to ribbon-like forms, sometimes with a ventral, adhesive pad near posterior end of body. Tentacles absent. Eyes numerous, distributed fanwise anteriorly from just posterior to cerebral organ to sub-marginal zones of cephalic region. Mouth and pharynx posterior; intestinal trunk long, with many pairs of non-anastomosing branches. Testes and ovaries in rows alongside intestinal trunk. Genital pores separate. Male copulatory complex dorsal or posterior to its pore; seminal vesicle well developed; prostate pyriform, interpolated and lined with smooth epithelium; penis-papilla variably developed. Duplicate male complex may occur. Vagina short, in dorso-posterior loop; 'shell'-chamber spacious, often dorso-ventrally compressed. Lang's vesicle may be present.

Genus **CESTOPLANA** Lang, 1884

DIAGNOSTIC FEATURES. With characters of family

Key to Cestoplana species from African waters

- 1 With multiple female copulatory complexes *polypora*
- 1' With single female copulatory complex 2
- 2 Dorsal surface of body with 3 longitudinal bands of red *rubrocincta*
- 2' Dorsal surface with 3 longitudinal bands of yellow *filiformis*

***Cestoplana rubrocincta* (Grube, 1840)**

LOCALITIES. Under stones at low tide, Boa Vista, Cape Verde Is (Laidlaw, 1906); East Beach, Pram Pram, Ghana (Miss M. A. Tazelaar *leg.*). Known also from English Channel, the Mediterranean and Japan.

DESCRIPTIONS. Lang, 1884:516; Stummer-Traunfels, 1933:3573; Kato, 1937a:225.

***Cestoplana filiformis* Laidlaw, 1903**

LOCALITY. East African coast (Laidlaw, 1903).

DESCRIPTION. Laidlaw, 1903a:110.

NOTE. Kato (1937a) regarded this species as a variety of *C. rubrocincta*.

***Cestoplana polypora* Meyer, 1922**

LOCALITY. Koseir, Red Sea. (Meyer, 1922).

DESCRIPTION. Meyer, 1922:149.

NOTE. Faubel (1983) erected the genus *Cestoplanoida* for this species on account of its multiple female copulatory complexes.

Family EMPROSTHOPHARYNGIDAE Bock, 1913

DIAGNOSTIC FEATURES. Elongate-oval forms, without tentacles. Cerebral and tentacular eye-clusters distinct, the latter slightly posterior to level of former; submarginal eyes arranged in an irregular band of varying width and length; few frontal eyes may lie between submarginal eyes and cerebral eye-clusters. Pharynx closely posterior to cerebral organ; intestinal trunk reaching to copulatory organs; intestinal branches not anastomosing. Genital pores separated in posterior region of body. Male copulatory complex anterior to its aperture. Vasa deferentia unite to form a long muscular canal leading to muscular seminal vesicle; pyriform prostate interpolated, with smooth epithelium, its distal end forms base of penis-papilla, occasionally bearing a stylet. Vagina forms a short anteriorly-directed loop; Lang's vesicle absent; uterine canals anteriorly separated.

Genus EMPROSTHOPHARYNX Bock, 1913

DIAGNOSTIC FEATURES. With characters of family.

***Emprosthopharynx vanhoffeni* Bock, 1931**

LOCALITY. Sao Vicenta, Porto Grande, Cape Verde Is and Morocco (Bock, 1931); Port Etienne, Mauretania (de Beauchamp, 1951b); near Accra, Ghana, 9.9.1955 (J. D. Thomas *leg.*).

DESCRIPTION. (Fig. 16). Bock, 1931:268.

NOTE. The Ghanaian specimen is immature and much larger than the type-specimen of *E. vanhoffeni*, and the submarginal band of eyes extends much farther posteriorly.

Suborder COTYLEA Lang, 1884

Diagnostic features. Body with ventral sucker placed posteriorly to female genital pore—occasionally wanting.

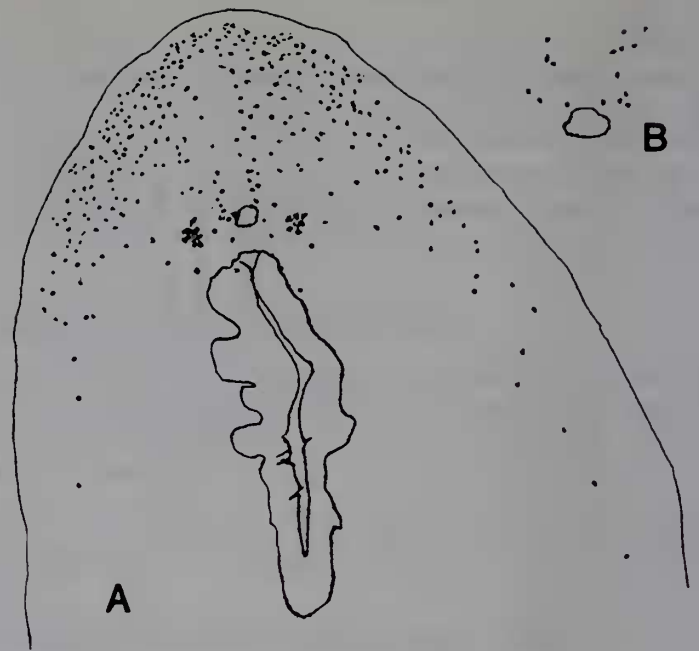


Fig. 16 *Emprosthopharynx vanhoffeni*: A, dorsal view of anterior region of body; B, cerebral eyes (ventral view).

Tentacles when present antero-marginal, except in families Stylochoididae and Opisthogenidae in which nuchal tentacles occur. Eyes often in groups at base of tentacles and/or in marginal band on anterior margin of body; cerebral eyes in two short elongate groups, or in conical or rounded clusters over cerebral organ. Pharynx tubular, campanulate or ruffled. Prostate often independent. 'Shell'-gland normally swollen, but dorso-ventrally compressed. Uterine canals extend posteriorly from vagina (except in Boniniidae and Pericelididae, in which the canals form an H-shaped figure). Lang's vesicle rarely present.

Key to cotylean families from African waters

- | | | |
|----|---|-------------------------|
| 1 | Mouth and pharynx in anterior third of body | 2 |
| 1' | Mouth and pharynx in middle or posterior third of body | 5 |
| 2 | Pharynx tubular or campanulate | 3 |
| 2' | Pharynx ruffled or irregularly ring-like | 4 |
| 3 | Without tentacles | <i>Prosthlostomidae</i> |
| 3' | Tentacles marginal | <i>Euryleptidae</i> |
| 4 | Nuchal tentacles; male copulatory complex posterior to female | <i>Opisthogenidae</i> |
| 4' | Marginal tentacles; male complex anterior to female | <i>Pseudocerotidae</i> |
| 5 | Without tentacles | <i>Anonymidae</i> |
| 5' | Tentacles marginal | 6 |
| 6 | Male complex with one or more prostatoids | <i>Boniniidae</i> |
| 6' | Male complex without prostatoids | <i>Pericelididae</i> |

Family BONINIIDAE Bock, 1913

Diagnostic features. Elongate body with two lateral lappet-like appendages on anterior margin. Adhesive organ as a rounded depression in posterior region of ventral surface of body. Eyes anterior, chiefly marginal or submarginal, with

remaining few eyes in cerebral region. Long ruffled pharynx in mid-third of body; intestinal trunk long; intestinal branches not anastomosing. Genital pores separated. Testes and ovaries in dorsal parenchyma. Male copulatory complex posterior to pharynx, with unarmed penis-papilla and includes single prostatoid with stylet or several such organs opening into male antrum or on ventral surface of body. Vagina with dilated, dorso-ventrally compressed 'shell'-chamber. Lang's vesicle developed. Uterine canals form H-shaped figure bearing vesicles.

Genus *TRAUNFELSIA* Laidlaw, 1906

Diagnostic features. Vasa deferentia open directly into base of small penis-papilla; no seminal vesicle or prostate. Single prostatoid posterior to conical penis-papilla and opening into depression on ventral surface of body. On each side of penis-papilla, narrow canal opens into male antrum and terminates inwardly by branching into number of small chambers invested with large gland cells.

Traunfelsia elongata Laidlaw, 1906

LOCALITY. From among weeds on sandy shore, Cape Verde Is (Laidlaw, 1906).

DESCRIPTION. Laidlaw, 1906:714.

Family ANONYMIDAE Lang, 1884

DIAGNOSTIC FEATURES. Broadly-oval forms with ventral sucker, but without tentacles. Eyes along margin of body and in two groups over cerebral organ. Mouth more or less centrally situated; pharynx with four pairs of deep lateral folds. Male complex with many pyriform organs arranged in a longitudinal row in each lateral field of body. Each organ is composed of seminal vesicle and conical unarmed penis-papilla lying in penis-pocket; without prostate. Female copulatory complex simple, anterior to ventral sucker and closely posterior to mouth.

Genus *ANONYMUS* Lang, 1884

DIAGNOSTIC FEATURES. With characters of family.

Anonymus virilis Lang, 1884

LOCALITY. Among nullipores in 5–9 metres, St Vincent Harbour, Cape Verde Is (Laidlaw, 1906).

DESCRIPTIONS. Lang, 1884: 522; Stummer-Traunfels, 1933:3576.

Family PERICELIDIDAE Laidlaw, 1902, emend. Poche, 1926

DIAGNOSTIC FEATURES. Broadly-oval forms with two small widely-separated, anterior, marginal tentacles, each bearing eyes. Ventral sucker posterior. Marginal eyes round body; cerebral eyes in two elongate clusters; frontal eyes present. Pharynx ruffled, in mid-third of body. Genital pores united or closely approximate, between pharynx and ventral sucker.

Male copulatory complex anterior to male pore. Seminal vesicle distinct; no distinct prostate, but proximal region of ejaculatory duct is lined with eosinophilic gland-cells when male phase is active. Penis-papilla small, without stylet or penis-sheath. Vagina simple; 'shell'-chamber dilated and dorso-ventrally compressed. Uterine canals extend anteriorly from proximal end of vagina, with several uterine vesicles, occasionally uteri form H-shaped figure.

Genus *PERICELIS* Laidlaw, 1902

DIAGNOSTIC FEATURES. With characters of family.

Pericelis byerleyana (Collingwood, 1876) Laidlaw, 1906

Typhlolepta byerleyana Collingwood, 1876

LOCALITIES. Eylath, Gulf of Aqaba, Red Sea, May–Dec. 1951–1955 (H. Steinitz *leg.*); on a *Porites* in high reef of Iles Muscha, Gulf of Tadjourah, Djibouti (Meixner, 1907). Widely distributed in the Indo-W. Pacific region in the area bounded by East Africa, Indonesia, Fiji and the Great Barrier Reef.

DESCRIPTIONS. Collingwood, 1876:92; Laidlaw, 1902:291; Meixner, 1907:473.

Family OPISTHOGENIIDAE Palombi, 1928

DIAGNOSTIC FEATURES. Oval forms with nuchal tentacles containing eyes. Ventral sucker central. Marginal eyes anterior; cerebral eyes in oblong group between tentacles. Mouth anterior; pharynx ruffled in anterior third of body; intestinal trunk long; intestinal branches anastomosing. Male genital pore ringed by large gland-cells, between ventral sucker and posterior margin of body. Vasa deferentia extend from pharyngeal region to posteriorly-placed male copulatory complex. Seminal vesicle anterior to male pore; independent prostate posterior to pore; penis-papilla small, without stylet. Female genital pore between pharynx and ventral sucker. Female complex anterior to its external opening. Vagina simple; uterus consists of two lateral groups of narrow reticulate canals opening into proximal end of vagina.

Genus *OPISTHOGENIA* Palombi, 1928

DIAGNOSTIC FEATURES. With characters of family.

Opisthogenia tentaculata Palombi, 1928

LOCALITY. Dredged at Kubri, Suez Canal (Palombi).

DESCRIPTION. Palombi, 1928:608.

Family PSEUDOCEROTIDAE Lang, 1884, emend. Poche, 1926

DIAGNOSTIC FEATURES. Broadly-oval or elongate body varying considerably in size; dorsal surface may be papillate. Ventral sucker more or less central. Two tentacular lobes formed by folds on the anterior margin of the body. Each tentacle usually with eyes; cerebral eyes in a rounded, conical or

transversely arcuate cluster or in two elongate groups over the cerebral organ. Ruffled pharynx immediately posterior to cerebral organ; intestinal trunk extends from pharynx to posterior region of body and bears several pairs of anastomosing lateral branches. Genital pores between pharynx and ventral sucker. One or two sets of male copulatory organs closely posterior, or partly ventral, to pharynx. Vasa deferentia extending anteriorly from the posterior region of the body to enter a seminal vesicle. Prostate relatively small, independent; penis-papilla small, generally with short stylet and enclosed in penis-pocket. Female copulatory complex almost invariably single, lying closely posterior to male. Vagina short, arcuate; 'shell'-chamber dilated and dorso-ventrally compressed. Uterine canals form H-shaped figure connected with an anastomosing system of oviducts; uterine vesicles may be present.

Key to pseudocerotid genera from African waters

- | | | | |
|----|--|------------------------|---|
| 1 | Without tentacular eyes | <i>Parapseudoceros</i> | |
| 1' | With tentacular eyes | | 2 |
| 2 | Dorsal surface of body smooth | <i>Pseudoceros</i> | |
| 2' | Dorsal surface of body papillate | <i>Thysanozoon</i> | |

Genus *PSEUDOCEROS* Lang, 1884

DIAGNOSTIC FEATURES. Dorsal surface smooth, often brilliantly coloured. With tentacular eyes. Pharynx with four or five pairs of lateral folds. Male copulatory complex single or duplicated; in latter instance they are symmetrically arranged on either side of median line.

NOTE. There exists confusion concerning specificity in the genus *Pseudoceros*, for its species show a very high degree of uniformity in their general structure. Hyman (1954a) discussed the constitution of the genus and points to the problem of separating species on morphological grounds and suggests that coloration and markings of the body may be accepted as the means of distinguishing one species from another. Nevertheless, the present writer has found that colour in a species may be variable, but the arrangement of markings is reasonably constant. For instance, *Pseudoceros bedfordi*, *P. velutinus* and *P. zebra* may be readily recognized by their markings alone, irrespective of their colour. Unfortunately, preserved specimens often lose their coloration and markings completely, thus such specimens without notes on coloration and markings or some other form of representation, especially a painting or a colour-photograph, during life are very difficult, if not impossible, to determine specifically with any degree of certainty. It seems, therefore, that a close examination of superficial features is needed to assess their diagnostic value, and this should be done on living specimens.

Later, Hyman (1959) said 'Whether the male apparatus is single or paired is a useful character and details of the male copulatory apparatus may be of value in specific diagnosis' and went on to say that 'It now appears that the shape of the pharynx may be decisive. In most species, the pharynx has a compact outline but several species are now known in which the pharynx takes what I have termed the butterfly shape, putting out lateral lobulations that increase in length in the antero-posterior direction. . . . ' The shape of the pharynx in pseudocerotids as a diagnostic feature is debatable, because in a young worm the pharynx has a 'compact outline', but as

the worm grows so the pharynx finally assumes a 'butterfly shape'. Moreover, fixatives tend to cause the pharynx to contract, sometimes appearing as a mere rosette.

The number of male copulatory complexes is also questionable as a diagnostic feature, particularly at generic level, as proposed by Faubel (1984). Lang (1884) appears to have no doubts, because he described three varieties of *Pseudoceros maximus*, one with a single male complex and a single opening, one with two complexes, each with its own opening, and one with two complexes, but with only one opening. Stummer-Traunfels (1895) commenting on Lang's three varieties considered that each is worthy of specific recognition, but refrains from giving them names. Later, the same author (1933) figured two original specimens of *Pseudoceros latissimus* (Schmarda, 1859), one with a single male complex and the other two complexes, and clearly considers them to belong to the same species, thus implicitly discarding his earlier notion on speciation. Faubel (1954), however, re-named the specimen of *P. latissimus* with two complexes as *Pseudobiceros schmardae* sp.nov. In fact, Faubel employed a single or double male complex and the presence or absence of a penis-stylet as means of dividing the genus *Pseudoceros sensu* Lang into five genera, four of which are defined as new, but are, in the present writer's opinion, of doubtful validity. Marcus & Marcus (1951:15) stated that the penis-stylet in polyclads appears late in the development of the male complex in polyclads, as the present writer has found in the present investigation. In pseudocerotids, the stylet is merely a cuticle investing a slender conical penis-papilla, and in *Pseudoceros bifasciatus* n. sp. (see below) a not fully mature specimen shows no penis-stylet, whereas a fully mature one does. There is also the possibility of the cuticle covering the papilla being shed at the end of the male phase, as happens in some proseriate turbellarians. It therefore seems likely that the male complex in any species of *Pseudoceros* bears a penis-stylet at some stage in its development.

The occurrence of supernumerary organs is well known among certain families of polyclads, and there are instances of two ventral suckers, multiple female organs and double male copulatory complexes among species of *Pseudoceros sensu* Lang. The rigid acceptance of these features as systematically important is doubtful, because so little is known of morphological variation among polyclads. Looking among triclads turbellarians, instances of the development of supernumerary reproductive organs are known among individual species of the genus *Dugesia*, and there seems to be no reason why such should not occur among individual species of polyclad genera, e.g., the genus *Cestoplana*.

The writer, therefore, refrains from accepting Faubel's classification of the family Pseudocerotidae and recognizes the generally accepted scheme outlined by Bresslau (1933).

Pseudoceros albicuneatus sp.nov.

LOCALITY. Opposite Marine Biol. Stat., Inhaca I., Mozambique, 11.7.1961 (V. Gabie leg.).

DESCRIPTION (Fig.17). Body broadly oval, 6 mm in length after fixation in Susa. Dorsal surface yellowish, dotted with light brown and bearing 12 large white spots, 6 in each lateral field of body. Median line covered with a broad band of white. Broad marginal band of black, irregularly interrupted with cuneiform patches of white. Tentacles bearing black marginal band.

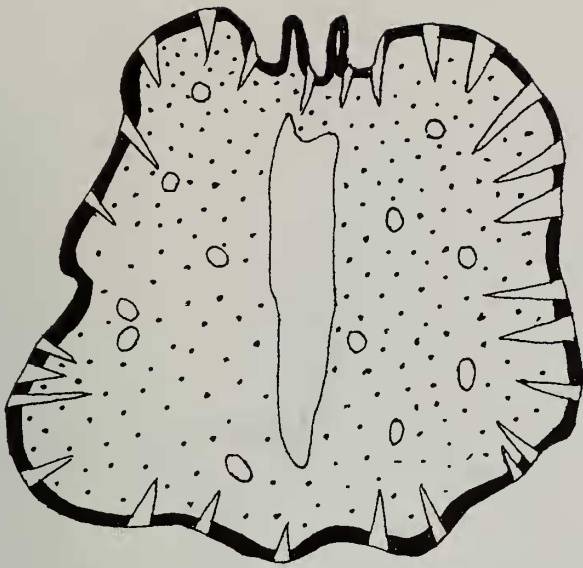


Fig.17 *Pseudoceros albicuneatus*, dorsal surface of body in life.

NOTE. No specimen available for study. Known only from a water-colour painting of the living worm. B.M.reg.no. 1985.7.5.2. The coloration and markings of the dorsal surface of the body are definite and enable the species to be readily recognized.

Pseudoceros albimaculatus sp.nov.

LOCALITY. Low tide, west coast of Inhaca I., Mozambique, July, 1958 (V. Gabie leg.) B.M.reg.no. 1985.7.5.3-6.

DESCRIPTION (Fig.18). Oval forms narrowing somewhat anteriorly and rounded posteriorly; 13-24 mm in length and 8-10 mm in maximum width. Disposition of eyes as shown in Fig.18. In a water-colour painting of the living worm, the dorsal surface is reddish violet, with transverse marginal patches finely stippled with white and along median line there are elongate patches likewise stippled with white. Marginal tentacles are prominent in the living worm, but retracted beyond recognition in preserved specimens, as shown in Fig. 18. One male pore; penis-papilla with stylet. The male copulatory complex shows no specific differences from that of other species of *Pseudoceros*, where the complex has been described.



Fig.18 *Pseudoceros albimaculatus*, marginal and cerebral eye-clusters (dorsal view).

Pseudoceros albireticulatus sp.nov.

LOCALITY. On south barrier reef, 13°04'S. 45°0.9'E., Benthedi, Mayotte, Comoro Is, 27.3.1977 (P. Bouchet leg.) B.M.reg.no. 1984.10.16.6.

DESCRIPTION. The only specimen available is immature and fragmentary, but the preserved fragments suggest that the worm measured about 5 mm in length. Ventral sucker lies a

little anteriorly to middle of body. The marginal tentacles are mere humps, each containing about 16 eyes, with a few eyes between the tentacles. The fragment containing cerebral eyes is missing, but a colour-transparency of the living worm suggests that there is a cluster of about 12 cerebral eyes. The transparency also shows that the dorsal surface of the body is reddish, with a dense network of thin rosy-white lines. The marginal regions anteriorly are distinctly lighter in colour than the remainder of the body.

NOTE. The coloration and markings are the specific features of this new form.

Pseudoceros bedfordi Laidlaw, 1903

Pseudobiceros bedfordi (Laidlaw) Faubel, 1984

LOCALITY. In front of Marine Biol. Stat., Inhaca I., Mozambique, July 1958 (V. Gabie leg.); known also from Singapore (Laidlaw, 1903), Indonesia (Bock, 1913), Palau Is (Kato, 1943), Vietnam (Dawydoff, 1952), Great Barrier Reef (Hyman, 1954a), Caroline Is (Hyman, 1959b).

DESCRIPTION. Represented by a water-colour painting by Dr Gabie and identified by Dr Libbie Hyman. The painting suggests that, when alive, the worm was elongate and measured 100 mm in length, but after preservation Dr Gabie found it to measure 35 mm by 36 mm. The coloration of this species is beautiful and variable. The ground-colour of the dorsal surface varies from dark green, dark brown to purplish brown covered with transverse arcs, stripes and spots of yellowish white, pink or buff, extending laterally from the median line. Margin of body of a darker hue and may be spotted with green. Ventral surface of body lighter in colour, without any pattern. Ventral sucker central. Marginal tentacles distinct. From ventral side of body numerous eyes are clearly seen on the margins of the tentacles. Cerebral eyes numerous, gathered into an oval cluster. Two male complexes. Descriptions have been given by Laidlaw (1903b:314), Bock, (1913:254) and Kato (1943:87).

NOTE. *P. bedfordi* was briefly described by Laidlaw from a damaged specimen found in Singapore Harbour. Bock (1913) described and figured the external features of a specimen from a coral reef on Mendanao, west of Pulau Belitung (Billiton) I. Mendanao is an Indonesian island lying between Borneo and Sumatera (Sumatra). Kato (1943) in recording the species from the Palau Is appears to have thought that Mendanao was Mindanao in the Philippines and Hyman (1954a) added confusion by stating that Bock recorded his specimen from 'off Billiton on the island of Mindanao in the Philippines'.

Pseudoceros bifasciatus sp.nov.

LOCALITY. At low tide, west coast of Inhaca I., Mozambique, July 1958 (V. Gabie leg.) B.M.reg.nos. 1985.7.5.8 (holotype), 1985.7.5.9-13 (paratypes).

DESCRIPTION (Fig.19). The body measures up to 53 mm in length and 30 mm in maximum width after fixation in FAA. The preserved specimens are deep brown dorsally, with a distinctly lighter marginal band, and brownish ventrally. In a water-colour painting of the living worm, the body is elongate, somewhat rounded anteriorly and narrowing posteriorly. This painting shows that the dorsal surface of the

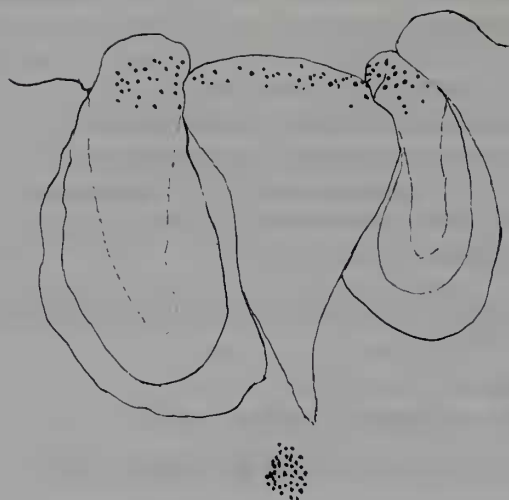


Fig. 19 *Pseudoceros bifasciatus*, cephalic region of body (dorsal view).

body is bordered with two narrow bands, the outer being orange coloured, the inner white. The ground-colour in the median region of the body is deep purple, gradually fading to pale bluish green on reaching the white sub-marginal band. On each side of the median line, there is a broad lanceolate band of black. The ventral surface of the body is purplish. Marginal tentacles represented by a pair of folds of the anterior margin of the body; they bear the orange and white marginal bands. Ventral sucker situated more or less centrally. Eyes occur in the anterior region of each tentacle and in the margin of the body between the tentacles. Cerebral eyes disposed dorsally to cerebral organ and appear as a single cluster or in three ill-defined arcuate rows. Mouth in anterior fifth of body and opens into middle of short pharyngeal chamber enclosing a large pharynx with four pairs of deep lateral folds. Slender intestinal trunk extends to near hind end of body and gives off many pairs of lateral limbs, the branches of which anastomose profusely.

Ventral testes and dorsal ovaries are widely distributed, but do not occur in the cerebral, tentacular and peripheral regions of the body. The copulatory organs were removed from a preserved specimen measuring 30 mm long and 20 mm wide and longitudinally sectioned. Unfortunately, the resulting sections show the worm not to be fully developed. The single male complex is only partially developed, showing an elongate seminal vesicle lying posteriorly to the male pore, and a penis-papilla without a distinct stylet and enclosed in a penis-sheath. The prostate is little developed and gives no indication of its ultimate size in relation to that of the seminal vesicle. Closely posterior to the male complex in this specimen lies a mass of gland-cells probably representing *Anlagen* of the female complex. The largest specimen has not been sectioned, but examined as a whole mount cleared in methyl saicylate. It has well-developed copulatory organs situated in anterior fifth of body, with an elongate seminal vesicle which is about three times larger than the globular prostate lying dorsally to the male pore. Its penis-papilla has a stylet. The female copulatory complex is typical of the genus *Pseudoceros*, with a wide 'shell'-chamber dorso-ventrally compressed and with uterine canals extending posteriorly to about middle level of body. It is worthy of note that the penis-papilla in the immature specimen is without a stylet which is present in the mature worm.

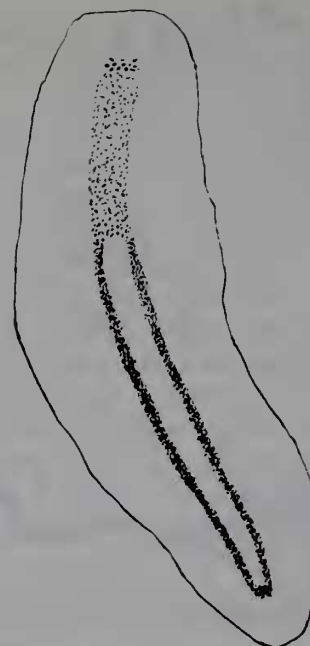


Fig. 20 *Pseudoceros bifurcus*, dorsal surface of body in life.

Pseudoceros bifurcus sp. nov.

LOCALITY. In 38 metres, M'Sanga Tsohole Reef (12°42'S, 40°59'E), Benthedi, Mayotte, Comoro Is, 29.3.77 (P. Bouchet *leg.*). B.M.reg.no. 1984.10.6.7-8.

DESCRIPTION (Fig. 20). The preserved specimens are brownish, but in a colour-transparency the living worm appears, when viewed dorsally, to be pale green, lightly tinged with mauve anteriorly and with a white marginal band. Along the median line, there is an orange-coloured band extending from the posterior border of the cerebral eye-cluster to about the junction of the anterior and middle thirds of the body, where the band bifurcates into narrow black or purplish bands running parallel with the median line and uniting posteriorly. Between the narrow bands the body is white. The body is elongate oval, 8-12 mm long and 5-6 mm wide. The anterior margin of the living worm is truncate, showing no indication of tentacles, whereas in one of the preserved specimens a pair of small tentacular folds of the anterior margin of the body occurs in the median region. The tentacles contain few eyes, and there are four or five marginal ones lying between the tentacles. Cerebral eyes arranged in an irregular cluster. Both specimens are immature.

Pseudoceros bimarginatus Meixner, 1907

LOCALITY. Among algae in Gulf of Tadjourrah, Djibouti (Meixner, 1907, 465).

DESCRIPTION (from Meixner). Preserved specimens 16-23 mm long and 11-13 mm wide. Ground-colour of living worm roseate dorsally and similarly coloured, but somewhat deeper, ventrally. Body-margin with inner band of golden yellow and outer band of chestnut-brown with green edging. Adult worms with mottling of reddish brown, with deeply ruffled pharynx showing whitish and uterine canals dark violet-grey. About 70 cerebral eyes in a rounded cluster. On dorsal surface and ventral margins of tentacles, eyes in one or two irregular rows, extending unbroken between tentacles. Pharynx with 5 or 6 pairs of deep lateral folds. Ovaries lateral to pharynx and widespread posteriorly to it; testes extend more anteriorly. Single male copulatory complex. Each

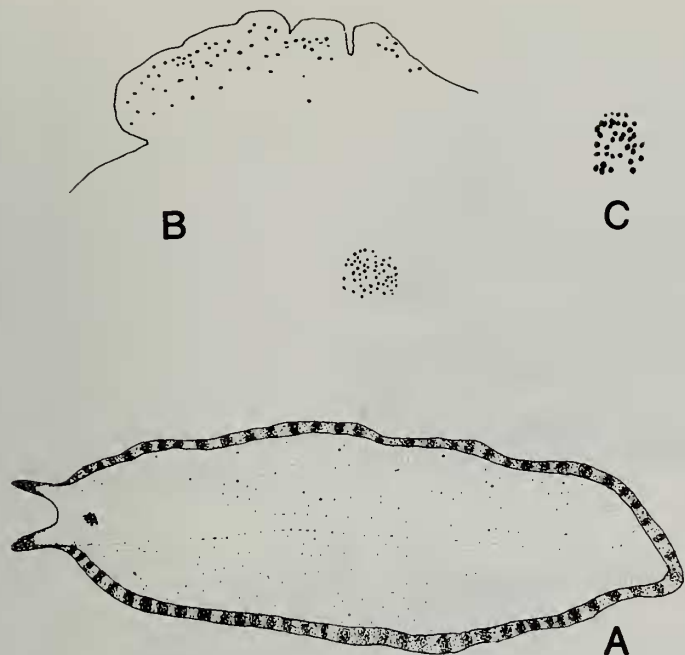


Fig.21 *Pseudoceros concinnus*: A, dorsal surface of body in life; B, cephalic region of body; C, tentacular eye-cluster.

uterine canal divides into three longitudinal branches lying dorsally to the vasa deferentia.

Pseudoceros caerleopunctatus Palombi, 1928

LOCALITY. Kabret, Suez Canal, 18.11.1924. (Palombi, 1928).

DESCRIPTION (from Palombi). Elongate-oval forms, 14.5 mm long and up to 8 mm wide. Ground colour of dorsal surface creamy yellow; margins spotted with deep blue, each spot surrounded by a bluish areola of reticulate appearance. Outer branches of areolae do not anastomose so that the yellowish ground-colour extends between the blue spots. Blackish punctuation follows margin of body irregularly. Eyes unevenly distributed along anterior margin of body. Cerebral eyes numerous, arranged in two, symmetrically-disposed, pyriform clusters. Single male pore. Vasa deferentia proceed anteriorly, give off a pair of large swellings and continue inwardly to separately enter sides of well-developed pyriform seminal vesicle; prostate relatively small; penis-stylet present; male antrum narrow.

Pseudoceros concinnus (Collingwood, 1876) Kaburaki, 1923

Proceros concinnus Collingwood, 1876

LOCALITIES. In 3–30 metres, Mayotte, Comoro Is (P. Bouchet leg.); under rocks at South Point, Inhaca I., Mozambique (V. Gabie leg.).

DESCRIPTION (Fig.21). When alive, the body of specimens from Inhaca I. in the southern region of the Mozambique Channel, was elongate and measured 15–40 mm in length. Prominent marginal tentacles deep blue. According to a water-colour painting of the living worm, the ground-colour of the dorsal surface is pale lemon, with a greyish border. This border bears blue spots at regular intervals throughout its course. Dorsally, there is a median band, lighter than the ground-colour, wider anteriorly than posteriorly. All traces of coloration and markings have been lost in preserved specimens,

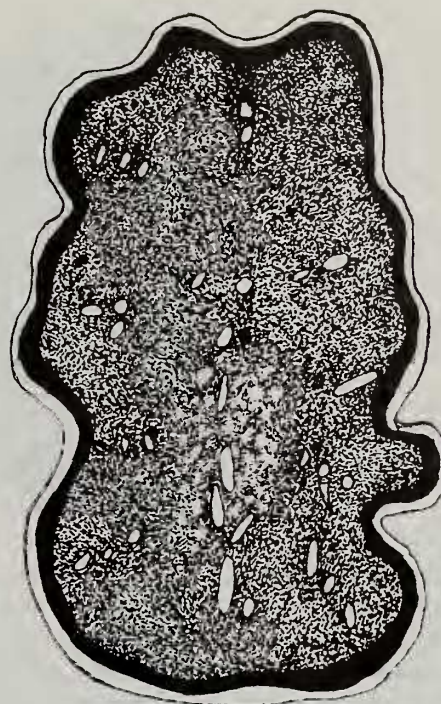


Fig.22 *Pseudoceros decorus*, dorsal surface of body in life.

which have become dark brown in alcohol or yellowish after fixation in Bouin's solution.

Ventral sucker weakly developed and situated in middle of body. Marginal tentacles with relatively few eyes; small accumulation of eyes over the cerebral organ. Pharynx with four pairs of deep lateral folds, the hinder pair of which are long alate projections extending posteriorly to about level of female genital pore. There appears to be one male copulatory complex. The copulatory organs of this species have been described by Hyman (1954a).

Immature specimens from the Comoro Is in the northern region of the Mozambique Channel have been assigned to this species, although their coloration and markings are, according to a colour-transparency, rather different from the Inhaca specimens. The ground-colour of the body is whitish, slightly tinged with yellow, the dorsal surface bears a median band of orange, and the margin of the body carries a series of large blue or mauve spots.

This species has also been recorded from Sabah, Malaysia (Collingwood, 1876), the Philippines (Kaburaki, 1923), Indonesia (Stummer-Traunfels, 1933), Irian Jaya (Dutch New Guinea) (Hyman, 1954a). These localities have provided specimens with variations in colour and markings. The identity of the specimens mentioned by Kaburaki and by Stummer-Traunfels are doubtful, and Hyman (1959) considers Stummer-Traunfels' specimens to be comparable to her new species *Pseudoceros tristriatus*.

Pseudoceros decorus sp.nov.

LOCALITY. Lighthouse, Inhaca I., Mozambique, 12 July 1962 (V. Gabie leg.) B.M.reg.no. 1985.7.5.16 (Painting).

DESCRIPTION (Fig.22). No specimen available for study. The living worm in a water-colour painting is oval in outline and measures about 20 mm in length. Its dorsal surface is purplish with a pattern of white spots of various sizes, as shown in Fig.22. There are two submarginal bands, an outer one of yellow enclosing a broader one of deep purple. No tentacles are indicated in the painting.

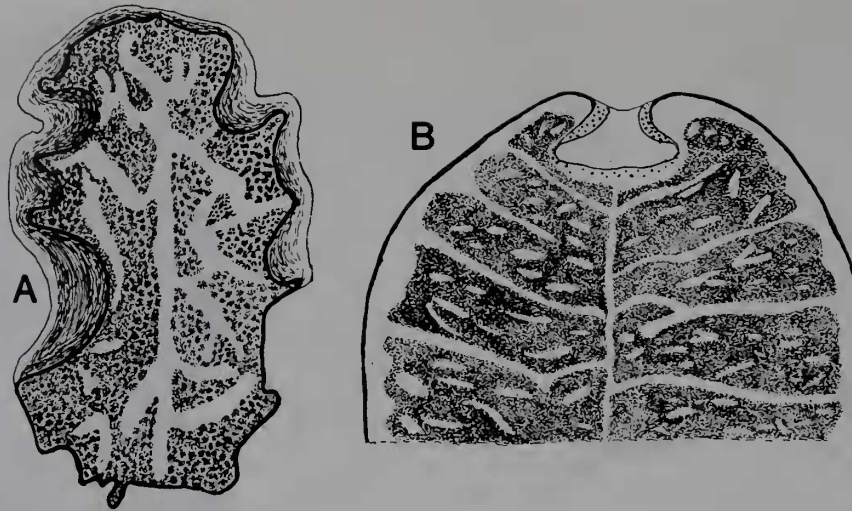


Fig.23 *Pseudoceros dendriticus*: A, dorsal surface of body in life; B, cleared preserved specimen.

NOTE. This form closely resembles *Pseudoceros kentii* Graff, in Saville-Kent, 1893, from the Great Barrier Reef, which is figured as being reddish brown dorsally with an outer band of yellow bordering a slightly wider band of reddish brown enclosing a narrow band of black or purple. If the two inner coloured bands were to mix it would then leave a broad band of deep purple similar to that of the Inhaca specimen. *P. kentii* is, however, without any white spots on the dorsal surface, but this feature might be incidental in the new species.

***Pseudoceros dendriticus* sp.nov.**

LOCALITY. Inhaca I., Mozambique, July 1960 and 1962 (V. Gabie leg.) B.M.reg.no.1985.7.5.17-19.

DESCRIPTION (Fig.23). The following account is based on a water-colour painting of a living worm and three alcohol preserved specimens, which have lost coloration. A single specimen fixed in Susa measures about 45 mm long and up to 20 mm wide after being considerably flattened. The live specimen appears to have measured about 32 mm long and 20 mm wide. The dorsal surface of this specimen (Fig.23A) has a ground-colour of yellow profusely dappled with deep brown, leaving a median band of deep yellow, from which similarly-coloured branches extend to the margin of the body. This margin bears a narrow band of black, between which and the brown dapple, the body appears to be reddish brown. The ventral surface of the body is yellowish brown, but towards the margins the body becomes reddish brown with thin longitudinal flashes of black.

The three preserved specimens have lost all colour and design on the dorsal surface, but when cleared in methyl salicylate, they have a pale ground-colour bearing a pattern of brown, as shown in Fig.23B. A pale median line extends through the body and gives off at intervals similar lateral lines extending to the margins of the body, thus superficially giving the dorsal surface the appearance of bearing two longitudinal rows of brownish plates. There is also a narrow marginal band of black, separated from the brownish plates by the paler ground-colour. Ventrally, the body is light brown with a narrow black marginal band.

Marginal tentacles are not apparent in the painted worm, but in each of the preserved worms they appear as a pair of small folds of the anterior margin of the body. The tentacles each contain relatively few eyes and fewer in the bridge

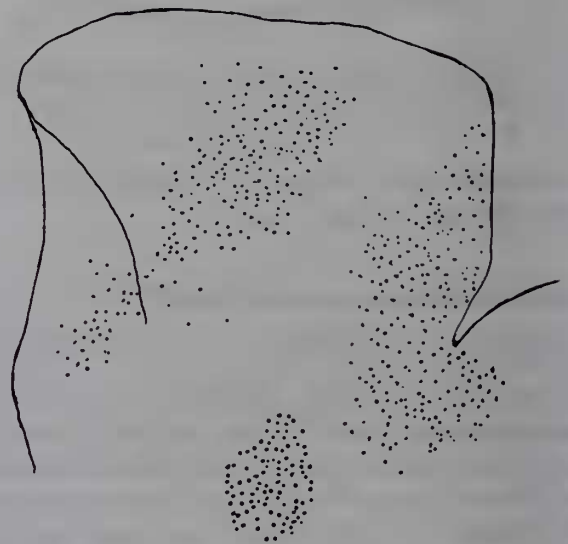


Fig.24 *Pseudoceros devisii*, arrangement of cerebral and tentacular eyes.

between the tentacles. The cerebral eyes are arranged in a conical cluster. Ventral sucker in mid-region of the anterior half of the body. Mouth opens into middle of pharyngeal chamber containing an elongate pharynx bearing 5 pairs of shallow lateral folds; intestinal trunk gives rise to a close network of canals. Reproductive system not yet developed in preserved specimens, but a pair of adjacent male genital pores occur near hind region of pharynx. Female genital pore not apparent.

NOTE. The difference in the design on the dorsal surface of the living worm and that seen in the preserved worms is such as to suggest that the two represent different species, but the present writer is left with no reason to disagree with the collector's interpretation until shown to be otherwise.

***Pseudoceros devisii* Woodworth, 1898**

LOCALITY. In front of Marine Biol. Station, Inhaca I. Mozambique, July 1958 (V. Gabie leg.) Hitherto known from the Great Barrier Reef (Woodworth).

DESCRIPTION (Fig.24). According to Woodworth's (1898:63) description the body is 'bright orange-yellow, with a broad marginal band of deeper orange and a prominent median dorsal ridge along which the pigment is denser than over the

general surface of the body, though not so deep in colour as the marginal band. Length, 33 mm; greatest breadth, 16 mm.'

The specimen examined by the present writer was, when alive, elongate and measured about 15 mm long and up to 6 mm wide. Its dorsal surface is, as shown in a water-colour painting, yellowish with a tinge of green and bordered by a thin band of orange. The median area is somewhat brownish, with patches of white anteriorly and posteriorly and a small dark spot anteriorly indicating the presence of a diamond-shaped cluster of cerebral eyes.

When preserved, the specimen was much flattened and now measures about 22 mm long and 10 mm in maximum width. It is now greyish, showing no trace of the original colour or markings. The ventral sucker is centrally placed. Marginal tentacles not distinct, but each bears two or three hundred eyes.

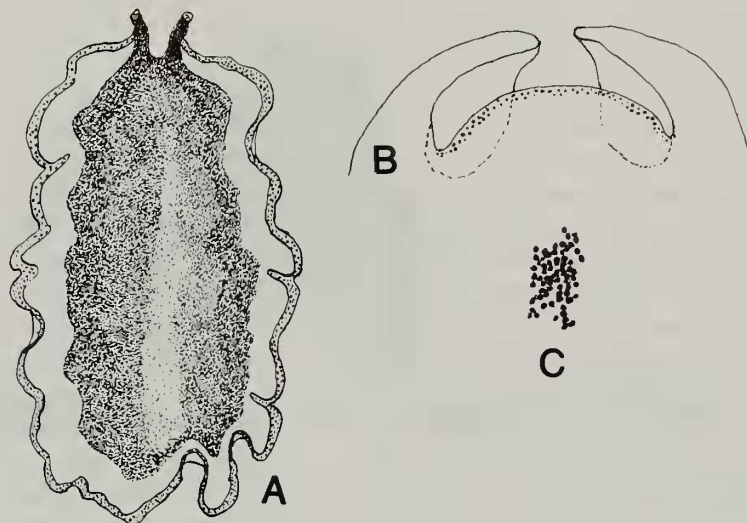


Fig.26 *Pseudoceros duplicinctus*: A, dorsal surface of body in life; B, cephalic region of body; C, cerebral eye-cluster.

DESCRIPTION (Fig.26). One preserved specimen available, and a water-colour painting of it when alive. Preserved in alcohol, the body is 48 mm in length and 32 mm in maximum width, and of ash-grey colour, being lighter in the marginal regions. The painting shows the dorsal surface of the body to be dark brown, lighter along the median line, more especially posteriorly. There is also a narrow marginal band of orange, bordering a wide band of pale blue. In the preserved condition, the tentacles appear as folds of the anterior margin of the body, but in the living worm they are prominent and brownish, tipped with orange. Shallow ventral sucker situated at about the junction of the anterior and middle thirds of the body. Eyes have not been detected in the tentacular folds, but appear to be confined to the margin of the body between the folds. Cerebral eyes in broad elongate mass over cerebral organ. Mouth in median line at about 10 mm posterior to anterior margin of body. It opens into middle of pharyngeal chamber containing a pharynx thrown into six pairs of deep lateral folds. Intestinal trunk narrow, extends from pharynx to posterior region of body, giving off along its course several pairs of lateral limbs, branches of which anastomose.

A single male copulatory complex lies closely posterior to pharynx, and, according to serial sections, is typical of other species of *Pseudoceros* in structure. Penis-papilla with stylet. Female complex likewise typical of the genus and bears no features which might be regarded as characteristic of the species.

NOTE. This species may be recognized by its colour and markings of the dorsal surface of the body and the apparent lack of eyes in the marginal tentacular folds. Heath and McGregor (1913) erected the genus *Licheniplana* for a new species, *L. lepida*, which has papillae on the dorsal surface of the body and no eyes in the marginal tentacles, but marginal eyes between the tentacles. In the present instance, the absence of eyes in the tentacular folds of the preserved specimen might be due to the considerable contraction of the tentacles at fixation, for the painting of this specimen when alive shows a pair of well-developed marginal tentacles.

Pseudoceros flavolineatus sp.nov.

LOCALITY. Northern Bay, Inhaca I., Mozambique, July 1960 and 1962 (V. Gabie leg.). B.M.reg.nos. 1985.7.5.25 (holotype), 1985.7.5.23–24 (paratypes).

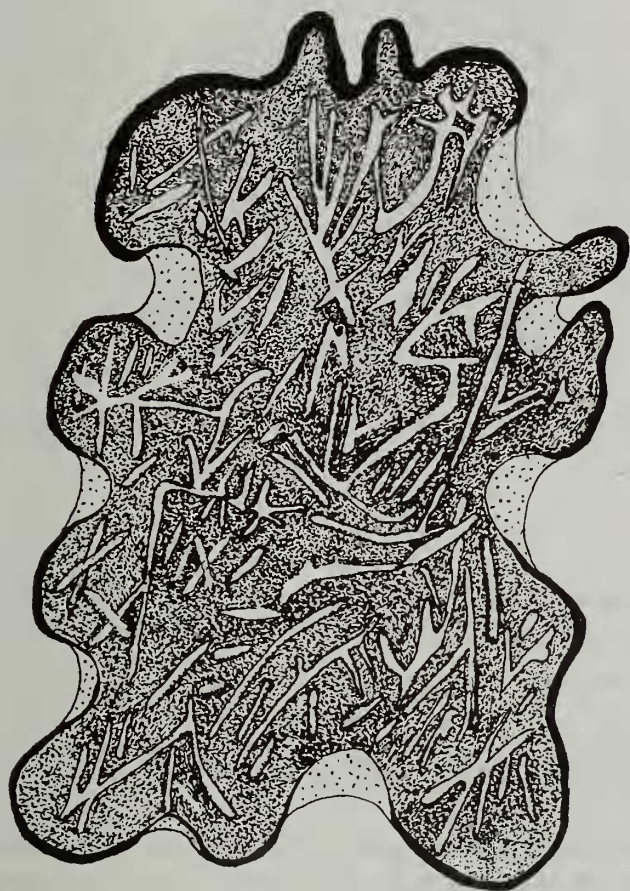


Fig.25 *Pseudoceros dubius*, dorsal surface of body in life.

Pseudoceros dubius sp.nov.

LOCALITY. Ponte Torres, Inhaca I., Mozambique, 11.7.1961 (V. Gabie leg.). B.M.reg.no. 1985.7.5.21 (Painting).

DESCRIPTION (Fig.25). No specimen available, but according to a water-colour painting of the living worm, the body is broadly oval with a deeply-folded margin. The dorsal surface is reddish brown and bears numerous scattered streaks or lines of yellow, sometimes merging with one another. There is a narrow marginal band of black. Ventral surface of body pinkish. Anterior marginal tentacles strongly developed and bearing the black marginal band.

Pseudoceros duplicinctus sp.nov.

LOCALITY. Opposite Marine Biol.Stat., Inhaca I., Mozambique, July 1960 (V. Gabie leg.). B.M.reg.no. 1985.7.5.22.

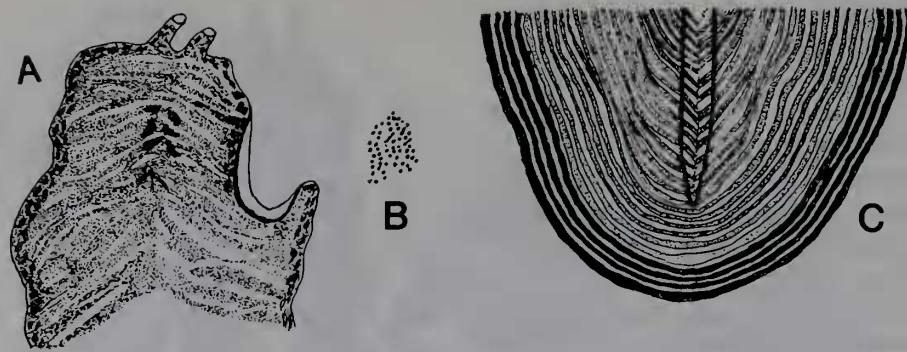


Fig.27 *Pseudoceros flavolineatus*: A, dorsal surface of body in life; B, cerebral eye-cluster; C, posterior region of cleared preserved worm.

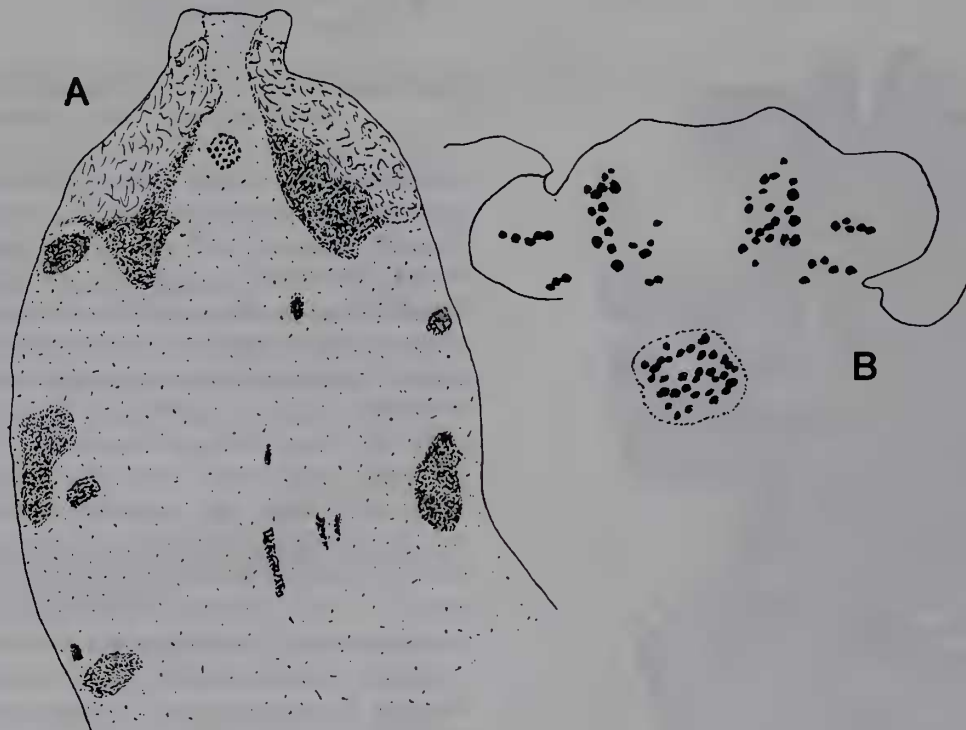


Fig.28. *Pseudoceros fuscomaculatus*: A, anterior half of body in life (dorsal view); B, arrangement of eyes.

DESCRIPTION (Fig.27). Three preserved specimens and a water-colour painting of this species are available. The painting is of an elongate-oval polyclad about 100 mm long and up to 60 mm wide. Its dorsal surface is reddish brown with numerous narrow yellow lines slanting postero-laterally from median line to margin of body (Fig.26A). Along the margin there is an irregular double row of black speckles. Ventral surface pinkish with black marginal band. Tentacles prominent, blackish, tipped with white.

When preserved, the body is oval and measures up to 40 mm long and 24 mm wide. Its ground-colour is greenish yellow dorsally and includes numerous thin white lines, faintly visible under magnification, which curve towards the median line where they terminate. Posterior to the intestinal trunk, the lines are not interrupted in median line and curve from one side of body to other, as shown in Fig.26C. A broad dark marginal band around body contains three whitish lines, except in the tentacular region where the band is wide and bears up to six white lines. These lines seldom link up with one another. Ventral surface of body whitish, with a plain brown narrow marginal band.

Margin tentacles deep brown and much folded, thus obscuring the disposition of tentacular eyes; about 60 cerebral

eyes in a bluntly conical group (Fig.26B). Pharynx with about 10 pairs of lateral folds and relatively more elongate than is usual in *Pseudoceros*; intestinal trunk extends to near posterior region of body; it is without distinct lateral limbs, but gives off on either side a close network of narrow branches. The epidermis over the intestinal trunk is a little darker than the remainder of the body dorsally and this darkened area is edged with brown. Two male genital pores symmetrically disposed near posterior end of pharynx. Worthy of note is the apparent difference in the markings of the living worm from those of the preserved specimens cleared in methyl salicylate.

Pseudoceros fuscomaculatus sp.nov.

LOCALITY. In 24 metres, SE Glorieuses (11°32'S, 47°23'E), Benthedi, Comoro Is., 12.4.1947 (P. Bouchet *leg.*) B.M.reg. no. 1984.10.16.9-11 (syntypes).

DESCRIPTION (Fig.28). The living worms were elongate oval, but in the preserved condition the body is more rounded and the largest specimen measures about 5 mm long and 3 mm wide. All three specimen available are, however, immature.

Dorsal surface of body whitish with faint patches of tiny greenish dots. In the marginal regions of the body there are 12–16 irregular patches of greenish brown, with a few similarly coloured smaller patches scattered over the body. There is also a pair of symmetrically-disposed areas of dark green anteriorly. Ventral surface greenish, with a narrow marginal band of white. Tentacles mere dorsal folds of anterior margin of body containing few eyes. About 30 cerebral eyes in a rounded cluster dorsal to rounded cerebral organ.

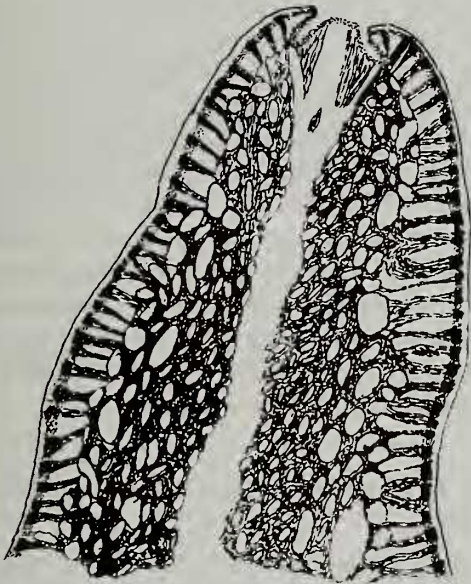


Fig.29 *Pseudoceros fuscoreticulatus*, anterior region of body in life (dorsal view).

***Pseudoceros fuscoreticulatus* sp.nov.**

LOCALITY. Low tide, west coast, Inhaca I., Mozambique, July, 1958 (V. Gabie leg.) B.M.reg.no. 1985.7.5.26 (holotype).

DESCRIPTION (Fig.29). The single specimen available was, when alive, elongate oval, measuring about 30 mm long and up to 10 mm wide. A water-colour painting of the living worm shows the dorsal surface to have had a light brown ground-colour bearing a reticulum of dark brown. A median band is free of reticulation, except for two or three small patches. The areolae of the reticulum are small alongside the median band, but gradually enlarge towards the lateral margins of the body. The periphery of the body bears a thin band of yellow enclosing a band of blue. Marginally, the reticulum tends to end in fingers which overlap the blue band to affect blocks of black regularly disposed along the band.

A pair of tentacles appear as mere folds of the anterior margin of the body and bear the blue band of the body. In the preserved condition, the worm has lost coloration and pattern, and its tentacles are not distinct, having been much flattened at fixation. The flattening of the body has disarranged the tentacular eyes, and the cerebral eyes have been broken into a small mass of irregular fragments. Ventral sucker appears as a small depression situated a little anteriorly to middle of body. Initial stages in the development of the copulatory organs are apparent and show a single male complex.

***Pseudoceros glaucus* sp.nov.**

LOCALITY. Coral reef, west shore, Inhaca I., Mozambique, 20.7.1962 (V. Gabie leg.); B.M.reg.no. 1985.7.5.27 (holotype).

DESCRIPTION. A water-colour painting shows the living worm to be about 35 mm long and up to 16 mm wide. Body-margin deeply folded. Dorsal surface of body bluish grey, with black maculae distributed over the body, except in marginal zones. There is also a median band speckled with black and grey. Marginal tentacles elongate and blackish. After preservation in alcohol, the specimen bears no resemblance to the painting, for its dorsal surface is brownish with a narrow light brown median band and a light brown marginal band. Ventral surface greyish. Tentacles in this specimen appear as distorted folds of the anterior body-margin, but they hold numerous eyes; about 35 cerebral eyes are arranged in a conical cluster. Pharynx with four pairs of deep lateral folds, each of which appear bifurcated and inclined posteriorly.

Single male genital pore lies between hinder pair of pharyngeal folds. Oval seminal vesicle about six times larger than globular prostate, but this considerable difference might be due to excessive flattening of the body at fixation; penis-styilet strong. Female pore midway between male pore and ventral sucker.

***Pseudoceros gravieri* Meixner, 1907**

LOCALITY. Among seaweeds in about 6 metres opposite the Ambouti Stream, near Djibouti, Gulf of Tadjourah, Djibouti.

DESCRIPTION. Meixner, 1907:468.

***Pseudoceros inhacensis* sp.nov.**

LOCALITY. Inhaca I., Mozambique. (Holotype from opposite Marine Biol. Station, 20.7.1962—B.M.reg.no.1985.7.5.28; paratype among coral debris, west shore, 21.7.1963—B.M.reg.no. 1985.7.5.29).

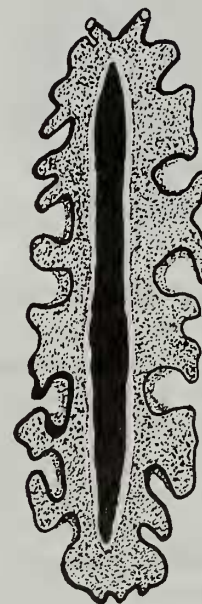


Fig.30 *Pseudoceros inhacensis*, dorsal surface of body in life.

DESCRIPTION (Fig.30). The holotype specimen is elongate oval with deeply notched margins. It measures about 40 mm long and 15 mm wide. Dorsally, the specimen is grey, faintly tinged with yellow and having a narrow black marginal band. Along the median line there is a wide band of deep brown tapering at both ends. Ventral surface greyish, but lighter than the dorsal surface. Anterior marginal tentacles well

defined and with black borders. Male copulatory complex not apparent.

A variety of this species (paratype) 'was damaged when fixing' and is not available for study, but a water-colour painting (Fig.30) shows the worm to be similar in outline to that of the holotype specimen. It was about 70 mm in length and about 30 mm in maximum width. The dorsal coloration of this specimen was greyish with dull yellow patches. The body margin also carried a narrow black band. There was also a dark median band tapering towards its extremities. This band had a narrow reddish stripe, anteriorly fading to pale red bordered by black.

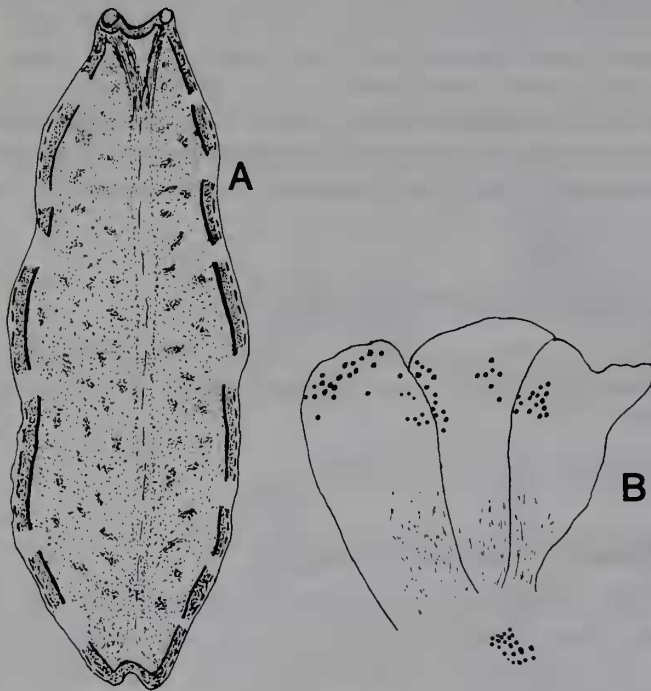


Fig.31 *Pseudoceros interruptus*: A, dorsal surface of body in life; B, cephalic region of body (dorsal view).

***Pseudoceros interruptus* (Stimpson, 1855) Kato, 1944**

Eurylepta interrupta Stimpson, 1855

LOCALITY. In front of Marine Biol.Stat., Inhaca I., Mozambique, July, 1958 (V. Gabie leg.).

DESCRIPTION (Fig.31). Of this species only one specimen is available. It was fixed in Susa and 'measured 2.1 cm., stretched before fixation'. In the preserved state, it is oval in outline and measures about 16 mm in length and 10 mm in maximum width. Its ground-colour is brownish, with two dark irregular marginal bands dorsally and well separated from each other. A water-colour painting of the living worm shows the body to be elongate-oval in outline and the dorsal surface to be brownish with narrow streaks and small blotches of reddish brown. There is also a median band of grey enclosing a line of black streaks. There are also four marginal bands, the outer being white, bordering a narrow black line, which surrounds a distinct band of orange colour, with fourth or inner band of black. These marginal bands are broken at intervals by patches of white. Cerebral and tentacular eye-clusters as shown in Fig.31. Pharynx with five pairs of deep lateral folds.

Male pore immediately posterior to pharynx and leads into a male copulatory complex bearing a penis-stylet and appears to have no features to distinguish it from other species of

Pseudoceros. Female pore at about 1 mm posterior to male; uterine canals extend from vagina to a little posteriorly to middle of body and give off a few lateral branches which anastomose.

NOTE. *Pseudoceros interruptus* has not previously been recorded since it was originally described by Stimpson from 'littoral, under stones in sandy places, near island of Loo Choo' [Okinawa], Japan. That the present specimen bears a very strong resemblance to the Japanese form may be seen from a composite of the descriptions of Stimpson (1855 & 1857), which runs as follows: oval, of a pale brown colour, with a median line of black blotches; margins ornamented with bands of dark brown, orange, black and an outer of white concentrically arranged and interrupted at intervals all round. Tentacles prominent, marginal; cerebral eyes in two crescents, convex forward, one behind the other; length $\frac{3}{4}$ inch. While the present specimen appears to differ slightly in coloration from the Japanese specimen, the pattern of markings in both specimens is very similar. The difference in the cerebral eye-clusters is undoubtedly due to fixation which very often alters the shape of the cerebral eye-clusters among species of *Pseudoceros*.

***Pseudoceros kelaartii* (Collingwood, 1876) Laidlaw, 1903**

Eurylepta kelaartii Collingwood, 1876

Prostheceraeus kelaartii (Collingwood) Lang, 1882

LOCALITY. In 15–20 metres (12°45'S, 45°18'E), N.Ile Pamanzi, Mayotte, Comoro Is, 25.3.1977 (P. Bouchet leg.) Previously recorded from under stones in Singapore Harbour (Collingwood).

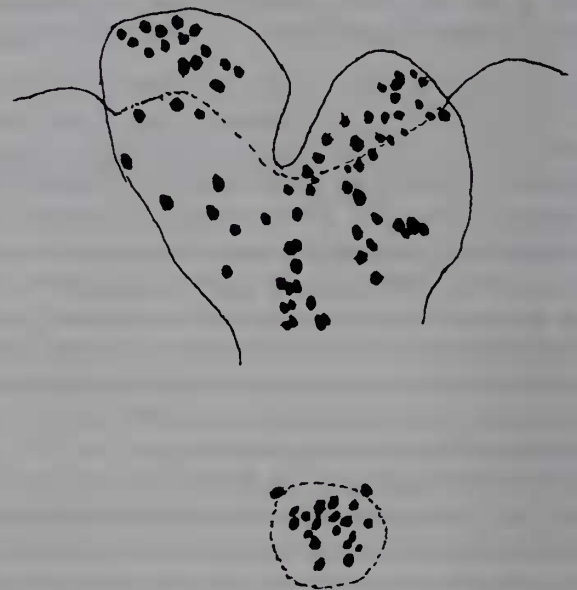


Fig.32 *Pseudoceros kelaartii*, Cephalic region of body (dorsal view).

DESCRIPTION (Fig.32). The preserved specimen available is elongate oval, 10 mm in length and 7 mm in maximum width. According to a colour transparency of the living worm, its dorsal surface is reddish or lilac-coloured and marked with elongate patches of white in the median and sublateral fields. This coloration and pattern closely resembles the coloured figure of *Eurylepta kelaartii* given by Collingwood. The white patches in the present specimen are, however, more numerous. Tentacles small, but distinct, each holding 30–40

eyes. About 18 eyes in group over cerebral organ. A pair of eyes lies on the antero-lateral borders of the cerebral organ and deeper in the parenchyma than the main group of cerebral eyes. The occurrence of a pair of precerebral eyes often appear among cotyleans, particularly among prosthlostomids, but it is doubtful whether their presence or absence is of diagnostic importance, because they may or may not be present in individuals of the same species. Mouth at about 0.7 mm posteriorly to cerebral organ and opening into anterior half of pharyngeal chamber; pharynx about 2.2 mm long and has five pairs of deep lateral folds. Ventral sucker 5.5 mm from anterior margin of body.

Male and female genital pores 0.5 mm apart and ventral to hind region of pharynx. With strong penis-stylet. Uterus formed by a pair of posteriorly-directed branching limbs, each of which gives off an antero-lateral branch to form a H-shaped figure.

***Pseudoceros limbatus* (Leuckart, 1828) Lang, 1884**

Planaria limbata Leuckart, 1828

LOCALITIES. Red Sea (Leuckart, 1828). Among coral debris on west shore of Inhaca I., Mozambique, 21.7.1962 (V. Gabie leg.).

DESCRIPTION. Leuckart, 1828:11–15; Lang, 1884:544. Only a water-colour painting is available to the writer. This specimen, when alive, was elongate oval and measured 40 mm in length. Dorsally, its ground-colour was light grey, bordered by a narrow band of black. There was also on the dorsal surface a broad median longitudinal band of dark reddish brown, not reaching to ends of body. Ventral sucker light grey.

NOTE. The painted worm differs from Leuckart's description inasmuch as the ground-colour of the original specimen was pale green and the margins whitish, bordering a somewhat thicker band of black. Moreover, Leuckart's specimen appears, in his figure, to have had a median blood-red band. Investigation of further material from Inhaca I. might reveal that there is really no specific difference between this species and *Pseudoceros in hacensis* n.sp.

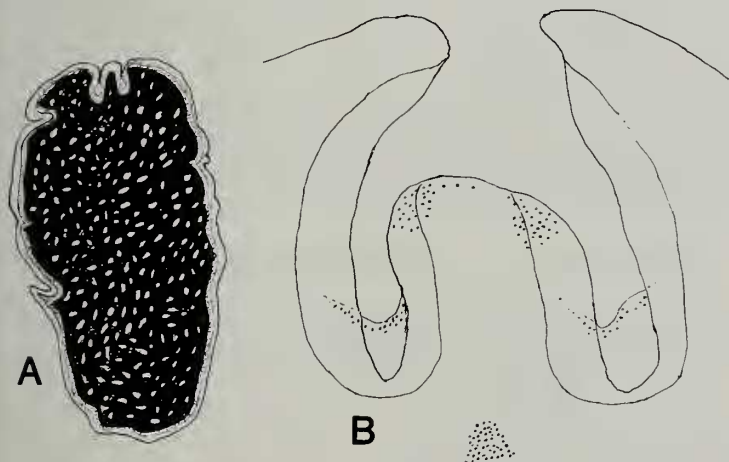


Fig.33 *Pseudoceros microcelis*: A, dorsal surface of body in life; B, cephalic region of body (dorsal view).

***Pseudoceros microcelis* sp.nov.**

LOCALITY. Opposite Marine Biol.Station, Inhaca I., Mozambique, May, 1965 (V. Gabie leg.) B.M.reg.no. 1985.7.5.32 (holotype).

DESCRIPTION (Fig.33). The only specimen available is much flattened and measures 35 mm in length and 23 mm in maximum width, whereas when alive it was about 55 mm long and 35 mm wide. A water-colour painting of the living worm shows the ground-colour of the dorsal surface to be black, adorned with numerous yellow spots of various shapes and sizes, bordered by a narrow band of yellow enclosing a narrow band of grey. All coloration and markings have been lost in the preserved specimen. Ventral sucker centrally situated. Tentacular and cerebral eye-clusters as depicted in Fig.33, and are the smallest the writer has so far met with in the genus *Pseudoceros*.

Single male copulatory complex lies adjacent to hind end of pharynx and receives vasa deferentia which arise near level of ventral sucker. The remaining features of the male and female complexes are obscured, owing to excessive flattening at fixation.

Despite the paucity of specific information, the present species may be readily recognized by the pattern of coloration on the dorsal surface of the body and by the relatively tiny cerebral and tentacular eyes.

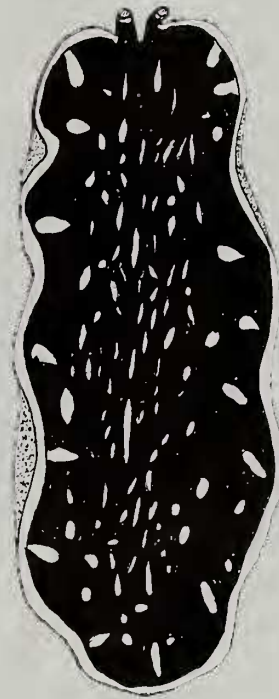


Fig.34 *Pseudoceros mossambicus*, dorsal surface of body in life.

***Pseudoceros mossambicus* sp.nov.**

LOCALITY. In front of Marine Biol. Stat., Inhaca I., Mozambique, July 1958 (V. Gabie leg.) B.M.reg.no. 1985.7.5.33 (holotype).

DESCRIPTION (Fig.34). The only specimen available is oval in outline and measures 65 mm in length and 30 mm in maximum width. According to a water-colour painting of the living worm, its dorsal surface is black with many greenish yellow maculae of differing shape and size, as shown in Fig.34. There is a marginal band of orange, which also occurs on the tips of the marginal tentacles. Ventral surface of body ash-grey.

Owing to dense coloration, it has not been possible, even after clearing in methyl salicylate, to make out the disposition of tentacular eyes, but there appear to be about 70 cerebral eyes arranged in a conical cluster. Pharynx thrown into five pairs of deep lateral folds, the hinder pair almost embracing

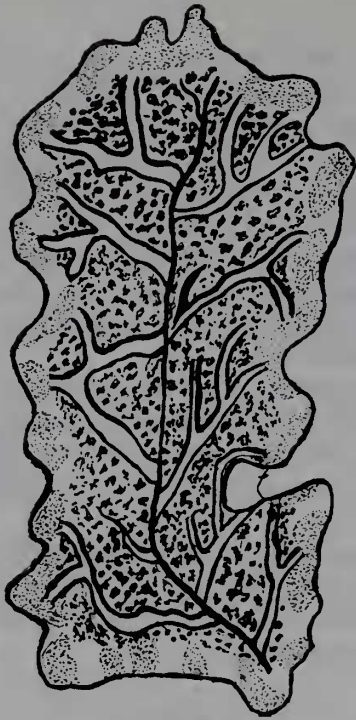


Fig.35 *Pseudoceros nigriramulosus*, dorsal surface of body in life.

the male copulatory complex which appears to have no specifically diagnostic features. A pair of moniliform uterine canals extend posteriorly from the female complex to a little beyond middle of body, but show no evidence of branching.

***Pseudoceros nigriramulosus* sp.nov.**

LOCALITY. Inhaca I., Mozambique, July 1958 (V. Gabie leg.) B.M.reg.no.1985.7.5.34 (painting).

DESCRIPTION (Fig.35). No specimen available, but according to a water-colour painting the living worm is elongate oval, about 32 mm long and 16 mm wide. The ground-colour of its dorsal surface is yellow with a thin black marginal band

around the body. A black median line extends from anterior to posterior region of body, giving off lateral limbs along its course. These limbs have secondary branches. The areas between the branches are speckled with black. There is a yellowish submarginal band with red blotches disposed intermittently along the band. Red blotches also cover marginal tentacles.

***Pseudoceros ovimaculatus* sp.nov.**

LOCALITY. Opposite Marine Biol.Stat., Inhaca I., Mozambique (V. Gabie leg.) B.M.reg.no. 1985.7.8.1 (holotype).

DESCRIPTION (Fig.36). The living worm according to a water-colour painting is broadly oval and measures about 20 mm in length. Its marginal tentacles are prominent and deep brown. Dorsal surface of body brownish, deeper in median region, lighter towards margins; brownish surface furnished with many white oval maculae. An elongate area between tentacles of a lighter brown than remainder of dorsal surface. Ventrally, body pinkish.

Unfortunately, the only preserved specimen available has been much flattened and is fragmentary. However, sufficient detail has been made out to mention the following; between fifty and sixty eyes in each retracted tentacle; cerebral eyes in two clusters, as shown in Fig.36. Pharynx with four pairs of deep lateral folds. Single male copulatory complex badly damaged; female complex typical of the genus, with dilated 'shell'-chamber dorso-ventrally compressed. Uterine canals show signs of forming a network.

***Pseudoceros papilionis* (Kelaart, 1858) Lang, 1884**

Planaria papilionis Kelaart, 1858

Acanthozoon papilio (Kelaart) Collingwood, 1876

Pseudoceros papilio (Kelaart) Lang, 1884

Prostheceraeus papilio (Kelaart) Kaburaki, 1923

LOCALITY. Under stones at St James, False Bay, Cape Province, South Africa (Palombi, 1938:355). Recorded also

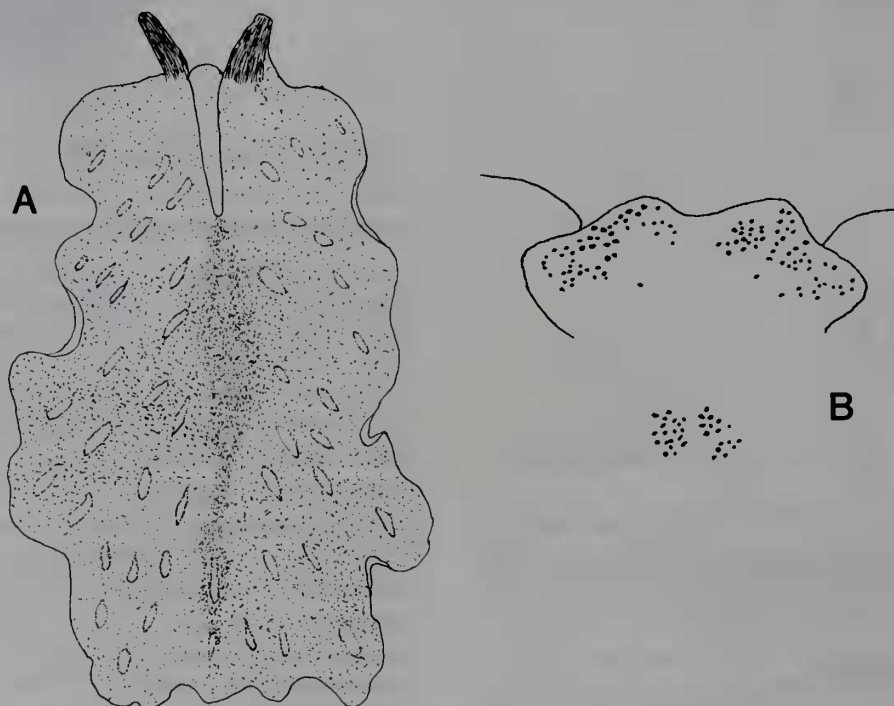


Fig.36 *Pseudoceros ovimaculatus*: A, dorsal surface of body in life; B, arrangement of eyes.

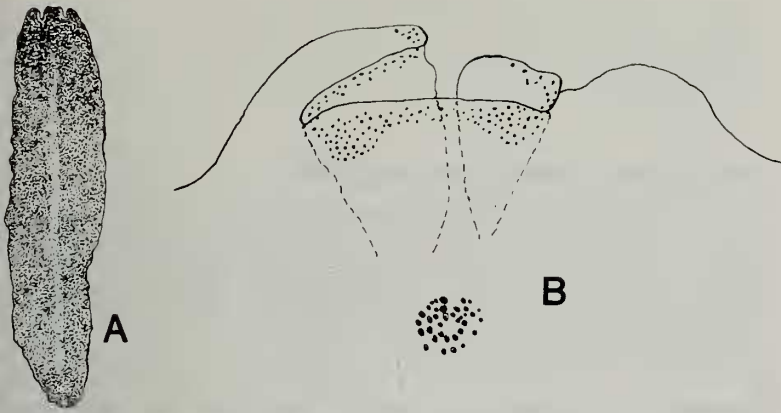


Fig.37 *Pseudoceros perviolaceus*: A, dorsal surface of body in life; B, arrangement of eyes.

from Sri Lanka (Kelaart, 1858) and Philippines (Kaburaki, 1923).

DESCRIPTIONS. Kelaart, 1858:136; Collingwood, 1876:95; Kaburaki, 1923:646.

Pseudoceros perviolaceus Hyman, 1959

Eurylepta violacea Schmarda 1859, nec Collingwood, 1876

Proceros violaceus (Schmarda) Diesing, 1862

Pseudoceros velutinus (Blanchard, 1845), var. *violaceus* (Schmarda) Lang, 1884

Pseudoceros violaceus (Schmarda) Stummer-Traunfels, 1933

LOCALITY. Low tide on sand-flats and among coral fragments on west coast and in front of Marine Biol.Stat., Inhaca I., Mozambique (V. Gabie leg.) This species has also been recorded from east and west coasts of Sri Lanka (Schmarda, 1859), Red Sea (Boutan, 1892) and Palau Is (Hyman, 1959).

DESCRIPTIONS (Fig.37). Lang, 1884:540; Stummer-Traunfels, 1933: 3544; Hyman, 1959a:566; Hyman, 1959b:7. Three preserved, much flattened specimens from Inhaca I. are available. They are elongate, measuring up to 40 mm long and 25 mm wide, but they may be four times longer than wide. The preserved worms are brownish, but when alive, as seen in a water-colour painting, the colour ranged from violet to deep purple, with a lighter median line dorsal to the intestinal trunk. Colour lighter ventrally. Arrangement of tentacular and cerebral eye-clusters as shown in Fig.37. Pharynx with four pairs of deep lateral folds; hind pair may bifurcate and almost enclose the single male complex bearing a penis-stylet.

Pseudoceros splendidus Stummer-Traunfels, 1933

Pseudoceros superbus Lang, 1884, nec. Schmarda, 1859

Pseudobiceros splendidus (Stummer-Traunfels) Faubel, 1984

LOCALITY. In front of Marine Biol. Stat., Inhaca I., Mozambique, July 1958 (V. Gabie leg.). This species appears to be widely distributed having been recorded from the Mediterranean, Vietnam, Galapagos Is., Puerto Rico and Bermuda.

DESCRIPTION. Lang, 1884:540. The body measures up to more than 60 mm long and 30 mm wide. In the living worm, the dorsal surface is deep bluish or purplish black, with a velvety appearance, bordered all round with a narrow submarginal band of white or orange-yellow, enclosed by a marginal band

of blue-black or purplish brown. The orange-yellow band follows the anterior tentacular folds to their tips, but on the inner margin of the folds and between their bases it is absent. When preserved in alcohol, the body becomes brown and sometimes shows a pale narrow submarginal band. There is also a dark band on the median line. Ventral sucker centrally placed or somewhat anterior to middle of body. With paired male copulatory complexes, each with a penis-stylet.

Pseudoceros tristriatus Hyman, 1959

LOCALITY. In front of Marine Biol.Stat., Inhaca I., Mozambique, July 1958 (V. Gabie leg.) Known also from the Caroline Is and Indonesia (Hyman, 1959b).

DESCRIPTION (Fig.38). Hyman, 1959a:576. The type-specimen of this species from the Ifaluk Atoll, in the western Caroline Islands is immature. In the preserved state it is, according to Hyman, entirely black, but from a colour-photograph of the worm in life, the ground-colour of the dorsal surface was light blue with three longitudinal orange-coloured bands. These bands were faintly bordered with black and extend from close behind the tentacles to near the posterior end of the body. The two lateral bands were confluent posteriorly to the median band.

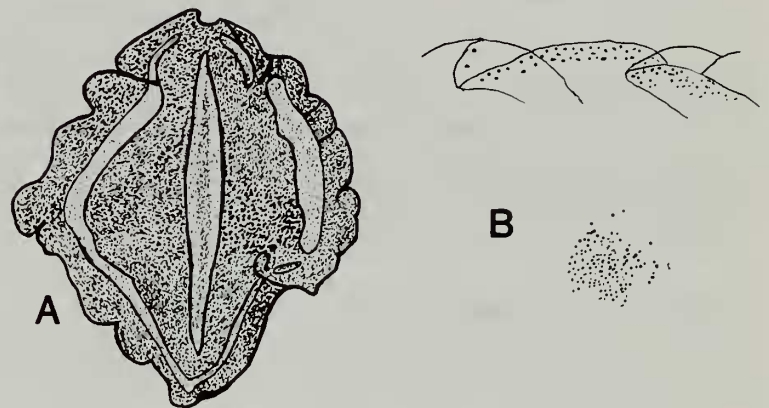


Fig.38. *Pseudoceros tristriatus*: A, dorsal surface of body in life; B, arrangement of eyes.

In a water-colour painting of the live specimen from Inhaca I., the dorsal pattern of markings is similar to that seen in Hyman's colour-photograph in having three longitudinal orange bands, with the laterals being confluent posteriorly to the median band. Dorsally, the ground-colour of this specimen was mauve and a band of deep blue bordered the body as well as the orange longitudinal bands, but these features are now lost in the preserved specimen. The living worm was about 48 mm long and 44 mm wide.

Anterior marginal tentacles are indistinct in both the painting and the preserved specimen. Tentacular eyes relatively few, and cerebral eyes in an irregular mass of about 100. Pharynx with five pairs of deep lateral folds curving posteriorly; intestinal trunk with numerous short lateral limbs that open into a dense network of intestinal branches.

Male genital pore lies between posterior pair of pharyngeal folds. Male copulatory complex well developed; prostate small and globular; seminal vesicle relatively large and pyriform; penis-papilla with stylet.

NOTE. The pattern of dorsal bands in *Pseudoceros gratus* Kato, 1937, from Japan and Western Australia is similar to



Fig.39 *Pseudoceros velutinus*, dorsal surface of body in life.

that found in the specimen from Inhaca I. Dorsally, the ground-colour of the Japanese form is, however, milky white with three black bands disposed as in *P. tristriatus* and with a black band around the body. This close resemblance in the disposition of markings in three forms from widely-separated areas, suggests that the importance of coloration in species of *Pseudoceros*, as implied by its numerous species known only on one specimen, might not be so diagnostically valuable for specific determination. Another point of interest is that *Pseudoceros tristriatus* has only one male copulatory complex, whereas *P. gratus* has two, again casting suspicion on the validity of considering the number of male complexes as a diagnostic feature among species of *Pseudoceros*.

***Pseudoceros variegatus* sp.nov.**

LOCALITY. Opposite Marine Biol. Stat., Inhaca I., Mozambique, 11 July 1961 (V. Gabie leg.)

DESCRIPTION. No specimen available, but a water-colour painting of the living worm, shows the body to be broadly oval and measuring about 25 mm long and 20 mm wide. According to the painting, the ground-colour of the dorsal surface is reddish brown, with a thin marginal band of dark brown around the body. This surface also bears pale pink elongate patches and a median whitish band extending for almost the length of the body. Ventral surface pinkish. No further information available.

***Pseudoceros velutinus* (Blanchard, 1847) Lang, 1884**

Proceros velutinus Blanchard, 1847

LOCALITY. In front of Marine Biol.Stat., Inhaca I., Mozambique, July 1958 (V. Gabie leg.); Kabret, Suez Canal (Palombi, 1928). Recorded also from the Mediterranean (Blanchard, 1847; Lang, 1884 (coloured fig.)) and surface waters of the Gulf Stream.

DESCRIPTION (Fig.39). Lang, 1884,538. The specimen from Inhaca I. is shrivelled, presumably having dried up at some time and is useless for diagnostic purposes. There is, however, a water-colour painting of this specimen when alive. It appears to have been elongate oval and measuring 17 mm long, although the species is known to reach a length of 50

mm. The dorsal surface is velvety bluish black with a marginal band of purple and has a small colourless area over the rounded cluster of cerebral eyes. This colourless area appears to be specific.

***Pseudoceros vinosus* Meixner, 1907**

LOCALITY. Entedebir, Eritrea, March 1962 (from H. Steinitz colln.) Originally recorded from under stones in shallow water near Obock on the Clochetterie Reef in Gulf of Tadjourrah, Djibouti (Meixner, 1907).

DESCRIPTION. Meixner, 1907:470. Three specimens from Entedebir are available for study and agree well with the description given by Meixner. The original specimens were, when alive, wine-coloured and speckled with yellow and white. The present specimens preserved in alcohol are now whitish, but faint traces of red do occur. They are mature and measure 8–27 mm long. Tentacular eyes form a narrow band extending round and between the tentacles from the lateral base of one tentacle to the lateral base of the other; there are 50 or more cerebral eyes in a conical mass. Pharynx with 4 to 6 pairs of deep lateral folds, gradually becoming larger and longer posteriorly, so that the posterior pair almost envelop the copulatory complexes. Thin-walled seminal vesicle oval or pyriform, much larger than muscular globular prostate; penis-stylet long, lying in muscular penis-sheath. Uterine canals short, extending to level closely posterior to centrally-placed ventral sucker.

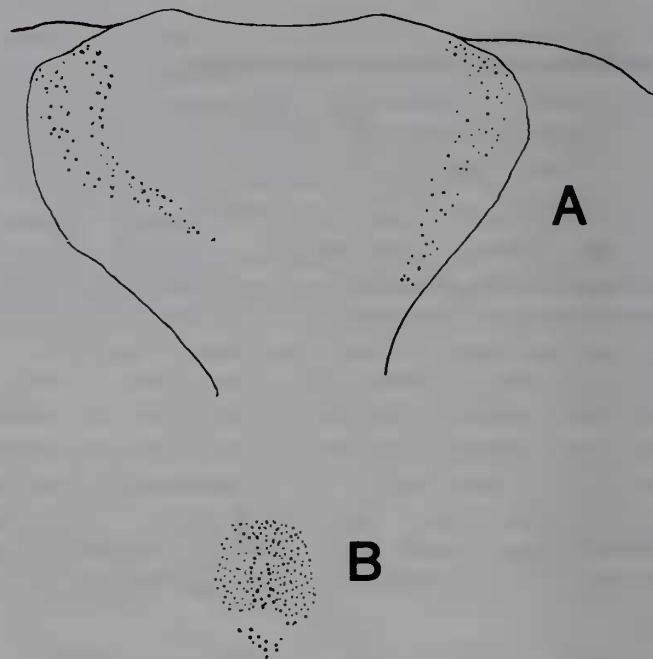


Fig.40 *Pseudoceros violaceus*: A, tentacles with eyes (dorsal view); B, arrangement cerebral eye-cluster (ventral view).

***Pseudoceros violaceus* (Kelaart, 1858) Hyman, 1959**

Planaria violacea Kelaart, 1858

Eurylepta violacea Collingwood, 1876

LOCALITY. On sand-flats, low tide, in front of Marine Biol. Stat., Inhaca I., Mozambique (V. Gabie leg.) Known hitherto only from Sri Lanka (Kelaart).

DESCRIPTION (Fig.40). Kelaart's description is brief and a coloured figure by him is published in Collingwood (1876).

The present specimens from Inhaca I. are up to 40 mm long and 15 mm wide. In a water-colour painting of the living worm, the ground-colour of dorsal surface is violet-purple with a narrow marginal band of yellow and a median band of yellow gradually fading at its sides into the dark ground-colour and tapering at both ends. Ventral surface lighter in colour and bears the yellow marginal band. Arrangement of eyes as shown in Fig.40. Pharynx with 4 or 5 pairs of deep lateral folds, the posterior of which may bifurcate. Single male genital pore; penis-papilla with stylet; seminal vesicle oval, much larger than the globular prostate. Uterine canals appear on either side of median line as a network of branches, becoming posteriorly confluent.

***Pseudoceros zebra* (Leuckart, 1828) Lang, 1884**

Planaria zebra Leuckart, 1828

Pseudoceros pleurostictus Bock, 1913

LOCALITIES. On coral-reef, western shore of Inhaca I., Mozambique, 20.7.1962 (V. Gabie *leg.*) and Comoro Is, northern region of Mozambique Channel (P. Bouchet *leg.*); El Tor, Gulf of Suez (Leuckart); Macamby, Malagasy (Bock).

DESCRIPTIONS (Fig.41). Leuckart, 1828:11; Lang, 1884:546; Bock, 1913:257. This species appears variable in colour, but less so in markings. According to a water-colour painting, a living specimen from Inhaca Is. measured about 33 mm long and 10 mm wide. Its ground-colour was pale yellow, with a whitish median band and an orange-coloured marginal band. From the median band, transverse black bars, which may bifurcate or trifurcate, reach the marginal band (Fig.41A). This specimen was much flattened at fixation and preserved in alcohol, and now measures 35 mm long and 18 mm wide. The black bars are still distinct, but the orange marginal band is much faded.

The marginal tentacles in the preserved specimen are so mutilated that it is not possible to make out the normal arrangement of the tentacular eyes, although there may be

about 100 such eyes present; cerebral eyes number about 25 arranged in an elongate cluster (Fig.41B).

Pharynx with five pairs of lateral folds, individuals of which may bifurcate, hinder pair relatively long and partially embrace the male copulatory complex. Owing to the excessive flattening of the specimen it has not been possible to interpret the morphology of the copulatory organs satisfactorily, but a penis-stylet has been detected.

An immature specimen from the northern waters of the Mozambique Channel appears to be a variant of the southern form. According to a colour-transparency, its dorsal surface is orange in the marginal and submarginal zones and yellowish in the median field. There are also black transverse blotches in each lateral field (Fig.41c). A large median black patch lies immediately posterior to the anterior marginal tentacles and from this a very thin black line extends to posterior end of body.

Genus ***PARAPSEUDOCEROS*** gen.nov.

DEFINITION. As *Pseudoceros*, but lacks tentacular eyes. With pair of precerebral ventral eyes.

TYPE-SPECIES. *Parapseudoceros dubius* sp.nov.

***Parapseudoceros dubius* sp.nov.**

LOCALITY. In front of Marine Biol. Stat., Inhaca I., Mozambique, July 1958 (V. Gabie *leg.*) B.M.reg.nos. 1985.7.3.8 (holotype) and 1985.7.3.9 (paratype).

DESCRIPTION (Fig.42). This species is represented by two preserved specimens, both of which are in poor condition, having been excessively flattened to wafer thin at fixation and are now almost friable. Both specimens have, however, had their natural appearance recorded in a water-colour painting. Each is oval in outline, with a distinct median indentation on the anterior margin of the body. One living worm (holotype) was about 12 mm long and 6 mm wide. Its dorsal surface was blotched with colour varying from crimson to purple, with a darker median band, and irregularly mottled with a lighter colour. Ventral surface paler than the dorsal. The second worm (paratype) measured, when alive, about 18 mm long and 12 mm wide. Its dorsal surface was light brown, mottled with dark brown, and a pinkish median band in anterior half of body. The painting also indicates a pinkish under surface. Ventral sucker well developed in middle of body.

A pair of marginal tentacles appear as small humps on either side of a deep notch on the anterior margin of the

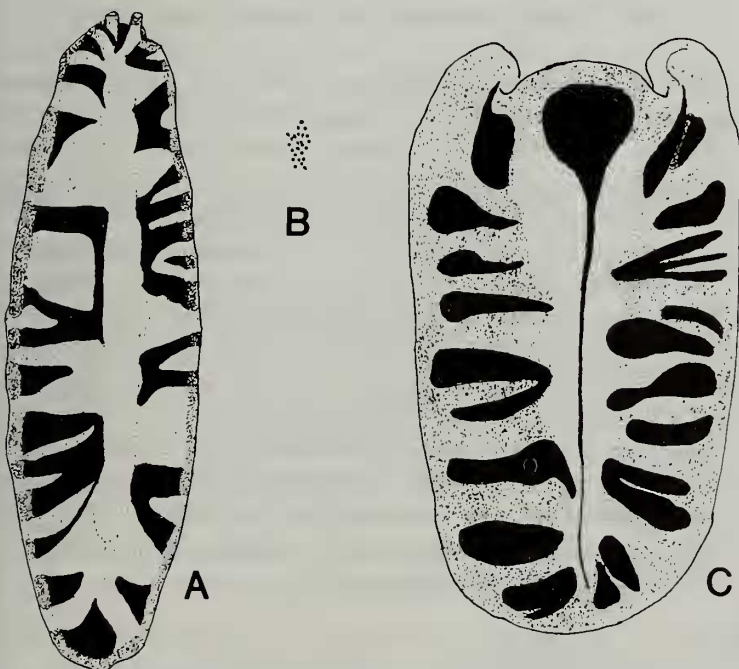


Fig.41 *Pseudoceros zebra*: A, specimen from Inhaca I.; B, cerebral eyes of Inhaca specimen; C, specimen from Comoro Is.

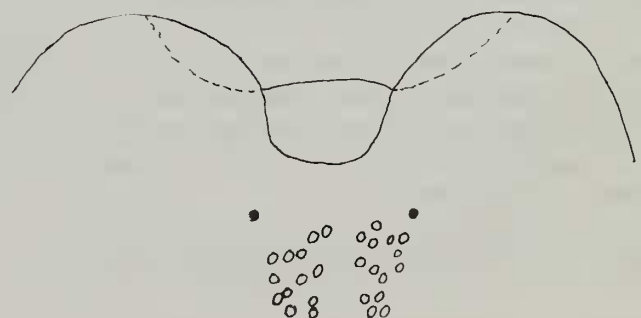


Fig.42 *Parapseudoceros dubius*, tentacular region of body with cerebral eyes.

body. No eyes have been detected in the tentacular region of both specimens. Cerebral eyes arranged in two approximate elongate clusters, with 13–17 eyes in each, lying dorsally to the cerebral organ. In one specimen (holotype) there is a single eye situated anteriorly and laterally to each cerebral cluster and deep in the parenchyma. In the other specimen, the latter eyes are less apparent, lying nearer to the clusters.

Pharynx closely posterior to cerebral eyes and thrown into 3 or 4 pairs of deep lateral folds; intestinal trunk extends to hind end of body and gives off a close network of canals.

Male copulatory complex adjacent to posterior pharyngeal folds. Its structure is typical of the genus *Pseudoceros*. Penis-papilla with strong stylet. Female genital pore near male pore; uterine canals form a close network. The coloration of the holotype closely resembles Collingwood's coloured figure of *Eurylepta kelaartii*, which has a pair of small approximate marginal tentacles. The anterior notch in the present specimens probably indicates the presence of a pair deeply retracted tentacles. The brownish form is very likely merely a colour variety.

NOTE. In its gross morphology the above-described form undoubtedly resembles that of the genus *Pseudoceros*, but the lack of tentacular eyes separates it from this genus. Whether this feature alone is of generic or subgeneric importance is questionable. A similar problem is, however, found in the genus *Licheniplana* Heath & McGregor, 1913, which appears to be identical with the pseudocerotid genus *Thysanozoon* Grube, 1840, but differs only in the absence of tentacular eyes. Modern authors appear to have accepted this difference as generically important. Therefore, to be consistent, a new genus *Parapseudoceros* has been erected for the present species.

Genus *THYSANOZOON* Grube, 1840

DIAGNOSTIC FEATURES. Dorsal surface of body bears numerous papillae, into which intestinal diverticula may extend. Male copulatory complex single or double, closely posterior to pharynx.

Thysanozoon brocchii (Risso, 1818) Grube, 1840

Tergipes brocchi [sic] Risso, 1818

Eolidiceros brocchii (Risso) Quatrefages, 1845

LOCALITIES. Port Said, Suez Canal, 13.12.1924 (Palombi, 1928); 13°N, 15.4°W., Baie de Caballo, Rio de Oro, west coast of Africa, 2.11.1935 (Palombi, 1939); Shelly Beach, East London, Cape Province, South Africa. (Palombi, 1939); Algeria (Dieuzeide & Goeau-Brissonniere, 1951); South Africa, Cape Province: (from intertidal rocks, Richmond, 25.3.1939); among rocks in 18 metres, off Gordons Bay, False Bay, 25.6.1952; Jefferies Bay, between Still Bay and Port Elizabeth. (Day colln.) Known also from the Mediterranean, Borneo, Japan, Florida, Vietnam, New Zealand, Brazil, Caribbean and England.

DESCRIPTIONS. Lang, 1884:525; Kaburaki, 1918:48.

Thysanozoon cruciatum Schmarda, 1859

Thysanozoon (*Eolidiceros*) *cruciatum* Schmarda, 1859

Thysanozoon brocchi var. *cruciatum* (Schmarda) Laidlaw, 1906.

LOCALITY. Cape Verde Is. (Laidlaw, 1906,713.) Originally described from Australia and New Zealand.

DESCRIPTIONS. Schmarda, 1859, 30; Lang, 1884, 526; Stummer-Traunfels, 1895, 714 and 1933, 3550.

Thysanozoon discoideum Schmarda, 1859

LOCALITIES. East London, Cape Province, Dec.1960 (V. Gabie leg.); Bauli I., Tanzania (Stummer-Traunfels, 1895); Home Wood Beach, Port Elizabeth, Cape Province, South Africa (Palombi, 1938, 354). Originally described from Sri Lanka.

DESCRIPTIONS. Schmarda, 1859:29; Stummer-Traunfels, 1895:716.

Thysanozoon plehni Laidlaw, 1902

LOCALITY. Coral-reef, west shore of Inhaca I., Mozambique, 20.7.1962 (V. Gabie leg.) *T. plehni* originally described from Minikoi, Laccadive Is, Indian Ocean.

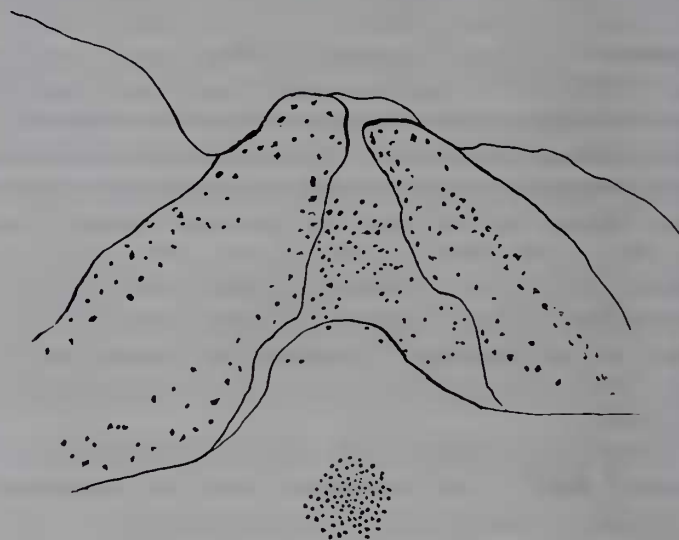


Fig.43 *Thysanozoon plehni*, tentacles and eye-clusters.

DESCRIPTION (Fig.43). Laidlaw, 1902:294. Two Inhaca specimens are available for study, one of which was the subject of a water-colour painting when alive. The other specimen is so fragmentary as to be of no use whatever. The painting shows the ground-colour of the dorsal surface of the body to be whitish and covered with numerous black papillae, which are concentrated above the median line and gradually becoming less numerous and smaller towards the margin of the body. Underlying gonads seen as small dark spots lying between the papillae. There is also a very narrow marginal band of deep pink. Body broadly oval, about 35 mm long and 30 mm wide. Marginal tentacles well developed and completely black. Single male genital pore. Male copulatory complex typically pseudocerotid in having no specifically diagnostic features, except perhaps a relatively long penis-stylet. Female copulatory complex again typical.

NOTE. In appearance, the above specimen resembles *Thysanozoon plehni* very closely. The ground-colour of Laidlaw's 'spirit specimen' is described as 'dull pale yellow'. Moreover, 'on the dorsal surface lie a considerable number of black, rather pointed papillae; the small marginal tentacles are also black.' The African specimen differs only in the

ground-colour of the body and in the presence of a narrow marginal band of pink. Nevertheless, the difference in ground-colour is negligible and the marginal band in the living worm was probably lost in the preserved specimen. Laidlaw makes an interesting observation concerning *T. plehni* for he states that:

'Whereas the gonopore is situated on the middle line, the penis with the penis-sheath lies very decidedly to one side of it, the right side. But the cavity of the [male] antrum is extended fairly equally to the right and to the left of the middle line. This peculiarity perhaps indicates that this species is descended from a form in which, as in some other species of *Thysanozoon*, the penis is paired, and that one of the pair, the left in this instance has disappeared leaving the right penis to open into the side of the antrum.'

This observation strengthens the present writer's view, mentioned above under the genus *Pseudoceros*, concerning the apparent unreliability of recognizing the single or double copulatory complexes as diagnostic features among species of pseudocerotid genera.

Family EURYLEPTIDAE Stimpson, 1857

DIAGNOSTIC FEATURES. Body with smooth or papillate dorsal surface, which may be highly coloured. Pair of anterior marginal tentacles, sometimes difficult to detect. Ventral sucker well developed, in mid-third of body. Cerebral eyes in two elongate clusters; tentacular eyes within or at base of tentacles. Mouth at anterior end of short pharyngeal chamber near cerebral organ; pharynx tubular or bell-shaped, directed anteriorly; intestinal trunk extends posteriorly, provided with paired lateral branches usually anastomosing. Testes ventral; ovaries dorsal. Genital pores between mouth and ventral sucker. Male copulatory complex simple, central or immediately posterior to pharynx. Vasa deferentia run anteriorly from hind region of body to open into well-developed seminal vesicle. Prostate rather small, independent; penis-papilla anteriorly directed, often with stylet enclosed in penis-sheath. Vagina short and simple. 'Shell'-chamber dilated and dorso-ventrally flattened. Uterine canals unbranched; open into proximal end of vagina and extend posteriorly to hind level of intestinal trunk; uterine vesicles may occur.

Key to euryleptid genera from African waters

1	Penis-stylet present	2
1'	Penis-stylet absent	<i>Laidlawia</i>
2	Intestinal branches terminating in marginal vesicles	<i>Cycloporus</i>
2'	Intestinal branches without terminal vesicles	3
3	Marginal tentacles lappet-like	4
3'	Marginal tentacles as small folds of body-margin or inconspicuous	<i>Stylostomum</i>
4	Lateral intestinal branches anastomosing ...	<i>Prostheceraeus</i>
4'	Lateral intestinal branches not anastomosing ..	<i>Oligocladus</i>

Genus *PROSTHECERAEUS* Schmarda, 1859

DIAGNOSTIC FEATURES. Elongate-oval forms with smooth dorsal surface, often strikingly marked. Well-developed

marginal tentacles with numerous eyes between and at their bases. Cerebral eyes in two clusters above the cerebral organ. Campanulate pharynx short; intestinal trunk long, with several pairs of lateral branches forming an anastomosing system. Penis-papilla with stylet. Uterine canals united posteriorly with uterine vesicles.

Prostheceraeus rubropunctatus Lang, 1884

LOCALITY. From bottom of lighter, Cape Verde Is (Laidlaw, 1906).

DESCRIPTION. Lang, 1884:56.

Prostheceraeus flavomaculatus Graff, in Saville-Kent, 1893

LOCALITY. Glorieuses Is, Northern Mozambique Channel (P. Bouchet *leg.*)

DESCRIPTION. This worm is available to the present writer only in colour-transparencies of the living animal. According to these, the ground-colour of the dorsal surface of the body is bluish black, amply spotted with yellow and bearing a whitish marginal band. The ventral surface is also bluish black, but without yellow spots. The anterior marginal tentacles bear the dorsal ground-colour and the whitish marginal band. In the mid-line, closely posterior to the tentacles, there is a pyriform clear space, presumably covering the cerebral organ and its eye-cluster. Information on the type-specimen of this species from Thursday I. on the Australian Great Barrier Reef is available only in a coloured picture of the living worm. The dorsal surface of this specimen is greenish blue, mottled with irregularly-shaped orange-coloured spots. There is also a wide marginal band of blue on which occur patches of yellow.

Prostheceraeus boucheti sp. nov.

LOCALITY. In 25 metres, south barrier-reef (13°04'S, 45°09'E), Mayotte, Comoro Is, northern Mozambique Channel, 27.3.1977, and in 10–20 metres, north reef, Mayotte, (12°35'S, 45°05'E), 30.3.1977 (P. Bouchet *leg.*) B.M.reg.no. 1984.10.16.1–2.

DESCRIPTION (Fig.44). Two specimens of this species are available, but they are badly fragmented. The body is oval and appears to measure 3.5 to 5 mm long and 2 to 3 mm wide. According to colour-transparencies of these worms when alive, the dorsal surface has a brownish ground-colour and a thin transparent margin enclosing a narrow band of yellow or greenish yellow. At about the junction of the anterior and middle thirds of the body, a large yellow spot lies in the median line. From this spot, a median reddish band extends to near posterior end of body, while a much narrower reddish band proceeds anteriorly from the yellow spot to near cerebral eye-cluster. Both median bands lie in area distinctly lighter than the remaining ground-colour of the dorsal surface. Ventral sucker central. Marginal tentacles as large lappets deeply pigmented with black, containing eyes, with further eyes between tentacles. Cerebral eyes in irregular cluster in one specimen, but inclined to form two elongate groups in the other. Both specimens are juvenile.

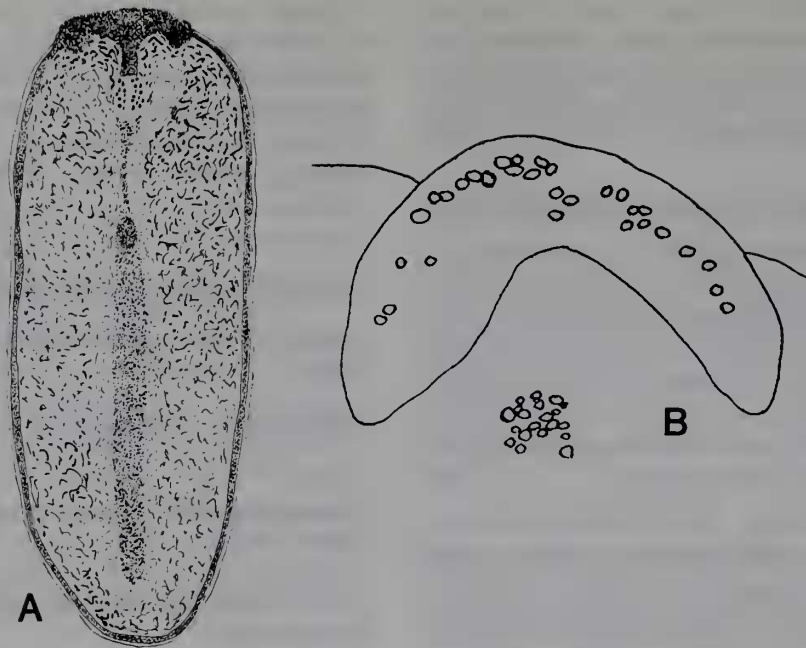


Fig. 44 *Prostheceraeus boucheti*: A, dorsal surface of body in life; B, tentacles and arrangement of eyes in preserved specimen.

Genus *CYCLOPORUS* Lang, 1884

DIAGNOSTIC FEATURES. Small oval forms with smooth or papillate dorsal surface. Small marginal tentacles with eyes in their bases and ventral surfaces. Cerebral eyes in two closely associated elongate clusters. Intestinal trunk extends to near posterior end of body, dividing into three branches anteriorly, median branch passing over cerebral organ; 6 to 10 pairs of lateral intestinal branches anastomose and terminate in small vesicles opening on margin of body. Vasa deferentia unite and immediately open into large seminal vesicle; prostate vertically disposed dorsally to male pore. Male antrum relatively deep; penis-papilla with stylet. Vagina narrow; uterine canals with vesicles.

Cycloporus papillosus (Sars, in Jensen, 1878) Bock, 1913

Thysanozoon papillosum Sars, in Jensen, 1878
Cycloporus papillosus Lang, 1884

LOCALITY. Non-papillate form under stones at low tide, Porto Praya, Cape Verde Is (Laidlaw, 1906). Known also from Scandinavia, United Kingdom, NW France, Mediterranean and Vietnam.

DESCRIPTIONS. Lang, 1884:568; Bock, 1913:262.

Genus *OLIGOCLADUS* Lang, 1884

DIAGNOSTIC FEATURES. Small oval forms with smooth dorsal surface. Pointed marginal tentacles, each with many eyes on ventral side. Cerebral eyes in two groups. Mouth anterior or ventral to cerebral organ; tubular pharynx well developed; intestinal trunk with 3 or 4 pairs of non-anastomosing lateral branches and extending to near posterior end of body, where it opens by a median dorsal pore. Male genital pore ventral to pharynx; vasa deferentia open independently into seminal vesicle lying dorso-posteriorly to male pore. Female genital complex ventral to hind region of pharyngeal chamber; uterine canals bear 1 to 4 pairs of vesicles.

Oligocladus sanguinolentus (Quatrefages, 1845) Lang, 1884

Proceros sanguinolentus Quatrefages, 1845

LOCALITY. Among nodules of nullipores, dredged in 5 to 10 metres in St Vincent Harbour, Cape Verde Is (Laidlaw, 1906). Known also from Scandinavia, United Kingdom, NW France and Mediterranean.

DESCRIPTIONS. Lang, 1884:580; Bock, 1913:267.

Genus *STYLOSTOMUM* Lang, 1884

DIAGNOSTIC FEATURES. Small elliptical forms, usually broader posteriorly. Tentacles small or inconspicuous. Cerebral and tentacular eye-clusters usually with few eyes. Mouth and genital pore may form a common antrum. Intestinal trunk with up to 6 pairs of lateral branches, which ramify and may anastomose. Male copulatory complex central or anterior to pharynx; with penis-stylet. Female complex ventral to hind region of pharynx; uterine canals form H-shaped figure with uterine vesicles.

Stylostomum ellipse (Dalyell, 1853) Lang, 1884

LOCALITY. Near lighthouse, Cape Town, South Africa (Bock, 1913). Known also from Scandinavia, United Kingdom, Mediterranean, Falkland Is., South Georgia and Tierra del Fuego.

DESCRIPTIONS. Lang, 1884:584; Bock, 1913:270.

Genus *LAILAWIA* Herzig, 1905

DIAGNOSTIC FEATURES. Small oval forms with inconspicuous marginal tentacles or difficult to make out. Eyes few. Intestinal trunk with 6 or 7 pairs of non-anastomosing lateral branches and an unpaired anterior branch. Penis-papilla in penis-sheath, but without stylet. Uterine canals unite posteriorly to form a large vesicle opening on dorsal surface

of body. Posterior to female complex, uteri connected by transverse canal opening into genito-intestinal canal. Near opening of transverse connection, each uterine canal has a large vesicle.

***Laidlawia polygenia* Palombi, 1938**

LOCALITY. Under stones at Oudekraal, Cape Province, South Africa (Palombi).

DESCRIPTION. Palombi, 1938:360.

Family **PROSTHIOSTOMIDAE** Lang, 1884

DIAGNOSTIC FEATURES. Elongate or oval forms without tentacles. Ventral sucker usually present. Eyes marginal or submarginal, disposed anteriorly or in a continuous series round body; additional eyes in two elongate cerebral clusters or scattered fanwise anteriorly from cerebral organ. Mouth at anterior end of pharyngeal chamber, immediately posterior to cerebral organ. Muscular tubular pharynx directed anteriorly; intestinal trunk extends from pharynx to posterior region of body, with several pairs of non-anastomosing lateral branches. Genital pores separated, between pharynx and ventral sucker. Vasa deferentia originate in posterior half of body and extend anteriorly to open independently into a large muscular seminal vesicle lying between pair of accessory vesicles. Ejaculatory duct and ducts from accessory vesicles open into penis-papilla, bearing a strong stylet, in penis-sheath. Numerous unicellular glands open into lumen of penis-pocket. Vagina short, simple, looped anteriorly, without Lang's vesicle; 'shell'-chamber enlarged and dorso-ventrally compressed. Uterine canals form H-shaped figure with transverse limb opening into proximal end of vagina.

Key to prosthiostomid genera from African waters

- 1 Muscular sheath enclosing male accessory vesicles *Lurymure*
- 1' Male accessory vesicles not enclosed in muscular sheath *Prosthiostomum*

Genus **PROSTHIOSTOMUM** Quatrefages, 1845

DIAGNOSTIC FEATURES. Elongate or ribbon-like forms, broadly rounded or truncate anteriorly, gradually narrowing posteriorly. Cerebral eyes in one or two elongate clusters; marginal eyes variable, more often disposed in two or three irregular rows anteriorly. Intestinal trunk with unpaired anterior branch lying dorsally to pharynx. Male accessory vesicles not enclosed in muscular sheath.

***Prosthiostomum capense* Bock, 1931**

LOCALITY. Simon's Town, Cape Province, South Africa.

DESCRIPTION. Bock, 1931:296.

***Prosthiostomum dohrnii* Lang, 1884**

LOCALITY. Among nullipores at low tide and in about 18 metres, St Vincent Harbour, Cape Verde Is (Laidlaw, 1906). Known also from the Mediterranean.

DESCRIPTION. Lang, 1884:601.

***Prosthiostomum siphunculus* (delle Chiaje, 1828) Lang, 1884**

Planaria siphunculus delle Chiaje, 1828.

LOCALITY. Dredged in 20 metres off Meteor Reef, Gulf of Tadjourrah, Djibouti, 26.2.1904 (Meixner, 1907); Still Bay, Cape Province, South Africa, 5.1.1932 (Palombi, 1936); on algae, eastern harbour, Alexandria, Egypt (Steinböck, 1937); Port Etienne, Mauritania (de Beauchamp, 1951); known also from the Mediterranean, Black Sea, NW France, United Kingdom and Vietnam.

DESCRIPTION. Lang, 1884, 595; Palombi, 1936, 31; Lang, 1884, 595.

***Prosthiostomum lineatum* Meixner, 1907**

LOCALITY. On Porites, Musha I., Gulf of Tadjourrah, Djibouti.

DESCRIPTION. Meixner, 1907:482.

***Prosthiostomum* sp.innom. of Laidlaw (1906)**

LOCALITY. From nullipore on Bird Rock, St Vincent Harbour, Cape Verde I.

DESCRIPTION. Laidlaw, 1906:714.

Genus **LURYMURE** du Bois-Reymond Marcus & Marcus, 1968

DIAGNOSTIC FEATURE. Differs from *Prosthiostomum* only in having the two male accessory vesicles bound in a muscular envelope.

NOTE. The validity of *Lurymure* as a genus appears to be uncertain. The present writer has found that in not fully developed specimens of *Prosthiostomum delicatum*, the accessory vesicles are quite independent of one another, but in fully mature specimens they are bound together by a muscular envelope. There is a suggestion of a similar condition in *Prosthiostomum purum*, as described by Kato (1937b). This gives rise to the question of whether or not *Lurymure* is really a late stage in the development of *Prosthiostomum*.

***Lurymure delicatum* (Palombi, 1939) du B.-R. Marcus & Marcus, 1968**

Prosthiostomum delicatum Palombi, 1939

LOCALITIES. East London, Cape Province, South Africa, 25.7.1937 (Palombi). On vertical rock in 0–4 metres below LWST, Oatland Pt, False Bay; among rocks and stones in 9 metres, Algoa Bay, 6.4.1954; among rocks in 18 metres off Gordon's Bay False Bay 25.6.1952; in 7–9 metres, Fish Hoek Bay; on sandy bottom in 24 metres, 34°10'S, 18°27.5'E, False Bay; on rocks nr Seal I., False Bay, 22.2.1952—Cape Province, South Africa. (Day colln.)

DESCRIPTION. Palombi, 1939:135.

NOTE. In several specimens examined by the present writer and assigned to *L. delicatum* variations in the number of eyes

are plainly visible. In the single specimen described by Palombi, there are 72 marginal eyes and 35 cerebral eyes, the latter divided into two groups, 17 in one and 18 in the other. In the present material, the number of marginal eyes varies from 35 to 110 and cerebral eyes 15 to 27 in each group. In most specimens there is a pair of precerebral ventral eyes, but in the remainder only one such eyes may be present. The specimen from off Gordon's Bay is said to have been 'pale fawn, blue eye-spots'.

***Lurymure drygalskii* (Bock, 1931) du B.-R. Marcus & Marcus, 1968**

Prothiostomum drygalskii Bock, 1931.

LOCALITIES. Cape Province, South Africa. (Simonstown Bay—Bock, 1931); (among coarse shell in 20 metres, Saldanha Bay; dredged on sand and shell substratum in 26 metres, 34°07'S, 18°36'E, False Bay, 30.2.1964—Day colln.); (Eylath, Gulf of Aqaba, 4.5.1955—H. Steinitz leg.).

DESCRIPTION (Fig.45). Bock, 1931:298.

NOTE. The main feature of this species is the small number and disposition of the cerebral eyes.



Fig.45 *Lurymure drygalskii*, arrangement of eyes.

***Lurymure russoi* (Palombi, 1939) du B.-R. Marcus & Marcus, 1968**

Prothiostomum russoi Palombi, 1939

LOCALITIES. Cape Province, South Africa. (Shelley Beach, East London—Palombi, 1939); ('on mixed bottom' in 4.5–5.5 metres below LWST., Oatland Pt., False Bay—Day colln.); on shell and rock in 42 metres, 25°57'S, 33°02'E., Mozambique—Day colln.).

DESCRIPTION. Palombi, 1939a:141.

NOTE. The large tubular pharynx appears to be the main feature of this species.

***Prothiostomum* (s.1.) *capense* Bock, 1931**

LOCALITY. Simonstown Bay, Cape Province, South Africa.

DESCRIPTION. Bock, 1913:296.

GLOSSARY

adhesive organ: muscular sucker, or adhesive pad or depression on ventral surface of body.

atrium: chamber receiving openings of two or more organ-systems.
bursa copulatrix: bulbous muscular organ opening into vagina externa.
cerebral organ or '*brain*': a globular or bilobed mass of nerve-tissue in cephalic region of body.
cirrus: male copulatory organ capable of protruding (everting) by turning inside out.
cirrus-sac: cavity lined with hooks and spines which cover surface of cirrus when everted.
common sperm duct: canal uniting vasa deferentia with seminal vesicle.
ductus communis: duct formed by union of prostatic duct and ejaculatory duct.
ductus vaginalis: continuation of inner region of vagina after receiving uterine duct to open either to exterior or into vagina externa.
ejaculatory duct: canal passing sperm from vasa deferentia to exterior during sexual union; often modified to include seminal vesicle, prostate and intromittent organ.
eyes: small dark spots arranged in groups, as: *cerebral* eyes, when lying over or alongside cerebral organ; *frontal* eyes, when strewn over cephalic region of body; *marginal* eyes, when occurring along body margins; *submarginal* eyes in a row well separated from body margin; *tentacular* eyes lying in or around tentacles, or where tentacles would be, if present.
female antrum (vagina externa): distal region of vagina opening to exterior.
female copulatory complex: includes Lang's vesicle, if present, vagina externa, vagina media and vagina interna.
genital pores: openings of male and female copulatory complexes to exterior.
genito-intestinal canal: canal connecting vagina with intestinal trunk.
independent prostate: vesicular appendage of ejaculatory duct not conveying sperm.
interpolated prostate: modified part of ejaculatory duct, variously developed through which sperm pass during sexual union.
intestinal trunk: central tube in median line with lateral branches ramifying to body-margins.
intromittent organ: see penis-papilla and cirrus.
Lang's vesicle: variously developed blind terminus of vagina interna.
male antrum (antrum masculinum): space between male genital pore and intromittent organ.
male copulatory complex: consists of seminal vesicle, prostate and intromittent organ.
mouth: ventral, opens into pharyngeal chamber containing pharynx.
penis-papilla: muscular cone at end of male system projecting from roof of male antrum.
penis-pocket: inner chamber of male antrum enclosing penis-papilla.
penis-sheath: conical projection separating inner and outer chambers of male antrum.
pharynx: ruffled, bell-shaped or tubular fold of muscular tissue lying in pharyngeal chamber.
pharyngeal chamber or *buccal cavity*: contains pharynx.
prostate: (independent).
prostate: (interpolated).
prostatoid: pyriform musculo-glandular organ lying in parenchyma and opening into male antrum or on ventral surface of body.
seminal vesicle: muscular organ storing sperm.
'shell'-chamber (*vagina media*): part of vagina receiving secretion from investing 'shell'-glands.
spermiducal bulb or *vesicle*: distal part of vas deferens swollen and muscular.
tentacles: dorsal projections on body surface in cerebral region (nuchal tentacles) or folds of anterior margin of body (marginal tentacles).
uterine canals: two tubes lying alongside pharynx and receive eggs from oviducts.
vagina bulbosa: highly muscular female antrum.
vagina externa = female antrum.

vagina interna = proximal part of vagina into which uterine canals open.

vagina media = 'shell'-chamber.

vasa deferentia: sperm-canals linking vasa efferentia and ejaculatory duct.

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